The North Seas Grid risk landscape

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Introduction and emerging landscape of future projects

For years politicians and engineers have floated the idea of building an advanced power grid across Europe's northern seas. The dream of a North Seas grid has been to tap into the huge reserves of wind power available at lower cost and with more stability than any one country could achieve on its own. Interconnected grids across the North Seas region, according to this vision, would enable increased power trading across borders and stronger energy security through resource sharing.

Despite the gloom often surrounding European investment it seems that enough private companies see the future of European energy to start to make this vision a reality. New E3G research commissioned from Redpoint consultancy shows a huge number of proposed infrastructure projects have been put forward which would - if built - deliver the backbone of a North Seas Grid. However the same research also shows that these projects - and the benefits they bring are at risk from policy uncertainty and political drift.

Overall, 13 offshore interconnectors are under development in the North Seas region with over 14 GW of capacity. 124 ‘far offshore’ wind transmission projects are in the pipeline, representing 70 GW of offshore wind capacity. In addition, three combined interconnection / offshore wind transmission projects are being developed (with up to 19 GW of capacity), with a further two projects with over 4 GW of capacity designed to trade onshore wind across borders.

If completed in full, the projects identified would transform the trading capacity and renewable production of the region. The projects would more than double the number of offshore interconnectors in the North Seas region. The ‘far offshore’ wind projects identified represent more than 11 times the total current offshore wind capacity. Countries would have a greater ability to sell power when there is a surplus, and to import electricity when supplies are tight.

> http://www.e3g.org/docs/E3G_NSG_Project_Pipeline_Analysis_-_Key_Findings.pdf
In recognition of this potential, the European Commission has designated the North Seas Offshore Grid as a ‘priority corridor’ for new infrastructure. This week, 13 of the projects assessed were designated as ‘Projects of Common Interest’, a new designation that will aim to enable faster permitting procedures and access European funding sources.

However, despite this encouraging step, the majority of projects remain at early concept stage and face high levels of risk. A number may face delays or may even not be built. Policy and regulatory barriers were identified as the highest risk factor for the majority of projects, with technology, consenting and grid connection issues seen as significant yet manageable risks.

The key challenges and the risk landscape

The unpredictability and short term nature of current electricity policies and politics is a particular challenge for network infrastructure development. Offshore grid investments are designed to operate for decades, yet current European renewables targets expire in 2020. This impacts not only future needs for offshore wind transmission, but also future cross-border power flows. A continuing uncertainty on future targets and generation investments will challenge the business case for new interconnections. Similarly, the introduction of nationally-based capacity mechanisms would undermine the value of new interconnection, as subsidised fossil generation in-country would reduce the value of cross-border trade.

Merchant lines face the highest risks to investment (but also potentially the highest returns) as their revenue streams depend on usage of the interconnector, and they also must secure regulatory exemptions. However, regulated lines also require a forward-looking policy framework as developers need to make a strong business case on future benefits to secure agreement from regulators to allow the investments to go ahead. They may also face challenges from dealing with differing permitting and regulatory frameworks on different sides of the border.

The projects identified in the analysis remain poorly coordinated between countries and between policy regimes, as a result of the lack of a joined up regulatory framework. Only three projects identified are designed to act as both offshore wind connections and interconnectors; and only a further two projects are designed specifically to trade renewable power across borders.

As a result, opportunities for cost savings through shared assets may be missed – resulting in what one grid company has labelled offshore ‘spaghetti’. ‘Combined’ projects incorporating both offshore wind transmission and interconnection can increase the utilisation rates of offshore cables and reduce the quantities of investments needed overall. They also result in fewer connections needing to be built to shore, safeguarding coastal landscapes and habitats.

However combined projects face particularly high regulatory risks and investment challenges. Regulatory regimes for interconnectors, onshore transmission and offshore

> Elia ‘High-voltage grid in the North Sea’
transmission are often very different even within a single country and vary significantly between countries. For projects that fulfil multiple functions and connect multiple countries, the uncertainty of regulatory treatment that results from this fragmented landscape is a key barrier. The absence of trading arrangements for renewable power across borders also counteracts against moving to more integrated grids.

While offshore hub technologies for combined projects are thought to be ready for commercial deployment, they are relatively untested. Offshore wind developers often do not have sufficient incentives to develop combined projects, as incorporating interconnections can add complexity for little direct reward to the project developer. A final key challenge is the need to manage stranding risks, if an offshore hub is designed to connect future offshore wind farms that then do not materialise. So far most developers have been reluctant to shoulder such risks without support.

**Overcoming challenges**

Each country in the North Seas region has the potential to gain from offshore grid projects, so a failure to develop a supportive policy environment for offshore grids would be in no one’s interest. Countries with high renewables outputs (e.g. Ireland, Denmark, Germany) can both export power and import balancing resources. Countries with flexible assets such as hydro power (e.g. in Norway and Sweden) can access new markets for the resource, and increase supply during dry years. Countries facing power capacity retirements (e.g. UK, France) can access both new offshore wind generation and imports from neighbouring countries.

Capitalising on the opportunity from offshore grids in the North Seas Region, however, will require a renewed effort to put in place a supportive policy environment. Despite the significant number of separate interconnector and offshore wind projects in the pipeline, momentum behaviour appears unlikely to deliver on the potential offered by an integrated offshore grid.

Policy and regulatory risks are within the gift of governments and regulators to manage. Existing policy initiatives such as the European Projects of Common Interest and the North Seas Offshore Grid Initiative are helpful but insufficient to ensure that the projects are built. A policy regime is therefore required that can capture near term benefits by delivering the projects currently stalled in the pipeline, while also moving towards a coordinated approach in the medium term.

Europe is currently developing a new energy and climate policy framework for 2030. The package should address the continuing hurdles faced by grid projects as well as setting a clear policy direction to guide investments.

The ‘Connecting Europe Facility’, a new €5 billion infrastructure fund, will begin operation in 2014. In order to test the benefits of combined projects and overcome the investment hurdles to early projects, innovative offshore hub projects should be prioritised for European investment.
Finally, the role of the North Seas Offshore Grid Initiative should be upgraded. It has so far addressed regulatory and permitting challenges and potential grid designs. It must now be empowered to develop a joint interconnection strategy for the North Seas region, to ensure the full potential from the offshore grid projects in the pipeline are met.