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**Regulatory Policy & Promotion of Renewable Energy Sources**

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# **EU Action to promote Offshore Wind Energy**

## **Report on the Public Consultation April–June 2008**

In line with the Commission's commitment to transparent and interactive policy-making, this document aims at providing an overview and general impression of the feedback provided to the Commission in the context of a public consultation. The statements and opinions expressed in the document do therefore in no way necessarily reflect those of the Commission or the Commission services.

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## Executive Summary

On 23 January 2008 the Commission presented a far-reaching package of energy and climate change related proposals including a draft directive to promote renewable energy and increase its share to 20% by 2020. Reaching this target will be challenging and require contributions from many different new technologies. Offshore wind energy has the potential to play a significant role but exploiting this potential is associated with a number of specific challenges that might require further, more targeted actions.

This report presents the results of the public consultation on EU action to promote Offshore Wind Energy carried out from 24 April to 20 June. This public consultation was held in order to identify the key barriers for the further development of offshore wind energy in Europe and how to overcome them.

Overall, the 237 individuals and organisations who contributed to the public consultation have generally acknowledged the potential of the development of offshore wind and its importance to help achieve energy policy objectives of the EU, including the combat against climate change, increased security of supply and competitiveness. A vast majority of respondents considered that actions at EU level are important in order to promote offshore wind energy.

Respondents broadly confirmed the existence of a number of barriers that might prevent the potential of offshore wind resource from being tapped if not addressed. The barriers identified by respondents among the most important are in particular:

- The lack of integrated approaches as a significant obstacle to the identification of suitable locations for offshore wind farms.
- The requirement of permissions from different authorities within a country as part of the consenting process.
- The need for and/or construction time of onshore grid reinforcements to assure connection and enable integration of offshore wind into the European grid, as well as the need for offshore grid connectors to the wind farms.
- The current insufficient availability of reliable tested offshore wind turbine technologies.
- The adaptation of national support schemes to the risks and costs related to offshore wind energy.

A broad range of ideas for possible actions were put forward by respondents. This report explores the feedback in more details. The policy conclusions drawn by the Commission are set out in an official communication and not addressed in the present report.

# 1. Context & Process

## 1.1 Context & purpose

On 10th January 2007 the European Commission made proposals for a new Energy Policy for Europe. These included a Renewable Energy Roadmap proposing a binding 20% target for the overall share of renewable energy in 2020 for the EU.

In March 2007, the Spring European Council adopted conclusions endorsing these objectives. In September 2007 the European Parliament adopted a resolution on renewable energy. Both institutions called on the Commission to follow-up with a legislative proposal.

On 23rd January 2008 the Commission adopted a new energy and climate package including a proposal for a directive on the promotion of the use of renewable energy, setting national binding targets for the share of renewable energy consumption aimed at together achieving the overall 20% EU target.

The projections made for the Renewable Road Map of January 2007 suggested that offshore wind energy has the potential to make a significant contribution to reaching this target. However, exploiting this potential is associated with a number of specific challenges that might require further, more targeted actions.

To inform the preparation of a Commission initiative on offshore wind energy, a public consultation on Action to promote Offshore Wind Energy was held from 24 April to 20 June. Public authorities, businesses, non-governmental organisations and other interested parties were asked:

- what they consider are the *most important barriers* related to the future development of offshore energy in Europe;
- what *action could be taken* to address these barriers, *especially at EU level*.

## 1.2 Process & timing

The consultation consisted of a questionnaire in English with structured questions, supplemented by open "free text" questions where participants could provide feedback not captured in the structured part.

The public consultation complied with the Commission's minimum consultation standards, incl. the 8 week minimum duration. The standard Commission internet tool for Interactive Policy Making<sup>1</sup> was used. As participation was voluntary and based on self-selection, the views expressed by respondents are not necessarily representative of the views held by all stakeholders or citizens. A press release was published the 25 April 2008<sup>2</sup> to announce that the consultation was launched.

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<sup>1</sup>[http://ec.europa.eu/yourvoice/ipm/index\\_en.htm](http://ec.europa.eu/yourvoice/ipm/index_en.htm)

<sup>2</sup><http://europa.eu/rapid/pressReleasesAction.do?reference=IP/08/645&format=HTML&aged=0&language=EN&guiLanguage=en>

## 2. Background information about the respondents

In all, 237 responses from individuals and organisational participants were received through the IPM tool (the online questionnaire).

	Number of requested records	Requested records (237)
Individual citizen	<b>136</b>	<b>57%</b>
Representative of an organisation	<b>101</b>	<b>43%</b>
Total number	<b>237</b>	<b>100%</b>

Tab. 1 Total number of respondents

A few other responses were submitted by organisations who did not make use of the web-based interface to reply to the questionnaire or who submitted additional contributions via email. The statistical data in this report refer only to responses made by 237 responses submitted through the IPM tool. However, the views in all the submitted responses, including those submitted without using the IPM tool, have been considered by the Commission services.

### 2.1 Individual respondents

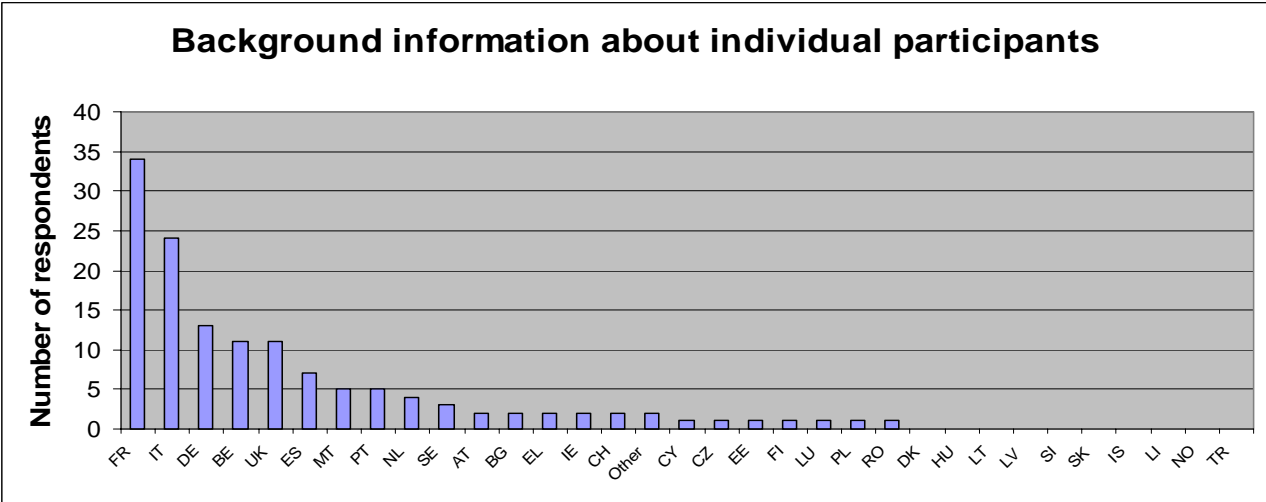
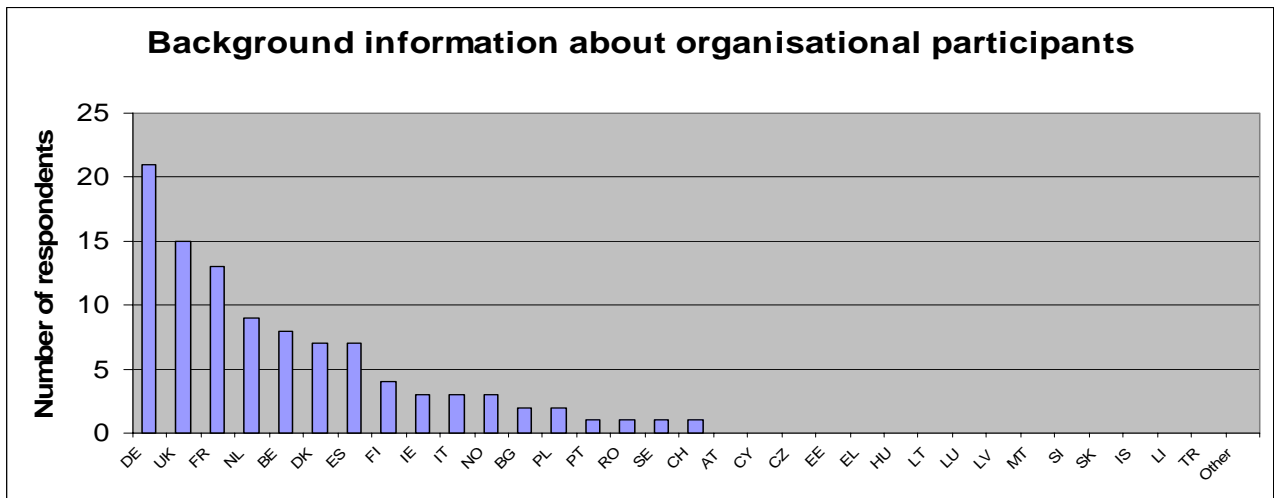


Fig. 1: Number of individual respondents per country of residence

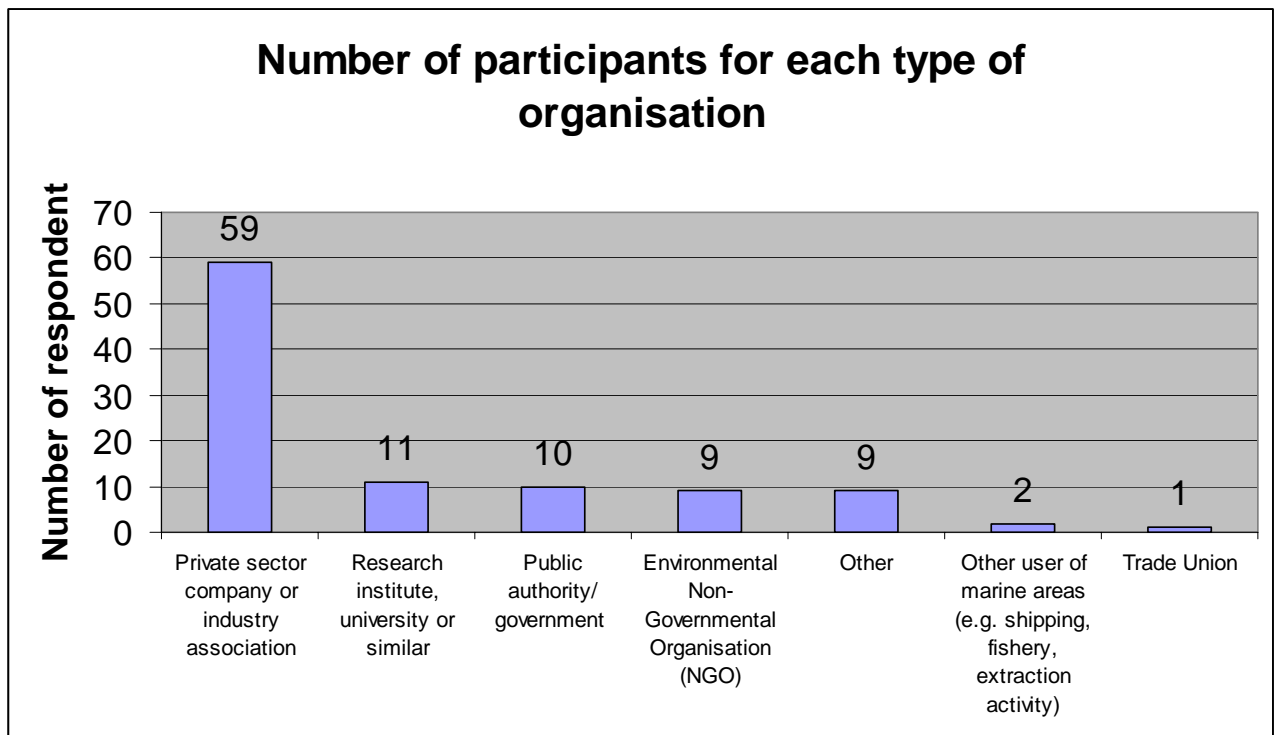
In all, 136 responses from individuals were received. Most replies came from France, Italy, Germany, Belgium and UK. The number cannot be seen as representative or significant. Differences in press coverage of the press release, or individuals particularly active in forwarding the news to contacts, seem to be the most probably cause for this distribution.

