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Equitable Testing and Evaluation of Marine Energy Extraction Devices in terms of Performance, Cost and Environmental Impact

Grant agreement number: 213380

EquiMar

Deliverable D5.8
Impacts upon marine energy stakeholders

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Impacts upon marine energy stakeholders

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Summary

The successful licensing, planning, deployment and operation of a marine energy array depends to a large degree on a well planned and executed consultation with stakeholders. Stakeholders shape their opinions based on their perception for the environmental, socioeconomic and emotional impacts the proposed development has on them and their area. Since an array of marine energy converters does not exist yet, the current report uses previous experiences published by the offshore wind industry in order to recognise generic impacts.

The marine energy stakeholders are separated into four main categories and a series of questions and suggestions are proposed, aiming to help the developer to successfully identify them. The steps of a consultation procedure especially designed for arrays of marine energy converters are described and previous examples of developer-stakeholders interactions, with positive and negative outcomes, are reported. Finally, arguments used in the past to oppose and support offshore energy farming are listed, along with demands expressed by the local population, authorities and organisations involved, in order to form a positive view. Nonetheless, the reader should keep in mind that the present report provides only generic guidelines and suggestions, and thus discrepancies on the impacts, the number and type of stakeholders and the consultation process required should be expected depending mainly on the type and location of the proposed development.

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CONTENTS

1. INTRODUCTION

This expected advance of the European ocean energy industry will manifest itself through the design and deployment of arrays / farms of marine energy converters. Although, public support is generally high, e.g. European Communities (2006), recent experience mainly from the wind industry indicates that an ongoing debate exists on whether nearshore or offshore energy farms are a desirable and acceptable solution for electricity generation.

The stakeholders' opinion is the decisive factor for the outcome of the aforementioned debate, which in turn crucially affects the overall licensing procedure of the array. Nevertheless, stakeholders shape their opinions based on their perception for the environmental, socioeconomic and emotional impacts the proposed development has on them and their area. The factors crafting all these impacts can vary significantly depending on a number of variables such as the type (wave, tidal, floating, submerged etc), size and location (nearshore, offshore) of the proposed development and of course the cultural and other characteristics of the neighbouring population. Therefore simply recognising the general impacts of a hypothetical array on marine energy stakeholders would be of limited use. Hence the present report provides the reader with the generic information required in order to identify the stakeholders involved in the development of an array, and plan a procedure to consult with them. Since a marine energy arrays are at a formative stage of development the terms and processes described here consider the lessons previously learned by the interaction of the offshore wind industry with stakeholders.

2. WHO ARE THE STAKEHOLDERS

A stakeholder of an array / farm development can be any person, group, or organization that has a stake in the development. This can be more accurately defined by saying that that the person, group, or organization can be affected by and can affect the actions taking place prior, during, or after the development, and also the objectives and policies involved.

At the initial stages of an array development the stakeholder body might typically include owners (shareholders), developers, suppliers, employees, the government, unions, and individuals or whole communities located near or at the vicinity, for onshore marine energy converters, of the development being affected by it or providing resources to it. When the array is fully operational creditors and end energy users could be included as well.

The BWEA (2002) in its consultation for offshore wind energy developments categorises stakeholders into three main groups. As, however, the idea of combining offshore wind and wave energy continuously gains ground and supporting evidence come into light, see e.g. Stoutenburg et al. (2010), a fourth category of stakeholders should be considered. This will include developers / owners of existing offshore infrastructure, e.g. offshore wind farms, with potential benefits from a co-development; this fourth category is referred to as symbiotic stakeholders. All four stakeholder groups are described below and examples can be found in Table 1.

- Statutory consultees

  Statutory consultees are authorities, agencies, groups or bodies defined in local, national or international legislation, which the developers are obligated to consult. A pre-defined statutory process is usually followed by the developer but in the same time no restrictions exist on including this category of stakeholders in non-statutory consultation as well.
- Strategic stakeholders (non-statutory consultees)

  This category includes local, regional, national or international organisations (and their representatives) who have important information, experience and expertise to contribute, and the final stand of whose, either positive or negative, affects significantly the overall progress of the

development. If the development refers to an array of onshore marine energy converters or nearshore with onshore support facility requirements, land owners may be part of this category as well.

- Community stakeholders

  This category includes any individual, groups of individuals or organisations, whose lives, interests and welfare can be affected by the development.

- Symbiotic stakeholders

  Symbiotic stakeholders can be owners or organizations who may have an interest on or may have mutual benefits from a co-development.

