



The Royal Academy
of Engineering

EU Action to Promote Offshore Wind Energy

Response from the Royal Academy of Engineering to the EU Commission

June 2008

Open Consultation on EU Action to Promote Offshore Wind Energy

- 1.1 The Royal Academy of Engineering welcomes the opportunity to contribute to the open consultation on 'EU Action to Promote Offshore Wind Energy'. The Academy brings together over 1,200 distinguished engineers, drawn from all the engineering disciplines. Its strategic priorities are to enhance the UK's engineering capabilities; to celebrate excellence in engineering and inspire the next generation; and to lead debate by guiding informed thinking and influencing public policy.
- 1.2 This response has been collated on the basis of input from our Fellows, whose experience in this area lies predominately in the UK offshore wind energy market. Despite the UK's outstanding potential for wind energy generation, to date only 404MW of offshore wind capacity and 2142 MW of onshore wind capacity have been installed— a performance which compares poorly to that of other EU member states with less abundant wind resources. An attempt to address the barriers that impede the growth of the UK's offshore wind industry would therefore go a considerable way towards unlocking the potential of offshore wind in Europe as a whole. Although this analysis concentrates on the UK wind sector, potential actions to promote offshore wind which could be undertaken on a European level are also highlighted.
- 1.3 On 3 November 2008, the Academy will host a conference for Euro-CASE, the association of European engineering academies, to examine the engineering solutions needed across a range of renewable technologies to help the EU to meet its 2020 renewable energy targets. Energy Commissioner Andris Piebalgs has agreed to deliver the keynote address. Engineering solutions to deliver the EU's potential in offshore wind electricity generation will be examined in more depth at the conference and in resulting policy communications.

Barriers to Growth

- 2.1 Planning uncertainty is the source of the most serious direct and indirect barriers to the introduction of new wind power capacity in Britain, both onshore and offshore. A lack of grid access is an equally pressing and not unrelated problem. The world-wide growth in demand for wind technologies coupled with global price increases for commodities has recently imposed supply chain constraints on new offshore build, though some of these should lift as international markets develop for offshore wind technology. Developers are also finding it difficult in the current market to source equipment with the high levels of operability, and workers with the specific skill sets, needed for offshore wind projects.

Planning Constraints

- 3.1 Planning constraints constitute the greatest barriers to the introduction of new wind capacity in the UK. Additionally, several seemingly unrelated obstacles to new build are either directly caused by or linked to problems in the planning process.

- 3.2 Long timescales and deep uncertainties in the planning process, often exacerbated by strong local opposition to new proposals, continue to cause problems for both onshore and offshore wind developers. Developers have pointed in particular to the stop-go effect of the planning process, a perceived inconsistency between Government energy policy and the approval process, and to inconsistent or over-enthusiastic application of the precautionary principle by statutory consultees¹. The recent rejection of a proposal for strategically important wind farm developments on the Isle of Lewis, where it was suggested that the proposal was not compatible with the Habitats Directive², points towards tensions between competing EU level energy and environmental priorities.
- 3.3 While local opposition is not as acute a problem for offshore wind projects as it has been for onshore build, the time-consuming, complex and expensive planning process is regarded as a barrier to market entry in its own right. The uncertainties and delays associated with a long and difficult planning process can have knock on effects on the provision of grid access and project financing. Planning problems surrounding land-based elements of offshore plants can also introduce uncertainties into the entire project. The refusal of planning permission for a substation at Cleve Hill for the London Array by Swale Borough Council in June 2006 – a decision reversed on appeal – held up delivery of the 1GW project, and proved a contributing factor in the departure of a key member of the consortium.
- 3.4 There is no easy solution to these planning difficulties. Balancing local concerns against national or global needs is always difficult, particularly when there are significant environmental arguments for and against the planned project. Proposals put forward in the 2007 UK Planning Bill to draw up national policy statements on renewable energy generation sites should help clarify this issue.
- 3.5 The sites which have been put forward in the first two rounds of offshore wind build in the UK are located relatively close to shore. However, several zones identified for the third round of offshore wind build lie outside the twelve mile limit for national territorial waters. There is as yet little legal clarity on the procedures for planning applications in these zones.
- 3.6 **There is need for research at EU level examining European and international best practice in reconciling local environmental and ecological objectives with climate change mitigation needs. There is also a need for research and policy work on the legal procedures for progressing planning applications for offshore wind facilities outside national territorial waters.**

Grid Access

- 4.1 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.

¹ British Wind Energy Association (2007) *Offshore Wind: Moving up a Gear*.

