



BRINGING CLEAN POWER TO THE CARIBBEAN

Flexible power generation technology answers Honduras island's energy demands

A major sustainable energy transition is happening in the Caribbean. Heavy fuel-based economies and vulnerability to extreme weather see the region pushing for greater resiliency and energy security. Upgrades to existing infrastructure are supporting the increased demand for energy capacity brought by tourism. So is the case off the northern coast of Honduras on the island of Roatan, where a robust sustainable energy investment strategy is accelerating the region's clean energy transition. The modernisation of the local Roatan power system via the integration of renewables and flexible generation has already delivered long-term economic growth for a population of approximately 60,000 inhabitants.

Modern power system with flexible energy solutions

Progressive and environmentally conscious Caribbean utility Roatan Electric Company (RECO) is leading that change. Since 2015, which saw the installation of the island's first wind power plant, the utility has been upgrading its existing power system to operate to maximise efficiency and integrate renewables at a large-scale. The island's 3.9 MW wind farm, 12 MW of solar PV, 28 MW Wärtsilä power plant with four 34SG engines running on LPG, and a nine-kilometer underwater subsea cable, are all examples of how RECO is introducing flexible power generation to effectively absorb current and future system load variations. The result: clean power, and expanded distribution network to two nearby islands.

Flexible added capacity

Notably, in 2016, the island reduced its carbon footprint by a quarter and improved its electricity supply by introducing a 28 MW power plant of Wärtsilä 34SG-LPG engine generating sets. The solution of liquefied petroleum gas (LPG) engines run on propane, and with multi-fuel capabilities, enables RECO to efficiently manage generating assets, maximising generating cost. The ability of Wärtsilä's SG engines to perform efficiently at ambient temperatures and with minimal water consumption (the benefit of a closed-loop cooling system), was an important consideration to operate in the local climate.

"We greatly appreciate Wärtsilä's support in arranging fast delivery of this energy storage system. Electricity demand continues to increase on the island, and by integrating energy storage to our already efficient engine power plant, we will be better placed to meet this demand and ensure grid stability. The energy storage will allow the further integration of intermittent and variable solar, wind and other future resources into the existing system. Increased grid reliability is an important factor for investors."

Matthew Harper, Director of Operations RECO.

Storage tech optimises engine plant performance and facilitates renewables integration

Existing operational and infrastructure challenges are related to high energy costs and fuel consumption as well as other difficulties associated with operating an isolated distribution grid, has spurred a renewables shift for Roatan. And it has not stopped at a more efficient power plant.

Wärtsilä’s solution was an energy upgrade—including a new 10 MW / 26 MWh energy storage system and advanced control platform—that introduced flexibility into the local Roatan grid. While the batteries secure reliability by eliminating the need for mechanical spinning reserve, Wärtsilä’s sophisticated GEMS energy management software controls Roatan’s entire energy system, including enhancing earlier delivered Wärtsilä engines and solar panels. GEMS provides data visibility into the entire system, including load forecasting, and has enabled the optimisation of the (load) data and system assets. GEMS also enable the further integration of intermittent and variable solar and wind resources into the existing grid.

These energy optimisation capabilities have increased the reliability of the system, as well as prepared the Roatan hybrid power system for a shift to large-scale renewables integration. Both have resulted in continued island investments in infrastructure—from new roads to streetlights—as Roatan adopts sustainable energy solutions. It is expected that by the end of 2021, more than 20% of the delivered island energy will come from renewable sources.

Future lies in renewables

RECO and Wärtsilä share an ambitious vision of leading a clean energy future. This future lies in renewables integration,

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SITE SIZE: 10 MW / 26 MWh

SITE LOCATION: Roatan, Honduras

APPLICATIONS: Renewables integration, Engine+, Grid reliability, Island grid

SCOPE OF SERVICES: Engineered Equipment (EEQ)

DELIVERY: 2020

| THE CHALLENGE | WÄRTSILÄ’S SOLUTION | BENEFIT |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> Secure energy reliability in extreme weather and for an island grid with fluctuating energy demands. Introduce the quick dispatch of back-up (thermal) generation via an advanced control system. Facilitate the integration of more renewables into the grid and seamless synchronisation and optimisation of these intermittent assets. | <ul style="list-style-type: none"> Smart energy storage system that provides virtual spinning reserve capacity to maintain the stability of the grid, particularly important for the energy security of an island grid. Tertiary control of GEMS energy management platform that optimises the entire hybrid system, including existing power plant with Wärtsilä engines, as well as solar PV and wind. | <ul style="list-style-type: none"> Storage and GEMS bring grid flexibility and enable further renewables integration into the local grid. Increased grid reliability and a reduction in blackouts has resulted in considerably more investment towards improving the infrastructure on the island in general. |

and storage is a critical part of the fast-acting, flexible and efficient (backup) generation technology required for the ambition to be realised. Hybrid projects like RECO are particularly well-suited to geographies like Roatan which traditionally rely on expensive diesel to meet their power needs. The addition of GEMS introduced a fully optimised approach, and it can now work around and with existing wind and thermal generation towards cleaner, more reliable and more efficient energy.

RELATED RESOURCES

[Wärtsilä Smart Storage Technology](#)

[Wärtsilä Energy Solutions](#)

[Wärtsilä GEMS energy storage technology to enhance Wärtsilä engine plant and integrate renewables in Honduras](#)

[Wärtsilä supplies 28 MW propane power plant to Honduras](#)

[Wärtsilä 34SG-LPG leaflet](#)

