Combined Impact Assessment and Ex Ante Evaluation of the Review of the LIFE+ Regulation: Options Development

Options Report
Volume 1: Options Development

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A report submitted by GHK Consulting

in association with

Arcadis, IEEP and Milieu

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1 Purpose and outline approach to the assessment

1.1 Purpose and requirements of the assessment

The overall purpose of the study is to assist the Commission in carrying out a combined ex-ante evaluation of the existing financing instrument LIFE+ and an Impact Assessment of different options for the development of a new financial instrument focusing exclusively on the environment. Throughout this report, the scope of a specific instrument for the environment extends to all environmental issues, *including climate action*. As such, when referring to the environmental acquis, this refers to all environmental legislation for the environment, including climate.

It will provide advice on whether to replace, modify or continue the existing LIFE[1]+ Regulation, or whether to cease to have such an instrument. The current uncertainty over the forthcoming financial perspectives for the period post 2013, as well as the future development of alternative instruments, needs to be taken into account through appropriate risk assessments.

The study has therefore to support the Commission through the standard steps of Impact Assessment:

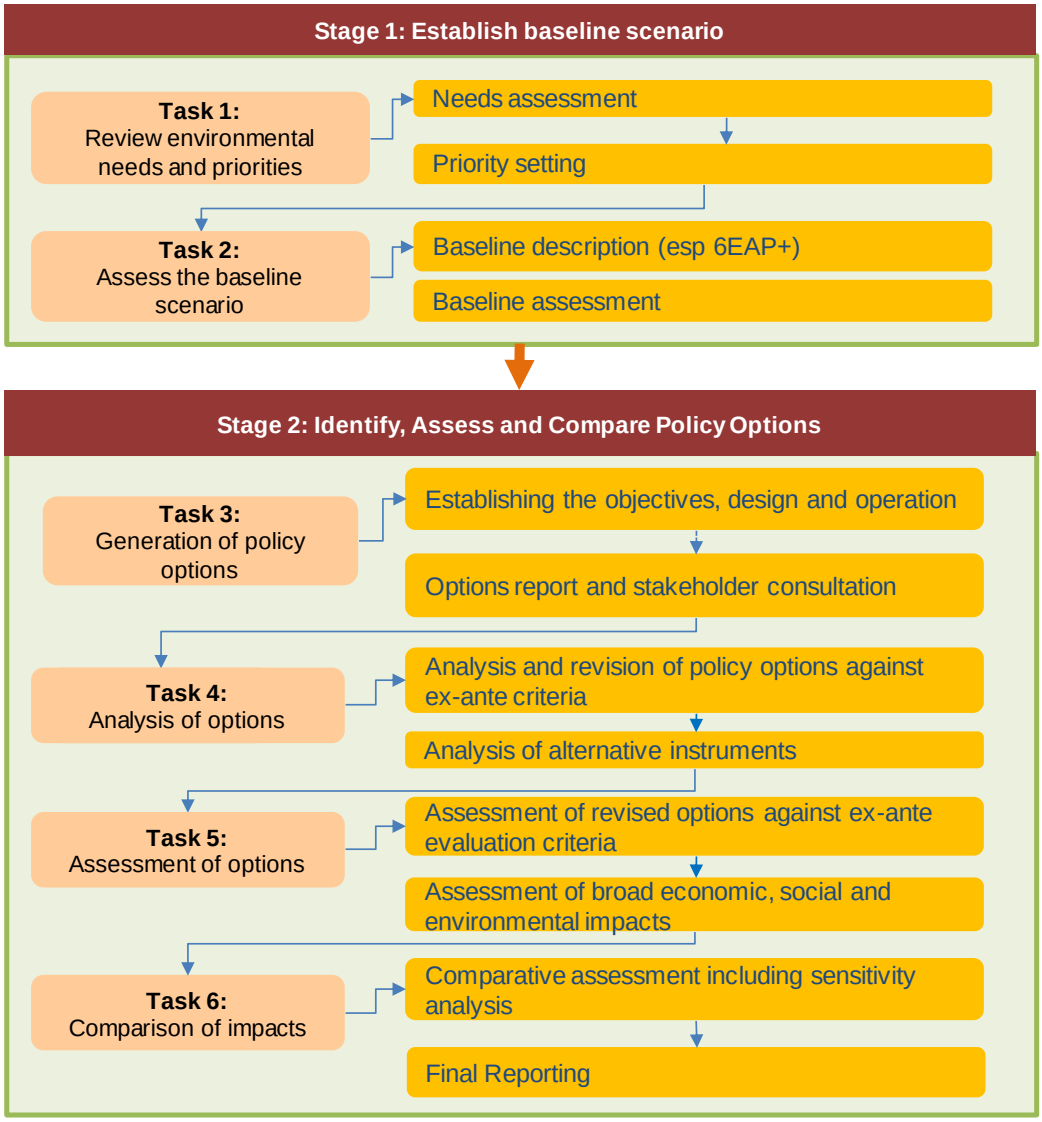
1. identifying the problems and needs to be addressed (and baseline scenario);
2. indicating the potential EU added value and rationale;
3. specifying policy objectives, developing policy options;
4. assessing options using agreed criteria; and
5. elaborating on the preferred option

Figure 1.1 provides an overview of how these steps are linked to the different activities to be undertaken as part of the assessment. The respective volume 1 of the options report focuses on task 1 to 3 (options development), whereas volume 2 addresses steps 4 to 6 (options assessment).

Both reports contain preliminary information and estimates which are not endorsed by the Commission and serve an illustrative purpose.

[1] LIFE ("L'Instrument Financier pour l'Environnment"/ the financing instrument for the environment)

Table 1.1 Requirements of the Assessment



1.2 Method of approach

1.2.1 Description of Method

The method of completing the work programme is summarised in Table 1.1.

Table 1.2 Summary of method of approach

Steps	Methods
Task 1 – Review of environmental needs and priorities	
Step 1.1: Assessment of Environment Problems	▪ Desk research and literature review, building on draft SOE Assessment ▪ Interviews with key actors ▪ Analysis of drivers, pressures, state, impact, response

Step 1.2: Review of Strategic Perspectives	▪ Consultation with Commission Services and other stakeholders to establish overview of policy needs and future relevance of the LIFE+ Regulation
Step 1.3: Scaling the Cost of the Problem	▪ Analysis of the existing evidence on the cost of environmental problems ▪ Further development of COPI methods for key domains
Step 1.4: Description of Alternative Themes	▪ Considerations of potential interventions based on the range of identified problems and policy needs
Step 1.5: Review of Priorities	▪ Survey of stakeholder views on the relative significance of identified needs and related interventions
Task 2 – Assessment of the baseline scenario	
Step 2.1: Description of the Regulation	▪ Summary of the intervention logic, design and operation of the LIFE+ Regulation
Step 2.2: Update of 6EAP	▪ Review of existing analyses relating to the follow-on of the 6th Environment Action Programme (6EAP), based on existing work and consultations
Step 2.3: Update Complementary Analysis	▪ Update of mid-term evaluation (MTE) complementary analysis using additional desk research and consultations
Step 2.4: Assessment of Current Regulation Impacts	▪ Assessment of the likely outputs and impacts of the LIFE+ Regulation ▪ Primary survey research with Commission Services and Project Co-ordinators
Step 2.5: Sensitivity of Results to Minor Changes	▪ Review and adjustment of the impacts to reflect possible changes in the Regulation as the baseline scenario
Step 2.6: Integration of IA with Ex ante Evaluation	▪ Assessment of the baseline scenario using the assessment of likely impacts and evidence from the MTE
Task 3 – Generation of policy options	
Step 3.1: Review of Exemplars	▪ Review of experience by MS and other countries to implement financial instruments for the environment

Step 3.2: Development of Intervention Logics and Objectives	▪ Initial development of interventions and the related logic, including the specification of objectives ▪ Brainstorm workshop to review and revise intervention logics and to ensure clarity in policy objectives
Step 3.3: Detailed Option Design and Operation	▪ Development of options with reference to the various dimensions including intervention levels and delivery systems
Step 3.4: Review and Expansion of IA Criteria	▪ Elaboration of assessment criteria on the basis of identified policy objectives to be used in IA and any other particular matters identified as important by the Steering Group
Step 3.5 Draft Options Report	▪ Presentation of alternative policy options with supporting justification
Step 3.6: Steering Group Meeting	▪ Presentation and discussion of policy options
Step 3.7: Stakeholder Consultation on Draft Options	▪ Circulation for comment to agreed stakeholders
Step 3.8: Conclusions and Lessons from Stakeholder Responses	▪ Collation and analysis of stakeholder responses ▪ Stakeholder meeting
Task 4: Analysis of Options	
Step 4.1: Operation of the Options	▪ Further data collection and review of alternative delivery and implementation systems
Step 4.2: Analysis of Costs	▪ Further analysis of the scale of environmental problems
Step 4.3: Analysis of Impacts	▪ Further analysis of the possible environmental, economic and social impacts
Step 4.4: Analysis of alternative instruments	▪ Further analysis of possible complementary instruments
Task 5 – Detailed assessment of policy options	
Step 5.1: Assessment of the individual policy options	▪ Review of findings from the analysis of relevant national, Commission and Council

Step 5.2: Brainstorming workshop to review the assessments of the policy options	documents ▪ Review of findings from interviews and case studies with key stakeholders at EU level, as well as other important players and national authorities ▪ Brainstorming with DG ENV and other actors considered useful ▪ Discussions and validation with the Steering Group.
Task 6 – Comparison of the policy options	
Step 6.1: Comparison of the policy options	▪ Comparison of options on the basis of the individual assessments ▪ Analysis of alternative MS interventions ▪ Discussions and validation with the Steering Group.
Step 6.2: Assessment and consideration of proportionality and EU added value	
Step 7.1: Conclude on preferred option	▪ Conclude on preferred option
Step 7.2: Ex-ante evaluation of preferred option (previously 5.3)	▪ Integration of impact assessment with the ex ante evaluation criteria to provide the ex ante evaluation of the preferred option
Step 7.3: Assessment of efficiency of preferred option	▪ Includes assessment of the efficiency of management options
Step 7.4: Final Reporting and Meeting with Steering Group	▪ Presentation of the Draft Final Report and discussions with Steering Group ▪ Submission of Final Report

1.3 Structure of the report – Volume 1

Section 2: EU policy interest and legal obligations

Section 3: Problem definition

Section 4: Scale of the problem

Section 5: Institutional drivers of environmental problems

Section 6: Rationale and EU added value of an instrument for the environment

Section 7: Defining the policy objectives

Section 8: Choices for a future financial instrument for the environment

Section 9: Description of the instrument options

2 The European Union has a strong policy interest and legal right (obligation) to secure environmental protection

This section details the EU policy interest and legal right to act with regard to environmental protection. It summarises the Treaty on the Functioning of the European Union, the Cardiff Process, international conventions and the subsidiarity principle as these aspects relates to environmental action. It also briefly describes the EU policy frameworks which promote environmental protection, and the budgetary framework for a specific instrument for the environment.

2.1 The EU right to act

The constitutional basis of the European Union consists of two Treaties: the Treaty on European Union (TEU) which was originally signed in 1992 and entered into force in 1993, and the Treaty on the Functioning of the European Union (TFEU), originally named Treaty establishing the European Community, signed in 1957 and entered into force in 1958. The TEU and the TFUE were consolidated in 2008 into the Lisbon Treaty.[2] All European legislation, including any financial instruments, must have an explicit legal basis in one or more articles of the TEU or TFEU[3].

2.1.1 The Treaty on the Functioning of the European Union (TFEU)

The European Union's environmental objectives are enshrined in the Environmental Title (Title XX, Articles 191 to 193) of the TFEU. The most common legal basis for environmental legislation is Article 192 of the TFEU which empowers the European Parliament and the Council to decide what action should be taken by the Union in order to achieve the environmental objectives which are set out in Article 191 of TFEU. The Lisbon Treaty in particular strengthened the emphasis on climate action by making combating climate change an explicit part of the environmental objectives.

The Treaty on the Functioning of the European Union: Article 191[4]

1. Union Policy on the environment shall contribute to the pursuit of the following objectives:

   - preserving, protecting and improving the quality of the environment
   - protecting human health,
   - prudent and rational utilisation of natural resources,
   - promoting measures at international level to deal with regional or worldwide environmental problems, and in particular combating climate change.

2. Union policy on the environment shall aim at a high level of protection taking into account the diversity of situations in the various regions of the Union. It shall be based on the precautionary principle and on the principles that preventive action should be taken, that environmental damage

[2] European Commission (2008) Consolidated versions of the Treaty on European Union and the Treaty on the Functioning of the European Union (2008/C 115/01). Available from: http://www.ecb.int/ecb/legal/pdf/fxac08115enc_002.pdf

[3] The TEU and TFEU were most recently amended by the Lisbon Treaty. The Lisbon Treaty was signed by the EU Member States on 13 December 2007 and entered into force on 1 December 2009. As a result of one of the Lisbon Treaty amendments, the former Treaty establishing the European Community was renamed as the Treaty on the Functioning of the European Union (TFEU).

[4] Formerly Article 174 of Treaty establishing the European Community.

should as a priority be rectified at source, and that the polluter should pay.

In this context, harmonisation measures answering environmental protection requirements shall include, where appropriate, a safeguard clause allowing Member States to take provisional measures, for non-economic environmental reasons, subject to a procedure of inspection by the Union.

3. In preparing its policy on the environment, the Union shall take account of:

- available scientific and technical data,
- environmental conditions in the various regions of the Union,
- the potential benefits and costs of action or lack of action,
- the economic and social development of the Union as a whole and the balanced development of its regions.

4. Within their respective spheres of competence, the Union and the Member States shall cooperate with third countries and with the competent international organisations. The arrangements for Union cooperation may be the subject of agreements between the Union and the third parties concerned.

Article 114 of the TFEU[5] (Chapter 3) provides further legal basis for environmental legislation when the legislation concerns measures for the establishment and functioning of the internal market. Article 114 has been used for some chemicals legislation, packaging requirements and emission controls for motor vehicles. Under Article 114(3), the Commission when proposing measures concerning the environment must take a high level of protection as a base when proposing measures concerning the environment.

The key difference is that for measures based on Article 191, Member States can put in place higher standards, but for internal market measures based on Article 114 of TFEU, Member States must harmonise. Although these are the key foundations, other legal bases for environmental legislation in the EU also exist.

2.1.2 The Cardiff Process – an EU framework for environmental integration

Article 11 of the TFEU[6] sets out the integration principle which provides that:

'Environmental protection requirements must be integrated into the definition and implementation of the Union's policies and activities, in particular with a view to promoting sustainable development'.

This principle seeks to apply environmental considerations across all policy areas. The aim is to avoid otherwise contradictory policy objectives that result from a failure to take into account environmental protection or resource conservation goals.

In 1998, the European Council took action to give practical application to the then Article 6, by requesting different Council formations to prepare strategies and programmes aimed at integrating environmental considerations into their policy areas, starting with energy, transport and agriculture. This was the launch of what has become known as the 'Cardiff process[7].'

In September 2002, the entry into force of the Commission's 6th Environment Action Programme (6EAP) put renewed emphasis on the importance of environmental integration.

The process now embraces nine sectors (also covering industry, internal market, development, fisheries, General Affairs and economic and financial affairs), all of which have adopted integration strategies.

[5] Formerly Article 95 of Treaty establishing the European Community.

[6] Formerly Article 6 of the Treaty establishing the European Community.

[7] COM (1998) 333 final, Commission Working Document, "Partnership for integration. A Strategy for integrating environment into EU policies".

In 2004, the Commission published a report evaluating the progress which had been made in integrating environment into these nine sectors. It concluded with a finding of mixed results. In terms of the positive outcomes, it cited examples of improvements in some sectors such as the Commission's initiatives on renewable energy and energy efficiency, the 2003 and 2004 CAP reform and more generally to the overall raised profile of environmental integration. However, in terms of weaknesses, it noted the lack of consistency in efforts from one sector to another, lack of real commitment in certain Council formations and the fact that many sector strategies failed to clearly identify priority areas where focussed actions could make a difference[8].

2.1.3 International conventions

Under Article 216(2) of the TFEU, international agreements concluded by the Union are binding upon the institutions of the Union and on its Member States. The European Union is party to many international conventions in all of the typical environmental sectors:[9]

- **Water -** various agreements are in place to protect specific seas from pollution, including the Helsinki Convention on the Baltic Sea, the Bonn Convention for the North Sea, the Barcelona Convention for the Mediterranean, the Lisbon Convention for the protection of coasts/waters of North East Atlantic and the Danube Convention.
- **Waste -** the Basel Convention has governed transboundary movements of hazardous waste in the EU since 1994;
- **Nature -** the Convention on Biological Diversity (CBD) has been in force for the EU since 1994 and the Cartagena Protocol on biosafety to the biodiversity convention has been in force since 2003; additional commitments relate to the Convention on international trade in endangered species (CITES) or Convention on the conservation of European wildlife and natural habitats (Bern Convention);
- **Air and industrial emissions** - noteworthy agreements are the UN-ECE Long-range transboundary air pollution convention, the Montreal Protocol to the Convention for the Protection of the Ozone Layer on Substances that deplete the Ozone Layer and the Convention on Transboundary Effects of Industrial Accidents;
- **Chemicals** - the EU is party to the Stockholm Convention on persistent organic pollutants and the Rotterdam Convention on prior informed consent.
- **Climate change** - the EU is party to the Framework Convention on Climate Change and also to the later Kyoto Protocol; and
- **Cross-cutting** - the EU is a party to the Aarhus Convention on access to environmental information, public participation in environmental decision-making and access to justice and also the Espoo Convention which looks at environmental impact assessment in a transboundary context[10].

2.1.4 Considerations of the subsidiarity principle

Under Article 4(2)e of the TFEU, the environment is an area of EU policy that is subject to shared competence between the EU and its Member States, meaning that the Union and Member States can both legislate and adopt legally binding acts. Since the Union does not have exclusive competence in the area of environmental policy, the principles of subsidiarity and proportionality apply.

[8] COM (2004) 394 final, Commission Working Document, 'Integrating environmental considerations into other policy areas – a stocktaking of the Cardiff process'

[9] The list is not exhaustive.

[10] This section is not intended to provide a comprehensive listing of all of the international agreements to which the EU is a party but rather to give examples of some of the most noteworthy agreements.

The principle of subsidiarity is set out in Article 5 of the TEU:

"*Under the principle of subsidiarity, in areas which do not fall within its exclusive competence, the Union shall act only if and in so far as the objectives of the proposed action cannot be sufficiently achieved by the Member States, either at central level or at regional and local level, but can rather, by reason of the scale or effects of the proposed action, be better achieved at Union level*".

The application of the subsidiarity principle is to ensure that within the EU, interventions are taken at the most appropriate level to achieve the policy objectives and to address the problems inherent in the particular situation.

The proportionality principle is closely related. However, it looks at the intensity of EU legislation. It requires that the content and form of any Union action should not exceed what is necessary to achieve the objectives of the Treaties.

2.2 Strategic EU policy frameworks

There are several EU strategic policy frameworks which act to promote environmental protection. This section provides an overview of the EU Sustainable Development Strategy (SDS), the Lisbon Strategy and the Europe 2020 strategy.

2.2.1 The EU Sustainable Development Strategy (SDS)[11]

Sustainable development became a fundamental objective of the EU in 1997, when the principle was included in the Treaty of Amsterdam as an overarching objective of EU policies. The first EU SDS was launched in 2001 at the Gothenburg Summit. The strategy consisted of two main approaches. The first was to tackle key unsustainable trends, whilst the second attempted to ensure that EU economic, social and environmental policies are mutually reinforcing. As part of this endeavour, the Commission was obligated to submit each new major policy proposal to an Impact Assessment.

In 2006, the SDS was revised in light of continuing unsustainable trends, despite some important achievements. The revised SDS is designed to have a stronger focus, a clearer division of responsibilities, broader ownership and support, better integration of the international dimension and more effective implementation and monitoring.

The renewed SDS sets out a single, coherent strategy, recognising the need to gradually change the EU's current unsustainable consumption and production patterns and move towards a better integrated approach to policy-making. Importantly, it reaffirms the need for global solidarity and recognises the importance of strengthening cooperation with partners outside the EU given the significant impact that rapidly developing countries will have on global sustainable development.

The SDS stresses the importance of education, research and public awareness for facilitating the transition to more sustainable production and consumption patterns. In order to meet its overarching goals, the SDS identifies and develops actions, setting down overall objectives and concrete actions across seven key priority challenges:

- Climate change and clean energy
- Sustainable transport
- Sustainable consumption & production
- Conservation and management of natural resources
- Public Health

[11] Content adapted from the European Commission's website on Sustainable Development (Available from: http://ec.europa.eu/environment/eussd/)

- Social inclusion, demography and migration
- Global poverty and sustainable development challenges

Key overarching aspects of the SDS are the efficient management and use of resources, the recognition of the important role that ecological and social innovation can play in the EU's economy and the need for a more integrated and coordinated approach to policy making (both through EU's internal and external policies).

2.2.2 Lisbon Strategy

The adoption in Göteborg of the strategy for sustainable development enabled an environmental dimension to be incorporated into the Lisbon strategy.

The Lisbon Strategy launched structural reforms in the fields of employment, innovation, economy, social cohesion and environment through direct actions promoting the scientific research, education, vocational training, ICT accessibility, jobs improvement and environmental sustainability. The Lisbon Strategy rests on three main pillars. The environment is a pillar in its own right, alongside economic and social considerations:

- Economic pillar - Preparing the ground for the transition to a competitive, dynamic, knowledge-based economy. Emphasis is placed on the need to adapt constantly to changes in the information society and to boost research and development.
- Social pillar - Modernising the European social model by investing in human resources and combating social exclusion. The Member States are expected to invest in education and training, and to conduct an active policy for employment, making it easier to move to a knowledge economy.
- Environmental pillar - Decoupling economic growth from the use of natural resources, added at the Göteborg European Council meeting in June 2001.

The environmental pillar was added at the Göteborg European Council meeting in June 2001 and stresses that economic growth must be decoupled from the use of natural resources. However, in 2003 the European Trade Union Confederation (ETUC) suggested that shortcomings in delivery were clearly apparent. The Executive Committee of ETUC drew attention in particular to the failure to balance the three policy strands, with economic objectives taking priority over social and environmental progress.

During the Environment Council of 2004 the Dutch Presidency of the EU launched a dialogue aimed at setting up a partnership among different stakeholders at EU level (EU Commission, Member States, business organisations, and environmentalists) in order to achieve a 'Clean, Clever and Competitive Europe' and initiate a dialogue to identify ways of improving the production and the dissemination of eco-efficient technologies in the EU. This was seen as an important way to achieve the Lisbon targets related to the achievement of sustainable economic growth.

The European Council of March 2005 relaunched the Strategy by refocusing its priorities on economic growth and employment, while acknowledging the continuing relevance of the social and environmental pillars. The Strategy was therefore refocused on promoting knowledge and innovation, making the EU an attractive area to invest and work in, fostering growth and employment based on social cohesion, and promoting sustainable development. Lisbon structural indicators related to the environment fall under the following categories:

- Greenhouse gas emissions
- Energy intensity of the economy
- Volume of freight transport relative to GDP

2.2.3 Europe 2020 Strategy

The EU2020 Strategy replaced the Lisbon Strategy when it was adopted in June, 2010 as Europe's new strategy for sustainable growth and jobs. The strategy is now the centrepiece of the Commission's mandate, aiming to enhance policy synergies and, at the same time, reinforce the European integration process by offering a stronger vision and governance model.[12] It has three broad thematic objectives:

- creating value through knowledge;
- empowering people in inclusive societies; and,
- creating a competitive, connected and greener economy.

Innovation and green growth thus underpin its objective to re-establish the competitiveness of the EU economy.[13] The strategy establishes five quantitative 'headline' targets to be adopted at national level:

- Raising the employment rate of the population aged 20-64 from the current 69% to 75%
- Raising the investment in R&D to 3% of the EU's GDP
- Meeting the EU's 2020 objectives to cut greenhouse gas emission by 20% and source 20% of its energy needs from renewable sources
- Reducing the share of early school leavers from the current 15% to under 10% and making sure that at least 40% of youngsters have a degree or a diploma
- Reducing the number of Europeans living below the poverty line by 25%, lifting 20 million out of poverty from the current 80 million.

The first three targets had already been included in the Lisbon strategy. However, the targets related to education and social objectives are new. This is a considerable step, given that policies in these domains are traditionally considered competences that should remain at national (and sometimes regional) level. Further detailed targets are to be set in the near future, including the submission by Member States of stability and convergence programmes, as well as national reform programmes.[14]

The strategy also includes 9 EU flagship initiatives proposed by the Commission, of which two are particularly relevant to environmental policy:

- A 'Low-carbon, resource efficient Europe'; and,
- 'Clean and efficient energy'.

Concrete policy initiatives under these flagships include a long-term roadmap for low-carbon energy systems by 2050 and the adoption of a revised Energy Efficiency Action Plan. Eco-innovation and resource efficiency therefore play a strong role in the strategy. The strategy recognises that new greener technologies can stimulate growth, create new jobs and simultaneously help the EU meet climate change goals. National and EU level policies to address these aspects should include emission trading, tax reform, subsidies and loans, public investment and procurement and targeting of research and innovation budgets.

[12] The EU 2020 Strategy: Analysis and Perspectives (2010). Available from: http://www.cultureactioneurope.org/lang-en/component/content/article/41-general/597-the-eu-2020-strategy-analysis-and-perspectives

[13] Europa Press Release RAPID (2009) Commission launches consultation on EU 2020: a new strategy to make the EU a smarter, greener social market. Available from: http://europa.eu/rapid/pressReleasesAction.do?reference=IP/09/1807

[14] The EU 2020 Strategy: Analysis and Perspectives (2010). Available from: http://www.cultureactioneurope.org/lang-en/component/content/article/41-general/597-the-eu-2020-strategy-analysis-and-perspectives

Increasing innovation capacity, new technologies, skills, fostering entrepreneurship and "internationalising" SMEs will also play an important part in a new industrial policy for Europe.[15] The strategy recognises the importance of market-based instruments (e.g. emissions trading in the fight against climate change) and proposes to prioritise the revision of energy taxation and public procurement rules at EU level.[16]

Under the strategy, it is also expected that the Commission will propose a major plan for upgrading Europe's energy networks, a trade strategy that will include a proposal in the World Trade organisation (WTO) "to remove all custom-duties on 'green products' and more intensive cooperation on international standardisation issues, as well as proposals for removing obstacles to the creation of a single market for renewable energy.[17]

In order to achieve its ambitious goals, the strategy introduces two important governance innovations, which were absent under the Lisbon Strategy:

- The European Council is now in charge of driving the process, on the basis of Commission proposals
- The Commission has the capacity to issue “policy warnings” if a Member State fails.

The reporting system on the Member States’ efforts to achieve the headline targets in the strategy will also be better co-ordinated and aligned with the reporting system of the Stability and Growth Pact.[18]

2.3 The budgetary framework for a specific financial instrument for the environment

The environment is addressed under EU financial instruments including FP7, EAFRD, Structural Funds and the Competitiveness and Innovation Programme (CIP). LIFE is the only instrument however that focuses solely on nature and environmental protection (see Annex 8.5 for a detailed analysis of the use of other EU financial instruments for the environment).

The EU Budget Review[19] highlights that future budgetary reforms need to focus on, and be underpinned by, the following three considerations:

- Prioritisation;
- Added value; and,
- A high quality of spending.

The Review details a further five core principles against which budgetary options should be assessed:

- **Delivering key policy priorities**: highlights the importance of key EU policy priorities and the policy directions established in the Treaty of Lisbon.
- **EU added value**: highlights the need to justify spending at the EU level.
- **A results-driven budget**: highlights that spending must have tangible impacts.

[15] Europa Press Release RAPID (2009) Commission launches consultation on EU 2020: a new strategy to make the EU a smarter, greener social market. Available from: http://europa.eu/rapid/pressReleasesAction.do?reference=IP/09/1807

[16] Euractiv (2010) Greens unimpressed by draft 'Europe 2020' plan. Available from: http://www.euractiv.com/en/climate-environment/eus-draft-2020-strategy-fails-impress-environment-news-282980

[17] *ibid*.

[18] Griffiths, N. (2010). Europe 2020: innovation, green growth and jobs; Reshaping the EU's long-term strategy - take two. Available from: http://www.innovationeu.org/news/innovation-eu-vol2-1/0199-europe-2020-innovation-green-growth-and-jobs.html

[19] The EU Budget Review (COM(2010) 700 final) Available from: http://ec.europa.eu/budget/reform/library/com_2010_700_en.pdf

- **Mutual benefits through solidarity**: emphasises the importance of burden sharing
- **A reformed financing of the budget:** highlights the need to re-align EU financing with principles of autonomy, transparency and fairness

EU added value is noted as being particularly high in the case of public goods and cross-border challenges, both of which are aspects which characterise environmental assets. The Review also clearly recognises the need for solidarity and the value of burden sharing, with environmental protection being explicitly noted as an area where this is both relevant and necessary.

Looking ahead, issues which are raised which have relevance for environmental protection are innovation (especially in the context of market failures), infrastructure and recognising the importance of the international agenda. Whilst infrastructure is discussed in the traditional sense of the word, the conclusions of the Review could be extended to, and are relevant for, the concept of natural and green infrastructure, especially given their transnational nature.

Throughout the Review the importance of coordination and integration is particularly emphasised, especially to deliver the Europe 2020 strategy. The need to improve coordination is an important element of the possible future Common Strategic Framework for five EU funds. As detailed in the Review, this Framework would set strategic guidelines for policies and ensure greater coordination between them and would cover the actions taken today by the Cohesion Fund, the European Regional Development Fund, the European Social Fund, the European Fisheries Fund and the European Agricultural Fund for Rural Development. Importantly, the framework would identify linkages and coordination mechanisms with other EU instruments such as programmes for research, innovation, lifelong learning, and networks. Investment Partnership Contracts between the Commission and Member States would set out the objectives to be achieved and how progress towards the achievement of these objectives will be quantified and measured.

Further details on the EU Budget Review is included in Annex 2.

A report written by a coalition of environmental NGOs have also published an assessment of the next EU Budget, setting out recommendations and principles which they believe will support the transition to a more sustainable society.[20] The report lists 10 guiding principles which should be applied to all EU funding instruments. The first six echo the sentiments of the five core principles laid down in the EU Budget Review:

- **Public money for public goods and ecosystem services** – the EU-Budget should provide for public goods, such as the preservation of biodiversity, ecosystems, climate stability, water quality, air quality and soil quality.
- **Targeted spending** – the EU-Budget should support a limited number of priorities which are clearly identified and justified.
- **Coherence within and across European policies and instruments** – European spending should not undermine any EU policy objectives or the effectiveness of other European policies.
- **Maximising EU leverage** – the EU-Budget should concentrate on projects that deliver the most public benefits at European level and reflect European priorities.
- **Long term cost effectiveness** – the EU-Budget should support solutions which are the most costeffective over time.
- **Integrated strategy** – the EU-Budget should be the result of an integrated strategy, to ensure coherence.
- **Transparency** – the EU-Budget should provide full disclosure of its spending in a timely and accessible fashion.

[20] Changing Perspectives: How the EU budget can shape a sustainable future (2010). Available from: http://www.eeb.org/EEB/?LinkServID=7819455B-C145-9353-9D77F0192D2A9BD2&showMeta=0

- **Partnership** – the EU-Budget should apply binding rules for meaningful public participation and partnership of all relevant stakeholders.
- **Accountability** – European payments should ensure the achievement of targets and comply with the requirements that are attached to the payment schemes.
- **Environmental proofing** (climate, energy efficiency, biodiversity and resource use) – European payments must be assessed, prior to implementation, to ensure that they do not produce negative effects or undermine European climate, energy, biodiversity and resource objectives.

Specifically with regard to a dedicated fund for the environment, the report suggests that at least 1 percent of the EU Budget should be allocated to a new LIFE instrument. Currently, LIFE has access to €2.1 billion, representing around 0.23 percent of the total EU Budget. This is set against the costs of the Natura 2000 network which amount to €5.8 billion a year.[21]

Recently, both the European Parliament Committee on the Environment, Public Health and Food Safety (ENVI) and the Council of the European Union released opinions and conclusions which set out improvements for environmental policy instruments in the context of the next Multi Annual Financial Framework (MFF), both of which emphasise the continuing importance of a specific instrument for the environment. The main conclusions of both the ENVI Committee and the Council are set out in the box below:

The ENVI Committee Opinion on the MFF :Conclusions on improving environmental policy instruments

The European Parliament's Committee on the Environment, Public Health and Food Safety (ENVI) recently released its Opinion on the policy challenges and budgetary resources for the EU after 2013 – the next Multiannual Financial Framework (MFF). A number of key suggestions are put forward:

- **Integration of environmental objectives into sectoral policies needs to be strengthened** (including the CAP, cohesion policy, consumer policy, the CFP and development policy) and mainstreaming of EU finances to ensure compliance with EU environmental legislation should take place, as well as the active contribution of spending through the EU budget to its environmental policy objectives
- The **EU budget should support the provision of public goods** that are unlikely to be sufficiently delivered by the market – namely environmental public goods. These include preservation of biodiversity and ecosystems, wilderness, climate stability and carbon absorption capacity and air and soil quality. CAP should reward farmers and land managers for the delivery of public goods, such as an attractive countryside rich in biodiversity, and Structural and Cohesion Funds should foster ecological sustainable development and a transition to a low energy-consumption and resource-efficient society
- **European funding should not have negative impacts on the environment, climate change, ecosystems and biodiversity within and outside the EU**. The EU should aim to phase out all environmentally harmful subsidies as soon as possible, at the latest by 2020, in line with the commitments undertaken under the Convention on Biological Diversity (CBD). European payments should be assessed prior to implementation to ensure they do not undermine European climate, energy, biodiversity and resource objectives
- The EU **must further enhance the capacity of developing countries to mainstream environment and climate mitigation and adaptation across sectors** and development plans
- The **EU budget must commit sufficient funding on a structural basis to reach key environmental targets and to earmark money** within the different EU funds for eco-friendly

[21] Gantioler, S., Rayment, M., Bassi, S., Kettunen, M., McConville, A., Landgrebe, R., Gerdes, H. and ten Brink, P. (2010) Costs and Socio-Economic Benefits associated with the Natura 2000 Network. Final report prepare by the Institute for European Environmental Policy / GHK / Ecologic on Contract ENV.B.2/SER/2008/0038 for the European Commission, DG Environment: Brussels.et al (2010). Costs and socio-economic benefits associated with the Natura 2000 network. Available from: http://ec.europa.eu/environment/nature/natura2000/financing/docs/natura2000_costs_benefits.pdf

sectors such as renewable energy and sustainable agriculture. The **greening of the EU Financial Framework must also be intensified in line with the Europe 2020 Strategy to promote concrete environmental outcomes**

- **Co-financing for the management of Natura 2000 needs to be guaranteed from a dedicated source** in the new budgetary framework
- Member States and the Commission are urged to **enhance and improve the implementation and enforcement of EU environmental legislation** in order to improve the state of the environment and to **ensure a level playing field**
- It is **crucial to clarify and harmonise the existing rules on environmental inspections**, while providing the flexibility needed to allow Member States' systems to be fully operational. The Commission and MS should consider further steps to improve environmental inspections in consultation with relevant stakeholders; the Commission should also provide further support to promoting cooperation projects in the area of environmental inspections – including those at a regional level and through IMPEL – and particularly support MS efforts to implement waste legislation
- There is a **need for a renewed and comprehensive Environment Action Programme** that builds on the relevant aspects of the Europe 2020 Strategy and 2006 Sustainable Development Strategy and that develops an ambitious vision for EU environmental policy for 2050 addressing persistent environmental problems; the Programme should aim to enhance the role and facilitate the engagement of regional and local authorities and promote eco-innovation and other environmentally sound solutions and technologies, aiming at faster acceptance by markets
- **The importance of the LIFE+ programme is underlined – it is the main instrument entirely dedicated to environmental financing and there is a need to strengthen it in the future MFF to achieve EU environmental objectives while promoting synergies with other EU financial instruments that contribute to achieving the EU environmental objectives**

2.4 General rationale for an EU financial instrument for the environment

2.4.1 The general case for environmental policy is well defined and developed

One of the basic rationales for public policy intervention on the environment is the failure of markets to take fully into account the environmental impacts of the choices of producers and consumers. This failure derives in large part because the environment is largely a public good; which means that it can be used by any one person without affecting the supply to all other people, and for which it is impractical to charge individually. This in turn gives rise to externalities, where the environmental costs of production or consumption fail to be reflected in market prices.

Public goods such as environmental quality are invariably provided by government because it is not possible for a private business to profitably produce them. Private businesses can't sell public goods in markets, because they can't charge a price and keep non-paying people away.

Governments can secure environmental public goods through regulation, by definition of property rights, through imposition of fees and charges, and through spending financed through general taxation. Where environmental impacts can be traced to individual producers and consumers it is possible to require compensation for these impacts through direct payments (taxes and charges), payments for emission permits or environmental regulation. This requirement is reflected in the well established and accepted polluter pays principle (PPP). Examples of public spending to secure environmental public goods include public investment in habitat protection and the conservation of biodiversity, and in environmental research.

Another rationale for policy action on the environmental is the protection of human health through preservation of natural assets and environmental resources which are fundamental to good health and social well-being.

2.4.2 The case for EU environmental environmental intervention is well defined and developed

The general principles noted above relate to the environment in local neighbourhoods through to the global environment. The case for EU level intervention derives from these same principles, and in recognition that many environmental resources and types of pollution cut across Member State borders.

Recognising the principle of subsidiarity, the case for EU action derives from the efficiency of having a standard body of environmental policy (the environmental 'acquis') that applies across all Member States (as transposed) to deal with common environmental problems, including trans-boundary pollution. The adoption of EU policy also avoids the risk of 'beggar thy neighbour' policies where one Member State seeks a competitive advantage from adopting a lower environmental standard (although increasingly competitive advantage is understood much more to be a function of high environmental standards) or adopting a high standard that only national producers can meet.

These arguments are reflected in the establishment of a well developed and tested environmental acquis. To the extent that EU environmental issues evolve, and new problems emerge, new EU interventions provide the basis for an efficient and equitable response. Better regulation initiatives by the EC have also been adopted to fine-tune the performance of particular measures over time.

Under the Lisbon Strategy and the Europe 2020 Strategy, high standards of environmental quality are also understood to be necessary for the long-term and sustainable competitiveness of the EU economy. Europe 2020 goes beyond the various EU and MS 'green stimulus' packages and puts greener, sustainable growth at the heart of Europe's economic strategy. Greater resource efficiency, a transition to low carbon economy and development of new clean technologies underpin our future competitiveness as well as the health of our environment in Europe and globally.

In addition, the wide public consultation exercise for the Budget Review that took place in the years 2007 and 2008 identified that climate change is a major challenge and two thirds of the contributors considered it Europe's biggest test for the future. The political conference closing the public consultation confirmed this.

Finally, as regards the external policies of the EU, the Lisbon Treaty justifies the promotion of measures at international level to deal with regional or worldwide environmental problems, and in particular combating climate change. The European budget would therefore seem the appropriate geographical level to strengthen environment and climate spending as it will underpin the EU's many bilateral environmental and climate co operations and support the EU's negotiations in the Multinational Environmental Agreements, including the United Nations Framework Convention on Climate Change and the Convention on Biological Diversity.

The specific case for an instrument dedicated to the environment will be covered in more detail in Section 6.

3 Problem definition

This section summarises environmental problems and institutional drivers, which have been developed as providing the basis for a specific instrument for the environment.

3.1 Environmental problems and institutional drivers

An initial description of a set of six environmental problems that could potentially form the basis for a specific instrument for the environment (presented in detail in Annex 3) was subject to stakeholder consultation and discussion with Commission services.

Details of the stakeholder consultation are presented in the Box below. Throughout the report, relevant conclusions from the stakeholder consultation are presented in similar Boxes.

Details on the stakeholder consultation

A total of 192 stakeholders responses were gathered during the initial stakeholder consultation conducted by GHK. This includes 11 interviews with Commission officials, including the different Units in DG Environment, as well as representatives from DG AGRI, REGIO, MARE and CLIMA. Additionally, a total of 34 survey responses were received: 16 from NGOs, 6 from social partners and 12 from National Contact Points. Project beneficiaries were also surveyed separately and 147 responses were received[22].

The interviews with Commission officials focused on qualitative discussions around:

- The type and scale of the environmental policy problems in the EU (including available evidence) and potential for EU added value from a Financial Instrument focused on the environment
- Judgements concerning the relative importance of particular problems and the drivers behind the problems
- What responses might best address the problems; what could/should be the priorities for an Instrument for the environment, and what objectives and activities should an Instrument for the environment focus on

Surveys of NGOs, National Contact Points and social partners aimed to obtain quantitative information on stakeholder perspectives regarding the environmental policy problems facing the EU and the potential role for a financial instrument dedicated to the environment. Project beneficiaries were only asked whether they agreed with the problem definition detailed above, which of those they felt were the most important, and whether they thought the severity of the problems will change into the future.

Once the options had been developed on the basis of this initial stakeholder consultation, a workshop was organised by the Commission on the 28th of January, 2011 where stakeholders were consulted on their views of the revised problem definition (including the environmental problems and the institutional drivers), the rationale for an EU financial instrument for the environment, and the proposed options. The workshop was attended by roughly 100 stakeholders, comprised of European Commission officials, NCPs and Member State representatives, NGOs and social partners. Attendants were split into 10 separate groups to discuss the issues (with a mix of different types of stakeholders in each group). Alongside a qualitative discussion, participants were also asked to rank different aspects. These rankings were awarded points (rank 1 = 10 points; rank 2 = 5 points and rank 3 = 2 points), to allow an aggregate weighted score to be calculated.

Alongside to the survey that was conducted of stakeholders and project beneficiaries, a separate

[22] Project beneficiaries were asked to name their organisation but were not asked to categorise themselves by type of beneficiary. Therefore the breakdown between type of beneficiaries is not easily available due to the fact that organisation names do not always indicate beneficiary type.

survey was also conducted by the European Commission's LIFE Unit in "Your Voice in Europe" (YVIE). Results of this survey were analysed for the purpose of this report, by which point 912 responses had been received, 53% of which were from private individuals, 35% from organisations and the remaining 13% from Competent Authorities in Member States. The results of interest from this analysis are also considered here.

There was also an EC-led survey which ran after the GHK stakeholder workshop. Its aim was to gather the opinions of local and regional authorities (LRAs) on the important environmental problems, the weaknesses and limitations in implementing EU environmental policy, and the potential role for a future EU financial instrument for the environment. As with the YVIE survey, the results of interest from that analysis are also considered here.

A full breakdown of the stakeholder consultation is given in Annex 5.

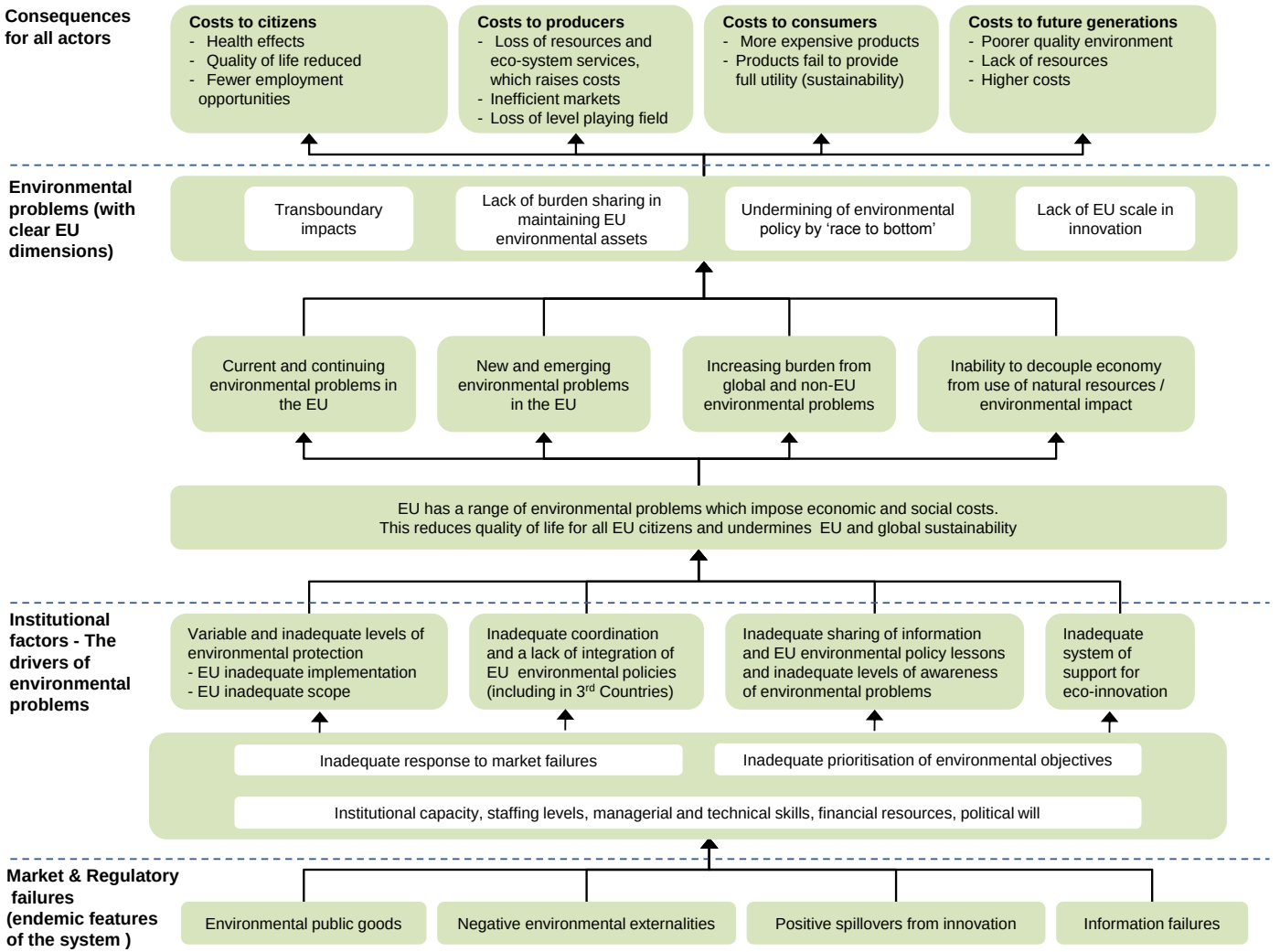
In the light of the these consultations the description of the six problems was revised and sought to clarify more particularly the distinction between the physical environmental problems within and outside the EU; and the institutional drivers[23], that lead to policy gaps and weaknesses that result in the continuation of the physical problems.

We have therefore divided the initial six problems into four environmental problems and a further five drivers, that influence and which can be influenced by a financial instrument for the environment.

The separation into drivers and problems is illustrated in Figure 3.1 and summarised below. These are described in greater detail below.

[23] not to be confused with the wider driving forces of the problems, e.g. demographic or economic change

Figure 3.1 Environmental Problems in the EU: Problem Tree



3.1.2 Environmental problems

The main environmental problems identified are:

- **Current and continuing environmental problems in the EU** – this encompasses existing problems of environmental damage, biodiversity loss, pollution, resource exploitation and lack of sustainability not resolved by current actions. The 2010 assessment of Europe's environment[24] as well as the 2009 Environmental Policy Review[25] show that, although considerable progress has been made in single thematic areas, halting the loss of biodiversity and improving resource efficiency along with climate change and environment and health related concerns remain key challenges for the EU.
- **New and emerging environmental problems in the EU** – refers to new environmental threats and challenges posed by changes to the policy, economic and technological landscape, including new materials and substances placed on the market in the future that could pose a threat to the environment. Similarly, changes to economic activity in the future will change the type and magnitude of pressures placed on the environment.
- **Increasing burden from global and non-EU environmental problems** – The EU is contributing to environmental pressures in other regions of the world and at the same time the impacts of activities elsewhere are increasingly affecting the EU. This problem refers to transboundary issues where the EU faces economic and social costs because of environmental problems in the rest of the world. Examples include over-fishing, biodiversity loss, POPs, transboundary pollution and climate change.
- **Inability to decouple economy from use of natural resources/environmental impact** – this is an extension of current and continuing environmental problems, but which is explicitly defined to recognise the established need for decoupling.

3.1.3 The institutional drivers of environmental problems

The problems described above are a consequence of wide range of economic and social activity and behaviour, so called 'driving forces' These driving forces have been the subject of substantial policy efforts to prevent, reduce and control environmental harm and to provide adequate environmental protection. To the extent that the problems described above continue and are judged to imply inadequate levels of environmental protection, then these policy efforts need to be strengthened. This has been the purpose of the successive Environmental Action Programmes introduced by the Commission (the first in 1973, the current programme (the sixth) in 2001; and of the previous specific financial instruments for the environment (LIFE), dating back to 1992.

The gaps and weaknesses in current policy provide the basis for defining the institutional drivers for the physical environmental problems to which any LIFE instrument would be directed, These were developed on the basis of discussions with experts and Commission officials.

The institutional drivers of environmental problems, and to which a specific instrument would be expected to address, are described below. The underlying causes are discussed in detail in section 5:

- **Variable and inadequate level of environmental protection due to the inadequate implementation or scope of environmental policy** – there are few environmental problems that have not been the subject of EU environmental policy action. New problems continue to emerge, but it is widely recognised that the environmental acquis communautaire is a comprehensive and mature body of EU legislation. The implementation of this acquis is the responsibility of the Member States under the shared competency for the environment with the Commission. However, the

[24] EEA, The European Environment State and outlook 2010 available at http://www.eea.europa.eu/soer.

[25] SEC(2010) 975 final.

implementation process is complex and sometimes costly; with common problems of transposition, inadequate financial and human resources, and a lack of capacity, knowledge and information. The failure to implement at MS level gives rise in part to the environmental problems described above, and therefore EU co-financed measures to address these problems at MS level provides strong EU value added.

- **Inadequate coordination and uneven integration of EU environmental policies (including 3rd countries**) – The driving forces (in the context of the DPSIR framework) that give rise to environmental problems are also the subject of a range of EU and MS polices that seek to achieve other policy goals, such as improved competitiveness, employment and social inclusion, or poverty reduction in developing countries. Inevitably these other policies can have adverse effects on the environment, requiring the effective integration of environmental objectives within these other policies when being implemented, to avoid where possible environmental harm. Improved integration can therefore reduce the environmental problems described26.
- **Inadequate sharing of information, best practice and EU environmental policy lessons** – the problems of implementation and integration described above arise in part because of the inadequate sharing of information between for example Commission Services and MS in relation to transposition and between MS in relation to the identification and transfer of good practice implementation measures. At the same time, transposition allows flexibility for MS to design implementation processes that best suit their circumstances, requiring a level of creativity and innovation to establish the best solutions. The scope to learn and to experiment with new approaches is important to secure cost-effective implementation.
- **Inadequate awareness of environmental problems** – the lack of urgency and momentum in tackling environmental problems and resourcing implementation reflect in part a lack of civil society interest and pressure for change; itself arising from a lack of awareness of environmental problems and possible solutions.
- **Inadequate system for finding solutions to environmental problems** – the market failures that lead to underinvestment in finding solutions to environmental problems generally are compounded by the failure to 'price' environmental benefits into the returns to innovation. There is therefore a shortfall in the investment that would otherwise be made in eco-innovation (i.e. innovation that seeks specific returns as a result of improved environmental performance). As a result problems are greater than they should be and continue for longer. In addition to addressing the underlying market failures, support to innovators is required to overcome barriers to innovation.

3.1.4 Underlying market and regulatory failures

Environmental problems can be characterised as a failure of the market, society or policy makers (i.e. regulation) to adequately account for the environmental externalities or other such consequences of human activity on the environment. Examples include the environmental damage caused by pollution or the unwillingness of actors to adopt technologies or consume products, which can reduce environmental impacts / improve resource efficiency, due to lack of awareness or imperfect competition in the market place. Broadly, these 'market' and 'regulatory' failures relate to one of the following five categories:

[26] Since the Treaty of Amsterdam in 1997, the integration of the environment into sectoral policies is part of the EC/EU Treaties. This is therefore an obligation, not just a principle. Article 11 TFEU (ex Article 6 TEC) states that: Environmental protection requirements must be integrated into the definition and implementation of the Union's policies and activities, in particular with a view to promoting sustainable development. European heads of state and government (The European Council) at their meeting in Cardiff, in June 1998, required different Council formations to integrate environmental considerations into their respective activities, putting Article 6 of the EC Treaty into practice – the Cardiff process.

- **Environmental public goods** – non-rivalrious and non-excludable, these goods often have no property rights attached to them, therefore these resources can be over exploited and under protected as they are seen as free by many actors. Examples include clean air, water and use of the world's oceans.
- **Negative environmental externalities** – occur when the true environmental cost of a resource to society is not incurred by the user, often causing the over consumption of a good with negative effects on the environment and others For example combustion of fossil fuels by industry and households can be seen as an externality, generating health and environmental impacts on others.
- **Positive spillovers from innovation** – the positive social benefits or policy win-wins of environmental innovation are not recognised by the market, with less investment in innovative technologies than would otherwise be the case.
- **Information failures** – lack of information between buyers and producers results in buyers making ill informed decisions regarding the purchases of goods and services, meanwhile producers receive the incorrect signals regarding customer demand.
- **Regulatory capture** – with particular interested parties having a disproportionate influence over policy might also be considered to be a significant regulatory failure.
- **Imperfect competition** – the dominance of a few sellers in a market can restrict market access for other more innovative producers or in extreme cases predate on new entrants. In such cases, incumbent businesses and old technology can have a significant market advantage.

We return to the factors contributing to these institutional drivers in Section 5, after a brief review of the evidence (in Section 4) defining the scale of EU environmental problems, which follow as a result of these drivers.

4 Scale of the environmental problem

This section summarises the scale of existing environmental problems in the EU, using both a thematic and resource based approach. The aggregate external cost to the EU across the thematic environmental areas is estimated. It also discusses the scale of environmental problems outside the EU.

4.1 Approach to the assessment

The assessment is concerned with establishing the broad orders of magnitude of the environmental costs associated with pollution and the use of natural resources (see Annex 6 for a brief summary of these problems). These environmental costs, expressed as far as possible in monetary terms, reflect the external costs of economic and social activity on the environment; and which fail to be reflected in the prices and therefore decisions of producers and consumers.

The intention of the assessment is only to provide a broad contextual estimate of the approximate overall scale of the environmental problem in the EU. The assessment is based on the availability of existing literature to quantify and value these external costs. There is considerable uncertainty in the valuation of at least some of these external costs, and the assessment seeks to provide the approximate order of magnitude of the problem, rather than offer a precise calculation of the scale of the problem.

We also note that there are a number of studies currently under way (for example with respect to climate change and resource efficiency) that are examining and updating existing estimates of environmental externalities. The analysis should therefore be understood as a work in progress and not a definitive statement.

Because there are significant inter-linkages between environmental problems (for example climate change affects biodiversity, air pollution can cause water pollution from acidification) there is considerable risk of double-counting these external costs from a 'bottom-up analysis' of individual problems. We have therefore adopted a conservative assessment, omitting impacts where there is a risk that is reflected in part at least in another impact. This is compared to available 'top-down' or aggregate assessments of external costs.

The methodologies employed in the literature to quantify and value environmental impacts is by now well developed. In essence these methodologies seek to quantify the physical environmental impacts (reflected most recently in the State of the Environment assessment[27]) and then to establish the costs of damage (damage costs) to various 'receptors' such as adverse human health effects, damage to agriculture, forestry, buildings and infrastructure, biodiversity loss, and adverse impacts on recreation and tourism. These impacts can be monetised by reference to the loss in market value (eg of crops, timber or tourism) and, in the absence of markets, estimates of the willingness of society to pay to avoid these impacts using revealed or stated preference techniques. In some cases, where environmental objectives and standards have been set, the expenditure to comply (compliance costs or environmental expenditure) provides a proxy of the minimum estimate of the value of the environmental impact. For example, the cost of improving water quality by removing the subset of pollutants from wastewater can be a reasonable proxy for the economic cost of the pollution to water. The presence of pollution creates an economic cost.

A major determinant of the economic value of environmental impacts is the scale and impact on human health. In some cases where the literature reports health impacts but has not provided a monetary value we have followed IA Guidelines[28] to estimate the economic cost.

[27] State of the Environment (SOER) Assessment, European Environment Agency (2010): http://www.eea.europa.eu/soer

[28] Section 9 of Annex to Part III: Annexes to impact assessment guidelines (European Commission 15 January 2009)

These advise that the Value of a Statistical Life (VOSL) should be taken as between €1-2 million and the Value of Life Years (VOLY) as between €50-100,000, Mid-range estimates of €1.5 million and €75,000 respectively have been used to convert health related impacts to monetary estimates.

It is important to note that both VOSL and VOLY estimates include several important uncertainties. For example, VOSL is calculated based on two general approaches, the human capital approach and the willingness to pay (WTP) approach. The human capital approach measures the economic productivity of the individual whose life is at risk; it takes an individual's discounted lifetime earnings as its measure of value, assigning valuations in direct proportion to income. The WTP approach is based on the assumption that changes in individuals' economic welfare can be valued according to what they are wiling (and able) to pay to achieve that change[29]. Thus the monetary estimate of the value of a statistical life will be influenced by an individual's ability and propensity to pay, which itself depends on their individual financial circumstances. In addition, an individual's perception of risk-changes will influence their WTP, and thus the final VOSL value.

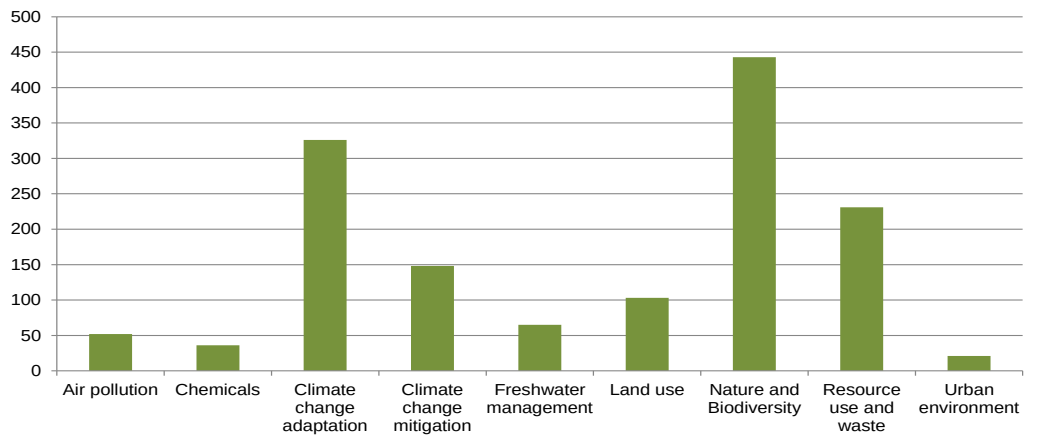
4.2 The scale of environmental problems in the EU

The most recent State of the Environment Report (2010), published by the European Environment Agency (EEA), concluded that mounting demands on natural capital are exerting increased pressure to ecosystems, economies and social cohesion in Europe and elsewhere.[30] Despite some progress and improvements to the environment, major environmental challenges remain which will have significant consequences for Europe if left unaddressed.

Stakeholder views – Physical environmental problems in the EU

Workshop participants were asked to rank the three most important environmental problems facing the EU. The weighted totals are shown in the graph below (where a problem ranked number 1 was given a weight of 10, number 2 was given a weight of 5, and a 3 was given a weight of 2).

Figure 4.1 The weighted totals of the rankings given by stakeholders to the environmental problems facing the EU indicate that stakeholders believe the most important problems are nature and biodiversity, climate change adaptation and resource use



Source: GHK analysis, EC Workshop

[29] European Commission (2005) ExternE – Externalities of Energy: Methodology 2005 update http://www.externe.info/brussels/methup05a.pdf

[30] Available from: http://www.eea.europa.eu/soer/synthesis/synthesis

The results indicate that stakeholders believe the greatest environmental challenges facing the EU are that of nature and biodiversity, climate change adaptation and resources use and waste. Similar findings came out of the Committee of the Regions (CoR) survey, where climate change adaptation was identified as being highly significant by 69% of respondents, resource use and waste by 67% and nature and biodiversity by 42%. The two surveys differ however, in that nature and biodiversity was seen as more important than climate change adaptation and resource use by workshop participants than responses from the CoR.

Notably, most CoR respondents (54% of responses) identified a weak cause-and-effect relationship between their local environmental problems and those occurring in other countries; two thirds of the remaining respondents believe that these problems are to some extent related (31% of responses), while only one third of them (15% of responses) consider that such a link exists to a great extent.

4.2.2 Thematic approach

The analysis adopts a thematic approach based on the range of physical environmental problems and examining the available estimates of external costs. The full analysis is provided in Annex 6.

The different thematic impacts and their environmental costs can be aggregated, as long as care is taken to avoid double-counting particular impacts. In the summary table below we indicate those impacts that have not been included in the overall order of magnitude estimate to avoid the double counting risk.

Table 4.1 is a summary of the costs of the environmental issues described above. This value is an approximation, and should not be considered as a comprehensive valuation of all environmental issues in Europe. It is intended to provide an order of magnitude estimate as context to the Impact Assessment and to demonstrate the scale of the problem for an instrument attempting to improve environmental quality in the EU.

Table 4.1 Aggregation of Thematic External Costs in the EU (€ per year)

Environmental theme	Type of Environmental Cost	Annual Value (€ billion)	Aggregated Annual Value	
			(€ billion)	(%)
Climate Change	External cost of European GHG emissions	€162 billion	€162	24%
Biodiversity	Loss of Ecosystem Services (Cost of Policy Inaction)	€218 billion	€269	40%
	Invasive Alien Species	€13 billion		
	Soil Degradation	€38 billion		
Air and Industrial Pollution	Ozone (premature deaths)	€1 billion	€95	14%
	Ozone (crop damage)	€7 billion		
	Particulate matter	< €1 billion		
	SOx, NOx. PM, VOCs, mercury	€87 billion		
Water Resources	Drought	€12 billion	€114	17%
	Abstraction	€102 billion		
Freshwater Pollution	Pesticides (benefit of implementing policy)	€1.billion	€16	2.5%
	Urban waste water	€15 billion		

	(compliance cost)			
Marine Environment	Fishing	< €1 billion		
	Urbanisation and development	< €1 billion	€8	1%
	Eutrophication (Baltic Sea)	€8 billion		
Waste	Benefit of Landfill Directive	€2 billion	€2	0.5%
Total			**€666**	

Source: Individual thematic assessments

The aggregated assessment indicates that the total environmental cost in the EU each year is in the order of €666 billion. This is a conservative assessment, given the risks of double counting, and might be considered a minimum estimate. To put the figure of €666 billion in context, the GDP of the EU-27 was €11,783 billion in 2009[31]. External environmental costs therefore represent, conservatively, 5.7% of EU GDP.

Finally, it is worth noting the analysis by UNEP et al summarised in Table 4.2. This suggests that global external costs are in the order of €5,000 billion. This figure does not include the cost of ecosystem services associated with biodiversity loss. Based on the EU share of global GDP (as a crude proxy of the share of external cost) of 20%, this would suggest that the aggregated annual external cost in the EU is in the order of €1,000 billion, which comparable with the aggregate thematic figure above.

Table 4.2 Global Environmental Costs in 2008 and Projected to 2050

Environmental Impact	External costs in 2008 (€ billions)	External cost relative to global GDP in 2008	Projected external costs in 2050 (€ billions)	Projected external cost relative to global GDP in 2050
Greenhouse gas (GHG) emissions	3,398	7.5%	15,607	12.9%
Water abstraction	920	2.0%	3,527	2.9%
Pollution (SOx, NOx, PM, VOCs, mercury)	410	0.9%	1,445	1.2%
General Waste	148	0.3%	476	0.4%
Natural resources Fish Timber	 41 32	 0.1% 0.1%	 215 192	 0.2% 0.2%
Other ecosystem services, pollutants and waste	Not available (NA)	NA	NA	NA
Total	4,946	11.0%	21,461	17.8%

Source: UNEP/FI Trucost, 2010. Adjusted to Euro at $1=€0.75

[31] Eurostat

The UNEP report also suggests that the external cost will continue to increase. At a global level the increase to 2050 is in the order of four times. For the EU, assuming the EU share of global GDP falls to say 10% by 2050, as a result of the relatively higher rates of growth in the rest of the world, the UNEP report suggests annual external cost would still double in real terms to over €2,000 billion without further policy action.

The recently published impact assessment of the new EU biodiversity strategy to 2020[32] provides information on economic reasons for action, to reach the 2020 objective of halting biodiversity loss[33]. The Strategy includes six targets, which should be mutually supportive and inter-dependent. They are broken down into a set of actions and measures which are included in the Annex to the Communication. The targets address the implementation of the Birds and Habitats Directives, the maintenance and enhancement of ecosystems and their services, the integration of biodiversity conservation and restoration into agriculture and forestry, sustainability of fisheries, combating invasive alien species and addressing global biodiversity loss. The assessment of the economic impact of the different targets concluded that increased benefits from ecosystem services are to be expected if new initiatives are implemented. Though no aggregate information is yet available, project-based evidence showed the cost-benefits ratio of restoration projects can range to 3 to 75. In addition, payments for ecosystem services for water-related ecosystem services are expected to amount to USD 30 billion by 2050. The implementation of green infrastructure, amongst others, could reduce the social costs of traffic accidents. In Switzerland for example, these amount to €42 million per year. No detailed assessment of the impact of different initiatives to be taken in the context of the strategy is available yet.

4.2.3 Resource Use and Decoupling

A different approach to considering the scale of environmental external costs is to consider the cost savings from improving the efficiency with which resources are used and hence reducing the associated external cost. It should be clearly noted that this approach is an alternative method of examining external costs, and should not be included in the thematic aggregation of external costs, above. It more specifically relates to those costs resulting from the inability to decouple economy from use of natural resources/environmental impact (see 3.1.2).

Potential resource savings, achieved by improving resource efficiency in the EU to levels already achieved by the most efficient Member States, have been estimated. This provides an indication of the scale of benefits available using existing technologies.

The analysis is based on Eurostat data for EU27 on total domestic material consumption (DMC) and domestic inland energy consumption. This data refers to raw materials only and does not address natural resources and the associated challenges such as underestimation. . The resource savings are based on Member States (MS) achieving the level of resource efficiency set by the average achieved by the five most efficient MS, calculated as the resources used per unit of GDP by MS.

The analysis (Table 4.3) indicates that the scope for resource savings is greater for materials (46%) than for energy (20%), due in part to the higher unit costs of energy. The resource savings are estimated using the market price of materials and for energy, plus an estimate of the associated external cost savings from reduced pollution, based on available externality estimates. The saving at market prices is €550 billion a year. A further €60 billion

[32] European Commission (2011). Communication on our life insurance, our natural capital: an EU biodiversity strategy to 2020, COM(2011) 244 final, http://ec.europa.eu/environment/nature/biodiversity/comm2006/pdf/2020/1_EN_ACT_part1_v7%5B1%5D.pdf

[33] European Commission (2010). Communication on options for an EU vision and target for biodiversity beyond 2010, COM(2010)4 final, http://ec.europa.eu/environment/nature/biodiversity/policy/pdf/communication_2010_0004.pdf

Environment Council Conclusions of 15 March 2010, http://register.consilium.europa.eu/pdf/en/10/st07/st07536.en10.pdf

a year in reduced externality costs might also be secured. The total economic value achieved is equivalent to over 5% of EU GDP.

Table 4.3 Estimated savings in market and external costs from improved resource efficiency in the EU (€ billion)

Indicator	Unit	Materials	Energy	Total
Total resources (EU27)	mil tonnes; mil toe	8,200	1,800	
Resource saving (avg of top 5)	mil tonnes; mil toe	3,800	370	
Savings as a share of total	%	46%	20%	
Unit value of external cost	€/tonne; €/toe	2.40	151	
Unit value of market price	€/tonne; €/toe	9.80	1,508	
External cost	€ billion per annum	10	60	60
Market value	€ billion per annum	40	550	590
Total economic value	€ billion per annum	50	610	660

Sources: GHK own estimates from data from Eurostat. External cost estimates sourced from COWI (using a UK study of the externalities of primary aggregate production and likely to be a minimum estimate; and taken as 10% of market price for energy, at current price of $100 a barrel, which approximates to €0.01 per kWh

Notes:

1. Materials: The total amount of materials directly used, defined as the annual quantity of raw materials extracted from the domestic territory, plus all physical imports minus all physical exports. Data for 2007.
2. Energy: The total energy necessary to satisfy inland consumption of the EU based on consumption by the energy sector itself; distribution and transformation losses; and final energy consumption by end users. Data for 2008.

4.2.4 New and emerging problems in the EU

In addition to the problems of well defined environmental impacts, there is also the risk that new and emerging problems will add to the current stock of problems. One case that illustrates this is the environmental risks from nanotechnology (see Section 5.1.2 below). It is likely that other risks will emerge in coming years. However, stakeholders considered this risk to be of less significance than the problem of implementing current policies.

4.3 The scale of environmental problems outside the EU

Table 4.3 provides an indicative estimate of the global external cost per year from a range of environmental impacts. The recent European Environment State and Outlook Report 2010 (SOER 2010) highlights close link between Europe's environmental challenges and those in the rest of the world. Europe is contributing to environmental pressures in other regions of the world, and at the same time, the impacts of activities elsewhere are increasingly affecting Europe.

This analysis provides a brief overview of key environmental issues that link the EU and other parts of the world: these are presented in Table 4.4 below, which describes both EU influence on the rest of the world as well as those of other regions on Europe.

For the sake of analysis, these issues have been divided into three levels:

- Global issues
- Regional issues (in this case, the Pan-European region of countries that are members of the UN Economic Commission in Western, Central and Eastern European, the Caucasus and Central Asia)

- Europe's neighbourhood (bordering countries and others under the European Neighbourhood Policy, ENP).

The EU has subscribed to number of multilateral environmental agreements to address these common issues. These agreements are found at global level, in the Pan-European region and also with neighbouring countries. A selected set of key conventions are also shown in the table below, together with key agreements the EU has undertaken, such as the Cancun Agreement on climate change agreed at the December 2010 COP. In a few cases, EU legislation calls for cooperation with neighbouring countries on shared ecosystems: an example is the Water Framework Directive (listed in the table).

SOER provides a description of environmental issues, including projections for some issues. It also provides an analysis of the long-term global megatrends that will influence Europe's environment. Key megatrends are presented in the last column of the table along with brief information on projections, where available.

Table 4.4 Key environmental issues linking the EU and the rest of the world

Issue	Global influence on EU environment	EU influence on environment in other regions of the world	Selected EU Commitments	Global megatrends and their potential influence in coming years (from EEA, SOER 2010)
Shared global environmental issues				
Climate change: mitigation	• GHG emissions in the rest of the world affecting climate change impacts in Europe	• EU commitment to reduce GHG emissions • EU commitment to address climate change and assist developing countries in so doing	• UNFCCC and the Kyoto Protocol • The Cancun Agreement • Climate and Energy Package	*Increasing severity of the consequences of climate change* • Growth of emerging economies will increase their share of global GHG emissions in coming decades
Climate change: adaptation	• GHG emissions in the rest of the world affecting climate change impacts in Europe	• EU commitment to assist countries with adaptation	• UNFCCC • The Cancun Agreement	*Increasing severity of the consequences of climate change* • Without new policies, global climate change impacts will become more severe
Biodiversity protection	• Alien species from other parts of the world disrupt EU ecosystems • Habitat loss outside EU affects migratory species	• Biodiversity loss in the EU affects global trends • EU imports of endangered species • EU commitment to support global biodiversity goals	• CBD • Nagoya Declaration • CITES • MDG 7b • EU Council (3/2010)	*Decreasing stocks of natural resources* *Increasing severity of the consequences of climate change* • Resource consumption and climate change are growing pressures on global biodiversity
Transboundary movements of hazardous waste		• Illegal EU exports of hazardous waste	• Basel Convention	*Increasing unsustainable environmental pollution load* • Waste exports from emerging economies may grow; possible backlash in receiving countries
Other transboundary waste movements		• Legal and illegal EU exports (e.g. electronic waste, cars exported as second-hand goods)	• Waste Framework Directive, other legislation	*Increasing unsustainable environmental pollution load* • Waste exports from emerging economies may grow; possible backlash in receiving countries

Issue	Global influence on EU environment	EU influence on environment in other regions of the world	Selected EU Commitments	Global megatrends and their potential influence in coming years (from EEA, SOER 2010)
Transboundary movement of chemicals	• Chemicals imported to the EU as well as chemicals found in agricultural and manufactured imports may harm human health and the environment in Europe	• EU exports of chemicals (including pesticides) could harm human health and the environment in other parts of the world, especially if their transport, storage, use and disposal are not properly managed	• Rotterdam Convention (Prior informed consent) • Stockholm Convention (persistent organic pollutants) • Support for sound management through SAICM	• Thousands of chemicals are in commerce and for most, their effects on human health and the environment are poorly understood • Chemical production outside the EU and OECD countries is growing rapidly • EU legislation – in particular REACH – provides a comprehensive approach to assessing risks and applies to imports; moreover, many governments are looking at EU legislation.
EU share of consumption of global renewable/non-renewable resources	• Competition for natural resources (from oil and gas to rare metals and timber) affecting resource extraction in EU (from oil from regional seas to timber)	• EU imports of renewable/ non-renewable imports and "embedded" GHG emissions, water consumption, etc. • EU goods imports and "embedded" GHG emissions, water consumption, etc.	• MDG 7a	*Intensified global competition for resources* *Decreasing stocks of natural resources* • With rise of emerging economies, global resource demand will grow along with issues of price and scarcity: a concern for EU in terms of environmental security
Insufficient access of the share of global population to safe drinking water supply and basic sanitation		• EU support for a shared global commitment to halve the share of global population without access to safe drinking water and basic sanitation	• MDG 7c	*Increasing unsustainable environmental pollution load* • UN reports progress to drinking water goal, but sanitation goal remains more distant
The adverse living conditions of slum dwellers		• EU support for a shared global commitment to improve the lives of at least 100 million slum dwellers	• MDG 7d	*Living in an urban world: spreading cities and spiralling consumption* • Improvements not keeping pace with growing numbers of urban poor

Issue	Global influence on EU environment	EU influence on environment in other regions of the world	Selected EU Commitments	Global megatrends and their potential influence in coming years (from EEA, SOER 2010)
Ozone layer protection	• High share of ODS emissions from non-EU sources	• Decreasing with accelerated phase-out of ODS in EU	• Montreal Protocol	• Global ODS consumption expected to decline in coming years
Regional environmental issues (i.e. Pan-European)				
Transboundary air pollution	• Air pollution from neighbouring countries to EU • Air pollution from other continents	• Air pollution from EU to neighbouring countries • EU commitments under LRTAP	• LRTAP	*Increasing unsustainable environmental pollution load* • EU emissions of SO_2 and NO_x expected to decline (PM and others to remain stable) • Inter-continental pollutants expected to raise background levels of pollution in EU
Transboundary water pollution	• Water pollution from neighbouring countries to EU	• Water pollution from EU to neighbouring countries	• Helsinki Convention • Water Framework Directive	*Increasing unsustainable environmental pollution load* • Water pollution from urban areas in EU should decrease; agricultural trends unclear
Issues in Europe's direct neighbourhood				
Shared ecosystems: regional seas • Arctic • Baltic • Black • Mediterranean • NE Atlantic	• Exploitation of fisheries by other countries	• EU fishing, aquaculture and agricultural runoff, as well as chemical pollution from ships and industry, are having major impacts on coastal waters and seas • EU exploitation of shared fisheries (varies by sea)	• Conventions for Baltic, Black and Med. seas and NE Atlantic • Marine Strategy Framework Directive	*Decreasing stocks of natural resources* • Concerns over oil and gas exploration in Arctic *Increasing severity of the consequences of climate change* • Climate change will increase ecosystem vulnerability
Shared cross-border ecosystems (e.g. Carpathians, Dinaric Alps, Bialoweza Forest)	• Shared migratory species and habitats	• Shared migratory species and habitats • Links with neighbouring areas can support habitats and species in the EU	• Carpathian Convention and others • COE Conventions	*Increasing severity of the consequences of climate change* • Climate change will increase ecosystem vulnerability – and need for ecological corridors

Issue	Global influence on EU environment	EU influence on environment in other regions of the world	Selected EU Commitments	Global megatrends and their potential influence in coming years (from EEA, SOER 2010)
Shared watercourses (e.g. Danube, Dniestr, Daugava)	• Water pollution from neighbouring countries affecting EU • Shared water resources and ecosystems	• EU water pollution affecting neighbouring countries • Shared water resources and ecosystems	• Water Framework Directive • Danube Convention and others	*Increasing severity of the consequences of climate change* • Climate change will increase ecosystem vulnerability • The intensity and frequency of water scarcity, droughts and flooding are expected to increase

4.3.2 Global issues

Climate change and biodiversity are among the most important global environmental issues – indeed, these are linked to two megatrends identified in SOER 2010: increasing severity of the consequences of climate change; and decreasing stocks of natural resources. For example as the Stern Review pointed out, without taking additional action, temperatures are expected to rise well above 2ºC this century, which could have significant economic impacts with GDP per capita losses ranging from 1 to 8% (taking into account market, non-market impacts, risks of catastrophes and climate feedbacks) at the end of this century and 2.9 to 35.2 % in 2200. This could disproportionally affect the poorest, least capable of adapting to the impacts of climate change. Despite current global agreements and the possibility of new accords, the negative consequences of these two trends are expected to continue in coming years and decades.

In the areas of hazardous and non-hazardous waste, the EU's exports bring pressure on the environment in other countries, in particular in the developing world. While the Basel Convention and EU legislation regulate waste exports, illegal waste shipments continue to be a key concern.

The consumption of renewable and non-renewable resources is a growing global concern. The EU consumes an estimated 16 tonnes of raw materials per citizen per year, of which an estimated 20% to 30% are imported, including fuels, minerals and agricultural products[34]. Additional material consumption is linked to goods that are imported into Europe. The EEA has identified growing competition for resources as a key megatrend for coming decades: it is fuelled in part by the rapid growth of emerging economies.

In this regard, the new EU Biodiversity Strategy to 2020 iterates to take into full consideration biodiversity in production, consumption and global trade decisions, as a necessity for a resource-efficient economy. As such the strategy is part of the flagship initiative on a resource efficient Europe, and indicates measures to be undertaken to reduce negative impacts of EU consumption and production on biodiversity globally. This particularly refers to impacts resulting from commodities such as soybeans, fish and crustaceans, bovine meat, cotton and palm oil. Actions inter alia include appropriate ex-ante Trade Sustainability Impact Assessments, and work to reform, phase out and eliminate environmental harmful subsidies, In addition, measures such as increase funding and assistance and 'biodiversity proofing' EU development cooperation are also mentioned.

The EU has also undertaken commitments to support the Millennium Development Goals: these include environmental goals to improve access to safe drinking water and sanitation as well as slum conditions. For one of these goals, access to safe drinking water, the UN reports progress.

Progress is also being seen for another global environmental issue, ozone-layer protection, the Montreal Protocol and subsequent agreements have led to a reduction in emissions, a trend that is expected to continue.

Beyond these two cases, however, the current global environmental trends are not positive.

4.3.3 Regional (pan-European) issues

Transboundary air pollution and water pollution are addressed by separate conventions under the UN Economic Commission for Europe (UNECE). For air pollution in particular, the EU's emissions of key pollutants such as SO2 and NOx have decreased in recent decades and are expected to decrease further in coming decades: this will reduce EU pressures on other countries and regions. The UNECE agreements have provided a framework for emissions reduction in other countries as well. Nonetheless, hemispheric and inter-continental pollution flows are projected to increase – for example from emerging economies such as China. These are expected to affect background air quality levels in particular, including those in remote areas such as the Arctic.

[34] EEA (2010) The European Environment State and Outlook 2010 – Material resources and waste

4.3.4 Europe's neighbourhood

The EU and its neighbours in Eastern Europe, the Balkans, the Caucasus and the Mediterranean share marine, land and freshwater ecosystems.

The marine ecosystems in shared regional seas face a range of threats from over-fishing, land-based pollution, shipping and resource exploitation, such as offshore oil and gas extraction. Water pollution, water supply and other issues – such as the impacts of inland navigation – are among the pressures in shared watercourses such as the Danube. These watercourses and land-based ecosystems in areas such as the Carpathians and the Balkans provide key links with ecosystems in the EU; these areas are often rich in important species that are less common or endangered in the EU, such as the Eurasian lynx and the vipera ursinnii rakoniensis. Thus, watercourses and land-based habitats such as saltic lakes in neighbouring countries provide important green infrastructure that is linked to the EU.

The EU therefore has a stake in addressing problems such as pollution levels and habitat conservation in neighbouring countries (see box below). The European Neighbourhood Programme, the Union for the Mediterranean, the EU's Partnership and Co-operation Agreement with Russia and other agreements provide a framework for co-operation in neighbouring regions. These growing links with neighbouring countries may be part of a megatrend identified by EEA: the momentum behind binding global agreements has ebbed from a high point in the 1990s, and recent progress has been seen mainly in the area of regional agreements.

The impacts of the activities of non-EU countries on the effectiveness of EU environmental policy and intervention

Depolluting the Danube

The Danube River Basin (DRB) is Europe's second largest river basin, and the world's most 'international' river basin as it includes the territories of nineteen countries, nine of which are non-EU countries. The DRB contains 130 identified industrial pollution hot spots and suffers from toxic chemical pollution as well as eutrophication caused by nutrient runoff from agriculture and industrial pollutants discharged into the river. The DRB also faces water quantity issues as a function of dams and flood control measures and vulnerability to climate change and extreme weather events[35].

The Joint Action Programme[36] of the ICPDR demonstrated that the Danube Countries were willing to invest over €4.4 billion over the period 2001-2005 in order to respond to priority needs in the sectors of municipal waste water collection and treatment, industrial waste water treatment, and agricultural pollution and land use.

Countries within the DRB are socially and economically diverse and face a variety of challenges that are bound up with the environment. Serbia and Romania contain significant mineral deposits that could serve as an economic foundation for rural development. However, the risks to the environment from poorly planned and technologically inadequate mining operations are great. While the EU's environmental legal framework provides a protection to the environment, there are concerns that since this does not apply to non-EU countries, such as Serbia, it could undermine EU efforts to address pollution in the Danube.

Threats to the conservation of the Egyptian vulture

The Egyptian Vulture was listed as Endangered in the IUCN Red List following a very recent and extremely rapid population decline in India, Europe and West Africa, owing to a variety of threats[37]. The species is included in Annex I of the EU Birds Directive and in Appendix II of the Bern, Bonn and CITES Conventions. As a result of the important decline in Europe, the species was classified as Endangered at European and EU level.

[35] Antypas, A (2010) Environment and the Purposes of a Danube Area Macro-regional Strategy

[36] The Joint Action Programme (JAP) of the ICPDR outlines the specific steps that were agreed to be taken over the period 2001-2005 to achieve the environmental objectives outlined in the Danube River Protection Convention

[37] BirdLife International, 2008

The species is migratory and spends a considerable part of its life cycle in Africa, where it may be facing significant threats. The threats stem from a range of activities including the use of poison baits (prohibited in Europe by the Bern Convention and in the EU by both the Birds and the Habitats Directives); and the electrocution of migratory and wintering, Egyptian Vultures that prefer to roost on electrical poles and pylons. In the latter case, halting these deaths requires the insulation of the power lines, especially near Port Sudan and coordination with the Sudanese Electricity Company to ensure the use of a safe model of pylons.

It is not possible to quantify the costs relating to the losses of these vultures, EU based vultures,. based in the Balkans and also Southern Europe, particularly Spain. However this example demonstrates how activities taking place outside the EU are undermining the EU's conservation efforts relating to these species, most notably through projects funded by the LIFE programme to conserve a number of raptors[38].

4.4 Summary of the scale of EU environmental problems

4.4.1 Current and continuing environmental problems in the EU

The scale of current environmental problems, as measured by attempts to value in monetary terms the external costs, is estimated to be in the order of €666 billion, representing some 6% of EU GDP (see Section 4.2). This estimate has been derived from a 'bottom-up' analysis of individual environmental domains. The estimate is similar to a published 'top-down' estimate of aggregate global external costs. In both estimates a degree of conservatism has been applied to avoid double counting. Both estimates also recognise that there are environmental costs that can not or have not been captured in the monetary valuation of impacts. For these reasons the estimated external cost should be taken as a minimum estimate of the scale of the problem.

The analysis has identified a number of areas where, due to policy intervention, the external costs are considered to be declining, and are now less than they were in the past. This is especially the case of air pollution due to energy and industrial production. However, the overall assessment of environmental trends is largely negative, with dangerous climate change a greater reality, and expected further losses of biodiversity. The projections of future global external costs suggest that external costs might double in the EU in the next 50 years[39].

In addition to the problems of well defined environmental impacts, there is also the risk that new and emerging problems will add to the current stock of problems.

The scale of the problem can also be understood in terms of the current levels of environmental expenditure undertaken to internalise external costs, mainly as a result of

[38] http://ec.europa.eu/environment/life/themes/animalandplants/lists/raptors.htm

[39] This is based on a comparison of current externalities in this report (€666 billion) (see annex 6 for full calculations) and the estimate from UNEP/FI Trucost (2010) which suggest that the global external costs are in the order of €5,000 billion, of which approximately €1,000 billion (20%) relates to Europe. The UNEP/FI Trucost estimate is based on external costs of marginal changes in resource use, pollution and waste. External costs were applied to data on current on projected greenhouse gas emissions, pollutants – sulphur oxides (SOx), nitrogen oxides (NOx), particulate matter (PM), volatile organic compounds (VOCs) and mercury, waste, waste, water withdrawal and use of timber and fish. The findings reflect uncertainties and margins of error inherent in estimates of externalities. Actual values are likely to be higher since the study takes a global view that simplifies many economic and environmental complexities. Due to the lack of available data the analysis excludes most natural resources used, as well as many environmental impacts including water pollution, most heavy metals, land use change and waste in non-OECD countries. Externalities would also be higher if degradation of environmental services such as watershed protection or climate regulation could be accounted for. The study applied rising external costs to projected 'flows' of resource use, waste and pollutants to estimate the size of future annual externalities if business continues as usual with regionally oriented low per-capita economic growth rising population levels and slow, fragmented technological development.

compliance with the EU environmental acquis. This is estimated[40] to be in the order of €319 billion in 2008 (2.7% of GDP). In other words, the current level of external costs is over three times the current expenditure to internalise external costs.

Of course, depending on the costs required to internalise the estimated current externalities, it may not be economically efficient to seek to do so – detailed cost benefit analyses of policy proposals, for new or revised regulations, increased levels of enforcement and revised or additional market based instruments, would be required in order to decide on the extent of internalisation on a case by case basis.

4.4.2 Increasing burden from global and non-EU environmental problems

The significance of international problems was seen by stakeholders as the problem most likely to get worse. The possibility of an increasing burden in the EU from global and regional problems is reflected in the projected increase in real terms of global external costs. This is expected to increase by a factor of four over the next 40 years[41]. As a consequence the contribution of global problems to EU problems might be expected to increase in importance relative to local problems. The contribution of the EU to the generation of global problems (for example through increasing demand for natural resources) is therefore also likely to become more significant.

4.4.3 Inability to decouple the economy form the use of natural resources/environmental impact

The pressure to reduce the global footprint of EU economic activity places increasing attention on resource efficiency and the need to secure not just a relative decoupling (where demand continues to increase but represents a smaller share of GDP) to absolute decoupling (an absolute fall in demand).

The economic cost (including external costs) of the inefficient use of resources (compared to the five most efficient MS) in the EU has been estimated, above, to be some €660 billion. This is a saving that could be achieved by transferring good practices and without any major investment in new technology – although there would obviously be a transition period as MS invested to catch-up.

4.4.4 Most affected groups and regions:

All Member States' authorities and public bodies (at national, regional and local level), the private sector (including SMEs), NGOs and other non-profit organisations, and civil society groups are affected by the problems and underlying causes identified.

The assessment of the most affected regions is ongoing; however it can be assumed that most of the capacity needs are located in the EU convergence regions and in particular in the Member States that most recently joined the EU. However, it should be noticed that some regions have additional pressures due to the presence of specific environmental assets (high value biodiversity areas) or cross-border and transboundary problems. These will also be particularly affected. Similarly private stakeholders in sectors that enter a crucial implementation phase or where compliance costs are higher would also be particularly affected.

[40] Study on the Competitiveness of the EU eco-industry, Ecorys et al, for DG Enterprise, 2009

[41] UNEP/Trucost, op cit

5 The drivers of environmental problems

This section describes the key institutional drivers and demonstrates the rationales for intervention in each of them. The four institutional drivers as presented in Figure 3.1 are:

1. Variable and inadequate levels of environmental protection through weaknesses in policy implementation and development;
2. Inadequate coordination, and inadequate integration of the environment into policy (including in 3rd countries);
3. Inadequate sharing of information and awareness of EU environmental problems
4. Inadequate system of support for eco-innovation

5.1 Weaknesses in policy implementation and development

Recent reviews of the state and prospects of Europe's environment, summarised in Section 4, evidenced in the recent SOER report (EEA, 2010)[42], and detailed in Annex 6, highlights that in spite of considerable progress in single thematic areas great challenges remain, particularly in the areas of climate change mitigation, biodiversity and nature conservation as well as resource exploitation and environment and health (EEA 2010). One way of meeting these challenges is through environmental policies. Besides mitigating some of the costs that these challenges present, there are also numerous socio-economic benefits attached to a stringent environmental policy (see Evidence Box 2).

The scope for improvements in EU policy implementation and development can be demonstrated by the achievements of recent EU policy development and improvements (see box below). This can be evidenced through experience in MS (See Annex 7 for detailed case studies on Member States and Annex 8.1 for a case study on nano-technology)..

Benefits of improved environmental policy implementation and development

The development and implementation of improved environmental policies and legislation will lead to a wide range of benefits, including health benefits, eco-system benefits, and broader benefits such as benefits to natural resources (e.g. fisheries or agriculture), social benefits and also general economic benefits (e.g. attracting tourism or eco-efficiency gains). It is, however, important to clarify up front what we mean by benefits and how we calculate them. Many of the benefits are in fact avoided damage. This is the case notably for health benefits and other environmental benefits such as eco-system benefits. In other words, the benefit is calculated on the basis of understanding what the impact or level of damage is and how this will be reduced with improved environmental regulation. This leads to estimates for reductions in the incidence of respiratory diseases for example, the reduction in the number of poor quality rivers, or the reduction in agricultural losses from pollution deposition. Other benefits are more 'common sense' benefits, i.e. where improved regulation leads to actual improvements rather than just a reduction of damage. For example, the social benefits of increased learning and awareness of environmental impacts and increased involvement in solving environmental problems is this type of benefit. Another example is the issue of improved access to clean drinking water. Also, improved environmental policy may lead to enhanced competitiveness and new job opportunities, e.g. by promoting environmental technologies and innovation

Source: Ten Brink and Bassi, 2008[43]

5.1.1 Gaps in Existing Policy – the Need for Continued Policy Development

The EU is likely to face new problems (such as nanotechnologies, discussed in 5.1.2), partly as a result of improved understanding of the physical environmental processes involved in

[42] Available from: http://www.eea.europa.eu/soer/synthesis/synthesis

[43] P ten Brink and S Bassi (2008) Benefits of Environmental Improvements in the European Neighbourhood Policy (ENP) Countries – A Methodology. A project working document for DGENV. http://ec.europa.eu/environment/enlarg/pdf/methodology_report.pdf

currently defined problems, and partly as a result of new forms of technological and economic development. In turn, these future challenges are likely to require continuing policy development.

Stakeholder views – Continued Policy Development

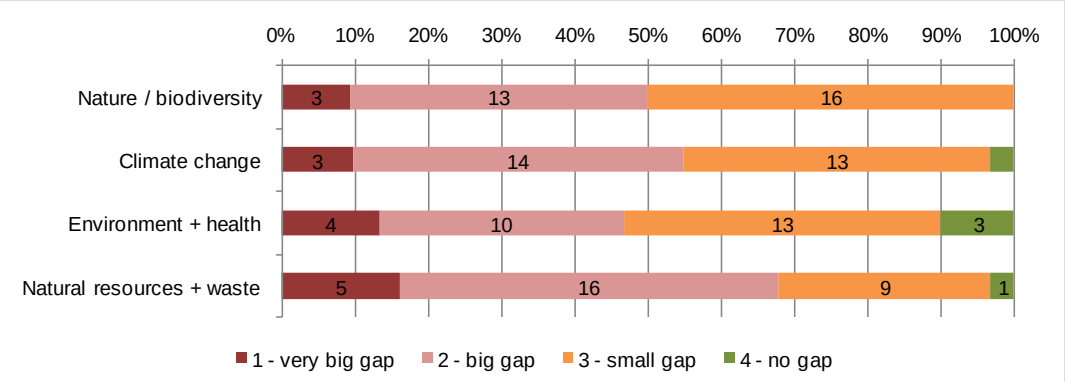
Extent and importance of the problem

Although most stakeholders (62%) from the GHK survey (including non-project stakeholders and project-beneficiaries) agreed that there is a need for continued policy development, the scope of the current acquis was not identified as being one of the most important problems that needs addressing. In fact, the scope of the acquis was the problem that was considered second least important (with addressing international problems as the least important). Most GHK survey stakeholders (54%) also believed the problem is most likely to stay the same in terms of severity, with only 25% believing the problem will increase in severity.

This relative lack of importance attributed to the scope of the acquis across all stakeholder consultations was largely a reflection of the fact that stakeholders could only identify a few areas which the current acquis does not address. Most of the interviews with Commission officials, for instance, highlighted that the EU's current legislation is already quite comprehensive. Nonetheless, a few areas were identified by interviews with EC officials, which the acquis could extend to, namely on aspects such as soil, invasive alien species and sustainable consumption and production patterns. A further relevant point that was raised in these interviews is the fact that there is a significant body of environmental policy which is non-binding (self-regulation), which means that likely progress on these aspects was thought to be limited and where further development might be needed.

Policy gaps were also identified by GHK survey respondents. For instance, in terms of broad policy areas, two-thirds of GHK survey respondents identified natural resources and waste policy as having the biggest need for policy development. 45% of respondents also believed that there was a gap in the development of policy in terms of climate change. There was a division of opinion in relation to biodiversity with half believing there is only a small, or no gap at all, whilst the other half believed there is either a very big or big gap to fill. Environment and health policy was thought to be the most comprehensive.

Figure 5.1 Policy development was only considered to be a significant problem by some stakeholders across the four environmental policy areas



Source: GHK analysis, GHK Survey

Underlying causes and barriers to the problem

Results from the EC workshop further supported these findings. However, attendees noted that a potential barrier to improving the scope of the current acquis is the perceived current lack of willingness and the absence of an appetite for new legislation and legal standards to be adopted. It is therefore, likely to become more difficult to regulate future environmental challenges, especially in the current economic and political climate. The perceived decline in support for the EU and its activities is also a potential issue.

As evidenced in the Box above, stakeholders consulted so far have agreed that, given the cost and time involved in developing new legislation, the emphasis should be on improving

the current acquis, thus avoiding the need for substantial new legislation. The value of this process can be identified from a review of recent improvements in EU policy development, two examples of which include:

- **Air quality improvements**[44] - Additional measures to deliver better air quality would cost between 0.04% and 0.12% of EU-25 GDP in 2020, but would achieve health benefits alone that would exceed the costs by a factor of two or more;
- **Improved pesticides management**[45] - Introducing further measures on the sustainable use of pesticides would generate net benefits to the EU especially farmers even with additional costs to some industries;

These examples are further discussed in Annex 8.2. The exploitation and demonstration of such opportunities to improve the scope and stringency of the acquis, where marginal changes can be made, and where the cost-effectiveness of action can be shown, will continue to be required.

5.1.2 The Problems of Implementation

Stakeholder views – Policy implementation

Extent and importance of the problem

The implementation of the acquis was consistently considered to be the most important issue to address across all stakeholders consultations. More than 80% of the GHK stakeholder survey agreed that the inadequate implementation of policies is causing major environmental problems to persist, and 55% of stakeholders identified inadequate implementation as the most important environmental policy problem in the EU (a full 15 percentage points ahead of the next most important policy problem).

On the other hand, respondents to the CoR questionnaire felt that weaknesses in policy development and implementation was not the most important problem to address, however it was still rated as being very significant. Respondents most often rated the weaknesses in policy development and implementation as second most important institutional barrier to addressing environmental problems (selected as most important weakness by 22% of the respondents and as second most important by 28% of the respondents).

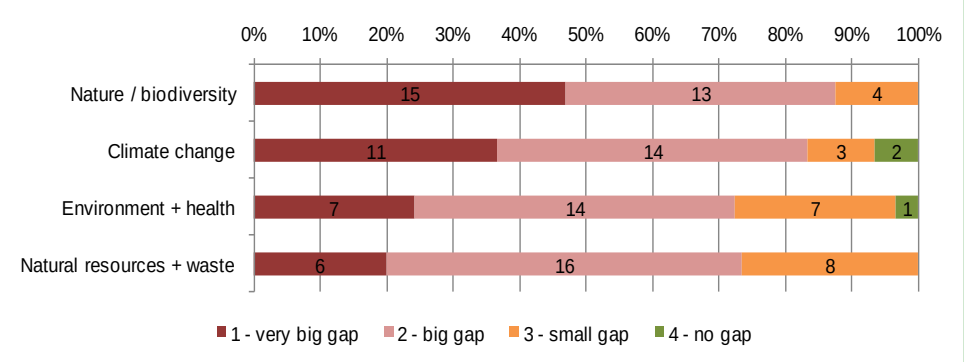
Policy implementation was identified by GHK survey respondents as being a significant concern across all four environmental policy areas; more than 70% of respondents rating the gap in policy implementation as either very big, or big across all four policy areas, The gap was thought to be especially big in terms of nature and biodiversity policy; almost half believed there was a very big gap in policy implementation with almost all the remainder believing there was a big gap (see Figure below).

In the case of nature and biodiversity, the management of the Natura 2000 network remains the biggest challenge as emphasised across all stakeholder groups. Interviews with the Commission also highlighted that Member States continue to breach their legal obligations due both to adjustment problems and general non-compliance. Key barriers to the implementation of marine policy, for instance, are enforcement and ensuring compliance. The issue of enforcement was also raised in the survey responses as a key barrier to the proper implementation of the acquis. The use of derogations and exemptions by Member States was also noted as being a potential contributing factor to the inadequate implementation of environmental policy.

[44] The Communication on Thematic Strategy on Air Pollution and The Directive on “Ambient Air Quality and Cleaner Air for Europe”. Impact Assessment. http://ec.europa.eu/environment/archives/cafe/general/keydocs.htm

[45] European Commission (2006) Thematic Strategy on the Sustainable Use of Pesticides. Impact Assessment. http://ec.europa.eu/environment/ppps/pdf/sec_2006_0894.pdf

Figure 5.2 Stakeholders believed there were significant gaps in policy implementation across all four environmental policy areas



Source: GHK analysis, GHK Survey

Underlying causes and barriers to the problem

When asked to consider the causes of continuing environmental problems in the EU, GHK survey respondents indicated that more than 40% of the cause is due to weaknesses in the current EU environmental policy and difficulties with its implementation. The remaining 60% was thought to be due to the broad range of demographic, economic and social pressures on the environment which indirectly implies weaknesses in the current policy. Some survey respondents did highlight that the two causes are closely linked, in that social and economic pressures result in the inadequate implementation of the acquis, whilst the environmental acquis can mitigate some of the pressures (although some are outside the competence of the EU). One GHK survey respondent noted that the inadequate implementation of the acquis is not necessarily due to the fact that policy is weak, but that the pressures are perhaps too strong for policy to compensate.

The GHK survey highlighted that the inadequate implementation of the acquis was largely seen as a problem of insufficient resources and differing competencies and understandings at Member State level. Similarly, results from the CoR survey showed that 40% of respondents felt that regional level improvements in the implementation of EU environmental policy/legislation are most effective in addressing the identified environmental problems. A further 24% believed that national responses also play a significant role. However, a few GHK survey respondents also noted that the implementation of the acquis was being significantly hampered at the policy level by the lack of integration of environmental concerns in the implementation other EU policies (e.g. in terms of marine policy). Some of the CoR respondents also indicate that EU levels were also indicated as important (24% of responses), contrary to the local level, which received only 12% of responses.

CoR respondents were asked to consider the most significant barriers to improving the implementation of the acquis. The two most frequently cited in response were the 'lack of financial resources to adequately implement and enforce policy' (identified as the 'most significant' issue by 56% of the respondents and placed in the top three significance levels by all but two respondents) and 'conflicting priorities, e.g. between development and the environment' (selected as 'most significant' issue by 20.5% of the respondents and as second most significant by 41% of the respondents), which is a reflection of inadequate integration.

The 'least significant' issue in terms of implementing EU environmental policy/legislation for CoR respondents was the 'lack of knowledge': 46% of the respondents consider this issue as 'least significant' and 13% as 'second least significant'. Other issues mentioned by respondents include the lack of technical and human resources, the lack of a relevant policy framework at the national and regional levels, as well as the lack of knowledge and awareness by the general public.

GHK survey respondents were split almost equally across those who thought the problem would improve or get worse to 2020, whilst most (more than 40%), believed the problem would stay the same. Those who believed the problem is likely to intensify attributed this to a declining support for the EU, the accession of new Member States who will experience difficulties in implementing European legislation and the absence of any concrete mechanisms which will stimulate the acquis' implementation. A few survey respondents felt the situation unlikely to improve as long as resources (and capacity to manage them) were not increased. Moreover, the current economic climate is likely to worsen the problem as the environment drops down on the agenda, in favour of other priorities.

It is not possible to specify the exact contribution of implementation failures to the overall scale of the problem. Moreover, the full implementation of existing policies would not be expected to internalise all external costs, where the costs of so doing would be greater than the environmental benefits achieved. However, the costs of continued environmental damage would be lower if the acquis were properly implemented; difficulties of transposition and inadequate capacities to implement and enforce polices at MS level are resulting in higher external costs. Effective implementation of environmental policy can lead to cost savings as well as environmental benefits:

- **Benefits from implementing the IPPC –** To date, there has been insufficient implementation of best available techniques (BAT). Estimates indicate that implementing BAT is likely to incur additional costs of €2– €7 billion for industry and yield €9 – €30 billion in cost savings, a benefit-cost ratio of over €5 for every €1 spent. This increases to over €7 for every €1 spent if health benefits are included.

This example is further detailed in the Annex 8.3.

5.1.2.1 Infringements

Environmental infringement procedures still account for approximately one third of all open cases for non-communication, non-conformity or bad application of EU law in the EU-27. At the end of 2009, DG Environment had 451 open infringement files under investigation (see Figure 1). Infringement files are those in which the first step in legal action under Article 258 of the Treaty on the Functioning of the European Union (TFEU) has been taken through the issuing of a letter of formal notice. Over the past five years the number of open cases dealt with by DG Environment has remained broadly constant (with a high of 571 in 2004 and a low of 421 in 2006).

At the end of 2009, Spain had the highest number of ongoing infringements cases (40), most relating to nature legislation (14) followed by water legislation (10) (see Figure 5.1). Italy and Ireland had more than 30 open infringements each and the Czech Republic, France and the UK had each 26. The Netherlands has the lowest number of infringements in the EU-15 (EC, 2010c). The high number of infringements indicates that the implementation of environmental legislation remains far from satisfactory.

5.1.3 The Causes of Implementation Problems

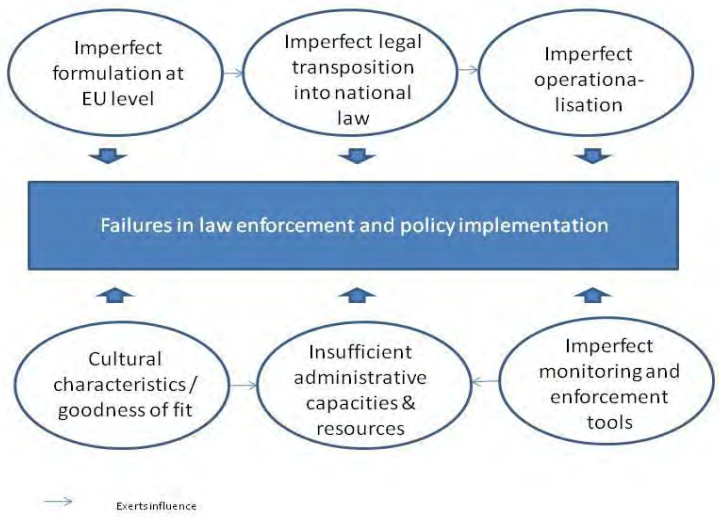
There are a number of causes – some legal, some political, some economic and some linked to different European legal-administrative cultures – for why ensuring compliance with the requirements of the environmental acquis in Europe remains a challenging task. A classification of causes that is in widespread use is given in Figure 5.2.

There is not one dominant factor that can help explain implementation failures. Rather, different factors influence each other. A full discussion of these different factors is presented in Annex 8.4.

- Imperfect formulation and imperfect legal transposition
- Imperfect operationalisation of policy at the national level
- Cultural characteristics and goodness of fit
- Insufficient administrative technical and financial capacities
- Imperfect monitoring of implementation and enforcement

Overall, European environmental policy and law enforcement and implementation largely rests on cooperative, partnership-based approaches, given the larger absence of direct enforcement tools at the European level. Moreover, provisions for citizen or private law enforcement of EU legislation is allowed only restrictively. Litigations rights of environmental associations, for example, are either not possible or placed under various constraints in the EU member states, in contrast to the US. Implementation and law enforcement is thus heavily dependent on both the ability and willingness of EU Member States, i.e. it is a mix of acceptance (legitimacy), will to enforce (power) and capacity to act (management). While infringement procedures can help tackle problems of formal norm compliance they are hardly suited to deal with problems of factual norm compliance.

Figure 5.3 Causes for failures in implementation and enforcement



Source: developed on the basis of information in Richardson, 2001

5.2 Weaknesses in synergies and with the integration of the environment

The two main issues with regard to synergies and integration are:

- **Synergies in the use of other financial instruments for the environment.** There are a number of other EU instruments which address environmental concerns to differing degrees and aspects (e.g. Structural Funds, Rural Development Funds, CIP). The complementarity principle aims to ensure that overlaps between the various instruments are avoided, in terms of the actions to be financed and the beneficiaries to be supported. This is to ensure synergies between the EU instruments are significantly improved and to also avoid double funding. Ensuring complementarity therefore requires cross-working between the different DGs responsible for managing the instruments and between the different competent authorities in the Member States.
- **Integration of the environment (in policy and in practice).** This relates to the principle of environmental integration as set out in the Treaty, and further underlined by the Cardiff process. It is based on the recognition that environmental policy alone cannot achieve the environmental improvements required as part of sustainable development, and that essentially all sectors should take clear steps on integrating environmental concerns into their policy areas, thus contributing to achieving environmental objectives. Given that the integration of environmental considerations into policy is to be carried out at the level of a given sectoral policy, ensuring integration lies with the DGs responsible for their respective policy area and between the competent authorities in the Member States.

Annex 8.5 explores these issues on the use of other EU financial instruments for the environment and Annex 8.6 which describes the progress made as laid out in the stocktaking of the Cardiff process, Stakeholder views on the issues are presented in the Box below.

Stakeholder views – Integration and synergies

There is a distinction between integration, and creating synergies (mainstreaming). Integration of environmental concerns into sectoral policies is seen as the responsibility of individual policy units. Creating synergies on the other hand, has less to do with policies than with improving complementarities between actual funding instruments. Stakeholders tended to focus their feedback and discussion on the former issue (i.e. integration of environmental concerns into sectoral policies), rather than on improving synergies between funding instruments as such (i.e. between, for instance, LIFE and the European Agricultural Fund for Rural Development (EAFRD). The latter point was, however, reflected in proposals (especially for Commission service interviews), for developing options for the future of LIFE, whereby LIFE could act as a test bed for pilot projects, which would then be mainstreamed through other funds.

It is important to note that the issue of integration of environmental concerns into sectoral policies can be broken down into two key components:

- integration in principle: the integration of the environment concerns into sectoral objectives; and,
- integration in practice: the lack of implementation of integration objectives (i.e. the lack of implementation of more sustainable concerns into sectoral policies).

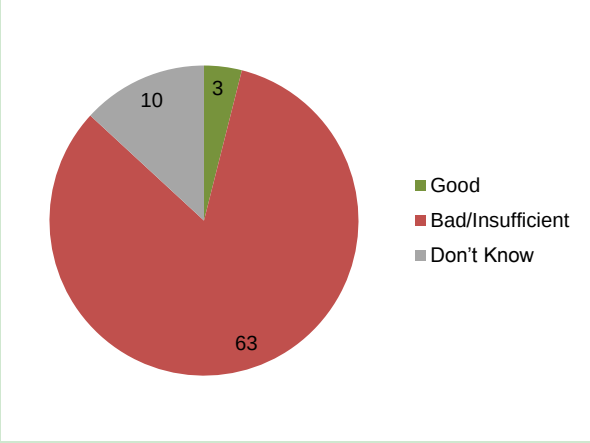
Extent and importance of the problem

Consultation of Commission services suggest that whilst some progress has been made in improving environmental integration within sectoral objectives (and to a lesser extent in practice), it remains a key issue across the policy areas and there is still significant room for improvement.

In fact, respondents to the CoR questionnaire most often rated the weaknesses in the integration of environmental policy considerations into other policy areas as the most important institutional barrier to addressing environmental problems (selected as most important weakness by 41% of the respondents and as second most important by 16% of the respondents). Moreover, weaknesses in the use of various EU funding instruments to support the environment was also felt to be a significant problem, being selected as most important weakness by 15.5% of the respondents and as second most important by 22% of them.

The general consensus across GHK survey stakeholders, EC workshop attendees and interviews with Commission officials was that the problem of integration is one of its application, not the principle. Most stakeholders did think that the main problem lay in the implementation of the policies, rather than the definition of polices; instruments such as the Common Agricultural Policy (CAP) are 'greened' in principle, but this does not always translate into their application.

Figure 5.4 The clear majority of workshop participants did not think that the integration of environmental concerns into sectoral policies has been successful



Source: GHK analysis, EC Workshop

Overall, the impact of other EU policies and spending instruments was seen as the second most important environmental policy problem by GHK survey respondents (after the implementation of the acquis), especially in the area of nature and biodiversity policy and natural resources and waste. Some EC workshop participants for instance, noted that the lack of coherence in funding for

biodiversity across major European policy instruments (as well as weak political prioritisation in Member States), are the key factors in the low uptake of the wide range of funding opportunities for biodiversity.46 Indeed, integration was seen as a problem by most workshop participants, with 83% feeling that integration to date has been poor.

Interviews with Commission officials highlighted that mainstreaming of the environment into other policy areas remains the 'preferred approach', however some policy areas are lagging in progress compared to others.

The CAP was mentioned most often as the funding instrument in which integration in practice was most difficult. Participants to the workshop perceived the CAP as 'unsuccessful' in integrating nature and biodiversity objectives into the instrument, and as counteracting other environmental policies. Areas outside Natura 2000 were felt to be particularly neglected, with CAP funding being viewed as 'patchy' on the ground, with low uptake by some farmers. However, in its mid-term review of the 6th Environment Action Programme (6EAP) (COM(2007) 225) the Commission expressed a different view from above, through recognising that, "in the agricultural sector, there have been fundamental reforms over the last 15 years that have moved towards seeing farmers as stewards of nature". Interviews with Commission officials also highlighted that the impacts of Cohesion Policy and the Common Fisheries Policy require better integration. In the workshop it was also perceived that structural funds have focused mainly on infrastructure, innovation and competitiveness rather than on the environment.

Specifically in the case of nature and biodiversity, integration was seen as a particularly major issue by stakeholders, especially given that currently only 20% of financing needs for the Natura 2000 network are being met. This 'gap' in financing needs highlights the importance of other instruments, namely rural development and regional funding, and the role they can play in contributing towards filling the gap. Currently, although instruments such as the CAP and the European Regional Development Fund (ERDF) are 'proofed' and 'greened' (e.g. explicitly mention Natura 2000) and opportunities to finance activities relating to the network exist, uptake remains poor in practice. This lack of application 'on the ground' is most likely associated with poor administrative and absorption capacity in the Member States, and the fact that for example in agriculture, less strategic planning is undertaken for nature and biodiversity.

Underlying causes and barriers

Given the general viewpoint that integration is an issue of application, it is perhaps unsurprising that many stakeholders in the GHK survey, in the workshop and in the interviews with EC officials, noted that the problem of integration manifested itself at a national, Member State level (once the policies had been developed and environmental concerns integrated); there is a disconnect between what is happening at the EU policy level and what is happening in practice at the local level. This is possibly due to the degree of flexibility given to Member States to utilise the funding from the key instruments and/or because the instruments are regionally managed. As noted by one Commission interviewee that the problem is less with the policies or the instruments themselves, than in their delivery mechanisms.

Some workshop participants felt that there are limits to how far integration can go given the different interests and priorities of Member States – the environment is generally a lower priority and gets side-lined in the interest of other issues. Other factors included the lack of adequate capacity and knowledge sharing, as well as the prevalence of competing interests and the different weights of funds which reflect the different priorities in Member States. Overcoming barriers such as a lack of implementation at the Member State level and a lack of knowledge of the benefits that can be gained from improved integration, will be key to addressing this area.

Interviews with Commission officials stressed that a further barrier to better integration is a lack of knowledge of the 'win-wins' obtainable through properly integrating environmental considerations into other policy areas. For example, a large proportion of farmers do not currently view themselves as 'guardians of the landscape', and more effort is required to address such information barriers to improve the outcomes of 'greening' in policy areas such as agriculture. Furthermore, interviewees pointed out that given how biodiversity cuts across all policy areas and is affected negatively by certain policy areas (e.g. infrastructure provision affects biodiversity corridors), much more effort is required to improve integration across the board.

[46] Changing Perspectives: How the EU budget can shape a sustainable future (2010). Available from: http://www.eeb.org/EEB/?LinkServID=7819455B-C145-9353-9D77F0192D2A9BD2&showMeta=0

Although most GHK survey stakeholders (46%) believed the problem would largely stay the same until 2020, almost 40% thought the environmental problems caused by the impact of other EU policies was likely to increase.

5.3 Inadequate levels of awareness and sharing of information

Recent Eurobarometer surveys (2007 and 2010) suggest that there is still a general lack of awareness of environmental problems amongst the general public. This persistent lack of awareness is considered a key contributing factor to the continued environmental problems in the EU. A lack of awareness is largely considered to be, for example, a key external barrier to the implementation of environmental policy and legislation. For instance, the major market driving force for promoting environmental responsiveness in industry is generally consumers with high environmental awareness.

The issue of awareness seems to be one of two parts:

- One of understanding (e.g. general awareness of environmental problems); and,
- One of knowledge sharing (e.g. awareness of potential solutions to the problems) and up-taking of solutions.

Although the two are closely related (e.g. the sharing of data on the status of the marine environment to improve understanding on its vulnerability to climate change), it is nonetheless worth making the distinction as the two are relevant to different stakeholder groups in different ways, and, most importantly, require different responses. The first is most often applied to the general public and businesses who are often not sufficiently aware of environmental problems and their contribution to them. There is also some perception that policy and decision makers are also subject to a lack of awareness The recent report on The Economics of Ecosystem Services and Biodiversity (TEEB) can, be seen as a response to this problem. The report is tailored to policy makers and demonstrates the value of ecosystems and biodiversity to the economy, to society and to individuals and thereby underlines the urgency of policy action[47].

The second is much less relevant for the general public and much more a problem that needs to be addressed at the decision-making (e.g. policy) level. The issue, for instance, applies to businesses (e.g. being informed of new and beneficial environmental technologies), the top-down and bottom-up transfer of knowledge between decision makers (e.g. local and national level), the sharing of knowledge between networks of organisations and authorities (e.g. IMPEL). In the case of the environment, the sharing of best practice examples is perhaps one of the most relevant types of knowledge sharing.

Stakeholder views – awareness raising and information sharing

Extent and importance of the problem

The need to improve awareness levels and to increase knowledge sharing was most often rated as having middling importance by GHK survey respondents. Similarly, CoR respondents gave a lower level of importance to the inadequate levels of awareness of environmental problems by policy-makers, with 22% ranking this weakness as second most important and an equal percentage as third most important. However, Commission interviewees believed that awareness of the public and of politicians is a key issue which needs to be improved, especially given the links between awareness and policy implementation.

A lack of awareness and knowledge sharing was rated by GHK survey respondents as second most important in the policy area of environment and health. However Commission interviewees considered that the problem was relevant to virtually all policy areas. Interviews with Commission services suggested that knowledge sharing was also seen as important in the case of waste policy

[47] TEEB for National and International Policy Makers (2011). Edited By Patrick ten Brink (Institute for European environmental Policy, IEEP). Earthscan Available from: http://www.teebweb.org/ForPolicymakers/tabid/1019/Default.aspx

and resource use, with a lack of knowledge transfer between national and local levels, whilst in the case of the Natura 2000 network, the lack of awareness of the benefits of the network is seen as a major barrier to progress.

The importance of public awareness lies in the scope to generate political pressure which can drive the implementation of a policy. This was noted during interviews with Commission officials as being as important, for example, in the case of maritime policy, where the issue is relatively intangible and invisible. The force that public pressure can bring to bear on politicians therefore is especially important. However, first, the public has to be aware of the problems (or the solutions) before it can pressure politicians to address (or implement) them.

Underlying causes and barriers

EC workshop participants also noted that raising awareness should not be seen as a standalone activity, but rather as an activity that is associated with all other activities. Several workshop attendees noted that a lack of awareness impedes the implementation of policy. Some also thought that an adequate implementation of policy would also lead to greater awareness. Awareness is therefore considered a critical element to ensuring the adequate implementation of policy. As such, many stakeholders indicated that a lack of awareness is an underlying cause of other problems.

Nonetheless, a few GHK survey stakeholders suggested that in the case of politicians (compared to the public) the issue is one of increasing political will, and less a case of increasing knowledge.

5.4 Inadequate support for finding new solutions to environmental problems

The *Europe 2020* strategy aims to promote collective action to turn the EU into a smart, sustainable and inclusive economy delivering high levels of employment, productivity and social cohesion. The strategy puts innovation and green growth at the heart of its blueprint for industrial competitiveness. More detailed information supporting this section can be found in Annex 8.8.

A recently published green paper[48] outlines proposals for a Common Strategic Framework which brings together future EU research and innovation funding programmes. This will have profound implications for eco-innovation funding since the full range of current instruments focused on research through to market deployment (e.g. FP7, CIP, LIFE, etc.) would be required to work together more strategically and in a more streamlined manner.

One interpretation of this new system would see existing mechanisms such as elements of CIP and LIFE take forward and mainstream particular innovations arising from research projects funded under FP8. This would help to develop a pipeline approach to funding innovation, moving research ideas to market and policy application.

However, the evolving definitions of eco-innovation have important implications for how EU interventions for eco-innovations are framed. In a strict sense, eco-innovation has often been interpreted as the development of novel environmental technologies that go beyond the Best Available Technologies (BAT) in reducing pollution and environmental impacts for any given industrial sector. However, over the past 5 years “resource efficiency” has come to the fore. Encapsulating material and energy efficiency, as well as water and carbon efficiency during production, lifetime and disposal of products (or ‘cradle to cradle’), resource efficiency provides a far broader interpretation of eco-innovation.

Importantly, the pursuit of eco-innovation is not just about developing new consumer products or technologies that are intrinsically cleaner and greener than their predecessors. It is also about engendering better practices across the economy. Using this broader idea of ‘eco-innovation’, interventions now need to be flexible enough to capture a more diverse set of objectives and outcomes than previously.

[48] European Commission, *‘From Challenges to Opportunities: Towards a Common Strategic Framework for EU Research and Innovation funding’,* February 2011, COM(2011) 48

Stakeholder views – supporting eco-innovation

Regarding general implementation of the eco-innovation issue, all stakeholders recognised that new policy and technological responses are required to address continuing and future environmental problems, above all of the other drivers. Some workshop participants however, suggested that the lack of support for eco-innovation should not be considered as a driver (especially when interpreted strictly as supporting innovative eco-technologies).

Respondents to the CoR survey rated the inadequate support for eco-innovation as one of the least important issues to address. Views in the case of the GHK survey were very much divided about how important the need for eco-innovation is; roughly a third each thought it was most important, of middling importance, and of low importance. Almost the same was found when GHK survey respondents were asked how the problem would change in severity by 2020, with roughly a third each saying it would decrease, stay the same, or increase.

6 The policy rationale and EU added value for a specific instrument

This section draws together the preceding analysis with a summary of the implications for the future LIFE instrument. For each of the institutional drivers, the lessons learned from the mid-term evaluation in relation to the current (LIFE+) instrument as well as the ex-post evaluation of LIFE, LIFEII and LIFEIII are also highlighted. International exemplars of specific financial instruments and the rationale behind these instruments is provided in Annex 9. Together, these different perspectives (forward- and backward-looking) illustrate the extent to which there is a continued need for a future specific instrument for the environment.

The section concludes by identifying, for each driver, where the future specific instrument for the environment can add value and how it could best address each of the drivers.

6.1 The scale of the problem – a rationale for intervention

The analysis of the scale of environmental problems identifies a clear rationale for EU action – the scale of external costs due to common environmental problems across the EU. The scale of the problem is many times greater than the scale of EU interventions; the estimated total EC expenditure on the environment is estimated to be some €20 billion per year; even with an intervention rate of 50% and a leverage of a further €20 billion, this represents only 3.5% of the identified problem.

Moreover, the scale of the problem is expected to grow in real terms, possibly doubling over the next 40 years, as climate change and biodiversity loss become more pronounced, and from the direct and indirect (via contributions to global problems) costs of a failure to decouple resource use from economic growth.

Given its limited size (based on the current allocation), a specific instrument for the environment cannot fully tackle this problem. As under the current LIFE+ Regulation the specific instrument for the environment, with a relatively modest budget, should clearly be used to target the underlying institutional weaknesses rather than the physical environmental problems directly and focus on catalysing and leveraging changes in policy development and implementation including by improving the integration of environmental concerns in other policies in practice.

6.2 Overview of the institutional drivers

The major needs as identified in Section 5 relate to the improved implementation of EU environmental policy and the integration of the environment into other policies through the creation of synergies, as the most feasible use of LIFE in contributing to the overall environmental problems.

At a strategic level, the problems that the LIFE instrument would aim to address are the four key institutional drivers identified in Section 3.1.2 (see Figure 3.1):

1. **Variable and inadequate levels of environmental protection through weaknesses in policy implementation and development** – difficulties of transposition and inadequate capacities to implement and enforce polices at MS level are resulting in higher external costs, than with effective implementation (recognising existing policies fully implemented would not be expected to internalise all external costs, where the costs of so doing would be greater than the environmental benefits achieved). Meanwhile, new problems, partly as a result of improved understanding of the physical environmental processes involved in currently defined problems, and partly as a result of new forms of technological and economic development, will need continuing policy development including to contribute to reaching the targets set out in the Europe 2020 strategy.
2. **Inadequate levels of synergy and integration:**

- Missed opportunities for creating greater positive environmental impacts through improved levels of complementarity between LIFE+ and other EU financial instruments. There is currently a missed opportunity of catalysing an improved scale and quality of project pipeline; and of securing a better integration of funding objectives within projects to aid mainstreaming.
- Limited effectiveness in the implementation of integration objectives (i.e. the lack of implementation of more sustainable concerns into sectoral policies)

3. **Inadequate awareness of EU environmental problems and sharing of information –** the lack of urgency and momentum in tackling environmental problems and resourcing implementation reflect in part a lack of civil society interest and pressure for change; itself arising from a lack of awareness of environmental problems and possible solutions. At the same time there is greater need to share knowledge and experience to improve learning in the application of environmental policy instruments.
4. **Inadequate system of support for eco-innovation** – the market failures that lead to underinvestment in innovation generally are compounded by the failure to 'price' environmental benefits into the returns to innovation. There is therefore a shortfall in the investment that would otherwise be made in eco-innovation (i.e. innovation that seeks to improve environmental performance). As a result problems are greater than they should be and continue for longer. In addition to addressing the underlying market failures, support to innovators is required to overcome barriers to innovation.

6.3 The potential role of LIFE in addressing the institutional drivers

Section 5 has described the main institutional drivers that fail to adequately address underlying market and regulatory failures leading to the specified environmental problems. These drivers are addressed to varying degrees by the current specific instrument. In the following sections we consider the lessons learned in relation to the contribution of the current LIFE instrument to these drivers; and the potential role that a future specific instrument could play in continuing to address these long=standing weaknesses.

6.3.1 The role of LIFE in policy implementation and development

The importance of the general objective of LIFE+ – developing and implementing EU environment policy – remains highly relevant and is, if anything, becoming all the more urgent with for example, the failure to meet biodiversity targets, and the increasing recognition of the importance of natural capital as the provider of economically and socially essential eco-system services. The Regulation has therefore to support the implementation and development of EU environment policy.

The mid-term evaluation highlighted the important role that LIFE+ plays in implementation and development of EU environmental policy. For example, forty-five percent of project beneficiaries who responded to a survey undertaken in the MTE regarded the Programme as crucial to the development and implementation of EU environmental legislation and policy, with only 6% of respondents considering it not to be an important funding instrument. All Project Co-ordinators without exception considered that the Programme had a continuing role to play in policy implementation and development, further indicating that the implementation of the acquis remains the most important issue to be addressed by a specific instrument for the environment.

Traditionally many Nature projects have been identified as being successful in policy development and also aiding in the process of updating policy. The Nature strand has been viewed as successful as it has focused on best practice and demonstration of implementation in a very concrete and well defined area. For example the LIFE INDEMARES(LIFE07/NAT/E/000732) project will ensure necessary studies are carried out to complete the identification of the most representative marine areas around Spain. It also proposes to add at least 10 sites to the Natura 2000 network. The results will support any future revision of the Birds and Habitats Directives' annexes and will contribute to the implementation and reinforcement of the marine international conventions applied in Spain.

Conversely the Environment Policy Governance (EPG) strand covers a wide range of themes and therefore policies, which can make it difficult to link EPG projects to the development of policy in the thematic units. However, increasingly priorities are being set for the calls for proposals, which aim to create a clustering of projects and develop expert knowledge on particular areas leading to greater contributions to policy development. An example of EPG contributing to policy development is a project managed by Airbus which sought to develop an extended product and site-oriented environmental management system (EMS). Large-scale pilot experiments were used to demonstrate a broadening of the scope of the EMS to integrate product-related activities and a life-cycle dimension. Guidelines were produced and will be used to further disseminate this approach both within the aerospace sector and to other industries.

It is also evident that by supporting NGOs through operational grants, LIFE further contributes to the implementation and development of environmental policy, albeit indirectly. NGOs, for instance, play an important role in ensuring good governance and balanced stakeholder involvement in environmental policy. They also play a clear role in safeguarding policy making from regulatory capture due to the disproportionate influences from groups of stakeholders, and to articulate the interests of civil society. From an environmental policy implementation perspective, it can arguably be more effective to enable NGO to maintain their policy watchdog function and follow-up on insufficient policy implementation than for the Commission to fulfil these functions, especially as NGOs are often closer to what is happening on local and regional levels.

Commission progress: The Commission is improving coordination by working with the policy units to identify focus areas within the limits of the current legal framework.

6.3.2 Addressing the weaknesses in policy implementation and development

The analysis suggests that in various ways the implementation weaknesses stem from a combination of insufficient political will, insufficient resources and the lack of capacity among national and local competent authorities. Whilst the LIFE instrument cannot fundamentally shift political positions it can aim to influence these positions over time through improved understanding of issues through research and higher levels of awareness and by contributing to the improvement of institutional capacity.

The provision of additional funding through LIFE+ (appropriately targeted) would improve the capacity of a number of supervision institutions. Given the information on budgeting this would need to be principally targeted at personnel, given the overwhelming proportion of institutional budgets that this occupies. However, there are potential problems with directing this from EU funds. Assuming that this is beyond the instrument, then the instrument should be targeted at the priorities identified in inspection plans drawn up by Member States. However, there may be limitations to this.

Overall, there are a wide range of implementation problems in the Member States. Many infringement cases concern failures of transposition or development of appropriate plans or programmes. Supervision and enforcement activity is also more problematic. The task is never competed and it cannot be specified in fine detail in EU law. The function is continuous and has to be appropriate to individual circumstances. As shown above there is a good case for a funding instrument to assist in this regard. It would have to be designed to allow for support to the most critical supervision objectives in any particular Member State and should not reduce current support for the networking activities of IMPEL. LIFE has not worked extensively in the area of enforcement and there is a lack of visibility in enforcement issues. For example, for nature there have been no proposals received for enforcing borders and the EPG strand has too many focus areas to make any real difference to enforcement issues. In the past the LIFE instrument has focused mainly on innovation and there was fewer links to implementation. In LIFE+ a fundamental move was to increase emphasis on demonstration. However it is unclear whether sharing best practices and experience on how to better implement environmental legislation has been enough to meet the objective of better implementation.

The cross-cutting nature of environmental legislation also means that the implementation of other EU policy can considerably influence whether the environmental acquis is being fully implemented. There is therefore, a rationale for further improving the levels to which environmental concerns have been incorporated into other policy areas, and perhaps more crucially, the extent to which these changes at the policy level are translated into action on the ground. Significant steps have been made to this end at the policy level, however there do seem to be difficulties in applying this integrated approach in practice in Member States and maximising synergies on the ground. This issue will be discussed further in Section 6.3.2.

Stakeholder views – Rationale for intervention in policy development and implementation

Policy development

Although the need for further policy development was not thought to be as great relative to other environmental policy issues, almost 70% of GHK survey stakeholders believed there was substantial added value from EU level action. Only one consultee thought there was no added value in doing so, although a third believed there was no added value for financial expenditure at the EU level on policy development. The transboundary nature of environmental problems was by far the most commonly cited rationale by GHK survey respondents for EU intervention in policy development.

Whether a dedicated financial instrument for the environment is the best means to address this problem however is not so clear. For instance, participants in the EC workshop expressed reservations as to whether an instrument for the environment should address weaknesses in the development of EU policy. There was a general sense that the instrument should focus on demonstrating innovative approaches to policy problems, rather than actual policy development. Policy development was ranked as the second least important reason for having a specific instrument for the environment by the workshop attendees.

Policy implementation

Although the implementation of the acquis was largely seen as a problem at the Member State level, virtually all GHK survey stakeholders believed there was substantial added value from EU level action to improve the implementation of environmental legislation, with all respondents believing there was a need for financial intervention to address the problem. The most common rationales given for doing so was the transboundary nature of environmental problems and the regulatory failures in Member States.

90% of GHK survey respondents indicated that there was substantial EU added value for EU level action to improve policy implementation, with 97% believing that there is a rational for EU financial intervention. Enhancing the capacity of Member States to implement policy was ranked as the most important role for a specific instrument for the environment.

More than 80% of respondents to the “Your Voice in Europe” survey also noted that EU financial assistance for the implementation of the environmental acquis is relevant or very relevant as a justification for a specific instrument for the environment. 70% also believed that supporting and improving implementation was either very important or important for a future financial instrument for the environment.

6.3.3 Addressing the weaknesses in environmental integration

There are several lessons that can be learnt from LIFE+ in relation to complementarily and integration.

The complementarity principle aims to ensure that overlaps between the various EU instruments are avoided, and if possible, to promote synergies . However, the mid-term evaluation pointed out that the focus on risk management and ‘avoidance of double funding’ has tended to dominate over a focus on building and enhancing linkages and synergies with other programmes and financial instruments, and has led to some conservatism about developing linkages. Building these linkages with other programmes is made especially more

difficult where, unlike LIFE, they are implemented through shared management arrangements.

The difficulty to create synergies between the various EU instruments was identified in the mid-term evaluation. The main finding was that even within themes, the projects lacked coherence as a programme, addressing a wide range of issues and approaches and limiting the scope for effective multipliers. Examination of the project descriptions suggested that there is a high level of diversity, especially among waste and climate change projects, that makes it particularly difficult to develop EU added value beyond the individual projects. The evaluation went on to suggest that simply maintaining individual projects under-utilises the potential of the Action Grants to generate EU added value in terms of generating multiplier effects through greater synergies between projects.

There are LIFE projects that demonstrate that creating synergies between funds is possible. The project 'farming for conservation in the Burren' aimed to develop a new model for the sustainable agricultural management of the priority habitats of the Burren. Importantly, the project built on its success among the 20 pilot conservation farms and a much larger "Farming for Conservation Programme" has been launched. Supported by the agri-environmernt programme for Ireland, the scheme aims to bring 100 Burren farmers into the new agri-environmental programme.

The level of integration of environmental requirements in the operation of other EU sectoral policy areas remains unsatisfactory, despite efforts made within the Commission to improve integration through increased communication, which appear to be having limited success. The mid-term evaluation found that the Regulation has had no significant impact on the allocation of resources in other programmes, with the informal communication channels that do exist to manage and promote integration being in themselves inadequate to have anything but marginal effects on the priorities and resource allocations of individual programmes. There does remain, however, strong interest and commitment at the level of the Commission to better communicate and maintain dialogue between the different sectoral policy areas, which should contribute towards improving integration.

The idea of a project pipeline was suggested in the Mid-term evaluation and can be described as a project that is funded at different stages by different funding instruments. For example at the beginning of the project lifecycle the projects may conduct research funded by DG RTD. Following this, concepts may be tested /piloted using LIFE funds and finally rolled out and mainstreamed under CIP.

Regarding the need for integration on a transnational level, the transboundary nature of environmental issues and the importance of ensuring that non-EU countries were also 'taking action' in the environment field were seen as the major reasons for the need to allow more flexibility in the instrument for the inclusion of third countries. The evaluation found that Nature and Biodiversity projects are most affected by the inability to fund actions outside the EU – as biodiversity is a common issue to all countries – highlighting some of the barriers to implementation of nature and biodiversity policy that are created by the current instrument.

Commission progress: the Commission has tried to adopt a more positive attitude towards complementarity by granting additional points to LIFE projects demonstrating synergies with other funds or showing an integrated approach in the use of other funds. It is also exploring new ways to improve synergies and complementarity with other funds, such as the development of guidelines for improving synergies between particular programmes. The Commission coordinates to identify projects that may be financed by other EU funds (e.g. developing a protocol to manage submissions under the CIP and LIFE+ Environmental Policy and Governance strand, to identify the most suitable instrument for a given activity). Regarding Third Country action, the Commission has sought and received the opinion of the Legal Service regarding the flexibility of action in Third Countries and is identifying possibilities for a more flexible interpretation of this provision to allow at least some action in third countries, when it is required to achieve EU objectives.

In addition integrated projects, projects receiving funding from different sources, is a model currently being explored by the Commission . A small number of these projects already exist

under LIFE. For example a project that prepared conservation and management plans for five areas within the central Lapland aapa mire zone successfully used LIFE funding for planning, ERDF funding for construction of tourism infrastructure and national funds for construction of barns on the hay meadows. Integrated projects arguably have greater added value due to the extensive learning experience that can be shared with others. However evidence of the benefits is still anecdotal at this stage which is why there should also be further emphasis on reinforcing complementarity.

6.3.4 The different issues of integration and complementarity

In discussing the potential role of LIFE for addressing this driver, it is crucial to distinguish between the different issues of integration and complementarity. It is clear that this driver encompasses two separate issues, the first of which (policy integration), can be further broken down into an additional two aspects, as follows:

- **The integration of environmental considerations into policy**:
  - **Integration in policy**: the integration of the environment concerns into sectoral policies; and,
  - **Integration in practice**: the contribution of sectoral activities to environmental improvements, in the implementation of the sectoral policies (into which environmental concerns have been integrated).

- **Synergies in the use of other financial instruments for the environment**

A distinction should therefore be made between improving integration, and improving synergies. Integration of environmental concerns into sectoral policies is seen as a sectoral responsibility, where a specific instrument for the environment would have a very limited role to play. Whilst the problem was seen as a very significant one by stakeholders, it is not necessarily a problem that LIFE currently could effectively address.

From the analysis and stakeholder responses, integration of environmental considerations into other policy areas remains a crucial issue that is as yet unresolved. Although there has been progress in certain policy areas, the analysis suggests that full integration is some way far from being achieved, notably in fisheries and transport, and increased political impetus is required.

In this context there is real value in being able to demonstrate the economic and environmental benefits that can follow from improved practical integration of environmental objectives in practice.

The stakeholders consulted have underlined the importance of integration as a driver of environmental problems. Thus there is a strong argument for more efforts to be made in improving integration. Whilst LIFE would be less able to integrate policy goals per se (i.e. integration in principle), it might, however, be able to support integration by helping to demonstrate the benefits of translating environmental goals already included in other policies into action (i.e. integration in practice, as shown in the examples in the evidence box above).

Actions could relate to, for example promoting the need for better integration of environmental concerns at the local and regional levels, where integration may be poorly understood or may represent a ‘low priority’. Improving capacity building could contribute towards a greater understanding of the need for improving integration. This would apply, for example, to officials within local competent authorities and farmers, who are directly responsible for using the various possibilities for promoting the environment which are available in the CAP.

Although there are opportunities for LIFE to support integration in principle (e.g. by supporting the Cardiff process), and in practice (e.g. through demonstrating the benefits of taking environmental concerns into account when implementing other sectoral policies), it is evident that LIFE could perhaps play a more active role with regard to the second aspect of this driver, namely by improving synergies and improving complementarities between actual funding instruments. Analysis from the mid-term evaluation suggests that synergies between

the different instruments remain weak, and that the lines between various programmes are blurred. Certain activities that could be funded under LIFE+ can actually be funded under other instruments such as Cohesion Policy.

This has implications for the manner in which LIFE could be used. One possibility for improving complementarity between the instruments, and coherence between LIFE projects and projects funded under other instruments, is to use LIFE specifically as a 'platform' for undertaking pilot projects which could subsequently be mainstreamed into other programmes. However this requires formal planning with guidance and appraisal systems / incentives to foster applications for pilot projects with the express intention of subsequent mainstreaming through other financial instruments. It also requires additional guidance to managing authorities under shared management instruments to advise potential applicants of the explicit intention to fund projects that seek to replicate and mainstream LIFE projects.

Another approach is the introduction of 'integrated projects' as mentioned in the evidence box above. There projects would be large enough to be segmented for the purposes of funding applications to different instruments. As long as the criteria for the different instruments clearly distinguishes their specific requirements the projects would greatly improve levels of complementarity and have the potential to realise greater levels of EU added value through dissemination of information, capacity building and knowledge sharing on a greater scale. It would therefore be of benefit to allow for the provision of such activities in the future programming period. In the meantime additional research could usefully be undertaken to establish the potential costs and benefits of the integrated project model.

In considering the options to improving synergies, the question raised in the EU budget review must be kept in mind, of whether it is best for funds to be mainstreamed, or whether separate, dedicated funds would be better. For instance, while mainstreaming resource efficiency and climate priorities into different programmes may for the largest proportion of funding needed be a more effective approach than large dedicated funds, it would require some re-prioritisation inside policies like research, cohesion, agriculture and rural development and could be accompanied with a clear cross-cutting obligation to identify where programmes had promoted such policies.

Stakeholder views – Rationale for intervention in the integration of environmental concerns into sectoral policies

Improving the integration of environmental concerns into other policies is considered imperative by all groups of stakeholders because of:

- the cross-cutting nature of the environment and biodiversity;
- the negative impacts of other policies on the environment and biodiversity; and,
- the fact that direct funding for the environment is severely constrained, and so financing for the environmental acquis is highly dependent on other policies and funding instruments.

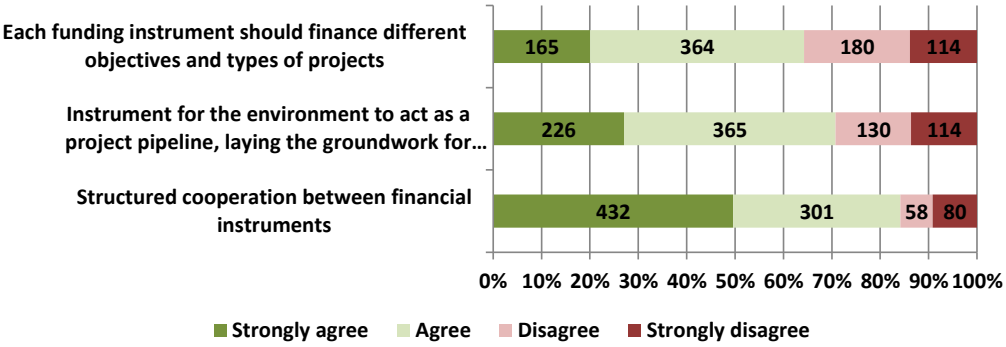
Most (almost 75%) of GHK survey respondents thought the added value of EU level action to improve the impact of other EU policies on the environment was substantial. The most popular rationales given for doing so was the fact that environmental assets are public goods, requiring EU action to ensure their adequate provision, and the need to mitigate the possible adverse impacts on competitiveness. 75% of stakeholders thought the problem merited financial expenditure at the EU level.

With regard to synergies between different funding instruments, YVIE results showed that most respondents agreed (more than 80%) that a structured cooperation between the future EU financial instruments for the environment and other EU funding instruments should be established. This was by far the preferred option for enhancing synergies between LIFE and other EU programmes.

A further popular suggestion was to use the future instrument for the environment to develop a project pipe-line, funding exemplar initiatives to demonstrate feasibility and disseminating results as the basis of subsequent mainstream funding other EU instruments (65% of GHK stakeholder survey respondents agreed or strongly agreed that this would improve complementarity). A significant number of respondents to the YVIE also believed that this approach would be a good means to

improving complementarities between different funding instruments (see Figure 6.1)

Figure 6.1 The most popular suggestion for improving complementarities between funding instruments was for structured cooperation to be established between the financial instruments



Source: GHK analysis, YVIE Survey

6.3.5 Addressing the weaknesses in awareness and knowledge sharing

In addition there are lessons to be learnt from LIFE+ regarding awareness raising and knowledge sharing.

The continued lack of awareness of environmental problems by the general public and the inadequacies surrounding the sharing of knowledge between different stakeholder groups were recognised by the mid-term evaluation as contributing significantly towards continued environmental problems within the EU. In the case of Environment Policy and Governance projects, insufficient learning, exchange and testing of transferability or project results, reduced the ability of projects to provide lessons and advice to policy makers, and created a weaker multiplier effect.

The mid-term evaluation undertook a review of a selected sample of the communication activities, which suggested that these activities have been useful for those participating and have added value via increased awareness and understanding of key aspects of LIFE+ and the results of LIFE projects. For example, European Mobility Week planned for September 2011, is an EU-wide awareness raising campaign aimed at making citizens aware of the benefits of using public transport, cycling and walking. This idea originated from a LIFE project (SMILE – Sustainable Mobility Initiative for Local Environment LIFE00 /ENV/F/00640) and is now aimed at encouraging European cities to promote these modes of transport and to invest in the new necessary infrastructures. The European Week of Waste Reduction is a similar example of such EU-wide awareness raising activities.

However the mid-term evaluation also concluded that the activities often reached an audience that was “already aware of LIFE and to a large extent...already involved in LIFE in some form”, i.e. did not manage to go ‘beyond the usual suspects’. Indeed, the main driver behind the introduction of the new Information and Communication component was the political perception that there was a need for greater communication of the LIFE+ Regulation to take place, and to “bring policy closer to the citizens.” The mid-term evaluation also found that NGOs can play a significant role in addressing the lack of awareness. For instance, the mid-term evaluation found that NGOs serve as hubs for a growing number of national and international environmental organisations, providing information about existing and upcoming policies and informing EU decision makers about the views and demands of their members. NGOs also play an important role in increasing transparency and public participation of the policy process, helping members to better understand EU environmental policies, and to mobilise the public and decision makers to implement solutions and to support a progressive role for the EU on environment and sustainable development. As such, NGOs play a particularly crucial role in awareness raising and knowledge sharing, targeting both the general public and policy makers as beneficiaries of their communication campaigns.

Moreover, they raise awareness of environmental issues in their target audience, as well as sharing knowledge that they access on potential solutions to the problems both within communities and within the policy circle. Indeed, one third of NGOs thought that funds spent directly on awareness raising through LIFE (e.g. on Green Week) would be better spent indirectly through communication initiatives conducted by the NGOs themselves. Using the funds to support NGOs in their outreach work on EU environmental policies, including organising public debates at the national level, could have more impact. On the other hand, NGO communication initiatives could be done more in partnership with EC.

Commission progress: the Commission is increasing the number of tailored publications on specific subjects including other funds. Recent LIFE thematic brochures now put more emphasis on extracting the techniques used and lessons learned from LIFE projects. The Commission is also continuing efforts to reinforce and improve dissemination activities and to attract 'non-traditional' applicants to the Programme.

6.3.5.1 Awareness raising

Whilst knowledge sharing is critical, the value of disseminating information and generally raising awareness levels of environmental problems and their solutions should not be neglected.

The analysis suggests that while some levels of awareness are increasing, there is still a significant gap in awareness which is contributing to the continued environmental problems facing the EU. In terms of the public, increasing their awareness can drive improvements in the market and in policy by bringing pressure to bear on businesses and policy makers. In terms of businesses, the analysis shows that they are often not sufficiently aware of environmental problems and their contribution to them, making it difficult for them to improve their impact which in many cases can be significant.

LIFE+ is already making considerable in-roads to addressing this problem under the existing Information and Communication strand. Indeed, the role of LIFE+ in raising awareness was seen as one of its most important and effective areas of influence by consultees. There was broad agreement that this should continue to play an important role in LIFE's activities into the future.

