Annex 4: Offshore wind

The market penetration of offshore wind energy has not been evaluated in this study because the technology is only at an early stage of implementation and there are few truly offshore plants in operation. Nevertheless, it is estimated that there is an exploitable potential for offshore wind of more than 3 000 TWh/year (Hassan and Lloyd, 1995) and there is an increasing level of activity in many Member States to exploit this resource.

Belgium, Denmark, Germany, Ireland, the Netherlands, Spain, Sweden and the UK are all at different stages in the exploitation of their offshore wind resources. Blyth wind farm in the UK and Middlegrunden near Copenhagen in Denmark were constructed during 2000.

Are there lessons to be learnt from previous experiences of renewable energy developments onshore — and in particular from the case studies evaluated in the present study — that could be relevant to the offshore situation?

Political: This emerging technology is still more expensive than most established land-based renewable energy technologies, and requires some form of financial subsidy to bridge the stage between early demonstration turbines to full-scale commercialisation. Offshore wind farms are considerably larger (wind farms of up to 100 MW are envisaged) than most of their onshore equivalents. The level of commitment from national governments to support offshore wind energy development would therefore need to be strong and over a long period, in order to provide a stable and encouraging environment for long-term investment from the private sector.

Legislative: By and large, the success of onshore wind generation has been driven by the long-term stability and economic viability provided to the onshore generators by output support mechanisms, in particular feed-in tariffs. However, the move towards an EU-wide liberalisation of electricity markets makes the establishment of new feed-in or competitive tendering arrangements for offshore wind more complex than during the 1990s. Competitive electricity markets, and cross-border trading in electricity, are not compatible with national feed-in arrangements in the long term. New power purchase guarantees and output support mechanisms may therefore have to be established to ensure long-term stability and economic viability for offshore wind. This could be a useful guiding principle in the establishment of any new arrangements.

Financial: The extensive experience gained from the development of onshore wind developments has increased the level of confidence of developers as they expand into the new offshore market. This confidence is also seen in banking and financial institutions, which are willing to invest in this emerging technology without significant levels of capital subsidy as long as there are appropriate revenue forecasts available (through power purchase arrangements).

Fiscal: As a non-fossil source of energy, electricity from offshore wind is eligible for exemptions or rebates from energy or carbon taxes. As more and more Member States implement environmental taxes, this will continue to improve the competitiveness of renewable energy in comparison with fossil energy sources.

Administrative: Offshore wind installations open up new aspects of planning permits. Offshore turbines interact with conservation, fishing, tourism and shipping interests. The siting of the turbines would therefore have to be carefully considered. Active support from local administrations will be important in this respect.

Technological development: Offshore wind turbines draw on technological capabilities from both the onshore wind industry and the offshore installations industry (particularly from the oil and gas industry). Much research and technological development is being carried out by

turbine developers, especially through a step-by-step approach to installations, with considerable monitoring and evaluation taking place at all stages. Government financial support often focuses on feasibility studies and other non-technical support. This partnership approach between government and industry helps to ensure that the systems and approaches being taken to develop this new technology are robust and will ultimately be technically and financially successful.

Information, education and training: Public support for offshore wind developments is critical if this technology is to be widely accepted. Most offshore developers have carried out extensive public consultations and information campaigns to raise awareness and obtain public support. The Copenhagen wind farm, for example, ensured public support not only through consultation but also by enabling local people to purchase shares in the project through a cooperative.

Offshore wind is projected to make an important contribution towards EU policy and targets for renewable energy deployment in the next 5–10 years. Its progress is benefiting from the experiences gained in overcoming barriers and in identifying potential success factors for deploying renewable energy technologies (especially wind energy) on shore during the 1990s.