## 2.2 Organisations responding



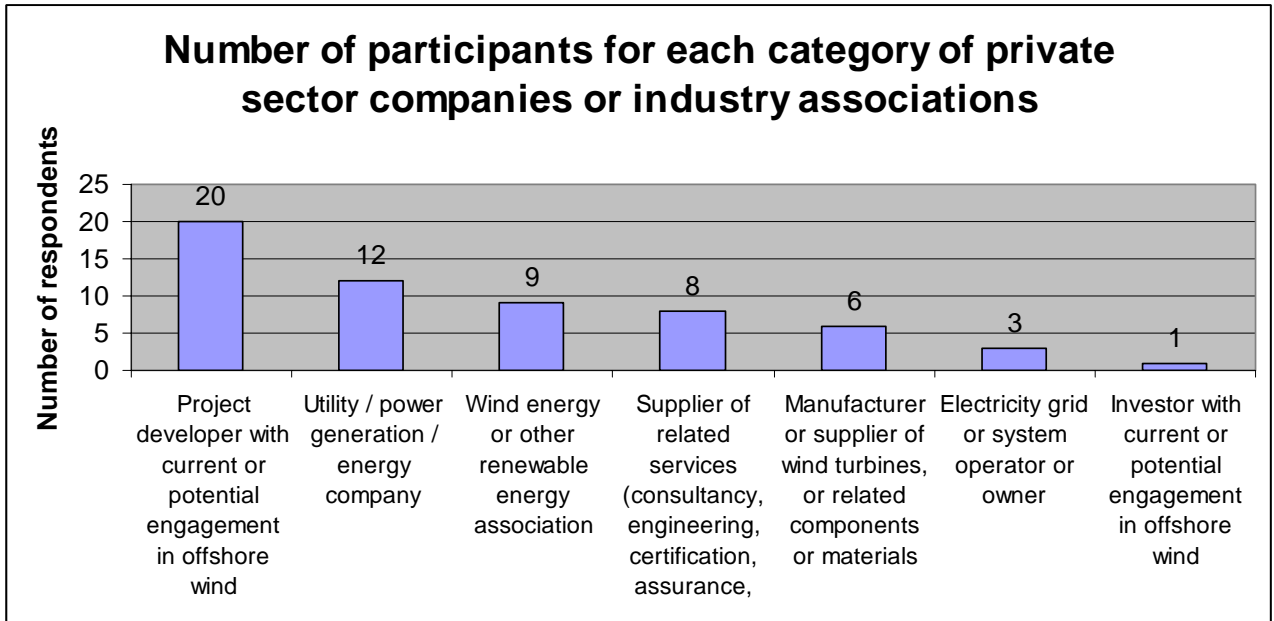
**Fig. 2: Number of organisations responding per country of residence**

Most responses on behalf of organisations were received from Germany, followed by the UK, France, Netherlands and Belgium. This distribution seems to reflect reasonably well what could be expected given current activity and involvement in offshore wind energy development.



**Fig. 3: Number of participants for each category of organisations**

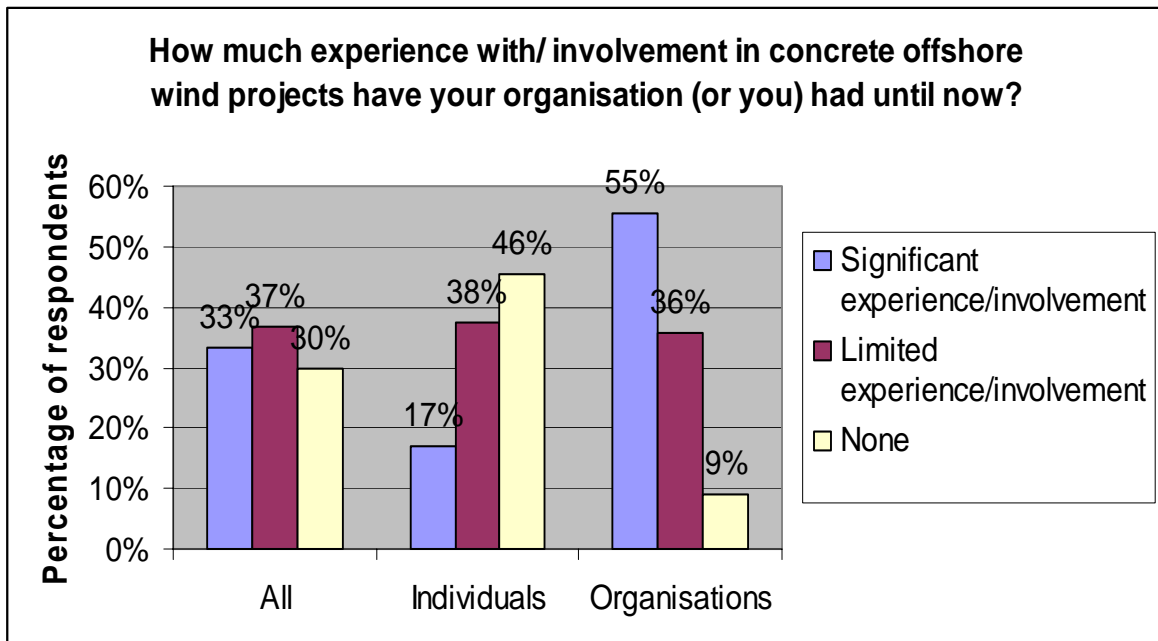
The largest single fraction of responses was from private sector companies or industry associations.



**Fig. 4: Type of private sector companies or industry associations that responded**

Within the fraction of private sector companies or industry associations, the largest single group was from project developers with current or potential engagement in offshore wind. This group was also the largest single group of all organisations responding.

### 2.3 Degree of experience/ involvement of respondents



**Fig. 5: Extent of experience with/ involvement in concrete offshore wind projects**

Figure 5 shows the respondents' self-assessment of their degree of expertise and involvement in offshore wind energy projects. Whereas individual participants on average had a lower degree of expertise and involvement (only 17 % with significant - and 38% with limited - experience/ involvement), 55% of the organisations participating claimed to have significant

experience/ involvement in concrete offshore wind projects and another 36% at least limited experience/ involvement.

### 3. General opinion about offshore wind energy

In general, almost all participants agreed on a high potential of offshore wind energy and its potential to help addressing issues like climate change, security of energy supply and competitiveness. Further to this, a significant number of participants consider that there is a need for more EU action in order to promote offshore wind energy.

#### 3.1 Perception on potential for the development of offshore wind

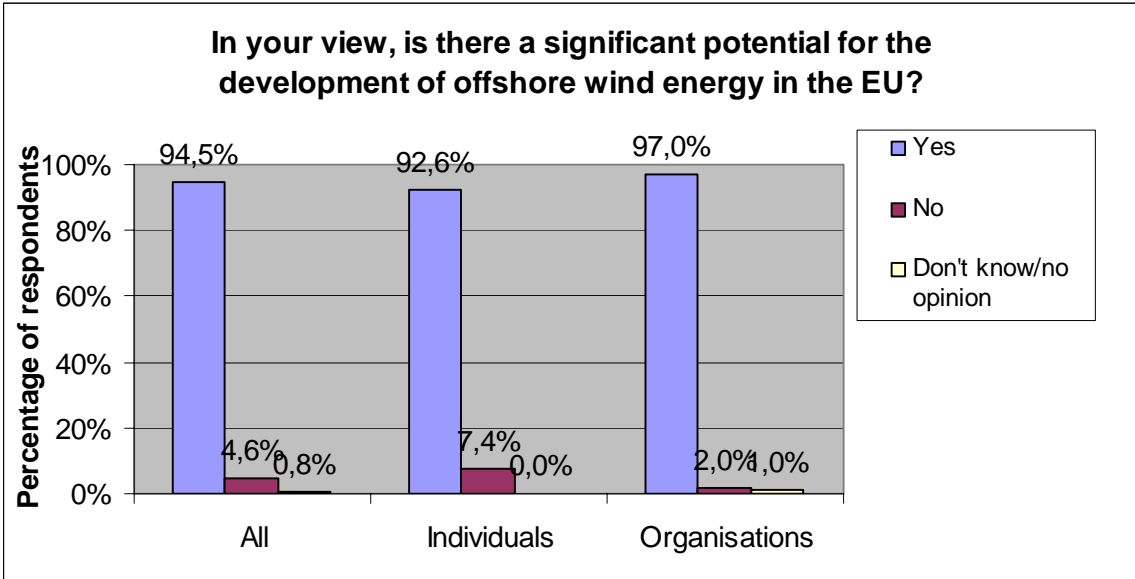
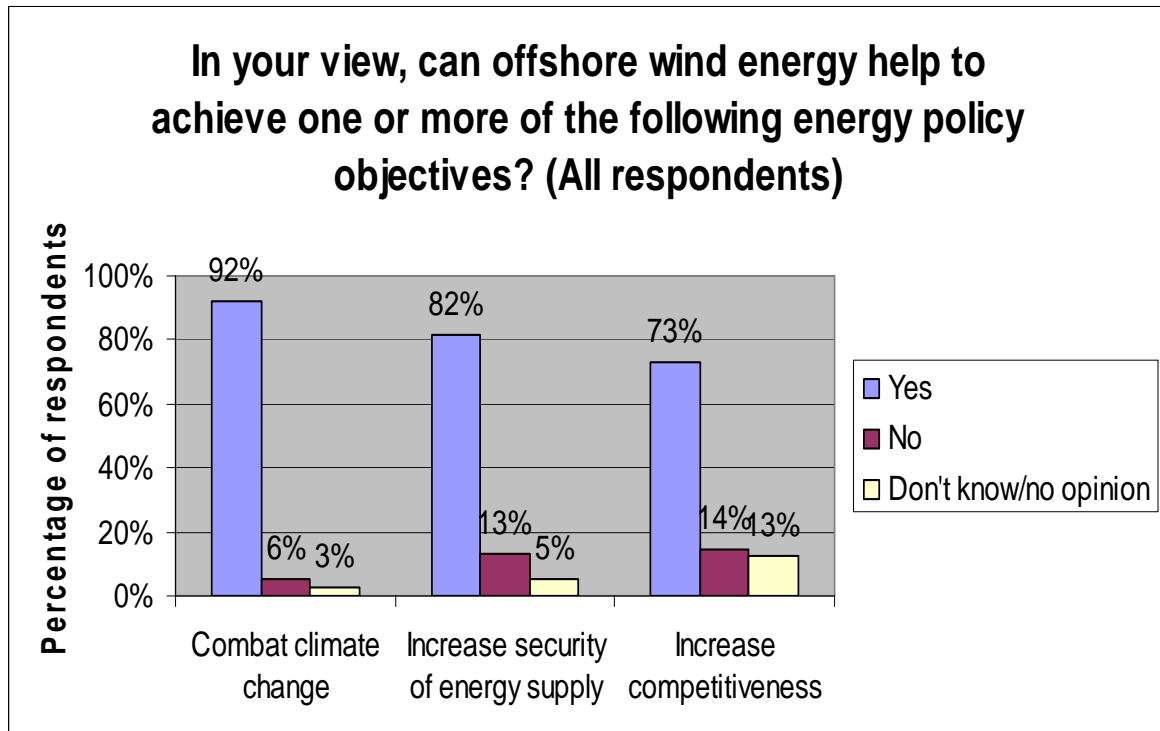


