

Gulf Wind Project

Using Radar to Protect Birds and Bats

Kenedy Ranch, Kenedy County, TX

Photography by Christine Coates, Editor, Wind Today



John Calaway, founder of Superior Renewables, and now director of wind development for Pattern Energy, Houston, TX, grew up in Corpus Christi.

Calaway knew from his early years that the wind resource in south Texas along the Laguna Madre on the Gulf Coast near Sarita – was strong. It just took a while to prove it and then to secure approval to harvest the wind while still protecting the unique surrounding habitats.

Now, the 283.2 megawatt (MW) Gulf Wind Project which is owned and operated by Pattern Energy and located across approximately 7,300 acres of the John G. and Marie Stella Kenedy Memorial Foundation portion of the 230,000-acre Kenedy Ranch is one of two wind farms sited on the ranch.

The other, the 404 MW Peñascal I and II wind project, is owned and operated by Iberdrola Renewables, Portland, OR, and operates on the John G. Kenedy Jr. Charitable Trust property.

These are the first wind farms to operate in coastal south Texas, and their development and construction generated heated opposition from environmentalists and from their neighbors – representatives of the adjacent King Ranch.

Efforts to address opponents' concerns

and to build and operate a wind farm in such a remote and ecologically unique site have required Gulf Wind owners to employ some innovative methods in its development, construction, and operation.

Development

According to Rick Greiner, environmental manager, Pattern Energy, Superior Renewable Energy LLC began pursuing development of a wind farm on the Texas Gulf Coast in 2003.

When Babcock & Brown, Sydney, Australia, acquired Superior Renewable Energy in 2006, Gulf Wind was part of the portfolio.

In 2007, says Greiner, Babcock & Brown divested its assets, making its development pipeline and employees available to investors. At that time, private equity firm Riverstone Holdings LLC and the company's executive management team purchased the energy business and development pipeline to form Pattern Energy Group LP.

Meanwhile, Babcock & Brown continued development and construction of the Gulf Wind Farm.

In 2007, according to news reports, representatives of the neighboring King Ranch teamed with local environmental groups to try to stop development of wind farms ▶

Facility Highlights

Location: Armstrong, TX – Kenedy Ranch near Sarita

Size: Approximately 7,300 acres

Distance between towers: Approximately 900 to 1,000 ft.

Developer: Superior Renewables/Babcock & Brown

Owner: Pattern Energy Group LP

Project capacity: 283.2 MW

Power contract: Merchant

Connector & transmission system:

American Electric Power

Substation: Designed by MES. Operated by Pattern Operators LP

Utility: American Electric Power

Commissioning: Mitsubishi Power Systems

Date on line: July 2009

Power output: 283.2 MW

Turbine Features

Turbines: Mitsubishi MWT95/2.4 MW

Tower: Dong Kook – Korea

Blade Length: 46.2 meter (161 ft.)

Pad construction: RES Americas-spread footing

Rotor: 95 meter (311 ft.)

Onboard computer: Mitsubishi Power Systems

Gears: 3-stage planetary

Transformer: Dry type 34.5 kV primary. 690 v secondary.

Other: Special corrosion resistant tower coating.

Key Personnel

Operations & Maintenance Director: Pat Collier

Assistant Facility Manager: Bobby Owens

Subcontractor personnel: 25





Pattern Energy has installed MERLIN SCADA radar technology for real-time bird mortality risk mitigation.



The Gulf Wind farm is located on the Kenedy Ranch along the Gulf coast in south Texas.



Bobby Owens



Rick Greiner



Power generated by the 118 turbines runs through 115 junction boxes to 14 different collection circuits.

on the Kenedy Ranch. The groups cited concern about potential damage to coastal wetlands and wildlife.

Once legal challenges were dismissed in 2008, construction began on the wind farm.

Construction

RES Americas, Broomfield, CO, constructed the wind farm which is comprised of 118 Mitsubishi MWT 95/2.4 MW turbines.