Table 1: Typical examples of stakeholders subject to national and regional differences

Statutory consultees	Strategic stakeholders	Community stakeholders	Symbiotic stakeholders
DEFRA: Department from the Environment, Food and Rural Affairs. DCMS.: Department of culture media and sport. DTI: Department of Trade and Industry. DTLR: Department of Transport, Local Government and the Regions. CEFAS: Centre for Environment, Fisheries and Aquaculture. CAA: Civil Aviation Authority. Countryside Agency. Local Authorities. National heritage and nature. Ministry of defence. Maritime and Coastguard agency. National parks.	Investors. Marine Archaeological interests. Marine Conservation society. National Fishermen's Organisations. National Trust. Ramblers Association. Societies for the protection of birds. Yachting Association. Fishery Committees. WWF Green peace. SAS: Surfers Against Sewage. Regional coastal for a. The Wildlife Trust. Trade unions. Land owners. Universities. Project developers.	Residents associations. Individual residents. Sailing clubs. Recreational groups. Regional or local fishermen associations. Local companies. Local touristic agents and / or agent associations. Women's Institutes. Community councils. Church groups.	Offshore wind energy industry. The wind industry supply chain. Offshore oil industry. Electrical grid owners.

3. IDENTIFYING THE STAKEHOLDERS

Although the statutory stakeholders are, in most cases, well defined by legislation, identifying stakeholders from all other categories might be a great challenge. Previous experience mainly from the offshore wind industry, see e.g. BWEA (2002), indicates that even local individuals can cause important delays or even the cancelation of the overall development. Hence it is for the best to include as many stakeholders as possible and thus minimise the risk of excluding a stakeholder who could prove to be crucial. As an example, the offshore wind database (www.4coffshore.com) reports 4350 stakeholders for 929 wind farms over 36 countries.

Upon identifying the stakeholders the following questions may be of use:

- Who is investing on the development?
- Who will the development affect, either positively or negatively?
- Which are the changes the development will bring and who supports or opposes such changes?
- Which are the official post in the area of the development and who is holding them?
- Who is influential in the local community?
- Who are the representatives of local organisations with environmental or social interests?
- Who are the representatives of local organisations with economic interests?
- Who are the representatives of similar (if any) developments in the area, like e.g. existing offshore wind farms?
- Was there anybody involved in similar issues in the past?
- Who are the local policy makers?
- Who are the representatives of the local / regional research community?
- Who else should be involved?

Although, the dynamic exists for a large number of stakeholders to be finally recognised, it is very helpful to originally distinguish the authorities, organizations, groups, associations, individuals etc. involved within the various stages of the array development and planning. Such a focused approach can save valuable time for the development and allow the optimum recognition of the appropriate stakeholders. Figure 2 gives a generic example of the various stakeholder categories associated with each phase of the array planning and deployment process, and their potential involvement.

Figure 1: Indicative examples of the different stakeholder categories associated with each phase of the array planning, deployment and operation.

4. REACHING THE STAKEHOLDERS

Unless special reasons specify otherwise, the first step is to identify relevant institutions, organizations and groups at the four spatial levels, local, regional, national and international. Local residents can then be reached and surveyed using methods well described in Gee (2010). The outcomes can accordingly be categorised on a matrix indicating the relative strength and composition of each sector; e.g. the number of stakeholders per sector, and / or the local to national, regional to international stakeholder ratios etc.

As an example, Figure 2 plots percentages of the total number of stakeholders identified per thematic sector for selected offshore wind farms; data adapted from Licht-Eggert et al. (2008). Although very useful, such data should be treated with caution as the overall sector contribution to Figure 2 does not necessarily entail a strong interest and / or a 'live' stake in the development. Gee and Licht-Eggert (2010) analysed public documents for all cases reported in Licht-Eggert et al. (2008) and suggested that the most vociferous reactions were split amongst political stakeholders, nature conservation organizations and the wind energy sector.

With communication playing a key role in reaching the stakeholders, local press can be a valuable ally. Nonetheless, failure to reach all stakeholders and get them involved does not necessarily imply a failure of the process, but could indicate apathy, a lack of interest or simply that some stakeholders do not feel affected by the proposed development. However, it is worth making sufficient efforts to ensure that the interests and concerns of stakeholders are not in any case marginalized or excluded.

