

Smart Management of Renewable Energies : The TWENTIES Project

Vicente González López, REE, Spain

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Abstract

TWENTIES is a collaborative research, development and demonstration (RD&D) project funded by European Commission. It aims at demonstrating by early 2014 through real life, large scale demonstrations, the benefits and impacts of several critical technologies required to improve the pan-European transmission network, thus giving Europe a capability of responding to the increasing share of renewables in its energy mix by 2020 and beyond, while keeping its present level of reliability performance.

The project is being carried out by a consortium which comprises a group of Transmission System Operators from Belgium, Denmark, France, Germany, Spain, The Netherlands, two generator companies (IBERDROLA RENOVABLES, DONG), three power technology manufacturers (ABB, AREVA, SIEMENS), two wind turbine manufacturers (GAMESA, SIEMENS WIND) and a few research and development organisations,

The plan is to perform six full scale demonstrations devoted to quantify the impacts and benefits of novel power engineering technologies, some of which already available from European manufacturers, but not yet optimally used in a coordinated way within the existing, interconnected pan European transmission grid.

The project objectives are the following:

- To show that active and reactive power control can be performed reliably with the help of aggregated wind farms, thus allowing **secondary frequency control and voltage/reactive control in the system**
- To show at large scale that **aggregating wind production with flexible loads** within appropriate regulatory schemes lead to a more secure and efficient electricity system having **high scalability** potential
- To provide the critical building blocks of DC grid control / protection strategies and DC breakers based on full scale demonstrations which will allow guaranteeing the security of future HVDC multi terminal grids.
- To demonstrate that adequate coordination mechanisms between offshore, wind farms and hydro power capacity available in Norway through an existing HVDC link brings viable solutions to securely control the power balance during offshore storm passages
- To demonstrate that adequate coordination mechanisms between Dynamic Line Rating, Power Flow Controlling Devices and Wide Area Monitoring Systems (WAMS) bring more flexibility to the electric system within affordable capital and operational costs

- To demonstrate that alternative operation parameters provided by Dynamic Line Rating and FACTS technology applied on a regional basis, do bring flexibility, do enhance security and do expand the capability of the network to evacuate more wind.
- To streamline the permitting process of HVDC off-shore interconnectors.
- To assess the impact, barriers and solutions needed to upscale the demonstration results
- To assess the benefits of replicating the obtained results throughout the entire pan European interconnected transmission system