

## Electricity grid expansion in the context of renewables

“BASREC study: Electricity grid expansion in the context of renewables integration in the Baltic Sea Region”

The overall purpose of the study is to identify the requirements and implementation challenges of electricity grid development in the BSR for the integration of a growing share of fluctuating renewables, with particular emphasis on wind power.

The study is structured around four work packages. A **review of barriers and challenges for integration of renewable energy (WP1)** focusing on the demand for new interconnectors in the region and the most important barriers to their establishment. Subsequently, a **scenario development phase (WP2)**, where a limited number of scenarios are established for electricity and district heating generation in the region in 2030. Under the scenarios the most critical bottlenecks in the electricity system are identified in the **analysis and identification phase (WP 3)**. Finally, in the **stakeholder consultation phase (WP 4)** the stakeholders in the region are invited to comment on and give input to the draft report

Preliminary findings from WP1:

- **Energy markets** in the region have become significantly more integrated during recent years. The three Baltic countries are now part of Nord Pool and with the exception of the Russian Federation market coupling is implemented between all power pools in the region. However, there is a potential for improving the coupling of intraday markets and markets for ancillary services.
- The **BEMIP plan** is of key importance to the Baltic countries. The main focus of the plan has been to integrate the Baltic countries closer into the wider EU electricity market. This objective will be achieved within the next 2-3 years with the establishment of NordBalt, Estlink II and Lit-Pol connections.
- A number of projects are implemented in the Western Part of the Baltic Sea Region, which will **strengthen North-South connections** in the region. The projects cover a wide range of issues, from internal reinforcement of the Norwegian and Swedish grids to stronger connections between Norway and Denmark, Denmark and Germany and internal reinforcements within Germany. The integration of renewables has been one of the key drivers for these projects as they will increase the transmissions capacity between areas of renewable energy surplus – in the Northern part of region (and in the Northern part of Germany) with the load centres further south.
- The existing and planned infrastructure projects are **sufficient to deal with the expected expansion of renewable energy within the 2020 time horizon**. Beyond the 2020 timeframe, the different studies reviewed point towards a need for further integration of the grids in the region, assuming that the role of renewable energy technologies will continue to increase.
- The ENTSO-E has analysed **46 “pan-European” grid projects** in the Baltic Sea Region. The projects have been evaluated according to a multi-criteria methodology. The results of the multi-criteria analysis gives indications as to what are the main barriers for developing the grid in the region.
- For example the ENTSO-E analysis reveals that 59 % percent of the projects are subject to “medium or high risk” with respect to **social and environmental impact**. In other words, the project will have (or is perceived to have) social and environmental impacts (such as impact on nature or visual impacts), which pose a risk to the implementation of the project or could mean delays.
- The ENTSO-E report also provides an assessment of the **economic consequences** of the 46 projects. A rough assessment by the consultants of the BASREC study, based on the ENTSO-E

data, indicates that 17% of the projects demonstrate good socio-economy, 57% a balanced economy and 26% a negative economy.

- The ENTSO-E analyses do not reveal how the different projects affect **stakeholder economy**. However, experience shows that the benefits of infrastructure projects are often unevenly distributed between stakeholders group (consumers, electricity producers, TSO's etc.) as well as between countries. This poses a barrier for the financing and implementation of infrastructure projects even if they demonstrate good economy for the region as a whole.
- Finally, as pointed out by ENTSO-E in its Regional Investment Plan for Baltic Sea, the large number of projects in some countries constitutes a challenge in itself, because it requires increased **implementation capacity both internally and in the suppliers market**.

The draft results from work packages 1-3 are expected to be available for stakeholder consultation in summer 2014. The final report is due be published in the autumn of 2014.