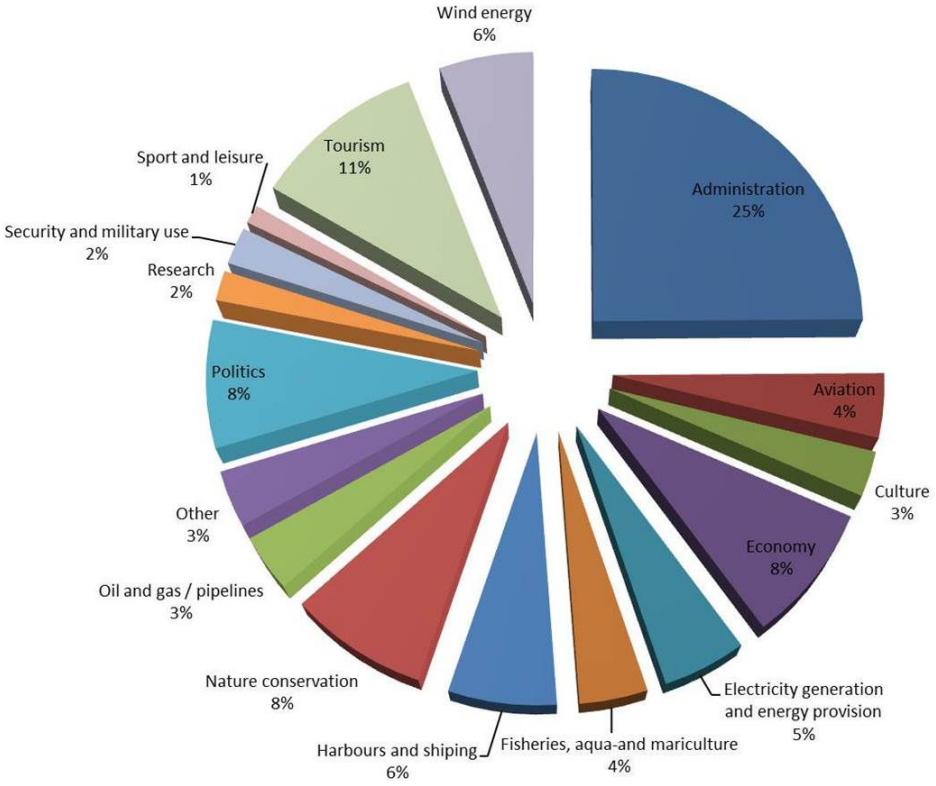

Figure 2: Examples of thematic sectors referred to by stakeholders expressing their position on offshore wind farming. Percentages represent the amount of stakeholders expressing arguments related to the specific sector, out of a total number of 430 stakeholders; original data after Licht-Eggert et al. 2008.

5. CONSULTATION WITH THE STAKEHOLDERS

Both EU and legislation in many EU member states requires the development to go through several consent stages, within which the developer has to conduct and submit detailed Environmental and Socio-economic impact assessments. The same consent processes also include an established procedure for consulting with a limited number of key stakeholders. This procedure mainly involves written communication with statutory stakeholders at either national or regional level, including detailed information of the development, plans and diagrams. Although planning documents may be too complex for some, e.g. community, stakeholders recent experience has shown that sharing the information openly and widely and engaging the public into scientific liaison processes may prove beneficiary for the future of the overall development, e.g. Fugate (2010).

Recently, however, the UK offshore wind industry, sought to widen the consultation process at 'voluntary' base, in order to also include all other stakeholder categories (Table 1). In the past a number of onshore wind farm developments attracted significant opposition and, amongst other reasons, inadequate consultation with stakeholders has held responsible. At the same time the UK national dialogue run by the Environmental Council gave emphasis on a significant concern; if more than one development take place in any one area it will be important for all the stakeholders to consider any cumulative consequences of such multiple developments.

In a similar manner, referring at a broad stakeholder consultation base is crucial for any marine energy development, either onshore, nearshore or offshore. The consultation process should be iterative and whenever possible open to all categories of stakeholders. Statutory stakeholders for example can be present

in the formal consultation process but also in the voluntary one. This could result in further benefits as the experience and credibility of statutory stakeholders may have much to offer at an open discussion. Surprisingly, however, Bruns and Gee (2009) concluded that is local stakeholders that are underrepresented in the public consultation phase.

Given the broad range of marine energy converters, every consultation plan will be different. Nevertheless, it should be central to the overall project as to allow the development's planning, deployment and operation to arrive at a stage acceptable to as many stakeholders as possible. Initiating the consultation plan during site selection can reduce the risk of potential conflicts. Assuming that the stakeholders have been identified, an interactive communication route is then required. Such a route can include the local, regional or national media, individual or group meetings, academic events, public exhibitions, liaison groups, workshops, written communication and of course the internet which allows the real time exchange of information. As an indicative example, Figure 3 presents six consultation criteria extracted from the UK code of practice on written consultation for offshore energy licensing issued in 2004.