Fig. 6: View of potential of offshore wind energy in the EU

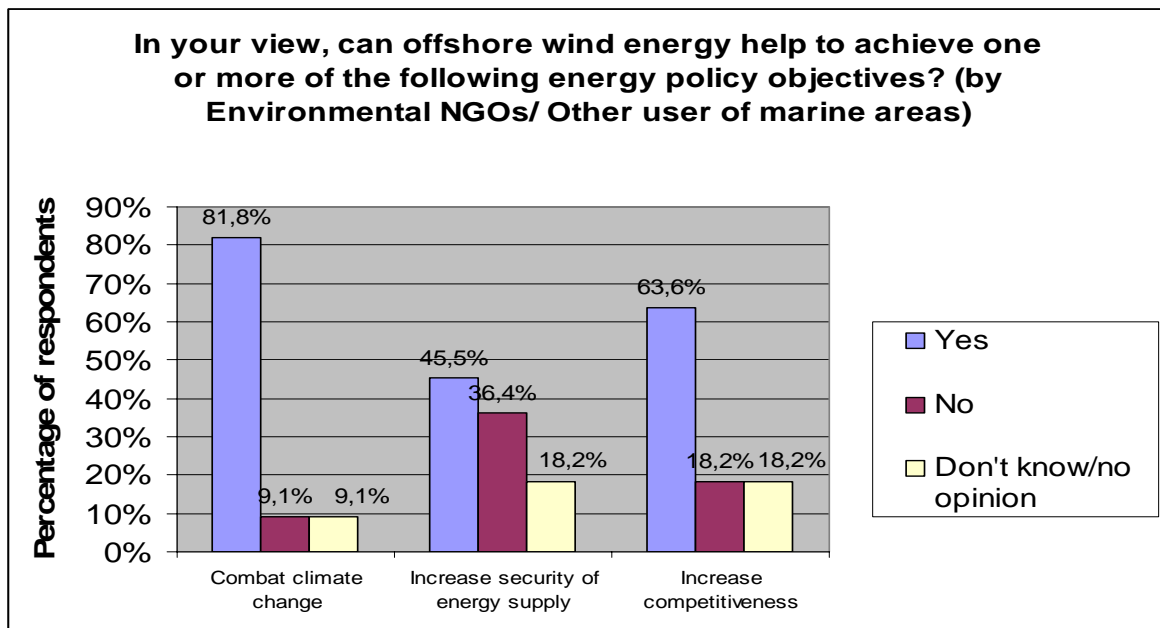
Individual and organisational participants share the view that there is a significant potential for the development of offshore wind energy in the EU. In this respect, 94,5 % of all respondents see a significant potential, whereas hardly any see no significant potential.

### 3.2 Perception on potential to contribute to certain goals



**Fig. 7: Offshore wind energy: Potential of achieving goals**

In addition to the perceived potential, offshore wind energy is also seen as a chance to contribute to meeting the key objectives of the EU's energy policy. In this regard, nearly all participants see offshore wind as helpful to combat climate change (92% of all respondents). A large majority of both participants see it also as helpful to increase security of energy supply (82% of all respondents) and to increase competitiveness (73% of all respondents).



**Fig. 8: Offshore wind energy: Potential of achieving goals viewed by NGOs/ Other user of marine areas**

NGOs and other marine user groups, where one could assume are more critical opinion show also a largely similar result, although there are differences in the perception of offshore wind contribution to security of energy supply: only 46% of the NGOs and other marine users think that there is a positive link.

### 3.3 Need for EU action

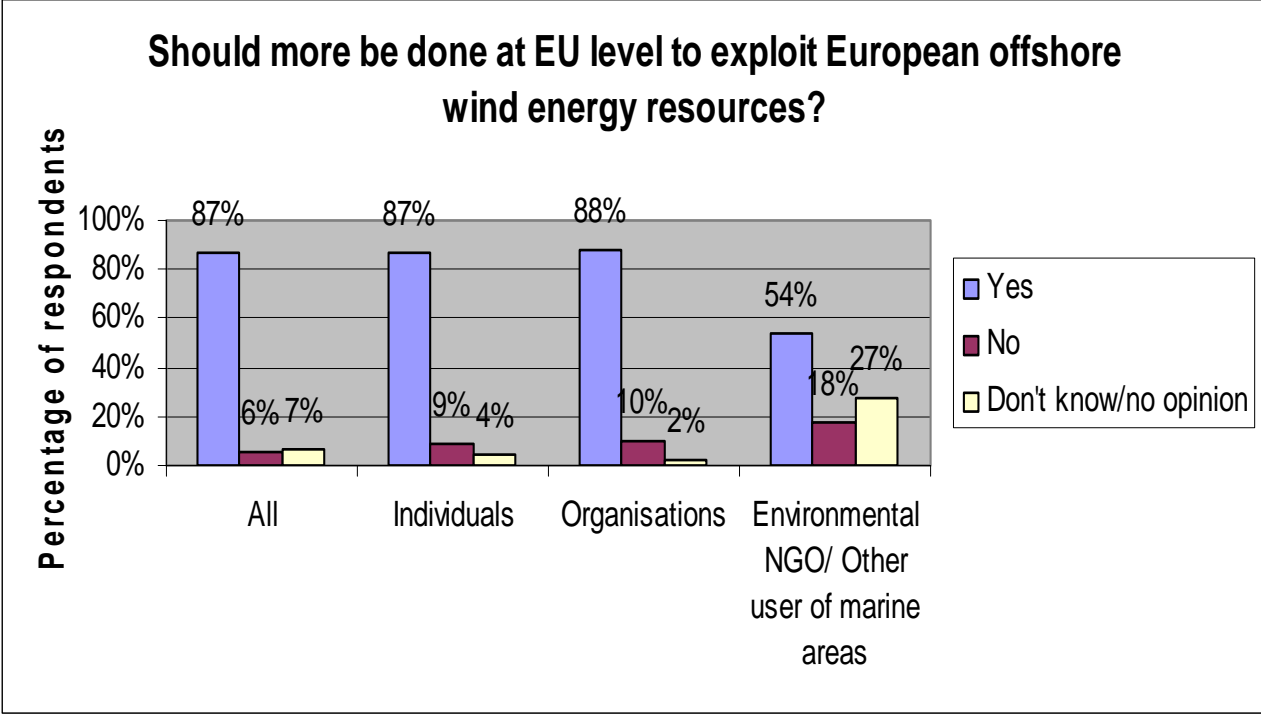


Fig. 9: Need for EU action

The large majority of responses (87%) received indicate support for more EU action to promote offshore wind energy. Here again there can be observe a slight difference to the NGOs etc., where only but still a majority of 54% agree to this.

## 4. Key barriers and suggestions for action

### 4.1 Introduction

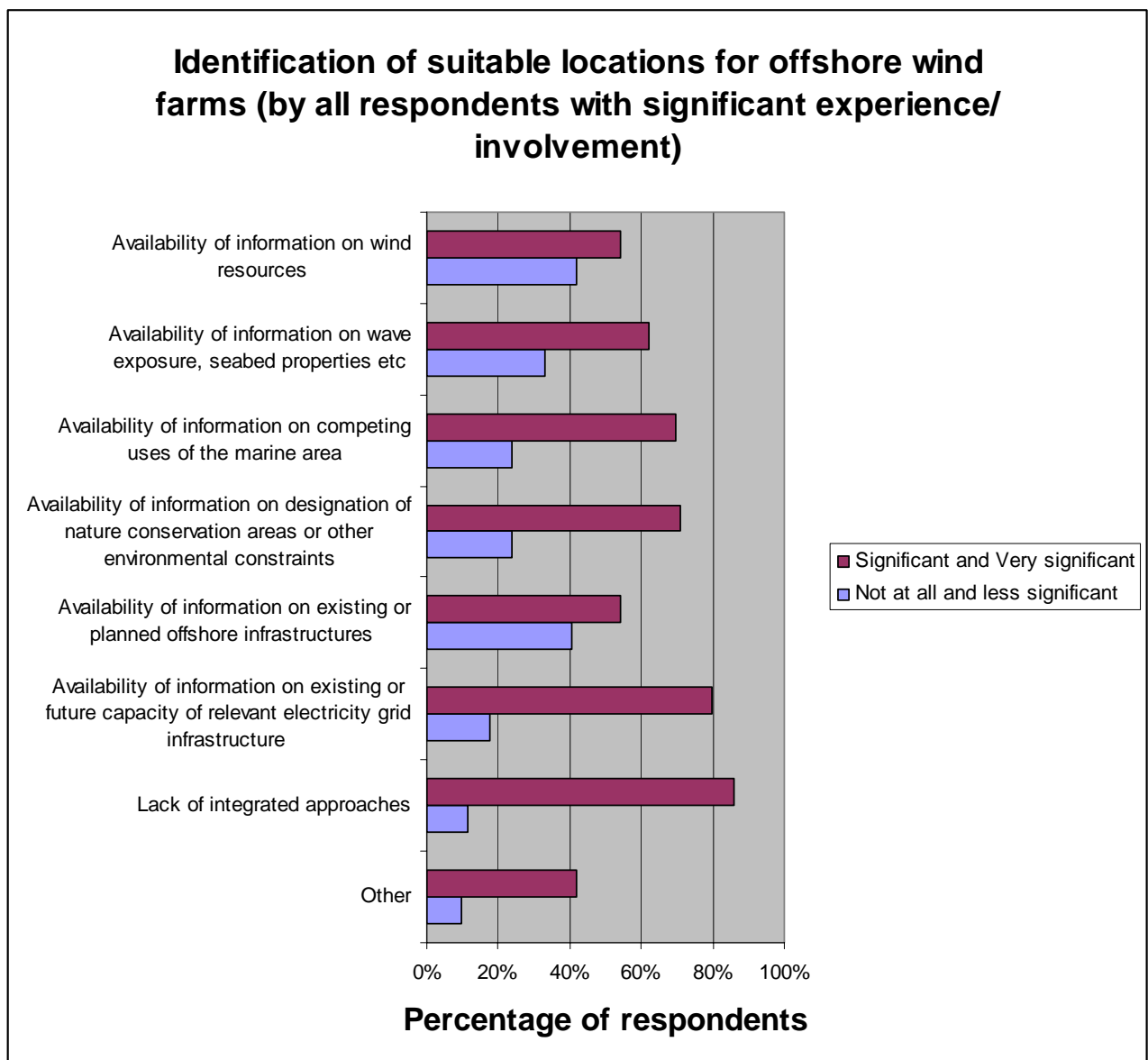
Although respondents broadly agreed that the offshore wind resource is significant, they also confirmed the existence of a number of barriers that might prevent this potential from being tapped. The consultation aimed at identifying such barriers and stakeholders'views on which ones are most significant.

