



# Enabling a flexible future for ERCOT Creating the largest merchant battery system in the world

# The Story

Texas' ERCOT market is in need of flexible, dispatchable resources to adapt the grid to more frequent extreme weather, manage growing volumes of intermittent resources and provide fast-responding generation. These resources will need to bear the burden of repeated daily cycling that will help the aging and inflexible legacy thermal fleet retire gracefully, while ensuring system reliability. Since 2019, Texas has annually doubled its solar capacity. The state is on track to have the most solar capacity in the entire country by 2025 and already hosts more installed wind capacity than most countries.

Wärtsilä delivered two major interconnected energy storage systems in South Texas totalling 200 MW that are owned by Eolian L.P. (Eolian), a portfolio company of Global Infrastructure Partners.

### Batteries are bigger and better in Texas

With over 500 megawatt-hours (MWh) of capacity as a combined project, Madero and Ignacio is the world's largest fully-merchant and market-facing energy storage facility built to date. The facility's multi-hour continuous dispatch capability provides the longest duration of any energy storage assets currently operating in ERCOT. "Madero and Ignacio are the definition of functional dispatchability and will keep the lights on while keeping electricity affordable."

Aaron Zubaty, CEO, Eolian

Madero and Ignacio adds much needed year-round reliable operational ramping capacity to Texas' grid. It can react instantaneously to sustain electricity output and keep the lights on when power generation fails or cannot respond quickly enough to rapidlychanging conditions.

## Overcoming all obstacles

Construction of the facilities began in January 2021 to meet the rapidly evolving flexibility and reliability needs of the ERCOT market, amidst challenging market conditions marked by supply chain constraints.

Wärtsilä and Eolian worked diligently to construct this critical piece of grid infrastructure throughout an exceptionally difficult period that included a global pandemic, severe supply chain disruptions, volatile commodity prices and a complete redesign process of the ERCOT electricity market. Despite these challenges, they preserved to complete the project that serves a power grid and market experiencing rapid load growth in tandem with repeated extreme summer and winter weather events.



The challenge	Wärtsilä's solution	Benefits
<ul> <li>Meet the rapidly evolving flexibility and reliability needs of the ERCOT market.</li> <li>Deliver grid infrastructure during a difficult period including a global pandemic and severe supply chain disruptions.</li> </ul>	<ul> <li>Completed project on time and without large cost disruptions.</li> <li>GEMS monitors and controls the flow of energy.</li> <li>Wärtsilä's Storage+ solution delivers key ancillary services required for grid stability.</li> </ul>	<ul> <li>Flexible capacity for grid support and energy resource optimisation to ensure a smooth transition from older inflexible generation.</li> <li>Improve grid stability in Texas after several extreme weather events with fast-ramping resources that can quickly adjust to unforeseen conditions driven by supply or demand volatility.</li> <li>Provide year-round reliable operational ramping capacity in ERCOT.</li> </ul>

Texas needs more flexible resource solutions like energy storage for grid support and energy resource optimisation. The project will help the grid adapt to more frequent extreme weather events. Fastresponding generation will help the market transition between high-and low- volume hours of renewable energy penetration and allow aging, inflexible and increasingly fragile generators to remain available for deep reserve needs, thereby keeping system costs low.

# Putting the best hardware and software forward

The facilities are optimised with both Eolian and Wärtsilä's software solutions. Wärtsilä's GEMS Digital Energy Platform is a critical aspect of the system, which monitors and controls the flow of energy, enabling these projects to provide grid support during periods of grid instability. With Wärtsilä's Storage+ Solution, the projects will deliver key ancillary services required for grid stability, such as fast frequency response and frequency regulation. The Madero and Ignacio sites are the first systems to use GEMS to qualify for fast frequency response in the ERCOT market.

The project includes Wärtsilä's GridSolv Quantum, a fullyintegrated modular and compact energy storage system that offers the lowest life cycle costs, fastest deployment times, highest quality control and maximum flexibility. GridSolv Quantum is certified to UL 9540 and 9540A by Eurofins MET Labs along with CSA, and is fitted with several safety features.

#### **Related Resources**

Wärtsilä GEMS Digital Energy Platform

Wärtsilä and Eolian complete 200 MW standalone energy storage facility in Texas, the largest merchant battery system in the world

Wärtsilä to supply and maintain two major interconnected energy storage systems for Texas grid services



# Site size:

200 MW / 500+ MWh

#### Site location:

South Texas, USA

#### **Applications:**

Storage+, Ancillary Markets (Fast Frequency Response (FFR), Frequency Regulation, Responsive Reserve Service (RRS), ERCOT Contingency Reserve Service (ECRS), Non-Spin (NSRS)), physical energy trading, new ERCOT capacitybased products depending on final market rules

#### Scope of services:

EEQ (Engineering, Equipment, Delivery), Service+ GAP

Delivery: 2023



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