Regardless its final form, the stakeholder consultation process should be linked to the environmental and socio-economic impact assessments for all the planning and developing stages of the proposed array (Figure 4**Error! Reference source not found.**). Stakeholders need to be informed about the predicted impacts and made aware that their views are well considered and affect the decision-making process. Figure 4 presents a series of generic steps linked to the various development and deployment stages of the array, which could be followed when consulting with stakeholders. Overall an iterative approach is described, where information shared (e.g. EIA's), collected (e.g. stakeholder views), gained (e.g. stakeholder views) and used (e.g. for mitigation measures) within subsequent steps may make it essential to return to the first step and repeat the procedure. The overall number of iterations required is arbitrary and depends strongly on the characteristics of the array, e.g. size, location, energy converter type etc. Even during operation the whole procedure can be repeated as the information becoming available through monitoring needs to be communicated with the stakeholders.

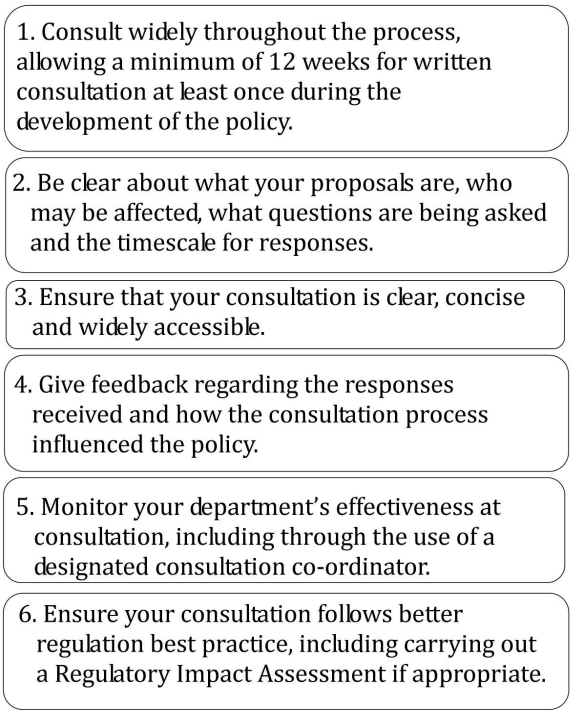

Figure 3: Written consultation criteria for offshore energy licensing as originally proposed in the UK code of practice issued in 2004.

Recent experience from other sectors of the offshore industry has shown that the final success of the proposed development does not depend only on technical aspects and detailed planning. The concerted involvement of stakeholders at all stages of planning and deployment (see deliverable D5.5) could confirm or amend the environmental description of the development, result in beneficial changes on the array design, and even cause opposing groups to reverse their views; for examples see Table 2.

Details on methods for identifying and analysing positions, opinions, perceptions and valued of stakeholders can be found in Ramirez (1999), Coastal Resource Centre (2005), and Lange et al. (2010).

