



Offshore wind farms – Do they have a future?

Offshore wind farms

Renewable energy policy in the UK stands at a critical junction. Major decisions and substantial investment are required in order for the UK to be able to satisfy its carbon reduction commitments, meet its contribution to the EU's renewable energy target by 2020, and guarantee future energy supply.

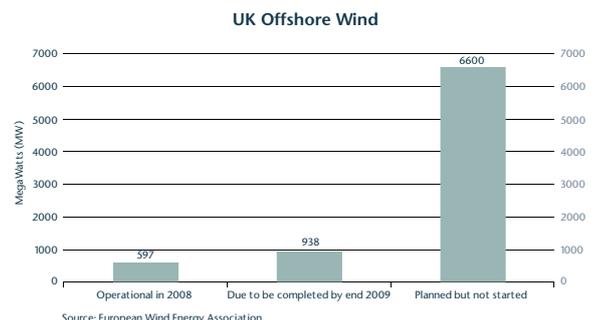
The European Commission has proposed that the UK should provide renewable sources for 15% of its total energy use by 2020. This is a highly ambitious target. In 2006 only around 1.5% of the UK's final energy consumption came from renewable sources. When currently planned projects come on line this is expected to rise to 5% by 2020.¹ Thus the UK will have to triple planned consumption from renewable sources in order to achieve the proposed EU target.

Current UK government plans include proposals to increase offshore wind to achieve 25GW of additional generation capacity by 2020.² However, there are serious questions about whether this target will be met. Some observers have expressed doubts about the economic appeal of offshore wind projects to developers, noting that "the risk-returns do appear to be on the knife-edge of what's attractive enough for these companies."³

The uncertainty about investment returns is a major problem. The UK government is relying on private enterprise to develop offshore wind capacity that will support achievement of its EU-agreed carbon reduction targets, but indications are that these projects are no longer attractive to at least some private sector participants. If this results in a failure to develop planned offshore wind capacity, the UK could miss its renewable energy production targets.

Present state of the industry

Denmark led the world in the development of offshore wind after installing the first project in 1991, but has recently been overtaken by the UK. The completion of a 194MW wind farm off the coast of Lincolnshire at the end of 2008 boosted the UK total to 597MW of installed capacity, while the Danish total was 423MW. An additional five UK projects are currently being constructed and when completed in 2009 another 938MW will be brought on line, bringing UK total offshore wind capacity up to 1.5GW. An additional 6.6GW capacity is projected to be produced from planned projects that have not yet started construction. Taken together, existing, incomplete and planned projects will result in a total capacity of 8.135GW from offshore wind, which still leaves a shortfall of over 16GW from the government's target of 25GW from offshore wind.⁴



The EU also has a role to play in the development of offshore wind in a European context. In late January 2009 it pledged a EUR500m stimulus package to the offshore wind industry over the next two years, as part of a wider move to invest in key infrastructure. The proposed offshore wind programme would focus on providing support to large-scale offshore demonstration projects in different member states as well as expanding existing offshore wind farms.

1. 2007 Energy White Paper : Meeting the Energy Challenge
 2. UK Renewable Energy Strategy: Consultation Document June 2008
 3. Tom Jennings, 2009. Quoted in 'Offshore wind power: big challenge, big opportunity'. The Carbon Trust
 4. Note that the Carbon Trust projects that 29GW of offshore wind will be required to meet the UK's portion of the EU renewable energy target. Carbon Trust, 2006. 'CTC610 - Policy frameworks for renewables'

Who's involved?

Some 75% of today's operating offshore wind is found in British or Danish waters⁵ but other European countries including Germany and Sweden are beginning to develop their own offshore projects. Power companies are behind much of the UK's offshore programme with Centrica and SSE leading the field. Centrica completed construction of a project off the Lincolnshire coast in October 2008 and has recently received planning consent for another project in the same region, while SSE are developing a 504MW wind farm off the Suffolk coast in partnership with RWE which, when completed, will become the world's largest offshore facility. Foreign capital is behind the flagship UK development, the £3bn, 1000MW London Array, which is being financed by a partnership of Germany's E.ON, Denmark's Dong Energy, and the Masdar Initiative, a clean energy investment firm set up by the Abu Dhabi

government. Vattenfall operates a number of offshore facilities in UK waters and StatoilHydro also has an interest in a UK project. The same European power companies dominate the industry across the continent.

Operating in partnership with these developers are turbine manufacturers such as Siemens, Areva and Vestas. Areva has designed turbines specifically for use at sea, which have a new waterproofing system and a simplified, lighter design, which should mean cheaper and easier installation and fewer expensive maintenance visits. The first of these are being installed at the German offshore project off the islands of Borkum. Meanwhile Vestas is increasing investment in a UK blade factory in order to service the expanding UK market.