The towers came from Dong Kook, Korea, and the blades were manufactured by Vientek—a joint venture of Mitsubishi Power Systems Americas Inc., Orlando, FL, and TPI Composites Inc., Warren, RI—at its Juarez, Mexico plant.

According to company reports, approximately 450 people were employed during construction.

In order to avoid any wetlands impact, says Greiner, roads were sited around surface water features.

“The Army Corps verified that our delineations were accurate and the roads wouldn’t impact wetlands,” says Greiner.

“The area is a sand plain with very flat terrain and advancing and retreating sand dunes,” explains Greiner. He says wind tidal flats and oak motts (stands of oak trees) also had to be considered.

The foundations are all spread footings and, because of proximity to the coast and saltwater, a special corrosion resistant coating was used on the towers, and rebar foundation studs were coated in grease and paint then covered with a plastic cover.

“We have to keep on top of any potential corrosion issues because salt can impact both metal turbines and concrete foundations, says Owens.

As part of the effort to ensure the reliable construction of foundations, he explains, a test foundation was poured to measure the integrity of the form and make sure the concrete reached the proper consistency.

Greiner further reports that Mitsubishi

turbines were selected because they are hurricane rated—a concern proven valid when the September 2008 Hurricane Ike caused a slight delay in construction.

Construction was completed and Gulf Wind became operational in July 2009.

In March 2010, Pattern Energy announced its acquisition of the Gulf Wind farm from Babcock & Brown. Pattern Energy now owns and operates the wind farm.

Operation

Bobby Owens has been the assistant site manager at Gulf Wind since September 2010.

Owens and Site Manager Pat Collier are Pattern Energy employees who work with the 25 Mitsubishi personnel who work full-time at the site. Owens says up to 12 additional part-time staff are employed periodically for special projects.

One of Owens’ responsibilities is to greet visitors with site induction training which includes a careful explanation of safety rules—a big job in an area where weather, wildlife, and geography can endanger people.

Weather. Owens says Gulf Wind has emergency action plans that correlate with the severity of potential events. He says the meteorological department at Pattern Energy’s Houston offices monitors both weather and bird and bat migration daily and sometimes hourly.

“We will get a seven-day advance notice if there is a possibility of a storm and then they will track it on an hourly basis,” says Owens.

If a severe event like a hurricane is expected, he explains, turbines will be shut down and the site evacuated until the site has been assessed for safety following the storm.

“People are our biggest asset,” says Owens. “Their safety comes first, so we remove them from the site,” he explains.

Wildlife. According to Owens, wildlife common to the Kenedy Ranch includes badgers, javelinas, nilgai, coy-

otes, wild turkey, Mexican eagles, black widow spiders, scorpions, and snakes.

"We take snakes extremely seriously," says Owens who reports that rattlesnake sightings are common.

"Every truck has at least one pair of gators (leg coverings to protect from snake bites) and we mow around the base of turbines to help keep the grass short enough that workers can see snakes," says Owens.

Geography. Because the wind farm is in such a remote location (a 45-minute drive from the entrance to the ranch), Owens says the site is set up with Halo Flight, an emergency evacuation service.

Wind farm trucks also carry safety kits which include basic first aid supplies including a defibrillator.

Collection System

Another of Owens' responsibilities includes management of the wind farm's substation and collection system.

According to Greiner, AEP built an extension to its transmission line to connect the wind farms on Kenedy Ranch to its existing line.

Owens explains that the power generated by the 118 turbines runs through 115 junction boxes to 14 different collection circuits which carry it to the wind farm's 345 kilovolt (kV) substation.

The power collected at the substation connects directly onto AEP's 345 kV main line at the substation via bus bar. From there the power moves to AEP's Zorillo substation which collects power from both Peñascal and Gulf Wind, then carries it out to the Aho substation near Highway 77, then onto the grid.

Greiner says power generated at Gulf Wind is sold on a merchant basis.