Supporting NGOs could play a crucial role in this area of activity (both as beneficiaries of operational and action grants). For instance, some consultees noted that NGOs play a significant role in addressing the lack of awareness, and thus a specific instrument for the environment might not necessarily need to fund separate activities that deal exclusively with awareness raising, as it might already be addressed as part of all the other activities it could fund. For instance, the mid-term evaluation found that one third of NGOs thought that funds spent directly on awareness raising would be better spent indirectly through communication initiatives conducted by the NGOs themselves. Using the funds to support NGOs in their outreach work on EU environmental policies, including organising public debates at the national level, could have more impact. On the other hand, NGO communication initiatives could better complement those of the EC.

Although it is difficult to measure the impact that NGOs have in increasing levels of awareness, it is generally agreed that they play a crucial role in raising the awareness of both the general public and policy makers. Being well-practiced and experienced in awareness raising, it would be sensible for a specific instrument for the environment to make more of this existing resource in order to disseminate information.

6.3.5.2 Knowledge sharing

Levels of awareness and knowledge sharing underpin many of the problems contributing to the continuation of environmental problems. This relationship is perhaps most significant in terms of the implementation of the acquis, where it is clear that improving the levels of information sharing and thus improving the capacity of competent authorities to address environmental problems would go some way to improving the levels of policy implementation.

Encouraging networking between authorities to assist in identifying problems, sharing information and best practice is therefore of considerable importance. A number of Member States have already organised formal and informal networks between supervision bodies at national, regional and local level. At EU level networking is achieved through IMPEL (see above) and thematic working groups/committees. This means that the major activity that can be funded in response to the problems of policy implementation (networking, sharing experience, best practice, reviewing each others' performance, etc) is already well established through IMPEL . There is, therefore, no need for additional structures in this regard.

In addition other organisations, such as the competent authorities who are responsible for issuing IPPC permits, may require additional knowledge sharing through training or the provision of new infrastructure such as a new database to build capacity and to more easily ensure that all requirements are met. LIFE+ already funds this activity; LIFE is funding the Secretariat as well as individual projects bringing Member State enforcement authorities together to share best practice and make recommendations for implementation and enforcement for issues ranging from IPPC to the Waste Shipment Regulation. Importantly, IMPEL work also involves peer review assessments (through the IMPEL Review Initiative – IRI) of Member State enforcement authorities, making recommendations for change.

No new instrument is therefore needed; but arguably considerably greater funding levels are required, (€500,000 at a 70% co-funding rate) supported by a range of transnational initiatives as well as bottom-up initiatives. It is not possible here to suggest any particular funding level. Clearly, if LIFE+ were to support supervision activity in individual Member States, there would be a need to review the relative interaction with IMPEL's activities and the relative allocation of funding. However, funding for IMPEL does benefit all Member States (if they take part) and, therefore, much of such funding may be more cost-effective than targeting funding at an individual Member State.

Besides increasing the level of funding, the existing activities being funded under LIFE+ to foster learning and demonstration could be improved. Currently, these types of benefits are essentially project specific and are not widely shared or disseminated. One potential means of meeting this need would be to tap more into the existing activities of NGOs. As NGOs have established networks and are already very active in this area, it would be worthwhile doing more to tap into this existing resource. Using NGOs and their existing networks could be a cost-effective and efficient means of disseminating knowledge and sharing best practice experience. The mid-term evaluation, for instance, suggested synergies could be increased if NGOs were provided with incentives to exploit the available information on the activities of other NGOs. For example, demonstrating a concrete networking plan could become an award criterion for an operational grant, where organisations working on the same issues are expected to cooperate to share their expertise. Encouraging the sharing of best practice this way, rather than just relying on one to one reporting (NGOs to the Commission), could also be used for stakeholders to learn from one another.

However, the current problem of insufficient dissemination is potentially a consequence of the current lack of focus in terms of the specific policy needs projects are supposed to address. A more specific statement of and focus on policy needs could go some way to securing greater learning and policy application from the projects.

A further potential option (for instance, to complement or combine with NGO activity) would be to share knowledge through mutual ('peer') learning activities based on the results of selected projects. The approach combines elements of peer-review by stimulating in-depth discussion on case studies of approaches and practices being presented without actually engaging in full assessment of approaches presented and eventually leading to a detailed comparison and contrasting of the case study examples. Mutual learning therefore goes beyond mere dissemination of information.

Essentially, mutual learning aims to allow an active exchange of information on what makes certain policies and practices succeed (or fail, as much can also be learnt from such failure). It is essential that mutual learning is not only focussed on the transferability of successful policies, but on promoting a better understanding of the policy mix, and the operational and

institutional framework which may have contributed to its success. This is achieved by establishing two broad levels of exchange of experience and mutual learning:

- At the overall policy level, addressing the key conditions and requirements for policy change
- At the more practical and detailed level, addressing the opportunities and constraints for policy implementation

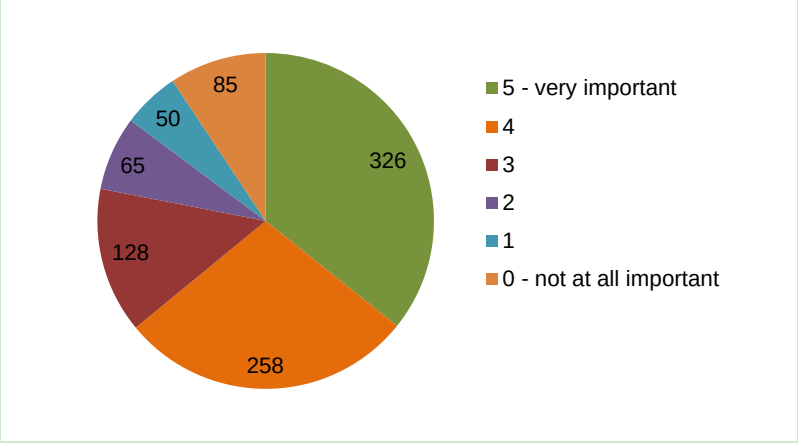
In order for such a process to work in the context of the existing LIFE instrument, this approach would have to be thoroughly integrated into the Action Grants Programme, including the drafting of calls for proposals (for instance by defining the policy needs the call is intended to address and informing the relevant actors on the intended call), project selection (e.g. selection criteria would need to include a criterion related to planned mutual learning activities), through to the signing of project contracts (negotiations would need to ensure commitment to mutual learning processes). Just as importantly, the results of the mutual learning activities would then need to be disseminated to the wider policy community.

There are some potential difficulties in terms of application and willingness of actors to engage with the process that would need to be addressed. For instance, establishing what policy needs would be targeted could be contentious, while ensuring beneficiaries are willing and able to engage with the process given the additional investments of time and effort that would likely be required present a challenge.

Stakeholder views – Rationale for intervention in awareness raising and information sharing

Slightly more than half of the GHK survey respondents believed there was substantial added value for EU level action to improve awareness levels (with the other half believing there was at least some added value). The majority of respondents (almost 90%) also believed there was a rationale for EU level expenditure to do so, because of the need to share good practice and innovative ideas, and to support burden sharing. In the case of the YVIE survey, a considerable number of respondents felt that it was very important for a future instrument for the environment to contribute to awareness raising and information activities (being given a rating of 5 or 4 by 64% of respondents) (Figure 6.2). However, some workshop participants felt that awareness had already been sufficiently mainstreamed, and that other instruments and other stakeholders are already addressing this issue.

Figure 6.2 Most YVIE respondents felt it was important for a future instrument for the environment to contribute towards awareness raising and information sharing was an important



Source: GHK analysis, YVIE Survey

6.3.6 Addressing the lack of eco-innovation

The LIFE instrument has also highlighted lessons learnt from the support for eco-innovation.

Research undertaken for the mid-term evaluation found that there were several factors contributing to inadequate support for eco-innovation. These included: a low participation of SMEs in research programmes on the environment; too much emphasis being placed on technological innovation as opposed to non-technological innovation as solutions; inadequate financing for R&D and first demonstration projects to enable scaling to the next phase, and insufficient capacity at the level of EU procurement authorities to appraise products and services.

Overall, LIFE+ is found to be helping to direct increasing levels of funding towards projects that capture eco-innovation, for example through improving management approaches and methods for the public sector authorities. In so doing, LIFE+ is reinforcing the overall Commission funding of eco-innovation under ETAP, linking to the CIP eco-innovation funding objectives, and reducing some of the blockages that stop innovations from moving from research to the market place.. The scope for the LIFE+ instrument to play a greater role and provide greater spillovers depends on the scope to generate projects that can be classified as eco-innovation which provide environmental solutions for public sector authorities. Whilst demand is increasing under LIFE+ (at least in terms of projects looking to provide innovative management systems and models for public authorities), there is the potential to strengthen guidance to potential applicants on the nature of eco-innovation and the areas where development would be of particular interest.

Where LIFE does support the development of environmental technologies, it is important for the uptake and acceptance of these technologies and/or approaches and/or systems that they have been shown to generate positive results. For instance, this can be done through the use of the evaluation criteria laid down in the Best Available Techniques Reference Document (BREF).[1]

An important feature of LIFE+ according to the mid-term evaluation was that the technologies and methods funded under the programme are deemed to be useful for public authorities. For example, a focus of the programme on water treatment and waste management, amongst others, is a reflection of the extent to which public authorities in many EU member states are responsible for these services and hence represent important demand for new innovations. However the mid-term evaluation found that some projects eligible for funding could have been funded by CIP and the distinction between the two programmes was sometimes blurred with projects under LIFE having both a public sector and a private sector application.

The mid-term evaluation suggested that a clear distinction is necessary, however, at the same time strong cross-programme coordination is required if synergies are to be maximised between LIFE+ and other EU programmes such as CIP (as well as respective member state eco-innovation programmes). Some bi-lateral initiatives have been taken (e.g. with DG ENTR in relation to eco-innovation) to address the need for synergy but it was suggested that overall communication channels might be developed further.

High level policy rationales for support for innovation and eco-innovation in particular are well established. Given that the challenges facing developers of eco-innovations are often indistinguishable from those developing other types of innovation, it is not surprising to see common types of intervention being developed to help improve the growth and penetration of eco-innovation across the economy.

[1] Economics and Cross-Media Effects – Best Available Techniques Reference Document (BREF). Available from: ftp://ftp.jrc.es/pub/eippcb/doc/ecm_bref_0706.pdf

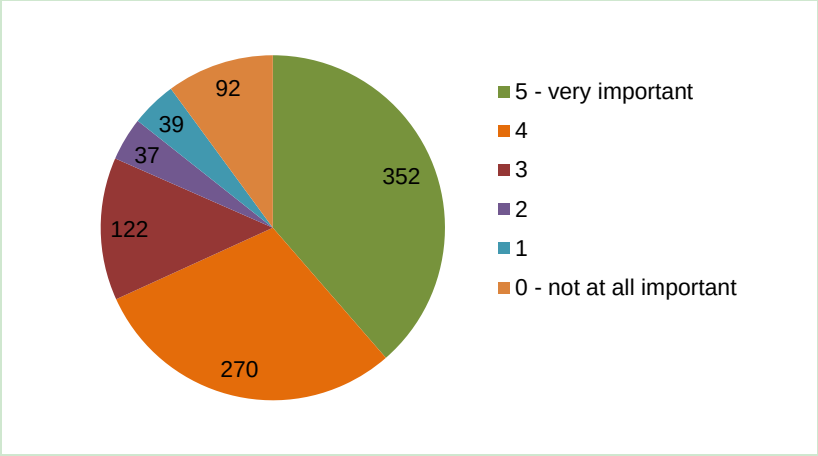
Stakeholder views – Rationale for intervention in eco-innovation

Almost 60% of survey respondents believed there is substantial EU added value from supporting eco-innovation (with 77% agreeing that this should include financial support), with the key justification being the need for knowledge sharing.

In the case of the YVIE survey, a considerable number of respondents felt that it was very important for a future instrument for the environment to contribute to awareness raising and information activities (being given a rating of 5 or 4 by 68% of respondents) (see Figure 6.3)

However, although thought to be an important issue in addressing environmental problems in general, only a third of GHK survey respondents felt that a specific instrument for the environment should address the needs of eco-innovation given the presence of other instruments in this field, particularly that of the Competitiveness and Innovation Programme (the CIP) and the Seventh Framework Programme. More than 60% of survey respondents felt that addressing eco-innovation is only somewhat relevant for an instrument dedicated to the environment.

Figure 6.3 Most YVIE respondents felt it was important for a future instrument for the environment to boost innovative actions for the environment



Source: GHK analysis, YVIE Survey

6.3.7 The benefits of eco-innovation

Establishing the economic and environmental benefits of eco-innovation is difficult to attribute to specific policy interventions, given the mix of factors that give rise to innovation, and the elapsed time to identify consequences. However, to illustrate the benefits we have briefly reviewed a number of 'best practice' LIFE projects form the LIFE III programme. These indicate that EU funding yields benefits in excess of the costs of funding.

Cost-effectiveness analysis – LIFE Best Practice projects

25 projects over a number of themes were selected as 'Best Practice' projects under 'LIFE Environment 2009' using a range of criteria, and which should be widely disseminated. These projects were funded under the LIFE III programme and relate to water; chemicals; natural resources and waste; air and climate change. Below are three 'Best Practice' examples of projects where the economic value of the environmental benefits for public sector authorities has been calculated and can be compared with the LIFE project cost to indicate the value of LIFE funding.

PERBIOF – New technology for treating tannery wastewater with low environmental impact (Italy) (LIFE05 / ENV / IT/ 000868):

Wastewater treatment plants face recurrent problems such as sludge production and the toxicity of treated effluents. The PERBIOF project developed at demonstration scale an innovative technology for treating municipal and/or industrial wastewater. The technology had significant impacts on

treating tannery wastewater. The high compactness of the plant in comparison with traditional plants meant that the footprint is some 25% of that of a standard plant and the sludge production is about one thirtieth of the amount produced by a traditional plant. Although investment costs are some 10% higher than for a standard plant, operating costs are one-third of those of a traditional plant.

With a LIFE project cost of €625,000 over 3 years, the PERBIOF project estimated that by using its technology, €72 million per annum in cost savings (benefits) could be achieved by the tannery industry. The project yields a Net Present Value (NPV) over 10 years, discounted at 4%, of €655 million. This is equivalent to over €1,000 in benefits generated for every €1 spent in LIFE.

Brine Recovery – Brine Recovery in the production of polycarbonate (Netherlands) (**LIFE03 ENV/NL/000472 & LIFE06 ENV/NL/000178**)

The main objective of the Brine Recovery project was to demonstrate substantial savings on raw materials and energy in the production of polycarbonate, through the recovery of brine, at Sabic Innovative Plastics in Bergen op Zoom, the Netherlands. Currently, the re-use of brine is impossible because the brine contains a number of impurities that could seriously damage the production methods; however, the project developed a new technology that is capable of removing all the relevant impurities from the brine, creating a closed loop cycle.

With a LIFE project cost of €8m over 3 years, the Brine Recovery project estimated that by using its technology, a reduction in salt consumption of 72,000 tons a year could be achieved, which the project calculated was equivalent to €3 million per annum in cost savings, creating a competitive advantage. Furthermore, it was estimated that 147,000 GJ of energy could be saved a year, worth €2.5m in benefits. The project yields a Net Present Value over 10 years, discounted at 4%, of €42 million. This is equivalent to some €6.5 in benefits generated for every €1 spent in LIFE

AIRAWARE - Air Pollution Impact Surveillance and Warning System for Urban Environment (Romania) (**LIFE05 ENV/RO/000106)**

Bucharest is one of Romania's most polluted cities. Sixty percent of the city's cars are more than eight years old and the intense traffic is one of the main causes of air pollution. Bucharest's urban area is expected to continue growing at a significant rate until 2010. Air pollution from road traffic will increase accordingly, contributing to increased incidences of lung diseases. The project aims to assist spatial planning decision-making, traffic management and pollution control in the Bucharest metropolitan area by predicting the health and environmental impacts of air pollution. The project promotes a cross-institutional data sharing system, developing a set of indicators, and constructing a mathematical model of air pollution based on a geographic information system (GIS) platform.

Incidence of diseases due to air pollution had a public health cost of €4.4 million in 2003, according to the Bucharest Municipality in 2004. The report estimated that some 10% of this cost can be estimated as being caused by air pollution. The implementation of AIR-AWARE's pollution prevention plan is expected to reduce the air contamination load by 50%, leading to savings in excess of €175,000 per annum. The LIFE project cost was €1.1m over 3 years. The project yields a Net Present Value over 10 years, discounted at 4%, of €520,000. This is equivalent to €1.50 in benefits generated for every €1 spent in LIFE.

The current suite of interventions in support of eco-innovation is now broader than earlier programmes of intervention which tended to focus on single issue (often point source) themes such as industrial emissions, ozone depletion, groundwater pollution, water pollution, landfill, etc. Table 6.1 separates the suite of interventions into those aimed at supporting the RTD and commercialisation of environmental technologies/eco-innovations (the supply side) and those measures that are primarily aimed at driving the demand for and adoption of new eco-innovations, (the demand side).

Table 6.1 Breakdown of interventions to support eco-innovation

Supply side RTD	Supporting measures for innovators	Demand side R&D	Supporting measures for market adopters
Innovations across the Low Carbon & Environmental	Financing to meet capital requirements – equity, debt, grants (e.g. GIF) Enhanced, globalised	Underpinning research and 'real life', in-situ testing	Regulations (e.g. bans, % of materials specified in products) Policies (e.g. waste prevention)

Technology & Services sectors [as well as broader economy]	knowledge flows Verification (e.g. ETV) Certification New business models IPR protection Small Business Research Initiative (procured R&D competitions) Trade support Information provision		Standards (e.g. for biofuels) Price signals (full cost recovery, taxes, subsidies, incentives, etc.) Eco-Labelling (EU Ecolabel & MS schemes) Public procurement ('green' plus procurement of innovative solutions) Lead Market Initiatives (construction, waste/recycling, bio-based products) Improved global agreements (e.g. Kyoto-type mechanisms) Knowledge transfer to 3rd countries

The challenge for a LIFE instrument is defining its contribution in this complex policy environment. The consultations in the IA suggest that as long as LIFE has a limited budget that it should define a particular role explicitly linked to policy, rather than in the wider innovation system. This has two dimensions:

- First, on the demand side, the role of environmental policy is central to establishing the framework conditions for eco-innovation - reflected in the support measures in Table 6.1. A more explicit recognition of the role of EU environmental policy in setting these framework conditions should be recognised. More specifically, the possibility of stimulating joint regulator/business initiatives to find solutions to higher standards might be considered.
- Second, on the supply side, the importance of policy implementation requires a particular focus on approaches to the management challenges faced by national and local competent authorities. Piloting new approaches to implementation that address some of the institutional difficulties of implementation is of major importance. This might relate to capacity building, improved environmental monitoring, trialling of permitting and consent systems and new inspection regimes. These activities may not be associated with the possibility of commercial return (at least in the first instance).

6.4 The EU added value of a specific instrument for the environment

The analysis (Section 4) has indicated the substantial scale of the environmental challenges across the EU; requiring an EU level response. The analysis also highlights the cross-border nature of environmental challenges both within the EU and outside. There are obvious benefits, recognised in the Treaty and in the current LIFE Regulation, to Member States of taking action at the EU level. These benefits include more efficient policy responses to environmental problems (addressing driving forces at a level that is most effective). There are also benefits because environmental problems and the environmental assets of EU interest that need protection are unevenly distributed between Member States, and would otherwise require in the absence of EU action, disproportionate costs for some Member States and the risk of 'free riders' for MS not contributing to costs but gaining benefits.

It is therefore axiomatic that the EU added value from a specific instrument derives in part from the unequal burden placed on some Member States compared to others because of transboundary problems and the uneven spatial distribution of natural capital across the EU and a need for responsibility sharing. This is already recognised in the current instrument through the use of national allocations reflecting the distribution of protected areas and of population (as a simple but crude proxy for the distribution of 'driving forces'). In addition the environmental acquis is understood to provide collective benefits through the provision of

shared public goods and the avoidance of 'free riders' (sometimes called the 'common action problem').

The mid-term evaluation assessed the LIFE+ instrument to have a continuing relevance based on the well documented needs of environment policy and its implementation, combined with the recognition in the Regulation that EU added value derives at least in part from the bottom-up approach. Although the evaluation did not assess the results and outcomes of the current Programme activity, evidence based on the review of funded activity and project appraisal and monitoring systems, indicated that it continues to address the underlying policy needs.

The principal weakness has been the inability to generate strong multiplier value, either through projects with the scale to create spillovers and knock-on effects, or by leveraging other financial instruments in pursuit of environmental objectives. Subsequent instruments should therefore recognise a requirement for stronger, but more flexible priorities, clearly reflecting MS needs, expressed through multi-annual work programmes; the use of negotiated projects to leverage wider funding; greater focus in the use of delivery mechanisms, particularly in relation to eco-innovation, are responses that would further increase EU added value.

6.4.1 Summary of the implications of the institutional drivers for the role and use of a specific instrument

The **potential role for a specific instrument for the environment is to act as a catalyst for policy improvements and to leverage contributions from other policies and instruments by addressing the institutional drivers**. In summary the implications of the institutional drivers for the role and use of a specific instrument for the environment are as follows:

Addressing the weaknesses in policy implementation and development

- There appears to be less need for an instrument like LIFE to focus on improving the scope of current policy in terms of new legislation, given the potential barriers to developing the scope and the lack of a perceived urgency to do so in most policy areas. However, policy developments to improve the implementation of the acquis are valuable.
- Overall, the implementation of the acquis seems to be a much more significant problem than the scope of the acquis. There is a strong case therefore, for an instrument to support MS who are struggling to transpose and enforce environmental legislation, through for instance, capacity building and demonstrating the benefits of policy implementation. The instrument could also improve implementation by addressing weaknesses in knowledge sharing and policy integration, and by supporting eco-innovation related to policy needs (see below).

Addressing the weaknesses in policy integration and complementarity

- Complementarity requires cross-working. The instrument therefore needs to coordinate more closely with other funds and to support mainstreaming. For instance, the instrument could be used more explicitly to develop project pipelines for other EU financial instruments or to fund projects that demonstrate how to use the different funds available in an integrated way.
  The instrument can also contribute to improving the effectiveness of the integration of environmental concerns in other EU policies. Sectoral initiatives, especially at MS level, could be potentially very useful in improving capacity and demonstrating the benefits of integration.

Addressing the weaknesses in knowledge sharing and awareness raising

- Although it seems that there is no need for additional structures to deliver knowledge sharing activities for implementation (this is covered by formal networks such as IMPEL), the instrument can assist in increasing the funding available for such activities. Increasing the number of transnational and bottom-up initiatives could prove especially beneficial.

- A key area for improvement is in the dissemination of benefits as the basis of further multiplier effects. This could potentially be achieved by having projects focus more explicitly on specific policy needs. This could secure greater learning and ensure better policy application for example through mutual ('peer') learning processes.
- Raising general levels of awareness could also be a key area of action for the future, given that the role of the current LIFE instrument in raising awareness was seen as one of its most important and effective areas of influence by consultees.

Addressing the lack of eco-innovation

- The policy environment for eco-innovation is complex; the role of a future instrument needs to well defined. One possibility is to focus its support for eco-innovation in order to develop environmental solutions that improve the implementation of environmental legislation. This would differ from other instruments, which are explicitly market-orientated. Another distinguishing focus would be to concentrate on the demand side, improving the framework conditions for eco-innovation.

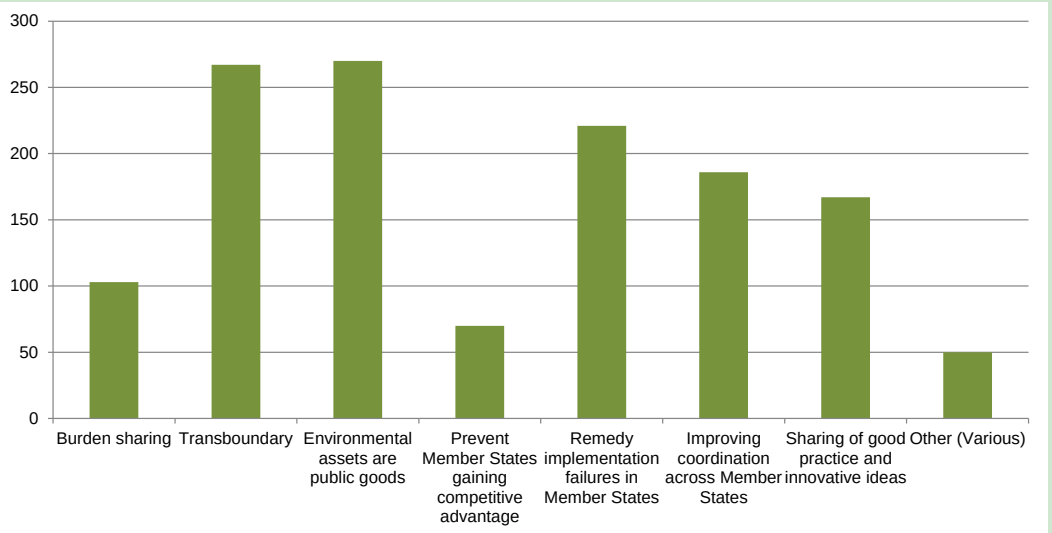
Stakeholder views – EU added value

Justifications for an instrument for the environment

Several reasons were felt to be important justifications for having a dedicated instrument for the environment. The two most important reasons according to workshop participants are the transboundary and public asset nature of environmental assets (see Figure 6.4)

However, viewpoints between different stakeholder groups did differ somewhat. For instance, social partners believed the most important reason for a dedicated instrument for the environment was for the sharing of good practice and innovative ideas, while for government officials, the most important reason was to remedy implementation failures in Member States. For NGOs and NCPs, both felt that the most important justification was the public asset nature of environmental assets, although NGOs also felt that implementation failures in Member States was almost equally as important.

Figure 6.4 Weighted ratings indicate that the most important justifications for an instrument for the environment rated by workshop participants is the transboundary and public goods nature of environmental assets



Source: GHK analysis, EC Workshop

In the case of CoR respondents, who were asked a similar question, the rationale for EU level action that were considered highly valid by stakeholders (50% of respondents) was that 'EU action is required to remedy failures in Member States in the transposition, implementation and enforcement of EU environmental policy' was considered highly valid by 50% of the respondents. 'Improved coordination of policy efforts across Member States (MS) in (central/regional level) in order to better integrate environmental policies in sectoral policies', was placed in the top two validity levels by 85%

of the respondents. A similar indication was given by 77.5% of the respondents about 'burden sharing at EU level to increase the effectiveness of MS policy in meeting EU objectives'. Moreover, 40% of the respondents considered highly valid the following arguments: 'Environmental problems are often trans-boundary across MS borders and require EU level responses' and 'environmental assets are public goods and require EU action to ensure adequate provision'. On the other hand, the argument that 'Member States could seek to gain a competitive advantage from environmental policies in the absence of action at the EU level' is not considered valid by 20% of the respondents.

EU added value of the existing instrument for the environment

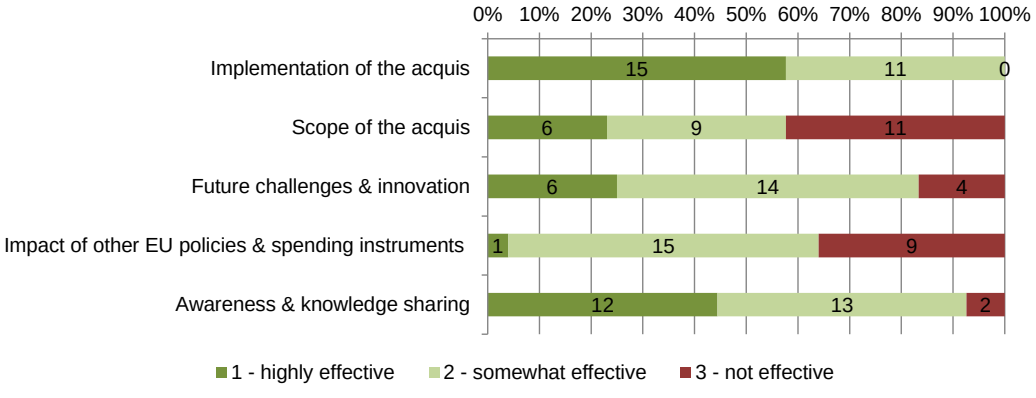
Stakeholders believe the LIFE instrument is a valuable programme and should definitely continue into the future. Results from the YVIE survey were also clear on this point – almost 80% of respondents believed to a great extent that there is a need for a specific instrument for the environment. Moreover, 98% of workshop participants also felt that a specific instrument for the environment was necessary in order to meet environmental challenges. However, whilst virtually all participants felt that there is a clear need, some noted that it will not be sufficient to address environmental problems unless the integration of environmental considerations into other funding instruments is improved and the resources available to it are significantly increased.

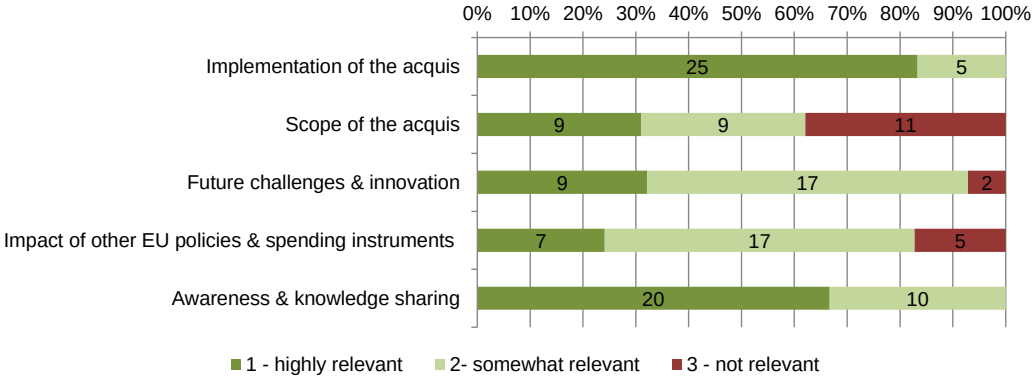
Interviewees noted areas of improvement for LIFE as it is currently designed and implemented:

- **The alignment of LIFE with EU priorities** – instrument priorities could be better focused and resources allocated according to EU-level priorities;
- **Improving the use of project results in policy making** – through increased sharing of the knowledge gained from projects, with communication and dissemination of project results critical to ensuring the maximum level of EU added value. Stronger links to the thematic policy development and update was seen as a key area; and,
- **Building better bridges and links with other funding instruments** – with a need for greater coordination with the activities under the Structural Funds, CAP funds and the Integrated Maritime Policy. Complementarities and synergies between LIFE and these funds need to be amplified and made more systematic. The instrument could do more to consistently 'lay the groundwork' for other funds such as the rural development fund. These synergies are mostly informally managed and coordinated at the MS level.

The consensus across all stakeholders consulted is that the most important focus for LIFE should be the implementation of the acquis. Its role in implementing policies for nature and biodiversity (e.g. the Natura 2000 network) was seen as being particularly important, given the absence of any other financial instrument specifically focused on nature protection. The promotion of awareness and knowledge sharing also an important activity. GHK survey respondents stated that other relevant areas of activity for LIFE+ were the funding of innovative means of addressing future challenges as well as addressing the impact that other EU policies and spending instruments can have on the environment.

Figure 6.5 The existing LIFE instrument was thought to be most effective (first figure) and most relevant (second figure) in the case of the acquis' implementation, with its role in awareness raising and knowledge sharing also being especially significant



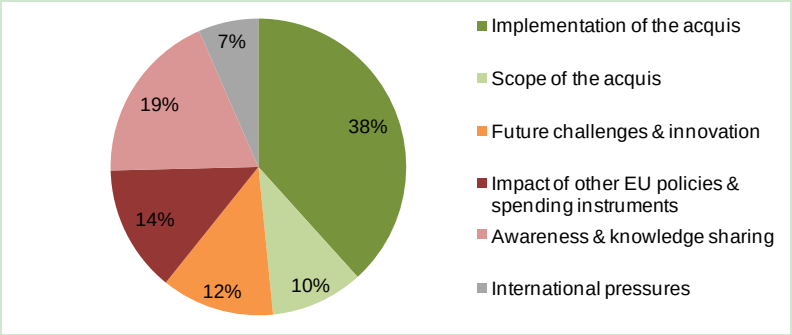


Source: GHK analysis, GHK Survey

Survey respondents were also asked to allocate resources across the different policy problems, and consequently spread the resources across all the policy problems (Figure 6.6), although most of the resources (38%) were thought to be best allocated to the implementation of the environmental acquis. This provides further indication that the focus of a future instrument for the environment should be on improving the implementation of the acquis.

There was a clear preference for the instrument to focus a significant portion of its resources on the implementation of the acquis (see Figure 6.6 below). GKH survey respondents thought that after the implementation of the acquis, almost equal portions of resources should be spent on awareness raising and knowledge sharing, and addressing the impact that other EU policies and spending instruments can have on the environment. Respondents thought that the least amount of resources should be spent on addressing the impacts of international pressures on the EU (see Figure below). Thus, despite the current resource limitations, none of the stakeholders believed the instrument should be restricted to addressing just one type of policy problem or activity.

Figure 6.6 GHK survey stakeholders believed, on average, that 38% of the resources of LIFE should be spent on addressing the inadequacies of the acquis' implementation



Source: GHK analysis, GHK Survey

6.4.2 Summary

The terms of the Treaty, the priorities of the Budget Review and the findings of the MTE, as well as views from stakeholders, confirm the strong rationale and the potential and actual scope to achieve EU added value from a specific instrument for the environment. The strong political support for the instrument, expressed especially through the European Parliament, has been seen to be repaid in terms of the benefits generated, given the scale of the budget.

Analysis of the institutional drivers and the role that a specific instrument could play in future in addressing their weaknesses demonstrates the potential to continue to deliver EU added value, at an enhanced scale.

7 Objectives and impact assessment criteria for a specific instrument for the environment

This section summarises the objectives and intervention logic of the specific instrument for the environment and climate action. It elaborates the basic intervention logic. It also defines the assessment criteria to be applied to each option as the basis of the options assessment

7.1 Objectives for the instrument

Based on the revised problem definition in Section 6 above, and stakeholder views, this section presents the policy objectives. These have been revised from the draft Options Report in light of stakeholder consultation and feedback. Stakeholder views on the objectives, activities and resources are outlined below.

7.1.1 General objective

Based on the accepted problem tree (Section 3), the instrument should focus on addressing the institutional weaknesses that contribute to environmental problems; catalysing and leveraging changes in institutional approaches and activities. In doing so it would contribute to the updating, development and better implementation of EU environmental policy and legislation.

As a general objective, the purpose of the instrument is therefore to:

- **Provide solutions in order to achieve environmental objectives by developing, updating and implementing EU environmental policy**. Policy makers include the EU institutions, and national, regional and local policy makers in the Member States. Relevant policy makers include those responsible for environmental policy or for the integration of environmental objectives in other policy areas. These solutions will also be relevant for other stakeholders including NGOs and private companies. It is expected that providing solutions to policy makers will result in an improvement of the EU environmental 'common good' which will benefit EU citizens

The instrument shall also contribute to the development and implementation of the EU policies, in particular with regard to the objectives of the Europe2020 strategy and it shall complement the objectives pursued in other areas of the Union's activities.

7.1.2 Specific objectives

Specific objectives are based on the institutional drivers identified in the previous sections. The specification of specific objectives has sought to distinguish between **means and ends**, where knowledge sharing, awareness raising and support for eco-innovation are judged to be means which help to deliver the specific objectives of improved policy development, implementation and integration. The principle of solidarity and responsibility sharing is also formalised as a specific objective to ensure a focus on maximising EU added value.

This means that the specific objectives are based on specific problems arising particularly from insufficient and integration, such as:

- The problems of inadequate scope and implementation of current EU environmental policy;
- The problems of inadequate use of opportunities to demonstrate and test the feasibility and economic and environmental benefits of improved integration of environmental objectives;
- The missed opportunities to improve complementarity and synergies between EU financial instruments to deliver projects and activities that can provide positive environmental impacts; and
- The principle of responsibility sharing and solidarity applied to EU environmental policy

The other problems that have been analysed (inadequate levels of awareness and sharing of information, eco-innovation) also need to be addressed by the specific instrument. However, in these cases, the activities that are required can be framed by the specific objectives. So for example activities to improve knowledge sharing or awareness raising will be required as a means to deliver the specific objective. Similarly, investment in eco-innovation will be one of a range of activities to generate solutions that will assist in meeting the specific objectives.

Table 7.1 Problems and specific policy objectives

Institutional Drivers	Specific Problems	Objectives
Weaknesses in policy implementation and development	**Specific problem 1:** The inadequate scope and implementation of the existing EU environmental acquis to meet all current and new environmental challenges	**Specific objective: 1:** To improve the scope of EU environmental policy and legislation
		Specific objective 2: To improve the implementation of EU environmental policy and legislation, (including EU commitments to international agreements)
Inadequate level of synergies and integration	**Specific problem 2:** Inadequate use of opportunities to enhance the environment which are available in EU sectoral policies	**Specific objective 3:** To improve the contribution of other policies to environmental objectives at implementation level
	Specific problem 3: Missed opportunities for creating greater positive environmental impacts through improved levels of complementarity between LIFE+ and other EU financial instruments	**Specific objective: 4:** To develop solutions for subsequent mainstreaming in other EU financial instruments to support the multiplier effect
Weaknesses in policy implementation and development	**Specific problem 4:** The unequal burden placed on some Member States compared to others because of transboundary problems and the uneven spatial distribution of natural capital across the EU	**Specific objective 5:** To contribute to responsibility sharing in the protection of EU natural assets
		Specific objective 6: To contribute to responsibility sharing in addressing transboundary problems affecting EU internal and external borders

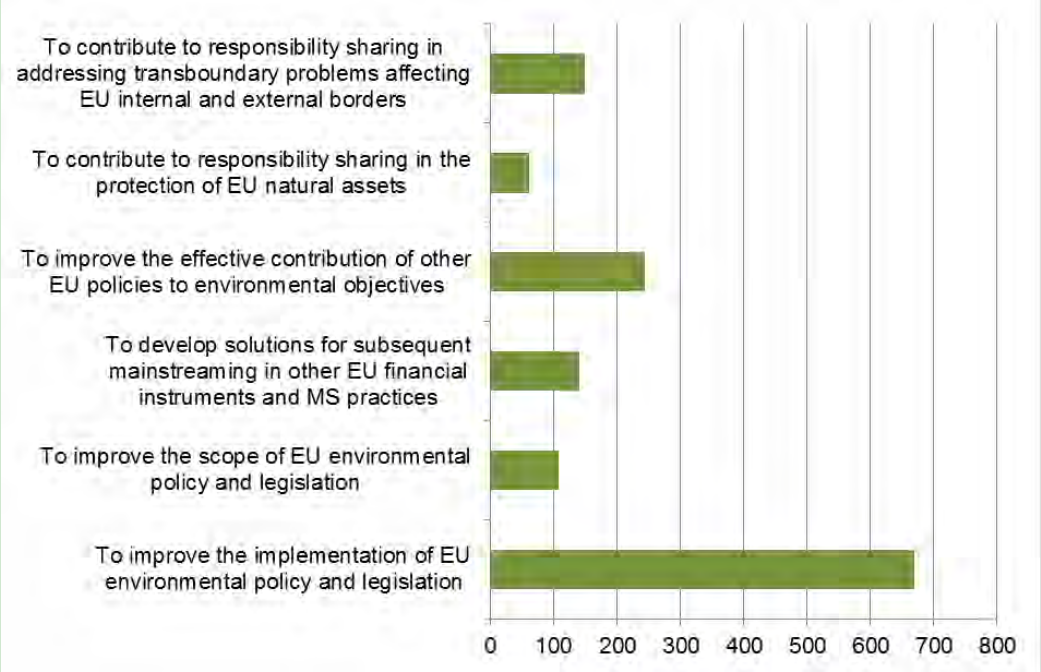
Stakeholder views – Objectives, Activities and Resources

Objectives

The stakeholder workshop considered suggested objectives. These were largely accepted. As with the GHK survey, the most important objective for a specific instrument for the environment was felt to be the implementation of the acquis (see Figure 7.1).

However, there was some concern that a specific objective relating to EU international commitments might lead to an instrument that gave insufficient weight to issues of more immediate concern and which would provide clearer EU added value.

Figure 7.1 Workshop participants indicated that the most important objective for an instrument for the environment is to improve the implementation of the environmental acquis (weighted scores)



Source: GHK analysis, EC Workshop

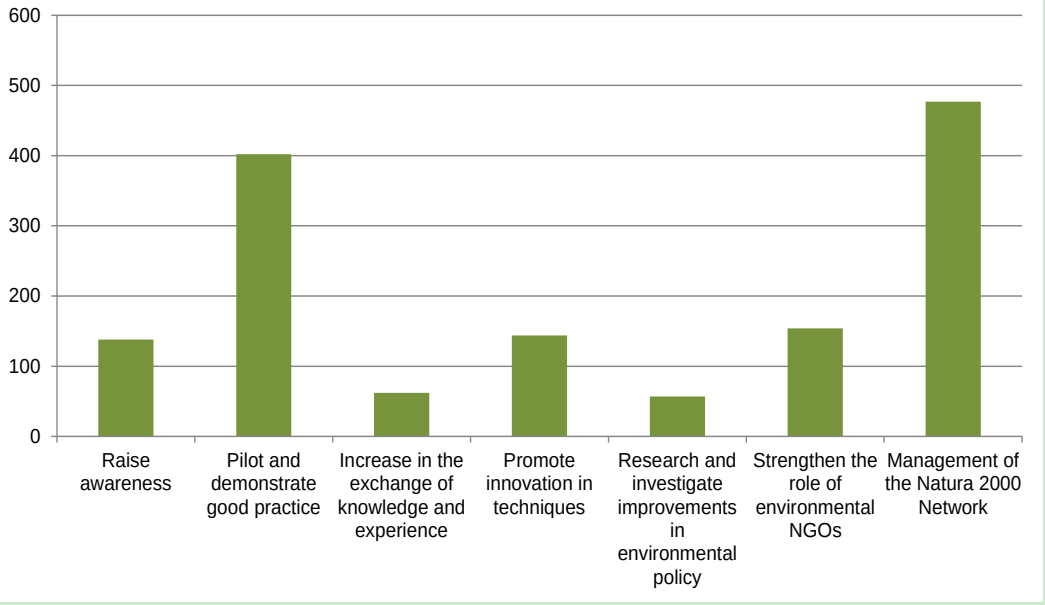
Activities

Workshop participants were asked to rate potential activities that a future instrument for the environment could undertake. By far the most important activities rated by participants were the management of the Natura 2000 network, and the demonstration of good practice through pilot projects (see Figure 7.2).

Interviews with Commission officials also highlighted that the instrument should continue to focus on funding the demonstration of best practices and knowledge sharing to illustrate the means and benefits of implementing the environmental acquis. The demonstration and sharing of best practice was in fact rated the most important objective for an instrument for the environment by respondents to the YVIE survey, although only marginally (see Figure 7.3).

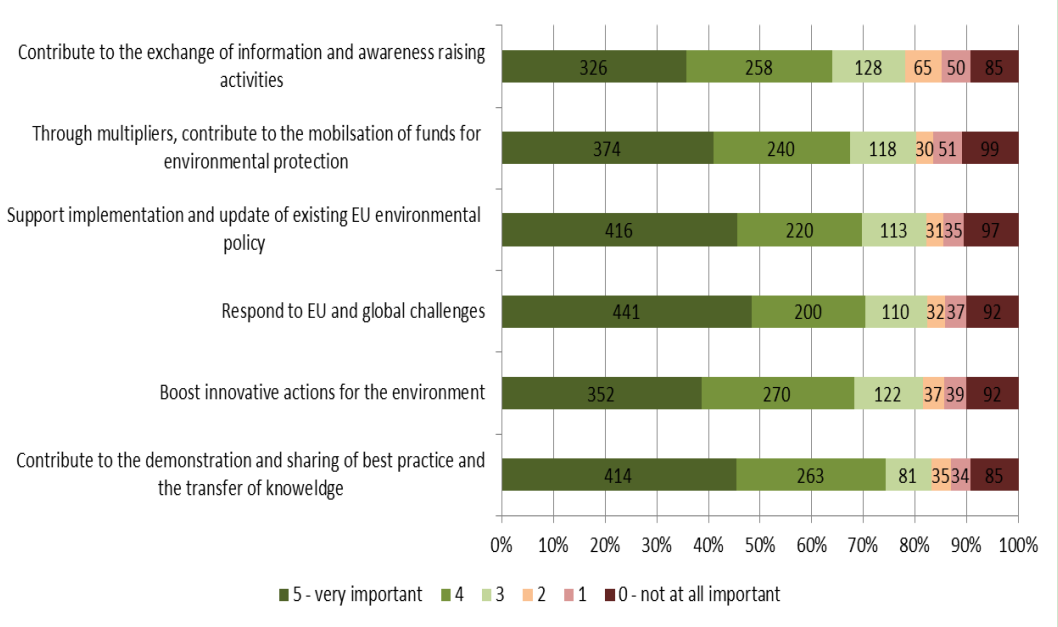
Some stakeholders also suggested that LIFE should fund bottom-up projects, as well as projects programmed at national level within a national framework to develop innovative approaches that provide new solutions to the key problems.

Figure 7.2 Weighted ratings by workshop participants indicate that the management of the Natura 2000 network and the demonstration of good practice are the key activities perceived by stakeholders for an instrument for the environment



Source: GHK analysis, EC Workshop

Figure 7.3 Demonstration and sharing of best practice was most often given the highest ratings when YVIE respondents were asked what role a future instrument for the environment should play



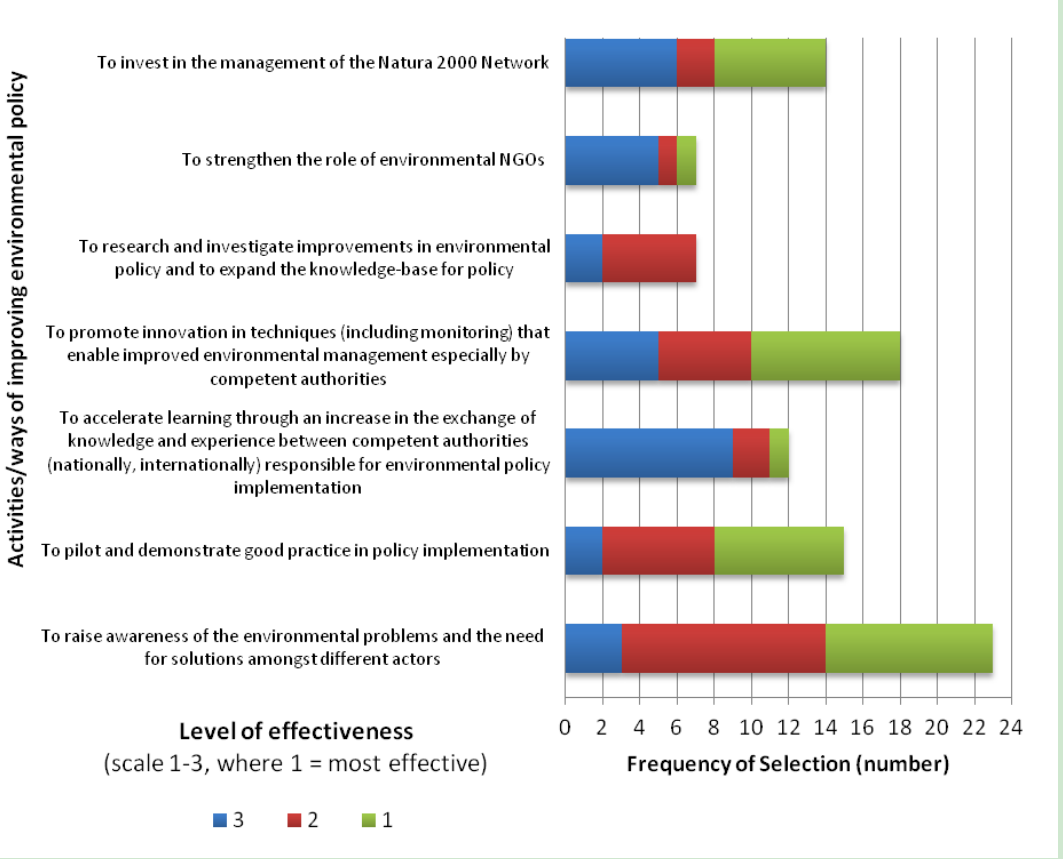
Source: GHK analysis, YVIE Survey

CoR respondents were also asked to consider what activities would be most effective in improving environmental policy and its implementation. In contrast to the results found in the GHK and 'Your Voice in Europe' (YVIE) survey, the most frequently selected activities was the "raising awareness of the environmental problems and the need for solutions amongst different actors" (selected as most effective by 28% of the respondents and as second most effective by 34.5% of the respondents) and "promoting innovation in techniques (including monitoring) that enable improved environmental management especially by competent authorities" (selected as 'most effective' by 25% of the respondents and second most effective by 16% of the respondents).

The demonstration of good practice (selected as 'most effective' by 22% of the respondents and as second most effective by 19% of the respondents) and investment in the management of the Natura 2000 network (selected as most effective by 19% of the respondents and as third most effective by an equal percentage of respondents), whilst also popular choices, were considered slightly less important than those activities mentioned above (see Figure 7.4)

The least effective of the activities were considered to be 'to research and investigate improvements in environmental policy and expanding the knowledge base for policy' (not selected by any of the respondents as the most effective way), 'to strengthen the role of environmental NGOs' (selected by only 6% of the respondents as either second or third most effective way) and 'to accelerate learning through an increase in the exchange of knowledge and experience between competent authorities responsible for environmental policy implementation' (selected by less than 10% of the respondents as either second or third most effective way).

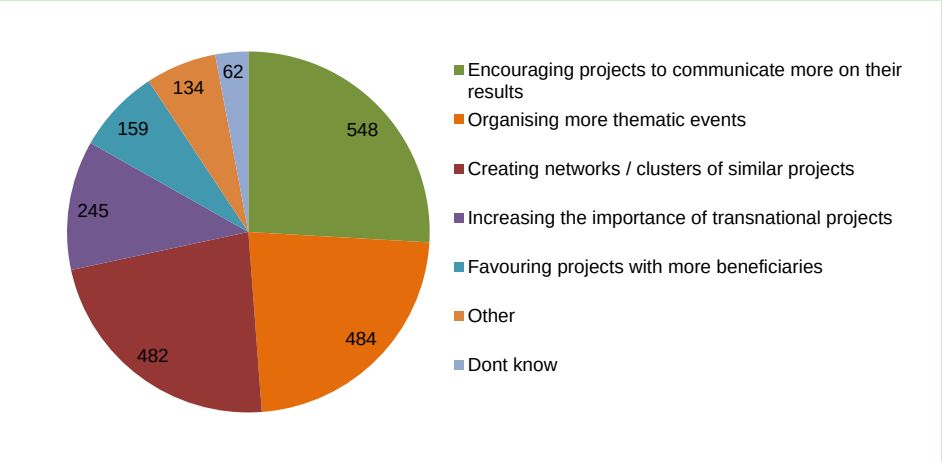
Figure 7.4 CoR respondents most often selected the need to raise awareness of environmental problems and solutions, and the promotion of innovation as the key activities to improve the implementation of environmental policy



Source: CoR Report: 'Assessment of Territorial Impacts of the EU LIFE+ Instrument' – results from the Committee of the Regions survey

YVIE respondents were also asked what activities they thought would most act to increase the visibility of the results of LIFE+ funded projects and encourage their replication at a larger scale. Most respondents thought this was best done through encouraging projects to communicate more on their results. However, more thematic events, and the creation of networks and clusters of projects within the same environmental field and/or which have similar objectives was also thought to be useful.

Figure 7.5 YVIE respondents believed that the communication of project results was most often selected as the activity which would increase the visibility and replicability of LIFE+ project results



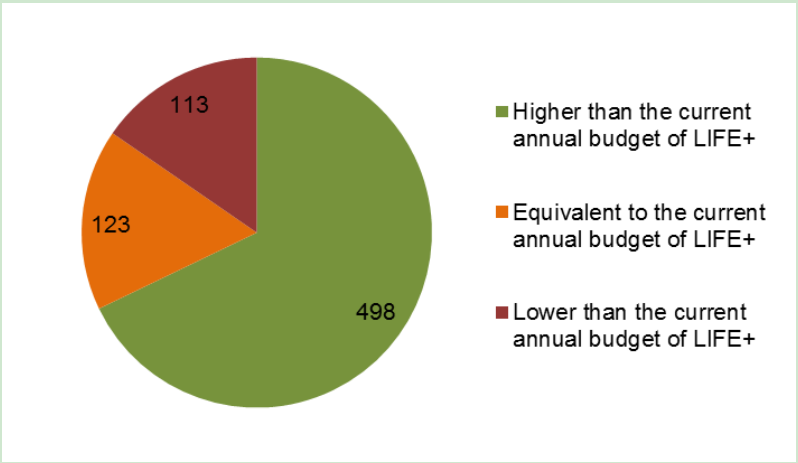
Source: GHK analysis, YVIE Survey

Resources

Although stakeholders identified opportunities for improvement, they also noted that a key factor limiting the effectiveness of LIFE+ has been its limited resources.

Results from the YVIE survey indicate that the clear majority of respondents (68%) thought that a future instrument for the environment should have an annual budget that is higher than the current annual budget of LIFE+. Only the least number of respondents (15%) believed the budget should be decreased (see Figure 7.6).

Figure 7.6 The majority of respondents to the YVIE survey believed that the budget for a future instrument for the environment should be increased

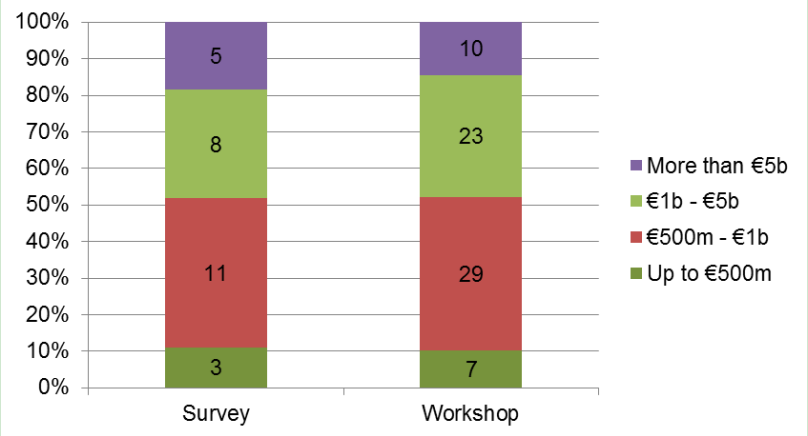


Source: GHK analysis, YVIE Survey

The result was even more unequivocal in the case of the GHK survey, where 90% of survey respondents believed that LIFE+ was under-resourced and should have access to considerably more funding. Whilst many did not think there would, realistically, be a very significant increase, most nonetheless considered that significantly more resources were required. Similarly with EC workshop participants, the sentiment was one of, "the more the better", as long as there was a commensurate increase in capacity to manage the funds.

Most survey respondents, and 42% of EC workshop participants, believed that resources of €500 million to €1 billion a year would be more appropriate (see Figure 7.7 below) than the current €0.3 billion. The majority of the remaining workshop participants (33%) voted for an increase in resources to €1 – 5 billion a year.

Figure 7.7 The preference of stakeholders consulted by GHK, (an almost identical proportion of those consulted in the survey and in the workshop), was to increase the resources available to LIFE+ to levels of between €500 million and €1 billion a year (about 40%), while the second most popular option was to increase resources to €1 million and €5 billion a year (about 30%)



Source: GHK analysis, GHK Survey and EC Workshop

7.2 An intervention logic for the specific financial instrument

An 'intervention logic' describes the purpose, activities and expected results and impacts from a proposed policy intervention.

7.2.1 General, Specific and Operational Objectives

Based on the accepted problem tree (Section 3), the instrument should focus on addressing the institutional weaknesses that contribute to environmental problems; catalysing and leveraging changes in institutional approaches and activities. In doing so it would contribute to the updating, development and better implementation of EU environmental policy and legislation.

As a general objective, the purpose of the instrument is therefore to:

- **Provide solutions in order to achieve environmental objectives by developing, updating and implementing EU environmental policy**. Policy makers include the EU institutions, and national, regional and local policy makers in the Member States. Relevant policy makers include those responsible for environmental policy or for the integration of environmental objectives in other policy areas. These solutions will also be relevant for other stakeholders including NGOs and private companies. It is expected that providing solutions to policy makers will result in an improvement of the EU environmental 'common good' which will benefit EU citizens.

The instrument shall also contribute to the development and implementation of the EU policies, in particular with regard to the objectives of the Europe2020 strategy and it shall complement the objectives pursued in other areas of the Union's activities.

With regard to specific and operational objectives, the criteria for the distinction are that:

- Specific objectives recognise more formally the EU added value of the instrument – and their measurement provides the basis of any strategic assessment of the achievement of the programme
- Operational objectives provide a more detailed description of how the specific objectives can be met and provide 'the means' to achieve 'the ends' – and therefore may relate to more than one specific objective. Their measurement is helpful but not essential in establishing the strategic impact of the programme

A 'menu' of objecties and activities are presented below. How these fit together is presented in Table 7.2

At a strategic level, **specific objectives** relate to the purpose of the instrument – and provide the main criteria for the assessment of the instrument:

- To improve the scope of EU environmental policy and legislation:
- To improve the implementation of EU environmental policy and legislation, (including EU commitments to international agreements):
- To improve the contribution of other EU policies to environmental objectives at implementation level:
- To develop solutions for subsequent mainstreaming in other EU financial instruments to support the multiplier effect:
- To contribute to responsibility sharing in the protection of EU natural assets:
- To contribute to responsibility sharing in addressing transboundary problems affecting EU internal and external borders.

The intended results of the instrument can also be described through the specification of **operational objectives**: These include the need to improve knowledge sharing, to raise awareness and to support eco-innovation. These are grouped under the specific objectives, and can relate to more than one specific objective:

To improve the scope of EU environmental policy and legislation

- To identify, test and develop policy proposals to current and emerging environmental problems
- To improve the contributions of environmental NGOs and civil society to implementation, policy making and review

To improve the implementation of EU environmental policy and legislation, (including EU commitments to international agreements)

- To identify, test and develop policy approaches to improve MS and private sector capacity to better transpose, implement, monitor, and enforce EU environmental legislation
- To facilitate knowledge sharing of successful environmental policy and practice
- To improve support for international commitments and management of third country problems
- To improve the contributions of environmental NGOs and civil society to implementation, policy making and review
- To increase effectiveness of MS and third countries activities to reduce environmental externalities adversely affecting the EU

To improve the contribution of other EU policies to environmental objectives at implementation level

- *To identify or realise demonstration activities capable of informing opportunities for improved sectoral performance in achieving environmental objectives*
- *To raise awareness of policy makers and economic and social actors of the opportunities for better integration*

To develop solutions for subsequent mainstreaming in other EU financial instruments to support the multiplier effect

- *To identify, test and develop technical and policy solutions to environmental problems suitable for mainstreaming through other EU / MS financial instruments*

To contribute to responsibility sharing in the protection of EU natural assets

- *To recognise the effort sharing of Member States on the basis of the geographic distribution of environmental resources*
- *To increase effectiveness of protection and management activities in MSs' with unequal amounts of natural assets*

To contribute to responsibility sharing in addressing transboundary problems affecting EU internal and external borders

- *To recognise the risk sharing principle for MS on the basis of transboundary problems experienced*
- *To increase effectiveness of MS and third countries activities to reduce environmental externalities adversely affecting the EU*

7.2.2 Activities to be undertaken by the instrument

The activities to be undertaken would address the specific and operational objectives:

- Public procurement of environmental investigation and technical studies defining and scaling problems and identifying possible policy options
- Public procurement / grant funding of the demonstration of the feasibility of policy options
- Public procurement of environmental investigation and technical studies of transposition, implementation, monitoring and enforcement problems (including in the context of international commitments)
- Funding of environmental NGOs to reduce regulatory capture, contribute to policy implementation and integration, build the knowledge base, improve citizen engagement in decision-making processes and support awareness raising and knowledge sharing
- Funding of the demonstration of updated and improved policy approaches
- Funding of good practice demonstration of implementation for subsequent dissemination
- Funding of mutual and peer learning activities and networks
- Funding of targeted training initiatives
- Funding of the demonstration and dissemination of new or updated approaches to improve environmental performance of key sectors
- Funding of solutions to environmental problems capable of being mainstreamed
- Funding of transboundary projects, with third country participation where required

7.2.3 Expected outputs from the instrument

The expected outputs from the instrument would comprise:

- Challenges to existing approaches to policy development and implementation;
- Improved awareness by policy makers and stakeholders of problems and opportunities
- Expanded institutional capacity of competent authorities to manage EU policy (through increased awareness and knowledge, training, learning networks, improved stakeholder engagement, technical assistance)
- Expanded knowledge base of environmental problems and drivers and the demonstration of updated, improved and good practice approaches to policy, including the testing of new financial instruments and the testing of approaches / techniques to improve environmental performance of industry and households
- Dissemination of lessons and solutions, including by mainstreaming through other EU financial instruments, learning networks, communication events

7.2.4 Expected results and impacts of the instrument

The expected results from the instrument would comprise:

- Improved environmental monitoring and problem definition
- Policy proposals that improve the scope of EU policy to deal with environmental problems
- Take-up and replication of new or updated approaches and good practices that improve monitoring, implementation and enforcement of EU environmental policy in MS
- Increased EU contribution to securing international commitments
- Take-up and replication of new or updated approaches that improve sectoral environmental performance
- Increased mainstream funding for environmental solutions
- Improved level of protection of EU significant environmental assets
- Reduced significance of transboundary problems across internal and external EU borders
- Increased contributions of environmental NGOs to policy making and review, implementation and integration, knowledge base and awareness raising.

The expected impacts (over a specified period) would comprise attributable changes in environmental impacts:

- reduced emissions;
- improved resource efficiency;
- improved environmental quality;
- enhanced environmental assets, including biodiversity and related ecosystem services

Table 7.2 An intervention logic for a specific instrument for the environment and climate action

General Objective: Provide solutions in order to achieve environmental objectives by developing, updating and implementing EU environmental policy

Specific and operational objectives	Types of activities	Outputs	Expected Results
To improve the scope of EU environmental policy and legislation *To identify, test and develop policy proposals to current and emerging environmental problems* *To improve the contributions of environmental NGOs and civil society to implementation, policy making and review*	Funding of the demonstration of updated and improved policy approaches Funding of environmental NGOs	Challenges to existing approaches Expanded knowledge base Demonstration of new / updated policy approaches Testing of new financial instruments	Improved environmental monitoring and problem definition Policy proposals that improve the scope of EU policy to deal with environmental problems
To improve the implementation of EU environmental policy and legislation, (including EU commitments to international agreements) *To identify, test and develop policy approaches to improve MS and private sector capacity in EU environmental legislative transposition, implementation, monitoring, and enforcement* *To facilitate knowledge sharing on successful environmental policy and practice* *To improve support for international commitments and management of third country problems* *To improve the contributions of environmental NGOs and civil society to implementation, policy making and review*	Funding of the demonstration of updated and improved policy approaches Funding good practice demonstration of implementation for subsequent dissemination Funding of mutual and peer learning activities and networks Funding of environmental NGOs	Challenges to the operation of existing approaches Expanded institutional capacity to implement policy (new skills, expanded knowledge base, new and extended networks of competent authorities) Expanded knowledge base Demonstration of updated policy approaches and of good practice policy implementation / enforcement Dissemination of good practice – multiplier effects	Take-up of new or updated approaches and good practices that improve monitoring, implementation and enforcement of EU environmental policy in MS Increased EU contribution to securing international commitments Replication of good practice
To improve the contribution of other EU policies to environmental objectives at implementation level *To identify or realise demonstration projects capable of informing opportunities for improved sectoral performance in achieving environmental objectives*	Funding of the demonstration and dissemination of new or updated approaches to improve environmental performance of key sectors	Increased awareness of the need and scope for integration Expanded institutional capacity (new skills, expanded knowledge base, new and extended networks of competent authorities) to increase integration	Take-up of new or improved approaches that improve sectoral environmental performance Replication of new /

Specific and operational objectives	Types of activities	Outputs	Expected Results
To raise awareness of policy makers and economic and social actors of the opportunities for better integration		Demonstration of new or updated approaches to improve environmental performance of key sectors Dissemination within sectors of new / improved approaches – multiplier effects	improved approaches
To develop solutions for subsequent mainstreaming in other EU financial instruments to support the multiplier effect *To identify, test and develop technical and policy solutions to environmental problems suitable for mainstreaming*	Funding of solutions to environmental problems capable of being mainstreamed	Demonstration of new or updated approaches / techniques to improve environmental performance capable of being mainstreamed Applications for EU funding based on demonstration projects – multiplier effects	Increased mainstream funding for environmental solutions
To contribute to responsibility sharing in the protection of EU natural assets *To recognise the effort sharing of Member States on the basis of the geographic distribution of environmental resources* *To increase effectiveness of protection and management activities in MSs' with unequal amounts of natural assets*	Funding of the Natura2000 (N2K) Network Funding of biodiversity protection that is not N2K and is on IUCN/EU Red Lists Funding of measures to halt the loss of biodiversity and to support biodiversity protection and enhancement	Challenges to the operation of existing approaches New and expanded networks of stakeholders enabling conservation measures Expanded knowledge base of good practice conservation measures Expanded use of nature conservation measures within N2K sites and wider eco-system management	Improved conservation status and reduced degradation of EU significant environmental assets
To contribute to responsibility sharing in addressing transboundary problems affecting EU internal and external borders *To recognise the risk sharing principle for MS on the basis of transboundary problems experienced* *To increase effectiveness of MS and third countries activities to reduce environmental externalities adversely affecting the EU*	Funding of transboundary projects, with third country participation where required	Challenges to the operation of existing approaches Expanded knowledge base of cross-border problems Expanded institutional capacity to implement policy across internal and external EU borders Demonstration and dissemination of new or updated approaches to address transboundary problems	Reduced significance of transboudary problems

7.3 Assessment criteria for use in the Impact Assessment

The assessment comprises essentially three tests for each option, as the basis for comparison:

- The effectiveness, efficiency and consistency of the option in meeting the specific objectives
  - Effectiveness: The extent to which options can be expected to achieve the objectives of the proposal;
  - Efficiency: The extent to which objectives can be achieved for a given level of resources/at least cost (cost-effectiveness) (assessed for the preferred option only); and,
  - Consistency: The extent to which options are likely to limit trade-offs across the economic, social, and environmental domain.
- The environmental, economic and social impacts (with reference to specific criteria) – see below
- Distributional impacts on different groups, and the effects on fundamental rights.

This assessment will have taken into account the costs of the options, but further consideration of the costs to the Commission and to MS will be provided including the issue of administrative costs associated with the operation of and participation in the option.

The assessment will also identify key risks and uncertainties in the assessment and comment on the implications for the comparison of options; and the need for accompanying measures. A final reflection on feasibility is then added.

7.3.1 Effectiveness, efficiency and consistency

The specific objectives against which those aspects are measured are outlined in **Error! Reference source not found.**defined in Table 7.2 above.

7.3.2 Environmental, economic and social criteria

The environmental, economic and social impact of policy options for new or substantially revised instruments can be assessed against the baseline scenario. The specific criteria and indicators need to be considered for these impacts. The emphasis is on the impact of options relative to the baseline scenario, rather than absolute measures of impact. As this is an ex ante evaluation and impact assessment, determining the absolute scale of impact of each option would require very specific assumptions about, for example, areas of Natura 2000 sites protected or effects on species numbers; or the scale of adoption of new methods and technologies. But as a *relative* assessment, the measurement is concerned with whether there are any significant differences, positive or negative, in the scale and type of outcomes of an option compared to the baseline scenario and hence the economic and social and environmental impacts relative to the baseline.

The absolute environmental, economic and social impacts, against which to assess options, will need to be established as part of the assessment of the baseline scenario. This assessment is developed further below, but will require an assessment of the likely impacts of the current Regulation. In the case of operating grants to NGOs this will need to be based on their contribution to policy debates, problem definition and levels of awareness.

In the case of public procurement of services to support policy development, to the extent that there is a core requirement across all options, use is unlikely to affect the order of magnitude of impacts across the different options.

On the basis that the options (except the 'zero' option) absorb a similar level of funds, the economic and social impacts will directly relate to the target beneficiaries; and indirectly to the environmental and policy changes. These impacts will depend on the type and scale of outcomes attributable to the option. This will include the estimated level of dissemination and

replication activity capable of supporting the further take-up of project results, thereby multiplying the benefits of the project. Improving the multiplier value of the Programme is one of the major challenges identified in the MTE.

The general set of results in the baseline would be expected to relate to:

- Improved conservation status of N2000 sites and protected species;
- Effects on species diversity and population numbers;
- Effects on greenhouse gas emissions;
- Changes in resilience to climate change;
- Changes in awareness about environmental issues.
- Changes in the environment policy / regulatory framework, and related environmental impacts;
- Scale of adoption and diffusion of new approaches, techniques and methods, with environmental impacts;
- Changes in behaviour of target beneficiaries, with environmental impacts.

These outcomes would be expected to lead directly to **environmental impacts** and improvements in environmental quality, depending on the particular environmental domains subject to intervention.

To establish the **economic and social impacts** associated with outcomes of different options it will be necessary to have some view of how these and similar outcomes, including environmental changes can lead to direct and indirect economic and social changes.

Depending on the particular option, theme and proposed delivery mechanism, the target beneficiaries are likely to comprise some combination of the following:

- Businesses / universities – support for more cost effectives ways to implementing environmental legislation and solving environmental problems;
- Public authorities - support for innovation in environmental management, support for nature conservation, support for more cost effectives ways to implementing environmental legislation and solving environmental problems;
- Landowners (public, private, NGOs) – payments for biodiversity and eco-system services; ownership of environmental assets etc and
- NGOs – operating grants, support for innovation in environmental management and for the generation of new technologies.

Generic economic and social impact indicators allowing comparison of direct impacts would therefore comprise:

- Technology outcomes (e.g. leveraged R&D spend, patents);
- Cost savings to public authorities in environmental management;
- Additional sales / exports from environmental technologies and new business opportunities;
- Stakeholder engagement through NGOs; and
- Improved health as a result of improved environmental quality / eco-system services.

The indirect economic and social impacts, attributable to policy options, result from changes, in:

- environmental quality / eco-system services at EU, national and local scales;

- EU environmental policies (e.g. changes in regulation, changes in the use of market based instruments);
- MS environmental policies and implementation (e.g. costs of regulation due to improved transposition and management, changes in cost recovery, environmental taxes); and
- environmental investment and expenditure and the use of environmental techniques and technologies.

Generic indicators of the indirect impacts would therefore be the same as for the direct impacts but possibly include sector level changes in costs, income, output and employment, based on analyses of the linkages between environmental outcomes and impacts and economic activities.

7.3.3 Distributional impacts

The identification of groups affected by the proposal is important since the options identified could be beneficial to some groups but harm other groups. The following questions would be used in the IA process to systematically capture the groups affected by policy options and the impacts on such groups:

- Who is affected?
- How are they affected?
- What type of impact is it (social, economic, environmental)?
- What is the magnitude of the impact?

In addition consideration of any effects on fundamental rights will be included.

Table 7.3 Draft Assessment Grid for Each Individual Option

Specific objective to be achieved/ problem addressed	***Element***	***Anticipated impact: effectiveness (rated from –5 to +5)***		***Explanation of rating and aspects of the policy option necessary to achieve impact***
To improve the scope of EU environmental policy and legislation.	NAT			
	EPG			
	INF			
	NGO			
To improve the implementation of EU environmental policy and legislation, (including EU commitments to international agreements)	NAT			
	EPG			
	INF			
	NGO			
To improve the practical contribution of other EU policies to environmental objectives at implementation level	NAT			
	EPG			
	INF			
	NGO			

Specific objective to be achieved/ problem addressed	***Element***	***Anticipated impact: effectiveness (rated from –5 to +5)***		***Explanation of rating and aspects of the policy option necessary to achieve impact***
To develop solutions for subsequent mainstreaming in other EU financial instruments and MS practices	NAT			
	EPG			
	INF			
	NGO			
To contribute to responsibility sharing in the protection of EU natural assets	NAT			
	EPG			
	INF			
	NGO			
To contribute to responsibility sharing in addressing transboundary problems affecting EU internal and external borders	NAT			
	EPG			
	INF			
	NGO			

Assessment of options – Against impact indicators

Specific objective to be achieved/ problem addressed		Anticipated impact: effectiveness (rated from –5 to +5)	Explanation of rating and aspects of the policy option necessary to achieve impact
Environmental impacts	Changes in policies/management		
	Changes in habitats/eco-systems		
	Changes in pollution / resource use		
Economic impacts	Technology outcomes		
	Additional sales / GVA		
	Net cost savings		
Social impacts	NGO contributions to policy		

	Improvements in human health		
	Additional employment		

Assessment of option – Other criteria

Specific objective to be achieved/ problem addressed	*Anticipated impact: effectiveness (rated from –5 to +5)*	*Explanation of rating and aspects of the policy option necessary to achieve impact*
Impacts on different social and economic groups		
Fundamental rights		
Risks		
Financial costs to the EU budget (direct staff costs, funding instruments)		
Financial costs to Member States (e.g. administrative costs for applicants and management costs for beneficiaries)		
Summary of benefits and advantages of option		
Summary of disadvantages and risks of policy option (including negative economic and social costs in EU and third countries)		
Essential accompanying measures		
Feasibility: Issues raised in stakeholder consultations		
Feasibility: Issues raised by Member States		

8 Choices for a future financial instrument for the environment and climate change

This section outlines some of the choices that are available in designing the future instrument. These choices relate to the thematic and territorial focus that might be selected. There are also choices available in relation to the choice of activities and the types of delivery and management approaches that could be used in the design of the instrument. They are also part of the menu for developing the different options for a new specific financing instruments for the environment.

8.1 Thematic choices for the future financial instrument

The thematic focus of the instrument might be examined firstly from a consideration of environmental problems; and secondly from a consideration of environmental policy requirements, based on issues associated with the existing acquis.

8.1.1 Environmental problems

The range of EU level environmental problems is well defined and subject to continuous monitoring and research by the European Environment Agency (EEA); and periodically presented by theme and Member State in the *State of the Environment* report. This work tends to take a thematic approach.

Major environmental problems are well defined and form the basis of the acquis. These problems are briefly summarised below and elaborated further in Annex 3. The major environmental problems also map well onto a framework for considering thematic policy choices, as shown in Figure 8.1 below. This can best be seen by moving across the diagram from left to right:

- **'Physical environment'** (left): this policy area relates mostly to nature and biodiversity, which continues to be affected by a number of factors including land use conflicts, and pollution. It includes climate change impacts (such as droughts and flooding) and management of the Natura 2000 network.
- **'The existing acquis'** (centre): this policy area includes air quality, which remains an ongoing concern, especially in terms of levels of particulate matter and the issue of chemical substances of high concern. Freshwater management remains an issue and reducing pollution to Europe's rivers and other water bodies is a key concern; implementation of the Water Framework Directive is crucial.
- **'Resource efficiency and decoupling'** (right): this policy area relates to resource use and waste. Waste legislation, despite being well developed, is facing major challenges in terms of implementation. Climate change mitigation, which is strongly linked to resource efficiency, may require further action and the EU is considering enhancing its 2020 commitments by an increased reduction to 30% from 20%.

Put simply there is a continuum of environmental problems that goes from a concern with the state of the environment and the stock of environmental assets and related eco-system services, at one end; to a broader concern with resource efficiency and decoupling of resources at the other.

8.1.2 Environmental policies

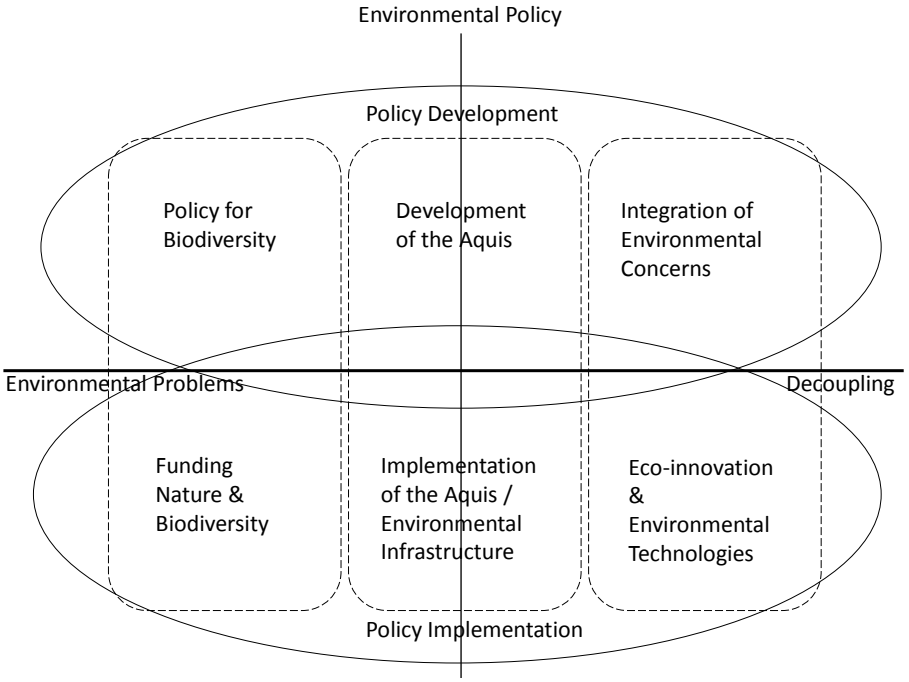
A second consideration is the already substantial body of EU environmental policies and the extent to which the new instrument would be required to reflect and frame this 'acquis', as with the current Regulation. Again it is possible to identify a continuum – in this case between the further development of policy at one end (activity that is currently largely supported through public procurement of service contracts) and the implementation and delivery of environmental policy at the other end (activity that is largely supported through the LIFE Programme of Action Grants). In this context we note that the new Environment

Commissioner Janez Potocnik has stated that key issues will be ...*resource efficiency and the effective implementation and enforcement of existing environmental legislation*.

8.1.3 A possible framework for considering thematic policy choices

The two perspectives outlined above (i.e. environmental problems and environmental policies) provide ways of framing the policy choices. Figure 2 presents a representation of this indicative framework. The top half is concerned with policy development and the bottom half addresses policy implementation. The policy area to the left relates specifically to the physical environment, and especially nature protection and biodiversity. Moving to the centre the policy areas are more focused on the existing acquis, and on the right hand side the policy areas are more focused on resource efficiency and decoupling. It is worth noting that the current LIFE+ Regulation covers the whole of this framework.

Figure 8.1 Thematic Choices for Policy Options



Stakeholder views – Thematic focus

None of the GHK survey stakeholders believed the instrument should be restricted to addressing just one type of policy problem or activity. The clear majority of EC workshop participants (75%) were also clear that a thematic focus was not required, with a need to address the whole of the acquis. Some noted that excluding certain themes at different times might compromise the continuity in the support provided to particular themes and hence quality of work delivered. There was a resounding view that all the themes are interlinked and there is a lot of interaction between them, making it difficult to separate out 'more important' themes.

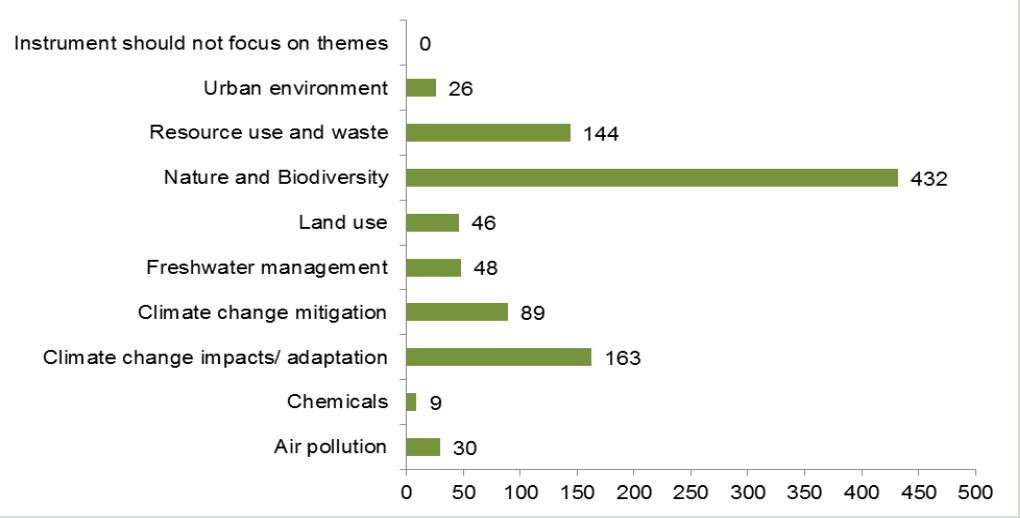
Similarly, respondents to the CoR survey indicated that more than three quarters of the respondents (76%) do not agree with narrowing the focus of the future instrument to a specific area/objective (Chart 20). Those who are in favour of a more focused LIFE instrument, specify climate change (42% of responses), the management of the Natura 2000 Network (33% of responses) and the Habitats and Birds directives (17% of responses) as the most pertinent objectives/areas (Chart 21).

The results from the YVIE survey, however, show that roughly 60% of respondents felt that the Commission should set a number of environmental thematic issues to be addressed in priority. It should be noted that the YVIE survey was asking respondents whether certain environmental fields should be prioritised; this does not necessarily mean that other environmental fields would be completely excluded. Therefore the YVIE results and the GHK survey results are not necessarily contradictory, given that the GHK survey was asking respondents to consider whether a future

instrument should be completely limited to certain environmental policy areas. This latter option was clearly much less desirable.

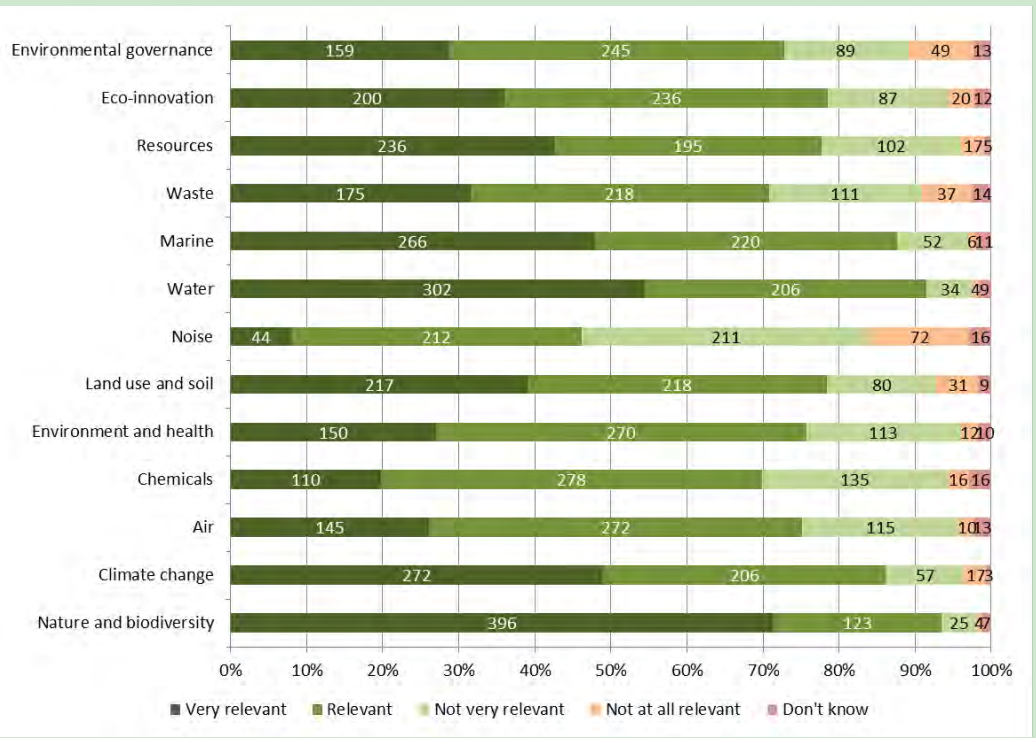
Indeed, whilst many stakeholders noted that a focus on nature and biodiversity in a future instrument would be useful (especially given that no other instruments directly supports nature protection and biodiversity as an explicit objective), other activities which are not explicitly related to nature protection (e.g. water resources) should not be excluded from being potentially funded (see Figure 8.2).

Figure 8.2 Weighted responses from workshop participants indicated that the clear majority felt that a focus on nature and biodiversity was most important, although other environmental policy areas remain relevant



Source: GHK analysis, EC Workshop

Figure 8.3 YVIE results indicate that the most relevant environmental policy area for an instrument for the environment is nature and biodiversity, although other environmental policy areas also remain important



Source: GHK analysis, YVIE Survey

A similar result was found in the YVIE survey, where nature and biodiversity was thought to be the most relevant environmental policy area for an instrument for the environment, but other environmental fields (e.g. water, climate change, marine, etc.) were also believed to be particularly relevant (see Figure 8.3)

Overall then, it seems that stakeholders are not necessarily adverse to having a focused instrument, but they are adverse to having an instrument which focuses only on one type of activity or policy area to the exclusion of all others (such as nature protection). Stakeholders felt that priorities, if set, should be non-exclusive, to avoid deterring good ideas and projects but ensuring the weight of the programme addresses the main objectives.

8.2 Territorial scope of the future financial instrument

The main territorial choice for the instrument relates to the extent that third countries should benefit from funding (mainly through action grants) and under which conditions; and whether activities carried out outside the EU are to be eligible for funding.

There are three main 'arrangements' that could be considered in terms of the territorial scope of a future financial instrument for the environment:

- **'Exclusively EU':** this arrangement rules out funding of any third country participation by the financial instrument. For action grants, this has two main implications. The first is that projects will not be able to involve partners from third countries (e.g. in helping to protect species that may migrate to non-EU countries during certain seasons). Secondly, projects with the main aim of supporting efforts of national administrations outside the EU to develop and implement environmental policy will not be eligible for funding. For NGOs, this would imply that offices situated outside the EU (e.g. non-EU regional branches of European NGOs) would not be able to receive funding through the instrument, which could have negative impacts on partnership working and co-operation on certain international projects. Lastly, for public procurement for policy support, DG ENV staff will continue to be required to request funds from DG RELEX to undertake activities outside the EU (e.g. attending conferences outside the EU) instead of directly from DG ENV itself.
- **'Minor allowances for Third Country involvement':** the territorial focus here would be exclusively on the EU, but would allow for some small allowances to be made for funding Third Country involvement in response to particular issues for which there is an apparent funding 'gap'. For example, this might relate to clear trans-boundary problems which affect implementation of a specific EU environmental policy, and which involve Third Country neighbours and their active participation. This would be particularly pertinent in those third countries where resources and political will to implement environmental policy is relatively weak. This arrangement implies some flexibility in funding some third country participation (as is currently the case in the adjustments that have been made to LIFE+ to allow for some funding of third country partners), but does not imply a level of third country funding similar to the former LIFE TCY component of the LIFE III Programme.
- **'Greater integration of third countries':** The territorial focus for this arrangement derives from the defined needs and thematic focus. Given the Treaty requirements for international action, as well as the importance of global environmental and European neighbourhood problems, an explicit role in co-operation with DG RELEX and DG DEV could be included, whereby DG ENV and the future instrument plays a significant role in funding third country participation. This might involve, for example, providing funding for a technical assistance facility to assist governments in developing countries to draw up low emissions development strategies. However, this has the potential to weaken development policy coherence.

Stakeholder consultation – Territorial focus

The territorial focus could better be considered in the design of the future instrument. Several Commission interviewees stated that it was regrettable that the Third Country component was removed from LIFE, as they felt these projects had been effective in the past. Stakeholders across all the consultations generally supported the potential for a specific instrument for the environment to fund activities outside the EU, as long as it provided EU benefits.

Almost 70% of respondents to the "Your Voice in Europe" survey agreed that a specific instrument should allow for the possibility of some activities to be carried out outside the EU. Of those who responded in the affirmative, most (almost 40%) thought that external action should only be carried out where there is a clear contribution to achieving an EU policy objective. Other justifications given for external action were in the case of countries which aim at becoming members of the EU in the future ('candidate countries' and 'potential candidates') and in the case of countries neighbouring the EU.

Similarly, workshop participants considered that the primary focus for activities outside the EU should be on issues with neighbouring countries, rather than international commitments. Funding activities outside the EU would help with awareness raising and knowledge sharing as there is often a significant need for joint action.

For transnational projects, the current minimum share of LIFE+ funds allocated (15%) is viewed as reasonable by the majority of stakeholders consulted. In fact, the current instrument spends 30% of the budget on transnational activities.

However, 39% of respondents to the CoR survey believe that the new LIFE instrument should address EU countries only. Nonetheless, 36% consider that it should ideally include 'minor allowances for third countries involvement'. The few arguments raised by the respondents regarding this matter suggest that involvement of countries outside the EU should be allowed if required by the project, or more specifically, whenever there is a clear contribution towards achieving specific EU policy objectives and/or promoting solutions to shared problems.

Overall, these results are not entirely surprising, in light of the fact that most stakeholders believed that burden sharing and the transboundary nature of environmental problems is the second most important rationale for a specific instrument for the environment to exist (EC workshop participants), and the most important rationale by YVIE survey respondents. survey).

8.3 Delivery mechanisms for the future financial instrument

Depending on the range of activities to be carried out (and listed in Section 3.2.2 above) there are a number of different delivery mechanisms, which can be used to varying degrees and in different combinations, depending on policy needs and the particular requirements of the work programme:

- **Public procurement** by Commission Services – formerly known as the 'common pot', this activity provides for the provision of services covering technical assistance, research and policy appraisal and evaluation; environmental monitoring and the funding of mission costs of DG ENV staff. Procurement is planned and managed through standard Commission procedures;
- **Action Grants** – grants allocated in response to the interests and objectives of MS in response to the identified objectives laid down in the annual work programme and calls for proposals. This mechanism has been the mainstay of previous LIFE programmes, providing EU added value mainly through the benefits to MS of shared learning and innovative activity. In particular, Action Grants provide one of the most important ways of generating a 'bottom-up' approach to the improvement of EU environment policy. Sub-sets of Action Grants could be considered depending on particular needs, organised through calls for proposals:
  - **Transnational Projects** – grants allocated through calls for proposals, targeted for use by MS at national level for transnational activity, and which is specified top-down as part of the integrated work programme. The rationale for these types of grants is

the need to address common problems of implementation. The grants would assist with explicit exchange of experience and shared learning activity designed to address transposition problems and to build institutional capacity at the national level;

- **Integrated Projects –** grants allocated through calls for proposals for projects that cover a large portion of the territory of a region or MS, directed to building the necessary capacity to address a specific thematic or territorial issue by using LIFE funds to mobilise other EU, national/regional/private sector funds. The applicant must show how the range of funding will be used to finance the range of activities proposed, and how the different activities deliver the range of outcomes required by the funders. The rationale for this type of grant would be the fact that certain issues may be so significant in nature and have various differing elements that they require a large and varied amount of funding, which cannot be obtained through one fund alone (see Box);
- **Project Pipelines -** a project that is funded at different stages of its life –cycle by different funding instruments. For example at the beginning of the project lifecycle the projects may conduct research funded by DG RTD, following this, concepts may be tested /piloted using LIFE funds and finally rolled out and mainstreamed under CIP and structural funds.

Integrated Projects

An idea that is possible for the future is financing integrated projects. Although this idea has only been tested in a small number of current LIFE projects potential benefits exist. An integrated project is a traditional LIFE project that covers a large portion of the territory of a region (it could also be national), where the applicant, namely a competent authority, aims at generating the necessary capacity to manage a specific sector at the most appropriate territorial/administrative level in a durable way by mobilising LIFE funds and other EU, national/regional/private sector funds. LIFE finances the measures and activities included in the proposal for the LIFE project but as a pre-condition to obtain funds, the applicant has to demonstrate that the LIFE project implements the sectoral programme concerned and show how the other funds will be used to finance the complementary measures included therein.[49]

- **Technical Assistance** – grants to project applicants to support project development. Based on the JASPERS model[50], the grant may be linked to territorial or thematic priorities. It could be also be linked to the Integrated Projects and may be particularly useful in certain New Member States, which may be experiencing a lack of resources and know-how in how to apply for project funding.

- **Operational Grants** – grants to bodies, principally environmental NGOs operating at the EU level as a means of reducing the risks of regulatory capture and to better reflect the interests of civil society. Such grants remain pertinent given the significant role that NGOs play in contributing to better implementation and development of environmental policy;
- **Innovative instruments** – this could include:
  - **Loans:** such as those provided by the European Investment Bank (EIB). These could be deployed via commercial banks to SMEs and market segments which have difficulty accessing commercial banks; through venture capital and SME guarantees operations, by acquiring stakes in SMEs (primarily innovative small businesses with

[49] European Commission – personal communication

[50] JASPERS provides assistance to applicants from the start of project design through to the final application for EU funding and approval. JASPERS funds project development in five sectors: including transport and environment. JASPERS fund horizontal tasks such as obtaining expertise on public-private partnerships, and the financial analysis of projects including state aid issues

high growth potential); and through bank guarantees. Such loans would increase the leverage effect of the funding, to secure additional finance through the provision of subsidised interest rates or on the basis of guarantees provided by the instrument. These loans would be operated under the terms and conditions as laid down by the European Investment Bank (EIB).

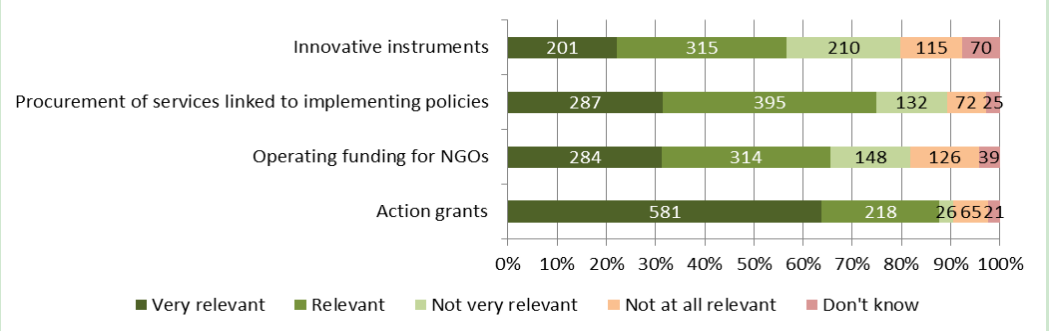
- **Revolving loans:** similar to JEREMIE, an arrangement which allows Member States – through national and regional managing authorities – the opportunity to use part of their Structural Funds to finance SMEs by means of equity, loans or guarantees through a revolving Holding fund. Repayments are obtained from financial intermediaries for further investment in SMEs. The advantage here is sustainability of the instrument, unlike the 'pure grant approach' and the potential ability to engage the financial sector in participating.
- **Risk Sharing Finance Facility (RSFF):** a collaboration between the EIB and EC, RSFF is an innovative scheme to improve access to debt financing for private companies or public institutions promoting activities in the field of research, development and innovation. It is based on the principle of credit risk sharing, extending the ability of the Bank to provide loans or guarantees for investment with a higher risk and reward profile (e.g. the RSFF used a €2bn cushion to lend more than €6bn by mid-2010). However, RSFF beneficiaries need to demonstrate an ability to service financial obligations i.e. to show that regular activity or implementation of the RSFF-funded project will generate sufficient free cash-flow to cover loan interest payments, which would be problematic for public sector beneficiaries such as regional authorities.

Stakeholder consultation – Delivery mechanisms

In general, the existing suite of mechanisms used in the current LIFE+ instrument was seen by stakeholders as being adequate. Respondents to "Your Voice in Europe" noted that action grants were, by far, the most important activity, followed by public procurement of services. Procurement of services (e.g. studies, technical assistance) was only somewhat thought to be more relevant than the operational grants given to NGOs. There was considerable more uncertainty about the use of innovative instruments (e.g. provision of interest rate subsidies, subsidised loans, venture capital, micro-credit) (see Figure 8.4).

In the case of the CoR survey, the most effective mechanisms to be used in the future LIFE instrument are considered to be 'action grants (transnational projects, integrated and technical assistance)', followed by 'operational grants', (42% and 23% of responses, respectively). The other two mechanisms listed in the questionnaire ('public procurement' and innovative instruments) received less than one fifth of responses (19% and 16% respectively).

Figure 8.4 YVIE results indicate that respondents believe that the most relevant delivery mechanism for an instrument for the environment is nature action grants



Source: GHK analysis, YVIE Survey

Action grants

Despite the support given by stakeholders to the need for, and importance of, action grants (as indicated in Figure 8.4), stakeholders did raise some issues with the current co-financing rate for

action grants, with 65% of YVIE respondents noting that the current 50% rate is not appropriate. Some workshop participants, for instance, felt that the current co-financing rate is regressive, and discriminates against poorer Member States. It was suggested that differentiated co-financing rates (i.e. similar to national allocations), would be beneficial, with higher co-financing rates for those Member States who find it difficult to submit project applications or absorb funding. The number of quality projects being financed may also be lower, as some project beneficiaries are unable to secure sufficient match funding to be eligible for LIFE funding.

Overall, there was a general agreement among workshop participants that the EU should contribute a maximum of 75% of the total project budget to ensure that beneficiaries maintain ownership of their projects.

Operational grants

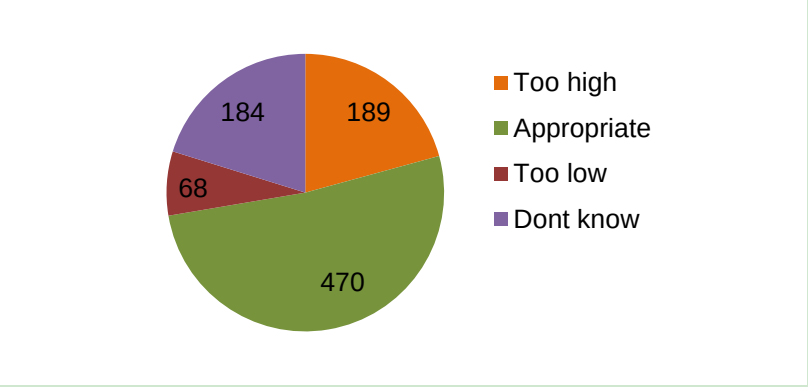
Although operational grants received less support in the YVIE survey than public procurement or action grants, workshop participants nonetheless noted that strengthening the role of environmental NGOs was a very important activity, given their importance in linking inputs from the general public to policy development, in raising awareness and sharing knowledge, as well as ensuring that the views of civil society are represented at a policy level.

When asked whether the current co-financing rate of 70% for NGO operating grants is appropriate, most stakeholders (52%) believed it was. However, several respondents also believed it was too high, although an almost similar amount was not sure (see Figure 8.5). When asked further whether this operational funding should be gradually decreased over consecutive years, there was an even split between respondents who thought it should, and respondents who thought it shouldn't (38% each way).

A clearer response was given to the question of whether a future instrument for the environment should prioritise the funding of certain types of NGOs; in this case, 46% believed this approach should be adopted, whilst a third believed it should not.

The type of NGOs that were most often chosen as being prioritised, are the NGOs that work on the implementation of EU policy. Other preferred means of prioritisation were NGOs which are involved in shaping EU policy, and those which have large geographical coverage. Respondents were less likely to indicate that prioritisation should be given to those NGOs which work on specific topics and new NGO networks.

Figure 8.5 YVIE results indicate that most stakeholders believed the current co-financing rate for NGO operating grants (70%) to be appropriate



Source: GHK analysis, YVIE Survey

Use of innovative instruments

The use of innovative instruments (e.g. loans) had the least support. For instance, many workshop participants believed that loans are not likely to be appropriate for nature and biodiversity projects, which are better served by grants. However, loans could be more feasible for EPG-type demonstration projects that are close to market (although the potential for overlaps with the CIP would need to be carefully managed).

Integrated projects

Views were somewhat divided on the benefits of integrated projects (IPs). Some thought they have

the potential to increase complementarity and policy interaction, especially respondents to the YVIE survey, where 55% thought that IPs should be encouraged. Fewer respondents felt that IPs are suited to the management of the Natura 2000 network (42%), and a significant number of respondents were not sure (41%). Slightly more respondents (50%) thought IPs were right, however, for other sectors. Again though, many were unclear about the nature and benefits of IPs (38%).

In the case of the CoR survey, 85% of the respondents liked the idea of IPs, as opposed to only 10% who disagreed with that concept; 5% of respondents did not express an opinion. Respondents have underlined the suitability of IPs when searching for local solutions to regional or national environmental problems. They also claim that IPs are appropriate to enhance coordination in environmental issues especially when involving international cooperation; can help promote coordination between sectoral policies and between different territorial areas; and allow the optimisation of resources. On the other hand, respondents have commented that the necessary staff capacity to support IPs is missing at the local level. Moreover, those who are against IPs, argue that in practice, such projects are too complex and fail to achieve high quality standards.

About three quarters of the respondents consider IPs quite feasible, while 21% finds those projects very feasible; only 5% believe that such projects are not feasible. As one of the respondents commented, IPs offer the advantage of a comprehensive solution to the problem at regional level, but at the same time require quality coordination of activities and increased financing. In addition, respondents raised concerns over the increased coordination requirements between the different agencies governing IPs, calling for consensus at a high governance level. The need to simplify financial reporting procedures was also mentioned, along with comments on the difficulties faced by public bodies lacking resources to co-finance IPs.

At the same time, respondents highlighted the potential of IPs to maximise synergies and value for money, as well as to create opportunities for the implementation of large-scale actions, bringing together both a large number of experts/technicians and adequate funds.

Many participants at the workshop believed IPs would be difficult to operationalise in practice. Some issues that were raised included the potential difficulties in fulfilling eligibility requirements, possible difficulties in managing projects and actually coordinating the project across the different funding instruments involved given the very different management and organisational cultures. The perceived clash between the programmatic approach in other instruments and the project approach in LIFE was a key reason for why stakeholders were sceptical of the potential for integrated projects to be successful in practice. It was noted that IPs are likely to be more feasible for nature and biodiversity projects as the future instrument would be able to 'activate' other funds and gather diverse sectoral policies.

However, CoR respondents suggested that IPs could most realistically and effectively be used to address a wide variety of environmental problems/challenges met within their region/municipality, notably: 'freshwater management' (21.5% of responses); 'nature and biodiversity' (18% of responses); 'resource use and waste' (14% of responses); as well as 'urban environment', 'air pollution' and 'land use' (each counting for 9% of responses). In addition, a total of 14% of the related responses concerned climate change issues (either adaptation or mitigation).

About half of the CoR respondents (47%) were not certain if their municipality/region would be interested in applying for an integrated project in the next programme period; as few respondents commented, such a decision remains subject to their capacity and availability of resources. 45% of the respondents anticipate such an action in the future, while only 8% is negative in that respect.

8.4 Management approaches for the future financial instrument

There are three main ways in which the future instrument could be managed and implemented:

- **Centralised system:** the instrument would be managed by DG ENV through the LIFE Units, as is the case with the current LIFE+ instrument (current baseline scenario). Assuming that the internal resources to manage the instrument would be sufficient, the main advantages of retaining a centralised system of management lie with the fact that the Commission would remain 'closer' to the Action Grant projects in particular, and would maintain the link between policy and implementation, as well as keeping up a higher level of visibility in terms of their involvement with the instrument. However, the costs of permanent staff tend to be higher; DG staff also usually have broader set of

duties and may be seen as having to 'manage the Programme on the margins of their policy work', meaning they potentially have less scope to identify/develop new solutions;

- **Agency-type approach - indirectly centralised system:** potentially similar to the Executive Agency for Competitiveness and Innovation (EACI), the Agency would be mainly in charge of monitoring project implementation while policy aspects are dealt with by DG ENV/DG CLIMA. This option may also include taking over some of the tasks currently carried out by AIDCO in relation to the ENRTP and IPA although this would require further analysis. The main advantages of an Executive Agency approach are the generation of cost savings from freeing staff within DGs to work on core issues and through using less costly staff and who would be employed on a contractual basis. Having a clear mandate and some operational autonomy could allow the Agency to find more efficient means of managing the instrument. However, core activities of financial/contract management would still need to be retained in the DG so the scope for significant cost savings is limited. The autonomy of the Agency may result in a slower and smaller response to changing policy needs and priorities as identified by the DG;
- **Shared or decentralised system:** according to this management arrangement, Member States would be responsible for implementing the EU programme, achieving programme objectives and the application of specific progress indicators. This option would allow greater collaboration with Member States on external actions. However, the key concern with this type of arrangement would be securing buy-in and political will from Member States in managing a financial instrument which may have a relatively small budget and which would require resources at the national level which the Member States may not be able to release, as well as potentially high set-up costs for the Member States.

It may also be possible to have 'variable delivery mechanisms' for the different types of activities – in other words, using centralised management for nature projects; an Agency for environmental policy/governance projects; and for example, Specific International Cooperation Actions[51] (SICAs) for climate change. This, however, will be best be considered when there is more certainty on the types of activities that will be financed by the instrument.

Stakeholder consultation – Management approaches

An interesting discussion was had between workshop participants regarding the most suitable management approach. The overall conclusion was the best management approach varies depending on the size of the budget. With the current budget however, the significant majority (81%) agreed that the current direct centralised management approach is best (see Figure 8.6). Although there was significantly more variation in response to the YVIE survey, a clear majority (almost 70%) of respondents also wanted to see the current central management approach continue.

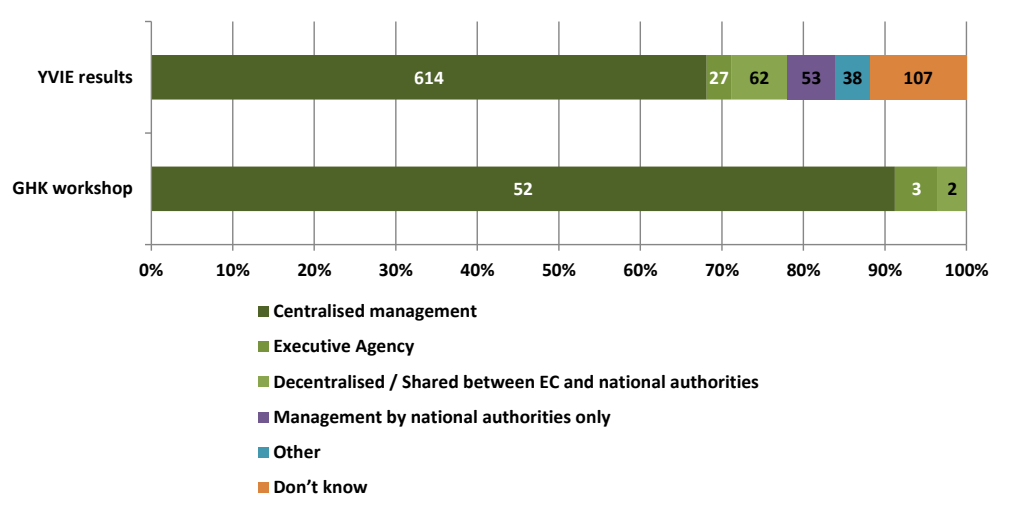
YVIE respondents who felt that a management system other than the current centralised approach was more appropriate, varied in what they believed was the best alternative. Slightly more than a third of those (34%) believed that shared management between the European Commission and national authorities was best. Slightly less than a third of those (29%) believed that the management of a future instrument for the environment should be entirely left to national authorities. The least popular approach for YVIE respondents was an European Executive Agency.

The direct centralised approach was seen as the preferred approach for a number of reasons:

- the Commission has gained a wealth of experience in managing the instrument and seems to have delivered it competently to date;
- management by the Commission enables a good oversight of the programme, making the creation of synergies with other instruments easier; and,
- it is the best approach for maintaining the linkage between what happens on the ground and policy development, which participants feared would be lost through a European Executive Agency approach.

[51] This is a new FP7 instrument to promote participation of non-EU Member States/ Association countries within certain thematic areas.

Figure 8.6 The clear majority of workshop participants and YVIE respondents felt that a centralised management system would continue to be the most appropriate management approach



Source: GHK analysis, YVIE Survey and EC Workshop

Although some workshop participants recognised the benefits (e.g. potential cost savings) of having an Executive Agency managing the future instrument, very few felt that these were significant enough given the effort and time that would be required to change the current system, especially when the current system is established and is working quite well.

Decentralising the management of a specific instrument for the environment was only seen as a feasible alternative if the budget was to significantly increase (and if the subsequent increase in resources would outstrip the capacity of the Unit to manage the increase).

9 Description of instrument options

This section presents a description of the process for identifying the instrument options, and presents a systematic description of each instrument options. Five options have been identified for a future specific financial instrument for the environment for the next multi-annual financial framework, partly reflecting the terms of reference, and partly the underlying problem and related intervention logic:

Instrument option 1: Zero Option – no LIFE financial instrument (other than the continuation of the 'common pot' for policy development and review)
Instrument option 2: Baseline Option – continuation of the current LIFE+ Regulation and related delivery mechanisms ('Common pot', Action Grants, Operating Grants)
Instrument option 3: Strategic Programming Option – combining a stronger strategic planning framework with 'bottom-up' delivery that includes but also expands current delivery mechanisms
Instrument option 4: Restricted Activities Option – essentially as Option 3, but focusing on a smaller number of activities linked most closely with the development and implementation of the environmental acquis
Instrument option 5: Restricted Thematic (Nature) Option – essentially as Option 3, but focusing on the co-financing requirement under the Habitats Directive

It should also be noted that the options consider an instrument for the environment including climate change, recognising the creation of a separate Directorate-Generale.

All options assume that other EU financial instruments continue to operate in the next programme period, as they operate within the current programme.

Table 9.1 below provides a brief comparison of the instrument options, highlighting key differences. Following a description of how the options were developed (Section 9.2), a brief description of each policy option is given (Section 9.3). Detailed intervention logics for each option are then presented in Section 9.4.

Table 9.1 Table 9.1: Quick comparative overview of policy options (with key differences highlighted)

Features	Zero Option	Baseline	Strategic Programming	Restricted Activity	Restricted Theme (Nature)
Strategic planning	None	Limited	Extensive	Extensive	Extensive
Catalytic value	None	Limited	Extensive	Extensive	Extensive (in themes)
Thematic focus	None	None	None	None	Biodiversity + Climate
Activities	'Common Pot'	All	All	Restricted	All
Delivery mechanisms	Public procurement only	Only existing mechanisms	Expanded + Additional	As required to reflect activities	Expanded + Additional

9.2 Derivation of the Instrument Options

All the above options hav been based on a presumption that the indicative budget available to the instrument would be unlikely to be one that would allow a direct response to environmental problems. A budget many times greater than that currently provided would be required if it were. Instead, the focus has been on identifying ways to make better use of a budget set between the current level and a budget 2 to 3 times greater / smaller, for activities focused on catalysing and leveraging changes in policy development and implementation.

Given the overall scale of the problem and the range of institutional drivers, the process sought to consider options capable of providing a focus to the instrument that was not too broadly defined, and could provide the basis of an effective and feasible instrument.

In essence one could conceive an option based on the current instrument, but addressing weaknesses including the need for improved priority setting (Option 3), or restricting the range of activities to focus on a smaller number (Option 4), or restricting the thematic focus to a particular theme (Option 5). The LIFE instrument is to be used both by DG ENV and DG CLIMA. Options 2, 3 and 4 include climate change as a theme within the acquis.

In arriving at the policy options outlined below, other options were discussed and considered but were not selected. This included an option to focus more on resource decoupling and one to address major problems. In the case of the former, the decoupling agenda was considered to require a potentially diverse range of activities, and considerable risks of duplicating the use of other instruments (especially in the case of energy use). In the case of the latter, the main funding instruments are better placed to respond.

An option somewhere between Option 3 and Option 5 taking a broader thematic focus than Option 5 but excluding elements of the acquis addressed under Option 3 might be considered to provide a stronger link to underlying problems (an Option 5+). This option could, for example, be considered for a combined Biodiversity / Climate instrument with the purpose of addressing the institutional drivers relating to the two largest global problems, and which are expected to have greater impacts on the EU in future, whilst other elements of the acquis might be considered to be of lesser priority for the instrument.

Stakeholder views – The options

Overall participants reacted positively to the options proposed. It was clear however that the most popular option was Option 3 (Strategic Programming), with almost 60% of participants voting for that option over the others. This option was also consistently the most popular across all stakeholder types.

The baseline was only the preferred option in the case of some NCPs (national contact points) and in the case of one social partner. The least popular option was the restricted thematic option (Option 5), whilst the restricted activities option (Option 4) only received slightly more support across the different stakeholder types. Workshop participants tended to develop various options of their own, which tended to be based on the Strategic Programming option, but with some slight variations.

Discussions made it clear that there were, in particular, two key aspects to be considered: the future budget and the fact that most participants saw the current LIFE instrument as being generally effective and fit for purpose (although there are some areas where improvements could be made). Consequently, the general sense was that participants did not want to stray too far from the current instrument and participants were keenly aware of budgetary constraints which might affect whether certain options are realistic or not.

Considering these aspects, it is largely unsurprising that Option 1 (Discontinuation of LIFE) was not readily accepted by participants, although some did feel it should be considered in the current financial context. Instead, participants noted the many positive aspects of the Baseline Option (continuation of the current LIFE instrument), including its centralised management, the broad eligibility of activities, and the support given to NGOs. Whilst some felt that the current wide thematic scope was also a clear advantage, by providing flexibility, where projects can reflect needs as they arise. Moreover, some participants felt that setting a strict thematic focus could reduce the quality of projects, in which good ideas are not accepted as they do not “fit” the priorities. Other participants however felt that without a clear focus, an instrument for the environment risks being ‘aimless’. Several participants noted that having priorities could increase the EU added value of an instrument such as LIFE. Overall, the general consensus was that strategic priorities would be useful, so long as they are non-exclusive.

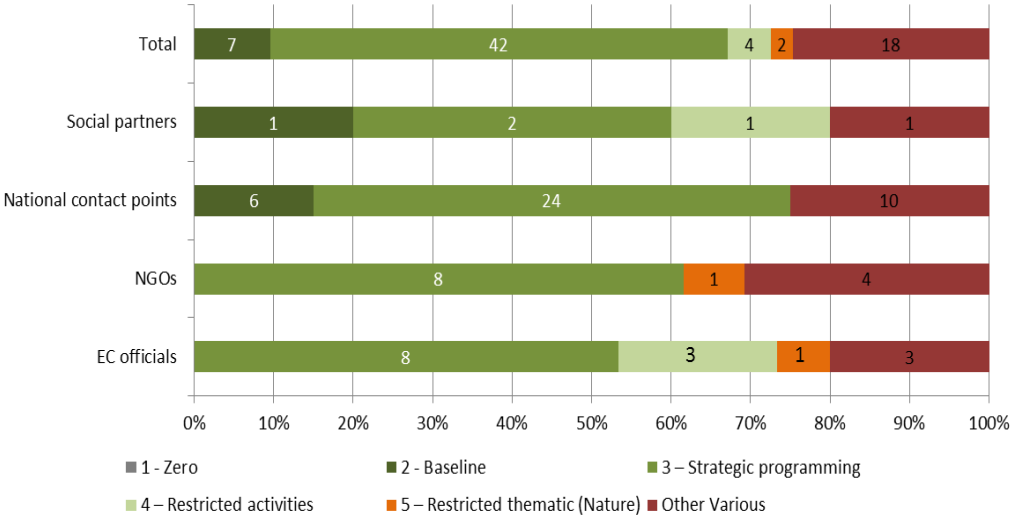
This strategic programming was the key element that stakeholders appreciated in Option 3. For instance, survey respondents were asked to rank 9 potential aspects for LIFE in order of importance; improving the strategic management of LIFE was rated the most important most often. Option 3 was also the most popular of the 5 options presented, with 58% of the participants voting for this option as their preferred choice. Nonetheless, several participants noted that the emphasis on integrated projects to improve complementarities between funding instruments may be an unrealistic

expectation.

The key benefit perceived for Option 4 (restricted activities) was that it could be particularly useful for focusing the instrument, especially if the budget remains limited. Moreover, it could be easier to manage because it is restricted. However, some viewed it as having limited feasibility and being less effective as a result. The activities that participants were least concerned to lose from the current instrument were the separate information / communications strand and the support to eco-innovation. The former was due largely because dissemination activities are already part of projects under the other strands; the added value of having a separate strand purely dedicated to information and communication activities was questioned. In terms of eco-innovation, participants recognised that this was quite well covered through other funding instruments, particularly the CIP.

Option 5 (restricted thematic - Nature) received the most opposition. It was felt that focusing, for instance, on Nature could suppress the funding of projects that benefit nature and biodiversity under other funds (e.g. EARDF). Moreover, it was felt that if the scope were to be too narrow, then opportunities might be missed. A few participants nonetheless felt that this could be a worthwhile option, especially if the budget remains limited and given the legal requirements for the EU to co-finance the management of the Natura 2000 network and the fact that no other instrument has nature protection as a direct objective. The scope to extend the option to include climate action was suggested by some stakeholders.

Figure 9.2 The most popular option amongst Workshop participants, across all stakeholder types, was Option 3 (Strategic Programming)



Source: GHK analysis, EC Workshop

9.3 Description of the Instrument Options

9.3.1 Instrument option 1 – Zero Option – no LIFE except for the 'common pot'

Rationale: To test the costs and benefits of the instrument

This option, specified by the Terms of Reference is defined to illustrate, by comparison, the costs and benefits associated with a dis-continuation of the LIFE instrument. Under this option the LIFE instrument would no longer exist. However, since the current instrument also funds public procurement of services (such as studies and missions) to allow in-house staff to develop and improve policy it is assumed that this will continue, to enable in-house staff to operate effectively. Spending on the environment, including the implementation of environmental policies and achievement of environmental goals, would be entirely reliant upon MS activities and other EU funding instruments such as the Cohesion Policy and the Common Agricultural Policy.

9.3.2 Instrument option 2 – Baseline Option – continuation of the LIFE+ Regulation

Rationale: To provide the basis of comparison with other options

The baseline option is based on the continuation of the current LIFE+ Regulation and related delivery mechanisms. Under this option the instrument is framed by a replacement statement to the 6EAP, setting out the policy priorities for the programme period. The baseline also assumes the adoption of agreed actions in the light of the Mid-Term Evaluation of LIFE. This includes the development of stronger policy links with thematic units as the basis of clearer annual priorities and the re-introduction of third country participation in LIFE projects.

The baseline assessment is critical to the impact assessment, as it provides the basis against which the other options are assessed; the emphasis is therefore on the impact of the other options *relative to* the baseline scenario, rather than absolute measures of impact. As a *relative* assessment, the concern is to determine whether there are any significant differences, positive or negative, in the scale and type of results and impacts of an option compared to the baseline and hence the economic, social and environmental impacts relative to the baseline.

9.3.3 Instrument option 3 – Strategic Programming Option – expanding the planning and delivery of the financial instrument

Rationale: To build on the success of the current instrument, but addressing observed weaknesses and formally recognising the advice of the Budget Review

This Instrument option is the continuation of a specific financial instrument for the environment (LIFE), but one which is more strategically focused and directly linked to the policy priorities and work programmes of DG Environment. These would continue to reflect the existing Treaty requirements to develop, update and implement EU environmental policy in response to continuing and emerging EU scale environmental problems. The Instrument priorities and work programme would reflect agreed decisions through comitology and hence with MS, on a thematic (and possibly Directive by Directive) basis.

Thus, the option differs from the current LIFE instrument by having a greater emphasis on:

- establishing strategic priorities in the context of multi-annual planning based on well defined needs provided by the policy units in DG Environment (rather than by reference to the general objectives provided by the 6EAP), and;
- increasing the catalytic potential of the financial instrument and synergies with other financial instruments by increasing the multiplier and replication impacts, leveraging additional mainstream funding and expanding the use made of project results.

The catalytic value of LIFE would be developed through, for instance, developing project pipelines to maximise the contribution of other EU financial instruments to environmental goals. LIFE projects would more often serve as pilots for subsequent mainstreaming under Cohesion Policy or the Common Agricultural Policy. Improving synergies through such project pipelines, given the relatively limited resources available under LIFE and the significant financial contribution made by other financial instruments to meeting environmental objectives, is crucial. Moreover, integrated projects would be actively encouraged to increase cross-working between financial instruments.

On the basis of these tools, the option's main aim would be to address the identified institutional weaknesses that are significant contributors to environmental problems.

In terms of delivery mechanisms, the option would use existing mechanisms as well as expanding current ones such as grants for technical assistance and introducing new mechanisms such as loans when required. Greater use would also be made of the flexibility to use different delivery mechanisms in combination. Different delivery approaches will be used depending on the nature of the issues to be addressed, requiring a LIFE unit to manage the range of mechanisms. A substantial increase in budget would require consideration of an Executive Agency, depending on the allocation of resources to different mechanisms (and especially the scale of action grants and loan funds).

9.3.4 Instrument option 4 – Restricted Activities Option – focusing on a limited set of activities

Rationale: To examine the costs and benefits of adopting a more focused set of activities targeted at the development and implementation of policy

This option is based on the preceding option (Option 3) but with a reduced range of activities. It is designed to examine the effects of focusing the instrument on the principal weaknesses of policy implementation, focusing on good practice, knowledge sharing and mutual learning. Specific information & communications activity and eco-innovation would be excluded. This allows consideration of the trade-offs associated with varying the range of activities. It also allows testing of an option that could operate under a significantly reduced budget.

The emphasis on the strategic planning element of Option 3 is retained. The thematic focus of the option would reflect the general objective of developing, updating and implementing EU environmental policy and cover the whole acquis. The territorial focus would be exclusively on the EU (with minor allowance for Third Country involvement in response to clear trans-boundary problems affecting implementation).

The delivery mechanisms used would reflect the restricted nature of the activities, with a continued emphasis, as in Option 3, to maximise the catalytic value of LIFE (for example though integrated projects and improved project pipelines).

9.3.5 Instrument option 5 – Restricted Thematic (Nature) Option – focusing the instrument on the statutory area requiring co-finance

Rationale: To examine the costs and benefits of adopting a narrower thematic focus, and considers the use of the instrument solely to implement Article 8 of the Habitats Directive, to secure the effective management and stewardship of the Natura 2000 network and the related biodiversity policy agenda.

This option is essentially a thematically restricted version of the Option 3 (Strategic Programming), in that the same tools and the same activities are used, but exclusively for the purpose of delivering only a part of the environmental acquis. The general strategic priority therefore is set from the outset, namely to meet the legal obligations to co-finance the Natura 2000 network and to address climate change.

All the same tools and activities will be available as those specified under Option 3 (i.e. expanded and additional delivery mechanisms), but these are to be used in the exclusive context of supporting the Natura 2000 network, and related nature and biodiversity goals.

The costs of meeting this need have been estimated to be in the order of €6 billion a year. Approximately half of the current budget is allocated to nature and biodiversity. Assuming the overall budget remains the same, this would allow a near doubling of effort on a clearly defined and unmet need. Continuing provision for public procurement would be required to meet the basic policy needs of the rest of the aquis.

9.4 Detailed Intervention Logics for each of the Instrument Options

The Intervention Logics of each of the five options are given below, with specific reference to the headings requested in the Terms of Reference and summarised in Table 9.2.

Table 9.2 Intervention Logic and Dimensions of Policy Options - Template

Stages in the Intervention Logic	Dimensions of Policy Options	Comment
Stage 1: Objective Definition:	**Scope:** Thematic and territorial focus of the option including reference to the need for	The thematic focus of the option based on policy needs as defined by EU/MS. The EU territorial focus derives from the defined needs and thematic focus. An initial reflection on the budget implied by the

Definition of policy needs and objectives taking account of alternative instruments	action outside the EU	option
	Processes: consideration of role of the option given alternative instruments	The option has to take account of alternative instruments operated or planned by the EC that provide environmental funding and/or address the same issues. The scope for complementarity and avoidance of overlap will need to be defined
Stage 2: Design: Design of the intervention taking account of target actors, and desired outcomes	**Approaches:** Top-down programming vs bottom-up project funding	The option will need, as a basic choice, to consider the use and type of project level activity and appropriate management systems
	Levels of intervention: target beneficiaries, intervention rates, funding levels	The objectives should define the relevant target actors, the types of activity to be funded and the intervention rates and funding levels necessary to secure the desired changes in behaviour
	Budget: The approximate scale of budget required	Broad scale of the budget would inform overall option design, here the budget is firmed up to reflect the specific design proposals
Stage 3: Operation: Detailed specification of the operation of the instrument	**Delivery systems**: use of different types of Grants / funding	The specific choice of funding mechanism should follow from and be defined by the previous dimensions, recognising a menu of choices is potentially available.
	Implementing methods: centralised within the EC, Agency, decentralised within MS	Depending on the scale and complexity of the option, the nature of target actors and funding instrument, different implementing methods could be considered. A menu of choices is potentially available

9.4.2 Instrument option 1 – Zero Option – no LIFE except for the 'common pot'

Table 9.3 Description of the Zero Option

Dimensions of Instrument Options	Description
Stage 1: Objective Definition: Definition of policy needs and objectives taking account of alternative instruments	
Scope: Thematic and territorial focus of the option including reference to the need for action outside the EU	Discontinuation of the specific financial instrument for the environment, leaving only the in-house work of DGENV and DG CLIMA to support the development, updating and implementation of EU environmental policy, in line with Treaty obligations and enabling legal commitments to international and EU policy to be maintained. The option assumes the retention of limited public procurement authority to support in-house work through studies and missions. However all monitoring and awareness raising would be the responsibility of MS Removal of the Operating Grants to NGOs The thematic focus encompasses the whole environmental acquis, but with a limited focus on supporting MS implementation, and assistance with emerging problems. The territorial focus is exclusively within the EU, except where international

	commitments are required to be met. An indicative budget of say €60 million per year, similar to the current public procurement budget
Processes: consideration of role of the option given alternative instruments	The option relies on other EC financial instruments to take forward, with MS, the full development and implementation of EU environmental policy. This would include the current co-financing responsibilities for the Natura 2000 network under the Habitats Directive. It is assumed that these will be taken up (eg as an explicit additional element of Green Infrastructure under Cohesion Policy), rather than seeking to revise the Directive to remove the co-finance requirement All activity outside of the EU, would rely on the RELEX family to fund directly or indirectly international activity in support of EU environmental policy and international commitments
Stage 2: Design: Design of the intervention taking account of target actors, and desired outcomes	
Approaches: Top-down programming vs bottom-up project funding	Public procurement – activities are defined and planned through DG Annual Management Plans (AMPs), combining those of DG ENV and CLIMA and subject to standard public procurement rules No other financing activity
Levels of intervention: target beneficiaries, intervention rates, funding levels	The target beneficiaries are the Commission (through funding for public procurement) Public procurement (100%) of goods & services includes information and communication, and the preparation, implementation, checking and evaluation of projects, policies, programmes and legislation
Budget: The approximate scale of budget required	100% of the budget is allocated to public procurement
Stage 3: Operation: Detailed specification of the operation of the instrument	
Delivery systems: use of different types of Grants / funding	Public procurement – activities are defined and planned through DG Annual Management Plans (AMPs), combining those of DG ENV and CLIMA and subject to standard public procurement rules
Implementing methods: centralised within the EC, Agency, decentralised within MS	The option would be centrally managed by the EC There would be no requirement for Technical Assistance

9.4.3 Instrument option 2 – Baseline Option – continuation of the LIFE+ Regulation

Table 9.4 Description of the Baseline Option

Dimensions of Instrument Options	Description
Stage 1: Objective Definition: Definition of policy needs and objectives taking account of alternative	

instruments	
Scope: Thematic and territorial focus of the option including reference to the need for action outside the EU	Continuation of the current LIFE+ Regulation – supporting the development, updating and implementation of EU environmental policy in response to emerging and well defined existing environmental problems common to MS, and reflected in a formal statement of policy objectives The thematic focus encompasses the whole environmental acquis with a particular focus on identifying and disseminating good practice and promoting innovation in policy development, monitoring and implementation The territorial focus reflects recent legal opinion and includes support to activities including third countries. An indicative national allocation of budget is made to reflect the distribution of environmental needs across the EU. It cannot serve as a legal base for extra appropriations agreed in the Parliament. The budget is €300 million per year
Processes: consideration of role of the option given alternative instruments	The emphasis is on avoiding the double funding of activity with other instruments. As a result there is little overlap but little attempt to build synergies. The exception is the combined management of the CIP programme with DG ENTR in support of eco-innovation
Stage 2: Design: Design of the intervention taking account of target actors, and desired outcomes	
Approaches: Top-down programming vs bottom-up project funding	The requirements for activities is defined in the EU strategic statement of objectives for the programme period Public procurement – activities are defined and planned through DG Annual Management Plans (AMPs) Operating Grants – EU level activity by NGOs Action Grants – bottom-up project activity in MS
Levels of intervention: target beneficiaries, intervention rates, funding levels	The target beneficiaries are the Commission (through funding for public procurement), EU environmental NGOs (through use of Operating Grants) and MS actors (competent authorities, universities/research institutes, businesses, NGOs, through use of Action Grants) Public procurement (100%) of goods & services includes information and communication, and the preparation, implementation, monitoring, checking and evaluation of projects, policies, programmes and legislation Operating Grants (with an intervention rate of 70%) to strengthen the participation of EU environmental NGOs in the dialogue process in environmental policy-making and in its implementation; and in the European standardisation process Action Grants (with an intervention rate of 70% for selected activities and 50% for the remainder) to support MS activities to raise awareness, demonstrate and disseminate good practice and promote innovation in the development and implementation of EU environmental policies
Budget: The approximate scale of budget required	78% of the budget is allocated to Action Grants (with a minimum of 50% of the Action Grant budget for nature & biodiversity) 19% of the budget is allocated to public procurement

	3% of the budget is allocated to Operating Grants
Stage 3: Operation: Detailed specification of the operation of the instrument	
Delivery systems: use of different types of Grants / funding	Public procurement – activities are defined and planned through DG Annual Management Plans (AMPs), combining those of DG ENV and CLIMA and subject to standard public procurement rules procurement rules Operating Grants – allocated via calls launched and appraised by DGENV, supported by Technical Assistance. Action Grants – allocated via annual calls for projects, subject to indicative national allocations. launched and appraised by DGENV, supported by NCPs Specific sub-components to maximise EU added value and to reflect budget provisions (nature & biodiversity; environmental policy & governance, information & communication)
Implementing methods: centralised within the EC, Agency, decentralised within MS	The option is centrally managed by DGENV in collaboration with DG CLIMA in accordance with EC financial perspectives and under agreed comitology and the LIFE+ committee comprising representation from MS. Technical assistance is used by the EC for support in appraising and monitoring Action Grant projects. Technical Assistance is continued for NGO Operating grants.

9.4.4 Instrument option 3 – Strategic Programming Option – expanding the planning and delivery of the financial instrument

Table 9.5 Description of Option 3 – Strategic Programming Option

Dimensions of Instrument Options	Comment
Stage 1: Objective Definition: Definition of policy needs and objectives taking account of alternative instruments	
Scope: Thematic and territorial focus of the option including reference to the need for action outside the EU	The thematic focus of the option would reflect the general objective of developing, updating and implementing EU environmental policy. Thus it would seek to address emerging problems of EU scale and the whole of the environmental acquis. The option would continue to focus, given the limited funds cf the scale of the problem on awareness raising, support for innovation and demonstration, learning and knowledge exchange, and the identification of good practice and its dissemination of MS implementation of EU environmental policy The territorial focus derives from the defined needs and thematic focus. Given the Treaty requirements for international action, as well as the importance of global environmental and European neighbourhood problems an explicit role in co-operation with DG RELEX and DG DEV would be included An initial budget would assume continuation of existing commitments of €300 million a year. However, considerable scaling up would be possible and would probably deliver improved cost-effectiveness A separate Loan Fund, through EIB, would be added with an initial loan pot of say €50m. Grant funding could be used to guarantee the loan, enabling some additional leverage. The grant would be available for recycling when the loan is paid off. It could also be used to subsidise a

	sub-market rate of interest, incentivising greater investment
Processes: consideration of role of the option given alternative instruments	The option takes a pro-active approach to co-operation and the development of synergy with other instruments, especially funding programmes. A clear focus on piloting and demonstration of activities to support future project pipelines, and subsequent roll-out through the other funding instruments, especially through CP and CAP The majority of EC funding in response to environmental problems and especially the investment needs of the existing acquis will continue to be met by Cohesion Policy The importance of ensuring environmental policy integration results in actual environmental improvements on the ground is also recognised, as endorsed by the Cardiff process
Stage 2: Design: Design of the intervention taking account of target actors, and desired outcomes	
Approaches: Top-down programming vs bottom-up project funding	The requirements for activities is defined in the EU strategic statement of objectives for the programme period, and more fully reflected in the three year and annual work programmes. The work programmes of the thematic units will reflect in part the Directive by Directive decisions made with MS through comitology. The work programmes will also specify the desired use of the alternative delivery mechanisms and the expected outcomes Public procurement – activities are defined and planned through DG Annual Management Plans (AMPs) Transnational Grants – Collaborative MS level activities in support of MS work programmes Operating Grants – EU level activity by NGOs Action Grants – bottom-up project activity in MS (including the use of Integrated Projects) Technical Assistance – (based on the JASPERS instrument) Loans – to support as required for borrowers looking to access funds at below market rates for environmental investment (perhaps on a revolving fund basis), either through interest subsidy or increased security guarantee
Levels of intervention: target beneficiaries, intervention rates, funding levels	The target beneficiaries are the Commission (through funding for public procurement), EU environmental NGOs (through use of Operating Grants), MS through Transnational Grants, and MS actors (competent authorities, universities/research institutes, businesses, NGOs, through use of Action Grants and Loans) Public procurement (100%) of goods & services includes information and communication, and the preparation, implementation, monitoring, checking and evaluation of projects, policies, programmes and legislation Operating Grants (with an intervention rate of 70%) to strengthen the participation of EU environmental NGOs in the dialogue process in environmental policy-making and in its implementation; and in the European standardisation process Transnational Grants (with an intervention rate of 70%) to strengthen MS level mutual /peer leaning, and exchange of experience in support of agreed thematic 'clusters' of policy priorities

	Action Grants (with an intervention rate of 70% for selected activities and 50% for the remainder) to support MS actors activity to raise awareness, demonstrate and disseminate good practice and promote innovation in the development and implementation of EU environmental policies Technical Assistance (with an intervention rate of 100%) to support the design and submission of complex projects requiring multi-funding sources ('integrated projects') Loans – using EIB mechanisms where possible and subject to the requirements as laid down by EIB
Budget: The approximate scale of budget required	Minimum budget is €300 million per year, as in Option 2, but allocated in the context of the strategic approach to programme management
Stage 3: Operation: Detailed specification of the operation of the instrument	
Delivery systems: use of different types of Grants / funding	Public procurement – activities are defined and planned through DG Annual Management Plans (AMPs), combining those of DG ENV and CLIMA and subject to standard public procurement rules Operating Grants – allocated via calls launched and appraised by DGENV, supported by Technical Assistance. Action Grants – allocated via annual calls for projects, subject to indicative national allocations. launched and appraised by DGENV, supported by NCPs Specific sub-components to maximise EU added value and to reflect budget provisions (nature & biodiversity; environmental policy & governance, information & communication) Transnational Grants – allocated via annual call for proposals, launched and appraised by DG ENV, supported by NCPs Technical Assistance for Integrated Multi-funded Projects (minimum size of say €5m) – allocated via annual pre-application call for proposals, launched and appraised by DG ENV, supported by NCPs. Technical Assistance is continued for NGO Operating grants. Loans – allocated to applicants that meet the specific terms and conditions for use and for interest and loan repayment
Implementing methods: centralised within the EC, Agency, decentralised within MS	The option is centrally managed by DGENV in accordance with EC financial regulations and under agreed comitology and the LIFE+ committee comprising representation from MS. Specific components related to climate action would be manage by DG CLIMA using management modes to be further determined by the Impact Assessment of those components of a programme. Technical assistance is used by the EC for support in appraising and monitoring Action Grant projects

9.4.5 Instrument option 4 – Restricted Activities Option – focusing on a limited set of priority activities

Table 9.6 Description of the Restricted Activities Option

Dimensions of Instrument Options	Comment
Stage 1: Objective Definition: Definition of policy needs and objectives taking account of alternative instruments	
Scope: Thematic and territorial focus of the option including reference to the need for action outside the EU	The thematic focus of the option would reflect the general objective of developing, updating and implementing EU environmental policy, but with a strong focus on supporting MS who struggle to implement the existing acquis. The option would focus on a smaller range of activities directly linked to improving implementation, with an emphasis on learning and knowledge exchange for competent authorities, and the identification of good practice implementation measures and its dissemination. The option would exclude more general awareness raising activities (focusing instead on knowledge sharing related to particular policy needs), and eco-innovation. The territorial focus would be exclusively on the EU (with minor allowance for Third Country involvement in response to clear trans-boundary problems affecting implementation). An initial budget would assume continuation of existing financial commitments of €2.2 billion over 7 years. However, possible scaling down might be easier than in other options. A separate Loan Fund, through EIB, would be added with an initial loan pot of say €50m
Processes: consideration of role of the option given alternative instruments	The option focuses strongly on the specific needs of MS and competent authorities in improving policy implementation. Issues of mainstreaming are less significant compared with creating multipliers through knowledge sharing. The majority of EC funding in response to environmental problems and especially the investment needs of the existing acquis will continue to be met by Cohesion Policy
Stage 2: Design: Design of the intervention taking account of target actors, and desired outcomes	
Approaches: Top-down programming vs bottom-up project funding	The requirements for activities is defined in the EU strategic statement of objectives for the programme period, and more fully reflected in the three year and annual work programmes. The work programmes of the thematic units will reflect in part the Directive by Directive decisions made with MS through comitology. The work programmes will also specify the desired use of the alternative delivery mechanisms and the expected outcomes. Public procurement – activities are defined and planned through DG Annual Management Plans (AMPs), combining those of DG ENV and CLIMA Transnational Grants – Collaborative MS level activities in support of MS work programmes Operating Grants – EU level activity by NGOs

	Action Grants – bottom-up project activity in MS Technical Assistance – (based on the JASPERS instrument) Loans – to support as required, focused on public sector borrowers
Levels of intervention: target beneficiaries, intervention rates, funding levels	The target beneficiaries are the Commission (through funding for public procurement), EU environmental NGOs (through use of Operating Grants), MS through Transnational Grants, and MS actors (competent authorities, universities/research institutes, NGOs, (but not businesses) through use of Action Grants and Loans) Public procurement (100%) of goods & services includes information and communication, and the preparation, implementation, monitoring, checking and evaluation of projects, policies, programmes and legislation Operating Grants (with an intervention rate of 70%) to strengthen the participation of EU environmental NGOs in the dialogue process in environmental policy-making and in its implementation; and in the European standardisation process Transnational Grants (with an intervention rate of 70%) to strengthen MS level mutual /peer leaning, and exchange of experience in support of agreed thematic 'clusters' of policy priorities. Raise minimum to be allocated to transnational activity to 50% Action Grants (with an intervention rate of 70% for selected activities and 50% for the remainder) to support MS actors activity to raise awareness of competent authorities, demonstrate and disseminate good practice and promote innovation in the development and implementation of EU environmental policies Technical Assistance (with an intervention rate of 100%) to support the design and submission of complex projects requiring multi-funding sources ('integrated projects') Loans – using EIB mechanisms where possible and subject to the requirements as laid down by EIB
Budget: The approximate scale of budget required	Minimum budget is €300 million per year
Stage 3: Operation: Detailed specification of the operation of the instrument	
Delivery systems: use of different types of Grants / funding	Public procurement – activities are defined and planned through DG Annual Management Plans (AMPs), combining those of DG ENV and CLIMA and subject to standard public procurement rules Operating Grants – allocated via calls launched and appraised by DGENV and supported by Technical Assistance.Action Grants – allocated via annual calls for projects, launched and appraised by DGENV, supported by NCPs Specific sub-components to maximise EU added value and to reflect budget provisions (nature & biodiversity; environmental policy & governance, information & communication) Transnational Grants – allocated via annual call for proposals, launched and appraised by DG ENV, supported by NCPs Technical Assistance for Integrated Multi-funded Projects (minimum size of say €5m) – allocated via annual pre-application call for proposals, launched and appraised by DG ENV, supported by NCPs. Technical

	Assistance is continued for NGO Operating grants. Loans – allocated to applicants that meet the specific terms and conditions for use and for interest and loan repayment
Implementing methods: centralised within the EC, Agency, decentralised within MS	The option is centrally managed by DGENV in accordance with EC financial perspectives and under agreed comitology and the LIFE+ committee comprising representation from MS. Technical assistance is used by the EC for support in appraising and monitoring Action Grant projects

9.4.6 Instrument option 5 – Restricted Thematic Nature Option – focusing the instrument on the statutory area requiring co-finance

Table 9.7 Description of the Nature Option

Dimensions of Instrument Options	Comment
Stage 1: Objective Definition: Definition of policy needs and objectives taking account of alternative instruments	
Scope: Thematic and territorial focus of the option including reference to the need for action outside the EU	The thematic focus of the option would reflect the specific need of Article 8 of the Habitats Directive to co-finance with MS the management of the Natura 2000 Network and broader biodiversity policy objectives The option would focus on building effective and sustainable capacity for the improvement and management of designated sites. The territorial focus is defined by the designated sites. Some allowance for Third Country involvement would allow responses to trans-boundary problems that affected particular designated sites An initial budget would assume continuation of existing commitments of €300 million a year A separate Loan Fund, through EIB, would be added with an initial loan pot of say €50m for public authorities that required capital funds
Processes: consideration of role of the option given alternative instruments	The option takes a pro-active approach to co-operation with Cohesion Policy, CFP and CAP, in order to mainstream required initiatives for larger funding needs. A clear focus on piloting and demonstration of activities to support future project pipelines, and subsequent roll-out through the other funding instruments, especially through CP and CAP The major EC funding in response to other environmental problems and especially the investment needs of the existing acquis will continue to be met by Cohesion Policy The importance of environmental policy integration in so far as it can deliver benefits to the network through sectoral policies would be a priority
Stage 2: Design: Design of the intervention taking account of target actors, and desired outcomes	
Approaches: Top-down programming vs bottom-up project funding	The requirements for activities will be based on the specified needs of the network as identified and communicated by MS. The EC work programme will specify the desired use of the alternative delivery mechanisms and the expected outcomes Public procurement – activities are defined and planned through DG

	Annual Management Plans (AMPs) Transnational Grants – Collaborative MS level activities in support of the Network Operating Grants – EU level activity by NGOs in support of the Network Action Grants – bottom-up project activity in MS Technical Assistance – (based on the JASPERS instrument) Loans – to support as required
Levels of intervention: target beneficiaries, intervention rates, funding levels	The target beneficiaries are the Commission (through funding for public procurement), EU environmental NGOs (through use of Operating Grants), MS through Transnational Grants, and MS actors (competent authorities, universities/research institutes, businesses, NGOs, through use of Action Grants and Loans) Public procurement (100%) of goods & services includes information and communication, and the preparation, implementation, monitoring, checking and evaluation of projects, policies, programmes and legislation Operating Grants (with an intervention rate of 70%) to strengthen the participation of EU environmental NGOs in the dialogue process linked to the needs of the Network Transnational Grants (with an intervention rate of 70%) to strengthen MS level mutual /peer leaning, and exchange of experience in support of the Network Action Grants (with an intervention rate of 70% for selected activities and 50% for the remainder) to support MS actors activity to raise awareness, demonstrate and disseminate good practice and promote innovation in the management of the Network Technical Assistance (with an intervention rate of 100%) to support the design and submission of complex projects requiring multi-funding sources ('integrated projects') in support of the Network Loans – using EIB mechanisms where possible, focused on public sector borrowers
Budget: The approximate scale of budget required	Minimum budget of €300 million per year
Stage 3: Operation: Detailed specification of the operation of the instrument	
Delivery systems: use of different types of Grants / funding	Public procurement – activities are defined and planned through DG Annual Management Plans (AMPs), combining those of DG ENV and CLIMA and subject to standard public procurement rules Operating Grants – allocated via calls linked to the needs of the Network launched and appraised by DGENV, supported by Technical Assistance Action Grants – allocated via annual calls for projects, subject to indicative national allocations. launched and appraised by DGENV, supported by NCPs Transnational Grants – allocated via annual call for proposals, launched and appraised by DG ENV, supported by NCPs Technical Assistance for Integrated Multi-funded Projects (minimum size of say €5m) – allocated via annual pre-application call for proposals,

	launched and appraised by DG ENV, supported by NCPs. Technical Assistance is continued for NGO Operating grants. Loans – allocated to applicants that meet the specific terms and conditions for use and for interest and loan repayment
Implementing methods: centralised within the EC, Agency, decentralised within MS	The option is centrally managed by DGENV in accordance with EC financial perspectives and under agreed comitology and the LIFE+ committee comprising representation from MS. Technical assistance is used by the EC for support in appraising and monitoring Action Grant projects

Combined Impact Assessment and Ex Ante Evaluation of the Review of the LIFE+ Regulation: Options Development

Options Report
Volume 2: Options Assessment

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in association with

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Contents

1 Description of the rationale and intervention logic

This section provides the background to the options assessment, and is taken from Volume 1 of the Impact Assessment report: Options Development

1.1 Rationale for policy intervention and EU added value

The scale of environmental problems, which is expected to increase, provides a clear rationale for EU action. The problem is already many times greater than the scale of current EU interventions. Given its limited size (based on the current allocation), a specific instrument for the environment cannot directly tackle this problem. Unless there are very major changes in the indicative budget, it is clearly right to rely on other EU financial instruments to address these major problems. Instead, a specific instrument for environment and climate change would have a greater impact by focusing on institutional drivers that contribute to the problem.