In order to identify the real and most significant existing barriers, experience/ involvement in concrete offshore wind projects is helpful. The quantitative analysis of the responses in the following chapter therefore focuses on responses from individuals and organisations which claimed to have significant experience and involvement in concrete offshore wind projects into account. This applies to some 33% of all respondents.

## 4.2 Identified key barriers

The questionnaire contained a number of "closed" questions reflecting a number of possible barriers identified by the Commission services and grouped under five different headings. Respondents were asked to state how significant each of the identified barriers are, and indicate any other significant ones where relevant. In the following the responses for each of the subgroups of barriers are discussed.

### 4.2.1 Identification of suitable locations for offshore wind farms



**Fig. 10: Identification of suitable locations for offshore wind farms**

The first group of barriers concerned difficulties relating to the identification of suitable locations for offshore wind farms. The responses generally confirmed the list of barriers identified by the Commission services as relevant as they all very considered significant or very significant by more than half of the respondents with significant experience/involvement.

The barrier topping the list was "*lack of integrated approaches, e.g. spatial planning involving site identification, consenting procedures and grid planning not carried out in parallel*". More than 85% of the respondents with significant experience and/or involvement in offshore wind projects consider that lack of integrated approaches to the identification of suitable locations for offshore wind farms as a very significant (54%) or significant (32%) barrier. This was a recurring theme raised by stakeholders also in the open text response. The absence of integrated, strategic planning implies a risk that individual projects are not evaluated using consistent standards, that resources are wasted on developing similar ad-hoc solutions for similar problems several times in different contexts ("reinventing the wheel"), that the wind resources are not exploited in an optimal way (e.g. in the right order) and that assessments of potential cumulative effects becomes more difficult.

The lack of strategic level planning across Member States is particularly problematic for the perspective of realising synergies that could come from such cross-border cooperation. An evolutionary, uncoordinated development based on individual projects risks being severely inoptimal in terms of system cost if the ambition is at some point in time to reach a significant exploitation of the potential. Early investments in connections to the grid might be optimal from a project level point-of-view, but far from cost-effective from a wider and longer-term perspective that takes into account potential cross-border synergies between connections of different farms in the grid. Not surprisingly, a very large majority of the respondents with significant experience and/or involvement considered the availability of information on existing or future capacity of relevant electricity grid infrastructure (offshore and onshore) to be a very significant (47%) or significant (33%) barrier.

Hence, many respondents considered action at EU level essential to overcome the lack of integrated and strategic planning. There was a strong demand for more cooperation and cross-border approaches between Member States in order to develop offshore wind in an optimal way. Coordination is seen as necessary in order to improve site selection of offshore wind projects, to develop an effective grid connection and to implement effective cost sharing.

**Examples of stakeholder feedback stressing the lack of regional or EU level coordination and integrated, strategic planning:**

- "...improved European coordination is needed in order to reap supra-national system benefits more fully" (project developer)
- "...lack of SEIA (Strategic Environmental Impact Assessment) for the different seas in the EU; sites and areas for large scale development are presently chosen by national governments without taking developments in adjacent countries into account. Decisions on site selection are therefore sub-optimal." (individual)
- "Insufficient analysis during the site allocation process, leading to a poor understanding of the local marine environment and thus allocation of sites that are not optimal for offshore wind." (wind energy association)
- "There is a need for European or at least regional planning as to renewables integration, grid structure and cost sharing" (wind turbine manufacturer)
- "There is currently little cooperation between nations when sites are selected for development ... What would help the process is more regional (both within nations and international) collaboration in baseline data collection, cumulative impact assessment and mitigation measures." (public body dealing with nature conservation)
- "Identify no-go areas from low wind, environmental and security aspects; ALL OTHER areas then qualify automatically" (environmental NGO)
- "Emphasis on sustainable approaches which include ecological and strategic approaches to identifying appropriate locations is needed" (environmental NGO)
- "Cross-border learning between Member States: wheel is re-invented many times, no acceptance of lessons learned..... Compare to oil & gas: very long time single nation pipelines. Offshore wind should learn from that and start interconnection grid for offshore wind feed in now" (university)
- "...insufficient coordination between individual projects" (project developer)
- "The development of offshore wind power will increase the need for grid reinforcements of the existing onshore grid. For TSOs to be able to meet this demand (as proposed in the draft RES directive) it is important that the authorities speed up the authorisation process for the necessary grid development. Today these procedures are much more time consuming than the authorisation process for wind parks. It is therefore also important that the grid authorisation process is coordinated with the authorisation process for offshore wind mill parks. When the authorities examine the authorisation of offshore wind mill farms they should at the same time examine the needed grid development and start the process of authorising this development as well. ....Dedicated regional offshore wind energy grid plans could serve as a coordinated approach for building the necessary infrastructure on a regional and European level and would help to minimise the total costs of offshore projects, e.g. coordinated planning on the North Sea and the Baltic Sea. Without this coordination it will be difficult to obtain the full potential of offshore wind energy in Europe." (association of transmission system operators)

Several stakeholders have also highlighted the need for more clarity on the conditions under which wind farms can be built in or close to areas designated for protection under the EU "Birds" and "Habitats" directives<sup>3</sup> or other protected nature conservation areas. There seems to be limited learning from other projects and thus experiences generated from some projects are not sufficiently applied to facilitate the process in others.

Moreover, where Member States have not yet designated marine protected areas this creates uncertainty about where such areas will be and, for any given area, whether it will eventually be designated for conservation purposes. From a developer's perspective, this increases uncertainty and risks. A related problem is lack of knowledge about the potential environmental impacts a project might have, the needs to generate such information and the cost of doing so. More than 71% of participants with significant experience and/or involvement responding thus consider the availability of information on designation of nature conservation areas or other environmental constraints, such as presence of important wildlife habitats or migration routes, to be a significant or very significant barrier.

There was thus a widespread support for more transparency and information on the EU environmental legislation to overcome uncertainties and delays in authorisation processes. Among other measures, collaboration in baseline data collection, cumulative impact assessment and mitigation measures and general guidelines at EU level were mentioned as being important.

**Examples of stakeholder responses relating to environmental impacts assessments and to uncertainties relating to the application of the EU environmental legislation :**

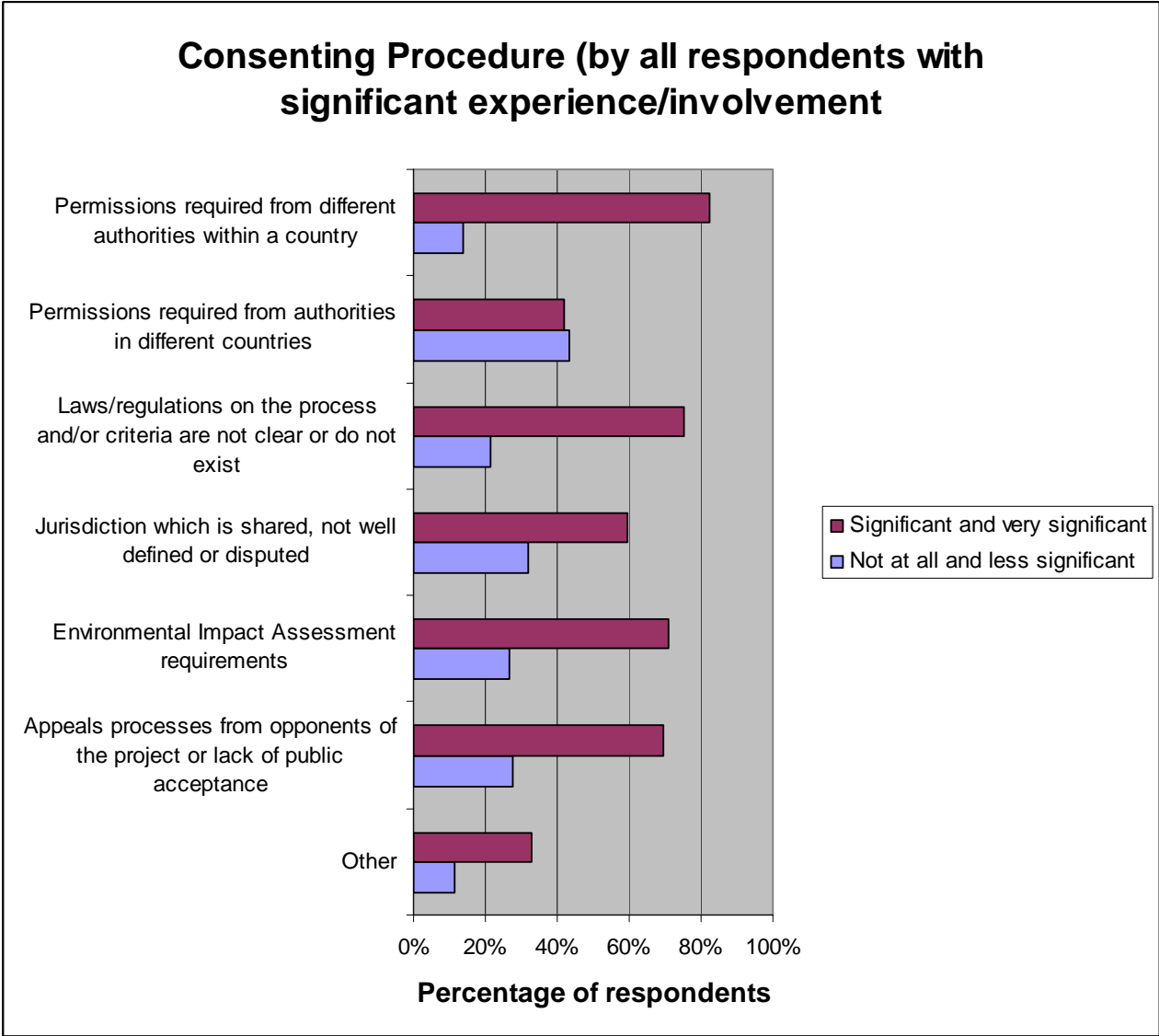
- *"...due to the unacceptable delays in the implementation of, in particular, the EU's Habitats and Birds Directives in the marine environment, and associated identification and designation of the Natura 2000 network of protected areas, the planning processes for offshore wind energy installations face unnecessary uncertainties and frequent delays in the authorisation process at regional and local level. Without the necessary marine biological, ecological and hydro-morphological data, and without certainty over where sensitive and/or protected habitats and species occur, environmental and strategic impact assessments at local and regional level may be prolonged and affected by disputes and appeals procedures. It is therefore necessary that Member States complete data collection efforts, map marine ecosystems and identify and designate marine protected areas without further delay, and within the next two years at most."* (environmental NGO)
- *"One key issue for offshore development projects is the environmental impact study. This, by its very nature, is local. The results of the project however will have an impact on the wider, national level. How to balance the local and national interest is not always clear. Some guidelines at EU level could benefit those engaged in balancing these two aspects."* (energy company)
- *"...if an EIA is done properly ... and appropriate mitigation measures are put in place, the EIA itself is not an obstacle. What would help the process is more regional (both within nations and international) collaboration in baseline data collection,*

<sup>3</sup> Council Directive 79/409/EEC of 2 April 1979 on the protection of wild birds and Council Directive 92/43/EEC of 21 May 1992 on the protection of natural habitats and wild fauna and flora.