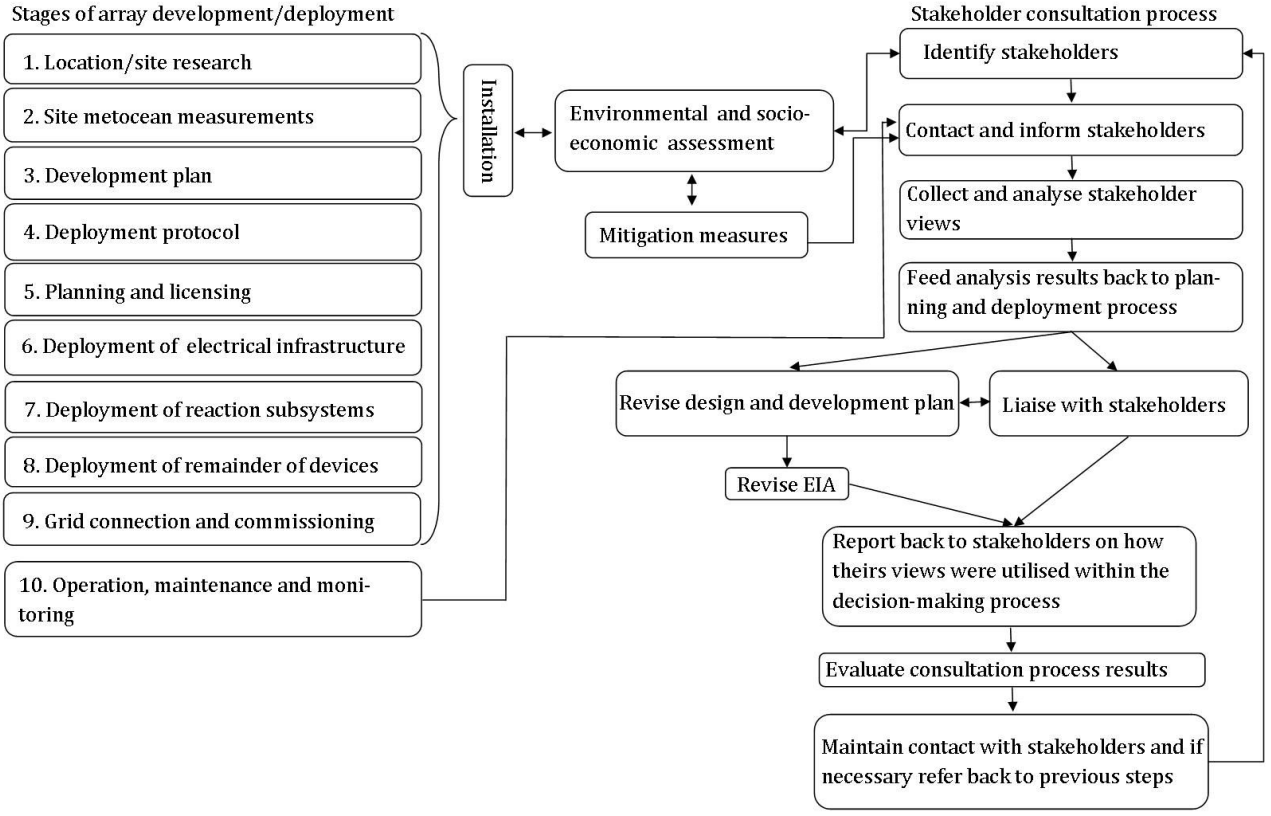

Figure 4: Example of an iterative stakeholder consultation process based on subsequent steps linked to various stages of the array design, deployment and operation.

Table 2: Examples of interactions between offshore wind and marine array developers and stakeholders; examples after BWEA (2002) and Bald et al. (2010).

Renewable energy type	Location	Reason(s) for opposing and related stakeholders	Outcome
Offshore wind	Gunfleet Sands, UK	SSSI designated area.	The route of the onshore grid connection cable was modified.
Offshore wind	North Hoyle, UK	Navigation and visual amenity/ Local stakeholders and Countryside Council for Wales.	The layout of the turbine array was adjusted and the onshore cable was buried.
Offshore wind	Scroby Sands, UK	Navigation, fisheries, environmental (marine mammals) / Harbourmaster, Port Authority, fisherman, local Borough Council, Royal society for the Protection of Birds and the Sea, Mammal Reseaarch Unit and the University of St. Andrews.	Export cable root was redesigned and the construction methodology and timing was purposely adjusted to accommodate the stakeholder requirements.
Offshore wind	Kentish Flats, UK	Local oyster beds and effects on bird migratory patterns / Fishermen and Royal society for the Protection of Birds and the Sea.	Site relocation and baseline study of bird concentrations at the proposed new site.
Offshore wind	Rhode Island, US	Fishing / Fishing community.	Fishermen negative views came around 180 degrees after a series of meetings focused on fisheries impacts.
Onshore wave: Mutriku pilot plant	The Basque Country, Spain	Environmental concerns for the proposed energy converter and the associated breakwater / Local groups. Fishermen on the other hand supported the project as it provided an improvement to their old fishing harbour.	A pilot wave (OWC) energy plant was built and provided the adjacent village with added tourist value.
Wave and tidal	Douglas County, Oregon, USA	Surfing quality of the waves / Local surfers association (The Surfrider Foundation).	On-going feasibility and technology studies consider the effects on the quality of surfing waves and alternative solutions are investigated.
Wave	Tillamook Country, Oregon, USA	Fishing and aesthetic concerns/ Local fishing community (Fishermen's Advisory Committee for Tillamook).	One of the main developers withdrew his participation due to the inability to reach a common ground with the local fishing groups.

6. STAKEHOLDER POSITIONS ON OFFSHORE RENEWABLE ENERGY: LESSONS LEARNED FROM OFFSHORE WIND FARMS

Figure 5 and Figure 6 summarise arguments used to support and oppose offshore wind farms in Germany. More details regarding various European countries and the US can be found in Kempton et al. (2005), Firestone and Kempton (2007), and Ladenburg (2009). Those arguments were expressed either as statements during public consultation procedures (Figure 5) or as views of the local population (Figure 6).
Nature conservation and shipping safety appear to be the main reasons raised against offshore farming by the stakeholders over public consultations. The former argument is largely supported by the local population, which however demonstrated an even stronger trend towards guarding the aesthetic qualities of the landscape and seascape. Gee (2010) attributed this emotionally driven reaction to moral sea values and a general public instinct to keep the marine environment untouched. Previous experience referring mainly to visual and acoustic impacts of inland wind farms only enhanced such opposing views amongst stakeholders.

