

Policy Briefing



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Renewable energy prospects - wind

CIC recently had a briefing from RenewableUK, a trade and professional association covering wind energy (both on and off shore) as well as wave and tidal energy. Although this association does not cover all renewable sources of energy (i.e it does not deal with either hydro-electric or bio-mass power), the wind sector has proven technology with good growth prospects. The development of more diverse energy resources is urgently required in light of the drive towards low carbon and the need for future energy security. Decarbonisation of the power supply will be a major element in a low carbon future and there is considerable potential of job creation in building and maintaining these installations in widely dispersed locations throughout the country and off-shore.

Growth prospects

The EU target of 15% of all UK energy from Renewable resources by 2020 will translate to production of 30% of our renewable electricity supplies by that date. The UK Renewable Energy Strategy 2009 estimated that 5.5% of energy is currently generated from all renewables so prospects for growth in this sector are bright. Most of the future growth in renewables will occur in the wind energy sector.

Figures from RenewableUK in 2010 indicate that there are already 4.5 GW of wind plant installed and a further 9 GW are either being built (2.5GW) or are consented (6.5GW). An additional 9 GW is currently in the planning system. While the largest on-shore wind farm in Europe is in Whitelee in Scotland, the biggest potential is off-shore, a fact reflected in the 32GW in off-shore licences awarded by the Crown Estate in addition to 15GW being developed from earlier leasing rounds.

Costs

In the case of wind energy, generation costs depend on wind speed, the cost of plant, financing terms and operating costs. The following figures are derived from update of the RenewableUK 2008 submission to the House of Lords Economic Affairs Committee. There are many variable factors but overall it can be said that building off-shore is about twice as costly as on-shore construction. While

on-shore wind and nuclear may have comparable costs, gas generation is cheaper at current prices.

Capital costs are primarily a function of the size of installation and its location (with the best wind speeds often being on the most remote sites). Costs for on-shore wind farms are currently in the range of £1,250 /kw - £1,573/kw with a mean of £1,334/kw. Operating and maintenance costs are around £40/kw/yr. Offshore wind generation is more expensive with the majority costing between £2,500/kw and £3,600/kw.

By comparison the capital cost of combined gas turbines are around £600-£700/kw at present. Estimating future gas-fired generation costs is uncertain because of the uncertainties around the price of gas. Nuclear costs are also difficult to estimate given the long lead-in times for construction and uncertainties around de-commissioning but costs have been estimated at £2,000- £3,300/kw.

Constraints

Generating power from wind installations has several constraints at present. Some of the main constraints are: planning issues; grid access; market stability; the support infrastructure for construction; skills shortages and; conflicts with aviation in relation to radar.

Planning For on-shore construction in particular, planning problems are a major issue. Local communities often complain about issues of noise, interference with wild-life and visual impact. For onshore wind farms in England, the average project waits 17 months for a decision by local planning authorities and only 25% of applications are approved. The new Infrastructure Planning Commission (IPC) in conjunction with the new framework of National Policy Statements was set up with the aim of achieving a speedy resolution to issues of national policy where there was conflict between nationally significant issues and local sensitivities. One feature of this system was a target of a 9 month timeline for decisions once an application was made. The fate of the IPC is currently in the balance but some sort of streamlined approach is needed if projects are not to be held in the system for years.

Grid The present transmission network is designed for a system of a relatively small number of fossil fuel power plants delivering power throughout the country at a constant flow. Renewable wind power on a large scale is derived from a large number of small installations often located well away from established infrastructure, delivering variable amounts of power. Much of the existing grid (around 60%) needs to be replaced or upgraded in the next decade in any case but renewal of the grid is a major factor (as well as being an opportunity for work) in relation to renewable power.

Market stability Adequate renewable funding and financial support mechanisms are vital for the expansion of the industry. Commitment to the Renewables Obligation is seen by the renewables industry as vital. In this context the recent announcements from BIS on support for the technical development and research into wind power are important. Rising costs are also a major issue as turbines have to be sourced from euro-zone areas at a time when sterling has fallen in value over the past couple of years; there is lack of competition in the supply chain and; raw materials costs (e.g steel) are rising steeply.

Support infrastructure Particularly in relation to off-shore construction there are major constraints but off-shore also presents some of the best possibilities. While the first off-shore turbines off Blyth in Northumberland were only 2 MW, Round three of current licensing is likely to include turbines in excess of 7 MW generating capacity to take advantage of the higher wind speeds off-shore. Developments off-shore are however constrained by major problems in the supply chain. For the off-shore wind industry the development of coastal manufacturing hubs producing the turbines, towers, cable needed and acting as a base for shipping (to transport men and materials for construction foundations and cabling) would be a positive development. With a certain amount of investment and with regional planning the off-shore renewable industry can have a profound multiplier effect.

Skills shortages The renewable industry suffers a skills shortage at all levels from technician level entrants through to professional engineers. The problem is particularly acute for the off-shore industry which offers the biggest potential for expansion.

Conflicts with aviation RenewableUK estimate that 4GW of wind farm developments in the UK planning system in 2009 were blocked because of radar issues; 1.3 GW of projects have consent with radar issues to resolve and 5.8GW are in pre-application with known objections from military or civilian stakeholders. There was a Memorandum of Understanding signed on this issue in 2008 and while technical solutions are being researched on this at present, serious consideration needs to be given to upgrading and replacing ageing national radar infrastructure in order to cope with the reflections from wind turbines.

Potential

The industry presents considerable potential in the UK in relation to construction, turbine manufacture and cabling, with regions and ports which could become manufacturing and research clusters for offshore wind and other marine renewables in much the same way as Aberdeen was for the oil and gas industry in the 1970s and the 1980s. The size of the turbines involved would encourage local manufacture, as these are not easily transportable items. RenewableUK

would like to encourage some sort of low carbon renewable energy zones specifically targeted to renewable wind energy.

Properly managed, the UK wind industry could be developed to provide 60,000 – 70,000 jobs. Currently there are 6,000 people employed in wind in the UK, against 20,000 people employed in Denmark, 30,000 in Spain and 80,000 in Germany. Many of these jobs will be in the supply chains feeding new offshore wind turbine manufacturing facilities. A major step forward was taken in March 2010 to secure these new manufacturing facilities in the UK with the announcement of the offshore wind infrastructure competition supported by Government funding of £60m. The announcement of the competition triggered announcement from GE and Siemens that they intend to locate new turbine factories in the UK. As of 22 June, the government has not confirmed if the competition will go ahead.

Recent developments

News from BIS (received on June 21) indicates that Business Secretary Vince Cable has confirmed some projects which will go ahead following a Treasury review. The Treasury carried out a review of significant projects announced since January 2010 to check they were affordable and that they fitted in with the priorities of the new Coalition Government. While money promised by Lord Mandelson in relation to nuclear power (i.e to Sheffield Forgemasters) has been withdrawn, substantial sums have been allocated to wind energy development. The Government will continue with BIS projects for:

- National Renewable Energy Centre (NAREC) Offshore Wind Blade Test Site, Blyth - £11.5 million;
- NAREC Offshore Wind Turbine Test Site - £18.5 million;
- Offshore Wind Demonstration and Development - £12.4 million; and
- Offshore Wind, Mitsubishi Collaborative R&D to support Mitsubishi and partners - £30 million.

Conclusion

While these investments are welcome, longer term growth is dependent on: control of capital costs; the development of the supply chain; and resolution of outstanding planning and aviation issues. If the 2020 targets for renewable energy are to be achieved there must be a drive to support the off-shore industry in particular together with a planning system at both regional and national level which facilitates development and growth.