² BBC News 'Largest' Wind Farm Rejected
http://news.bbc.co.uk/1/hi/scotland/highlands_and_islands/7358315.stm

- 4.2 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. Delays associated with this backlog are having a distorting effect on the market, with long waiting lists and high deposits discouraging all but the best resourced developers.
- 4.3 There will remain a 'chicken and egg' situation with regard to provision of grid access for new wind projects, both offshore and onshore. The cost of providing grid access to remote locations and the low rate at which planning approvals are converted to active wind farms means that grid connection cannot be provided to sites speculatively. The high number of proposed sites also imposes logistical problems for the grid operator in providing connections as quickly as many developers would like.
- 4.4 The UK Government's preference for point to point connections between the mainland and offshore wind facilities stands in contrast to the approach taken by other EU countries who are interested in, or actively developing, offshore grids.
- 4.5 **The Academy urges more action at a national and EU level to examine the needs of a 21st century European transmission grid. Existing EU initiatives in this area should be fully supported, and the UK should be encouraged to further engage with EU stakeholders to examine how greater connectivity could improve the exploitation of its wind resources.**
- 4.6 **The Academy strongly believes that the national and EU debates on future grid arrangements need to be better informed by engineering realities. Engineers have a key role to play in the development and delivery of Europe's ambitious renewable energy policy.**

Technology Issues and Supply Constraints

- 5.1 A number of global trends have put a strain on the resources needed for offshore wind build, with consequent negative effects on project costs and timetables. Dramatic growth in emerging Asian economies has driven a rise in commodity prices. At the same time, an increased international focus on renewable energy, exemplified by the EU's commitment to meet 20% of its energy needs from renewable sources by 2020, has boosted global demand for offshore wind technology.
- 5.2 Supply constraints are most keenly felt in the UK in the areas of turbine supply and installation. The two international manufacturers who supply the vast bulk of turbines for new offshore build are reporting very long lead times of over three years. However, it seems likely that some of these constraints will lift as international markets develop. Growth in demand has attracted a large number of new firms to the area of wind turbine manufacture in recent years, both within the EU and internationally. To date, these new entrants have focused on onshore wind technology, but we expect the offshore wind market to develop in similar fashion in the coming years.
- 5.3 In the current 'seller's market', the increased technical requirements for offshore wind turbines (compared to those used onshore) have made offshore wind contracts less attractive for turbine manufacturers. Extremely high

levels of operability are required for offshore wind farms because operators are unwilling to lose the use of a turbine for a trivial mechanical or electronic failure if denied access to fix it for long periods of time due to weather conditions. There is reluctance among wind turbine manufacturers to invest in the high performance engineering required to ensure these levels of operability, particularly at a time when the onshore sector is so buoyant. The growing demand from upcoming offshore wind projects may see lead-times increase still further before the market loosens due to increased competition.

- 5.4 Further down the wind turbine supply chain there are issues surrounding competition with other industries for the supply of large, high quality castings and gearboxes, which manufacturers can sell into other cyclical industries such as ship-building, possibly at higher profit margins.
- 5.5 **It would be useful to produce EU level year-by-year forecasts for offshore and onshore wind demand in the lead up to 2020, which would allow turbine manufacturers to plan appropriately for medium term demand.**
- 5.6 **Research should continue under the EU Framework Programme or within a future Knowledge and Innovation Community (KIC) on sustainable energy under the European Institute of Innovation and Technology (EIT) into the efficient manufacture of turbines with the heightened levels of operability needed for deployment offshore.**
- 5.7 **New suppliers based in EU member states should be encouraged to enter the offshore wind turbine market. The market opportunities available within the EU for offshore turbine technology could usefully be raised in the course of EU sustainable energy dialogue with third countries with strengths in turbine manufacturing.**
- 5.8 Finally, developers are finding it difficult to recruit the highly specialised workforce necessary for the construction of offshore wind capacity; there is a particular demand for highly qualified engineers with experience in working offshore. These problems reflect the skills shortages experienced in the UK by the engineering sector in general and the renewable energy sector in particular. The Academy, along with other UK stakeholders, is helping to address this problem by promoting awareness of engineering and engineering careers to all sectors of society. Through the medium of Euro-CASE, the Academy is engaging with its fellow engineering academies in developing European solutions to the problem of engineering skills shortages across the EU.
- 5.9 **The Academy believes that European co-operation will be essential in addressing engineering skills shortages across the continent, and calls for the full engagement of European business leaders and policy makers in the engineering skills agenda. The Academy would welcome the opportunity to share its experiences and expertise in this area with all appropriate EU stakeholders.**

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