The mid-term evaluation assessed the LIFE+ instrument to have a continuing relevance based on the well documented needs of environment policy and its implementation, combined with the recognition in the Regulation that EU added value derives at least in part from the bottom-up approach, based on project activity in Member States (MS). Although the evaluation did not assess the results and outcomes of the current Programme activity, evidence based on the review of funded activity and project appraisal and monitoring systems, as well as new research in the impacts of the current instrument, indicate that it continues to address the underlying policy needs.

Both the results from the mid-term evaluation, as well as analysis for this study, has identified the major need as the improved implementation (especially) and development of EU environmental policy and the integration of environmental policy with other policies (especially sectoral) and with EC financial instruments. The **potential role for a specific instrument for the environment and climate change is to act as a catalyst for policy improvements and to leverage contributions from other policies and instruments, addressing the institutional drivers** (as summarised in the Box below).

This role supports strongly the objectives of EU2020 for sustainable growth and reflects the recommendations of the Budget Review, which recognises the need for solidarity and the value of burden sharing, with environmental protection being explicitly noted as an area where this is both relevant and necessary.

Implications of the institutional drivers for the role and use of a specific instrument for the environment and climate change

Addressing the weaknesses in policy implementation and development

- There appears to be less need for an instrument like LIFE to focus on improving the scope of current policy in terms of new legislation, given the potential barriers to developing the scope and the lack of a perceived urgency to do so in most policy areas. However, policy developments to improve the implementation of the acquis are valuable.
- Overall, the implementation of the acquis seems to be a much more significant problem than the scope of the acquis. There is a strong case therefore, for an instrument to support MS who are struggling to transpose and enforce environmental legislation, through for instance, capacity building and demonstrating the benefits of policy implementation. The instrument could also improve implementation by addressing weaknesses in knowledge sharing and policy integration, and by supporting eco-innovation related to policy needs (see below).

Addressing the weaknesses in policy integration and complementarity

- Complementarity requires cross-working. The instrument therefore needs to coordinate more closely with other funds and to support mainstreaming of policy soluitons. For instance, the instrument could

be used more explicitly to develop project pipelines for other EU financial instruments or to fund projects that demonstrate how to use the different funds available in an integrated way.

- The instrument can also contribute to improving the effectiveness of the integration of environmental concerns in other EU policies and related economic and social outcomes. Sectoral initiatives, especially at MS level, could potentially be very useful in improving capacity and demonstrating the benefits of solutions and integration.

Addressing the weaknesses in knowledge sharing and awareness raising

- Although it seems that there is no need for additional structures to deliver knowledge sharing activities for implementation (this is covered by formal networks such as IMPEL), the instrument can assist in increasing the funding available for such activities. Increasing the number of transnational and bottom-up initiatives could prove especially beneficial.
- A key area for improvement is in the dissemination of benefits as the basis of further multiplier effects. This could potentially be achieved by having projects focus more explicitly on specific policy needs. This could secure greater learning and ensure better policy application for example through mutual ('peer') learning processes.
- Raising general levels of awareness could also be a key area of action for the future, given that the role of the current LIFE instrument in raising awareness was seen as one of its most important and effective areas of influence by consultees.

Addressing the lack of eco-innovation

- The policy environment for eco-innovation is complex; the role of a future instrument needs to be well defined. One possibility is to focus its support for eco-innovation by public and university sectors directed to providing compliance solutions. This would then differ from other instruments, which are explicitly market-orientated. Another distinguishing focus would be to concentrate on the demand side, improving the framework conditions for eco-innovation.

In summary, there is clear EU added value from a specific instrument for the environment and climate action because it:

- **Addresses a clear problem** of weaknesses in institutional drivers which undermine EU environmental policy and that other instruments do not address
- **Generates clear collective EU benefits** through responsibility sharing and in so doing contributes to meeting the objectives of EU2020
- **Improves the effectiveness and efficiency of the main EU financial instruments** through demonstrating and mainstreaming effective environmental solutions

1.2 An initial intervention logic for the specific financial instrument

An 'intervention logic' describes the purpose, activities and expected results and impacts from a proposed policy intervention.

1.2.1 General, Specific and Operational Objectives

Based on the accepted problem tree (Section 3 in Volume 1), the instrument should focus on addressing the institutional weaknesses that contribute to environmental problems; catalysing and leveraging changes in institutional approaches and activities. In doing so it would contribute to the updating, development and better implementation of EU environmental policy and legislation.

As a general objective, the purpose of the instrument is therefore to:

- **Provide solutions in order to achieve environmental objectives by developing, updating and implementing EU environmental policy**. Policy makers include the EU institutions, and national, regional and local policy makers in the Member States. Relevant policy makers include those responsible for environmental policy or for the

integration of environmental objectives in other policy areas. These solutions will also be relevant for other stakeholders including NGOs and private companies

The instrument shall also contribute to the development and implementation of other EU policies, in particular with regard to the objectives of the Europe2020 strategy and it shall complement the objectives pursued in other areas of the Union's activities.

Specific objectives are based on the institutional drivers identified in the previous sections. The definition of specific objectives has sought to distinguish between means and ends, where knowledge sharing, awareness raising and support for eco-innovation are judged to be means which help to deliver the specific objectives of improved policy development, implementation and integration ('ends'). The principle of solidarity is also formalised as a specific objective to ensure a focus on maximising EU added value.

This means that the specific objectives are based on:

- The problems of inadequate scope and implementation of current EU environmental policy;
- The problems of inadequate use of opportunities to demonstrate and test the feasibility and economic and environmental benefits of improved integration of environmental objectives;
- The missed opportunities to improve complementarity and synergies between EU financial instruments to deliver projects and activities that can provide positive environmental impacts; and
- The principle of responsibility sharing and solidarity applied to EU environmental policy

The other problems that have been analysed (issues of knowledge sharing, awareness raising, eco-innovation) also need to be addressed by the specific instrument. However, in these cases, the activities that are required can be framed by the specific objectives. So for example activities to improve knowledge sharing or awareness raising will be required as a means to deliver the specific objective. Similarly, investment in eco-innovation will be one of a range of activities to generate solutions that will assist in meeting the specific objectives.

Specific and operational objectives can be distinguished:

- Specific objectives recognise more formally the EU added value of the instrument – and the measurement of specific objectives provides the basis of any strategic assessment of the achievement of the programme
- Operational objectives provide a more detailed description of how the specific objectives can be met and provide 'the means' to achieve 'the ends' – and therefore may relate to more than one specific objective. Their measurement is helpful but not essential in establishing the strategic impact of the programme.

The relationship between the rationale, drivers and objectives is summarised in Table 1.1.

Table 1.1 General. specific and operational policy objectives

EU rationale	Drivers	General objective	Specific and *Operational* Objectives
Uneven distribution of EU significant environmental assets and transboundary pollution – recognised in adopted treaties as requiring EU level action and shared responsibility with MS		Provide solutions in order to achieve environmental objectives by developing, updating and implementing EU environmental policy. Policy makers include the EU institutions, and national, regional and local policy makers in the Member States. Relevant policy makers include those responsible for environmental policy or for the integration of environmental objectives in other policy areas. These solutions will also be relevant for other stakeholders including NGOs and private companies. It is expected that providing solutions to policy makers will	**To contribute to responsibility sharing in the protection of EU natural assets** *To recognise the effort sharing of Member States on the basis of the geographic distribution of environmental resources* *To increase effectiveness of protection and management activities in MSs' with unequal amounts of natural assets* **To contribute to responsibility sharing in addressing transboundary problems affecting EU internal and external borders** *To recognise the risk sharing principle for MS on the basis of transboundary problems experienced* *To increase effectiveness of MS and third countries activities to reduce environmental externalities adversely affecting the EU.*
	Inadequate scope & implementation		**To improve the scope of EU environmental policy and legislation** *To identify, test and develop policy proposals to current and emerging environmental problems* *To improve the contributions of environmental NGOs and civil society to implementation, policy making and review* **To improve the implementation of EU environmental policy and legislation, (including EU commitments to international agreements)** *To identify, test and develop policy approaches to improve MS and private sector capacity to better transpose, implement, monitor, and enforce EU environmental legislation* *To facilitate knowledge sharing of successful environmental policy and practice* *To improve support for international commitments and management of third country problems* *To improve the contributions of environmental NGOs and civil society to implementation, policy making and review* *To increase effectiveness of MS and third countries activities to reduce environmental externalities adversely affecting the EU*
	Inadequate coordination and uneven integration of EU environmental policies		**To improve the contribution of other EU policies to environmental objectives at implementation level** *To identify or realise demonstration activities capable of informing opportunities for improved sectoral performance in achieving environmental objectives* *To raise awareness of policy makers and economic and social actors of the opportunities for better integration* **To develop solutions for subsequent mainstreaming in other EU financial instruments to support the multiplier effect** *To identify, test and develop technical and policy solutions to environmental problems suitable for mainstreaming through other EU / MS financial instruments*

	Inadequate sharing of information and levels of awareness of environmental problems	result in an improvement of the EU environmental 'common good' which will benefit EU citizens	*INCLUDED ABOVE* *To facilitate knowledge sharing of successful environmental policy and practice* *To raise awareness of policy makers and economic and social actors of the opportunities for better integration*
	Inadequate system for finding solutions to environmental problems		*INCLUDED ABOVE* *To identify, test and develop policy proposals to current and emerging environmental problems* *To identify, test and develop policy approaches to improve MS and private sector capacity to better transpose, implement, monitor, and enforce EU environmental legislation* *To identify or realise demonstration projects capable of informing opportunities for improved sectoral performance in achieving environmental objectives* *To identify, test and develop technical and policy solutions to environmental problems suitable for mainstreaming through other EU / MS financial instruments*

1.2.2 Activities to be undertaken by the instrument

The activities to be undertaken would address the specific and operational objectives:

- Public procurement of environmental investigation and technical studies defining and scaling problems and identifying possible policy options
- Public procurement / Grant funding of the demonstration of updated and improved policy options
- Public procurement of environmental investigation and technical studies of transposition, implementation, monitoring and enforcement problems (including in the context of international commitments)
- Funding of environmental NGOs to reduce regulatory capture, contribute to policy implementation and integration, build the knowledge base, improve citizen engagement in decision-making processes and support awareness raising and knowledge sharing
- Funding of the demonstration of updated and improved policy approaches
- Funding of good practice demonstration of implementation for subsequent dissemination
- Funding of mutual and peer learning activities and networks
- Funding of targeted training initiatives
- Funding of the demonstration and dissemination of new or updated approaches to improve environmental performance of key sectors
- Funding of solutions to environmental problems capable of being mainstreamed
- Funding of the Natura2000 (N2K) Network
- Funding of biodiversity protection that is not N2K and is on IUCN/EU Red Lists
- Funding of measures to halt the loss of biodiversity and to support biodiversity protection and enhancement
- Funding of transboundary projects, with third country participation where required

1.2.3 Expected outputs from the instrument

- The expected outputs from the instrument would comprise:Challenges to existing approaches to policy development and implementation;
- Improved awareness by policy makers and stakeholders of problems and opportunities
- Expanded institutional capacity of competent authorities to manage EU policy (through increased awareness and knowledge, training, learning networks, improved stakeholder engagement, technical assistance)
- Expanded knowledge base of environmental problems and drivers and the demonstration of updated, improved and good practice approaches to policy, including the testing of new financial instruments and the testing of approaches / techniques to improve environmental performance of industry and households
- Dissemination of lessons and solutions, including by mainstreaming through other EU financial instruments, learning networks, communication events

1.2.4 Expected results and impacts of the instrument

The expected results from the instrument would comprise:

- Improved environmental monitoring and problem definition
- Policy proposals that improve the scope of EU policy to deal with environmental problems

- Take-up of new or updated approaches and good practices that improve monitoring, implementation and enforcement of EU environmental policy in MS
- Increased EU contribution to securing international commitments
- Replication of good practice
- Take-up of new or improved approaches that improve sectoral environmental performance
- Replication of new / improved approaches
- Increased mainstream funding for environmental solutions
- Improved conservation status and reduced degradation of EU significant environmental assets Reduced significance of transboundary problems Increased contributions of environmental NGOs to policy making and review, implementation and integration, knowledge base and awareness raising.

The expected impacts (over a specified period) would comprise attributable changes in environmental impacts:

- reduced emissions;
- improved resource efficiency;
- improved environmental quality;
- enhanced environmental assets, including biodiversity and related ecosystem services

The full intervention logic is summarised in Table 1.2.

Table 1.2 An intervention logic for a specific instrument for the environment and climate action

General Objective: Provide solutions in order to achieve environmental objectives by developing, updating and implementing EU environmental policy

Specific and operational objectives	Types of activities	Outputs	Expected Results
To improve the scope of EU environmental policy and legislation *To identify, test and develop policy proposals to current and emerging environmental problems* *To improve the contributions of environmental NGOs and civil society to implementation, policy making and review*	Public procurement of environmental investigation and technical studies defining and scaling problems and identifying possible policy options Public procurement / Grant funding of the demonstration of updated and improved policy options Funding of environmental NGOs	Challenges to the operation of existing approaches Expanded knowledge base Demonstration of new / updated policy approaches Testing of new financial instruments	Improved environmental monitoring and problem definition Policy proposals that improve the scope of EU policy to deal with environmental problems
To improve the implementation of EU environmental policy and legislation, (including EU commitments to international agreements) *To identify, test and develop policy approaches to improve MS and private sector capacity to better transpose, implement, monitor, and enforce EU environmental legislation* *To facilitate knowledge sharing of successful environmental policy and practice* *To improve support for international commitments and management of third country problems* *To improve the contributions of environmental NGOs and civil society to implementation, policy making and review*	Public procurement of environmental investigation and technical studies of transposition, implementation, monitoring and enforcement problems (including in the context of international commitments) Funding of the demonstration of updated and improved policy approaches Funding good practice demonstration of implementation for subsequent dissemination Funding of mutual and peer learning activities and networks Funding of targeted training initiatives	Challenges to the operation of existing approaches Expanded institutional capacity to implement policy (new skills, expanded knowledge base, new and extended networks of competent authorities) Expanded knowledge base Demonstration of updated policy approaches and of good practice policy implementation / enforcement Dissemination of good practice – multiplier effects	Take-up of new or updated approaches and good practices that improve monitoring, implementation and enforcement of EU environmental policy in MS Increased EU contribution to securing international commitments Replication of good practice

Specific and operational objectives	Types of activities	Outputs	Expected Results
	Funding of environmental NGOs		
To improve the contribution of other EU policies to environmental objectives at implementation level *To identify or realise demonstration projects capable of informing opportunities for improved sectoral performance in achieving environmental objectives* *To raise awareness of policy makers and economic and social actors of the opportunities for better integration*	Funding of the demonstration and dissemination of new or updated approaches to improve environmental performance of key sectors	Increased awareness of the need and scope for integration Expanded institutional capacity (new skills, expanded knowledge base, new and extended networks of competent authorities) to increase integration Demonstration of new or updated approaches to improve environmental performance of key sectors Dissemination within sectors of new / improved approaches – multiplier effects	Take-up of new or improved approaches that improve sectoral environmental performance Replication of new / improved approaches
To develop solutions for subsequent mainstreaming in other EU financial instruments to support the multiplier effect *To identify, test and develop technical and policy solutions to environmental problems suitable for mainstreaming through other EU/MS financial instruments*	Funding of solutions to environmental problems capable of being mainstreamed	Demonstration of new or updated approaches / techniques to improve environmental performance capable of being mainstreamed Applications for EU funding based on demonstration projects – multiplier effects	Increased mainstream funding for environmental solutions
To contribute to responsibility sharing in the protection of EU natural assets *To recognise the effort sharing of Member States on the basis of the geographic distribution of environmental resources* *To increase effectiveness of protection and management activities in MSs' with unequal amounts of natural assets*	Funding of the Natura2000 (N2K) Network Funding of biodiversity protection that is not N2K and is on IUCN/EU Red Lists Funding of measures to halt the loss of biodiversity and to support biodiversity protection and enhancement	Challenges to the operation of existing approaches New and expanded networks of stakeholders enabling conservation measures Expanded knowledge base of good practice conservation measures Expanded use of nature conservation measures within N2K sites and wider eco-system management	Improved conservation status and reduced degradation of EU significant environmental assets
To contribute to responsibility sharing in addressing transboundary problems affecting EU internal and external borders	Funding of transboundary projects, with third country participation where required	Challenges to the operation of existing approaches Expanded knowledge base of cross-border problems	Reduced significance of transboudary problems

Specific and operational objectives	Types of activities	Outputs	Expected Results
To recognise the risk sharing principle for MS on the basis of transboundary problems experienced		Expanded institutional capacity to implement policy across internal and external EU borders	
To increase effectiveness of MS and third countries activities to reduce environmental externalities adversely affecting the EU		Demonstration and dissemination of new or updated approaches to address transboundary problems	

2 Résumé of options and related budgets and assessment criteria

A detailed description of the options and their evolution is provided in the Options Development Report. We provide a brief résumé together with an indicative budget for each option. We also copy the assessment criteria adopted for the Impact Assessment

2.1 Instrument option 1 – Zero Option – no LIFE except for the 'common pot'

Rationale: To test the impacts of removing the instrument

This option, specified by the Terms of Reference is defined to illustrate, by comparison, the costs and benefits associated with a dis-continuation of the LIFE instrument. Under this option the LIFE instrument would no longer exist. However, since the current instrument also funds public procurement of services (such as studies and missions) to allow in-house staff to develop and improve policy it is assumed that this will continue, to enable in-house staff to operate effectively. Spending on the environment, including the implementation of environmental policies and achievement of environmental goals, would be entirely reliant upon MS activities and other EU funding instruments such as the Cohesion Policy financial instruments and the financial instrument of the Common Agricultural Policy.

Table 2.1 Indicative EC Budget: €57m per year

Zero	**€m**	**57**				
Element	Allocation		EC contrib.	Co-finance share	Total funding	Change from baseline
Public Procurement	100%	57	57	100%	57	0%
Operating Grants	0%	0	0	70%	0	-100%
Action Grants	0%	0				
of which	Nature	50%	0	50%	0	-100%
	EPG	45%	0	50%	0	-100%
	INF	5%	0	50%	0	-100%
Total			57		57	-90%

2.2 Instrument option 2 – Baseline Option – continuation of the LIFE+ Regulation

Rationale: To provide a baseline scenario as the basis of comparison with other options

The baseline option is based on the continuation of the current LIFE+ Regulation and related delivery mechanisms. Under this option the instrument is framed by a replacement statement to the 6EAP, setting out the policy priorities for the programme period. The baseline also assumes the adoption of agreed actions in the light of the Mid-Term Evaluation of LIFE. This includes the development of stronger policy links with thematic units as the basis of clearer non compulsory annual priorities and the re-introduction of very limited third country participation in LIFE projects (third countries cannot be associated beneficiaries but activities in third countries might be possible if needed to achieve EU policy objectives).

The baseline assessment is critical to the impact assessment, as it provides the basis against which the other options are assessed; the emphasis is therefore on the impact of the other options *relative to* the baseline scenario, rather than absolute measures of impact. As a *relative* assessment, the concern is to determine whether there are any significant differences, positive or negative, in the scale and type of results and impacts of an option

compared to the baseline and hence the economic, social and environmental impacts relative to the baseline.

The instrument relates to three strands: nature and biodiversity; wider environmental policy and governance (EPG); and information and communications. In the case of EPG, Table 2.2 provides a typology of the types of relevant activity.

Table 2.2 For the EPG strand the projects can be divided into four activity types

Main purpose of activity	Type of activity
A - Problem definition – measuring environmental impacts	Environmental investigation / collecting data on the extent of a problem / barriers to implementation / better ways of addressing environmental challenges
	Developing a new approach / technique /process for monitoring of environmental impacts within a municipality or sector
B - Improvements in implementing environmental policy	Develop / demonstrate and introduce methods and action plans for reducing environmental impacts (approach / management system/ process / plans) to reduce environmental impact, informing policy. Mainly at the level of municipality. Sometimes with other national / international partners
	Stimulate behaviour change through new market based instruments
	Assistance in purchasing infrastructure / capital costs that reduces environmental impacts
	Set up public private partnerships (PPPs) to show more effective ways of reducing environmental impacts
C - Improvements in the environmental management of economic activities, integrating environmental objectives	Demonstrate good practice / produce instructions / tools / kits/ guidelines to industry on how to reduce environmental impacts
	Pro-actively engaging with stakeholders (industry involved) to change behaviour
D - Developing particular solutions to environmental problems and improving compliance (eco-innovation)	Testing and demonstrating / developing a technology / technique / process / product that reduces environmental impacts within a municipality or sector

Source: GHK analysis of EPG activities. Further description is provided in Annex 2

Table 2.3 Indicative EC Budget: €300m per year

Baseline	**€m**	**300**			
Element	**Allocation**		**EC contrib.**	**Co-finance share**	**Total funding**
Public Procurement	19%	57	57	100%	57
Operating Grants	3%	9	9	70%	13
Action Grants	78%	234			
of which	Nature	50%	117	50%	234
	EPG	45%	105	50%	211
of which (see EPG typology):	*A*	15%	15	50%	31
	B	26%	27	50%	55

	C	11%	12	50%	24
	D	48%	51	50%	101
	INF	5%	12	50%	23
Total			300		538

The baseline scenario also establishes the average number of projects, project size and the total costs of managing the programme. A complexity multiplier factor has not been applied for larger projects, instead the detailed costs comprise an average across all project sizes. We briefly summarise these features on an annual basis, based on the current programme:

- Average programme spend per year (EC contribution): €234m
- Approximate number of projects commissioned per year: 200
- Average length of time of a project: 4 years
- Approximate number of projects operating per year: 600 (with a peak of over 700)
- Average total project size: €2.4m
- Average intervention rate: 50%
- Average staff required: 44 fulltime equivalent posts (cost €5m per annum)
- Average technical assistance: €10m (per annum expenditure)

2.3 Instrument option 3 – Strategic Programming Option – expanding the planning and delivery of the financial instrument

Rationale: To build on the strengths of the current instrument, but addressing observed weaknesses identified in the ex-post assessment of the previous programme (LIFE III) and the MTE of the LIFE+ Regulation. It also seeks to recognise the advice of the Budget Review for improved efficiency and EU added value.

This Instrument option is the continuation of a specific financial instrument for the environment (LIFE), but one which is more strategically focused and directly linked to the policy priorities and work programmes of DG Environment. These priorities would continue to reflect the existing Treaty requirements to develop, update and implement EU environmental policy in response to continuing and emerging EU scale environmental problems. The Instrument priorities and work programme would reflect agreed decisions through comitology and hence with MS, on a thematic (and possibly Directive by Directive) basis.

The option differs from the current LIFE instrument by having a greater emphasis on:

- strategic priorities and multi-annual planning based on well defined needs;
- stronger targeting on the identified and underlying institutional weaknesses; and
- increasing the catalytic potential of the financial instrument and synergies with other financial instruments.

The catalytic value of LIFE would be increased through, for instance, improved peer to peer and mutual learning networks between competent authorities, and fostering project pipelines to maximise the contribution of other EU financial instruments to environmental goals. LIFE projects would more often serve as pilots for subsequent mainstreaming under Cohesion Policy or the Common Agricultural Policy, for example. The use of integrated projects would be actively encouraged to increase cross-working between financial instruments and to bring increased scale to interventions in support of the specific instrument.

On the basis of these tools, the option's main aim would be to address the identified institutional weaknesses that are significant contributors to environmental problems.

The option would use existing delivery mechanisms as well as new ones such as integrated projects and grants for technical assistance. Greater use would also be made of the flexibility to use different delivery mechanisms in combination. Different delivery approaches will be used depending on the nature of the issues to be addressed, requiring a LIFE unit to manage the range of mechanisms. Indicative EC budget: €300m per year

Programme	**€m**	**300**				
Element	**Allocation**		**EC contrib.**	**Co-finance share**	**Total funding**	**Change from baseline**
Public Procurement	19%	57	57	100%	57	0%
Operating Grants	3%	9	9	70%	13	0%
Action Grants	78%	234				
of which	Nature	50%	117	50%	234	0%
	EPG	45%	105	50%	211	0%
of which (see EPG typology):	*A*	15%	15	50%	31	0%
	B	26%	27	50%	55	0%
	C	11%	12	50%	24	0%
	D	48%	51	50%	101	0%
	INF	5%	12	50%	23	0%
Total			300		538	0%

2.4 Instrument option 4 – Restricted Activities Option – focusing on a limited set of activities

Rationale: To examine the impacts of adopting a more focused set of activities targeted at the development and implementation of policy

This option is based on the preceding option (Option 3) but with a reduced range of activities. It is designed to examine the effects of focusing the instrument on the principal weaknesses of policy implementation, focusing on good practice, knowledge sharing and mutual learning. General information & communications activity and eco-innovation would be excluded. This allows consideration of the trade-offs associated with varying the range of activities.

The emphasis on the strategic planning element of Option 3 is retained. The thematic focus of the option would reflect the general objective of developing, updating and implementing EU environmental policy and cover the whole acquis. The territorial focus would be exclusively on the EU (with minor allowance for Third Country involvement in response to clear trans-boundary problems affecting implementation).

The delivery mechanisms used would reflect the restricted nature of the activities, with a continued emphasis, as in Option 3, to maximise the catalytic value of LIFE (for example though integrated projects and improved project pipelines).

Table 2.4 Indicative EC budget: €300m per year

Restricted	€m	300				
Element	**Allocation**		**EC contrib.**	**Co-finance share**	**Total funding**	**Change from baseline**
Public Procurement	19%	57	57	100%	57	0%
Operating Grants	3%	9	9	70%	13	0%
Action Grants	78%	234				
of which	Nature	50%	117	50%	234	0%
	EPG	50%	117	50%	234	11%
of which (see EPG typology):	*A*	28%	33	50%	66	114%
	B	50%	59	50%	118	115%
	C	22%	25	50%	50	114%
	D	0%	0	50%	0	-100%
	INF	0%	0	50%	0	-100%
Total			300		538	0%

2.5 Instrument option 5 – Restricted Thematic (Nature) Option – focusing the instrument on the statutory area requiring co-finance

Rationale: To examine the impacts of adopting a narrower thematic focus, specifically the use of the instrument solely to implement Article 8 of the Habitats Directive, to secure the effective management and stewardship of the Natura 2000 network and the related biodiversity policy agenda.

This option is essentially a thematically restricted version of the Option 3 (Strategic Programming), in that the same tools and the same activities are used, but exclusively for the purpose of delivering only a part of the environmental acquis. The general strategic priority therefore is set from the outset, namely to meet the legal obligations in the Habitats Directive to co-finance the Natura 2000 network.

All the same tools and activities will be available as those specified under Option 3 (i.e. expanded and additional delivery mechanisms), but these are to be used in the exclusive context of supporting the Natura 2000 network, and related nature and biodiversity goals.

The costs of meeting this need have been estimated to be in the order of €6 billion a year. Approximately half of the current budget is allocated to nature and biodiversity. Assuming the overall budget remains the same, this would allow a near doubling of effort on a clearly defined and unmet need. Continuing provision for public procurement would be required to meet the basic policy needs of the rest of the acquis.

Table 2.5 Indicative budget: €300m per year

Nature	€m	300				
Element	**Allocation**		**EC contrib.**	**Co-finance share**	**Total funding**	**Change from baseline**
Public Procurement	19%	57	57	100%	57	0%
Operating Grants	3%	9	9	70%	13	0%

Action Grants	78%	234				
of which	Nature	100%	234	50%	468	100%
	EPG	0%	0	50%	0	-100%
	INF	0%	0	50%	0	-100%
Total			300		538	0%

2.6 Assessment criteria for use in the Impact Assessment

The assessment comprises essentially three tests for each option, as the basis for comparison:

- The effectiveness, efficiency and consistency of the option in meeting the strategic objectives
  - Effectiveness: The extent to which options can be expected to achieve the objectives of the proposal;
  - Efficiency: The extent to which objectives can be achieved for a given level of resources/at least cost (cost-effectiveness) (assessed for the preferred option only); and,
  - Consistency: The extent to which options are likely to limit trade-offs across the economic, social, and environmental domain.
- The environmental, economic and social impacts (with reference to specific criteria) – see below
- Distributional impacts on different groups, and the effects on fundamental rights.

This assessment will have taken into account the costs of the options, but further consideration of the costs to the Commission and to MS will be provided including the issue of administrative costs associated with the operation of and participation in the option.

The assessment will also identify key risks and uncertainties in the assessment and comment on the implications for the comparison of options; and the need for accompanying measures. A final reflection on feasibility is then added.

The scale and type of public procurement expenditure is the same for all options and is therefore not included in the impact assessment

2.6.1 Specific objectives as assessment criteria

The specific objectives are defined in Section 1 above.

2.6.2 Environmental, economic and social criteria

The environmental, economic and social impact of policy options for new or substantially revised instruments can be assessed against the baseline scenario. The specific criteria and indicators need to be considered for these impacts. The emphasis is on the impact of options relative to the baseline scenario, rather than absolute measures of impact. As this is an ex ante evaluation and impact assessment, determining the absolute scale of impact of each option would require very specific assumptions about, for example, areas of Natura 2000 sites protected or effects on species numbers; or the scale of adoption of new methods and technologies. But as a *relative* assessment, the measurement is concerned with whether there are any significant differences, positive or negative, in the scale and type of outcomes of an option compared to the baseline scenario and hence the economic and social and environmental impacts relative to the baseline.

The absolute environmental, economic and social impacts, against which to assess options, will need to be established as part of the assessment of the baseline scenario. This assessment is developed further below, but will require an assessment of the likely impacts

of the current Regulation. In the case of operating grants to NGOs this will need to be based on their contribution to policy debates, problem definition and levels of awareness.

In the case of public procurement of services to support policy development, to the extent that there is a core requirement across all options (even the zero option), use is unlikely to affect the order of magnitude of impacts across the different options.

On the basis that the options (except the 'zero' option) absorb a similar level of funds, the economic and social impacts will directly relate to the target beneficiaries; and indirectly to the environmental and policy changes. These impacts will depend on the type and scale of outcomes attributable to the option.

The general set of outcomes in the baseline would be expected to relate to:

- Changes in number / area of Natura 2000 sites protected;
- Effects on species diversity and population numbers;
- Effects on greenhouse gas emissions;
- Changes in resilience to climate change;
- Changes in awareness about environmental issues.
- Changes in the environment policy / regulatory framework, and related environmental impacts;
- Scale of adoption and diffusion of new technologies, techniques and methods, with environmental impacts;
- Changes in behaviour of target beneficiaries, with environmental impacts.

These outcomes would be expected to lead directly to **environmental impacts** and improvements in environmental quality, depending on the particular environmental domains subject to intervention.

To establish the **economic and social impacts** associated with outcomes of different options it will be necessary to have some view of how these and similar outcomes, including environmental changes can lead to direct and indirect economic and social changes.

Depending on the particular option, theme and proposed delivery mechanism, the target beneficiaries are likely to comprise some combination of the following:

- Businesses / universities – support for innovation in environmental management and for the generation of new technologies;
- Public authorities - support for innovation in environmental management, support for nature conservation;
- Landowners (public, private, NGOs) – compensation for biodiversity and eco-system services; and
- NGOs – operating grants, support for innovation in environmental management and for the generation of new technologies.

Generic economic and social impact indicators allowing comparison of direct impacts would therefore comprise:

- Technology outcomes (e.g. leveraged R&D spend, patents);
- Cost savings to public authorities in environmental management;
- Additional sales / exports from environmental technologies;
- Stakeholder engagement through NGOs; and
- Improved health as a result of improved environmental quality / eco-system services.

The indirect economic and social impacts, attributable to policy options, result from changes, in:

- environmental quality / eco-system services at EU, national and local scales;
- EU environmental policies (e.g. changes in regulation, changes in the use of market based instruments);
- MS environmental policies and implementation (e.g. costs of regulation due to improved transposition and management, changes in cost recovery, environmental taxes); and
- environmental investment and expenditure and the use of environmental techniques and technologies.

Generic indicators of the indirect impacts would therefore be the same as for the direct impacts but possibly include sector level changes in costs, income, output and employment, based on analyses of the linkages between environmental outcomes and impacts and economic activities.

2.6.3 Distributional impacts

The identification of groups affected by the proposal is important since the options identified could be beneficial to some groups but harm other groups. The following questions would be used in the IA process to systematically capture the groups affected by policy options and the impacts on such groups:

- Who is affected?
- How are they affected?
- What type of impact is it (social, economic, environmental)?
- What is the magnitude of the impact?

In addition consideration of any effects on fundamental rights will be included.

The draft assessment grid, below, is used to capture the judgements of the evaluator, building on the arguments presented in the analysis of each option. The scores for each element allow a more considered assessment of each option across the range of activity covered by the instrument. The scores for each criterion reflect the individual element scores, but this is not a simple average of the element scores and mainly reflects the element scores for Nature and EPG, given they represent some 90% of the resources used.

Table 2.6 Draft Assessment Grid for Each Individual Option

Specific objective to be achieved/ problem addressed	Element	Anticipated impact: effectiveness (rated from –5 to +5)	Explanation of rating and aspects of the policy option necessary to achieve impact
To improve the scope of EU environmental policy and legislation.	NAT		
	EPG		
	INF		
	NGO		
To improve the implementation of EU	NAT		
	EPG		

Specific objective to be achieved/ problem addressed	Element	Anticipated impact: effectiveness (rated from –5 to +5)	Explanation of rating and aspects of the policy option necessary to achieve impact
environmental policy and legislation, (including EU commitments to international agreements)	INF		
	NGO		
To improve the effective contribution of other EU policies to environmental objectives	NAT		
	EPG		
	INF		
	NGO		
To develop solutions for subsequent mainstreaming in other EU financial instruments and MS practices	NAT		
	EPG		
	INF		
	NGO		
To contribute to responsibility sharing in the protection of EU natural assets	NAT		
	EPG		
	INF		
	NGO		
To contribute to responsibility sharing in addressing transboundary problems affecting EU internal and external borders	NAT		
	EPG		
	INF		
	NGO		

Table 2.7 Assessment of options – Against impact indicators

Specific objective to be achieved/ problem addressed		Anticipated impact: effectiveness (rated from –5 to +5)	Explanation of rating and aspects of the policy option necessary to achieve impact
Environmental impacts	Changes in policies/management		
	Changes in habitats/eco-systems		
	Changes in pollution / resource use		
Economic impacts	Technology outcomes		
	Additional sales / GVA		
	Net cost savings		
Social impacts	NGO contributions to policy		
	Improvements in human		

	health
	Additional employment

Table 2.8 Assessment of option – Other criteria

Specific objective to be achieved/ problem addressed	Anticipated impact: effectiveness (rated from –5 to +5)	Explanation of rating and aspects of the policy option necessary to achieve impact
Impacts on different social and economic groups		
Fundamental rights		
Risks		
Financial costs to the EU budget (direct staff costs, funding instruments)		
Financial costs to Member States (e.g. administrative costs for applicants and management costs for beneficiaries)		
Summary of benefits and advantages of option		
Summary of disadvantages and risks of policy option (including negative economic and social costs in EU and third countries)		
Essential accompanying measures		
Feasibility: Issues raised in stakeholder consultations		
Feasibility: Issues raised by Member States		

3 Assessment of instrument options

This section assesses each instrument option relative to the baseline scenario (Option 2), using the agreed criteria. The assessment is built up from the different components and strands in the baseline scenario, but which change according to the option. A comparison of each option assessment is provided in Section 4

3.1 Option 1: Zero option (relative to baseline)

In this option all Action Grant funding is undertaken through the main EU financial instruments (especially CAP and the Structural Funds). Public procurement continues. Operating Grants for environmental NGOs is discontinued. The main EU financial instruments are Cohesion Policy, CAP Pillar II and CFP and FP7/8. These are assumed to operate as they do now. In the case of FP8, where there is a Green Paper, some analysis of the results of relaxing this assumption is provided.

To the extent that baseline activities can be funded under other instruments, then the baseline impacts can be assumed to continue under this option, subject to the level of funding. This requires the intrinsic purpose and nature of the activities funded under different instruments are maintained. If it did not then this would render the option unusable as a means of assessing the effective deadweight effect of the programme. In the case of operating grants for environmental NGOs it is assumed that no other instrument would be available to fund this activity (however there is currently some discussion at Commission level on the possibility of a horizontal instrument covering operational grants for NGOs in all areas including the environment).

The MTE[1] examined the level of project funding that would have been used in the absence of funding from the LIFE instrument. Projects were asked whether they would otherwise have used other EU and MS programmes.

The results (Table 3.1) indicate that some projects consider they could have secured funding from other EU instruments. In total 12% of EC LIFE funding could have been derived from other EU funds; in the case of EPG projects, 13% of investment could have been funded from other instruments. The main EU instruments considered to provide a source of alternative funding to LIFE were, FP7 and Interreg. Interestingly, the use of CIP as an alternative instrument was barely mentioned, reflecting the attempts to distinguish and target the instruments on different activities.

The results also suggest that the possibility of securing alternative funding from MS programmes was very limited (3% for the programme overall, 5% for EPG but zero for the other strands).

Table 3.1 Share of EC project contribution by LIFE Strand that could have been funded from other EU and MS financial instruments

LIFE Programme by Strand	Share of investment from other EU funds (%)	Share of investment from MS funds (%)
Nature & Biodiversity	6	0
Environmental Policy & Governance	20	6
Information & Communications	6	0
Total Programme	13	3

Source: Mid-Term Evaluation (GHK project survey), n = 165 projects; total investment of €374m

[1] Mid-term Evaluation of the LIFE Regulation, European Commission, 2010

Examination of projects that suggested they would have used alternative instruments does not however indicate that other EU instruments would clearly be capable of funding them; projects would of course need to be reconfigured to suit the relevant eligibility criteria of the other instruments whilst essentially undertaking the same activity – and be successful, to generate similar results and impacts.

We review in more detail the possibility of other instruments funding the baseline activities funded by Action Grants, by Strand, and delivering similar types and quality of results and impacts.

3.1.2 NATURE

Under LIFE III, funding for nature and biodiversity was limited to the implementation of the Birds and Habitats Directives, which established the legal basis for the Natura 2000 network. In 2007, LIFEIII was widened under LIFE+ to include additional funding for a wider biodiversity component (under the "Biodiversity" strand), which focused on the implementation of the broader objectives laid out in the Communication on "Halting the loss of biodiversity by 2010 – and beyond"[2]. However, only a limited number of projects (12 in total) were selected for the "Biodiversity" theme in the calls for 2007, 2008 and 2009, compared to the 126 projects funded under the original LIFE+ "Nature" theme.

Given that much of LIFE's nature-related funding to date has been directed towards funding activities to support the implementation of the Natura 2000 network, this is the area where the implications of having to rely only on other EC funds might be expected to be greatest.

3.1.2.1 Support for the Natura 2000 network

In the baseline, Natura 2000 related activity is included within several EU funding instruments aside from LIFE+, including the European Agricultural Fund for Rural Development (EAFRD), European Fisheries Fund (EFF), Structural Funds (i.e. the European Fund for Regional Development – ERDF and the European Social Fund – ESF and the Cohesion Fund and the 7th European Framework Programme for Research and Development (FP7). Because of their scale, these other financial instruments might well be (and even arguably be better) suited to the needs of the network (e.g. Structural and Cohesion Funds – €336 billion and EAFRD €151 billion over the period 2007 to 2013). EAFRD in particular is suited to providing annual payments to farmers and landowners; these make up a significant proportion of the overall ongoing costs of managing the network. This is set against the significantly smaller budget of LIFE (€2.2 billion over the 2007 to 2013 period of which 39% is to be allocated to grants for Nature and Biodiversity).

Examining the possible use of other instruments to provide the same results and impacts as LIFE Nature, the alternative funding is most likely to come from EARFD, and the Structural Funds. These funds, combined with LIFE, have made available around €3.8 billion for financing Natura 2000 through 2007 to 2013 (see Table 3.2). Note that (from Table 3.1 above) beneficiaries considered their scope to access alternative funds was very limited – only 6% of beneficiaries thought they could have used other EU funding sources and none considered they could have used MS funding sources.

Estimating the financial allocations for Natura 2000 from the current EU budget is difficult becasue the budgetary allocations under most of the funds do not allow a distinction between Natura 2000 related expenditure and support to conservation of biodiversity and environment in a wider context. Due to these difficulties, the exercise can easily lead to underestimates or overestimates of the contribution to the implementation and management of Natura 2000 of certain EU funding instruments. For example, the only compulsory measure that Member States are required to implement under Pillar II of the CAP, the agri-environment payments scheme, but it is difficult to isolate the contribution of the very large number of measures to the conservation and restoration of biodiversity which is only one of many objectives. According to a BirdLife report (Boccaccio et al. 2009)[3], if spending on agri-

[2] COM (2006) 216

[3] Boccaccio L, Brunner A, Powell A (2009). "Could do better." BirdLife International (May 2009); 1-45.

environment is considered in relation to its value purely for biodiversity, in 2007 in Austria less than 8 per cent of total budget was spent on sub-measures with 'strong' effects. At the same time, it should be emphasised that agri-environment payments and other Pillar II measures can play an important role in financing the network, depending upon implementation at national level.

In the case of the Structural Funds payments allocated to Natura 2000 and biodiversity that might directly benefit conservation or restoration, are difficult to define since they are covered by the vaguely defined heading of category 51 and the wide range of measures possible to be supported within it.[4] The following table attempts to provide a very rough first order estimate of the potential contributions to Natura 2000 under the three most important EU financial instruments assuming a proportion of the key measures is applied for this purpose.

Table 3.2 Approximate allocation under some EU financial instruments which are dedicated to, or are most likely to benefit, Natura 2000 (€million, 2007-2013)[5]

Funding instrument	**Estimated allocation** (€million, 2007-2013)
Community LIFE+ Nature & Biodiversity allocation	700
EAFRD Community direct Natura 2000 payments + agri-environment payments expected to likely contribute to Natura 2000 management (25 per cent of category 214 on agri-environment)	600 - 5,400
Community Structural funds (25 - 50 per cent of ERDF cat.51 for biodiversity and Natura 2000)	600 - 1,300
Total	**1,900 – 7,400** ***300 – 1,100 per year***

Note: Other rural development measures are also used by Member States to finance Natura 2000, e.g. forest-environment payments, non-productive investments in agriculture and forests

The estimated spend is approximately between 300 – 1,100 million EUR / year, which represents only 5-20 per cent of the estimated financing needs of 5.8 billion EUR / year.

It also needs to be noted that the figures refer to allocated funding and not to actual expenditure. Mid-term information available on financing under EAFRD indicates a striking disparity between planned allocations and resources used, particularly in the context of the direct Natura 2000 payments (Kettunen et al. 2011).This suggests a very slow uptake of the measure at the beginning of the financing period. As outlined in the report, the reasons can be manifold, depending on implementation and administrative processes or the popularity of the measure in a Member State. Data on later periods is not yet available.

Moreover, although there are a range of funds available to support the network, a recent report[6] found that there is a significant range of activities that are not funded by the other instruments (Table 3.3). Key gaps identified include:

[4] Kettunen, M., Baldock D., Gantioler, S., Carter, O., Torkler, P., Arroyo Schnell, A.,Baumueller, A., Gerritsen, E., Rayment, M., Daly, E. & Pieterse, M. (2011). Assessment of the Natura 2000 co-financing arrangements of the EU financing instrument. A project for the European Commission – final report. Institute for European Environmental Policy (IEEP), Brussels, Belgium. 138 pp + Annexes

[5] Note figures must be treated with caution. See forthcoming Kettunen report (2011) for caveats linked to EAFRD figures

[6] IEEP et al (2011, forthcoming): Assessment of the Natura 2000 co-financing arrangements of the EU financing instrument. Final Report

- Pilot projects
- Consultation & networking
- Conservation management, especially where projects are unable to demonstrate significant socio-economic benefits (as required by other funds)
- Gaps for particular habitats – particularly those that are not managed for agriculture or forestry – especially marine, coastal, water and unfarmed terrestrial habitats.. The allocation and uptake of payments for forest measures under EAFRD is very low compared to those for agricultural habitats.
- Management planning
- Monitoring and risk management

The scale of the gap is also significant; current EU funding is estimated at €0.5 to €1.1 billion annually compared to estimated annual costs of €5.8 billion[7]. To establish the approximate scale of funding relative to where the gaps are, Kettunen et al (2011) analysed the main costs of implementing the network provided by 11 Member States in the context of the Gantioler et al (2010) study. The results indicated that around 15% of costs are in activities for which there are significant gaps in financing opportunities, and 52% in activities for which there are moderate gaps in financing opportunities. To the extent that LIFE is the only instrument capable of meeting some of these gaps (as indicated below) and is already doing so then there is little or no scope to use alternative instruments.

Table 3.3 Overview of the major and moderate gaps in financing key management measures within the current EU co-financing framework for Natura 2000

Establishment of Natura 2000 Sites		
PILOT PROJECTS	Moderate gaps	In principle, possible in all budget lines. However, restricted under EAFRD. The pilots must usually be in line with the funds general requirements (i.e. have links with rural / regional development). Information if funds have been used for pilot projects is not available.
Management planning		
ESTABLISHMENT OF MANAGEMENT BODIES	Significant gaps	Some possibilities under ERDF but most probable only used indirectly in some transboundary projects.
CONSULTATION AND NETWORKING – PUBLIC MEETINGS, NETWORKING, LIASON WITH LANDOWNERS	Moderate gaps	LIFE communication can provide direct project funding. ERDF provides several indirect options but the real uptake is only realised through transnational cooperation projects.
RUNNING COSTS OF MANAGEMENT BODIES	Significant gaps	None of the funding lines provides funding for running costs. Some use might be possible under LIFE if beneficiaries "sell" their projects as innovative and new to cover ongoing costs.
ONGOING STAFF COSTS	Significant gaps	LIFE provides staff costs only during the project lifetime.

[7] Gantioler, S., Rayment, M., Bassi, S., Kettunen, M., McConville, A., Landgrebe, R., Gerdes, H. and ten Brink, P. (2010) Costs and Socio-Economic Benefits associated with the Natura 2000 Network. Final report prepare by the Institute for European Environmental Policy / GHK / Ecologic on Contract ENV.B.2/SER/2008/0038 for the European Commission, DG Environment: Brussels.et al (2010). Costs and socio-economic benefits associated with the Natura 2000 network. Available from: http://ec.europa.eu/environment/nature/natura2000/financing/docs/natura2000_costs_benefits.pdf

Ongoing habitat management and monitoring		
CONSERVATION MANAGEMENT – HABITATS, SPECIES	Moderate gaps (e.g. marine)	LIFE has a clear track record of projects in this field. Under EAFRD AEM and Natura payments can be linked to specific conservation (e.g. agricultural land and forests), although often not targeted enough. EFF provides several opportunities but most legal opportunities remain unclear with low or no uptake in the national programmes.. FP7 provides indirect research possibilities with wider biodiversity context. ERDF provides good opportunities for transboundary activities and in sectoral programmes, although in competiveness objective regions possibilities are limited as nature projects must be investment related and show economic effects. Species conservation is more difficult under ERDF as funding has a clear territorial dimension and species projects need to be linked to concrete land based measures.
IMPLEMENTATION OF MANAGEMENT SCHEMES AND AGREEMENTS	Moderate gaps (e.g. non-rual areas)	LIFE can provide project financing. Significant potential under AEM where a huge diversity of measures exists, can be difficult to target measures on sites as the measures are voluntary. Some positive impacts might come from LFA and Natura 2000 payments but these payments are not targeted at specific outcomes.
PROVISION OF SERVICES, COMPENSATION FOR RIGHTS FOREGONE AND LOSS OF INCOME	Moderate gaps (e.g. non-rual areas)	AEM and Natura payments allow for wide coverage of payments but can lack clear targeting. Also, these payments only cover loss of income and additional cost for agriculture-related activities, not for urban development etc.. LIFE can also finance compensation payments.
MONITORING AND SURVEYING, AND RISK MANAGEMENT	Moderate gaps (e.g. marine)	LIFE projects can realise all kind of measures in this field. In principle measures could be included under LEADER activities but no information is available on the uptake. Under ERDF, monitoring and surveillance could be realised under the risk prevention schemes but no information about uptake is available as most risk prevention plans are linked to industrial risks and hazardous materials.
(ONGOING) SURVEILLANCE OF SITES	Significant gaps	None of the funds provides possibilities for ongoing surveillance.

Source: Edited from Kettunen et al (2011)

There are some activities (e.g. monitoring, surveying, management of risks), which are not generally eligible for funding through other instruments. Only LIFE provides opportunities for funding these important activities. These activities relate more to management activities of the network rather than one-off investments. Activities linked to the latter seem relatively well covered by the various financial instruments. Some two thirds of the estimated costs of running the network relate to management activities (see Table 3.4), which are largely ineligible for funding through other means.[8] Without LIFE therefore, entire aspects of the network would receive no funding from EC sources.

Table 3.4 Summary of the main costs of implementing the Natura 2000 network

Cost category	Costs for 25 Member States (€m)	%
One off costs (annualised)		
Management	255	5%
Land purchase	398	8%
Infrastructure	835	16%
Sub-total	***1,671***	***33%***

[8] Kettunen et al (2011) , *initial source Gantioler et al. 2010*

Recurrent costs (annual)		
Management planning[9]	703	14%
Habitat management and monitoring	2,707	53%
Subtotal	***3,428***	***67%***
Total (25 MS)		
	5,099	**100%**

Source: Edited from Kettunen et al (2011) op cit

These funding gaps result from the different objectives, eligibility criteria and payment structures of these other instruments and arise from the fact that none of them (with the exception of LIFE) were specifically designed to fund nature projects. Even where it is possible to use other instruments as an alternative source to LIFE funding other funds have a specific socio-economic aim other than biodiversity conservation. Therefore, while they can fund conservation actions, it is only when these actions are linked to relevant sectors through socio-economic objectives, that these actions can be funded.[10] LIFE therefore is the only fund which can fund conservation actions where the purpose is conservation alone. Without LIFE therefore, a subset of these activities would receive no funding.

Moreover, while other funds provide valuable finance for Natura 2000, it can be argued that the specialist expertise within DG Environment can be crucial in maximising the added value that its funding delivers for the network. Replacing this funding from other sources would therefore reduce the added value delivered to the overall detriment of the network. At the same time, the LIFE programme combines Commission expertise in helping with the design of the programmes and the use of funds with technical expertise regarding the practical implementation at a national and regional level.

The presence of these gaps in funding argues that the baseline impacts cannot in general be provided by alternative instruments. This is supported by the projects themselves; which considered that only 6% of LIFE funding for Nature could have been replaced by other instruments.

Another consideration is whether the use of alternative instruments provides the same level of EU added value through contributions to burden sharing in the protection of EU natural assets. Figure 3.1 below indicates the funds received by MS under the EAFRD and Structural Funds that are most likely to benefit the Natura 2000 network, relative to the MS allocation under the National Allocation for the LIFE programme, using this as a suitable proxy for the distribution of nature protection priorities.

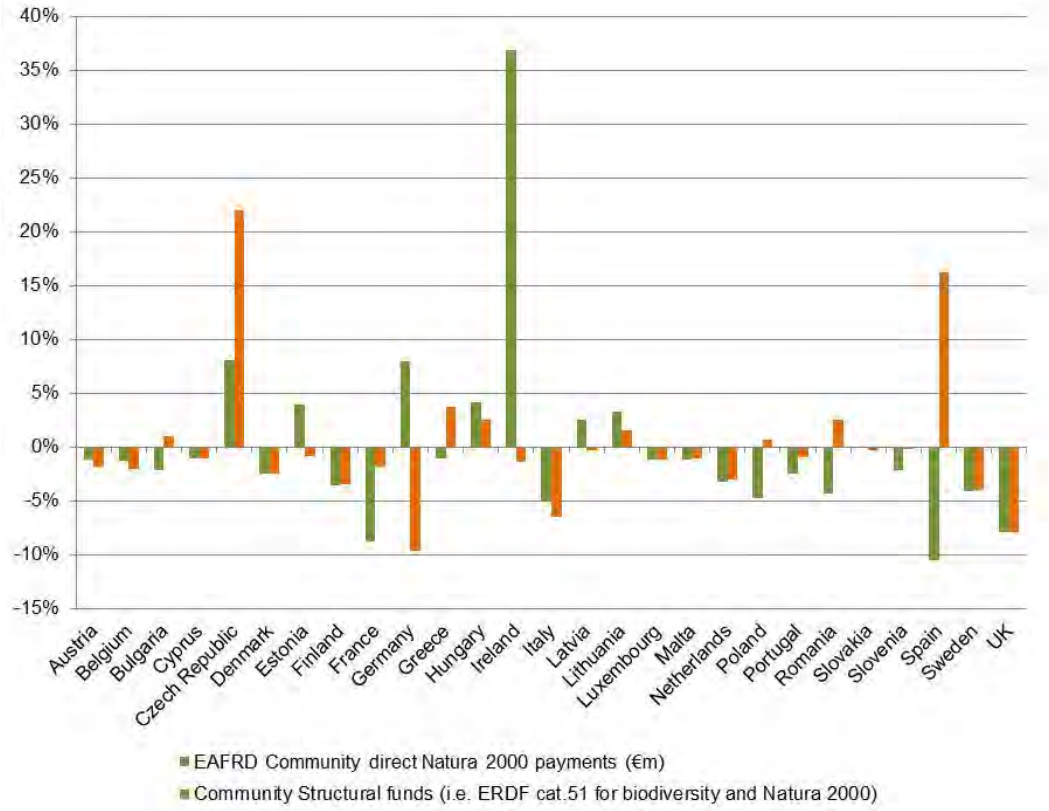
The variance from the national allocation indicates where Member States receive too much, or too little relative to their needs. The greater the variance, the less the use of these funds contributes to burden sharing. In the case of EAFRD for 7 MS the funding is greater than 5% different to that implied by the national allocation. In the case of the Structural Funds for 5 MS the funding is greater than 5% different to that implied by the national allocation and suggests that neither fund provides the same level of EU added value as LIFE.[11]

[9] Some management planning falls under one-off costs, some under recurrent costs. Recurrent costs mainly include the running of management bodies, and to a less extent public communication, and review of management plans.

[10] For instance, funding of conservation action under EAFRD is only possible for farmland and forestry, and does not include other types of Natura 2000 sites.

[11] Under proposals for the next MFF, cohesion policy in non-convergence regions will not fund environmental measures: “Transition regions and competitiveness regions would be required to focus the entire allocation of cohesion funding (except for the ESF) primarily on energy efficiency and renewable energy; SME competitiveness

Figure 3.1 **Burden sharing in the protection of natural assets:** The variance in the national distribution of EAFRD and Structural Funds relative to the national allocations under the LIFE programme



Source: GHK analysis, adapted from the information in IEEP et al (2011, forthcoming)

Finally, it needs to be questioned to what extent national financing for nature conservation could replace resources from LIFE+. The budget of the instrument is small compared to other EU financing instruments, and if it is only considered by its size, it could be argued that this could be easily replaced at the national level. However, as became evident from the stakeholder consultation and its mid-term evaluation, LIFE+ plays an important catalytic role in leveraging MS funds, and without which less MS funds would be allocated. An analysis of national funding available for Natura 2000 in six case study countries[12] showed that though the level of financing and the application of EU financing instruments strongly vary across Member States, national level funding is generally inadequate and there is a lack of resources to compensate for the heavy reliance on EU financing instruments.

3.1.2.2 Support for wider biodiversity goals

Aside from the funding of the actual Natura 2000 network, the impact on broader biodiversity goals needs to be considered. Current baseline funding is modest (some €20m in the first two calls). However, the Mid-Term Evaluation (MTE) of the LIFE programme found that this is not an expression of the lack of a need for such activities. Instead, the broadening of the Nature component to include wider biodiversity issues is seen by Member States and stakeholders as both useful and necessary, with the previously restricted focus being seen as too limiting given the need to protect species and ecosystems outside of the network as well as within.

and innovation. In these regions, investments in energy efficiency and renewable energy will be at least 20%." - COM(2011) 500 final, page 25

[12] Kettunen et al (2011)

Rather, the limited activity under the Biodiversity strand was seen as an indication of "teething problems" in light of the theme's infancy compared to the Nature theme, which has been operating since the beginning of the LIFE Programmes. The MTE analysis noted that it is likely that the Biodiversity theme would develop in the same way as the Nature theme, and would attract a high number of good quality applications as the biodiversity 'market' matures. The current impacts of the LIFE programme are therefore likely to under-represent the impacts of the baseline option over the programme period.

Declining and deteriorating biodiversity levels means that the benefits arising from biodiversity, by way of ecosystem services, are also significantly reduced. The services provided by biodiversity are wide ranging, and include, for instance, the provision of food, fuel, fibre and medicines, the regulation of water, air and climate, and the maintenance of soil fertility and the cycling of nutrients. These services are worth hundreds of billions of Euros per year and underpin EU growth, jobs and wellbeing. Once these services are lost or degraded, it can be very difficult or impossible to restore them or to find substitutes. There is therefore a definite need for funding to maintain and restore biodiversity and the functioning of ecosystem services.[13]

This need for funding is recognised in the development of the new EU biodiversity strategy towards 2020, released in May 2011[14]. The Strategy includes six targets, which should be mutually supportive and inter-dependent. They are broken down into a set of actions and measures which are included in the Annex to the Communication. The targets address the implementation of the Birds and Habitats Directives, the maintenance and enhancement of ecosystems and their services, the integration of biodiversity conservation and restoration into agriculture and forestry, sustainability of fisheries, combating invasive alien species and addressing global biodiversity loss.

The need for funding is in part justified on the basis of the assessment of the economic impact of the different targets concluded that increased benefits from ecosystem services are to be expected if new initiatives are implemented. Though no aggregate information is yet available, project-based evidence showed the cost-benefits ratio of restoration projects can range to 3 to 75. In addition, payments for ecosystem services for water-related ecosystem services are expected to amount to USD 30 billion by 2050. No detailed assessment of the impact of different initiatives to be taken in the context of the strategy is available yet.

It might be expected that an instrument specifically targeted at biodiversity will be more effective than the allocation of small shares of budgets from within other instruments, and where biodiversity objectives are subsumed under broader objectives unrelated to stemming biodiversity loss.

3.1.3 Environmental Policy & Governance (EPG)

3.1.3.1 Analysis of the possible use of other instruments

As indicated above, projects advise that the possibility of other EU instruments funding project activity is greatest for the EPG strand. The MTE identified the principal risk of overlap and potential for the use of other instruments to fund LIFE activity was in relation to eco-innovation projects.

To assess the implications of this the segment of projects that might be classified as eco-innovation projects has been identified, using the typology described in Annex 2, itself based on a detailed review of project descriptions to understand the major focus of projects. The typology provides the basis of an indicative analysis only, since projects are often multi-faceted and tend to have elements of each of the types of activity described; the typology and related analysis therefore seeks only to reflect the major focus of projects.

[13] Communication COM(2006)216 "Halting the Loss of Biodiversity by 2010 – and beyond". Available from: http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2006:0216:FIN:EN:PDF

[14] European Commission (2011). Communication on our life insurance, our natural capital: an EU biodiversity strategy to 2020, COM(2011) 244 final

In summary (Table 3.5) the analysis indicates that the eco-innovation focused activity accounts for 42% of projects, but because they tend to be slightly larger projects, to account for 48% of the EC contribution to EPG projects.

We briefly review the likelihood of using other instruments for each of the different activities:

- **Environmental problems:** Overall assessment of replacing LIFE: *Unlikely*. Projects relate to measuring and monitoring environmental problems. Some projects might get funding from FP7 for research and monitoring activity. Depending on the outcome of current discussions on the Green Paper on innovation and the next Framework Programme (FP8), it is possible that there will be less funding, in the context of a focus on FP8 on investing in science for the market rather than for policy. Future Cohesion Policy may have a stronger focus on monitoring, although this is still not likely to be an adequate replacement for LIFE. To the extent that these relate to municipality plans there may some very limited scope to combine with urban planning.
- **Environmental policy improvements:** Overall assessment of replacing LIFE: *Unlikely* Projects relate to improving environmental policies and plans, mainly at municipality level. Might conceivably be seen as an element in broader urban planning and cohesion policy, although projects tend to be well focused. Interreg funding was referenced by a small number of projects as a possible alternative.
- **Environmental integration:** Overall assessment of replacing LIFE: *Unlikely.* Projects demonstrate initiatives to integrate environmental objectives in sectoral activities could in principle be funded by others (e.g. CIP, ERDF), but any such opportunities are not always clear given the different objectives of other instruments. Since such projects are expected to demonstrate the possibility of socio-economic benefits, the demonstration projects might form the basis for ERDF funding.
- **Eco-innovation activity:** Overall assessment of replacing LIFE: *Unlikely*. Projects demonstrate innovative solutions to environmental problems, largely by private companies (two thirds of beneficiaries) to assist in meeting compliance requirements directly or as a process to assist other companies (in around a third of cases). In some cases could possibly be funded by FP7 even though they are not always commercially orientated. Some possible use of CIP where commercial interest are being pursued. The possibility of socio-economic benefits might suggest some use of ERDF / EAFRD.

Table 3.5 An indicative breakdown of EPG projects

EPG Projects by Activity	Share of EPG Projects by Activity	Share of EPG EC Contribution by Activity	Possible use of other instruments to provide the EC contribution (as % of EPG EC contribution)
A. Environmental problems	14%	15%	15-25%
B. Environmental policy improvement	26%	26%	0-5%
C. Environmental integration	19%	11%	5-10%
D. Eco-innovation activity	42%	48%	15-25%
Total EPG	100%	100%	10-18% (weighted total)

Source: GHK Project survey, n=86 projects, with total investment of €190m

GHK own estimates of the use of other instruments based on review

Translating this review into an estimate of the possible share of the EC contribution that might have been funded from other instruments suggests that overall 10% to 18% of the EC

contribution to EPG projects might have been financed from other instruments. This compares with the 20% identified by projects from the MTE (Table 3.1 above).

The EPG activity least capable of being funded by alternative instruments is the preparation of new or revised management plans and capacity building for the improvement of environmental policies and also the development of new environmental policies. An example of an EPG project contributing to policy development is a project managed by Airbus which sought to develop an extended product and site-oriented environmental management system (EMS). Large-scale pilot experiments were used to demonstrate a broadening of the scope of the EMS to integrate product-related activities and a life-cycle dimension. Guidelines were produced and used to further disseminate this approach both within the aerospace sector and to other industries. It is considered unlikely that this project would have been eligible under alternative funding instruments.

This has been identified as the biggest 'gap' left by the other instruments, and sets LIFE apart as being an 'initiator of change' and a key mechanism for enhancing the capacity of competent authorities to develop sound planning and policy action. The importance of such plans is often underestimated – without them there is effectively no guidance for how to manage responses to environmental problems or to guide environmental investment.

The other notable gap addressed by the specific instrument is facilitating the development of 'science for policy' as opposed to funding for more commercially-driven 'science for market.' Some solutions are often developed with the sole purpose of addressing a particular problem which a local authority might have, for example, although it may have no commercial value. Given the potential likelihood that the future Framework Programme for Research and Innovation ('FP8') may shift to being a more commercially-oriented instrument, this gap in funding 'science for policy' may, as noted above, become more prominent, suggesting that LIFE would have a more important role to play in financing such solutions.

3.1.3.2 Effects of the option on baseline results and impacts

The first approximation of the impact of the zero option on EPG activities based on the possible use of alternative EU instruments is that between 10% and 18% of baseline results and impacts would be retained through use of other funds. This assumes that the different types of project funded by alternative instruments make the same contributions to results and impacts.

Analysis of the types of projects that reported results and impacts is summarised in Table 3.6. This indicates that over 56% of results are reported by policy improvement and integration projects and 32% by eco-innovation projects. 59% of reported impacts are from eco-innovation projects.

The analysis is broadly in line with expectations, with policy improvement and integration projects focused more on testing and developing new policy approaches and proposals (which only have environmental impacts when implemented); whereas eco-innovation projects are focused on demonstrating environmental benefits as a result of innovative solutions.

Table 3.6 An indicative breakdown of EPG projects by type of activity reporting results and impacts

EPG Projects by Activity	Share of EPG EC Contribution by Activity - Spend	Share of EPG EC Contribution by Activity – Results	Share of EPG EC Contribution by Activity – Impacts
Environmental problems	15%	13%	10%
Environmental policy improvement	26%	38%	23%
Environmental integration	11%	18%	8%

Eco-innovation activity	48%	32%	59%
Total EPG	100%	100%	100%

Source: GHK Project survey,

Projects reporting results, n=31, with EC investment of €25m

Projects reporting impacts, n=42 with total investment of €45m

Based on the possible use of other funds by type of project activity, (low and high estimate, Table 3.5)) the share of results and impacts in the baseline that might be produced by other instruments can be calculated by multiplying the estimates in Table 3.5 by the shares in Table 3.6. This suggests that between 8% and 15% of results and between 11% and 19% of impacts produced in the baseline could be generated by other funding instruments.

Based on the conservative baseline impact of some €200m of environmental benefits each year (see baseline scenario), then perhaps in the order of €20m to €40m of benefits might be secured under the zero option from other funding instruments.

3.1.4 INFO

In reviewing the objectives of other EU financial instruments which could be accessed to meet environmental goals, it is apparent that there is no other alternative EU instrument that has a specific component dedicated to raising awareness amongst a wide range of stakeholders of the importance of various aspects of environmental policy, and the ways in which other policy areas can contribute to better implementation of EU environmental policy.

Recent Eurobarometer surveys suggest that more could be done to provide European citizens with more information about the environment, as there is still a general lack of awareness of environmental problems amongst the general public. Roughly 38% of citizens feel that more information about the environment would be useful. For instance, 47% of citizens feel that the labelling of environmentally-friendly products is inadequate.[15]

To the extent that environmental issues are understood in a wider development context (e.g. urban or rural development, or in the context of certain economic activities (e.g. port operation) then some activities, especially those funded under Interreg could provide some limited alternative to the LIFE INF activity.

Furthermore, unlike EC-wide communication activities that are run by DG ENV itself such as Green Week and the European Business Awards for the environment, projects funded under the Information and Communication component are distinctive because they often have a greater focus on a local area or municipality, a spatial level at which coordinating action can often be more effective.

Given the bottom-up nature of LIFE, it would therefore appear to be the case that no alternative EU instrument would fund projects which aim to raise awareness amongst a broad set of stakeholders specifically about environmental issues at a local and regional level, and to bridge the 'communication gap' between policymakers at the European level and citizens. The mid-term evaluation also found that communications activities were often ranked low as a priority by most Member States, suggesting that the likelihood of LIFE INF-type activities being funded by alternative MS instruments remains low.

The actual contribution of the strand to the results and impacts of the programme is difficult to judge given the indirect nature of its influence, and its relatively modest budget (5% of the Action Grants).

[15] What Europeans think about the environment, Eurobarometer

3.1.5 Operating Grants for Environmental NGOs

As elaborated in the baseline option, there are a number of ways in which NGOs contribute towards improvements in EU environmental policy development, implementation and enforcement. An analysis on data collected from the NGOs in the MTE revealed that the activities of NGOs that have been granted an operational fund are split up as follows:

Table 3.7 An indicative breakdown of the type of activities undertaken by NGO Operating Grant recipients

Kind of activity		% of total budget granted for 2007 and 2008
A	Environmental policy development	27%
B	Environmental policy implementation	28%
C	External capacity building of members and partners	17%
D	Environmental education and awareness raising	10%
E	Activities on enlargement and third countries	8%
F	Internal functioning and capacity building	10%

Source: DG Environment and analysis from the Mid-Term Evaluation

These six activities can be grouped into four elements:

Covered by activity A and partly E and F:

- **Problem identification and definition of policy options.** NGOs are systematically invited to participate in various working groups, scientific expert groups, advisory groups and preparatory and implementation committees by DG Environment to support policy work. NGOs regularly provide input into various policy areas and act as important counterweights to other stakeholders with financial interests. There are numerous examples of environmental investigation and studies carried out by NGOs in relation to environmental policy, many of which have contributed directly to the policy process. For instance, an investigation by the Pesticides Action Network (PAN) Europe in 2008 of bottles of wine purchased inside the EU found evidence that some wines contain residues of "a large number of pesticides".[16]
- **Policy definition and political debate**. Involving NGOs in consultations and policy debate contributes to a balanced and broader stakeholder representation. The White Paper on European Governance[17] stressed the importance of involving civil society in the consultation processes, and the European Commission encourages civil society representation at the European level. Moreover, the EU is party to the Aarhus Convention, which establishes the right for public participation in environmental decision-making and requires that public authorities enable the affected public and NGOs to comment on environmental decisions, and for these comments to be taken into account. In this, funded NGOs play an important role in coordinating the positions of their members, providing the Commission with a single interlocutor and giving a voice to a large number of local organisations which would otherwise have difficulties reaching EU decision-makers. Examples of activities include preparation of coordinated press releases, position papers and memoranda to EU presidencies. NGOs also reply regularly to public consultations, providing useful input and perspective to the policy process. Operation grants are considered a tool to protect the level playing field in the public debate and the policy development between environmental NGOs and sector-federations or other organisations funded by industry. However only 31% of the NGOs in the MTE thought a level playing field is effectively being reached with the actual

[16] PAN Europe (2008) European wines systematically contaminated with pesticide residues. Available from: http://www.pan-europe.info/Media/PR/080326.html

[17] COM(2001) 428 final

operational funding. Of the 34 NGOs funded in 2007 and 2008, 13 specialised mainly in policy development, another 12 focussed on multiple activities including policy development.

- **Covered by activity B, E and F:**
- **Policy implementation**. With their networks and specific expertise, NGOs are effective in promoting implementation of EU policy on the ground. They can serve as 'watchdogs' for implementation by for example, drawing attention to cases of non-compliance and publishing black lists, scoreboards and reports. They also act as centres of expertise helping local authorities and economic actors to comply with legal or policy requests, or setting up implementation initiatives themselves. The balance between continuous, operation funded activities and discontinuous project based (and individually granted) activities can be an issue, in that in the case of the former, an NGO is able to rely on continuous funding in their role as a stakeholder, whereas in the case of discreet projects, the contribution of an NGO is confined to an individual project where they cannot play a full role as a stakeholder. Of the 34 NGOs funded in 2007 and 2008, 9 specialised in policy implementation. As mentioned above another 12 focussed on multiple activities including policy implementation.
- **Covered by activity C and D:**
- **Raising awareness of environmental problems and policy issues.** In support of the above functions, NGOs carry out activities to raise awareness of civil society and decision makers, reducing information failure and improving the quality of policy debate and policy decisions. Activities include campaigns, events and awards, and environmental education (targeting various groups such as children, officials and professionals). Genuine grass-root NGOs have a particular advantage of being 'close to the ground' and having high credibility with the public, and therefore being effective in achieving outreach and increasing awareness and knowledge. Specialised NGOs are often recognised as centres op expertise on specific issues and gain credibility from it. NGOs also actively raise awareness and promote EU environmental policy beyond EU borders. No NGOs declared themselves to be only involved in education and awareness raising, but very frequently they apply awareness raising and communication as a supporting activity for their other activities and projects.

Without funding from the programme through Operating Grants, the beneficiary NGOs would need to substantially reduce their activities, which includes their contributions to the EU policy process, either because they lack the direct means for continuing their activities (A to E) or because they lose their internal supporting capacity (F).

Some NGOs, for principal reasons or to avoid any risk or allegation of Astroturf lobbying or non-independence, refuse all subvention from governmental sources and all private sponsoring. Only very large and international renowned NGOs (type Greenpeace) can afford to limit their resources to membership contributions and its own merchandising. Most NGOs active in the field of EU policy do not possess these possibilities or cannot compete on a free market of membership and merchandising, because they cover more technical or for the large public less visible topics.

Demands on NGOs, their European structures and their offices in Brussels have grown considerably in recent times, including meeting demands from citizens and requests from the EU institutions for input and expertise. In this context, financial resources for the operation of environmental NGOs remain hugely important and the removal of operating grants for NGO beneficiaries would severely hamper their ability to meet multiple responsibilities for contributing to policy development and implementation, awareness raising and helping to identify problems and potential solutions with regards to environmental policy.

NGOs are not dependent on one single source of income, but tend to spread the risk by applying for different grants, both operation based as project based. However, in the MTE about 81% declared that the operational funding cannot be replaced by either the ERDF, ESF, Cohesion Fund, EAFRD, CIFP, EFF, 7th framework programme or LIFE+ public

procurement contracts. 34% thought that LIFE+ action grants could partially replace operational funding. Regarding their dependency on LIFE+ operational funding NGOs receiving LIFE+ funding declared that they are:

- Very dependent: survival is not possible without the actual LIFE+ funding: 16%
- Dependent: shifts in the actual LIFE+ funding would lead to considerable shifts in the working programme: 65%
- Rather dependent: the NGO would lose efficiency but could find other sources to continue realising its programme: 16%
- Rather independent: the NGO is strong enough to realise its primary mission, the funds only help to realise useful extra projects: 3%
- Independent: the NGO can easily swap between possible sources of working means: 0%

The degree of dependency from LIFE+ operational funding can be expressed by the amount of operational funding received or by the % of co-funding for operational expenditures. NGOs with a LIFE+ co-funding percentage of > 50% or with an amount of > €500,000 can be considered as at risk if LIFE+ operational funding were to be discontinued. This would affect 19 different NGOs out of the 32 NGOs funded for 2010.

The absence of NGO activity leads to major costs compared with the baseline option:

These costs can be linked to the drivers of environmental problems for which a supporting LIFE-like financial instrument could help remediation. The drivers are identified in chapter 5 of volume 1:

- *Variable and inadequate levels of environmental protection through weaknesses in policy implementation and development;*

Table 3.7 indicates that environmental policy development and implementation is identified as the principal raison d'être of most of the granted NGOs and that respectively 27% and 28% (in total 55%) of the operational budget is used for policy development and implementation.

Without the NGO intervention on policy development there would be an **increased risk of regulatory capture and reduced effectiveness of policy:** The allocation of NGO Operating Grants ensures NGO input is acquired in policy areas of the greatest importance at the EU level as a result of shared appreciation of the most important environmental issues. The removal of NGO funding would significantly reduce the contributions made by NGOs to the development and implementation of priority policy areas, and, in particular, since these areas are likely to be the subject of particular lobbying and negotiation from affected parties, increasing the risk of unbalanced negotiation and regulatory capture. Even today, the NGOs questioned in the MTE declare that no level playing field is achieved due to the larger resources and impact of industrial federations and organisations.

Policy innovation through adapted policy scoping is enhanced by NGOs when they act as an early warning system signalling and tackling new and emerging environmental problems before they are included in the EU policy acquis. Without their activities there would be increased **costs of environmental monitoring and cost savings from early action:** NGOs play a particular role in collating and presenting evidence of environmental problems and their consequences. This not only reduces the requirement on public authorities it also allows information to be collated earlier than it would otherwise and facilitates the development of early action potentially reducing the scale and costs of action required.

- *Inadequate coordination, and inadequate integration of the environment into policy (including in 3rd countries);*

The role of NGOs in the field of coordination and integration is expressed in their policy development, implementation and awareness raising activities, especially when they integrate environmental issues in the larger frame of sustainability. NGOs that work across

both environmental concerns and other sectoral areas (e.g. Transport and Environment, Health and Environment, CEE Bankwatch) play particularly important roles in addressing the inadequate integration of the environment into policy. A frequently recurring remark of NGOs during the MTE was that the distinction between their (eligible) environmental activities and their often closely linked sustainability activities was rather artificial. NGOs are often trailblazers for the integration of environmental issues in economic and social policy fields. However, their focus on coordination and integration is more clearly visible in the 8% of the granted budget spent on activities on enlargement and third countries, and partly in their external capacity building activities and awareness raising on more integrated or holistic topics. Without the NGO activities **increased costs for coordination and integration** will occur.

- *Inadequate sharing of information and awareness of EU environmental problems*

"Sharing of information" can be split up in three communication lines: (1) the regulator likes to share information with its target groups. (2) He likes to receive feedback and technical or other information from stakeholders especially within the process of policy development and evaluation, and (3) he likes best practices to be shared between the members of its target group. In all three domains NGOs contribute to more effective communication and information sharing. Without their activities this would lead to:

(1): **Increased costs of awareness raising and reduced effectiveness of policy**: NGOs can be effective communicators with both civil society and policy makers, disseminating information and improving the quality of policy debate; with subsequent benefits in terms of the quality of policy decisions and hence its cost-effectiveness and acceptability.

(2):**Increased costs of consultation:**, NGOs make a significant contribution to ensuring the involvement of civil society and provide a sound balance in relation to the competing interests of other actors with more resources and financial interests. They also provide a more cost-effective way of dealing with civil society, since in effect, a European environmental NGO represents the co-ordinated views of all national member organisations. Removing funding for NGOs would negatively affect their resources and hence their ability to coordinate a large number of viewpoints, leaving the Commission to deal with many more interlocutors, which is highly inefficient in terms of use of resources.

(3): **Decreased NGO independency:** NGOs experience to a certain degree how the European funding influences their independency in determining activities or opinions, but always in a positive way. The LIFE+ operational funding allows NGOs to keep a higher level of independency compared to national funding, sponsoring of application for other funding or resources. A lower degree of independency would affect the quality of the policy input given by the NGOs, and it would increase the risk of astroturf lobbying.

It is difficult to quantify these costs, but they have been recognised by the Commission18. It is also difficult to pinpoint poor policy that is at least partly attributable to the lack of effective NGO contribution. Sometimes NGO contribution is lacking, or its remarks are minimised because its representatives are outnumbered by other stakeholders. When technical issues are discussed in stakeholder meetings advising the European Commission or the Council the balance between participants defending individual industrial interests and participants from NGOs is often rather unequal. At least in the field of policy development the risk of unbalanced outcomes of stakeholder consultations would strongly increase if NGOs were less able than they are currently to participate in the consultation. The issue of NGO dependency is not only important for information sharing, but also for policy development and implementation.

(4): **Increased costs for facilitating exchange of information between stakeholders or target groups**: NGOs possess of a large network of members, sympathizers,

[18] SEC(2008) 2633 final

contacts and interlocutors, often at grassroots level. They frequently have shorter and more effective communication lines than official bodies. NGOs use this network not only for disseminating downhill information or to collect information for uphill public consultation, but also for mutual exchange between contacts in a target group. (e.g. transition towns, eco-teams etc).

- *Inadequate system of support for eco-innovation*

Although some NGOs are specifically working on technical aspects of eco-innovation ,their impact can be larger through enhancing the legal frame for eco-innovation (policy development and implementation) and by facilitating dissemination of results and best practices (communication and awareness raising). This topic is thus largely covered by the above mentioned drivers.

3.1.6 The assessment of the option

The assessment of the option is summarised in the following assessment grids

Table 3.8 Assessment of Zero option (relative to baseline)

Specific objective to be achieved/ problem addressed	Element	Anticipated impact: effectiveness (rated from –5 to +5)		Explanation of rating and aspects of the policy option necessary to achieve impact
To improve the scope of EU environmental policy and legislation.	NAT	-3	-2	Adverse impact, especially biodiversity but main impact is on implementation
	EPG	-1		Adverse impact but main impact is on implementation
	INF	-1		No significant effect on policy scope but lack of awareness can effect policy development
	NGO	-4		Very significant impact by not addressing regulatory capture
To improve the implementation of EU environmental policy and legislation, (including EU commitments to international agreements)	NAT	-5	-4	Very significant impact – little replacement in other funds
	EPG	-4		Very significant impact – some replacement in other funds
	INF	-3		Adverse impact through loss of awareness
	NGO	-4		Very significant impact through loss of implementation activities led by NGOs.
To improve the effective contribution of other EU policies to environmental objectives	NAT	-2	-2	Adverse impact through loss of working with policy makers across policy areas
	EPG	-2		Adverse impact from loss of 'C' Projects – but only small share of EPG
	INF	-2		Adverse impact through loss of dissemination with policy makers and economic actors in other sectors
	NGO	-2		Adverse impact through loss of engagement with policy makers and the cross-policy networking capacity of NGOs.
To develop solutions for subsequent mainstreaming in other EU financial instruments and MS practices	NAT	-2	-2	Adverse impact from lack of demonstration
	EPG	-2		Significant impact from loss of 'D' projects - some replacement
	INF	-1		Adverse impact from lack of dissemination to potential applicants

Specific objective to be achieved/ problem addressed	Element	Anticipated impact: effectiveness (rated from –5 to +5)		Explanation of rating and aspects of the policy option necessary to achieve impact
	NGO	-2		Adverse impact from lack of NGO dissemination
To contribute to responsibility sharing in the protection of EU natural assets	NAT	-4	-3	Very significant impact due to loss of investment
	EPG	-3		Significant adverse impact from lack of demonstration
	INF	-2		Adverse impact from lack of awareness of issues – e.g. forest management and forest fire protection
	NGO	-3		Significant adverse impact from lack of expertise
To contribute to responsibility sharing in addressing transboundary problems affecting EU internal and external borders	NAT	-3	-3	Significant adverse impact from loss of transboundary working
	EPG	-4		Very significant adverse impact from loss of transboundary working
	INF	-2		Adverse impact from lack of targeting of transboundary problems and related awareness of issues
	NGO	-3		Significant adverse impact from lack of expertise

Table 3.9 Assessment of Zero option – Against impact indicators

Specific objective to be achieved/ problem addressed		Anticipated impact: effectiveness (rated from –5 to +5)	Explanation of rating and aspects of the policy option necessary to achieve impact
Environmental impacts	Changes in policies/management	-3	No replacement of activity in other funds
	Changes in habitats/eco-systems	-5	No replacement of activity in other funds
	Changes in pollution / resource use	-4	Limited replacement of activities most directly related to these impacts
Economic impacts	Technology outcomes	-4	Limited replacement of activities most directly related to these impacts
	Additional sales / GVA	-4	Limited replacement of activities most directly related to these impacts
	Net cost savings	-4	Limited replacement of activities most directly related to these impacts
Social impacts	NGO contributions to policy	-4	Only limited replacement of activity in other funds
	Improvements in human health	-5	Limited replacement of activities most directly related to these impacts
	Additional employment	-4	Limited replacement of activities most directly related to these impacts

Table 3.10 Assessment of Zero option – Other criteria

Specific objective to be achieved/ problem addressed	Anticipated impact: effectiveness (rated from –5 to +5)	Explanation of rating and aspects of the policy option necessary to achieve impact
Impacts on different social and economic groups	-3	Loss of environmental and social benefits will tend to have adverse effects on lower income groups
Fundamental rights	0	No impact
Risks		
Financial costs to the EU budget (direct staff costs, funding instruments)	€57m	Public procurement costs per year – sometimes called the common pot – this is the same for all options
Financial costs to Member States (e.g. administrative costs for applicants and management costs for beneficiaries)	To the extent that MS can find replacement resources for LIFE there will be additional costs	No member state activity, except for 20% of EPG projects assumed to be funded under other instruments
Summary of benefits and advantages of option	EC savings of €15m MS savings of €5m per year relative to baseline Some €30m-€40m of environmental benefits might be secured from other instruments	EC savings of €5m staff cost and €10m TA MS savings of €3.4m in bid costs pa and €1.7m in admin costs pa
Summary of disadvantages and risks of policy option (including negative economic and social costs in EU and third countries)	Loss of environmental benefits conservatively estimated to be €600m per year Loss of economic and social benefits, worth at least €1 billion GVA Loss of burden sharing Loss of engagement of civil society in EU policy Long-term risks from failure to address growing problems	
Essential accompanying measures	None	
Feasibility: Issues raised in stakeholder consultations	General concern of lack of action	
Feasibility: Issues raised by Member States	General concern of lack of action	

3.1.7 Summary of the impact of the option

3.1.7.1 Consolidated option score (relative to baseline)

The scores proved above, when normalised (using a range from zero to 10, where the baseline impacts are taken as a score of 5), sum to a score of 3.7. Further analysis is provided in Section 4.0.

3.1.7.2 Impact of the option on the programme

The analysis has indicated that despite the operation of the main financial instruments there are significant gaps in their coverage, with the result that in the absence of the instrument only a small level of activity would be otherwise be funded from EU or MS resources. The main area that might otherwise be funded relates to some eco-innovation activity under EPG that could potentially be funded, mainly under FP7 or sometimes CIP. However, in the case of FP7 it was acknowledged that LIFE projects allowed beneficiaries to go beyond research to identify and catalyse policy solutions that might otherwise be ineligible under FP7.

The choice of this option would save the baseline programme cost of some €234m a year. It would however lead to the loss of programme benefits conservatively estimated, under the baseline scenario, of some €600m per year as assessed against the baseline option.

The environmental impacts of the option would be significant. There would very likely be considerable deterioration in the condition of habitats and ecosystems given the fact that there is no replacement of the activities funded under LIFE by other EU funds. There is also likely to be some negative impacts with regard to pollution and resource use, although there is some limited possibilities for these activities to be funded by other means. In the absence of LIFE, there is also likely to be fewer opportunities or means by which policies or management systems can be changed, which would have potentially negative consequences for the environment.

3.2 Option 2: Baseline Scenario

The purpose of the impact assessment of the baseline scenario is to understand how it affects the underlying problems in the period 2014 – 2020, and how it influences the institutional drivers that underpin the development and implementation of policy

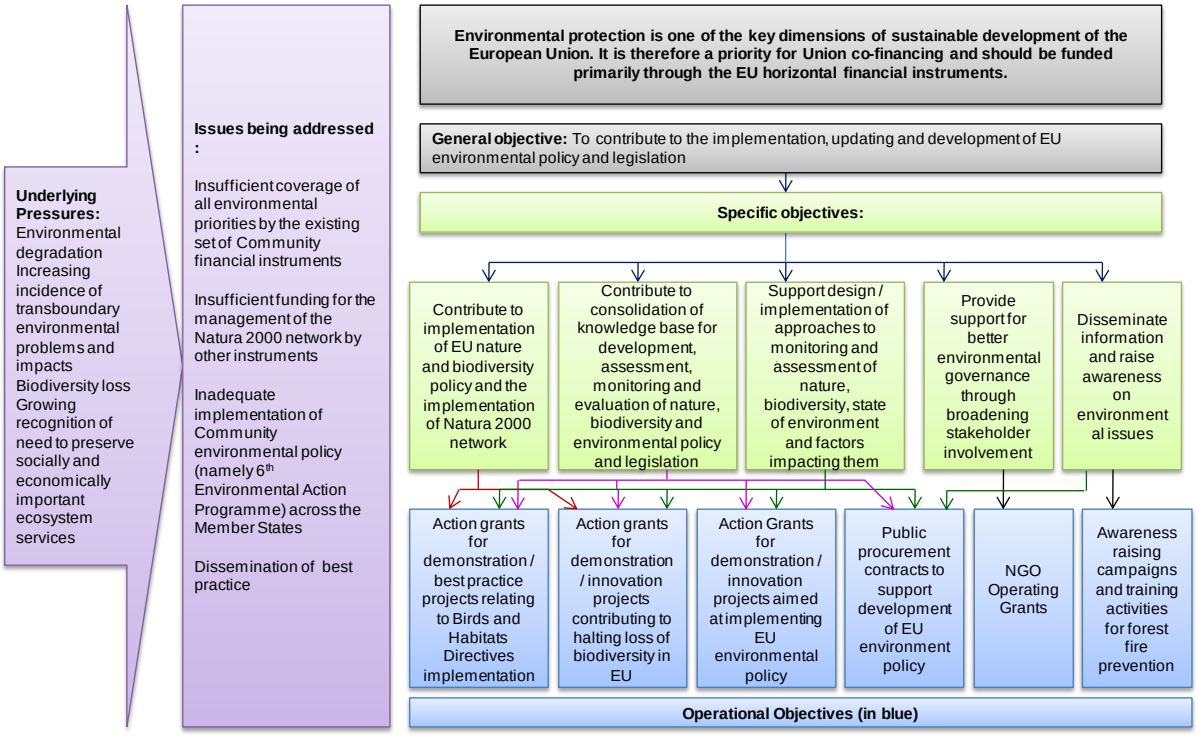
3.2.1 The baseline scenario

Article 1(2) of the LIFE+ Regulation establishes the general objective which is to contribute to the implementation, updating and development of Community environmental policy and legislation, including the integration of the environment into other policies, thereby contributing to sustainable development.

In particular, LIFE+ shall support the implementation of strategic environmental objectives (described in the 6th EAP), including thematic strategies. EU added value derives from the formulation of policies to respond to the common environmental problems of Member States and the co-financing of actions in MS to catalyse improvements in policy making and implementation, and facilitating burden sharing across MS.

The objectives and structure of activities are described in the underlying intervention logic (Figure 3.2). The three main components of the instrument comprise public procurement (19% of budget), operating grants for NGOs (3%) and action grants (78%). At least 50% of the action grants should be allocated to supporting the Nature and Biodiversity theme (and in particular the co-financing of MS needs in the designation and management of the Natura 2000 network).

Figure 3.2 Intervention logic of the baseline scenario



The baseline scenario is based on the following assumptions:

- the basic objectives and structure of the instrument remain the same (and that the completion of the 6EAP in 2012 is followed by a replacement statement that continues to define the strategic policy objectives for the next programme period);
- the current allocation of €2.2 billion over 7 years (€300m per year) remains the same in real terms;

- the emerging policy needs, in so far as they differ from the current period, are reflected in the strategic policy statement and hence in the different delivery mechanisms;
- the priority recommendations adopted from the mid-term evaluation (MTE) of the regulation are implemented. These aim to improve the policy focus and multiplier value of the instrument. They also allow funding of activities in third countries where it delivers EU added value.

The impact assessment has focused on the use of action grants given their significance in the overall instrument, but also includes consideration of the impacts of the operating grants to NGOs. As noted above, the scale and type of public procurement expenditure is the same for all options and is therefore not included in the impact assessment.

The assessment of action grants is based on a survey of project beneficiaries contracted under the first three years of the programme. Table 3.11 provides a summary of the responses received. These response rates for investment provide the basis of grossing-up survey responses. Based on the first three years the annual investment cost of the programme (including Member State investment) is:

- NAT: €199m
- EPG: €223m
- INF: €17m
- Total: €438m

Table 3.11 Summary of the LIFE+ Action Grant projects contracted (2007-2009) and survey responses

	PROJECTS (Number)			FUNDING – Total Investment (€ million)		
	Total	Sample	Response Rate	Total	Sample	Response Rate
NAT*	215	37	17%	563	63	11%
EPG	288	90	31%	668	238	36%
INF	39	13	33%	50	14	29%
Total	549	147	27%	1,318	348	26%

Source: EC LIFE+ monitoring records and GHK survey returns

**Excludes 7 projects and €33m of funding for marine projects*

In the context of a proposal for a specific instrument for environment and climate action, the baseline scenario includes activities that address climate change. In the case of nature projects these contribute directly to climate adaption through contributing to eco-system resilience and explicit climate adaptation functions such as flood management. In the case of EPG, climate change is an explicit policy theme and has been recognised as a priority theme in calls for proposals. In the first three years of the current programme 28% of contracted EPG funding was provided to projects classified under the climate change theme.

3.2.2 Impact assessment of action grants for Nature & Biodiversity and Environmental Policy & Governance (EPG)

The assessment of action grants has covered the three sub-components of Nature and biodiversity (NAT); Environmental Policy & Governance (EPG); and Information & Communications (INF). Given the early stages of projects and the emphasis in some projects on results that only indirectly influence environmental impacts, the assessment

focuses on projects funded under NAT and EPG. Annex 3 provides a fuller description of the activities and results of the Action Grants.

The impact of the NAT and EPG projects has been assessed in terms of the physical environmental impacts, the economic value of these benefits in so far as relevant external costs have been identified, and any related economic and social impacts identified by the projects. It is important to recognise that the projects, especially those only recently contracted, have yet to be completed. The assessment is therefore based on the best assessments of project managers as to the likely future impact of the projects.[19] Projects were asked to anticipate the impact three years after the end of the project, recognising a period of elapsed time would be required before the full impacts of the projects could be realised.

3.2.2.1 Environmental Impacts

The environmental impact has been examined by reference to a series of indicators selected to reflect the nature of the projects, and with an attempt to maintain some consistency with the indicators previously used in the ex-post assessment of the LIFE III programme (see Annex 4 for a list of indicators used in the baseline assessment). The relevant estimates of the value of the environmental impacts have been sourced from the literature. These are presented in Annex 7.

3.2.2.2 Nature & Biodiversity

In the case of NAT projects the assessment has examined the impacts by broad habitat type. The reported impacts for selected indicators are shown in the Table below.

Table 3.12 Reported impacts on habitats: Expected impacts of LIFE+ Nature and Biodiversity projects on selected indicators [20]

	Survey Response		Applied to All Projects*	
Selected Indicators	**No of Habitats/ Areas/ Species**	**Area (Ha)**	**No of Habitats /Areas / Species**	**Area (Ha)**
Habitats that will be created or re-created	25	684	200	6,100
Habitats that will be restored	1,221	242,518	10,800	2,154,100
Habitats that will be brought under sympathetic management	2,172	114,733	19,300	1,019,100
Priority areas protected from invasive species	20	9,666	200	85,900
Species and area of habitats that will benefit from local biodiversity action	108	163,060	1,000	1,448,300

**Grossed up results based on the share of total project investment reported*

The total area benefitting from projects is estimated from Table 3.12, and totals some 4.7m hectares of land. This represents some 6% of the total area of the designated Natura 2000 terrestrial sites. A more detailed analysis is provided in Annex 5.

Although a number of responses were received from marine based projects these are not included in the above results, which are based only on terrestrial projects, including coastal

[19] See also the Ex Post Evaluation of Projects and Activities Financed under the LIFE Programme. Available from: http://ec.europa.eu/environment/life/publications/lifepublications/evaluation/

[20] These figures relate to impacts that are expected to be seen after three years of the project ending. The figures therefore relate to expected not achieved results – no projects under the current programme have finished

projects that include for example salt marshes. In the first three calls there were twelve marine based projects. These projects have not been included in the analysis of terrestrial benefits.

The reported environmental impacts have been converted into an estimated economic value using published externality values for eco-system services associated with different types of habitat. These are applied to estimates of the environmental impacts by habitat type as reported by projects. Given the lack of detailed knowledge of the individual projects (e.g. the level of quality of the ecosystems within these projects) and the related eco-system benefits the following estimate (Table 3.13) should be taken as providing only a very approximate estimate of the economic value of the environmental benefits.

The externality values are based on case studies of the economic value of eco-system services. These cases include the impacts of substantial changes in eco-system services. Given that most of the funded activity relates to restoring or improving habitats it is likely that simply applying the published estimates might overstate the benefits. On the other hand, as many of the studies usually only cover a few of the ecosystem services provided or only certain habitats (e.g. forests) the risk of underestimating the externalities is also high.

Table 3.13 Indicative annual economic value of the environmental benefits provided by Nature projects (€m)

Indicator	Total value	Low estimate (@ 5%)	Medium estimate (@10%)	Higher estimate (@15%)
Habitats that will be created or re-created	53	3	5	8
Habitats that will be restored	6,280	314	628	942
Habitats that will be brought under sympathetic management	1,943	97	194	291
Total	8,276	414	828	1,241

**Grossed up results based on the share of total projects reporting*

Three habitat types are responsible for most of the benefits calculated above as they are often the main focus of valuation studies: freshwater habitats (accounting for half of the benefits), and coastal habitats and forests each accounting for around 20% of benefits.

The estimated value of benefits takes a conservative approach, assuming the benefits are between 5% and 15% of the published externality values to provide an indicative estimate only. This indicates an annual benefit of between €400m and €1,200m. It is extremely unlikely that the benefits are less than this, but likely that benefits in fact exceed this range.

On an annual basis, taking the low estimate, the benefits represent twice the total investment cost of the projects (of €199m). Using the higher estimate, benefits are six times the investment cost. This excludes any economic or social impacts, described below.

Of course the benefits are also expected to last for many years (although management costs will be required). Taking the low estimate and assuming the benefits last for 10 years, the discounted (at 4%) present value would be €3.2 billion, almost six times the total investment cost (€562m).

To put these results in context, a number of studies have carried out a detailed cost-benefit analysis of Nature investment and provide exemplar indications of the potential cost-benefit ratio associated with the implementation of Natura 2000[21]. In the context of a wider economic and institutional assessment of the network in France, analyses were undertaken

[21] Gantioler et al.(2010) and references within

to determine its net benefits. The valuation of the site 'Pleine de la Crau', for example, estimated the benefits to be around seven times higher than the costs. A study investigating the rate of return as regards the application of farming practices according to the Burren LIFE project in Ireland, determined that if all operating costs and all direct payments were considered, for the most conservative estimate the return rate would still amount to 235 per cent. In 2009, the Metsähallitus Natural Heritage Services and the Finnish Forest Institute (Metla) carried out a national level assessment on the economic impacts of nature tourism and nature-related recreation activities on local economies. The study referred to key government owned nature areas, including 35 national parks and 10 other recreation areas. In general, it concluded that €1 public investment provided €20 return.

Environmental Policy and Governance (EPG)

The analysis of Environment Policy & Governance (EPG) projects has focused on those projects anticipating physical environmental outcomes. Thirty-three of the 68 projects that responded provided estimates. These are summarised in Table 3.14. Significant impacts are reported in terms of expected reductions in CO_2 emissions, the area and people likely to benefit from improved air quality, the area of soil erosion prevented, and the reductions in non-hazardous solid waste generation.

Table 3.14 Reported environmental impacts (selected indicators)

Theme	Indicator	Unit	Survey Response	Grossed Response*
Climate Change	Expected reduction in emissions of CO2 or other greenhouse gases	Tons/year	152,467	933,000**
Water	Area of rivers/lakes that will have improved quality	Ha	507,850	1,604,000
Water	Likely improvement in areas meeting national quality standards/ targets	Ha	495,800	1,566,000
Water	Area with likely improved groundwater quality	Ha	5,931	19,000
Air	Likely improvement of air quality	Km2	10,410	30,000
Air	Likely improvement of air quality	No of people (m)	4	12
Air	Likely increase in area with ambient air quality meeting EU air quality standards	Km2	5,400	16,000
Air	Likely reduction in emissions of noxious gasses (e.g. SO2, NOx, NMVOC an NH3)	Tons/year	1,700	5,000**
Air	Expected decrease in CO2 emissions through use of private cars	Tons/year	50,400	147,000**
Soil	Expected reduction of soil erosion	Ha (000)	2,000	7,000**
Urban environment	Expected reduction in CO2 emissions through increase in bicycle traffic	Tons/year	4,803	20,000**
Urban environment	Expected reduction in CO2 emissions through reduction in car traffic	Tons/year	6,301	27,000**
Env & Health	People that will be better protected from air pollution by particles	No of people (m)	1	1
Natural resources & waste	Likely reduction in energy consumption	KwH/Year	3	35

Natural resources and waste	Likely reduction in use of limited or non-renewable natural resource	Tons/year	10,105	119,000
Natural resources and waste	Likely reduction in non-hazardous solid waste generation	Tons/year	27,080	318,000**
Natural resources and waste	Likely increase in recycling of waste	Tons/year	82,435	968,000**
Forests	Forest Area that will be better protected	Ha (000)	2,000	33,000

**Grossed up results based on the share of total project investment reported by theme*

*** Used to estimate the economic value of environmental impacts*

Indicators were chosen based on indicators used in the ex-post assessment of LIFE. Project beneficiaries (2007-2009 beneficiaries) were then asked to attribute an expected impact to each indicator. The economic value of these environmental benefits has been calculated based on the application of published externality estimates. It is difficult without knowing the specific details and context of the project to be confident that the application of externality values is justified. However in the case of estimates of reductions in emissions or wastes (rather than changes in environmental quality), externalities can be applied with more confidence to provide a conservative assessment. This means that indicators of changes in air and water quality are not included.

The externality values relevant to each indicator are taken from the literature (see Annex 7). We have taken the values as presented, rather calculate a range. It should however be emphasised that, as previously noted, the transfer of externality estimates does lead to some uncertainty, which has been minimised by excluding indicators of environmental quality, and has not therefore been reflected in the calculation of a range – whilst the benefit estimates should only be taken as being indicative, because of the exclusions they can be taken as the minimum or a 'low' estimate.

On this basis the economic value of the environmental benefits provided by Environment projects could be in the order of €200 million per year (Table 3.15). This represents the minimum level of benefit. Substantial economic benefits are also potentially associated with health benefits from improved air quality and reduced particulates; and from improved forest protection.

Table 3.15 Indicative annual economic value of the environmental benefits provided by Environment projects (€m)

Indicator	Unit	Estimated Impact	Externality Value (€)*	Economic Value (€m)	% of Total
Expected reduction in emissions of CO2 or other greenhouse gases	Tons/year	933,000	120	112	58%
Likely reduction in emissions of noxious gasses (e.g. SO2, NOx, NMVOC an NH3)	Tons/year	5,000	1,308	6	3%
Expected decrease in CO2 emissions through reduction in use of private cars	Tons/year	147,000	120	18	9%
Expected reduction of soil erosion	Ha (000)	7,000	5	38	20%
Expected reduction in CO2 emissions through increase in bicycle traffic	Tons/year	20,000	120	2	1%
Expected reduction in CO2 emissions through reduction in car traffic	Tons/year	27,000	120	3	2%
Likely reduction in non-hazardous solid waste generation	Tons/year	318,000	11	3	2%

Likely increase in recycling of waste	Tons/year	968,000	11	11	5%
Total annual economic value				194	100%

**Externality value relates to the selected indicator unit, e.g. tons of CO2 per year*

Note that the different indicators relating to CO2 emissions reflect activities under different themes and does not reflect any double-counting

On an annual basis, taking the minimum benefit estimate of the 2007-09 projects, the benefits are slightly less than the total investment cost of the projects (of €223m). This excludes significant environmental benefits that can not be monetised as well as economic and social benefits, described below, which are substantial.

Of course the environmental benefits are also expected to last for many years. Assuming the benefits last for 10 years, the discounted (at 4%) present value would be €1.6 billion, two and a half times the total investment cost (€668m).

3.2.2.3 Economic and Social Impacts of Nature and EPG Projects

The economic and social impacts of the Action Grants, as reported by Nature and EPG projects, are summarised in Table 3.16, for the indicators selected for the Impact Assessment. Key impacts include:

- a total investment of some €600m is being made in technology outcomes by EPG projects. In addition Nature projects are investing €380m in new approaches and techniques for nature conservation;
- the additional sales generated by the development of new products from EPG projects of €2.7billion, generating around €1.1 billion of GVA[22];
- substantial health impacts both from the investment in improved natural environments and from improvements in environmental quality, especially from reductions in air pollution, affecting over 12 million people;
- modest but positive employment impacts of some 2,000 jobs[23] associated with the continuation of project activity post LIFE funding and indirect economic benefits of a further 18,000 jobs based on additional sales of new products[24].These impacts are particularly important given that Nature projects tend to create and retain employment in areas that are being depopulated and/or have lower relative incomes.

[22] GVA accounts for 40% of environmental technology sales, based on DG Environment, 2007, Table 4.4. Total sales of eco-industries was estimated to be €319 billion in 2008 (2008 prices), (Ecorys, 2009)

[23] In terms of social impacts, a recent analysis on the economic benefits of environmental policy concluded that the Natura 2000 network could be supportive of 122,000 full-time equivalent (FTE) jobs in the regions where the sites are located, if adequately resourced and managed. If indirect and induced effects are taken into account, this could amount to 207,000 FTE jobs at the EU level. However, these job estimates must also be treated with some caution as it is not possible to control for negative or positive impacts in other sectors (Rayment et al (2009) within Kettunen et al (2011)

[24] €147k of environmental technology sales supports one job (including multiplier effects), based on DG Environment, 2007, Table 4.4

Table 3.16 Estimated economic and social impacts of LIFE Projects (for selected indicators)

Impact Indicators		NATURE & Biodiversity Projects	EPG Projects
Economic Impacts	Additional technology outcomes	64% of the investment in projects will lead to the demonstration or development of new methods, techniques or approaches for species or habitat creation. The total investment in technical outcomes is therefore €380m for NAT projects. *e.g. new methods for marine monitoring such as remote sensing, new approach to wetland restoration, pilot techniques for conservation of amphibians*	88% of the investment in projects will result in new methods, new techniques and/or new approaches. The total investment in technology outcomes is therefore €590m for EPG projects. *e.g. new innovative tools and methods for interactive and co-creative citizens, a new approach for creating a corridor crossing a city and connecting different elements of its environmental and cultural heritage and establishing a set of certifying criteria*
	Additional sales / GVA	11% of projects will include new commercially viable products (eg timber). *(Project beneficiaries were unable to estimate the expected annual sales from these products)*	44% of projects will lead to new commercially viable products, collectively amounting to annual sales of €2.3bn and €1.1bn in GVA (assuming GVA constitutes 40% of sales) *e.g. a new water box technology as a more cost effective solution to irrigation*
	Net cost savings	27% of project investment (€160m) will lead to cost savings for the Competent Authorities. *(Projects were unable to estimate the annual cost savings)*	57% of project investment (€380m) will lead to cost savings for Competent Authorities as a result of new methods, techniques or approaches *(Projects were unable to estimate the level of annual cost savings)*
Social Impacts	NGO contributions to policy	33% of total budget granted for 2007 and 2008 is allocated towards environmental policy development and environmental policy implementation, some €5m	22% of total budget granted for 2007 and 2008 is allocated towards environmental policy development and environmental policy implementation, some €3.5m
	Improvement in human health	4.7m hectares of land (6% of total Natura 2000 designated area) will be protected, restored and improved, helping to improve human health.	At least 1 million people will be better protected from particulate pollution and some 12 million people will be receive health benefits due to improvements in air quality
	Additional employment	A total of 750 jobs are estimated to be safeguarded as a result of the planned continuation of NAT projects post LIFE funding A total of 175 jobs will be created as a result of the LIFE+ project (mainly from increased tourism)	A total of 1,000 jobs are estimated to be safeguarded as a result of the planned continuation of EPG projects post LIFE funding Projects were expected to continue for varying lengths of time, between 2 years and 5 years An estimated 18,000 jobs from additional sales of €2.7 bn of new products

Source: Based on the survey response of project beneficiaries

3.2.3 Impact assessment of information and communications

The main driver behind the introduction of the new Information and Communication component to the LIFE Programme was the political perception that there was a need for greater communication of the LIFE+ Regulation to take place, and to "bring environmental policy closer to the citizens."

The main aim of the component has been to actively promote EU environmental policies through information, communication, awareness-raising and dialogue, helping to 'empower' individuals and groups in European civil society, as well as other stakeholders such as industry and local authorities to participate in an informed and active manner in the protection of the environment and the sustainable use of resources. The aim is that, by enhancing their ownership of environmental policy, more effective implementation can be achieved.

In the first three calls of LIFE+ (2007,2008 and 2009), 38 projects were selected for funding under the Information and Communications component, accounting for just over €24 million in EC contributions (total sum of investment was €49 million). 12 of these projects related to nature and biodiversity (with forest fires and climate change accounting for a further 11). Many of these projects aim to raise awareness amongst the general public (some with a particular focus on sub-groups such as schoolchildren and consumers), visitors to Natura 2000 sites, landowners/farmers and other stakeholders, of the importance of nature and biodiversity conservation, and to educate their targeted audience on the effect that human activities can have on the local environment. The projects can also play an active role in changing public perception about the Natura 2000 network, which is often seen as a burden to economic development and creating opportunity costs[25].

Other projects aim to raise awareness of a number of target groups of either broader topics (e.g. climate change and its impacts on the local community) or more specific issues that are aimed at a narrower target audience, such as improving the understanding of the olive oil industry of the need to introduce more sustainable production and consumption practices. Other interesting examples include:

- using animation and cartoons to target young children to raise their awareness of climate change issues and to promote their adoption of environmentally-friendly behaviour;
- raising awareness among trappers and among the general public about the ending of the transition period for trapping activities in Malta and about the damage to wild bird populations that occurs as a result of trapping; and
- increasing the awareness amongst those working in ornamental horticulture industry of the risks of introducing invasive alien plants associated with ornamental horticulture.

However, as a result of the indirect influence the projects have on realising environmental benefits, it is not possible to quantify a specific impact.

3.2.4 Impact assessment of operating grants

A summary of the impacts of NGOs is presented below, based on evidence collected during the MTE. In summary the assessment indicates that the funding represents value for money.

Progress of NGOs using outcome indicator data

An analysis of the operational funding of NGOs for 2007 and 2008 (undertaken in the mid-term evaluation, see Annex O, Table O-1) showed that a substantial proportion of the budget is used for policy development (27%), policy implementation (28%), with external capacity building, awareness raising and enlargement and third countries being smaller fields of activity. See paragraph 0.

[25] Gantioler et al (2010) Also see the LIFE 2008 INF project 'European Business and Biodiversity', which aims to improve awareness and understanding among corporate decision-makers about the impacts of business operations on biodiversity and about business opportunities in relation to biodiversity conservation

An analysis of reported outcome indicators (based on the indicators reported by the NGOs on the actual application of funds retrieved in the 2008 programme and data on estimated values for the 2009 programme) showed that the most common activities undertaken by the NGOs were press releases, participation in conferences and written submissions to the Commission. In contrast, attention to non compliance and infringement procedures appeared to be less of a priority for the EU-wide operating funded NGOs, based on the data below.

Policy development and implementation

Action	Median of actions per NGO per year, 2008
Participation in expert groups	5
Replies to stakeholder consultations	2
Participation in stakeholder meetings, public hearings etc,	4
Press releases	10
Written submissions to EU institutions	8
Studies undertaken	3
Conference/events organised > 50 participants	3
Conferences/events organised < 50 participants	5
Active participation/contributions to conferences/events > 50 participants	7
Active participation/contributions to conferences/events < 50 participants	6
Other policy areas than environment covered	2
Actions taken to draw attention to non-compliance with EU policy	0
Infringement procedures	0

It must be noted that a quantitative interpretation of the indicators for policy development and implementation is not easy to make. Quality cannot be observed through quantitative figures, which makes it difficult to compare for example the number of participations in expert groups or written submissions between NGOs.

The outliers in the data point to a type of specialisation between NGOs. For example, some NGOs would appear to specialise in expert groups, some in in stakeholder meetings and public hearings, and others in studies.

The quantitative indicators as reported by the NGOs are outcome-based, which attempts to measure the outcome of the given funding. However, these indicators are designed as if the funds serve to realise a project with a delineated target and an expected end-result. This is, however, not the case for the operational activities that are funded and project-like indicators are not always applicable on standard operational activities. It is difficult to measure operational outcome in terms of the quantity of reports written or expert groups participated in. Indication on outcome of operational activities is looking at quality, and therefore its indications are often more of an indirect or a qualitative nature.

Education and awareness raising

Action	Median of actions per NGO per year, 2008
Communication/education material	9
Periodicals	6
Subscriptions	1000
Education activities on EU policy implementation and development	7

Some NGOs do not focus on education or awareness raising and therefore do not participate in one or more of the possible educational instruments. A quantitative interpretation of the indicators for education and awareness raising makes more sense than on policy development and implementation, because the instruments often are comparable; leaflets, periodicals, subscriptions to electronic newsletters…

Little can be learned from looking at awareness raising and education outcome indicators, other than to make the distinction between NGOs that are relatively pro-active on education and awareness raising activities, and NGOs that focus on other instruments.

Capacity building

Action	Median of actions per NGO per year, 2008
Staff training (n° of days)	10
Network capacity building	5
Strategic approach development	1
Financial management development	1
Evaluations	3
Membership development	1
Press coverage	20
Web page traffic	24000

Through these outcome indicators, staff training appears to be the main instrument applied to achieving internal organisational development and capacity building objectives, with little activity in strategic approach development and financial management development are the least mentioned fields for capacity building. The large variation observed is connected with the accuracy of internal data gathering in the NGOs.

Note that the included indicators for press coverage and web page traffic are not directly connected to internal capacity building, but more to communication and visibility. Frequently NGOs do not have exact figures on both topics. In the reported data a zero for an individual NGO often means 'no data available').

Conclusions

A large number of NGOs have undertaken a broad range of activities to contribute towards improved EU policy implementation and development. For example, they have:

- Served as hubs for a growing number of national and international environmental organisations.
- Provided information about existing and upcoming policies
- Informed EU decision makers about the views and demands of their members and sought their support, as well as working in coalitions with other organisations (including those outside the environmental movement) to have their views accepted
-

Much of the success of NGOs is related to their ability to:

- Defend or increase the ambitions of EU legislation, and campaign for real implementation of legislation or policy priorities.
- Assist in increasing transparency and public participation.
- Contribute to integration of environmental concerns into other policies through the provision of specific expertise.
- Help members better understand EU environmental policies, to better mobilise the public and decision makers to support a progressive role for the EU on environment and sustainable development.

However, it is relatively difficult to assess the progress NGOs have made with respect to such objectives using quantitative outcome indicators such as those above. The data suggests that NGOs use a wide variety of activities and undertake different tasks to achieve their aims. The nature and level of activity varies significantly between NGOs, reflecting in part the level of specialisation of the particular NGO.

3.2.5 Effects of the revisions made following the mid-term evaluation

The operation of the programme has been revised in two main ways following the mid-term evaluation:

- The first change was to address the recommendation that calls for proposals reflect a stronger link to EC policy needs; and

- The second change, supported by legal opinion, was to allow funding of activity in third countries where it provided EU added value.

The impact assessment has briefly considered the potential effects of these changes. In the former case, a review of the responses to the first call to have a stronger priority focus (climate change) did not produce any major or obvious difference in the balance of themes reflected in the applications to that in previous calls.

In the case of the second, there has been limited time for any cases to be identified.

The MTE also emphasised the importance of increasing the multiplier effects from projects. However, this will need to be reflected in the assessment of bids and management of projects; and only demonstrated some time after. The proposed use of Integrated projects to assist in this process will not be available until the next period. It is therefore not possible to include any specific allowance for this in this assessment.

Finally, the MTE also raised a concern over the use of the National Allocations and MS specified priorities, potentially leading to a reduced level of EU added value. A response to this conclusion cannot be implemented in the context of the baseline scenario.

Therefore whilst there is recognition of the value of key changes, they are unlikely to have an immediate short-term impact and hence are assumed not to affect the overall impacts of the baseline scenario previously assessed.

3.2.6 EU added value and subsidiarity

Based on the terms of the Treaty, the priorities of the Budget Review and the current LIFE Regulation, the findings of the MTE, as well as views from stakeholders during the Impact Assessment, confirm the strong rationale and relevance of the instrument, operating at the EU level in support of the shared responsibilities between the EU and Member States for environmental protection.

The findings also confirm the actual and potential scope to achieve EU added value. This added value is based on activity largely at the local level which supports burden sharing and the engagement of civil society in EU policy making and contributes directly to meeting EU environmental policy needs and priorities.

The impacts presented above, would have been unlikely to have been generated without the programme and the associated EU spending; the analysis in the zero option confirmed the small level of deadweight associated with the programme. As noted the programme has facilitated local action in support of EU policy needs, particularly where the collective lessons of groups of projects around particular policy themes provide a critical mass of evidence and lessons for wider replication; which would otherwise not have been undertaken, or if it had then at higher taxpayer expense.

However, the inability to generate strong multiplier value, either through projects with the scale to create spillovers and knock-on effects, or by leveraging other financial instruments in pursuit of environmental objectives was also raised in the MTE. Subsequent instruments should therefore recognise a requirement for stronger, but non-exclusive priorities, clearly reflecting EU needs, expressed through multi-annual work programmes; the use of integrated projects to leverage wider funding; and greater use of national as well local projects to address institutional weaknesses. These changes collectively are reflected in Option 3.

The MTE, and subsequently the report of the European Economic and Social Committee on the MTE,[26] also raised concerns over the current use of national allocations to provide an affective basis for enabling the required levels of responsibility sharing. As noted above, the MTE raised the concern of a potential conflict over the quality of projects, where national

[26] Opinion of the European Economic and Social Committee on the Communication from the Commission to the European Parliament and the Council: Mid-term review of the LIFE+ Regulation, COM(2010) 516 final, 15/03/11

allocations dictated the selection of projects, that although judged to be eligible, provided less EU added value than projects that would otherwise have been selected.

The Committee suggested that there was no need for a national allocation on the basis that the Programme is intended to support the priorities of the Commission, and hence requires the Commission to clearly establish the priorities for addressing the underlying institutional problems, which are reflected in calls for proposals. Again the removal of national allocations and developing a stronger link between the programme and policy needs is reflected in Option 3.

3.2.7 Summary of the impacts

3.2.7.1 Consolidated option score (relative to baseline)

The baseline impacts provide the basis for comparison with the other options. Positive and negative impacts of the other options are based on comparison with this option. In the normalised scoring the baseline scenario is given a score of 5 in the range 0-10. The comparative analysis is provided in Section 4.0.

3.2.7.2 Summary of the environmental impacts

The environmental impacts under the baseline scenario are substantial. In addition to the quantified benefits of some €600m a year, which are based on conservative estimates, the instrument leads to the improved conservation and restoration of some 4.7m hectares of land, representing some 6% of the total area of the designated Natura 2000 terrestrial sites. It also supports a wide range of environmental improvements including improvements in water quality over an area of approximately 3 million hectares; improvements in air quality affecting some 13 million people; and reductions in waste of some 300,000 tonnes and the recycling of a further 1 million tonnes.

3.3 Option 3: Strategic programme (relative to baseline)

This option assesses the impact associated with adopting an approach designed to increase the EU added value of the specific instrument, using the same level of financing. It is based on the recommendations from the Mid-Term Evaluation for a more strategic programming approach, with a stronger top-down statement of priorities to guide the programme activity at national and local levels. Greater emphasis is also given to increasing the multiplier value of the programme, ensuring programme results are replicated and used to provide environmental solutions beyond just the projects. This also addresses weakness identified, by the ex-post assessment, in the previous LIFE III Programme

3.3.1 A Strategic Programming Approach

The impact of this option is dependent not only on the type and range of activities but also on the approach to be taken to the operation of the instrument. We consider the activities below, but first we describe the approach to the instrument provided by this option.

The critique of the current specific instrument (Option 2 – baseline option) provided by the Mid-term Evaluation, is that, whilst being relevant to the specified objectives and effective at project level, the instrument has greater potential for EU added value than is being realised.

This under achievement is due in large part to the absence of a strategic approach to the management of the programme as a whole, which means that EU policy needs are not fully reflected in programme activity and that the ability to make greater use of project results in support of policy needs (the so called catalytic or multiplier effect of the programme) is underdeveloped.

The baseline option is essentially based on annual calls for projects framed by the existing 6th Environmental Action Programme (6EAP). These calls provide some, but limited, reflection of the emerging and changing EU policy needs, but the emphasis is on allowing maximum flexibility to beneficiaries to respond to local needs.

As a consequence there is variable direct contribution to supporting EU level priority needs. Furthermore, whilst there is a requirement for individual projects to disseminate results and some subsequent grouping and synthesis of lessons from projects by theme, there is limited attempt to build networks between projects and potential users of results that would facilitate wider application and replication of project results, resulting in limited catalytic effects.

The MTE argued that LIFE could be improved, particularly in terms of a more strategic, multi-annual approach that better articulated and translated the strategic EU priorities, especially in relation to the implementation and integration of environmental policy, as the basis of programme activity. The MTE also emphasised the need for a stronger focus on utilising project results more widely through improved facilitation and transfer of know-how between beneficiaries and different stakeholders.

This is particularly the case for the Environment Policy and Governance strand, which is much broader in coverage than the Nature and Biodiversity strand, and covers the EU environmental acquis. This breadth of coverage requires that there be greater emphasis on the strategic focus and to link projects' activities and results with the needs and priorities of the Commission in a more targeted manner.

Multi-annual planning

The strategic programming approach assumes a multi-annual approach, that allows priorities to be established for the full programme period, based on the individual policy needs of DG Environment, and provides an early signal of planned changes in emphasis in programme activity over the programme period. This planning would be conducted within the Commission's policy planning system. In addition to a broad strategic framework for the whole period and the annual management plans, there is scope for a rolling 2 or 3 year management plan, signposting changes in policy needs and priorities, and informing the drafting of calls for projects.

This planning is important because not only does it improve the translation of EU policy needs into calls for projects, it allows recognition of the time lag between funding decisions and availability of project results. This planning also avoids the risk that applicants are not prepared for changes in the priority themes and the risk that applicants might be confused by any year to year changes in the priorities as reflected in calls for proposals.

Thematic priorities

The current high priority attached to climate change, is expected to continue in the next programme period. This will be reflected, as with the baseline scenario, in calls for projects; either with reference to a specific policy theme, or as a separate sub-programme.

It might also be expected that there will be a shift in policy priorities in the next financial period, with for example greater emphasis given to improving resource efficiency in light of EU2020 objectives. Whatever the changes, the multiannual framework provides the basis for defining the thematic priorities as they evolve over the programme period, and reflecting the associated policy needs in terms of improved development and implementation, and reflecting these needs in calls for proposals.

Non-exclusive priorities

This strategic programming option is the same as the baseline scenario in that it envisages the use of non-exclusive priorities; in other words, applicants would be free to submit proposals in relation to issues and themes that have not been designated as priorities, with a clear understanding that, all other things being equal, preference will be given to projects that address specified priority themes, but that if resources allow, and the quality of the bid is high, that funding will be considered. This approach is important because it still allows for relevant and high quality projects across the breadth of the acquis, and allows scope for innovations that could have subsequent spin-offs for the priority themes. It also has the benefit of removing the risk that participation of actors that are responsible for a range of themes will decline because their full responsibilities, interests and competences are not fully reflected in the programme priorities.

National allocations

This option would change the approach to the use of national allocations to remove the risk, identified in the MTE that they could undermine both the quality of the programme and fail to reflect EU priorities as defined by the EC. This option assumes that the national allocations and the related use of national priorities are removed completely and replaced by the multiannual framework and priority specification. This recognises that an EU perspective is required to establish the priorities in relation to EU significant assets and transboundary problems. Such a perspective is of course fully informed through the Member State Committee for the programme.

Broadening the range of projects

This option is intended to be delivered through broadening the range of projects. The option proposes:

- Top-down projects – designed to formally recognise the need for cross MS participation in mutual or peer to peer learning and responding to specific EC concerns; and the subsequent development of institutional capacities to address the need for improvements in policy development and especially implementation. Given the range of policy needs across the acquis more of these types of projects are required for EPG and INF than for Nature. The EPG projects will tend to be Type B compliance promotion and enforcement projects. The average project size, including MS contribution, is estimated to be €2m based on an intervention rate of 50%, slightly smaller than the current average size of €2.4m. In addition top-down projects are envisaged to improve dissemination and to raise awareness in relation to key priority themes as specified by policy units;
- Bottom-up projects – representing the ‘classic’ project as contracted under the baseline scenario, with a strong emphasis on sectoral, municipality and regional level activity, covering nature and biodiversity and all four categories of EPG. The average project

size, including MS contribution, is estimated to be €3m based on an intervention rate of 50%, slightly larger than the current average size of €2.4m;

- Integrated projects – large scale activity designed to address a major challenge and involving the need to integrate a range of economic, social and environmental objectives, supported by other funding instruments. The projects are designed to enhance the critical mass and catalytic impact of the programme. The average project size, including MS contribution, is estimated to be €20m based on an intervention rate of 70%, plus additional funding secured from other funding instruments;
- Technical assistance (TA) for Integrated Projects – to cover the cost of preparing such large projects it is proposed to offer technical assistance to applicants at 100% to cover approved costs.

3.3.1.1 A programmatic approach to the Natura 2000 network

No Member State or region has, as yet, adopted a coordinated programmatic approach to Natura 2000 financing which defines priorities, allocations through different funds, role divisions and monitoring. This results in a myriad of different constructions to financing Natura 2000 from EU funds and lack of clarity on the actual financing needs and how these needs should be met. The lack of coherence makes Natura 2000 financing very dependent on political goodwill in different sectors and herewith vulnerable to under allocation of resources.

LIFE therefore needs to make a particular effort to encourage and support the establishment of Prioritised Action Frameworks (PAFs) at national level (foreseen under Article 8 of the Habitats Directive), to clearly identify financing needs and facilitate a more systematic use and uptake of different EU funds for Natura 2000. Such PAFs would provide a clearer framework to set out objectives and priorities, including systematically outlining the measures required to be financed and identifying the potential contribution of each EU fund as well as Member State's own share in financing these measures.

Supporting Member States in developing their PAFs would help to strategically direct future LIFE funding for the network, as well as potentially leveraging funds from other EU financial instruments, once their potential role in meeting the identified needs are clarified.

While the designation of Natura 2000 is well advanced, efforts required to meet the objectives of the network are still at an early stage. It is estimated that only 17% of the Natura 2000 area is in favourable conservation status. In many parts of Europe the actions required to achieve favourable conservation status have yet to be identified. The network can therefore be regarded as being at a developmental stage rather than at the stage where it requires more routine management actions.

Given its early stages of development, an important area of focus for LIFE is therefore to support the development and implementation of management and monitoring of Natura 2000 sites. Moreover the scale of the problem further justifies intervention; two thirds of the estimated costs of running the network relate to management activities. Given that the network is still in its relative infancy, several projects that aim to address ongoing management activities should still qualify as demonstrative or best practice.

Therefore LIFE has a significant ongoing role to play in informing the development, demonstration and uptake of actions needed to deliver the network. Arguably, as the Natura 2000 network becomes more established, LIFE – which is most important in developing approaches to the implementation of the network – could focus instead on newer, emerging priorities.

Priorities and targeting

It is clear that, whilst comparatively small in size, LIFE currently plays an important strategic role in addressing some of the gaps in the implementation of the Natura 2000 network. Consequently, and from the analysis of the Zero Option, it is apparent that removing this element from the LIFE instrument would significantly weaken the delivery of the network. Nonetheless, there is clearly a need, and opportunities, for the added value of LIFE to be

increased. One obvious area where LIFE could increase its strategic value is in terms of addressing the wider policy context. Although the Natura 2000 network remains at the heart of EU nature policy, other key priorities with regard to nature and biodiversity are emerging. This clear policy imperative means the contribution to EU added value is especially significant.

However, these priorities potentially compete with Natura 2000 for LIFE funding. The need for LIFE to be more strategic is therefore even greater as the policy needs continue to expand beyond the network. LIFE, as the only financial instrument with a specific focus on nature protection, will have to rise to meet these new demands. Steps are already being taken in this direction, for example under LIFE+, co-funding is available under the 'Biodiversity' part of the strand for wider actions to help halt the biodiversity loss outside the Natura 2000 network. Nonetheless, uptake under this new strand to date has been limited[27] and needs to be further encouraged given the growing policy landscape (see Box below).

Emerging priorities for biodiversity in the policy landscape

From the EU 2010 Biodiversity Baseline, it is clear that the EU's target of halting biodiversity loss in Europe by 2010 has been missed and that EU biodiversity remains under serious pressure, with only 17% of Annex I habitats being in favourable condition.[28] Whilst there has been progress on the implementation of the EU's 2006 biodiversity conservation strategy,[29] the European Commission has also recently acknowledged that the EU has failed to achieve its biodiversity target.[30] From this, it is evident that current policies and instruments are not sufficient to maintain biodiversity. The lack of adequate financial support has been identified as one of the key issues in hampering the success of the Biodiversity Action Plan[31].

The severity and implications of ongoing biodiversity losses and ecosystem degradation is increasingly being recognised and there is consequently a renewed political ambition to tackle the problems and a recognition that biodiversity in the wider countryside is as important as the biodiversity within protected areas. This has resulted in the new 2020 target for biodiversity, "To halt the loss of biodiversity and the degradation of ecosystem services in the EU by 2020, restore them in so far as feasible, while stepping up the EU contribution to averting global biodiversity loss." This target will underpin a new EU biodiversity strategy to be developed early in 2011.[32] The focus of biodiversity policy in the EU will reach further than just the Natura 2000. Emerging priorities as laid out in the recently published new EU Biodiversity Strategy to 2020 will include the, improving the implementation and management of the network, protecting and enhancing green infrastructure, develop an initiative on no net loss of ecosystems and their services , improving the integration of biodiversity policy in other sectors such as agriculture and forestry, explore the us of innovative financing mechanisms, combating invasive alien species and halting the loss of biodiversity outside the EU.

The need for investing in an integrated approach

The EU Biodiversity Action Plan[33] attempts to not only reinforce the implementation of nature conservation legislation, but also encourages the integration of biodiversity conservation requirements into the policies of other sectors such as agriculture, fisheries, transport and energy. The latter is especially important, given that, as evidenced above, the destruction, degradation and fragmentation of habitats results from land use changes, including significant land conversion, intensification of production systems, urban sprawl, infrastructure developments and the

[27] GHK et al. (2010) Mid-Term Evaluation of the Implementation of the LIFE+ Regulation.

[28] EEA (2010) EU 2010 Biodiversity Baseline. EEA Technical Report. No 12/2010

[29] Halting Biodiversity Loss by 2010 – and Beyond: Sustaining ecosystem services for human wellbeing. COM (2006) 216 final.

[30] The 2010 assessment of implementing the EC Biodiversity Action Plan. COM(2010) 548 final.

[31] Fournier N., Gantioler S., Good S., Herkenrath P. and Mees C. (2010) Assessment of the EU Biodiversity Action Plan as a tool for implementing biodiversity policy. European Commission Biodiversity Knowledge Base. Service contract nr 09/543261/B2. Brussels

[32] EU Biodiversity Policy Development. http://ec.europa.eu/environment/nature/biodiversity/policy/index_en.htm

[33] http://ec.europa.eu/environment/nature/biodiversity/comm2006/index_en.htm

abandonment of traditional (often biodiversity–friendly) practices.

These effects are largely under the influence of other sectoral policies. Agricultural policy, for instance, is especially important as the quality of agricultural habitats is key to maintaining and enhancing connectivity in the landscape due to the fact that agricultural land covers about 50% of the total European land surface. Integration is also important for areas within the Natura 2000 network. A recent report for instance, concludes that improving the existing integrated approach to co-financing Natura 2000 seems to provide the most effective, politically feasible and risk adverse way forward.

Investing further in ensuring that an integrated approach to the environment is adopted in the implementation of the various sectoral policies will therefore be a critical contribution to ensuring that the EU's revised biodiversity target is met.

The need for further policy development

Aside from adopting new approaches (e.g. habitat banking, investing in green infrastructure) and improving the implementation of existing initiatives (e.g. integration), there are also key policy areas which will have to be developed in order to sufficiently address the various types of biodiversity. A key example, for instance, is soil biodiversity although there is currently no EU policy framework which addresses this important issue. However, there is a proposal for a Soil Framework Directive in the context of the EU's Thematic Strategy on Soil Protection. Other key areas for development are, for instance, marine and forestry habitats. It is likely that policy will have to be further developed to sufficiently address the issues facing these habitats.. The recent Green Paper on forest protection and information[34] emphasises this multi-functionality, underlining the socio-economic functions of forests (e.g. raw materials, jobs, income and the protection of settlements and infrastructure), environmental functions (e.g. soil protection, water regulation and biodiversity conservation) and their role in climate regulation (including local climate and wider mitigation impacts). It also describes the risks of the impacts of climate change on forests, including shifting environmental conditions, diebacks, destructive storms and large fires, and briefly reviews the tools currently existing at the Member States and Community level to address those challenges.

Within this policy context, and under this option, there would be a much stronger strategic targeting of projects, by linking calls for proposals with policy areas that have been identified as having significant gaps in development and implementation. This would continue to include support for the implementation of the Natura 2000 network, as before, in light of the considerable gap in funding needed to finance the network. However, activities such as those originally foreseen under the Biodiversity strand, which address the wider biodiversity measures, would need to play a much more significant role.

The current distinction made within LIFE+ (i.e. between projects designed to support the Natura 2000 network, and projects designed to support the broader policy context), could therefore be usefully continued. Maintaining this distinction would provide some insurance that the network continues to be funded, so that its needs are not crowded out by other, newer, priorities. Despite this distinction, it is clear that the two are very much linked. The Natura 2000 network is essentially the backbone of wider nature protection efforts. Conversely, neglecting biodiversity found outside of Natura 2000 sites is likely to lead to increased costs in implementing the network itself.[35] This co-dependence makes it clear that it makes strategic sense for LIFE to fund both elements.

By covering nature and biodiversity outside of the Natura 2000 network, there is also more scope for climate change adaptation activities to be funded under the broader "Biodiversity" theme, given that green infrastructure and biodiversity play a significant role in increasing climate change resilience and thus sustaining the key ecosystem services they provide. In the context of this extended focus, LIFE would be able to fund a greater number of projects which support the development of biodiversity climate change adaptation elements in the wider countryside, such as sustainably managed areas, green buffer areas, natural and

[34] Green Paper on Forest Protection and Information in the EU: Preparing forests for climate change (COM(2010)66 final) and accompanying staff working paper (SEC(2010)163 final)

[35] IEEP et al (2010). Costs and socio-economic benefits associated with the Natura 2000 network. Available from: http://ec.europa.eu/environment/nature/natura2000/financing/docs/natura2000_costs_benefits.pdf

artificial connectivity elements (i.e. corridors, stepping stones and green bridges) connecting where appropriate neighbouring and third countries.

Funding under both these 'themes' would support demonstration, best practice and innovative projects. This is a crucial difference to the current LIFE+ programme, where a very narrow definition of innovation was applied to projects under the 'Biodiversity' theme, limiting the number of projects that were eligible for funding. Adopting the more flexible concept of demonstration under both 'themes' is important as those approaches which are most likely to have the most substantial biodiversity impacts are those which are 'tried and tested' methods, as is the case with current LIFE "Nature" projects.[36]

Overall, the approach under this Option is much broader, but also more strategic, and therefore enables the available funds to be stretched to cover a wider array of (more targeted) activities. However, given the significant scope of the activities to be funded, the still limited resources that would be available under LIFE NATURE (given the focus of LIFE on the rest of the acquis as well), the anticipated benefits of this approach are somewhat mitigated. This is reflected in the table of assessment criteria in Section 2.6 above.

3.3.1.2 A programmatic approach to EPG

Addressing the institutional weaknesses, especially those that limit the effective implementation of the existing acquis, requires these weaknesses to be clearly defined and formulated as the basis of calls for projects. This in turn requires a stronger articulation of policy needs by the respective policy units within DG Environment as the basis of the multi-annual programming.

The baseline scenario assumes that a successor statement of priorities to the current 6EAP will be formulated. The weakness of this approach for maximising EU added value is that it provides a limited framework for establishing the areas that would most benefit from funding through the EPG strand. The 6EAP and assumed successor acknowledge the range of environmental problems (or themes) and the need to continue to develop, update and implement environmental policies within these themes. However, three additional requirements are needed for a more effective programme:

- First, a recognition that the institutional problems vary according to different environmental themes, and that therefore in some cases more work is required to address implementation weaknesses and in others more work is required to facilitate sectoral integration or to improve the measurement of environmental problems – best defined by individual policy units;
- Second, a recognition that the programme response needs to be planned over the whole period to take advantage of the certainty of funding provided, recognising that some problems are more urgent and need to be dealt with first, and that there is a lag between the commissioning of projects and the application of their results to problems. This argues for a clear multi-annual plan for the whole period, which is periodically updated and detailed – say on a 2 or 3 year rolling basis; and
- Third, the use of a broader range of projects than just the conventional 'LIFE project', which tends to be driven by local needs. This includes the use of Integrated projects (geographically and financially larger projects making use additional funding instruments) and National level projects to allow more direct response to some of the more substantial challenges associated with implementing the acquis, providing a more formal process of mutual learning and peer review of appropriate approaches to the transposition and operation of EU policies.

In this way LIFE has the potential to deliver more directly policy relevant advice and demonstration of improved approaches to policy development and implementation.

[36] GHK et al. (2010) Mid-Term Evaluation of the Implementation of the LIFE+ Regulation

Priorities and targeting

As previously demonstrated, the scale of environmental problems are such that they can not be directly addressed by the specific instrument given its small size; and the availability of other larger funds to respond to particular problems. As reflected in the general and specific objectives, the purpose of the specific instrument is to address underlying institutional weaknesses and to catalyse effective solutions for policy makers and other stakeholders that can subsequently improve the performance of environmental policy.

In this context the policy and governance strand has to prioritise those weaknesses that most undermine the performance of EU environmental policy, and where it can have an effective impact. Whilst solutions need to be based on the demonstration of possible approaches and techniques, they need to be framed by the assessments of the individual policy units in DG Environment as to the main barriers to improving performance. These may identify the need for better environmental monitoring, new technical responses as well as for institutional solutions related to improved capacities and resources. These needs should be reflected in the multi-annual programme and provide the basis of the subsequent calls for projects.

The identification of policy needs as the basis of calls for projects will itself be framed by the broader policy goals of the next financial programming period. In particular the EU2020 Strategy has identified the critical importance of reducing the use of natural resources and materials, by improving resource efficiency, as the basis of environmentally sustainable growth. As demonstrated in the box below, the specific instrument has already contributed directly to the need for improved resource efficiency and will need to increasingly target the implementation of the Resource Efficiency Flagship identified in Europe 2020.

Resource Efficiency and the previous contributions of LIFE

The EU's Europe 2020 Strategy for growth emphasises the essential move to a more resource efficient, green and competitive economy. The LIFE programme has a long track record of generating effective approaches for building a resource efficient Europe.

Resource efficient industrial growth: The LIFE programme has been helping in implementing resource efficient and innovative production processes at all stages of the lifecycle.

- In Italy, the PROWATER project (LIFE04 ENV/IT/000583) developed prototypes for effluent treatment and reuse in pilot sites at four textiles plants. Wastewater was treated using physical-chemical processes and innovative membrane technologies. These techniques exceeded targets whilst also meeting targets for the removal of other pollutants.

Conserving resources in product design, production, use and disposal: The ceramics sector, where the finishing process is associated with significant environmental damage, has been the focus of several successful LIFE projects.

- An Italian project (LIFE04 ENV/IT/000589) demonstrated a new clean technology for the decoration of ceramics on flat and textured surfaces. Its implementation generated a reduction in energy consumption of up to 76%.

Improving the environmental performance of products and stimulating demand for more sustainable goods and production technologies: LIFE has provided financial support to enterprises across Europe to explore more energy and resource efficient production methods.

Reductions in emissions and waste: A number of LIFE projects have also reported significant economic benefits from the more efficient management of resources previously wasted.

- A LIFE project in Italy (LIFE99 ENV/IT/000034) developed an innovative system to avoid the substantial amounts of waste generated in the packaging of fruit and vegetables. The scheme has continued to grow, using 12 million boxes that are used a total of 110 million times/yr by the 950 members. The scheme has created numerous jobs and annual savings of more than 100,000 tonnes of waste, 100 Mwh of energy and €13 million in waste disposal costs. The project cost only €1.5 million (with €600 000 of EU co-financing).

Transport efficiency: Transport generates over 20% of all CO2 emissions in the EU.

- Thus the overall aim of the 2005-09 LIFE BioTyre project (LIFE06 ENV/L/000118) was to demonstrate the technical and economic viability of an environmentally friendly tyre design that achieves a substantial reduction in rolling resistance of up to 30%. The beneficiary estimates that a 30% decrease in rolling resistance corresponds to a 5%-6% decrease in fuel consumption.

Raising awareness of lifecycle thinking: LIFE can provide practical tools and guidance on how lifecycle analysis (LCA) can be used to make real resource efficiency gains in complex sectors.

- The LIFE EQuation project (LIFE00 ENV/NL/000808) optimised innovative LCA tools for the construction industry in the Netherlands, Belgium and UK. The project optimised an advanced computer model for calculating environmental impact and an environmental assessment method for homes. Environmental performance improvements of 15% were achieved.
- Environmental management systems (EMS) have improved the environmental performance of many companies. The LIFE ACADEMY project involving Airbus has demonstrated how EMS can be successfully applied over the lifecycle of an extremely complex product - aircraft.

Efficient water management: LIFE projects have tackled water loss from the supply infrastructure in different contexts through the introduction of technologies to detect leaks more rapidly and better regulate water flow, increasing the effective supply of clean water to households and businesses. By enabling quicker intervention, water losses were decreased from 37% to 21% of total extraction.

LIFE and implementing EU legislation on sustainable transport. LIFE innovations contribute directly to efforts to promote cleaner and more resource efficient transport systems, and to reduce transport demand.

- LIFE IMMACULATE (LIFE02 ENV/GR/000359) is a project that tested the potential benefits, and barriers to market uptake, of cleaner and more efficient engine technologies.

LIFE also contributes to resource efficiency through helping to: boost the energy efficiency of EU building stock; protect Europe's fisheries and marine resources; preserve resources in the agricultural sector; demonstrate the environmental benefits of green public procurement ; and improve land use planning.

Source: DG Environment (2011) LIFE & Resource Efficiency: Decoupling growth from resource use

3.3.2 The contribution of the option to required outputs

As well as the change in the approach to the instrument, the option also changes the emphasis in the activities to be carried out. This can best be understood by reference to the required outputs of the instrument.

The intervention logic (in Section 1) identified the types of activities and intended outputs in support of the general and specific objectives of the instrument. The following section considers the contribution of this option to generating these outputs, and hence providing the foundation for the achievement of the desired results and impacts – and increased EU added value compared to the baseline scenario.

As previously described, the outputs comprise:

- Challenges to existing approaches to policy development and implementation;
- Improved awareness by policy makers and stakeholders of problems and opportunities
- Expanded institutional capacity of competent authorities to manage EU policy (through increased awareness and knowledge, training, learning networks, improved stakeholder engagement, technical assistance)
- Expanded knowledge base of environmental problems and drivers and the demonstration of updated, improved and good practice approaches to policy, including the testing of new financial instruments and the testing of approaches / techniques to improve environmental performance of industry and households

- Dissemination of lessons and solutions, including by mainstreaming through other EU financial instruments, learning networks, communication events

The range of activities funded under the option all contribute to the range of outputs. The analysis below focuses on each output in turn and those activities that contribute most significantly to the output.

3.3.2.3 Challenges to existing approaches to policy development and implementation

The development and improvement of EU environmental polices requires constant monitoring of the performance of policies; and a breadth of opinion in formulating critiques and advice on remedies. There is a constant need to protect against regulatory capture of policy by vested interests and to reflect the wider interests of the EU and its citizens.

There are a number of activities that contribute to this output:

- funding of environmental research and monitoring;
- funding of awareness raising;
- funding environmental Non-Governmental Organisations (NGOs).

We briefly consider the impact of the option on these activities, but especially the role of NGOs.

Funding of environmental research and monitoring

The Type A projects focused on environmental research and monitoring funded under the EPG strand will continue under this option. Under this option greater effort would be made to target the research and monitoring activity on those problems that are both of major concern and where policy would benefit from improved problem definition and the evidence to identify the weaknesses in the effectiveness of current policy approaches.

Funding of awareness raising

Effective challenge both to the accepted environmental priorities and to the detail of current policy response can be supported by improving the awareness of different actors and citizens of environmental problems and possible solutions and facilitating their engagement in the policy making process. This option continues with information and awareness activities funded under the baseline. These are considered further below in the section on awareness raising.

Funding of environmental NGOs

The important role of NGOs as a means to raise awareness of issues and as a defence against vested interest has long been recognised through the funding of environmental NGO contributions to EU policy using Operating Grants.

In the MTE, NGOs were interviewed on the possible advantages and disadvantages of applying a more selective strategic role in line with policy priorities. The selection of NGOs for grant funding is based on an analysis of the submitted application form. In this analysis the priorities of 6EAP are taken into consideration, with other criteria. The result is a spread of NGOs over different topics, regions, sizes etc. 65% of the NGOs thought that a reasonable spread was achieved and that the list of NGOs selected under the programme is appropriate to ensure the necessary contribution to EU policy. 35% disagreed, mainly because the focus is too much on policy development and too little on policy implementation.