Owens explains that a feature unique to Gulf Wind related to the collection system is a silicon-based coating added to the insulators to prevent arc and track across the lines.

"The humid Texas environment can lead to grid events in the 345,000 volt substa-

tion," says Owens. He explains that Gulf Wind hasn't had an outage due to arc events since they began coating the insulators.

Radar

According to Greiner, Gulf Wind is in a migratory corridor for birds approaching Baffin Bay.

In order to help alleviate concerns about migrating birds, Greiner explains, Pattern Energy has installed MERLIN SCADA radar technology for real-time bird mortality risk mitigation.

The early warning radar system – which has been developed and manufactured by DeTect Inc., Panama ▶

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City, FL—detects approaching bird activity, assesses mortality risk conditions, and automatically activates mitigation responses, including the idling of all turbines when appropriate.

The technology was originally developed for the U.S. Airforce and NASA to reduce bird-aircraft strike risk.

Greiner says the system can run 24 hours a day, seven days a week, 365 days a year.

“Using this system,” says Greiner, “we have built the largest radar database of any wind farm in the world.”

He says most systems’ use is limited to migratory periods. However, this system is run continuously along with another identical system operated by the neighboring Peñascal wind farm.

“During spring migration,” says Greiner, “each wind farm moves its radar to the southern edge of its site to see birds coming. In the fall,” he says, “we move the radars to the north.”

In addition to operating the radar system, Pattern Energy contracts with Western EcoSystems Technology, Inc. (WEST), Cheyenne, WY, for post-construction biological monitoring at the wind farm.

Greiner says this is the second year Pattern has conducted post-construction searches. He explains that the search companies conduct daily fall and spring migratory searches and eight-day searches before and after those seasons.

“The first year,” says Greiner, “environmental consulting firm TX-ESA, Kingsville, TX, used trained dogs and now in the second year WEST uses human searchers.”

In the first year, he says, findings indicated an annual mortality rate of 2-4 birds per megawatt and 7-9 bats per megawatt.

“Looking at all the site results WEST publishes,” says Greiner, “our bird rate is low to average and bats are average.”

Christine Coates, editor

Gulf Wind Farm Supplier List

Blades.....	Vientek (Mexico)
Blade Protection	IEC Class 1
Bolts & Fasteners	Mitsubishi Power Systems
Certification & Testing	GL Garrad Hassan
Concrete Services	RES Americas
Construction Services.....	RES Americas
Controls/Monitors.....	Mitsubishi Power Systems, GL Garrad Hassan
Crane Rental	Turner Brothers, TNT Crane
Electrical Contractor	CG Power Solutions (formerly MSE Power Systems)
Electrical Interconnection	American Electric Power
Electrical System Design.....	CG Power Solutions
Engineering & Planning.....	CG Power Solutions, Garrad Hassan
Environmental Consulting	West Environmental
Excavation Services.....	RES Americas
Feasibility Studies	CG Power Solutions
Fiber Installation	RES Americas
Field Services	Mitsubishi Power Services
Foundations	RES Americas
Generator Services	Mitsubishi Power Services
Grid Connection Equipment	HVB AE Power Systems
Inspection Services.....	RES Americas
Lubricants & Filtration Equipment.....	Mobil, Hydac
Maintenance.....	Mitsubishi Power Services
Nacelles.....	Mitsubishi Power Services
Operation & Maintenance.....	Mitsubishi Power Services
Project Management	Pattern Operators LP
Reactive Compensation Equipment	Joslyn
Safety Products.....	SALA, MSA
Software.....	Mitsubishi Power Services
Substation Design	CG Power Solutions
Tools & Tensioning.....	Hytorc
Torque Wrench Calibration.....	Wind Turbine Tools
Towers	Dong Kook
Tower Erection	RES Americas
Training	AVO
Transformer	GE Prolec
Transmission Services	American Electric Power
Transportation & Logistics	FedEx
Turbine Performance Monitoring.....	GL Garrad Hassan
Utility	American Electric Power