



# Mining Company Gets Clean Power Source

**S&C Featured Solution:** Engineering, Procurement, and Construction services

**Location:** Great Falls, Montana

## Customer Challenge

United Materials of Great Falls, Montana, operates a large mining facility. It had been powered by five diesel generator sets, ranging in size from 500 to 1000 kW. But the high costs of diesel fuel and generator maintenance, along with reliability concerns, led the owner to consider other options. Working with Exergy Development Group and S&C's Power Systems Solutions engineers, United Materials decided to construct a wind farm with an interconnection to the transmission system of the serving utility, Northwestern Energy.

The Horseshoe Bend Wind Farm would consist of six 1500-kW wind turbine generators with an overall peak generating capacity of 9 MW. The wind farm would replace the generator sets and, during operating hours, provides 4 MW of power to the mining facility and 5 MW of power to Northwestern Energy. During off hours, the entire 9 MW would be delivered to Northwestern Energy.

The distribution system would be configured to allow the maximum generated capacity, or any portion thereof, to be delivered to the facility.

The project would require a new 34.5-kV wind-turbine collector system, including pad-mounted transformers, medium-voltage power cable, fiber-

optic communication cable, turbine-tower grounding provisions, and power and control wiring to the turbine towers.

A new 10.5-MVA, 100/34.5-kV substation would be needed as well to connect the wind farm to the transmission system. Medium-voltage overhead distribution line extensions, underground cable duct banks, low-voltage distribution transformers and circuit breakers, and fiber-optic communication equipment would be required to connect the substation to the mining facility.

## S&C Solution

As turnkey contractor, S&C was responsible for all aspects of engineering, design, procurement, construction, testing, and commissioning of the wind-turbine collector system and substation.

S&C's services included:

- Project management
- On-site construction management
- Permitting
- Engineering calculations and studies, including fault current analysis, protective device coordination, load-transfer calculations, and voltage stability analysis
- Civil, structural, and electrical design and engineering—and construction—of the wind-turbine collector system, the substation, overhead distribution line extensions, and underground cable duct banks
- Equipment installation
- Testing and commissioning

The project was in two phases. The substation would be constructed first, and then the wind-turbine collector system.

The substation was completed and placed online. This allowed United Materials to decommission the diesel generator sets and connect their facility directly to the





utility system, providing a much more reliable, less-expensive source of power.

The wind-turbine collector system was then completed and placed online. Now, rather than being a power consumer, United Materials is a power producer. As long as the turbine towers are generating power, the owner will continue to realize additional revenue by selling power back to the serving utility. And even when the wind is inadequate to generate power or the wind turbines are out of service for maintenance, the facility will still benefit from lower-cost utility power... and not lose valuable production time.

## Results

The Horseshoe Bend Wind Farm continues to operate with an impressive track record, not only generating power to United Materials but adding revenue to the company's bottom line as well. The owner is now considering expanding the wind farm and even building additional wind farms.

