

# STATCOM case study

## Punta Lima wind farm

### Dynamic VAr compensation for grid code compliance

A wind farm in Puerto Rico, challenged to comply with strict interconnection requirements, chose ABB to deliver reactive power compensation, voltage ride through, frequency response and ramp rate support.

With high energy prices, Puerto Rico has been implementing renewable energy to manage costs and promote their energy independence. To that goal, a wind farm was developed on the eastern coast of the island, facing the winds of the Atlantic. The Punta Lima wind farm includes 13 wind turbines with capacity to meet the energy demands for 9,000 homes in several towns in the area.

Power regulators in Puerto Rico need to ensure that wind and solar plants have minimal impact on the entire network. As a result, strict interconnection requirements have been put in place requiring a STATCOM solution. ABB provided a 12 MVar containerized VArPro STATCOM unit, along with a switched capacitor bank and a switched shunt reactor. This solution allows the wind farm operator to automatically control the amount of reactive power, address voltage stability, limit grid impedance, and enhance the power output of the wind farm.



#### Key project data

Scope of supply	12 MVar STATCOM in a single 48' ISO container Two external transformers, switched capacitor bank and a switched reactor Site controller
Power demand	23.4 MW wind farm connected to 115kV grid
Requirements	Meet PREPA requirements for interconnection requirements

#### Wind farm operation benefits

Grid code compliance, including reactive power compensation and voltage control
Maximize profitability, including protection against faults, voltage drops, and other issues that can stress equipment, lower power output and revenue
Improve network reliability, securing the electrical grid and enabling renewable power implementation



Punta Lima wind farm in Naguabo, on the windy eastern coast of Puerto Rico. The site provides 23.4 MW of renewable power generation to thousands of residents and businesses in the region.

### What is a STATCOM?

A STATCOM (or Static Synchronous Compensator) is a voltage regulating device. It is based on a power electronics voltage-source converter and can act as either a source or sink of reactive AC power. It is a member of the Flexible AC transmission system (FACTS) family which detects and instantly compensates for voltage fluctuations or flicker, as well as controls power factor. As a fully controllable power electronic device, the STATCOM is capable of providing both capacitive and inductive VARs.

### STATCOM benefits

- Power factor control
- Voltage regulation
- Independent phase control
- Flicker reduction
- Active harmonic filtering (application specific)
- Multiple system parallel control
- High and low voltage ride through
- Modular inverter blocks for simple long term maintenance
- Flexible transformer integration for optimal footprint and low installation costs
- Optional overload capacity up to 300 percent



ABB's 48 foot containerized STATCOM solution, installed at the Punta Lima wind farm.

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