

# Norway discovers wind power

The Norwegian energy advisory board has presented plans to turn wind power into a new industry sector with significant export potential. Industrialists and politicians are positive, but: 'There are still a lot of unanswered questions.'

| by Reiner Gatermann

Norway is a country blessed with energy. 98.5% of the power needed for its domestic market is sourced from hydroelectric power stations and there is significant potential for further development. Norway is fifth on the list of oil exporting countries and now it wants to add an as yet untapped energy source: offshore wind power. That, at any rate, is what the country's highest energy advisory body has said should be done.

There is little doubt that the conditions

for developing wind power in Norway are superb. With a coastline of around 2,500 km (the longest in Europe) and with the best wind conditions in Europe, is in a position to deliver 40 TWh of wind power by between 2020 and 2025. That is about a third of current domestic demand. Approximately half of the required capacity (5,000 to 8,000 MW) is expected to come from offshore wind farms. The country also has the legal, engineering, technological and production experience - gained through the development and

expansion of its oil and gas industry on the continental shelf - to develop an offshore wind industry.

At the end of 2007, then Oil and Energy Minister Aaslaug Haga commissioned the energy advisory board, which includes representatives of government and industry, to undertake a study into the possibility of wind power. She did this in response to the EU directive for renewable energy, which requires the share of renewables in electricity supply to be 20% in 2020.

Norway had almost completely neglected wind power as a source of electricity until then. Its current production capacity is about 425 MW, less than 1% of total capacity in Europe. The reason is that the installation costs have simply too high in comparison with the abundant hydroelectric power and government subsidies have been too inconsistent and limited. Onshore wind power was thus not considered to be a realistic option and many construction permits are gathering dust.

### New life |

Thanks to the EU directive, new life has now been breathed into the Norwegian energy debate. According to the report from the energy advisory board, 'the new European energy policy offers Norway an exceptional opportunity to develop a new industrial sector while simultaneously becoming a significant exporter of renewable energy to Europe.' The board concludes that 'in practice, Norway has access to an unlimited sea wind power capacity.' The only limits would be set by technology and transmission capacity.

But the board also notes that in comparison with countries such as Germany, Spain, and Denmark, Norway has a lot of catching up to do. It must move quickly so as not to be left even further behind in the development of technology and surrender the market to other countries. The experts have presented the government with a comprehensive plan and a timetable. Now it is up to the government to decide. Minister Haga has left and the new Minister has not made a decision yet. Most of the political parties are supportive of the energy board's plans, and companies like NorskHydro and Statoil have projects going on, but they are waiting for the government to prepare the legislative conditions.

Political will is essential, because wind power is simply not required for domestic use. Subsidies are therefore necessary. In addition, in order to make offshore wind power attractive to buyers, the government must guarantee them security of supply, which means that the offshore network must be integrated into the mainland grid. This is because hydroelectric power must

be able to fill in when there is no wind. Also, if Norway is to become 'the battery of Europe', as the energy board has suggested, significant development of power connections to the continent (Sweden, Denmark, Germany and the Netherlands) and to the UK must be built and the transmission capacity of the domestic network must be expanded. The energy advisory board believes a transmission

adopted by the government to make the wind power revolution possible. The board clearly favours the German 'feed-in-tariffs' over the green certificates used in Sweden and the UK. According to the report, the feed-in-system significantly reduces the economic risks for the power plant operator and is the best way of promoting new technologies that are not yet fully developed. The system is quick and easy

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increase from approximately 5,000 to around 13,000 MW will be necessary. This transmission capacity should be designed for the current to flow in both directions, to make both export and import of power possible. The plans envisage a potential annual crossborder exchange capacity of about 60 TWh.

### Support systems |

The energy board has proposed a detailed system of incentives that should be

to implement and provides a reliable basis upon which to calculate the income from any project. The report found that 'it is these markets [that have a feed-in tariff] in which technological developments take place, such as in Germany, where there is a movement towards deeper water and larger turbines.' On the other hand, green certificates are appropriate for developing the lowest possible priced electricity, based on a mature industry. These operators receive no risk relief. The energy board

## Hydropower

Norway can easily cover its growing domestic electricity demand by making greater use of the capacity of its current hydroelectric power stations, even without having to call on its legally protected waterways. 47% of Europe's water reservoirs are in Norway. The country possesses the potential to produce 205 TWh per year from hydropower, of which 120 TWh are currently used, covering 98.5% of domestic demand. Of the remaining potential hydropower capacity, about half is located in protected waters, the other half is freely available for further development.

