



## BEST PATHS NEW DEMONSTRATOR FOR REAL-TIME SIMULATION OF LARGE OFFSHORE WIND FARMS GRID INTEGRATION UNVEILED IN TRONDHEIM

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**Sharing solutions to better integrate renewable energies into the European electricity grid and make it more reliable is the aim of the Best Paths partners, who gathered in Trondheim (Norway) on 11 May to present the first results of the project to over 50 experts from the electricity sector.**

Within the Best Paths project, five different demonstration areas have been selected to address the challenges currently facing the European electricity sector, from the integration of renewable energies to the repowering of ageing lines and the interconnection of national grids. For this first Special Stakeholder Workshop, project partners presented the outcomes of the research conducted within the first demonstration of Best Paths, exploring solutions to certain issues that arise when connecting offshore wind farms with meshed High Voltage Direct Current (HVDC) grids.

"With the increase of renewable energies, Direct Current has become a prominent technology because it is more efficient and reliable for transmitting power coming from remote renewable energy sources, and especially from offshore wind farms. In Best Paths, we developed an innovative set of models and a simulation toolbox that can be used to test the integration of offshore wind into an HVDC grid. This is a great development to include more renewables in our energy mix," says Iñigo Azpiri, from Iberdrola, one of the major wind generation companies worldwide which is leading the activities on the first demonstration.

This set of models for the simulation of offshore wind farms integration with HVDC grids, developed in Best Paths' first Demonstration, helps to connect large offshore wind farms to the onshore electricity grid and to transmit large amounts of electricity with minimal losses.

These models have been compiled in a [simulation toolbox](#), made available to the public on the Best Paths website, to enable researchers and offshore wind project managers to test the system configuration of their choice. With the toolbox, Best Paths partners have already tested five different configurations from a simple point-to-point HVDC link to a twelve-terminal HVDC system with

offshore DC links. These different system configurations, which are constituting models likely to be adopted for offshore wind energy transmission in the upcoming years, have been assessed against several key criteria such as power quality, converter ratings, system protection and faults, fault tolerance, resonance and grid code compliance and will be refined after being tested in a laboratory environment.

After the workshop, participants also had the chance to visit the Norwegian [National Smart Grid Laboratory](#), where the models developed within the project will be tested. Within this laboratory, hosted by SINTEF Energi and NTNU (Norwegian University of Science and Technology), three modular multilevel converters with a rating of 60 kW each have already been installed and connected to a real-time simulation system. At a later stage, Power-Hardware-in-the-Loop equipment will also be added to the system to allow researchers and wind developers to test their models in a [real laboratory environment](#) and with different grid parameters. The results of the simulation will be published in December 2017.

Additionally, progress on the other four project demonstrations has been reported at the occasion of parallel poster sessions. Their detailed results will be presented in future dedicated events in the first half of 2018. If you would like to learn more about the topics discussed during this first Special Stakeholder Workshop, please click here to [download the speakers' presentations](#).

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**BEST PATHS** stands for 'BEyond State-of-the-art Technologies for rePowering Ac corridors and multi-Terminal HVDC Systems'. It involves 39 partners and with a budget of 63 million Euros that will be 56% co-funded by the European Commission under the 7<sup>th</sup> Framework Programme for Research, Technological Development and Demonstration under grant agreement no. 612748. It is coordinated by Red Eléctrica de España (REE), and is set to run until September 2018.