The North Seas Countries' Offshore Grid Initiative

Final 2012 report

Ministerial meeting
3/12/2012

NSCOGI 2012 REPORT (final)

Objectives of the North Seas Countries' Offshore Grid Initiative

In December 2010, a Memorandum of Understanding was entered into by ten countries, the EU Commission, ACER (Agency for the Cooperation of Energy Regulators), ENTSO-E (European Network of Transmission System Operators for Electricity) and national regulatory authorities. The ten countries involved are Belgium, Denmark, France, Germany, Ireland, Luxembourg, Netherlands, Norway, Sweden and the UK.

Its objectives are:

1. To contribute to the move to a **sustainable low-carbon economy** while maintaining **security of energy supply in a cost efficient manner**;
2. To maximise the potential of the **renewable energy** resources of the North Seas, taking account of the scale of investments required in offshore infrastructure and necessary onshore grid reinforcements;
3. To identify and **tackle barriers to offshore grid development**, in particular as regards technical, regulatory, market, planning and authorisation issues;
4. To facilitate a **strategic, coordinated and cost-effective** development of offshore and onshore grids.

The Steering Committee established 3 Working Groups to look at Offshore Infrastructure (chaired by Denmark and the Netherlands), Market and Regulatory issues (chaired by Ireland and the United Kingdom) and Planning and Permitting (chaired by France and Germany).

Key initial findings

The North Seas Countries' Offshore Grid Initiative (NSCOGI) is considered as a useful forum for discussion and information exchange by all participants. It identified and tackled barriers to a strategic, coordinated offshore grid development, in particular technical, regulatory, market, legal, planning and authorisation issues.

NSCOGI developed for the first time a grid modelling for the North Seas region for the year 2030, through a joint exercise among Governments, Transmission System Operators, the European Commission and regulatory authorities. Based on this joint effort, it conducted the *North Seas Grid Study*. This study is one of the largest undertaken so far. It takes into account the report on offshore grid technology developed by ENTSO-E for NSCOGI. This looks at the technologies available today and expected cable and converter technology developments over time.

The current grid will not fulfil the future requirements as countries continue to follow their scheduled paths towards larger capacities of both conventional and renewable energy sources from 2020 to 2030. Timely establishment of necessary grid reinforcements is therefore required.

The *North Seas Grid Study* highlights this requirement and investigated as part of this study two possible 2030 offshore grid design options connecting offshore renewable generation:

- **Radial** – point-to-point connection of offshore wind farms and shore-to-shore interconnectors, which implies continuing with mainly uni- or bilateral solutions between countries, or
- **Meshed** – coordinated offshore and interconnector design, which implies multilateral cross-border cooperation between the North Seas countries

Both design variants result in similar initial investment costs (both in the order of 30bn€) and market benefits, on the basis of the assumptions made. The similarity in results can be explained by the relatively small volume of offshore renewable energy assumed to be installed between 2020 and 2030 in this scenario.

However, the slight difference in net annual costs suggests a preference for adopting a meshed approach to grid design by 2030 (with the meshed approach being some 77 M€ p.a. less expensive than the radial approach). This difference arises from the introduction of relatively few meshed assets, but only represents a small percentage of the total costs. As such it may not necessarily be sufficient to distinguish the results from a net break-even result for either design. However, the significance of this difference has to be tested with further analysis and risk assessment.

Initial work on a sensitivity analysis including a more ambitious offshore renewable deployment resulted in more complex and integrated offshore grids. This indicates that the level and the location of offshore renewable sources is likely to determine the level of meshing that makes economic sense for the region.

The outcome of this study is not a blueprint, but a suggestion that multi-lateral cooperation between the North Seas Countries is the way to proceed. There might be additional, less quantifiable benefits such as operational flexibility and fewer landing points.

It is also expected that the meshed design might create some technical challenges. Neither of these have been investigated within the scope of this study.

The grid study assumes the absence of regulatory barriers. This may not be the case in reality but while there are differences, there do not appear to be insurmountable incompatibilities between the different countries. New offshore grid configurations with offshore renewable energy projects grouped together and connected to more than one country do pose *regulatory and market challenges*, as potentially does the interaction of different renewable support schemes.

As a first step towards addressing possible barriers, a set of high-level principles was drawn up for NSCOGI countries to use as guidelines for the development of cross-border transmission infrastructure. The principles cover issues such as planning, grid design, financing, operation of assets, ownership of assets and system charges. The aim is to move towards a more common approach towards such investments in order to facilitate coordinated offshore developments where these might prove to be cost-effective.

As there are currently no arrangements either at national or EU level for trading across assets combining interconnection and offshore generation, a range of possible options were considered. Two of these options look promising: in both, the offshore generator bids into its national hub. However in one the connection to its home country is classified as an interconnector, whereas in the other it is defined as part of the national transmission system. Both need to be studied in greater depth, with particular emphasis

on the interactions with renewable energy support schemes, how costs should be allocated and the interactions with trading over different time scales and system balancing. A number of policy options may be developed for consideration by Ministers.

Industry's decisions on investment in innovation and supply chain developments are partly based on ENTSO-E's long term grid planning and the ten Governments' policy ambitions towards 2030. In order to facilitate the necessary innovation and timely solutions for market participants, regulatory clarity and political guidance will be necessary.

A predictable decision making and efficient processing of planning and permitting procedures is essential for reaching legal certainty. This will ensure planning certainty for applicants and investment certainty for investors. The analysis carried out showed that the differences between the different countries do not act as insuperable barriers to integrated cross-border grid infrastructure development. Procedural guidelines have been developed and recommended to the competent authorities in each country in order to facilitate better coordinated planning and permitting regimes for cross-border infrastructure developments. It was agreed that efficient project management and standardization of time frames as well as improved communication, cooperation and coordination are recommended tools to accelerate decision making. This will ensure efficient planning and permitting procedures for offshore grid infrastructure, with particular attention to landfall points. These are often the most critical issue in the procedures, due to comparatively high public and local political attention.