Graciosa Island Grid

Grid control, integration and optimisation

Heavy dependence on fossil fuel imports, coupled with a growing climate crisis, puts islands around the globe in a very unique bind as it relates to energy security. Relying on oil, diesel and natural gas shipments has been a very expensive endeavor and traditionally the only option for these isolated communities. That is until now. Integrating renewable energy has not only become an economically viable alternative, it’s also a sustainable one.

Graciosa, a Portuguese territory located in the northern Azores, is one of many islands pursuing a hybrid approach to island grid energy generation, combining wind, solar, energy storage and thermal generation. Led by Graciolica Lda, the project will combine solar and wind generation, together with energy storage using lithium-ion batteries supplied by Leclanché SA. This project represents the journey towards a 100% renewable energy future with an integrated power system combining renewables, engines and energy storage that will deliver both economic and environmental benefits.

“Our investment will help create a renewable energy asset that will deliver both economic and environmental benefits. This project represents the future direction of the global energy sector with an integrated power system combining renewables and energy storage. We appreciate Greensmith’s professionalism in providing the software needed to expand the functionality of the microgrid to create overall system reliability and performance.”

Scott Macaw, Director, Graciolica Lda
Solution: Island Grid

Supplying energy for an entire island community entails a unique skillset beyond simply connecting inverters and batteries – which is why Graciolica Lda engaged Greensmith Energy, a Wärtsilä Company. Leveraging the industry-leading Greensmith Energy Management System (GEMS), the Graciosa island grid will be able to address baseload supply requirements while accommodating fluctuations in output that are inherent to energy supplied from renewable sources, such as solar and wind.

The optimisation and monitoring capabilities of the GEMS platform will maximize the performance and longevity of the Graciosa energy system. Data inputs from SCADA, electric meters, HVAC, as well as weather forecasts are evaluated within GEMS for optimal energy distribution. But the relationship doesn’t stop with the deployment. Greensmith will also provide software maintenance services under a five-year agreement.

Results: A Path to Energy Independence

Upon completion, the Graciosa Hybrid Renewable Power Plant will enable 1 MW of solar, 4.5 MW of wind power and 6 MW/3.2 MWh energy storage system to be supplied to the local grid, reducing the islands’ reliance on petroleum imports and significantly reducing greenhouse gas (GHG) emissions. Graciolica Lda’s end client, local utility EDA, anticipates this investment will boost renewable energy consumption from 15% to 65% once the plant is fully operational in late 2018 and eliminate the need for 17,000 liters of diesel per month. Not only does this reduce the island’s carbon footprint, the hybrid island grid will also greatly impact the cost of energy going forward.

KEY DATA

CUSTOMER: Graciolica Lda

SITE SIZE:
1 MW of solar, 4.5 MW of wind power and 6 MW/3.2 MWh energy storage system

SITE LOCATION: Azores, Portugal

APPLICATION:
- Integration of renewable energy
- Optimisation of multiple generation assets

OPTIMISATION:
- Engine and battery economic dispatch
- Renewable curtailment
- Engine operating constraints
- Grid quality and spinning reserve requirements

Technology-neutral
GEMS has been integrated with 16 different batteries and 10 power conversion systems.

Maximise system ROI
Advanced algorithms maximise battery performance and longevity.

Increased value
Enables additional value streams such as frequency regulation, spinning reserve or VAR support.

Efficient O&M
GEMS provides a comprehensive view of expected performance over the system’s lifetime.

As one of the largest providers of energy storage software and integration services, Greensmith’s mission is to make energy storage a fundamental part of a cleaner, more intelligent and more distributed energy infrastructure. Now in its fifth generation, Greensmith’s GEMS software platform optimises the performance of energy storage by lowering costs and maximising the system’s return on investment throughout its life.