

Optimal Operation and Planning of Insular Power Systems towards a Sustainable and Smart Grid

by

Keynote Speaker

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This Keynote Speech addresses the effects of large-scale integration of renewable energy sources (RES) and demand-side management on the optimal operation and planning of insular (non-interconnected) power systems, proposing efficient measures, solutions and tools towards the development of a sustainable and smart grid, all under the EU-funded FP7 project SiNGULAR (a 5.2 million euro project involving 11 industry partners).

A large share of the recent RES installed capacity has already taken place in insular energy grids, since these regions are preferable due to their high RES potential. However, the increasing share of RES in the generation mix of insular power systems presents a big challenge in the efficient management of the insular distribution networks, mainly due to the limited predictability and the high variability of renewable generation.

In parallel, the Smart Grid initiative, integrating advanced sensing technologies, intelligent control methods and bi-directional communications into the contemporary energy grid, provides excellent opportunities for energy efficiency improvements and better integration of distributed generation, including RES such as wind, photovoltaic, small hydro, cogeneration and wave energy systems, coexisting with centralized generation units within an active network.

The goal is the generation of effective solutions and information so that the integration of insular and highly variable energy resources is maximized. The optimal operation and planning tools have been applied in different insular energy grids in five countries across Europe for extensive demonstration, allowing the development of generalized guides of procedures and grid codes specific for future generation of smart insular energy grids.