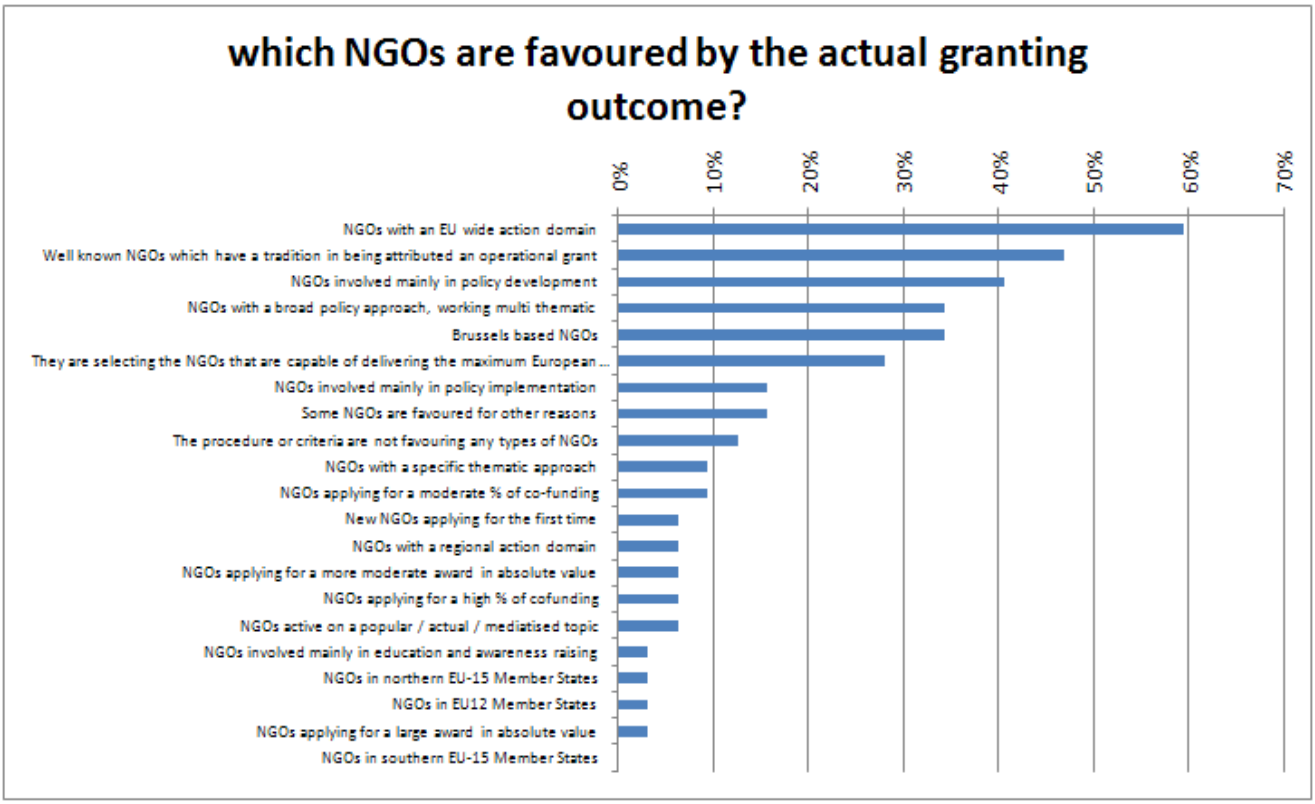
The increased emphasis on policy implementation identified and reflected in the specific objectives of the instrument should make the option more attractive to NGOs. In terms of the thematic coverage, none mentioned an unequal spread over the different topics.

In terms of the implications of the strategic approach to funding, the current main focus is perceived to be placed on well known, EU-wide, Brussels based, policy development NGOs with a broad scope. They usually cover all topics of 6EAP. Specialised NGOs covering a specific thematic approach (within or without the 6EAP priorities) are not favoured (Figure 3.3).

If Option 3 is applied, the same broad scope of NGOs will remain favoured, because it can be assumed that they will continue to cover all topics that are to be defined in new EU policy priorities. The effect of Option 3 would be to shift away from some smaller, specialised NGOs that cover a topic which is not included in the priorities, towards more large general NGOs that can cover all priorities, and towards small specialised NGOs involved in the right priority topic. This suggests:

- an advantage from a stronger more co-ordinated framework for NGO contributions, able to enhance the priorities that are set;
- a possible major drawback could be the lack of continuity for specialised NGOs. Each shift in EU priority definition, could cause these NGOs to fall in or fall out of the scope of the instrument;
- a second drawback could be the incentive for NGOs to become followers of the EU priority setting, and hence will have more difficulties to signal new, emerging environmental or sustainability issues that are not yet included in the set priorities (e.g. nanotechnology, plastic soup).Moreover, it is possible that NGOs could lose some of their independence, becoming agents of the Commission rather than independent entities.

Figure 3.3 On the question of whether specific types of NGOs are favoured by the grant appraisal process, NGOs answered yes for following types:



Source: Mid-term Evaluation of the LIFE+ Regulation

3.3.2.4 *Improved awareness of problems and opportunities*

The approach taken to awareness raising and information sharing is based on a combination of NGO activity, and project level dissemination activity, supported by programme level synthesis of project results and dissemination – the latter through a specific strand of activity.

Under this option the main activities undertaken comprise:

- funding the role of NGOs in awareness raising
- the use of funded 'bottom-up' project communication activity

- the use of 'top-down' projects

We briefly consider these activities under this option.

Funding of the role of NGO activity in awareness raising

As noted above, NGOs bring information and pressure to bear on EU decision-makers. There is also a central role for NGOs in the communication, to their members and EU citizens more widely, of improvements in the understanding of problems and of required behavioural changes consistent with improved environmental performance. This role is well evidenced in the MTE and is an important rationale for funding. Some added value should therefore follow by seeking to encourage NGO activity to better reflect strategic priorities.

'Bottom-up' project communication activity

Adopting a stronger strategic approach including the generation of multiplier effects emphasised by the option will also be translated into greater responsibility on project co-ordinators of 'bottom-up' projects for identifying and communicating findings with target users. At the same time networks of similar projects around priority themes will be promoted through the appraisal and selection process such that there is a greater critical mass of evidence around specified priority themes. This would form the basis for further action using top-down projects in selected areas (see below).

The strategic approach would also enable the existing information and communications strand to be better focused. The strand has been hampered to date by its attempt to cover a broad range of themes and by the fact that only a small number of projects have been successfully funded so far (38 selected for funding from 329 proposals for the first 3 calls). This has affected its strategic impact ('spread too thinly') and its ability to concentrate on the issues of greatest priority. It has also been argued in the MTE that the INF projects only managed to complement and add value to DG ENV's own communication efforts to a limited extent (with potential deadweight effects), reflecting the lack of strategic 'linking' between the communication activities which take place on a European scale, and those which take place at a more local or specific spatial level.

Use of 'top-down' projects

Given the relatively small size of the Information and Communications component (for the 2007-2009 calls the INF component accounted for only 4% of the EC's contribution in LIFE+), more strategic value can be gained from strengthening the mandatory information and communication activity in projects, as argued above. This is particularly the case in this option given the intention is to increase the average size of projects and to introduce integrated projects. Communicating to stakeholders at a local level could still be achieved, but activities could be more strategically focused and targeted on those EU specific policy areas which require a greater level of awareness raising.

In this option this activity would be supported with selective 'top-down' activities defined by the policy units where awareness raising is a key issue for a particular policy (for example the case of Chemicals policy and the low levels of awareness amongst consumers of the health risks associated with particular products and discrepancies fire safety standards associated with upholstered furniture). These top-down projects could also be initiated to take on the synthesis and dissemination activity of results from the 'bottom-up' projects under selected themes.

3.3.2.5 Capacity building

LIFE is already being used extensively as a capacity building tool for nature protection and environmental policy AND governance. However, further support for capacity building is a key requirement for the future, in light of the fact that a lack of capacity is a significant part of the reason for Natura 2000 sites being ineffectively managed and/or protected and for the continuing infringements of EU legislation by Member States. Expanded institutional capacity of competent authorities to manage EU policy (through increased awareness and knowledge, training, learning networks, improved stakeholder engagement, technical assistance) is required to address institutional weaknesses. It must be noted that in many

Member States, administrative capacities are dwindling, because of the need for financial savings.

A recent report[37], for instance, identified the lack of stakeholder capacity as one of the major constraints for a more successful uptake of EU funding for Natura 2000. Improving stakeholders' capacity to access and effectively utilise different EU funding opportunities would also enhance stakeholders' ability to seek new, more innovative sources for funding, thus increasing the overall resources available and securing the financing of Natura 2000 in the long term. Capacity building at the level of relevant government officials in various ministries would also help to improve integration of nature protection and other policy needs into relevant EU funds at the national level, and, potentially, improve coordination and cooperation between relevant administrative bodies.

LIFE could also be very useful for catalysing partnerships that would offer beneficiaries the necessary capacity to engage in projects that would otherwise be out of reach; and for promoting wider mutual learning and peer review of policy. Promoting broader civil involvement is also an important opportunity, for example in the case of Natura 2000 sites, and nature protection more widely.

Expanded capacities are therefore required at national and local levels across the different stands of the instrument. This output, under this option, will be generated by a combination of funding relating to the use of:

- 'top-down' projects with MS
- bottom-up demonstration projects
- integrated projects
- technical assistance

We consider each of these activities in turn.

Funding top-down projects with MS

Top-down projects are aimed at responding to specific policy needs of the Commission. Subject to calls for proposals, the emphasis is on encouraging applications from the national level, with a particular interest in developing peer review and mutual learning activities between MS, especially with respect to the need for expanding the institutional capacities for implementation and enforcement of policy. An example of the type of project that might be envisaged is the IMPEL project, described in Volume 1, comprising MS participation in a wider network of EU competent authorities, examining the scope to improve enforcement systems. Similar projects, either examining cross-cutting issues (eg training and resources) or specific thematic issues, would provide the opportunity to address key bottlenecks in the effective transposition and implementation of EU policy. Initiatives in relation to for example the Water Framework Directive might be promoted.

Analysis of EU Member States' environmental spending shows that the majority of spending is foreseen for inspections, followed by monitoring, whereas strategic policy development, cooperation and training receives relatively little attention, and current austerity measures further aggravate the situation. Given that an increasing amount of environmental legislation foresees stakeholder participation, LIFE funding could help tackle the challenge of limited environmental administrative capacities to sustain engagement and build up trust with stakeholders on the one hand, and to enable authorities to build up the grounds for strategic public-private partnerships on the other. This funding strategy would also directly benefit the implementation record, as stakeholder participation can also fail due to a lack of administrative capacity. Importantly, LIFE under this option could facilitate transboundary administrative policy learning – currently it is difficult for local and regional administrations to disseminate and learn about good policy practice.

[37] Kettunen et al (2011)

In the case of national competent authorities their own resource allocations will reflect the respective interests of MS rather than the strategic priorities as laid down by the Commission. The top-down projects allow some flexibility, through transnational co-operation to respond to EU priorities. Under the baseline scenario it would be a matter of some chance if bids aligned with the views of policy units as to which national authorities would best contribute and benefit from such activity, and reflect the specific policy issues. The proposed strategic and targeted approach would improve the alignment of MS activity to policy needs and increase added value.

The capacity building potential of LIFE: Exemplar top-down projects

One of the unique aspects of the current LIFE Programme is the role it plays in developing capacity. This role is particularly crucial given both the frequent lack of capacity at the level of the competent authority to deliver environmental objectives, and the fact that no other financing instrument appears to give capacity building activities the same level of focus as LIFE. The following projects provides examples of successful capacity building undertaken under LIFE and provide lessons for how LIFE can continue to develop the capacity building element in the future.

NATSLOMPIS - NATURA 2000 in Slovenia - management models and information system (LIFE04 NAT/SI/000240)

- This project aimed to provide local administrations with a model on which to base the actions aimed at the conservation of habitats and species of EU interest. The project developed guidelines for Natura 2000 management plans and therefore had a considerable impact in the establishment of effective management of Natura 2000 in Member States.
- Furthermore, the project was carried out in collaboration with the Italian Environment Ministry and could therefore make the best use of previous experience of developing similar guidelines for the Italian Natura 2000 sites thereby sharing knowledge through mutual learning activities. The project brought together all concerned parties in a series of workshops to review the existing national nature conservation legislation and incorporate the Natura 2000 requirements.

EX-TRA - Improving the conditions for large carnivore conservation - a transfer of best practices (LIFE07 NAT/IT/000502)

- This project brought representatives from Italy, Romania, Bulgaria and Greece together and aimed to transfer the best practice and lessons learned from previous related projects. It planned to put in place the infrastructure, knowledge and awareness necessary in these areas to prevent conflicts and achieve the ultimate objective of improving the conservation status of the targeted large carnivore and scavenger raptor species. It specifically looked to strengthen cooperation between stakeholders, develop the necessary capacity for the management of conflicts, provide know-how and ensure capacity for the management of more wild prey for maintaining the present wolf populations.

Hydro4LIFE - Hydropower Sustainability Assessment Protocol: EU Assessments, Monitoring, Capacity Development and Outreach (LIFE09 ENV/UK/000026)

- The main aim of this current LIFE project is to demonstrate the effectiveness of the Hydropower Sustainability Assessment Protocol (HSAP) in the EU and consolidate knowledge on hydropower sustainability performance in the EU. The project aims to raise awareness and build capacity (primarily via an electronic outreach campaign) about the HSAP and hydropower sustainability performance in the EU by sharing knowledge among all relevant stakeholders, including Member State/EU regulators and policy-makers.

Funding bottom-up demonstration projects

The benefits of a more strategic approach with a stronger statement of priorities, applied to bottom-up demonstration projects is that it allows funding to be targeted where it is most needed. This can be seen in the case of building and improving the capacity of regional and municipal competent authorities. This option continues this activity. The scope for improved EU added value in this context is described in the box below.

The role of LIFE in building capacity at the local and regional level

One of the unique aspects of the LIFE Programme is the role it plays in developing capacity – both administrative and strategic planning – amongst local and regional competent authorities. This role is crucial given both the frequent lack of capacity of the competent authority to deliver environmental objectives, and the absence of any other financing instrument to improve capacity and delivery.

LIFE projects lead to improvements in the development and implementation of EU environmental policy in a number of ways although, at the level of competent authorities and in the context of capacity building, these are characterised mainly by the development of action plans, management plans, and policy recommendations which directly feed into a local, regional or national strategy and policy measures. They also frame the structure and content of the training of competent authority officials. Projects also involve the sharing and exchanging of information and knowledge between competent authorities within and between different Member States, and aids capacity building in those MS which lack know-how and resources.

Support for capacity building is only likely to increase in importance, particularly as other EU financial instruments focus their resources directly on environmental infrastructure and on more technological solutions (e.g. FP8). As a vehicle for funding capacity building measures, LIFE would be the prime instrument for demonstrating and disseminating good practices, improving knowledge sharing between local and regional authorities and developing plans for strengthening the management of environmental policy measures.

LIFE could intensify efforts to improve institutional capacity for policy development and implementation:

- Fund pilot actions at the municipality level (e.g. green public procurement in the city administration; public private partnerships for environmental investment; environmental accounting for public interventions; testing local market based instruments and new voluntary or regulatory measures). These pilot actions often act as models for demonstration and replication and provide important inputs that are consequently adopted in strategic plans at a higher spatial level, e.g. regionally and nationally.
- Facilitate the linking up of stakeholders from different backgrounds to work together to achieve common environmental goals – avoiding the risk of stakeholders operating in 'policy or agency silos' and being disconnected from one another - LIFE has played a crucial role in promoting dialogue and cooperation between parties that are often perceived to be conflicting
- Assist local and regional authorities to develop their understanding of environmental policy, knowledge of environmental issues and potential responses, by developing centralised support frameworks (e.g. integrated management systems) and related tools. This helps to develop competence amongst competent authorities and enables them to contribute more effectively to environmental commitments.
- Create training capacity to help conduct baseline reviews, establish action plans and build organisational structures. Training hubs should be established across the EU-27, linking up to exchange knowledge and good practice and to improve transboundary cooperation where looking 'beyond their own frontiers' to find high-quality expertise is required - LIFE has already funded projects that have incorporated this type of activity, and such projects have helped to improve implementation of current EU environment regulations at the local and sub-regional level, as well as attracting and leveraging support from the national level.
- Promote the creation of networking and partnership opportunities, which enable stakeholders to develop follow-up projects that build on results of LIFE projects and enable access to the major funding instruments, thereby mainstreaming the results.
- Promote the creation of capacities to support public-private partnerships to foster local and regional projects and innovation processes. Often, administrations do not have the capacity or expertise to meaningfully sort out potentials for public-private partnerships with companies. Capacities are needed to enable the development and maintenance of contacts, build up confidence and trust and share information.

Funding Integrated Projects

The post-2013 multiannual financial framework (MFF) suggests that integrated instruments could be used to maximise their leverage role by combining different funding sources. A specific instrument for the environment (as a contributor funder) would guide the implementation process in an Integrated Project by providing a specific environmental focus and expertise and by ensuring that the totality of funds mobilised have the most positive environmental impact. The main benefits of Integrated Projects would therefore be as follows:

- Environmental priorities become embedded into all the project activities as a requirement;
- Cost savings to the specific instrument because of the larger size and effectiveness of the projects[38], replacing some smaller projects with associated reductions in the costs of applications, and monitoring and evaluation;
- As a result of their scale, integrated projects provide a greater ability to create employment opportunities linked to continuing environmental management both during the project lifetime and afterward in the post-funding period work ensuring sustained results;
- Because of their scale Integrated Projects can establish a structured relationship with and develop project pipelines for the main EU funds, thereby promoting the mobilisation of their much larger resources to support environmental objectives. This should help to tackle the current under spending by the Structural Funds in the fields of biodiversity and environment,
- Opportunity is provided through Integrated Projects to build capacity on a wider scale with a wider spectrum of stakeholders.
- Integrated Projects provide a major role for regional and local authorities as potential lead beneficiaries, which are also often the environmental competent authorities as well as being responsible for leading projects funded by Rural Development, the Operational Programmes for Structural Funds, and the future Natura 2000 Prioritised Action Frameworks.[39]

The box below provides an early illustration of how an integrated project might be used to support capacity building.

LIFE Integrated Project: Example of use for capacity building

NATURA 2000 in Slovenia - management models and information system

The Slovenian delegate to the Habitats Committee recently presented their national Management Plan for Natura 2000. They are now considering the idea of an integrated project, building on a previous LIFE project to exemplify the catalytic power of LIFE.

The previous LIFE project led to transnational co-operation between different actors and different sectors (forestry, fisheries and water management). This capacity could now be used in an integrated project to build on previous work undertaken. Slovenia is currently in the process of implementing legislation to ensure that integrated projects are feasible.

Potential benefits:

- Rural development funds could help in aspects of forestry and agricultural, cohesion funds could be used to undertake sustainable tourism, environmental protection and

[38] The larger size of Integrated Projects responds to the call for larger projects made in the ex-post assessment of the LIFE III programme

[39] Noted as a benefit of integrated projects by the Committee of the Regions (2011) DRAFT OPINION of the Commission for the Environment, Climate Change and Energy on THE EU LIFE PROGRAMME. THE WAY FORWARD.

nature conservation activities, whilst LIFE funding would help with capacity building, awareness raising and training.

- Combining these activities and funding is considered to provide a real opportunity to bring together economic, social and environmental objectives leading to enhanced results

Practicalities:

One single regulation and one set of guidelines would be required to cover administrative and reporting aspects across all funding instruments.

To ensure integrated projects are feasible it is essential that there is a strong project design phase with rigorous and detailed preparation which agree priorities across funding instruments. Technical assistance will be necessary in ensuring all Member States have the capacity to apply for such projects and that it does not become an overly expensive process. The timing of all funding programmes will need to be designed to ensure that projects can co-exist.

It will be important for the Commission to establish who might lead an integrated project and what this management would constitute. Partners can come together in advisory groups/steering committees but it would most likely be necessary to have one party with an overall decisive role.

Integrated projects are meant to mobilise both national and EU funds to implement environmental action plans as part of wider development programmes. They also have the potential to mobilise funds from financial institutions and the private sector. Similarly, part of the budget could be received through relevant climate windows within the new debt or equity instruments that may be set up as part of the MFF.[40]

Moving to this more ambitious type of financing may require simplification of the delivery mechanism. Suggestions from the MFF include project planning based on periodic reviews, a higher co-financing rate balanced by a reduced scope for eligible costs, e.g. staff costs only. Since the administrative capacity varies between MS and the concept has not been tested, it will be important to encourage MS and regions to learn from each other and to develop mutual learning networks.

This lack of formal testing[41] means there is lack of information on how to overcome particular challenges and address the risks that currently deter beneficiaries from developing an Integrated Project. Based on the reflections of public authorities that have considered the use of Integrated Projects, collected as part of the Impact Assessment, the table below highlights potential risks and provide possible solutions that could be further developed by the LFE Unit in conjunction with other relevant DGs.

Table 3.17 Summary of Reflections on Integrated Projects from LIFE Beneficiaries

Potential Challenge	Possible Solution
Structural funds have a decentralised management opposed to LIFE's centralised management which could limit the ability to effectively manage integrated projects and transfer lessons.	LIFE as a centrally managed programme based on annual calls, could approve 'potential' Integrated Projects, or 'Hub Projects' allowing the project to subsequently link with other partners and funds in the decentralised programmes. The hub project would negotiate with the other programmes before application, and contract following approval from LIFE. The monitoring and evaluation requirements would be established and managed by LIFE. If the links fail to be made, the project continues as standalone LIFE project (albeit potentially larger than the average).

[40] DG Environment, Post-2013 Multiannual Financial Framework, Input for a composite Impact Assessment, A financial instrument for the environment and climate action (LIFE)

[41] As will shown later on some LIFE projects could be considered as precursors of integrated projects

Other instruments will need to revise their legal basis to recognise the use of integrated projects and to include it as an eligible activity under the main funding instruments	Discussions between DGs have taken place to discuss and develop the idea. It will be important to test the feasibility of any proposed model with beneficiaries and NCPs, perhaps through a workshop or seminar.
There is a lack of capacity on the ground to put together proposals for integrated projects.	Technical assistance funding could be made available (although this would require an additional application and approval process). Best practice examples will need to be developed and provided to prospective applicants.
Different eligibility criteria of the different funding instrument may pose problems for potential beneficiaries	Although the current LIFE programme is addressing some of the gaps in the eligibility criteria, the Commission could streamline eligibility criteria further and make it explicit what activities and which type of beneficiaries and activities can be funded through integrated projects. Alternatively it could, through adequate cross-reference in the statutory basis of the different instruments, allow the requirements of the Integrated Project to take precedence, allowing other eligibility criteria to be excluded.
Different funding instruments may be working to different timetables in achieving objectives and also different timing cycles (e.g. structural funds operate an n+2 cycle)	A robust planning stage with defined roles and responsibilities and detailed delivery plans will be required. The LIFE Unit could contribute to the planning of, for example, Operational Programmes for Structural Funds, commenting on draft Proposals Since projects will be larger and longer running, there is greater scope for some flexibility. An n+2 type rule would potentially prevent projects requiring structural funds being approved in the last three years of the MFF given an average life of say 5 years. Again direct involvement may be required by the LIFE Unit, or may require the suspension of such rules under the precedence granted to Integrated Projects
Multiple monitoring and evaluation requirements associated with the different funds could make the administration too complex and too costly	The LIFE monitoring, evaluation and reporting system could be extended in agreement with other instruments to include the completion and distribution of relevant monitoring and evaluation reports to national/local programme committees

Source: Interviews with beneficiaries from five LIFE projects and discussions with DG Environment officials

The example below describes a LIFE project that has successfully combined different funding sources.

LIFE Integrated Project: An example of multiple funding

Protection and usage of aapa mires with a rich avifauna

LIFE project actual costs: €2.6m; ERDF project cost: €0.6m

The aim of this project was to prepare conservation and management plans for five areas within the central Lapland aapa mire zone, so that ecotourism and recreational use can be organised on a sustainable basis.

The project was considered successful in combining the resources gained from different EU sources (LIFE for planning and ERDF for construction of the tourism infrastructure) and national funds (for construction of barns on the hay meadows). The funds were managed efficiently. The EC payments were made in time and did not cause any problems or delays in the implementation process.

The project manager of this LIFE project noted the following (*pers comm*):

- Administratively the project was well set-up with clear roles and responsibilities for all parties. Objectives and results were separated for purposes of effective monitoring and evaluation.
- It was not difficult to align the project to the different objectives of different funding sources as the various project objectives were clear. In addition different project managers were required to clearly state their expectations in the preparation phase.
- The use of various funding sources provided the opportunity to make environmental objectives more ambitious. The beneficiary also stated that integrated projects can create positive publicity and enhance the status of Natura 2000.
- The combination of funds has not resulted in significant additional administrative costs. If the project objectives are mutually supportive, the overall benefit is greater than any additional costs.

By combining funds the projects can implement measures that the LIFE fund would have been unable to support such as service structures. Implementation of the service structure, in Lapland has increased interest in Natura 2000 areas and brought positive publicity to the project and to the LIFE programme more generally.

The success in combining funds has provided confidence in the approach; and it will be used in the future, with the expectation that this will allow greater integration of environmental project activity in wider development activity, engaging more stakeholders and building capacity, improve the end results and contribute to sustainability.

A further example describes a current LIFE projects which is ready to consider the idea and feasibility of an Integrated Project. The case study highlights potential benefits of integrated projects, as outlined by the beneficiary and also the challenges in developing and managing such projects.

Potential LIFE Integrated Project

LIFE Integrated Projects: PM10 control in urban areas

Four Austrian LIFE projects are interconnected and all have PM10 control in urban areas as a main objective. Each project has been used as a further step in developing a more holistic approach and contributing to a long term plan. The four projects could theoretically have been combined into a single integrated project, which drew on several funding sources.

Potential benefits

- The larger project would have greater impacts.
- The project would enable partners from different sectors to work together and allow a more effective combination of different priorities such as climate change, health and air pollution.
- Integrated projects would help to achieve economic development alongside environmental protection
- Greater scope for innovation through the co-ordination and synergy between environmental and economic objectives and activities

Practicalities

An integrated project could follow-on from current LIFE projects, building on achievements to date. In the case of PM10 projects, they have created new knowledge and techniques which an integrated project could develop over a larger geographical scale, combining LIFE funds which would focus on practical solutions with DG RTD funds to further scientific knowledge and structural funds to invest in necessary infrastructure.

In addition, to ensure the up-take of integrated projects, it will be necessary to have just one application process in which you can apply for different combination of relevant funds and one

monitoring and evaluation process rather than separate processes for each fund.

Furthermore clear clarification, guidance, provision of relevant definitions and frequently asked questions would help in the application process. The project suggested a two-step application approach, the first step establishing feasibility and eligibility, would be useful as applications for integrated projects are likely to require significant resources. The two step approach ensures that the applicant is developing a suitable project before submitting a completed application.

Consultation responses from a survey carried out by the Committee of the Regions (CoR) [42] with local and regional authorities found that the majority considered that Integrated Projects were both highly desirable and feasible. 85% of the respondents like the idea of 'integrated projects' (IPs), contrary to only 10% who disagree with the concept; 5% of respondents did not express an opinion. About three quarters of the respondents consider IPs quite feasible, while 21% finds those projects very feasible; only 5% believe that such projects are not feasible.

The evidence box below summarises the main findings of the consultation with respect to Integrated Projects

Consultation views from local and regional authorities on Integrated Projects (IPs)

The main finding of the consultation, with local and regional authorities, in relation to Integrated Projects, is that they are both desirable and feasible. The main benefits and problems are summarised below.

The benefits foreseen from the use of Integrated Projects include:

- addressing a wide variety of problems, notably in the fields of 'freshwater management', 'nature and biodiversity' and 'resource use and waste' (except where a sole and specific focus on the environment is required);
- enhancing coordination in environmental issues especially when involving international cooperation;
- promoting coordination between sectoral policies and between different territorial areas;
- enabling the optimisation of resources and increased value for money; and
- creating opportunities for the implementation of large-scale actions, bringing together both a large number of experts/technicians and adequate funds.
- Problems foreseen for the use of Integrated Projects include:
- the lack of necessary staff capacity to support integrated projects at the local level;
- concerns that such projects are too complex and would fail to achieve high quality standards;
- concerns over the increased coordination requirements between the different agencies governing IPs, calling for consensus at a high governance level;
- the need to simplify financial reporting procedures; and
- the difficulties faced by public bodies lacking resources to co-finance IPs.

Source: Committee of the Regions Consultation: LIFE Impact Assessment: Assessment of Territorial Impacts of the EU Life+ instrument (Table 1) and text

Survey replies received from 40 respondents from 12 MS

The idea of Integrated Projects has still to be fully tested – there is only very limited evidence to date of their feasibility and results.

[42] Assessment of Territorial Impacts of the EU Life+ instrument, Committee of the Regions, 2011.

Funding for Technical Assistance

This option also includes provision for the use of more targeted technical assistance in support of integrated projects, but also perhaps in support of specific capacity building through the funding of networks of projects. Such examples include ELENA – European Local Energy Assistance scheme and JASPERS – Joint Assistance to Support projects in European Regions (see Box below).

Possible Examples of Support for Technical Assistance

ELENA - European Local Energy Assistance Scheme

ELENA was set up by the European Commission and European Investment Bank (EIB) and managed by the EIB via the Intelligent Energy Europe programme. ELENA helps to prepare cities and regions' sustainable energy projects to be 'ready for EIB funding' by covering a share of the cost of technical support needed to prepare, implement, finance investment programmes e.g. feasibility, market studies; business plans; energy audits; preparing tender documents. This enhances the capacity of cities and regions in EU to implement projects and investment programmes e.g. retrofitting of public/private buildings, sustainable building, energy-efficient district heating and cooling networks, environmentally-friendly transport, and LIFE could consider a similar type of assistance to local and regional authorities.

Source: http://www.eib.org/products/technical_assistance/elena/index.htm

JASPERS - Joint Assistance to Support projects in European Regions

JASPERS is a technical support facility for the twelve EU Member States which joined the EU in 2004 and 2007. It is designed to help them to better prepare projects which will be supported by EU funds. Through this joint initiative, the European Commission (DG Regional Policy), the European Investment Bank, in cooperation with the European Bank for Reconstruction and Development (EBRD) and Kreditanstalt für Wiederaufbau (KfW), share their professional experience with the beneficiary Member States in order to help them to use EU Structural Funds more effectively.

Source: http://www.eib.org/attachments/thematic/jaspers_brochure_2006_en.pdf

3.3.2.6 *Expanded knowledge base and the demonstration of good practice policy approaches and testing of new instruments and techniques*

Expanding the knowledge base and the demonstration of updated, improved and good practice approaches to policy, including the testing of new financial instruments and the testing of approaches / techniques to improve environmental performance of industry and households is a critical element of the current instrument and remains the cornerstone of the instrument.

The strategic value of LIFE would also be increased by strategically drawing more on NGOs, making more use of their existing knowledge base, skills and their networks. Making greater use of such existing resources enables resources to be freed for use elsewhere.

The traditional 'bottom-up' projects providing mainly local and regional examples, demonstrating improved and good practice policy approaches and demonstrating innovative technical solutions to environmental problems remain central to the instrument. As discussed in Option 2, the critique is that the projects are insufficiently linked to the policy needs of DG Environment, and lack, collectively, the critical mass needed to secure major changes in policy and environmental performance.

The next sub-section considers the scope to increase the multiplier value of the instrument; below, the analysis considers the value of expanding the knowledge base and the use of demonstration activity with particular reference to:

- The further expansion of the knowledge base in relation to the use of green infrastructure;
- The further demonstration of the benefits of the practical integration of environmental objectives into economic and sectoral activities; and
- The benefits of targeting the development and testing of new financial instruments; and
- The catalytic role of NGOs.

The further expansion of the knowledge base in relation to the use of green infrastructure

Measures to increase network coherence could provide significant benefits in terms of maintaining ecological coherence and ecosystem resilience. However, the implementation of these measures across the EU has been mixed. Of 27 Member States, only 16 indicated in a recent review that they have tools in place to support ecological connectivity.[43] Where connectivity measures have been implemented, there is limited evidence on whether the measures have been successful.

LIFE could, and should, continue to play a crucial role in addressing this lack of evidence, by funding projects which generate examples of best practice and innovation, in order to promote success stories and provide examples of how best to construct and support green infrastructure in the EU. Moreover, by funding projects which focus on green infrastructure in the context of spatial planning, LIFE could also further support efforts to improve integration, for instance by bringing together sectors to decide on land-use priorities in an integrated and co-operative way. A future instrument for the environment should build on existing efforts being made to do so under the current LIFE+.[44]

Efforts to support green infrastructure would be funded under both 'themes', in that the basis for doing so in relation to the Natura 2000 network is established in Article 10 of the Habitats Directive, which highlights the need for measures to maintain or restore the coherence of the Natura 2000 network. However, support for Green Infrastructure is also important in sites which are not directly related to the network, and counter-acting the heating effect in cities resulting from climate change.

Addressing fragmentation and improving coherence – investing in Green Infrastructure

Nearly 30% of the EU-27 territory is now highly to moderately fragmented, with evidence suggested that further habitat fragmentation will occur over the next 20-30 years.[45] Furthermore, a recent study strongly suggests that further habitat fragmentation will occur over the next 20-30 years along with declines in semi-natural biodiversity rich habitats, principally due to urban expansion, transport and other infrastructure developments and changes in agriculture.[46] Climate change adds further urgency as the impacts are exacerbated, as fragmentation reduces the resilience of species populations, habitats and ecosystems to the effects of climate change.

The importance of coherence is already recognised within the Habitats Directive, with Article 3 highlighting the need for 'a coherent ecological network', which recognises Natura 2000 as an important element of a broader ecological network (or 'Green Infrastructure' system), with numerous functional links amongst sites. The Natura 2000 network for instance, only covers 17% of the EU

[43] Commission Staff Working Document. Accompanying document to the report from the Commission to the Council and the European Parliament: The 2010 assessment of implementing the EU Biodiversity Action Plan. COM(2010) 548. Available from: http://ec.europa.eu/environment/nature/biodiversity/comm2006/pdf/bap_2010/CONSOLIDATED%20PROFILE.pdf

[44] European Commission (2010). LIFE building up Europe's Green Infrastructure: Addressing connectivity and enhancing ecosystem

[45] EEA (2010) EU 2010 Biodiversity Baseline. EEA Technical Report. No 12/2010

[46] Alterra et al. (2010). Land use modelling – Implementation. Available from: http://ec.europa.eu/environment/enveco/studies_modelling/pdf/report_land_use.pdf

territory. This importance is further recognised in the inclusion in the 2020 biodiversity target of ecosystem restoration, in light of which the Commission is developing an EU strategy on the implementation of Green Infrastructure.

Demonstration activities illustrating the benefits of integration of environmental objectives in economic activity

It is clear that sectoral economic policies have a major influence not only on economic performance but, as a consequence, on their environmental impacts and hence the condition of Europe's biodiversity, air and water quality, as well as climate change. It is therefore unlikely that the EU 2020 targets (eg for biodiversity or for climate change) will be met unless sectoral policies take the needs and benefits of environmental protection into account. In the main EU policies acknowledge the need for economic performance to be sustainable and consistent with meeting environmental objectives. However, the scope for consumers and producers to achieve both economic and environmental objectives is often limited; and results in environmental objectives being sacrificed in favour of economic growth.

This is evident, for instance, in the low priority that Member States give to environmental protection compared to other priorities when drawing down EU funds. Analysis for this Impact Assessment also makes it clear that stakeholders believe that there is much that still needs to be done in terms of translating the integration achieved in policy into the integration of environmental objectives in practice.

The specific instrument funds projects that seek to develop and demonstrate techniques and solutions that increase the scope of meeting economic and environmental objectives. Given the objectives of Europe 2020, and especially the investment in the Resource Efficiency Flagship, the need for these projects is arguably even greater than previously recognised.

The specific instrument would also support integration by developing the evidence base to enable the EU to better achieve its international commitments (for example in relation to halting biodiversity loss). This could be done, for instance, by exploring the links between EU consumption patterns and global conservation efforts, and through supporting the development of global product certification and/or biodiversity labelling of products in the single market. Given the transboundary nature of environmental problems and the dependence of the EU on the global biodiversity and the ecosystem services provided by that biodiversity, there is a strong case for the EU to address the international rates of biodiversity loss, climate change and other growing problems in this option.

Integrated projects in support of integration

The potential contribution of integrated projects to the practical integration of environmental objectives can perhaps be exemplified by the experience of Interreg projects, since IPs share the same purpose as Interreg projects of seeking to better integrate economic, social and environmental objectives. Interreg projects therefore provide possible illustrations of the integration benefits that might follow from Integrated Projects. It should of course be noted that Interreg projects do not seek to combine different funding sources and therefore do not have the requirement that Integrated Projects do, to reconcile and manage the strategic objectives of different funds. Interreg projects are also likely to be smaller than an IP.

We summarise below a number of examples of Interreg projects which have had a particular focus on integrating environmental objectives with wider economic development objectives. These projects illustrate the potential benefits from integrating economic, social and environmental objectives as the basis of co-ordinated action and learning

Successful examples of Integrated Management from INTERREG

TIDE (Tidal River Development)

The TIDE project covers the estuaries of the Rivers Elbe (DE), Humber (UK), Scheldt (BE/NL) and Weser (DE) and brings together experts, scientists, policy-makers and managers representing

economic, social and environmental interests in the four estuaries.

TIDE aims to promote the economic objectives of port development, alongside environmental protection and social benefits to the wider population through the development and use of ecosystem services.

TIDE seeks to integrate the physical needs for economic development with ecological and environmental needs based on the definition of ecosystem services. In this case study the ecosystem service approach is used and thought of as: defining benefits that estuary ecosystems can provide, defining services required to realise these benefits and assessing what management techniques are needed to provide for these services.

The project aims to realise its objectives through principles of shared management and four work packages have been designed, one assigned to each partner. Work package integration is leading to shared experiences and promotion of knowledge transfer between sites and partners. All partners contribute to the different work packages although one partner initiates each package by producing a guidance document and a central team co-ordinates the different partners. The 4 work packages are designed to cover different themes and in this case consists of the following:

- Improve Knowledge on Estuary Functioning
- Realise Integrated Management Planning / Governance
- Mitigation and Compensation Measures
- Transnational Exchange & Capacity Building

The integrated partnership model is achieved primarily through the work package integration and also through general cooperation and sharing of knowledge and solutions by partners. The benefits of this method include:

- Provision of a forum for issues to be discussed between port authorities and conservation bodies.
- Scope to learn lessons drawn from previous projects
- Knowledge sharing between partners, breaking down previously polarised views
- Identifying and establishing the strategic management themes for estuaries to be assessed alongside estuary specific themes.

Sources:
TIDE, Tidal River development - http://www.northsearegion.eu/files/repository/20091028105326_TIDE_Flyer_8s_K07_Druck.pdf; TIDE Times, Issue 01 2010, Hamburg Port Authority & s.Pro sustainable projects GmbH - http://tide-project.eu/downloads/TIDE_Times_Issue_01.pdf; Stakeholder interviews

SURF

The SURF project, which is part of the North Sea Regional Interreg Programme, is led by the city of Aberdeen (UK) and involves city or regional authorities in all of the Member States surrounding the North Sea, as well as two academic partners.

SURF focuses on the urban fringes – land at the interface between urban and rural areas where a broad variety of land use and activities occur. The aim of SURF is to “unlock the potential” of the urban fringe. The environmental issues of concern are the risk to economic activity posed by climate change and the role and value of green space in the urban fringe. SURF therefore simultaneously looks to aid economic development through identifying opportunities to increase the competitiveness of urban fringe areas whilst helping to protect environmental quality through improved management. Social objectives are also promoted through recognising the value of urban fringe areas to local communities. In this context, SURF aims to deliver:

- A governance model for urban fringes
- Recommendations to support and strengthen enterprise and make more competitive places
- Comparison of urban fringe policies, recommendations for future policy and development of a set of policy guidelines for urban fringes
- A toolkit for green space management

- A SURF accessible learning legacy
- A knowledge network on urban fringes

A Conceptual and Analytical Framework was developed, which led to the identification of five themes for SURF, which act as the focus for the work and a framework for the analysis. Each of the themes is led by one of the two academic partners and also involves at least three of the other partners. Each of the partner projects has a primary and a secondary theme on which they are focused.

SURF has a rolling SWOT, which is being used to promote mutual understanding between the project partners, to engage with stakeholders and to check progress towards meeting the project's objectives.

The transnational element is important and enables partners to share knowledge and learn from each other's experiences. Partners act as advisors and peer reviewers on their mutual projects to enable learning, and help partners to overcome barriers and identify solutions more quickly; and which can deliver cost savings, particularly over the long term. The project enables academic institutions to engage with local and regional authorities and thus to share knowledge and experience, and also provides the academic institutions space to assist the authorities in solving their environmental problems.

Source: SURF leaflet and information sheets; Stakeholder interviews;

http://www.sustainablefringes.eu/home/home.asp;

NATURESHIP

The Natureship project is part of the Central Baltic Interreg IVA Programme. The participating regions of the Programme are situated in Estonia, Finland (including Åland), Latvia and Sweden. The emphasis of the Natureship project is for a novel approach on planning and management of traditional rural landscapes and selected coastlines. The aim of the project is to create and restore an optimal ecosystem service network based on integrated sustainable coastal planning.

The project builds on the earlier co-operation between partners on the Interreg IIIA project RUOKO (reed strategy in Finland and Estonia), in which an attempt was made to optimise ecosystem services. This team was then expanded to draw on other relevant knowledge such as the County Administrative Council of Gotland who had mapped the Gotland coastal area, covering data relevant for ecosystem services. The different partners each took responsibility for different theme areas of the project including:

- Integrated coastal planning
- Landscape and habitat monitoring and evaluation with retrospective land cover and land use change detection using remote sensing and GIS
- Management and species of traditional rural biotopes
- City meadows
- Conservation and management of calcareous habitats in the coastal cultural Landscape
- Evaluation of ecosystem services as a tool for coastal zone
- Management
- Ecosystem services and management of coastal lagoons
- NATURSHIP highlighted a number of win-wins, reflecting the holistic and proactive objectives that can be funded under Interreg. The project has a strong focus on ecosystem services, protecting natural resources through planning and management whilst providing a safe and healthy environment. In addition the project will also assess how to achieve cost-effective planning and management of traditional rural biotopes in order to enhance public and biodiversity values.

A common recommendation for improved future territorial co-operation was better knowledge brokerage between currently funded Interreg projects. It was also suggested that this would be especially relevant for projects that deal with Natura 2000 areas and that there is a need for a more

international funding instrument, similar to LIFE.

Sources: http://www.centralbaltic.eu/documents/doc_view/4-programme-document-?tmpl=component&format=raw; Evaluation of the Central Baltic Interreg IVA Programme 2007-2013, Final mid[term evaluation report, Deabaltika, 24 November 2010; Stakeholder interviews.

Testing financial instruments

The option would continue with activities under the baseline scenario to assist competent authorities to develop, test and demonstrate new policy proposals for new financial instruments that can deliver environmental solutions. This might include new market based instruments or the adoption of new voluntary systems of management, that provide incentives for improved environmental performance. In either case, given the possible limitations in new legislation and the economic efficiency benefits of financial instruments, such testing is now arguably more important.

At the same time such instruments are capable of generating revenues that can contribute to the costs of environmental policy, especially administrative costs; and assisting with capacity building.

Public-private partnerships are possible responses to some environmental management issues, but these can only operate where the private partner is able to leverage a revenue stream (for example in the provision of some municipal services, or from some improved eco-system service).

Where there are private benefits from environmental investment, these have the potential to be captured by market based transactions, providing opportunities for new, innovative, market-based financial instruments such as targeted payments for ecosystem services (PES) schemes, biodiversity credits, product labelling and marketing initiatives, and the sale of licences for rights to natural resources.

The application of these instruments, although recognised, are still poorly understood, presenting LIFE with an important opportunity to act as a test bed and catalyst for establishing and 'selling' innovative financial instruments. LIFE has an important potential role to play in co-funding pilot schemes to develop and trial new methods of financing Natura 2000 activities. For instance, LIFE could add value in supporting pilot projects which develop the marketing and sales of products produced from Natura 2000 sites as a potential way of catalysing new financing initiatives.

Many of these innovative financial instruments have more applicability to the wider biodiversity context. As LIFE's support for biodiversity outside of Natura 2000 grows, so will the opportunities for developing guidance and test cases to show how these types of schemes could work. For instance, projects to test biodiversity offsetting would be most useful for sites outside of the network, given that the network already has an established system for offsetting under the Habitats Directive (see the box below). Equally, schemes for developing PES are best suited to non-Natura 2000 sites as Natura 2000 sites profit from a certain level of protection and there is less risk of these sites being subject to land use change or inappropriate management. Hence the perceived risk of loss of ecosystem services is relatively small.[47]

Innovative financial instruments: the case of habitat banking

Given the context above, there is a definite need to review and strengthen biodiversity policy and look at new approaches. Habitat banking and biodiversity offsetting is one of the new approaches being considered under a number of current initiatives (e.g. the global Business and Biodiversity Offsets Programme (BBOP), the EC Habitat Banking study and ongoing efforts to develop guidance for mitigation and compensation for wetland loss under the Ramsar Convention). Habitat banking is

also being developed in Member States, for instance, a pilot biodiversity 'credit' project is underway in France.[48] In Germany, there is already well-developed formal system for compensating for biodiversity damage through the Impact Mitigation Regulations.[49]

Biodiversity offsetting can address the significant residual impact on biodiversity caused by development and other land use change activities. Most damage to biodiversity in the wider environment, for instance from small developments or low impacts, are not currently compensated individually, but cumulatively can have significant impacts.[50] This damage could be compensated for by habitat banking instruments, such as biodiversity offsetting, to ensure no net loss and, preferably, a net gain of biodiversity after appropriate steps have been taken to avoid and minimise impacts. On this basis, the EU Habitats and Birds Directive Task Force has given its cautious approval for biodiversity offsetting for habitats and species of European Importance outside Natura 2000 sites in a recent position paper on biodiversity offsetting.[51]

The Commission has already introduced stronger compensation for biodiversity damage through the Environmental Liability Directive and extended the compensation requirements under the Birds and Habitats Directives (which apply, however, only in very specific circumstances). Within the current Habitats Directive, Article 6 establishes a strict offset system for potential damage to Natura 2000 sites, which effectively requires a bespoke like-for-like offsets for individual plans and projects.[52]

Given this mechanism is already established for Natura 2000 sites, it is likely that any new and wider biodiversity offset systems would instead focus on addressing impacts on biodiversity in the wider countryside, as there appears to be a gap in the BAP and EU policy framework with respect to measures for residual impacts on biodiversity outside Natura 2000 sites.

3.3.2.7 Dissemination and replication of lessons and solutions – generating multiplier effects - The Catalytic Role of LIFE

The use of activities under this option, to boost the catalytic role of the instrument, includes substantially greater weight attached to:

- Deliberately targeting and increasing the use made of the major EU funding instruments to replicate project results and to mainstream project benefits; and
- Recognising the potential from the replication of both Nature and EPG related activities.

Mainstreaming of project results using the main EU funding instruments

The baseline scenario operates on the basis of ensuring the avoidance of double funding of projects from separate EU sources. This tends to limit the pursuit of increased complementarity. However, given its relatively small size compared to other EU financial instruments, the specified objective for the instrument is to contribute more positively to the integration of environmental objectives into economic (sectoral) and social activities, partly by developing the use of Integrated Projects which combine different funding sources to pursue an integrated set of objectives including environmental.

The importance of an integrated approach to funding was highlighted in a recent report for DG Environment in the context of the Natura 2000 network.[53] The report concluded that the most promising approach for financing the network involved strengthening the current "integrated funding" approach. Within this, LIFE already acts as a catalyst for maximising the

[48] GHK et al. (forthcoming) Costing potential actions to offset the impact of development on biodiversity

[49] BirdLife International (2010). Position Paper. Available from: http://www.birdlife.org/eu/pdfs/2010_BHDTF_position_Biodiversity_offsets.pdf

[50] EFTEC et al. (2010). The use of market-based instruments for biodiversity protection – the case of habitat banking

[51] BirdLife International (2010). Position Paper. Available from: http://www.birdlife.org/eu/pdfs/2010_BHDTF_position_Biodiversity_offsets.pdf

[52] BirdLife International (2010). Position Paper. Available from: http://www.birdlife.org/eu/pdfs/2010_BHDTF_position_Biodiversity_offsets.pdf

[53] IEEP et al (2011, forthcoming). Assessment of the Natura 2000 co-financing arrangements of the EU financing instrument. Final Report.

use of the available funds, through, for example, funding of the development of innovative projects combining different funding sources, feasibility studies and pilot projects, capacity building, and provision of funding to fill financing gaps. By building more on these existing efforts, the added value of LIFE would be further increased. However, in order to do so, LIFE would need to coordinate better with the needs of other funding instruments (and vice versa) in order to target projects that are of relevance to the sectoral policy, and which demonstrate the important links between the relevant sector and nature protection. This could include, for instance, piloting sustainable fisheries management projects, nurseries and no-take zones in the context of EFF. Similarly, Natura 2000 could be used as a cornerstone for the so called green infrastructure that could form a basis for sustainable regional development in the context of EU Cohesion Policy.

There are considerable opportunities here for LIFE to leverage significant funds from other EU financial instruments for environment related projects, by targeting 'test-bed' projects which could then be rolled out and mainstreamed through other funds which have significantly more resources at their disposal. LIFE already does this to some extent. For instance, LIFE is exploring the possibilities for recovering the costs of protecting high-nature-value grasslands from conversion to arable land for bio-energy cost. The results will be of considerable relevance to the Common Agricultural Policy.[54] An example of where a pilot project under LIFE has now been mainstreamed through another fund is the case of on-going management support under the EAFRD for biotope management to maintain habitat for rare species (orchids and butterflies) in combination with extensive farming, methods which were first tested under LIFE.[55] Under this Option these types of projects would become a key priority, substantially increasing the strategic added value of LIFE.

Increasing multiplier and catalytic effects from NATURE related activities

Under the current baseline scenario there are important examples of projects that have demonstrated environmental benefits, which have subsequently been disseminated and have catalysed subsequent take-up and expansion of benefits to secure multiplier effects from the instrument. Two examples of current LIFE Nature projects supporting strong catalytic effects are summarised below.

The catalytic role of LIFE - NATURE

Two projects serve to illustrate examples of projects which have had 'multiplier' effects. Given the need for elapsed time, these exemplars are taken from the LIFE III Programme.

Farming For Conservation in the Burren (LIFE04 NAT/IE/000125)

- This project brought together farmers, scientists, conservationists and agriculturalists to work proactively together to help resolve these problems and formulate a blueprint for sustainable farming in the Burren. Innovative ideas such as the development of new grazing and feeding systems were launched to improve habitat health without further compromising the financial viability of the farming system. **The success of this project led to a pioneering 'Burren Farming for Conservation Programme (BFCP)' funded** through the Irish Rural Development Programme. The BFCP now works with 120 Burren farmers managing 12,887ha within Natura 2000.

IBA MARINAS - Important Bird Areas for Seabirds (Marine Ibas) in Spain (LIFE04 NAT/ES/000049)

The project aimed to prepare a detailed inventory, using objective methodological criteria, to determine marine IBAs for seabird species listed in Annex I of the Birds Directive that live in Spanish marine waters. The project worked closely in co-ordination with a similar LIFE project covering

[54] The relationship between CAP and biodiversity (2006). Outcome of an international seminar in Warsaw, Poland 7-8 December 2006: The Common Agricultural Policy and farmland biodiversity in an enlarged EU.

[55] The EU's Rural Development Policy as an Instrument for Protecting Biodiversity – Complementarity with LIFE+. Available from: http://ec.europa.eu/environment/life/news/newsarchive2010/documents/PW_DGAgri.pdf

Portuguese territorial waters. The project developed a model methodology for defining future marine IBAs. This approach has now been adopted by members of BirdLife International as part of a global standard. This has been applied in countries such as Greece, Malta, the Baltic Countries, Argentina, Peru, USA, South Africa and New Zealand.

Increasing multiplier and catalytic effects from EPG related activities

There is scope for a significant improvement in the leverage and multiplier effects of EPG, and hence its catalytic role. This analysis draws on IA survey data and the use of examples of LIFE projects which illustrate how projects can be highly replicable, in terms of their findings, with results being taken up by a large number of stakeholders, or being used to actively inform the design and development of environmental solutions in different locations or contexts (with some forming the basis of subsequent bids for mainstream funding).

Key projects capable of generating leverage and multiplier effects through replication tend to pursue one or more of the following activities:

- Environmental investigation which both directly informs policy development and implementation in the case examined but informs policy where the same problems are to be found (these would be Project A types under the EPG typology – see Annex 2);
- Exchange of information and experience between national or local Competent Authorities that results in policy / management improvements (Type B);
- Promotion of integration by targeting particular sectoral issues and policies (e.g. an innovative process developed by a LIFE project that is subsequently adopted by the agricultural sector) (Type C and D):
- Demonstration of the feasibility of an effective approach or solution which is capable of subsequent take-up, with possibilities for mainstreaming (possibly using other funding instruments (especially EU)), i.e. helping to develop a project pipeline for mainstream funding (Types B,C and D);
- Solutions to national problems of maintaining EU significant assets or addressing transboundary pollution that would not have otherwise been addressed because of lack of alternative funding (All types).

In the baseline scenario there is an obligation on projects to communicate and disseminate activity (workshops, conferences, publications, training sessions). This Option looks to place greater emphasis on ensuring actual take-up of project results following dissemination.

This process can be engineered through project design (such as mutual learning projects) or by creating active clusters of projects that, collectively, provide a body of evidence or a network strong enough to encourage take-up. Take-up will of course also be accelerated by better reflecting the need and demand for project results in the priorities set for the programme, and benefit from the strength of the programme in its ability to operate at different spatial scales from the local to the international, which allows significant opportunities to target and apply results.

Examples of current LIFE EPG projects supporting strong catalytic effects are summarised below.

The catalytic role of LIFE – EPG

Two projects serve to illustrate examples of projects which have had 'multiplier' effects. Given the need for elapsed time, these exemplars are taken from the LIFE III Programme.

Reducing Emissions of Greenhouse Gases in Rome (LIFE04 ENV/IT/000453)

The project funded a local action plan in Rome to reduce GHG emissions by 6.5% by 2012 (compared to 1990), in line with the Kyoto target for Italy. The project included eight small pilot projects to test actions that might be included in the plan. These pilot actions proved successful and were **consequently models for demonstration and replication**. For example, the pilot on local

traffic planning gave important inputs that have now been adopted in the new Strategic Mobility Plan for Rome. An Action Plan for the Reduction of GHGs in Rome was drawn up and approved by the municipal council in March 2009, building on the results of the pilot projects. Voluntary agreements to involve local partners were seen as one of the drivers behind the success of the LIFE project.

Establishment of a Green Certificate for tourism operators in Latvia (LIFE00 ENV/LV/000959)

The main objective of the project was to alter people's attitude towards tourism through the development and implementation of a national eco-label – the 'Green Certificate'. The project, led by the Latvian Tourism Association, developed the Green Certificate label with national criteria, based on the most recognised European eco-labels. The project has also had **wider impacts on other Member States**. The 'Green Certificate' criteria and awarding procedure has been used as the basis of the Lithuanian national eco-label, which is currently under development. Furthermore, rural tourism organisations in Belorussia, Ukraine and Estonia also intend to use the 'Green Certificate' project experience to inform activities in the**ir** respective countries.

The project also allowed for the creation of networking and partnership opportunities, which has enabled the project beneficiary to develop follow-up projects for the further development of eco-labelling and integration with EU eco-labelling activities. The lead beneficiary has successfully secured LIFE+ funds (€244,900) for a new project that started in 2009 (POLPROP-NATURA, LIFE07 ENV/LV/000981). This latest project builds on outcomes from the Green Certificate work and adds value to it by demonstrating the techniques and benefits involved in sustainable tourism management models for Natura 2000 sites. Activities focus on designing practical and pragmatic tourism support approaches that balance environmental, social and economic factors to highlight green tourism's potential as a sustainable economic driver for Natura 2000 areas in Latvia.

LIFE could also demonstrate the benefits of organising information dissemination and policy learning between local and regional authorities beyond administrative boundaries. This concerns in particular the exchange of information between authorities from different sectors, which is relevant for the implementation of a number of directives, for example the Water Framework Directive. While a lot of information is available, it is difficult for local and regional administrations to rely on effective structures to share information on good practice, to find the right dissemination channels and find the appropriate contacts to help with further advice.

Projects could support larger networks and channels of information dissemination between administrations. Establishing an effective information network would result in less duplication and better use of funds as well as increase legal certainties and reduce administrative workloads and provide supporting conditions for implementing more innovative pilot projects and testing their potential for up-scaling via other European funds. Coordinating knowledge transfer would require national coordination capacity development.

Catalytic potential of NGOs

This second focus, exploiting the catalytic potential and handing over to more mainstream funding systems, is applicable to project funding but less applicable to operational funding. Priorities met by operational grants include financial stability in the operational working conditions, and the possibility to retain experienced collaborators within NGOs.

Under the baseline scenario current funding is not aiming at setting up new initiatives but at creating stability and guarding and strengthening the existing NGO capacity. This is both an advantage and a disadvantage of the existing system, as analysed in the MTE. Among the grant conditions are proven experience on the covered topics and the ability to carry a considerable share of the operational costs through other resources. In this way, new emerging NGOs, e.g. focussing on new regions or on new environmental issues, have difficulties in 'joining the club' of funded traditional NGOs. This Option could play a role in developing mechanisms to support new emerging EU-wide operational NGOs and assist them towards the status of the already established traditional NGOs.

However, this Option could not act as a pipeline to direct traditionally funded NGOs to other sources. About 81% of the NGOs declared in the MTE that the operational funding, because of its specificity, cannot be replaced by the other funding programs. The effect of applying

the principles of this Option would be to put pressure on the budget, to include funding for higher risk applications from new NGOs wishing to enter the field.

An increase in the budget for NGO activities would mean that NGOs were able to employ additional resources or to use financial resources to carry out a greater number of activities (e.g. a higher number of studies, press releases, conferences/events etc). A higher budget would also allow NGOs to have a more strategic input. For example, with an increased budget NGOs would have a greater capacity to campaign for legislation or policy priorities and provide greater assistance in increasingly transparency and public participation, thereby increasing overall awareness raising and knowledge sharing.

In addition an increase in the budget would increase the contributions made by NGOs to the development and implementation of priority policy areas and further reduce the risk of unbalanced negotiation and regulatory capture. Furthermore a higher budget would allow NGO to provide additional help to members to better understand EU environmental policies and advise on ways to improve the effectiveness of environmental policy implementation.

It is arguably more effective to further enable NGO to maintain their policy watchdog function and follow-up on insufficient policy implementation than for the Commission to fulfil these functions, given that NGOs are often closer to what is happening at local and regional levels.

3.3.3 Estimated impact of the option

The assessment of the option against the baseline is summarised below:

Table 3.18 Assessment of Strategic Programming option (relative to baseline) – against objectives

Specific objective to be achieved/ problem addressed	Element	Anticipated impact: effectiveness (rated from –5 to +5)		Explanation of rating and aspects of the policy option necessary to achieve impact
To improve the scope of EU environmental policy and legislation.	NAT	+4	+4	Very significant impact from targeted role in knowledge base (e.g. green infrastructure, biodiversity offsets)
	EPG	+4		Very significant impact from stronger more targeted role in knowledge base across the acquis
	INF	+1		Positive impact from better targeted activity
	NGO	-1		Impact from stronger more co-ordinated framework for NGO contributions (but limited regarding the activities of the large multi-focus NGOs that already cover the priority themes), but less possibility to introduce new policy topics.
To improve the implementation of EU environmental policy and legislation, (including EU commitments to international agreements)	NAT	+4	+5	Very significant impact from more targeted, programmatic approach to implementing the network
	EPG	+5		Very significant impact from more targeted, programmatic approach to addressing MS implementation problems
	INF	+2		Positive impact from more targeted approach
	NGO	0		Possible positive impact from a more co-ordinated contribution but loss of the potential to represent civil society form loss of NGOs not fully working within strategic priorities
To improve the effective contribution of other EU policies to environmental	NAT	+3	+3	Significant impact from better demonstration of the links between ecosystem services and socio-economic benefits
	EPG	+3		Significant impact from better targeted demonstration of socio-economic benefits from environmental integration

Specific objective to be achieved/ problem addressed	Element	Anticipated impact: effectiveness (rated from –5 to +5)		Explanation of rating and aspects of the policy option necessary to achieve impact
objectives	INF	+3		Significant impact from better targeted awareness raising
	NGO	0		No positive or negative impact from better engagement with wider policy makers
To develop solutions for subsequent mainstreaming in other EU financial instruments and MS practices	NAT	+4	+3	Very significant impact from stronger role in developing integrated projects & project pipelines for other instruments
	EPG	+3		Significant impact from developing project pipelines for other instruments
	INF	+1		Positive impact from supporting awareness of mainstream opportunities
	NGO	+2		Positive impact from supporting awareness of mainstream opportunities
To contribute to responsibility sharing in the protection of EU natural assets	NAT	+4	+3	Very significant impact from a better reflection of the distribution of natural assets and green infrastructure
	EPG	+2		Positive impact from improved targeted of policy priorities
	INF	+2		Positive impact from stronger alignment of awareness raising with strategic priorities
	NGO	+2		Positive impact by promoting greater appreciation of EU priorities, by supporting the large, broad scope policy development NGOs. Increased possibility to introduce emerging NGOs in new regions. They will also be able to promote activities in 3rd countries.
To contribute to responsibility sharing in addressing transboundary problems affecting EU internal and external borders	NAT	+3	+3	Significant impact from extending focus from e.g. migratory species and including a stronger international focus
	EPG	+4		Very significant impact from better targeting of policy needs and international commitments
	INF	+3		Significant impact from targeting awareness on key priorities
	NGO	+1		Positive impact from promoting a broader appreciation of EU priorities, by supporting the large, broad scope policy development NGOs, and by increased possibilities to support emerging NGOs. They will also be able to promote activities in 3rd countries

Table 3.19 Assessment of Strategic Programming option – Against impact indicators

Specific objective to be achieved/ problem addressed		Anticipated impact: effectiveness (rated from –5 to +5)	Explanation of rating and aspects of the policy option necessary to achieve impact
Environmental impacts	Changes in policies/management	+4	Very significant impact from a stronger focus on assessing and addressing weaknesses in policy scope and implementation
	Changes in habitats/eco-systems	+4	Very significant impact from broader policy perspective given the importance of ecological connectivity and coherence in maintaining

			biodiversity
	Changes in pollution / resource use	+4	Very significant impact from improving the targeting on priority policy needs and improving the knowledge base and the capacity of competent authorities
Economic impacts	Technology outcomes	+3	Significant impact from reflecting policy needs in funding of potential solutions and improved mainstreaming
	Additional sales / GVA	+2	Significant impacts from testing of innovative financial instruments. Longer-term, positive impacts from integration & mainstreaming
	Net cost savings	+1	Little change from baseline. Longer-term positive impacts from integration & mainstreaming
Social impacts	NGO contributions to policy	+3	Stronger co-ordination and targeting in the use of NGO capacities and networks,
	Improvements in human health	+2	Significant impacts from improved policy implementation
	Additional employment	+1	Little change from baseline. Longer term positive impacts from mainstreaming & integration Decreased job security for some smaller specialised NGOs Increased possibilities for job creation in new emerging NGOs

Table 3.20 Assessment of Strategic Programming option – Other criteria

Specific objective to be achieved/ problem addressed	Anticipated impact: effectiveness (rated from –5 to +5)	Explanation of rating and aspects of the policy option necessary to achieve impact
Impacts on different social and economic groups	+3	Environmental and social benefits will tend to have positive effects on lower income groups
Fundamental rights	0	No impact
Risks		
Financial costs to the EU budget (direct staff costs, funding instruments)	€300m plus staff costs Could see pressure for an increase in budget for support to new emerging NGOs in a pilot phase	Public procurement and grant funding per year
Financial costs to Member States (e.g. administrative costs for applicants and management costs for beneficiaries)	Same as in the baseline, given there is no change in the expected size and number of projects - €3.4m in bid costs pa €1.7m in admin costs pa	
Summary of benefits and advantages of option	Increase in environmental, economic and social benefits as a result of addressing institutional weaknesses – €120m on the basis of a 20% improvement in environmental benefits Increased level of responsibility sharing Increased engagement of civil society	

	Increased focus on addressing increasing risks from growing problems
Summary of disadvantages and risks of policy option (including negative economic and social costs in EU and third countries)	Tighter focus may require some adjustment from current programme – with an increased emphasis on addressing institutional weaknesses
Essential accompanying measures	Well defined and active explanation of the changes in the option to MS and potential beneficiaries
Feasibility: Issues raised in stakeholder consultations	Avoid loss of good demonstration projects as a result of too tight a policy focus
Feasibility: Issues raised by Member States	Ensure any changes from current approaches are well sign-posted in advance Limit changes within the programme period

3.3.4 Summary of the impact of the option

3.3.4.1 Consolidated option score (relative to baseline)

The scores proved above, when normalised (using a range from zero to 10, where the baseline impacts are taken as a score of 5), sum to a score of 8.0. Further analysis is provided in Section 4.0.

3.3.4.2 Estimated impact on programme benefits

This instrument option is intended to increase the EU added value from the same budget, through stronger priority setting and related targeting, and through the increase in the leverage and multiplier effect. The approach proposed by the option and the change in emphasis in activities to generate the required outputs provide the basis for increased impact and EU added value from the instrument.

The scale of this improvement is difficult to quantify; it depends on how much of the best practice currently achieved could be expanded and used to replace significantly less effective activity. On the assumption that there could be a 50% improvement in the least effective part of the programme (say the bottom quartile of activity), and a 25% improvement in the second least effective quartile, this would represent an overall improvement of 19% (say 20%).

Taking the minimum value of the environmental benefits expected to be achieved of €600m a year, and excluding the substantial social and economic benefits, this would represent an increase of €120m of environmental benefits per year attributed to this option.

3.3.4.3 Summary of the environmental impacts

Based on the estimate above the environmental impacts under this option are at least 20% greater than those estimated (conservatively) for the baseline scenario. This would add a further million hectares of land, conserved and restored; water quality improvements over an area of approximately half a million hectares; and improvements in air quality affecting some two and a half million people.

3.3.4.4 Contribution to EU Added Value

The EU added value of the option compared to the baseline scenario rests on a number of features:

- **Stronger links to EU policy needs** - The strategic programming approach based on multi-annual planning provides the basis of a stronger link between the programme and the EU policy needs as articulated by Commission Services. In addition, by removing the national allocation system, the risk of tensions from the use of different assessment criteria is removed
- **Stronger multiplier effects** - The approach formally acknowledges the importance of securing an improved catalytic effect, with the objective to mainstream project results through subsequent use of EU financial instruments

- **Improved critical mass and replication in support of catalytic effects** - The use of a mix of different types of project, complementing traditional 'bottom-up' local projects, with the stronger promotion of national level projects to promote mutual learning and exchange of good practice and the use of Integrated Projects to build critical mass
- **Improved integration of the environment with other EU policy objectives** – The use of Integrated Projects provides not only scale but also an expanded scope to integrate environmental objectives in wider development goals, supported by the main EU financial instruments
- **Greater focus on and support for the development of financial instruments** – The need and opportunity to complement limited institutional resources by seeking to secure revenue from the use of new financial instruments is recognised as a legitimate area of activity

3.4 Option 4: Restricted activity (relative to baseline)

This option is based on Option 3 but examines the impact of restricting the type of activity, rather than the thematic focus (which is considered in Option 5). It examines the effect of excluding the funding of eco-innovation and of separate standalone information and communication activity. As a result the assessment of this option combines previous assessments for the different components presented in relation to Options 1 and 3.

The option shares the same approach to strategic programming, and it would be expected that, as assessed under Option 3, that the funding would be more effective than in the baseline. Option 3 estimated the additional impact in terms of environmental benefits, of the strategic programming approach, compared to the baseline scenario, to be in the order of 20%.

We examine the effects first of excluding eco-innovation activity and then the stand alone information and communication strand.

3.4.1 Eco-innovation

In this option, it is assumed that funding of some €50m per year for eco-innovation projects (Type D projects supporting pre-commercial innovation demonstration) is excluded, on the basis that this is the activity most likely to be funded by alternative instruments, including FP7 and CIP. These projects account for over half of the impacts of the EPG strand. Analysis presented in the assessment of the zero instrument option, based on an analysis of reported planned impacts, by project type, indicated that 59% of the estimated impacts derived from eco-innovation even though it only accounted for 48% of the EC contribution in EPG.

The resources from eco-innovation are assumed to be reallocated to the other types of activity (projects A, B, C). The net effect is to reduce the environmental benefits from EPG by 21%[56] or by some €80m. In addition the loss of eco-innovation also has a disproportionate effect on economic outcomes. This impact is compensated by the wider strategic programming approach.

However, although excluding eco-innovation per se, the option might be expected to see a share of the activity still receiving funding under the other types of projects especially that undertaken by public or research sectors, which accounts for around a third of the Type D projects.[57]

In terms of the meeting the objectives of the instrument, the risk is that the activities funded under the baseline scenario are not funded by other instruments and would therefore undermine the achievement of the objectives of the instrument. As assessed in the zero option, only 25% of Type D funding at most would be expected to be financed by other instruments; so even assuming some activities would be funded by the specific instrument under other project types there is a high risk that at least half of the activity would not be funded at all.

Therefore, at the level of the instrument, whilst the benefits of the strategic programming approach generate an improved level of impacts relative to the baseline, the absence of eco-innovation means that a substantial part of this benefit is lost. At the same time the loss of the information and communications activity, although only 5% of the action grant funding, would also be expected (see below) to have a small but negative impact on the influence of the EPG strand to meet the specific objectives.

[56] Calculated by dividing the share of the impact from projects ABC (41%) by the EC contribution for ABC (52%) and subtracted from 1

[57] Two thirds (68%) of Type D projects are led by private companies for commercial market replication

3.4.2 Information and communications

The option also includes the removal of the information and communications strand. This strand accounts for 5% of grant funding but is designed to support the other two strands through non-project specific information and awareness dissemination. It also has the potential to impact on NGOs.

3.4.2.1 NATURE

Although the loss of general information and communication activity may have some negative impact on the awareness of biodiversity related issues it is judged unlikely to have a significant effect, especially given the use of larger, higher profile project activity using Integrated Projects.

3.4.2.2 EPG

The resources of this strand are assumed to be reallocated to the EPG strand and to have a positive impact in line with EPG activity (Projects A, B and C).

The impact of removing the strand is considered in the zero option. In summary the main impact is likely to be a negative impact especially on policy development, which benefits from wider community awareness of environmental problems and potential solutions. Whilst there are general DG Environment information & communications activities funded out of public procurement that continue, there is a knock-on effect on the effectiveness of EPG activity.

However, this negative impact is likely to be offset by the use of a mix of projects, including greater use of top-down projects and Integrated Projects, both of which are designed to better facilitate awareness of problems, but also to better link this awareness of issues to potential solutions.

More generally, the MTE pointed to the possibility of substantially higher deadweight with this strand and its removal may not lead to a substantial reduction in Member State activity in this area.

3.4.2.3 NGOs

10% of the funds allocated to NGOs are used explicitly for environmental education and awareness raising. When this activity is excluded in this option, an amount of about €900,000 would need to be reallocated to other tasks performed by the NGOs. This could happen without major problems because none of the NGOs were reported in the MTE to be solely active in the field of communication and awareness raising.

3.4.3 Estimated impact of the option

The assessment of the option against the baseline is summarised below:

Table 3.21 Assessment of Restricted Activities option (relative to baseline)

Specific objective to be achieved/ problem addressed	Element	Anticipated impact: effectiveness (rated from –5 to +5)		Explanation of rating and aspects of the policy option necessary to achieve impact
To improve the scope of EU environmental policy and legislation.	NAT	+4	+2	Very significant impact from targeted role in evidence base (e.g. green infrastructure, biodiversity offsets)
	EPG	+1		Significant impact form stronger more targeted role in evidence base across the acquis, offset by some loss of policy related eco-innovation activity and loss of general information and awareness activity
	INF	0		A negative impact on policy development, although offset by the strategic programming approach targeting key issues, and the use of a mix of project types that will

Specific objective to be achieved/ problem addressed	Element	Anticipated impact: effectiveness (rated from –5 to +5)		Explanation of rating and aspects of the policy option necessary to achieve impact
				improve awareness of issues and links to policy solutions
	NGO	-1		Positive impact from stronger more co-ordinated framework for NGO contributions, offset by reduced activity in promoting problem awareness and policy proposals because of reduced information and communication activities
To improve the implementation of EU environmental policy and legislation, (including EU commitments to international agreements)	NAT	+4	+2	Very significant impact from more targeted, programmatic approach to implementing the network
	EPG	+1		Significant impact from more targeted, programmatic approach to addressing MS implementation problems. offset by some loss of policy related eco-innovation activity and loss of general information and awareness activity
	INF	-1		Adverse impact through loss of awareness in support of multipliers, largely offset by the use of different project types designed to better profile and disseminate issues and solutions
	NGO	+2		Possible positive impact from a more co-ordinated contribution
To improve the effective contribution of other EU policies to environmental objectives	NAT	+3	+3	Significant impact from better demonstration of the links between ecosystem services and socio-economic benefits
	EPG	+3		Significant impact from better targeted demonstration of socio-economic benefits from environmental integration
	INF	-2		Adverse impact through loss of dissemination with policy makers and economic actors in other sectors
	NGO	0		No positive or negative impact from better engagement with wider policy makers
To develop solutions for subsequent mainstreaming in other EU financial instruments and MS practices	NAT	+4	+2	Very significant impact from stronger role in developing integrated projects & project pipelines for other instruments
	EPG	0		Loss of eco-innovation activity offsets most of the benefits from improved targeting
	INF	-1		Adverse impact from lack of dissemination to potential applicants
	NGO	+1		Positive impact from supporting awareness of mainstream opportunities
To contribute to responsibility sharing in the protection of EU natural assets	NAT	+4	+3	Very significant impact from a better reflection of the distribution of natural assets and green infrastructure
	EPG	+2		Positive impact from improved targeted of policy priorities
	INF	-1		Some adverse impact from lack of awareness of issues – e.g. were forest management and forest fire protection activity to be curtailed
	NGO	+2		Relative impact from reflecting a broader appreciation of national priorities, by supporting the large, broad scope policy development NGOs. Increased possibility to introduce emerging NGOs in new regions
To contribute to	NAT	+3	+2	Significant impact from extending focus from e.g. migratory

Specific objective to be achieved/ problem addressed	Element	Anticipated impact: effectiveness (rated from –5 to +5)	Explanation of rating and aspects of the policy option necessary to achieve impact
responsibility sharing in addressing transboundary problems affecting EU internal and external borders			species and including a stronger international focus
	EPG	+1	Significant impact from better targeting of policy needs and international commitments, offset by lack of eco-innovation solutions and by the lack of information and communications activity
	INF	-2	Adverse impact from lack of targeting of transboundary problems and related awareness of issues
	NGO	+1	Relative impact from reflecting a broader appreciation of national priorities, by supporting the large, broad scope policy development NGOs, and by increased possibilities to support emerging NGOs.

Table 3.22 Assessment of Restricted Activities option – Against impact indicators

Specific objective to be achieved/ problem addressed		Anticipated impact: effectiveness (rated from –5 to +5)	Explanation of rating and aspects of the policy option necessary to achieve impact
Environmental impacts	Changes in policies/management	+2	Significant impact from a stronger focus on assessing and addressing weaknesses in policy scope and implementation, but negative impacts from the absence of eco-innovation and, at the margin, information and communication activity
	Changes in habitats/eco-systems	+3	Significant impact from broader policy perspective given the importance of ecological connectivity and coherence in maintaining biodiversity
	Changes in pollution / resource use	+2	Significant impact from improving the targeting on priority policy needs but reduced by lack of eco-innovation activity
Economic impacts	Technology outcomes	-3	Lack of eco-innovation activity reduces the number of technology outcomes (offset slightly by modest scope to fund under other instruments)
	Additional sales / GVA	0	Significant impacts from testing of innovative financial instruments. Longer-term, positive impacts from integration. Offset by lack of eco-innovation and reduced levels of mainstreaming
	Net cost savings	-1	Adverse impact due to the loss of eco-innovation and reduced levels of mainstreaming
Social impacts	NGO contributions to policy	+3	Stronger co-ordination and targeting in the use of NGO capacities and networks
	Improvements in human health	+2	Significant impacts from improved policy implementation
	Additional	0	Little change from baseline. Longer term

employment	positive impacts from integration offset by lack of mainstreaming eco-innovation Decreased job security for some smaller specialised NGOs Increased possibilities for job creation in new emerging NGOs

Table 3.23 Assessment of Restricted Activities option – Other criteria

Specific objective to be achieved/ problem addressed	Anticipated impact: effectiveness (rated from −5 to +5)	Explanation of rating and aspects of the policy option necessary to achieve impact
Impacts on different social and economic groups	+3	Environmental and social benefits will tend to have positive effects on lower income groups.
Fundamental rights	0	No impact
Risks		
Financial costs to the EU budget (direct staff costs, funding instruments)	€300m plus staff costs of €5m Could see pressure for an increase in budget for support to new emerging NGOs in a pilot phase	Public procurement and grant funding per year
Financial costs to Member States (e.g. administrative costs for applicants and management costs for beneficiaries)	Similar to baseline, adjusted for the removal of information projects - €3.4m in bid costs pa €1.7m in admin costs pa	
Summary of benefits and advantages of option	Increase in environmental and social benefits as a result of addressing institutional weaknesses, but reduced relative to Option 3 Increased level of burden sharing Increased engagement of civil society Increased focus on addressing increasing risks from growing problems	
Summary of disadvantages and risks of policy option (including negative economic and social costs in EU and third countries)	Tighter focus may require some adjustment from current programme – with an increased emphasis on addressing institutional weaknesses Lack of eco-innovation results in a slightly negative economic impact compared to baseline	
Essential accompanying measures	Well defined and active explanation of the changes in the option to MS and potential beneficiaries	
Feasibility: Issues raised in stakeholder consultations	Avoid loss of good demonstration projects as a result of too tight a policy focus	
Feasibility: Issues raised by Member States	Ensure any changes from current approaches are well sign-posted in advance Limit changes within the programme period	

3.4.4 Summary of the impact of the option

3.4.4.1 Consolidated option score (relative to baseline)

The scores proved above, when normalised (using a range from zero to 10, where the baseline impacts are taken as a score of 5), sum to a score of 6.4. Further analysis is provided in Section 4.0.

3.4.4.2 *Estimated impact on programme benefits*

This instrument option (as with Option 3) is intended to increase the EU added value from the same budget, through stronger priority setting and related targeting, and through the increase in the leverage and multiplier effect. The scale of this improvement is difficult to quantify; it depends on how much of the best practice currently achieved could be expanded and used to replace significantly less effective activity.

However, the restriction on activities reduces the effectiveness of these changes. In particular the removal of the eco-innovation activity and general information and communication activity, has a negative impact, especially on EPG, even though resources are reallocated to the rest of EPG activity; and information and communication activities funded by public procurement will continue, as well a greater scope to raise awareness through the use of a wider range of project types.

The assessment suggested that the additional benefit provided by the strategic approach might be cancelled out as a result of a restriction on activities. However, it might also be expected that some of the activity would continue to meet the objectives of the instrument by receiving funding under other types of project (given the often hybrid nature of projects). More widely some of the activity would be expected to be funded by other instruments and indirectly contribute to the objectives of the instrument. The possible extent of this 'substitution funding' is indicated in the assessment

On balance it is assessed that the restricted activities substantially reduce the benefits of the strategic approach (especially the loss of eco-innovation funding), but that the option still has a positive impact compared to the baseline option.

3.4.4.3 *Contribution to EU Added Value*

The EU added value of the option compared to the baseline scenario rests on the basic improvements provided by the strategic programming approach which remains despite some dilution due the restriction on funding some activities.

3.5 Option 5: Restricted theme (Nature) (relative to baseline)

This option examines the impact of restricting the programme to a small part of the acquis – focusing on the statutory requirement to co-finance the implementation of the Habitats Directive.

3.5.1 NATURE

Under Option 3 (Strategic Programming), LIFE NATURE has a more extended focus, going beyond just the Natura 2000 network to support the wider policy context. The approach is more strategic, and therefore enables the available funds to cover a wider array of (more targeted) activities. Given the already great, and increasing, policy needs for funding biodiversity and nature protection, there is considerable value to increasing the funds available to meeting these goals, especially in light of the significant funding gaps that are evident in the current financial framework.[58] The option focuses on both Natura 2000 and wider biodiversity policy, as presented in Option 3, due to the impact of the conservation and restoration of biodiversity on the wider countryside and marine areas and on habitats and species of Community interest.

Importantly, a range of climate change activities would still be funded by action grants under this Option, given the contribution of biodiversity and ecosystem services to climate change mitigation (e.g. carbon capture and storage capacity of forests) and adaptation (e.g. flood protection).

Under this Option therefore, more resources would be allocated to the NATURE and BIODIVERSITY strand as described in Option 3. Based on the analysis of the environmental, economic and social impact undertaken under the baseline option, it is assumed that an increase in resources would positively influence the environmental, economic and social value arising from related activities. This is reflected in the assessment table below, where the anticipated impact is greater relative to the impact under Option 3.

In order to maximise the strategic added value of funding for nature, Lawton (2010)[59] suggests that the first priority is to enhance the quality of remaining wildlife habitat. Investment in the Natura 2000 network will therefore be a continued priority if funds for nature protection were increased. There is also an argument that the most strategic value from additional funding would be to invest in increasing the size of protected areas, in order to maximise economies of scale. For instance, size affects estimates of the number of staff working or expected to be needed on each site. However, there are important trade-offs to consider in investing more in protected areas rather than in biodiversity of the wider countryside.

Protected areas and the wider environment are mutually dependent; actions to improve the quality of existing sites will be less effective if the pressures on them are not also reduced by enhancing the wider environment. The effects of climate change would inter alia increase the pressures on biodiversity (and thereby increase the costs of managing Natura 2000 for instance[60]). Similarly, the lack of support for implementing the objectives of the Water Framework Directive would also hamper the protection of many habitats and species of Community interest (e.g. amphibians, wetlands) given the risks of deterioration of the status of wider freshwater habitats.

For instance, an analysis of the LIFE EPG projects in 2008 and 2009 indicate that roughly 17% of projects (37 of 215 projects in the two year period, corresponding to 15% of the total EC value, some €33 million of the total €210 million) have (direct or indirect) links to nature and biodiversity (see Table 3.24). These particularly relate, for instance to:

[58] IEEP et al (2011, forthcoming). Assessment of the Natura 2000 co-financing arrangements of the EU financing instrument. Final Report.

[59] Lawton (2010). Making space for Nature: A review of England's Wildlife Sites and Ecological Network.

[60] Gantioler et al (2010)

- Water management at the scale of river basins
- Site rehabilitation
- Forest management, soil and landscape protection and desertification prevention
- Sensitive area and integrated environment management
- Urban design
- The impacts of waste and pollution

By no longer having an EPG strand under LIFE, there is a risk that these projects will no longer be funded, which will mean these additional benefits to nature and biodiversity will be lost. However, it is clear that some of these projects could, however, potentially be funded under a more fully resourced LIFE Nature option, especially a LIFE Nature instrument which puts more focus on wider biodiversity measures.

For instance, 3 projects over the two years relating to enhancing urban Green Infrastructure have been funded under EPG that could be funded under Nature.[61] Given the increasing prominence and importance of green infrastructure in the EU and its role in supporting biodiversity and wider ecosystem service benefits, there is certainly a case for these types of activities to be funded under a restricted LIFE Nature Option. Similarly, many of the projects relating to soil conservation, forest management and protection, the management of river basins and sensitive areas could also be funded under this restricted Option, and so the benefits of these projects would not be completely lost.

The analysis indicates that roughly 26 of the 37 projects (70%) relating to nature and biodiversity under the EPG strand over the last 2 years could potentially be funded under a restricted LIFE Nature Option. This amounts to an EC investment value of €24 million. Although the objectives of these projects are in line with nature and biodiversity, a potential barrier to these projects being funded under a Nature/Biodiversity strand however, is the lack of concrete conservation action. Even though these projects support and advance the efforts to protect and enhance biodiversity, they do lack specific conservation outputs that are required of current Nature/Biodiversity projects. For these projects to continue to be funded by LIFE under this Option therefore, the requirement for concrete conservation action would need to be applied with more flexibility.

However, some of the projects which benefit nature and biodiversity more indirectly are less likely to be funded, meaning these benefits would be foregone. The analysis indicates that this would be the case for 11 of the nature-related EPG projects (30%), amounting to a value of €8 million. These tend to relate to waste treatment, pollution control and pesticide management. Although these projects benefit biodiversity by mitigating the potential adverse impacts on flora, fauna and ecosystems of waste and pollution, the link is more indirect than some of the other projects which have much greater scope to be funded under a restricted LIFE Nature Option.

Table 3.24 The extent to which EPG projects support biodiversity goals (2009 and 2008)

	Number		Value of EC investment (€ mill)	
All projects with links to nature and biodiversity	37	17%	33	15%
Projects which could be funded under a restricted LIFE Nature	26	12%	24	11%
Projects which are unlikely to be funded under a restricted LIFE Nature	11	5%	8	4%
Total EPG projects	215	100%	210	100%

Source: GHK project survey

[61] LIFE08 ENV/E/000097, LIFE09 ENV/IT/000074 and LIFE09 ENV/ES/000437

The question also remains whether some of the environmental challenges currently covered by the EPG strand such as these, are, or could be, adequately addressed by other EU financing instruments, such as EFF, EAFRD or Structural Funds. However, the analysis under the zero option has shown that within the existing framework only a small proportion of the EPG projects might have been financed by other instruments. In addition, it needs to be observed that a further separation of environmental thematic areas could increase the risks of failing to notice potential biases and trade-offs caused by a lack of integration.

The option assessment demonstrates that under this option there would be a strategic need for LIFE NATURE to continue to support both the implementation of the Nature strand as well as the broader environmental policy context.

It is also assumed that the option would include some, but not all, of the relevant information and communications activity as it relates to nature and biodiversity issues.

3.5.2 EPG

The impacts of this option are as assessed under Option 1 – with some 20% of funding and related impacts potentially available from other funding instruments.

3.5.3 INF

The impacts of this option are as assessed under Option 1.

3.5.4 NGOs

The impacts of this option are as assessed under Option 3 but focused on Nature.

This option would mean a reallocation of about €6m, currently allocated in respect of other themes in the acquis, to nature. However this would be limited to policy development and policy implementation activities in the field of nature that have an EU wide or at least supranational importance. It is unclear if the actual NGOs active in the field of nature have sufficient absorption capacity to cope with the tripling of the actual budget.

The number of eligible NGOs would drop (compared to the 2008 situation) from 34 to 25 NGOs, among which 13 are more or less specialised in nature, 9 operate with a broad scope and 3 that are specialised in energy and climate change. One uncertainty is whether the NGOS that operate with a broad scope are able to divide their operational activities to create a specific link to the topic of nature.

The impact of the option on the non-nature parts of the acquis would be similar to those assessed for Option 1.

3.5.5 Estimated impact of the option

The assessment of the option against the baseline is summarised below:

Table 3.25 Assessment of Restricted Theme (Nature) option (relative to baseline)

Specific objective to be achieved/ problem addressed	Element	Anticipated impact: effectiveness (rated from –5 to +5)		Explanation of rating and aspects of the policy option necessary to achieve impact
To improve the scope of EU environmental policy and legislation.	NAT	+5	0	Very significant impact from targeted role in knowledge base (e.g. green infrastructure, biodiversity offsets)
	EPG	-2		Adverse impact but main impact is on implementation
	INF	-2		No significant impact on policy scope

Specific objective to be achieved/ problem addressed	Element	Anticipated impact: effectiveness (rated from –5 to +5)		Explanation of rating and aspects of the policy option necessary to achieve impact
	NGO	-3		Significant impact from stronger more co-ordinated framework for NGO contributions but excludes rest of acquis. The operational strength of major players like FoE or EEB will decrease.
To improve the implementation of EU environmental policy and legislation, (including EU commitments to international agreements)	NAT	+5	-1	Very significant impact from more targeted, programmatic approach to implementing the network
	EPG	-4		Very significant impact – some replacement in other funds
	INF	-3		Adverse impact through loss of awareness
	NGO	-3		Significant impact from a more co-ordinated contribution but offset by failure to address rest of the acquis. The operational strength of major players like FoE or EEB might decrease.
To improve the effective contribution of other EU policies to environmental objectives	NAT	+4	0	Significant impact from better demonstration of the links between ecosystem services and socio-economic benefits
	EPG	-2		Adverse impact from loss of 'C' Projects – but only small share of EPG
	INF	-2		Adverse impact through loss of dissemination with policy makers and economic actors in other sectors
	NGO	-3		Positive impact from better engagement with wider policy but offset by failure to address rest of the acquis makers. The operational strength of major players like FoE or EEB will decrease.
To develop solutions for subsequent mainstreaming in other EU financial instruments and MS practices	NAT	+5	0	Very significant impact from stronger role in developing integrated projects & project pipelines for other instruments
	EPG	-3		Significant impact from loss of 'D' projects - some replacement
	INF	-1		Adverse impact from lack of dissemination to potential applicants
	NGO	-3		Positive impact from supporting awareness of mainstream opportunities but offset by failure to address rest of the acquis
To contribute to responsibility sharing in the protection of EU natural assets	NAT	+4	0	Very significant impact from a better reflection of the distribution of natural assets and green infrastructure
	EPG	-3		Significant adverse impact from lack of demonstration
	INF	-2		Adverse impact from lack of awareness of issues – e.g. forest management and forest fire protection
	NGO	-1		Significant impact from reflecting a broader appreciation of national nature priorities, limited by lack of reference to the rest of the acquis
To contribute to responsibility sharing in addressing transboundary problems affecting EU internal and external borders	NAT	+3	-2	Significant impact from extending focus from e.g. migratory species and including a stronger international focus
	EPG	-4		Very significant adverse impact from loss of transboundary working
	INF	-2		Adverse impact from lack of targeting of transboundary problems and related awareness of issues
	NGO	+1		Positive impact from promoting a stronger appreciation of

Specific objective to be achieved/ problem addressed	Element	Anticipated impact: effectiveness (rated from –5 to +5)	Explanation of rating and aspects of the policy option necessary to achieve impact
			national transboundary nature priorities but offset by failure to address rest of the acquis. Recognition that some of the problems covered by the rest of the aquis are also related to nature.

Table 3.26 Assessment of Restricted Theme (Nature) option – Against impact indicators

Specific objective to be achieved/ problem addressed		Anticipated impact: effectiveness (rated from –5 to +5)	Explanation of rating and aspects of the policy option necessary to achieve impact
Environmental impacts	Changes in policies/management	-1	Strategic approach to nature and biodiversity offset by lack of EPG activity
	Changes in habitats/eco-systems	+4	Very significant impact from broader policy perspective given the importance of ecological connectivity and coherence in maintaining biodiversity. Lack of funding in the rest of the aquis, given links to nature, has a minor offsetting effect
	Changes in pollution / resource use	-4	Lack of EPG activity has a very significant impact on scope to achieve benefits. Some activity is replaced by other instruments
Economic impacts	Technology outcomes	-4	Lack of activity removes technology outcomes offset slightly by modest scope to fund under other instruments
	Additional sales / GVA	-2	Significant impacts from testing of innovative financial instruments for Nature more than offset by lack of eco-innovation and reduced levels of mainstreaming
	Net cost savings	-1	Positive impacts from improved eco-system services offset by adverse impact due to the loss of eco-innovation and reduced levels of mainstreaming
Social impacts	NGO contributions to policy	-2	Stronger co-ordination and targeting in the use of NGO capacities and networks more than offset by lack of contribution over the rest of the acquis
	Improvements in human health	-2	Lack of improvements in pollution reduction has a negative impact on health despite some improvements through improved management of natural resources and increased eco-system services
	Additional employment	-2	Loss of employment associated with EPG activities offset by some additional employment related to expanded nature and biodiversity management

Table 3.27 Assessment of Restricted Theme (Nature) option – Other criteria

Specific objective to be achieved/ problem addressed	Anticipated impact: effectiveness (rated from –5 to +5)	Explanation of rating and aspects of the policy option necessary to achieve impact
Impacts on different social and economic groups	-1	Economic and social costs will tend to have negative effects on lower income groups, reflecting their tendency to be subject to relatively greater exposure to air and water pollution. Positive impact on rural communities form increased investment
Fundamental rights	0	No impact
Risks		
Financial costs to the EU budget (direct staff costs, funding instruments)	€300m plus staff costs of €5m	Public procurement and grant funding per year
Financial costs to Member States (e.g. administrative costs for applicants and management costs for beneficiaries)	Lower costs than baseline reflects the lower bid and admin costs of Nature projects - €2.1m in bid costs pa €1.5m in admin costs pa	
Summary of benefits and advantages of option...	Substantial Increase in environmental benefits related to nature and biodiversity Increased level of responsibility sharing in relation to environmental assets Increased engagement of civil society around nature and biodiversity Increased focus on addressing increasing risks from loss of biodiversity and climate adaptation	
Summary of disadvantages and risks of policy option (including negative economic and social costs in EU and third countries)	A substantial loss of environmental benefits as a result of addressing institutional weaknesses in the rest of acquis A reduced level of responsibility sharing in relation to transboundary problems A loss of engagement with civil society in relation to the acquis Modest economic and social costs associated with lack of investment in technical solutions and the management of pollution	
Essential accompanying measures	Well defined and active explanation of the changes in the option to MS and potential beneficiaries	
Feasibility: Issues raised in stakeholder consultations	Avoid loss of good demonstration projects as a result of too tight a policy focus	

3.5.6 Summary of the impact of the option

3.5.6.1 Consolidated option score (relative to baseline)

The scores proved above, when normalised (using a range from zero to 10, where the baseline impacts are taken as a score of 5), sum to a score of 4.4. Further analysis is provided in Section 4.0.

3.5.6.2 Estimated impact on programme benefits

This instrument option (as with Option 3) is intended to increase the EU added value from the same budget, through stronger priority setting and related targeting, and through the increase in the leverage and multiplier effect.

However, the focus on only one theme (nature) limits the effectiveness of these changes in meeting the objectives of the specific instrument. In particular, the lack of any EPG activity,

as assessed under Option 1, is to remove any real possibility of generating the type and scale of benefits achieved by the baseline scenario.

Some of the EPG activities relating to nature might receive funding under the restricted theme, subject to an approach to the provision of specific conservation actions. However, the the wider benefits of EPG in reducing impacts (e.g. in relation water use, waste management, climate change) that subsequently lead to pressures on biodiversity are lost. These losses offset some of the benefits associated with the increased funding provided for nature protection under this option.

3.5.6.3 Contribution to EU Added Value

The EU added value of the option compared to the baseline scenario rests on the basic improvements provided by the strategic programming approach. However, the restriction on themes reduces the EU added value substantially (and below that provided by the baseline scenario) and fails to meet the objectives set for the specific instrument. In particular, many of the institutional weaknesses associated with the acquis as a whole will not be addressed by this option.

4 Comparison of options (relative to baseline)

4.1 Summary of the assessment results

The different option assessments as scored in the previous section are summarised in the assessment grid (Table 4.1)

Table 4.1 Summary of option assessment scores

Specific objective to be achieved/ problem addressed		***Option***				
		Zero	***Baseline***	***Programme***	***Restricted***	***Nature***
To improve the scope of EU environmental policy and legislation.		-2	0	+4	+2	0
To improve the implementation of EU environmental policy and legislation, (including EU commitments to international agreements)		-4	0	+5	+2	-1
To improve the effective contribution of other EU policies to environmental objectives		-2	0	+3	+3	0
To develop solutions for subsequent mainstreaming in other EU financial instruments and MS practices		-2	0	+3	+2	0
To contribute to responsibility sharing in the protection of EU natural assets		-3	0	+3	+3	0
To contribute to responsibility sharing in addressing transboundary problems affecting EU internal and external borders		-3	0	+3	+2	-2
Environmental impacts	Changes in policies/management	-3	0	+4	+2	-1
	Changes in habitats/eco-systems	-5	0	+4	+3	+4
	Changes in pollution / resource use	-4	0	+4	+2	-4
Economic impacts	Additional technology outcomes	-4	0	+3	-3	-4
	Additional sales / GVA	-4	0	+2	0	-2

Specific objective to be achieved/ problem addressed		***Option***				
		Zero	***Baseline***	***Programme***	***Restricted***	***Nature***
	Net cost savings	-4	0	+1	-1	-1
Social impacts	NGO contributions to policy	-4	0	+3	+3	-2
	Improvements in human health	-5	0	+2	+2	-2
	Additional employment	-4	0	+1	0	-2
Impacts on different social and economic groups		-3	0	+3	+3	-1
Fundamental rights		0	0	0	0	0
Risks						
Financial costs to the EU budget (direct staff costs, funding instruments)		€57m	€300m + staff costs of €5m	€300m + staff costs of €5m	€300m + staff costs of €5m	€300m + staff costs of €5m
Financial costs to Member States (e.g. administrative costs for applicants and management costs for beneficiaries)			€5m	€5m	€5m	€3m
Summary of benefits and advantages of option		EC savings of €15m (staff costs & TA) MS savings of €5m per year relative to baseline Some €30m-€40m of environmental benefits might be secured from other instruments		Increase in environmental, economic and social benefits as a result of addressing institutional weaknesses – €120m on the basis of a 20% improvement in environmental benefits Increased level of responsibility sharing Increased engagement of civil	Increase in environmental and social benefits as a result of addressing institutional weaknesses, but reduced relative to Option 3 Increased level of burden sharing Increased engagement of civil society Increased focus on addressing increasing	Substantial Increase in environmental benefits related to nature and biodiversity Increased level of responsibility sharing in relation to environmental assets Increased engagement of civil society around nature and biodiversity Increased focus on

Specific objective to be achieved/ problem addressed	***Option***				
	Zero	***Baseline***	***Programme***	***Restricted***	***Nature***
			society Increased focus on addressing increasing risks from growing problems	risks from growing problems	addressing increasing risks from loss of biodiversity and climate adaptation
Summary of disadvantages and risks of policy option (including negative economic and social costs in EU and third countries)	Loss of environmental benefits conservatively estimated to be €600m per year Loss of economic and social benefits, worth at least €1 billion GVA Loss of burden sharing Loss of engagement of civil society in EU policy Long-term risks from failure to address growing problems		Tighter focus may require some adjustment from current programme – with an increased emphasis on addressing institutional weaknesses	Tighter focus may require some adjustment from current programme – with an increased emphasis on addressing institutional weaknesses Lack of eco-innovation results in a slightly negative economic impact compared to baseline	A substantial loss of environmental benefits as a result of addressing institutional weaknesses in the rest of acquis A reduced level of responsibility sharing in relation to transboundary problems A loss of engagement with civil society in relation to the acquis Modest economic and social costs associated with lack of investment in technical solutions and the management of pollution
Essential accompanying measures	None		Well defined and active explanation of the changes in the option to MS and potential beneficiaries		
Feasibility: Issues raised in stakeholder consultations	General concern of lack of		Avoid loss of good demonstration projects as a result of too tight a policy focus		

Specific objective to be achieved/ problem addressed	*Option*				
	Zero	*Baseline*	*Programme*	*Restricted*	*Nature*
	action				
Feasibility: Issues raised by Member States	General concern of lack of action		Ensure any changes from current approaches are well sign-posted in advance Limit changes within the programme period		

4.2 Comparison of option scores

The scores provided have been normalised, with a score from 0 to 10 and the baseline option set to 5 points, and summarised in Table 4.2 below. The weighted scores (with equal weights throughout) are summarised in Table 4.3.

Table 4.2 Normalised scores for each option assessed against the baseline score of 5

Assessment criteria	weight head criterion	weight sub-criterion	normalised score by option			
			1	3	4	5
I specific objectives	20					
I.a – policy development		16.7	3.3	10.0	7.8	5.6
I.b – policy implementation		16.7	1.0	10.0	7.0	4.0
I.c – policy integration		16.7	3.8	10.0	10.0	6.3
I.d – mainstreaming		16.7	3.8	10.0	8.8	6.3
I.e – solidarity – assets		16.7	2.5	10.0	10.0	6.3
I.f – solidarity – pollution		16.7	2.5	10.0	8.8	3.8
II environmental impact	20					
II.a – policy changes		33.3	2.2	10.0	7.8	4.4
II.b – eco-system changes		33.3	0.0	10.0	8.9	10.0
II.c – pollution changes		33.3	1.1	10.0	7.8	1.1
III economic impact	20					
III.a – technology		33.3	1.3	10.0	2.5	1.3
III.b – sales / GVA		33.3	1.4	10.0	7.1	4.3
III.c – Cost savings		33.3	1.7	10.0	6.7	6.7
IV social impacts	20					
IV.a – NGO contribution		20	1.3	10.0	10.0	3.8
IV.b – Human health		20	0.0	10.0	10.0	4.3
IV.c – Employment		20	1.7	10.0	8.3	5.0
IV.d – Distribution		20	2.5	10.0	10.0	5.0
IV.e – Fundamental rights		20	10.0	10.0	10.0	10.0
V financial costs	20					

V.a – EU costs	50	10.0	0.0	0.0	0.0
V.b – MS costs	50	10.0	0.0	0.0	3.7

Table 4.3 Aggregated weighted scores (equal weights throughout)

Assessment criteria	Options			
	1	3	4	5
I: achieving specific objectives	2.8	10.0	8.7	5.3
II: environmental impact	1.1	10.0	8.1	5.2
III: economic impact	1.4	10.0	5.4	4.1
IV: social impacts	3.1	10.0	9.7	5.6
V: financial costs	10.0	0.0	0.0	1.8
Weighed total score	3.7	8.0	6.4	4.4

Table 4.4 Comparison of option scores

Options		Score
1	Zero option	3.7
2	Baseline	5.0
3	Strategic programming option	8.0
4	Restricted activities option	6.4
5	Restricted thematic (nature) option	4.4

The comparison of assessment scores across all the assessment criteria and summarised in Table 4.4, confirms that the Strategic Programming option (Instrument option 3) is the best option. Inspection of the scores also indicates that it is the better option on all criteria, other than cost. The next best option is the restricted activities option.

4.3 Sensitivity Analysis - Weighting of criteria in the options assessment

The comparison of options and the ranking of options on the basis of the assessed scores against the range of criteria provides the results presented above. This approach has assumed equal weight is given to the different criteria (objectives, the three sets of impact indicators and costs).

The sensitivity of the ranking of options can be assessed by examining the effect of using a different set of weightings applied to the criteria. These alternative weightings provide an assessment of how robust the ranking is to changes in weighting, by changing the scores calculated for each option. Table 4.5 illustrates the different weighting systems used in this process.

Table 4.5 Overview table of alternative weighting systems

Assessment criteria	Alternative weighting systems				
	Baseline Assessment	Objectives	Environmental Impacts	Costs	Implementation
Achieving Specific Objectives / Addressing problems	20	80	20	30	80 (of which 60% is attached to the specific objective addressing implementation)
Environmental Impact	20	5	55	10	5
Economic Impact	20	5	10	10	5
Social Impacts	20	5	10	10	5
Financial costs	20	5	5	40	5
Total weight	100	100	100	100	100

4.3.1 Rationale behind weighting each option

The weighting systems allow an assessment of the effects on the ranking of options of different weighting systems. Four alternative weighting systems were used to reflect different perspectives on the importance of the different assessment criteria and to compare against the 'equal weighting' system:

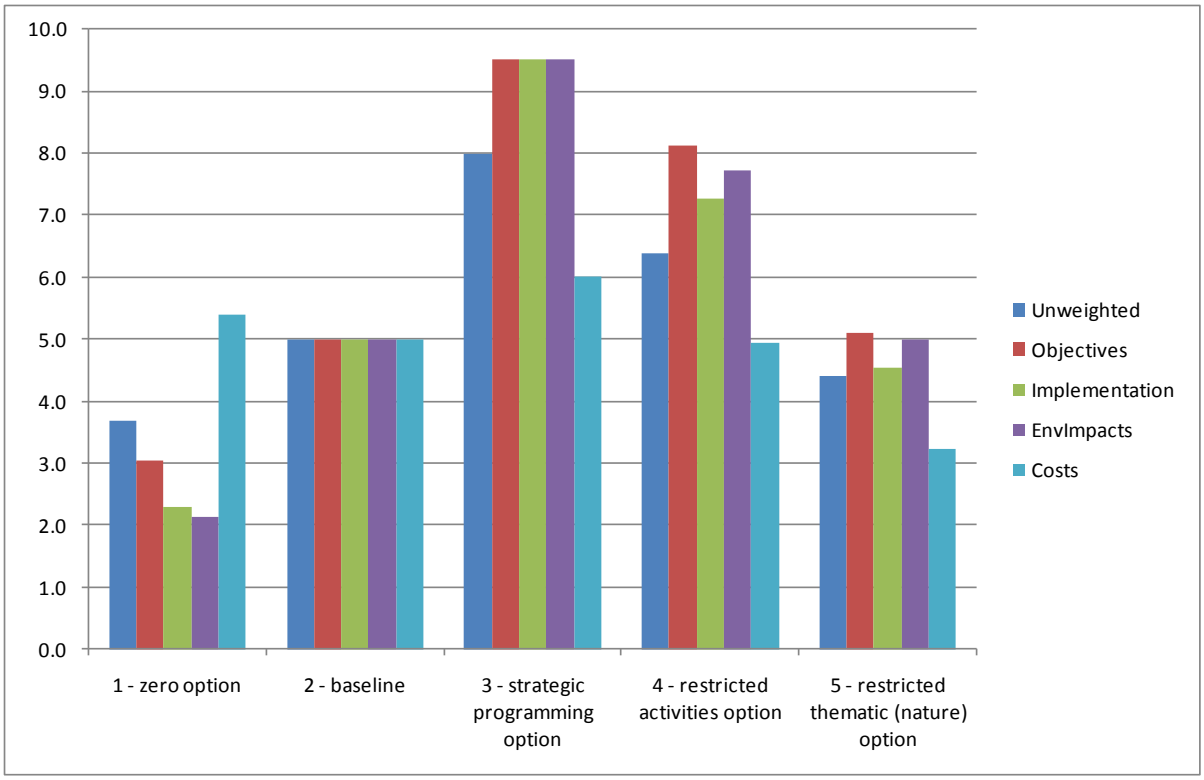
- Objectives – this assumes that the ability to achieve the agreed objectives is the most important criterion in scoring the options
- Environmental Impacts – this assumes that the impact of the options on the environment, is the most important criterion, given the purpose of the instrument
- Cost – this assumes that the cost of the option (which is the same for each option) is the most important criterion
- Implementation – this assumes that the ability to address the problems of policy implementation is the most important criterion

4.3.2 Weightings applied to options

The results in terms of the different scores for each option as a result of the different weighting systems are illustrated in Figure 4.1. This indicates that the alternative weighting systems change the ranking of options compared to that provided using the baseline assessment using equal weights. However, the score obtained by Option 3 is the highest score of all options under all of the different weighting systems. This indicates that the identification of Option 3 as the preferred option is robust to changes in the weighting applied to the assessment criteria.

The highest score obtained by Option 3 is under the objectives and implementation weighting systems; the lowest score is obtained when weighting costs, although the option still scores highest of all options under this weighting system.

Figure 4.1 Weighting of the criteria across options



Source: GHK analysis

5 Assessment of the preferred option

5.1 Description of the option

Option 3 has been assessed as the strongest option against the range of assessment criteria. This option scores highest on all criteria, reflecting the trade-offs associated with Options 4 and 5, and the scope to improve EU added value compared to the baseline scenario (Option 2). It has been shown that the same activities and results cannot be obtained through other financial instruments (the Zero option, Option 1), subject to the current uncertainties associated with the negotiation of the next Multi-Annual Financial Framework (MAFF).

The individual option assessments suggest that although Option 3 is the strongest there are a number of minor changes that would improve Option 3 as the preferred option:

- Option 1: this option assessment indicates that there is some uncertainty over the availability of funds from other sources in the next programme period, especially FP8, that could possibly fund certain aspects, especially environmental research and eco-innovation. On balance, at the present time it is considered unlikely that the scope will increase, but this is dependent on whether FP8 makes specific provision for the environment; and includes investment in science for policy-making as well as the market. If this were to be the case it would argue for a minor revision to the EPG allocations in Option 3, with less allocated to Type A and D projects;
- Option 3: this option assessment demonstrates the potential for increased contribution from a marginal increase in funding (from 3% to 4%) in the context of the strategic programming approach, to allow additional NGO capacity to respond;
- Option 4: this option assessment indicates that although only a modest component, the separate INF strand provides little added value as a standalone set of projects; and that the emphasis should be less on communication per se than on the actual take-up of results;
- Option 5: this option assessment indicates that the expansion of the Nature component provides increased benefits from the wider biodiversity related activity, and argues for ensuring that the Nature activities are not overly constrained by a focus on N2K sites. They also argue for larger projects with broader scope and scale.

The preferred option is detailed in Table 5.1. This preferred option includes provision for adjustments depending on the outcomes of policy developments (e.g. future FP8) especially with regard to eco-innovative projects. Since discussions about innovative financial instruments and support to eco-innovation have not been finalised this preferred option is flexible enough to adjust to these future decisions.

Table 5.1 Description of Preferred Option – Strategic Programming Option

Dimensions of Instrument Options	Comment
Stage 1: Objective Definition: Definition of policy needs and objectives taking account of alternative instruments	
Scope: Thematic and territorial focus of the option including reference to the need for action outside the EU	The thematic focus of the option would reflect the general objective of developing, updating and implementing EU environmental policy. Thus it would seek to address emerging problems of EU scale and the whole of the environmental acquis. The option would continue to focus, given the limited funds compared to the scale of the environmental problem ,on institutional weaknesses by awareness raising, support for innovation and demonstration, learning and knowledge exchange, linked to the identification of opportunities and solutions for the

	improvement and the use of good practice in the development of EU environmental policy and its implementation at MS level Given the Treaty requirements for international action, as well as the importance of global environmental and European neighbourhood problems an explicit role in co-operation with DG RELEX and DG DEV would be included, together with direct interventions with third countries where it provided EU added value An initial budget would assume continuation of existing commitments of €300 million a year. However, considerable scaling up would be possible and would deliver improved cost-effectiveness
Processes: consideration of role of the option given alternative instruments	The intended programme of results of the option is not capable of being funded by other financial instruments. The option takes a pro-active approach to co-operation and the development of synergy with other funding instruments, by introducing integrated projects and looking to support project pipelines. A clear focus on piloting and demonstration of activities to support future project pipelines, and subsequent roll-out through the other funding instruments, especially through CP and CAP The majority of EC funding in response to environmental problems and especially the investment needs of the existing acquis will continue to be met by Cohesion Policy The importance of ensuring environmental policy integration results in actual environmental improvements on the ground is also recognised, as endorsed by the Cardiff process
Stage 2: Design: Design of the intervention taking account of target actors, and desired outcomes	
Approaches: Top-down programming vs bottom-up project funding	The requirements for activities is defined in the EU strategic statement of objectives for the programme period, and more fully reflected in the multi-annual work programmes. The work programmes of the thematic units will reflect in part the Directive by Directive decisions made with MS through comitology. The work programmes will also specify the desired use of the alternative delivery mechanisms and the expected outcomes Public procurement – activities are defined and planned through DG Annual Management Plans (AMPs) Operating Grants – EU level activity by NGOs Action Grants comprising: Top-down projects Bottom-up local and regional project activity in MS Integrated Projects Technical Assistance – (based on the JASPERS instrument)
Levels of intervention: target beneficiaries, intervention rates, funding levels	The target beneficiaries are the Commission (through funding for public procurement), EU environmental NGOs (through use of Operating Grants), MS through 'top-down' projects, and MS actors (competent authorities, universities/research institutes, businesses, NGOs), through 'bottom-up' project activity Public procurement (100%) of goods & services includes information and communication, and the preparation, implementation, monitoring, checking and evaluation of projects, policies, programmes and legislation Operating Grants with a maximum intervention rate of 70%, to strengthen the participation of EU environmental NGOs in the dialogue process in environmental policy-making and in its implementation; and in the European standardisation process Action grant projects as the basis of the full range of outputs, comprising - Top-down projects with an intervention rate of 70% - Bottom-up projects with an intervention rate of 50% - Integrated projects with an intervention rate of 75% - Technical Assistance (with an intervention rate of 100%) to support the design and submission of integrated projects.
Budget: The approximate scale of budget required	Minimum budget is €300 million per year

Stage 3: Operation: Detailed specification of the operation of the instrument	
Delivery systems: use of different types of Grants / funding	Public procurement – activities are defined and planned through DG Annual Management Plans (AMPs), combining those of DG ENV and DG CLIMA and subject to standard public procurement rules Operating Grants – allocated via calls launched and appraised by DG ENV, supported by appointed National Contact Points (NCPs) in MS to disseminate details of the call and to assist applicants Action Grants – allocated via annual calls for projects. Launched and appraised by DG ENV, supported by NCPs Specific sub-components to maximise EU added value and to reflect budget provisions (Nature & Biodiversity; and Environmental Policy & Governance) Technical Assistance for Integrated Multi-funded Projects (minimum size of say €5m) – allocated via annual pre-application call for proposals, launched and appraised by DG ENV, supported by NCPs
Implementing methods: centralised within the EC, Agency, decentralised within MS	The option is centrally managed directly by DG ENV in accordance with EC financial regulations and under agreed comitology. Specific components related to climate action would be managed by DG CLIMA using management modes to be further determined by the separate Impact Assessment of those components of a programme. Technical Assistance is used by the EC for support in appraising and monitoring Action Grant projects and related training and communication activities as well as supporting the selection and monitoring of operating grants.

5.2 Programme budget and project activity

5.2.1 Constant budget and project activity

The indicative resource allocation for the preferred option is summarised in the table below.

Table 5.2 Indicative resource allocation for the preferred option – constant budget

Preferred	**€m**	**300**				
Element	**Allocation**		**EC contrib.**	**Co-finance share**	**Total funding**	**Change from base**
Public Procurement	19%	57	57	100%	57	0%
Operating Grants	4%	12	12	70%	17	33%
Action Grants	77%	231				
of which	Nature	50%	116	50%	231	-1%
	EPG	50%	116	50%	231	10%
of which	*A*	10%	12	50%	23	-25%
	B	45%	52	50%	104	90%
	C	20%	23	50%	46	96%
	D	25%	29	50%	58	-43%
	INF	0%	0	50%	0	-100%
Total			300		536	0%

This assumes a constant budget of €300m per annum from the baseline scenario, of which €231m is allocated to Action Grants, divided equally between Nature and EPG strands. In the light of the limited added value from standalone information projects and the introduction of Top-down project and Integrated Projects, which provide for improved awareness raising

and communication this strand has been removed and funding allocated to EPG. The change from the baseline scenario is indicated in the final column.

Re-allocation of funding between activities

Analysis of the Zero Option showed that the EPG strand funds a variety of different activities (Annex 2), which can be categorised broadly into four areas: researching environmental problems, environmental policy improvements, environmental integration and eco-innovation activity; which map directly on to the specific objectives of the instrument (as elaborated in the intervention logic). Under the baseline scenario (Table 3.4) almost half of the EC funding contribution is allocated to eco-innovation, with a quarter for policy improvement, and the rest roughly split between funding the measurement of environmental problems and funding solutions to aid environmental integration. The table also identified other possible funding instruments that might fund at least some of the activities, especially in the case of FP7 / FP8 for the measurement of environmental problems and related eco-innovation responses.

Given the analysis of the range and scale of institutional problems, and alternative funding instruments, this allocation and specification of activities has been re-specified to maximise EU added value. In particular the Preferred Option, building on Option 3, would seek to allocate funding more in line with the weight attached to different institutional problems;

- Environmental problems – 10%
- Improvements in environmental policy – 45%
- Integration of environmental policy – 20%
- Non-commercial eco-innovation – 25%

The added value of LIFE is therefore increased by concentrating the resources of the EPG strand on environmental policy improvements, which relates largely to the development of action plans, management plans and strategies at the level of a competent authority or municipality; and on funding environmental solutions that can help integration directly and through being mainstreamed in the major funding instruments.

This reallocation reflects the attempt to better align programme activities with the range of specific objectives and the underlying set of institutional weaknesses. The major change is the switch in emphasis from eco-innovation to improvements in environmental policy. Already from LIFEII to LIFEIII and subsequently from LIFEIII to LIFE+ there has been a shift from innovation projects towards projects that promote demonstration and implementation of EU policies thus increasing the EU added value of the LIFE+ programme.

In the case of eco-innovation, the option recognises the current concern that there should be a clearer distinction between the activities funded under the specific instrument and other eco-innovation activities that might be funded under other financial instruments. To this end the activity under the specific instrument for the environment is focused on activities, undertaken mainly by the public sector or universities rather than businesses, that are non-commercial in nature; i.e. where there is no commercial interest and no major prospect or intention of generating a financial return, but which may have long-term benefits for the activities of competent authorities.

The activity would be directed to testing and demonstrating / developing a technology / technique / process / product that reduces environmental impacts and supports the need for environmental compliance, and especially to go beyond Community standards, or which increase the level of environmental protection in the absence of Community standards, within a municipality or sector. This change may, somewhat paradoxically, reduce some of the wider economic and social impacts associated with the baseline scenario, although this should be offset by increased levels of environmental benefits through a greater focus on non-commercial activities, mainly by public sector bodies

In the case of activities of that seek to improve environmental policies, especially the rigour and efficiency of implementation, these build on current and past activities of this type (see

examples below). The main difference is that the activities should more fully reflect EU policy priorities, in response to the underlying weaknesses.

Project type and scale for Action Grants

As described in option 3, four types of projects are proposed:

- Integrated projects (EC contribution €10m) – large scale activity designed to address a major challenge and involving the need to integrate a range of economic, social and environmental objectives, supported by other funding instruments;
- Top-down projects (EC contribution €1m) – designed to formally recognise the need for cross MS participation in mutual or peer to peer learning in compliance and enforcement;
- Bottom-up projects (EC contribution €1.5m) – representing the 'classic' project as contracted under the baseline scenario, although slightly larger;
- Technical assistance (TA) projects (EC contribution €0.25m) – designed to support the costs of preparing the Integrated projects.

Summary of the preferred programme

Based on this budget and planned allocations, Table 5.3 summarises the number, size and types of projects that would best lend themselves to addressing the specific objectives and the underlying institutional weaknesses.

The programme of around 100 projects per year, plus 10 TA projects is roughly half that under the baseline scenario. This potentially implies a lower level of programme management cost. However, any cost savings from the reduction in the total number of projects is offset at least in part by managing the Integrated Projects.

Table 5.3 Indicative outline of the annual number, size and types of projects funded by Action Grants with the preferred option (€231m) at 2011 prices

	Type of project				
	Integrated	**Top-down**	**Bottom-up**	**TA**	**Totals**
Nature (No of projects)	6	6	32	6	50
EPG (No of projects)	4	12	42	4	62
Total Projects	10	18	74	10	112
Average size (€m)	13.3	1.4	3.0	0.25	3
Total EC Spend (€m)	100.0	18	111	3	232
Share of Spend (%)	43%	8%	48%	1%	100%

Source: GHK own proposals

Impact of the Option (constant budget)

The budget, intervention logic, the range of specific objectives, and the range of project activities are the same as in Option 3. The main differences in the preferred option to Option 3 are the removal of a separate Information & Communications strand, the readjustment in the EPG allocation and a slight increase in the budget from 3% to 4% for NGOs.

The estimated increase in added value of Option 3, was in the order of 20%. It is assumed that the adjustments in the allocation and targeting of resources would increase this

additional impact. However, the introduction of the large Integrated Projects has the potential, by reducing the number, to undermine the critical mass and the related multiplier effects of the smaller projects, especially for EPG, given the breadth of the acquis.

It is also questionable that, given their potential, 10 Integrated Projects per year is enough to adequately address the range in the scale and number of challenges.

As a result the preferred option has the risk, with a constant budget, of 'falling between two stools' – neither introducing enough Integrated Projects to make a difference nor funding enough of the more 'traditional' projects to maintain current levels of activity. This suggests that the option will not be effective without a larger budget and that the programme does not achieve critical mass.

5.2.2 Impacts of an increase in the budget – building critical mass and enhanced catalytic effects

Instead of starting with the budget, the funding requirement can be considered from the perspective of 'what will it take' to produce a step change in the impact of the programme.

Integrated Projects

The number of projects required relates to the relevant territorial 'units' for each environmental theme as the basis of establishing an adequate number of projects.

Nature – The relevant unit is the NUTS 2 region, in which to ensure adequate nature protection and biodiversity measures. This also has the merit of linking directly to possible regional funding. There are 271 NUTS regions. Assuming that the minimum level of action is required, in the form of one Integrated Project for nature conservation, in say a quarter of the regions over a 7 year programme period, the required number of projects would be 10[62].

EPG – The relevant unit depends on the environmental theme. Priority areas for activity would include:

- Waste management – the appropriate unit is also probably the NUTS 2 region, given the nature of regional waste management plans. Perhaps 10% IP activity over the programme would provide a minimum level of catalytic effect – say a minimum of 4 projects a year;
- Water management – the appropriate unit is the river basin district of which there are 110. Given the important issues associated with transposition and implementation of the Water Framework Directive (WFD), and the interest in ensuring cross-compliance with the WFD as a condition of regional funding, then a greater share of 'units' should be covered – say 25%. This would require a minimum of say 4 projects a year;
- Air quality management – activity in large cities to combat urban air pollution (e.g. particulates, low level ozone and nitrogen dioxide) would also benefit from the use of Integrated Projects. Building on the 2013 European 'Year of Air', 3 IP projects a year would allow action in 20 of the most polluted EU cities.

EPG would require a minimum of 10 projects a year if the use of IPs was to really tackle the institutional weaknesses that underpin the lack of adequate policy implementation and effective policy integration.

Top-down projects

The purpose of the top-down projects is to enable greater national and cross-MS working on common policy issues, especially of compliance promotion and enforcement at the national level, together with some specific awareness raising activity. The indicative range of 18 projects a year (6 Nature and 12 EPG) in the constant budget programme is probably of an appropriate scale. Over the programme each MS may on average have been involved in between 4 and 5 projects.

[62] 25% of 271, divided by 7 (assuming a 7 year programme period)

Bottom-up projects

The traditional LIFE projects require a substantial scale of activity across projects in order to generate scope for synthesis and replication and the generation of multiplier effects.

Nature – The current programme has about 90 projects a year, mainly relating to the Natura 2000 network. Whilst the introduction of the Integrated Projects reduces the need for the same number of projects; the minimum requirement would be to maintain half of the current bottom-up activity, 63 projects per year.

EPG - The current programme has about 90 projects over 10 environmental sectors, an average 9 per sector per year. This would appear to be, based on the MTE, the minimum number required in order to facilitate the creation of lessons and replication. Under the preferred option, the number of sectors may reduce to say 6 to generate a stronger focus. At the same time the intention is to increase the average size of projects and to secure stronger networking of project activity. Taking the number per sector required as the basis of a strong multiplier effect as no less than 10 projects per sector, with say 6 sectors[63], a minimum of 60 projects would be required.

Taking the minimum requirements above, this translates into a budget requirement of €408m per year (Table 5.4).

Table 5.4 Indicative outline of the minimum annual number, size and types of projects funded by Action Grants with the preferred option to achieve a 'step change' (2011 prices)

	Type of project				
	Integrated	**Top-down**	**Bottom-up**	**TA**	**Totals**
Nature (No of projects)	10	6	63	10	89
EPG (No of projects)	10	12	60	13	95
Total Projects	**20**	**18**	**123**	**23**	**184**
Average size (€m)	13.3	1.4	3	0.25	4
Total EC Spend (€m)	200	18	185	5.75	408
Share of Spend (%)	10	6	63	10	89

Source: GHK own proposals

This programme would represent an increase in annual grant funding of €177m (an increase of 76%). Given resource constraints, such an increase appears unlikely.

Based on the growth of EU Gross National Income (the basis for establishing the growth in the EU budget) of some 40% since the establishment of the current programme, a 'standstill' budget for the next period would be in the order of €324m grant funding.

Taking this as the budget constraint, then an indicative programme, that seeks to optimise against the minimum requirements discussed above might be as presented in Table 5.5. This also recognises the political interest in having an equal share of the budget between

[63] Environmental sectors (excluding nature, biodiversity & soil) could be grouped into Air & Emissions, Climate change, Green economy & Resource efficiency, Chemicals, Environment & Health (including noise), Water, Waste

Nature and EPG. The resulting programme comprises 114 projects (excluding TA projects), of which 18 are Integrated Projects, accounting for 56% of the programme.

Table 5.5 Indicative outline of the annual number, size and types of projects funded by Action Grants with the preferred option with a 'standstill' budget (2011 prices)

	Type of project				
	Integrated	**Top-down**	**Bottom-up**	**TA**	**Totals**
Nature (No of projects)	9	5	43	9	66
EPG (No of projects)	9	5	43	9	66
Total Projects	**18**	**10**	**86**	**18**	**132**
Average size (€m)	13.3	1.4	3	0.25	3.9
Total EC Spend (€m)	180	10	129	4.5	324
Share of Spend (%)	56%	3%	40%	1%	100%

Source: GHK own proposals

The impacts of this resource constrained programme would be expected to increase at least in proportion to the increase in budget. However, even with the resource constraints, because of the scope to expand the use of the programme in the directions noted above, the EU added value is expected to increase by more than the budget.

5.3 Management options

This section provides an analysis of the costs and benefits associated with managing the preferred instrument. The management options considered are:

- centralised management through DG Environment, supported by Technical Assistance (TA) to provide capacity for the appraisal of bids and subsequent project monitoring; and
- an Executive Agency (with and without) the use of Technical Assistance.

The comparison considers both the relative costs of the two options and the implications for managing the programme and its subsequent quality.

For the purpose of the comparison we have based the costs on the following programme:

- Average programme spend per year (EC contribution): €234m
- Approximate number of projects commissioned per year: 200
- Average length of time of a project: 4 years
- Approximate number of projects operating per year: 600 (with a peak of over 700)
- Average total project size: €2.4m
- Average intervention rate: 50%
- Average staff required: 44 fulltime equivalent posts
- Average technical assistance: €10m

The comparison excludes overheads associated with staff posts (office costs, staff training) since these are assumed to be the same for the Commission and the Agency.

5.3.1 A centralised management approach

5.3.1.1 Staffing costs

The staff requirement of 44 full-time equivalent posts is based on the following specific functions:

- Management group (4 employees): consists of the Head of Unit (HoU) and the Deputy Head of Unit (DHoU) for two LIFE units. The HoU operates as the authorising officer; signs all payments, is responsible for all contractual issues and the general personnel management of the Unit. The Deputy Head of Unit (DHoU), as operational verifier, is in charge of technical aspects, cooperation with thematic Units in DG Environment and the Unit Management Plan.
- LIFE Units' Technical Desk Officers (TDOs) (19 employees) whose main tasks relate to:
  - Managing the project selection process
  - Monitoring: Each TDO is responsible for approximately 40 projects.[64] This includes following project progress, project visits, handling amendments and extensions and communication/dissemination activities
  - Additionally they undertake horizontal tasks (thematic correspondent, information/conferences, part of working groups etc.)
- LIFE Units' Financial Desk Officers (FDOs) (11 employees) - are involved in both selection and monitoring. In relation to selection, their main tasks are to evaluate the proposals' financial coherence. In relation to monitoring, their main tasks are connected with payments and budget changes. Each FDO typically manages approximately 70 projects. Senior FDOs act as financial verifiers.
- LIFE Unit Administration (8 employees) - provides administrative support and document management services for primarily the desk officers, and carries out specialised secretarial tasks involving dissemination. They are also responsible for administering the annual call for project proposals.
- LIFE Unit Financial Administration (2 employees) - undertakes financial administration. All financial documents (requests, signed contracts, payment requests) go through and are registered digitally by the secretariat.

The TDOs and FDOs are organised in country desks. Each TDO and FDO is responsible for the project portfolio within one or more countries.

The 44 posts consist of 36 permanent and 8 contract staff. Based on DG BUDG figures of staff costs (average cost of DG staff in 2010 is €127,000 and €64,000 for permanent and contract staff respectively), this equates to €5.1m in staff costs (excluding overheads) per annum.

5.3.1.2 Use of technical assistance

External contractors provide technical assistance, with an average cost over the programme period estimated to be approximately €10m per annum. This finances the following activity:

- Project Selection: a total of 55, mainly part-time, experts during the project selection period (working on all stages of the evaluation and selection procedure except eligibility);
- Project Monitoring: approximately 60 monitors undertaking the monitoring of all projects funded:
- Communication: 15 environment and communications experts responsible for the production and circulation of thematic and best practice publications, the development

[64] COWI (2009) Ex-Post Evaluation of Projects and Activities Financed under the LIFE Programme

and maintenance of the LIFE website, including maintaining the LIFE project database, and the organisation of seminars and events.

- Information workshops: implementing information workshops on preparing LIFE+ project proposals and managing LIFE+ projects in collaboration with the Member States.

In total, over 130 external contractor employees assist on selection, monitoring, communication and dissemination of the LIFE Programme, approximating to say 80 fulltime equivalent posts. According to the mid-term evaluation of LIFE+, the current level of involvement of external contractors was considered to be optimal, with no further outsourcing required.

External contractors have made many direct changes which have led to a significant decrease in the administrative burden associated with the management of the Programme. For example, in 2008, Agreco introduced a person specifically responsible for assisting the LIFE Nature and Biodiversity group coordinator during the Selection and Award phase to, amongst other things:

- Contact evaluators falling behind schedule.
- Keep track of ESAP to ensure it was being properly filled in.
- Liaise with persons responsible for translations and the conformity check between applications and the EU Natura 2000 database.
- Respond to significant differences in scores by starting facilitation between evaluators for finding agreement on minor technical disparities.

5.3.1.3 Cost of Programme Management as a % of Programme value

The number of full-time equivalent posts to manage all aspects of the programme is therefore approximately 125 full-time equivalent posts. The total administrative cost of the option is the sum of staff costs (excluding office overheads) and the cost of outsourcing (technical assistance); just over €15 million (€15,084,000). This represents 6.2% of the total annual programme budget[65].

5.3.2 Agency option

5.3.2.1 Use of an existing Agency

The Commission has decided not to create any additional executive agencies unless there are new Commission competencies up to 2013 and instead to make use of the possibility to extend the mandate of existing agencies. This 'extension' option is the basis of this management option. This means that there are no set-up or initial investment costs. However, the transfer of staff, dossiers and recruitment of staff would all still require a significant amount of effort from the parent DGs.

The most likely 'candidate' existing Agency that would 'take on' responsibilities relating to the management of the specific instrument is the Executive Agency for Competitiveness and Innovation (EACI), which is responsible for implementing part of the 'Competitiveness and Innovation' framework programme and Marco Polo II.

The feasibility of using the Agency has not been examined in detail, but might be considered feasible on the basis that

- The majority of the staff in the Agency (up to 75%) can be contract posts that cannot last more than 5 years and are significantly cheaper (see section below)

[65] Estimated to be €244 million (annual EC contribution to action grants and expenditure on technical assistance)

- The recruitment of such contract staff of a high quality and technical capability is not likely to be difficult given past evidence[66]. The Agency employees could therefore undertake the bulk of work that is currently undertaken by the LIFE Unit staff:
  - Management tasks – specific tasks relating to programme management such as financial and administrative management e.g. payment processing (and finding ways to improve the processing)[67];
  - Programme implementation e.g. ensuring reports processed within deadlines and selection of projects takes place on time;
  - Communication and dissemination activities currently undertaken by the LIFE Communications team;
- The same number of staff (44) could be applied to an Agency, as well as allowing for 8 additional staff in DG Environment (for supervision and monitoring of the programme);
- In addition there will be an additional staff requirement related to supplying additional administrative services (human resources etc) to the new Agency staff of 44 posts. Applying a ratio of 1 administration job for every 5 new posts adds a further 9 posts making the total staff requirement of 61 (8+44+9) fulltime equivalent posts;

5.3.2.2 Number of Agency Staff and Costs

Based on 61 posts (excluding TA) the annual staff costs would be €5.0m (Table 5.6).

Table 5.6 Number of Agency Staff and Costs

Category of staff	Number of posts	Cost of post (ex overheads) per year (€)	Total cost(€)
Seconded officials	9	127,000	1,143,000
Contract staff	35	64,000	2,240,000
DG ENV management	8	127,000	1,016,000
Administrative staff	9	64,000	563,200
Total	61		4,962,200

There are also additional overhead costs (eg office costs) associated with the 17 (61-44) additional posts. Assuming an overhead cost of €25,000 per post this would add a further €0.4m, making a total staff related cost of €5.4m. This is slightly more than centralised management option and means that there are no cost savings from the Agency option.

The use of contract posts in the Agency also 'frees up' the Commission's human resources in terms of 'saving' permanent posts and allowing for the re-allocation of them elsewhere within the Commission, which in itself reduces the need for contract posts.

The Agency option would free up 19 posts; of which two thirds would be ASD posts and one third, say 6, would be AD posts.

5.3.2.3 Replacing technical assistance

If the existing technical assistance under the centralised option is replaced it would require a broad range of geographical and thematic expertise, as well as full coverage of the EU

[66] See Technopolis (2006), 'Cost Benefit Analysis of the externalisation of the certain tasks regarding the implementation of the Competitiveness and Innovation Framework Programme (2007-2013) through an executive Agency'

[67] According to the European Court of Auditors Special Report No. 13, 'Delegating implementing tasks to Executive Agencies: a successful option?' (2009), the contracting time for the 'Public health' programme dropped from 345 days to 219 when managed by an Agency; payment period shortened from 503 to 91 days and approval time for technical/financial reports dropped from 90 to 42 days

languages. Although hiring new Agency employees to undertake this work entails some costs associated with the recruitment of individuals with both language and technical skills, it is likely that these employees could be found, given the current labour market situation and supply of high-quality candidates. Assuming that such candidates could do the work of the technical assistance external contractors at the same level of effectiveness and efficiency, then at an annual staff cost of €64,000, the additional 80 fulltime equivalent contract posts would cost €5.1m. There is also a requirement for additional administrative posts. Assuming the same ratio of one administrative post to five new posts would add a further 16 posts. The total staff cost would be €6.1m.

In addition there would be overhead costs of €25,000 for the additional 96 posts, adding a further €2.4m,

Since the staff would be based in Brussels there would be the additional mission costs currently avoided by using contractor staff based in the Member States. These costs are estimated to be in the order of €0.7m based on 700 trips per year at a €1,000 a trip.

The costs of replacing the Technical Assistance activity by Agency activity would on this basis cost in the order of €9.2m, a saving of €0.8m per year.

5.3.2.4 Cost of the Agency (including replacement of Technical Assistance)

The total cost of this option, with the replacement of external assistance, would be €14.6m, representing 6.0% of the programme budget; a saving of €0.5m (3.0%) on the centrally managed option.

The costs do not however, take account of the high mobility of staff in the Agency (2.5 year length of service on average)[68] and consequent need to re-invest in recruiting/training of new staff and the efficiency loss due to the non-productive months resulting from the turn-over of new staff. Based on a contract staff requirement of 115 (35+80) posts, the staff turnover over a 7 year programme, would require the recruitment and training of the workforce twice over (230 posts).

Based on a cost of recruitment and training of say €10,000 a post, the staff turnover would cost some €2.3m over the programme (€330,000 a year), bringing the total cost to €15m, the same as the centralised management option.

The cost saving estimated above excludes other costs that are difficult to quantify:

- kick off costs necessary to transfer the activities and start the new business in the agency;
- costs associated with establishing a team of experts with the expertise that has been developed for the current programme;
- costs associated with developing any associated programme support (e.g. database and related reporting systems, such as a potential replacement for BUTLER);

5.3.2.5 Summary cost comparison

The various cost estimates for the three options are summarised in Table 5.7, below.

Table 5.7 Summary of the annual cost estimates (€m) of the different management options

	Management options		
Category of cost	**Centralised Management**	**Agency (with Technical Assistance)**	**Agency (with no Technical Assistance)**
Staff costs (€m)	5.1	5.0	11.1

[68] Draft Impact Assessment of EACI, CSES, 2011

Additional overhead costs (€m)		0.4	3.1
Technical assistance (€m)	10.0	10.0	
Mission costs (€m)			0.7
Total cost (€m)	15.1	15.4	15.0
Total cost as % of programme	6.2%	6.3%	6.1%
Total saving (€m) compared with Centralised Management option		-0.3	0.1
Saving as % of Centralised Management option		-2.0%	0.9%

The estimated cost saving of €0.1m associated with the full Agency option, given the uncertainties and costs excluded from the comparison which cannot be quantified, are likely to substantially overstate the saving; and indeed it is probable that the full Agency option would cost more.

5.3.3 Other issues

5.3.3.1 Weaknesses in cost comparisons of Executive Agencies

It remains difficult to undertake a truly accurate comparison of management costs associated with a direct centralised management option by DG ENV and an Executive Agency option. In quantitative terms, the Court of Auditors report highlighted the difficulties of undertaking a detailed cost-benefit analysis (CBA) of the Executive Agency option, and that it resembled more of a 'cost comparison' than a 'proper CBA' for a number of reasons:

- Emphasis is placed mainly on savings from the use of cheaper contract staff rather than permanent staff but aspects of improved performance and efficiency gains are rarely considered;
- Costs of additional staff needed in the Commission to supervise agencies and at the agencies for horizontal functions, are not accurately included or not included at all;
- Comparison is often made using the single average unit cost for the various categories of contract staff but in practice they vary in grade and therefore cost. Analysis shows the composition of the Commission consists largely of lower grades compared to specialised personnel so this would lead to an overestimation of Commission costs in cost comparisons.

5.3.3.2 Policy connection, the quality of programme management and production of results

The cost savings identified, subject to the uncertainties noted above, provide one argument for the use of an Agency option. The option of an Agency also becomes self selecting, in the case where there is a say a very substantial increase in the budget and the related number of projects (for example say the fivefold increase in the programme proposed by the NGOs), since it is the only solution that can provide adequate resources to DGs Environment and Climate Action given the restrictions on recruiting additional Commission staff.

However, in the case where the level of programme remains similar to current levels, or where the budget increase is associated with a programme using similar or fewer numbers of projects but with a larger average project size, and especially if technical assistance is used because of the importance of maintaining the current networks, the Agency option becomes less attractive on cost savings grounds. The preferred option and related programme of has fewer projects than the current programme and would not need to be transferred to the Agency.

The other strategic consideration is the nature of the preferred option. The preferred option is one which is based on a strategic programming approach, requiring enhanced cooperation and management between the programme and the policy units, and high quality technical support to ensure that replication results are being achieved. As a result there is a risk that the Agency option would undermine the ability of the option to deliver the added value that it is capable of. Savings of up to €1.3m (8%) achieved by moving to an Agency option without technical assistance are highly likely to be outweighed by the loss of EU added value.

Put another way, the quantified environmental impact of the baseline scenario is worth a minimum of €600m a year. The preferred option is estimated to increase the value by at least 20% (€120m) through a strategic programming approach. **If the Agency approach reduced this impact by just 1% (€1.2m), the loss of added value would offset the quantified cost savings of the full Agency option by a factor of ten.**

5.3.3.3 Transition arrangements

It is estimated that there will be around 600 live projects at the end of the programme period. These will need to be managed in line with programme requirements and will incur technical assistance costs. Based on the average project life of 4 years, the current programme will not be completed until 2017. Any transfer of the programme to the Agency would require sufficient staff capacity in DG Environment, and related technical assistance, to be maintained to allow for the required completion of the current programme.

5.4 Monitoring and Evaluation Framework

The monitoring and evaluation framework for the preferred option is based on the intervention logic set out in Section 1 (Figure 1.1). It is also informed by the standard principles, of establishing specific, measurable, achievable, realistic, and targeted (SMART) indicators; recognising the hierarchy of objectives for the option and related theory of change that underpins the expected results and impacts as a consequence of the funded activities.

The framework also builds on the framework proposed for the current instrument[69] but is revised according to both the new intervention logic and the changes made to the baseline scenario in the preferred option. In particular the framework does not include a separate Information & Communications strand. Neither, since there is no change in the activities undertaken under the public procurement budget, does the framework include these activities.

The framework is summarised in Figure 4.1Table 5.8.

[69] Proposed monitoring and evaluation framework for the LIFE+ Regulation, DG Environment, 2007

Table 5.8 Monitoring and evaluation framework for the preferred option

General Objective: Provide solutions in order to achieve environmental objectives by developing, updating and implementing EU environmental policy.

Specific objectives	Related operational objectives	Types of activities	*Expected outputs*	Output indicators	*Expected Results*	Result indicators	Impact indicators
To improve the scope of EU environmental policy and legislation.	To identify, test and develop policy proposals to current and emerging environmental problems To improve the contributions of environmental NGOs and civil society to implementation, policy making and review	Public procurement of environmental investigation and technical studies defining and scaling problems and identifying possible policy options Public procurement / grant funding of the demonstration of updated and improved policy options Funding of environmental NGOs	*Challenges to the operation of existing approaches* *Expanded knowledge base* *Demonstration of new / updated policy approaches* *Testing of new financial instruments*	No. of reports providing critiques / solutions, by theme, Directive, MS No. of policy options / instruments developed and tested, by theme, Directive, MS No., size, type of NGOs activity (+ subset of indicators required for NGO outputs[70]) Improved environmental awareness of civil society (Eurobarometer)	*Improved environmental monitoring and problem definition* *Policy proposals that improve the scope of EU policy to deal with environmental problems*	Expanded sets of environmental indicators, periodicity & quality of data, by theme, Directive, MS Increase in knowledge base of environmental problems New policy proposals by theme, Directive, MS	Attributable environmental improvements from improved targeting and/or design of policy instruments
To improve the implementation of EU environmental policy and legislation, (including EU commitments to international agreements)	To identify, test and develop policy approaches to improve MS and private sector capacity to better transpose, implement, monitor, and enforce EU environmental legislation To facilitate knowledge sharing of successful	Public procurement of environmental investigation and technical studies of transposition, implementation, monitoring and enforcement problems (including in the context of international commitments)	*Challenges to the operation of existing approaches* *Expanded institutional capacity to implement policy (new skills, expanded knowledge base, new and extended networks of competent authorities)*	No of reports providing analysis of existing institutional weaknesses in relation to policy implementation, and related solutions, by theme, Directive, MS Participation in peer learning networks and replication activities (by MS, themes, number and	*Take-up of new or updated approaches and good practices that improve monitoring, implementation and enforcement of EU environmental policy in MS*	Expanded and improved capacity for implementing EU environmental policies at MS and local levels (changes in No. & quality of relevant competent authority staff) Reported changes	Attributable environmental improvements from increased effectiveness of policy instruments, especially through improved levels of implementation

[70] Additional work is required to fine-tune the NGO indicators to better reflect their role in helping to avoid regulatory capture as well as promoting civil engagement

Specific objectives	Related operational objectives	Types of activities	*Expected outputs*	Output indicators	*Expected Results*	Result indicators	Impact indicators
	environmental policy and practice To improve support for international commitments and management of third country problems To improve the contributions of environmental NGOs and civil society to implementation, policy making and review	Funding of the demonstration of updated and improved policy approaches Funding of good practice demonstration for subsequent dissemination Funding of mutual and peer learning activities and networks Funding of targeted training initiatives Funding of environmental NGOs	*Expanded knowledge base* *Demonstration of updated policy approaches and of good practice policy implementation / enforcement* *Dissemination of good practice – multiplier effects*	type of actors) Participation in training activities (by MS, themes, actors) Dissemination activity of updated and good practice policy approaches, by type of activities (workshops, publications etc) and by theme and type and number of actors Third country involvement in research, demonstration and dissemination activities	*Increased EU contribution to securing international commitments*	and improvements in transposition and implementation procedures Reduced No. of reported infringements of EU legislation Improved quality of EC inputs to international working	Attributable reductions in international environmental problems
To improve the contribution of other EU policies to environmental objectives at implementation level	To identify or realise demonstration projects capable of informing opportunities for improved sectoral performance in achieving environmental objectives To raise awareness of policy makers and economic and social actors of the opportunities for better integration	Funding of the demonstration and dissemination of new or updated approaches to improve environmental performance of key sectors	*Increased awareness of the need and scope for integration* *Expanded institutional capacity (new skills, expanded knowledge base, new and extended networks of competent authorities) to increase integration* *Demonstration of new or updated approaches to improve environmental*	No. of reported policy proposals for improved integration of environmental objectives in sectoral activities, by sector and sub-sector No. of new and updated approaches demonstrated that improve integration and enable economic actors to improve environmental performance, by type of actor, sector, MS	*Take-up of new or updated approaches that improve sectoral environmental performance*	No. of updated approaches that have been used by economic actors to improve environmental performance, by actor, sector, MS, type and number of actors	Attributable reductions in environmental problems as a result of take-up of demonstrated successful approaches

Specific objectives	Related operational objectives	Types of activities	*Expected outputs*	Output indicators	*Expected Results*	Result indicators	Impact indicators
			performance of key sectors *Dissemination within sectors of new / improved approaches – multiplier effects*	Dissemination activity of updated and good practice approaches to integration, by type of activities (workshops, publications etc), by sector and type and number of actors			
To develop solutions for subsequent mainstreaming in other EU financial instruments to support multiplier effects	To identify, test and develop technical and policy solutions to environmental problems suitable for mainstreaming	Funding of solutions to environmental problems capable of being mainstreamed	*Demonstration of new or updated approaches / techniques to improve environmental performance capable of being mainstreamed* *Applications for EU funding based on demonstration projects – multiplier effects*	No. of reported technical and policy solutions capable of being mainstreamed, by theme, sector Dissemination activity of project results potentially capable of being mainstreamed, by type of activity (workshops, publications etc), by, theme, sector and type and number of actors Applications submitted for mainstream funding based on demonstration results, by value, by theme, sector	*Increased mainstream funding for environmental solutions*	No of projects receiving mainstream funding (under ERDF, EAFRD, CF etc) to roll-out and diffuse the take-up of demonstrated solutions under LIFE, by value, by theme, sector	Attributable reductions in environmental problems due to subsequent application of solutions from mainstream funding
To contribute to responsibility sharing in the protection of EU natural assets	To recognise the effort sharing of Member States on the basis of the geographic distribution of environmental resources	Funding of the Natura2000 (N2K) Network; Funding of biodiversity protection that is not N2K and is on IUCN/EU Red Lists;	*Challenges to the operation of existing approaches* *New and expanded networks of stakeholders enabling*	No. of sites, by area and type of habitat subject to conservation, restoration and/or improved management No. of species targeted	*Improved conservation status and reduced degradation of EU significant environmental*	Improved quality of management of N2K sites and networks (by area, habitat, MS) No and quality of	Attributable and specified environmental improvements due to the improved quality of management

Specific objectives	Related operational objectives	Types of activities	*Expected outputs*	Output indicators	*Expected Results*	Result indicators	Impact indicators
	To increase effectiveness of protection and management activities in MSs' with unequal amounts of natural assets	Funding of measures to halt the loss of biodiversity and to support biodiversity protection and enhancement	*conservation measures* *Expanded knowledge base of good practice conservation measures* *Expanded use of nature conservation measures within N2K sites and wider eco-system management*	No. of approaches demonstrated	*assets*	approaches to biodiversity conservation demonstrated to be effective and efficient	and use of new approaches
To contribute to responsibility sharing in addressing transboundary problems affecting EU internal and external borders	To recognise the risk sharing principle for MS on the basis of transboundary problems experienced To increase effectiveness of MS and third countries activities to reduce environmental externalities adversely affecting the EU.	Funding of transboundary projects, with third country participation where required	*Challenges to the operation of existing approaches* *Expanded knowledge base of cross-border problems* *Expanded institutional capacity to implement policy across internal and external EU borders* *Demonstration and dissemination of new or updated approaches to address transboundary problems*	No. of reports providing analysis of existing institutional weaknesses in relation to transboundary pollution, and related solutions, by theme, MS No. of policy / technical proposals / approaches for addressing transboundary problems, tested and demonstrated, by theme, MS Third country involvement in research, demonstration and dissemination activities, by theme	*Reduced significance of transboundary problems*	No. and quality of updated approaches for dealing with transboundary problems demonstrated to be effective and efficient	Attributable and specified environmental improvements due to the improved quality of policy approach / management and use of new approaches to transboundary pollution

5.5 Ex ante evaluation

Based on the analysis and comparison of the options, and in particular the description and analysis of Option 3 and the preferred option we summarise the main findings in relation to the standard ex-ante evaluation criteria. The analysis is also informed by the findings of the ex-post assessment of the previous LIFE III programme and the mid-term evaluation of the current LIFE+ Programme The assessment is based on a preferred option operating on the same budget as in the baseline scenario.

