Faial is part of the Azores archipelago, nine islands in the North Atlantic Ocean about 1,500 km west of Lisbon, Portugal. It is a volcanic island situated close to the tectonic divide between the European and North American continental plates. With a population of 15,000 spread over an area of 173 km², Faial is from a geophysical perspective the westernmost point of Europe. The island’s main activity is tourism.

The local utility, Electricity de Açores (EDA), wanted to achieve high penetration of wind generation on the island, where electricity is generated traditionally by Heavy Fuel Oil (HFO) generators. EDA launched a tender on June 2012, which was awarded to ABB in December 2012, with the installation to be finished in June 2013. The current system is based on one power station with 6 HFO generators from 1.5 MW to 3,705 MW totaling in 17MW installed capacity and 5 850 kW wind turbines totaling in 4.3 MW installed capacity. The load varies between 3.6 MW and 8.9 MW.

The system has low loads at night, where the wind power is still substantial. This could mean that at night, the minimum loading constraints on the HFO generators could be reached, if EDA doesn’t impose the curtailment of the wind farm. Without curtailment of the wind farm, a safe operation might not be given. An automatic control system would be able to automatically curtailing the wind farm to ensure a safe operation of the HFO plant. The Renewable Microgrid Controller (RMC) is able to automatically define the set points for the power production on the HFO generators and the wind turbines in a collaborative approach, to achieve the best utilization of wind power. Further, the RMC is able to
advise the operators on the optimal configuration, so they can adjust the operation of generators and turbines. Further, the RMC allows EDA to set up maximum and minimum loading constraints on the HFO generators, an intelligent spinning reserve management and also the steam production necessities for the auxiliary services. ABB’s powerful solution for renewable integration in isolated grids, the RMC 600, is proven to EDA, as they have installed this technology’s predecessor on two other islands already and maximized penetration of wind generation in these networks, reducing fuel consumption. Key to EDA was also that the RMC 600 allows a smooth future integration of the PowerStore™, or other high penetration of renewables enabling technology.

This grid stabilization device from ABB allows a further increase of wind penetration while maintaining a stable grid. Also, the RMC 600 is capable of adopting changes to the existing generators or possible extensions to the wind farm without the need for additional engineering effort.

The RMC 600 is designed to manage and automate power generation systems that integrate very different energy sources, such as thermal (diesel, HFO), wind or solar based generation. It effectively integrates renewable and conventional generation, and is a cost-effective way to maintain an optimized operation of all plant. It automates the integration of the grid’s generation resources, and by maximizing renewable penetration, reduces fuel consumption.

**Project Information**

Title: Faial Wind Farm integration
Region: Azores, Portugal
Customer: EDA, Electricidade dos Açores
Commissioned: 2013
Power system type: wind/diesel/RMC 600
Voltage: 15 kV
Frequency: 50 Hz
Installed generation capacity: 21.3 MW
5 x V52 Vestas wind turbines, 850 kW each
3 x 3.7, 2 x 3 and 1 x 2 MW HFO generators

Grid stabilization:
Peak demand: 9 MW
Minimum demand: 3.6 MW

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