Obstacles

While the foundations of offshore wind expansion are clearly in place, the question remains whether they are sturdy enough to support the enormous expansion of the industry which is required to meet the UK's 15% renewable target by 2020. Unsurprisingly, the biggest obstacle is posed by finance.

The London Array project has recently been making headlines because of difficulties in attracting investors. Shell withdrew from the project in May 2008, reportedly selling its stake due to spiralling costs. The company has recently announced it would be axing all future investment in renewable energy projects, with the exception of biofuels.⁶ In November 2008 BP announced that it too was abandoning plans to invest in UK offshore wind farms, preferring instead to invest in onshore wind energy in the US.⁷ These companies have clearly concluded that UK offshore projects do not offer attractive investment opportunities.

Current investors also seem to be questioning their continued involvement in offshore projects. Recently the director of innovation and investments of the Masdar Initiative commented that in light of the continuing financial turmoil, "the economics of [the London Array] should be revisited."⁸ The chief executive of E.ON UK, Paul Golby, has expressed doubts about the London Array's financial viability, saying the economics of the London Array were precarious due to high construction costs and the falling prices of oil, gas and carbon.⁹ Similar questions are being asked about other projects. Despite having been granted permission to construct a new 250MW project off the East coast of England, Centrica is "revisiting the economics"¹⁰ of this development as well as two further proposed projects at Race Bank and Docking Shoal. "The costs of building offshore wind farms are very high," said a spokesman for Centrica. "We are therefore running through all our construction and other costs before we give them the go-ahead."¹¹

Doubts over the development of offshore wind are not a UK phenomenon, with German projects experiencing similar issues. Many of these projects are being developed by small companies which are reportedly having difficulty obtaining bank financing in the current financial crisis.¹² Furthermore, larger developers in Germany like E.ON and RWE are delaying putting down the cables that would connect the offshore wind farms to the grid because none of the turbines are in operation yet.¹³

Government subsidies are essential in order to make offshore wind an economically competitive alternative to traditional, fossil-fuel based sources of energy. Offshore wind farms currently cost about £3bn per gigawatt (GW), up from about £2bn in 2007 and just £600m per GW for a gas-fired power station. Nuclear power, at about £1.8bn per GW, is a lot cheaper.¹⁴ Compared to onshore wind farms, offshore costs about twice as much to build but, once completed, is likely to be more productive due to stronger and more constant winds at sea. According to green energy specialists New Energy Finance, the problem is that the costs of many offshore projects are rising rapidly due to a combination of increases in prices on the supply and contract side of developments.¹⁵ A recent article in the Financial Times added, "the costs are driven by the difficulty of siting turbines in deep water, the more robust generation equipment needed and the greater wear and tear and need for maintenance."¹⁶ Hence the subsidy regime behind offshore wind is critical for future development in order to attract investment. The need for a review of the renewables subsidy regime was recently recognised by Lord Smith, the chairman of the Environment Agency, who warned that the UK needed "serious investment" in research and development in renewable technologies.¹⁷

5. European Wind Energy Association (EWEA), 2009. <http://www.wind-energy-the-facts.org/en/part-3-economics-of-wind-power/chapter-2-offshore-developments/>

6. Linda Cook, Shell, 2009. Quoted in <http://en.cop15.dk/news/view+news?newsid=900>

7. Financial Times, 2009. http://www.ft.com/cms/s/0/e92d5e7e-ebd7-11dd-8838-0000779fd2ac.html?nclink_check=1

8. Reuters, 2009. <http://uk.reuters.com/article/rbssIndustryMaterialsUtilitiesNews/idUKLJ60576820090119>

9. Financial Times, 2008. 'Chill wind as companies pull out of projects'. <http://www.ft.com/cms/s/0/e92d5e7e-ebd7-11dd-8838-0000779fd2ac.html>

10. Centrica, 2008. Quoted in 'Centrica says reviewing new wind farm economics'.

<http://www.reuters.com/article/scienceNews/idUSTRE4AD3SV20081114?pageNumber=1&virtualBrandChannel=0>

11. Centrica, 2009. Quoted in The Independent <http://www.independent.co.uk/news/business/news/offshore-wind-farm-plans-in-jeopardy-without-support-1062916.html>

12. Quoted in Business Week, 2009. http://www.businessweek.com/globalbiz/content/feb2009/gb2009022_294371.htm

13. *ibid*

14. Independent, 2009. <http://www.independent.co.uk/news/business/news/offshore-wind-farm-plans-in-jeopardy-without-support-1062916.html>

15. New Energy Finance, 2009. 'Offshore Wind: Europe's EUR90b funding requirement' <http://www.newenergyfinance.com/NEF/HTML/Press/Offshore-wind-funding.pdf>