5.5.1 Relevance

The preferred option is based on an intervention logic informed by an appreciation of the underlying institutional weaknesses that give rise to environmental problems; and responds to a set of specific objectives that reflect those weaknesses.

This logic is developed at length as the basis of the options development.

5.5.2 Coherence

The internal coherence is demonstrated by the absence of trade-offs with economic or social objectives. In particular the analysis of the baseline scenario demonstrates a range of positive economic and social outcomes associated with the instrument. The preferred option, because of a reduced emphasis on eco-innovation projects, lowers some of the related technology and economic outcomes but does not lead to any trade-offs with the outcomes of other EU policies or instruments.

The preferred option has been designed to clarify responsibilities for funding with other EU financial instruments, especially FP8, but also cohesion policy, EAFRD and EFF. The express intention is to avoid funding activities that are clearly eligible for funding from other instruments; to this end, the analysis had assessed the potential overlaps and gaps in funding available from other instruments as part of the assessment of the zero option (Option 1) to inform the preferred option.

There is some uncertainty over the actual level of external coherence because of the uncertainties surrounding the evolution of other instruments. The assessment suggests that the largest area of uncertainty surrounds the current consultation on the Green Paper on Innovation and the subsequent design of the next Research Framework Programme (FP8).

Developments in cohesion policy and CAP could reduce the coherence of the preferred option if they were to significantly expand the range of environmental objectives that they were prepared to fund, and to give them equal priority with non-environmental objectives.

The objectives of the specific instrument are also to increase the contribution to mainstreaming environmental solutions by piloting approaches that can form the subsequent basis of applications for mainstream funding; and by developing solutions that can assist with the integration of environmental objectives into economic and sectoral activities. This should strengthen the external coherence of the preferred option compared to the baseline scenario.

5.5.3 Economy

The preferred option requires a similar management capacity and related cost to the baseline scenario. The management cost of a direct centralised management option is 6% of programme budget. The scope to change the management option has been examined and the use of an indirect centralised management (Executive Agency) option has been cost as 5% of programme budget. This represents a saving of some €2.5m. However, there is a risk, given the nature of the preferred option, that the use of the Agency approach would reduce the added value of the preferred option. Even a small risk would outweigh the cost savings.

In the event of a substantial increase in the programme, and related management requirement then given the constraints on the recruitment of additional Commission staff, the Agency approach would be the only feasible choice.

5.5.4 Effectiveness

The preferred option has been designed to maximise EU added value by:

- **addressing directly the institutional weaknesses limiting the effectiveness of EU environmental policy** that lead to the continuation of the market and regulatory failures that give rise to environmental externalities and the lack of public goods – leaving the main financial instruments to invest in responses that address the externalities and supply of public goods directly (with the exception of the co-financing of the Habitats Directive);
- developing **a programme logic that specifies objectives which reflect this rationale**, and refocusing programme activities in response;
- adopting **a multi-annual strategic programming framework** that makes the best use of the certainty provided by the allocation of programme funds over the programme period and which provides a clear set of policy priorities, based on the needs of EU environmental policy and which reflects a phased approach to meeting these needs;
- placing the **testing and demonstration of innovative policy solutions at the heart of the programme**, allowing it to **provide the catalyst for environmental solutions** that better **meet EU environmental policy needs** and which can be **replicated through the programme** and by **mainstream funding** instruments; and
- recognising the scope and value of **responsibility sharing and cross-border cooperation** between Member States in meeting EU environmental policy goals.

The performance of the baseline scenario indicates that the general programme is effective in generating policy responses which can be applied and replicated which in turn delivers environmental benefits in line with EU policy needs. The co-financing of the Habitats Directive and the investment in the N2K network has also been shown to be effective.

The preferred option seeks to improve the effectiveness of the baseline scenario by: strengthening the strategic programming framework; and by focusing on the catalytic role that sees a more overt and explicit focus on ensuring that effective solutions are replicated.

It is difficult to estimate the additional level of effectiveness that the preferred option can bring compared to the baseline scenario, but an expected increase of 20% in the level of environmental benefits does not seem unreasonable.

5.5.5 Efficiency

The analysis of the baseline scenario indicates that the preferred option is capable, even on the basis of conservative and minimum estimates of the environmental benefits achieved, of generating benefits well in excess of the total programme investment costs. An overall return over a 10 year period of some 5 times total investment cost is possible[71].

This is based on a programme with the same budget as the baseline scenario. An increase in the budget for the preferred scenario would allow an even more efficient programme by enabling the greater use of integrated and transnational projects and an increase in the scale of projects.

5.5.6 Consistency

The specific instrument has the benefit of creating positive spillovers for other EU policies and instruments by formally recognising these in the objectives and approach. In particular, the objectives of supporting the integration of environmental objectives into economic and especially sectoral activities, and mainstreaming tested solutions through the main EU funding instruments both provide positive spillovers.

[71] Calculated on the basis of an investment cost of €1,231 (comprising €563m for NAT and €668m for EPG) and a present value of a ten year benefit stream of €5,840 (based on an average annual benefit of €720m, discounted at 4%)

5.5.7 Distribution

There are no negative distributional effects of the specific instrument. Since environmental problems disproportionately affect lower income households, there should be a positive redistributive benefit from the preferred option. This is especially the case in terms of reductions of pollution attributable to the instrument.

5.5.8 Acceptability

The proposals for the specific instrument have been the subject of wide consultation both as part of the Impact Assessment and in a separate exercise undertaken by Commission Services. The overwhelming majority of respondents support the purpose and objectives of the specific instrument. They particularly emphasise the importance of addressing the institutional weaknesses that give rise to inadequate policy implementation.

In the stakeholder workshop[72] to review the options for the specific instrument, the majority (58%) of respondents expressed a preference for the preferred option. A further 25% of respondents preferred an option that represented a less significant change from the baseline scenario, especially because of the risk that strategic programming would prevent funding of good proposals that were less aligned with strategic priorities; and because of some concern over the feasibility of integrated projects.

[72] Stakeholder workshop held 28th January 2011

Annex 1 Other EU financial instruments and links with the LIFE instrument

Table A1.1 Summary of other EU financial instruments

Policy and DG	Programme	Policy Linkage and Relevance of LIFE+
Research, DG Research	FP7 (Environment)	Innovation and demonstration of activities that build on research undertaken in FP7.
Cohesion Policy, DG Regio	Structural and Cohesion Funds	Innovation and demonstration of activities that contribute to more sustainable regional development by providing the basis of new policy measures. Measures to ensure sustainable use of habitats and species[73]
Cohesion Policy, DG Regio	European Regional Development Fund (ERDF)	Possible funding options for the Natura 2000 network, with references to measures related to administrative structures, monitoring plans, activities and infrastructures. Management plans and measures to ensure the sustainable use of resources.
Rural Development Policy, DG Agri	Support for rural development by the European Agricultural Fund for Rural Development (EAFRD).	Innovation and demonstration activities that contribute to more sustainable rural development by providing the basis of new policy measures. Possible funding options for the Natura 2000 network, with references to the framework for management and administration, operation, monitoring and infrastructures.
Fisheries Policy	European Fisheries Fund (EFF)	Innovation and demonstration activities that contribute to more sustainable fisheries by providing the basis of new policy measures. Measures to conserve and ensure sustainable use of habitats and species. Possible funding for the Natura 2000 network, with training, capacity building, network activities and awareness raising activities related to fisheries management.
Competitiveness Policy, DG Enterprise	Competitiveness and Innovation Programme (CIP)	Innovation and demonstration activities that provide the basis for further commercialisation and market testing.
European Employment Strategy, DG Employment, Social Affairs and Equal Opportunities	European Social Fund (ESF)	Possible funding options for the Natura 2000 network, with references to the framework for management and administration, operation, monitoring and infrastructures.

A1.2 Relevant results from the MTE

A1.2.1 Complementarity and Eco-innovation - Eco-innovation linkages between LIFE+ and other EU policies and funding mechanisms

EU policies, initiatives and instruments that, inter alia, promote eco-innovation include:

- Eco-design Directive (2005/32/EU);

[73] WWF (2005) EU funding for environment, A handbook for the 2007-2013 programming periodhttp://assets.panda.org/downloads/eufundingforenvironmentweb.pdf

- Competitiveness and Innovation Framework Programme (CIP), including the Eco-innovation field within the Entrepreneurship and Innovation Programme and the Intelligent Energy Europe Programme;
- Seventh Framework Programme for Research and Technological Development (FP7);
- Environmental Technologies Action Plan (ETAP);
- Directive on the Energy Performance of Buildings (EPBD, 2002/91/EC);
- European Union Action Plan on Sustainable Consumption and Production;
- Directive on Waste from Electrical and Electronic Equipment;
- European Union Energy Label.

Furthermore, the Commission's consultation on 'EU 2020: a new strategy to make the EU a smarter, greener social market', published on 24 November 2009, states that[74]:

"The policies at EU and national level to promote eco-innovation and energy-efficient products and systems should include emission trading, tax reform, subsidies and loans, public investment and procurement and targeting of research and innovation budgets."

This makes the eco-innovation agenda far reaching and means that numerous Commission DG's and executive agencies like EACI (see Box 1) have some influence over delivery of eco-innovation. It is clear that the LIFE+ programme is a central element in the Commission response. The challenge for the Programme is to maintain or extend its influence and linkage to other programmes.

Box 1: The Executive Agency for Competitiveness and Innovation (EACI)

EACI is contracted by the Commission to manage the programme of Market Replication Projects (eco-innovation) and parts of Intelligent Energy-Europe – all part of CIP. It is responsible for calls and application appraisals; and exploits the synergies with the Enterprise Europe Network (e.g. Network partners support SMEs with IPR advice, partner searching for CIP eco-innovation). Collectively, EACI enables the construction of a broader 'community of interest' animating demand and building interest.

The fit of LIFE+ in the eco-innovation model

There is a clear fit of LIFE+ in the linear eco-innovation model that the EU seeks to fund through the use of different financial instruments or programmes (see Table 1 below). In broad terms, this plays out as follows:

- The 7th Framework Programme provides eco-innovation funding up to precompetitive demonstration level.
- LIFE+ and CIP provide funding for demonstration more directed at market-oriented demand. LIFE+ focuses primarily on the demand from public authorities; CIP on demand from private market/firms and SMEs (e.g., construction, food, bio-based products), although 36% of EPG beneficiaries are enterprises.
- Structural Funds promote larger scale promotion of eco-innovation best practices at the regional level.

[74] europa.eu/rapid/pressReleasesAction.do?reference=IP/09/1807&format=HTML&aged=0&language=EN&guiLanguage=en

Table A1.2 Provision of European support for eco-innovation

Basic R&D	Applied R&D	Demonstration	Commercialisation	Market accumulation	Diffusion
FP7					
			EIP*		
			IEE*		
			ICT* (enabling)		
		LIFE +			
		ERDF			
					ESF
					Cohesion

**Note: EIP, IEE and ICT are all elements of CIP*

An important feature of LIFE+ is that the technologies and methods are deemed to be useful for public authorities. For example, a focus of the programme on water treatment and waste management, amongst others, is a reflection of the extent to which public authorities in many EU member states are responsible for these services and hence represent important demand for new innovations. Clearly in some countries like the UK the private sector is more involved with water and waste management. While, broadly speaking, this public sector rationale helps to tailor the programme's objectives, it also illustrates the challenges of developing a separate funding programme focused on the public sector because many of the eco-innovations may well have strong applicability to private enterprise – and hence a strong potential overlap with, e.g. CIP.

Overall, strong cross-programme coordination is required if synergies are to be maximised between LIFE+ and other EU programmes (as well as respective member state eco-innovation programmes). Some bi-lateral initiatives have been taken (e.g. with DG ENTR in relation to eco-innovation) to address the need for synergy but overall communication channels might be developed further. The Workshop on complementarity identified a number of possible actions to improve synergies (refer to the table below). In addition to communication activities, improved synergies are possible through joint financing of funding mechanisms through LIFE+.

A1.2.2 Complementarity and Nature - Linkages between LIFE+ and other EU policies and funding mechanisms

One of the objectives of LIFE+ Nature and Biodiversity is 'to contribute to the implementation of Community policy and legislation on nature and biodiversity [...] and to support the further development and implementation of the Natura 2000 network'. LIFE+, however, is not the only funding instrument that finances Natura 2000. Other EU funding instruments include:

- The Structural Funds (European Social Fund - ESF) and European Regional Development Fund - ERDF);
- The Cohesion Fund
- The European Agricultural Fund for Rural Development (EAFRD)
- The European Fisheries Fund (EFF);

- The 7th Research Framework Programme (FP7)

A1.2.3 Nature funding

In broad terms, the provision of European support for nature is as follows:[75]

- **European Cohesion Policy**, implemented through the cohesion and structural funds such as ERDF, ESF and Cohesion Fund,[76] permits support for investment in **infrastructure** in Natura 2000 sites under national, regional and cross border programmes in the framework of environmental projects and programmes, where they contribute to the overall economic development of the region. The ESF, in particular, takes into account social inclusion, education, training and equality. For instance, the ESF operational programmes can fund activities related to **reform** of a Member State's **administration** related to environmental management.

  The three funds under cohesion policy aim to support three distinct objectives:

  – Convergence – financed by ERDF, ESF and CF[77]

  – Regional Competitiveness and Employment - financed by ERDF& ESF

  – Territorial Co-operation – financed by ERDF

ERDF aims to contribute to the reinforcement of economic, social and territorial cohesion by reducing regional disparities and supporting the structural development and adjustment of regional economies. ERDF therefore has very broad aims and is unlikely to focus on environmental issues to the same degree as LIFE+.

ESF supports policies and priorities aimed at achieving progress towards full employment, productivity at work and social inclusion. With these priorities, its ability to include environmental issues in the programme will be limited although there is some scope to include priorities to support the implementation of Natura 2000

The Cohesion Fund is able to intervene in areas related to sustainable development which present environmental benefits; however it is suggested that it is unlikely that the Cohesion Fund is to be used for direct funding of Natura 2000[78]. In general, the Cohesion Policy has much broader objectives than LIFE+, focusing on investment in infrastructure and activities to promote reform within administrations, which suggests a limited overlap.

- The **European Agricultural Fund for Rural Development (EAFRD)** has been the single instrument to finance rural development policy since January 2007. EAFRD does fund someactions that are similar to LIFE Nature

- **FP7:** Although LIFE+ also looks at improving innovation, it is clear that priorities here are much broader than those that exist under LIFE+. FP7 supports transnational **research** in a range of thematic areas, including the environment. Research is to be carried out on 10 key themes, one of them being Environment (including climate change). Within this theme, FP7 focuses on :

  – Environmental technologies for observation, simulation, prevention, mitigation, adaptation, remediation and restoration of the natural and man-made environment

  – Protection, conservation and enhancement of cultural heritage, including human habitat improved damage assessment on cultural heritage

[75] EC (2007) Financing Natura 2000 Guidance Handbook

[76] The Cohesion fund may intervene in areas related to sustainable development which clearly present environmental benefits. It is unlikely that the Fund will be used for direct funding of Natura 2000, although it is possible that Natura 2000 sites can profit indirectly through projects funded by the Cohesion Fund.

77 'Convergence regions are those where the GDP per capita is less than 75% of the EU average. All other regions are potential candidates to the 2nd objective' from EC (2007) Financing Natura 2000 Guidance Handbook

[78] EC (2007) Financing Natura 2000 Guidance Handbook – it is stated that there could be situations where Natura 2000 sites profit indirectly through projects funded by the Cohesion Fund

- Technology assessment, verification and testing
- Earth observation and assessment tools

On the whole, there is a limited scope for LIFE+ to overlap with other funding instruments due to the strict guidelines on complementarity and the differences in objectives of each funding instrument. The greatest risk of overlap is with ERDF and EAFRD, as the table shows. In addition although alternative funding instruments for Nature projects exist, LIFE+ remains a largely unique instrument for certain types of projects that lack other funding options and is also the only instrument with an exclusive focus on nature and environmental issues.

Table 3 below illustrates the possible sources of funding for the Natura 2000 network and indicates the areas and activities in which the LIFE+ Programme appears to be a particularly important funding option for nature protection, given the lack of coverage by other instruments. The table suggests that LIFE+ is particularly valuable for funding activities relating to operation and monitoring, and would appear[79] to be the only instrument which funds ex-situ conservation activities and re-introduction programmes.

[79] WWF (2005) EU Funding for Environment, A handbook for the 2007–13 programming period, Belgium WWF European Policy Office http://assets.panda.org/downloads/eufundingforenvironmentweb.pdf

Table A1.3 Funding options for the Natura 2000 network

	Cost item	Funding options						
		ERDF	ESF	Cohesion Fund	EAFRD	EFF	LIFE+	
							Nature	Other Components
Framework for management and administration	Adaptation of legislation		■					
	Establishment of management bodies	■	■		■			
	Administration costs							
	Training and capacity building	■	■		■	■		
	Awareness raising activities and environmental education	■			■	■		■
	Visitor management measures/activities	■			■		■	
	Public participation systems		■			■		
	Networking activities	■	■			■	■	
	Preparation and review of management plans for sites or species	■			■		■	
	Measures and activities to carry out appropriate Environmental Impact Assessment Studies	■	■		■			
	Scientific studies, inventories, mapping				■	■	■	
Operation and monitoring	Surveillance, wardening and patrolling activities		■					
	Monitoring systems	■			■	■	■	
	Habitats and species conservation, management and restoration measures	■			■	■	■	
	Ex-situ conservation activities and re-introduction programmes						■	
	Measures to ensure sustainable use of habitats and species	■		■	■	■	■	
	Compensatory payments				■	■	■	
	Forest-environment measures				■		■	■
	Trans-boundary projects	■					■	
	Supporting and communicating pilot projects	■			■		■	
Infrastructures	Infrastructures maintenance	■			■			
	New infrastructures specific for the maintenance or restoration of habitats and species	■			■		■	
	Public use infrastructures	■						
	Equipment acquisition	■					■	
	Precautionary measures in sites still not designated pSCI	■						
	Fire prevention, fire control and fire management measures	■			■			■
	Mitigation measures for infrastructures affecting Natura 2000	■						
	Land purchase	■		■	■		■	

Source: WWF (2005) EU Funding for Environment: A handbook for the 2007–13 programming period

A1.2.4 Biodiversity funding

LIFE+ Biodiversity is one of the new themes in the LIFE+ Regulation. The aim of LIFE+ Biodiversity is to contribute to the implementation of the objectives of Commission Communication "Halting the loss of biodiversity by 2010 – and beyond" and LIFE+ Biodiversity projects have to be either demonstrative or innovative. While LIFE+ Nature projects relate to the implementation of the objectives of the Birds and Habitats Directives, LIFE+ Biodiversity projects focus on the demonstration of measures and practices that contribute to halting the loss of biodiversity on the territory of the Member States. All biodiversity projects, whether innovative or demonstration, must have as an integral part of their project the evaluation and active dissemination of the results and lessons learnt during the project.

EU funding for biodiversity is focused on aiding the implementation of the EU's key priorities, including the establishment and management of the Natura 2000 network of protected areas. Most financial support for biodiversity is currently integrated into a number of sectoral

policies, in a similar fashion to funding for nature protection. Actions supporting biodiversity conservation have received financial support as part of other Community policy areas, such as agriculture and rural development, fisheries and regional development. One of the largest elements of EU support for biodiversity has come through payment for environmentally sensitive agriculture management practices, from the agri-environment measure within the Common Agricultural Policy (CAP), first introduced in 1985. Since the 1990s, such measures have provided an important 'avenue' for funding the conservation of biodiversity within agricultural ecosystems.[80]

Currently, the extent of funding opportunities for biodiversity varies between different funds, reflecting the general focus and specific rules of each of the instruments. For example:

- **Structural Funds:** can be accessed by a wide range of stakeholders, although actions supported by these instruments need to be linked with the broader sustainable development of the region and funding is not usually available for ongoing management payments
- **EAFRD:** targeted on conserving biodiversity in rural areas and focuses specifically on co-financing measures carried out by farmers or foresters
- **EFF:** financial allocations do not include the amount allocated to certain measures or operations, and it is therefore not possible to 'single out' biodiversity related expenditure from other environmental measures financed under the fund
- **LIFE+:** provides support to a range of activities aimed at implementing the EU Biodiversity Action Plan (BAP), and is highly selective in order to avoid duplication of funding.

The majority of the EU funds now available for biodiversity (and for Nature more generally) are managed at the national level, which allows a strong reflection of national specificities and conservation priorities, and allows Member States to make their own decisions about the importance of biodiversity relative to other priorities for spending EU funds. However, a weakness is that it allows Member States with little political commitment to biodiversity to minimise their expenditure of EU funds in this area. In this regard, LIFE Nature and Biodiversity – being more centralised than the other financing instruments – reduces this pitfall.

The Table below illustrates the various EU financing options foreseen for biodiversity in the 2007-2013 programming period. Analysis would suggest that LIFE+ is likely to remain an important financing instrument for biodiversity given the lack of focus on biodiversity of the other funds, the clear lack of earmarking of a specific proportion of the funds to biodiversity objectives, and the requirement for funding needs for biodiversity in the EU to be properly assessed, taking into account the welfare benefits that ecosystems deliver.

Table A1.4 EU financing options foreseen for biodiversity for the 2007-2013 period

[80] IEEP for WWF (2009), 'Biodiversity and the EU Budget: Making the case for conserving biodiversity in the context of the EU Budget Review'

EU fund in 2007-2013	Key funding opportunities	Possible Community contribution for financing biodiversity (EUR)	Comment
Financial Instrument for the Environment (LIFE+) Possible recipients of funding: All possible, e.g. public administrations and NGOs	Implementing the EU Birds and Habitats Directives, e.g. Natura 2000 Network Implementing the EU Biodiversity Action Plan, e.g. protection of biodiversity in the context of wider land and seascapes. Note: only finances activities that are not supported by other Community funds.	0.84 billion	40 per cent of the total LIFE+ funding earmarked for the LIFE+ Nature and Biodiversity component
European Agricultural Fund for Rural Development (EAFRD) Possible recipients of funding: Farmers, foresters, land managers and owners	Support to maintain and enhance biodiversity through the promotion of environmentally sensitive farm management practises in agricultural ecosystems, e.g. management of Natura 2000 sites. Note: financed activities need to be linked with the management of agricultural or forest land.	22.2 billion for agri-environment (AE) measures 0. 58 billion for Natura 2000 payments and Water Framework Directive (WFD) payments (agriculture and forest) 12.6 billion for natural handicap measures (LFA)	AE schemes are not only focused on biodiversity but often address other goals (see section 3.2 above). Therefore, the total amount of money either allocated specifically for biodiversity conservation, or that has indirect biodiversity benefits remains unclear LFA funding is not earmarked for promoting biodiversity conservation, i.e. final allocations for biodiversity not clear
European Fisheries Fund (EFF) Possible recipients of funding: Fishermen and aquaculturalists	Support to biodiversity friendly activities in marine and coastal ecosystems, e.g. management of Natura 2000 sites. Note: financed activities need to be linked with fisheries activities.	No estimate available	
European Regional Development Fund (ERDF) European Social Fund (ESF) Cohesion Fund Possible recipients of funding: All possible, e.g. public administrations, NGOs, SMEs	Support to sustainable regional development, e.g. promoting conservation and sustainable use of biodiversity and ecosystems (e.g. management of Natura 2000). Note: financed activities need to be linked with the broader development of the area.	2.7 billion for the promotion of biodiversity and nature protection 1.1 billion for promotion of natural assets 1.4 billion for protection and development of natural heritage	Funding for promotion of natural assets and protection and development of natural heritage**not earmarked** for promoting biodiversity conservation,i.e. final allocation not clear
7th Framework Programme for Research and Development (FP7) Possible recipients of funding: Research institutions	Opportunities for certain biodiversity related research activities.	1.9 billion for environmental research Support to biodiversity projects to date: 29.6 million	Funding for environmental research **not all earmarked** for promoting biodiversity conservation, i.e. final allocation not clear

Source: IEEP for WWF (2009), 'Biodiversity and the EU Budget: Making the case for conserving biodiversity in the context of the EU Budget Review'

Annex 2 Elaboration of LIFE EPG activities (for purposes of the IA)

Table A2.1 Activities for improving environmental policy and its implementation

Main purpose of activity	Type of activity	Project examples
A - Problem definition – measuring environmental impacts	Environmental investigation / collecting data on the extent of a problem / barriers to implementation / better ways of addressing environmental challenges	e.g. conducting surveys amongst businesses on their environmental practices; developing scenarios for regional climate change adaptation to feed into a long-term strategy for a municipality
	Developing a new approach / technique /process for monitoring of environmental impacts within a municipality or sector	e.g. developing an innovative mapping technique to assess current or future climate change risks or developing an assessment method for local authorities to use as a tool for estimating emissions; introduction of innovative monitoring techniques based on metagenomic data and using modern biotechnology and IT technologies; introducing 3D models and intelligent meters to audit energy in real time; developing environmentally sustainable tyre concepts based on novel green material solutions
B - Improvements in implementing environmental policy	Develop / demonstrate and introduce methods and action plans for reducing environmental impacts (approach / management system/ process / plans) to reduce environmental impact, informing policy. Mainly at the level of municipality. Sometimes with other national / international partners	e.g. introducing EMAS environmental management system into a number of municipalities across Europe; developing a new management model for urban green areas to be replicated in other municipalities; e.g. drawing up an action plan for a municipality on combating climate change and new regulations for protecting green spaces, parks and public gardens; implementing action plan for tackling problem of noise pollution; e.g. demonstrating that the implementation of an ICT platform in two different countries may reduce energy consumption
	Stimulate behaviour change through new market based instruments	e.g. voucher schemes that distributes vouchers to households to use when purchasing local eco-products/services; providing a rebate to private distribution companies to use green vehicles
	Assistance in purchasing infrastructure / capital costs that reduces environmental impacts	e.g. purchasing a biofuel production plant that produces enough fuel for local hybrid buses thereby demonstrating advantages; and selecting, purchasing and installing a waste-treatment facility for WEEE to enable the introduction of a system for separation and collection
	Set up public private partnerships (PPPs) to show more effective ways of reducing environmental impacts	e.g. creating a PPP that sets up waste collection points to collect waste which would have otherwise gone to landfill demonstrating advantages of this model in the context of waste collection
C - Improvements in the environmental management of economic	Demonstrate good practice / produce instructions / tools / kits/ guidelines to industry on how to reduce environmental impacts	e.g. draw up sustainable tourism management model and policy proposal for sustainable tourism for biodiversity; Produce instructions / tools / kits/ guidelines to households on how to reduce food wastes and encourage composting

activities, integrating environmental objectives	Pro-actively engaging with stakeholders (industry involved) to change behaviour	e.g. building collaboration with wide range of stakeholders through dialogue and setting up of fora; engaging directly with producers in recycling schemes to change their practices by participating and signing up to voluntary agreements and targets; training drivers to drive in more eco-friendly ways; e.g. triggering the adaptation of banking systems in Greece, Bulgaria, Romania and Cyprus to the risks and financial impacts of climate change by quantifying climate change risks and opportunities, pricing climate adaptation solutions for companies and training bank employees on how to identify climate risks and opportunities for clients and how to assist businesses to adapt to climate change
D - Developing particular solutions to environmental problems and improving compliance (eco-innovation) This is a new process / product / technique / technology – for mainstreaming	Testing and demonstrating / developing a technology / technique / process / product that reduces environmental impacts within a municipality or sector	e.g. demonstrating technologies that reduce urban pollutant loads in waters and demonstrating the applicability of an In-Situ Chemical Oxidation (ISCO) technique for the remediation of soil and groundwater;

Annex 3 Activities, outputs and results of the Action Grants

A3.1 Analysis of LIFE+ Nature Survey

A3.1.1 Background Information – Project Details

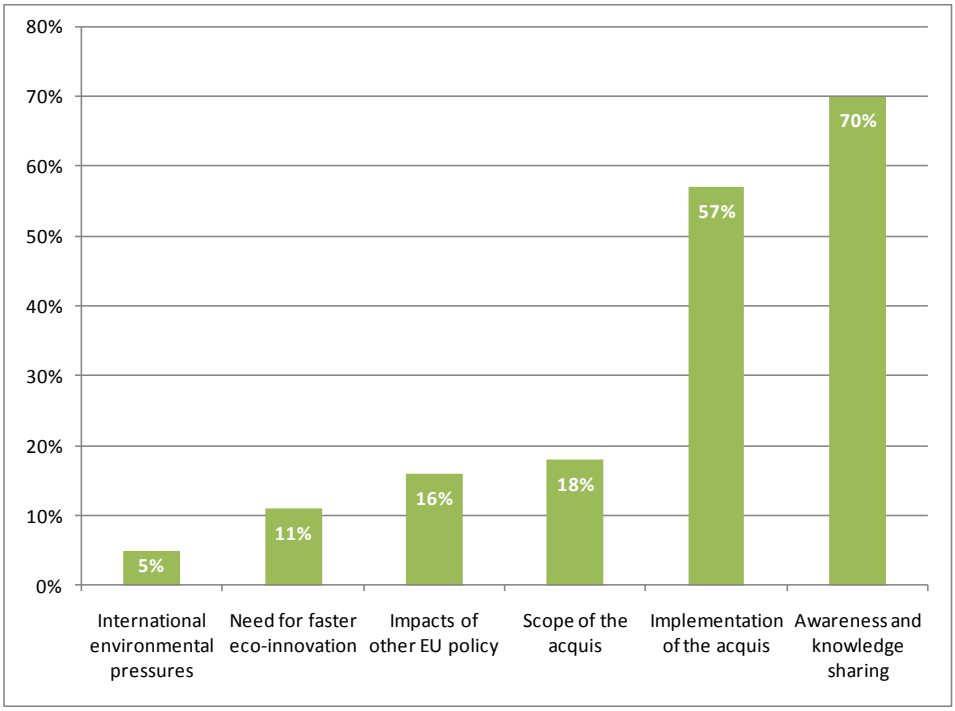
Forty-four projects responded to the LIFE+ Nature survey, a response rate of 20%. 81% of projects fell under the Nature strand of LIFE funding with 19% relating to biodiversity. The average project cost was €2.1m with average European Commission (EC) co-financing of €1.3m. The total project budgets ranged from €6m to €356,000 with co-financing ranging from €3.4m to €260,000.

Projects ranged in length from 2.5 years to just under 7 years, with an average project lifetime of 4 years. The number of partners engaged in the project varied from 1 to 25, although the average project involved 6 partners. Of the respondents, 54% had previous experience of managing LIFE projects.

A3.1.2 Problem Definition

Over half of the projects focused on the implementation of the acquis (57%), reflecting the importance of this problem for project beneficiaries (Figure 1.1). Three-quarters of projects also emphasised their work on awareness and knowledge sharing as a result of the contractual obligation on all projects to carry out dissemination and awareness raising activities. One-fifth of projects were designed to address the scope of the acquis. Less than one in twenty were intended to focus on international environmental pressures. 16% of projects addressed the impacts of other EU policy and 11% of projects aimed to address the need for faster eco-innovation, through the development of new approaches, techniques or systems.

Figure A3.1 The problems that projects were designed to address



Source: GHK LIFE Nat Survey, Base = 44 respondents. Respondents could choose more than one problem.

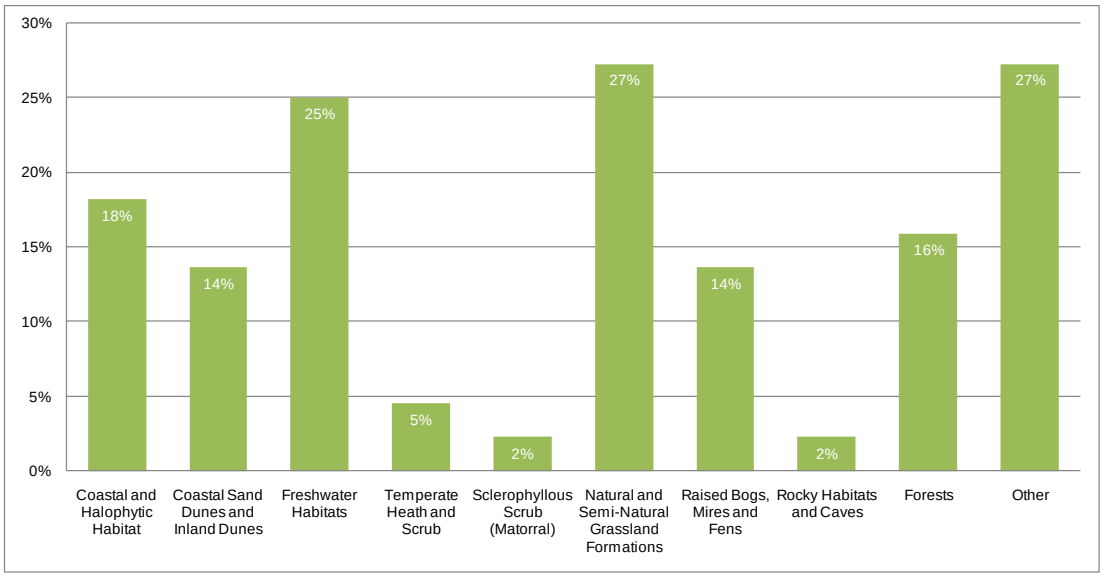
The projects seek to reduce barriers which prevent solutions to environmental problems. Suggestions of the types of barriers addressed included a lack of methods for monitoring, insufficient capacity, a lack of controlled management of the NATURA 2000 areas, fragmented engagement between different stakeholder groups, a lack of public consultation

and negative effects of agriculture and water management. Other responses stated by a number of beneficiaries included 'a lack of information and training and the burden of the costs involved. '.

A3.1.3 Habitat focus of projects

Projects were asked to identify the principal habitat type that was the focus of the project. In many cases more than one habitat type was involved. The main types of habitat addressed by projects were natural and semi-natural grassland (27%) and freshwater habitats (25%) as illustrated in Figure 1.2.

Figure A3.2 Habitat focus of projects



Source: GHK LIFE Nat Survey, Base = 44 respondents. Respondents could choose more than one habitat.

The majority of projects (64%) were designed to assist in the management of the Natura 2000 network, whilst 45% related to other aspects of the Habitats directive such as species conservation. Thirty-six per cent addressed the Biodiversity 2010 Target. For those who stated that their project related to another EU policy, it was either the Water Framework Directive or the Marine Strategy Framework Directive which shows the strong links between Nature legislation and Water and Marine legislation (the areas were N2000 sites or to become N2000 sites).

A variety of stakeholders were involved in projects, as beneficiaries or associated beneficiaries, as illustrated in Figure 1.3. The majority of projects included public authorities (82%) and a large proportion included NGOs (59%). Universities and research organisations, policy makers, farmers and private companies were also relatively important stakeholders involved in between 43% and 39% of projects. 'Other' stakeholders included fishermen, hunters, tourists and citizens.

A3.2 Administration costs[81]

A3.2.1 Costs of Bidding

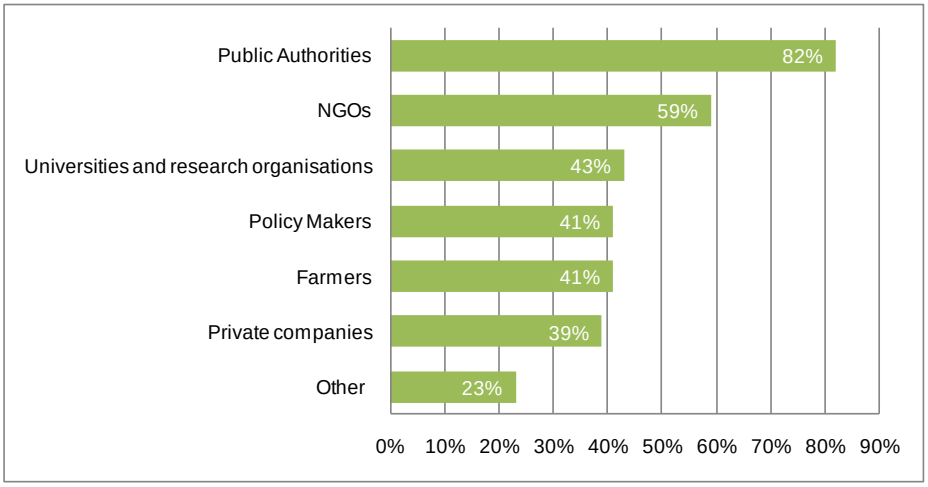
The cost to applicants of bidding for LIFE Nature funding was €12,000 per project, taking into account the administration and technical staff time involved. The main cost was the time required to write and submit the bid. Given an average project size of €2.2m, the bid cost represented 0.6% of project value.

[81] A full breakdown of administrative costs is provided in Annex 6

A3.2.2 Costs of Project Management

The cost to beneficiaries of the administration and management of the project including reporting, taking into account the administrative and technical staff time involved, was €25,500, 1.2% of project value. The largest item of cost is the planned expenditure on the preparation of the Final Report, account for a third of costs.

Figure A3.3 Stakeholder involvement



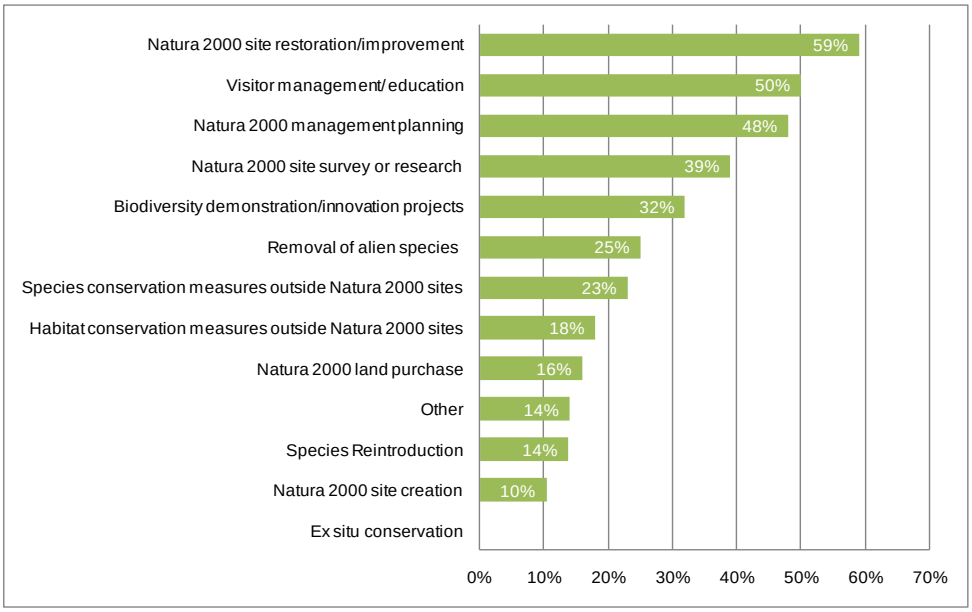
Source: GHK LIFE Nat Survey, Base = 44 respondents. More than one stakeholder could be involved in a project.

A3.2.3 Activities and Output

The majority of projects included activities related to Natura 2000 site restoration or improvement (59%). Natura 2000 management planning and site survey or research were common conservation actions (undertaken by 48% and 39% respectively). These results are unsurprising as the project site must, in general, be a N2000 site to be eligible for funding. As shown in Figure 1.4, a further 50% included an element of visitor management and education which is in line with the objective of creating awareness and knowledge sharing. Natura 2000 site creation or land purchase was generally not an important element of the project cohort who responded to the survey, whilst ex-situ conservation was not part of any project activity for those who replied.

The most frequently undertaken preparatory actions were inventories and studies, which were conducted by 64% of projects. Whilst 62% of respondents stated that preparatory actions had not changed objectives and planned results, the remainder stated that preparatory actions had made objectives clearer and more focused.

Figure A3.4 The conservation actions that projects are designed to undertake



Source: GHK LIFE Nat Survey, Base = 44 respondents. Respondents could choose all options that applied

A3.3 Management Results

Over half of project beneficiaries (59%) felt that their activities had helped to improve the capacity of the area's stakeholders, through the involvement of the local community via schools and public seminars. In addition, seminars and information days engaged local people and demonstration days allowed a larger number of stakeholders, including at the city level, to be engaged.

Looking forward, the majority of respondents stated that partnerships would be established. For example, one project aimed to establish a private foundation who would manage restored sites and communication actions aligned through the Park Authority. Others stated more generic activity where local authorities, NGOs and public services would continue to co-operate, including through working groups.

Transnational co-operation is likely to be established in over half of projects (54%), with all stating that this would improve project results or help projects to achieve results at least to some extent.

The table below summarises the range of management results planned ot be produced by the projects..

Table A3.1 Management results by indicator

Indicator of management results	Number of projects	Share of projects (%)
Legislative/ policy/ planning documents to be politically approved as a result of your project	23	52%
Management systems or plans to be introduced	29	66%
Implementation of new monitoring or assessment systems	23	52%
Land use agreements to be established or land purchase and land compensation measures conducted	24	55%
Compensation to be provided to landowners/land users affected by projects loss	8	18%

Recreational facilities to be established in project area improving visitors' numbers/ awareness of area characteristics	34	77%
Enlargement of the national Natura 2000 network as a result of the project	8	18%
Improvement of the conservation status of site(s) in the Natura 2000 network	30	68%
Measurable change evident in the extent or condition of particular priority habitats	25	57%

Source: GHK LIFE Nat Survey, Base = 44 respondents. Respondents could choose all results that applied

47% of projects expected up to three legislative, policy or planning documents to be politically approved as a result of their activity, with 26% expecting one document to be approved and 11% stating that five documents would be approved The URBANBEES project states that it will develop and implement an action plan to conserve and enhance wild bee diversity in urban habitats. The plan will include guidance on changing conventional practices and the testing will lead to a validated action plan, which will be reproducible in other European cities. The project expects more than 5 legislative, policy or planning documents to be produced. Another example of a project producing several documents is the CAP DOM LIFE Biodiversity project. The objective is to contribute to stopping biodiversity loss in three DOMs (Reunion, Martinique and French Guiana) and one of the aims is the Implementation of a national monitoring programme of species and sites for common birds adapted to the DOMs. This project expects to introduce 5 legislative, policy or planning documents.

In addition, for the 66% of projects that anticipated new management systems or plans would be introduced, the systems or plans were expected to be realised at varying scales with 72% of projects introducing management systems at the local level, 55% at the regional level and 41% at the national level.

Over half of the projects (52%) will include implementation of new monitoring or assessment systems at all levels, but particularly at the local scale (65%) and regional scale (57%).

A number of recreational facilities are to be established to improve visitor numbers and/or the awareness of the project area's characteristics including visitor information centres (by 25% of the projects that responded) and information boards on site (by 70% of the projects that responded). Other facilities included educational/walking trails, bird watching towers and visitor open days. As a result of this activity, several respondents were able to estimate an increase in visitor numbers. The average increase in visitor numbers was 64% (although these figures varied from 5% to 500%).

Where respondents stated that there would be an enlargement of their national network (18%) they were asked by how much. Some were not able to estimate figures but for those who could the answers ranged between 20 and 2000 hectares with the total from responses equalling 2150 ha.

A3.3.2 Employment data

Only14 projects were able to estimate the increase in employment they expected to occur as a result of the LIFE+ project (e.g. from increased tourism to the site). Answers ranged from no impact to an increase of 10 FTEs. In total these 14 projects estimated that they would result in an impact of 35 FTE.

All projects have to draft an "After-LIFE conservation plan". If projects can not demonstrate how results/activities will be continued afterwards, projects will not secure funding. Respondents were asked whether their projects would continue after the LIFE funding period as the means by which continuation could be secured and 39% of respondents stated that they would. In the other cases different arrangements are planned to continue the activities.

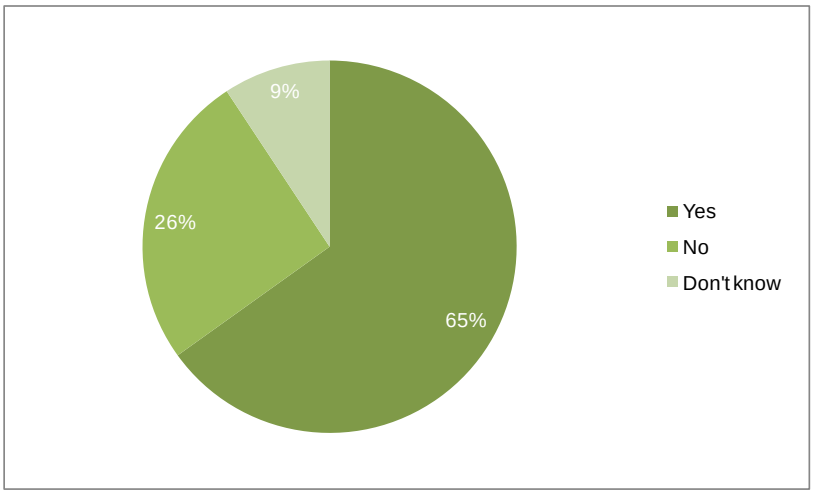
When asked how many years the impacts of the project would last,7% stated up to 5 years, 29% stated 5-10 years and 64% stated 10 years or more,.

When asked how many additional people the project would employ answers ranged from no additional Full Time Equivalent (FTE) positions to 10 additional FTE positions (where 1 full-time post is equal to 2 part time posts). Some 30 additional positions are being created by the respondent projects – a total of 150 FTE jobs across all Nature and Biodiversity projects if the sample is fully representative.

A3.4 Demonstration and Innovation Results

64% of projects include the demonstration or development of new methods, techniques or approaches for species or habitat creation. When asked to elaborate on the kind of demonstration and development, answers included the development of new grazing techniques, the development of early warning systems, measures to control invasive or alien species not undertaken within the country and restoration of certain habitats.

Figure A3.5 Will there be the demonstration/development of new methods, techniques or approaches for species or habitats creation?



Source: GHK LIFE Nat Survey, Base = 43 respondents

The results of demonstration or development activity may lead to cost savings for the Competent Authorities in some case (27%). However these beneficiaries were unable to estimate the savings that could potentially be made. Even though projects are not required to or expected to generate products, 11% of respondents stated that results include new commercially viable products, although unable to estimate the expected annual sales from these products.

70%of projects promote the sharing or upscaling of best practice. This is undertaken through a variety of methods including the diffusion of demonstrative actions, media, best practice guidance, and the production of recommendations or communication activity within local communities (including schools etc). One project also stated that it was taking part in international events to share its field work methodology and indicators.

A3.5 Awareness and Replication

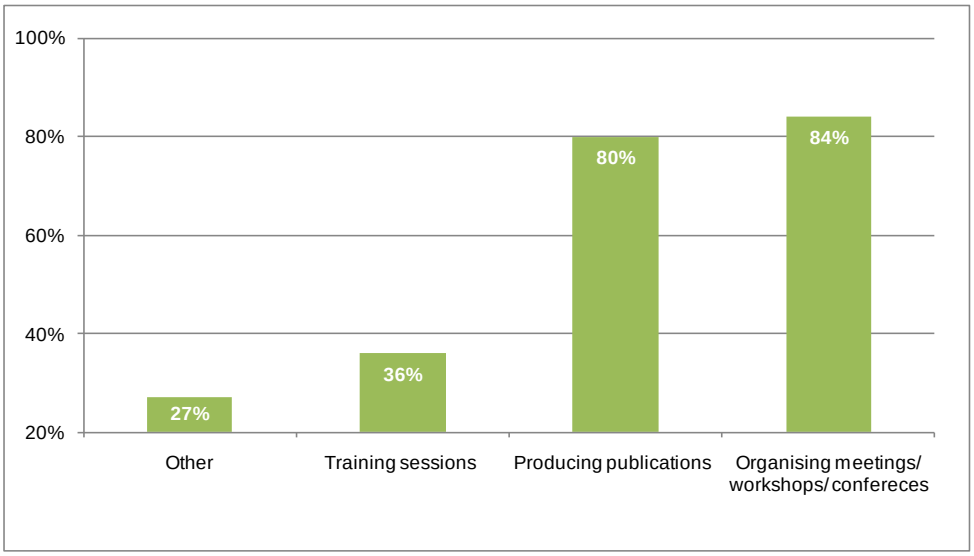
To generate awareness project beneficiaries are required to develop a website. Respondents were asked what other methods they used, the results of which are shown in Figure 1.6. The organisation of meetings, workshops and conferences was cited by the majority as another tool for awareness raising (84%) and the production of publications was cited by 80% of respondents. In addition, 36% of projects are incorporating training sessions for local stakeholders which include farmers and other businesses. Other activities being undertaken include environmental education which targets schools and tourists and mass media, including the radio. One project stated that they were raising awareness through the

creation of local handicrafts with biodiversity themes and also through the promotion of ecotourism through local events.

Through awareness raising activities, most beneficiaries anticipate that their projects will reach some 500 or more people (59%). When questioned further, projects suggested that the target audience could be up to 1 million people. For 20% of the projects it is expected that between 200 and 500 people will be reached. The majority of project results are designed to be replicated (64%) by, for instance, partners, local and regional authorities, NGOs, fisherman and farmers and over periods ranging from three years to ten years.

The results of project activity are likely to benefit a variety of user groups. For example, on average, 62 local authorities, 5 national public authorities, 19 businesses and 6150 community members will benefit from the results of each project. Other groups who will benefit include whole cities, farmers, landowners, NGOs, students and schools. The primary benefits to target users include increased awareness, improvement to environmental quality and habitats, enhanced technical knowledge, income from tourism and increased visitor numbers. 59% of projects will include staff training at the project site.

Figure A3.6 Awareness Raising Activities Undertaken by Projects



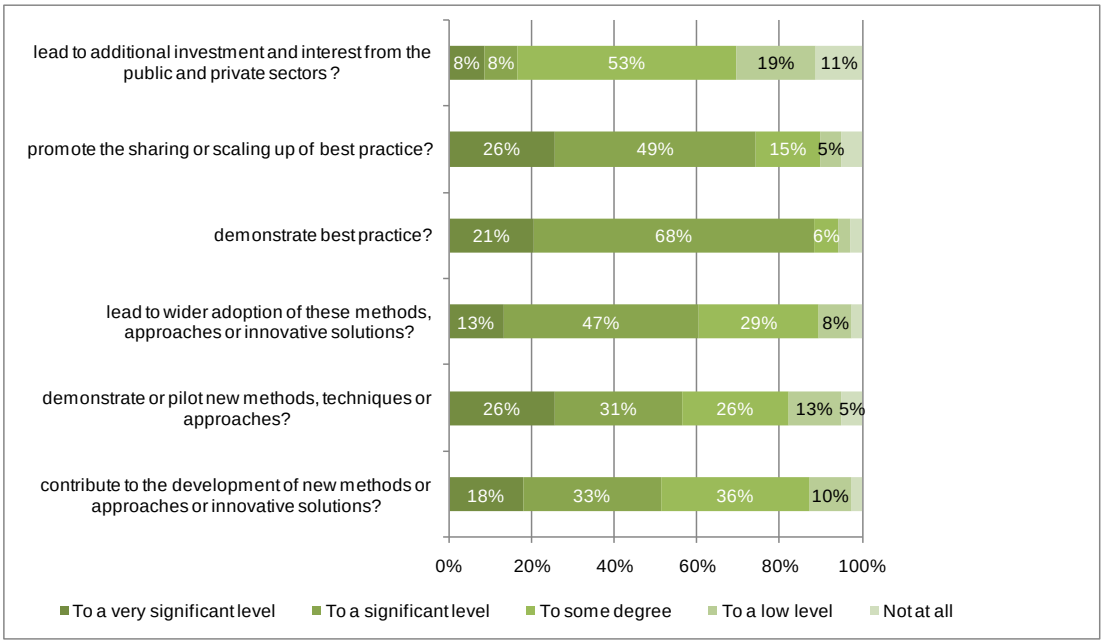
Source: GHK LIFE Nat Survey, Base = 44 respondents

A3.6 Summary of EU Added Value

Respondents were asked to consider the extent to which the project would provide added value ranging from a very significant level to not at all. The results are show in Figure 1.7. The most important strategic role of the projects was their demonstration of best practice. 89% of respondents agreed their project provided significantly or very significantly. One in four projects (26%) expected to demonstrate or pilot new methods, techniques or approaches to a very significant level.

The least important strategic or catalytic role played by projects was leveraging additional investment (either public or private), only 16% expected to achieved any significant or very significant impact. This is in addition to the co-financing already provided and that required to continue with activities after project closure.

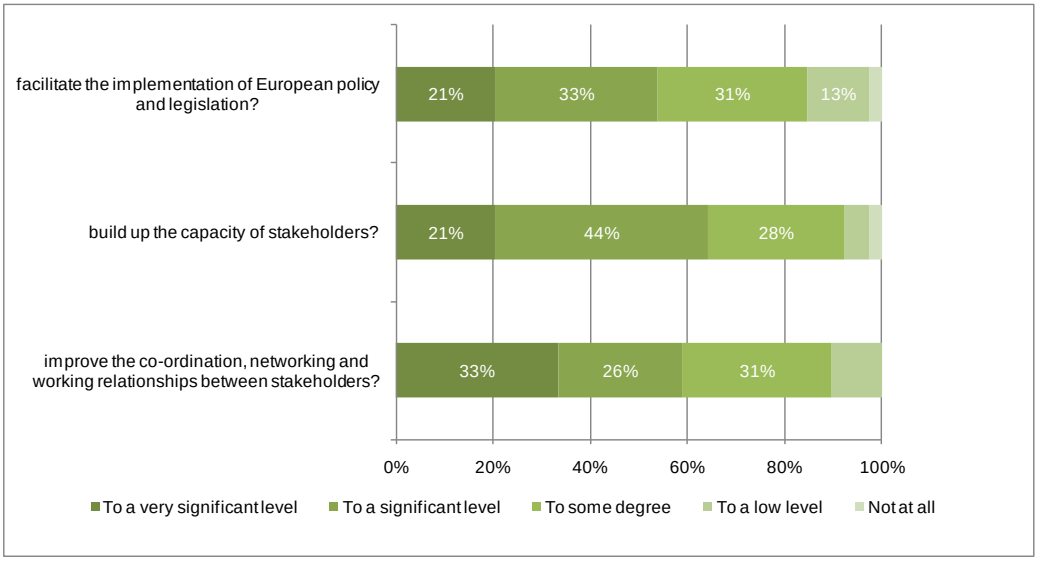
Figure A3.7 Strategic or Catalytic Role – Will the project.....



Source: GHK LIFE Nat Survey, Base = 44 respondents

When asked to rate the co-ordinating and implementation role of the project (Figure 1.8) the most significant action was building the capacity of stakeholders which will take place in 65% of projects to a significant or very significant degree. Facilitating the implementation of European policy and legislation to a significant or very significant degree will take place in 59% of projects that responded and improving the co-ordination, networking and working relationships between stakeholders will take place to a significant level in 54% of projects that responded.

Figure A3.8 Coordination and Implementation Role – Will the project....

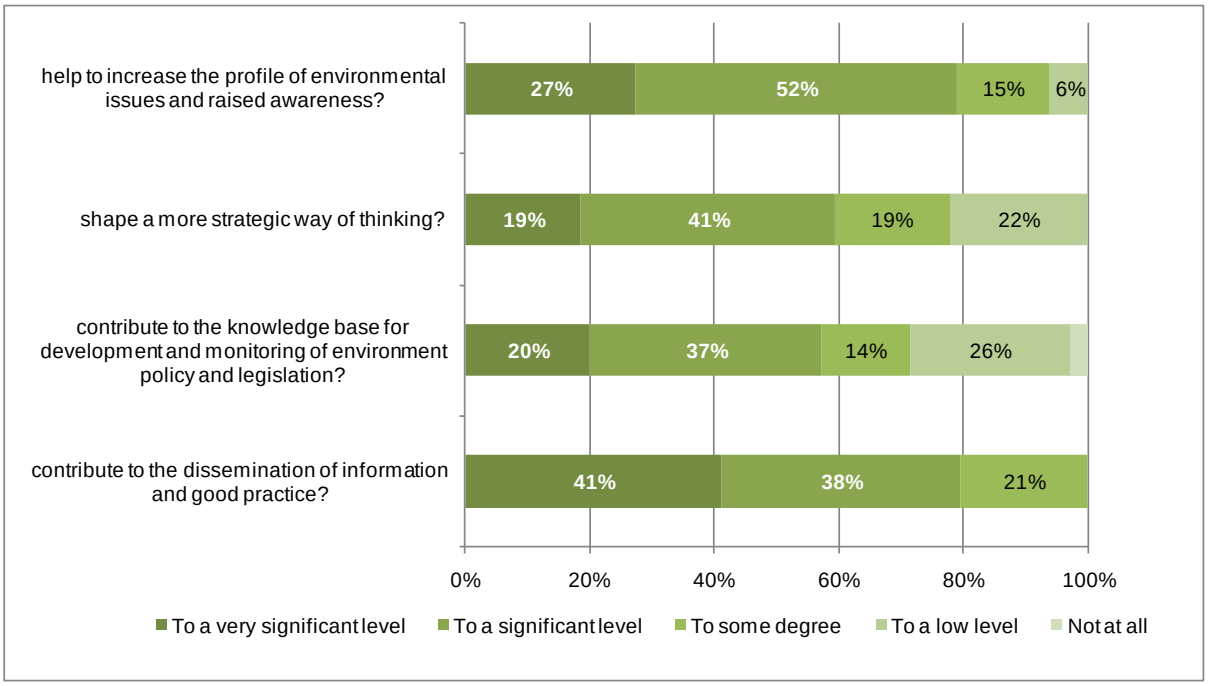


Source: GHK LIFE Nat Survey, Base = 44 respondents

Figure 3.9 illustrates the extent of influencing and awareness raising activity through projects. All projects will contribute to the dissemination of information and good practice at least to some degree and 41% will disseminate good practice to a significant level. Whilst one quarter of projects state the there will be low levels of contribution to the knowledge base relating to the development and monitoring or environmental policy and legislation, for 57% of projects, the contribution will be significant or very significant. This reflects the split

between Biodiversity and Nature projects as the objective of LIFE Nature is to implement the legislation whereas the objective of LIFE Biodiversity projects is to innovate and demonstrate.

Figure A3.9 Influencing and awareness raising - Will the project....



Source: GHK LIFE Nat Survey, Base = 44 respondents

A3.7 Analysis of EPG Survey

A3.7.1 Background Information – Project Details

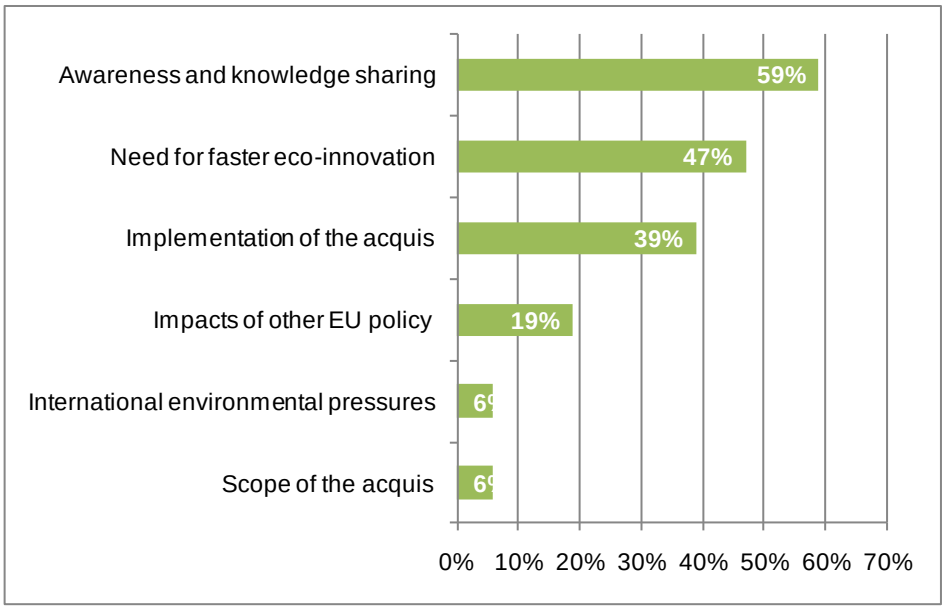
Ninety responses were received in response to the LIFE+ EPG survey, a response rate of 31%. Of those who responded, the average project cost €2.2m with average European Commission (EC) co-financing of €1m. However, total project budgets ranged from just over €7m (with an additional project stating their total budget was €44.6m) to €0.5m with co-financing ranging from €3.4m to €0.25m.

Projects ranged in length from 5 years to half a year, with an average project lifetime of 3 years. The number of partners engaged in the project varied from 1 to 20, although the average project involved 5 partners. 71% of respondents had previous experience of managing LIFE projects.

A3.7.2 Problem Definition

Figure 2.1 illustrates the primary problems that the project sought to address. A significant number of the projects (47%) are focused on the need for faster eco-innovation and (39%) on the implementation of the acquis. Respondents were allowed to choose multiple answers for this question and although 59% of projects focused on awareness and knowledge sharing this reflects the obligation in all projects to carry out dissemination and awareness raising activities.

Figure A3.10 The problems that projects were designed to address



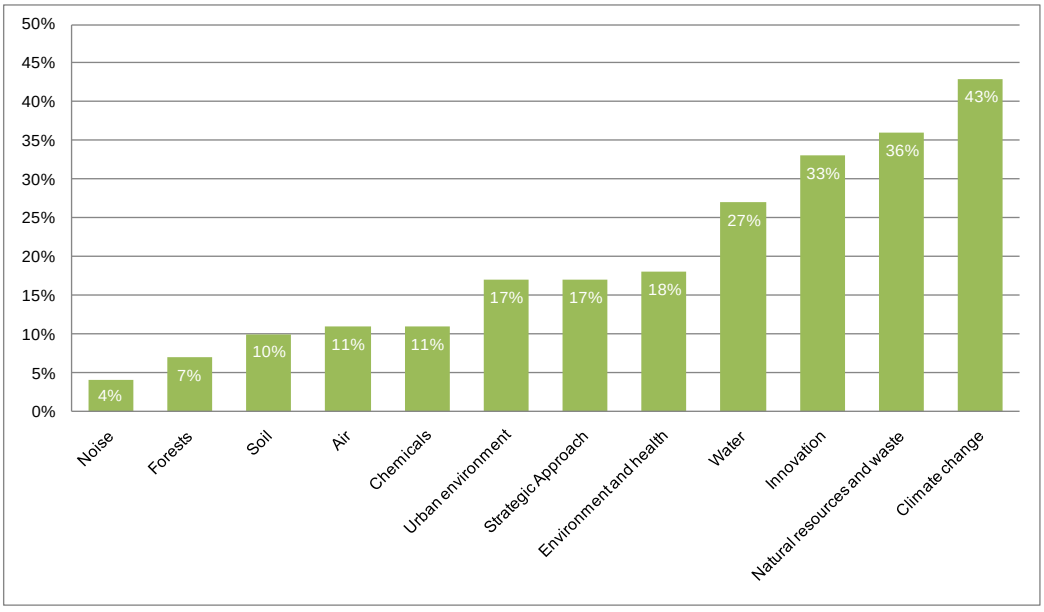
Source: GHK LIFE EPG Survey, Base = 90 respondents. Respondents could choose more than one problem.

A number of barriers exist which prevent solutions to environmental problems. The main barriers that projects aimed to overcome were a 'lack of information' and 'eco-innovation' and concerns over cost. Projects felt that there was a need for improved awareness through training, knowledge sharing and capacity building.

A3.7.3 Project theme

Respondents were asked to categorise their projects by 6EAP theme (respondents were able to choose several themes if they applied). Just over a third of projects were related to either natural waste and resources and a third related to innovation. 47% of projects related to climate change as illustrated in Figure 2.2. Few of those that responded fell under the themes of noise, forests, soil, air and chemicals.

Figure A3.11 6EAP focus of projects

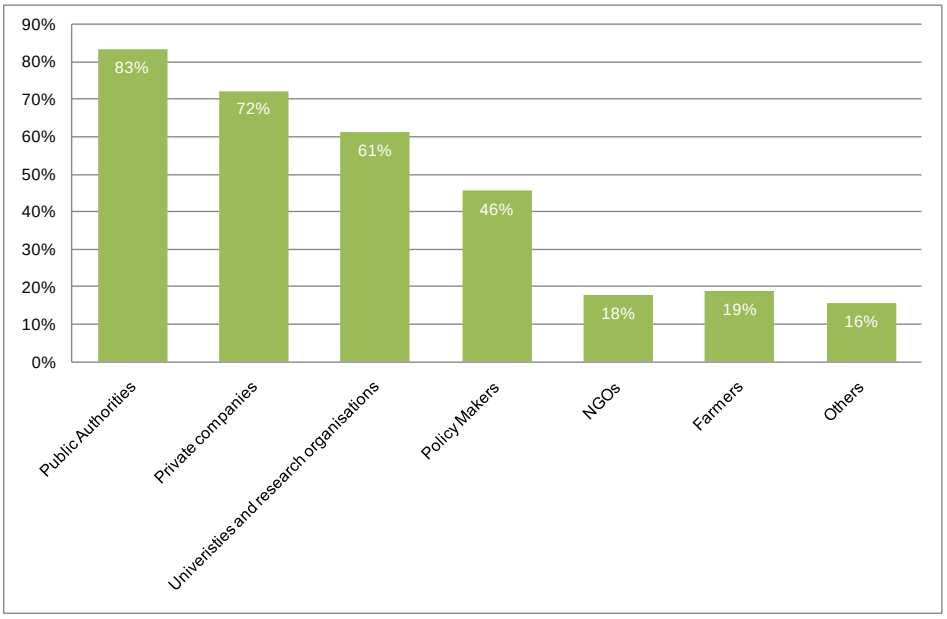


Source: GHK LIFE Nat Survey, Base = 90 respondents. Respondents could choose more than one 6EAP theme.[82]

Projects related to different EU policies depending on theme, with the most common being the Water Framework Directive and the Waste Directive. Other examples included BAT implementation, the Common Fisheries Policy and ensuring the implementation of EU commitments under UNFCCC Kyoto Protocol, REACH and policies concerning sustainable production and consumption, the sustainable use of pesticides and the promotion of hydrogen techniques.

A variety of stakeholders were involved as coordinating or associated beneficiaries in projects, as illustrated in Figure 2.3. The majority of projects included public authorities (83%) and a large proportion included private companies (72%). Universities and research organisations and policy makers were also relatively important stakeholders involved in 61% and 46% of projects respectively. 'Other' stakeholders included associations, schools and tourist operators.

Figure A3.12 Profile of Stakeholder involved in projects



Source: GHK LIFE EPG, Base = 90 respondents

A3.8 Administration costs[83]

A3.8.1 Costs of Bidding

The cost to applicants of bidding for LIFE EPG funding was €23,000 per project, taking into account the administration and technical staff time involved, almost double to cost for Nature projects. The main cost was the time required to write and submit the bid. Given an average project size of €2.6m, the bid cost represented 0.9% of project value.

A3.8.2 Costs of Project Management

The cost to beneficiaries of the administration and management of the project including reporting, taking into account the administrative and technical staff time involved, was almost €28,000, 1.1% of project value. The largest items of cost are the expenditure on the preparation of the Inception Report, account for 29% of costs and the Final Report (27%)

[82] See Annex 6 for a classification of projects actually financed by the programme

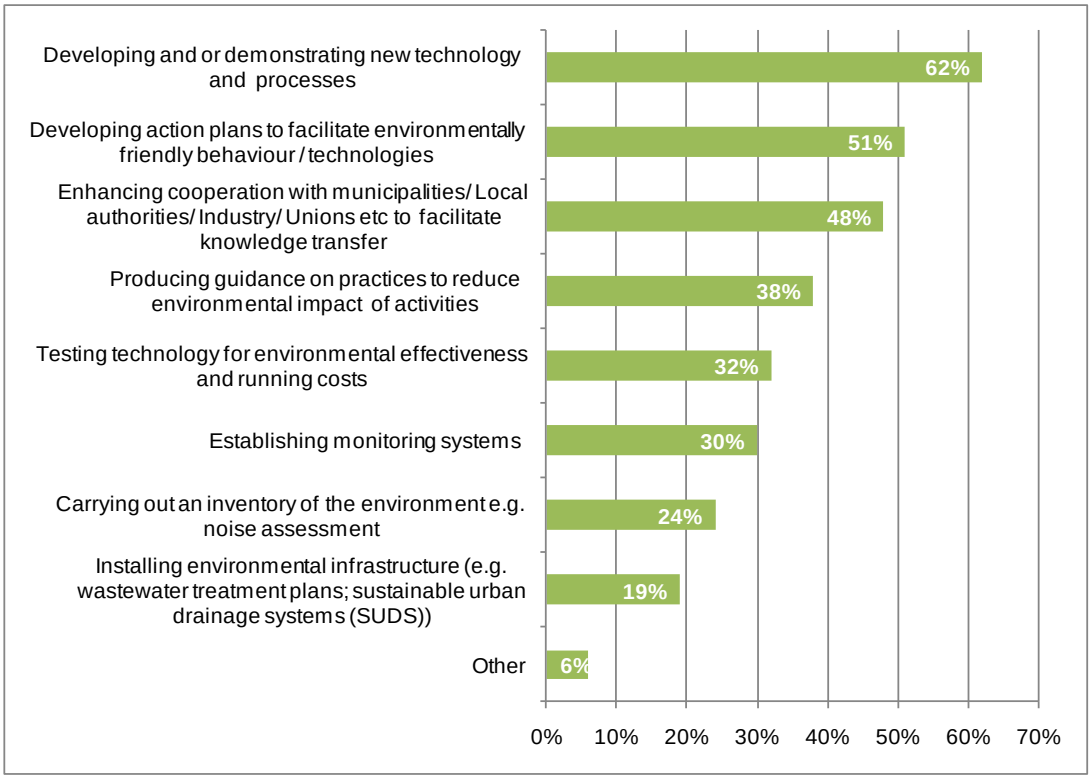
[83] A full breakdown of administrative costs is provided in Annex 6

A3.9 Activities and Output

Respondents were asked what core activities the project would undertake (Figure 2.4). Developing (62%) and/or demonstrating (51%) new technology and processes were the most frequent responses.

Of different preparatory actions, preparatory studies were most frequently undertaken by respondents (78%), closely followed by technical planning (63%). 73% of respondents stated that preparatory actions had not changed objectives or planned results. The remaining respondents who believed that changes in the stated objectives had resulted from preparatory actions (27%) all felt that the preparatory actions had made the project clearer and more focused.

Figure A3.13 The core actions that projects are designed to undertake



Source: GHK LIFE EPG Survey, Base = 90 respondents.

A3.10 Management Results

When asked how many legislative, policy or planning documents were to be politically approved as a result of their activity, answers ranged from 0 to 7 with an average response of one per project.

In addition, for 61% of projects it was anticipated that new management systems or plans would be introduced. Projects expected these management systems to be realised at the local (49%), regional (41%), national (12%) and EU (18%) scales. Over half of projects (59%) will include implementation of new monitoring or assessment systems. This will occur across all levels, particularly the local and regional scale (45% and 37% respectively).

72% of project beneficiaries felt that their project activity would help to improve the capacity of the area's stakeholders, through training, awareness raising, knowledge sharing and the development of new processes and systems.

Approximately two-thirds of respondents stated that partnerships would be established. For example, one project was to establish a collaborative network among technical staff to control performance in terms of reducing the environmental impact of the use of chemicals. Transnational co-operation is likely to be established through just over half of projects (54%),

with all stating that this would improve project results or help projects to achieve results at least to some extent.

The table below summarises the intended management results of the projects. Key results include developing early warning systems and monitoring systems for climate change management and introducing life-cycle analysis, waste management strategies and introduction of systems for sustainable management of limited resources.

Table A3.2 Management results by indicator

Theme	Management results Indicator	Number of projects	Share of projects (%) by theme
Climate Change Management	Early warning climate strategy model that will be implemented	17	43%
	Emissions Trading Schemes that will be established	2	5%
	Monitoring systems	20	50%
Air Quality Management	Monitoring systems	5	50%
	Early warning systems	2	20%
Water Management	River basin management plans/programme	9	38%
	Measures that will be developed for protection of the marine environment	1	4%
	Administrative staff to be trained in River Basin Management Planning	6	25%
Natural Resources and Waste Management	Introduction of system for sustainable management of limited or sensitive resources	12	36%
	Introduction of life-cycle analysis (sustainability-oriented method) as a basis of development of industrial and/or consumer products	14	42%
	Waste management strategy	12	36%
Chemicals Management	People to receive training in safe management, handling and use of chemicals including pesticides	3	30%
	Companies that will be informed about/trained in implementation of EC legislation on chemicals	3	30%
	Strengthening of science-policy integration on chemicals issues	5	50%
	Guidelines for evaluation or classification of chemical hazard/ risks to be introduced	3	30%
	Chemical management guidelines to be introduced	2	20%
	Measures that will reduce risks related to handling or use of pesticides introduced?	3	30%
Urban Environment	Development of urban environmental management plan (or sustainability plan)	4	25%
	Development of a cooperation between citizens and city council regarding urban environment issues	0	0%

Strategic Approaches Management	Environmental management system (EMAS or other)	1	6%
	Environmental assessment system or procedures	4	24%
	Eco-labelling or other broad environmental labelling system	1	6%
	Green procurement system	1	6%
	Guideline for sustainable tourism	3	18%
	Guideline for sustainable building	1	6%
Forest Management	Monitoring systems	5	71%
	A system that will provide comprehensive information on forests to increase understanding in relation to climate change, biodiversity, forest fires, forest conditions and the protective functions of forests	4	57%
	Development of a risk assessment framework concerning multiple stresses on forests over time and space.	2	29%
Soil Management	Soil management plans or monitoring systems	6	67%
Noise Management	Environmental noise management plans or monitoring systems	2	50%
Environment and Health Management	Health management strategy	4	24%
	Monitoring system	3	18%

A3.11 Employment Data

Respondents were asked whether their projects were likely to continue after the LIFE funding period and 59% of respondents stated that they would. When asked how many additional people the project would employ answers ranged from no additional Full Time Equivalent (FTE) positions to 150 additional FTE positions (where 1 full-time post is equal to 2 part time posts). The total of all FTE positions created of those who responded to the survey was 300 FTE positions and the projects were expected to continue for varying lengths of time, between a year and a half and indefinitely.

A3.12 Demonstration and Innovation Results

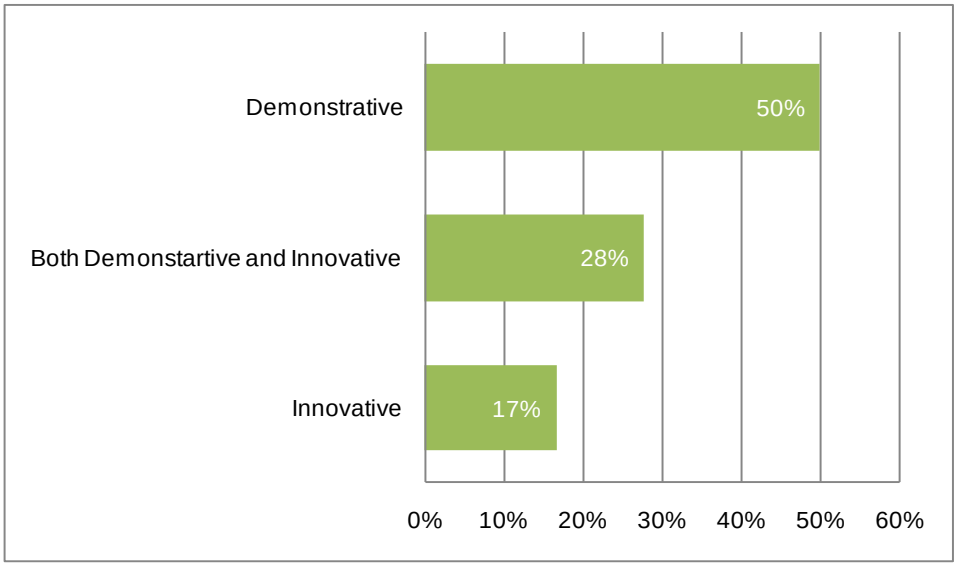
When asked whether the project could be classified as 'demonstrative' and/ or 'innovative' (as per the Commission agreed definition) half of the respondents stated demonstrative, 17% stated innovative and 28% considered that their project was both demonstrative and innovative see figure 2.5.

When asked about the innovation activities of projects it was revealed that on average a projects would result in 2 new methods, 2 new techniques and 2 new approaches. For example, the GREECIT, Green citizens of Europe project, aims to develop innovative tools and methods for interactive and co-creative citizens. This project states that it will results in 20 new methods, 10 new approaches and 10 new techniques. A project entitled 'Soria CO2Cero - Urban Environmental Corridor CO2Zero,territorial axis for a sustainable culture in the city of Soria' will create a corridor crossing the city and connecting different elements of its environmental and cultural heritage and will establish a set of certifying criteria This project states that it will result in 5 new methods, 5 new approach and 5 new techniques.

65% of the respondents stated that as a result of the new methods, techniques or approaches, cost savings would be achieved by the Competent Authority. When asked to

estimate these annual cost savings responses varied from €35,000 to €10,000,000 per project. Other responses indicated cost savings in terms of savings per ton/waste., and as a share of current costs. Just under half of respondents (48%) stated that their projects would lead to new commercially viable products and when further probed for expected annual sales, responses ranged from €100,000 to €335million.

Figure A3.14 Project classification as 'demonstrative' and/ or 'innovative' (as per Commission definition)

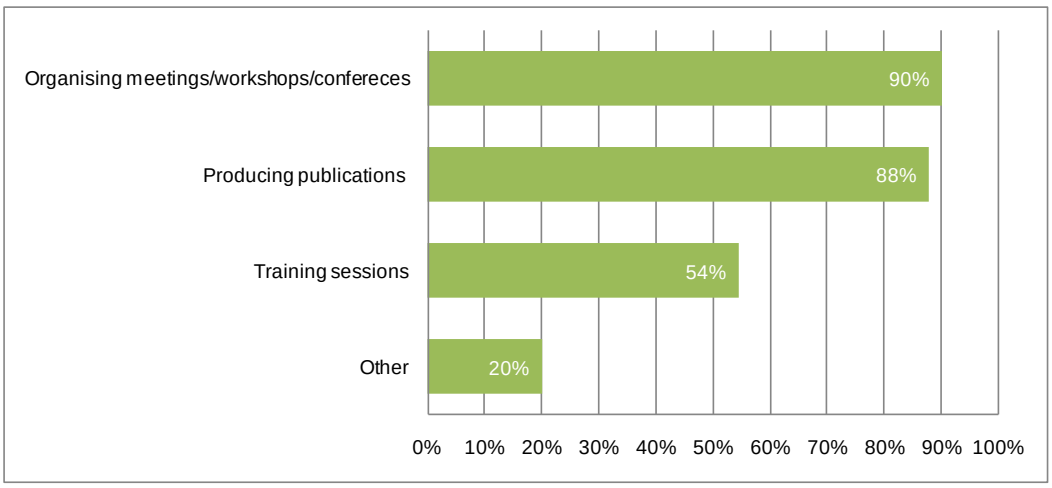


Source: GHK LIFE EPG Survey, Base = 85 respondents.

A3.13 Awareness and Replication

To generate awareness projects are required to develop a website Other methods used to raise awareness are shown in figure 2.6. The organisation of meetings, workshops and conferences is undertaken by 90% of respondents and the production of publications by 88%. In addition, just over half of respondents are incorporating training sessions. Further activity undertaken includes education in schools, study tours and fairs.

Figure A3.15 Awareness Raising activity



Source: GHK LIFE EPG Survey, Base = 90 respondents.

Through awareness raising activities, a significant number of projects anticipate that they will reach over 500 people (49%), with a target audience up to 100,000 people. A further 25% of projects aim to reach between 200 and 500 people and 20% between 50 – 200 people.

These results are fairly evenly split in the geographic focus between local regional and national levels.

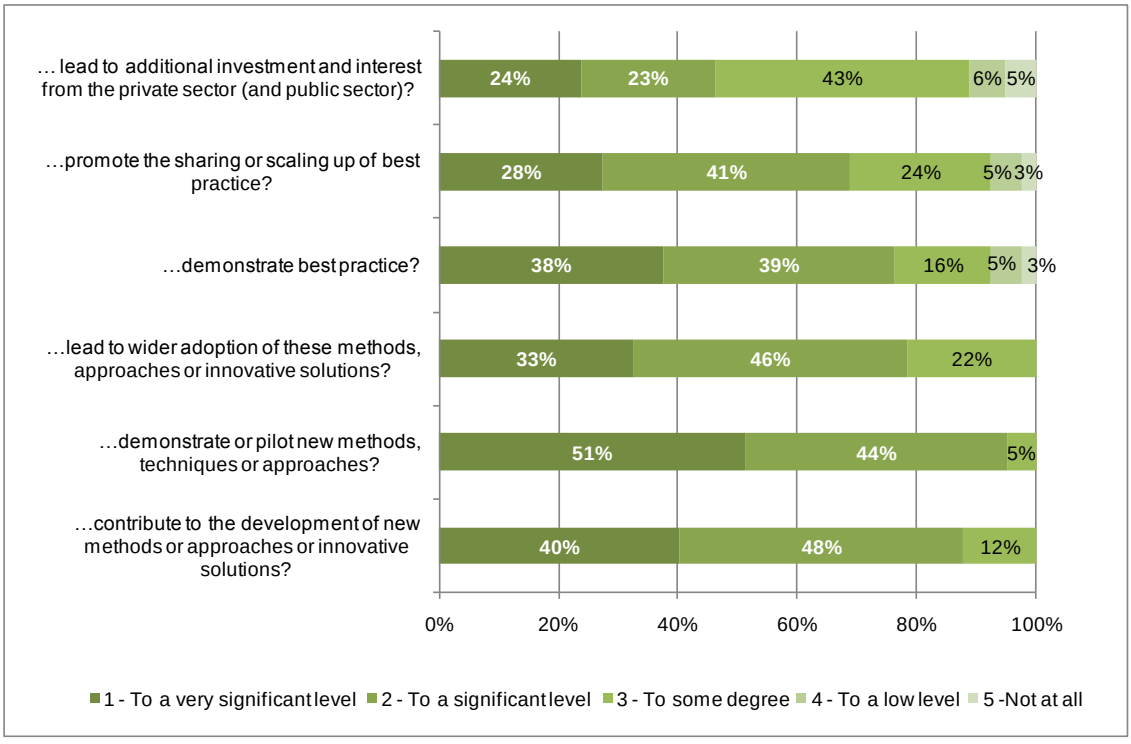
The majority of project results are designed to be replicated (76%) by, for instance, partners, local and regional authorities, farmers, NGOs, private businesses and other project organisations, over periods ranging from two years to ten years. The results of project activity are likely to benefit a variety of user groups. For example respondents will collectively provide a benefit to 1068 local authorities, 331 national public authorities, 3098 businesses and 1,386,952 community members. In addition 71% of projects will include staff training at the project site.

A3.14 Summary of EU Added Value

Respondents were asked to rate how well the project would achieve a range of strategic roles, the results of which are show in Figure 2.7.

The most important strategic role of projects was the demonstration or piloting of new methods, techniques or approaches, for which 95% of respondents considered their project would have either a significant or very significant impact. 85% also considered they would significantly contribute to the development of new methods, approaches or innovative solutions.

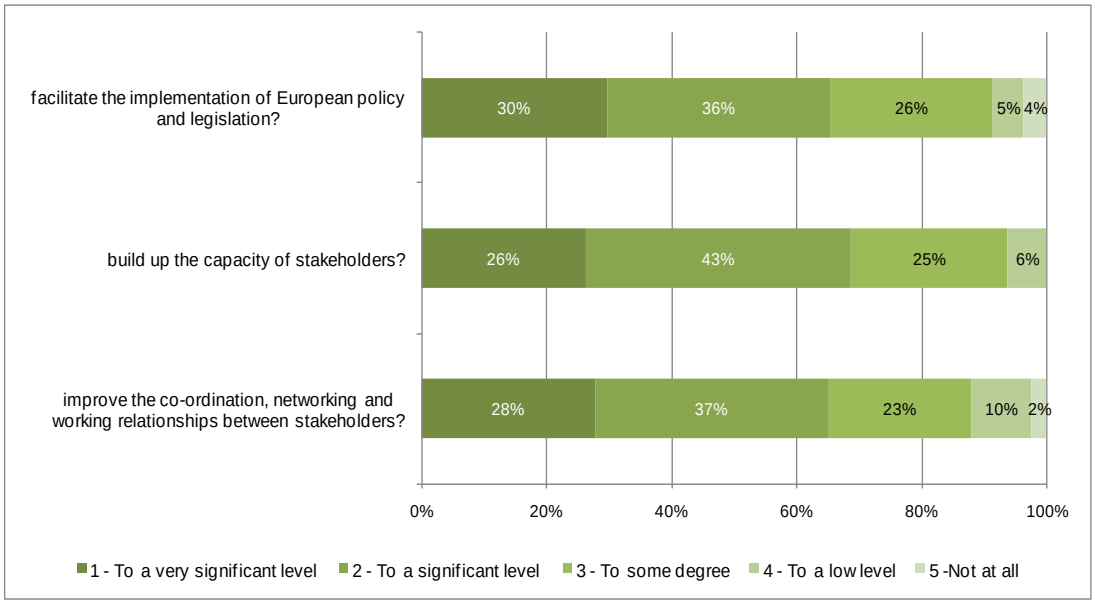
Figure A3.16 Strategic or Catalytic Role – Will the project.....



Source: GHK LIFE EPG Survey, Base = 90 respondents

When asked to rate the co-ordinating and implementation role of the project (Figure 2.8) the most significant role was building the capacity of stakeholders (69%). Beneficiaries also rated highly the degree to which their project would facilitate the implementation of European policy and legislation and improve the co-ordination, networking and working relationships between stakeholders.

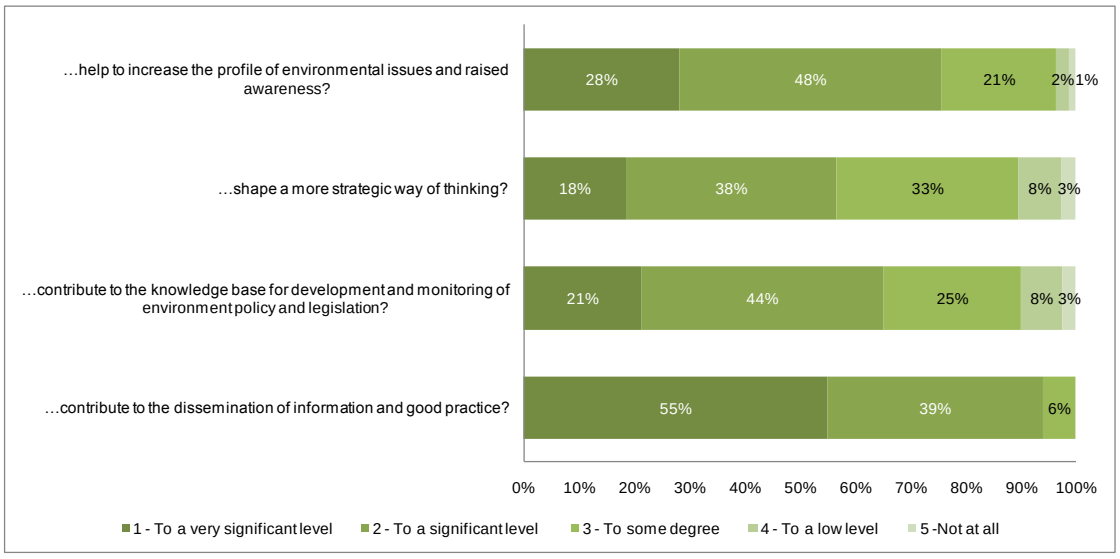
Figure A3.17 Coordination and Implementation Role – Will the project....



Source: GHK LIFE EPG Survey, Base = 90 respondents

Figure 2.9 illustrates the extent of influencing and awareness raising activity through projects. All projects will contribute to the dissemination of information and good practice at least to some degree and 55% will disseminate good practice to a significant level. 76% of projects will help to increase the profile of environmental issues and raise awareness. In addition 65% of respondents will contribute to the knowledge base for development and monitoring of environment policy and legislation to a very significant or significant level.

Figure A3.18 Influencing and awareness raising - Will the project....



Source: GHK LIFE EPG Survey, Base = 90 respondents

A3.15 Analysis of LIFE- Information and Communication Survey

A3.15.1 Background Information – Project Details

Thirteen responses were received in response to the LIFE-INF survey, a response rate of 33%. Of those who responded, the average project investment was €1.1m and the average co-financing received from the European Commission was €0.5m although finance ranged from approximately €0.1m to just over €1m.

The average project will last for just over 3 years and involve 6 partners. However, one project is due to run until August 2015 (duration of 5 years) with another engaging 12 or 13 partners over the project's lifetime. Nine of the respondents did not have previous experience of managing a LIFE project.

A3.15.2 Problem Definition

All respondents stated that their project was designed to address the problem of awareness and knowledge sharing. A further three had also designed the project to address the implementation of the acquis and two projects also addressed the need for faster eco-innovation, by accelerating awareness and supporting diffusion. One project also addressed the impacts of other EU policies.

The main barrier to addressing the environmental problem in the EU identified by the projects was information failure. For some respondents this included a lack of information sharing between Member States, organisations or people due to mistrust or a lack of will. One project said its focus was to 'facilitate access to information' which is held by the administration but rarely reaches the wider public and thereby their project sought to improve the attitudes of the population to environmental problems.

A3.15.3 Project Administration

Six of the projects related to the 6EAP theme of Climate Change and six projects also related to Natural Resources and Waste. Five respondents related their projects to water and three respondents related their projects to environment and health. Only one project was related to each of the themes of urban environment, strategic approaches, innovation and forests. No projects related to the theme of noise, chemicals or air.

The majority of projects involved, as coordinating or associated beneficiaries, public authorities (8 projects) and private companies (10 projects). Six projects involved NGOs and four involved policy makers. Three projects involved universities and research organisations and three projects also involved farmers. In addition, two projects stated that their stakeholders included society in general or environmental associations and teachers. Fishermen, students and the press were also mentioned as additional stakeholders.

A3.15.4 Administration costs[84]

A3.15.4.1 Costs of Bidding

The cost to applicants of bidding for LIFE Information and Communications funding was €10,600 per project, taking into account the administration and technical staff time involved, similar to the cost for Nature projects. The main cost was the time required to write and submit the bid. Given an average project size of €1.1m, the bid cost represented 1% of project value.

A3.15.4.2 Costs of Project Management

The cost to beneficiaries of the administration and management of the project including reporting, taking into account the administrative and technical staff time involved, was almost €14,000, 1.3% of project value. The largest item of cost is the expenditure on the preparation of the Mid-term Report, 31% of costs.

A3.15.5 Activities and Outputs

Respondents were asked which core actions the project was designed to undertake. Eleven out of the thirteen projects' core activity was *awareness raising campaigns* related to the implementation, updating and development of European environmental policy and legislation. Seven out of thirteen projects' focus was *information and communication actions*

[84] A full breakdown of administrative costs is provided in Annex 13

related to the implementation, updating and development of European environmental policy and legislation.

Projects often undertake a number of public events and excursions for those living in the area (on average 24 over the lifetime of the project). Stakeholder events and meetings take place numerous times (an average of 41 times during the project lifetime, however this result is distorted by one project which states 210 stakeholders and events would take place). In addition, educational activities, media activities and participatory activities take place often (on average 41, 21 and 17 times respectively during the project lifetime). Activities comprising of site visits, publications, individual meetings with public authorities and activities aiming to facilitate user access and awareness take place less often but still on average between 9 and 16 times over the course of the project. On average each project includes 7 presentations at technical conferences, 4 meetings between LIFE projects, 2 films or DVDs, and 1 final conference.

Stakeholder consultation is, or has been, part of the project's activities for seven of the projects with the number of consultations varying between 1 and 700. Preparatory studies were or will be included in six of projects – for the majority, one study has been undertaken. Three projects included technical planning; for those who provided detail on the number of technical planning actions, responses varied between 2 and 10.

Of all the respondents just two stated that preparatory actions had changed objectives or planned results and both of these respondents emphasised that preparatory actions had made the project increasingly clear and focused.

A3.15.6 Employment Data

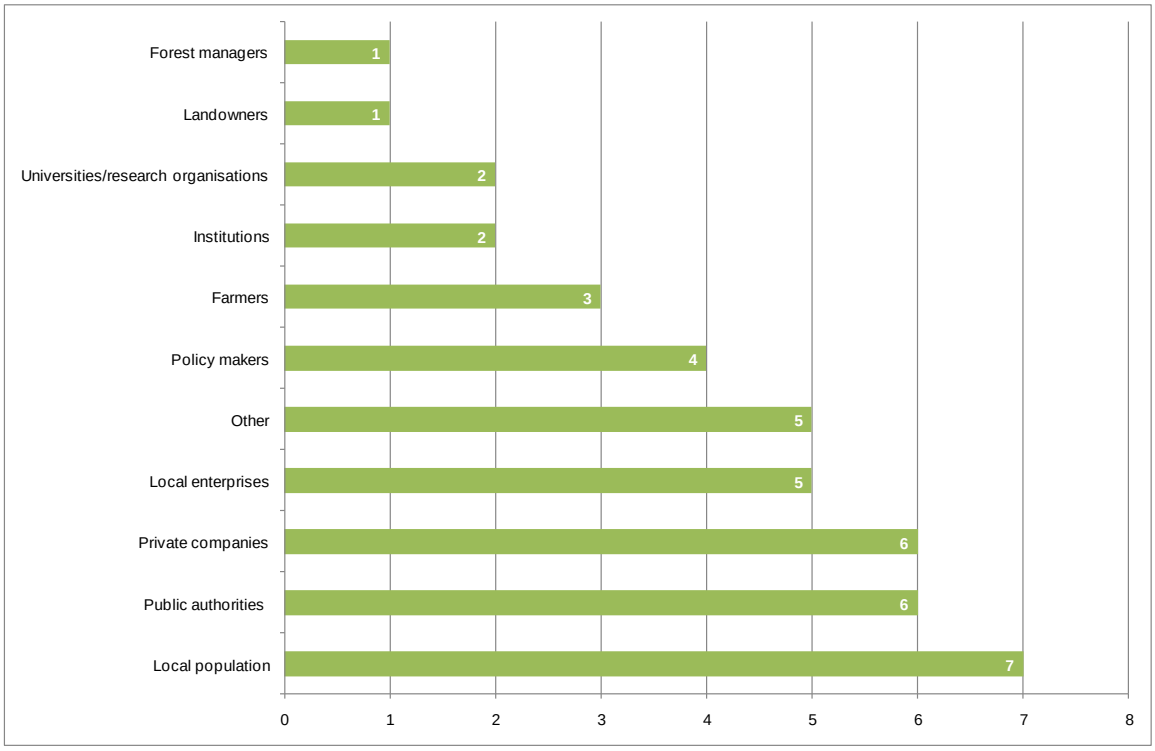
Respondents were also asked whether their projects were likely to continue after the LIFE funding period. Five of the 7 respondents stated that the project was likely to continue and when asked how many additional people the project would employ, one respondent said 2 additional Full Time Equivalent (FTE) positions and the others did not know. One respondent was able to state that the project would continue for three years or more, the others were unable to say.

A3.15.7 Awareness and Replication of Results

The primary topics of awareness raising campaigns related to climate change and water sustainability with two further projects focusing on natural resources and waste. More specifically this included local impact and mitigation measures such as energy saving, the restoration of rivers and rational use of water resources and the promotion of green products and reducing carbon emissions and the prevention of waste. Such activity was to be achieved through specific actions with numbers ranging from 2 actions to 4000 actions.

The primary targets of awareness raising activity were the local population (7 projects), public authorities (6 projects) and private companies (6 projects) as illustrated in Figure 3.1. In addition 5 projects projects stated their activity focused on local enterprises and a further four focused on policy makers.

Figure A3.19 Target Audiences of Awareness raising activity



Source: GHK LIFE-Inf Survey, Base = 13 respondents

Eleven of thirteen projects indicated that they would expect to reach over 500 from their awareness raising activity. Four projects provided further detail on the number of people who would be reached and answers ranged from 10,000 to 25 million. Eleven projects also stated that new knowledge and skills would be imparted to the target audiences following awareness raising activities. Between 200 and 100,000 people would gain an increased awareness or knowledge of environmental issues, between 30 and 50,000 would receive specific training and between 300 and 50,000 would gain improved skills or competencies to deal with environmental management issues.

Eight projects stated that awareness would be raised regionally by their actions. Six projects stated the awareness would be raised at the national level and a further six projects stated that the impact would be local. Four projects felt that awareness would be improved at an EU level..

Seven of the respondents stated that project results were designed to be replicated and six projects stated that results were not designed for replication. For those that were, replication activity was to be achieved through the distribution of web tools, the promotion by authorities and associations and the creation of a national campaign.

The target audience that respondents anticipated would benefit on average from the projects included local public authorities (810), an average of 8 national public authorities, 20 business and 114 community members.

Four projects said that they had evidence to show the environmental impact of their activity – more specifically this included one project with a 10% decrease in carbon emissions for all those engaged in the project and another which stated that a decrease in per capita water consumption would illustrate the project's environmental impact.

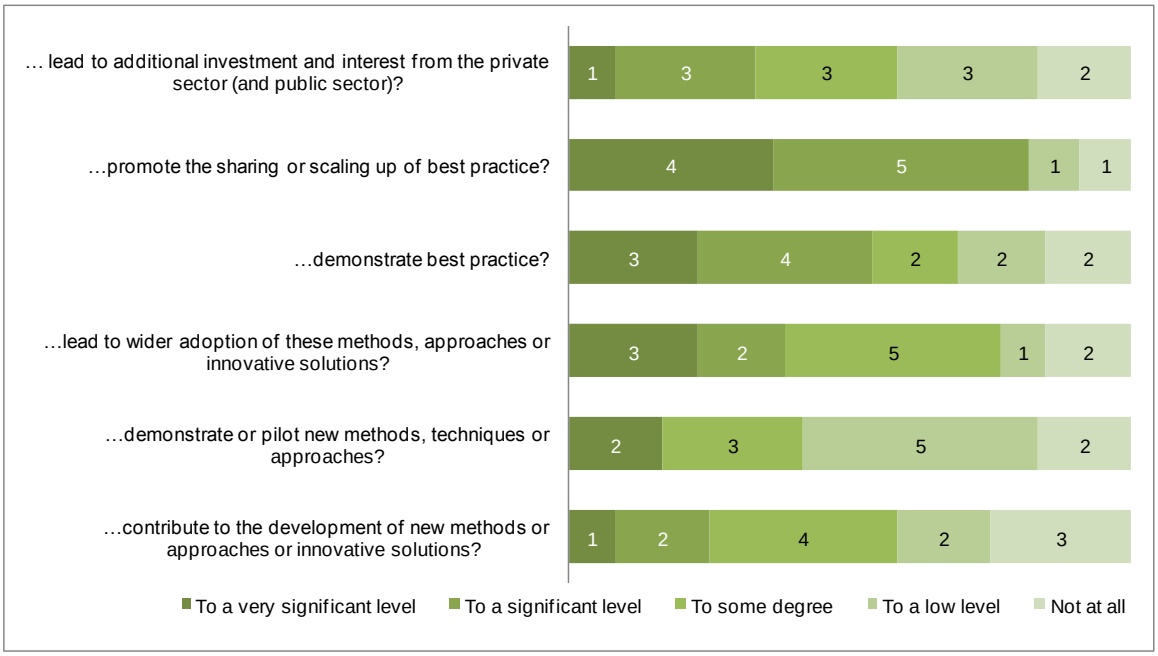
A3.15.8 Summary of EU Added Value

To ascertain the added value of the projects, respondents were asked to the rate the extent to which their projects would lead to certain results. Figure 3.2 shows answers related to the project's strategic or catalytic role.

The most significant impacts are related to best practice with seven respondents stating that their projects would demonstrate best practice either to a significant or very significant level and nine respondents stating the project will promote the sharing and upscaling of best practice through the planned dissemination activity. It is also expected that projects will lead to wider adoption of methods, approaches or innovative solutions, with 76% of respondents believing this would take place to some degree or to a significant or very significant level.

There were mixed views as to whether projects would lead to additional private or public sector investment or interest. There was little agreement that projects would contribute to the development of new methods, approaches or innovative solutions, although one-third felt this would take place to some degree.

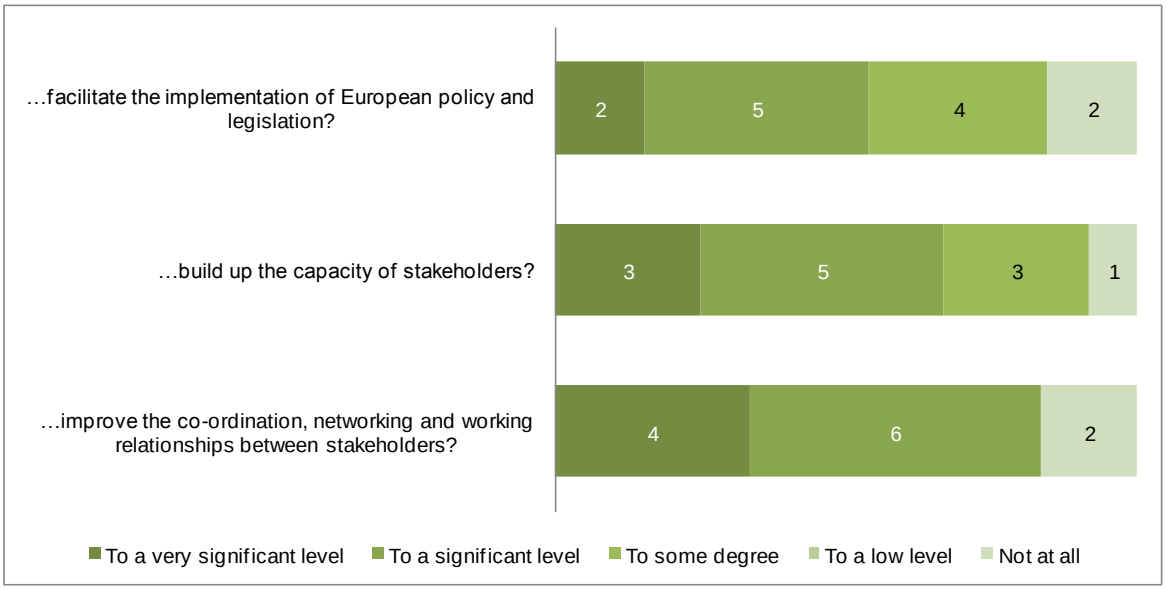
Figure A3.20 Strategic and Catalytic Role – will the project...



Source: GHK LIFE-Inf Survey, Base= 12/13 respondents

Figure 3.3 illustrates views on the project's coordination and implementation role. The most significant impact is expected to be the improvement of co-ordination, networking and working relationships between stakeholders, with ten projects stating it would occur to a significant or very significant level. Two-thirds of projects were expected to significantly or very significantly build up the capacity of stakeholders. The facilitation of European policy and legislation implementation is likely to be a significant or very significant result for seven respondents.

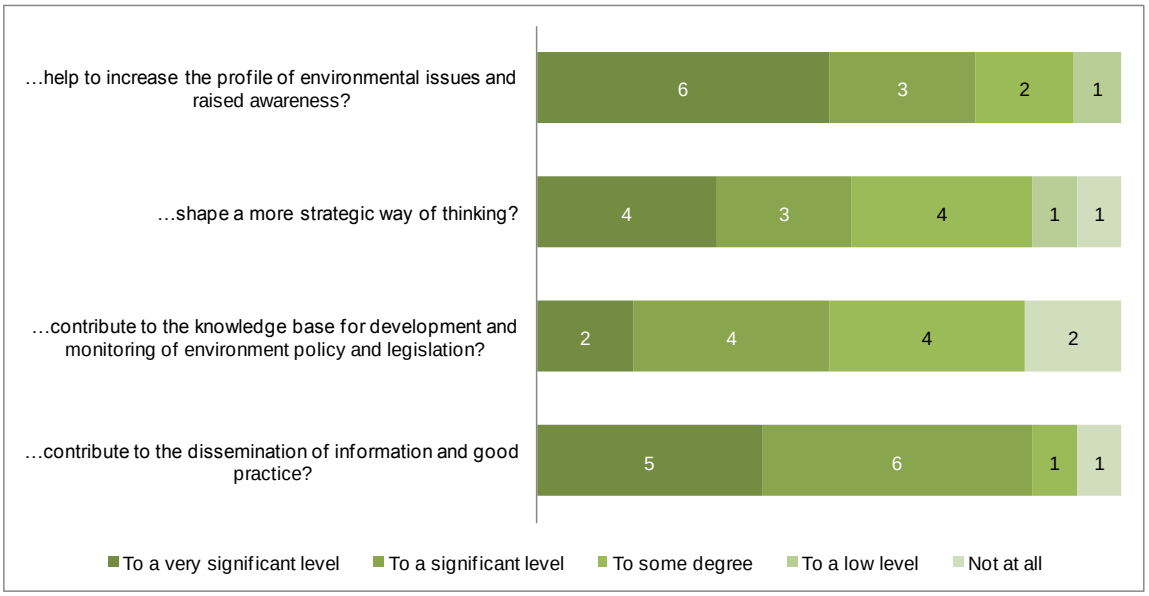
Figure A3.21 Coordination and Implementation Role - Will the project....



Source: GHK LIFE-Inf Survey, Base= 12/13 respondents

Figure 3.4 illustrates the project's influence and awareness raising. For all except one of the projects, it was expected that the project would play a significant or very significant part in the dissemination of information and good practice, as would be expected from communications activity. A significant number of projects also anticipated that the profile of environmental projects would be raised as a result of their project activity. Projects held mixed views as to whether they would shape more strategic environmental thinking or whether they would contribute to the knowledge base for the development and monitoring of environmental policy or legislation.

Figure A3.22 Influencing and awareness raising - Will the project.....



Source: GHK LIFE-Inf Survey, Base= 12/13 respondents

Annex 4 Environmental impact indicators used in the baseline assessment

A4.1 Environment, Policy and Governance - Environmental Impact indicators by theme

Table A4.1 (Impacts expected to be seen 3 years after the project has ended)

Theme	Indicator	Unit
Climate Change	Expected reduction in emissions of CO_2 or other greenhouse gases (expressed in CO equivalent)	Tons/year
	Expected reduction in emissions of Ozone Depleting Substances (ODS)	Tons/year
Air	Likely improvement of air quality	Number of people that will be affected Area km^2
	Likely increase in area with ambient air quality meeting EU air quality standards	Increase in area - km^2 Expected population living in the area
	Likely reduction in emissions of noxious gasses (e.g. SO_2, NOx, NMVOC an NH3)	Tons/year
	Likely reduction in use of private cars	Expected decrease in km travelled per year Expected Reduction in CO2 emissions Tons/day
	Likely improvement of ecosystem negatively affected by acidification	Number of ecosystems that will be improved
Water	Area that will be protected against adverse effects of flooding	Area km^2
	People that will be protected against adverse effects of flooding	Number of people that will be protected
	Area of rivers/lakes that will have improved quality (chemical, microbiological or ecological)	Area - ha
	Likely improvement in areas meeting national quality standards/ targets	Area – ha
	Area with likely improved groundwater quality	Area – ha
	Area that will be protected against adverse effects of flooding	Area – ha
	People that will be protected against adverse effects of flooding	Number of people that will be protected
	Volume of urban wastewater that will meet EC Directive 91/271 requirements	Volume - m^3/year
	Volume of urban waste water discharges that will be shifted from untreated to treated	Volume - m^3/year
	Volume of industrial waste water discharges that will have enhanced quality regarding hazardous chemical substances	Volume - m^3

Natural Resources and Waste	Likely reduction in energy consumption	MJ/year
	Likely reduction in water consumption	Volume - m^3/year
	Likely reduction in use of limited or non-renewable natural resources	Tons or m^3/year
	Likely reduction in non-hazardous solid waste generation	Tons/year
	Likely reduction in hazardous waste generation	Tons/year
	Likely increase in recycling of waste	Tons/year
Chemicals	Expected reduction in use of hazardous chemical substances (e.g. CMR or PBT11)	Tons/year
	Expected substitution of hazardous substances	Number of substances
Sustainable Urban Development	Expected increase in size of urban recreational/ green areas	Area - ha
	Expected increase in pedestrian/ bicycle paths in cities	Area - km
	Expected increase in bicycle traffic	Km/year Expected reduction in CO2 emissions Tons/day
	Expected reduction in car traffic	Km/year Expected reduction in CO2 emissions Tons/day
	Expected success of recreational/green area	Number of users/year
Strategic Approaches	Will eco-friendly products be introduced	State Yes/No Number of products
	Goods that will be purchased under green procurement system	Number of companies that will be involved
	Tourists expected to be on sustainable travel arrangements	Number of tourists
	House units that will be constructed in accordance with sustainable building principles	Number of house units that will be constructed
	Please state any other expected impacts	
Soil	Expected area of improved soil quality	Area – km^2
	Expected extent of reduced soil erosion	Area – km^2
	Please state any other expected impacts	
Noise	Expected reduction in environmental noise caused by traffic	Decibels
	Reduction in environmental noise caused by industrial activities	Decibels
	Reduction in environmental noise caused by recreational activities	Decibels
	Please state any other expected impacts	
Environment and	People that will be better protected from air	Number of people

Health	pollution by particles	
	People that will be better protected from air pollution by ozone	Number of people
	Please state any other expected impacts	

A4.2 Nature & Biodiversity Environmental Impacts

Table A4.2 (Impacts expected to be seen 3 years after the project has ended)

Indicator	**Unit**
Land Purchase	**Area (ha)**
Habitats that will be created or re-created	Area - ha Number of habitats created/re-created
Habitats that will be restored	Area - ha Number of habitats restored
Habitats that will be brought under favourable management.	Area - ha Number of habitats brought under sympathetic management
Favourable conservation status that will be achieved for species /habitats	Number of species listed on directive annexes Number of habitats achieving favourable status Number of priority habitats achieving favourable status Overall % change in conservation status from before the project to after
Species that will be reintroduced	Number of individual species reintroduced Original population
Invasive species that will be controlled	Area - ha Number of invasive species that will be controlled Number of priority habitats protected
Demonstration of the wider applicability of the technique(s) applied	State Yes/No Type of audience
Species and area of habitats that will benefit from local biodiversity action	Area ha Number and type of species
Please state any other impacts expected	

Annex 5 Detailed analysis of habitat improvement

The estimated terrestrial area of expected habitat improvement by habitat type for the current programme was based on the response of LIFE projects to the project survey. In some cases projects cover more than one habitat type, in which case the dominant habitat type was identified.

The survey did not attempt to assess the scale of improvement in environmental quality, based on e-survey responses; and would require site by site appraisal. The survey responses have been grossed up from the results provided by projects for all terrestrial projects based on the levels of project investment. Marine impacts have not been included.

Table A5.1 Habitats that will be created or re-created

Habitat Type	Number of habitats created or re-created	Area (ha)
Coastal and Halophytic Habitat	30	650
Coastal Sand Dunes and Inland Dunes	40	590
Freshwater Habitats	60	2,800
Temperate Heath and Scrub	10	360
Sclerophyllous Scrub (Matorral)	1	6
Natural and Semi-Natural Grassland Formations	20	470
Raised Bogs, Mires and Fens	40	840
Rocky Habitats and Caves	1	6
Forests	20	360
Total	220	6,100

Table A5.2 Habitats that will be restored

Habitat Type	Number of habitats created or re-created	Area (ha)
Coastal and Halophytic Habitat	3,500	105,500
Coastal Sand Dunes and Inland Dunes	3,500	2,700
Freshwater Habitats	3,500	1,238,000
Temperate Heath and Scrub	10	360
Sclerophyllous Scrub (Matorral)	2	60
Natural and Semi-Natural Grassland Formations	60	380,400
Raised Bogs, Mires and Fens	160	15,400
Rocky Habitats and Caves	2	60
Forests	60	411,900
Total	10,800	2,154,000

Table A5.3 Habitats that will be brought under sympathetic management

Habitat Type	Number of habitats created or re-created	Area (ha)
Coastal and Halophytic Habitat	6,300	103,200
Coastal Sand Dunes and Inland Dunes	6,400	6,100
Freshwater Habitats	6,300	5,000
Temperate Heath and Scrub	10	360
Sclerophyllous Scrub (Matorral)	3	3,300
Natural and Semi-Natural Grassland Formations	90	473,400
Raised Bogs, Mires and Fens	80	3,800
Rocky Habitats and Caves	3	3,300
Forests	60	420,500
Total	19,300	1,019,000

Table A5.4 Favourable conservation status that will be achieved for species and habitats

Habitat Type	Number of species listed in the Annexes of the Birds and Habitats Directives	Number of habitats achieving favourable status	Number of priority habitats achieving favourable status
Coastal and Halophytic Habitat	310	140	50
Coastal Sand Dunes and Inland Dunes	50	40	30
Freshwater Habitats	120	50	20
Temperate Heath and Scrub	-	9	2
Sclerophyllous Scrub (Matorral)	20	1	-
Natural and Semi-Natural Grassland Formations	120	40	30
Raised Bogs, Mires and Fens	240	90	70
Rocky Habitats and Caves	20	1	-
Forests	160	60	40
Total:	1,040	430	240

Table A5.5 Number of individual species reintroduced

Habitat Type	Number of individual species reintroduced	Number of species in the population before the project began
Coastal and Halophytic Habitat	160	-
Coastal Sand Dunes and Inland Dunes	150	-
Freshwater Habitats	5,500	1,800
Temperate Heath and Scrub	-	-
Sclerophyllous Scrub (Matorral)	-	-
Natural and Semi-Natural Grassland Formations	20	-
Raised Bogs, Mires and Fens	-	-
Rocky Habitats and Caves	-	-
Forests	40	80
Total:	5,900	1,900

Table A5.6 Invasive species that will be controlled

Habitat Type	Habitat Type	Area (ha)	Number of priority habitats protected	Number of invasive species that will be controlled
Coastal and Halophytic Habitat	1,700	20	119,200	3,000
Coastal Sand Dunes and Inland Dunes	1,900	20	119,200	3,000
Freshwater Habitats	1,100	60	40	109,500
Temperate Heath and Scrub	120	2	5	-
Sclerophyllous Scrub (Matorral)	110	1	1	-
Natural and Semi-Natural Grassland Formations	21,300	30	119,200	1,599,000
Raised Bogs, Mires and Fens	580	10	20	-
Rocky Habitats and Caves	110	1	1	-
Forests	59,000	40	70	302,000
Total:	85,900	180	357,700	2,017,000

Table A5.7 Species and area of habitats that will benefit from local biodiversity action

Habitat Type	Area (ha)	Number and type of species	Area (ha)	Number and type of species
Coastal and Halophytic Habitat	3,600	-	31,700	-
Coastal Sand Dunes and Inland Dunes	3,100	-	27,200	-
Freshwater Habitats	142,400	90	1,265,000	780
Temperate Heath and Scrub	-	-	-	-
Sclerophyllous Scrub (Matorral)	2,800	20	24,500	180
Natural and Semi-Natural Grassland Formations	-	-	-	-
Raised Bogs, Mires and Fens	280	-	2,400	-
Rocky Habitats and Caves	2,800	-	24,500	-
Forests	8,200	-	73,100	-
Total:	163,200	110	1,448,000	960

Annex 6 Administration Costs – Nature and Biodiversity Projects

A6.1 Costs of Bidding

The cost to applicants of bidding for LIFE Nature funding was €12,000 per project, taking into account the administration and technical staff time involved. The main cost was the time required to write and submit the bid. Given an average project size of €2.2m, the bid cost represented 0.6% of project value.

The table below provides a breakdown of the average number of hours spent on each task during the bidding stage per project, divided between administrative and professional staff. This indicates that the cost of profession staff accounts for 69% of the total cost.

Table A6.1 LIFE+ Nature Projects – Average time and cost spent on the application process per project bid

Bid tasks	Administrative staff - hours	Technical/ Professional - hours	Administrative staff - cost €	Technical/ Professional - cost €	Total - cost €	%
Researching Funding options	19	21	447	554	1,002	8%
Negotiating, conceiving and writing the proposal	80	162	1,896	4,245	6,141	51%
Submitting the proposal to the competent authority	22	88	513	2,313	2,826	23%
Answering Commission requests	24	24	564	635	1,199	10%
Negotiating/ signing the contracts	12	26	294	677	971	8%
Total	156	321	3,715	8,424	12,139	100%

Source: GHK project survey (n= 44)

Notes: Average cost per hour based on:

- Administrative staff time - €24/hour
- Technical & Professional staff time €26/hour

A6.1.2 Costs of Project Management

The cost to beneficiaries of the reporting and information obligations during the project management stage, taking into account the administrative and technical staff time involved, was €25,500 per project, 1.2% of project value. The largest item of cost is the planned expenditure on the preparation of the Final Report, accounting for a third of costs.

The table below provides a breakdown of the average number of hours spent on each task during the project management stage per project, divided between administrative and technical staff time, and the subsequent average cost per project. This indicates that the cost of profession staff accounts for 66% of the total cost.

Table A6.2 LIFE+ Nature Projects – Time and cost spent on the project management reporting and information obligations per project

Project management tasks	Administrative staff - hours	Technical/ Professional - hours	Administrative staff - cost €	Technical/ Professional - cost €	Total - cost €	%
Preparation of the inception report	39	85	925	2,232	3,158	12%
Preparation of mid-term report	89	91	2,106	2,387	4,493	18%
Preparation of final report	97	195	2,310	5,113	7,423	29%
Preparation of layman's report	12	55	284	1,449	1,732	7%
Notification activities linked to changes to the grant agreement other than amendments	9	42	220	1,104	1,324	5%
Amendments to the grant agreement	32	53	761	1,398	2,159	8%
Visits of the monitoring team	33	61	779	1,590	2,369	9%
Visits of the Commission	21	52	500	1,364	1,864	7%
Other	36	4	855	112	967	4%
Total	368	638	8,741	16,749	25,490	100%

Source: GHK project survey (n= 44)

Notes: Average cost per hour based on:

- Administrative staff time - €24/hour
- Technical & Professional staff time €26/hour

A6.2 Administration costs - EPG Projects

A6.2.1 Costs of Bidding

The cost to applicants of bidding for LIFE EPG funding was €23,000 per project, taking into account the administration and technical staff time involved, almost double to cost for Nature projects. The main cost was the time required to write and submit the bid. Given an average project size of €2.6m, the bid cost represented 0.9% of project value.

The table below provides a breakdown of the average number of hours spent on each task during the bidding stage per project, divided between administrative and professional staff. This indicates that the cost of profession staff accounts for 83% of the total cost.

Table A6.3 Table 1.3: LIFE+ EPG Projects – Time and cost spent on the application process per project

Bid tasks	Administrative staff - hours	Technical/ Professional - hours	Administrative staff - cost €	Technical/ Professional - cost €	Total - cost €	%

Researching Funding options	16	25	438	831	1,270	5%
Negotiating, conceiving and writing the proposal	76	322	2,059	10,591	12,649	55%
Submitting the proposal to the competent authority	19	134	526	4,417	4,943	21%
Answering Commission requests	22	65	592	2,147	2,739	12%
Negotiating/ signing the contracts	13	36	360	1,171	1,531	7%
Total	147	583	3,974	19,158	23,133	100%

Source: GHK project survey (n= 90)

Notes: Average cost per hour based on:

- Administrative staff time - €27/hour
- Technical & Professional staff time €33/hour

A6.2.2 Costs of Project Management

The cost to beneficiaries of the administration and management of the project including reporting, taking into account the administrative and technical staff time involved, was almost €28,000, 1.1% of project value. The largest items of cost are the expenditure on the preparation of the Inception Report, account for 29% of costs and the Final Report (27%)

The table below provides a breakdown of the average number of hours spent on each task during the project management stage per project, divided between administrative and technical staff time, and the subsequent average cost per project. This indicates that the cost of profession staff accounts for 65% of the total cost.

Table A6.4 Table 1.4: LIFE+ EPG Projects – Time and cost spent on the project management reporting and information obligations per project

Project management tasks	Administrative staff - hours	Technical/ Professional - hours	Administrative staff - cost €	Technical/ Professional - cost €	Total - cost €	%
Preparation of the inception report	104	157	2,816	5,164	7,980	29%
Preparation of mid-term report	58	114	1,559	3,752	5,311	19%
Preparation of final report	105	139	2,837	4,586	7,422	27%
Preparation of layman's report	37	32	1,002	1,053	2,056	7%
Notification activities linked to changes to the grant agreement other than amendments	9	21	239	706	945	3%
Amendments to the grant agreement	13	22	363	723	1,086	4%

Visits of the monitoring team	12	29	329	961	1,291	5%
Visits of the Commission	9	17	254	557	812	3%
Other	14	13	385	442	828	3%
Total	362	546	9,786	17,944	27,730	100%

Source: GHK project survey (n= 90)

Notes: Average cost per hour based on:

- Administrative staff time - €27/hour
- Technical & Professional staff time €33/hour

A6.3 Administration costs – INF Projects

A6.3.1 Costs of Bidding

The cost to applicants of bidding for LIFE Information and Communications funding was €10,600 per project, taking into account the administration and technical staff time involved, similar to the cost for Nature projects. The main cost was the time required to write and submit the bid. Given an average project size of €1.1m, the bid cost represented 1% of project value.

The table below provides a breakdown of the average number of hours spent on each task during the bidding stage per project, divided between administrative and professional staff. This indicates that the cost of profession staff accounts for 59% of the total cost.

Table A6.5 Table 1.5: LIFE+ INF Projects – Time and cost spent on the application process per project

Bid tasks	Administrative staff - hours	Technical/ Professional - hours	Administrative staff - cost €	Technical/ Professional - cost €	Total - cost €	%
Researching Funding options	20	24	379	583	962	9%
Negotiating, conceiving and writing the proposal	144	166	2,769	4,116	6,885	65%
Submitting the proposal to the competent authority	7	13	142	327	470	4%
Answering Commission requests	28	37	548	920	1,467	14%
Negotiating/ signing the contracts	29	12	566	293	859	8%
Total	229	252	4,404	6,239	10,643	100%

Source: GHK project survey (n= 13)

Notes: Average cost per hour based on:

- Administrative staff time - €19/hour
- Technical & Professional staff time €25/hour

A6.3.2 Costs of Project Management

The cost to beneficiaries of the administration and management of the project including reporting, taking into account the administrative and technical staff time involved, was almost €14,000, 1.3% of project value. The largest item of cost is the expenditure on the preparation of the Mid-term Report, 31% of costs.

The table below provides a breakdown of the average number of hours spent on each task during the project management stage per project, divided between administrative and technical staff time, and the subsequent average cost per project. This indicates that the cost of profession staff accounts for 48% of the total cost.

Table A6.6 Table 1.6: LIFE+ INF Projects – Time and cost spent on the project management reporting and information obligations per project

Project management tasks	Administrative staff - hours	Technical/ Professional - hours	Administrative staff - cost €	Technical/ Professional - cost €	Total - cost €	%
Preparation of the inception report	91	73	1,750	1,801	3,551	25%
Preparation of mid-term report	156	54	3,003	1,333	4,336	31%
Preparation of final report	45	62	874	1,535	2,408	17%
Preparation of layman's report	20	27	376	678	1,054	8%
Notification activities linked to changes to the grant agreement other than amendments	8	11	158	265	423	3%
Amendments to the grant agreement	27	15	524	379	903	6%
Visits of the monitoring team	22	25	428	621	1,049	8%
Visits of the Commission	6	4	124	110	235	2%
Other	0	0	-	-	-	0%
Total	376	272	7,238	6,721	13,959	100%

Source: GHK project survey (n= 13)

Notes: Average cost per hour based on:

- Administrative staff time - €19/hour
- Technical & Professional staff time €25/hour

Annex 7 Environmental externality values

Table A7.1 Data sources used to calculate the economic value of environmental impacts

Theme	Indicator	Economic value per unit €	Source
Environment, Policy and Governance (EPG)			
Climate Change/Air/ Urban Environment	Reduction in CO2 emissions – tonnes	120	Watkiss, P.(2006): The social cost of carbon, by Paul Watkiss Associates, UK, for Defra, available at: http://www.oecd.org/dataoecd/19/21/37321411.pdf. *This reference provides EU price as 70-170 Euros, hence average of 120 Euros per tonne carbon.*
	Reduction in energy consumption – tons/CO2	0.0015	The value of energy savings was calculated by converting MJ into kwh, and then using a standard figure for kg / CO2 of electricity generated in the UK. This value was identified at: http://www.defra.gov.uk/environment/business/reporting/pdf/20090928-guidelines-ghg-conversion-factors.pdf). *The total tonnage of CO2 emissions was subsequently multiplied by the social cost of carbon of €120 / tonne.*
Natural resources and waste	Likely reduction in use of limited or non-renewable natural resources: Tons per year	10	COWI (July 2010) Economic Analysis of Resource Efficiency Policies, DG environment
	Likely reduction in non-hazardous solid waste generation tonnes/year	11	DG Env (2000) A Study on the Economic Valuation of Environmental Externalities from Landfill Disposal and Incineration of Waste *http://ec.europa.eu/environment/waste/studies/pdf/econ_eva_landfill_report.pdf* *Assumes that the landfill is a modern containment landfill that fulfils the demands of the newest*

Theme	Indicator	Economic value per unit €	Source
			directive (EC/31/1999). The landfill has a leachate collection and treatment system. Further, the landfill gas is collected to generate electricity and heat (CHP). Includes global warming, air pollution, leachate, disamenity and pollution displacement externalities.
	Likely increase in recycling of waste - Tons/year	11	DG Env (2000) A Study on the Economic Valuation of Environmental Externalities from Landfill Disposal and Incineration of Waste http://ec.europa.eu/environment/waste/studies/pdf/econ_eva_landfill_report.pdf *Assumes that the landfill is a modern containment landfill that fulfils the demands of the newest directive (EC/31/1999). The landfill has a leachate collection and treatment system. Further, the landfill gas is collected to generate electricity and heat (CHP). Includes global warming, air pollution, leachate, disamenity and pollution displacement externalities.*
Soil	Reduced of soil erosion - ha	51	From Commission staff working document - Document accompanying the Communication from the Commission to the Council, The European Parliament, the European Economic and Social Committee and the Committee of the Regions - Thematic Strategy for Soil Protection - Impact assessment of the thematic strategy on soil protection {COM(2006)231 final} {SEC(2006)1165} http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:52006SC0620:EN:NOT . *Based on intermediate figure for cost of soil erosion in Europe of €7,624 million (2003 €), for approximately 150 million ha. This is only based on data for 13 European countries. Therefore €7624 million/150 ha = €51/ha.*
Forests	Protection of forest area - ha	1836	Ten Brink, P., Braat, L., Rayment, M., Bräuer, I., Chiabai, A., Bassi, S., Markandya, A., Nunes, P., ten Brink, B., van Oorschot, M., Gerdes H., Stupak, N., Foo, V., Kettunen, M., & Gantioler, S. 2009. Further Developing. Figure based on COPI values for bioregions in Europe.
Water	Area of rivers/lakes that will have improved quality (chemical, microbiological or ecological) -ha	36	Benefits from improved environmental quality from eutrophication in marine ecosystem. Valuation of air pollutation ecosystem damage acid ozone nitrogene and biodiversity; DG Environment, October 2007. *A study calculated the potential benefits of improved water in Swedish archipelago as 506-842 SEK. The evaluation team estimated the potential benefits in the EU given the characteristics of the geographical area in question (e.g. the size and the population).*

Theme	Indicator	Economic value per unit €	Source
	Likely improvement in areas meeting national quality standards/ targets - ha	36	Benefits from improved environmental quality from eutrophication in marine ecosystem. Valuation of air pollutation ecosystem damage acid ozone nitrogene and biodiversity; DG Environment, October 2007.
	Area of likely improved groundwater quality - ha	120	EU Water saving potential (Part 2 – Case Studies) ENV.D.2/ETU/2007/0001r, 19. July 2007: Ecologic - Institute for International and European Environmental Policy
Air	Likely improvement of air quality - km2	0.038	COMMISSION STAFF WORKING PAPER Annex to : The Communication on Thematic Strategy on Air Pollution and The Directive on "Ambient Air Quality and Cleaner Air for Europe" *Impact Assessment*, SEC (2005) 1133
	Likely improvement of air quality - Number of people that will be affected	91	COMMISSION STAFF WORKING PAPER Annex to : The Communication on Thematic Strategy on Air Pollution and The Directive on "Ambient Air Quality and Cleaner Air for Europe" *Impact Assessment*, SEC (2005) 1133 *Health benefits under the chosen level of ambition. The evaluation team selected what the EC calls "the mid-range scenario": the middle value improvement in each category. The figure includes fewer premature deaths, less sickness, fewer hospital admission, improved labour productivity.*
	Likely increase in area with ambient air quality meeting EU air quality standards - km2	0.038	The Communication on Thematic Strategy on Air Pollution and The Directive on Ambient Air Quality and Cleaner Air for Europe
	Likely reduction in emissions of noxious gasses (e.g. SO2, NOx, NMVOC an NH3) - tonnes/year	1,308	The Communication on Thematic Strategy on Air Pollution and The Directive on Ambient Air Quality and Cleaner Air for Europe
Environment and Health	People that will be better protected from air pollution by particles? Number of people	37,348	Reference: de Leeuw, F. and Horálek, J. (2009). Assessment of the health impacts of the exposure to PM2.5 at a European level. ETC/ACC Technical paper 2009/1. The benefit per person is €37,300. This is based on an approximate reduction in mortality associated with reducing particulate matter concentrations. If we assume that the LIFE interventions decrease mortality by 5% (low scenario in reference used), then every person lives ~0.5 years longer. Value of a Year of Life Lost is €75,000, so 0.5 years is worth €37,300 per person.

Theme	Indicator	Economic value per unit €	Source
Nature and Biodiversity			
Coastal and Halophytic Habitat	Ecosystem services of habitats that will be created or re-created – ha Habitats that will be restored – ha Habitats that will be bought under sympathetic management – ha	7083	
Coastal Sand Dunes and Inland Dunes	Ecosystem services of habitats that will be created or re-created – ha Habitats that will be restored – ha Habitats that will be bought under sympathetic management – ha	60970	
Freshwater Habitats	Ecosystem services of habitats that will be created or re-created – ha Habitats that will be restored – ha Habitats that will be bought under sympathetic management – ha	3675	All values across habitats are taken from the following source: ten Brink, P., Braat, L., Rayment, M., Bräuer, I., Chiabai, A., Bassi, S., Markandya, A., Nunes, P., ten Brink, B., van Oorschot, M., Gerdes H., Stupak, N., Foo, V., Kettunen, M., & Gantioler, S. 2009. Further Developing *Figure based on COPI values for bioregions in Europe. There is likely to be considerable variation between habitats in specific bioregions due to biotic / abiotic factors.*
Temperate Heath and Scrub	Ecosystem services of habitats that will be created or re-created – ha Habitats that will be restored – ha Habitats that will be bought under sympathetic management – ha	317	
Sclerophyllous scrub	Ecosystem services of habitats that will be created or re-created – ha Habitats that will be restored – ha Habitats that will be bought under sympathetic management – ha	89	

Theme	Indicator	Economic value per unit €	Source
Natural and Semi-Natural Grassland Formations	Ecosystem services of habitats that will be created or re-created – ha Habitats that will be restored – ha Habitats that will be bought under sympathetic management – ha	202	
Raised Bogs, Mires and Fens	Ecosystem services of habitats that will be created or re-created – ha Habitats that will be restored – ha Habitats that will be bought under sympathetic management – ha	1845	
Forests	Ecosystem services of habitats that will be created or re-created – ha Habitats that will be restored – ha Habitats that will be bought under sympathetic management – ha	1836	
Invasive Alien Species	Controlling invasive species / ha / year	21	Reference: Kettunen, M., Genovesi, P., Gollasch, S., Pagad, S., Starfinger, U. ten Brink, P. & Shine, C. (2008) Technical support to EU strategy on invasive species (IAS) - Assessment of the impacts of IAS in Europe and the EU (final module report for the European Commission). Institute for European Environmental Policy (IEEP), Brussels, Belgium. 44 pp. + Annexes

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Annexes to the Options Report

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ANNEXES

Annex 1 References

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Annex 2 Key messages from the EU Budget Review

A2.1 Core principles

The Review details a further five core principles against which budgetary options should be assessed:

1. Delivering key policy priorities:

Amongst the policies that require significant public spending, the weight of spending should mirror the EU's core **policy priorities**. It should also reflect the new policy directions of the Treaty of Lisbon, the importance given to particular areas (e.g. energy and climate, etc). The Review notes that there is a need to concentrate EU and national resources on agreed EU priorities, using a possible "menu" of thematic priorities.

2. EU added value

Added value is needed to justify spending at the EU level. EU level funding could, for instance, be used to finance EU **public goods**, actions that Member States and regions cannot finance themselves, or where it can secure better results. EU expenditure can offer economies of scale and allow the effective targeting of policy priorities and **avoid unnecessary overlaps**. It **plugs gaps** left by national policy-making, most obviously addressing **cross-border challenges in areas like infrastructure**. It can also open the door to **leveraging** a much wider range of public and private resources than available at the national level alone.

3. A results-driven budget

The Review highlights that spending programmes must have a real **impact**, with the investment feeding through into action.

4. Mutual benefits through solidarity (i.e. burden sharing)

The Review highlights that special attention needs to be paid to those who are most vulnerable and to those who carry a particular burden due to reform. The benefits of solidarity are enjoyed by all. Two examples that are used to illustrate this point is investment in **infrastructure** and action to promote **environmental protection** (e.g. climate change).

5. A reformed financing of the budget

The connection between the original EU ‘own resources’ and common EU policies has been lost, making the system less transparent. There is a need to re-align EU financing with principles of autonomy, transparency and fairness.

A2.2 Looking ahead

The Review highlights that the EU budget should make a contribution to further its **collective goals**. It notes the importance of the **Europe 2020 strategy** as a driving force. This ‘vision’ can have objectives which reinforce each other and where actions can serve different goals at once, which **requires a high degree of coordination**. Europe 2020 needs integrated solutions, so the **instruments to deliver it should be integrated** as well. **Better coordination at regional, national and EU level** can do more to **prevent overlaps** and **encourage best practice** and reinforced joint programming could ensure synergies and complementarity of the different funding levels. Increased coherence and coordination of EU instruments delivering EU policies in areas such as transport, communications, energy, agriculture, **environment**, and innovation is essential. **The new financial instruments for budget delivery must be smart, integrated and flexible.**

Relevant points include those made regarding innovation, infrastructure and the need for international perspectives (other points are raised, but these were identified as being most relevant in the context of this project).

A2.2.1 Innovation

The Review specifically recognises that kick-starting investment in the greener technologies and greener services has some of the greatest potential for future exports and future jobs as an industry. It notes further that to secure this goal, all EU financial instruments, including innovative financial instruments and sources, need to be harnessed effectively.

The more that external costs can be internalised, the more revenues can be generated to contribute to the investments needed to achieve strategic goals like accelerating the decarbonisation of the economy. **Financial instruments should be focused on addressing identifiable market failures** taking into account the state of national financial markets, the legal and regulatory environment and the needs of final beneficiaries.

An interesting case to examine on how to maximise impact with limited resources may be the Risk-sharing Finance Facility (RSFF). The RSFF has demonstrated that novel approaches to providing support can be successful in leveraging private investment; this facility has used an EU budget of € 1 billion to bring an additional € 16.2 billion to support R&D across the EU.

A2.2.2 Infrastructures of the future

Cross-border infrastructure was noted as being one of the best examples of where the EU can plug gaps and deliver better value results. Market failures mean that projects with high EU added value can fail to attract the investment needed from private companies. Although the term infrastructure here was used in the traditional sense, it could be extended to, and is relevant for, the concept of natural infrastructure (/ green infrastructure).

A2.2.3 International perspectives

Given the process of globalisation, the importance of complementing the EU's internal agenda with an external one was highlighted (especially in the context of solidarity and burden sharing). The ability of the EU to target its instruments effectively needs a clear strategic overview, the right relationship with third country partners, and well-designed instruments.

A2.3 A common strategic framework

The Review suggests that the Commission could adopt a common Strategic Framework, outlining a comprehensive **investment strategy** translating the targets and objectives of Europe 2020 into investment priorities. This would replace the current approach of separate sets of strategic guidelines for policies and would ensure **greater coordination** between them. It would encompass the actions covered today by the Cohesion Fund, the European Regional Development Fund, the European Social Fund, the European Fisheries Fund and the European Agricultural Fund for Rural Development. The framework would also **identify linkages and coordination mechanisms** with other EU instruments such as programmes for research, innovation, lifelong learning, and networks.

Based on the Strategic Framework, Member States would present their development strategy in their **National Reform Programmes**, in order to ensure strong ownership. This strategy would identify how the Member State and its regions seek to address the priorities and targets established and would define the positive changes they aim to achieve with EU support. The result of the discussion with the Commission would be a **Development and Investment Partnership Contract** between the Commission and the Member State reflecting the commitments made and the results expected from EU support.

The Contract would **set out the objectives to be achieved**, how progress towards the achievement of these objectives will be **quantified and measured** and the allocation of national and EU resources among priority areas and programmes. The Contract would also establish a limited number of **conditionalities**, linked to the reforms needed to ensure effective delivery. Where relevant, it would identify strategic projects to be included. It would also describe the coordination between EU funds to be applied at national level.

Annex 3 Initial Problem Definition

This Annex details the initial understanding of the problems affecting the EU's environment. It also establishes potential approaches for assessing and measuring each of the problems described.

A3.1 Initial outline of the problem

Problem 1: The implementation of existing EU environmental policy and legislation is inadequate

This problem relates to the economic and social costs that result because of the lack of compliance with agreed EU environmental policies and legislation. The problem therefore relates to all approved environmental policies and related regulation.

The problem can arise because:

- The necessary expenditure to achieve agreed objectives has not been made – this may be for a number of reasons including capacity constraints to design and deliver policies and related infrastructure and affordability (reflected in outstanding budget requirements and lack of policy action); and/or
- The necessary level of enforcement of existing regulations has not been implemented because of inadequate capacities related to resource constraints (including monitoring capacity, enforcement staff numbers and skills) (reflected in non-compliance and poor compliance compared to best practice)

The costs of the problem can therefore be identified with respect to:

- The estimated expenditure required to meet commitments
- The estimated economic, social and environmental costs of policy inaction / non-compliance (with particular reference to cost of policy inaction (COPI) assessments)
- The estimated economic, social and environmental benefits of policy implementation
- Reported MS infringements with respect to EU environmental policies
- Good practice enforcement operation

This problem can be dimensioned by looking at transposition, implementation and enforcement of specific pieces of legislation, framed by the existing acquis. With respect to implementation and enforcement, data on general problems and good practice examples can be sourced from IMPEL[1]. Review of the comparative analyses of MS enforcement activity reported by IMPEL found the work to be difficult to complete due to significant differences in MS approaches.

Generic problem: Regulatory Failure – specifically implementation and enforcement problems, arising chiefly at Member State level due for example to lack of awareness and information sharing, and limited management and operational capacity.

Problem 2: The EU has a range of environmental problems (often transboundary in nature) that impose costs, reduce the quality of life and undermine long term EU and global sustainability

The problem relates to specific environmental problems of a scale capable of undermining long-term sustainability; in other words, 'big ticket' problems that have the potential to create significant social and economic costs over the short and longer-term.

Initial review suggests the following issues at least, need to be considered:

[1] European Union Network for the Implementation and Enforcement of Environmental Law, an international association of environmental authorities

- Climate change
- Biodiversity loss
- Water quality and quantity (scarcity, droughts and flooding)
- Chemicals (including pesticides)
- Waste and resources efficiency

Essentially this problem can be dimensioned by using cost estimates and figures relating to the problems to which community environmental policy and legislation and in particular the Sixth Community EAP (6EAP) are directed – the 'big ticket items'. Costs might be expressed in terms of scenarios about future EU GDP. For example, in the case of biodiversity loss, if nothing is done then the EU might be X% worse off in GDP terms and have other quality of life threats. In the case of climate change, the Stern report and subsequent assessments provide source data. Equivalent data for other problems can be sought. Existing data on trends in the problems would also be used (eg from the latest EEA SOE analysis).

Generic problem: Market and Regulatory Failure – specifically the continuing existence of environmental externalities and the under supply of environmental public goods, and the failure to develop policy to address these failures.

Problem 3: EU environmental policy and legislation is faced with current and new challenges: solutions need to be informed by innovations and successful practices.

The potential to generate significant social and economic savings in the future exists in the capacity to stimulate new policies and technologies in response to the future evolution of environmental challenges. These may be an evolution of current trends in major problems (eg biodiversity loss, climate change) and new problems (e.g. related to nanotechnology). Capacity building for innovation of management and technology in government, NGOs, industry and universities is required.

Aggregate estimates of economic and social benefits would depend on assumptions about rates and extent of replication – but this could be done based on clear assumptions and related sensitivity analysis as to the underlying scale of demand for innovations, informed by reference to relevant market data.

LIFE+ is meant to inform the development of EU policy and legislation in response to existing and evolving challenges. Horizon scanning - gathering new insights that may point us towards identifying new and emerging trends and developments – may be of use in further understanding this problem.

For example, the growing concern over the failure of resource efficiency improvements to keep pace with resource demand such that absolute increases in demand result, suggest the need for some 'technological' and policy 'breakthroughs', what would be the benefit of the Regulation if it could lead to marked changes in behaviour quickly (for example, if LIFE could lead to a major cost reduction in say key environmental technologies and/or encourages one or two countries to stimulate demand through clever subsidies and nudging). If future LIFE stimulated a few of these breakthroughs it could make a major difference to the probability of achieving sustainable development.

Generic problem: Market Failure – specifically the under-investment in environmentally targeted innovative practices as a result of externalities: both in terms of the failure to price environmental costs leading to reduced returns to environmental innovation; and because of unpriced spillover effects that further reduce the incentive to innovators. However, nearly all policy areas are relevant. In practice, the size of the current LIFE+ Regulation makes it difficult to make a substantial difference but the gains to be made relative to costs are potentially good. Examples of systematic procedures for integrating environmental aspects in policy making would be helpful, even if at regional or national level and outside of the EU, especially where this allows estimates of the costs/value of the benefits. In addition, the budgetary ceiling in the current LIFE regulation where max 22% can be spend for other

items than project grants has in the past blocked the possibility to implement extra appropriations voted by the Parliament for climate action.

Generic Problem: Regulatory Failure – specifically implementation and enforcement problems, arising at EC level that fail to secure effective responses to market externalities (covering both negative environmental externalities and positive spillovers relating to innovation).

Problem 4: Other EU policy and legislation generates environmental costs and works against the achievement of EU environmental policy objectives

The consequences of other EU policies for the environment have been identified in ex-post assessments that can provide some measure of the scale of the problem. Additional analyses, based on consultations with Commission officials will seek to identify the share of these costs that can be attributable to a lack of effective implementation of agreed protocols and guidelines.

This problem can be dimensioned by estimating the costs relating to the failure to secure the effective implementation of measures for the integration of environmental impacts into other non-environmental EU policies, especially major spending instruments such as CAP, Structural Funds or the European Fisheries Fund (EFF). Examples of the environment costs arising from other financial instruments have been reported in relation to the spending instruments mentioned above. This is often exacerbated by a lack of coordination at Member State level and lack of capacity to strategically think about implementing environmental objectives into other policies. Collaboration and dialogue can help to address this problem.

Ex-post assessments of instruments are likely to be the most extensive source of information relating to this problem, supported by consultations with various stakeholders (especially environment NGOs that monitor these impacts) to gather evidence of adverse environmental and related economic/social impacts.

Generic problem: Regulatory Failure – specifically with regards to non-environmental EU policy implementation. A lack of environmental awareness and inadequate policy design at EC level, and inadequate environmental integration at MS level (where policy design may have been adequate), result in unnecessary environmental costs.

