



Creating a sustainable,  
fossil-free ecosystem  
with Network Manager

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Case study

# Empresa de Electricidade da Madeira (EEM)

## The customer

Empresa de Electricidade da Madeira (EEM) is a publicly-owned utility responsible for the production, transportation, distribution and commercialization of energy on the Madeira Islands: Madeira and Porto Santo. EEM has over a decade's experience managing these islands' electrical networks in conjunction with a large penetration of hydro, wind and solar photovoltaic (PV) production.

Madeira, the larger of the two islands, has roughly 130,000 customer meters and a permanent population of 260,000, with 1.2 million tourists per year. Porto Santo has roughly 5,000 customer meters and a permanent population of roughly 5,000 people, which doubles or even triples during tourist season.

## The challenges

EEM has been a user of Hitachi Energy's network management systems for about 30 years. Throughout this period, Hitachi Energy has helped EEM through several product upgrades. Now, with increasing investments in wind production and energy storage, as well as a large dissemination of solar PV on homes and smart charging for electric vehicles, a new platform capable of providing reliable and secure operations in real time was required.

EEM has partnered with Hitachi Energy to further its goal of transforming Porto Santo into a fossil-free island by creating a new energy ecosystem on the island. While it has historically relied heavily on fossil fuels, the "Sustainable Porto Santo – Smart Fossil Free Island" program aims to accelerate the energy transition to renewables and reduce the island's carbon footprint.

EEM recognized the potential vulnerabilities of its previous system and its inability to reliably operate and be managed on a small island grid. EEM desired a system that could provide control over the grid not only to increase overall security, but also to optimize resources. Additionally, EEM sought a supervisory control and data acquisition (SCADA) system to efficiently manage the rising number of renewable resources and distributed energy resources (DERs) being added to the island's power grid.

"Hitachi Energy's ongoing partnership and its Network Manager plays a critical role in EEM's ability to manage a unified network with a variety of DERs."

José Cotrim  
Director of Transport and Dispatch at EEM

## The solution

To effectively manage the large penetration of renewables required to make Porto Santo fossil free, EEM has partnered with Hitachi Energy to use Network Manager, an integrated network operations platform that includes advanced distribution management system (ADMS) capabilities, to extend grid control and optimization. Network Manager will provide the functionality for EEM to optimize the safe and efficient operation of sub-transmission, medium- and low-voltage distribution networks on the Madeira and Porto Santo islands.

With Network Manager, EEM will be able to efficiently manage their distribution assets, as well as adequately prepare for the changing world of distribution – improving reliability and reducing the impacts of outages.

Network Manager will provide interoperability and increased functionality to EEM across a range of smart grid solutions, including assets from other ongoing projects, including the implementation of a Schneider Electric® AMI system and IEDs and an EV2G project with Renault® electric vehicles. The resulting smart grid is able to be remotely controlled from the ADMS, providing automation and fault location for fast and reliable operation of the grid to optimize the use of PVs for car charging. Network Manager will also work with the Renault EV program to analyze data from various charging points to learn how to adjust charging habits to optimize the penetration of renewables.

As an integrated distribution operations platform, Network Manager also includes an outage management system (OMS), which will be deployed at EEM. This functionality is critical to equipping EEM with tools to manage key processes in the outage management lifecycle, in real time, especially given the continual influx of energy assets being placed on the grid. In addition to improving EEM's response to outage incidents, the OMS functionality proactively provides information about the forecast impact of planned outages and timely updates for existing outages. This provides crucial insight for utilities operating on an island vulnerable to severe weather and natural disasters.

EEM is also currently installing an Hitachi Energy four-megawatt energy storage system (ESS) in Porto Santo. This storage system will store power from the islands' intermittent wind farms and solar generation sources to minimize, and eventually decommission, Porto Santo's diesel generator.

## The results

With Network Manager in an active testing phase at EEM, there are already some clear benefits that EEM is anticipating upon full implementation of the solution:

### Increased grid control

Network Manager provides EEM the ability to gain visibility of the complete grid including the LV networks as well as remote control access through its highly automated network. This level of automation empowers EEM to manage the increasing number of DERs, as well as planned and unplanned outages.

### Open architecture

Due to its ability to interoperate with other information technology and operations technology systems, Network Manager provides EEM the functionality to integrate existing information technology and operations technology systems from other manufacturers. With several manufacturers working on ongoing projects in conjunction with Hitachi Energy on the Madeira islands, Network Manager provides a platform to seamlessly integrate all systems.

### More energy usage information

The level of automation within Network Manager provides EEM with copious amounts of energy usage information from their end-users. These behavioral insights allow EEM to better understand end-customers and how they're consuming energy, a key insight for continuing to push for a fossil free island. Network Manager applies smart analytics to this deluge of data, helping EEM to draw actionable insights to inform their operations in real-time and plan for the future. Information like this is key for utilities, like EEM, to cope with the ongoing change of the energy production paradigm.

Network Manager provides EEM complete visibility of the grid, across the traditional boundaries of transmission and distribution networks down to the consumer meter point. With the network's integrated operations platform, which gives operators absolute control of their networks, EEM is set to continue onboarding renewables on the island's grid in a safe and reliable manner.

“Network Manager lays the path for future reliable renewable generation on the Madeira Islands through its operational efficiencies, renewables integration, improved reliability and grid resilience.”

José Cotrim  
 Director of Transport and Dispatch at EEM

ADMS operator views of the EEM Porto Santo MV and LV networks and DER



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