*cumulative impact assessment and mitigation measures.... There is currently little collaboration in cross border impact assessment and mitigation."* (public body)

- *"Consenting processes: Guidelines for recognizing the environmental impact assessment results from other countries [would be helpful / needed]."* (wind turbine manufacturer)
- *"The limitation of what is to be studied in Environment Impact Studies creates great problems. An EIA study is by its very nature local where the benefit of an offshore wind park is often best measured at a national level. Benchmarks should be created at EU level to help balance the local and the national interests. A substantial body of best practice has been built up in different areas. It should be reflected in the EIAs structure for new projects."* (wind energy association)
- *"Create a website with best case examples (from an environmental, aesthetic and public opinion point of view). ... Collect and coordinate research about the effects on nature from wind plants, including the effects of mitigation and compensation."* (environmental NGO)
- *"An appropriate balance needs to be struck between the member states' obligations for nature conservation and renewable energy: balancing the requirements of the Renewable Energy Directive and the requirements of other environmental EU Directives may not be easy. The Commission may be able to assist by improving the process and guidance relating to environmental legislation such as the Habitats and Birds Directives. EU level support to member states would help to ensure consistency of approach and sharing of data and research on environmental impacts."* (Member State government)

**4.2.2 Consenting procedures: generally too complex, unclear and long**



**Fig. 11: Consenting procedures.**

The second group of barriers concerned difficulties relating to the consenting procedures. Again the responses largely confirmed the list of barriers identified by the Commission services as relevant: almost all barriers listed were considered significant or very significant by more than half of the respondents with significant experience/involvement.

The fact that permissions are required from different authorities within a country was considered a very significant (48%) or significant (34%) barrier. The lack of a unique entry point for project applicants and clear procedures for coordination between the authorities tends to prolong and complicate the procedures. The absence of certainty as regards the legal framework and the dispersion of the responsibility increase the risks and thus costs for developers. As the European Wind Energy Association explains it:

*"Planning for offshore wind farms is extremely complex, interfacing as it does marine, aviation, grid, safety and territorial waters. The consenting process can take up to 5 years or longer. ... Offshore wind parks consist of large projects with large capital expenditure. Non transparent and delayed consenting procedures add cost and accentuate the limitations offshore already faces. Any delay to the proposed planning schedule adds costs in the following areas. A. Ordering of machinery. B. Ordering of foundations. C. Ordering and scheduling of installation services. D. Placement of needed grid and substations. E. Lost revenue when park does not come on line on schedule." (EWEA consultation response)*

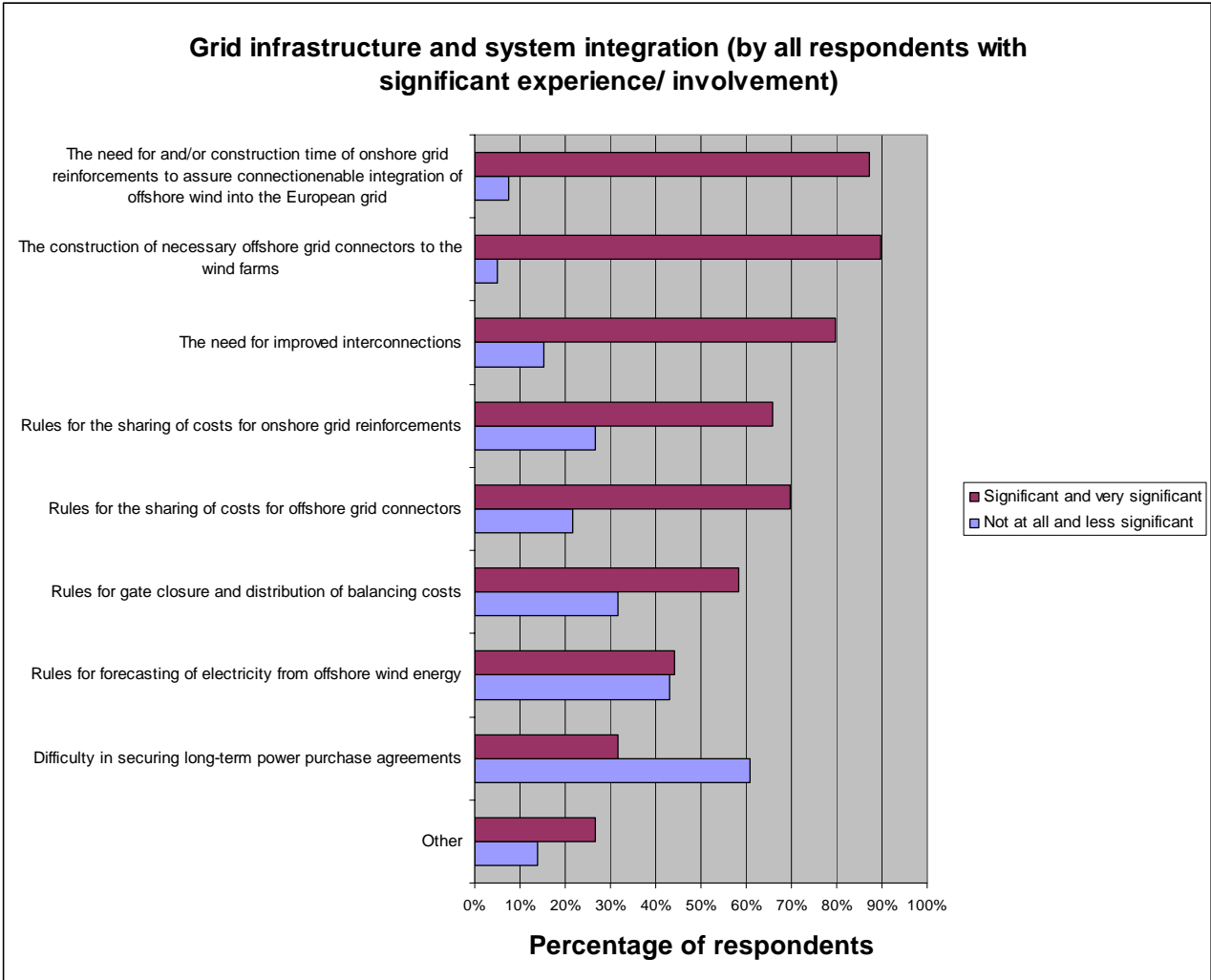
While the problems relating to consenting issues are not all specific to offshore wind energy, the fact that the legislative frameworks and the established procedures are sometimes written with land and not offshore applications in mind is clearly a further complication. Stakeholders generally consider it as a significant barrier that laws or regulations on the process and/or criteria for obtaining development consents and similar permits, licences or concessions are not clear or do not exist – 74% of the participants with significant experience/ involvement found this a significant or very significant barrier.

There was a general agreement among respondents that consenting procedures should be accelerated in order to facilitate the planning process of offshore plants and reduce risks for investments. Among other measures, a "one-stop-shop" solution that gathers all steps and all stakeholders involved in consenting procedures was broadly suggested. Many respondents also argued in favour of more harmonized consenting procedures.

#### **Examples of stakeholder feedback on consenting procedures.**

- *"The answers relate to offshore wind farms only. In principle, the consenting procedures function reasonably. Nonetheless, competencies of diverse authorities for different permissions lead to inefficiencies and avoidable time lags. A one-stop-shop solution for the consenting procedure would be desirable." (energy company)*
- *"Main barrier: "Lack of transparent, precise and (scientifically) credible consenting procedures causing lengthy and burdensome consents leading to delay and high risk of consents not being granted"" (project developer)*
- *"Best Practice Guidelines / recommendations for harmonization of consenting procedures within EU Collecting and disseminating of information and practical experiences regarding the actual environmental impacts of the implemented offshore wind farms (targeted both for the consenting authorities and general public)" (project developer)*
- *"Specific regulation must be developed for Offshore Wind consenting process. Jurisdiction and field of the different authorities must be defined into an integrated process." (energy company)*
- *"Consenting processes differ across member states and therefore need alignment in order to reflect the common EU 2020 targets and support cross-border electricity trading." (energy company)*

### 4.2.3. Grid infrastructure and system integration



**Fig. 12: Grid infrastructure and system integration.**

The third group of barriers concerned difficulties relating to the integration in the electricity grid and system. Again the responses largely confirmed the list of barriers identified by the Commission services as relevant: except two all were considered significant or very significant by more than half of the respondents with significant experience/involvement.

The offshore wind resources are not equally distributed across the continent and to date most offshore wind developments have been in Northern Europe. In a scenario with large-scale development of offshore wind power, the production from such installations will therefore mainly need to be fed into the grid via entry points on the coasts in Northern Europe. This raises a question about the capacity of the existing grid to transmit the power from the new wind farms to the consumers. In some Member States, especially in Germany, bottlenecks exist already or are expected in case of significant wind capacity expansion in the North Sea, and the need for reinforcements and further interconnection capacity has been demonstrated e.g. by the German Dena I study. The issue has mainly been raised by transmission system operators who see this as a potentially significant challenge, but these concerns are also reflected more broadly in the feedback from the consultation - the need for and/or construction time of onshore grid reinforcements to assure connection and enable integration of offshore wind into the European grid is considered a very significant (66%) or significant