Problem 5: Awareness and information sharing of environmental issues amongst the EU public and policy actors is low

As a consequence of this problem, Problems 1, 2, 3 and 4 are worse than they would be otherwise. Some survey data on the priorities of policy actors and the relative importance attached to the environment, especially recent trends over the period of the economic crisis, would help. It is plausible that this problem is storing up greater problems in the future.

Lack of awareness implies:

- for Policy actors:
  - Failure to appreciate scale of problems and a lack of capacity to build policy responses (problems 1 and 2)
  - Failure to anticipate challenges and a lack of capacity to support innovation (problem 3)
  - Failure to understand the need for ‘greening’ policies & instruments and lack of appreciation of consequences this causes (problem 4)
- For the Public (producers & consumers):
  - Failure to change behaviour, contributing to additional environmental impacts and missed opportunities for cost savings (all problems)

It may need to be considered that there are limitations to information, to the extent that greater dissemination of information may not necessarily lead to changes in behaviour, and that increased information and awareness may be more effective on certain aspects (e.g.

best practices v. problems) and with regard to certain actors (e.g. industry v. consumers). However, signs that industry are 'coming together' voluntarily to share knowledge is evidence that information is important.

Generic Problem: Regulatory and Market Failures – specifically implementation and enforcement problems as a result of inadequate information and training in the case of policy actors; and imperfect information held by the public (e.g. on the availability of cost-effective environmental improvement opportunities for producers or the lack of information on the environmental costs and benefits of particular products, for consumers), in turn partly because of regulatory failures that fail to require adequate information provision.

Problem 6: Environmental problems outside the EU could have long-term impacts on the EU, both in terms of knock-on environmental impacts (e.g. through resource shortages) and related socio-economic pressures (e.g. higher prices, migration pressures from environmental refugees)

The failure of countries outside the EU to address environmental problems has direct impact on the EU environment and the effectiveness of EU environmental policy. Examples of adverse impacts on EU initiatives and projects can be found in LIFE and wider policy review (e.g. reduced effectiveness of the Marine Strategy in certain waters; and effects on species and habitats). The related economic and social impacts can be considered as part of the review. This would therefore use case studies of selected environments or species where EU environmental policy interventions have been rendered ineffective because of environmental problems outside the EU (mainly in neighbouring countries).

The problem is exacerbated by the difficulties of targeting environmental problems through EU third country programmes that have poverty reduction as their main aim. Whilst these programmes include environmental measures there is evidence from the MTE that there are gaps that could be filled, and for which responses would be consistent with Treaty obligations.

The focus of the current LIFE+ Regulation is on the EU, with instruments operated by the RELEX family (mainly DG AIDCO, but also DEV and Enlargement for IPA) directed at a range of policy objectives, but mainly focused on poverty reduction. Because of the policy priorities, the level of resources and/or the type of activity funded in these other instruments in response to environmental challenges may be limited. Data on the long-term challenges faced globally and in neighbouring regions, together with data on the work of DG AIDCO would provide some evidence of an underlying policy need, recognising that the LIFE instrument will have only a limited role to play in this wider context. It is also noted that whilst environmental problems occurring outside the EU can impact on the EU, the same is also true in the other direction – that activities within the EU can impact non-EU countries.

Generic Problem: Regulatory Failure – specifically the failure either to prioritise environmental problems in non-environmental instruments designed to engage with countries outside the EU, especially in relation to poverty reduction, or to prepare parallel instruments with an explicit environmental focus.

A3.2 Stakeholder reflections on the initial problem description

Across all stakeholders consulted, there was general agreement on the initial problem, although some differences were evident. There were very high levels of agreement (more than 80%) on the significance of the inadequate implementation of the acquis, and that new policy and technological responses will be required to address continuing and future environmental problems. The significance of impacts from environmental problems outside the EU on the EU (and vice versa) were acknowledged. Most stakeholders (more than 60%) also agreed that the scope of the existing acquis is inadequate and that there is a lack of environmental and policy awareness. There was less agreement, especially amongst project beneficiaries, that other EU policies and major spending instruments are contributing towards environmental problems. Nonetheless, interviewees and other survey respondents more widely agreed that this is a problem.

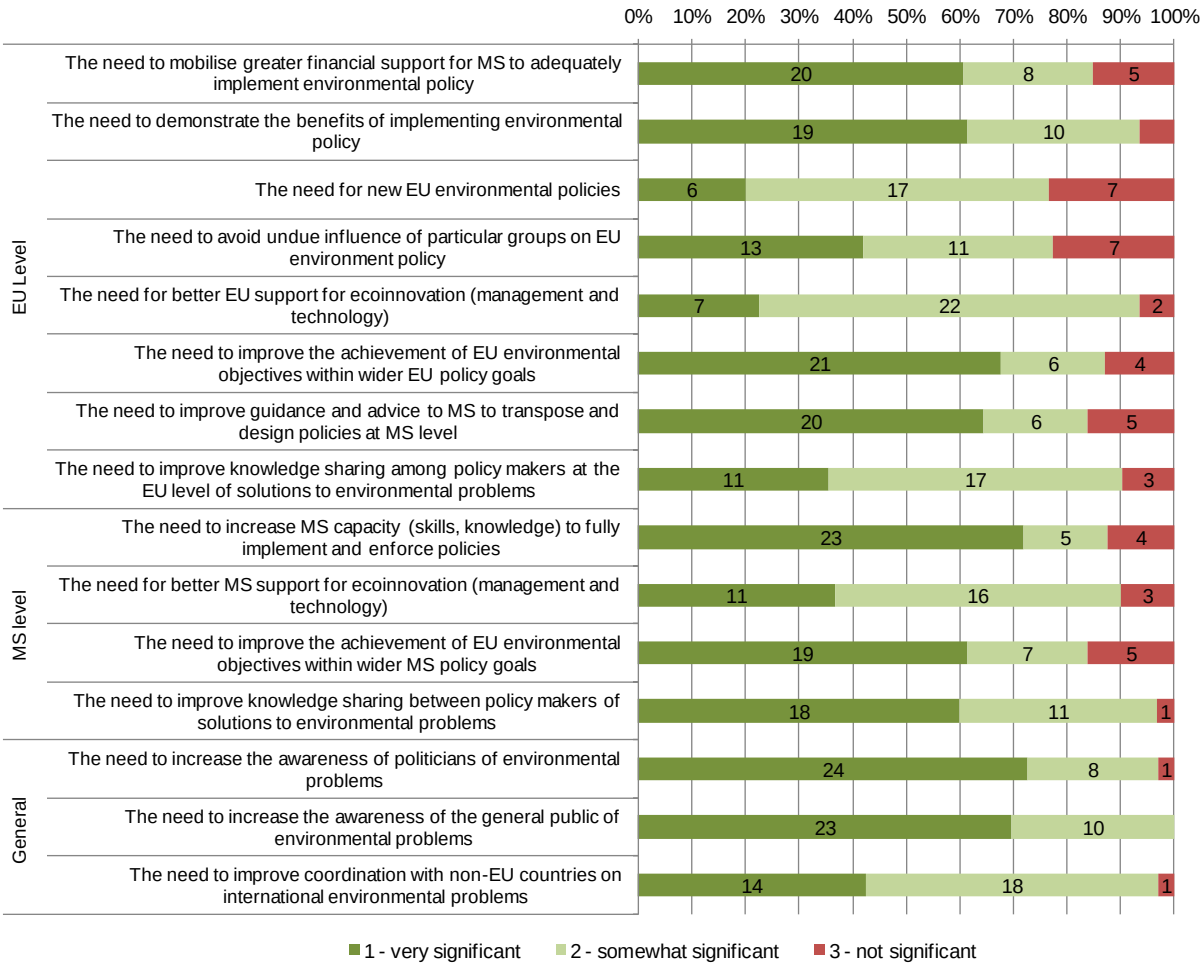
The majority of stakeholders (75%) believed the problem definition to be comprehensive. The remaining believed some problems were missing, although elaborations on this indicated that these reflected only more nuanced understandings of the six problems that had already been defined. For example, one consultee defined a problem of priorities in that other policy areas are considered more important than environmental policy. This however is linked to the importance of integrating environmental concerns into other EU policies. Several consultees noted that a wider understanding of international pressures is necessary, which takes into account not just the impact that international activities has on the EU, but also the impact that EU activities has on the international environment. Additional problems noted by consultees that had not been included in the problem definition are:

- Current consumption and production patterns are not in line with the capacity of the ecosystems upon which they depend, creating and exacerbating environmental problems – essentially relating to the need for absolute decoupling of resource use form economic growth;
- The real value of biodiversity and ecosystem services are not currently being integrated into national accounting which is driving the loss of biodiversity and the subsequent environmental problems resulting from that loss – essentially the underlying problem of externalities
- Human and financial resources allocated to addressing environmental problems are insufficient and therefore environmental problems persist (and get worse) – another reflection of the problems in priority setting of the environment against other policies.
- There is a dominance of certain groups in the policy process which is not compensated for, and counteracted by, for by sufficient involvement of civil society groups – the importance of avoiding regulatory capture.
- The support for legislating at the EU level is declining, making the implementation of existing requirements more difficult and creating a lack of willingness to adopt new legal standards – a cause of the implementation problem.

The above problems can be mapped onto, and reflect elements of, the original six problems defined. The first two for instance, could be a reflection of the inadequate scope of the current acquis. The third is linked to the insufficient integration of environmental concerns into the implementation of other policy areas. The insufficient representation of civil society in the policy process can be considered as contributing to the inadequate implementation and development of the acquis. The last is clearly linked to both the inadequate implementation and the inadequate scope of the acquis.

As a whole, stakeholders believed by a clear margin that the implementation of the acquis is the most important problem that needs to be addressed (57%). The other important problems needing attention are dealing with the impacts of other EU policies and spending instruments on the environment, and the need to raise awareness and improve knowledge sharing. The less important problems were considered to be the current scope of the acquis and the need to address international pressures.

Figure A3.1 Policy problems to do with the implementation of the acquis, awareness raising and the integration of environmental concerns into other EU policies where often considered highly significant by survey respondents



In terms of the significance attributed to a detailed understanding of institutional problems in affecting EU environmental policy, several issues were similarly rated by survey respondents as highly significant, such as problems of resourcing and building the capacity of MS implementation of the acquis, raising awareness and the integration of EU environmental concerns into other EU policies. Problems rated as less significant were the need for new EU environmental policies, and the need for increased support for eco-innovation (see Figure below).

Despite being consistently rated as being of less significance than the other policy problems, the issue of international pressures was nonetheless the one problem which a clear majority of stakeholders thought would increase in severity. For the rest of the environmental policy problems, a roughly similar proportion of consultees believed the problems would stay the same as those which believed the problems would get worse. Only a small proportion believed the problems would get better, mostly in terms of the implementation and scope of the acquis, as well as in terms of awareness raising and knowledge sharing.

A3.3 Revised definition of problems and drivers

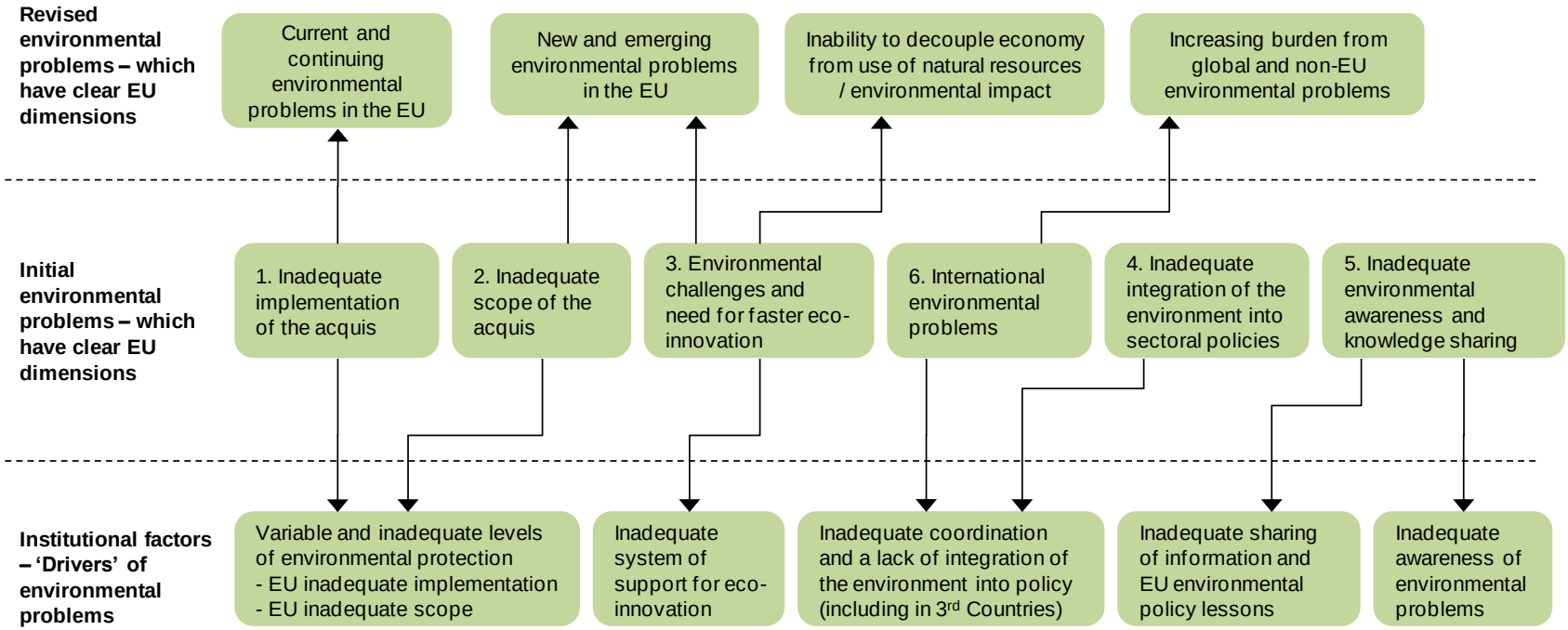
In the light of these reflections and responses we have reviewed the description of the six problems and sought to clarify more particularly the distinction between the physical environmental problems within and outside the EU; and the institutional drivers[2], that lead to

[2] not to be confused with the wider driving forces of the problems, e.g. demographic or economic change

policy gaps and weaknesses that result in the continuation of the physical problems. A LIFE instrument (given the current indicative budget) would be expected to address the institutional drivers and seek improvement in policy rather than directly funding solutions to the physical problems (with the important exception of the Nature 2000 Network which requires co-finance).

We therefore divided the initial six problems into four environmental problems and a further five drivers, that influence and which can be influenced by a financial instrument for the environment. This separation is illustrated in Figure A3.2.

Figure A3.2 Sub-division of the Initial Problems into Problems and Drivers



Annex 4 A summary of EU environmental challenges

Table A4.1 A Brief Overview of Key Environmental Challenges for Europe

Theme	Key challenges
Air pollution	• *Air quality* remains an ongoing concern, in particular for levels of particulate matter Some *national emissions ceiling* requirements as well as air quality requirements likely to be missed in 2010
Chemicals	• For many chemicals, information is lacking on how they affect the environment • REACH and related EU legislation are addressing the problem; however, REACH implementation is at an early stage • Nanotechnology
Climate change impacts/ vulnerability/ adaptation	• The impacts of climate change are already being observed and are projected to become more pronounced, including extreme weather events (heat waves, droughts and floods), rising temperatures in southern Europe and the Arctic, a decrease in precipitation in southern Europe and increases in the north. • These changes will affect ecosystems, economies and the quality of life.
Climate change mitigation	In 2008, the EU's greenhouse gas emissions decreased for the fourth consecutive year and the EU is on track to meet its Kyoto targets The EU is making good progress towards its goal of a 20% emissions reduction 2020 (compared to 1990), though additional efforts are needed EU leaders are discussing increasing the EU's 2020 commitment to a 30% reduction
Freshwater management	• EU legislation has been a key factor in reducing pollution to Europe's rivers and other water bodies in recent decades • Major issues remain, including ongoing pollution problems and the modification of water bodies; climate change will bring new impacts in coming decades • Implementation of the Water Framework Directive and related legislation is a key issue here More focus on quantitative issues (scarcity, droughts and flooding) needed
Land use	• Land use conflicts, including sprawl, remain a key concern for Europe's environment • Land use is addressed through urban, coastal zone and other EU strategies and the European Spatial Development Perspective • The INSPIRE Directive will provide new information on land use
Nature and Biodiversity	• *Freshwater ecosystems* face numerous threats, from water scarcity and droughts to pollution to modification; the Water Framework Directive is a key instrument for their protection • *Forests* cover a large area of Europe, but face threats from climate change, fragmentation, airborne pollution and unsustainable management • *Marine ecosystems* are facing a range of pressures, including climate change, ocean acidification and overfishing; the Marine Strategy Framework Directive is a key instrument here • Climate change is increasingly affecting *species and habitats* • Implementing EU legislation (especially the Habitats and Birds Directives) remains a strong concern, with a high level of ECJ infringement cases
Resource use and waste	• Improving *resource efficiency* (including energy and materials) is a key goal of the Commission's EU 2020 Strategy • Some Member States, as well as regions and cities, have made progress in *waste prevention* and *recycling* and establishing innovative programmes • Overall, *implementation* of EU waste legislation is a serious concern and a major area for ECJ infringement cases
Urban environment	• Although the quality of life in Europe's cities has improved in recent decades, many challenges remain, including health problems related to noise and air pollution

Source: EEA website and supporting materials

Annex 5 Stakeholder Consultations

A full report of the Stakeholder Consultation and its results, as well as a list of stakeholders consulted for this assessment is provided in a separate document:

GHK (2011) Combined Impact Assessment and Ex-ante Evaluation of the Review of the LIFE+ Regulation: Stakeholder Consultation Report

A5.1 GHK Stakeholder Survey

GHK consultation involved two online surveys and a series of interviews. Firstly a survey was sent to all project beneficiaries which aimed to assess the likely impacts of projects, see Table A5.1 for responses received.

Table A5.1 Project Beneficiary responses:

Component	Number of funded projects (07-09) that survey was sent to	Responses received	Response Rate (%)
EPG	288	90	31%
Nature and Biodiversity	222	44	20%
Information and Communications	39	13	33%
Total	549	147	27%

Secondly a survey was sent to three groups of consultees, consisting of:

- NGOs
- NCPs
- Social Partners

This survey, requested opinions on the nature and scale of problems that a European environmental instrument should seek to address, see Table A5.2 for stakeholder responses.

Table A5.2 Stakeholder responses:

Stakeholder category	Number of surveys sent	Responses received	Response Rate (%)
NGOs	71	16	23%
Social partners	126	6	5%
NCPs	27	12	44%
Total	224	34	15%

A5.2 Stakeholder Interviews

Finally 11 interviews were conducted with Commission officials, including the different Units in DG Environment, as well as representatives from DG AGRI, REGIO, MARE and CLIMA. The interviews with Commission officials focused on qualitative discussions around:

- The type and scale of the environmental policy problems in the EU (including available evidence) and potential for EU added value from a Financial Instrument focused on the environment
- Judgements concerning the relative importance of particular problems and the drivers behind the problems
- What responses might best address the problems; what could/should be the priorities for an Instrument for the environment, and what objectives and activities should an Instrument for the environment focus on

A5.3 European Voice Survey

A survey was published on the European Voice website inviting responses. In total 507 responses were received to this consultation. Responses were categorised by category of consultee and comprised the following:

- Private Individual - 480
- Organisation - 315
- Competent authority - 117

A5.4 GHK Stakeholder Workshop

A formal stakeholder consultation workshop was held in Brussels, on 28th January 2011, to consider issues and options for a future specific financial instrument for the environment and climate action.

Workshop attendees consisted of 102 invited participants and involved the following:

- European Commission officials
- NCP and Member State Representatives
- NGOs
- Social Partners

Annex 6 Scaling of the problems – Detailed cost analysis

A6.1 General Rationale for an EU Environmental Instrument

A6.1.1 The general case for environmental policy is well defined and developed

The basic rationale for public policy intervention on the environment is the failure of markets to take into account the environmental impacts which result from producer and consumer choices. This market failure derives in large part because the environment is a public good; it can be used by any one person without affecting the supply to all other people, and it is impractical to charge for its use on an individual basis. As a consequence the environmental costs of production or consumption fail to be reflected in market prices. These environmental costs are termed externalities.

Public goods (such as environmental quality) are generally provided by government as it is not possible for a private business to profitably provide them. Private businesses cannot sell public goods in markets, because they cannot charge a price and keep non-paying people away.

Governments can secure environmental public goods through regulation, by definition of property rights, through imposition of fees and charges, and through spending financed through general taxation. Where environmental impacts can be traced to individual producers and consumers it is possible to require compensation for these impacts through direct payments (taxes and charges), payments for emission permits or environmental regulation. This requirement is reflected in the well established and accepted polluter pays principle (PPP). Examples of public spending to secure environmental public goods include public investment in habitat protection and the conservation of biodiversity, and in environmental research.

A6.1.2 The general case for EU environmental policy is well defined and developed

The general principles noted above relate to the environment in local neighbourhoods through to the global environment. The case for EU level intervention derives from these same principles, and in recognition that many environmental resources and types of pollution cut across Member State borders.

Recognising the principle of subsidiarity, the case for EU action derives from the efficiency of having a standard body of environmental policy (the environmental 'acquis') that applies across all Member States (as transposed) to deal with common environmental problems, including trans-boundary pollution. The adoption of EU policy also avoids the risk of 'beggar thy neighbour' policies where one Member State seeks a competitive advantage from adopting a lower environmental standard (although increasingly competitive advantage is understood much more to be a function of high environmental standards) or adopting a high standard that only national producers can meet.

These arguments are reflected in the establishment of a well developed and tested environmental acquis. To the extent that EU environmental issues evolve, and new problems emerge, new EU interventions provide the basis for an efficient and equitable response. Better regulation initiatives by the EC have also been adopted to fine-tune the performance of particular measures over time.

Under the Lisbon Strategy and the Europe 2020 Strategy, high standards of environmental quality are also understood to be necessary for the long-term and sustainable competitiveness of the EU economy. Europe 2020 goes beyond the various EU and MS 'green stimulus' packages and puts greener, sustainable growth at the heart of Europe's economic strategy. Greater resource efficiency, a transition to low carbon economy and development of new clean technologies underpin our future competitiveness as well as the health of our environment in Europe and globally.

A6.2 Problem definition and scope

A6.2.1 Overview

The previous section illustrates that in many instances the environment can be regarded as a public good, which creates the potential for this valuable resource to be exploited or damaged. This can cause significant economic, social, health, cultural and environmental costs to all EU citizens. There is a clear rationale for European environmental policy to ensure that the polluter takes account of the negative externalities associated with their activity, and to protect citizens from the negative impacts caused by the activities of others. In the case of transboundary impacts where dialogue with third countries is important, or where a desire exists to promote environmental beneficial technologies on the European market, the European Commission is often best placed to take action on behalf of Member States. The European Commission has a leading role in preventing a "race to the bottom" in environmental protection. It maintains a level playing field, requiring a degree of harmonisation in approach and standards. In each circumstance, a clear rationale exists for EU instruments and mechanisms to implement, coordinate, and monitor the various aspects of environmental policy.

For the purposes of quantification, establishing a causal link between the drivers of environmental problems, the environmental problems themselves, and their physical consequences, is difficult. Each problem is often the product of more than one factor or driver, making the task of defining and valuing each relationship complex. Defining how individual environmental problems relate to policy issues surrounding LIFE+ is often equally difficult, but a necessary exercise if options for the improvement of LIFE+ are to be proposed and assessed in a robust and transparent manner.

Defining and quantifying each environmental problem related to LIFE+ serves two critical purposes in this study. Firstly, by valuing the environmental consequences of either the introduction or absence of environmental policy across different environmental fields, the magnitude of each problem and the benefits of intervention can be clearly quantified under LIFE+. These outputs will form the foundations of the ex-ante evaluation of LIFE+, establishing how effective the current framework has been, in addition to identifying key deficiencies and potential improvements to the current framework. Secondly, the quantified impacts of LIFE+ will be used to construct the baseline for the impact assessment. By quantifying the impacts of each proposed option as marginal changes from this baseline, a consistent and robust estimation of the likely impacts shall then be possible.

One of the principal challenges of this study is the ability to attribute monetary values to specific environmental impacts without double counting. Many environmental impacts are cross-cutting between environmental fields (i.e. climate change) and across problem areas (i.e. numerous market and regulatory failures can cause a single problem). Our approach has therefore been developed with these factors in mind and acknowledges the lack of data in many cases. For example, although environmental impacts are widely reported in policy appraisals, they are infrequently quantified and even less likely to be disaggregated to a level that enables the attribution of specific impacts to specific drivers and policy instruments.

The remainder of this chapter outlines the identified problems, our approach to scaling the associated impacts and the outcomes of this analysis.

A6.2.2 Outline of the Problems

Each environmental problem can be characterised as a failure of the market, society or policy makers (i.e. through regulation) to adequately account for the environmental externalities of human activity on the environment. Examples include the environmental damage caused by pollution or the unwillingness of actors to adopt technologies or consume products which have reduced environmental impacts or that increase resource efficiency, due to lack of awareness or imperfect competition in the market place. Broadly, these 'market' and 'regulatory' failures relate to one of the following five categories:

- **Environmental public goods –** non-rivalrous and non-excludable, these goods often have no property rights attached to them, therefore these resources can be over exploited and under protected as they are seen as free and infinitely available by many actors. Examples include clean air, freshwater and the world's oceans.
- **Negative environmental externalities –** occur when the true environmental cost of a resource to society is not incurred by the user, often causing the over consumption of a good with negative effects on the environment and others. For example, combustion of fossil fuels by industry and households generates externalities, including the health and environmental impacts incurred by the rest of society from inhalation/ingestion of hazardous substances and GHG induced climate change.
- **Positive spillovers from innovation –** the positive social benefits or policy win-wins of environmental innovation are not recognised by the market, in which case fewer innovative technologies are produced by the market than required, with knock-on consequences as fewer incentives exist for developers to continue innovating.
- **Information failures –** the lack of or imperfect information exchanged between buyers and producers results in buyers making ill informed decisions regarding purchases of goods and services; meanwhile producers receive the incorrect signals regarding customer demand and consequently respond poorly to market needs.
- **Imperfect competition –** the dominance of a few sellers in a market can restrict market access for other more innovative producers or in extreme cases predate on new entrants hastening market exit. In such cases, incumbent businesses characterised by old technology can have a significant market advantage.

Although many of the identified failures are recognised by policy makers, resulting in the introduction of new or revised legislative and non-legislative actions, the drivers of the problems encountered by LIFE+ are not in themselves market failures, but rather the **inadequate policy response to these failures**. Leading failures identified in relation to LIFE+ include: the inadequate prioritisation of environmental objectives in policy; changes to the relevance of policy due to changes in the economic, political and social landscape; and a lack of implementation/enforcement of policy. Each of these problems has an environmental consequence, which we shall refer to as the environmental problems of LIFE+. Five categories of environment problems and impacts have been identified in the inception report, which shall be quantified later in this task as impacts of LIFE+. Each environmental problem is described as follows:

1. **Problem 1: Current environmental problems in the EU –** encompasses existing problems of environmental damage, pollution, resource exploitation and lack of sustainability not resolved by current actions, due to many of the drivers highlighted above. For example, current legislation may not go far enough in resolving a particular environmental problem, creating persistent negative impacts.
2. **Problem 2: New environmental problems in the EU –** collectively refers to new environmental threats and challenges posed by changes to the economic and technological landscape, including new materials and substances placed on the market in the future that could pose a threat to the environment. Similarly, changes to economic activity in the future will change the type and magnitude of pressures placed on the environment.
3. **Problem 3: Increasing burden from global and non-EU problems –** includes transboundary issues where the EU may not be the leading contributor to the environment problem, but are significant recipients of its negative effects. Examples include over fishing, pollution and climate change.
4. **Problem 4: Variation in EU environmental policy leading to lack of a level playing field and harmonisation –** refers to cases where legislation is not uniformly implemented across Member States, or adequately enforced resulting in a lack of policy effectiveness to deal with environmental problem(s). In other cases, a lack of

consistency between policies can create a situation where legislative gaps emerge, understanding of the legislation is poor or that mixed incentives exist at EU level. Such problems permit a "race to the bottom" to emerge, lowering environmental standards between competing Member States.

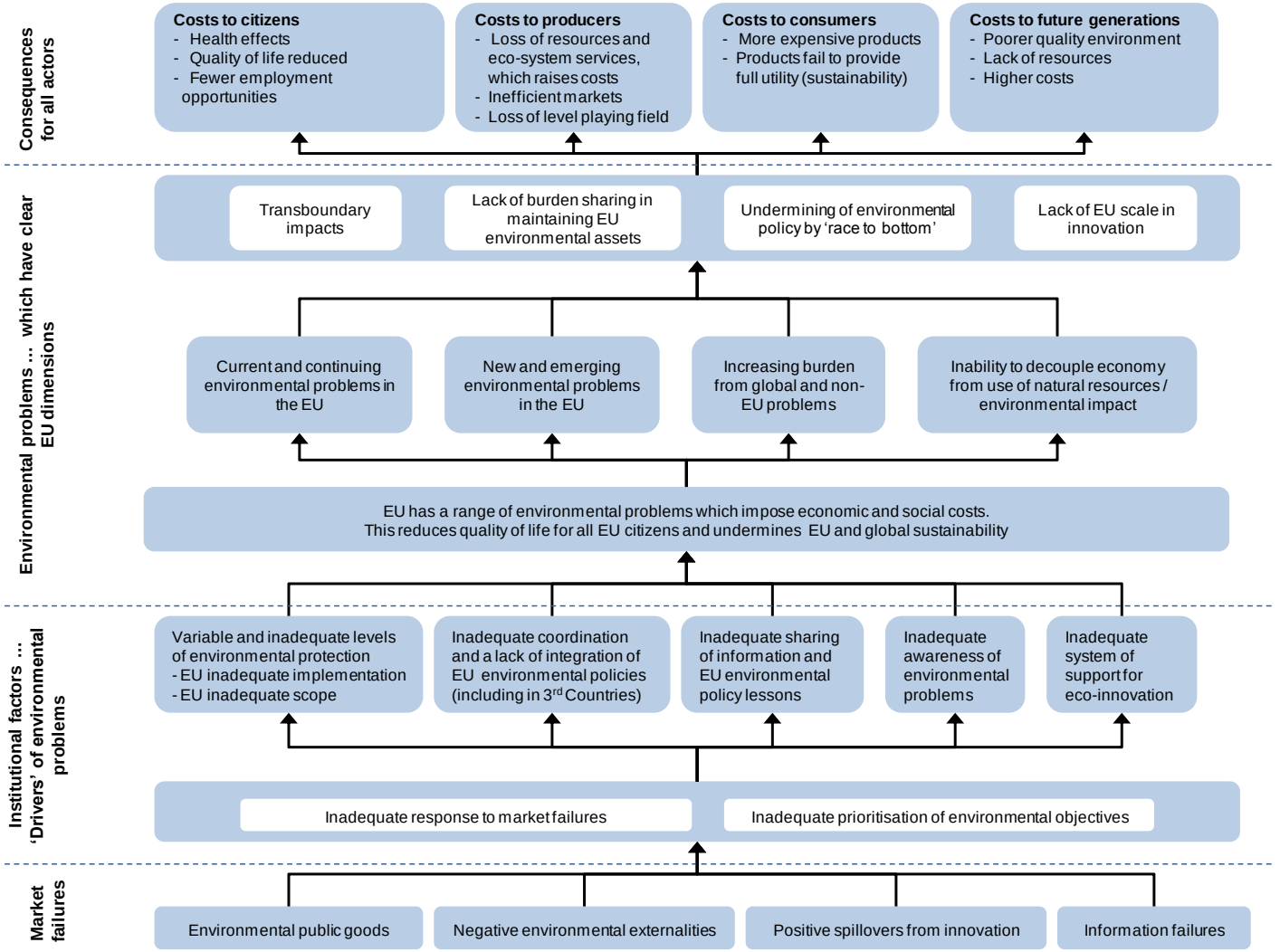
5. **Problem 5: Inability to decouple economy from use of natural resources/environmental impact –** represents a leading objective of environmental and sustainability policy, requiring innovations in products and production processes to reduce resource use and environmental impacts. This problem therefore relates to a lack of eco-innovation and resource efficiency due to a failure to create a market environment conducive to innovation, promote environmentally beneficial behaviour through incentives, and provide adequate funding support.

Institutional failings may be the leading drivers of the environmental problems noted above, and the recognition of these failings is critical to the development of appropriate policy recommendations for the LIFE+ framework. These failures are linked to the institutional structures of the current LIFE+ framework and complementary policy delivery mechanisms. The five leading institutional failings are:

- Variable and inadequate level of environmental protection (i.e. inadequate implementation or scope of EU legislation)
- Inadequate coordination and a lack of integration of EU environmental policies (including 3rd countries)
- Inadequate sharing of information, knowledge and EU environmental policy lessons (i.e. poor identification of policy win-wins and of synergies between regulatory mechanisms)
- Inadequate awareness of environmental problems (amongst policy makers, industry and households)
- Inadequate system of support for eco-innovation (including access and availability of funding, correct incentives in legislation)

A problem tree illustrating the causes, drivers, and consequences of each environmental problem, is provided in Figure A6.1 below.

Figure A6.1 Environmental Problems in the EU: Problem Tree



A6.2.3 Approach to quantification of the environmental problems

The purpose of this review is to summarise relevant data from the literature on the costs of environmental damage caused by each problem by domain. Where the introduction or implementation of measures supported by LIFE+ partially solves or mitigates the identified environmental problems, these quantifications can be regarded as a measure of the benefits attributable to the policy action taken, and can thus be accounted for in the quantification of any baseline scenario. This analysis includes environmental domains such as climate change, air pollution, biodiversity, marine and freshwater, waste management and resource efficiency.

Our approach to this quantification draws on the available literature, including past environmental policy impact assessments, ex-post and ex-ante evaluations, as well as publications from academic, independent and NGO sources. The figures presented were identified in a variety of literature sources, and care has been taken to avoid double counting and ensure that the figures are aligned / quality checked as appropriate. Figures are therefore only reported once and referenced in the remaining text where any figures cannot be disaggregated or apportioned to individual problems.

Many impacts related to environmental policy are generally not well quantified or disaggregated to a level that facilitates their attribution to specific policy actions, problems or domains. Due to gaps in data availability, overlaps in quantification and a lack of adequate analysis in policy appraisals it is prohibitively difficult to provide accurate and precise results. As a result, the quantification figures presented below are **orders of magnitude estimates of the impacts identified, rather than precise estimates**. This is sufficient to illustrate the magnitude of any differences between the costs and benefits of the actions proposed, and consequently demonstrate the effectiveness of different instruments. Supplementary case study examples are presented throughout the study, based on consultation and a review of the literature, to highlight nuances in the impacts and demonstrate the need for future policy action.

It has been assumed that compliance costs estimates associated with policy action are a reliable proxy for the value of environmental problems. For example, the cost of improving water quality by removing the subset of pollutants from wastewater can be a reasonably proxy for the economic cost of the environmental problem caused. In other words, by not placing the pollutants in the environment in first place, these costs would be forgone and therefore not incurred. This is clearly a simplification of the true costs involved as impacts on human health, the environment and on the economic activities that are reliant on good water quality are not considered (often referred to as the total damage or resource cost). Cost estimates derived in this manner should therefore be viewed as lower bound estimates, as accounting for the social costs would undoubtedly increase the order of magnitude of these estimates in many cases. The benefit of this approach is that as compliance costs relate to given pollution reduction or similar physical target, marginal costs can be derived and used in later analysis.

Each problem is scaled in the following text by domain and sub-domain where possible, including a brief contextual summary of each. The box below lists the assumptions which underpin several of the externality values in the following sections. These assumptions are applied consistently throughout the analysis.

Assumptions in calculating externalities and benefits

In an evaluation or impact assessment study, it is often necessary to report any impact estimates using a comparable unit of measurement (usually in Euros) to enable the consistent comparison of options and attached values to non-tangible and non-market impacts. In this way, the true total costs of environmental problems can be accounted for any analysis as fully as possible given the limited information available. Adhering to the Commission's own impact assessment guideline which calculates the Value of a Statistical Life (VOSL) at between €1-2 million and the Value of Life Years (VOLY) at between €50-100,000, this study shall adopt values of €1.5 million and €75,000

respectively to convert health related impacts to monetary order of magnitude estimates.

Where possible, the cost of CO2 emissions shall be quantified based on a price of €120/tonne of carbon . In order to calculate the social cost of CO2 the weight of CO2 is multiplied by 12/44, and the subsequent weight (tonnes) multiplied by €120. This is done as a CO2 molecule has a molecular weight of 44 g/mol, representing two oxygen atoms at 16 g/mol each, and one carbon atom at 12 g/mol; the social cost of carbon relates to carbon only, not oxygen.

Finally, to compare the scale of these impacts, the value of percentages changes in GDP for the entire EU will be based on a total GDP figure in 2009 of €11.806 trillion .

A6.2.4 Structure of the review

The review is structured around the main environmental themes:

- Climate change and energy
- Air pollution
- Water pollution and resources
- Biodiversity and nature
- Material resource use and Waste management

The review presents an overview of the environmental problem and a discussion of the related available estimates of the external environmental costs.

A6.3 Climate change and energy

Climate change is driven by greenhouse gas (GHG) emissions from fossil fuel use, from fluorinated gases, and from certain agricultural practices such as forest clearance for agriculture, or the enteric fermentations of livestock. Climate change causes environmental change as changes in temperature, sea levels and climatic conditions ultimately affect the environment in which plants and animals must live. Climate change can also be viewed as self perpetuating, as rising temperatures can induce the melting of permafrost, releasing methane into the atmosphere, increasing temperatures further. The melting of the ice cap affecting ocean currents and weather patterns is another example of the self-perpetuating potential of climate change.

Climate change is a global phenomenon driven by greenhouse gas (GHG) emissions from around the world. Between 1970 and 2004, GHG emissions increased by 70%, with the largest growth in global GHG emissions coming from the energy sector (an increase of 145%)[3]. The combined effect of global per capita income growth (77%) and global population growth (69%) over the same period has driven energy-related CO_2 emissions, despite a decrease in global energy intensity (33%) during this period[4].

The Intergovernmental Panel on Climate Change (IPCC) has predicted that GHG emissions will continue to grow in the future, even with the implementation of CO_2 reducing policies and mitigation measures. The Special Report on Emissions Scenarios[5] projected an increase of baseline global GHG emissions by a range of 9.7 to 36.7 $GtCO_2$-eq (25 to 90%)

[3] IPCC, 2007: Summary for Policymakers. In: Climate Change 2007: Mitigation. Contribution of Working Group III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change [B. Metz, O.R. Davidson, P.R. Bosch, R. Dave, L.A. Meyer (eds)], Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.

[4] Ibid

[5] IPCC (2001) Special Report on Emissions Scenarios, in IPCC, 2007: Climate Change 2007: Synthesis Report. Contribution of Working Groups I, II and III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, Pachauri, R.K and Reisinger, A. (eds.)]. IPCC, Geneva, Switzerland, 104 pp.

between 2000 and 2030. However these projections have been criticised[6], and may in fact underestimate the full extent of GHG emissions in the long term.

Irrespective of future emissions climate change is happening now, and it is a key driver of global environmental change. In Europe current and projected climate change is likely to have far reaching impacts, including; sea-level rise; changes in precipitation patterns and water availability; and more frequent and intense extreme weather events (e.g. floods and droughts). These impacts will affect the vulnerability of European society, threatening human health, damaging economic sectors (e.g. energy, agriculture and tourism), damaging ecosystem goods and functions as well as loss of biodiversity at all levels[7]. European vulnerabilities will differ regionally, with significant adverse effects expected in the Mediterranean basin, North-Western Europe and the Arctic. Many coastal zones, river flood prone areas and mountains are vulnerable to climatic changes, as are cities and urban areas. In the short (2020) to medium term (2030) climate change may present opportunities to certain sectors and regions (e.g. improving agricultural productivity in North Europe), but in the medium to long term (2050) adverse effects are likely to dominate.

The consequences of climate change in Europe are described below in terms of temperature and precipitation.

A6.3.1 Temperature

- To date, Europe has warmed more than the global average and the average temperature for the European land area to 2009 was 1.3°C above 1850 – 1899 average temperature, and for combined land and ocean area 1°C above[8]. Particularly significant warming has been observed over the past 50 years in the Iberian Peninsula, in central and north-eastern Europe and in mountainous regions[9]. In the past 30 years, warming was the strongest over Scandinavia, especially in winter, whereas the Iberian Peninsula warmed in the summer[10].
  The incidence of high-temperature events, such as heat-waves, have become more frequent, while low-temperature extremes (e.g. cold spells, hot days) have become less frequent in Europe[11]. The average length of summer heat waves over Western Europe doubled over the period 1850 to 2009, and the frequency of hot days almost tripled[12].
  The annual average temperature in Europe is projected to rise to 2100, at greater rate than the global temperature increase, with the most significant warming over eastern and northern Europe in the winter, and over Southern Europe in the summer[13]. Summer

[6] Garnaut, R., Howes, S., Jotzo, F., Sheehan, P., 2008, 'Emissions in the Platinum Age: the Implications of Rapid Development for Climate Change Mitigation', Oxford Review of Economic Policy 24 (2), 377-401

[7] Stern, N. (2007): The Economics of Climate change: The Stern Review, Cambridge, available at: http://www.occ.gov.uk/activities/stern.htm

[8] EEA (2010) Data and maps. Accessed online 08 11 10 http://www.eea.europa.eu/data-and-maps/figures/european-annual-average-temperature-deviations-1850-2008-relative-to-the-1850-1899-average-in-oc-the-lines-refer-to-10-year-moving-average-the-bars-to-the-annual-land-only-european-average-1

[9] Haylock, M.R., N. Hofstra, A.M.G. Klein Tank, E.J. Klok, P.D. Jones, M. New. 2008: A European daily high-resolution gridded dataset of surface temperature and precipitation. J. Geophys. Res (Atmospheres), 113, D20119, doi:10.1029/2008JD10201

[10] Ibid

[11] IPCC (2007a) Climate Change 2007: The Physical Science Basis. eds. Solomon S, Qin D, Manning M, Chen Z, Marquis M, Averyt K, Tignor MMB & Miller HL),. Working Group 1 Contribution to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC). Chapters 3 (Observations: Surface and Atmospheric Climate Change), 10 (Global Climate Projections),11 (Regional Climate Projections)

[12] Ibid

[13] EEA (2010) Global and European Temperature CSI 012 http://www.eea.europa.eu/data-and-maps/indicators/global-and-european-temperature/global-and-european-temperature-assessment-3

temperatures are projected to increase by up to 7°C in Southern Europe and 5°C in Northern Europe comparing the period 2080 – 2100 with the 1961 – 1990 average[14]. High temperature events across Europe are projected to become more frequent, intense and longer to 2100. Projections indicate that for the 2071-2100 period the number of days with apparent temperature exceeding 40.7°C will double in most parts of southern Europe[15].

A6.3.2 Precipitation

- During the 20th century, annual precipitation increased in northern Europe by 10 – 40%, and decreased in some parts of southern Europe by up to 20%[16]. There have also been significant changes to seasonal precipitation patterns across Europe. Mean winter precipitation has increased in most of western and northern Europe (20-40%), but in southern and parts of central Europe winters were generally drier[17].
- Projections of changes in precipitation in Europe due to climate change vary considerably from season to season, and across regions. Generally, projections indicate that northern Europe will receive more precipitation and southern Europe less. Under the IPCC medium emissions scenarios projections vary from 5 – 20% increase in northern Europe and 5 – 30% decrease in southern Europe and the Mediterranean[18]. These changes are more pronounced under the high emission scenarios. The type of precipitation is also expected to change over the long term, with heavy precipitation events expected to become increasingly frequent across Europe[19]. Across Europe as a whole, but particularly in southern Europe, the length and frequency of extended dry periods is expected to increase due to climate change[20].
- Precipitation levels have an obvious and significant impact on river flow levels, and over the 20th century flow levels have increased in northern Europe and decreased in southern Europe. Climate change is expected to reduce annual river flow in southern and south-eastern Europe and increase in northern Europe (but absolute changes remain uncertain)[21]. Regions in southern Europe already suffering water stress are projected to be particularly vulnerable to reductions in water resources due to climate change[22].

A6.3.3 Impacts of climate change in Europe

The projected changes described above, specifically changes to temperature and precipitation will have significant impacts on Europe's environment. These impacts are described in Table A6.1 below.

[14] van der Linden P., and J.F.B. Mitchell (eds.) (2009) ENSEMBLES: Climate Change and its Impacts: Summary of research and results from the ENSEMBLES project

http://ensembles-eu.metoffice.com/docs/Ensembles_final_report_Nov09.pdf

[15] Ibid

[16] EEA (2008) Impacts of Europe's Changing Climate – 2008 indicator based assessment. EEA Report 4/2008

[17] Ibid

[18] Christensen, J. H.; Hewitson, B.; Busuioc, A.; Chen, A.; Gao, X.; Held, I.; Jones, R.; Kolli, R. K.; Kwon, W.-T.; Laprise, R.; Magaña Rueda, V.; Mearns, L.; Menéndez, C. G.; Räisänen, J.; Rinke, A.; Sarr, A. and Whetton, P., 2007. Regional Climate Projections. In: Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change. Solomon, S.; Qin, D.; Manning, M.; Chen, Z.; Marquis, M.; Averyt, K. B.; Tignor, M. and Miller, H. L. (eds.), Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.

[19] EEA (2008) Impacts of Europe's Changing Climate – 2008 indicator based assessment. EEA Report 4/2008

[20] EEA (2008) Impacts of Europe's Changing Climate – 2008 indicator based assessment. EEA Report 4/2008

[21] EEA (2008) Impacts of Europe's Changing Climate – 2008 indicator based assessment. EEA Report 4/2008

[22] Ibid

A6.3.4 Impacts of global climate change to Europe

Due to the GHG emissions already in the atmosphere, the world is committed to average global temperature increases of between 2 - 3°C by approximately 2050, with several degrees more by 2100 if emissions continue to grow[23]. GHG emission scenarios and projections related to the impacts of climate change are highly uncertain, and thus estimating the costs of climate change is not straightforward. Nevertheless, it is possible to extrapolate future costs from the cost of current events, such as storms, floods, droughts and heatwaves. Climate change is projected to increase the frequency and severity of these weather events, consequently affecting the extent of the costs associated with them. Table A6.1includes an estimation of the cost of climate change to Europe.

[23] Stern (2006) Stern Review on the Economics of Climate Change

Table A6.1 Likely impacts and costs of climate change on Europe's environment

Impact*		Externality	Comment / assumptions	Unit	Value (€) / year
GHG emissions					
Global GHG emissions		Projected external costs in 2050, global cost[24].	Europe is currently responsible for 23% of global emissions. Assume this figure is the same in 2050. €1=$1.32	Annual cost to global GDP in 2050	€6,318 billion
Marine and coastal environment					
Sea level rise	Sea-level rise is expected to be overwhelmingly negative in Europe. Major impacts include increased flooding and permanent inundation of low-lying coastal areas, increased erosion of beaches and cliffs, and degradation of coastal ecosystems. Salinisation of land may be important in some areas. The scale of these impacts will be influenced by land use practices in coastal areas, and the extent of flood defences.	The high emission scenarios of the IPCC 2007 report projected sea level rise of 1m by 2100. In Europe currently 140,000 km^2 is within 1m of sea level, and based on current population and GDP, such a rise would affect over 20 million people and put an estimated €240 billion worth of GDP at risk. By 2100 the exposed assets of European coastal cities is expected to reach more than €2 trillion. The Netherlands is the most vulnerable European country in terms of sea level rise – a 1m rise would flood almost 25% of the population**.	€240 billion European GDP at risk annual by 2100	Annual cost to European GDP in 2100	€240 billion
Marine biodiversity and ecosystems	Increasing sea surface temperature (SST) has been observed in European seas, and is particularly pronounced in northern Europe. It is not possible to project changes in SST for specific geographic regions of Europe because of the spatial resolution of the models used. Changes to the phenology and distribution of marine species have been observed. These changes are likely to continue, and potentially increase, due to climate change.	No externality values were identified.			

[24] UNEP FI/PRI and TruCost (2010). Universal ownership. Why environmental externalities matter to institutional investors. UNEP FI. New York.

Water quantity					
Glaciers and headwaters	Most European glacial regions are shrinking, and the rate has increased since the 1980s. Climate change will increase average temperatures, reducing glacier cover further, and reducing annual melt water. This will have serious consequences for freshwater supply, river navigation, ecosystems dependent on river water, irrigation, and power generation. Changing water run-off patterns may potentially lead to more droughts in summer and floods and landslides in winter.	No externality values were identified.			
Floods	Hydrological floods are complex, influenced by precipitation, land-use changes, water management practices and water withdrawals. Annual river flows have increased in northern Europe and decreased in southern Europe during the 20th century. There is no conclusive evidence that this is the result of a changing climate. Projected changes in precipitation patterns, as a consequence of climate change, will alter the intensity and frequency of pluvial floods and possibly also flash floods.	Current expected annual damage of flooding in Europe is approximately €6.4 billion, and is projected to increase to €14 – 21.5 billion (in constant 2006 prices) by 2100, depending on the emissions scenario**. The annual expected number of people affected by flooding (currently about ~200,000) is projected to rise by approximately 250,000 to 400,000[25].	Damage costs per annum by 2100 (in constant 2006 prices)**	Annual damage costs by 2100	€18 billion
Droughts and agriculture	Crop production is constrained by water supplies in many European regions, especially in the south, where actual production equates to less than half of potential production. Droughts and water scarcity[26] are expected to increase due to climate change, particularly in central and south Europe and in summer, which will decrease river discharge and lower vegetation productivity. Conversely	No externality values were identified.			

[25] EEA (2010) Adapting to Climate Change: SOER 2010 Thematic Assessment

[26] Drought and water scarcity are not the same. Drought is a primarily caused by a deficiency of rainfall and high temperatures. Water scarcity is long-term water imbalance, where demand for water exceeds the level of water resources available.

	in northern Europe, increased water availability, higher temperatures and a lengthening growing period, are likely to increase crop production.	
Water scarcity	Large parts of Europe experience shortages of water, either due to physical shortages or due to high population density. Agricultural irrigation and electricity (33%), domestic use (24%) and manufacturing (13%) are the leading sources of water demand. In southern Europe demand for agriculture irrigation contributes to over 60%. Water demand for agriculture irrigation is projected to increase as climate change modifies precipitation patterns, particularly in southern Europe. Southern Europe is unlikely to have sufficient water resources to support this additional irrigation.	No externality values were identified.
Terrestrial biodiversity and ecosystems		
Ecosystems	Biodiversity in Europe is under considerable pressure and is declining at an increasing rate. Fragmentation, degradation and destruction of habitats, due to changes in land use and land management, urbanisation, industrialisation, over-exploitation, pollution, has led to widespread species loss. Climate change is an additional pressure on Europe's biodiversity, which is likely to increase over time and exacerbate the pressures outlined above. Species at risk include specialists, those at the top of the food chain, those with range restrictions, and those with poor dispersal abilities.	No externality values were identified.
Plant and animal species	Phenological and distributional changes in European plant and animal species have been observed during the 20th century. Trends in phenological and distributional changes are projected to continue due to climate change. The rate of change is likely to exceed the ability of many species to adapt, particularly where landscape fragmentation restricts movement.	No externality values were identified.

Urban environment					
Urban environment	Cities are highly vulnerable to the impacts of climate change due to high population density and their physical structure. Current and projected climate change impacts on cities and urban populations include coastal and river floods, heat waves and droughts. Heat waves during summer and intense precipitation events during winter are projected to become more frequent in Europe. These risks will exacerbate existing environmental problems of many towns and cities, for example, low air quality and water supply problems, as well as social inequalities.	The summer of 2003 Europe experienced a heat wave of average temperatures 2 - 3°C higher than the long term average. It brought forward the deaths of 35,000 people (often due to the interaction of elevated temperature and air pollution) and agricultural losses of $15 billion. In the past, a summer as hot as 2003 would be expected to occur once every 1000 years, but existing climate change has doubled the chances of such as heat wave occurring (now once every 500 years). This sort of heat wave will be commonplace by 2050. Heat-related mortality in Europe in the 2080s related to projected climate change could increase by 50,000 to 160,000 case per year, mainly in central and southern Europe (but this figure is likely to reduce once acclimatisation occurs)27.	160,000 people suffer early mortality per annum (by 2080)**. Assume that each person loses 0.5 years, at €75,000 Value of Life Year[28] (160,000 people x €37,500)	Value of Life Year of €75,000	€6 billion
Other					
Storms	Storms cause a significant amount of damage in Europe; between 1998 and 2009 approximately two thirds of the economic losses caused by natural disasters in Europe were caused by storms and floods.	Storms are projected to become more severe due to climate change. In Europe the costs of a 100-year storm event could double by the 2080s with climate change (€40 billion in the future, compared with €20 billion today). Average storm losses are estimated to increase by only 16 – 68% over the same period**.	By 2080, double of annual cost from €20 billion today**	Annual cost to GDP in Europe by 2080	€40 billion

***Source**: EEA (2010) The European Environment State and Outlook - Adapting to Climate Change*

** ***Source:** Stern (2006) Stern Review on the Economics of Climate Change*

[27] Ibid

[28] The Commission's impact assessment guidelines include an estimate for Value of Life Years (VOLY) at between €50-100,000. This study has adopted €75,000 to convert health related impacts to monetary order of magnitude estimates.

Table A6.2 provides some estimates of the current cost of climate change. Due to the difficulty determining which current weather events are related to climate change, a number of assumptions have been made. The first is that the marginal damage cost of carbon can be used as a proxy for estimating the current cost of climate change. The second is that the cost of current weather events, which are predicted to increase in severity and frequency due to climate change, can be used as reasonable estimations of the current cost of climate change. This assumption is nuanced, as the costs may not necessarily be due to anthropogenic climate change, but are the baseline of what the current climate is costing now. Thus to estimate the marginal cost of climate change, this estimate of current costs would serve as a baseline.

Table A6.2 Current costs of climate change

Impact	Externality	Comment / assumptions	Unit	Value (€) / year
GHG emissions	GHG emissions in the EU-27 in 2008 were 4,939,738,000 tonnes of CO_2 equivalent[29]. This is equal to 1,347,201,273 tonnes of carbon[30].	Assuming the social cost of carbon is €120 / tonne[31], the cost of Europe's GHG emissions in 2008 was €162 billion (€120 x 1,347,201,273)	Social cost of carbon of €120 / tonne	€162 billion
GHG emissions*	External costs associated with GHG emissions in 2008[32]. Total global external cost estimated at $US 4.530 billion in 2008. Europe responsible for 23% of global GHG emissions in 2008.	23% of $US 4530 billion = $US 1042 billion. Assuming €1=€1.32, the global external cost of Europe's GHG emissions in 2008 is €1,375 billion.	Global cost of EU GHG emissions	€1,375 billion
Natural disasters, including hydro-metrological events*	Annual cost of natural disasters in Europe[33]. Around 90% of natural disasters that have occurred in Europe since 1980 have been hydro-meteorological hazards, representing around 81% of the economic hazards. It is currently difficult to determine accurately the proportion of losses attributable to climate change. Based on current and projected climate change impacts, its contribution to losses is expected to increase.	Costs include: geophysical events (earthquake, tsunami, volcanic eruption); hydrological events (flood, mass movement); climatological evens (heat wave); meteorological events (storm); and, climatological events (cold wave, drought, forest fire).		€7 billion

A6.3.4.2 Summary costs of climate change

In order understand the marginal cost of climate change, it is necessary to compare estimations of current and predicted costs. **Error! Reference source not found.** provides a

[29] Eurostat

[30] Carbon dioxide has a molecular weight of 44 g/mol, and Carbon a weight of 12 g/mol. Therefore to calculate the amount of carbon per tonne of carbon dioxide, it is necessary to multiply the total weight of carbon dioxide by 12/44.

[31] Watkiss, P. (2006) The Social Cost of Carbon. Paul Watkiss Associates, for Defra. http://www.oecd.org/dataoecd/19/21/37321411.pdf *This reference provides EU price as 70-170 Euros, hence average of 120 Euros per tonne carbon*

[32] UNEP FI/PRI and TruCost (2010). Universal ownership. Why environmental externalities matter to institutional investors. UNEP FI. New York.

[33] EEA (2010) The European Environment: State and Outlook 2010 – Adapting to Climate Change

summary of the current and predicted future costs of climate change. These figures do not include any discounting or risk aversion rates.

Table A6.3 Marginal costs of climate change to Europe

Impact	Current annual cost	Future annual cost	Marginal annual cost (2080s)
Marginal damage of CO_2 emissions	€162 billion	NA – emissions have not occurred	NA
External cost of GHG emissions to Europe, 2008*	€1,375 billion	€6,318 billion[34]	€4,943 billion
Natural disasters, including hydro-metrological events*	€7 billion	These costs were not identified	NA
Sea level rise*	NA (no current cost as cost will only arise when sea level rises)	€240 billion / year	NA
Floods*	These costs were not identified	€18 billion / year	NA
Heatwaves*	These costs were not identified	€240 billion / year	NA
Storms*	These costs were not identified	€40 billion / year	NA

**To avoid double counting and to ensure a conservative estimate of externalities, these will not be included in the final aggregation of external costs.*

Using estimated marginal damage costs of carbon in the IA requires an assumption about the extent to which the damage estimate should include damage costs which accrue globally, from national (or European) emissions. For example, it may be assumed that the only damages which should be included are those that occur in the area where the costs of reducing such damages will be borne.

In addition, it is not clear what the reported marginal damage cost estimates include, and it is likely that the costs include damage related to floods, heatwaves and storms. Thus to avoid double counting, in the aggregated analysis of external costs in Europe, all marginal damage costs of carbon have been excluded.

A6.4 Air pollution

Emissions of a range of air pollutants and greenhouse gases occur as a result of all economic and social activities, but industrial production levels, transport levels and agricultural production are key drivers. Emissions from natural sources (such as forest fires) are also important for certain pollutants.

The main air pollutants in Europe include particulate matter (PM), sulphur oxides (SO_x), nitrogen oxides (NO_x), ozone and ammonia (NH_3). The principal sectors responsible for emitting these pollutants in Europe are road transport, power and heat production, industry and agriculture[35]. Air pollution from these sectors has been decreasing in Europe, and marine, inland water and air transport are becoming increasingly significant sources of SO_x, NO_x and PM emissions.

Pollutant concentrations vary significantly by pollutant, location, and time. Pollutants principally having high concentrations close to their emission sources include sulphur dioxide (SO_2), carbon monoxide (CO), NO_x, and benzene from streets and industrial plants.

[34] UNEP FI/PRI and TruCost (2010). Universal ownership. Why environmental externalities matter to institutional investors. UNEP FI. New York.

[35] EEA (2007) Air pollution in Europe 1990 – 2004. EEA Report 2/2007

Other pollutants, such as ozone and the deposition of acidifying substances, occur on a broader scale (due to their formation and transformation under atmospheric transport)[36]. Levels of these pollutants in Europe may be influenced by hemispheric scale pollutant transport across the northern hemisphere[37]. Conversely, pollutants such as PM may have high regional background levels, which can then be exacerbated by local (urban) emissions.

While a large proportion of air pollutants are emitted directly into the air following combustion processes, ozone and a significant proportion of PM form in the atmosphere following emissions of precursor substances. For this reason, their concentrations depend strongly on changes in meteorological conditions. Ozone concentrations, in particular, are significantly higher during periods of high air temperatures and sunlight, and are considerably higher during summer heat waves[38]. Climate change is likely to exacerbate air pollution, for example by increasing average temperatures and lengthy periods of clear skies. Over the past two decades climate change is thought to have already contributed to an increase of 1 – 2% per decade in average ozone concentrations in central and southern Europe[39].

Air pollution, and associated reductions in air quality, causes negative human health eimpacts, as well as affecting ecosystems and materials. The main air pollution issues in Europe are[40]:

- Human health impact of exposure to PM and ozone (and to a lesser extent NO_2, SO_2, carbon monoxide, lead and benzene);
- Acidification and eutrophication of ecosystems;
- Damage to ecosystems and crops through exposure to ozone;
- Damage to materials and cultural heritage due to exposure to acidification and ozone; and,
- Impacts of heavy metals and persistent organic pollutants on human health and ecosystems.

Emissions of all the main air pollutants across the EEA-32 have decreased since 1990. A brief overview of each of the main pollutants is provided below.

- Energy industries, industrial processes and road transport were the main contributing sectors to primary PM emissions and secondary particulate precursors in 2010, each responsible for 36%, 17% and 13.6% respectively. Re-suspension of dust from road or natural sources (e.g. Saharan dust, sea salt, biogenic particulate organic carbon) can contribute to primary PM emissions in some European regions[41]. The household sector (e.g. home heating by wood and coal burning) can also be an important source of air pollutants (e.g. Nordic countries). Emissions of primary PM have reduced by 21% across the EEA-32 region between 1990 and 2008, with significant reductions in most countries[42]. Although emissions of primary PM are expected to decrease in the future

[36] Ibid

[37] TFHTAP (2010) Convention on Long-range Transboundary Air Pollution, Task Force on Hemispheric Transport of Air Pollution. Draft interim assessment report. http://www.htap.org

[38] EEA (2009) Assessment of ground-level ozone in EEA member countries, with focus on long term trends. EEA Technical report 7/2009.

[39] Andersson, C., J. Langner & R. Bergström (2007). Interannual variation and trends in air pollution over Europe due to climate variability during 1958–2001 simulated with a regional CTM coupled to the ERA40 reanalysis. Tellus, 59B, 77-98.

[40] EEA (2010) The European Environment State and Outlook 2010 – Air Pollution

[41] EEA (2007) Air pollution in Europe 1990 – 2004. EEA Report 2/2007

[42] EEA (2010) National emissions reported to the Convention on Long-range Transboundary Air Pollution (LRTAP Convention)

http://www.eea.europa.eu/data-and-maps/data/ds_resolveuid/fe871206780bc79086945d7f379b925b

(as vehicle technologies are further improved and stationary fuel combustion emissions are controlled through abatement or use of low sulphur fuels such as natural gas) it is expected that within many of the urban areas across the EU that PM concentrations will be above EU limits[43].

- Agriculture and energy are responsible for the majority of the emissions of acidifying substances in Europe[44]. For eutrophying substances, mainly emissions of the acidifying and nutrient NH_3 agriculture was by far the most important source, responsible for 94% of the emissions[45]. In the EEA-32 region between 1990-2008, the emissions of acidifying pollutants have decreased significantly. This reduction is principally due to reductions in SO_2 emissions, levels of which have reduced by 74% since 1990[46].
- The most significant sources of ozone precursor pollutants (NOx, non-methane volatile organic compounds, carbon monixide, and methane) in Europe were agriculture, solvent and product use, and road transport. Emissions of the various ozone-precursor pollutants have decreased in almost all sectors between 1990 – 2008, except in the waste, solvent and product use, non-road transport and industrial processes sectors. Emissions of all (ground-level) ozone precursor pollutants have decreased across the EEA-32 region from 1990 – 2008, mainly due to the introduction of catalytic converters to vehicles. The transport sector remains the dominant source of ozone precursor pollutants in Europe[47].

A6.4.1 Impacts of air pollution in Europe

Although most air pollution in Europe is reducing compared to 1990 levels, significant environmental and health impacts remain. These impacts are outlined in Table A6.4.

[43] EEA (2010) Emissions of primary particles and secondary particulate matter precursors http://www.eea.europa.eu/data-and-maps/indicators/emissions-of-primary-particles-and-5/assessment

[44] EEA (2010) National emissions reported to the Convention on Long-range Transboundary Air Pollution (LRTAP Convention)

http://www.eea.europa.eu/data-and-maps/figures/ds_resolveuid/45823d350bf26de4449b138a26ff4b37

[45] Ibid

[46] EEA (2010) Emissions of acidifying substances (CSI 001) http://www.eea.europa.eu/data-and-maps/indicators/emissions-of-acidifying-substances-version-2/assessment

[47] EEA (2010) Emissions of ozone precursors (CSI 002) http://www.eea.europa.eu/data-and-maps/indicators/emissions-of-ozone-precursors-version-2/assessment

Table A6.4 Cost of air pollution in Europe

Pressure	Impact	Comments / Assumptions	Unit	Value (€) / year
Acidification	Excess deposition of acidifying air pollutants in the past has led to a loss of key species in many sensitive freshwater ecosystems in Europe. The proportion of European areas which exceed acidity critical loads has decreased by over 50% since 1990. Some areas still exceed critical loads due to the contribution of ammonium from agricultural activities. Successful mitigation measures have reduced acidifying deposition, particularly due to sulphur emissions, and sensitive European lakes and rivers are showing strong signs of recovery.	No externality values were identified.		
Excess nutrient nitrogen	Excess inputs of nitrogen to sensitive ecosystems have led to eutrophication and nutrient imbalances. Heathlands and nutrient-poor grasslands are particularly at risk from excess atmospheric nitrogen inputs, the negative effects of which include; species loss, changes in inter-species competition and increased susceptibility to plant diseases, insect pests, frost, drought and wind stress. The magnitude to the risk of ecosystem eutrophication and its geographical spread has diminished only slightly in recent years. In 13 EEA member countries the percentage of sensitive ecosystems at risk is still close to 100% in 2010.	No externality values were identified.		
Ozone	Ambient ozone levels found in Europe can result in a range of effects on vegetation, including visible leaf injury, growth and yield reductions, and altered sensitivity to organic and additional inorganic stresses, such as drought. In general, the highest ozone concentrations are found in southern Europe, particularly in Italy, Switzerland, Greece, Slovenia and Spain.	Assume that each person loses 0.5 years, at €75,000 Value of Life Year. This is equivalent to 20,000 people x €37,500	Value of Life Year of €75,000	
	It has been estimated that exposure to ozone concentrations exceeding critical health levels is associated with more than 20,000 premature death in the EU-25 on an annual basis[48].			€0.75 billion
	Damage to more than 30 crop species due to current ozone concentrations has been recorded.	Ozone induced yield losses for 23 crops in 47 European countries were estimate		€6.7 billion

[48] IIASA (2008) National Emission Ceilings for 2020 based on the 2008 Climate & Energy Package. NEC Scenario Analysis Report Nr. 6. International Institute for Applied Systems Analysis http://www.iiasa.ac.at/rains/reports/NEC6-final110708.pdf

		at €6.7 billion per year for year 2000 ozone concentrations[49].		
Particulate matter	Health impacts caused by exposure to certain pollutants such as sulphur dioxide and lead have been reduced considerably in Europe over recent decades. However European air pollutants levels still frequently exceed limits set by EU Air Quality Directives, and pollutants such as fine particulate matter, ozone and nitrogen dioxide still pose considerable threat to the health of European citizens. $PM_{2.5}$ pollution in EEA-32 countries may be associated with approximately 490,000 premature deaths in 2005, equivalent to 4.9 million years of life lost[50].	4.9 million years of life lost, at €75,000 per year	Value of Life Year of €75,000	€368 million
SOx, NOx. PM, VOCs, mercury	Annual global external cost for 2008 has been estimated at approximately €413 billion[51], of which 21% are associated with Europe.	Europe is responsible for €87 billion of global external costs.	Annual cost to global GDP	€87 billion
SOx, NOx. PM, VOCs, NH_3, PM_{25}	The Thematic Strategy for Air Pollution impact assessment[52] provides three abatement scenarios, the average cost of which is €10,485 billion per year in 2020.	Abatement at least equivalent to external damage costs	Annual cost of abatement	€10,485 billion
Likely improvement of air quality - area km^2	In 2010 estimated annual crop damage in EU25 was €2.15 billion. Moderate scenario of the IA[53] estimates a decrease of 27% in annual crop damage by 2020 (€1.6 billion circa). The damage in 2020 under this scenario is about €600 million lower than that of 2010.	Utilised agricultural area in EU25 (2007) was circa €156 million hectares. Cost per hectare is therefore about €3.80 per hectare and €0.038 per km2.	€0.038 per km2	

[49] Centre for Ecology and Hydrology (2006) Development of a framework for probabilistic assessment of the economic losses caused by ozone damage to crops in Europe http://icpvegetation.ceh.ac.uk/publications/documents/FinalEconomcisreportrecoveredversionTuespmFHJac.pdf

[50] de Leeuw, F. and Horálek, J. (2009). Assessment of the health impacts of the exposure to PM2.5 at a European level. ETC/ACC Technical paper 2009/1. http://air-climate.eionet.europa.eu/docs/ETCACC_TP_2009_1_European_PM2.5_HIA.pdf

[51] UNEP FI/PRI and TruCost (2010). Universal ownership. Why environmental externalities matter to institutional investors. UNEP FI. New York. Assumes €1=$1.32

[52] The Communication on Thematic Strategy on Air Pollution and The Directive on "Ambient Air Quality and Cleaner Air for Europe". Impact Assessment. http://ec.europa.eu/environment/archives/cafe/general/keydocs.htm

[53] European Commission (2005) The Communication on Thematic Strategy on Air Pollution, and The Directive on "Ambient Air Quality and Cleaner Air for Europe Impact Assessment. SEC (2005) 1133.

Likely improvement of air quality - Number of people that will be affected	Health benefits from improved particulate matters per annum are about €42 billion by 2020 (calculated in 2005)[54]. EU population in 2005 was 461 million. Therefore, estimated per person per annum is circa €91.		€91 per person.
Likely increase in area with ambient air quality meeting EU air quality standards - km2	In 2010 estimated annual crop damage in EU25 was €2.15 billion. Moderate scenario of the IA estimates a decrease of 27% in annual crop damage by 2020 (€1.6 billion circa)[55]. The damage in 2020 under this scenario is about €600 million lower than that of 2010.	Utilised agricultural area in EU25 (2007) was circa €156 million hectares. Cost per hectare is therefore about €3.80 per hectare and €0.038 per km2.	€0.038 per km2.
Likely reduction in emissions of noxious gasses (e.g. SO2, NOx, NMVOC an NH3) - tons/year	The volume of emissions for each type of emission in 2010 varies from 1,357 kilotonnes to 8,735 kilotonnes. Likely reduction under moderate IA scenario by 2020 ranges from 56% to 83% for different emissions, and estimates a reduction between 359-2,547 kilotonnes[56]. Abatement cost under moderate IA scenario is between €573 million to €3.8 billion given different types of emissions.	Abatement cost per type has been calculated and the average abatement cost per tonne is €1,308.	€1,308 per tonne.

Source: EEA (2010) The European Environment State and Outlook – Air Pollution

[54] European Commission (2005) The Communication on Thematic Strategy on Air Pollution, and The Directive on "Ambient Air Quality and Cleaner Air for Europe Impact Assessment. SEC (2005) 1133. Health benefits under the chosen level of ambition. The figure includes fewer premature deaths, less sickness, fewer hospital admission, improved labour productivity.

[55] European Commission (2005) The Communication on Thematic Strategy on Air Pollution, and The Directive on "Ambient Air Quality and Cleaner Air for Europe Impact Assessment. SEC (2005) 1133.

[56] European Commission (2005) The Communication on Thematic Strategy on Air Pollution, and The Directive on "Ambient Air Quality and Cleaner Air for Europe Impact Assessment. SEC (2005) 1133.

A summary of the total costs attributable to air pollution in the EU is provided in Table A6.5

Table A6.5 Summary of estimated costs of air pollution impacts

Impact	Comment/Assumption	Value (€) / year
Ozone	Premature deaths	€0.75 billion
	Crop damage	€6.7 billion
Particulate matter	4.9 million years of life lost, at €75,000 per year	€0.37 billion
SOx, NOx. PM, VOCs, mercury	External costs of pollution	€87 billion
SOx, NOx. PM, VOCs, NH_3, PM_{25}*	Average compliance costs of Thematic Strategy on Air Pollution	€10,485 billion

**To avoid double counting and to ensure a conservative estimate of externalities, these will not be included in the final aggregation of external costs.*

The external cost of €87 billion for SOx, NOx. PM, VOCs, mercury is derived from a global costs of these pollutants. It is likely that these figures are an underestimation as they only include the costs of ecosystem maintenance necessary to cope with increased levels of pollutants. The costs do not account for growing ecosystem sensitivity, increased natural capital scarcity and potential breaches of thresholds which could trigger step-changes such as ecosystem collapse.

A6.5 Water pollution and resources

A6.5.1 Impacts of freshwater pollution in Europe

High levels of pollutants in European freshwater's have led to adverse effects on aquatic ecosystems and the degradation of habitats, resulting in a reduction of freshwater biodiversity. This pollution of European freshwater resources has been significantly reduced in the last two decades. Key measures undertaken include the improvement of waste water treatment, reduction in the volumes of industrial effluents, reduced use of fertilisers, reduction in, or bans of, phosphate content in detergents, and lowering atmospheric emissions of pollutants[57]. An overview of the impacts to Europe's freshwater in provided in **Error! Reference source not found.**

A6.5.2 Costs of freshwater pollution in Europe

The presence of pollutants in freshwater can lead to the need for costly water treatment incurring significant capital and operating costs for water utilities and industry , to ensure water is of sufficient quality for human consumption, or that waste water is treated to a standard sufficient not to cause adverse environmental effects. The presence of agricultural pollutants in sources used for drinking water, can require the removal of pesticides, nutrients and microbes such as cryptosporidium. Costs for water treatment, but not for specific pollutants, are available. Some pollutants are more expensive to remove than others, and where these costs are available they are included. Table A6.6 below includes cost estimates for freshwater pollution in Europe.

A6.5.3 Water resources

In Europe, 45% of freshwater abstraction is for cooling in energy production, 22% for agriculture, 21% for public water supply and 12% for industrial purposes. In southern

[57] EEA (2009) Progress towards the European 2010 biodiversity target. EEA Report 4/2009.

Europe agriculture is responsible for more than 50% of total national abstraction, while in Western Europe more than half of water abstracted is used in energy production[58].

Europe's freshwaters suffer from water scarcity and droughts. Water scarcity results when demand exceeds supply, droughts are caused by prolonged dry periods which result in depleted water resources. Over abstraction from water resources results in low river flows, lowered groundwater levels, and the drying-up of wetlands, all of which have detrimental impacts on freshwater ecosystems. In the future it is projected that climate change will reduce water availability, increasing negative impacts to freshwater ecosystems[59].

The Water Exploitation Index (WEI)[60] decreased over the last 10-15 years. This reduction was mainly in Eastern Europe, due primarily to economic and institutional changes. Reductions in some west European countries was the result of water saving and water efficiency measures[61]. Although the total amount of water abstracted decreased by about 10% during this period, almost half of Europe's population still live in water-stressed countries.

Over-abstraction of water can have significant impacts on the environment, an overview of which is provided in Table A6.6 below.

A6.5.4 Marine environment

Europe's marine environment, its seas and coasts, are under considerable pressure from human activities on land and at sea. Fertilisers and pesticides run from agriculture and urban areas into rivers, and are subsequently carried to coastal waters. Excess nutrients can lead to eutrophication, reducing available oxygen and reducing in life on the sea floor. Despite measures to reduce nutrient concentrations in European seas, 85% of measurement stations show no change in nitrogen concentrations, and 80% show no change in phosphorous concentrations[62]. Oxygen depletion (as a result of eutrophication) is particularly serious in the Baltic and Black seas[63].

Fishing of Europe's seas generally exceeds the carrying capacity of fish stocks, and this is reflected in declining fish stocks. Climate change is also threatening the resilience of sea and coastal ecosystems; temperature changes are changing the composition of plankton and some fish species, thus changing fishing opportunities in European seas[64]. Ecosystem resilience is also threatened by pollution of the marine environment, such as the illegal dumping and accidental spillage of oil into the sea.

The result of this deterioration in the quality of the European marine environment is that the ecosystem services provided by Europe's seas and costs are declining, with potentially significant economic costs for Europe.

[58] EEA (2010) Use of freshwater resources (CSI 018) http://www.eea.europa.eu/data-and-maps/indicators/use-of-freshwater-resources/use-of-freshwater-resources-assessment-1

[59] EEA (2010) Use of freshwater resources – outlook from the EEA (Outlook 014) http://www.eea.europa.eu/data-and-maps/indicators/use-of-freshwater-resources-outlook/use-of-freshwater-resources-outlook

[60] WEI is the annual total water abstraction per year as percentage of available long-term freshwater resources around 1990 and latest year available

[61] EEA (2010) Use of freshwater resources (CSI 018) http://www.eea.europa.eu/data-and-maps/indicators/use-of-freshwater-resources/use-of-freshwater-resources-assessment-1

[62] EEA (2010) The European Environment State and Outlook – Marine and Coastal Environment

[63] Ibid

[64] Ibid

Table A6.6 State of water resources in Europe

Pressure	Impact	Comment / assumption	Unit	Value (€) / year
Freshwater pollution				
Nutrients (nitrogen, phosphorus)	Eutrophication: promotion of algal blooms which reduce desirable plant and animal species. Algal blooms can lead to cyanobacteria, which can be toxic to humans through direct skin contact and ingestion. In Europe, 44% of substances causing eutrophication come from agriculture and 22% from road transport, 45% of acidifying substances derive from industry and 27% from agriculture[65]. The average nitrate concentration in European rivers and lakes has decreased since the late 1990s due to actions to reduce agricultural inputs of nitrate. Phosphorus concentrations have also decreased, due to improvements in waste water treatment and reduced phosphate content of detergents[66]. However despite these reductions, nutrient surpluses in many regions of Europe remain at an excessively high level[67].	No externality costs were identified.		
Chemicals	Chemicals with endocrine disrupting properties, for example, have been shown to trigger feminising effects in male fish, raising implications for their fertility and population survival. Information about chemicals on concern in European freshwaters is lacking. Assessing chemical status is difficult as potentially hundreds of chemicals can be discharged into water bodies, and these chemicals can combine to form new substances. The Water Framework Directive (WFD) now sets targets for the phase-out and reduction of hazardous substances in freshwater to achieve "good chemical status" across the EU-27.	No externality costs were identified.		
Pesticides	Death of fresh-water macro-invertebrates. Mixing of various pesticides and different chemicals of concern but nothing conclusive has been proved. Information on pesticide concentrations in European water bodies is limited.	The Thematic Strategy on the Sustainable Use of Pesticides[68] includes several costs and benefits.		

[65] EEA (2007) Assessing water quality in Europe using stratification techniques – Results of a prototype application using French data. Technical Report 10/2007

[66] EEA (2010) Nutrients in Freshwater (CSI 020) http://www.eea.europa.eu/data-and-maps/indicators/nutrients-in-freshwater/nutrients-in-freshwater-assessment-published-1

[67] Grizzetti, B.; Bouraoui, F.; Aloe, A., 2007. Spatialised European Nutrient Balance. http://ies.jrc.ec.europa.eu/uploads/fileadmin/Documentation/Reports/RWER/EUR_2006-2007/EUR_22692_EN.pdf

[68] European Commission (2006) Thematic Strategy on the Sustainable Use of Pesticides. Impact Assessment. http://ec.europa.eu/environment/ppps/pdf/sec_2006_0894.pdf

	However, pesticides have been found in recent years in groundwater at concentrations greater than permitted under both the Groundwater and Drinking Water Directives. They are now equally regulated under the WFD to reduce concentrations to safe levels.			
		Benefit of implementing the strategy to farmers of €380 - €710 million / year;	Benefit to farmers	€545 million
		Benefit of implementing the Strategy to industries €300 - €670 million / year	Benefit to industry	€485 million
		Benefit of implementing the Strategy to industries 3000 jobs (total); and, Benefit of implementing the Strategy to MS authorities €191 million / year.	Benefit to MS	€191million
Urban waste water	Urban waste water includes numerous pollutants, including; industrial chemicals, metals, pharmaceutical products, nutrients, pesticides and microbes. These pollutants can pose a threat to human health and the environment. Urban waste water often includes nutrients, chemicals and pesticides. Microbes are also generally present in urban waste water, which can pose a risk to public health; they have the potential, for example, to cause sickness and diarrhoea. Implementation of the Urban Waste Water Treatment Directive (a perquisite of WFD compliance) has led to improvements in wastewater treatment across much of Europe. The vast majority of the population in northern Europe is connected to waste water treatment plants with the highest levels of treatment (tertiary). In central Europe over half of the waste water is subject to tertiary treatment. In southern and eastern Europe only 20% receive tertiary treatment[69]. The Urban Waste Water Treatment Directive has to be fully implemented in the New-10 EU members by 2015. When this happens, the majority of the urban population will then be connected to tertiary or secondary treatment[70].	UWWTD Compliance* €91,364 million. Cost of new investment and re-investment, 2007 – 2013[71].	Cost of new investment and re-investment, 2007 – 2013	€15.2 billion
Area of rivers/lakes	Benefits from improved environmental quality: eutrophication in marine ecosystem. 506-842 SEK per year for Swedish archipelago, 20% of total SE	Given the size of Swedish archipelago, cost range per hectare is between €27 and €45, and the	€36 / ha	

[69] EEA (2010) Urban Waste Water Treatment (CSI 024) http://www.eea.europa.eu/data-and-maps/indicators/urban-waste-water-treatment/urban-waste-water-treatment-assessment-1

[70] EEA (2010) Urban Waste Water Treatment Outlook (Outlook 047) http://www.eea.europa.eu/data-and-maps/indicators/urban-waste-water-treatment-outlook-eea/urban-waste-water-treatment-outlook

[71] European Commission (2010) Compliance Costs of the Urban Waste Water Treatment Directive. DG Environment.

that will have improved quality (chemical, microbiological or ecological) - ha	population[72].	simple average of the range is €36.		
Likely improvement in areas meeting national quality standards/ targets - ha	Benefits from improved environmental quality: eutrophication in marine ecosystem. 506-842 SEK per year for Swedish archipelago, 20% of total SE population[73].	Given the size of Swedish archipelago, cost range per hectare is between €27 and €45, and the simple average of the range is €36.	€36 / ha	
Area of likely improved groundwater quality - ha	EU Water saving potential, Ardeche (France) case study[74]. Total savings for households and agriculture sector is about 3.9 million m3 accounting for circa €10.3 million. Total savings for industry is €113 per inhabitant and the geographical area in question has 112,000 inhabitants. Total savings reaches €23 million circa. Potential savings per hectare is €92.	Cost avoided per hectare	€92 / ha	
Water resources				
Depletion of the water resource**	Over-abstraction may lead to diminished water resources, reflected by reduced river flows, lowered lake and groundwater levels and drying up of wetlands. Lack of water also harms terrestrial ecosystems, diminishing plant and animal life. In many areas of Europe the balance between water abstraction and availability is critical. Typically, the cause is a combination of drought and over-abstraction by at least one economic sector.	A drought in Europe during the summer of 2003 cost around €12 billion in economic loss. The drop in water levels affected the stability of dykes, interrupted navigation on the Danube, Elbe and Rhine Rivers, and slowed energy production: hydro-electric dams in Spain were operating well below capacity and nuclear power stations in France struggled to find river water to cool their	Drought in 2003	€12 billion

[72] DHI (2005) The Impact of REACH on Environment and Human Health. ENV.C.3/SER/2004/0042r

[73] Ibid

[74] EU Water saving potential (Part 2 – Case Studies) ENV.D.2/ETU/2007/0001r, 19. July 2007: Ecologic - Institute for International and European Environmental Policy

		reactors. Crop failure was widespread, forest fires raged and tourists deserted holiday destinations[75]. During summer 2006, rainfall in Lithuania was only half of the summer long-term average and agricultural production fell by 30% with an estimated loss of around €200 million. In 2003, the Slovenian Ministry of Agriculture, Forestry and Food estimated direct annual losses attributable to drought of around €100 million[76].	
	The global external cost of water abstraction has been estimated at €929 billion in 2008, of which 11% can be attributed to Europe, which is equivalent to €102 billion[77].	External cost of European water abstraction was approximately €102 billion in 2008.	€102 billion
Ecological impacts**	In order to maintain a healthy aquatic ecosystem, rivers require a sufficient amount of water, termed the 'environmental flow'. Low flows have negative environmental impacts, to biodiversity (migratory fish require sufficient flow to complete their migration) and water quality (lower flow diminishes a river's ability to dilute pollutants). Although flow levels are critical to maintain health aquatic systems, abstraction of water from rivers is often excessive, particularly during summer months when water availability is typically at a minimum. Excessive abstraction can also affect terrestrial ecosystems, leading to the drying out of woodland, forests, heathland, dunes and fens, making them less suitable for characteristic plant and animal life. Negative ecological impacts associated with low flows are often reported across Europe.	No externality costs were identified.	
Saline intrusion**	Saline intrusion results from excessive groundwater abstraction from a coastal aquifer, which causes the freshwater level to lower and seawater to flow into the aquifer. Conventional water treatment methods do not remove this salt, and demand for freshwater is typically met by other sources, including desalination of coastal water. Large areas of the Mediterranean coastline have been affected by saline	No externality costs were identified.	

[75] UNESCO (2009) Learning to live with drought in Europe. A World of Science, Vol. 7, No. 3, July–September 2009 http://unesdoc.unesco.org/images/0018/001831/183157e.pdf
[76] EEA (2010) The European Environment State and Outlook – Water Resources; Quantity and Flows
[77] UNEP FI/PRI and TruCost (2010). Universal ownership. Why environmental externalities matter to institutional investors. UNEP FI. New York. Assumes €1 = $1.32.

	intrusion driven by abstraction of water for agriculture and public water supply. Tourism in the Mediterranean is responsible for significant proportion of the public water demand. Saline intrusion also occurs in northern Europe, particularly in Denmark and northern Poland, which has got progressively worse over the past decade.			
Marine				
Cost of policy inaction	The costs of policy inaction in the European marine environment have been estimated as follows[78].			
	Commercial fishing: benefits of Common Fisheries Policy success	Value of exemplar changes in selected North Sea fish stocks – not total stock or total cost - €704m - €1100m NPV. Value is over a 10 year period, thus annual value approximately €70 m - €110 m / year.	Annual value of North Sea Fish stocks	€90 million
	Removing risk of illness from bathing water in the UK. Benefit of Bathing Water Directive in England and Wales	€85 million / year.	Cost of water treatment	€85 million
	Eutrophication in the Baltic.	WTP to remove eutrophication problem in Baltic. Over a ten year period (2005-2015) NPV of €77 bn, equal to €7.7 billion / year	Cost of eutrophication in Baltic	€7.7 billion

**Urban waste water is treated to remove nutrients and chemicals from waste water. It is assumed that resources invested in urban waste water treatment recognise the costs of nutrients and chemicals to the environment, i.e. money is spent on treatment to avoid negative consequences to the environment. For this reason, the cost of treatment should be at least the same as the level of the benefits of treatment.*

*** Source: EEA (2009) Water resources across Europe – confronting water scarcity and drought. EEA report 2/2009*

**** These are not annual values, they are the total cost of the failure to implement European policy related to the marine environment*

[78] GHK (2005) Costs of non-action in the European Marine Environment

Consistent with the approach adopted previously, a summary of the total costs attributable to air pollution in the EU is provided in Table A6.7.

Table A6.7 Summary of estimated costs of water impacts

Impact	Comment/Assumption	Value (€) / year
Freshwater pollution		
Pesticides	Benefit of implementing the Thematic Strategy on the Sustainable Use of Pesticides	€545 million €485 million €191million
Urban waste water	Cost of UWWTD Compliance	€15.2 billion
Water resources		
Drought	Cost of drought in Europe during 2003	€12 billion
Abstraction	External cost of water abstraction in Europe, 2008	€102 billion
Marine		
Cost of policy inaction	Fishing	€90 million
	Urbanisation and development	€85 million
	Eutrophication (Baltic Sea)	€7.7 billion

The external cost estimate for pesticide use in Europe is based on the estimated benefits of implementing the Thematic Strategy on the Sustainable Use of Pesticides. This assumes that the benefit of implementing the Strategy is at least equal to the current external cost of pesticide use in Europe. Similarly, the external costs of urban waste water are based on estimates of the costs of complying with the Urban Waste Water Treatment Directive. That is, the costs of compliance are at least equal to the current external costs of urban waste water.

The drought in Europe during 2003 was particularly severe, and thus the costs associated with this drought could be an overestimation of the annual costs of drought in Europe. However, as many regional droughts are likely to occur on an annual basis, for which there are no cost estimates available, it is reasonable to include the 2003 as an approximate external cost of droughts in Europe.

A6.6 Biodiversity and nature

The majority of anthropogenic biodiversity loss is ultimately driven by human consumption and production. The main direct causes in Europe are habitat loss, invasive alien species, pollution, overexploitation and climate change.

Biodiversity in Europe includes diversity of ecosystems including forests, mires, bogs, coastal areas, freshwater areas and grasslands. In addition, much of Europe's biodiversity has been established through historical land management techniques and land use patterns, such as farming. As agriculture modernises and becomes increasingly intensive, its historically positive impact on landscapes and biodiversity can be diminished and can even become a threat to biodiversity. Agriculture can have a negative impact on biodiversity due to its use and pollution of air, water and soil (i.e. through pesticides and nutrient use)[79]. In addition, land abandonment can have a negative impact on biodiversity, as the farming practices which species have co-evolved with are no longer undertaken[80].

[79] EEA (2007) Europe's environment – the fourth assessment. State of the Environment Report 1/2007
[80] EEA (2010) The European Environment State and Outlook – Nature and Biodiversity

The 'capping' of natural areas with artificial surfaces has a negative effect on biodiversity in Europe. The coverage of land, at the European level, is principally caused by the expansion of artificial areas and related infrastructure. Artificial areas are replacing agricultural areas, forests, and semi-natural areas. This can have a negative effect on biodiversity as it decreases the size of natural habitats, reduces the living space of a number of species, and fragments the landscape, supporting and connecting species / habitats[81]. European ecosystems are also traversed and fragmented by urban sprawl and the transport networks connecting them. Urban sprawl at the expense of agricultural land (and to a lesser extent, forests and semi-natural and natural areas) is a significant issue, leading to negative impacts on biodiversity due to the loss and fragmentation of habitats[82].

The number of invasive alien species (IAS) established in Europe is growing rapidly, severely impacting regional biological diversity[83]. IAS may impact on native populations of specific species through hybridisation, by facilitating the spread of pathogens, via tropic impacts (grazing, predation, parasitism) and / or competition for resources[84]. IAS have become a major driver of biodiversity loss, second only to habitat fragmentation[85].

There is growing scientific consensus that climate-induced changes in biodiversity and ecosystem services, are likely to increase to the end of the century in Europe[86]. Predicted changes in temperature and precipitation patterns are likely to alter the geographic spread of plant and animal species in Europe, resulting in a northward drift of species. The viability of species will depend on their adaptability; specialised species may be unable to respond to changing climatic conditions.

Acidification and eutrophication from excessive nitrogen accumulation have negative impacts on terrestrial and aquatic biodiversity. In terrestrial environments, excess nitrogen can change the species composition of an ecosystem by increasing the abundance of a usually limited nutrient[87]. Removing this limitation can alter the balance between species, allowing alien species to out-compete native species. In aquatic ecosystems, excess nitrogen can lead to algal blooms, reducing oxygen and light to other species[88]. Some algal blooms, so called 'nuisance algal blooms', can be toxic to plants and animals[89].

The quality and condition of soil Europe is relatively poorly understood, but is emerging as a key component of healthy European environments, and consequently biodiversity too. Soil is adversely affected by a broad range of anthropogenic factors, which can lead to a reduction in many of the vital processes and services provided by soil. For example, the integrity and functioning of soil can be threatened by erosion, compaction, sealing, salinisation, acidification, desertification and contamination by pollutants such as heavy metals[90].

The loss of biodiversity, habitats and other natural assets is difficult to quantify due to a lack of available literature on this issue. Where it has been possible to quantify the costs associated with the above pressures, they are presented in Table 8. Costs relating to the impacts of climate change have already been quantified in Table A6.8 therefore they will not be included here to prevent double counting in the final scaling of the problem.

[81] EEA (2010) Land Take (CSI 014) http://www.eea.europa.eu/data-and-maps/indicators/land-take/land-take-assessment-published-nov-2005
[82] Ibid
[83] Hulme, P. E. (2007) Biological Invasions in Europe: Drivers, Pressures, States, Impacts and Responses. Biological Invasions, (25), 56–80
[84] Ibid
[85] EEA (2010) Towards an early warning and information system for invasive alien species (IAS) threatening biodiversity in Europe. EEA Report 5/2010
[86] EEA (2010) 10 Messages for 2010 Climate Change and Biodiversity
[87] Ibid
[88] Ibid
[89] Ibid
[90] EEA (2010) The European Environment State and Outlook - Soil

The pressures placed on the environment relating to biodiversity and nature are summarised in Table A6.8 below.

Table A6.8 Summary of costs of biodiversity and nature impacts in Europe

Impact	Comment/Assumption	Value (€) / year
Cost of policy inaction to prevent biodiversity loss	Annual cost of ecosystem services lost due to biodiversity loss in Europe	€218 billion
Natura 2000 Network*	Annual costs of maintaining network	€15.8 billion
Alien species	Costs of invasive alien species to Europe	€12.5 billion
Soil degradation	Costs of erosion, soil organic matter depletion and health effects of contaminated sites	€38 billion

**To avoid double counting and to ensure a conservative estimate of externalities, these will not be included in the final aggregation of external costs.*

Table A6.9 Impacts and costs of biodiversity pressures in Europe

Pressure	Impact	Comment / assumption	Unit	Value (€) / year
Cost of policy inaction to prevent biodiversity loss	Historically the main drivers of biodiversity loss have been invasive species and over-exploitation. Currently, the most significant driver of biodiversity loss is habitat conversion from natural systems to agricultural use. Climate change is predicted to be the most significant threat in the future. The cost of failing to implement policy to protect biodiversity has been estimated as part of The Economics of Ecosystems and Biodiversity (TEEB) project[91]. Compared to a 2000 baseline, the global loss in ecosystem services associated with biodiversity will be €13,938 billion per year by 2050, of which €1,116 billon will be lost to Europe every year. Biodiversity is important in maintaining the resilience and viability of ecosystems, and thus the provision of a range of ecosystem services. The losses to ecosystem services associated with a loss in biodiversity include, for example; the ability of forests to store carbon, provide timber and shelter species and people; the provision by coral reefs of breeding grounds for the fish that much of the world's population rely on as a source of protein, and are a source of tourism revenue in many areas; water purification and reduced flood risk by wetlands; and, mangrove's protection of coastal populations from storm surges and tsunamis.	Value of ecosystem services lost due to biodiversity loss in Europe in 2010, per year, applying a discount rate of 4% to €1,116 by 2050 estimation.		€218 billion
	Based on the COPI analysis it is possible to estimate the value of ecosystem services for a several habitat types. The numbers below are the range of values, the average ( ), and the number of values the average is based on [ ]. The total value of these habitat types in Europe was not calculated.			
	Coastal habitats €242 – €21,282 (€7,083) [5]	The value of ecosystem services of coastal habitats in Europe is €7,083 / ha / year	€7,083 / ha / year	

[91] Bratt et al. (2008) Cost of policy inaction (COPI): The case of not meeting the 2010 biodiversity target

http://ec.europa.eu/environment/nature/biodiversity/economics/teeb_en.htm

	Dunes habitats €32,226 – €91,482 (€60,970) [3]	The value of ecosystem services of dunes habitats in Europe is €60,970 / ha / year	€60,970 / ha / year	
	Freshwater habitats €95 – €25,109 (€3,675) [8]	The value of ecosystem services of freshwater habitats in Europe is €3,675 / ha / year	€3,675 / ha / year	
	Heath and scrub €35 – €721 (€317) [9]	The value of ecosystem services of heath and scrub habitats in Europe is €317 / ha / year	€317 / ha / year	
	Sclerophyllous scrub €6 - €480 (€89) [3]	The value of ecosystem services of sclerophyllous scrub habitats in Europe is €89 / ha / year	€89 / ha / year	
	Grasslands €12 – €202 (€89) [5]	The value of ecosystem services of grassland habitats in Europe is €89 / ha / year	€89 / ha / year	
	Bogs, mires & fens €214 – €4,129 (€1,845) [3]	The value of ecosystem services of bog, mire and fen habitats in Europe is €1,845 / ha / year	€1.845 / ha / year	
	Forests €198 – €5,456 (€1,836) [17]	The value of ecosystem services of forest habitats in Europe is €1,836 / ha / year	€1,836 / ha / year	
Land use change / habitat loss	Land use in Europe is dominated by agricultural land, which is increasingly being used for agricultural and urban development. During 1990 – 2000, 48% of all areas that changed to artificial surfaces were previously used for arable land or permanent crops. Pastures and mixed farmland are the next category being taken, representing 36% of the total[92]. In terms of land uptake by urban and other artificial development in Europe, there are significant spatial differences across European regions; the principal cause is urban sprawl. Considering the contribution of each country to new total urban and infrastructure sprawl in Europe, mean annual values range from 22% (Germany) to 0.02% (Latvia), with intermediate values in France (15%), Spain (13.3%) and Italy (9.1%). Differences between countries are strongly related to their size and population density[93]. In many areas of Europe agriculture has been marginalised as an economic activity, often resulting in land abandonment. Although	The annual cost of the Natura 2000 network has been estimated at €5.8 billion for the EU-27[96].	Annual management cost	€5.8 billion

[92] EEA (2010) Land take (CSI 014) http://www.eea.europa.eu/data-and-maps/indicators/land-take/land-take-assessment-published-nov-2005
[93] Ibid

	some new areas have been taken into production, on average the loss caused by land abandonment is larger[94]. Decreasing pressure from grazing and spontaneous re-growth, as well as afforestation of abandoned agricultural land, has led to an increase of forest cover across Europe, at a rate of about 8000 – 9000 km^2 per year since 1990[95].			
Habitat fragmentation	European ecosystems are fragmented by urban sprawl and the transport network connecting urban areas, particularly in south-western Europe. A large part of western and central Europe has effectively become urban in character. Existing urban areas are sprawling to form much larger settlements, particularly in lowland and coastal areas[97]. Fragmentation in many places is caused by forest harvesting. From 1990 – 2000 the connectivity for forest species was stable in approximately 50% of Europe's territory, and increasing or decreasingly slightly for another 40%. Decreasing connectivity was significant in about 5% of provinces spread across Denmark, France, the Iberian Peninsula, Ireland and Lithuania[98].	Costs of habitat fragmentation to biodiversity in Europe have not been identified.		
Alien species	IAS result in significant damage to biodiversity, and have pushed many endemic species to distinction[99]. The number of alien species in marine and estuarine habitats is growing, although the number in freshwater and terrestrial ecosystems has levelled off in recent years[100]. As the numbers of alien species successfully establishing in	A partial and conservative extrapolation of the costs of invasive alien species has estimated that the cost to Europe is at least as high as €20 billion per year. This cost is likely to be an underestimation as it only includes a limited	Annual cost of IAS damage and management	€12.5 billion

[96] Gantioler S., Rayment M., Bassi S., Kettunen M., McConville A., Landgrebe R., Gerdes H., ten Brink P. Costs and Socio-Economic Benefits associated with the Natura 2000 Network. Final report to the European Commission, DG Environment on Contract ENV.B.2/SER/2008/0038. Institute for European Environmental Policy / GHK / Ecologic, Brussels 2010

[94] EEA (2010) Ecosystem coverage (SEBI 004) http://www.eea.europa.eu/data-and-maps/indicators/ecosystem-coverage/ecosystem-coverage-assessment-published-may-2010

[95] Ibid

[97] EEA (2010) Land take (CSI 014) http://www.eea.europa.eu/data-and-maps/indicators/land-take/land-take-assessment-published-nov-2005

[98] EEA (2010) Fragmentation of natural and semi-natural areas (SEBI 013) http://www.eea.europa.eu/data-and-maps/indicators/fragmentation-of-natural-and-semi/fragmentation-of-natural-and-semi

[99] EEA (2010) Invasive alien species in Europe (SEBI 010) http://www.eea.europa.eu/data-and-maps/indicators/invasive-alien-species-in-europe/invasive-alien-species-in-europe

[100] EEA (2009) Progress towards the European 2010 biodiversity target — Indicator fact sheets. EEA Technical report No 05/2009

	Europe has increased, it implies that the potential risk of damage to endemic biodiversity will increase over time. The increasing vulnerability of ecosystems to alien species invasion, resulting from other pressures such as habitat loss, degradation, fragmentation, over-exploitation and climate change[101], is likely to add to this risk.	number of invasive alien species, and does not cover the loss of biodiversity related existence, bequest and option values due to invasive alien species invasion[102]. Real and estimate costs to the European economy of IAS (based on available information without any extrapolation or benefits transfer) are approximately €12.5 billion per year[103]. These costs include €9.6 billion from damage caused by invasive alien species, and €2.8 billion related to the control of invasive alien species. Damage related to terrestrial invasive alien species, for example, damage caused by pests to agriculture and forestry, form a major part of this estimate. Although the actual costs of IAS are likely to be higher than €12.5 billion / year, this conservative estimation is included in the analysis.	
Alien Species – per Ha	It is possible to estimate the cost of controlling invasive species and the damage associated with them in Europe by hectare.	Dividing €12.5 billion (cost of controlling, and damage by, invasive species) by 958,000,000 ha (total area of Europe), gives a cost of €21 per ha per year.	€21 / ha / year
Climate change	Climate change is projected to have significant adverse effects on biodiversity in Europe. By 2100, the distribution of European plant species are projected to have shifted several hundred kilometres to the north, forests are likely to have contracted in the south and	Costs of climate change to biodiversity in Europe have not been identified.	

[101] Ibid

[102] Ibid

[103] Kettunen, M., Genovesi, P., Gollasch, S., Pagad, S., Starfinger, U. ten Brink, P. & Shine, C. (2009) Technical support to EU strategy on invasive species (IAS) - Assessment of the impacts of IAS in Europe and the EU (final module report for the European Commission). Institute for European Environmental Policy (IEEP), Brussels, Belgium. 44 pp. + Annexes

	expanded in the north, and 60% of mountain plant species may face extinction[104] . The rate of change will exceed the ability of many species to adapt, especially as landscape fragmentation may restrict movement[105]. Distributional changes are also expected for many animal species, changes which may also occur at a rate faster than animal species can adapt. For example, projections for 120 native European mammals suggest that up to 9% (assuming no migration) risk extinction during the 21st century[106].		
Eutrophication / Acidification	Although acidification and eutrophication from excessive nitrogen accumulation are declining, it is still responsible for significant negative impacts to biodiversity in Europe. Across the EU-25, approximately 47% of (semi-) natural ecosystem areas were subject to nutrient nitrogen deposition leading to eutrophication in 2004[107]. Only 15% of these areas received deposition of acidifying compounds (including nitrogen) during the same period[108].	Costs of eutrophication / acidification to biodiversity in Europe have not been identified.	
Soil degradation	During the 1990s 105 million ha (16% of Europe's total land area excluding Russia) were estimated to be affected by water erosion, and 42 million ha by wind erosion. Projected climate change, and extreme weather events (which are becoming more frequent), are likely to have negative effects on soil. This exacerbates existing issues related to salinisation, compaction and soil sealing, all of which significantly reduce soil functioning[109].	Soil degradation has been estimated to cost approximately €38 billion / year to the EU-25 economy[110]. This figure does not include the effect of all soil degradation processes, only erosion, soil organic matter depletion and health effects of contaminated sites.	Annual cost €38 billion soil degradation
	The impact assessment of the thematic strategy on soil protection provides lower (€720 million), middle (€7,264 million) and upper (€13,999 million) bound estimates for the annual cost of soil erosion in	Taking the middle estimate of the costs of soil erosion of €7,624 million, dividing it by 150 million ha, it is possible to estimate the cost of soil erosion	Annual cost of soil erosion / €51

[104] EEA (2010) Changes in species diversity as a result of climate change – outlook from the EEA (Outlook 004) http://www.eea.europa.eu/data-and-maps/indicators/change-in-species-diversity-as/change-in-species-diversity-as-1
[105] EEA (2010) Changes in species diversity as a result of climate change – outlook from the EEA (Outlook 004) http://www.eea.europa.eu/data-and-maps/indicators/change-in-species-diversity-as/change-in-species-diversity-as-1
[106] Ibid
[107] EEA (2010) Critical load exceedance for nitrogen (SEBI 009) http://www.eea.europa.eu/data-and-maps/indicators/critical-load-exceedance-for-nitrogen/critical-load-exceedance-for-nitrogen
[108] Ibid
[109] EEA (2010) The European Environment State and Outlook - Soil
[110] EU Commission (2006) Thematic Strategy for Soil Protection - Impact assessment of the thematic strategy on soil protection

	Europe. These figures are based on data available for 13 countries, of about 150 million ha in total land area.	in Europe / ha (€51 / ha)	/ ha / year

A6.7 Material resource use and Waste management

Resource use and waste generation are closely related, and in many ways can be considered as two sides of the same coin when assessing the lifecycle of all products with resultant environmental consequences. In general, as an economy increases its use of resources, the amount of waste produced will increase too.

Decoupling in this context refers to cases where economic activity increases at a faster rate than the quantity of resources consumed and waste produced. Therefore more is produced from the same or less quantity of resources, and less waste is produced.

A6.7.1 Material resource use

Economic growth and consumption are key drivers of resource use in Europe, as is the structure of the European economy, which has changed to include a larger share of services and rising imports of resources. Economic growth is intrinsically linked to economic growth; over the last 35 years domestic material consumption (DMC)[111] in the EU-15 only decreased during periods of recession or low economic growth[112].

There is long-term upward trend in the amounts of resources Europe is using. Of 8.2 billion tonnes of material consumption (DMC) in the EU-27 in 2007, minerals, including metals, accounted for 56%, fossil fuels for 23% and biomass for 21%[113]. This translates to around 16 tonnes of resource consumption per capita in 2007 for the EU-27[114], an increase from around 15 tonne per capita in 2000[115].

Europe imports the majority of its resources (20 – 30%), and in terms of natural resources, is one of the most import-dependent regions in the world[116]. The share of imports in EU-27 consumption ranges from 45% for natural gas, 55% for coal and 85% for oil, 50% for copper, 65% for zinc and about 85% for tin, bauxite and iron ores, to 100% for a wide range of hi-tech metals. The import of a significant share of raw materials and semi-manufactured input materials necessary for the functioning of European economies, results in a massive asymmetry in trade between the EU-27 and the rest of the world. In 2008, total European exports were 533 million tonnes, compared to imports of 1770 million tonnes[117]. Europe is not self-sufficient in the materials needed to sustain its economies; materials are either not available within European borders, or are too expensive to produce, and are subsequently obtained through international trade. Thus macroeconomic restructuring, rising domestic costs of production, availability of cheaper products from abroad and the removal of trade barriers are all significant factors in Europe's physical trade imbalance.

The substitution of resources from abroad, while cheaper and likely to reduce environmental impacts in Europe, increases the strain on the environment in countries where these resources originate. The environmental degradation associated with resource extraction (and often primary processing) takes place in the producing country. This damage may be further aggregated as producer countries may have lower social and environmental standards than the EU. The environmental pressures associated with resource extraction can be significant. For example, each tonne of imported metal can generate many tonnes of hidden materials (hidden to the EU at least); a tonne of steel can leave behind 4 tonnes of

[111] Domestic material consumption (DMC), measures the total amount of materials directly used in an economy. It is defined as the total annual quantity of raw materials extracted from the domestic territory, plus all physical imports minus all physical exports. The DMC indicator provides an assessment of the absolute level of the use of resources.

[112] Eurostat statistics

[113] Ibid

[114] Ibid

[115] EEA (2010) The European Environment State and Outlook – Material Resources and Waste

[116] EEA (2010) The European Environment State and Outlook – Material Resources and Waste

[117] EEA (2010) The European Environment State and Outlook – Material Resources and Waste

other materials, or a tonne of platinum as much as 400,000 tonnes[118]. Where the exporting country has lower environmental standards to that of the EU, a significant risk of additional environmental impact, such as carbon leakage, exists. This occurs where improvements made in Europe (i.e. in emissions reduction and resource use) are offset by the losses in third countries. In such cases, the gains made in Europe may not appear so substantial if due consideration is given to the environmental damage imported in to the EU.

In addition to the considerable environmental burden of European resource use which accrues outside of the EU, there are also environmental impacts within the EU. The environmental problems associated with the extraction of materials and production of goods including impacts on land, water and air. Environmental pressures result from the discharge of pollutants, release of harmful substances, consumption of resources beyond their sustainable capacities and the conversion of natural land into urban, agricultural or other economic use (i.e. quarrying). These pressures lead to environmental impacts, including:

- Climate change and global warming;
- Acidification and Eutrophication;
- Ozone formation;
- PM, NOx and SOx pollution of air;
- Chemical pollution of water;
- Biodiversity loss;
- Habitat fragmentation; and,
- Land use changes.

These environmental impacts have been quantified elsewhere in this section. Methodologies to correlate resource use with environmental impacts are not well developed, but in general terms resource use is closely correlated to waste generation and environmental impacts. Thus it is useful to consider resource use in terms material, labour and energy productivity. If productivity in these three areas were to increase significantly it is possible that environmental impacts would decrease, in Europe and abroad[119]. The extent of productivity gains required to offset increases due to economic growth (relative versus absolute decoupling) is discussed in below.

A6.7.2 Decoupling and resource efficiency

The 6th Environment Action Programme (6EAP)[120] includes the aim of decoupling economic growth and resource use. Decoupling resource use from economic growth from resource use can mean two things, first that that the economy grows faster than resource use, while the absolute quantity of resource input is still increasing, and second that the economy grows, while total resource input remains stable or decreases. These two different forms of decoupling are respectively termed relative and absolute decoupling. In terms of environmental impact, decoupling of resource use from environmental impact means that the economy grows at a faster rate than environmental impact (relative decoupling) or while environmental impact stabilises or decreases (absolute decoupling).

Europe is using more and more natural resources, and it is creating increasing amounts of wealth from of these resources Table A6.10. In this respect, resource use in many EU-27

[118] EEA (2010) The European Environment State and Outlook – Material Resources and Waste

[119] Increases in productivity / resource efficiency would reduce the amount of resources, and subsequent environmental impacts, that would otherwise occur.

[120] 6th Environment Action Programme of the European Community 2002 – 2012 http://ec.europa.eu/environment/newprg/index.htm

countries can be said to have decoupled from economic growth, but only in the sense that economic growth has grown at a rate faster than the rate of resource use, i.e. relative decoupling. Similarly, energy productivity is also improving over time across the EU-27 (Table A6.10).

Table A6.10 Resource productivity in the EU-27

Year	GDP Millions euro	DMC Thousand tonnes	Material productivity (Tonne DMC / 1000 euro)	Gross inland primary energy consumption (1000 tonne / toe)	Material productivity (1000 toe / 1000 euro)
2000	9,200,000	7,597,817	0.83	1,724,241	0.19
2001	9,500,000	7,524,685	0.79	1,7627,26	0.19
2002	9,900,000	7,433,632	0.75	1,7591,37	0.18
2003	10,100,000	7,406,540	0.73	1,802,902	0.18
2004	10,600,000	7,768,530	0.73	1,824,589	0.17
2005	11,000,000	7,848,084	0.71	1,825,237	0.17
2006	11,700,000	8,041,977	0.69	1,825,756	0.16
2007	12,400,000	8,200,305	0.66	1,807,794	0.15

Source: Eurostat

In absolute terms, Europe is not using fewer material resources, but increasingly relies on resources extracted from abroad. The relative decoupling between material use and economic growth in Table A6.10 may be the result of increased imports of raw materials and semi-manufactured products replacing domestic production. While this substitution of domestic production with imports may reduce the environmental burden in Europe and increase relative decoupling, it has resulted in environmental impacts being shifted abroad. Importing resources from outside Europe may be economically advantageous, or inevitable in the case of specific materials, but the extraction of resources in countries with less stringent environmental protection legislation may result in higher net environmental impacts (compared to the environmental impacts which might arise were the resources to be extracted in Europe). In addition, in terms of how resources are being used within Europe, decoupling of environmental impacts from resource use is less certain. There are no operational methods to quantify the environmental impacts of resource use, and thus it is not possible to conclude whether environmental impacts or environmental degradation (as a result of resource use) are increasing or declining[121].

A6.7.3 Waste management

The materials cycle generates waste at all stages; during extraction (mining waste), production and distribution (industrial waste, hazardous waste, packaging waste, etc.), consumption of products and services (municipal waste, waste electronic and electronic equipment, etc.) and during waste treatment (for example sorting residues from recycling facilities or incinerator slag)[122]. The management and disposal of waste results in environmental pressures, such as the emission of pollutants to water and soil, GHG and air pollutant emissions, energy and land use, biodiversity, and pressures on human health too.

[121] EEA (2010) The European Environment State and Outlook – Material Resources and Waste

[122] EEA (2010) The European Environment State and Outlook – Material Resources and Waste

Around 2.6 billion tonnes of waste was generated in the EU, of which about 101 million (4%) tonnes was hazardous waste[123]. This equates to roughly 5 tonnes of waste per capita. Long time series data is only available for municipal waste, which shows an increase of 7% between 1998 – 2008. In 1998, about 57% of municipal waste was disposed of in landfills, which decreased to 39% in 2008. During this period, the proportion of municipal waste incinerated increased from 14-19% during the period, and the amount of waste recycled or composed more than doubled.

Waste electric and electronic equipment (WEEE) contains significant amounts of hazardous substances that can pose a threat to the environment. In addition, WEEE also typically contains substantial amounts of valuable metals. Separate collection of WEEE and subsequent recovery and treatment in an environmentally sound manner helps achieve reduction of environmental impacts, and also improves resource efficiency.

Changes in waste management practise are responsible for reductions in the environmental impacts of waste in Europe. Some examples of these changes are discussed in Table A6.11.

Table A6.11 provides a summary.

Table A6.11 Summary of costs of waste management impacts in Europe

Impact	Comment/Assumption	Value (€) / year
Landfill	Benefit of Landfill Directive – avoided GHG emissions from reducing biodegradable municipal solid waste sent to landfill by 35% of its 1995 levels by 2016*	€1.3 billion
	Benefit of Landfill Directive – avoided GHG emissions if EU27 fully complied with the Landfill Directive's targets to divert biodegradable municipal waste from landfill.	€2.4 billion
WEEE	Annual costs for collection, disposing of and treating WEEE by 2020*.	€5.6 billion
Waste management	Management of hazardous and municipal waste costs*.	€75 billion

**To avoid double counting and to ensure a conservative estimate of externalities, these will not be included in the final aggregation of external costs.*

[123] Eurostat 2010

Table A6.12 Waste in Europe – current costs and value of potential efficiencies

Waste	Description	Comments / assumptions	Unit	Value (€) / year
Landfill	The increasing volumes of waste diverted from landfill towards recycling and recovery has reduced the pressures of water on the environment in Europe. GHG emissions from the waste sector (landfill and waste incineration without energy recovery) fell by 34% in the EU-27 between 1990 and 2007, primarily due to reduced methane emissions from landfills[124].	The European Commission has estimated that reducing the amount of biodegradable municipal solid waste sent to landfill by 35% of its 1995 levels by 2016 (an objective of the Landfill Directive) will save 40 MT CO_2e a year, which represents 1% of total annual EU-15 GHG emissions[125]. This is equivalent to 11 million tonnes of carbon[126]. The value of this saving can be calculated using a figure of €120 / tonne carbon (€120 * 11 million)	Social cost of carbon of €120 / tonne	€1.3 billion
		If all countries in the EU-27 fully complied with the Landfill Directive's targets to divert biodegradable municipal waste from landfill, 67 – 77 million tonnes of GHG emissions could be mitigated in 2020, compared with 2008[127]. If the mid-point of this estimate is taken (72 million tonnes GHG emission), it is equivalent to 20 million tonnes of carbon[128]. The value of this saving use a figure of €120 / tonne carbon (€120 * 20 million tonnes)	Social cost of carbon of €120 / tonne	€2.4 billion
	It is possible to estimate the externalities associated with disposal to landfill of municipal solid waste. An externality of €11 / tonne of MSW sent to landfill has been estimated[129]; this value includes global		€11 / tonne municipal solid waste sent to landfill	

[124] EEA (2009) Diverting waste from landfill. Effectiveness of waste-management policies in the European Union. EEA report 7/2009

[125] European Commission (2005) Thematic Strategy on the Prevention and Recycling of Waste. Impact Assessment. http://ec.europa.eu/environment/waste/pdf/ia_waste.pdf

[126] Carbon dioxide has a molecular weight of 44 g/mol, and Carbon a weight of 12 g/mol. Therefore to calculate the amount of carbon per tonne of carbon dioxide, it is necessary to multiply the total weight of carbon dioxide by 12/44

[127] EEA (2010) The European Environment State and Outlook – Material Resources and Waste

[128] Carbon dioxide has a molecular weight of 44 g/mol, and Carbon a weight of 12 g/mol. Therefore to calculate the amount of carbon per tonne of carbon dioxide, it is necessary to multiply the total weight of carbon dioxide by 12/44

[129] DG Env (2000) A Study on the Economic Valuation of Environmental Externalities from Landfill Disposal and Incineration of Waste http://ec.europa.eu/environment/waste/studies/pdf/econ_eva_landfill_report.pdf

	warming, air pollution, leachate, disamenity and pollution displacement externalities. This value assumes that the landfill; is a modern containment landfill that fulfils the demands of the newest directive (EC/31/1999); has a leachate collection and treatment system; and, landfill gas is collected to generate electricity and heat (CHP). This value can also be used to calculate the value of waste diverted from landfill to recycling, that is, the externality savings realised by diverting waste from landfill.		
WEEE	The EC Directive 2002/96/EC on waste electrical and electronic equipment (WEEE Directive) set a collection target of 4 kg of WEEE per capita and per year from private households by 2006. Only 11 countries have met the 4 kg per capita collection target, the remaining countries have either not met the targets or not reported. The collection rate achieved so far is only 23 % by weight of amounts put on the market in 2006 – the average of 18 European countries where data are available. There is evidence that considerably more than 23 % of WEEE is collected but not reported, and that a substantial part of this undergoes sub-standard treatment in the EU or is illegally exported. Where WEEE is collected separately, it is widely recycled: for 17 countries where recycling rates can be calculated, the average recycling rate was 79%.	The economic costs for society for collection, disposing of and treating WEEE are estimated to increase to €5.6bn a year by 2020 (including activity by public and informal sectors)[130].	€5.6 billion
Waste management	Management of hazardous and municipal waste costs industry and citizens up to €75 billion a year[131].		€75 billion
Likely reduction in use of limited or non-renewable natural resources	The UK Aggregate Levy is €2.4 / tonne for aggregates across Europe[132], and this is assumed to be a proxy for the external costs of DMC in Europe.	This cost does not account for the composition of DMC across Europe, and is likely to be a very conservative estimate.	€2.4 / tonne

*Source: EEA (2010) The European Environment State and Outlook – Material Resources and Waste; *Eurostat ** Eurostat and EEA*

[130] European Commission (2008) Directive on Waste Electrical and Electronic Equipment (recast). Impact Assessment. http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=SEC:2008:2933:FIN:EN:PDF
[131] European Commission (2004) Thematic Strategy on the prevention and recycling of waste and the immediate implementing measures. Impact Assessment.
[132] DG Environment (2010) Economic Analysis of Resource Efficiency Policies. Draft Final Report.

A6.8 Summary of the Economic and Social Costs of Environmental Problems

Table A6.13 provides a summary of the environmental damage costs described above. This value is a conservative approximation, expressly defined to avoid any risk of double counting. It should not been considered as a comprehensive valuation of all environmental issues in Europe. It is intended to provide a context for the Impact Assessment, and to demonstrate a rationale for addressing environmental problems in Europe.

Taking the conservative approach, the minimum environmental damage costs in the EU are in the order of €666 billion per year. To put this in context, the GDP of the EU-27 was €11,783 billion in 2009[133], the EU environmental costs therefore represent in the order of 6% of EU GDP. This excludes damage costs caused by the EU to the rest of the world.

Table A6.13 Summary of Environmental Damage Costs in the EU (€ per year)

Environmental theme	Type of Environmental Cost	Annual Value (€ billion)	Aggregated Annual Value	
			(€ billion)	(%)
Climate Change	External cost of European GHG emissions	€162 billion	€162	24%
Biodiversity	Loss of Ecosystem Services (Cost of Policy Inaction)	€218 billion	€269	40%
	Invasive Alien Species	€13 billion		
	Soil Degradation	€38 billion		
Air and Industrial Pollution	Ozone (premature deaths)	€1 billion	€95	14%
	Ozone (crop damage)	€7 billion		
	Particulate matter	< €1 billion		
	SOx, NOx. PM, VOCs, mercury	€87 billion		
Water Resources	Drought	€12 billion	€114	17%
	Abstraction	€102 billion		
Freshwater Pollution	Pesticides (benefit of implementing policy)	€1.billion	€16	2.5%
	Urban waste water (compliance cost)	€15 billion		
Marine Environment	Fishing	< €1 billion	€8	1%
	Urbanisation and development	< €1 billion		
	Eutrophication (Baltic Sea)	€8 billion		
Waste	Benefit of Landfill Directive	€2 billion	€2	0.5%
Total			**€666**	

Source: Individual thematic assessments

[133] Eurostat

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Annex 7 Supporting Material for Section 5 – Case Studies

This Annex contains the case studies supporting section 5 in the report. The remaindering supporting materials for section 5 comprises Annex 8.

Case studies

The case studies below illustrate the costs and benefits of the implementation of various elements of the environmental acquis. References for each of the case studies are given in Annex A1.3 above.

The main focus of the cases is to describe and quantify the progress and benefits that policy improvements can make (a 'distance travelled' type of analysis – so focusing on MS that have made the most progress in improving rather than those with the best policies per se). The cases aim to describe:

- The problem (and related context) – with some quantification of the problem addressed;
- The measures taken to improve policies / implementation (and related actors/partnerships) – and a description of how these had evolved, and highlighting any innovative aspects
- The costs of measures (to different actors) - but mainly in terms of public funding;
- The environmental benefits of measures – and the resulting economic and social benefits, mainly in terms of benefits to society.

The case studies are undertaken using secondary materials supported by some checking and discussion with relevant MS contacts. The case studies describe:

- the effects of a general policy measure for a Member State or a region, or
- the EU-wide market for a specific product or application, or
- the effects of the application of a policy measure on a specific, individual, located case.

They focus on calculating the social and economic benefits of the policy and its results. The attempt to show a cause-effect relationship between the policy measure and the environmental benefits generated and the social and economic benefits retrieved from it.

The cases may be an ex post evaluation of the benefits of measures that are already in the implementation phase, or ex ante evaluation on assessed environmental benefits of possible or planned policy measures.

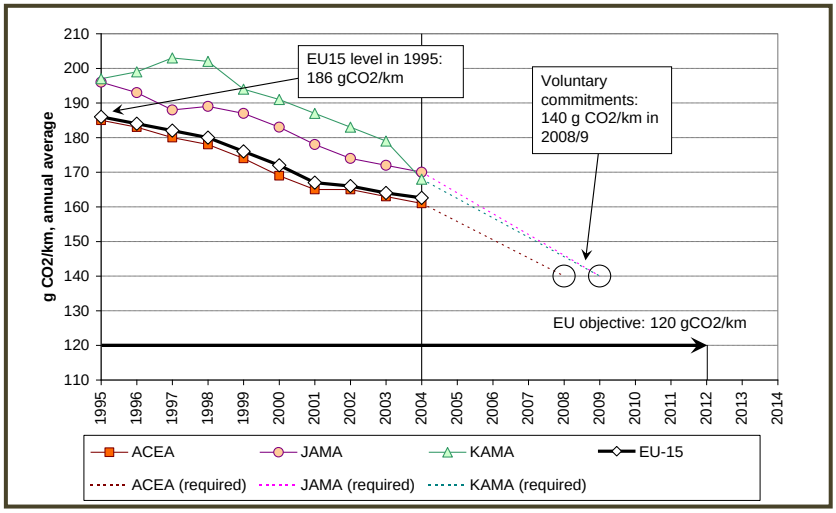
A7.1 The implementation of the French Bonus-Malus scheme

Transport is the second largest greenhouse gas emitting sector in Europe. Carbon dioxide (CO_2) from transport grew by 36 per cent between 1990 and 2007, and the share of total greenhouse gas emissions from transport in the EU grew from 21 per cent in 1990 to 28 per cent in 2007 (EIS, 2010). CO2 emissions from road transport rose by 29 per cent between 1990 and 2007, notably due to increases both in the number of vehicles on the roads as well as in distances driven annually. Cars are responsible for more than half of overall transport emissions.

After having considered introducing a target of 120g/km from passenger cars by 2005/2010 as early as 1994, the Community finally accepted negotiated a **voluntary agreement** with car industry associations (ACEA, JAMA, KAMA[134]) to reach **140g/km for 2008/2009 (ten Brink, 2010)**. This represented on average a **25 per cent reduction** in emissions relative to 1995 levels. The voluntary agreements were one of three key pillars of the Commission's CO_2 emission reduction strategy. The other two pillars were labelling and fiscal measures. Labelling was required by EU law (Directive: 1999/94/EC[135] adopted in 1999 and amended in 2003), with transposition and implementation left to the Member States. On the fiscal pillar, there was again a mix of EU level action and national action; market based instruments included taxes on petrol and diesel (also biofuels and compressed natural gas); registration and annual circulation taxes; congestion charging and road pricing; subsidies and their reform, whether for low emission vehicles or company cars; or (later) scrappage schemes to take old cars off the road and encourage the purchase of newer, cleaner and more efficient models.

In 2004 a 12.4 per cent reduction compared to 1995 had been achieved, out of total 25 per cent required by 2008/9, there was increasing realisation that industry's self commitment was not likely result in the 140g/km target being achieved in 2008/2009 (see Figure A7.1).

Figure A7.1 Average CO2 emissions from cars for 1995 to 2004 period and 2008/2009 targets[136]



Thus, the voluntary agreements with car manufacturers to reduce CO_2 emissions from passenger cars concluded in the second half of the 1990s, after some initial progress towards meeting the targets, failed to achieve their objective, calling from a more stringent regulation and leading to the adoption of the 2009 Regulation.

[134] ACEA: European Automobile Manufacturers Association; JAMA: Japan Automobile Manufacturers Association; KAMA: Korea Automobile Manufacturers Association.

135 Directive 1999/94/EC of the European Parliament and of the Council of 13 December 1999 relating to the availability of consumer information on fuel economy and CO_2 emissions in respect of the marketing of new passenger cars

136 EC Communication COM (2007) 19 final, Results of the review of the Community Strategy to reduce CO2 emissions from passenger cars and light-commercial vehicles: http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2007:0019:FIN:EN:PDF

In December 2008, the Council of Ministers and the European Parliament agreed on a Regulation 443/2009/EC[137] to reduce the fleet average CO_2 emissions of cars sold in Europe to 130 g/km by 2015 with additional 10g/km to be made up by additional measures under the "integrated approach"[138]. Furthermore, the regulation noted the aim of reducing specific emissions further, to 95 g/km by 2020.

Although contrary to the car industries of most other MS the French car industry was already on track (past trends extrapolated) to meet the 2015 target, the French government introduced a bonus-malus scheme in December 2007[139] (MEEDDM, 2010), to further accelerate the shift towards a cleaner car fleet in France. French legislation in fact set the target of achieving a 20 per cent fall in greenhouse gas emission from transport by 2020 compared to 2008, bringing them back to 1990 levels.[140] Emissions by passenger cars in 2007 did indeed represent 54 per cent of the greenhouse gas emissions from transport, which in turn represented 26 per cent of national emissions. Complementing the bonus-malus scheme, a car scrapping incentive was introduced in late 2008 as part of the French economic stimulus plan to support French industry (IHS, 2010). This case study looks into the costs and benefits of the combination of these two measures over the 2007-2010 period.

The instrument is of particular interest in the context of this project first as there are valuable lessons on the effectiveness of national instrument mixes addressing CO_2 from passenger cars, and as similar schemes could be introduced for other product families beyond transport, assuming financing needs can be addressed. In France, a working group was set up in September 2008 to consider extending the bonus-malus scheme to other product families (e.g. domestic technology such as televisions and computers) and the government confirmed in September 2009 that such an extension is planned. However, given the economic situation and falling purchasing power, the Government did not envisage that this extension of the scheme to other product families would happen in a very near future (La Dépêche, 2009).

With regard to air pollution, important emission reduction targets have been set at Community level which implications for the emissions of pollutants by passenger cars. A Thematic Strategy on Air pollution adopted in 2005 aims inter alia to reduce the concentration of fine particulate matter (PM2.5) by 75 per cent and of ground level ozone by 60 per cent by 2020. This means for example cutting nitrogen oxides (NOx) by 60% and primary PM2.5 by 59% from 2000 levels. In 2008 an ambient air quality Directive[141] which set new air quality objectives for PM2.5 including the limit value and exposure related, was adopted.

A7.1.2 Environmental needs

The adoption of an ambitious and pro-active strategy aiming at reducing the CO_2 from passenger cars originates in the growing political realisation, at EU and at national level that climate change needs to be tackled. The EU has committed itself to achieve at least a 20 per cent reduction of greenhouse gas emissions by 2020 compared to 1990 levels, and up to a 30 per cent reduction compared to 1990 as part of an international agreement. France in its burden sharing agreement, committed to a 0 per cent increase in greenhouse gas emissions by 2012 compared to 1990 levels and is expected to meet this target. Indeed, in 2008, France's greenhouse gas emissions were 6.5 per cent lower than the base year (1990) level.[142]

[137] Regulation 443/2009/EC of the European Parliament and of the Council of 23 April 2009 on setting emission performance standards for cars as part of the Community's integrated approach to reduce CO_2 emissions from light-duty vehicles

[138] These include energy efficiency requirements for air conditioning systems, tyre pressure monitoring systems, low rolling-resistance tyres, gear-shift indicators, mandatory fuel-efficiency targets for light-commercial vehicles, and increased use of biofuels.

[139] **Arrêté du 26 décembre 2007 relatif aux modalités de gestion de l'aide à l'acquisition des véhicules propres:** www.legifrance.gouv.fr/affichTexte.do?cidTexte=JORFTEXT000017764767&dateTexte

[140] **LOI n° 2009-967 du 3 août 2009 de programmation relative à la mise en œuvre du Grenelle de l'environnement**: www.legifrance.gouv.fr/affichTexte.do?cidTexte=JORFTEXT000020949548

[141] Directive 2008/50/EC of on ambient air quality and cleaner air for Europe

[142] EC (2010) Environmental Policy Review : http://ec.europa.eu/environment/policyreview.htm

To meet the CO2 challenges, to avoid market economy distortions, and for the sake of economic and social fairness, all sectors should contribute to the reduction effort, including transport - in 2005, 97 per cent of transport in France still depended on fossil-fuels (IFEN, 2006). Despite significant improvements in vehicle technology, in particular in fuel efficiency, progress in view of the EU objective of reaching an average new car fleet of 120 g CO2/km[143] could have been faster.

Another major problem linked to emission by cars is urban population exposure to air pollutants – exposure to particulates increases the risk of morbidity (e.g. asthma, chronic bronchitis etc.) and early mortality (e.g. via cancer). The related trends have not proven very positive in France over the last few years. A July 2009 report on air quality in France in 2008 and first observations in 2009 showed that while the concentration of certain pollutants had strongly diminished since 2000, the situation for nitrogen oxides (NO_x), ozone and small particles, which can all be linked to emissions by transport, including passenger cars, had not improved. The annual average of concentration of NO_x has diminished since 1997 but tended to stabilise in recent years. As air limit values got more stringent, the number of urban areas with a population of above 100 000 inhabitants where limit values were exceeded have slightly increased every year: 18 in 2008 compared to only 7 in 2000 (Roussel, 2009). In July 2009, France adopted its second National Environment and Health Action Plan for 2009-2013[144]. Among its main objectives is a 30 per cent reduction of fine particles (PM2.5) by 2015.

The underlying drivers of these problems include, inter alia, supply and demand for cars, individual mobility needs, availability of alternative public transport services and the costs of car ownership.

In 2005, 84 per cent of distances were travelled by car in France. The number of personal cars has continued to increase by 1.6 per cent a year between 2001 and 2005. EC Regulation 443/2009/EC had made it rather clear that reductions in CO_2 emissions should be achieved cost-effectively without undermining sustainable mobility and the car industry's competitiveness: Given the importance of cars as a means of transport for a large number and the sector for the French economy, care was given to the introduction of an incentive framework which would not undermine affordable mobility and compromise the competitiveness of the automotive industry.

A7.1.3 Measures to meet environmental needs

In December 2007 France put in place a bonus-malus system, so-called “ecological bonus”, which de facto is also a penalty scheme, designed to induce purchasers of new vehicles to choose a vehicle with a low CO_2 emission rate. The programme was to be applicable until the end of 2012 with a regular reinforcement of the level of eligibility.

The scheme was slightly less stringent in the beginning, and progressively became more stringent over time. Values in the tables below reflect the situation in 2010. A consumer who bought a car with emissions below 130g of CO_2/km benefitted from a bonus (see table A7.1). Bonuses from EUR 100 to EUR 5000 for cars under 125 CO2/ km were distributed. Vehicles under 60 g CO_2/km (electric cars and small vans) benefitted from a EUR 5000 bonus.

Table A7.1 Bonus depending on the CO2 emission (g/km) rate (in 2010, EUR in current prices)

CO2 emission rate (g/km)	Bonus
Rate ≤ 60	EUR 5,000
60 < rate ≤ 95	EUR 1,000
95 ≤ rate < 115	EUR 500
115 ≤ rate < 125	EUR 100

Source: Bredin 2010

[143] Commission’s Impact Assessment accompanying the proposal for Regulation 443/2009/EC
[144] MEEDDM, Deuxième Plan National Santé-Environnement (PNSE-2) 2009-2013 : http://www.ecologie.gouv.fr/IMG/pdf/PNSE_2_OO.pdf

In addition, if a car older than 15 years of age was disposed of and destroyed at the same time as a low emissions vehicle was purchased, the bonus was increased by an additional EUR 300. For cars emitting above 155g CO_2/km the consumer had to pay a malus (see table A7.2) (MEEDDM, 2010).[145]

Table A7.2 Malus depending on the CO2 emission (g/km) rate (in 2010, EUR in current prices)

CO2 emission rate (g/km)	Malus
156 ≤ rate ≤ 160	EUR 200
161 ≤ rate ≤ 195	EUR 750
196 ≤ rate ≤ 245	EUR 1,600
246 ≤ rate	EUR 2,600

Source: Bredin (2010)

In practice, this meant that consumers buying a car emitting between 125g and 155g of CO_2/km were not affected by the scheme in 2010.

On top of the bonus-malus scheme, an additional incentive was introduced in late 2008, as part of the French recovery package: from December 2008 to the end of 2009, car owners who bought a new car emitting less than 160g of CO_2/km and scrapped a car older than 10 years, were to be granted EUR 1000, in addition to the bonus-malus scheme. Under the bonus-malus scheme, car owners who scrapped cars older than 15 years while buying a car emitting less than 130g CO_2/km car were already granted EUR 300. In 2009, 600 000 car owners buying a new car and scrapping their old one benefitted from this additional measure. [146]

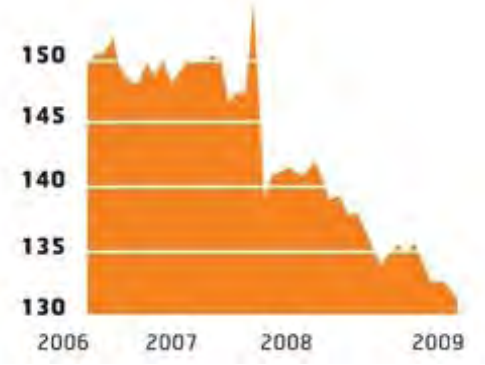
A7.1.4 Costs and benefits of measures

Impact of the scheme on purchasing behaviour

The average rate of CO_2 emissions per kilometre of new cars sold in France fell by 9 g in 2008 compared to an average fall of 1 g per year over the period 2001 and 2007 (Les Echos, 2009b). The share of cleaner vehicles has continuously progressed among the newly registered cars since early 2008. New vehicles emitting less than 130 g/km (and benefitting from the bonus in 2008) went up from 30 per cent of sales in 2007 to 45 per cent in 2008 and 56 per cent in 2009. At the same time, the sales of vehicles emitting more than 160 g (and subject to the malus in 2008) decreased from 24 per cent in 2007 to 14 per cent in 2008 and 9 per cent in 2009 (CGDD, 2010).

[146] Exécution du plan de relance – 3 février 2010 : Chiffres clés – Synthèse : http://www.relance.gouv.fr/IMG/pdf/03.02.10_CHIFFRES_CLES_-_Point_d_etape_du_plan_de_relance.pdf

Figure A7.2 Emissions of newly registered cars in France, 2006-2009 (in g of CO2/km)



Source: French Ministry of Ecology, Sustainable Development, Transport and Housing

After eligibility for the bonus was tightened in 2010 (emissions below 125g of CO_2/km), the cars eligible for the bonus still represented about 50 per cent of vehicles purchased over the 9 first months of 2010 (in 2008 the share represented 44 per cent). The cars for which a malus needs to be paid (emissions above 155 g/km) only represented about 10 per cent of the market, which is 4 per cent less than in 2008 (CGDD, 2010; Bredin, 2010).

Financing needs covered by public authorities

Originally, it was expected that the income generated through the malus would finance the distribution of the bonus. It appears that consumers have been more responsive than had been predicted and that car manufacturers were quick at adapting the models on offer and associated marketing to allow their customers to benefit from the bonus. In addition, the rise of fuel prices throughout 2009 has made buying more fuel efficient cars even more attractive to consumers.

Both in 2009 and 2010, the cost to government (deficit) of the bonus-malus scheme amounted to about EUR 500 million respectively. This is because in 2009 and 2010, the income generated through the malus (about EUR 250 million) was far from compensating for the spending needed to finance the bonus side of the scheme (about EUR 750 million). As a result, the government decided to make the scheme more restrictive starting January 2011 (see Figure 2) (Les Echos, 2010).

In addition to the specific costs of the bonus-malus (and also the scrappage scheme), the government loses fuel tax revenue from the increased efficiency of new vehicles registered. The loss may be a little offset by the “rebound effect” as some drivers of more fuel efficient vehicles may use their cars more as a result of lower fuel costs.

Environmental benefits in 2008 and 2009

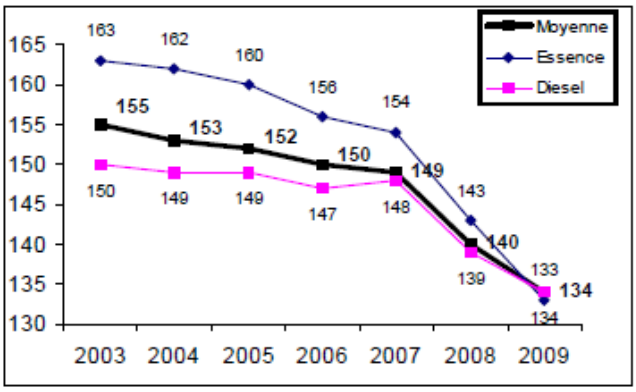
Overall, the environmental benefits (primarily reduction in CO_2 emissions but also air quality improvements in urban areas) and economic benefits (reduced consumption of fuel) compensate for the need for public funding of this measure.

In line with its objectives, the scheme has contributed to a reduction of the CO_2 emitted by newly registered cars in France. The annual fall of emissions of new vehicles was 9.2 gCO2/km between 2007 and 2008 and 6.3 g/CO2 between 2008 and 2009, while it amounted to 1 or 2 g of CO2/km saving per year in the period prior to the introduction of the scheme (see Figure 4) (CGDD, 2010). As a simple calculation of benefits to demonstrate the scale of the benefits - had the average specific CO2 emissions reduction trend of around 1 g/km per year for the period 2003 to 2007 continued to 2009, emissions would have been around 146 g/km on average for new registrations, or 12g/km higher that they were in reality in 2009 (8.5 g higher in 2008). With approximately registrations of 1.9 million in 2008 and 2 million in 2009 (ACEA, 2009), and assuming that annual vehicle kilometres are 14000 km (IEEP et al, 2005) and with an average lifetime of 12.5 years lifetime vehicle km are 175,000 per vehicle, this would lead to 2.1 tonnes of CO_2 savings per vehicle over the lifetime related to purchases in 2009 (1.5 tCO2/vehicle in 2008); this gives total

CO_2 savings as 4.2 mt CO2 for the 2009 period (2.8 mt CO2 2008 period). Part of this is due to the bonus-malus and associated scrappage scheme, and part is due to the wider economic context of the economic crisis (see also Box below for the French assessment).

With regard to social savings, assuming an average consumption of 6 lt/100km (approximate consumption of a car emitting 145 CO2 g/km (Douaud, 2010)), owners would on average see a lifetime fuel bill saving of 9 per cent for vehicles bought in 2009 (6 per cent in 2008), which is equivalent to approximately 1400 EUR for 2009 (950 EUR for 2008) with an average fuel price of 1.5 EUR/lt[147].

Figure A7.3 Average emissions of new vehicles registered in France since 2003, in gCO2/km



It should however be highlighted that the fall in fuel consumption and associated emissions fall can only partly be attributed to the scheme, although it did most certainly influence consumers' purchasing behaviour. The continuous rise in fuel prices over the 2008-2009 period as well as the economic crises which started mid-2008 has also influenced consumer's demand for vehicles consuming less fuel. An assessment by the French Ministry of the Environment has therefore compared the increase in the share of low CO_2 emitting vehicles with that of other European Member States where the structural context over this period was similar. In the EU-15 countries (excluding France) the observed fall of average emissions was about 3 per cent a year between 2007 and 2008. This needs to be compared to the of 6 per cent/year fall on average in France over the same period. Beyond simply increasing the share of cleaner cars purchased in France the bonus-malus sheme has stimulated innovation and is expected to make it even easier for French car producers to meet the target of the European Regulation which is set at average emissions per producer of 130 g CO2/km.

Hence, the bonus-malus scheme, which has required important levels of public funding, has resulted in benefits in terms of reduced greenhouse gas emissions, reduced emissions of local air pollutants, reduced fuel consumption and savings for the consumers.

Box 1: Government analysis of the costs/benefits of the scheme

In monetary terms, taking into account all costs (both accruing to economic agents and to public authorities) resulting from the bonus-malus scheme, the balance is positive both in 2008 (EUR 158 million) and 2009 (EUR 276 million). The gain of the scheme resulting from the fall in fuel consumption of the car fleet in terms of avoided CO_2 emissions was estimated at 1.9 million tonnes of CO2 ($MtCO_2$) in 2008 and 3 $MtCO_2$ in 2009. The monetary values attached to these gains are respectively EUR 69 million in 2008 and EUR 108 million in 2009.

This suggests that the cost of CO_2 emissions reduction to government from this instrument was around 36 EUR/tCO_2. This is the same order of magnitude to the guidance value for the price of carbon of EUR 32/tCO_2 and somewhat more than the ETS trading price of about EUR 15/tCO_2 in late 2010.

[147] www.developpement-durable.gouv.fr/energie/petrole/se_cons_fr.htm

The slightly lower values for the CO_2 savings in this study reflect, inter alia, that structural conditions to the economy were taken into account to avoid the effect of the crisis being seen as an effect of the bonus-malus scheme.

Benefits of the bonus-malus to consumers

Car owners benefit from the bonus-malus / scappage scheme due to incentives to lower purchase costs, lower fuel bills and also some incentives as regards registration and circulation taxes. There had been expectations that vehicle manufacturer production costs and hence purchase costs to consumers would rise under additional efficiency requirements. An early study estimated that cost of meeting a 120g/km target would lead to additional 500 to 700 EUR/vehicle to manufacturer and 1200EUR/vehicle to consumers (including margins and taxes) in 2005 (IEEP et al, 2005). A late 2006 study, estimated costs to manufacturers rising by 1700 EUR/vehicle and consumer retail prices by on average 2450EUR/vehicle (TNO et al, 2006). In the current economic crisis, and given the additional bonus-malus and scrappage scheme, there is no evidence of a pass through of costs to most consumers in France.

Social and environmental costs

A hard to evaluate rebound effect needs also to be taken into account in the overall equation which suggests that the fall in fuel consumption resulting from the more economical vehicles also reduces the cost of their use and results in an increase in traffic. The associated increases in fuel use however remain much below the fuel savings resulting from the scheme. A tentative assessment suggests that this additional traffic has a negative social impact as it generates costs of about EUR 0.09/km (costs resulting for example from increased likelihood of traffic traffic jams, noise etc.). Thus, the social costs of the rebound effect have been estimated to be EUR 108 million in 2008 and EUR 178 million in 2009 (CGDD, 2010). Parallel introduction of higher fuel prices could compensate for the rebound effect by contributing to a stabilisation of vehicle use.

A7.1.5 Conclusion

The introduction of the French bonus-malus scheme has underpinned the process and accelerated the pace with which France has moved towards achieving targets set at Community level in the areas of CO_2 emissions from passenger cars and reduction of air pollutant concentrations in urban areas, including PM2.5 and NOx. Given The introduction of the bonus-malus scheme in France at a time where fuel prices were on the rise and vehicles consuming less fuel and emitting less CO_2 arrived on the market has resulted in the scheme succeeding to reduce the average CO_2 and air pollutant emissions of passenger cars in France beyond expectations. This has resulted in fairly high costs to the public authorities which, basing the level of the bonus-malus scheme on erroneous assumptions with regard to the degree to which consumers would modify their purchasing behaviour had to use public money to compensate for the deficit of the scheme. The fall in tax revenues associated with fuel consumption can also be considered an additional cost of this measure to the public authorities. The scheme achieves multiple ranging from the savings associated with reduced fuel consumption for purchasers of the new vehicles to the environmental benefits associated with reduced emissions of CO_2 and air pollutants. The scale of these benefits suggests that that the bonus-malus has been an effective and worthwhile measure and overall positive. This in particularly the case were the scope for a rebound effect is limited, which will be very much dependent on the product to which a bonus-malus scheme is applied. Fine-tuning the scheme in the light of income generated by the malus and expenses due to the bonus can also reduce the cost to the public sector. With regard to costs to manufacturers, the market success of the low emission vehicles more than compensate for the initial investments in research and innovation.