Recently a detailed survey in Germany, indicated a well-established belief at local residential level that the sea should not be spoiled by any type of industrial activities, Gee and Licht-Eggert (2010). Any potential socio-economic benefit was considered of minor significance by the majority of stakeholders supporting the latter opinion.

In an earlier study, Licht-Eggert and Gee (2006) placed the majority of stakeholders opposing offshore wind farming to organisations and individuals at a local level. In terms of the marine energy sector, the latter entails that the caution required upon identifying, consulting and interacting with the stakeholders increases as the distance of the proposed array / farm from the shore decreases. This, however, does not in any case justify a looser approach for offshore developments, which have already been accused to greatly endanger navigability and significantly deteriorate the amenity value of the shoreline, see respectively EMEC (2009) and SAS (2009).

In the same time, however, groups and individual stakeholders relied mainly on its renewable character when arguing in favour of offshore renewable energy. Once again, economic advantages and new job potentials are accounted by a small part of the stakeholders involving mainly political organisations, industrial organisations and administrative institutions. Immaterial values were partly balanced only by the principle of renewable energy generation, for more details see e.g. Gee and Burkhard (2010).

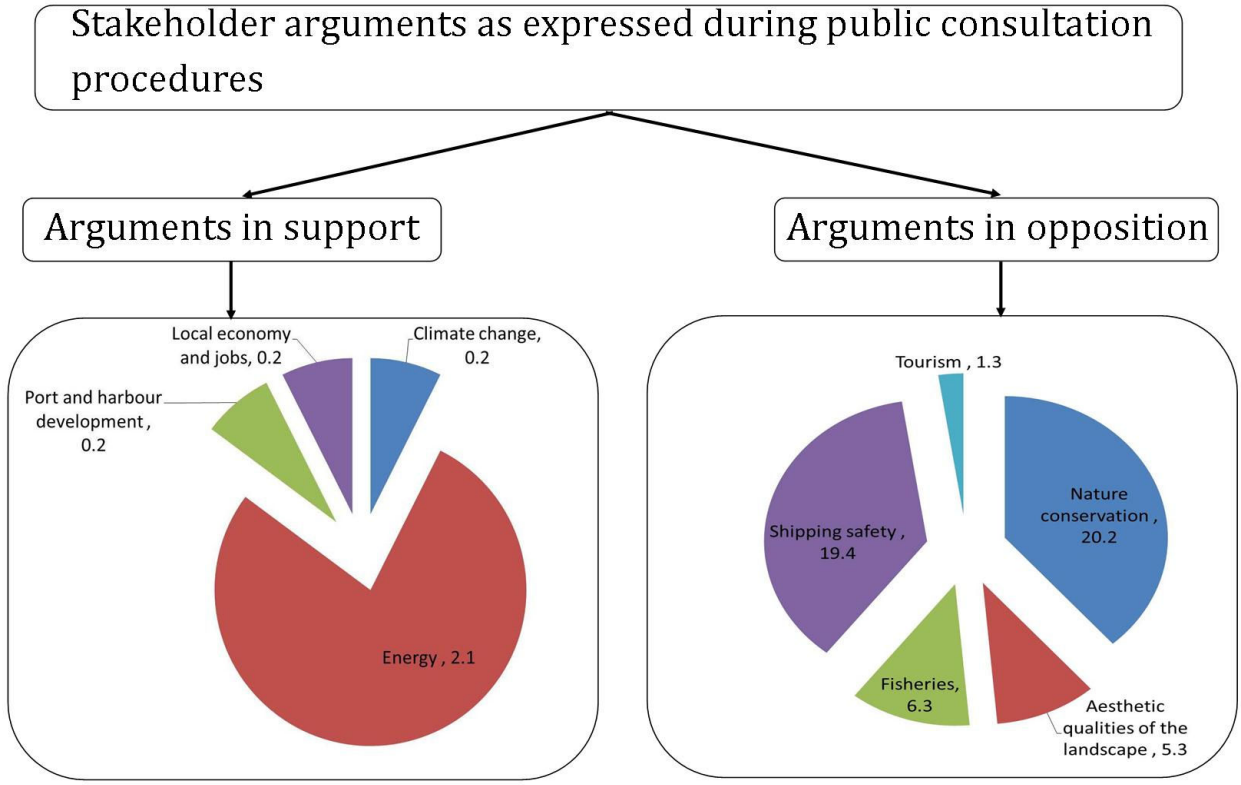

Figure 5: Arguments expressed by stakeholders in support and in opposition of offshore wind farming, during a public consultation procedure; usage extent of each argument relative to the total number of arguments is represented as a percentage by the figures included in the pie charts (data after Licht-Eggert et al. (2008) and for more details see also Gee and Licht-Eggert (2010)).