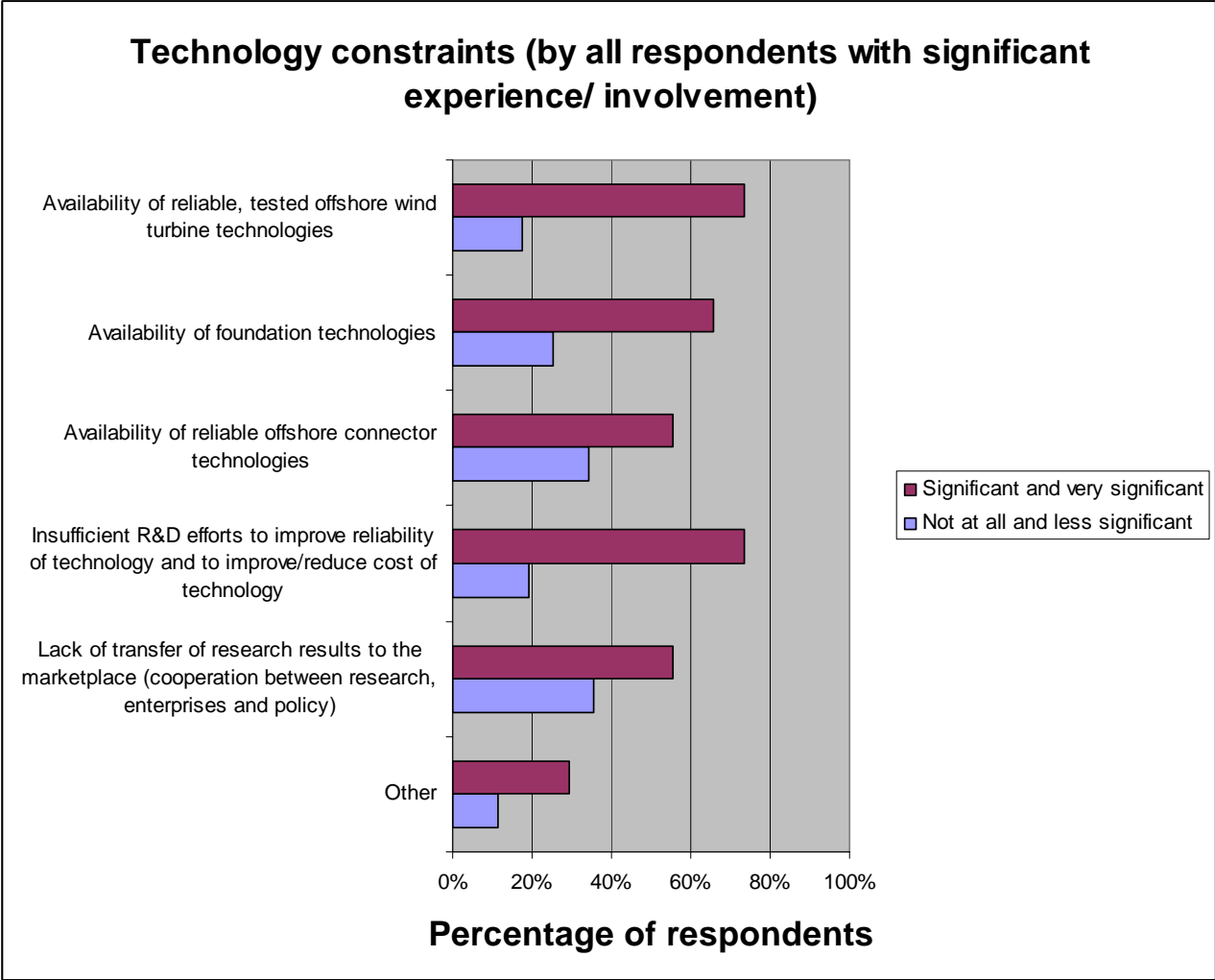
(22%) barrier by the participants responding with significant experience/ involvement in offshore wind projects.

Many respondents also see the construction of necessary offshore grid connectors to the wind farms as very significant (58%) or significant (32%) and the general need for improved interconnections as important (33% as very significant, 47% as significant).

**Examples of stakeholder feedback stressing the need for interconnection between the national grid infrastructures.**

- *"In the long term, enforcement of interconnections is essential for the future development of offshore wind parks."* (energy company)
- *"Give European assistance to accelerate the construction of national grid infrastructure and/or link the offshore grid between different Member states"* (energy company)
- *"Create an EU strategic grid infrastructure plan for offshore wind (including the onshore grid reinforcements required)."*(energy company)
- *"For historical reasons, only two interconnectors with a firm capacity of 2.2GW are in operation between England, where the bulk of energy demand originates, and Scotland, where the greatest potential for wind energy is located. There is now an urgent need for investment in further interconnector capacity. Many approved wind projects in Scotland remain blocked by the lack of grid access to the remote locations where potential for wind energy is greatest."* (research institute)
- *"Investigate EU offshore Renewable grid architectures (different options) that also can be used as a trade transmission line between EU countries"* (intergovernmental organisation)
- *"Propose a directive to facilitate the connection to the national grid in each EU countries without unjustified technical barriers"* (national public authority)
- *"...as offshore wind farms develop in other Member States there may be opportunities for connections to be shared and in addition used as interconnectors. In such circumstances there will be difficult regulatory issues to resolve as the cable connections will be subject to the offshore transmission regimes and grid code requirements in different jurisdictions. Electricity generated in one Member State and subject to one support mechanism may also need to be transferred to another jurisdiction. Recognising that such matters are for Member States to determine, the European Commission might however ask the relevant regulators and System Operators to begin discussions on how such arrangements could be facilitated."* (Member State government)

### 4.2.4 Technology constraints



**Fig. 13: Technology constraints.**

Offshore wind technologies are still relatively new when comparing to onshore – past projects have for example had issues related to reliability of wind turbines components such as gear boxes and transformers. It is therefore not surprising that availability of reliable, tested offshore wind turbine technologies is the barrier with most of the respondents identify as significant (33%) or very significant (47%). Today only a very limited number of turbine manufacturers offer serial production models for offshore applications – this obviously reduces the level of competition in the offshore market and thus increases the cost differential to onshore wind. Similar bottlenecks exist elsewhere in the supply chain – the limited availability of suitable cranes, jack-up rigs, installation vessels and similar equipment as well as of skilled personnel with the necessary mix of qualifications is highlighted by many stakeholders as a key barrier.

Regarding the technologies themselves stakeholders have emphasised the need for more research and development for instance with respect to foundation technologies including floating foundations. Current foundation technologies are limited to relatively shallow waters, thus reducing significantly the overall potential that can be exploited. Large-scale introduction of offshore wind would be greatly facilitated with foundation solutions enabling deployment in deeper waters, but such solutions still have to be developed and demonstrated in real applications. Insufficient R&D efforts to improve reliability of technology and to

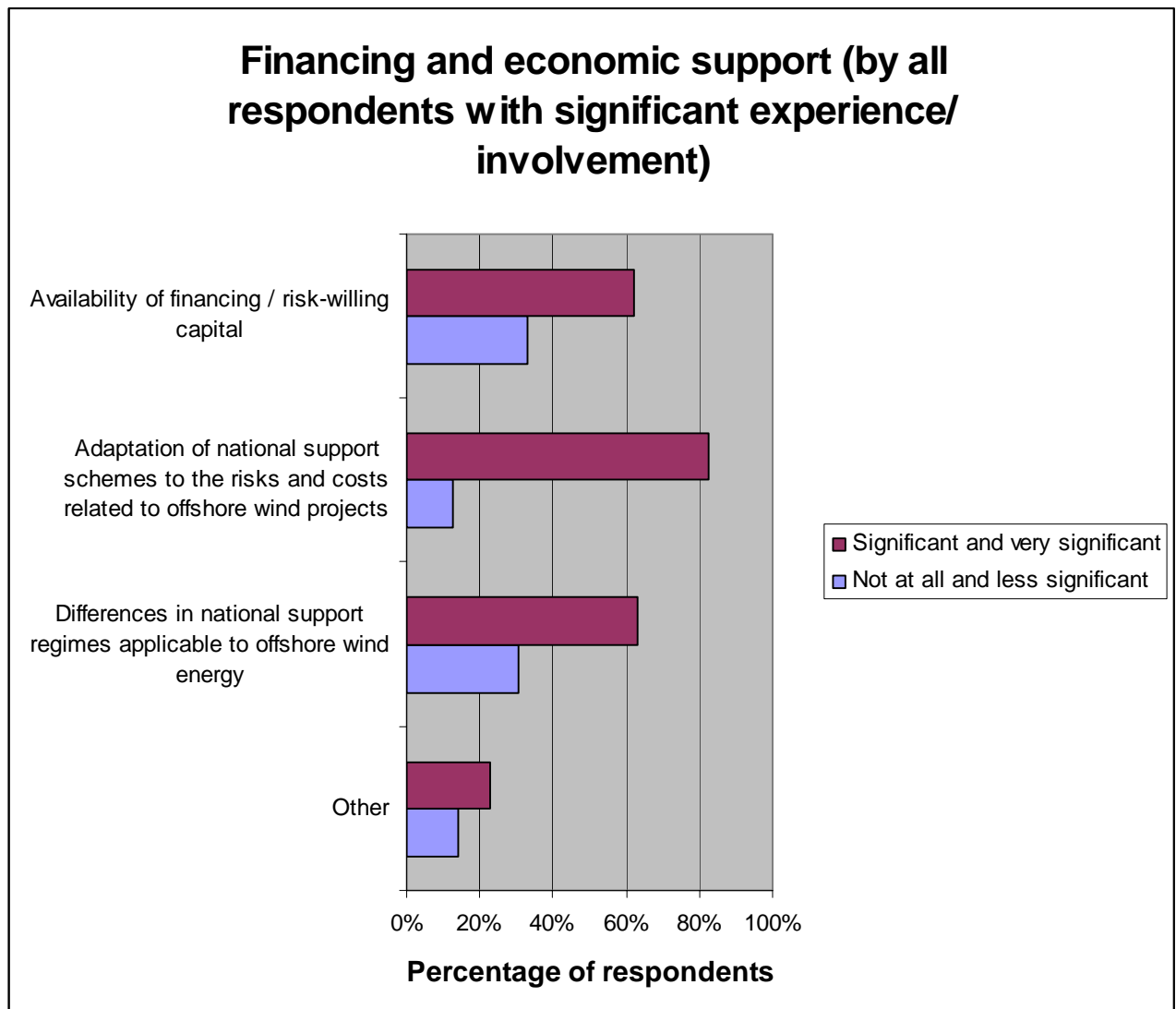
improve/reduce cost of technology are considered a significant (42%) or very significant (34%) barrier by the organisations responding to the on-line consultation.

Respondents emphasised therefore the importance of the support of research and development projects. The training of skilled work force was also mentioned as a necessary requirement by some.

**Examples of stakeholder responses relating to supply chain problems, technology costs and risk:**

- *"Lack of experience in project financing (both the equity and debt providers) [imply] high perceived risks and high profit margins; there needs to be plenty of "air" in the required PPA [power purchase agreement] sales price to make the projects bankable."* (project developer)
- *"...the high uncertainty due to the lack of experience with offshore technology leads to unreasonable insurance rates and high risk premiums demanded by interested investors."* (energy company)
- *"...wind speeds are significantly higher in regions of higher water depth. Thus in these regions more energy could be produced. Plus: There is a lot more space than in coastal areas. This can not be achieved with today's foundation technology for wind turbines. The EU should consider a support programme for the development of offshore-wind-energy technologies being capable on harnessing wind in deep water regions, i.e. on floating platforms."* (equipment manufacturer)
- *"Lack of sufficient number of trained scientists, engineers and skilled work force [is] very significant barrier... The success of offshore wind implementation is totally dependent on having sufficient numbers of trained personnel. The European population is aging and much vital offshore skills and know-how can disappear from the market if efforts are not made to replace and update the necessary offshore skills"* (project developer)
- *"The EU could assist through the funding of research and development work into improved offshore wind technology. It could also assist by helping to attract investment into the EU for the manufacturing of component parts that would increase competition in the supply chain, increase employment opportunities and put downward pressure on prices."* (energy company)
- *"Application of existing foundations technology in deep water will mean projects are very costly (potentially prohibitively so) - research and development within this area is critical to far-shore deployment of offshore wind."* (project developer)
- *"...ongoing R&D in order to improve offshore technology is important. By constantly improving e.g. the design of the wind mills, the effectiveness of production, ways to carry out maintenance at sea, cables, wind prognoses etc. not only the costs of building and operating offshore wind mill parks will be reduced but the contribution of the offshore parks to security of supply and stability in the power system will improve. Even though these results may not be ready within a short timeframe they should still be carried out. The EU Framework programme should also focus on these subjects."* (association of TSOs)

## 4.2.5 Financing and economic support



**Fig. 14: Financing and economic support.**

A majority of respondents considered the adaptation of national support schemes to the risks and costs related to offshore wind energy to be a very significant (33%) or a significant (49%) barrier to the development of offshore wind energy. More transparency and clarity in national support schemes are highly supported. However, stakeholders are divided on which type of national support scheme is the best.