16. Financial Times, 2009. 'Scots wind farm winners named.' http://www.ft.com/cms/s/0/077039c2-fc47-11dd-aed8-000077b07658.html?nclink_check=1

17. Financial Times, 2009. 'Chill wind as companies pull out of projects'. http://www.ft.com/cms/s/0/e92d5e7e-ebd7-11dd-8838-0000779fd2ac.html?nclink_check=1

Obstacles (continued)

The existing regime is based around Renewables Obligation Certificates (ROCs). Certificates are issued to generators on a 1 ROC per megawatt-hour (MWh) basis, to be sold on to power suppliers so they can prove their obligation to source green energy has been fulfilled. By providing an extra revenue stream, in addition to the price of electricity, ROCs help to subsidise the investment in infrastructure. Offshore facilities are so much more costly than onshore that their power is currently eligible for 1.5 ROCs per MWh, and the recent UK Budget announced that this will be increased further. Under the Chancellor's plans, new orders for offshore wind power will receive 2 ROCs per MWh in financial year 2009/10, falling back to 1.75 ROCs for orders placed in 2010/11, which will amount to a boost of £525m to the industry.¹⁸

Other players in the offshore industry are exploring alternative sources of finance. Duke Energy, a US utility company, has announced its plans to invest \$25 billion over the next five years in wind, solar and nuclear power stations, and is seeking to bypass banks altogether from the fundraising process. Instead the company intends to establish an in-house team to build long-term direct relationships with potential investors in Asia, and China, including national banks, wealthy individuals and pooled funds, in a return to a "pre-1980s model of investment."¹⁹

Another area the government can influence is planning, and many in the industry believe the authorities need to take action to spur development of the power grid and

simplify a planning system that can keep developers waiting years for approval. Progress is being made on planning as the Crown Estate, which owns all the foreshore and seabed to 12 miles off the UK coast, is supportive of offshore development and is currently implementing round three of its offshore strategy to select companies as partners in developing specified zones. In addition the UK government proposed the Marine and Coastal Access Bill (UK) in December 2008, a key aspect of which is the creation of a 'Marine Management Organisation' (MMO) to oversee and streamline the delivery of planning consents for offshore wind farms. The MMO will also have an important role in enforcing the provisions and restrictions of development licences. With more efficient, simpler and more cost-effective processes, developers should find it easier to progress projects.

Together with problems in accessing finance and obtaining planning permission, developers face difficulties in sourcing the actual turbines. Only one company, Vestas, manufactures turbines in the UK, but these are for the US market. As mentioned above, Vestas is increasing its investment in its UK facility to serve the expanding UK market, but this is unlikely to satisfy demand, leaving UK developers with no alternative but to look elsewhere. However options are limited. According to the British Wind Energy Association, only Vestas and Siemens Wind Power have developed operable offshore turbines to date and have "a credible offshore pedigree."²⁰

Conclusion

Ed Miliband, Energy and Climate Change Secretary, recognised the value of offshore wind power when he recently stated "In terms of electricity, [it] could potentially make the single biggest contribution to our 2020 renewable energy target."²¹

In theory offshore wind power offers an attractive and consistent source of renewable energy, less hampered by the planning delays and local objections which have hindered the development of many onshore projects. In practice the range of issues discussed in this paper threaten the development of a technology which offers the best, and possibly only chance for the UK government to meet its EU renewable energy commitments by 2020. Even then

the approximately 8GW of operational and proposed offshore wind will leave a substantial shortfall on the 25GW of renewable electricity the Government believes offshore wind needs to provide if the UK is to meet the EU target.²² To have any realistic chance of even partial success in reaching the EU target, the projects already started or planned must be pursued with vigour. The success of the London Array project is crucial to the UK offshore industry as all problems concerning finance, planning and infrastructure will have to be solved if it is to go ahead. If and when the project is complete it will set a precedent for other large developments to follow, and provide proof for other developers that the industry represents a viable investment for the future.

18. British Wind Energy Association, 2009. http://www.bwea.com/media/news/articles/wind_industry_gives_thumbsup_t.html

19. Comment from James Rogers, Chairman of Duke Energy, 2009. <http://business.timesonline.co.uk/tol/business/economics/wef/article5607996.ece>

20. British Wind Energy Association (BWEA), 2009. 'UK Offshore Wind: Moving Up a Gear'. <http://www.bwea.com/pdf/offshore/movingup.pdf>. p. 12

21. The stated Government goal, as discussed in the 'Renewable Energy Strategy Consultation', published by the Department of BERR in June 2008, is that 19% of renewable electricity is to be provided by offshore wind.

22. As mentioned, the Carbon Trust believes at least 29GW will be necessary.