



Offshore wind power in the North Sea – huge potential and enormous challenges

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International ‘Windspeed’ study presented, together with recommended course of action

If companies and wind power equipment manufacturers find favourable conditions, the North Sea could become home to offshore wind farms with a combined generating capacity as high as 135 gigawatts by the year 2030. This is the result of a study conducted as part of an international project chaired by the Energy Research Centre of the Netherlands (ECN) and in which the German Aerospace Center (Deutsches Zentrum für Luft- und Raumfahrt; DLR) was involved. The study made recommendations to politicians on the optimum way of developing wind power in the North Sea while remaining compatible with other uses of that body of water.

DLR researchers analyse potential sites for wind farms in the North Sea

With the help of a Geographic Information System (GIS), DLR researchers have developed a tool that identifies potentially suitable sites for wind farms in the North Sea. This involves linking data on average wind strength and water depths with data relating to nature conservation areas, maritime shipping routes, and oil and gas platforms. This process helped to identify sites particularly well suited to wind farms, as well as areas where this kind of application would be out of the question or where wind farms would be competing with existing uses. “In the course of this project, the first ever transnational ‘inventory’ of the different forms of usage prevalent in the North Sea has been produced. With the data now available, we can also calculate the costs of a wind farm, and can also determine the best technology for each of the different sites,” explained project leader Christoph Schillings from the DLR Institute of Technical Thermodynamics in Stuttgart. This tool can be used online free of charge after registering via the project’s homepage, www.windspeed.eu.

Offshore wind power with a capacity equivalent to about 135 atomic power stations

The countries with coastlines around the North Sea – Belgium, Denmark, the Netherlands, Norway and Great Britain – are all very interested in tapping the potential of offshore wind power in the North Sea. This Windspeed study describes for the first time the parameters that need to be established across the EU to achieve optimum expansion of wind farms in the North Sea between now and 2030, while at the same time minimising the negative consequences associated with this development. It is technically feasible to install wind farms in the North Sea with a generating capacity of 135 gigawatts, the equivalent of roughly 135 atomic power stations. If the countries whose coastlines border the North Sea were to implement their existing National Action Plans on Climate Protection and Expansion of Energy from Renewable Sources, they could install wind farms with a capacity of 32 gigawatts by 2020. Due to the long planning lead times, researchers view any more rapid expansion than this as unlikely. However, in the following years, leading up to 2030, the planning period is sufficiently long to make it feasible for a further 100 gigawatts of power generating capacity to be installed.

The world of politics must lay the groundwork for wind power

Researchers believe that the potential capacity calculated in this study can only be implemented if favourable conditions are created in all countries with a North Sea coastline. This means that politicians will have to make a larger area of the North Sea available for wind power than has so far been the case. Other important planning factors needed to provide security for investors are the precise nature of the supply conditions in every country, the price to be paid for power and the regulations governing the delivery of this power to their respective national grids.

The Windspeed study was sponsored by the European Commission as part of its International Energy – Europe programme (financial support reference number EIE/07/759/S12.499460, Horizontal Key Actions) and was produced by an international consortium of research institutes chaired by the Energy Research Centre of the Netherlands (ECN).

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The 'alpha ventus' offshore wind farm, off the North Sea coast of Lower Saxony, Germany



'alpha ventus', situated 75 kilometres off the German North Sea coast, was the first offshore wind farm. The twelve wind turbines became operational in 2010. If companies and wind power equipment manufacturers find favourable conditions, the North Sea could become home to offshore wind farms with a combined generating capacity as high as 135 gigawatts by the year 2030. This is the result of a study conducted as part of an international project chaired by the Energy Research Centre of the Netherlands (ECN) and in which the German Aerospace Center (DLR) participated.

Credit: DOTI/J.Oelker/2010.

Constructing wind turbines in the North Sea – huge potential and enormous challenges



The countries with coastlines around the North Sea – Belgium, Denmark, the Netherlands, Norway and Great Britain – are all very interested in tapping the potential of offshore wind power in the North Sea. Wind farms with a generating capacity of 135 gigawatts could be built there, the equivalent of about 135 nuclear power stations.

Credit: DOTI/M.Ibeler 2009.

Wind farm in the Baltic Sea, off the Danish coast



Increased, Europe-wide long-term planning security is vital for the expansion of offshore wind parks.

Credit: Bundesverband WindEnergie e.V./Christian Hinsch.

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