Supergrid paves the way for wind power expansion

A supergrid connecting Scandinavia and large parts of western Europe may pave the way for an even faster expansion of off-shore windpower.

Northwest Europe may pave the way for very large amounts of wind power by means of a supergrid connecting Germany, Ireland, the UK, Scandinavia, France and Benelux.

The cost for all the undersea cables is estimated at 30 billion euro.

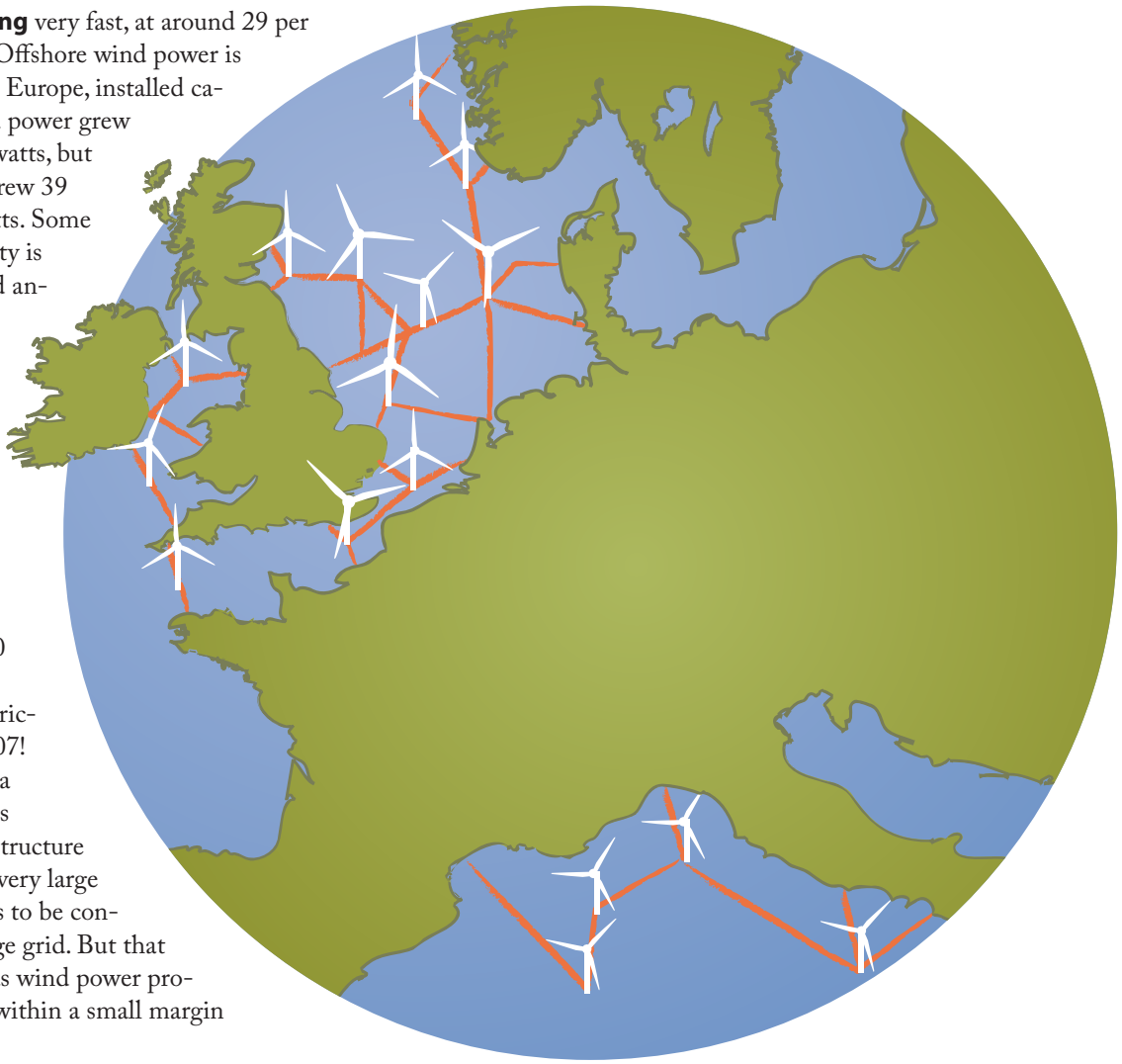
A political declaration was signed by officials from nine countries in December 2009 and aims at a binding agreement late 2010.

Wind power is growing very fast, at around 29 per cent per year globally. Offshore wind power is growing even faster. In Europe, installed capacity of onshore wind power grew 21 per cent to 64 gigawatts, but offshore wind power grew 39 per cent to 2.1 gigawatts. Some 3.5 gigawatts of capacity is under construction and another 16 has received all permits. (Data from ewea.org.)

