



Innovative Collector System Reduces Wind Plant Costs

S&C Featured Solution: Renewable Energy Interconnection

Location: Southeastern United States

CUSTOMER CHALLENGE

A major North American wind developer wanted to build a large wind plant along the Gulf Coast. Their goal was to generate approximately 200 MW of renewable wind energy annually, enough to power nearly 54,000 homes. They chose this location because coastal winds could produce more power during peak demand periods than plants farther inland. The plant would be their first U.S. and first coastal project using more than 100 Vestas® V82 1.65-MW wind turbines.

The developer needed a highly reliable, efficient collector system to deliver wind energy from the turbines to a collector substation . . . and then on to the transmission grid. They needed an innovative solution that would cut up-front and operating costs, minimize power losses, and protect their equipment investments. And, they needed this complex system engineered and completed in a relatively short timeframe, so that they could quickly realize returns from their new plant and deliver clean power to the grid.

Wind plant's 138-kV bus and interconnect, engineered by S&C.



“The successful completion of this project helped prove the value of grounding breakers as an economical alternative for protecting critical equipment at wind plants.”

—Dan Girard, Director of Renewable Energy and Energy Storage Business Development, S&C

S&C SOLUTION

Because of its experience developing collector systems for wind plants of all sizes, S&C was chosen to plan, design, and commission the collector system and interconnection substation. To protect the plant's turbines and other equipment, and ensure efficient operations, a well-designed grounding system was needed. Typically, wind farms use grounding transformers to limit temporary overvoltages

due to faults on the collector system. Without grounding transformers, overvoltages can damage collector system cables, arrestors, and the wind turbine transformer. But installing a grounding transformer on every feeder would increase equipment, labor, engineering, and installation costs, as well as the substation's footprint.

S&C's solution delivered groundbreaking benefits to a major wind plant, including almost \$1 million in savings.



S&C had a much more economical, innovative solution in mind . . . grounding breakers, an emerging alternative to grounding transformers. The industry was just starting to use grounding breakers in wind plant collector systems with positive results, and S&C knew they were the right fit for the project. By eliminating grounding transformers' high costs and core losses, grounding breakers provided significant up-front and long-term savings, while increasing system efficiency.

S&C's comprehensive services and end-to-end project management provided the groundbreaking solution this developer needed. S&C's services included complete engineering studies, planning, system installation, testing, and commissioning. S&C ensured that all of the customer's SCADA components communicated properly . . . and they implemented effective fault protection and coordination systems, including programming all protective devices and schemes.

VALUED OUTCOME

S&C delivered a collector system and interconnection substation that met the customer's specifications and schedule . . . while dramatically reducing their wind plant costs and helping increase efficiency with grounding breakers. The customer estimated their initial savings at close to one million dollars. S&C also conducted onsite support and training to ensure that the customer's personnel had a solid grasp on every aspect of system and substation operations. With S&C's assistance, this Gulf Coast wind plant started operations in 2009 and continues to feed renewable energy reliably and economically to the grid.



Pad-mounted transformer connected to wind turbine base.



Aerial view of wind plant substation, turbines, and laydown yard.