A7.1.6 Implementation of the Habitats and Birds Directives in Belgium (Flanders)

At the heart of the EU's conservation policy framework are Council Directive 2009/147/EC[148] on the conservation of wild birds (Birds Directive), adopted in 1979, and Council Directive 92/43/EEC[149] on the conservation of natural habitats and of wild fauna and flora (Habitats Directive), adopted in 1992. Both Directives require the establishment of a coherent network of protected areas that is designed to safeguard the habitats and species considered to be of Community interest[150] – the Natura 2000 network.

The establishment of the terrestrial Natura 2000 network is nearly completed, and according to the most recent data it consists of roughly 26,000 sites and covers almost 18 per cent of the EU territory (EEA, 2010). Under Article 17 of the Habitats Directive, Member States are obliged to report every six years on their progress in implementing the Directive and on the status of habitats and species of Community interest. The systematic assessment covering the reporting period 2001 to 2006[151] concluded that only 17 per cent of the habitats and species of Community interest as were found to be in 'favourable' condition, though this is quite variable across the regions.

Consequently, an increasing amount of attention is now being given to effective protection, management and restoration of Natura 2000 sites. Key priorities will be the formal designation by Member States, the setting of conservation objectives and the putting in place of adequate management measures for the achievement of favourable conservation status. Though significant additional marine areas have been added to the network in recent years, the key focus will remain on finalising the list of marine Natura 2000 sites and subsequently shift to effective protection and management.

Considering the status, scale, scope and diversity of Natura 2000 sites within the network and the large number of land uses, stakeholders and economic activities that are either directly or indirectly affected by Natura 2000, the correct and effective implementation of management measures pose a real challenge for all concerned. In particular, it will be crucial to guarantee adequate funding necessary for these management activities.

A7.1.7 Environmental needs

Belgium is one of the most densely populated areas in Europe, resulting in widespread pressure on environmental quality and natural areas particularly due to pollution and habitat fragmentation. In the Member State the average size of contiguous land units not cut through by major transport infrastructure is currently not more than 20 km² (EU average is 130 km²)[152], leading to highly fragmented and isolated natural areas and major impacts on biodiversity. Flanders, one of Belgium's three main regions besides Wallonia and Brussels, has a density of 452 inhabitants/km^2. According to an assessment of the region's biodiversity targets[153], the indicator on connectivity/fragmentation of terrestrial ecosystems demonstrates that Flanders is not on course to

[148] Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds. OJ L 20, 26.1.2010

[149] Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora. OJ L 206, 22.7.1992

[150] According to Article I of the Habitats Directive, this refers to habitat types which are 'in danger of disappearance in their natural range; have a small natural range following their regression or by reason of their intrinsically restricted area; or present outstanding examples of typical characteristics of one or more of the nine biogeographical regions' (Annex I). It includes species which are considered 'endangered, vulnerable, rare or endemic'(Annex II and/or Annex IV or V). According to Article 4 of the Birds Directive, this includes bird species in danger of extinction; vulnerable to specific changes in their habitat; or species considered rare because of small populations or restricted local distribution (Annex I).

[151] COM(2009) 358 final. Composite Report on the Conservation Status of Habitat Types and Species as required under Article 17 of the Habitats Directive. Brussels

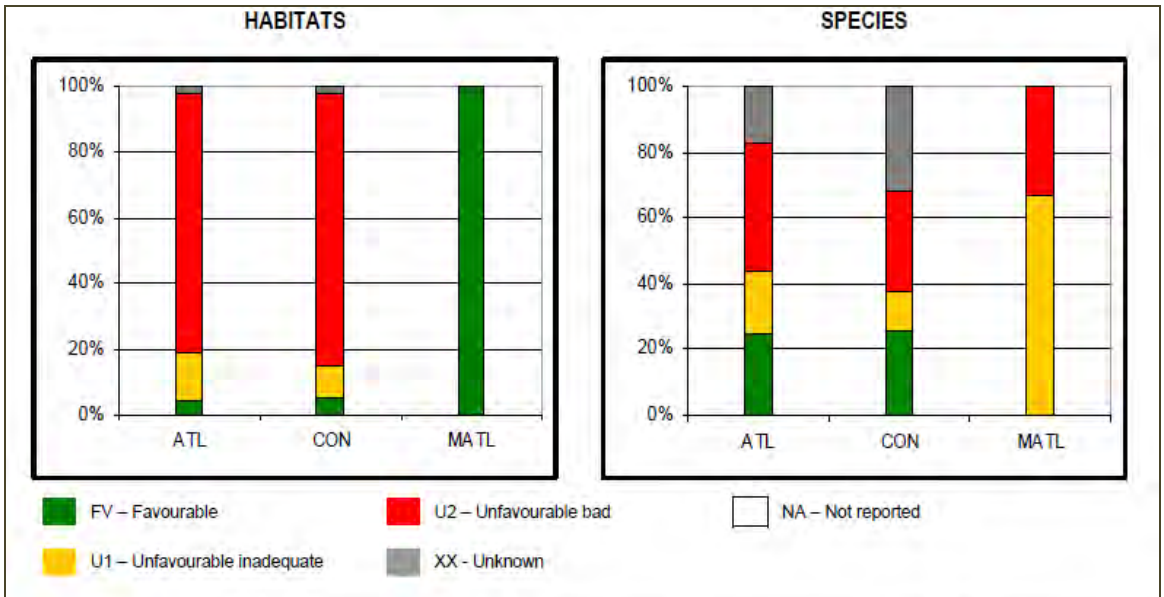
[152] EEA-ETC/LC, Proximity of transport infrastructures to designated nature areas / Fragmentation http://www.eea.europa.eu/publications/ENVISSUENo12/page010.html (last accessed 24 November 2010)

[153] INBO (2010)

reach its target of reducing the proportion of barriers for migratory fish species and improve the connectivity of its rivers, though restoration measures on a network of rivers in recent years showed some improvement. In addition to the continuing fragmentation and loss of habitats, threats such as invasive alien species continue to persist. Though positive developments such as reduced critical load exceedance for nitrogen and a reduced risk of eutrophication of ecosystems have occurred, these are not yet reflected in the status of Belgium's habitats and species.

According to national reporting under Article 17 of the Habitats Directive[154], terrestrial habitats of Community interest in Belgium (including Flanders, Wallonia and Brussels Region) generally had an unfavourable conservation status (with 79 per cent of the Atlantic and 83 per cent of the Continental region rated as 'unfavourable bad'), whereas the one site in the Marine Atlantic region was generally in favourable status (see Figure A7.4).

Figure A7.4 Overall assessment of conservation status in Belgium by biogeographical region (%)



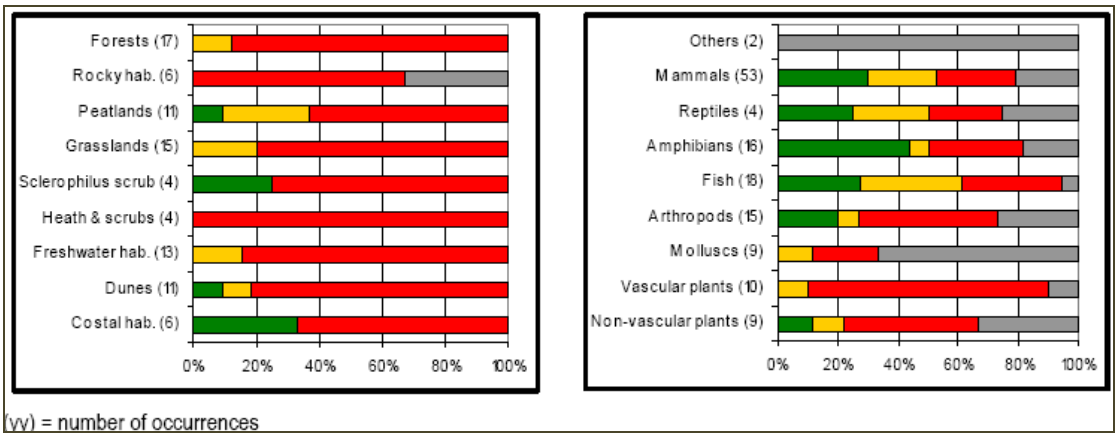
Region / Conclusion	HABITATS					SPECIES				
	FV	U1	U2	XX	NA	FV	U1	U2	XX	NA
Atlantic	4	15	79	2		25	19	39	17	
Continental	5	10	83	3		26	12	30	32	
Marine Atlantic	100						67	33		
Member State	**6**	**13**	**79**	**2**		**24**	**18**	**34**	**24**	

Source: EEA/ETC, Art. 17 Report 2001-2006, National Summaries

Forests and freshwater habitats are particularly under threat in the Member State. Vascular plants represent those species of Community interest in exceptionally bad condition, followed by non-vascular plants and arthropods (see Figure A7.5).

[154] EEA/ETC on Biological Diversity – Reporting under Article 17 Habitats Directive 2001-2006 - National Summaries http://circa.europa.eu/Public/irc/env/monnat/library?l=/habitats_reporting/reporting_2001-2007/ms-reports_summaries

Figure A7.5 Overall assessment of conservation status in Belgium by habitat category/species group (%)



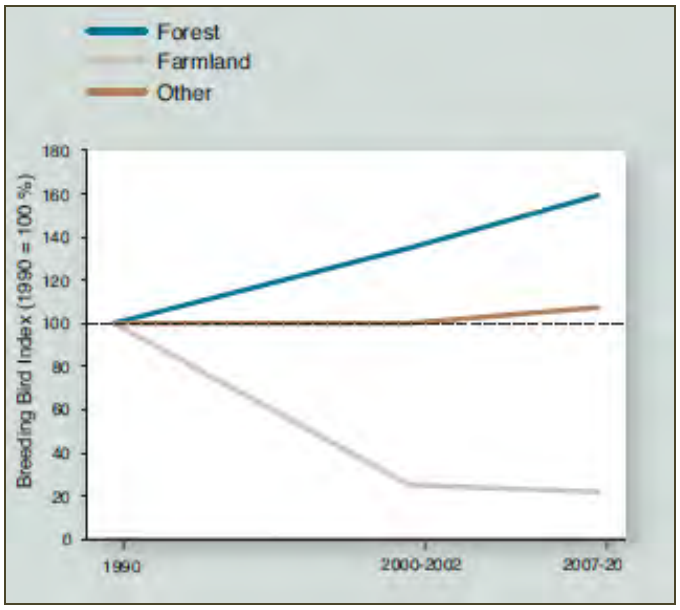
Source: ETC, Art. 17 Report 2001-2006, National Summaries

http://circa.europa.eu/Public/irc/env/monnat/library?l=/habitats_reporting/reporting_2001-2007/ms-reports_summaries&vm=detailed&sb=Title

With regard to the conservation of biodiversity in the wider Flemish countryside, trends in the abundance of woodland, farmland and common birds (see Figure A7.6) and abundance of selected grassland butterflies give an indication of its status[155]. According to the related indicator on common bird species, farmland birds faced a heavy decline since the 1990 baseline, though the negative trend visibly slowed down since the 2000 to 2002 reference period. On the other hand, the status of forest bird species has markedly and steadily improved over the last two centuries. The aggregated common grassland butterfly index, including the five common species Meadow Brown (*Maniola jurtina*), Large Skipper (*Ochlodes faunus*), Common Blue (*Polyommatus icarus*), Small Copper (*Lycaena phlaeas*) and Orange Tip (*Anthocharis cardamines*), has strongly fluctuated since its base year in 1992, with a peak in 2004 due to a strong recovery of Small Copper, while populations of other common butterfly species remained rather stable or showed slight improvements.

Figure A7.6 Trends in the abundance of woodland and farmland common birds in Flanders

[155] INBO (2010)



Source: SOVON, BTO, Vansteenwegen (2006), Vermeersch et al. (2004) within INBO (2010)

The figures above suggest that the status of biodiversity in Belgium (focussing on Flanders in particular) is still under serious threat, despite some improvement in areas such as the conservation of common forest birds and common butterfly species. It is yet difficult to assess progress on the implementation of the Habitats and Birds Directive and its effectiveness in conserving and restoring habitats and species of Community interest, since the 2001 to 2006 assessment was the first of its kind and thus a first time series will only be available when the next assessment will be published in 2014/2015. However, more recent analysis (Decleer, 2008) shows that in the Flemish region 22 per cent of sites designated under the Habitats Directive and 40 per cent of those sites protected under the Birds Directive were still under intensive agricultural use in 2008.

However, Belgium is also known to have put in place a range of instruments to address the challenge of biodiversity loss and ensure the achievement of the objectives of the two nature Directives. The country's way forward and interesting perspectives on how it differs from the implementation of the two Directives in other EU Member States are presented in the next section.

A7.1.8 Measures addressing environmental needs

In Belgium the responsibilities for nature conservation and consequently the designation of sites under the Habitats and Birds Directives are shared between the three regions of Flanders, Wallonia and Brussels-Capital, with the exception of the marine environment, which is regulated at the federal level.

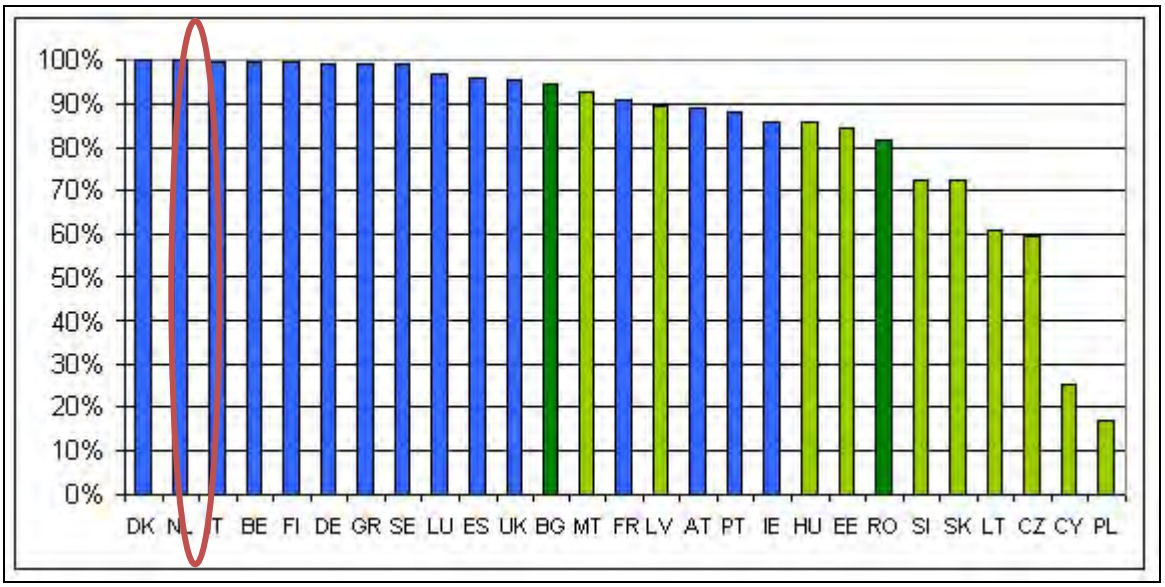
As of July 2009, Belgium designated 280 Sites of Community Importance (SCI) under the Habitats Directive, with a total area of 3,269 km² and amounting to 10.1 per cent of the country's terrestrial area. The only marine SCI comprised an area of 181 km², whereas the number of marine Special Protection Areas (SPAs) under Birds Directive amounted to 3 with an area of 306 km². The number of SPAs was 234 with a total area of 3,282 km², representing 8.7 per cent of the country's terrestrial area[156]. The figures show that the total national area of Belgium covered by SCIs and SPAs is comparatively small compared to other EU Member States such as Slovenia (31.3 per cent and 23 per cent) or Spain (25.5 per cent and 24.6 per cent)[157], but similar to other densely

[156] COM(2010) 548 final. Report from the Commission to the Council and the European Parliament - The 2010 Assessment of implementing the EU Biodiversity Action Plan and accompanying country profiles http://ec.europa.eu/environment/nature/biodiversity/comm2006/bap_2010.htm

[157] EC (2010). Natura 2000 Barometer May 2010 http://ec.europa.eu/environment/nature/natura2000/barometer/index_en.htm (last accessed 1 December 2010)

populated areas such as the Netherlands or Germany. In June 2008, Belgium was considered to have achieved 99.6 per cent of sufficiency in terms of the list of terrestrial protected areas under the Habitats Directive (see Figure A7.7). Also the list of Special Protection Areas (SPAs) was considered largely complete.

Figure A7.7 Distance to target: State of progress by Member States in reaching sufficiency for the Habitat Directive Annex I habitats and Annex II species.



Source: EC Natura 2000 Barometer. DG ENV, EU27, marine area excluded, June 2008
http://ec.europa.eu/environment/nature/natura2000/barometer/index_en.htm

According to recent reporting by Belgium[158], only 5.7 per cent of all Natura 2000 sites have a management plan completed to determine activities needed to reach the objectives of the two nature Directives. However, around 84 per cent of Natura 2000 sites have a management plan in preparation. Flanders iterates that though the number of management plans seems to be quite small the total surface of Natura 2000 with a management action plan covers already 20.3 per cent of Natura 2000 in the region. In addition, all marine Natura 2000 sites (SCI and SPAs) have a management in place. The development of management plans is not an explicit requirement under the Habitats Directive, but is recognised by the European Commission as a valuable tool towards achieving the conservation objectives of sites. Although countries such as Sweden, UK, Cyprus, France and Portugal have specified that more than 50 per cent of Natura 2000 sites have a

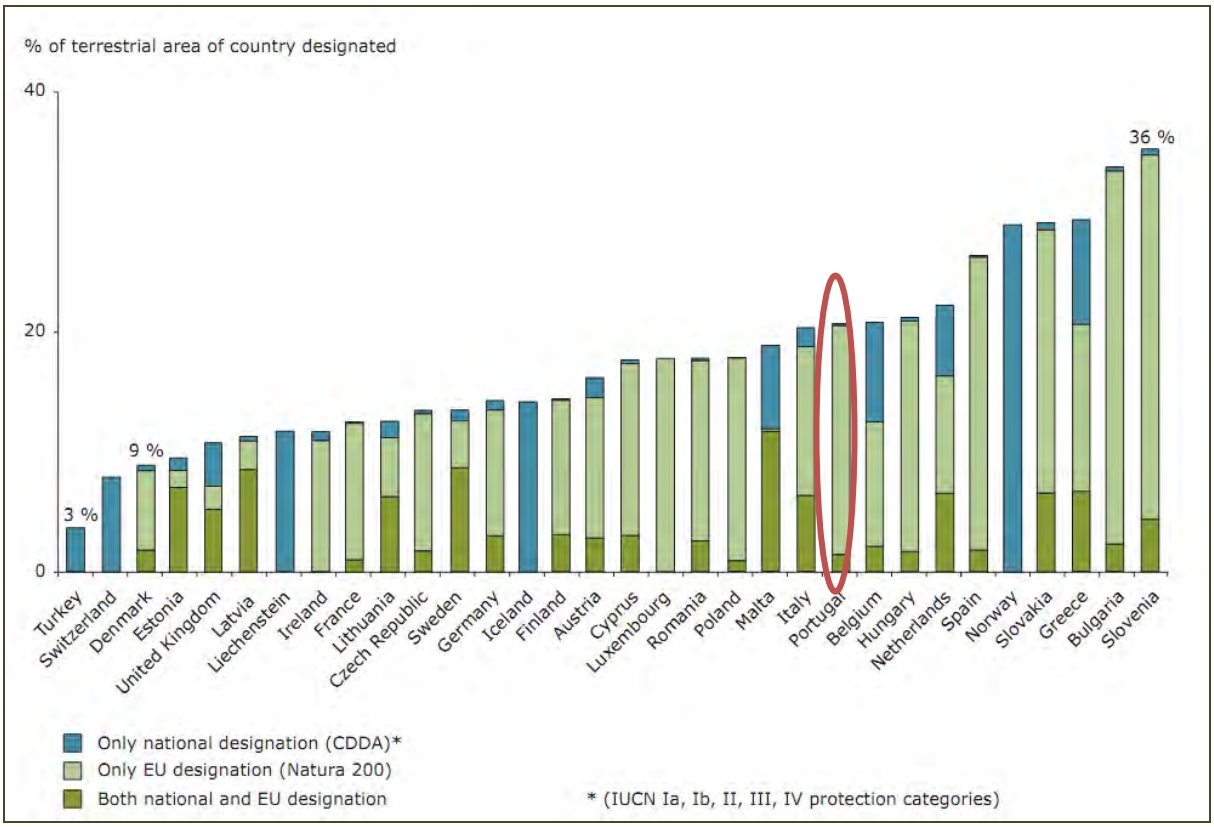
[158] COM(2010) 548 final. Report from the Commission to the Council and the European Parliament - The 2010 Assessment of implementing the EU Biodiversity Action Plan and accompanying country profiles
http://ec.europa.eu/environment/nature/biodiversity/comm2006/bap_2010.htm

management plan completed (five out of 21 responding Member States), Belgium is one of just five countries that have more than 50 per cent in preparation.

Article 10 of the Habitats Directive encourages the conservation of landscape features, to support the ecological connectivity of the Natura 2000 network, for example through land-use planning and development policies. In 1997, the Flemish Government published its Nature Decree and a Flemish Spatial Structure Plan including the obligation to designate a 'Flemish Ecological Network' in order to counter the tendency of small and fragmented 'green' spatial planning areas. In 2009, around 70 per cent of the envisaged 125,000 ha of the Flemish Ecological Network were formally designated (IEEP and Alterra, 2010).

Figure A7.8 shows the percentage of terrestrial area covered by national, EU or multiple forms of designation. Compared to other EU Member States, Belgium has a rather high level of nationally designated protected areas.

Figure A7.8 Percentage of terrestrial protected areas in EU-27



Source: EEA 2010. The European environment — state and outlook 2010 (SOER 2010). Biodiversity. http://www.eea.europa.eu/soer/europe/biodiversity

Considering the unfavourable status of biodiversity in Belgium, the Flemish region in particular has increasingly focused on restoration measures as part of its activities to meet the objectives of the nature Directives and the establishment of a coherent ecological network. In particular since the 1990s the (surface) area of ecological restoration projects[159] has strongly increased, amounting to 3,100 ha scattered over 540 locations in 2004. Related projects are usually of small scale, though there has been a recent trend towards larger projects due to increased funding provided by the EU

[159] Specific once-only measures to transform cultural biotopes to a more natural state with a larger value of biodiversity.

LIFE instrument (Decleer, 2008). Related financing stimulus packages supported ambitious restoration measures, according to the Research Institute for Nature and Forest (INBO). Other instruments used for ecological restoration of sites include the acquisition of land for the creation of nature reserves, as the Flemish Regional Authority (ANB) has the first opportunity to buy areas located within the Flemish Ecological Network (right of pre-emption). This practice is, however, rather rare due to difficulties in finding an agreement on the price between landowners and public authorities. However, ecological restoration is often co-financed in the context of large public works such as port development or the design of flood control areas. In addition, schemes for land development and land development for nature, supervised by the Land Development division of the Flemish Land Agency (VLM), are also increasingly used for ecological restoration in Flanders.

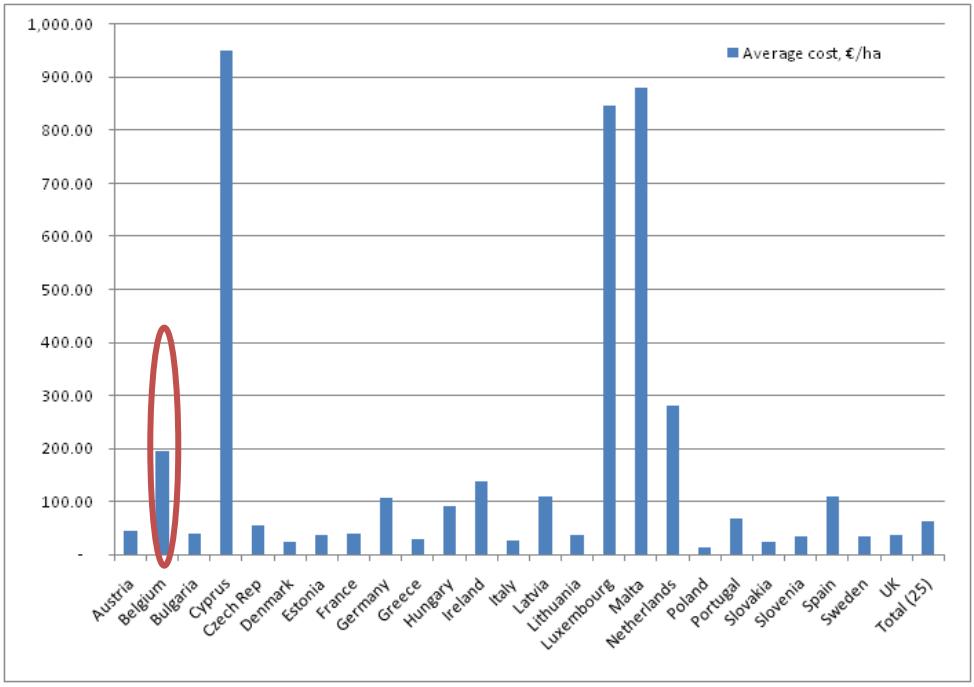
Belgium cannot be considered to be a forerunner regarding the extent of national area covered by Natura 2000 or the status of habitats and species of Community interest. However, over the last couple of years, the Flemish Region in particular, has undertaken substantial restoration projects to achieve the objectives of the Habitats and Birds Directives and improve the coherence of protected area network across the region. An increased amount of large-scale projects and the application of a range of instruments to achieve its objectives distinguish the region from other similarly densely populated countries and requiring major efforts to improve the conservation status of habitats and species of Community interest. The following section provides insights on some of the costs of Flanders's conservation and restoration measures as well as some case examples on resulting socio-economic benefits.

A7.1.9 Costs and benefits of improved measures

In the context of a recent report on the costs and benefits associated with the Natura 2000 network Gantioler et al, 2010), Belgium submitted an estimate of the costs involved in establishing the network along with 24 other Member States. The information builds on questionnaires sent to all Member States asking for information on one-off (e.g., finalisation of sites, infrastructure for restoration, land purchase and compensation) and recurrent costs (e.g., habitats management and monitoring, and management bodies) associated with Natura 2000. In the case of Belgium, the data submitted build on effectively planned and draft budgeted expenditures.

The report estimated the average cost of implementing the network at €63.4 per hectare per year (ha/yr), across the 25 responding Member States. This includes averaged recurrent costs of €42.6/ha/yr and one-off costs of €20.8/ha/yr. Compared to these figures, Belgium per hectare costs are relatively high, amounting to €195/ha/yr. Average per hectare costs are also high in other similarly densely populated areas such as Germany (107.35/ha/yr) and the Netherlands (281/ha/yr). These results underline the fact that population density tends to increase costs due to increased pressure on the site (e.g., from their proximity to urban areas). In highly populated areas the network of protected sites can be highly scattered and consist of small sites, which is likely to further increase the costs compared to larger and less scattered sites. In addition, the income (e.g. GDP, reflecting wages and land costs) can further affect the total amount of costs associated with the implementation and management of the network. Several of those factors are likely to apply to Belgium.

Figure A7.9 Average cost per hectare (EUR)



Source: Gantioler et al. (2010)

A more detailed look at Belgium's estimates shows that one-off management costs are relatively high compared to other Member States, especially regarding envisaged costs for land purchase and infrastructure development. The latter includes funding budgeted for a range of envisaged restoration projects.

Cost estimates related to Belgium's marine sites are not included. The authors of the study noted that inclusion of marine areas would reduce per hectare cost estimates and significantly depress mean per hectare costs for Member States with a large area of marine sites. Belgium estimated one-off costs amounting to €40,000 and annual recurrent costs to €195,000 for 3 marine SACs and one marine SPA covering a total of 4.75 million hectares.

On the benefits side, no overall monetary valuation of the Natura 2000 network compared to the costs has yet been carried in Belgium. However, several studies are available on the socio-economic benefits associated with Flemish Natura 2000 sites due to the increasing interest in the region in gaining a better understanding of the economic value of investing in the ecological restoration of habitats and species. To outline the potential economic benefits from restoration measures, one of those studies is presented in more detail below.

Ecological restoration in the Scheldt estuary

The study carried out by the University of Antwerp and VITO[160] essentially aimed at developing a methodology to define conservation objectives (COs) that allow a more strategic, integrated and sustainable approach to decision making, at the same time meeting the overall objectives of the Birds and Habitats Directives. The study area includes the Scheldt estuary, which with a length of 160 km flowing from Gent in Flanders to Vlissingen in the Netherlands is one the largest European estuaries with a complete salinity gradient tidal marine and brackish to fresh water habitats. These habitats include mudflats and marshes, deep water with natural shores, wet meadows, reedmarshes and alluvial forests. The estuary, both in the Netherlands and Flanders, includes a range of sites protected by the Birds and Habitats Directive. At the same time, the estuary faces threats such as the development of major infrastructural works to deepen the channel to the harbour of Antwerp, and the Sigmaplan for flood protection.

[160] De Nocker et al. (not dated) and Resource Analysis, IMDC, VITO, University of Antwerp

In the first step, the study team defined population targets and translated those to a surface of habitat needed, based upon data on the number and trends of different features and species, and upon knowledge of their habitat selection and densities. Secondly, the authors defined the desired and required degree of ecosystem services to be provided by the analysed system. This included, for example, the definition of the amount of water that needs to be stored during storm tides in order to reduce the risk of flooding. The volume was translated into the surface of flood control area needed, according to hydrodynamic models and politically agreed levels of safety. In addition, the surface of tidal marshes necessary to provide a significant nitrogen sink was calculated in order to determine the reduced nutrient load towards the coastal sea. Also targets were set for several environmental parameters (e.g. water and soil quality) in order to take the importance of habitat quality into account. The range of information was included in the definition of COs for the estuary, described both in terms of species population sizes and in terms of the amount of ecosystem services required for a sustainable development.

In a third step, a cost-benefit analysis was carried out to compare the overall economic benefits of an integrated plan versus sectoral plans. The analysis took two approaches to floodplain development into account: controlled inundation areas and reduced tidal areas. In addition, options such as the development of storm barriers and dike heightening were taken into account. The results are presented inTable A7.3 below.

Table A7.3 Different alternatives for flood protection in the cost benefit analysis (phase 1: different measures phase 2 optimalisation)

Phase	**1**					**2**
Measurements	Storm surge barrier	Over-schelde	Dykes (*340km*)	Floodplains (*CIA*, *1800 ha*)	Floodplains (*RTA, 1800 ha)*	Floodplains (*1325 ha)* + dykes (*24 km*)
Investment and maintenance costs	387	1.597	241	140	151	132
Loss of agriculture				16	19	12
Flood protection benefits	727	759	691	648	648	737
Ecological benefits				8	56	9
Other impacts: - shipping - visual intrusion	-1			-3	-3	-5
Total net benefits	339	-837	451	498	530	596
Payback period (years)	**41**	***I***	**27**	**17**	**14**	**14**

Figures are net present values in million EUR 2004, based on central estimates for economic growth and discounting (4per cent). Non-use values for nature development are not included in the figures.

Source: De Nocker et al. (not dated), and Resource Analysis, IMDC, VITO, University of Antwerp

According to the authors, the results of the cost-benefit analysis demonstrate that an intelligent combination of different measures such as dykes and floodplains can offer higher benefits at lower costs compared to more intensive man-made measures such as a huge barriers near Antwerp. The hydrodynamic modelling also indicated that floodplains are necessary to ensure safety levels in the longer term in the Scheldt basin. According to the study, dike heightening causes a shift in flooded areas which was not considered sufficient in importantly reducing flood risk over a longer period of time. Additionally, results showed that the benefits of the controlled reduced tidal areas (RTA) mostly exceed the benefits of the controlled inundation area (CIA) with agricultural use.

However, it needs to be emphasised that non-use values, i.e. values that beneficiaries attribute to an ecosystem related to its existence, have not been taken into account in the analysis. Those can be substantial as studies such as on the costs and benefits of Natura 2000 in Scotland have proved (Jacobs 2004). In addition, ecological benefits related to nutrient removal and sediment control clearly are smaller in the combined version of floodplains and dykes. This emphasises the need to make evident the range of considerations taken into account in such an analysis as well as potential caveats in order to guarantee informed decision-making.

Based on the findings of the study, the Dutch and Flemish governments approved the integrated management plan consisting of the restoration of approximately 2500 ha of intertidal and 3000 ha

of non-tidal areas, the reinforcement of dikes and the necessary dredging to improve the shipping channels to Antwerp.

A7.1.10 Conclusion

Belgium, as all EU Member States, faces serious threats to the conservation of its biodiversity due to impacts from increased habitat fragmentation and loss, land use intensification, invasive alien species and climate change. The status of the country's habitats and species of Community interest is particularly bleak due to the high pressure of often competing demands in one of Europe's most densely populated areas.

The Member State has been more or less successful in implementing its national network of Natura 2000 sites and related management plans, though it is not at the fore regarding its extent and progress in defining conservation objectives. Nevertheless, Belgium has developed a series of policy instruments to allow it to meet the objectives of the Habitats and Birds Directives of conserving and restoring Europe's natural heritage.

Over the last couple of years the Flemish Region in particular, but not exclusively, has undertaken substantial restoration projects to achieve the objectives of the nature Directives and improve the coherence of protected areas across the region. Determining the cost-effectiveness of these restoration measures in addressing multiple demands became of increasing interest. A series of studies were thus commissioned to determine the socio-economic benefits of restoration approaches, including the one presented on the Scheldt estuary.

The Scheldt study showed that approaches combining ecological restoration and socio-economic development can be effective strategies in addressing the objectives of the two nature Directives in areas with multiple demands, by simultaneously delivering cost-effective natural solutions through the conservation and restoration of ecosystem services. The Scheldt estuary was subject to a range of impacts from human activities which led to major deterioration and destruction of important habitats and the disappearance of species and related ecosystem functions. The project aimed to define an approach that integrates socio-economic growth and ecosystem restoration, and helps to improve the resilience of the region against natural hazards such as the increased risk of flooding. The study has proven the cost-effectiveness of such an approach, and highlighted the range of benefits provided. It also emphasised the importance of consultation and collaboration of different partners (Decleer, 2008). in order to progress from conflicts to win-win situations.

A7.2 Implementation of species specific conservation measures (UK)

The landscape of the EU is the most heavily altered in the world and has long been shaped by human activities, in particular agriculture and forestry. The intensification of these activities has been to the detriment of its native species and ecosystems, and the pressures on biodiversity have increased significantly over the past 60 years. The failure of the EU to meet its 2010 target to halt the loss of biodiversity is symptomatic of the difficulty in tackling the underlying drivers of biodiversity loss (COM(2010)4). However, through the actions of the EU, national governments and civil society groups, significant efforts are being made to reverse the negative trends and the EU now has the most comprehensive network of protected areas in the world, and is host to numerous examples of successful conservation programmes. The UK is a good example of a country where there have been some impressive conservation successes, despite the country as whole failing to meet the 2010 biodiversity target, and these can serve as useful case studies for other nations, particularly new Member States.

A7.2.1 Environmental needs

The British countryside has had mixed history of conservation and persecution of wildlife. Early gamekeepers ensured patches of wild areas and forest have been well managed to ensure the presence of game species to the benefit of many other species. Britain is also home to some of the first civil society groups founded for the protection of nature, such as the RSPB, which was founded in 1889, and has a strong voluntary sector which contributes substantially to wildlife conservation, research and monitoring. However, with a relatively high population density, the UK landscape has long been dominated by agriculture which has altered the suite of species present in many parts of the countryside. The change in land use patterns associated with agriculture as well as persecution of species considered threatening to agricultural practices has led to numerous national extinctions of charismatic species such as Wolf (*Canis lupus lupus*), Boar (*Sus scrofa*) and White-Tailed Eagle (*Haliaeetus albicilla*) and local extinctions such as Red Kite (*Milvus milvus*).

However, since WWII, the British countryside has seen dramatic and swift changes in the agricultural practices which have severely impacted the status of many once common UK species over the past 60 years (see Maclean, 2010). These changes include a move to intensive farming methods (which have led to changes in the habitat and food available to farmland species), pressure on water quality (through increased use of fertilisers and pesticides, including organochlorines) and destruction of habitat (such as the drainage of wetlands and increased non-native forestry). This rapid change in land use has had a significant impact on many species' status. Most notably, there have been dramatic reductions in farmland birds such as the Corncrake (*Crex crex*), the Grey Partridge (*Perdix perdix*), and the Cirl Bunting (*Emberiza cirlus*) due to changing agricultural practices. Other species have been indirectly affected by agricultural practices (e.g. the Otter, *Lutra lutra*).

A7.2.2 Measures addressing environmental needs

The response to the loss of biodiversity in the UK has come through a combination of public and third sector intervention. The National Park and Access to the Countryside Act of 1949 led to the designation of sites for nature conservation (i.e. Sites of Special Scientific Interest and National Nature Reserves) and areas to improve the access to nature for society through the designation of National Parks and Areas of Outstanding Natural Beauty. While this has helped protect and conserve some important areas of high biodiversity value, many sites have been degraded, primarily through insufficient or inadequate management. There have also been widespread losses of species in the wider countryside.

Tackling species loss in the wider countryside provides a particular set of challenges given the complexity of specific habitat requirements. Therefore, in addition to protecting vulnerable habitat groups, more targeted and species-specific measures have been deemed necessary to halt the loss of the most threatened species.

Increased powers were granted under the Wildlife and Countryside Act 1981, which provided the legislative authority for ensuring the protection of wild animals.[161] The Act implemented the Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention) and the Council Directive 1979/409/EEC[162] on the conservation of wild birds (Birds Directive) listing the wild animals to be afforded protection and the necessary enforcement provisions. In England and Wales, enforcement provisions were amended and extended by the Countryside Rights of Access Act (2000).

Following the adoption of the Convention of Biological Diversity which called for implementation of national biodiversity and action plans, the UK government produced the UK Biodiversity Action Plan[163] in 1994 which detailed its approach to conserving species and habitats. The implementation of the plan is focussed around a series of individual Species Action Plans (SAPs) and Habitat Action Plans (HAPs) which specify targets for the conservation of species and habitats, and the actions required to meet them. Selection of the original list was carried out by expert working groups based on criteria including identification of species of international importance, in rapid decline and of high risk. Following a review in 2007, the species priority list doubled to 1,150. Between 1995 and 1999, 436 action plans (391 SAPs and 45 HAPs) were produced. The EU Biodiversity Action Plan (COM(2006)216 final) appears to have had little impact on UK biodiversity conservation policy, possibly as many of the actions were already underway.

Alongside these measures there have been ongoing conservation programmes that have been separate from central policy strategy but have nonetheless become valuable components of the UK biodiversity response. These have included the re-introduction of White-tailed Eagle (*Haliaeetus albicella*) to Scotland, Osprey (*Pandion halietus*) to England, Red Kite (*Milvus milvus*) to Scotland and England (see Box 2), Great Bustard (*Otis tarda*) to England and, some time ago, Capercaille (*Tetrao urogallus*) to Scotland. Policy measures and regulatory interventions have also combined to deliver an impressive turnaround in fortunes for a number of species (such as that of the Otter).

The measures to protect species can be grouped as:

- Targeted agricultural measures (such as for Corncrake)
- Protection from persecution (e.g. Red Kite or Peregrine Falcon (*Falco peregrines*))
- Improving the quality of the broader landscape to reduce widespread pressures on a range of species (such as Otter).
- Re-introduction programmes of key species (e.g. White-tailed Eagle and Red Kite).

These are demonstrated in the three case studies below.

Box 2: The re-introduction of the Red Kite (*Milvus milvus*)

Environmental needs

Red Kites (*Milvus milvus*) have long been threatened by extinction in the UK and have been the subject of one of the longest conservation projects in the world. In the 19th Century they were considered to be a threat to lambs and gamebirds and were deliberately persecuted by gamekeepers and landowners. Red Kites, in fact, pose no threat to sheep farming or game rearing, but will eat dead lambs or gamebirds.[164] Due to their rarity, they subsequently became the primary target of egg collectors and bounty hunters. By the end of the 19th Century Red Kites had disappeared from England and Scotland because of human activities

[161] Wildlife and Countryside Act, 1981, Sections 9-12; the provisions for the granting of licenses and enforcement are set out in Sections 16-27.

[162] Note: this has now been replaced by the Directive 2009/149/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds.

[163] UK Biodiversity Action Plan (UK BAP)

[164] RSPB – Fact Sheet – Welcome to Red Kites in Rockingham Forest. http://www.rspb.org.uk/Images/Red%20kite%20fact%20file%20_tcm9-133428.pdf

and by 1930, only 10 pairs survived in Wales.[165]

Measures addressing environmental needs

During the 1950s and 1960s sophisticated nest protection initiatives succeeded in reducing the proportion of nests robbed to the level at which it is no longer considered a major threat to their survival.[166] However, by the mid-1980s there were still only 100 pairs[167] in Wales with little prospect of their re-colonising England and Scotland. Thus, the Nature Conservancy Council (now Natural England) and RSPB began a re-introduction plan in 1989 in England and Scotland. Early breeding successes justified the next stage of the programme to produce five self-sustaining breeding populations by 2000. The overall aim of the project was to provide the opportunity for breeding Red Kite populations to re-colonise all suitable habitat throughout the UK.

Costs and benefits of measures

The re-introduction programme has been remarkably successful, with the species becoming a familiar and well-loved feature in many parts of the UK. In 2001, the release site of Dumfries and Galloway (south-west Scotland) was selected in 2001 to link the Scottish and English populations. In 2008, a successful breeding season was found to include a kite from the 'indigenous' Welsh Red Kite population. This was the first confirmed occurrence of a Welsh Red Kite breeding in Scotland; an indication that the UK population is mixing and recovering strongly. The UK population now stands at 1,350 breeding pairs[168], approximately 5% of the world's population.[169]

Alongside these ecological successes, data regarding the socio-economic benefits of the programme are slowly becoming available. Following the success of the re-introduction of Red Kites in 2001, the Galloway Kite Trail was created, with initial funding from conservation and tourism agencies, as a community based wildlife viewing initiative. In 2007, the project received a grant of £165,000 from the Heritage Lottery Fund, the Forestry Commission, RSPB, Dumfries and Galloway Council and Scottish National Heritage (Molloy and Rollie, 2010). Between 2004 and 2009, the trail has attracted an extra £2.63 million new spend and supported a minimum of 13 extra jobs per year. The analysis shows increasing trends in visitor spending, jobs supported and the significance of the trail within Dumfries and Galloway tourism revenues (Molloy and Rollie, 2010).

An analysis of the investment costs in the programme reveals that they are significantly outweighed by the benefits. The release phase (2001-2005) cost a total of £148,947 and the subsequent monitoring phase (2006-2009) £89,785, a total of £238,732. This was funded evenly by the RSPB and Scottish Natural Heritage (SNH). The total project cost in setting up the Trail was £28k (in 2003) (50 per cent from Visit Scotland/Leader; 25 per cent SNH; and 25% private sector/in-kind). (C. Molloy, of the RSPB, *pers. Comm.*).

Red Kites are also proving popular with local tourism offices and local businesses elsewhere. In the Chilterns, local businesses have been supported through grants to promote themselves using Red Kites, helping to foster local pride through the special public interest in the bird. It has also supported an important educational programme for local schools, working with over 20 schools per year in the Chilterns. In the Black Isle, the presence of Red Kites was estimated to result in £131,000 additional visitor spending (Rayment and Dickie, 2001; cited in Dickie et al, 2006).

In mid-Wales, where the original nest protection schemes were successful in preventing the

[165] http://www.birdguides.com/webzine/article.asp?a=1435

[166] http://www.gallowaykitetrail.com/3-conservation-actions-i47.html

[167] http://www.birdguides.com/webzine/article.asp?a=1435

[168] www.biodiversityislifenet/?q=node/90

[169] http://www.birdguides.com/webzine/article.asp?a=1435

extinction of the species, Red Kites have now become an important part of the identity of the region and have helped the diversification of the rural economy. The region was successful in attracting European Union Structural Funds in 1994 to launch the Kite Country project which was successful in stimulating the tourism industry and raising awareness about the species and its environment. An extra £2.9 million in visitor expenditure during 1995/96 can be attributed to the Kite Country project supporting 114 FTE jobs (Rayment, 1997; cited in Dickie et al., 2006).

It is likely that the success of the programme is due to positive attitudes of local people (particularly in the Scottish lowlands and in England) as well as a strengthening of the sentencing laws in 2001 for nest poaching.[170] However, in the Scottish highlands attitudes appear to be resistant to the programme and the population appears to have been prevented from increasing by incidents of illegal poisoning.[171] [172]

Box 3: Efforts to restore farmland birds: case study of the Corncrake (*Crex crex*).

Environmental needs

The Corncrake (*Crex crex*) was, until recently, a widespread and common feature of agricultural landscapes. Since the second World War, when the agricultural practices to which it was so well adapted began to change, Corncrake numbers have plummeted and it has rapidly become in danger of becoming extinct in the UK. In particular, Corncrakes were affected by changes to the collection of hay fields. In the UK, the species is now broadly restricted to the north and western areas of Scotland, with some exceptions in central Scotland and England.

Measures addressing environmental needs

In 1993, a partnership between Scottish Natural Heritage, the RSPB and the Scottish Crofting Foundation (the Corncrake Initiative) began a scheme to make payments available to crofters and farmers with the bird on their land to manage their hay or silage fields in manner compatible with Corncrakes. Other schemes followed including Rural Stewardship Schemes, and Special Protection Areas were designated under the EU Birds Directive, with Scottish National Heritage payments available for dedicated Corncrake management. Following the CBD, a Species Action Plan was developed for the Corncrake, which set out the terms on which organisations could work together. The conservation measures commonly used included:

1. Increase of suitable tall vegetation to provide cover for Corncrakes
2. Encourage delayed mowing to avoid overlap between Corncrake breeding periods and mowing (i.e. June – August).
3. Encourage adoption of 'Corncrake-friendly' mowing techniques which allow chicks to escape from mowed areas whilst remaining in cover (RSPB, 2008).

Costs and benefits of measures

The close collaboration between farmers with the conservation groups (RSPB, SNH and the Scottish Executive Environment and Rural Affairs Department) resulted in yearly increases with the numbers peaking in 2007 with over 1,200 calling males recorded. This represented

[170] http://www.guardian.co.uk/environment/2009/jun/08/red-kites-reintroduction

[171] http://www.guardian.co.uk/environment/2009/jun/08/red-kites-reintroduction

[172] http://www.guardian.co.uk/environment/2006/dec/29/frontpagenews.conservationandendangeredspecies?intcmp=239

an increase of over 140% on 1993. The project is an example of the UK BAP process working well by encouraging the different actors to work towards a common goal and demonstrating how concerted, targeted action can have significant success. However, the numbers since 2007 have dropped for the first time in ten years and the fragile, peripheral areas in north and west Scotland are under threat from the loss of cattle farming. If this trend were to continue, it would mean declining hay production and mixed farm practices that are essential for supporting biodiversity in areas rich in natural assets. In addition, the first full survey of the species in 2009 for 6 years found that while the core areas have broadly remained strong, Corncrakes do not appear to be spreading to the wider countryside (RSPB, 2010).

A7.2.3 Costs and benefits of improved measures

The costs of the individual species programmes are not often readily accessible, particularly for programmes that have been ongoing for many years. However, the cost of implementing the UK BAP (including SAPs) was reviewed in 2006 (GHK, 2006) and subsequently updated in 2010 (Rayment et al., 2010) on behalf of Defra and the corresponding bodies in the devolved administrations of Scotland, Wales and Northern Ireland. This analysis estimates the cost of implementing the Species Action Plans for individual species only (without considering habitat management for widespread species at the landscape level) at £47 million per annum from 2011 to 2020. This covers all 1,150 priority species.

Table A7.4 Revised SAP Costs Estimate – Individual Species

	Cost Estimate (2009 prices, £k)	% of revised total
Vertebrates	25,012	53%
Invertebrates	12,620	27%
Plants	9,634	20%
All SAPs	**47,267**	**100%**

Source: Rayment et al (2010)

At the wider landscape level, the total annual cost of achieving the SAP targets for widespread species was modelled to be £274 million per year. However, this is likely to be an underestimate, as many of the new priority species that were added in 2007 include species of widespread distribution, which were not factored into this analysis.

The cost-effectiveness of the UK BAP has been questioned by Laycock et al. (2009) who found the distribution of spending across the plans was highly biased towards vertebrates with no correlation between effectiveness and cost; non-vertebrate species plans tended to be more efficient than vertebrate plans, as the cost of achieving the conservation goal for invertebrates is significantly lower.

Although a complete analysis of the benefits associated with the UK Biodiversity Action Plan is not yet available, evidence of the benefits provided to local communities by selected bird species gives an indication of the potential for charismatic species to benefit the local economy (see Table A7.5).

Table A7.5 The socio-economic benefits of selected bird species conservation in the UK

Species	Location	Benefit to the local economy	Visitors attracted
White tailed eagle	Isle of Mull	£1.4 -£1.6million per year, 36-42 FTE jobs	Unknown
Osprey	9 sites around the UK	£3.5million	290,000
Bee-eater	Co. Durham	Unknown	15,000 in a 5-week period

Chough	The Lizard, Cornwall	3.2 Full-time equivalent jobs	Over 80,000 each year
Peregrine	Symonds Yat across 8 UK sites	£0.5m, 18 FTE jobs Unknown	42,500 120,000 visitors
Capercaille	Strathspey	£90,000 annually	10,000 visitors (per year)
Seabirds	9 selected UK sites, including:	Unknown	250,000-400,000

Source: Dickie et al. (2006)

[NOTE: a recent report by GHK on 'Benefits of SSSIs' in Draft Final stage; this case study will be updated accordingly when the report is published]

A7.2.4 Conclusions

The UK demonstrates many of the biodiversity issues that have been experienced by other European nations where a combination of high population density and industrialisation has lead to the extinction of many of the larger, charismatic species, and where intensification of agriculture since the 1950s has lead to dramatic reductions in farmland and associated species. It also shares characteristics with Southern states where persecution of animals perceived to be a threat to livelihoods can prevent these species expanding or re-colonising former habitats. With the entrance of the Eastern block nations to the EU, which still have large areas of extensive farming, the lessons learnt in the rest of the EU on how to protect species will be very important to ensure that the rich biodiversity in these countries is adequately protected.

The UK has responded to the loss of species in a variety of ways, from re-introductions, to targeted changes in agricultural practices to the use of regulatory powers to reduce harmful activities. Although the country has failed to halt the loss of biodiversity overall, there have been a number of important success stories through different measures that have succeeded in reversing some of the negative trends. An important key to all of these case studies has been the collaboration between stakeholders working towards a common goal. Government agencies for nature have forged positive working relationships with the voluntary sector, and where conservation programmes have been most successful, it has been through these conservation groups working closely with farmers and landowners to ensure that their interests, too, are met.

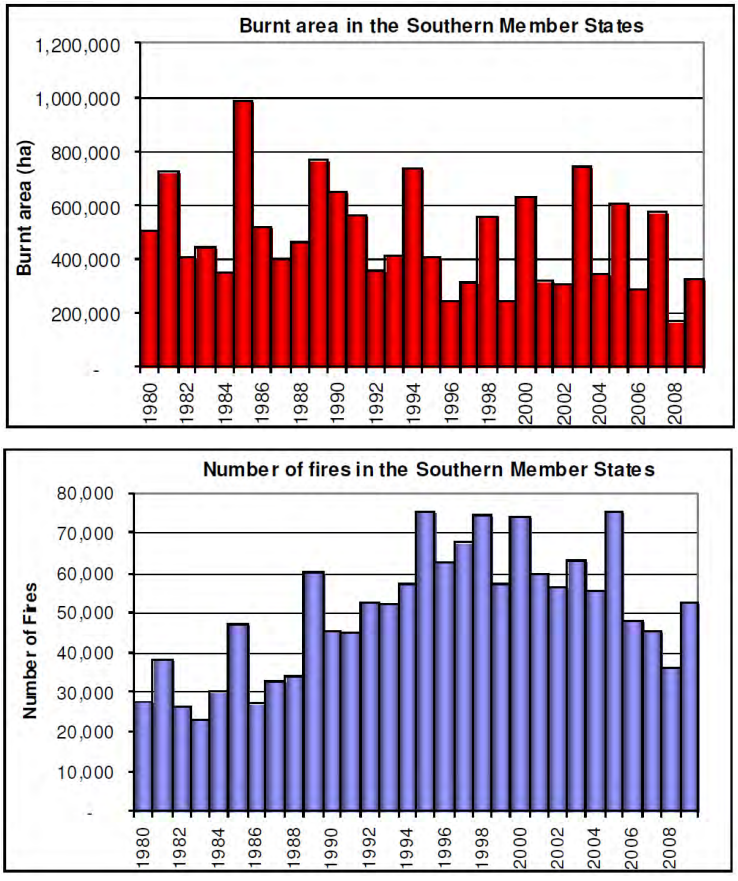
It remains difficult to summarise the relative cost-effectiveness of the measures. However, initial evidence from studies on birds suggest that there can be substantial local benefits following the conservation of charismatic and rare species. Throughout the conservation success stories, the provision of public funds has been a crucial element to ensuring the meeting of conservation objectives. Often this has been provided in conjunction with funds from the third sector and funds from the EU.

A7.3 Forest Fires prevention (Portugal)

Forest fires are the most important threats to forest and wooded area in Southern Europe. Reports of forest fires in France, Greece, Italy, Portugal and Spain show that in these areas more than 450,000 ha burned on average each year between 2000 and 2006. During 2009, fires in these 5 countries burned a total area of 323 896 hectares (JRC, 2009).

The figures below provide an overview of the total burnt area per year and the yearly number of fires in the five Southern Member States since 1980. The statistics vary considerably from one year to the next, which clearly indicates how much the burnt area depends on seasonal meteorological conditions.

Figure A7.10 Burnt area and number of fires in 5 Southern Member States



Source: JRC, 2009

After 1990, although the number of fires remained relatively high, the size of area burned decreased, due to a smaller size of fires. This seems to be largely related to the improvements in fire protection services. Furthermore, over the last decade the number of fires seems to have stabilized and some decrease has been observed. This is also partially due to changes in weather conditions, characterised by a relatively decline in average temperatures after the peak reached in 2004 and 2005. A positive effect of public information campaigns carried out in all the five countries and the improvements in the prevention and fire-fighting capacities is also likely (JRC, 2009).

The large destructive forest fires experienced in Europe have caused extensive damage, not only in terms of biodiversity loss, but also affecting human health, public and private properties, infrastructures and economic activities. Furthermore, forest fires can be responsible for substantial emissions of CO2. A study by Barbosa et al (2009) estimated that , between 2000 and 2005, forest fires yearly emission in Europe were about 11 million tonnes of CO2. Although this may be a relatively small contribution to climate change at EU level, it can be significant at local/country level

in the countries most hit by fires. According to a Portuguese NGO (Quercus, 2010) about 1.1 million tonnes of CO2 equivalent were burned during the 2010 Portuguese forest fires. In 2003 and 2005, the years of the worst forest fires emissions were respectively about 10 million and 5 million tonnes of CO2 equivalent. By comparison, Portugal total emissions of GHG in 2008 were 75 million tonnes of Co2 equivalent.

Forest fires in these areas are marked by a strong prevalence of human induced fires, in some cases voluntarily initiated, in others accidentally due to agricultural or forestry activities. Additional factors, such as management practices, territorial planning, development regulations, material capacity and responsiveness, extreme weather events and climate change, also contribute substantially to the spreading of fires.

Community initiatives on the prevention of forest fires in Europe initially built mainly on Council Regulation (EEC) No 2158/92[173], which provided a framework for the prevention of forest fires and for monitoring their causes and effects. The later 'Forest Focus' Regulation (EC) No 2152/2003[174] combined most elements of the initial Regulation, but included some additional monitoring provisions. 'Forest Focus' established a framework within which Member States were to develop national programmes eligible for Community co-financing in order to, *inter alia,* monitor and prevent forest fires and assess soils, carbon sequestration, climate change effects, biodiversity and the protective functions of forests. Following its expiration on 31 December 2006, the actions provided for by the Regulation were included in the LIFE+ Multi-Annual Strategic Programme 2007–2010.

Opportunities for investment on forest fires prevention and remediation are also offered by other EU financing instruments, such as the Structural and Cohesion Funds which, among other purposes, support the prevention of natural hazards (e.g. the EU Solidarity Fund). In the previous programming period (2000-2006) some Member States requested and obtained funding for forest fire related measures, such as the determination of fire risk levels, the compilation of fire protection plans, the implementation of monitoring systems and emergency response plans (GHK et al. 2007).

A7.3.2 Environmental needs

Portugal is among the European countries most severely hit by forest fires and witnessed particularly disruptive forest fires in the past decade. As shown in the figure below, the burnt area in Portugal in the period 2000-2009 was the highest among Southern countries.

Large areas of forest were burnt in particular between 2000 and 2005. 2003 and 2005 were the worst years, reaching peaks of 425,000 and 339,000 ha burned respectively. The past five years have been relatively less hit by fires, with burned areas below the 2000-2009 decade average (about 150,000 ha). In 2010 for instance the total number of forest fires was about 22,000, most of which of small dimension (i.e. less than 1 ha). This was a decrease of about 16% compared to the fires occurred in 2009, and 13% compared to the decade average. The total burned areas, however, was higher than the previous year, although lower that the decade average. About 133,000 ha were burned in 2010, half of which related to large fires (above 100 ha). An overview of the forest fires in the past decade is shown in the table below (Autoridade Florestal Nacional, 2011).

Forest fires in Portugal are caused and/or worsened by several factors. Rural depopulation for instance leads to an increase of unattended fire prone shrublands, increasing the risk of fire. Monocultures of fire prone species, like pines (mainly *Pinus pinaster*) and eucalyptus (*Eucalyptus globulus*), were encouraged by past forestry policies (Pereira et al, 2004; Mendes, 2004; Proença and Pereira, 2010)). In addition, the small size of forest properties in Portugal makes often forest management difficult (JRC, 2004). Weather conditions, such as the hot and dry summers of 2003 and 2005, have also contributed to the spreading of forest fires. Conversely, less severe weather conditions in the years 2007 and 2008 arguably made fires more controllable, contributing to a

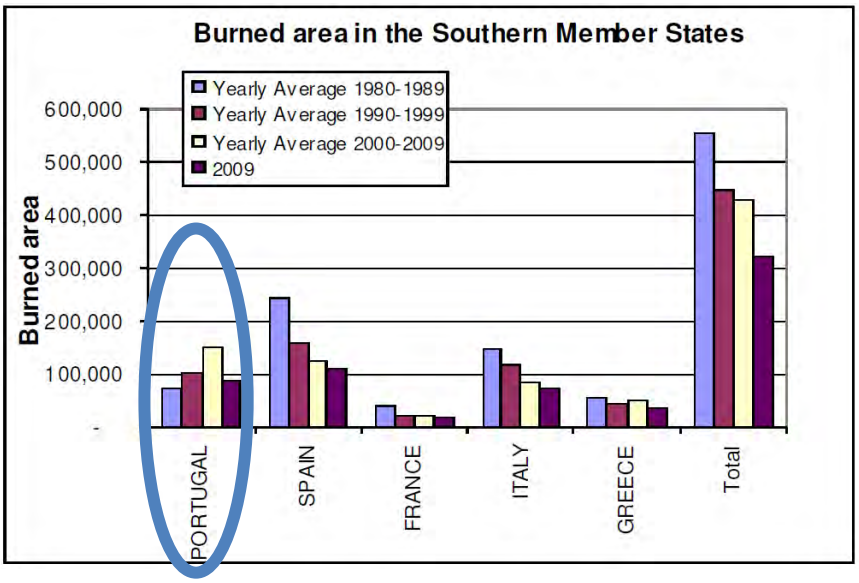
[173] Council Regulation (EEC) No 2158/92 of 23 July 1992 on protection of the Community's forests against fire http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CONSLEG:1992R2158:19970222:EN:PDF

[174] Regulation (EC) No 2152/2003 of the European Parliament and of the Council of 17 November 200 concerning monitoring of forests and environmental interactions in the Community (Forest Focus)

decrease in the area burnt (Autoridade Florestal Nacional, 2010). Overall, forest fires are expected to become worse due to the effects of climate change (Santos et al, 2002)

In general, a better understanding of the factors responsible for major forest fires can help identify appropriate policies to mitigate the risk and consequences of these natural hazards, not only in these countries but in the whole Mediterranean basin. The risk of destructive forest fires in fact can arguably rise by weak or inappropriate policy choices, e.g. those leading to ineffective forest management or to "grey" zones in development regulations. In addition, the increasing impact of climate change on the environment, and on forest fires in particular, should arguably lead to making climate policy far more streamlined in national forestry policies.

Figure A7.11 Burnt area in the southern Member States in the past decades and in 2009



Source: JRC, 2009

Table A7.6 Annual distribution of the number and size of forest fires 2000-2010

	Number of cases			Area burnt (hectares)		
Year	Forest fires	Small fires (<1ha)	Total	Forest	Shrubs	Total
2000	8,802	25,307	34,109	68,646	90,958	159,604
2001	6,898	20,049	26,947	45,617	66,695	112,312
2002	6,521	20,055	26,576	65,164	59,455	124,619
2003	5,323	20,896	26,219	286,055	139,784	425,839
2004	5,069	17,096	22,165	56,271	73,836	130,107
2005	8,192	27,632	35,824	213,921	125,168	339,089
2006	3,499	16,945	20,444	36,320	39,738	76,058
2007	3,677	16,639	20,316	9,829	39,535	49,364
2008	2,591	12,339	14,930	5,461	12,103	17,564
2009	5,862	20,274	26,136	24,097	63,323	87,420
2010	**3,970**	**18,056**	**22,026**	**46,079**	**87,011**	**133,090**
Average 2000-2009	5,643	19,723	25,367	81,138	71,060	152,198

A7.3.3 Measures to meet environmental needs

As noted above, Portugal is one of the countries mostly affected by forest fires in Europe. Across the years several prevention measures have been implemented which are well documented and that proved relatively effective. These can offer interesting insights and lessons on how national and EU funds can be invested to mitigate the effect of natural hazards such as of forest fires.

Portugal is facing a trend of decrease in the annual burnt area records since 2005. This is also the year when the Government settled a reform on the national system for forest fire prevention and suppression, including the adoption of the **National Fire Plan** (Plano Nacional de Defesa da Floresta Contra Incêndios) in May 2006 (JRC, 2010). The plan sets actions aimed at prevent, monitor and fight forest fires. Its five strategic objectives are to: increase the resilience to forest fires, reduce the number of fires, improve the effectiveness of forest fire management, rehabilitate ecosystems and improve the management structure[175]. Among its targets the plan particularly aims to reduce the burned area to less than 100,000 ha per year by 2012. By 2018 the plan target is to keep the annual burned area to less than 0.8per cent of the reforested areas, and to reduce to less than 75 the annual number of fires above 24 hours (Presidência Do Conselho De Ministros, 2006).

In spite of the increased burned area and number of fires, in 2009 Portugal was able to meet its national targets as regards the total burnt area for the fourth time. In 2010, however, the target was exceeded, as until October more than 120,000 ha were burned (Autoridade Florestal Nacional, 2010).

In addition, A **Permanent Forest Fund** was planned in 1996 (lei de Bases da Política Florestal, n. 22/1996) and became effective in 2004 (Decreto Lei n. 63/2004). It is a public fund financed by earmarking revenues of a tax on fuels. It provides grants to all kind of forests (private, communal and public). The fund targets forest fires prevention, improvement in forest management, forest research, the provision of forest public goods and monitoring of forest health conditions.

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Table A7.7 Permanent Forest Fund – envisaged measures and allocation

	2004	2005/06	2007/08	2009/12
Fire prevention	45%	60%	73%	25%
Improvements in forest management	12%	30%	17%	30%
Reducing landownership fragmentation	33%	3%		
Provision of forests public goods, monitoring of forest health, biotic risks			10%	20%
Forest research	4%	5%		10%
Forest certification	4%	2%		
Information and communication				15%
Other	2%			

Source: Adapted from Mendes presentation on Payments for Forest environmental services in Portugal – The case of the Permanent Forest Fund
http://www.efimed.efi.int/files/attachments/efimed/mabi_and_pes/8._mendes.pdf

In the past years, forest fire combat was almost exclusively based on volunteers. This situation is recently changing to allow better combat capacity, tactical coordination and communication. For the 2009 forest fire season, for instance, the Portuguese Authorities significantly **increased the number of means available for surveillance, detection and fire-fighting operations**. The distribution of these means was made in phases. The number of means applied in each phase

[175] MADRP website: Plano Nacional de Defesa da Floresta Contra Incêndios http://www.afn.min-agricultura.pt/portal/dudf/pndfci

depended, amongst other factors, on the forest fire risk expected for a given period. For example, during the most critical period (July-September), there were around 9,829 human resources, 2,196 vehicles and 56 aerial means available (JRC, 2010). The table below provides a summary of all the fire-fighting means distributed by phases:

Table 1.1 Fire-fighting means available per phase

Phases	Elements	Vehicles	Aerial Means
Alfa (<15 May)	Means available on demand		2-7
Bravo (15 May-30Jun)	6,200	1,465	24
Charlie (1Jul-30Sept)	9,829	2,196	56
Delta (1 Oct-15Oct)	5,441	1,247	19
Echo (>15Oct)	Means available on demand		2-7

Source: Adapted from JRC, 2010

After forest fires in 2003, the awareness among the population and public decision makers about the economic, social and environmental importance of forests increased substantially. The Portuguese government began a **reform of forestry management**, which encompassed mandatory forest management (with the Government being given the legal capacity to manage forests, which are not managed by their owners) and the creation of an **investment fund for forests**. In addition, a Secretary of State for Forestry was appointed within the Ministry of Agriculture, new financial incentives were provided to private forest management, and the profile of command-and-control instruments for private forestry was enhanced.

Increased forest management has also been achieved by **aggregating existing properties** and through **joint management** of several plots – through the financing of the investment fund and fiscal support. Some forestry projects are also aimed at replacing shrubby areas.

Among the infrastructures funded by the Portuguese authorities to tackle the problem of forest fires, there are the construction and improvement of **divisional forest roads** for fire prevention, of **fire breaks** and **water reservoirs**.

Some responses to land abandonment at various levels have also been taken into consideration, e.g. some **agri-environment measures** at EU level, national fire responses measures (eg in 2003, see above) and the **acquisition of farms** by the League for the Protection of nature (LPN) for biodiversity protection at local level (Pereira et al, 2004). This, however, is still a relatively marginal measure, which interested only limited areas.

The recent developments in the use of **prescribed fire** were followed with a renewed interest in Portugal in the actual fight against wildfires. In 2006, DGRF created 3-4 groups of specialists in the analysis of fire behaviour with the capacity to assess the possibilities to use suppression fire, and the skills to actually perform such operations. The Portuguese elements in the groups had sufficient expertise in the operational use of prescribed fire during winter, and assistance from the GRAF[176] in Catalonia and the Plan Nacional de Manejo del Fuego in Argentina was of great interest. Some of the major wildfires in Portugal during the summer of 2006 saw interventions by these groups. The success of the work encouraged the creation of 6-7 groups of specialists during 2007. They received further training, and the continued assistance of the above mentioned Catalonian and Argentinean organisations as well as the French organisation Espaces Méditerranéens. In 2007, these groups covered the whole country and were asked by the Civil Protection to assist in most of the large fires. Typically when fires started during the night and aerial attack was not possible the groups performed the analysis and the possible interventions with great success[177].

[176] GRAF, Grup de Recolzament a Actuacions Forestals, Forest Actions Support Group

[177] Reports and videos of their operations were done under the EU research project FIRE PARADOX aiming at a new approach to integrated fire management.

These new initiatives, besides weather conditions, are thought to explain to a large extent the success of fire-fighting during the 2006 and 2007 seasons.

In addition, Portuguese specialists also explored the possibility of using these new approaches in Greece. It was concluded that **cooperation and training** were needed at EU level in order to develop these new possibilities that were already used in the past and that can be extremely effective (in terms of costs and of effectiveness) if correctly performed. Plans to further develop this approach are underway.

As the problem of forest fires got worse, and environmental awareness rose, the government projects supporting afforestation based on mono-specific plantations got more and more criticism. Recent Portuguese programmes[178] tackling forest fires aim to contribute to the **diversification of tree species composition towards broadleaf species** (e.g. Quercus robur/pyrenaica in the North and Centre of Portugal), as they are less vulnerable to fire than maritime pine and eucalyptus. This is thought to be a key strategy to contribute to the reduction of forest fires in the long run. The increase of risk prone scrubland in abandoned land could be counterbalanced by the plantation of broadleaved species, assuring that forest development is supported until forest reach a mature state. Beside providing important ecosystem services and goods, mature broadleaved forests are much more resistant and resilient to fire than young forests and scrubland, and of coniferous and eucalypt plantations in general[179] (Proença et al, 2010). The major effects of these programmes, however, are hardly visible in the short period, as it takes time for the new species to grow.

Forestry-related programmes and funding in Portugal have generated a demand for technical advice by the non industrial private forest owners. A growing number of **forest owners' associations** appeared since the 1990s, especially in the northern and central regions where small-scale forestry is more salient. The existence and sustainability of these associations is thought to be an important factor contributing to the effectiveness of forestry policy and to sustainable forest management (Mendes, 2004).

WWF through its cork oak landscapes programme is active in three priority landscapes (including Southern Portugal) to develop **models for good practices** in protection, management and restoration based on a multi-purpose management approach. This will aim at conserving all uses, values and services, deriving socio-economic benefit from all values, engaging communities, developing partnerships and promoting certification (Bassi et al, 2008). Portugal has also experienced an increase in the adoption of certified forest practices, e.g. through collaborations between WWF and FSC[180].

A7.3.4 Costs and benefits of measures

Reliable data for prevention costs are not available, though some figures can be gathered from the budget of several plans and measures undertaken in the past years.

As for past EU support, project-by-project analysis of the Environment Sectoral Programme (POA) reveals that 1.93 million EUR was approved between 2000 and 2006 for fire prevention - of which 1.45 million from ERDF (GHK, 2006).

Table 1.2 Overview of ERDF projects, 2000-2006 (approved)

	Full cost (€million)	ERDF Fund(€million)	EU support (%)
Fire prevention	1.93	1.45	75

Source: Adapted from GHK, 2006

Furthermore, annual expenditure for fire brigades in 2009 accounted for about €323 million, of which about €304.5 million for running expenses and €18.5 million for capital investments (INE,

[178] PAF, PDF and Reg. 2080/92 (1987-99)

[179] Personal correspondence with Vânia Proença and Henrique Miguel Pereira- Centro de Biologia Ambiental, Faculdade de Ciências da Universidade de Lisboa

[180] Personal correspondence with Vânia Proença - Centro de Biologia Ambiental, Faculdade de Ciências da Universidade de Lisboa

2011). Similar figures were recorded in 2003 (about € 300 million) suggesting a relatively constant pattern of yearly expenditures - although it should be noted that a significant part of this amount can typically be attributed to functions other than forest fire-fighting (GHK, 2006). Assuming that about half the budget is spent on forest-fires related activities, a rough estimate would be of about €150 per year[181].

The 2006 National Fire Plan set out the expected budget for the measures related to forest fires proposed between 2006 and 2010. The overall budget was about 700 million EUR. The expected expenditures by intervention category are shown in the table below.

Table 1.3 Risk management budget for forest fires – forecast (2006-2010)

Intervention Budget	(million €)
Legislation and policy reviewing and integration	1.2
Promotion of forestry management and actions on strategic areas	410.96
Public and stakeholders involvement and increased civic responsibility	0.57
Knowledge improvement on forest fire causes	0.10
Public education and sensitization	28.56
Reinforcement of surveillance and dissuasive capacity	1.84
Guarantee of permanent availability of adequate means	29.61
Improvement of detection process, surveillance and primary action	83.75
Accurate and efficient fire combat and extinguishing	6.71
Guarantee of logistic and humanitarian support in combat areas	0.23
Evaluation and mitigation of the forest fires impacts and long term strategy implementation	4.04
Defining and implementing organizational structure	94.55
Base knowledge promotion on forest fire defence	15.46
Total	677.58

Source: Adapted from GHK (2006) based on Plano Nacional de Defesa da Floresta Contra Incêndios (2006) - 2005 prices

As an example of actual expenditures, part of these funding were allocated through the Portuguese Rural Development Plan. Under the measure 'Cost minimisation', two sub-actions addressing the issue of forest fire were included: sub-action 2.3.1.1 'Protection of forest against fires' (Defesa da floresta contra incêndios) and sub-action 2.3.1.2 'Minimisation of biotic risks after fire' (Minimização de riscos bióticos após incêndios). Since the beginning of the programming period, about 23,5 million EUR were invested under the first sub-action and the about 0.3 million EUR under the second (MADRP, 2010). The table below provides an overview of the applications presented so far under the two sub-actions.

Table 1.4 Applications presented – cumulative value since the start of the programming period

Typology of investment	Number of Applications	Investment	
		Million €	% over total
Primary network of areas of fuel management	108	8.468	36%
Mosaic of small areas of fuel management	92	8.002	34%

[181] Personal correspondence with Henrique Miguel Pereira- Centro de Biologia Ambiental, Faculdade de Ciências da Universidade de Lisboa

Water points	144	5,818	25%
Control of invasive species	6	0.483	2%
Others	193	0.673	3%
Total	543	23.445	100%

Note: the sum of applications is bigger than their actual total, as several applications were related to more than one typology of investment

Source: Adapted from MADRP, 2010

A rough estimate of the total yearly investment on fire prevention and combat we can consider the average yearly allocation under the national Fire Plan as an overall figure for total public expenditures on fire fight and prevention. This is likely an underestimate, as this does not take into account of private spending (e.g. actions by the Associations of Private producers and Owners and voluntary organisations) and likely of some of the spending done at regional or local level. As rough lower bound estimate, however, we can assume that yearly expenditures related to forest fires have been of about €140 million per year.

This figure can be seen in comparison with the direct revenue from cork and wood, which is about 700 million € per year (about half is from cork only)[182]. It therefore appears that the equivalent of more than a third of the revenue generated by timber and cork production is needed for fire combat and prevention. Nevertheless, while the revenues are private, the costs of forest fires are mostly covered by general taxation. This can be seen as an example of negative externality, partially exacerbated by the past model of forest management focusing on pine and eucalyptus monocultures.

As for the benefits of fire prevention/minimisation actions, no official study has been undertaken, but recent estimates on the Portuguese forest fires show that the potential savings from reduced damages caused by fire can be significant.

First of all, the reduction of forest fires will have immediate environmental benefits, in terms of reduced area burned. For instance, on average during the period 2000-2009, about 150,000 hectares burned yearly in Portugal due to forest fires (Autoridade Florestal Nacional, 2010). Between 2002 and 2006 about 1.6 million tonnes of carbon were emitted every year (Autoridade Florestal Nacional, 2007). Furthermore, forest fires also lead to soil deterioration, causing large soil losses during rainfall and deterioration of downstream water quality. It is also expected that, if current frequencies of wildfires persist or increase, there will be some major consequences for soils and for run-off. Physical and chemical soil erosion increases with decreasing soil thickness, leading to decreased soil fertility and carbon sequestration capacity. Surface run-off can also increase the likelihood of floods (Pereira et al, 2004).

Forest fires also can lead to substantial economic damage. Portuguese forest fires in 2002-2006 for instance led to significant losses of timber and non-timber products, recreational activities, and carbon sinks, and reduced protection of agricultural soil, aquifers and biodiversity. These losses were estimated to amount to more than EUR 300 million per year on average (Autoridade Florestal Nacional, 2007), with peaks in 2003 (EUR 600 million for DGRF – EUR 1 billion according to the European Commission) and in 2005 (EUR 500 million according to DGRF). In 2003 it was also estimated that more than 2,000 buildings were affected by fire (JRC, 2004), as well as 2,000 km of electrical cables and, in some areas, the telephone network.

Furthermore, a reduction in the incidence of forest fires can bring significant social benefits, especially in terms of reduced cases of illness and life losses. In Portugal for instance 21 people died in the major forest fires of 2003, and 18 died in the fires of 2005. In addition, in both years more than one thousand people were reported as in need of medical assistance due to smoke

[182] Personal correspondence with Henrique Miguel Pereira- Centro de Biologia Ambiental, Faculdade de Ciências da Universidade de Lisboa

intoxication, burn, wounds and other fire related problems. In addition, the damage to buildings due to forest fires caused almost 200 homeless (JRC, 2004).

A7.3.5 Conclusions

Portugal is among the European countries mostly affected by forest fires, and witnessed particularly disruptive forest fires in the past decade. Between 2000 and 2009 the burned area in Portugal was the highest in Europe, with an average of about 150,000 ha per year (Autoridade Florestal Nacional, 2010).

Several measures have been recently adopted to tackle the issue of forest fires, some of which have been effective in reducing the incidence and damages caused by fire. These included a reform of forestry management, which encompassed mandatory forest and the creation of an investment fund for forests; an increase in the number of means available for surveillance, detection and fire-fighting operations; the aggregation of existing properties and joint management of several plots; the construction and improvement of divisional forest roads for fire prevention, of fire breaks and water reservoirs; the implementation of some agri-environmental measures; the developments in the use of prescribed fire; the diversification of tree species composition towards less fire-prone broadleaf species; an increase in the number of forest owners' associations; and the development of models for good practices in protection, management and restoration of forests.

The benefits of such measures have not yet been established, but it is clear from the data available on the damages caused by forest fires that better prevention and management actions can bring significant environmental, social and economic benefits. Forest fires in the past decade have in fact lead to significant losses in terms of burned areas and soil deterioration, losses of human lives and increases in the cases of illnesses, and substantial economic damages due to the losses of timber and non-timber products and related ecosystem services, which amounted to more than EUR 300 million per year on average (Autoridade Florestal Nacional, 2007), with peaks in 2003 (EUR 600 million for DGRF – EUR 1 billion according to the European Commission) and in 2005 (EUR 500 million according to DGRF). Some of the actions and policy changes, such as the shift to fire resistant forest species, will take about 25 years to be fully effective. The success of this kind of long-term forest restructuring cannot be assessed in a short term, therefore recent decreases in burnt area should be mainly attributed to an improved system of fire fighting (centralized command, better detection and dispatch, more helicopters and airplanes, improved citizen awareness). It is expected that additional results will become visible in a few decades.

A7.4 Implementation of the IPPC Directive

A7.4.1 Overview

It is clear from previous discussion that variations in EU environmental policy, either in terms of implementation or enforcement can contribute to a reduction in the effectiveness and efficiency of legislation. For example, a lack of coherence between thematic areas can lead to confusion amongst Member State authorities and industry, leading to higher compliance and administrative costs (i.e. due to duplication of compliance effort). As a result, industry may be discouraged to implement policy recommendations or it may be difficult to enforce at Member State level, consequently reducing policy effectiveness. In other cases, variations in policy interpretation, implementation, and enforcement may distort the internal market.

This case study is intended to illustrate the impacts of this problem, specifically in relation to the costs and benefits of taking action, based on EU policies introduced to regulate industrial emissions, to which the Commission has recent produced an impact assessment of the problems and proposed policy options for the revision of the legislation[183].

[183] EC(2007): EC(2007)1679 – Impact Assessment: Accompanying document to the proposal for a Directive of the European Parliament and of the Council on industrial emissions COM(2007)843 final, Brussels, 21/12/2007

A7.4.2 Problem Definition

Industrial activities are important for the economic development and sustained growth of the EU. However, they also contribute significantly to adverse pressures placed on the environment, through the consumption of resources, generation of waste and emissions of pollutants to air, water, and soil. In the EU, large industrial installations are responsible for 83% of Sulphur dioxide (SO2), 34% of nitrogen oxide (NOx) and 55% of volatile organic compound (VOC) emissions[184].

Given the significance of these emissions, industrial installations are regulated with the objective of ensuring that minimum emissions occur, thus protecting human health and the environment. In 1996, the EU adopted a set of common rules for permitting and controlling industrial installations, essentially requiring operators of these installations to obtain an environmental permit from a licensed authority in each Member State. The Integrated Pollution, Prevention and Control (IPPC) Directive 96/61/EC was the result, recently amended and codified as Directive 2008/1/EC.

The IPPC review process conducted by the Commission and summarised in its impact assessment highlights a number of problems with the current Directive that contribute to effectiveness and efficiency of the current legislative framework. These problems relate to:

1. Insufficient implementation of best available techniques (BAT) leading to limited progress in the prevention and reduction of industrial emissions and to distortion of competition due to large differences in environmental standards;
2. limitations with regards to compliance, enforcement and environmental improvement that hinder environmental effectiveness and the stimulation of innovation;
3. unnecessary administrative burdens due to the complexity and incoherence of parts of the current legal framework;
4. insufficient scope and unclear provisions of the current IPPC Directive that could hinder the Thematic Strategies objectives to be met; and
5. a constraint on the use of more flexible instruments, such as the use of NOx and SO2 emission trading systems.

Focussing on the problems of most relevance to LIFE+, the following discussion focuses on the first three problems identified above. In each case approximate cost benefit analysis of the policy revision/intervention proposed shall be provided.

A7.4.3 Regulatory Context and Policy Background

The objective of the IPPC Directive is to minimise pollution from industrial sources throughout the EU. Operators of industrial installations as defined by Annex I of the Directive are required to obtain an environmental permit from the relevant Member State licensing authority to emit the relevant pollutant(s). The permit is issued based on the following four principles which are enshrined within the Directive[185]:

- **Integrated Approach –** permits must take into account the whole environmental performance of the installation, covering emissions to air, water and soil, the generation of waste, use of raw materials, energy efficiency, noise, prevention of accidents, and restoration of the site upon closure. This ensures that each installation minimises its total environmental impact.
- **Best Available Techniques (BAT) –** refers to those techniques and technologies which are proven to be the most effective and least costly to implement with regards to reducing industrial emissions. They are developed for each industry sector by experts from the Member States, industry and environmental organisations. Guidelines are produced by the Commission to

[184] EC (2010): Industrial Emissions – Prevention and control of Industrial Emissions, website of the DG Environment, last accessed 06/12/10
(http://ec.europa.eu/environment/air/pollutants/stationary/index.htm)

[185] http://ec.europa.eu/environment/air/pollutants/stationary/ippc/summary.html

instruct licensing authorities and industry as to the most cost-effective methods to reduce emissions (BAT Reference Documents (BREFs for short)). The expected costs of implementation and quantity of abatement under various conditions are published in these BREF documents to aid planning and reduce uncertainty.

- **Flexibility** – the IPPC Directive allows licensing authorities in the Member States to take account of the technical characteristics of the installation, its geographical location, and the local environmental conditions before determining the appropriate permit conditions that should be established.
- **Public participation** – the Directive gives the public the right to participate in the process of awarding permits, by having access to the European Pollutant Release and Transfer Register (E-PRTR), permit applications, existing permits issued, and the results of monitoring exercises conducted by Member State authorities.

IPPC currently applies to around 52,000 industrial installations throughout Europe. These installations are usually the largest such installations as they emit pollutants directly to the environment (rivers, landfill, etc.), rather than through municipal water and waste systems (i.e. smaller industrial facilities may discharge wastewater to sewers).

IPPC falls within the broader Thematic Strategy on Air Pollution which sets objectives to ensure the continued protection of human health and the environment from key air pollutants. As part of its continued development, the Commission will propose revised emission ceilings under the National Emission Ceilings (NEC) Directive. It is expected that without further emissions reduction from IPPC installations, the objectives of the Thematic Strategy will not be realised. In addition, other Thematic Strategies (on Soil Protection and on the Prevention and Recycling of Waste) have called for establishing and/or enhancing links with the IPPC Directive, to help the effectiveness of policy and its efficiency. Improvements to consistency can also enhance incentives and help reduce administrative burdens in this context. The IPPC Directive should consequently be viewed from this wider policy context, specifically in relation to the Energy and Climate Change Package adopted as part of the Europe 2020, and the better regulation agenda.

A7.4.4 Costs and Benefits

Implementing BAT-based permitting

The Commission's review process identified that existing permits issues under IPPC are often not based on BAT as described in the relevant BREF documents. A lower uptake of BAT therefore results, with consequent impacts for the cost-effective and efficient implementation of the Directive, and a large variation of permit conditions across the EU. The benefits of BAT are therefore largely forgone in terms of lower compliance costs and/or the environment may not be adequately protected.

The associated compliance costs for operators might be expected to be higher for BAT than for non-BAT installations, however the BREF process insures that BAT are economically viable for the industrial sector concerned with a balance between the likely costs and benefits. In this context, it is therefore expected that BAT should generate resource efficiencies in water, material and energy, in addition to the prevention of waste. Many such benefits are reported in the BREF documents. In summary, implementing BAT may incur a higher initial cost of compliance, but should result in substantial benefits over the longer term. Policy options to resolve this problem include clarification of BAT and BREF documents in the Directive and providing information to the relevant competent authorities in the Member States in order to increase uptake. Box 5 taken from the Commission's impact assessment provides some quantitative estimates of the expected impacts of these proposed options, each of which is expected to incur very little cost.

Box 5: Illustrations of the Impacts associated with increasing BAT implementation

Illustration 1: Specific modelling work was carried out in the context of the application of NOx abatement techniques in the cement sector[186]. Moving towards BAT in this sector (as defined in the BREF) would lead to significant benefits. The reduction of emissions compared to the baseline scenario (no policy change) ranges between 29 and 57 ktonnes per year[187], even based on the modest assumption that up to 40% of all installations in this sector would implement BAT. Based on the monetary value of NOx emissions reductions, the monetised benefits are between around € 330 and 660 million per year whereas the economic costs of the techniques are estimated between € 15 to 30 million per year.

Illustration 2: The same approach was followed for large coal power plants[188]. Assuming increases in the uptake of BAT from 5 to 40% in BAT compared to the current situation, the associated reductions in emissions would be around 30 to 260 ktonnes per year for NOx (with valued benefits of € 100 to 2,200 million per year at abatement costs of € 75-600 million per year) and 0.3 to 8 ktonnes per year or dust (with valued benefits of € 7 to 600 million per year at abatement costs of € 2 to 160 million per year). Emissions of mercury would be reduced by 0.1 to 2 tonnes per year across the EU.

Illustration 3: The environmental benefits expected from BAT implementation concern not only emissions to air but overall environmental impacts due to the integrated approach of BAT. For instance, review of the implementation of the IPPC Directive in the United Kingdom[189] has shown significant reduction of emissions to air and water from the implementation of BAT-based permitting as well as important improvements in the use of resources. However, monetary estimates are not available.

Strengthening compliance and increase environmental improvements, while stimulating innovation

At present, operators in different Member States are provided with varying incentives to meet the requirements of the IPPC Directive due to very large differences in inspection, compliance reporting and enforcement, in addition to different permit review regimes across the EU. This can create distortions in the internal market and a reduced level of environmental protection.

Poor implementation in this regard can be driven by the failure of inspection to monitor emissions, reporting by operators, or the lack of incentives to encourage the correct incentives to emerge. Options to improve the situation include: the introduction of a general compliance enforcement framework by requiring inspections to be performed based on minimum criteria, the strengthening of the enforcement framework by requiring inspections to be performed on the basis of specific plans and programmes, and the setting of minimum frequency of inspections per IPPC site.

The costs relating to the first option are not thought to be significant as these activities are currently ongoing and the option only requires minimal procedural change. However some training is likely to be required to implement the second option to ensure minimum requirements are followed. If it is assumed that training occurs on an annual basis in the baseline, then this option should be integrated at minimal or no additional cost. As regards, increasing the frequency of IPPC site visits,

[186] ENTEC (2007):Assessment of options to streamline legislation on industrial emissions and analysis of the interactions between the IPPC Directive and possible emission trading schemes for NOx and SO2, report for the European Commission, buy ENTEC Ltd, July 2007

[187] The range corresponds to the higher and lower end of the BAT associated emission levels of the BREF

[188] ENTEC (2007):Assessment of options to streamline legislation on industrial emissions and analysis of the interactions between the IPPC Directive and possible emission trading schemes for NOx and SO2, report for the European Commission, buy ENTEC Ltd, July 2007

[189] Defra (2007): Mid-term review of the UK's implementation of the Pollution Prevention and Control Regulations, UK Department for Environment, food and Rural Affairs, April 2007.

the Commission's, impact assessment estimates the cost to be in the region of €18 million per year for all installations, based on a minimum frequency of 1 inspection per year[190].

In order to estimate the benefits of the above options relating to better enforcement of compliance, the best method of quantification is to consider the non-compliance costs, caused by poor implementation. Box 6 presents the expected magnitude of these benefits, taken from the Commission's assessment, based on the CAFE methodology.

Box 6: Example of the potential costs of failure to comply with IPPC Directive

In this hypothetical example a medium sized installation, permitted to release 1000 tonnes of sulphur dioxide, is used as the basis for calculations. A possible scenario might be as follows:

- the installation fails to comply, resulting in a 10 percent increase in emissions
- this breach of permit conditions remains undetected for one year
- this leads to an increase of emissions by 100 tonnes of sulphur in a year
- the additional external cost of this failure to comply with a permit would, therefore, be between €560,000 to €1,600,000

Cut unnecessary administrative burden and simplify legislation

Legislative simplification and better regulation refers to the designing legislation to be more coherent, effective and incurring minimal administrative burdens in both public administration and industry. Simpler legislation in the context of IPPC should lead to increased compliance, lower administrative costs and greater effectiveness achieving environmental outcomes.

The range of separate pieces of legislation that exist alongside the IPPC directive, enacted at different times has led to problems of interaction, difficulties in reconciling the different standards and approaches used, as well as confusion over the different definitions used.

The two key issues emerging include concerns regarding the relationship between sectoral ELVs and the requirement for BAT-based permitting. The other major issue concerns the extent to which Member States have introduced combined permitting systems, thus reducing administrative costs.

The environmental impacts of measures to improve the coherence and clarity of the IPPC Directive are largely related to increases in the uptake of BAT quantified earlier. Focusing on the economic impacts, the total potential for cost savings for both operators and authorities from combined permitting has been estimated and presented in Table A7.8.

Table A7.8 Estimated administrative benefits of simplified legislation affecting industrial facilities, by considered policy option[191].

Considered Option	Reduction in Administrative Costs
Option 1: Make amendments to each individual Directive to improve consistency and coherence	€1-6 million per annum
Option 2: Create a new combined Directive integrating the requirements of the current measures, by either:	€5-30 million per annum

[190] IEEP (2006): Data gathering and impact assessment for a possible review of the IPPC Directive, report for the European Commission by IEEP, BIO, VITO, December 2006

[191] ENTEC (2007): Assessment of options to streamline legislation on industrial emissions and analysis of the interactions between the IPPC Directive and possible emission trading schemes for NOx and SO2, report for the European Commission, buy ENTEC Ltd, July 2007

Integrating the IPPC Directive with the older immediate industrial emissions Directives, or Including other broader instruments like the Seveso II, EIA and Greenhouse Gas Emission Trading directives	
Option 3: Make no change to the legislation but address inconsistencies through guidance	N/A

A7.4.5 Implications for LIFE+

The above examples demonstrate that the continued use of LIFE+ to address problems relating to variations in environmental policy, its implementation, enforcement and ultimate compliance with environmental standards should be expected to delivery economic, health and environmental benefits of at least an order of magnitude greater than costs incurred by LIFE+ in the revision of legislation and providing guidance to Member State authorities and industry.

A7.5 The costs and benefits of addressing a new and emerging problem: Nanotechnologies

Problem Definition

Nanotechnologies are one of the most interesting and highly anticipated technical innovations to emerge in recent years. Nano refers to structures measuring between 1 and 100 nanometre in at least one dimension (i.e. down to 10,000 times smaller than the diameter of a human hair). In many cases, these nano materials are simply the nano sized variants of their standard counterparts. For example, gold is available in its conventional physical form and as a nanomaterial in very small quantities. Nanomaterials are being developed and used because they display new physio-chemical properties that differ from the conventional form of each chemical. This may include changes in chemical reactivity, conductivity, mechanical properties (stiffness and elasticity), catalytic properties, and material and structural surface properties (strength, weight reduction, increased stability).

The unique properties of manufactured nanomaterials and products have given rise to concern about the adverse effects that some nanomaterials might have on human health and the environment. While nanomaterials may not pose significant risks beyond those of the bulk materials from which they are derived, evidence is emerging that other nanomaterials may give cause for concern. Recent examples include rigid, thin and longer than 20μm carbon nanotubes, if inhaled, may pose health risks similar to asbestos exposure[192]. Silver in nano form is also increasing used in a number of applications due to its antimicrobial properties and may therefore prove harmful to aquatic organisms or have consequences for wastewater treatment processes[193]. This problem is heightened by three factors. Firstly, the fast pace of innovation brings many new products containing nanomaterials to market, the impacts of which takes time to establish and for any associated risk factors to be adequately assessed. Secondly, with regards to REACH (the over-arching legislation applicable to the manufacture, placing on the market and use of substances on their own, in preparations or in articles on the EU market), which requires the registration of substances manufactured or imported in quantifies of 1 tonne or more. The registration deadline for substances is staggered from 30 November 2010 for substances manufacturer tor imported at 1,000 tonnes or more till 2018 for volumes between 100 and 1 tonne

[192] Poland, C.A., Duffin, R., Kinloch, I., Maynard, A., Wallace, W.A.H., Seaton, A., Stone, V., Brown, S., MacNee, W. And Donaldson K. (2008) Carbon nanotubes introduced into the abdominal cavity of mice show asbestos-like pathogenicity in a pilot study, Nature Nanotechnology Vol. 3 pg. 423-428.

[193] EC (2009) Information from Industry on Applied Nanomaterials and their Safety – Background paper on options for an EU-wide reporting scheme for nanomaterials on the market, prepared for the European Commission DG Environment by Milieu and RPA consultants, September 2009. Available at: http://www.nanomaterialsconf.eu/

a year[194]. The risk is that nanomaterials (by definition used in very small quantities) generate a regulatory gap with consequent risks for the protection of human health and the environment. Thirdly, a distinct lack of information exists on the release of nanoparticles from products during their lifecycle, their interaction with water and soil, their release, mobility and expected environmental concentrations[195]. With such little information often available, it can therefore be difficult to ensure that regulatory controls are appropriate or sufficient in a given context. This problem is clearly perpetuated by the size of nanoparticles which are difficult to observe and monitor in the environment. In all, a significant environmental and legislative problem potentially exists.

A7.5.1 Regulatory Context and Policy Background

Nanomaterials are covered under the definition of a "substance" in REACH, although not specifically mentioned in the regulation itself. The REACH[196] and CLP[197] Regulations are the overarching mechanisms by which EU regulators currently receive information about the substances on the EU market. This includes chemicals on their own, in preparations or in articles. The gathered information is used to assess the potential hazards that each poses to human health and the environment. Crucially, this regulatory framework places the burden of proof on industry opposed to regulators to ensure that those substances placed on the market do not cause adverse impacts. It also gives the right to downstream users, including final customers, to obtain information on whether hazardous substances are contained in the products they purchase.

While there are no provisions in REACH-CLP explicitly referring to nanomaterials, the Commission's Communication on regulatory aspects of nanomaterials clarifies that they are covered by the "substance" definition in REACH-CLP as they are considered a form of an existing or a distinct substance[198]. Independent of the tonnage in which the substance is placed on the market, REACH and CLP require the provision of a Safety datasheets and a notification of its classification and labelling to the European Chemicals Agency (ECHA), generally by 3rd January 2011. However manufacturers and importer are not expected to conduct additional testing for classification, but instead to make use of available information, even if the form or physical state of the substance placed on the market is different. Given that hazards can differ significantly between bulk and nanoforms of the same substance (for example gold is fairly benign in bulk form and seemingly more toxic in nanoform), there may be cases where more specific hazard information is not available and therefore not provided to the regulator or downstream users. The effectiveness of the current regulatory framework is consequently undermined and potential creates a significant regulatory gap for those substances produced or imported into the EU in quantities of less than 1 tonne per year (i.e. many nanomaterials could fall below the REACH-CLP reporting threshold). Other similar concerns, which could generate risks to human health and the environment, are summarised as follows:

1. Nanomaterial may fall under the 1 tonne per year threshold, in which case the potential risks to human health and the environment might not be adequately assessed;
2. Nanomaterials may be registered but only at the end of the registration timetable and not necessarily with an obligation to perform a chemical safety assessment or exposure scenario, due to the phasing in of REACH;
3. The registrations will not with sufficient precision address the fact that the nanoforms may be different from bulk form in their intrinsic properties; and

[194] EC (2010): Nanomaterials – summary provided on the European Commission DG Environment website, last accessed 04/11/2010, http://ec.europa.eu/environment/chemicals/nanotech/index.htm

[195] UBA (2010): Nanoparticle emission of selected products during their life cycle – Summary, by Dr. T. Kulbusch & C. Nickel for the Federal Environment Agency (Germany), available at: http://www.uba.de/uba-info-medien-e/4028.html

[196] Regulation on the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH) (1907/2006/EC)

[197] Regulation on Classification, Labelling and Packaging (CLP) (1272/2008/EC)

[198] EC (2008): Summary of legislation in relation to health, safety and environment aspects of nanomaterials, regulatory research needs and related measures – SEC(2008)2036 accompanying document to COM(2008) 366 final: Regulatory Aspects of Nanomaterials.

4. Nanomaterials may be exempt from REACH, such as those based on polymers and biopolymers, in which case little regulatory provision exists.

Faced with the regulatory challenge of striking a balance between the opportunities presented by the development of nanomaterials and at the same time ensuring the public health and safety, and the protection of the environment is maintained, requires that additional information is needed on: the nanomaterials being manufactured or imported (chemical name, CAS#, nanoforms, quantities and company), how they are being used (to better understand patterns of exposure and routes to environment over a products lifecycle) and information on the potential hazards posed by particular nanomaterials (i.e. physical-chemical properties, fate and behaviour data and health and environmental effects).

At present, no such EU-wide system exists for collecting this information on a consistent and systematic basis. As more nanomaterials and nano containing products are placed on the environment, this problem is likely to become more prevalent in the future.

A7.5.2 Response of Member States

Having identified that nanotechnology could pose a risk to the human health and the environment; many Member States have adopted voluntary reporting requirements and/or are in the process of developing mandatory systems. As such, Member States are going beyond current European legislation, the costs and benefits of which will be discussed in the following section. Firstly, the various reporting systems introduced by the Member States are summarised below:

- **United Kingdom –** the UK Department of Environment, Food and Rural Affairs (Defra) introduced a voluntary scheme in September 2006. During the first 2 year trial of reporting system, thirteen data submissions were received, eleven from industry and two from academia. The scheme is ongoing and under review to determine how nanomaterial can be better regulated under the umbrella of REACH. Ultimately the low submission rate has questioned the effectiveness of this voluntary instrument in the UK.
- **France –** Taking in to account the precautionary principle and acknowledging the need for more information on nanomaterials and nanomaterial containing products, a voluntary mechanism under the French Agency for Environmental and Occupational Health Safety (*Agence française de sécurité sanitaire de l'environnement et du travail*) was established, but was not deemed as successful due to a low number of respondents. The French government has consequently proposed legislation that would establish a mandatory reporting system for manufacturers and importer in the same vein as REACH. It is believed that this measure is still under discussion within the National Assembly.
- **Germany** – The German Federal Institute for Occupational Health and Safety (*Bundesanstalt für Arbeitsschutz und Arbeitsmedizin*) along with the Association of the Chemical Industry (*Verband der Chemischen Industrie*) conducted a survey to have a better understanding of the activities involving the handling of nanomaterials. Surveying 656 companies, a response rate of 33% was achieved[199]. Subsequent reports discussing the issues surrounding nanomaterials, particles and their impacts have since been produced by the Federal Environment Agency.

Other countries to collect information in this area include Denmark, Ireland, United States, Canada, Japan and Australia.

A7.5.3 Costs and Benefits

Costs

The costs of implementing a mandatory European reporting scheme is not presently quantified or evaluated by the Member States or in third countries, as this policy option is currently under

[199] BauA & VCI (2006): Exposure to Nanomaterials in Germany: Results of the Corporate Survey of the Federal Institute for Occupational Health and Safety (BauA) and the Chemical Industry Association (VCI) Available at: http://www.bau.de/en/Topics-from-A-to-Z/Hazardous-Substances/Nanotechnology/pdf/survey.pdf

discussion, or any impact assessments have yet to be published. However, it is possible to derive a proxy for the costs of implementing a reporting system based on the REACH business impact assessment (BIA) and updated reporting costs of 2006[200] which relates to the bulk chemical variants of nanomaterials. As illustrated above, much of the required information may already be reported under REACH-CLP for many substances and therefore the costs of nanomaterial reporting should be viewed as higher bound estimates, as much of the information should already be available. A breakdown of the costs estimated for REACH, by reporting component is provided in Table 1.12. For simplicity, only the cost elements highlighted in the above discussion, deemed necessary for nanomaterial reporting are presented (i.e. information on what is being manufactured or imported, how it is being used and the potential hazards posed by particular nanomaterials) from the REACH BIA.

Table A7.9 Costs of Producing a Dossier and CSR in Accordance with Article 10 of the REACH regulations.

Technical Dossier Components		Unit Cost (€)
a (i)	The identity of the manufacturer(s) or importer(s) as specified in section 1 of Annex VI	15
(ii)	The identity of the substance as specified in section 2 of Annex VI	200
(iii)	Information on the manufacture and uses(s) of the substance as specified in section 3 of Annex VI; this information shall represent all the registrant's identified use(s). This information may include, if the registrant deems appropriate , the relevant uses and exposure categories	100
(iv)	The classification and labelling of the substance as specified in section 5 of Annex VI	20
(ix)	Proposals for testing where listed in Annexes IX and X	0
(x)	For substances in quantities of 1 to 10 tonnes, exposure information as specified in section 6 of Annex VI	15
(b)	A chemical safety report when required under Article 14. Sections 5 and 6 of this report may include, if the registrant considers appropriate, the relevant use and exposure categories	1,770
Total Internal Administration Costs		€2,120

The information provided suggests that the administrative costs for companies reporting on nanomaterial usage could equate to around €2,120 per nanomaterial registered.

In order for environmental and health protection to keep pace with rapid technological development in the area of nanomaterials, financial and manpower resources may also be required so that adequate testing and risk assessment methodologies are developed, and studies of the risks posed by nanomaterials are conducted. As a proxy for the funding costs, approximately €3.5 billion is currently allocated for the nanosciences, nanotechnologies, materials & new production technologies (NMP) research theme of the Commission Framework Programme 7 for the period 2007-2013[201]. Assuming 10% of funding is spent on risk assessment studies alone, this would equate to €350 million in total, or €58 million per year.

Benefits

The benefits of going beyond current EU legislation by introducing a mandatory reporting system are far less obvious and somewhat more difficult to assess. Two distinct approaches to quantification can be taken in such cases. Firstly, if it is assumed the REACH-CLP regulations are

[200] EC (2006): Technical Assistance for REACH Impact Assessment Updates – ENTR/05/100, produced for the European Commission DG Enterprise by Risk & Policy Analysts (RPA) consultants, December 2006.

[201] http://cordis.europa.eu/fp7/budget_en.html

less effective due to the potential risks posed by nanomaterials to human health and the environment, then a proportion of the benefits estimated to be incurred due to REACH will be lost. This lost benefit can be measured as a proxy for the benefits of a mandatory European reporting system to fill the regulatory gap. A second approach involves quantifying the human health and environmental damage caused by the absence of a reporting scheme (i.e. the costs of these gaps in regulation).

As presented in our scaling of the environmental problems associated with LIFE+, the damage caused can be valued based on compliance cost estimates avoided if regulation functions as desired or through examples of where regulation has failed to adequately protect in the past and has therefore resulted in adverse impacts, reported and quantified in published material. A range of estimates from the literature is presented in Table A7.10 below, including the assumptions and approach used.

Table A7.10 Estimates of potential benefits from regulating nanomaterials

Case	Description/ Assumptions	Benefits(€)
Building sewage treatment plants[202]	Cost avoided if regulatory measure (REACH) reduces environmental contamination by 10%	€7.1-€24 million in 2017 €131-€440 million total 2017-2014
Drinking water purification[202]	Cost avoided of investment in improved drinking water purification technology, assuming regulatory measure (REACH) reduces environmental contamination by 10%	€49-€302 million in 2017 €896-€5,564 million total 2017-2014
Avoidance of severe health effects[202]	Extrapolated benefits from case substances	€210-€2,500 million in 2017 €4,000-€50,000 million total 2017-2014
Asbestos related deaths[203]	1,600 Mesothelioma deaths occurred in the UK in 2000, estimated to reach a peak of 1,750 per annum by 2020. Benefit calculated based on VOSL of €1.5 million[204].	€2,400-€2,625 million per annum (UK only)

A7.5.4 Implications for LIFE+

The discussion clearly highlights that nanomaterials have the potential to pose future environmental problems, which could require action at the European level. An order of magnitude analysis of the costs and benefit of future action, indicates that the benefits of taking action to address potentially hazardous nanomaterials are likely to be several orders of magnitude greater than the costs of a European reporting system, already considered by some Member States. Asbestos is presented as an example to demonstrate the costs of inaction based on the assumption that regulatory failure contributed to the continued production and use of asbestos and its externality impacts. Even with a proxy cost estimate for research into the risks of nanomaterials included in the analysis, the examples provided suggest that substantial net benefits should still be achievable.

The development of policy to meet future environmental challenges under LIFE+ should therefore be expected to deliver substantial added value to EU citizens based on these results. The need for regulatory intervention and therefore for an environmental policy instrument should also be noted.

[202] EC (2005): The impact of REACH on the environment and human health, by the Danish Technical Institute (DHI) for DG Environment, September 2005

[203] Tillinghast (2003): Asbestos: The current situation in Europe, by Salvator, L., Santoni, A., and Michaels, M. For Tillinghurst – Towers Perrin, available at:

http://www.actuaries.org/ASTIN/Colloquia/Berlin/Salvatori_Santoni_Michaels.pdf

[204] Based on Commission's own impact assessment guidelines which calculates the Value of a Statistical Life (VOSL) at between €1-2 million

A7.6 Application of high prevention and recycling targets on bio-waste in Hungary

A7.6.1 Introduction

This case study is based upon the results of the study:" Assessment of the options to improve the management of bio-waste in the European Union", prepared by ARCADIS and Eunomia in 2010. The study and its annexes can be consulted on

http://ec.europa.eu/environment/waste/compost/developments.htm

A7.6.2 Environmental issue

This case study assesses the costs, environmental, social and economic benefits of a number of policy measures to reach **high prevention and recycling** targets on **bio-waste in Hungary.**

It tackles this issue of waste management, and more in particular the management of bio-waste. Bio-waste has a negative impact on climate change due to GHG emissions (methane) from landfilling, and could have a positive impact on the improvement of soil fertility through the use of bio-waste as compost.

The concept of **bio-waste** as used in the Waste Framework Directive and in this case study is more restrictive than the concept of biodegradable waste as defined in the Landfill Directive. Indeed, the Waste Framework Directive defines bio-waste as "biodegradable garden and park waste, food and kitchen waste from households, restaurants, caterers and retail premises and comparable waste from food processing plants", while biodegradable waste is defined in the Landfill Directive (1999/31/EC) as "any waste that is capable of undergoing anaerobic or aerobic decomposition, such as food and green waste, and paper and paperboard".

For Hungary it is assessed that bio-waste corresponds to 56% of total biodegradable waste.

Bio-waste is split up between green (garden) waste and food (kitchen) waste. In Hungary, about 70% of the bio-waste can be considered food waste, and 30% as green waste.

A7.6.3 Policy and objective

EU acquis

One of the Commission objectives in the area of waste management is to improve the way in which bio-waste is managed in the EU. However, bio-waste management is also affected by other legislation (such as on nitrates) or affecting other targets (such as GHG emissions). Relevant European legislation and policies include:

- Thematic strategy on the Prevention and Recycling of Waste
- Waste Framework Directive 2006/12/EC: *provisions on bio-waste and end-of-waste criteria*
- Landfill Directive 1999/31/EC: *targets regarding the reduction of biodegradable municipal waste going to landfill*
- Waste Incineration Directive 94/76/EC: *emission limit values*
- Packaging Directive 94/62/EC
- Regulation on Animal By-products
- IPPC Directive 2008/1/EC
- EU soil strategy
- European Climate Change Program
- Directive 91/692/EC including use of sewage sludge
- Nitrate Directive 91/676/EEC : *limits on N-loads on farmlands which can affect the application of compost to land*

- Biofuels Directive 2003/30/EC
- EU policy for Renewable Energy and Directive on Renewable Energy Sources: *affecting the incentives for the use of bio-waste as a renewable energy sources*.
- Common agricultural policy
- LCA guidelines

A7.6.4 Landfill Directive objectives

The target of the Landfill Directive is that not later than 5 years after the date of implementation, biodegradable municipal waste going to landfills must be reduced to 75% of the total amount of biodegradable municipal waste produced in 1995. After 8 years, this must be reduced to 50% and after 15 years to 35%. The targets of the Landfill Directive are set on biodegradable waste and not on bio-waste. This means a reduction to 75% of biodegradable waste to be landfilled does not automatically request a reduction to 75% of bio-waste to be landfilled. In the modeling we start however from the presumption that the ration of bio-waste / other waste such as paper is more than 2, and that the recycling of other waste and of bio-waste will follow largely the same trends, and hence 75% is also applicable for bio-waste landfilling.

The target for Hungary is to reach 75% in 2004, 50% in 2009 and 35% in 2016. Hungary did not make use of the possibility to ask for a derogation and to postpone these deadlines with 4 years. This means that the following maximum quantities of bio-waste can be landfilled:

- 2009: 1.170 ktonnes
- 2016: 819 ktonnes

A7.6.5 Climate Change program

The commitments of the Community, as endorsed in the European Council of March 2007, are to achieve at least a 20% reduction of GHG emissions by 2020 compared to 1990.

In general, for EU27, this means that emissions should be reduced from 5.564 to 4.451 million tons CO_2 equivalents. For Hungary, GHG emissions should be reduced from 97,4 to 77,92 million tonnes CO_2 equivalents (reduction of 19,48 million tonnes). In 2008, total GHG emissions were at 73,1 million tonnes. In order to achieve the 20% reduction target, Hungary would need to reduce its emissions with another 4,82 million tonnes of CO_2 equivalents.

A7.6.6 Above EU acquis

In this case study, an impact assessment has been developed for a "**high prevention and recycling**" scenario to understand what the costs and the benefits of such a scenario will be, assuming that the Landfill Directive targets are already reached. This scenario can be interpreted as the "high ambition scenario", characterized by important waste prevention and high recycling rates. It includes the following objectives:

- Reduce the bio-waste **generation** to be treated with 7,5% compared to the baseline scenario, as result of effective waste prevention, meaning that in 2020, the total bio-waste collected will be **1.938 ktonnes** *(cf. baseline scenario: expected quantity in 2020 = 2.095 ktonnes)*.
- The **recycling** target is set at 60% of food waste and 90% of garden waste (that are not home composted) by 2020. This means these quantities are all separately collected and all recycled: garden waste in in-vessel composting (IVC), food waste in IVC or anaerobic digestion (AD).
- Home **composting**: same proportion as in baseline scenario: 216 ktonnes

We will assume gradual implementation of the targets for prevention and separate collection, with 1 January 2013 as start date. 1 January 2017 will be taken as the interim date, 1 January 2020 will be taken as the final target date. The interim target corresponds to 40% of the final target.

A7.6.7 Context

A7.6.8 Generation and collection of municipal and bio-waste

In 2005, 4.646 Ktonnes of municipal waste was generated in Hungary. The population in 2005 can be assessed at 10 million inhabitants, which makes an average municipal waste generation of 464 kg/inh.year. Hungary has reached a full coverage of waste collection.

Of the municipal waste, about 27,6% is assessed to be bio-waste (1.282 ktonnes).

Bio-waste is reported to be currently treated in :

- Landfilling in mixed municipal waste (82,1 %),
- Composting (5,7 %),
- Incineration or co-incineration in mixed municipal waste (5,5 %)
- Home composting (3,8 %)

Mechanical Biological Treatment (MBT) in mixed municipal waste (2,9 %)

Today the large majority of municipal waste is hence still landfilled. Hungary is in the middle of a transition, based on European funding, from dumpsites to regional sanitary landfills that are equipped with a sorting and a windrow composting platform. Landfilling of organic waste has been partially banned.

On the other hand, composting is currently very low (less than 5% of the bio-waste is being composted) although there is a very large potential for the use of compost materials in Hungary. Hungarian agriculture suffers from poor soil conditions and the use of large quantities of compost will be decisive for sustainable soil management. The agricultural crop cultivation plays an important economic role in Hungary, 51% of the country's total area is used for it (5 million ha arable land). The political situation in the former regime and the changes in the last 15 years lead to shortcomings in fertilizer management and to soils very poor in organic matter. This lead to a tremendous need for high quality organic fertilizers in Hungary. Facing this deficit, the production of compost is not only a matter of waste management but decisive for a sustainable soil management in Hungary. Even if all biodegradable organic waste (3,5 million tons) would be composted, the resulting 2 million tons of compost would never meet the need to improve the 5 million ha arable land. Besides agriculture, an additional potential exists in horticulture, landscaping and land restoration. The market shares can be split up as follows:

- Agriculture: 55%
- Horticulture and greenhouse production: 15%
- Landscaping: 10%
- Hobby gardening: 5%
- Land restoration and landfill cover: 15%

A7.6.9 Expected evolution under a baseline scenario

A baseline scenario can be developed involving a projection until 2020 of bio-waste generation and treatment methods, on the assumption that Hungary is coping with the targets from the Landfill Directive.

This baseline scenario concerning the generation and composition of municipal waste is set up by extrapolating the current situation and developments, assuming that no additional specific measures will be taken on bio-waste. It is based upon:

- The actual generation of this waste fraction in 2006
- The demographic evolution (*linear relationship between population and total waste production*)
- The evolution in GDP, as an indicator for changing consumption patterns (*average waste generation per capita is considered evolving in line with growing welfare, according to what has*

been observed in the front runner MS in Western European countries and the environmental Kuznetz curve) and the classification of Hungary on its stage in a typical waste policy development and its degree of decoupling (*scenario 2: no decoupling takes place and the environmental impact evolves at the same speed as economic activity*)

The baseline scenario hence allows to make a prognosis on the **quantities** of waste that will be generated in 2020. These quantities will be larger than in 2006, taking into account the expected increasing demography and GDP[205].

For Hungary, the increase of the bio-waste quantity is expected to be about 32%:

- the total population in Hungary is expected to decrease with 0,22% per year.
- the Hungarian GDP is assessed at an average yearly growth of 3,66% between 2000 and 2020.

The generation of municipal waste is driven by a rather strong economic growth combined with a declining demography. The assessed quantity of municipal waste for 2016 is 5.690 ktonnes. The change in the composition of the generated waste is characterized by an increasing fraction of bio-waste. **In 2016, the generation of bio-waste is expected to be almost 1.975 ktonnes, and in 2020 the amount would be 2.095 ktonnes (32% more than in 2008).**

A projection of municipal waste **treatment methods** has also been developed for the baseline scenario[206], based upon the preferences of Hungary as expressed in its waste management plans and the expected distribution of bio-waste treatment techniques (such as preferences for certain energy applications or compost applications).

For Hungary, taking into account the targets set by the Hungarian authority, the following treatment quantities for bio-waste are expected in 2020 (total quantity = 2.095 ktonnes):

Mixed waste treatment				**Bio-waste selective fraction treatment**			
Landfill	Incineration D10	Incineration R01	MBT	Composting	Home composting	AD	other
50,8%	0%	11,2%	38%	76,6%	23,4%	0%	0%
558 ktonnes bio-waste	0	123 ktonnes bio-waste	417 ktonnes bio-waste	764 ktonnes bio-waste	233 ktonnes bio-waste	0	0

The above is taking into account that 47,6% of the generated bio-waste is separately collected for recycling from 2016 on. In other words, 1.098 ktonnes will be collected as mixed waste, and 997 ktonnes will be separately collected. Only 558 ktonnes of all bio-waste will be landfilled, and 1.537 ktonnes will be treated by other means. This is beyond the Landfill Directive target, in which 819 ktonnes might still be landfilled. See however the remarks above on the distinction between bio-waste and biodegradable waste. The targets are set for the total amount of biodegradable waste. By composting more, Hungary can afford a longer transition period for other biodegradable waste streams.

In order to reach EU acquis, a considerable and persistent effort on developing alternatives for landfill will be needed, on top of what is already undertaken, and hence this scenario can not be seen as a 'business as usual' scenario. However, this is not part of the cost benefit analysis that follows in this case study.

[205] On EU27 level, the bio-waste growth expected is 10% in 2020 compared to 2008. At EU12 level, the increase is expected to be 40%.

[206] In general, for EU27, the following trends are expected by 2020, compared to 2008: Landfilling: - 58 %, Incineration: + 30 %, MBT: + 103 %, Composting: + 48 %, Home composting: + 149 %, AD: + 349 %. For EU 12, the trends are similar (but the quantities of waste are a lot smaller), except for MB T (increasing 15-fold) and composting (increasing 4 fold). Also, the quantities of bio-waste sent to AD in the EU12 would grow from zero to 66 ktonnes, but these quantities remain extremely small compared to the quantities sent in the EU15.

A7.6.10 Expected evolution under a high prevention and recycling scenario

Taking into account the objectives of this scenario, the effect of waste prevention will result in a total of 1.938 ktonnes of bio-waste generated in 2020.

The optimal treatment technique for source separated food waste for Hungary, using the lowest cost to society (under the social cost metric) is IVC with a biofilter. This technique has a net social cost of 50,6 €/tonne, while AD costs range between 56,4 and 70,2 €/tonne.

In order to achieve the high prevention and recycling scenario objectives and the optimal treatment techniques, the distribution of bio-waste over the different bio-waste **treatment** possibilities in 2020 would hence be:

- Landfill: 14,8 % (288 ktonnes)
- Incineration D10: 0
- Incineration R01: 3,3% (64 ktonnes)
- MBT: 11,3% (220 ktonnes)
- Composting: 59,4% (1.150 ktonnes)
- Home composting: 11,1% (216 ktonnes)
- AD: 0

A7.6.11 Policy measure(s)

The analysis in the reference study has estimated the costs and benefits of reaching some uniform prevention, collection and recycling targets. It has not considered the policies that would be needed at the Member State level to implement these targets.

Hungary can reach the targets by the establishment of a gradually **increasing capacity** for:

- Collection of source-separated bio-waste:
  - The national bio-waste program of 2005 includes initiatives for extending the separate collection to include garden waste, green waste from public parks, organic kitchen waste and paper by 2008.
  - The national waste management act requires that by 2013, 80% of the population should have access to separate collection of packaging materials.
- Providing waste sorting facilities
- Expanding composting capacity for the source-separated bio-waste (the existing MBT-installation can be retrofitted for this goal)

Possible policy measures that could be taken include:

- Ordinances for separate collection, requiring local authorities to organize separate collection
- Optimizing bio-waste capture: optimization / adaptation / replacement of existing collection systems
- Targets for recycling and composting
- Setting compost standards
- Targets for reducing residual waste
- Food waste prevention campaigns, seeking to inform households of good practice in food storage
- Collection system for food and garden waste (e.g. free waste collection)
- Home composting campaigns

- Landfill / incineration bans: gradually reducing the permitted amount of organic wastes that can be landfilled
- Generating a market for compost, though subsidies and green public procurement
- Include the use of compost in the agricultural policy schemes

A7.6.12 Financial costs

The cost calculation for this case study is described in detail in chapter 7 and annex E of the reference study on 'Assessment of the options to improve the management of bio-waste in the European Union'.

The model has used 3 different cost metrics: the social metric, the private metric and the hybrid metric. The costs are presented in real 2009 euros.

Financial costs have been modelled under both a private and a social cost metric.

- The **private cost metric** (WACC) includes the relevant taxes, subsidies, and support mechanisms that apply to the management of waste. The WACC values the opportunity cost of capital investments.
- The **social cost metric** does not include the effect of taxes and subsidies for the calculation of financial costs.

The costs have been calculated for the following treatment methods:

- Waste prevention
- Composting (green and food)
- Home composting
- AD (green and food)
- MBT
- Incineration
- Landfill

A7.6.13 Weighted average cost of capital (WACC)

The cost of capital for treatment processes varies depending on a number of factors such as the regulatory structure in respect of the national waste treatment market, the perceived credit-worthiness of the institutions seeking to attract international finance, and the way in which projects are financed. The weighted average cost of capital for specific processes for Hungary (high risk band) is:

- Landfill: 14%
- Incineration: 19%
- MBT: 19%
- AD: 16%
- IVC: 16%
- Windrow: 14%

A7.6.14 Revenues from electricity sales

Hungary would have a revenue from electricity sales of 52,44 €/MWh, 38,98 €/MWh from heat sales. It would have a revenue of 36,41 €/MWh from biogas to grid sales and of 0,18 €/m^3 from biogas to vehicle fuel sales.

The support for renewable electricity for Hungary is 10,33 €/MWh for renewable electricity for AD. There is no support for landfill gas, combined heat & power, or incineration, or for renewable heat, biogas to grid or biogas to vehicle fuel.

Hungary has not imposed a landfill tax or an incineration tax.

A7.6.15 Revenues from compost

We have assumed a value of 3,5 € per tonne of waste input for compost.

A7.6.16 Treatment process specific assumptions

In order to establish the different process specific **capital and operating costs**, a baseline plant, considered to be best representing the situation in Europe, has been taken.

From this baseline of process specific costs, the proportion represented by labor costs for both capex (capital expenditure) and opex (operational expenditure) is established for Hungary. This element is then varied according to the local wage levels, while the 'technology cost' (i.e. the cost of purchasing the capital equipment) is held constant.

The same approach is applied to the operational expenditure, with the technology element being held constant, and the labor element varied according to local wages of Hungary. The operating costs do not include the revenues from sales of compost or energy.

The average hourly labor cost in Hungary is 6,14 €. The capex and opex for the different treatment processes are listed in the table below, as well as their labor proportions for each process.

Table A7.11 Overview of capital and operational costs

Treatment process	Capex (€/t)	Labor proportion Capex (%)	Opex (€/t)	Labor proportion Opex (%)
Landfill	123	20	5	50
MBT (stabilization)	178	30	14	34
MBT (biodrying)	194	30	16	34
Incineration (electricity only)	550	16	21	23
Incineration (CHP)	668	16	22	21
Incineration (heat only)	647		21	
AD (electricity only)	305	25	29	30
AD (CHP)	388	25	30	30
AD (gas upgrading)	358	25	35	30
Windrow composting	92	17	5	21
IVC	167	25	11	15

A7.6.17 Food waste prevention

Food waste constitutes a significant proportion of the household and municipal waste streams. There is a growing recognition that much of this food waste may be avoidable. In respect of food waste prevention, the issue is not so much one of costs, but what is required to encourage households to avail themselves of the potential savings. Households typically waste around 500 € each year on avoidable food waste. In addition, there are clearly costs to municipalities (and hence, the households through the payment of the service) of collecting and treating / disposing of this waste.

A7.6.18 Home composting

The cost of home composting is caused by the reduction of the costs of collection of waste and its treatment (depending on the quantitative reduction effect) on the one hand, and the costs borne by the household for the composting system on the other.

This cost is varying between 19 and 50 € per tonne of waste being home composted.

The costs which home composting helps to avoid depend upon the exact detail of the collection system being used, and the way in which home composting affects participation in the collection scheme. As soon as these avoided costs become larger than 19 to 50 € per tonne, then home composting will lead to savings.

A7.6.19 Collection

The difference in financial costs from collection of bio-waste can, if the transition in collection systems is well engineered, be a net reduction in collection costs. Bio-waste collection (in the context of integrated collection systems) can be undertaken with zero additional cost. It is possible to re-optimise services in the transition to bio-waste collection such that there is no significant increase in transport related externalities. When bio-waste is collected, the amount of mixed municipal waste to be collected will decrease. The frequency of mixed household waste collection can decrease in line with increasing collection efforts for source separated bio-waste. A status quo or even net reduction of operational costs can be obtained.

A7.6.20 Composting - IVC

IVC systems come in various shapes and sizes. They can be horizontal or vertical. Their average lifetime can be estimated at 20 years. We assumed the following costs for IVC in Hungary (social metric):

- Capex = 166,60 €/tonne = 12,26 €/tonne/year
- Opex = 11,10 €/tonne (*Rejects = 5% of input material to be landfilled*)
- Maintenance = 8,33 €/tonne
- TOTAL NPV = 31,69 €/tonne

If ammonia scrubbers are installed at IVC plants for GHG abatement, the following costs are to be foreseen:

- Capital cost = 6,25 €/tonne
- Operating cost = 1,55 €/tonne of waste input

A7.6.21 Incineration

The financial costs can be calculated depending on the type of facility. We assume a lifetime of capital of 20 years. Below the NPV of the financial costs is given for the different types in Hungary, based on social and private cost metrics.

- Incineration (electricity only): Social cost = 74,7 €, Private cost = 122,5 €
- Incineration (CHP): Social cost = 84,8 €, Private cost = 142,8 €
- Incineration (heat only): Social cost = 78,6 €, Private cost = 134,8 €

The above financial costs (electricity only) include the following elements:

- Disposal costs (relatively small compared to the other costs)
- Maintenance (about 29 €/tonne)
- Unit opex (about 21 €/tonne)
- Annualized capex (about 40 €/tonne)
- Revenues from energy related outputs (about 25 €/tonne)

A7.6.22 Landfill

We assume that all landfill are compliant with the requirements of the Landfill Directive, and have a lifetime of 20 years.

The financial costs associated with the landfill are calculated with the social cost metric and therefore exclude any revenue from the support schemes for the generation of electricity from landfill gas, and any landfill taxes.

- Capex = 123,3 €/tonne = 13,10 €/tonne/year
- Opex = 5,50 €/tonne
- Maintenance = 6,20 €/tonne
- Energy revenues = 8,10 €/tonne
- TOTAL NPV = 22,10 €/tonne

When financial costs are calculated with the private cost metric, results are as follows:

- Capex = 123,3 €/tonne = 18,10 €/tonne/year
- Opex = 5,50 €/tonne
- Maintenance = 6,20 €/tonne
- Energy revenues = 8,10 €/tonne
- Landfill tax = 0
- TOTAL NPV = 27,10 €/tonne

A7.6.23 MBT

MBT facilities can be configured in various different ways. Our analysis assumes essentially 3 types of biological treatment processes. In general, the costs are as follows.

- Aerobic stabilization system
  - Capital costs = 230 €/tonne
  - Operating costs = 19 €/tonne
- Aerobic biodrying facility preparing SRF
  - Capital costs = 250 €/tonne
  - Operating costs = 21 €/tonne
- Split system preparing SRF
  - Capital costs = 320 €/tonne
  - Operating costs = 45 €/tonne

A7.6.24 Environmental improvements

In the below chapter, environmental impact and emissions modelling is being done for the different policy measures and treatment options **included in the high prevention and recycling scenario**.

A7.6.25 Food waste prevention

For every tonne of food waste avoided, around 4,5 tonnes of CO_2 equivalents are avoided. This is clearly highly significant. The monetised benefits from the avoided GHG emissions alone would amount to around 121,5 € per tonne of food waste avoided.

A7.6.26 Home composting

The level of emissions of home composting is found to be very low. Net welfare gains can be made from home composting.

A7.6.27 Collection

Collection systems influence the waste generation and impact on the viability of particular treatment systems.

Collection of waste impacts the environment through the vehicle use. When separate collections of bio-waste are introduced, the change in vehicle use and the associated change in environmental damage must be assessed.

These include fuel related emissions (most specifically climate change and air pollution) and congestion.

- Fuel related emissions are internalised within the environmental costs. Under various approaches of bio-waste collection, the total number of vehicles does not increase significantly. Furthermore, the differences in total vehicle mileage driven and fuel costs / use either decrease under the bio-waste collection options or do not increase significantly.
- Congestion will most likely not be affected significantly by a change in the collection system

Other up- and downstream processes such as costs arising from energy and fuel production, and soil and water pollution (the most significant effects of traffic on soil come from the emission of heavy metals and polycyclic aromatic hydrocarbons) also relate to fuel usage. These impacts can not be linked to kilometres travelled.

Noise impact however may be assumed to be more closely related to the distances travelled. The nature and landscape marginal costs are very low.

It can be concluded that any external costs that are created in the context of a switch to bio-waste collection are accommodated in the potential reductions in financial costs.

A7.6.28 Composting - IVC

The following environmental impacts result from the IVC process:

- Direct emissions from the process are principally biogenic CO_2 emissions from the degradation of food during the composting process.
- Air quality impacts resulting from the process itself (excluding the energy impacts) are relatively small, and relate to NH_3 emissions.
- Impacts associated with energy used by the process are dominated by the damage caused by air quality emissions. A significant proportion of this impact results from the use of electricity. Principal emissions are SOx from the combustion of coal, along with some emissions of NOx from both diesel and electricity use

The total environmental damage cost for IVC is calculated as 8,66€/tonne of bio-waste composted (including both direct emissions to air form the composting process, and the indirect emissions associated with energy use by the process). This assumes a well managed process designed to minimise CH_4 emissions. We assume the facility uses a biofilter to reduce emissions of NH_3, VOC and CH_4, but that this occurs at the expense of some additional N_2O emissions.

Table A7.12 Environmental benefits and costs of composting

	Climate change	Air quality	Other impacts	Totals
PROCESS				
Direct emissions (non energy)	€9.94	€0.49		€10.57
Energy use (electricity & diesel)	€0.44	€4.57		€5.11
USE OF COMPOST				
CO_2 emissions from soil	€1.87			€1.87
Diesel used to spread compost	€0.02	€0.58		€0.60
Reduction in pesticide use			- €3.29	- €3.29
Nutrient displacement impacts			- €1.96	- €1.96
Avoided energy, fertiliser production	- €0.09	- €0.25		- €0.34
Avoided phosphate rock extraction			- €0.69	- €0.69
Avoided water use			- €0.82	- €0.82
Avoided nitrogen leaching			- €1.61	- €1.61
Avoided N_2O emissions			- €0.13	- €0.13
Avoided peat extraction			- €0.65	- €0.65
FINAL TOTALS	€12.18	€5.39	- €9.15	€8.66

Of the produced compost, 50% is assumed to be used in agriculture, of which we consider the following benefits:

- The displacement of alternative nutrient sources otherwise applied through the use of synthetic fertiliser, including the avoided external costs of fertiliser manufacture and the avoided energy use associated with this.
- The greenhouse gases avoided from nitrogenous fertiliser applications (i.e. N_2O emissions) and the external costs associated with this.
- Avoided external costs from a reduction in the leaching of nitrate (from nitrogenous fertilisers) into groundwater.
- Avoided external costs associated with process wastewater and phosphogypsum disposal during the manufacture of phosphate fertiliser.
- Avoided energy requirement associated with the mining of phosphate rock for phosphate fertiliser, and the avoided external costs associated with this
- Avoided external costs through a reduction in the use of pesticides
- Avoided external costs through a reduction in the use of water.

The remaining 50% of the compost is assumed to displace the use of peat in horticulture and hobby gardening applications. Here the avoided impacts are principally the slow release of CO_2 from the aerobic degradation of peat after its removal from the peatland.

We have not quantified the external costs associated with any of the following:

- The production of leachate from composting;
- Odour from composting process, and other nuisances such as flies and vermin;
- External costs associated with the production of bioaerosols;
- The impacts associated with human or plant pathogens; and

- Estimation of the disamenity associated with a composting facility.

We note that the majority of the above can be minimised with careful plant maintenance and process management.

In addition, our model does not attribute an external benefit to any of the following positive impacts associated with the use of compost:

- Benefits from conservation of biodiversity through avoiding peat use;
- Reduced requirement for liming;
- Reduced susceptibility to soil erosion;
- Improved infiltration (including reduced irrigation requirement and reduced risk of flooding);
- Improved tilth;
- The bioremediation of soil using compost.

On balance, therefore, our model is likely to underestimate the benefits associated with the use of quality compost produced from well-managed facilities. Nonetheless, it can be seen from the results presented in the above table that the beneficial aspects of compost application remain significant, notwithstanding the omission of those benefits described above.

A7.6.29 Incineration

The damage costs relate to the following environmental impacts resulting from the incineration facility:

- Direct emissions principally relate to the release of biogenic CO_2 as the waste is combusted.
- Air quality impacts resulting from the process are much higher than for the other waste management routes.
- Energy use is significant at incineration facilities, resulting in both climate change and air quality impacts. Grid electricity is used principally within the air pollution control system, and some diesel is used to start the combustion process.
- A considerable proportion of the climate change and air quality impact is however offset by energy generation at the facility. A significant proportion of this results from offset SOx emissions relating to the use of coal and oil within the energy mix of the country. Some NOx emissions are also offset, although these account for a smaller proportion of the total damage costs

Table A7.13 Environmental benefits and costs of incineration

		Climate change	Air quality	Other impacts	Totals
ELECTRICITY ONLY	Process				
	Direct emissions	€11.28	€30.02		€41.30
	Energy use (electricity & diesel)	€1.95	€17.58		€19.53
	Avoided emissions, energy generation				
	Electricity	- €5.75	- €43.88		- €49.63
	FINAL TOTALS	€7.48	€3.72		€11.20
CHP	Process				
	Direct emissions	€11.28	€30.02		€41.30
	Energy use (electricity & diesel)	€1.95	€17.58		€19.53
	Avoided emissions, energy generation				
	Electricity	- €3.08	- €23.50		- €26.58
	Heat	- €3.17	- €18.45		- €21.62
	FINAL TOTALS	€6.98	€5.65		€12.63
HEAT ONY	Process				
	Direct emissions	€11.28	€30.02		€41.30
	Energy use (electricity & diesel)	€1.95	€17.58		€19.53
	Avoided emissions, energy generation				
	Heat	- €6.03	- €34.85		- €40.88
	FINAL TOTALS	€7.20	€12.75		€19.95

The monetised environmental emissions associated with the incineration of food waste are 24,5 €.

Our analysis does not consider the following impacts:

- The time dependent release of emissions associated with the landfilling of pollution control residues
- A financial estimation of the disamenity associated with living close to an incinerator.

In both cases, only limited data is available upon which to make an estimation of the damage costs.

A7.6.30 Landfill

The damage costs relate to the following environmental impacts resulting from the landfilling of food waste:

- Impacts are dominated by the climate change impacts caused by the direct emissions from the process – principally fugitive CH_4 emissions resulting from the anaerobic degradation of carbon in the landfill. Some biogenic CO_2 emissions also occur.
- Air quality impacts resulting from the process are dominated by NH_3 and NOx emissions resulting from the relatively high nitrogen content of food waste.
- The process also generates energy and this offsets some of the climate change and air quality impacts. The offset associated with this generation is reduced as it occurs over the 150 year lifetime of the material within the landfill, and benefits occurring during subsequent years are therefore discounted.

The issue of landfill gas capture efficiencies is one which critically influences the performance of landfills in any external cost assessment. We assume that landfills capture 50% of the gas that results from the biological degradation of the waste, during the 150 year period of the analysis. Of the gas that is captured, 60% is used to generate electricity, displacing an equivalent amount of generation which would otherwise have occurred using the average fuel mix of Hungary. The remaining captured gas is assumed to be flared, which oxidises the CH_4 contained within the gas to CO_2. We further assume that 10% of the CH_4 in the uncaptured gas is oxidised by the covering material of the landfill.

Table A7.14 Environmental benefits and costs of landfill

	Climate change	Air quality	Other impacts	Totals
Process				
Direct emissions (non energy)	€48.45	€18.06		€66.51
Energy use (electricity & diesel)	€0.15	€3.63		€3.78
Avoided emissions, energy generation				
Electricity	- €0.90	- €7.30		- €8.20
FINAL TOTALS	€47.70	€14.39		€62.09

The monetised environmental emissions associated with the landfilling of food waste are 62,20 €.

Our model does not include external costs associated with the following impacts:

- Emissions of leachate to soil and water;
- Impacts associated with odour;
- A financial estimation of the disamenity associated with living close to a landfill.

These impacts are likely to be relatively small in comparison to that which is attributed to the emissions of greenhouse gas to air.

A7.6.31 MBT

The 3 types of MBT facilities considered in the study each have different environmental impacts, because the process is different:

- **Aerobic stabilization system:** the output is landfilled after undergoing an aerobic degradation process to stabilize the waste
- **Aerobic biodrying facility preparing SRF:** the aim is to dry the waste using the biological treatment phase and subsequently produce a fuel. It involves the use of the heat from the process of biodegradation to reduce the moisture content of waste prior to its being mechanically refined for use as fuel. The fuel is typically refined after biological treatment – removal of inert material such as stones and fragments of glass. Rejects from the process are stabilized prior to being landfilled.
- **Split system preparing SRF:** the waste is split into low and high calorific fractions towards the start of the process. The high calorific fraction (containing the bulk of the paper and plastics) is thermally treated (combusted in a dedicated thermal facility or in a mass burn incinerator), whilst the low colorific fraction (containing the much of the food waste and fragments of inert material) is stabilized (biologically treated) prior to being landfilled.

Direct emissions to air from the process

Depending on the type of facility, direct emissions to air from MBT processes may result from:

- The Aerobic Stabilisation and Aerobic Biodrying processes;

- The incineration of SRF for those processes that produce a fuel;
- The landfilling of the stabilised residue or reject stream.

Emissions will result in impacts to both climate change and air quality.

Energy use at facilities

Energy is used in the mechanical and biological phases of MBT facilities for:

- the removal of materials for refinement of fuel and recycling; and
- shredding the waste.

Typically both diesel and electricity are used. The energy used at the facilities will result in climate change and air quality impacts that are dependent upon the energy mix of each country.

A7.6.32 Energy generation

Our model assumes that the gross energy content – when considered on a MJ / kg basis - of the SRF produced from the biodrying process is higher than that produced by the splitting process, largely as a consequence of the reduction in moisture content. The splitting process produces a greater volume of fuel, however, and this results in greater energy generation overall per tonne of waste to the MBT facility.

The typical gross energy content of SRF produced by whole waste biodrying process is 2,020 kWh, whilst that produced by the splitting process is 2,200 kWh per tonne of waste to the facility. We assume that the SRF produced by the MBT processes is treated in an incinerator that generates only electricity. This energy generation will result in offset climate change and air quality impacts.

A7.6.33 Social and economic benefits

In the following paragraphs, the social and economic benefits that derive from the environmental improvements (health, environmental quality, resources, employment … ; as far quantified/monetised as possible) are calculated.

Taking into account the shifting towards higher waste prevention and towards a different distribution over the treatment methods (as described in the context chapter on the high prevention and recycling scenario), the total social and economic benefits of the scenario can be calculated. This is presented in the table below.

The NPV total **environmental** damage net saving from 2013 till 2020 would be almost 99 million €, being about 10 € per capita. There is hence a significant benefit from waste prevention. The reduction in GHG emissions represents the greatest portion of the reduction in the environmental damage costs.

The NPV **financial cost** for composting is about 45 million € (2013-2020). However, the NPV financial benefit for avoided landfilling, incineration, MBT and home composting is in total more than 45 million €, bringing the balance to 0,34 million € of financial revenue[207].

[207] The financial savings from the policy occur because the avoided cost of residual waste treatment / disposal is greater than the cost of treating separately collected bio-waste. In Hungary however, bio-waste treatment costs are comparable to the costs for residual waste treatment, and financial savings are low.

Table A7.15 overview of social and economic costs and benefits of treatment alternatives

Incremental changes from baseline		Waste prevention	Landfill	Incineration	MBT	Composting	Backyard composting	Anaerobic digestion	Total
Total Waste Movement (2013-2020), thousand tonnes		521	-868	-186	-606	1.197	-58	0	0
Total GHG implications including organic carbon for the year 2020		-707	-368	-22	-123	189	-8	0	-1.039
Total GHG implications excluding organic carbon for the year 2020		-707	-276	9	-24	44	0	0	-954
Costs all in € thousands (thousand separator as '.')									
Financial (Private)	Financial Costs NPV (2020)	€ 0	-€ 7.134	-€ 7.217	-€ 11.224	€ 25.186	-€ 437	€ 0	-€ 826
	Total Costs NPV (2013-2020)	€ 0	-€ 17.936	-€ 17.771	-€ 26.838	€ 60.915	-€ 1.132	€ 0	-€ 2.763
Financial (Social)	Financial Costs NPV (2020)	€ 0	-€ 5.796	-€ 4.397	-€ 7.997	€ 18.593	-€ 303	€ 0	€ 101
	Total Costs NPV (2013-2020)	€ 0	-€ 14.572	-€ 10.828	-€ 19.121	€ 44.967	-€ 784	€ 0	-€ 338
Environ-mental	Financial Costs NPV (2020)	-€ 16.468	-€ 17.675	-€ 1.417	-€ 4.457	€ 1.477	-€ 348	€ 0	-€ 38.887
	Total Costs NPV (2013-2020)	-€ 42.754	-€ 44.439	-€ 3.489	-€ 10.658	€ 3.568	-€ 899	€ 0	-€ 98.671
Net Cost to Society	Financial Costs NPV (2020)	-€ 16.468	-€ 23.470	-€ 5.814	-€ 12.454	€ 20.070	-€ 651	€ 0	-€ 38.786
	Total Costs NPV (2013-2020)	-€ 42.754	-€ 59.011	-€ 14.317	-€ 29.779	€ 48.535	-€ 1.683	€ 0	-€ 99.009

When both financial (social metric) and environmental savings are considered, the **net saving to society** can be calculated. The net revenue to the society of Hungary from improved bio-waste management would hence be about 99 million € as to the combined effect of the policy over the period of 2013 to 2020.

The further annual benefit that could be achieved through the resultant increase of waste treatment infrastructure required to be in place by 2020 for the target would be almost 39 million €. This is of great importance since, given the fact that nearly 40% of the total benefit occurs in 2020, the continued benefits, beyond the period modelled in this case study, will remain significant.

Moreover, GHG emissions are reduced. Indeed, the policy scenario will deliver a net GHG saving of about 1 million tonnes of CO_2-equivalents saved in 2020. This is very significant compared to the EU target (decreasing the GHG emissions with 4,82 tons between 2008 and 2020), representing almost 21% of it.

A7.6.34 Conclusion

LIFE+ aims at funding projects of about 1 million €, with a total budget allocated to Hungary of about 5,2 million € in 2008. Of this budget 3,1 million € were actually absorbed for the funding of 4 projects.

Hence, if projects improving bio-waste management would be funded (such as separate collection, waste prevention projects, composting of waste), the net benefits to society would probably greatly exceed the funded amount, depending on the number of tonnes of waste less generated or the tonnes composted.

A7.6.35 List of abbreviations

AD	Anaerobic Digestion
MBT	Mechanical Biological Treatment
NPV	Net Present Value
GHG	Greenhouse Gas
IVC	In-Vessel Composting
CHP	Combined Heat & Power

Capex	Capital expenditure
Opex	Operational expenditure

A7.7 Development of windrow composting as a tool to obtain landfill diversion of biodegradable waste for the region of Pleven in Bulgaria

A7.7.1 Introduction

This case study is based upon the results of the study:" Preparation of solid waste management measures in Pazardjik, Pleven and Vidin regions-Bulgaria", (EuropeAid 117409/D/SV/BG) prepared by ARCADIS and partners for the Bulgarian Ministry of Environment and Water.

A7.7.2 Environmental issue

This case wants to demonstrate the necessity to promote initiatives to collect, to recycle and to treat household waste rather than dispose of this waste in controlled landfills. Initiatives regarding waste reduction are also important to take into account.

An overall evolution towards a stabilisation of the average waste production has been observed in countries that have already undergone a transition towards a performing waste management policy, and this evolution is used as a mirror for future evolutions in Pleven region.

In this case we focus on the costs and benefits of partial diversion of bio-waste from uncontrolled dumping in Pleven Region to composting integrated in an new to construct municipal waste treatment centre that combines compliant landfill, recycling of construction and demolition waste and open air windrow composting.

A7.7.3 Policy and objective

The purpose of the chosen project is to reduce the pollution of the environment (e.g. soil and groundwater) in Pleven and nearby municipalities; and increase reuse and recycling by establishing a functional and environmentally sound solid waste management system for Pleven and the municipalities of Gulyantsi, Dolna Mitropoliya, Dolni Dabnik, Iskar, Pordim in accordance with the Bulgarian legislation, which is compliant with the EU acquis.

The target of the Landfill Directive is that not later than 5 years after the date of implementation, biodegradable municipal waste going to landfills must be reduced. The targets are given in next table. The future amount of biodegradable waste is calculated as the total quantity of paper waste and organic waste, 20% of textile waste and 25% of other[208].

Table A7.16 Targets for acceptable landfill of *biodegradable waste* in Pleven and the scenario 2 targets

		Tonnes Bulgaria	*Population Bulgaria*	*Population Pleven*	*Tonnes Pleven*	*Scenario 2 (t/y)*
2005				210.116		
2010	75%	1.685.625	7.718.750	201.396	43.981	36.006
2013	50%	1.123.750	7.348.077	196.164	30.000	29.781
2020	35%	786.625	6.125.000	183.957	23.625	22.795
2026				175.000		

In order to achieve the targets for landfill of biodegradable waste, scenario 2 envisages that ca. 13.000 tonnes organic waste in the year 2013 and ca. 19.000 tonnes in 2020 should be recycled and therefore deviated from the landfill.