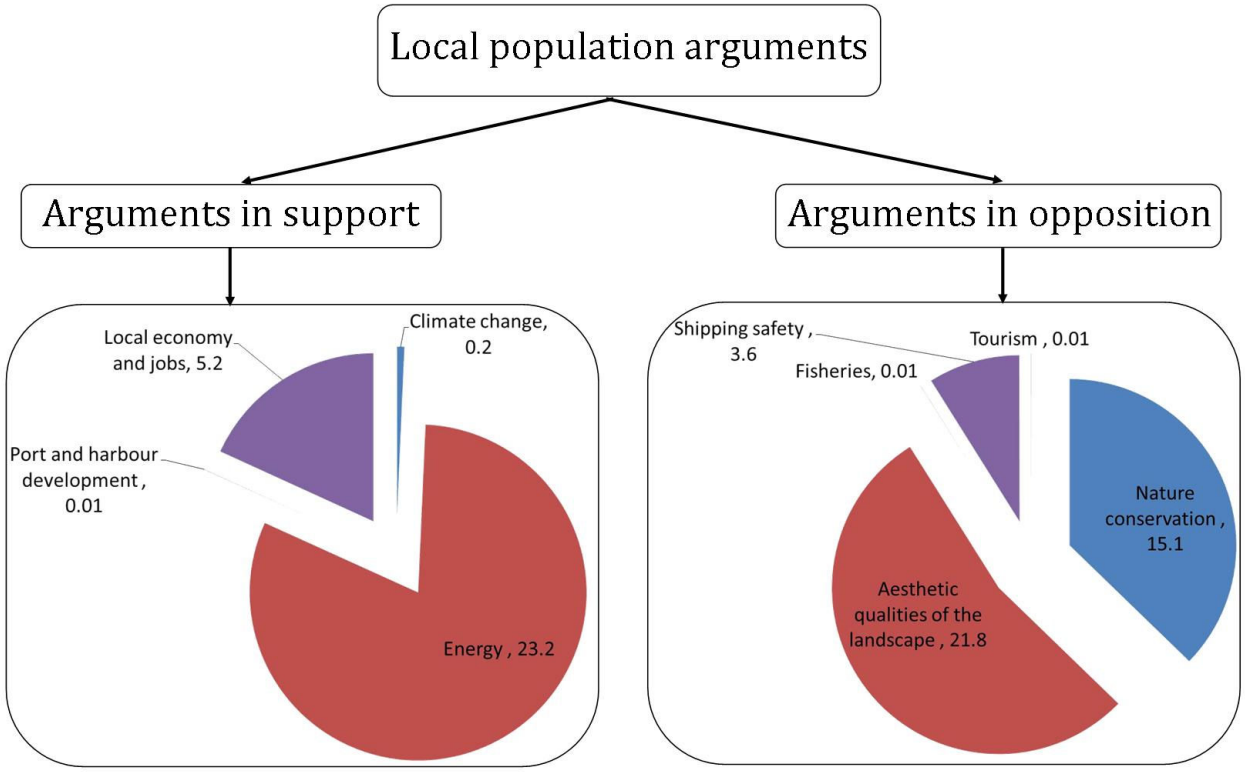

Figure 6: Arguments expressed by the local population in support and in opposition of offshore wind farming; the usage extent of each argument relative to the total number of arguments is represented as a percentage by the figures included in the pie charts (data after Licht-Eggert et al. (2008) and for more details see also Gee and Licht-Eggert (2010)).

Figure 7 presents the demands put forward by the local population and other stakeholders participating in the consultation process in order to support offshore wind parks. A clear trend appears, indicating that supporting views increase if allocation and feasibility issues are adequately resolved and properly communicated. However, such examples are only indicative and do not necessarily represent all the needs and arguments that should be addressed by a stakeholder consultation process designed for a marine energy array. Gee and Licht-Eggert (2010) suggested that despite the increasing experience, the planning process applied for offshore wind farms continues to fail to fully address the moral issues raised. As the environmental impacts may also vary, specialised requirements should be expected depending on the type of the energy converter (e.g. wave or tidal, floating or rigid) and the location of the proposed development (e.g. offshore or nearshore).