The technical potential for wind power, especially offshore, is massively abundant. In Norway alone, a study for the government estimated this potential at 14,000 TWh/year, or some 70 per cent of global electricity consumption in 2007!

But to achieve even a small percentage of this potential a lot of infrastructure is needed. Obviously every large wind power station has to be connected to a high-voltage grid. But that is not enough. Whereas wind power production is predictable within a small margin for say 25 years of operation, it is very variable over hours, days and weeks. When the wind is weak, there has to be backup power, and when the wind is strong some other power source has to decrease power.

Some of the variability can be evened out by wind power itself. Winds in the Baltic can be strong when they are faint in the Irish Sea. But to make use of that the sites have to be connected, which is hardly the case today.



A "supergrid" in the North Sea would make way for a large wind component for north-western Europe both for the above reason, and because Norway and Sweden (and also Finland) already have a large share of hydropower, a very cheap and fast way to counter the variability of wind power. When the wind turbines produce a lot of electricity, the water can stay and rise in the hydro dams. When wind is low, hydro can increase production.

Wave power also has a huge potential, though it is far less developed than wind power. It shares many of the characteristics with offshore wind power: it is expensive to build, has to face very harsh conditions and it is variable. Though it is not exactly in phase with wind power, and somewhat more predictable, it still needs backup.

Still another renewable option is tidal power. There is no doubt that it can work, and supply large amounts of electricity; the proposed Severn Barrage in the UK could produce 8,600 megawatts. Tidal power in that form – damming a river mouth against the sea – is not popular with environmentalists. But a different technology – direct use of the kinetic energy in the ingoing and outgoing current – would be much less disruptive for ecosystems. It is also more modular, unlike the enormous, one-off, investment in a barrage. Tidal power is not intermittent in the same sense as wind, wave and solar power, but it still varies. The locations are unevenly spread, often far from where electricity is consumed.

Solar power is another intermittent source of energy which produced more than 6 TWh of electricity in Germany[1] alone in 2009, equivalent to one big nuclear or coal power plant. The integration of solar power is not a problem anytime soon, but solar is growing very fast, some 40 per cent per year globally. It may well benefit from a supergrid's capacity for balancing by the time it is operating.

Nuclear power may, inadvertently, also be a beneficiary of the supergrid. Nuclear power production fell to a record low in Sweden in 2009 (after falling four years on end) and the first months of 2010, and 2009 also saw many long stops at German, French and UK reactors. The combination of low nuclear production and a cold winter in Scandinavia led sometimes to extremely high market prices for electricity, and left hardly any capacity margin on some days. By convention, nuclear is not classified as an intermittent source of power, but in fact, whatever the reasons, it presently is so.

A supergrid connecting the Scandinavian, Irish, British, Benelux and French grids could thus solve many problems.

This fact was recognized in a political declaration by ministers[2] from Germany, France, the UK, Ireland, Belgium, the Netherlands, Luxemburg, Sweden and Denmark on 7 December, just before the Copenhagen climate COP meeting. Norway added its name later. A first meeting of officials took place in early February, followed by one at a slightly higher level in March. A secretariat is in place in Brussels, and the aim is to have a binding agreement before the end of 2010.

The cost for a full package is estimated at 30 billion euro, according to der Spiegel[3] , so it is likely that the agreement, if the deadline is met, will initially cover only a tranche of that.

The declaration nevertheless calls for fast action, as it points to the *"crucial role which offshore wind energy is bound to play in order for Europe to meet the EU's 20-20-20 targets"*.

Nine years from conception to operation is a very short time for a large infrastructure project, and some observers, such as the conservative Die Welt, have expressed doubt whether it can be done.

Nevertheless, the political declaration is more specific about the problems that have to be faced: *"The costs, associated with the development of electricity (inter)connector infrastructure are enormous and various barriers still exist (technical, market, regulatory, and policy). These are shared challenges for all the countries concerned."*

One reason to believe that the North Sea supergrid will happen is that it has strong corporate backing. The big power companies all invest big money into wind power, and equipment manufacturers such as ABB have been lobbying for similar projects for years.

1 www.ag-energiebilanzen.de/viewpage.php?idpage=118

2 The ministerial declaration can be found at www.ewea.org/fileadmin/ewea_documents/documents/policy/Offshore_Wind/Political_declaration_on_the_North_Seas_Countries_Offshore_Grid_Initiative.pdf

3 www.spiegel.de/international/europe/0,1518,670429,00.html

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