The results of this study can be used to assess the possible benefits in the situation that the composting of the biodegradable waste is even more promoted and higher recycling targets for biodegradable waste are set. We aim to calculate, in a Bulgarian context, the costs and benefits of one tonne of bio-waste deviated from landfill and composted. In this way we can assess the

[208] See table 2

benefits of possible supplementary composting above the Landfill Directive targets and thus above the EU acquis.

A7.7.4 Context

At the time of the project (2008-2009) the **goals of a more sustainable waste management strategy** within Bulgaria are advised as follows:

- make sure that the waste from every household is collected, in order to allow proper treatment;
- foresee sufficient waste sorting, recycling and composting facilities for the treatment of the selectively collected recyclable waste and foresee a restricted amount of controlled landfills for final disposal of non-recyclable waste and sorting/recycling residues;
- registrate the amounts at the level of disposal and/or waste collection and provide research towards the composition, as this is preliminary in order to improve planning in the future.

On short term, a basic final disposal infrastructure should be set up, i.e. the necessary proper landfills. The total number of landfills should be limited on an economic and environmental basis. Capacities should be optimised. Investments should be phased.

The collection of recyclables is very limited for the moment, meaning that the majority of the municipal waste streams end up in legal or illegal, managed or non managed landfills and dumpsites. Most of the times there is no demarcation between the dumpsite and the surrounding fields.

For the Pleven region the construction of a new regional waste treatment centre is foreseen which includes a new regional landfill and a composting plant, the subject of this case.

A7.7.5 Waste quantities

The overall average production of household waste has been assessed at 271,69 kg/inhabitant.year. The composition of the household waste in Pleven District is comparable with the waste composition in neighbouring or comparable countries and is characterised as follows:

Table A7.17 Municipal waste compostion in Pleven

Waste fraction	kg/inh.year	%
Organic waste	91,06	33,52
Paper cardboard	26,98	9,93
Plastics	23,22	8,55
Glass	21,38	7,87
Metals	6,95	2,56
Textile	9,89	3,64
Inert	79,62	29,30
Other	12,59	4,64
	271,69	100,00

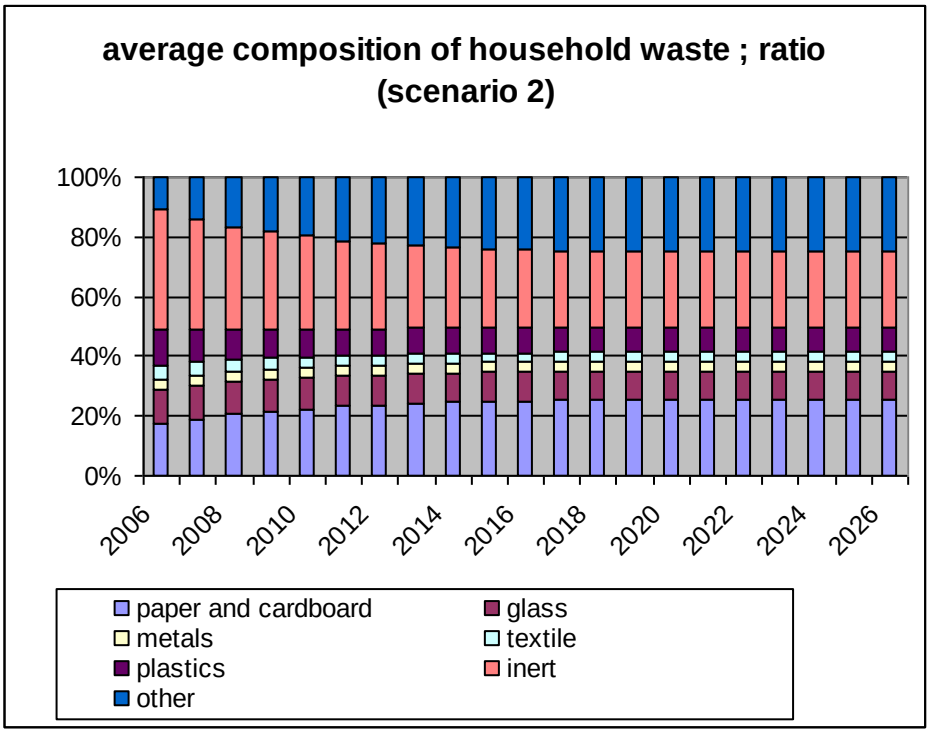
The quantity and also the composition of the household waste will be influenced by the changes in life style, standard of life, … . The changes in waste flow, characterised by estimated average and total quantities of household waste, are given in next table. There is still a potential for an increased composting of biodegradable waste. The assessed scenario assumes that until 21 % of the organic waste could be treated by composting.

Table A7.18 Scenario for waste generation, collection and treatment

Year	Average waste production	Total waste production	Total collected and treated waste[209]	Organic waste centrally composted		Organic waste composted at home	
	kg/y.inh	t/y	t/y	t/y	%	t/y	%
2005	271,69						
2006	293,8	61.221	50.201				
2007	317,76	65.664	59.426				
2008	343,68	70.429	66.908	0	0%	0	0%
2009	364,7	74.116	71.893	0	0%	0	0%
2010	387	77.996	77.216	0	0%	1.170	2%
2011	410,67	82.080	82.080	3.504	4%	2.490	3%
2012	427,42	84.717	84.717	5.417	6%	3.850	5%
2013	444,85	87.439	87.439	7.432	8%	5.282	6%
2014	462,99	90.249	90.249	8.593	10%	6.108	7%
2015	472,43	91.325	91.325	9.635	11%	6.848	7%
2016	482,06	92.413	92.413	10.108	11%	7.184	8%
2017	491,89	93.514	93.514	10.585	11%	7.523	8%
2018	491,89	92.738	92.738	10.887	12%	7.737	8%
2019	491,89	91.968	91.968	11.182	12%	7.947	9%
2020	491,89	91.204	91.204	11.471	13%	8.153	9%
2021	491,89	90.447	90.447	11.376	13%	8.085	9%
2022	491,89	89.696	89.696	11.282	13%	8.018	9%
2023	491,89	88.952	88.952	11.374	13%	8.084	9%
2024	491,89	88.213	88.213	11.280	13%	8.017	9%
2025	491,89	87.481	87.481	11.187	13%	7.951	9%
2026	491,89	86.754	86.754	11.276	13%	8.014	9%

The variation in average composition of household waste is illustrated in next figure.

[209] Collected and treated or treated at home (home composting) assuming full coverage of the population from 2011 onwards



The maximum treatment capacity of the **composting plant**, in order to meet the forecast of scenario 2 and taking into account non-municipal bio-waste, is about 25.000 tonnes per year, consequently the overall needed surface is of about 7.000 m^2. The entire surface will be paved with waterproof asphalt suitable of supporting heavy trucks; in addition all the composting plant area will be fenced. The fenced area provides about 8.000 m^2:

- Bio-Waste storage: 510 m^2
- Structure material storage: 1.350 m^2
- Windrow area: 4.000 m^2
- Mature compost storage: 1.600 m^2
- Green area: 510 m^2.

The flooring will be shaped with adequate inclination aimed to a correct collection and management of the rainwater.

The organic waste will be submitted to the following controls and processing:

- reception, visual control, document control and weighing;
- waste unload and storage;
- shredding and compostable mixture preparation
- accelerated composting phase (the first 10 to 20 days) of the compostable mixture piled in windrows (by spreading the material on the field forming long piles, that may be covered for control of the process or to be left in the open. The windrows must be turned over and irrigated frequently to ensure full degradation of the waste and maintenance of a sufficiently high temperature in the material for the compost to be sterilized. In the process carbon dioxide is formed and released to the atmosphere);
- composting phase (usually during 1 to 3 months);
- refining phase (screening and foreign bodies removal).

Besides the centralized installation the composting at home for smaller villages is a second proposed solution. Home composting is encouraged to avoid uncontrolled dumping but it also a way to reduce the measure which need to be taken to collect and treat this type of waste.

A7.7.6 Policy measure(s)

The overall project takes into account an integrated approach for waste management: remediation of old dumping sites, construction of a new regional waste treatment centre compliant with EU regulation, selective collection and treatment of different waste types. To realise the waste treatment investments (2010-2013) ERDF funding will be asked.

Within the project following measures are proposed (implementation by end 2026):

- the closure and remediation of the existing main dumpsites and landfills;
- the construction of a new regional waste treatment centre (RWTC) in Pleven, including
  - a new regional landfill with the necessary landfill equipment (period 2010-2011),
  - a composting plant (period 2011-2013),
  - a facility for construction and demolition waste recovery;
  - the construction of civic amenity sites for separate fractions of recyclable waste and for hazardous waste;
- a public awareness campaign;
- design and supervision;
- technical assistance for institutional development.

The regions have an important role in coordination while the municipalities carry most important legal responsibilities for waste management, including household waste collection and the construction, maintenance, closure and monitoring of the landfills for municipal and construction waste or other facilities and installations for disposal of such type of waste. The institutional framework necessary to guarantee the effectiveness of the regional waste treatment centre in Pleven was, at the end of the project, not yet defined. Possible structures are:

- Inter-municipal co-operation based on inter-municipal agreement;
- One municipality is owner of the project based on inter-municipal agreement with other non-owner municipalities;
- Inter-municipal independent legal entity that owns the landfill.

A7.7.7 Costs

Realisation of a composting plant

The investment cost for the composting plant (foreseen by 2011) is calculated and amounts to 1.741.426 BGN. An additional cost must be foreseen for the purchase of household composters, being 960.240 BGN. The operational costs regarding the composting plant are given in next table.

Table A7.19 Operational costs for a compostng plant in Pleven

Year	Organic waste centrally composted	Operational cost	Average unit value
	t/y	(BGN)	incl. VAT (BGN/t)
2011	3.504	189.055	53,95
2012	5.417	211.113	38,97

Year	Organic waste centrally composted	Operational cost	Average unit value
	t/y	(BGN)	incl. VAT (BGN/t)
2013	7.432	236.006	31,76
2014	8.593	261.635	30,45
2015	9.635	288.640	29,96
2016	10.108	304.194	30,09
2017	10.585	318.152	30,06
2018	10.887	324.489	29,81
2019	11.182	330.887	29,59
2020	11.471	334.922	29,20
2021	11.376	338.881	29,79
2022	11.282	342.756	30,38
2023	11.374	341.479	30,02
2024	11.280	340.218	30,16
2025	11.187	341.457	30,52
2026	11.276	340.195	30,17

The operational costs related to the operation and maintenance of the composting installation are 5,8 % of the total waste management operational costs.

A7.7.8 Environmental improvements

In the year 2013, ca. 13.000 tonnes organic waste and ca. 19.000 tonnes in 2020 should be recycled and therefore deviated from the landfill. There is chosen for partial composting of the biodegradable waste. An important constraint is that biodegradable waste should be preliminary separated from the mixed waste flow. The separation may be carried out through separate collection of the biodegradable waste at source – from the households, catering establishments, industrial enterprises etc.

Due to public awareness and growing prevention of waste, the average waste production per capita will ceil at a certain value. Ideally the waste production must be diminished towards a minimum level where nature's absorption capacities will not be endangered in future.

A7.7.9 Social and economic benefits

The analysis is based on the guide to cost-benefit analysis of investment projects (EC, 2005) and the 2007-2013 programming period's guidance on the methodology for carrying out cost-benefit analysis (EC, 2006). The methodology, including the default values and factors, developed by JASPERS experts for MSW projects to be financed by various European Union funds, is also used.

Project revenues

The revenues are divided into two main groups:

- revenues from the selling of recyclables (e.g. compost). Due to the composting it is possible to save on resources as the compost generated from central composting can be sold on the market at a relatively low price (20 BGN/t) (to improve soil quality).

- revenues from user fees to cover all the operational and replacement expenses taking into account affordability constraints (“the polluter pays” principle);

Based on the forecasted waste volumes and disposable household income of the region the tariff is set at a rate that generates a revenue that equals 1% of the household disposable income. Only the operational cost regarding the composting installation is taken into account (5,8 % of total).To calculate the revenue It is noted that the assumed 1% affordability level may result in an unacceptably high tariff for disadvantaged social groups. In future a new tariff system will be developed based on the monitored waste generation patterns.

In the next table an overview of these revenues is given.

Year	Compost for sale	Revenue compost sale	Average household income	Population Pleven (± 2,92 pers/ household)	Revenue from user fees
	t/y	BGN 20 BGN/t	BGN/y		BGN
2011			8.531		341.268
2012	4.334	86.680	8.701		348.069
2013	5.946	118.920	8.875	196.164	345.806
2014	6.875	137.500	9.053		352.742
2015	7.708	154.160	9.234		359.794
2016	8.086	161.720	9.419		367.003
2017	8.468	169.360	9.607		374.328
2018	8.709	174.180	9.799		381.809
2019	8.946	178.920	9.995		389.446
2020	9.117	182.340	10.195	183.957	372.519
2021	9.101	182.020	10.399		379.973
2022	9.025	180.500	10.607		387.573
2023	9.099	181.980	10.819		395.320
2024	9.024	180.480	11.035		403.212
2025	8.949	178.980	11.256		411.288
2026	9.020	180.400	11.481		419.509

The impacts on human health, environmental damages such as water and soil contamination, prevention of greenhouse gas emissions, aesthetic and landscape impacts and economic impacts are not accounted for in the financial analysis but do all have an impact on social welfare and thus need to be taken into consideration. To the extent the project increases environmental awareness on the one hand and waste fees are increased on the other hand, the project is expected to stimulate waste prevention and thus automatically prevents the occurrence of various negative impacts of waste generation and disposal altogether.

The identified *environmental effects* are mainly due to the illegal dumping of waste until now:

- leachate collection and treatment clearly reduces, and ideally prevents, emissions of toxic leachate to ground and surface waters from landfills;

- illegal dumping is countered by a public awareness campaign and an extended and well organised collection of household waste, thereby reducing hazards to local terrestrial ecosystems;
- the capture and flaring or validation of landfill gas will reduce emissions of methane, and associated impacts from climate change. Benefits of reduced emissions of greenhouse gases also accrue to the social and economic domain;
- the uncontrolled burning of waste has been common practise, producing large amounts of dioxin emissions, but under the project considered this practise will be banned;
- energy recovery from the capture of methane is foreseen, thereby avoiding emissions from conventional electricity generation.

The added value of the composting installation is in this analysis is represented by the avoided greenhouse emissions.

The estimated reduction of greenhouse gas emissions has been calculated on the basis of the annual expected reduction in tonnes of methane and carbon dioxide due to the project and the transformation of the quantities of methane captured in carbon dioxide. The approach followed in the JASPERS' model makes use of standard conversion factors, attributing a given emission (in CO_2-equivalents) to each tonne of waste that follows a given waste management option. Following conversion factors are used:

- Waste not disposed of properly: 833 kg CO_2/tonne;
- Mixed waste to compliant landfill: 250 kg CO_2/tonne;
- Organic waste centrally composted: 26 kg CO_2/tonne;
- Organic waste composted at home: 26 kg CO_2/tonne.

The net reduction in CO_2 and CO_2-equivalents, resulting from the implementation of the composting plant and the increased home composting, over the entire project horizon is then monetised using a standard value per tonne of CO_2. The value used is based on the study 'Waste management options and climate change' prepared by the AEA Technology (2001) for the European Commission. A value of 25 EUR/ton is used for 2010. This value is gradually increased to 45 EUR/ton in 2030.

Table A7.20 Total benefits from avoided CO_2 emissions

Year	CO_2 emissions organic waste landfilled	CO_2 emissions centrally composted	CO_2 emissions home composting	CO_2 price	Total benefits from avoided CO2 emissions
	t	t	t	BGN/t	BGN
2012	2.317	141	100	53	109.291
2013	3.179	193	137	55	155.497
2014	3.675	223	159	57	186.221
2015	4.121	251	178	59	215.993
2016	4.323	263	187	60	234.148
2017	4.527	275	196	62	253.106
2018	4.656	283	201	64	268.454

Year	CO_2 emissions organic waste landfilled	CO_2 emissions centrally composted	CO_2 emissions home composting	CO_2 price	Total benefits from avoided CO2 emissions
	t	t	t	BGN/t	BGN
2019	4.782	291	207	66	284.089
2020	4.906	298	212	68	300.012
2021	4.865	296	210	70	306.020
2022	4.825	293	208	72	311.919
2023	4.865	296	210	74	322.972
2024	4.824	293	208	76	328.728
2025	4.785	291	207	78	334.379
2026	4.823	293	208	80	345.461

The following *social effects* are identified:

- the proper closure of the old disposal sites as well as the installation and management of the new build landfill according to latest EU standards will bring benefits to human heath;
- there will be an increased amenity for the local population from better regulation, management, monitoring and reduced illegal dumping because of reduced odour nuisance, aesthetic benefits, reduced attraction of rodents etc.;
- spread of information (e.g. via the public awareness campaign) and active involvement of the public in waste selection, composting and collection schemes would lead to a better understanding of waste management issues by the local population, possibly also engendering a deeper sense of social responsibility;
- Integrated and coordinated waste management allows optimising the transport of waste. Organic waste in the non-urban areas is composted at home and therefore does not need to be transported at all.

Due to the home composting, the transportation needs are less great and it is possible op save on costs. This has also an effect on the investment and operating cost of the landfill.

Table A7.21 Costs related to home composting

Year	Cost savings home composting	Savings in landfill investment and operating costs due to home composting
	BGN	BGN
2012	76.770	45.983
2013	105.335	71.085
2014	121.785	97.533
2015	136.551	112.767

Year	Cost savings home composting	Savings in landfill investment and operating costs due to home composting
	BGN	BGN
2016	143.253	126.438
2017	150.021	132.645
2018	154.288	138.910
2019	158.475	142.863
2020	162.573	146.739
2021	161.224	150.534
2022	159.890	149.284
2023	161.201	148.050
2024	159.867	149.263
2025	158.539	148.026
2026	159.803	146.800

Relevant wider economic effects are:

- the collection, treatment, storage and monitoring of waste as well as construction works has positive employment effects, but more importantly the input of employment is expected to be organised more efficient;
- the use of new and best available technologies has the potential to stimulate local technological markets, possibly increasing employment and competitiveness in the long run;
- home composting and composting at site has benefits in terms of reduced disposal capacity needed thereby realising substantial cost saving. In addition, stimulation of home composting reduces the need for collection services and associated environmental and amenity impacts (see table above). The reduced landfill capacity needed would have otherwise also displaced potentially more profitable land uses;
- preventing illegal dumping, especially of hazardous waste, can have a significant impact on land use activities surrounding the dumpsite. Agriculture and tourism would potentially benefit;
- increased costs per tonne disposed will place a greater emphasis on efficiency of materials use and waste prevention, both of which have positive economic impacts;
- central and home composting produces compost which has a positive market value;
- electricity generation from the methane captured from the landfill.

A7.7.10 Conclusion

Next table gives an overview of the cost, the revenues, the cost savings and benefits which can be allocated to the composting of organic waste. The cost savings due to home composting and the savings in landfill investment and operating costs due to home composting are in fact covered by the willingness to pay by the inhabitants in the Pleven region.

Table A7.22 Overview of costs, revenues, savings and benefits

Year	Operational cost	Revenue compost sale	Cost savings home composting	Benefits from avoided CO_2 emissions	Savings in landfill investment and operating costs due to home composting	Willingness to pay
	BGN	BGN	BGN	BGN	BGN	BGN
2012	211.113	86.680	76.770	109.291	45.983	348.069
2013	236.006	118.920	105.335	155.497	71.085	345.806
2014	261.635	137.500	121.785	186.221	97.533	352.742
2015	288.640	154.160	136.551	215.993	112.767	359.794
2016	304.194	161.720	143.253	234.148	126.438	367.003
2017	318.152	169.360	150.021	253.106	132.645	374.328
2018	324.489	174.180	154.288	268.454	138.910	381.809
2019	330.887	178.920	158.475	284.089	142.863	389.446
2020	334.922	182.340	162.573	300.012	146.739	372.519
2021	338.881	182.020	161.224	306.020	150.534	379.973
2022	342.756	180.500	159.890	311.919	149.284	387.573
2023	341.479	181.980	161.201	322.972	148.050	395.320
2024	340.218	180.480	159.867	328.728	149.263	403.212
2025	341.457	178.980	158.539	334.379	148.026	411.288
2026	340.195	180.400	159.803	345.461	146.800	419.509

To define the total benefits the summation is made of the revenue due to the compost sale, the cost savings due to home composting and the savings in landfill costs and the benefits from the avoided CO_2 emissions. The balance benefit is subsequently given by the difference between the total benefit and the operational cost.

Table A7.23 Average unit benefit per tonne composted bio-waste

Year	Organic waste centrally composted	Organic waste composted at home	Operational cost	Total benefits	Balance benefits	Average unit benefit per tonne composted bio-waste
	t/y	t/y	BGN	BGN	BGN	BGN/t
2012	5.417	3.850	211.113	666.793	107.611	11,61

Year	Organic waste centrally composted	Organic waste composted at home	Operational cost	Total benefits	Balance benefits	Average unit benefit per tonne composted bio-waste
	t/y	t/y	BGN	BGN	BGN	BGN/t
2013	7.432	5.282	236.006	796.644	214.832	16,90
2014	8.593	6.108	261.635	895.781	281.404	19,14
2015	9.635	6.848	288.640	979.265	330.830	20,07
2016	10.108	7.184	304.194	1.032.561	361.364	20,90
2017	10.585	7.523	318.152	1.079.460	386.981	21,37
2018	10.887	7.737	324.489	1.117.641	411.343	22,09
2019	11.182	7.947	330.887	1.153.792	433.459	22,66
2020	11.471	8.153	334.922	1.164.184	456.743	23,27
2021	11.376	8.085	338.881	1.179.772	460.918	24,29
2022	11.282	8.018	342.756	1.189.167	458.837	24,78
2023	11.374	8.084	341.479	1.209.522	472.723	24,29
2024	11.280	8.017	340.218	1.221.550	478.120	24,78
2025	11.187	7.951	341.457	1.231.212	478.467	25,00
2026	11.276	8.014	340.195	1.251.972	492.268	25,52

The balance benefits from composting (centrally and at home) biodegradable waste for the period 2012-2026 is about 5,8 million BGN or 2,97 million €.

By increasing the recycling capacity and the quantity biodegradable waste to be handled by composting, stimulated by funding programs, a significant benefit could still be realised.

LIFE+ aims at funding projects of about 1 million €, with a total budget allocated to Bulgaria of about 4,5 million € in 2008. Of this budget 3,3 million € were actually absorbed for the funding of 5 projects.

A7.8 Air emission reduction measures for the Port of Rijeka in Croatia

A7.8.1 Introduction

This case study is based upon the preliminary results of the study: ”Technical assistance on the development of cost-efficient emission reduction measures for the Port of Rijeka Croatia”, prepared by ARCADIS for the department of foreign affairs of the Flemish Government, and on the study “real environment related health costs” that ARCADIS finished in 2009 for the department LNE of the Flemish Government

A7.8.2 Environmental issue

The case study has been set up to take action to reduce the impact of the activities within the port area of Rijeka in the Republic of Croatia on the ambient air quality in the most efficient way.

A7.8.2.1 Policy and objective

Air protection management in Croatia is regulated by the Air Protection Act (Official Gazette 178/04, 60/08) and by valid subordinate regulations governing in detail air quality protection and improvement. This act lays down the measures, manner of organising, implementing and supervising protection and improvement of air quality, as part of the environment as a common good. The Air Protection Act is harmonised with Directive 96/62/EC on Ambient Air Quality Assessment and Management and takes into account other EU Directives relating to air quality and emissions into air (97/101/EC).

The objective of this case study is to develop a proposal with potential technical and policy measures that can be implemented in the short term to guarantee that present and future air quality standards can be respected in Rijeka Port.

The objectives are compliant with the European acquis, but the port-based approach of the issue is a new policy approach (an instrument mix with a.o. a differential harbour tax following a Swedish example) for the first time applied on the port of Rijeka. This kind of policy approach is not yet included in the EU acquis.

A7.8.3 Context

In the sixties and seventies Rijeka became the city with highest air pollution in Croatia. In the nineties, the concentrations of different pollutants show declining trends, mainly due to reduction of production because of the war in Croatia, but also because of a switch to fuels with lower sulphur content.

In recent years the concentration of NO_2 (nitrogen dioxide) increased again, SO_2 (sulphur dioxide) ambient levels and PM10–levels (particulate matter) on the other hand have declined.

Table A7.24 gives an overview of total emissions from harbour related sources in Rijeka port. This figure shows that vessels are responsible for quasi 100% of the total emissions of NO_X, SO_2, CO_2 and VOC in the harbour. For PM10, about 50% of the emissions are from dry bulk handling.

Table A7.24 Overview of total emissions in the port of Rijeka (2008)

SOURCE	NOx	SO2	PM10	CO2 (in kton)	VOC
VESSELS	808,28	424,38	43,23	32,48	47,42
Hotelling	*99,51*	*70,99*	*5,37*	*8,48*	*11,95*
Manoeuvring	*524,27*	*233,01*	*30,07*	*17,58*	*20,03*
Reduced speed cruising	*178,96*	*119,16*	*7,40*	*5,90*	*14,95*

Tugboats	*5,54*	*1,21*	*0,39*	*0,82*	*0,49*
CHE	35,81	0,14	1,55	4,33	NA
TRUCKS	0,81	0,00	0,02	0,00	0,04
TRAINS	3,67	0,01	0,06	0,20	NA
DRY BULK HANDLING	NR	NR	74,00	NR	NR
TOTAL	848,57	424,53	44,86	37,01	47,46

A7.8.4 Policy measures

The case study lists a set of potential measures for vessels, dry bulk handling and cargo handling equipment.

Policy measures for Vessels:

- Use of fuel with a lower sulphur
- Flue gas desulphurization
- Motor adaptations:
- (advanced) internal engine modification (IEM)
- Dry water injection (DIW)
- Humid Air Motors (HAM)
- Exhaust gas recirculation
- Secondary catalytic reduction
- Diesel oxidation filter
- Shore side electricity

Policy measures for Dry Bulk Handling (for coal and iron):

- Spraying during storage
- Applying BAT during handling

Policy measures for Handling Equipment:

- Idling reduction program
- Replacing/retrofitting equipment

For this report we only discuss those measures of the case study that are described well. This means that information about reduction potential, investment and/or operational costs is available in the case study.

A7.8.5 Use of fuel with a lower sulphur content

The SO_2 emission is proportional to the S content in the fuel : reducing the S content will result in a reduction of the SO_2 emission and in a reduction of the PM10 emission.

The impact will be different, depending on the instrument that will be used to enforce or stimulate the use of fuel with a lower sulfur content, the case study considers different possible scenarios:

- For the moment there are no restrictions on the sulfur content used by vessels in the Mediterranean Sea other than the determination in Marpol, Annex VI, which restricts the sulfur content in fuel oil to 4,5 %. If Croatia would become an EU member state the use of 1,5 % S

fuel by passenger vessels and the use of 0,1 % S fuel by all ships while at berth would become mandatory. The case study studied following scenarios:

- The use of MDO (Medium Distillate Oil) for the auxiliary engines (AE) while in port;
- The use of 0,1 % S fuel by all ships while at berth;
- The use of 0,5 % S fuel by all ships while in harbour;
- The use of 0,1 % S fuel by all ships while in harbour.

- The harbor authorities could impose a Differentiated Harbor Tax, this is also implemented in Sweden. Ships using an S fuel of 0,5 % get a reduction on harbor taxes.

A7.8.6 Flue gas desulphurization

Instead of using low S fuel to reduce the emission of SO_2, the flue gas can be treated. Flue gas desulphurization is a well known technique whereby the flue gas is scrubbed with sea water to remove the SO_2. Afterwards the scrubbing liquid can be treated for suspended solids.

The impact will be different, depending on the instrument that will be used to enforce or stimulate the use the measure, the case study considers two possible scenarios:

- Croatia would becomes an EU member the use of low S fuel or an equivalent measure like flue gas desulphurization would become mandatory;
- Harbour authorities impose a Differentiated Harbor Tax.

A7.8.7 Motor adaptations

Several motor adaptations result in a reduced NOx emission. There is no legislation that enforces the adaptation on existing ships. Only for ships built after 2016 an important NOx emission reduction is mandatory. Therefore the use of a differentiated harbour tax can encourage the implementation of the measures for motor adaptations.

There is information about the costs and the reduction potential for the following modifications:

- Dry Water Injection (DWI)

With DWI, water is injected into the combustion chamber or mixed with the fuel in order to lower the combustion temperature and hence reduce NOx formation.

- Humid Air Motors(HAM)

The principle of HAM is also based on lowering the temperature in the combustion chamber to reduce NOx formation. In this case combustion air is mixed with evaporated sea water.

A7.8.8 Secundary Catalytic Reduction

The Selective Catalytic Reduction (SCR) process is based on the injection of an urea solution into the exhaust gas stream in the presence of a catalyst. The urea disintegrates into ammonia that reacts with the NOx forming N_2 and H_2O. Besides a reduction of the NOx emissions, this technique reduces also PM10-emissions.

The use of a differentiated harbor tax can encourage the implementation of this measure.

A7.8.9 Shore Side Electricity

While in port, ships use their Auxiliary Engines (AE) to produce electricity for hotelling, unloading and loading activities. A measure to reduce emissions from AEs while at berth is to provide electricity to the ships from the national grid. This is however a measure that transfers but not solves the issue, as energy production for the national grid has its own environmental impact.

A7.8.10 Costs

Annual investments, operating and total annual costs are given in Table A7.25. These are the costs made by all vessels (harbour authorities) involved to implement the proposed measures. The figures in **Error! Reference source not found.** show that the largest costs have to be made to implement flue gas reduction.

The use of low S fuel results in an extra cost due to the higher prices of low S fuel. In the case study the total annual costs for all the ships visiting the harbour are calculated for the scenarios where the use of low S fuel becomes mandatory. In this report we made an assessment of the annual costs if a harbour tax is implemented because less ships will use fuel with a low S content.

The case study mentions annual costs per ship for **flue gas desulphurization**, in this report we made an assessment of the costs for all the ships in Rijeka that will use this technique in the two scenarios.

The costs for the described **motor adaptations** in the case study differ considerably, in this report we made averages of those indicative values. Besides that it was necessary to calculate the annual costs and to multiply those with the number of vessels involved.

The costs of implementing **secondary catalytic reduction** depend on the size of the vessel, so on the power capacity of the engines in the vessel. The case study gives investment and operating costs per vessel for small, medium and large vessels. Since we don't have information about the number of small, medium and large vessels involved in this measure, we made an average of the costs. And multiplied this average cost per vessel by all the vessels who would implement this technique.

The case study describes the annualized costs per berth and per ship for **shore side electricity**. So in this report it was necessary to multiply these costs by the number of berths that will be transformed in Rijeka and the number of vessels involved.

Table A7.25 Summary of costs of the measures for vessels in Rijeka

Measure	Instrument		Investment cost	Operating cost	Total annual cost
			in euro/y		
Low sulphur fuel	Mandatory	MDO in AE			820.187
		0,1% at berth			913.951
		1,0% in harbour			412.931
		0,5% in harbour			471.922
		0,1% in harbour			1.253.595
	Harbour Tax	0,5% in harbour			246.310
Flue gas desulphurization	Mandatory		85.837.212	45.714	85.882.926
	Harbour Tax		51.201.144	27.268	51.228.412
Motor adaptations	Harbour Tax	DIW	175.189	89.025	264.214
		HAM	8.808.879	40.000	8.848.879
Secundary catalytic reduction	Harbour Tax	Small-Medium-Large	587.243	1.010.890	1.598.133
Shore side electricity	Harbour Tax	> 10 visits			597.856
		> 5 visits			1.025.780

A7.8.11 Environmental improvements

In the case Croatia becomes an EU member, the use of low S fuel or flue gas desulphurization is mandatory and will be applied by all ships. This instrument will result in a 100 % impact. The impact of measures with a 100 % impact are calculated and summarized in Table A7.26, and are indicated in the column 'instrument' by 'mandatory'.

In the case when a Differentiated Harbour Tax is imposed, one doesn't become a 100% impact improvements, not all actors will implement the proposed measures. The figures for those reductions were received by extrapolating the figures of Sweden.

The case study does not mention figures for PM2.5, only for PM10. **Error! Reference source not found.** mentions numbers for PM2.5 because only marginal damages are known for PM2.5 and not for PM10. Since PM10 mainly consists of PM2.5, we searched for ratios PM2.5/PM10 to calculate the emission reduction. The study[210] "Air pollution in Europe 1990-2004" lists PM2.5/PM10 emission ratios for different European countries. The lower bound is about 50% and the upper bound about 80%. In this report we will make conservative calculations for PM2.5 reductions and the benefits of those reductions with the upper bound ratio of 80%.

Error! Reference source not found. shows that **the use of low S fuel** will result in a reduction of the SO_2 and PM10 emission. It is clear that the lower the S content is, the higher the emission reduction is.

In the scenario where Croatia becomes an EU member, the use of low S fuel or an equivalent measure like **flue gas desulphurization** would become mandatory. It is expected that the use of flue gas desulphurization will be competitive with using low S fuel. However to reach comparable reductions for desulphurization as for fuel with 0.1 % S content a very efficient system is needed. It is not sure whether this will be possible. Besides, the case study supposes that the threshold for using a flue gas desulphurization will be higher than using low S fuel. For flue gas desulphurization one assumes for both instruments that impact improvements will be comparable to using 0.5 % S fuel, so this results also in a reduction of the SO_2 and PM2.5 emissions.

The emission reductions for **motor adaptations** are estimated regardless of the technique used (DIW or HAM).

If **secondary catalytic reductions** are encouraged in Rijeka by a harbour tax, one becomes a significant emission reduction for NOx and PM10.

It is reasonable to suppose that mainly ships that visit frequently will be modified to use **shore side electricity**. The case study considers two alternatives:

- modifying the ships with a visiting frequency higher than 10 per year;
- modifying the ships with a visiting frequency higher than 5 per year.

It is clear that the impact improvements are higher when the alternative with a visiting frequency higher than 5 per year is introduced.

The power plant in Rijeka uses heavy fuel oil as energy source and takes no emission reduction measures in place. By implementing this measure one has to make sure that the emission is not delocated from the harbour to the power plant. This means that it makes no sense to use shore side electricity for ships that use marine distillate as fuel for the auxiliary engines, unless measures are taking at the power plant to reduce the emission.

[210] http://www.eea.europa.eu/publications/eea_report_2007_2

Table A7.26 Environmental impact of measures for vessels in Rijeka

Measure	Instrument		NOx reduction	SOx reduction	PM10 reduction	PM2,5 reduction	CO_2 reduction	VOC reduction
			Reduction in ton/y					
Low sulphur fuel	Mandatory	MDO in AE	11,00	158,90	7,90	6,32	0,50	
		0,1% at berth		214,10	2,20	1,76		
		1,0% in harbour		222,80	6,70	5,36		
		0,5% in harbour		288,40	7,40	5,92		
		0,1% in harbour		396,20	7,40	5,92		
	Harbour Tax	0,5% in harbour		170,60	4,10	3,28		
Flue gas desulphurization	Mandatory			288,40	7,40	5,92		
	Harbour Tax			170,60	4,10	3,28		
Motor adaptations	Harbour Tax	DIW	18,90					
		HAM	18,90					
Secundary catalytic reduction	Harbour Tax	Small-Medium-Large	58,50		0,87	0,70		
Shore side electricity	Harbour Tax	> 10 visits	59,90	33,00	2,70	2,16	3,40	2,40
		> 5 visits	128,60	97,00	6,90	5,52	7,30	4,60

A7.8.12 Social and economic benefits

We made an estimation of the external costs by means of the figures for average damages in the Clean Air for Europe (CAFE) Programme[211]. The figures in CAFE take chronic and acute effects to human health into account, but do not account for impacts on agricultural production, cultural heritage and ecosystems. In that sense the figures presented in this report may be an underestimation of the actual benefits creates by these measures.

The CAFE Programme calculated average damages per ton of emission of NH3, NOx, PM2.5, SO_2 and VOCs for the EU25. The CAFE-study makes four calculations: Median VOLY (Value Of a Life Year), Median VSL (Value of Statistical Life), Mean VOLY and Mean VSL. The CAFÉ-study itself does not make any recommendation on which of the four estimates to use, but it is generally recommended to use the full range of low and high estimates[212]. Hence in Table A7.27 we report an average of CAFE's Median VOLY and Mean VSL.

The largest benefits are realized when a measure is mandatory, that is the case for the measures 'use of a low S fuel' and 'flue gas desulphurization'.

Using a 0,1 % S fuel is the measure with the largest benefits of all measures considered. Followed by the other measures considering a low S fuel. Moreover how lower the S content, the larger benefits are. The smallest benefits are gained using the measures for motor adaptations.

[211] http://www.cafe-cba.org/assets/marginal_damage_03-05.pdf

[212] http://www.eea.europa.eu/data-and-maps/indicators/en35-external-costs-of-electricity-production-1/en35

Table A7.27 External costs of measures for vessels in Rijeka

Measure	Instrument		NOX	SOX	PM2,5	VOC	TOTAL
			Average (Median VOLY, Mean VSL) in euro/y				in euro/y
Low sulphur fuel	Mandatory	MDO in AE	90.200	1.716.120	319.160		**2.125.480**
		0,1% at berth		2.312.280	88.880		**2.401.160**
		1,0% in harbour		2.406.240	270.680		**2.676.920**
		0,5% in harbour		3.114.720	298.960		**3.413.680**
		0,1% in harbour		4.278.960	298.960		**4.577.920**
	Harbour Tax	0,5% in harbour		1.842.480	165.640		**2.008.120**
Flue gas desulphurization	Mandatory			3.114.720	298.960		**3.413.680**
	Harbour Tax			1.842.480	165.640		**2.008.120**
Motor adaptations	Harbour Tax	DIW	154.980				**154.980**
		HAM	154.980				**154.980**
Secundary catalytic reduction	Harbour Tax	Small-Medium-Large	479.700		27.631		**507.331**
Shore side electricity	Harbour Tax	> 10 visits	491.180	356.400	109.080	4.500	**961.160**
		> 5 visits	1.054.520	1.047.600	278.760	8.625	**2.389.505**

A7.8.13 Conclusion

Table A7.28 gives the results of the difference between the annual costs and the benefits for the different measures considered in this report.

For the measure that stimulates or imposes the **use of a low S fuel**, we notice that all scenarios have positive results and that most benefits are created in the scenarios where the sulphur content is constrained. But the best result is obtained in the case 0.1% S fuel is used mandatory in the harbour.

In case **flue gas desulphurization** is mandatory or imposed by a differentiated harbour tax, we gain a negative result. These are the worst results of all measures, due to the high investment costs of this technique.

When we take a look at the results for **motor adaptations** and **secundary catalytic reduction** we can notice also negative results, this is mainly caused by rather small benefits and a high investment cost when using Humid Air Motors (HAM).

Installing **shore side electricity** produces also positive effects, but in a minor extent than using a low S fuel. In the case one implements this measure, one has to be certain that the emissions are not delocated from the harbour to the power plant and that the power plant uses a more clean technique than the vessels or that the power plant takes reduction measures instead.

A scenario can be designed with the mandatory use of 0,1% S fuel at berth and when in the harbour, secondary catalytic reduction and sustainable shore side electricity above 5 visits driven by a differentiated harbour tax. This would lead to benefits of 7.252.003 euro/year

Table A7.28 Cost-benefit Analysis of measures for vessels in Rijeka

Measure	Instrument		Benefits	Costs	Benefits-costs
			in euro/y		
Low sulphur fuel	Mandatory	MDO in AE	2.125.480	820.187	**2.125.480**
		0,1% at berth	2.401.160	913.951	**2.401.160**
		1,0% in harbour	2.676.920	412.931	**2.676.920**
		0,5% in harbour	3.413.680	471.922	**3.413.680**
		0,1% in harbour	4.577.920	1.253.595	**4.577.920**
	Harbour Tax	0,5% in harbour	2.008.120	246.310	**2.008.120**
Flue gas desulphurization	Mandatory		3.413.680	85.882.926	**-82.469.246**
	Harbour Tax		2.008.120	51.228.412	**-49.220.292**
Motor adaptations	Harbour Tax	DIW	154.980	264.214	**-109.234**
		HAM	154.980	8.848.879	**-8.693.899**
Secundary catalytic reduction	Harbour Tax	Small-Medium-Large	507.331	1.598.133	**-1.090.802**
Shore side electricity	Harbour Tax	> 10 visits	961.160	597.856	**363.304**
		> 5 visits	2.389.505	1.025.780	**1.363.725**

A7.9 Implementation of the Water Framework Directive (WFD)

Problem Definition

Improving water quality is the leading objective of water policy within the EU. As a resource, the quality and availability of water is important for economic sustainability, social well being, human health and the preservation of the environment. The Water Framework Directive (WFD) is the overarching legislative tool aimed at achieving this objective.

The WFD covers all types of water bodies and is based on achieving good ecological status in each locality, opposed to placing restrictions on emissions or other such activity. It must therefore consider all pressures affecting habitats for plants, fish and other wildlife when determining the environmental status of each water body. This includes the chemical composition of the water, the abstraction of water resources, the physical changes that might occur to a water body and its biological and nutrient content. In each cases compliance, with set standards must be achieved by 2015 in the first management cycle, with revisions made to these standards in subsequent management cycles.

To achieve compliance with the Directive, each environmental standard must be accomplished (or a derogation issued) and a series of reporting deadlines must be met to ensure that national plans and systems are in place to effectively implement and enforce the Directive. For example, in each river basin, exist water quality should be assessed against the new standards to determine which water bodies are at risk of failure, before identifying the most cost-effective method of achieving compliance (i.e. by end-of-pipe, and/or marketing and use restrictions). Monitoring and enforcement systems must then be established at Member State level. Each Member State is required to report progress to the Commission in order to prove compliance, to apply for derogation and to share information on best practice and produce guidance to industry and national competent authorities on how to implement the Directive and take necessary action to improve water quality that is cost effective.

The role of LIFE+ in this context is therefore to ensure that the current acquis (WFD and its Daughter Directives) are implemented correctly and therefore deliver the most cost-effective outcomes, thus continually improving the state of the aquatic environment. LIFE+ is therefore used to revise and implement legislation, but also to fund demonstration projects and to conduct research that contributes to achieving this objective. For simplicity it is assumed that investment in water treatment and other infrastructure is funded through water pricing and EU structural and cohesion funds, independent of LIFE+.

Costs and Benefits

As each element of the Water Framework Directive and Daughter Directive have been subject to numerous impact assessments and evaluations, many of which have used different methodologies and have assessed the impacts to varying degrees of completeness, it is difficult to provide EU level cost in this case study. The results of the UK (England and Wales) assessments are therefore reproduced below as indicative of the order of magnitude of the expected costs and benefits.

The latest cost estimate for full compliance of the WFD is £55 (€63) billion in the UK by 2015, however, this does not take into account the fact that less stringent targets apply and phased improvements are permitted, specifically where the targets are disproportionately costly to implement. A lower cost including investment in abatement and treatment technologies, in addition to the setting up of appropriate monitoring and management systems should therefore be expected.

A benefits study conducted by Nera and Accent for Defra[213] estimated the aggregate willingness to pay (WTP) benefits of the WFD by households to range from £18-£29 (€21-

[213] Nera & Accent (2007): Report on the benefits of Water Framework Directive programmes of measures in England and Wales, by Nera and Accent for the UK Department for environment, food and rural affairs (Defra), November 2007

€33) billion per annum. Direct economic impacts should also be considered in terms of cost savings for industries which rely on good quality water resources, for example:

- Cost savings are likely in drinking water treatment as the quality of water in each water body improves over time. The Commission's Impact Assessment[214] of the WFD, estimates the EU wide benefit to be around €362.5 million per year due to reduced pesticide contamination and €70 million in the Netherlands alone from reduced metal removal costs; and
- Industrial users of water in large volumes, often requiring pre-treatment should also benefit from lower costs (i.e. brewing, chemicals and energy sectors)

Implications for LIFE+

The scale of the costs and benefits associated with the implementation of WFD (particularly if the UK example is scaled up to EU level), suggests that if programmes and initiatives funded by LIFE+ improve the effectiveness or efficiency of implementation by only a marginal amount, the benefits are likely to be significant and exceed the costs.

[214] http://ec.europa.eu/environment/water/water-dangersub/pdf/sec_2006_947_en.pdf

Annex 8 Additional supporting material to Section 5

This section contains the following material in support of section 5 in the report.

- A8.1 – The case of nanotechnology
- A8.2 – Exemplars of the environmental and economic benefits of improvements in EU environmental policy
- A8.3 - Exemplars of environmental and economic benefits of the implementation of EU environmental policy – exemplars
- A8.4 – A description of the causes of inadequate implementation of the acquis
- A8.5 - The Use of other EU financial instruments for the environment
- A8.6 – A discussion on the progress to date on the Cardiff process
- A8.7 - Conclusions of the Environmental Policy Review on Public Awareness

A8.1 The case of nanotechnology

Nanomaterials are likely to pose a significant future environmental problem, which could require action at the European level. An order of magnitude analysis of the costs and benefit of future action (see details below) indicates that the benefits of taking action to address potentially hazardous nanomaterials are likely to be several orders of magnitude greater than the costs of a European reporting system, already considered by some Member States. Even with a proxy cost estimate for research into the risks of nanomaterials included in the analysis, the analysis suggests that substantial net benefits should still be achievable.

The development of policy to meet future environmental challenges under LIFE+ should therefore be expected to deliver substantial added value to EU citizens based on these results. LIFE + funding could generate added value through two activities:

- Quantifying and identifying risk of nanomaterials through risk assessment, health studies and establishment of EU reporting system (identifies risk and allows rapid response, preventing huge health impacts emerging further down the line.)
- In mitigating risk – possible development of new regulations on nanomaterials regarding nano content in products/uses/disposal (i.e. similar to WEEE/RoHS to reflect hazardous nature of material), plus changes to existing regulations, of which there are many (REACH, GHS, Waste, Landfill)

The need for regulatory intervention and therefore for an environmental policy instrument should be noted.

A8.1.1 Problem Definition

Nanotechnologies are one of the most interesting and highly anticipated technical innovations to emerge in recent years. and have particular potential in the problem definition stage.Nano refers to structures measuring between 1 and 100 nanometre in at least one dimension (i.e. down to 10,000 times smaller than the diameter of a human hair). In many cases, these nano materials are simply the nano sized variants of their standard counterparts. Nanomaterials are being developed and used because they display new physio-chemical properties that differ from the conventional form of each chemical. Nanotechnologies will have the ability to compete throughout LIFE+

The unique properties of manufactured nanomaterials and products have given rise to concern about the adverse effects that some nanomaterials might have on human health and the environment. While nanomaterials may not pose significant risks beyond those of the bulk materials from which they are derived, evidence is emerging that other nanomaterials may give cause for concern. Recent examples include rigid, thin and longer than 20µm carbon nanotubes, if inhaled, may pose health risks similar to asbestos exposure. Silver in nano form is also increasing used in a number of applications due to its antimicrobial properties and may therefore prove harmful to aquatic organisms or have consequences for wastewater treatment processes. Significant environmental and legislative problem potentially exists.

A8.1.2 Regulatory Context and Policy Background

Nanomaterials are covered under the definition of a “substance” in REACH, although not specifically mentioned in the regulation itself. The effectiveness of the current regulatory framework is affected by a lack of registration and information requirements for those substances produced or imported into the EU in quantities of less than 1 tonne per year (i.e. many nanomaterials could fall below the REACH-CLP reporting threshold).

Faced with the regulatory challenge of integrating the opportunities presented by the development of nanomaterials and public health and safety, and the protection of the environment is maintained, requires that additional information is needed on: the nanomaterials being manufactured or imported, use and patterns of exposure and routes to environment over a products lifecycle and information on the potential hazards posed by particular nanomaterials.

At present, no EU-wide system exists for collecting this information on a consistent and systematic basis. As more nanomaterials and nano containing products are placed on the environment, this problem is likely to become more prevalent in the future.

Having identified that nanotechnology could pose a risk to the human health and the environment; many Member States have adopted voluntary reporting requirements and/or are in the process of developing mandatory systems. As such, Member States are going beyond current European legislation, the costs and benefits of which will be discussed in the following section.

A8.1.3 Costs

The costs of implementing a mandatory European reporting scheme is not presently quantified or evaluated by the Member States or in third countries, as this policy option is currently under discussion, or any impact assessments have yet to be published. However, it is possible to derive a proxy for the costs of implementing a reporting system based on the REACH business impact assessment (BIA) and updated reporting costs in 2006 which relates to the bulk chemical variants of nanomaterials. The information provided suggests that the administrative costs for companies reporting on nanomaterial usage could equate to around €2,120 per nanomaterial registered.

In order for environmental and health protection to keep pace with rapid technological development in the area of nanomaterials, financial and manpower resources may also be required so that adequate testing and risk assessment methodologies are developed, and studies of the risks posed by nanomaterials are conducted. As a proxy for the funding costs, approximately €3.5 billion is currently allocated for the nanosciences, nanotechnologies, materials & new production technologies (NMP) research theme of FP7 for the period 2007-2013. Assuming 10% of funding is spent on risk assessment studies alone, this would equate to €350 million in total, or €58 million per year.

A8.1.4 Benefits

The benefits of going beyond current EU legislation by introducing a mandatory reporting system are far less obvious and somewhat more difficult to assess. Two distinct approaches to quantification can be taken in such cases. Firstly, if it is assumed the REACH-CLP regulations are less effective due to the potential risks posed by nanomaterials to human health and the environment, then a proportion of the benefits estimated to be incurred due to REACH will be lost[215]. This lost benefit can be measured as a proxy for the benefits of a mandatory European reporting system to fill the regulatory gap. A second approach involves quantifying the human health and environmental damage caused by the absence of a reporting scheme (i.e. the costs of these gaps in regulation).

A range of estimates is presented in the Table below, including the assumptions and approach used.

Table A8.1 Estimates of potential benefits from regulating nanomaterials[216]

Case	Description/ Assumptions	Benefits(€)
Building sewage treatment plants	Cost avoided if regulatory measure (REACH) reduces environmental contamination by 10%	€7 - €24 million in 2017 €131 - €440 million total 2017-2014
Drinking water purification	Cost avoided of investment in improved drinking water	€49 - €302 million in 2017

[215] It is important to recognise that this text is illustrative as it cannot cover all the complexity of the comprehensive solution REACH provides.

[216] UK only - Further details are provided in Annex 7.1

	purification technology, assuming regulatory measure (REACH) reduces environmental contamination by 10%	€896 - €5,564 million total 2017-2014
Avoidance of severe health effects	Extrapolated benefits from case substances	€210 - €2,500 million in 2017 €4,000 - €50,000 million total 2017-2014
Asbestos related deaths	1,600 Mesothelioma deaths occurred in the UK in 2000, estimated to reach a peak of 1,750 per annum by 2020. Benefit calculated based on VOSL of €1.5 million.	€2,400 -€2,625 million per annum

A8.2 Environmental and economic benefits of improvements in EU environmental policy – exemplars

A8.2.1 Thematic Strategy on Air Pollution and the Directive on Ambient Air Quality and Cleaner Air for Europe[217]

Emissions of pollutants to air, not only damage the environment through changes to the climate and air quality (i.e. greenhouse gases and particulate emissions), but can also have repercussions for water and soil environments, as suspended pollutants in the atmosphere can be deposited in each environment through precipitation. Recognising the success of previous strategies and the legislative action taken to reduce air pollution and protect the environment, the Commission has investigated what additional measures could be employed to deliver greater benefits by revising the strategy and its constituent legislative tools. To achieve significant improvements by 2020, three options for abatement of emissions are assessed, based on incremental degrees of pollution abatement. Net of the baseline, the direct abatement costs for the EU were estimated to be in the region of €5.9 billion for Scenario 1 and €14.9 billion for Scenario 3 per year in 2020. Additionally, the indirect costs were also assessed using the GEM-E3 general equilibrium model of the EU economy which accounts for the direct and wider economic impacts, such as those relating to price changes, labour market adjustments and feedback effects caused by implementing the abatement measures. The estimated costs of the scenarios in this model were estimated to be between 0.04% and 0.12% of EU-25 GDP in 2020 respectively.

Assessing the benefits of these measures, the following estimates were calculated:

- Human health benefits of €37-€120 billion in scenario A and €49-€160 billion in Scenario C, based on the value of statistical lives saved in 2020 (equivalent to 0.1%-0.35% of GDP);
- Damage reduction to agricultural crops in 2020 of €0.3 billion per year; and
- Environmental benefits equivalent to 74% less forest area and 39% less freshwater area where acidification critical loads are exceeded, plus 43% less area where critical loads for eutrophication are exceeded in 2020.

Based on the health benefits alone, the analysis indicates that the benefits should at least exceed the costs by a factor of two or more, if the environmental and agriculture benefits are to be accounted for. A clear justification for improving the implementation and development of environmental policy therefore exists.

A8.2.2 Thematic Strategy on the Sustainable Use of Pesticides[218]

A review of the thematic strategy on the use of pesticides to include plant protection and biocidal products has revealed that substantial benefits can still be achieved through the introduction of further measures to protect human health and the environment. The Strategy sits between two other leading pieces of environmental legislation, the REACH regulation to regulate what chemicals can be placed on the market and the Water Framework Directive (WFD) which monitors residues of chemicals entering the water environment. The Thematic strategy is therefore responsible for regulating the use of pesticides.

The proposed measures target a reduction of the risks for the environment and human health linked to the use of plant protection products. The overall costs and benefits of the strategy are summarised in Table 1 below, reproduced from the impact assessment.

217 The Communication on Thematic Strategy on Air Pollution and The Directive on "Ambient Air Quality and Cleaner Air for Europe". Impact Assessment. http://ec.europa.eu/environment/archives/cafe/general/keydocs.htm

218 European Commission (2006) Thematic Strategy on the Sustainable Use of Pesticides. Impact Assessment. http://ec.europa.eu/environment/ppps/pdf/sec_2006_0894.pdf

Table 1: Costs and Benefits of the Thematic Strategy on Pesticides

	Benefits	Costs	Balance
Farmers	€1,110 - €1440 million /yr (Reduced health impacts)	€725 million /yr	€380 - €710 million
Industries	+ 3,000 jobs	€300 - €670 million /yr (could be contained through more advisory services and development of more innovative products) - €670 to - €300 million/yr	
Member State Authorities	€200 million /yr (savings for health and environment costs) + 180 jobs Positive impacts on humans and the environment	€9 million/yr	€191 million/yr

The analysis clear indicates a positive net benefit from the revision of existing legislation protecting human health and the environment.

A8.3 Environmental and economic benefits of the implementation of EU environmental policy - exemplars

A8.3.1 Industrial Emissions (integrated pollution prevention and control) (recast) Directive[219]

The review process evaluating the performance of the first IPPC Directive 96/61/EC highlighted a number of problems which were adversely affecting the cost effective implementation of the Directive by the Member State authorities and industrial operators. Foremost amongst these problems is the insufficient implementation of best available techniques (BAT) leading to limited progress in the prevention and reduction of industrial emissions and to distortion of competition due to large differences in environmental standards between operators in the different Member States. While the initial compliance costs associated with introducing BAT may be higher, the BREF supporting document prepared for each industry sector prove that sufficient cost savings can occur through greater energy, water and material efficiency, in addition to reductions in waste generation to exceed the initial investment cost. Estimates of the impacts indicate the implementing BAT is likely to incur additional costs of €2.1- €6.5 billion for industry and yield €9 – €30 billion in cost savings for industry overall. This result suggests a cost benefit ratio of over €5 for every €1 spent.

If health benefits of €7-€28 billion per year due to the reduction of premature deaths/ years of lives lost by 13,000 and 125,000 respectively are included then this ratio increases to over €7 per €1 spent.

MS's record of implementing EU environmental legislation remains poor and that ensuring and enforcing the full implementation of EU environmental legislation by MS remains a major challenge, despite the measures taken by the EU to improve implementation and enforcement. These issues are covered in more detail in the following sections.

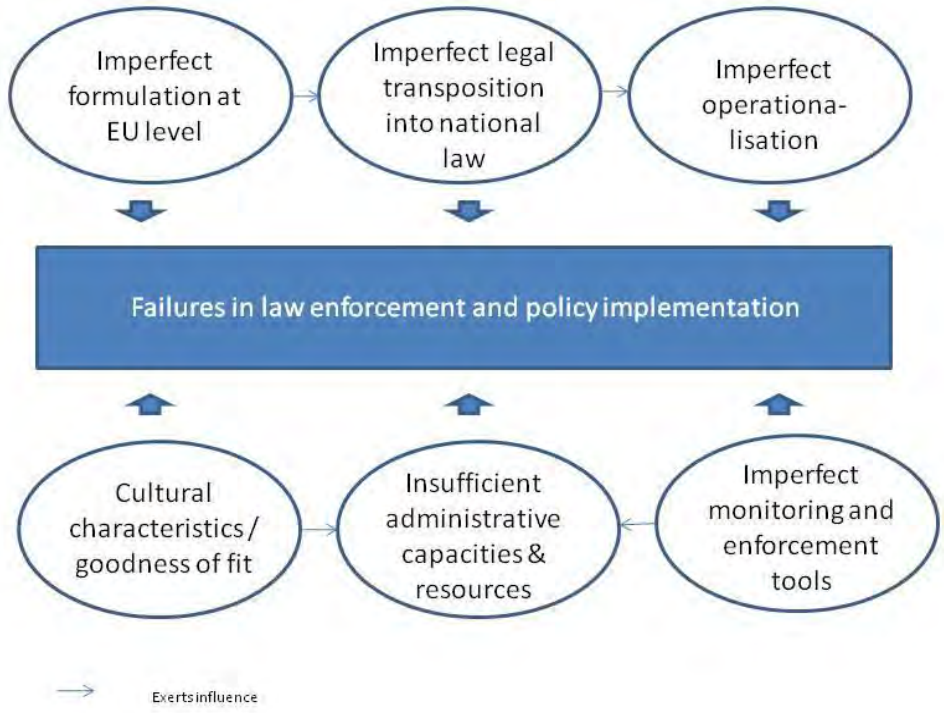
219 Directive of the European Parliament and of the Council on Industrial Emissions (integrated pollution prevention and control) (recast) Impact Assessment http://eur-lex.europa.eu/Notice.do?val=462132:cs&lang=en&list=511975:cs,516991:cs,508612:cs,505133:cs,499125:cs,485132:cs,461932:cs,462133:cs,462132:cs,261603:cs,&pos=9&page=1&nbl=16&pgs=10&hwords=&checktexte=checkbox&visu=#texte

A8.4 Causes of inadequate implementation of the acquis

A8.4.1 Overview

There are a number of causes – some legal, some political, some economic and some linked to different European legal cultures – which explain why ensuring compliance with the requirements of the environmental *acquis* in Europe remains a challenging task (Rechtschaffen, 2007). A classification of causes that is in widespread use is given by Richardson (2001, see Figure A8.1).

Figure A8.1 Causes for failures in implementation and enforcement



***Source**:* developed on the basis of information in Richardson, 2001

In a nutshell, European environmental policy and law enforcement and implementation largely rests on cooperative, partnership-based approaches, given the larger absence of direct enforcement tools at the European level (Demmke, 2004). Moreover, citizen or private enforcement of EU legislation is allowed only restrictively, in contrast to the US. Citizens are not enabled to take legal action against individual facilities that breach environmental law requirements (although complaints to the Commission are allowed), and in some Member States environmental groups even face enhanced problems in bringing suits in national courts (Krämer, 2004). Implementation and law enforcement is thus dependent on both the ability and willingness of EU Member States, i.e. it is a mix of acceptance (legitimacy), will to enforce (power) and capacity to act (management). There is not one dominant factor that can help explain implementation failures. Rather, different factors influence each other. The following sections will further explore the factors illustrated above.

A8.4.2 Imperfect formulation and imperfect legal transposition

The formulation or design of policy at EU level often generates legislative texts that are characterised by vaguely or ambiguously formulated objectives and provisions, or abstain

from regulating relevant topics and areas. EU legislation is finally the result of compromises between the EU Member States and the European Parliament. While the Commission has a lot of power in shaping the general contours and contents of legislation, deliberations between Council and Parliament can improve weak proposals, but they can also increase inconsistency and decrease the overall legislative quality. Unclear or ambiguous provisions, which cover differences of view or interpretation and which cannot be resolved in policy formulation, are subsequently shifted to the implementation stage and hamper the effectiveness of the implementation process.

Box 3: the case of the Water Framework Directive

The Directive contains many unclear or ambiguous provisions. The aim of the Water Framework Directive is to achieve good ecological and chemical status in all inland and coastal waters by 2015. However, 'good status' is not clearly defined in the Directive.

Another example is the phrase 'other equally important human development activities'. The Directive refers to this, among others, in Article 4(3), which states that 'Member States may designate a body of surface water as artificial or heavily modified, when the changes to the hydromorphological characteristics of that body which would be necessary for achieving good ecological status would have significant adverse effects on: (i) the wider environment; (ii) navigation, including port facilities, or recreation; (iii) activities for the purposes of which water is stored, such as drinking-water supply, power generation or irrigation; (iv) water regulation, flood protection, land drainage, or (v) other equally important sustainable human development activities [....].'

This phrase is the result of the laborious efforts at EU level to reach a compromise between the different actors involved and their respective interests and has been created to enable the introduction of a number of derogations from the achievement of the Directive's environmental objectives.

In the Flemish Region (Belgium) for instance, the officials and academic experts involved in the transposition of the Directive into Flemish law did not know what actually was meant by this phrase. This was also true for those officials who had been directly involved in the EU decision-making process. Unclear phrases or provisions like this one have led to a troublesome transposition process within Flanders as the officials and academic experts initially did not know how to deal with these provisions and as those unclear provisions generated lengthy discussions and laborious writing sessions within the legal team and the political working group (Geeraerts et al, 2006).

Unclear or ambiguous EU legislative texts can lead to national or regional authorities struggling with transposing those texts and subsequently induce implementation failures. Member States might react differently to this problem (Richardson, 2001):

- They might simply copy the EU legal text into national law, thereby avoiding interpreting the EU text and potentially shifting the interpretation problem even further down the policy cycle. This approach often leads to lengthy judificial clarification processes via court cases.
- Member States might also try to interpret the legal text (including the negotiation process that generated this text) and to translate the EU text in a way that the legislation is in line with existing domestic rules and procedures that their administrations are able to understand and act upon.
- Finally, a Member State's interpretation might lead to 'over-implementation' by creating national provisions that are going beyond what was not meant to be part of the EU policy concerned or might lead to 'under-implementation' by creating national provisions that constitute an attempt to lower the ambitiousness of the EU policy concerned. The latter concerns a deliberate transposition failure.

Imperfect legal transposition is a common cause for European infringement procedures, particularly in the area of European waste policy (EC, 2010).

A8.4.3 Imperfect operationalisation of policy at the national level

Transposition failures are, however, rather the tip of the iceberg and for the European Commission as the guardian of the Treaties relatively easy to detect and follow-up on. Much

more difficult to detect are cases where Member States more or less fairly transpose EU law but decide to violate the practical implementation (i.e. delivery) of the policy. This can take several forms (see Richardson, 2001), e.g. when Member States report on formal compliance, but rather tick-off implementation requirements than to seek active implementation. This can also include the manipulation of compliance information and indicators, taking particular advantage of situations of unclear responsibility sharing and coordination gaps between the European and the national level. Moreover, and more importantly, private actors as the final target group can decide to defy the regulation and public authorities might not have the means to chase them up. This highlights the fact that practical deviations from implementation requirements do not always reflect intentional behaviour by public authorities. It is often unintentional in the sense that public authorities can have limited means to respond to the 'cheating' behaviour of their target groups.

In a comprehensive assessment of EU infringement cases in the field of European environmental policy, Börzel et al (2007) have found that politically powerful Member States are most likely to violate European law, when it is not congruent with their domestic policy interests and/or costly to implement. The best compliers are rather small EU Member States with highly efficient bureaucracies. Political power is thus an important explanatory variable, yet not the only one, as countries with similar political power like the UK, Germany, Spain or France show different implementation records, noting the importance of administrative capacities (particularly organisational effectiveness and efficiency) which will be discussed in the next section.

Box 4: The case of the Habitats Directive

The Habitats Directive is a good illustrative case. During its implementation phase, the European Commission has issued infringement procedures against every Member State. While unclear provisions and requirements might explain part of the puzzle, a big influential driver has been a lack of political will in many EU Member States to implement the provisions of the Directive which by and large intend to qualitatively and quantitatively improve the status of nature conservation, particularly in view of designating protected areas and their inter-linkages. In some countries, this lack of political will was already visible in the transposition phase. Many Member States were late, and infringement procedures were initiated against eight Member States, leading to judgements of the ECJ in two cases, against Germany (C-83/97) and against Greece (C-329/96). More infringement cases were issued with regard to non-conformity of transposition measures (e.g. national laws clearly not in line with meeting the objectives of the Directive), leading to ECJ judgements in several cases (e.g. Luxembourg (C-75/01), Italy (C-143/02), Belgium (C-324/01)).

However, the outreach of infringement is limited, when it comes to individual failure to comply with norms, as can be illustrated on the basis of one case example (Sobotta, 2003). In this case, a population of protected sand lizards was eliminated through site destruction by removal of large amounts of sand in the course of a local road project. Authorisation had been given under the condition of specified measures to prevent harm, which were not followed. An administrative offence procedure was investigated by relevant national authorities afterwards, but no infringement was seen as the Member State had not violated the protection regime.

A8.4.4 Cultural characteristics and goodness of fit

Different political and administrative cultures and related path-dependencies in EU Member States also explain to some extent implementation failures. The literature links implementation problems in some EU Member States, particularly in the South and East, also to a laxer attitude regarding compliance with EU norms, which is linked to a political culture often characterised by clientelism and patronage. Other Member States, on the other hand, are often described to have a rather developed 'culture of norm compliance' (Börzel et al, 2007). A misfit between the national political culture and the cultural requirements to deal with European integration processes might add to this (Richardson, 2001).

A policy misfit (as to policy contents) might also explain implementation records of Member States. Misfit occurs to the 'goodness of fit' between the policy paradigm that informs the European regulation and the policy paradigm that informs the domestic regulation and institutional arrangements (Risse et al, 2001). The more an EU policy challenges or contradicts the corresponding policy at the national level, the higher the need for a Member

State to adapt its legal and administrative structures in the implementation process. Legal and administrative changes involve high costs, both material and political, which public authorities are little inclined to bear (Börzel, 2000). A policy misfit is therefore closely related and intertwined with a misfit at the level of political and administrative culture.

Whether or not such a misfit translates itself into implementation failure is influenced by different mediating factors, particularly with regard to the number of political veto-players within the political system concerned and its administrative capacities. While the latter will be discussed in the following section, it is worthwhile briefly reviewing the former at this point.

Box 5: The cases of the Environmental Impact Assessment Directive and the Directive on access to environmental information

The Environmental Impact Assessment Directive assumes horizontally integrated structures that enable a comprehensive assessment of any public or private project across environmental media, such as water or air, as well as across geographical areas (irrespective of political or administrative boundaries). Those two types of administrative requirements did not fit the federal and hierarchical structures in Germany. As a result, Germany fought the Directive during decision-making at EU level and, once adopted, approached the Directive's implementation in a minimalistic way (Knill and Lenschow, 2000).

Also, in the case of the Directive on freedom of access to environmental information, Member States were facing considerable adaptation challenges. The Directive included some procedural requirements that implied far-reaching changes in the administrative practices of some Member States. In particular the Directive's application to every citizen, regardless of personal interests or motives, contravened the definition of information rights in most Member States and therefore resulted in a restrictive and ineffective implementation. Germany for instance was very resistant in implementing the Directive (Knill and Lenschow, 2000).

A8.4.5 Insufficient administrative capacities

Competent authorities have a range of tasks to perform, including planning, monitoring, reporting, licensing, quality assurance, designations, inspection, public information, enforcement and dealing with emergencies (IEEP and Ecotec, 2001). The ability to execute such functions, i.e. the level of capacity, has both government-wide and sector specific components. However, capacity is not the same as performance. Translating capacity into performance depends upon political will that can either catalyse or inhibit supervision action. Thus, an institution may have sufficient capacity without producing results. The capacity of institutions includes the following elements:

- Individual competences (knowledge and skills of individuals, as well as their ability to set objectives and achieve those objectives).
- The organisational capacity (an organisation's mission, planning and decision-making processes, structure and resources, and the organisational culture).
- The enabling environment (legal and policy frameworks, and work approaches, needed for the manifestation of capacities at the individual and organisational level (OECD, 2006; UNDP, 2007).
- Partnerships/network of organisations – that describes the quality of interaction and cooperation among relevant public and private actors, as well as with development partners in the sector (ODI, 2006; ADB, 2008).

The capacity of supervision authorities in the EU Member States reflects a number of challenges. It is, however, not clear if capacity problems are consistent across the Member States. Key problems include:

- *Inadequate numbers of personnel.* This is a core capacity problem. The EU consists of Member States that differ largely in their respective enforcement capacities and level of experience with EU law. In particular many of the 2004 EU accession countries have faced and still face problems in providing the necessary legal and technical means to

ensure a sufficient transposition and formal compliance in all areas of the environmental acquis. Some Member States have limited numbers of inspectors. This is seen in some new Member States, particularly where inspection is focused at a regional/local level, as well as in some southern Member States which have relatively new inspectorates. However, even those with well established inspection systems tend to argue that additional personnel are needed. It is difficult to judge the extent and reality of the problem, however. Some inspectors spend all of their time on inspection activity, while others do not. Also some issues/laws attract greater attention to funding for personnel than others, so that the capacity problem is not evenly distributed.

- *Inadequate training/expertise of personnel.* Both new and existing staff require training to understand new legal and practical obligations. Experience from IMPEL exchange of inspectors in different areas of environment law indicate that this is a problem for many staff.
- *Inadequate equipment.* Equipment is required to monitor the environment, activities, store data and visit sites, etc. Historically, this has been identified as a problem in some transition countries. However, it is not clear if this remains a problem and, as noted below, in none of the countries this is a major aspect of budget spending.
- *Communication/networking.* This issue is both one of organisational processes and individual attitude. Certainly networking enhances capacity and the issue is addressed further below.

Box 6: The IPPC Directive – requiring significant amount of administrative capacities and resources

The IPPC Directive requires industrial operators to ensure that their activities operate according to the principle of Best Available Techniques (BAT). Authorities are required to issue permits containing operating conditions, such as emission limit values, based on that understanding of BAT. BAT is, however, not static and may change over time and it might also be appropriate to vary conditions because of local environmental concerns, for example. In order to implement the Directive, therefore, Member State authorities need to develop an understanding of BAT across all relevant industrial sectors. They also need to develop systems for assessing and issuing permits and establishing monitoring and inspection regimes to ensure compliance with those permits. Authorities might also need to grapple with fundamental questions as to what is, or is not, included with an IPPC permit determination and how to relate such analysis to conditions imposed by other EU Directives on the same installation. Where Member States have hundreds or thousands of IPPC installations, the complexity of technical and administrative approaches can, therefore, be significant. This is illustrated by the many years and huge resources that the Commission, Member States and stakeholders have put into the development of BAT Reference Notes (BREFs) through the Institute for Prospective Technology Studies, which only address part of IPPC implementation. IPPC is, therefore, a Directive with a complex implementation process requiring a significant amount of administrative capacities and resources (Farmer, 2007).

In addition, the degree to which responsibilities are organised and shared both vertically and horizontally is of major relevance to the implementation of environmental policy. For example, unclear responsibilities and cumbersome coordination processes between different authorities involved in the implementation process are often found to be major obstacles to an effective implementation. The more authorities are involved, the greater the number of diverging opinions and interests and the more difficult it is to find a compromise if the legislative piece under consideration is politically contested, particularly if there are different political majorities at different levels of governance. Poor coordination among various national bodies with responsibility for inspection or controls helps explain problems with implementing EU waste law (see Box 7).

Box 7: Implementation of EU waste law

As to waste policy in general, one can conclude that implementation and enforcement of EU waste

legislation fall significantly short of legal obligations. Many Member States lack sufficient capacity for the inspections, controls and other actions to enforce waste legislation properly. Organisational problems, such as poor coordination among the various national bodies with responsibilities for inspections and controls, hinder enforcement. More generally, implementation of EU waste legislation is considered a low priority in many Member States, resulting in insufficient allocation of resources for enforcement. Lack of technical capacity for the preparation of waste management plans and programmes is another widespread problem. Further, Member States have different interpretations of the EU waste requirements.

These gaps in implementation and enforcement have given rise to significant problems in many parts of the EU, notably: illegal waste dumping at a significant scale, large numbers of landfills and other facilities and sites that do not meet EU requirements and a high level of illegal waste shipments. Moreover, many national producer responsibility schemes, waste management plans and other strategies and programmes work poorly. These problems have led to a high level of citizen complaints to the European Commission and many infringement cases against various Member States: the waste sector, together with nature protection, has accounted for the largest share of environmental infringement cases brought before the ECJ in recent years (Milieu, 2009).

Responsibility for environmental decision-making, or for administering law enforcement and implementation, has also been significantly decentralised in some EU Member States (see Box 8), and in some sectors of the economy. For the future, the trend towards more local responsibility in institutional structures and operating procedures is likely to continue, limited of course by concerns that excessive decentralisation could lead to unacceptable inefficiencies. In contrast, new developments in European environmental governance, such as the tendency to form broader, more open Framework Directives and operationalise them through Daughter Directives, not only requires increased capacities at the national level (where a larger bulk of the original policy formulation work at the EU level is shifted to) but also requires a stronger presence of Member State experts in EU comitology and other technical expert assistance procedures.

Demands for increased enforcement and implementation capacities come at a time when many EU Member States are having problems in maintaining their public expenditures for the environment, or are actively downsizing them. This process started well before the economic crisis in 2007 and budgets have come under greater pressure since then (see Figure 1.2). As no EU Member State has a particularly high share of public spending for the environment in terms of per cent of GDP, cuts already apply on a rather low general level of spending. In the current economic crisis many governmental bodies in the Member States are under significant budget constraints and, therefore, it may be expected that ensuring sufficient budgets to deliver effective supervision and enforcement activity may be problematic.

Figure A8.2 Environmental expenditure by the public sector (% of GDP)

timegeo	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
EU (27 countries)	:	:	:	:	:	:	:	:	:	:	:	:
EU (25 countries)	:	:	:	:	0.56	0.58	0.53	:	:	:	:	:
EU (15 countries)	0.64(s)	0.61(s)	0.59(s)	0.59(s)	0.54(s)	0.56(s)	0.51(s)	:	:	:	:	:
Euro area	:	:	:	:	:	:	:	:	:	:	:	:
Belgium	0.42	0.44	0.51	0.47	0.59	0.63	0.61	0.65	0.63	:	:	:
Bulgaria	0.11	0.11	0.22	0.42	0.32	0.46	0.36	0.31	0.34	0.38	0.36	0.5
Czech Republic	:	:	:	:	:	:	:	:	:	:	0.53	0.38
Denmark	1.2	1.22	1.22	1.25	1.23	1.19	1.2	1.18	1.15	1.11	1.1	1.09
Germany	0.66	0.61	0.54	0.5	:	:	:	:	:	:	:	:
Estonia	0.25	0.2	0.23	0.21	0.27	0.17	0.29	0.17	0.2	0.24	0.16	:
Ireland	:	:	0.52	:	:	:	:	:	:	:	:	:
Greece	0.68	0.64	0.64	0.62	:	:	:	:	:	:	:	:
Spain	:	:	:	0.18	0.17	0.23	0.25	0.26	0.31	0.33	:	:

France	0.28	0.3	0.3	0.3	0.31	0.33	0.34	0.34	0.33	0.34	0.34	:
Italy	:	0.72	0.75	0.77	0.76	0.8	0.8	0.77	0.76	0.76	0.72	:
Cyprus	:	:	:	:	:	:	:	:	0.31	:	:	:
Latvia	:	:	:	:	0.01	0.17	0.16	0.07	0.06	0.06	:	:
Lithuania	0.25	0.22	0.2	0.13	0.1	0.09	0.1	:	0.32	0.49	0.65	:
Luxembourg	:	0.66	:	:	:	:	:	:	:	:	:	:
Hungary	:	:	:	:	:	0.57	0.64	0.49	0.52	0.64	0.6	0.29
Malta	:	:	:	:	:	:	:	:	:	:	:	:
Netherlands	:	2.64	0	:	:	:	:	1.45	:	1.38	:	:
Austria	1.3	0.19[(b)]	0.25	0.18	0.21	0.21	0.44	0.49	0.48	0.47	:	:
Poland	:	:	0.86	0.83	0.76	0.73	0.45	0.44	0.42	0.43	0.48	0.44
Portugal	0.68	0.7	0.51	0.56	0.56	0.57	0.55	0.51	0.49	0.5	0.46	:
Romania	:	:	0.52	0.39	0.16	0.13	0.2	0.13	0.22	0.23	0.54	0.59
Slovenia	:	:	:	:	:	0.67	0.74	0.8	0.77	0.68	0.61	:
Slovakia	:	:	:	0.71	0.14	0.1	0.19	0.12	0.28	0.26	0.26	0.24
Finland	0.52	0.49	0.45	0.39	0.38	0.37	0.37	0.39	0.39	0.33	0.39	:
Sweden	0.18	0.19	0.18	0.16	0.23	0.23	0.25	0.24	0.26	0.32	0.31	:
United Kingdom	:	0.47	0.47	0.48	0.48	0.45	0.46	0.45	0.48	:	:	:
Iceland	0.32	0.34	0.33	0.37	0.33	0.34	0.28	:	:	:	:	:
Norway	:	:	:	:	0.7	0.5	0.49	0.51	0.58	0.52	0.48	0.49
Switzerland	:	:	:	:	:	:	:	0.67	:	:	:	:
Croatia	0.06	0.1	0.08	0.11	0.31	0.07	0.14	:	:	0.08	:	:
Former Yugoslav Republic of Macedonia, the	:	:	:	:	:	:	:	:	:	:	:	:
Turkey	0.21	0.45	0.64	0.27	0.29	0.11	0.13	0.38	0.4	0.4	0.41	:

:=Not availables=Eurostat estimateb=Break in series

***Source**: Eurostat*

It is, however, also important to note that sources of funding for such activities are not always dependent on government budgets. A survey of some Member States' enforcement bodies (ten Brink and Farmer, 2005) found that these could be divided into three groups according to their funding sources:

- The first group consists of countries that have all (or almost all) of their revenue provided by government sources. Countries in this group include: Belgium, France, Malta, the Netherlands, Slovenia and Spain. The fact that all revenue comes from the state government does not exclude the existence of other sources (such as environmental taxes and charges, and administrative fees); it just indicates that the inspectorate does not benefit from them directly.
- The second group includes countries in which enforcement agencies receive some of their revenue directly through permit fees or inspection charges. These are important sources of funding for the Czech Republic, Denmark, Finland, Ireland, Sweden, and the UK. These are minor sources of funding in Poland.
- The final group includes those countries for which there are other (usually transitional) sources of funding for enforcement. This group includes Bulgaria and Poland where compliance assurance programmes are supported financially by earmarked environmental funds. However, these are used for the purchase of monitoring equipment, etc., not for general running costs, such as personnel.

Only a few authorities responsible for inspections noted that they had sufficient funds to carry out their job according to their mandates. The relative importance of these sources is set out in Table A8.2.

Table A8.2 Share of funding sources for some environmental enforcement authorities

Sources	BG	DK	FIN	IRE	POL	UK
Government funds	60.6%	80	60%	69%	69%	31%
Administrative fees	13%	20%	35%	29.5%	0.50%	70%
Pollution or natural resource fees	-	-	1%	-	-	-
Non-compliance fees/fines/penalties	1.4%	-	-	-	9%	0.25%
Other	25%	-	4%	1.30%	22%	-

***Source**:* Ten Brink and Farmer, 2005

It is important to note that the basis for funding options may be a principled approach. In the Netherlands, for example, supervision activity is viewed as a core function of government and, therefore, should be funded from governmental sources (as with the police). In contrast, in the UK, supervision activity is viewed as a necessary part of ensuring control of pollution, and therefore business should pay as an interpretation of the 'polluter pays' principle.

Analysis of actual budget allocation to specific activities shows that inspection is generally the most important activity, followed by monitoring, and in some cases permitting (where permitting comes under the tasks of the inspectorates). Fewer resources are being spent on compliance assistance, enforcement, research, and training and expenditure on compliance monitoring can be highly variable as the level of monitoring costs depends on whether monitoring is performed by the inspection or if it is done by a separate institution, and whether the infrastructure is already in place. With regard to the type of expenditure, the personnel-related operational costs generally represent the most significant expenditure. Capital investment, which generally refers to the purchase of assets that ensure enforcement activities, is also important but more difficult to trace as these expenditures extend beyond a single accounting period.

Box 8: Expenditure and capacity developments in Germany and UK

Germany is characterised by a growing trend towards decentralisation of tasks to the communal level at the expense of the regional level (SRU, 2007). A visible reduction in the overall expenditures for environmental protection has taken place over the last decade, particularly in the area of nature conservation and landscape protection which fell by approximately one-third between 1994-2001, while expenditures for air, water and soil protection initially rose and were then cut back to the starting level in the same period. In particular running expenses have been cut, while numbers of personnel stagnate in total (SRU, 2007). Even more important is the functional organisation of the environmental administration itself. Reforms in the past have often aimed at streamlining or abolishing those administration parts on a regional level in some of the federal Länder (namely the institution of "Bezirksregierung") and reallocating tasks of planning and permitting to the local level. However, the local level often does not have the same level of expertise and competence available as the regional level, mainly for reasons of economic efficiency. Administrative units are too small and it would be too costly to stock specific expertise. Moreover, the trend to decentralise runs the risk of losing critical functions for coordinating different programmes and activities and overarching spatial planning functions. These tasks are often performed by regional authorities and they are often indispensable for informing more complex permitting procedures that cut across media and policy files.

A further constraint on capacity development in Germany, notably at the regional level, with regards to regulatory activities (permitting, environmental inspections, etc), is the reduced availability of staff. A 2001 IMPEL study noted that "management [of a regional environmental inspection bureau] is influenced by the need to react to priority issues as they arise and, in the current staff situation, only limited effort is available for pre-planned inspection programmes. The filling of vacancies by direct advancement of staff without appropriate academic qualifications, but with proven experience and

technical skills, is not possible under the arrangements for appointment of Civil Servants" (IMPEL, 2001).

Current austerity regimes in many EU countries might further undermine the capacities and performance of many environmental administrations in EU member countries. For example, overall spending by DEFRA, the UK Department for Energy, Food, Rural Development and Agriculture, is expected to decrease from €2.9 to €2.2 billion by 2014, which has to be seen, however, against the larger increase of spending in the 1990s and beginning of 2000s.

EU funding can bring significant relief but can also be hampered by problems of inflexibility and can face the problem of co-financing rates. For example, the mid-term review of Life+ found that, despite successful efforts to strengthen the flexibility of the instrument, the use of alternative funding instruments are rather limited in practice (GHK et al, 2010).

Even if legal and technical expertise is available to a sufficient degree, the implementation process might be severely hampered by unclear coordination mechanisms. The European Commission has noted several times that assignment of monitoring and implementation responsibility, national databases on transposed Directives and close cooperation between those government officials responsible for negotiating Directives and those government officials responsible for implementing Directives are key elements of good practice. Often, however, different authorities with competing interests intervene in the process of implementation, leading to a weakening of implementation efforts up to the possibility of 'symbolic implementation'.

A8.4.6 Imperfect monitoring of implementation and enforcement

A major barrier towards a more effective enforcement of EU environmental law at national level relates to the lack of political priority given to environmental inspections in some Member States and as a result the limited resources available for inspecting authorities to develop a fully effective system of environmental inspections.

Box 9: Enforcement of EU waste policy

Many of the implementation problems in the area of waste are linked to difficulties in enforcement. These difficulties include organisational issues (such as the problem that competences for inspections and other activities in several Member States are divided among several bodies that are poorly coordinated), technical capacity (including a lack of knowledge of EU documents and of inspection and control methods), poor prosecution and low fines where violations are discovered, a lack of common standards for enforcement in the area of waste, and a lack of joint activities among Member States to address shared problems, particularly those related to transboundary shipments of waste (Milieu Ltd et al, 2009).

There is, for instance, clear evidence of illegal shipments of waste directly contravening waste shipment Regulation ((EC) No 1013/2006), in particular through hazardous waste exports and exports of waste for disposal to developing countries. Problems relating to illegal waste shipments have also arisen between Member States. Article 50 of the Regulation imposes certain obligations on the Member States aiming to ensure that effective inspection systems are put in place to achieve this. However, analysis undertaken in a number of contexts has shown that serious gaps have been identified in the enforcement and inspections carried out by Member States. These gaps include, inter alia, inadequate inspections of waste shipments 'in situ', e.g. random on-the-spot checks without opening of containers; in-sufficient frequency of 'in situ' inspections; and lack of clear criteria for inspections. A major problem seems to be that the Regulation currently lacks specific criteria related to the frequency or quality of inspections (IEEP, Bio and Ecologic, 2009).

Furthermore, the lack of European harmonization of the type and level of criminal penalties is generally considered to be a barrier towards an effective enforcement of EU environmental law. Various studies have indeed shown that penalties currently in place in Member States are not always sufficient to tackle the increasing problem of environmental crime and as a result to effectively implement EU's environmental policies (EC, 2007b).

Also at the EU level, barriers to an effective enforcement of EU environmental law remain. One of these barriers are the limited resources and powers of the European Commission, which does not have the resources and powers to carry out systematic and comprehensive

checks on the application and enforcement of EU law (Allio & Fandel, 2006). Although Member States are required to provide full information about the formal transposition of Directives into national or regional law, there is limited information about the organizational stage of implementation (in which the legal and administrative framework for the proper application and enforcement of the transposing laws is set up) and even less about the operational stage of implementation, i.e. compliance in practice (Wennerås, 2007).

Unlike other policy areas of European law, such as competition, veterinary, customs, regional and fisheries policy, the Commission does not have investigative/inspection powers or staff empowered with the prerogative to control the effective application 'on the ground' of EU environmental law. The Commission may ask the Member State to allow for inspections, but this lies completely within the discretion of the Member State and such requests are not likely to be honoured in cases where infringements may be discovered (Wennerås, 2007).

Moreover, citizen or private enforcement of EU legislation is allowed only restrictively, in contrast to the US. Citizens are not enabled to take legal action against individual facilities that breach environmental law requirements (although complaints to the Commission are allowed). In practice, access to EC courts is not possible for environmental NGOs which have seen all their actions in the past declared inadmissible as they were considered not to be directly and individually concerned. The narrow construction by the ECJ of direct and individual concern has therefore shut the door in practice for private enforcement in direct actions at EU level. This was expected to change with the Community's ratification of the Arhus Convention, but according to observers such as Krämer (2008) and Wennerås (2007) Regulation (EC) No 1367/2006 which intends to implement the Convention falls short in this in several respects and is therefore not in compliance with the requirements on access to justice of the Convention (Wennerås, 2007).

In some Member States environmental groups even face problems in bringing suits in national courts. This is one of the reasons why the Commission has brought forward a proposal for a Directive on access to justice in environmental matters in 2003 as increased public access to justice in environmental matters might overcome the current shortcomings in the enforcement of environmental law. The proposal, however, remains stalled in the Council. Some analysts, nevertheless, warn for too optimistic hopes for remedying violations of EU law through private enforcement at national level. According to Siepcevic (2009), in order to be successful, private enforcement of EU environmental law through national courts requires a particular set of conditions to be met on top of the legal preconditions. One of these conditions is the organizational capacity of the public interest groups to litigate – this refers to the resources available such as information and finance. Also the reaction of competent authorities to litigation before national courts determines the effectiveness of private judicial enforcement. Research has shown that competent authorities might refuse to obey their national courts. Despite these limits, private enforcement has the potential to improve enforcement in general as it will complement the EU's centralized enforcement system.

A8.5 The Use of other EU financial instruments for the environment

A8.5.1 Environmental spend across DGs

Through desk research and consultation with the various DGs, an approximate estimate of planned environmental expenditure across the policy areas managed by different DGs. This is intended only to provide an idea of the range of financial instruments used to support environmental objectives; and to flag up the very large contribution made through cohesion policy and CAP (Pillar II). The analysis serves to emphasise the limited scale of LIFE and the potential importance of increasing the complementarity between the wide number oif different financial instruments.

Table A8.3 EC planned environmental spend (€ billion), 2007-2013

DG	Programmes	Environmental Activities	Over programme (€bn)	Per annum (€bn)	% of total
DG ENV and DG CLIMA	LIFE	Total regulation	2.1	0.3	1%
DG RTD	FP7	Environment theme	1.9	0.3	1%
DG REGIO*	ERDF / ESF / Cohesion Fund	Environmental activities as defined	105.0	15.0	69%
DG AGRI**	CAP	EAFRD	35.4	5.1	23%
DG MARE	MARE	Maritime Policy (excluding EFF)	0.1	0.0	0%
DG ENTR	CIP	Eco-innovation, IEE, EIF	1.3	0.2	1%
DG AIDCO	ENPI	Total programme	3.9	0.6	3%
DG DEV	ENRTP	Total programme	1.2	0.2	1%
DG SANCO	Health	Total programme	0.3	0.0	0%
DG EMPL	EGF	Total programme	0.5	0.1	0%
DG ENER	Energy Recovery Programme	Offshore wind, Carbon capture & storage	1.6	0,2	1%
Total			**151.6**	**21.7**	**100%**

Source: GHK data analysis using figures from Commission websites and interviews with DG officials

** Of the DG Regio environment funding €45bn is direct investment in the environment (e.g. water, air, waste) with the remainder being indirect investments that might be expected to provide environmental benefits (e.g. cycleways and railways) – see Table 1, Regional Policy Contributing to Sustainable Growth in Europe 2020, SEC(2011) 92 final*

*** Of the DG AGRI environment funding over the programme €12.6 billion is for natural handicap measures (LFA); €22.2 billion for agri / environment measures (AE) and €0.59 billion for Natura 2000 payments (agriculture and forest)*

A8.5.2 Synergies between the different instruments

The data above indicates that a number of instruments contribute significantly in financial terms towards meeting environmental objectives. Feedback from consultations with Commission staff suggests, however, that the synergies between the different financial instruments could be strengthened and that more efforts are needed to build linkages

between LIFE and other instruments, in particularly as regards complementarity and synergies created between LIFE and Cohesion Policy; or between CIP and Cohesion Policy.

The distinction between the actions funded by LIFE and those funded by other instruments such as Cohesion Policy and CIP remains blurred (e.g. one EC consultee considered that the majority of LIFE projects could have been financed by Cohesion Policy). Another possible example is the lack of clarity on the links between LIFE and ESF, which both fund activities aimed at increasing training, improving knowledge and capacity building. This suggests the need for clearer roles for each instrument.

The concern of programme managers has been to avoid the double funding by two or more instruments, in line with financial regulations, rather than the creation of better linkages between instruments.

Despite there being particular areas where LIFE could improve linkages with other instruments (e.g. funding biodiversity corridors that do not currently qualify under CAP), there are some practical difficulties because of shared management of some programmes such as rural development and structural fund programmes with MS. This means the EC has only limited sight of the projects being funded at MS level, and suggest that the scope for synergy rests to some extent on the ability of MS to co-ordinate better between the use of different instruments.

The weaknesses highlighted makes it difficult to construct a 'project pipeline' where for example, LIFE funded projects could be seen as pilots for subsequent mainstreaming under CP or CA. This would perhaps require more explicit definition of the criteria for LIFE projects and additional guidance to reflect the interest in mainstreaming results in support of increased multiplier value.

A8.5.3 Integration of Environmental requirements into other Policies - Progress made to-date

The principle of environmental integration recognises that 'environmental policy alone cannot achieve the environmental improvements needed as part of sustainable development. The changes required to reduce environmental pressures of high concern and stimulate positive outcomes from fisheries, agriculture, transport, energy and other areas so as to achieve sustainable development, can only be achieved through a process of environmental integration in these sectors'.[220]

At the EU level, as previously noted the obligation of environmental integration is laid down in three main ways – Article 11 of the TFEU, the Cardiff process and the EU sustainable development strategy (see Section 2.1).

The Cardiff process decided that the Council sector configurations should adopt their own strategies for integrating environment and sustainable development into their respective policy areas, as proposed by the Commission, driven mainly by an 'acknowledgement that the EU institutions were segmented and hierarchical and produced incoherent policies.'[221] The agriculture, transport and energy sectors were invited to develop integration strategies (June 1998), followed by development, industry and internal market (December 1998) and then fisheries, economic and financial affairs and trade and foreign policy (June 1999).

Two external evaluations of the Cardiff process were made in 2001, although both found the initiative to be promising, progress until then had varied considerably between different Council configurations. The Commission's own stocktaking report in 2004 also concluded that the results of the Cardiff process had been 'mixed', with inconsistent quality across sectors and failure to translate commitments to actions[222]. A number of factors are likely to have contributed to this 'failure':

[220] COM(2004)394, "Integrating environmental considerations into other policy areas – a stocktaking of the Cardiff process"

[221] Persson (2004), Stockholm Environment Institute, "Environmental Policy Integration – An Introduction"

[222] COM(2004)394, "Integrating environmental considerations into other policy areas – a stocktaking of the Cardiff process"

- Weaknesses in implementation related to an inconsistency of strategies across Council formations and insufficient emphasis being placed on good practice in terms of content and implementation
- Some strategies built on incomplete or absent sector sustainability assessments and went through little external consultation
- Insufficient attention was given to the very significant differences between the policy sectors – namely the differing levels of EU competence, the extent of decentralisation of policy responsibilities and the nature of the actors and stakeholders that were to be targeted, and hence not enough guidance was provided to the sectoral policy communities about what exactly was involved in environmental integration
- It has also been suggested that focusing on economic sectors or responsibilities of individual Council formations was 'too simplistic' to address the more complex global environmental issues and themes.[223]

In an attempt to enhance visibility and political support for environmental integration at the highest level, the Commission stated that in line with the Presidency Conclusions to the March 2003 European Council, it would carry out an annual stocktaking of environmental integration as a complement to the Environment Policy Review. However, the first 'stocktaking of the implementation of the Cardiff process in 2004 turned out to be the last, and the initial priority given to reviving this process by the 2005 UK Presidency resulted in very few concrete achievements.

However, in its mid-term review of the implementation of the 6EAP published in 2007 (COM(2007)225 final), the Commission provided a brief stocktaking of the integration process in EU sectoral policies.

Since then, there have been other opportunities to further promote environmental integration, although each of these has also faced prominent challenges in achieving this:

- **Development of the 7 Thematic Strategies under the Framework of the 6EAP:** these were designed to address the complexity of cross-cutting environmental themes and issues such as management of natural resources and climate change and to provide structure to the different levels of government and stakeholders sharing competence in this area. However, none of the strategies includes new targets and timetables and most of them are short and dominated by proposals for non-legislative policy initiatives. These include, for example, the further development of standards in place of regulations; research, data collection and awareness raising and training.[224]
- **Development of the EU's Financial Perspective for 2007-13:** the Commission made clear during this process that "in the area of environment, the bulk of EU action comes through the mainstreaming of the environment into other policies," [225] i.e. that financial support for Natura 2000 and areas such as environmental technologies would be integrated into Structural Funds, EAFRD, CIP and EFF. However, this requires better co-ordination between programmes operating under shared management and those under central management.
- **Establishment and allocation of the EU Budget:** Wilkinson (2007) find that legislative approaches to environmental policy integration could not be applied to EU institutions. However, an exception to this is the establishment of the EU's annual budget, which allocates financial resources between spending priorities and also provides opportunities for attaching conditions to how the money is spent. This is particularly important from the environmental policy perspective, given that almost 80% of the EU's budget consists of

[223] Wilkinson, David (2007): 'Environmental Policy Integration at EU level – State-of-the-Art Report', EPIGOV Paper No. 4, Ecologic – Institute for International and European Environmental Policy: Berlin.
[224] Ibid.
[225] COM(2004)487, Financial Perspectives 2007 – 2013

expenditure of 'high environmental significance', especially with regards to CAP and Structural Funds.[226]

The progress made with respect to integrating environmental considerations in other policy areas, as laid out in the stocktaking of the Cardiff process, is summarised for a number of key policy areas in Table 1.4.8 in Annex 11. The priority objectives of environmental integration are taken from:

- the 6EAP
- the initial EU Sustainable Development Strategy
- the Plan of Implementation from the World Summit on Sustainable Development (WSSD)
- the White Paper on Transport (2001)

The need to deepen the integration of environmental concerns, including climate policy mainstreaming was clearly recognised by the beginning of 2010, when a new DG Climate Action was created as well as a Climate Action Commissioner post. The Commissioner was explicitly given the cross cutting responsibility for working with other Commissioners to ensure that an appropriate climate dimension (both adaptation and mitigation is present in all Community policies. It is too early to assess the progress made today as these changes took place less than one year ago.

[226] Wilkinson, David (2007): 'Environmental Policy Integration at EU level – State-of-the-Art Report', EPIGOV Paper No. 4, Ecologic – Institute for International and European Environmental Policy: Berlin.

A8.6 Progress to date on the Cardiff process

Table A8.4 A sectoral assessment of progress made in environmental integration

Sector	Priority objectives	'Progress made' – by Commission and Council/Parliament	Limitations / challenges remaining
Agriculture	▪ Reduce health and environment risks from agriculture ▪ Better protect nature/landscape and biodiversity ▪ Reduce agriculture's greenhouse gas emissions ▪ Sustainable use of natural resources including improved use of water resources	Council Regulation 1782/2003 introduced a single farm payment (SFP) decoupled from production from 2005.The SFP and other direct aids are granted subject to compliance with environmental and other standards and good agricultural and environmental conditions (cross-compliance). Council Regulation 1783/2003 increases emphasis of rural development policy on environment, with greater co-financing for agri-environment measures, support for farm advisory services Cross-compliance requirements under Regulation 1783/03 include respect for the Wild Birds and Habitats Directives and measures to maintain habitats and landscapes. Article 16 allows increased support levels for agricultural practices and management compatible with protection of biodiversity in	The Court of Auditors (CoA) Special Report in 2008 noted that[227]: ▪ The scope and objectives of cross compliance were poorly defined and certain issues (e.g. irrigation and air pollution) were excluded from the GAEC legislative framework without justification ▪ The legal framework for cross compliance was too complex and should be simplified (but standards not watered down), and that more guidance was needed from the Commission to ensure that standards are both verifiable and meaningful at farm level. In addition, some Member States were judged to have only partially implemented cross compliance. ▪ The distinction between cross compliance and agri-environment measures was not always clear. In some Member States, farmers receive payments for practices which should be included within the cross compliance baseline (e.g. for retaining terraces and undertaking crop rotations in Portugal); ▪ The control and sanction systems set up by Member States are weak. As a result it is difficult to judge the degree of compliance at farm level, and when breaches are detected, the subsequent reductions to farmers' direct payments are typically low; ▪ Monitoring and reporting data provided by Member States were thought to be unreliable in some cases, and this issue had not been effectively addressed by the Commission.

[227] CAP2020, IEEP (2008), 'Cross-compliance criticised by Court of Auditors' http://cap2020.ieep.eu/2008/12/23/cross-compliance-criticised-by-court-of-auditors

		Natura 2000 sites. Energy crop premium introduced. Maintenance of possibility to grow non-food crops on set-aside land.	Premium was abolished in 2009 following 'Health Check' of the CAP.
Transport	▪ Shift the balance between modes of transport ▪ Reduce greenhouse gas emissions from transport ▪ Reduce other air pollutants ▪ Decoupling of transport growth from economic growth	Second railway package adopted in April 2004 (reform and liberalisation of railway sector; development of interface with other transport modes; Regulation to establish European Railway Agency) Revision amending decision 1692/96/EC on Community guidelines for the development of the trans-European transport network (TEN-T) adopted in April 2004 FP7 support for R&D of Sustainable Transport Systems (€4.16bn allocated to this theme for the programming period)	The ASSESS study (commissioned by DG TREN in 2005)[228] found that: ▪ Legislative activities at the European Union level are well advanced. To date new legislation covering around 50% of the White Paper measures have been adopted by the European Parliament and the Council and the proposals for legislation for another 15% of the measures has been adopted by the European Commission and pending approval by the Parliament or Council. However, the measures that are not yet implemented are often the more difficult ones, which may have an high impact on the transport system, e.g. the pricing measures. A number of the measures with high expected impact are unlikely to be realised in the period 2005-2010, for instance with regard to taxes on kerosene. ▪ Three policies that have high degrees of advancement with the implementation of the White Paper policies at the EU level are the development of the Trans-European Transport Networks (TEN-T), where the Commission have executed a revision of the TEN-T project in 2004 and have renewed the financing mechanism; policies on developing high quality urban transport and putting research and technology at the service of clean, efficient transport, although partly because the proposed measures within these two policies are more modest (they predominantly aim at promotion and support activities, which are well embedded in several research and support programmes of the Commission). ▪ However, progress is slow in implementing the Community policy on effective transport charging (a Directive was discussed in 2005 but the scope is likely to be limited) and the measures aiming to manage the growth and the negative effects on the environment in the aviation sector are lagging behind (e.g. the introduction of market mechanism in slot allocation procedures on Community airports, kerosene taxation,

[228] DG TREN ASSESS study (2005), "Assessment of the contribution of the TEN and other transport policy measures to the mid-term implementation of the White Paper on the European Transport Policy for 2010". Technical assistance that assembled all main sources of quantitative information at the European level to carry out an assessment of both the achievements to date (mid 2005), the possible policy implementation scenarios to the year 2010, and the longer term prospects to the year 2020. ec.europa.eu/transport/white_paper/mid_term_revision/assess_en.htm

			differential en route air navigation charges and airport charges).
Energy	▪ Promoting the efficient use and production of energy ▪ Increasing the competitiveness and use of renewable energy sources ▪ Giving adequate priority to energy RTD and demonstration activities in Europe ▪ Contribute to meeting the Kyoto targets	Directives on energy labelling of domestic appliances (2002/31/EC, 2002/40/EC, 2003/66/EC) Directive 2002/91/EC adopted December 2002 on energy performance of buildings Directive 2001/77/EC on promotion of electricity from renewable energy sources, adopted in September 2001, with indicative EU target of 22% of electricity consumption from renewable sources by 2010[229]. IEE Programme to promote energy efficiency and renewable energy (FP7) Directive 2003/87/EC on greenhouse gas emissions trading, adopted October 2003	The targets for 2010 were not met. The Commission's Renewable Energy Roadmap[230] stated that this was for a number of reasons: ▪ Even though the cost of most renewable energy sources is declining - in some cases quite dramatically - at the current stage of energy market development, renewable sources will often not be the short term least cost options. In particular, the failure to systematically include external costs in market prices gives an economically unjustified advantage to fossil fuels compared with renewables. ▪ The complexity, novelty and decentralised nature of most renewable energy applications result in numerous administrative problems. These include unclear and discouraging authorisation procedures for planning, building and operating systems, differences in standards and certification and incompatible testing regimes for renewable energy technologies. ▪ There are also many examples of opaque and discriminating rules for grid access and a general lack of information at all levels including information for suppliers, customers and installers.
Industry	▪ Reduce impacts of chemicals on human health and the environment ▪ Sustainable production and consumption[231] ▪ Contributing to Kyoto Protocol targets	Regulation on chemicals and their safe use (EC 1907/2006) dealing with the Registration, Evaluation, Authorisation and Restriction of Chemical substances	REACH is a relatively new piece of legislation and it remains too early to say whether industry is facing issues in its implementation. However, substitution of hazardous substances (or those of very high concern) remains quite slow, and more efforts are required within industry to accelerate this substitution.

[229] Note that in January 2007, the Commission published a Renewable Energy Roadmap outlining a long-term strategy. It called for a mandatory target of a 20% share of renewable energies in the EU's energy mix by 2020. The target was endorsed by EU leaders in March 2007. To achieve this objective, the EU adopted a new Renewables Directive in April 2009, which set individual targets for each member state

[230] COM(2006)848, 'Renewable Energy Road Map Renewable energies in the 21st century: building a more sustainable future'

[231] Communication COM(2008)397 on Sustainable Consumption and Production and Sustainable Industrial Policy Action Plan

	▪ Promoting the development of environmental technology	ETAP	Set out range of initiatives to overcome barriers to adoption of eco-innovation, although a number of activities have been identified for further improving implementation of ETAP: ▪ to increase demand in environmental technologies by focussing on sectors with high environmental gains, e.g. building, food and drink, private transport, and recycling and wastewater industries; increase green procurement in particular for eco-innovative technologies, products and services; ▪ to facilitate the development and marketing of eco-innovation by mobilising greater financial investments, establishing an EU Technology Verification scheme to provide third-party reliable verification for the environmental performance of new technologies; ▪ to build on good practice of Member States through a structured exchange of experience and championing of promising practices in Member States; furthering national ETAP roadmaps will be instrumental in delivering concrete progress on the ground; ▪ to ensure a strategic knowledge resource on eco-innovation that would bring together timely and strategic knowledge for European public organisations and financers.
Fisheries	▪ CFP should explicitly include environmental, economic and social objectives, which should be considered on same footing. These objectives must apply to the Community's external fisheries policy and in particular fisheries agreements with developing countries ▪ Reduction in fishing pressure on fishing grounds to sustainable levels	Council agreement on CFP Reform (Regulation 2371/2002 of December 002) objectives includes to ensure exploitation of aquatic resources that promote sustainable development	The implementation of the CFP reform – through reductions in fishing pressure, integrating environmental concerns into aquaculture and developing new fisheries partnership agreements amongst other things, remains weak for a number of reasons: ▪ Over-fishing & environmental degradation: in some species, such as cod, over-fishing has resulted in over 90 per cent of the fish being caught before they are mature enough to reproduce (similar problems with over-fishing in respect of bluefin tuna and anchovies). The European Commission has suggested that 88 per cent of the EU's stocks are over-fished compared to 25 per cent worldwide.[232] The degradation of the wider marine environment has also become a significant issue. ▪ Over-capacity: Over-fishing is partly the consequence of over-capacity in the EU fishing fleet - "too many boats chasing too few fish". ▪ Enforcement: An EU Court of Auditors report in 2007 on enforcement in the six main fishing Member States[233] was highly critical, stating that almost all aspects of enforcement were failing (poor data on catches, inadequate

[232] Communication from the Commission to the Council - Fishing Opportunities for 2009 : Policy Statement from the European Commission, COM/2008/0331 final

[233] http://eca.europa.eu/portal/pls/portal/docs/1/673627.PDF

		monitoring, such that there was no guarantee that any infringements of the rules were being prevented or detected, and inadequate powers for the Commission to pursue Member States who flouted the rules). ▪ Politics of fishing: industry pressure applied by fishing communities in a number of Member States is substantial.

A8.7 Conclusions of the Environmental Policy Review on Public Awareness

A8.7.1 Climate Change

- Climate change is considered the second most serious problem faced by the world, (after poverty, the lack of food and drinking water, and before major global economic downturn) and almost two thirds of Europeans think that climate change is a very serious issue.
- The majority of Europeans (63%) agree that tackling climate change can have a positive impact on the European economy. Most Europeans (63%) say they have taken personal actions to contribute to fighting climate change, with the most common actions being separating waste for recycling and reducing energy and water consumption at home.

A8.7.2 Sustainable consumption and production

- 30% of respondents opt for the environmentally-friendly production of goods and services in second place, just behind the stimulation of research and innovation in European industry (31%).
- Four out of five Europeans say they consider the environmental impact of the products they buy.
- A slim majority (55%) of EU citizens say that, when buying or using products, they are generally fully aware of or know about the most significant impacts of these products on the environment. At the same time, only one in two Europeans says they trust producers' claims about environmental performance.
- To promote eco-friendly products, Europeans are generally more favourable towards a taxation system based on reducing taxes for green products than one on increasing tax for environmentally-damaging products.

A8.7.3 Water

- A majority of Europeans did not feel well-informed about the problems facing rivers, lakes and – where relevant – coastal waters in their country. A majority (68%) of EU citizens think that water quality is a serious problem in their country (highest percentages in Greece and Romania).
- Around a quarter of EU citizens felt that the shortage or excess (such as floods) of water is a very serious problem in their country (highest percentage in Cyprus and Greece), while 59% said that this is a problem.
- Industry (for the use of water and pollution) and agriculture (for the use of water, pesticides and fertilisers) are the factors that have a greater influence on the status of water, according to most Europeans.
- A vast majority of EU citizens say that they have been actively trying to reduce water-related problems in the last two years: 84% by using less water (e.g. by not leaving taps running, by taking a shower instead of a bath, installing water saving appliances etc.); 78% have avoided using pesticides and fertilisers in private garden; 60% have used eco-friendly household chemicals.

A8.7.4 Civil Protection

- A vast majority think that the European Union should give more support to Member States with respect to disaster prevention (90%), preparedness (90%) and response (92%).
- Most Europeans (82%) agree that the EU needs a disaster management policy because natural disasters are increasing in number and intensity; they are also in favour of the EU setting up a reserve to help EU Member States respond to disasters.

- When deciding on holiday destinations, most Europeans mentioned the location's environment (e.g. its overall attractiveness) as the key consideration (32%).

A8.8 Supporting material on the need to support eco-innovation

1.1.11 EU policy context for innovation

The *Europe 2020* strategy aims to promote collective action to turn the EU into a smart, sustainable and inclusive economy delivering high levels of employment, productivity and social cohesion. The strategy puts innovation and green growth at the heart of its blueprint for industrial competitiveness and sets key targets including:

- 3% of the EU's GDP should be invested in R&D;
- the '20-20-20' & 10% climate/energy targets

In order to enhance competitiveness, job creation and improve quality of life, the *Europe 2020* Flagship Initiative, *Innovation Union*[234], highlights the need to promote innovation across not only products, services and businesses, but also in social processes and business models. *Europe 2020* and *Innovation Union* require that EU eco-innovation funding interventions should - besides achieving specific environmental,- ultimately help to achieve environmental sustainable growth and development as well as enhancing productivity, competitiveness and job creation. The move towards a cleaner, lower carbon and more resource efficient economy creates key challenges for the EU, but also provides a focal point for concerted action on the promotion and adoption of eco-innovation. For example, the SET-plan estimates that an additional investment of €50 billion will be needed over the next 10 years for developing the necessary technologies to address climate change, secure EU energy supply and ensure the competitiveness of our economies. In addition, adaptation is a new priority for the EU and a broader spectrum of adaptation technologies will need to be deployed.

Committing funding to and investing in eco-innovation in the EU will help achieve progress in various ways, for example *"eco-innovation, which when achieved promotes industrial efficiency and new employment"*[235]*.* Perhaps most importantly, it can help to de-couple economic growth from environmental degradation by improving the resource efficiency of production and consumption. This also enables financial resources to be freed up and directed towards other important areas that will contribute to enhanced competitiveness, such as training and R&D.

A recently published green paper[236] outlines proposals for a Common Strategic Framework which brings together future EU research and innovation funding programmes. This will have profound implications for eco-innovation funding since the full range of current instruments focused on research through to market deployment (e.g. FP7, CIP, LIFE, etc.) would be required to work together more strategically and in a more streamlined manner.

The potential for Framework Programme 8 (FP8) to have a far greater role in supporting RD&D of eco-innovation activities, particularly using the European Innovation Partnerships to set the strategic research agenda, could help fulfil a suite of policy outcomes, including environmental protection, employment creation, competitiveness and resource efficiency.

One interpretation of this new system would see existing mechanisms such as elements of CIP and LIFE take forward and mainstream particular innovations arising from research projects funded under FP8. This would help to develop a pipeline approach to funding

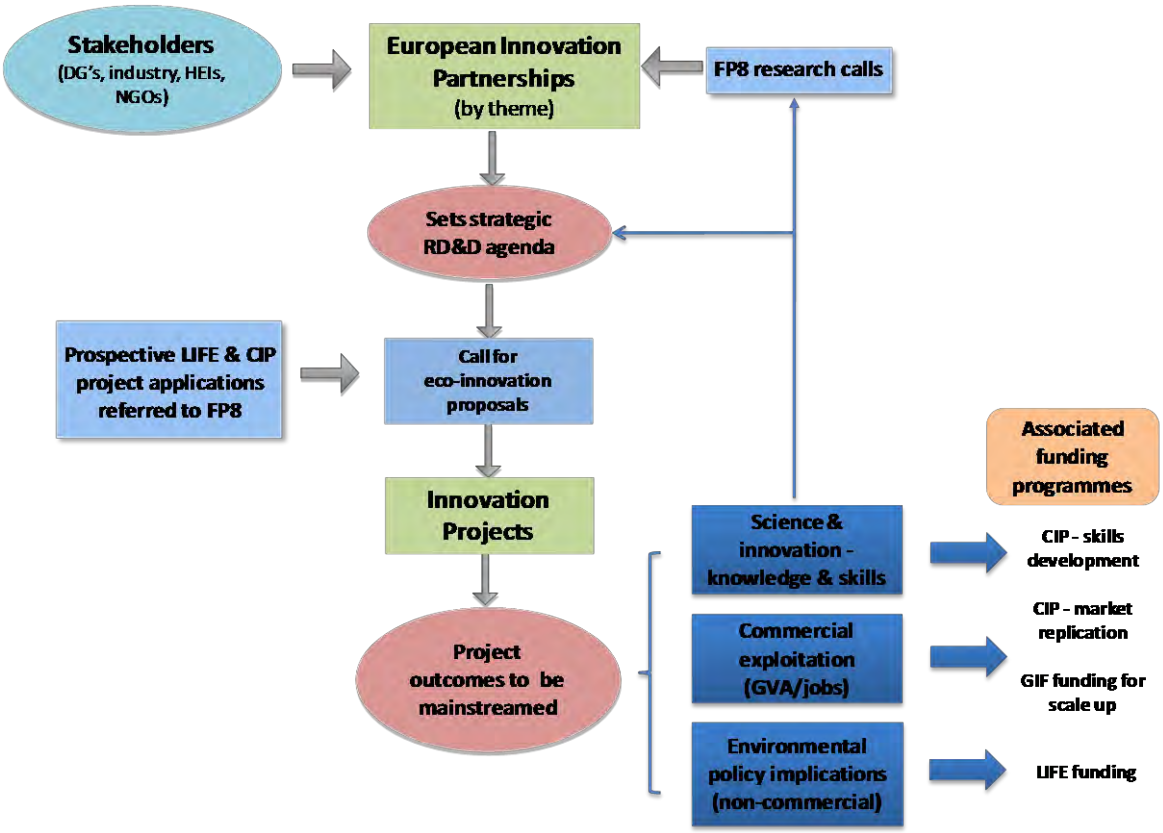
[234] COM(2010) 546 Final

[235] Mid term review of the 6th Environmental Action Programme, COM(2007) 225 Final http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2007:0225:FIN:EN:PDF

[236] European Commission, *'From Challenges to Opportunities: Towards a Common Strategic Framework for EU Research and Innovation funding',* February 2011, COM(2011) 48

innovation, moving research ideas to market and policy application. This interpretation for how such a project funding process might work in practice is outlined in Figure 5.3:

Figure 1.1One interpretation of a new eco-innovation funding landscape under FP8



Source: GHK reflection

1.1.12 The evolving definitions of eco-innovation have important implications for how EU interventions for eco-innovations are framed

DG Environment defines eco-innovation as including *"new production processes, new products or services, and new management and business methods. Eco-innovation means all forms of innovation reducing environmental impacts and / or optimising the use of resources throughout the lifecycle of related activities."*[237]

According to EACI's website, eco-innovation is "*about changing consumption and production patterns and market uptake of technologies, products and services to reduce our impact on the environment."*[238]

In a strict sense, eco-innovation has often been interpreted as the development of novel environmental technologies that go beyond the Best Available Technologies (BAT) in reducing pollution and environmental impacts for any given industrial sector. Eco-innovations in such areas have helped both to reduce the cost of compliance of the environmental acquis and have stimulated the development of a strong and competitive EU eco-industry. The fostering of such an industry has also been the focus of the ETAP, launched in 2004[239].

However, over the past 5 years "resource efficiency" has come to the fore. Encapsulating material and energy efficiency, as well as water and carbon efficiency during production,

[237] http://ec.europa.eu/environment/eco-innovation/what_en.htm

[238] http://ec.europa.eu/eaci/eco_en.htm

[239] http://ec.europa.eu/environment/etap/etap/about_en.html

lifetime and disposal of products (or 'cradle to cradle'), resource efficiency provides a far broader interpretation of eco-innovation. The revision of DG Environment's own definition of eco-innovation in the past year – away from one predominantly focused on 'environmental protection'[240] to a more balanced approach with resource efficiency - is evidence of this policy shift.

Importantly, the pursuit of eco-innovation is not just about developing new consumer products or technologies that are intrinsically cleaner and greener than their predecessors. It is also about engendering better practices across the economy. For example, enhanced skills and training of regulators and employees, and better business and regulator management practices will improve production and product efficiencies.

Achieving greater eco-efficiency does not necessarily mean spending large financial resources to promote the adoption of new environmental technologies – no cost or low cost methods are a preferred starting point, especially for the majority of companies (i.e. SMEs) across the EU[241].

Using this broader idea of 'eco-innovation', interventions now need to be flexible enough to capture a more diverse set of objectives and outcomes than previously.

Table 1.5 Changes in EU funding rationales and focus for eco-innovation

1990s/2000's	Post Lisbon 2020 / Innovation Union
▪ EU market focused R&D to address local/regional challenges	▪ Global societal challenges leads to markets in EU plus very distant from knowledge creation
▪ Collaboration across regions/MS ▪ Agglomeration of 'knowledge' assets across EU member states	▪ Global collaboration and high degree of flexibility - Open Innovation systems – EU corporates now less focused on venture investments but now mentoring and hand-holding SMEs as a 'big brother' to help bring their innovations to market[242] - User driven innovation - Globalised knowledge flows & traded knowledge within supply chains
▪ Focus on technological RTD ▪ Focus on manufacturing	▪ New business models ▪ Service sector innovation ▪ Product service approaches, e.g. Rolls Royce, ICI, Xerox, Interface, BOC) ▪ International cooperation strategies

1.1.13 The logic of intervention to support eco-innovation

To help accelerate the fulfilment of these policy objectives, the European Commission intervenes at an EU level to provide **innovation funding** and to improve the **wider framework conditions** in order to:

- Reduce market failures

[240] An older definition used by DG ENV, and quoted in the MTE of LIFE+ Regulation, defined eco-innovation as "all forms of innovation activities resulting in or aimed at significantly improving environmental protection. It includes new production processes, new products or services, and new management and business methods, the use or implementation of which is likely to prevent or substantially reduce the risks to the environment, pollution and any other negative impact of the use of resources throughout the lifecycle of related activities."

[241] This approach has been used over the past 15 years by the Envirowise programme in the UK, and has helped UK industry save more than £1 billion by reducing waste by using low cost improvements in organisation processes http://envirowise.wrap.org.uk/

[242] There are numerous examples of this across all sectors of the eco-innovation space. Notable companies include Veolia, Siemens, BP, ABB, Danfoss, Volvo, etc. Consultation with Cleantech Europe, December 2010

- Stimulate R&D and knowledge flow
- Set common standards and regulation
- Disseminate best practice

Table 5.17 provides a summary of these interventions.

Table 1.6 How the Commission intervenes to promote innovation across the EU

Reduce market failures	Stimulate R&D and knowledge flow
Help **overcome systemic market failures and institutional constraints** across all MS which are affecting competitiveness (e.g. lack of risk capital, low levels of entrepreneurship, limited demand for goods, excessive administrative regulations, lack of skilled labour[243]) **Provide better access to finance** to assist start up SMEs and the commercialisation of innovative technologies (e.g. through GIF under CIP and Risk Sharing Facility under FP7) as well as providing scale in VC funds (e.g. through the Eco-Innovation Fund under EIB) **Provide technical assistance** to the EU12 to help raise the quality of infrastructural projects to attract higher levels of investment (e.g. JASPERS)	**Provide scale of R&D** to enable the EU to tackle 'grand challenges' **Continue to close the 'innovation gap'** with USA and Japan (see Figure 2.1 below). **Stimulate large-scale infrastructure** to complement the 60 EU strategic networks of European researcher 'pools' which in turns provides access for EU/non-EU businesses to state-of-the-art infrastructure and attracts researchers from outside the EU **Promote free flow of trained researchers and knowledge** across the EU by removing barriers (i.e. brain 'circulation, not brain 'drain') **Extend SME networks and open up EU market** (without imposing too high a bureaucratic burden on participants[244]) **Promote 'spillover effects'** (i.e. positive externalities from development of clusters, networks and knowledge exchange that often results from investment in innovation funding)
Set common standards and regulations	**Disseminate best practice**
Provide EU wide standards and regulatory frameworks to assist in achieving an efficient single market Help ensure that **policy mixes are fit for purpose** and facilitate innovation	**Fund best practice** examples from outside respective MS Provide 'helicopter perspectives' on policy issues, to enable MS/regions to understand how best to undergo **'smart specialisation'** to build on their strengths

Source: GHK own summary

1.1.14 Future eco-innovation intervention needs to take account of failings in the current system

Review of programme experience, particularly of LIFE and CIP, suggests that there are a number of problems that could be addressed in a new specific instrument for the environment:

- **Lack of framework conditions:** improvements in the broader policy stimulus for eco-innovation through changes in standards, economic incentives etc could be more formally recognised
- **Lack of stakeholder inputs:** greater stakeholder involvement is needed to better validate the research proposals and intended outcomes, supporting project applications, and helping to accelerate subsequent application.

[243] See 2007 SME Observatory survey
[244] See PROINNO Paper 7, 2009 'Impact of EU Research on Innovation'

- **Lack of flexibility in the application of interventions:** more flexible eco-innovation funding mechanisms are required that respond better to the market and policy challenges of particular themes, as well as being able to take account of the changing innovation landscape across economies – with perhaps variable intervention rates depending on policy value and likely commercial return.
- **Lack of multipliers:** the current channelling of outcomes is not as effective as it could be, including through complementary mainstreaming programmes (a point emphasised in the MTE).
- **Lack of information sharing:** improved policy feedback is necessary where there is uncertainty about the issues (e.g. how to improve wastewater treatment for new pollutants, or the risks of using new materials in production processes and manufacturing).
- **Lack of detailed evaluation:** improved monitoring and evaluation of the outcomes of eco-innovation funding to show the value added from EU intervention and to inform the design of future intervention; addressing in particular the problem of distinguishing the impact of technologies from wider economic and social factors.

Recognition is also given to the challenges and opportunities arising from eco-innovation within Innovation Union, such as the use of smart and ambitious regulation (e.g. stricter environmental standards for cars to make manufacturers move towards low carbon vehicle production)245. These challenges all necessitate research and technological development of incremental eco-innovations and more radical, 'game changing'246 eco-innovations.

[245] Innovation Union COM(2010) 546 final, p.15

[246] A technology is 'game changing' if is: Scaleable (high level of market adoption); Lasting (i.e. it has lasting adoption potential in the market); Different (the innovation is sufficiently different to existing market offerings);and has a high commercial impact (could it change the competitive landscape; could it alter existing markets and/or create new ones).

Annex 9 International exemplars

A9.1 USA

A9.1.1 Problems

Like many countries the USA is facing challenges including global warming, air quality, water scarcity, biodiversity conservation and sustainable production and consumption. Clean water and drinking water are in particular major environmental issues[247]. Air quality is also a major problem in the US and activities have been focused on helping the private sector to update their power plants for engines and locomotives. As this can have a significant impact on clean air standards, funds are channelled into this area of air management. Abandoned sites and facilities are also considered to be an important environmental issue and are considered to hold potential for the development of green infrastructure.

A lack of coordinated response is also a real issue in the US in addressing environmental issues - even when local governments recognise that they should do something to control GHG emissions, institutional barriers can make it difficult for municipalities to move from political rhetoric to policy action. It is also questionable whether local initiatives can make meaningful contributions to climate change mitigation in the absence of policy changes at the state and national levels.[248]

Transboundary issues can exacerbate environmental problems and problems have arisen in the past between the United States and Mexico. Furthermore, a lack of environmental awareness and prioritisation at the level of the policy makers and also lack of demand from the general public has been cited as an obstacle in changing and improving policy.

The Recovery Act seeks in part to spur technological advances in science and health and to invest in environmental protection and other infrastructure that will provide long-term economic benefits and jobs. The Recovery Act includes $7.2 billion specifically for projects and programmes administered by the Environmental Protection Agency (EPA). These programmes will protect and promote both “green” jobs and a healthier environment. The Recovery Act environmental funding is therefore channelled into areas considered particularly relevant including brownfield sites and site clean-up, water and air quality.

A9.1.2 Rationale for the introduction of a specific instrument for the environment

The Recovery Act was signed into law by President Obama on February 17th, 2009 with an underlying rationale of aiming to help economic recovery and to create and save jobs whilst addressing challenges such as environmental protection.

The added value of intervention by the public sector highlights previous regulatory failure and ensures that the environment is now placed at a higher level on the political agenda. The funds available under the Recovery Act could play a role in increasing mutual learning across sectors to ensure that the environment becomes a consideration across all sectors and industry and that it has the potential to lead to a coordinated national response to environmental problems. Whilst the EPA has direct implementation responsibilities for six programme areas, other federal agencies and the recipients of Recovery Act funds can also incorporate sustainable practices into their Recovery activities. As such, key work will be undertaken by other agencies and EPA resources that can help support sustainable outcomes.

Consultation with an EPA representative suggests that the added value of the financial instrument also derives from the fact that the programme has an overall aim of stimulating job creation and therefore it can jointly boost the economy whilst addressing environmental issues.

[247] Personal correspondence with a representative of the EPA

248 MICHELE M. BETSILL, 2001, Mitigating Climate Change in US Cities: opportunities and obstacles, Local Environment, Vol. 6, No. 4, 393–406

A9.1.3 Complementarity

All programmes are considered to be entirely complementary – as the Recovery Act was rolled-out quickly, programmes that were already in place with existing processes and procedures were brought under the Recovery Act bracket, which enabled the centralised authority to set out the work required by state partners as quickly as possible.

The Recovery Act includes measures to modernise infrastructure, enhance energy independence, expand educational opportunities, preserve and improve affordable health care, provide tax relief, and protect those in greatest need. The environmental measures run alongside these other initiatives and in many cases clear links are evident, for example between health and the environment.

A9.1.4 Objectives of the instrument

Funding programmes under the Recovery Act will aim to protect and increase green jobs, sustain communities, restore and preserve the economic viability of property, promote scientific advances and technological innovation, and ensure a safer, healthier environment.

Additional objectives of the programmes under the Recovery Act are to ensure that funds are spent effectively and aid in the economic recovery as well as benefitting the environment. Recipients will incorporate innovative technologies and environmental best practices into their projects, and the government aims to ensure transparency and accountability as funds are spent.

A9.1.5 Design

The environmental programmes under the Recovery Act are overseen by the Environmental Protection Agency as the programme adopts a centralised implementation approach. The introduction of federalism ensures that the primary responsibility in implementing environmental laws falls to the state partners. The centralised EPA assumes an oversight role and monitors financial and programme performance. The delivery system takes the form of designated funds to states, interagency agreements and awarded contracts, as well as competitive grants.

In terms of funding the designated amount is often provided to a state entity who will then either choose projects or assign funds to municipalities or cities depending on state needs e.g. water quality in different areas. For Brownfield sites and urban development some contracts are competitively awarded or direct contracts can be used with particular companies. These environmental areas under the Recovery Act cover a number of different themes and encompass several programmes:[249]

- Clean Water State Revolving Fund and Drinking Water State Revolving Fund: $4 billion for assistance to help communities with water quality and wastewater infrastructure needs and $2 billion for drinking water infrastructure needs. A portion of the funding will be targeted toward green infrastructure, water and energy efficiency, and environmentally innovative projects.
- Brownfields: $100 million for clean up, revitalization, and sustainable reuse of contaminated properties.
- Diesel Emissions Reduction: $300 million for grants and loans to help regional, state and local governments, tribal agencies, and non-profit organizations with projects that reduce diesel emissions.
- Superfund Hazardous Waste Cleanup**:** $600 million for the cleanup of hazardous sites.
- Leaking Underground Storage Tanks: $200 million for cleanup of petroleum leaks from underground storage tanks.

A9.1.6 Selection and monitoring

[249] US EPA website http://www.epa.gov/recovery/

The EPA has adapted internal financial systems and management processes to expedite the flow of Recovery Act money to qualified grant recipients and contractors. EPA programme offices also give funding preference to recipients with a demonstrated or clear potential ability to produce desired results, and for projects that can be started and completed quickly in order to stimulate economic growth, as well as achieve long-term public benefit.

The new law aims to achieve performance and transparency. EPA plans to award both the designated funds to states and the competitive grants as quickly as possible. All funding will be monitored by the agency's Inspector General, which will receive $20 million for oversight and review. Announcements of grants will be posted online to ensure transparency.

The Stewardship Plan provides a framework for management oversight in common risk areas such as assurance of qualified personnel, use of competitive awards, timely awards, allowable costs, proper payments, timely expenditures, and timely completion of work. EPA is tracking progress against these measures and reporting on risks, corrective actions, and status of risk mitigation to the Agency's Stimulus Steering Committee. In addition, EPA is conducting audits and investigations of randomly selected recipients of Recovery Act funds which further prevents wasteful spending and minimises fraud.

A9.1.7 Effectiveness of the instrument

The EPA representative states that the programme has had a significant impact on the creation of jobs which has therefore infused money into the nation's economy.

The EPA representative explained that the organisation did not form a separate unit to manage the funds under the Recovery Act; instead they identified existing executives to manage different responsibilities and financial areas to ensure cost effectiveness.

Projects are generally of a high value but considering how recently the Recovery Act has been introduced, some benefits have already been seen in the environmental sector:

Best Practice Projects

Cleaning an Urban Tidal Estuary – New Bedford, Massachusetts – $30 million[250]

The New Bedford Harbour Superfund site encompasses 18,000 acres of urban estuary stretching from the upper Acushnet River into Buzzards Bay. In 2009, EPA announced that $25-35 million in new Recovery Act funding would be used to accelerate the hazardous waste clean-up already underway at the site. The swift allocation of Recovery Act funds has helped spur new jobs and economic opportunities in Massachusetts and is accelerating the pace of the harbour cleanup that was scheduled to take almost four decades. The Recovery Act funding could more than triple the amount of PCB-contaminated sediment removed compared to recent years. The progress anticipated this year will significantly expedite the timetable to return a clean harbour back to the community. More than 100,000 people, individuals and families, live in the area and will directly benefit from the project acceleration. This project has created more than 80 jobs.

The effectiveness of the programmes under the Recovery Act can, to some extent, be judged by the broader economic recovery indicators that EPA expects to see as a result of stimulus funding. These broad indicators include the following:[251]

[250] US EPA website http://www.epa.gov/recovery/

251 American Recovery and Reinvestment Act of 2009: Environmental Protection Agency recovery Act Plan: A strong economy and a clean environment June 1 2010

- A greater share of federal funds provided for local clean water and drinking water projects, including disadvantaged and environmental justice communities.
- Increased economic development through reuse of Brownfields and Superfund sites, including improved property values and job opportunities.
- Improvement in the general condition of diesel engines, which will maximize engine life, resulting in savings for owners and fleet managers.
- Increased demand for construction materials such as steel and concrete.
- Increased demand for laboratory and environmental monitoring equipment.
- Increased demand for clean diesel fuel, and emission control technology and equipment.

A9.1.8 Reflections for LIFE

Key features of the programme that can be reflected on and possible lessons for LIFE include:

- Mutual learning that is encouraged across sectors to integrate environmental thinking into other sectors
- The environmental funding is part of a package of responses to improve the economy and programmes are designed to be mutually supportive
- Recipients will incorporate innovative technologies and environmental best practices into their projects
- Funding preference is given to recipients that can produce desired results quickly in order to stimulate economic growth, as well as achieve long-term public benefit.
- All funding will be monitored by the agency's Inspector General.
- EPA is tracking progress against measures and reports on risks, corrective actions, and status of risk mitigation to the Agency's Stimulus Steering Committee. EPA also conducts audits and investigations of randomly selected recipients of Recovery Act funds.

A9.1.9 Consultees:

Don Flattery, EPA ARRA Tracking and Reporting, Office of Administration and Resources Management

A9.2 Australia

A9.2.1 Problems

Australia's environment contains iconic areas such as the Great Barrier Reef, the Wet Tropics, the Snowy River and the Australian Alps, along with coastal areas, forests, rivers, wetlands and unique wildlife which are considered important to both national identity and the economy. Australia derives a significant proportion of the nation's wealth from its environmental assets, including agriculture, mining and tourism.

These environmental assets provide ecosystem services such as regulating the climate, purifying water, absorbing and transforming wastes, preventing disease and providing the genetic resources that are the basis for many medicines. Therefore if environmental assets are allowed to deteriorate the costs associated would be significant. While most ecosystem services are unpriced, and do not have a monetary value, the Great Barrier Reef adds more than $5 billion to the Australian economy each year, and food exports annually total around $24 billion, although annual production losses due to degradation are around $1.2 billion.[252]

The main challenges facing Australia include climate change, water scarcity, pollution, the legacy of past land management change such as inappropriate land clearing, unsustainable farming practices and inappropriate development.

The Department of the Environment, Water, Heritage and the Arts and the Department of Agriculture, Fisheries and Forestry share responsibility for delivery of the Australian Government's environment and sustainable agriculture programmes, which have traditionally been broadly referred to under the banner of 'natural resource management'.

A9.2.2 Rationale for the introduction of a specific instrument for the environment

The underlying rationale for intervention is that the environment, natural icons and productive land are central to national identity and a significant proportion of the nation's wealth is generated by the environment through agriculture, mining and tourism. The Australian Government has identified that national leadership is required to redress the decline in the health of Australia's landscapes.

Caring for our Country is the way the Australian Government funds environmental management of natural resources and takes the view that environmental assets are public goods which should be protected. Previous programmes were seen to have failed to address issues comprehensively and proper outcomes were not achieved, and therefore Caring for our Country is designed to improve coordination and be increasingly focused and targeted in its approach.[253]

A9.2.3 Complementarity

Caring for our Country integrates the Australian Government's previous natural resource management initiatives, including the Natural Heritage Trust, the National Landcare Programme, the Environmental Stewardship Programme and the indigenous land and sea ranger programmes. Caring for our Country establishes national priorities and outcomes to refocus investment on protection of the environment and sustainable management of natural resources.

A9.2.4 Objectives of the instrument

The goal of Caring for our Country is to achieve an environment that is *'healthier, better protected, well managed, resilient, and provides essential ecosystem services in a changing*

[252] Caring for our Country Website - http://www.nrm.gov.au/nrm/index.html

[253] David Pannell (2008) *Making the Most of Caring for Our Country* , ARC Federation Fellow, University of Western Australia

climate.[254] In its first five years, from July 2008 to June 2013, Caring for our Country is investing funds to improve strategic outcomes across six national priority areas:

- the National Reserve System
- biodiversity and natural icons
- coastal environments and critical aquatic habitats
- sustainable farm practices
- natural resource management in northern and remote Australia
- community skills, knowledge and engagement.

A9.2.5 Design

Caring for our County commenced in July 2008, with a budget of $2.25 billion over five years. The Australian Government has to date approved more than $241 million in Caring for our Country which includes:

- $181 million in base level funding for 56 regional natural resource management organisations around Australia
- More than $60 million for 168 competitive open call projects to improve, protect and better manage natural and productive landscapes including 43 Landcare projects.
- An additional $43.9 million has been provided to support Reef Rescue projects.
- More than $7 million is being provided to successful applicants for activities under Caring for our Country 2009-10 Community Action Grants

The programme recognises that groups will work at different scales to achieve Caring for our Country outcomes and a variety of investment approaches have been introduced which include project funding, competitive open call projects and base level funding for specific organisations. This funding supports regional natural resource management groups, local, state and territory governments, Indigenous groups, industry bodies, land managers, farmers, Landcare groups and communities. Caring for our Country will also provide an increased opportunity for non-government organisations, regional bodies, local, state, territory and Australian government agencies to access a greater proportion of the programme's funds to help achieve national priorities.

Furthermore Community Action Grants are a small grants component that aims to help community groups take action to conserve and protect their natural environment. Investment proposals were sought from environmental, Indigenous, Landcare, Coastcare and sustainable agriculture community groups for grants of between $5000 and $20,000 to take action to help protect and conserve Australia's environment.

Caring for our Country will operate through an integrated network of facilitators. Roles will be more clearly defined than under the Natural Heritage Trust and National Landcare Programme and facilitators will continue to be based in each state and territory.

Projects funded by Caring for our Country frequently contribute to more than one priority area. For example work to improve the biodiversity of Australia’s landscapes, and to improve sustainable practices, will in many cases be mutually supporting. Caring for our Country investments will also complement other Australian Government programmes such as Water for the Future and Australia’s Farming Future.

A9.2.6 Selection and monitoring

The Australian Government received more than 600 applications for the open call component of the Caring for our Country business plan 2010-11, including approximately 50

[254] Caring for our Country Website - http://www.nrm.gov.au/nrm/index.html

Expressions of Interest for sustainable agriculture and fishing practices projects. All proposals were subjected to a rigorous selection process which involved assessment by community panels. The applications were assessed and ranked in terms of how they addressed the Caring for our Country targets and the criteria set out in the business plan.

An important part of the Caring for our Country initiative is stated to be the commitment to establishing simple, efficient, reliable and cost-effective mechanisms for measuring and reporting on outcomes from Caring for our Country investment. Monitoring, evaluation, reporting and improvement (MERI) is cited as a fundamental part of the Caring for our Country investment process by the Government and has been built into the design of all programmes and projects, consistent with the Natural Resource Management MERI Framework. The programme will measure and report annually on progress towards the five-year outcomes for the Caring for our Country initiative; this will be done in accordance with the MERI strategy, which will also aim to facilitate learning and improvement.

A9.2.7 Effectiveness of the instrument

Caring for our Country funding is helping 56 regional organisations, and, through them, more than 1200 community groups and more than 12,000 landholders, to protect and conserve Australia's natural resources; farming land, water, coasts, plants and animals.[255]

In terms of effectiveness, the programme aims to adopt a stronger business approach with clear outcomes and priorities as compared with the previous programmes that covered the environment.[256] This involves the Australian Government taking greater responsibility for the setting of specific priorities, and therefore a diminution in the power of Catchment Management Organisations to set their own priorities.

A comprehensive set of assessment criteria for evaluating funding proposals has been specified and Pannell (2008) states that the immediate priority should be to develop systems and processes to allow the assessment criteria to be applied to the assessment of potential investments.[257] The outcome-focused monitoring and evaluation framework is thought to be positive but requires a stronger emphasis on quantitative estimation of likely natural resource outcomes, probably based primarily on modelling in many cases.

A9.2.8 Reflections for LIFE

Key features of the programme that can be reflected on for LIFE include:

- A centralised approach is taken to establishing national priorities (i.e. Government takes greater responsibility for setting specific priorities)
- A variety of investment approaches have been introduced which include project funding, competitive open call projects and base level funding for specific organisations.
- The programme operates through a network of facilitators in each state or territory who have clearly defined goals.
- Expressions of interest are used in the selection process for projects under certain themes to make evaluation of these proposals a more effective process.
- Monitoring, evaluation, reporting and improvement (MERI) is cited as a fundamental part of the Caring for our Country investment process. The programme will measure and report annually on progress towards the five-year outcomes for the Caring for our Country initiative.
- Weaknesses have been identified and then addressed e.g. the need for stronger emphasis on quantitative estimation of likely natural resource outcomes.

[255] Caring for our Country Website - http://www.nrm.gov.au/nrm/index.html

[256] David Pannell (2008) *Making the Most of Caring for Our Country* , ARC Federation Fellow, University of Western Australia

[257] ibid

A9.3 Canada

A9.3.1 Problems

Canada's environmental record is among the worst in the industrialized world, due in part to its poor performance fighting global warming, according to a report from the Conference Board of Canada.[258] Canada placed 15th among 17 peers, beating only Australia and the United States. Greenhouse gas emissions, high waste production, and overuse of fresh water were its biggest environmental problems. There is now a growing recognition that gross domestic product (GDP) produced at the expense of the global environment, and at the expense of scarce and finite physical resources, overstates the net contribution of that economic growth to prosperity.[259]

Environment Canada's Community Action Programs for the Environment (CAPE) support Canadians' efforts to preserve and enhance the environment and helps to address a range of problems across the fields of Nature, Climate Change and Water.

A9.3.2 Rationale for the introduction of a specific instrument for the environment

The underlying rational for CAPE Projects is that encouraging action at the community level would thereby encourage Canadians to make better environmental choices and to adopt environmentally friendly behaviour, thereby leading to a bottom-up, community driven approach to environmental protection.

Community Action Programmes for the Environment are the set of Environment Canada's funding programmes that support Canadian communities in the delivery of environmental projects.[260] The added value of intervention by the public sector is that the community based nature of the projects encourages environmental assets to be seen as a public good and awareness can effectively be raised at the ground level whilst developing mutual learning and knowledge transfer systems.

A9.3.3 Objectives of the instrument

The Community Action Programmes for the Environment consist of several Programmes and funding streams, each with differing aims and objectives:[261]

- Aboriginal Funds for Species at Risk - the goal is to contribute to the conservation and protection of Canada's biodiversity by supporting species recovery planning, habitat protection, and overall conservation and capacity-building-initiatives by Aboriginal people in Canada.
- Community Interaction Programme - St. Lawrence Action Plan - the Community Interaction Program , co-administered by Environment Canada and the Government of Quebec, supports community projects to improve the St. Lawrence ecosystem.
- EcoAction Community Funding Programme - projects promote the participation of local communities to address clean air, climate change, clean water, and nature to protect, rehabilitate or enhance the natural environment. The programme also supports projects that build the capacity of communities to increase knowledge and skills as well as changing attitudes and behaviours so that these activities may be sustained into the future.
- Environmental Damages Fund- the Environmental Damages Fund (EDF) is a specified purpose account administered by Environment Canada, on behalf of the Government of Canada, to manage funds received as compensation for environmental damage.

[258] Reuters - http://www.reuters.com/article/idUSTRE4A25NO20081104 /

[259] Conference Board Canada website - http://www.conferenceboard.ca/hcp/details/environment.aspx

[260] Environment Canada website - http://ec.gc.ca/pace-cape/default.asp?lang=En&n=06DD166D-1

[261] Environment Canada website - http://ec.gc.ca/pace-cape/default.asp?lang=En&n=06DD166D-1

- Great Lakes Sustainability Fund - provides technical and financial support to action projects aimed at cleaning up, restoring and protecting the environmental quality and beneficial uses of Canada's Great Lakes in areas of concern.
- Habitat Stewardship Program for Species at Risk - these funds promote the participation of local communities to help with the recovery of species at risk and prevent other species from becoming a conservation concern.
- Invasive Alien Species Partnership Program - the goal of the Invasive Alien Species Partnerships Program (IASPP) is to engage Canadians in actions to prevent, detect, and manage invasive alien species so as to minimize their risk to the environment, economy, and society.
- Lake Simcoe Clean-Up Fund - provides financial and technical support to implement priority projects aimed at reducing phosphorus inputs, restoring fish and wildlife populations, and enhancing research and monitoring capacity
- Lake Winnipeg Basin Stewardship Fund - the focus of the fund is to support collaborative, solution-oriented projects that reduce nutrient loads and improve the ecological sustainability of Lake Winnipeg and its basin.

A9.3.4 Design

Projects are grant based and follow a bottom-up approach. Certain programmes stipulate more specific requirements than others, for example programmes can request projects concentrating on particular geographical areas, as is the case for the Great Lakes Sustainability Fund, as opposed to a Canada-wide call for proposals.

Successfully funded projects use a variety of approaches to reach their environmental goals, including campaigns to reduce greenhouse gas emissions and air pollution, local watershed projects, programmes involving youth and educators, conservation projects to protect species at risk and campaigns to protect against invasive alien species.

In general the implementation of the different programmes and funding instruments assume a decentralised approach and details of regional contacts are provided by Environment Canada for advice on application and for further information on each programme.

In terms of thematic scope, programmes fund local action projects that are in line with broader Government of Canada environmental priorities including:

- clean water
- clean air
- climate change
- biodiversity
- reduced greenhouse gas emissions
- species at risk
- invasive and alien species and
- protection of wildlife and habitat

Funding under Community Action Programmes for the Environment is Canada-wide but each region has specific landscape/waterscape and species priorities. Funding amounts under different programmes range significantly from $10,000 to $200,000 and different programmes have been in operation for varying periods of time.

A9.3.5 Selection and monitoring

A risk-based approach has been adopted in terms of the monitoring of projects and includes other potential risk factors, such as capacity, timeframe and external factors, all of which may play a role in the achievement of results. Lower risk projects will usually require

recipients to provide fewer reports and will have more flexibility in cases where advance payments are deemed necessary. Higher risk projects will have more contact with project officers and will be expected to report more frequently than low or medium risk projects.

A9.3.6 Reflections for LIFE

Key features of the programme that can be reflected on and possible lessons for LIFE include:

- The community based nature of the projects encourages environmental assets to be seen as a public good and awareness can effectively be raised at the ground level whilst developing mutual learning and knowledge transfer systems.
- Different funding streams focusing on differing priorities often focus on specific geographical areas and projects can therefore have a real measurable impact. Furthermore, different amounts of money are allocated to each stream depending on the importance of each priority.
- A decentralised implementation approach allows regional contacts to stay closely in touch with projects.
- A risk based approach is adopted for monitoring procedures and the higher risk projects receive increased attention, which is effective in terms of resources.