### **Examples of stakeholder responses regarding financial and economic support:**

- *"The financial risks of wind offshore investments are still extraordinary high. It is very important that at least there is some security on the earning side. Feed-in Tariffs provide security and therefore are more useful for the promotion of offshore energy than other support schemes..."(energy company)*

- *"[our company] has identified the existence of different national support systems as a very significant barrier for development of offshore windpower. National support systems, with no trading mechanism between them, run a large risk to lead to sub-optimal allocation of investments. One practical effect is that small markets tend to receive less interest from equipment manufacturers, especially under constrained market conditions such as has been the case in the equipment markets the latest years. Interest is not directed to where conditions are the best but to where the subsidy levels are the highest..."* (energy company)
- *"Clarity of available financial support schemes in the individual countries lacks. One overview of available schemes should be easy to access in the individual countries."* (manufacture)
- *"Harmonizing of national support schemes (as a long term goal) - should go hand in hand with other measures targeting for an integrated internal electricity market"* (project developer)
- *"Eliminate or strongly reduce taxes in all the construction phases and in the return of investment - Capital gain, private equity, etc."* (national authority)
- *"It is important that economic support is not limited to a small number of large investors, if off-shore windpower is to develop into a large electricity source with moderate costs."*(non-governmental organisation)
- *"Main Barrier: Sensitivity of investor and banking confidence in the offshore sector. The offshore wind industry has a need to foster long term investments in projects and the supply chain needed to deliver them. Consequently governments must underpin confidence in the stable and consistent growth of markets in their countries. Action that the EU can take: • ensures that national action plans provide the investor confidence required: • Discourage local rules that are detrimental to the financial conditions of offshore such as a limit to the load hours accepted by the grid. • Ensure that government commitments to offshore are consistent over time • Ensure that commitments given in relation to the build up of EU offshore renewable energies become a part of an EU approved strategy that cannot be rescinded easily • Encourages the socialisation of EU grid infrastructure costs over a long term financial horizon ."* (energy association)
- *"A barrier to [a] coordinated European approach could be lack of harmonisation concerning the authorisation procedures and financing. A harmonised approach across Europe would be the preferred solution but bilateral agreements between countries or a regional approach would be a good starting point...The future perspectives of regional offshore energy grid plans where the parks may be developed jointly and the electricity from the wind parks to a larger extent will be shared among countries also calls for the development of a more harmonised and market based support framework allowing member states to trade RES-E."* (association of transmission system operators)

### 4.3 Ranking the categories of barriers

Apart from assessing the importance of each of the listed barriers in the different categories, respondents were also asked to give an overall ranking of these categories.

The ranking shows a fairly homogenous image although some categories clearly are identified as more important than others. In this regard, barriers relating to consenting procedures and to grid infrastructure and system integration appear to be considered most important, followed by barriers relating to technology constraints and to financing and economic support.

Some respondents rightly pointed out, that the most significant barriers are different in different Member States and that a ranking should ideally be made for each country. The results here therefore represent a kind of EU average which may not be representative or correct in any given Member State.

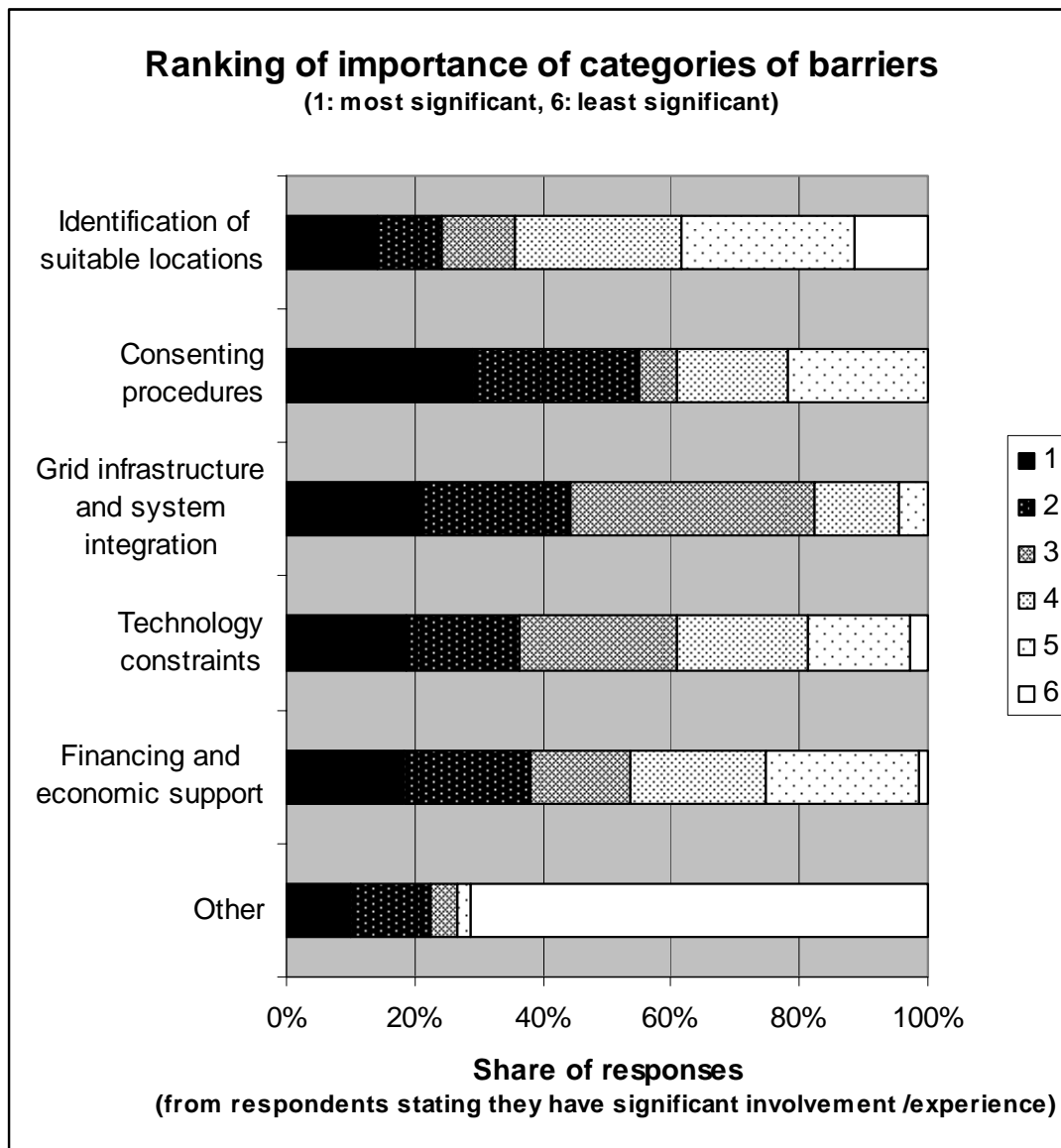
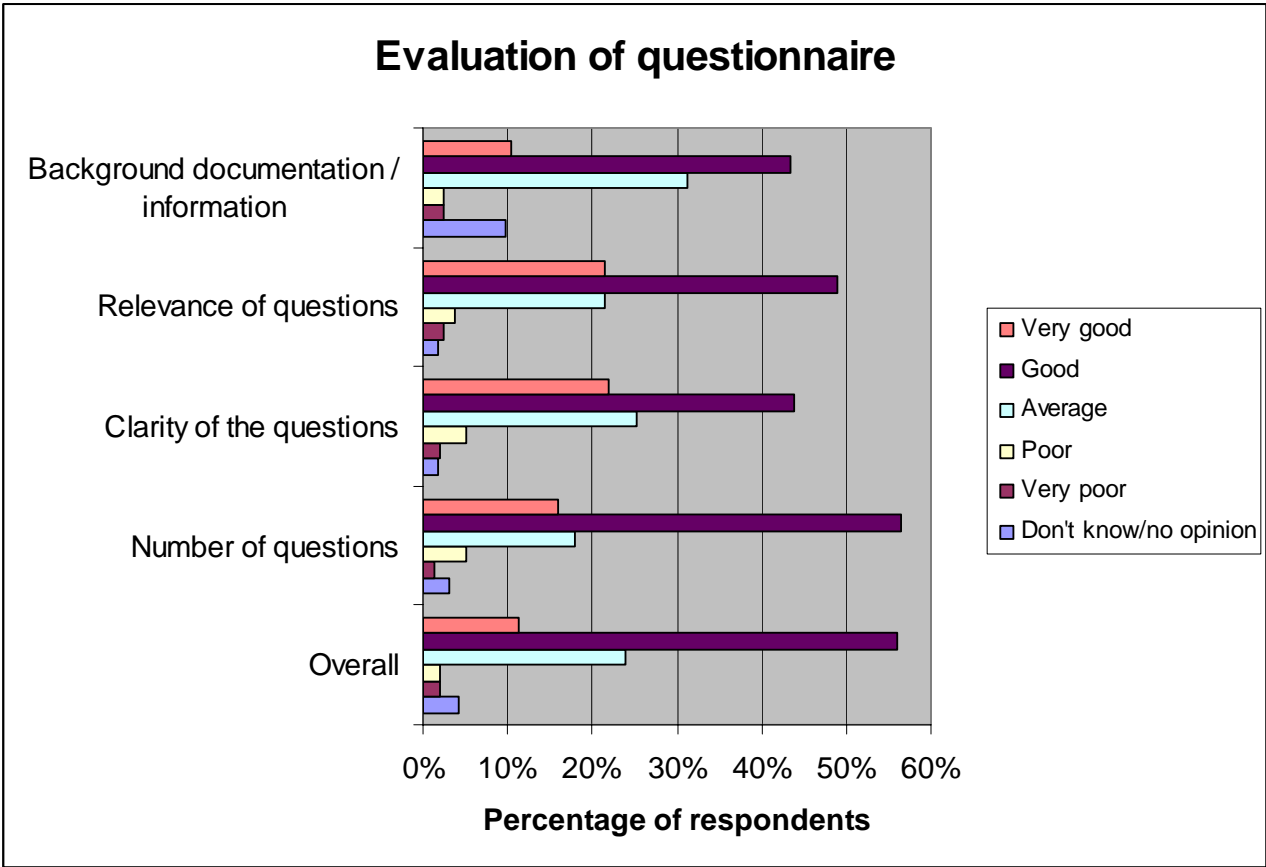


Fig. 15: Ranking of categories of barriers.

## 5. Feedback on the questionnaire



**Fig.16: Evaluation of questionnaire.**

Generally speaking, most respondents had a positive impression of the online consultation.

Concerning the overall perception, 67% of stakeholders said they had either a very good (11%) or good (56%) impression of the online consultation questionnaire. Another 24% had a neutral opinion while 2% considered it poor and another 2% very poor.

Also concerning individual aspects such as the quality of the background documentations and the relevance, clarity and number of questions, the large majority were either positive or neutral.

Nearly all comments that were received in the free text field at the end of the consultation referred to the subject matter and not to formal parts of the questionnaire. Nevertheless, some respondents used the free text field to comment on the questionnaire.

One respondent objected to the structure and general thrust of the questionnaire considering that it was biased in favour of marine development and offshore wind energy as opposed to marine conservation.