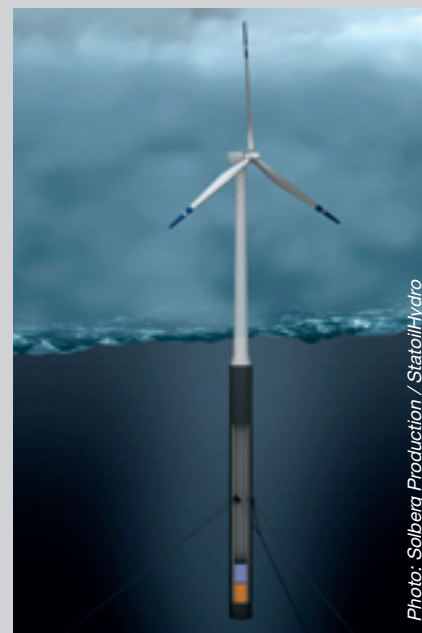


Photo: Solberg Production / StatoilHydro

observes that ‘the experience from the UK and Sweden shows that it is not possible to encourage the development of offshore wind power production through green certificates...offshore wind requires more support than onshore wind and therefore its own programme needs to be created that is independent of other support systems.’

Norway will not be able to develop the wind power industry on its own, says the energy board. The total investment requires ranges from anywhere between NOK100 to 220 billion (€13 to 28 billion) based on the installation of 5,000 to 8,000 MW, whereby each MW installed will cost



Photo: PictureNet/Corbis

NOK20 to 28 million (€2.5 to 3 million). In Oslo, it is assumed that there will be deals between Norway and the EU as well as between Norway and individual countries. As with oil and gas production, licences will be issued for specific areas with exclusive development rights for three to four years upon approval of a production plan for an operating time of 30 to 40 years. The report also states that future partners will most likely not restrict their development and subsidy programmes to projects within their borders. ‘This means that an offshore wind farm in Norwegian territory that exports to the UK will receive the same level of UK support as a farm which produces within UK territory.’

### Ambitious |

If the plans of the energy advisory board are fulfilled, Norway will have at least three to five offshore wind farms each with a capacity of 500 to 1,500 MW by 2020-2025. The great majority of the structures will

rest on the seafloor in the southern part of the Norwegian North Sea. They can be placed in water depths of approximately 60 metres. Until now, European offshore wind power plants have been situated in relatively shallow water no deeper than 15 metres. The exception is two turbines placed at a depth of 45 metres off the coast of Scotland.

And Norway is already thinking further ahead. Intensive development work is

industry say that Norway should first solve its existing transmission problems. There are bottlenecks in the south and deficits in central Norway’s network that are becoming increasingly apparent due to increased industrial development, they note.

The chairman of the Norwegian Electricity Industry Association (Energibedriftenes Landforening, EBL), Steinar Bysveen, who is also chairman of the energy advisory

## Wind power has been neglected in Norwegian politics or industry

being undertaken on floating wind power plants (see European Energy Review no. 4). The construction of the first experimental floating plant is planned for the autumn of 2009.

In Norwegian power industry and offshore industry circles, the energy advisory board’s report is considered to be very ambitious. Svein Sundsbø, energy expert with the Federation of Norwegian Industries (Norsk Industri) sees no technical difficulties, but he does see plenty of political and legal ones. The plans are ‘technologically, and economically achievable’ but nevertheless ‘there are many unanswered questions’, notes Norsk Industri. Representatives from

board, thinks that the onshore problems must be solved first before the gigantic task of developing an offshore industry can be tackled.

Power producer Statkraft sounds a positive note. ‘Studies show that the possibilities for offshore wind off the Norwegian coast are enormous’, says press spokesman Knut Fjerdingsstad. ‘We at Statkraft want to play a leading role in this development. We are co-operating on this with Swedish, Norwegian and Danish universities to find out what the best technologies are. If we were not convinced of the possibilities, we would not commit ourselves to this extent.’ ■

### Havsul I

The start signal for the new Norwegian wind power industry could be given soon. The Norwegian Water Resources and Energy Directorate (Vassdrags- og Energidirektorat, NVE) has issued a concession to build the first offshore wind farm, called Havsul I. It covers an area of 12x6 km and is located 60 km off the coast southwest of Trondheim. The farm is to be equipped with 3 to 8 MW turbines with a total capacity of 350 MW. NVE estimates that investment costs will be NOK18 million (€2.3 million) per MW. Based on an operating time of 2,850 hours per year and a lifespan of 20 years, production costs will be approximately 74 ore (0.093 eurocents) per kWh. On the Oslo electricity market, Nordpool, one kWh in 2012 is currently priced at 43 ore (0.054 eurocents). However, a protest has been lodged against the concession, which will have to be dealt with by the Oil and Energy Ministry. If the Ministry approves the project, the investment decision must still be made. In other words, the future of Havsul I is still uncertain.