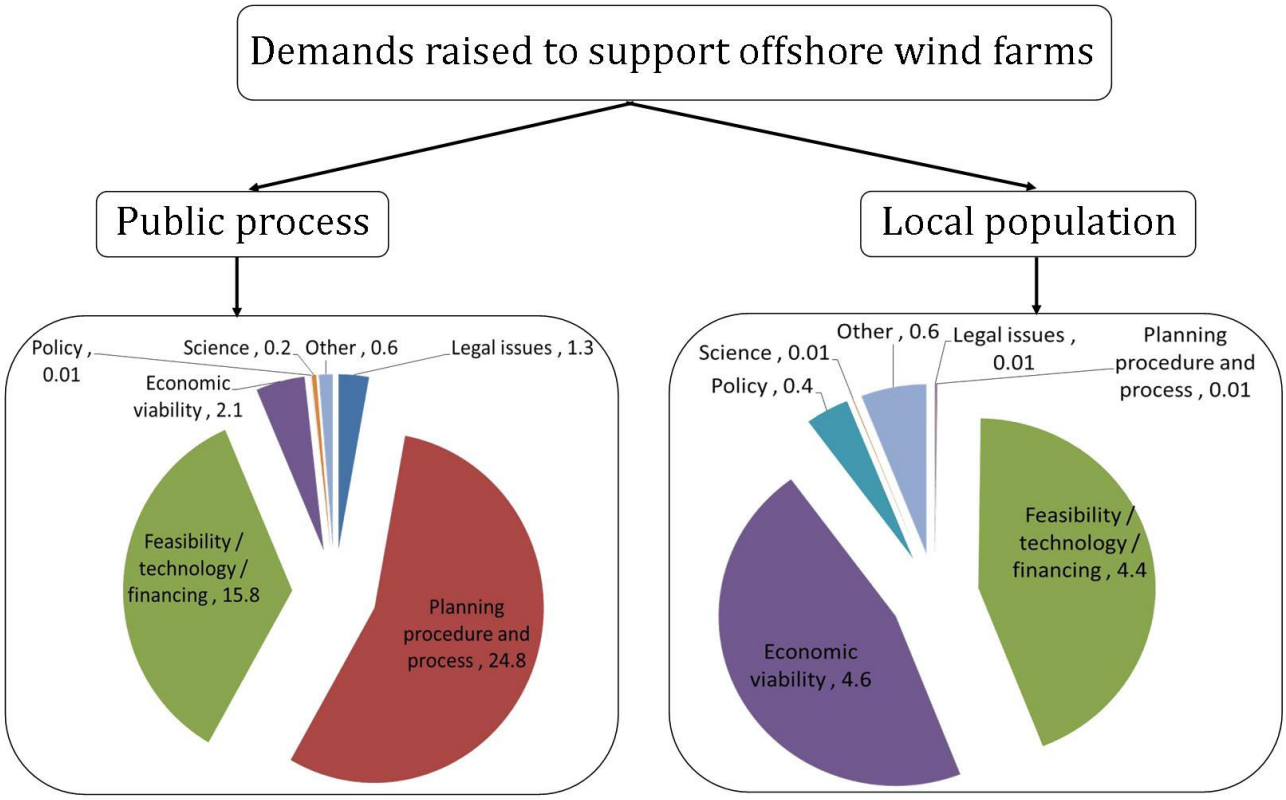

Figure 7: Demands raised by the local population and other stakeholders taking part in the consultation process in order to support offshore wind farms; the usage extent of each argument / demand relative to the total number of arguments is represented as a percentage by the figures included in the pie charts (data after Licht-Eggert et al. (2008) and for more details see also Gee and Licht-Eggert (2010)). The sum of all percentages from figures 5, 6 and 7 is 100%.

7. CONCLUSIONS

The successful licensing, planning, deployment and operation of a marine energy array depends to a large degree on a well planned and executed consultation with the stakeholders. Stakeholders shape their opinions based on their perception for the environmental, socioeconomic and emotional impacts the proposed development has on them and their area. These impacts can vary between different developments but a general form was reported here as recognised in past licensing and building efforts of the offshore wind industry. Amongst the arguments used to oppose wind farm developments shipping safety, nature conservation, moral concerns and fisheries dominate.

Nevertheless, through the effective communication and interaction between the developer and the stakeholders positive opinions can be formed and even negative views can be reduced or reversed. Generic steps towards this direction have been described here and a list of the most important follows:

- it is for the best to include as many stakeholders as possible
- initiate the consultation procedure as soon as possible and in parallel with early stages of the proposed development, e.g. site selection
- ensure that the interests and concerns of stakeholders are not in any case marginalized or excluded
- ensure an open, clear and continuous communication with the stakeholders
- the consultation procedure is iterative

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