## Annex: List of organisations submitting responses.

Country	Organisation	Website
BE - Belgium	crb comission fishery	ccecrb.fgov.be
BE - Belgium	Elia System Operator	www.elia.be
BE - Belgium	European Hydrogen Association EHA	www.h2euro.org
BE - Belgium	European Ocean Energy Association	www.eu-oea.com
BE - Belgium	EWEA - Eureopan Wind Energy association	http://www.ewea.org
BE - Belgium	Marine Board - European Science Foundation	http://www.esf.org/marineboard/
BE - Belgium	SFF FOD Economie DG Energie	http://www.mineco.fgov.be
BE - Belgium	WWF International; European Policy Office	panda.org
BG - Bulgaria	Perun TM Ltd.	
BG - Bulgaria	Wind Wealth Ltd.	www.windwealth.info
CH - Switzerland	ROCH Global Management	under changes/construction
DE - Germany	BDEW Bundesverband der Energie- und Wasserwirtschaft e.V.	www.bdew.de
DE - Germany	BEC - Energy Consult GmbH	www.bec-berlin.de
DE - Germany	Bundesministerium für Umwelt, Naturschutz und Reaktorsicherheit/Federal Ministry for the Environment, Nature Conservation and Nuclear Safety	www.bmu.de
DE - Germany	E.ON Climate&Renewables	www.eon.com
DE - Germany	Electrabel Deutschland AG	www.electrabel.de
DE - Germany	EnBW Energie Baden-Württemberg AG	www.enbw.com
DE - Germany	ep4 offshore GmbH	www.ep4offshore.com
DE - Germany	ExtraEnergy e.V.	www.extraenergy.org
DE - Germany	Fraunhofer LBF	www.lbf.fraunhofer.de
DE - Germany	Germanischer Lloyd Industrial Services GmbH	http://www.gl-group.com/glwind

DE - Germany	ISET	<a href="http://www.iset.uni-kassel.de">www.iset.uni-kassel.de</a>
DE - Germany	Offshore Forum Windenergie	<a href="http://www.ofw-online.de">www.ofw-online.de</a>
DE - Germany	PricewaterhouseCoopers Corporate Finance Beratung GmbH	<a href="http://www.pwc.com/de">www.pwc.com/de</a>
DE - Germany	Projekt GmbH	<a href="http://www.planungsgemeinschaft.de">www.planungsgemeinschaft.de</a>
DE - Germany	SkySails GmbH & Co. KG	<a href="http://www.skysails.com">www.skysails.com</a>
DE - Germany	Stadtwerke München GmbH	<a href="http://www.swm.de">www.swm.de</a>
DE - Germany	Stiftung Offshore Windenergie (German Offshore Wind Energy Foundation)	<a href="http://www.offshore-stiftung.de">www.offshore-stiftung.de</a>
DE - Germany	TÜV NORD Systems GmbH + Co. KG	<a href="http://www.tuev-nord.de">www.tuev-nord.de</a>
DE - Germany	Vattenfall Europe AG	<a href="http://www.vattenfall.de">www.vattenfall.de</a>
DE - Germany	VDMA Power Systems (German Engineering Federation)	<a href="http://www.vdma.org/windenergie">www.vdma.org/windenergie</a>
DE - Germany	WeserWind GmbH Offshore Construction Georgsmarienhütte	<a href="http://www.weserwind.de">www.weserwind.de</a>
DK - Denmark	Danish Energy Agency, Ministry of Climate and Energy	<a href="http://www.ens.dk">www.ens.dk</a>
DK - Denmark	Danish Society for Nature Conservation	<a href="http://www.dn.dk">www.dn.dk</a>
DK - Denmark	Danish Wind Industry Association	<a href="http://www.windpower.org">www.windpower.org</a>
DK - Denmark	Energinet.dk	<a href="http://energinet.dk">energinet.dk</a>
DK - Denmark	INFORSE-Europe	<a href="http://www.inforse.org">www.inforse.org</a>
DK - Denmark	Vattenfall Thermal Power	
DK - Denmark	Vestas Wind Systems A/S	<a href="http://www.vestas.com">www.vestas.com</a>
ES - Spain	ACCIONA ENERGIA	<a href="http://WWW.ACCIONA-ENERGIA.COM">WWW.ACCIONA-ENERGIA.COM</a>
ES - Spain	CENER	<a href="http://www.cener.com">www.cener.com</a>
ES - Spain	Environmental and Housing Department, Catalan Government (Departament de Medi Ambient i Habitatge, Generalitat de Catalunya)	<a href="http://mediambient.gencat.net">http://mediambient.gencat.net</a>
ES - Spain	Faepac. Energy Agency	<a href="http://www.faepac.org">www.faepac.org</a>
ES - Spain	IBERDROLA RENOVABLES	<a href="http://www.iberdrolarenovables.com">www.iberdrolarenovables.com</a>

ES - Spain	Institute of Geomatics	<a href="http://www.ideg.es">www.ideg.es</a>
ES - Spain	SPANISH WIND ENERGY ASSOCIATION	<a href="http://www.aeeolica.org">www.aeeolica.org</a>
FI - Finland	Ålands Elandelslag	<a href="http://www.el.ax">www.el.ax</a>
FI - Finland	Finnish Energy Industries	<a href="http://www.energia.fi/en">www.energia.fi/en</a>
FI - Finland	Ministry of the Environment (covers land use and environmental issues, others in: Ministry of Employment and the Economy)	<a href="http://www.ymparisto.fi/ym">www.ymparisto.fi/ym</a>
FI - Finland	wpd Finland Oy	<a href="http://www.wpd.de">www.wpd.de</a>
FR - France	CRPMEM - Comité Régional des Pêches Maritimes et des Elevages Marins de Haute Normandie.	<a href="http://www.crpmemhn.fr">www.crpmemhn.fr</a>
FR - France	EDF Energies Nouvelles	<a href="http://www.edf-energies-nouvelles.com/">http://www.edf-energies-nouvelles.com/</a>
FR - France	EGIS EAU (BCEOM France)	<a href="http://eau.egis-ingenierie-infrastructures-transports.com/">http://eau.egis-ingenierie-infrastructures-transports.com/</a>
FR - France	Enel Erelis	<a href="http://enelerelis.free.fr/enel_erelis.html">http://enelerelis.free.fr/enel_erelis.html</a>
FR - France	ENERTRAG	
FR - France	Eoleres SA	<a href="http://www.eoleres.com">www.eoleres.com</a>
FR - France	Ifremer	<a href="http://www.ifremer.fr">http://www.ifremer.fr</a>
FR - France	Ligue pour la protection des oiseaux	<a href="http://www.lpo.fr">www.lpo.fr</a>
FR - France	Mines ParisTech, Centre for Energy and Processes	<a href="http://www-cep.cma.fr">www-cep.cma.fr</a>
FR - France	SER-FEE (Syndicate for Renewable Energy - France Energie Eolienne)	<a href="http://www.enr.fr">www.enr.fr</a>
FR - France	tigné préservé	
FR - France	TRANSFERTS LR	<a href="http://www.transferts-lr.org">www.transferts-lr.org</a>
FR - France	VENT D'OUEST	
IE - Ireland	Airtricity	<a href="http://www.airtricity.com">www.airtricity.com</a>
IE - Ireland	BIRDWatch Ireland	<a href="http://www.birdwatchireland.ie">www.birdwatchireland.ie</a>
IE - Ireland	Coastal Concern Alliance	
IE - Ireland	Donegal County Council	<a href="http://www.donegalcoco.ie">www.donegalcoco.ie</a>

IT - Italy	Associazione EcoTurismoIN	www.ecoturismoin.net
IT - Italy	ENEL S.p.A.	www.enel.it
IT - Italy	Port Authority of Livorno	http://www.porto.livorno.it/
NL - Netherlands	Delft University of Technology	www.tudelft.nl
NL - Netherlands	Econcern	www.econcern.com
NL - Netherlands	European Commission - DG JRC - Institute for Energy	http://ie.jrc.ec.europa.eu/
NL - Netherlands	Evelop	www.evelop.nl
NL - Netherlands	Evelop	www.evelop.com
NL - Netherlands	Institute for Energy - DG Joint Research Centre - European Commission	http://ie.jrc.ec.europa.eu
NL - Netherlands	Milieunet Foundation	www.stichtingmilieunet.nl
NL - Netherlands	province of South-Holland Netherlands	www.pzh.nl
NL - Netherlands	Vryhof Anchors bv	
NO - Norway	Fred. Olsen Renewables	
NO - Norway	Institute of Marine Research	www.imr.no
NO - Norway	Statnett	Statnett.no
PL - Poland	Vattenfall Poland Sp. z o.o.	www.vattenfall.pl
PL - Poland	We@Sea	www.we-at-sea.org
PT - Portugal	Grupo GENERG	www.generg.pt
RO - Romania	Dialog Com	www.eficientaenerg.ro/www.SOSTerra.go.ro
SE - Sweden	Vattenfall AB	www.vattenfall.com
UK - United Kingdom	A Ferrand Stobart & Associates	www.grunweb.org.uk
UK - United Kingdom	Aberdeen Renewable Energy Group	www.aberdeenrenewables.com
UK - United Kingdom	British Wind Energy Association/Scottish Renewables	www.bwea.com

UK - United Kingdom	Centrica	<a href="http://www.centrica.com">www.centrica.com</a>
UK - United Kingdom	Department for Business, Enterprise and Regulatory Reform (BERR)	<a href="http://www.berr.gov.uk">www.berr.gov.uk</a>
UK - United Kingdom	EDF Energy	<a href="http://www.edfenergy.com">www.edfenergy.com</a>
UK - United Kingdom	Forth Ports plc	<a href="http://www.forthports.co.uk">www.forthports.co.uk</a>
UK - United Kingdom	ISLENET	<a href="http://www.islenet.net">www.islenet.net</a>
UK - United Kingdom	NaREC	<a href="http://www.narec.co.uk">www.narec.co.uk</a>
UK - United Kingdom	Natura; England	<a href="http://www.naturalengland.org.uk">www.naturalengland.org.uk</a>
UK - United Kingdom	RWE Innogy (response submitted by RWE Innogy UK on behalf of RWE Innogy)	<a href="http://www.rwe.com/generator.aspx/language=en/id=598392/rwe-innogy-home.html">http://www.rwe.com/generator.aspx/language=en/id=598392/rwe-innogy-home.html</a>
UK - United Kingdom	Scottish Government	<a href="http://www.scotland.gov.uk">http://www.scotland.gov.uk</a>
UK - United Kingdom	Scottish and Southern Energy	<a href="http://scottish-southern.co.uk">scottish-southern.co.uk</a>
UK - United Kingdom	Scottish Natural Heritage	<a href="http://www.snh.org.uk">www.snh.org.uk</a>
UK - United Kingdom	The Royal Academy of Engineering	<a href="http://www.raeng.org.uk">www.raeng.org.uk</a>
UK - United Kingdom	Venture Business Research	<a href="http://www.vbresearch.com">www.vbresearch.com</a>
UK - United Kingdom	Viking Energy Ltd	
EU	Greenpeace Europe	<a href="http://www.greenpeace.org">www.greenpeace.org</a>
EU	ETSO - European Transmission System Operators	<a href="http://www.ets-net.org">www.ets-net.org</a>