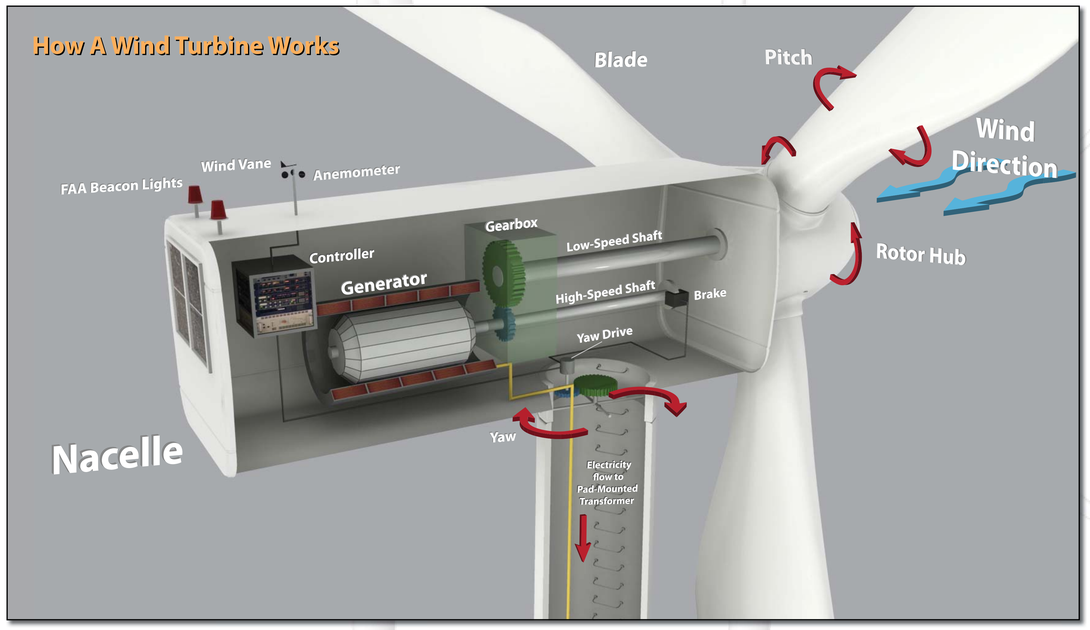
Project Engineering

Wind Turbines

When the wind blows, the blades of a wind turbine begin to spin. As they spin, the blades turn a large, low-speed shaft inside the nacelle which is connected to a large gear inside the gearbox. As the large gear turns, it turns a smaller gear on a high-speed shaft. The spinning high-speed shaft creates an electrical current. The electric current is interconnected to a pad-mounted transformer at the base of the turbine. The electricity generated from each turbine feeds into a collection system and on-site substation.



Specific turbines and a turbine manufacturer have not been selected for the proposed Project. Individual turbines could range in size from 1.5 MW to 3.0 MW each. The specifications for a representative 2.3-MW turbine are listed in the table below.

Equipment	Specifications
Tower Type	Tubular
Blade (Rotor) Diameter	331 ft (101m)
Hub Height	262 ft (80m)
Total Turbine Height	428 ft (130.5m)
Weight (Nacelle and Tower)	244 US Tons

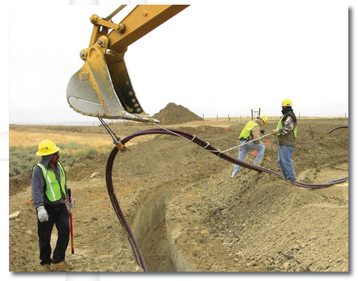
Source: http://www.powergeneration.siemens.com

To comply with Federal Aviation Administration regulations for structures taller than 200 feet, the turbines would require aircraft warning lights. To comply with Albany County, Wyoming wind energy siting regulations, the turbines would be a nonreflective white or gray color.

At the base of the turbine, a metal ring and anchor bolts would secure the turbine to its foundation. Foundations would be either mat (wide and shallow) or pier (narrow and deep) depending on the soil type and turbine requirements. Mat foundations would be approximately 50-60 feet wide and 10-12 feet deep. Pier foundations would be approximately 15-18 feet wide and 30-40 feet deep. The turbines would be placed along approximately 11 corridors, or strings. Each corridor would be approximately 250 feet wide, except for areas of steep topography where corridors would be approximately 400 feet wide to allow for safe construction.

Collection System

Turbines would be connected by an underground collection system to deliver power from individual turbines to the Project substation. The underground collection system potentially would be 34.5-kilovolt (kV), but could range from 12 kV to 34.5 kV.



The Project substation would increase the voltage of the energy generated by the collection system from 34.5 kV to 345 kV to interconnect it with Western's 345-kV transmission line. The interconnection, itself, would require a short, 345-kV overhead transmission line (approximately 0.3 miles long). The size of the Project substation would be approximately 70,000 to 85,000 square feet (1.6 to 2 acres).

Project Construction

Construction of the proposed Project would occur over approximately 18 months, depending on the final size of the Project. The expected sequence of construction activities is listed below.

1 - Mobilization
2 - Access roads and laydown areas
3 - Substation construction
4 - O&M building construction
5 - Transmission line construction
6 - Foundations
7 - Turbine installation
8 - Commissioning and acceptance testing

Project construction would necessitate material laydown areas, a concrete batch plant, a construction office area, and parking. Construction activities would increase truck travel on U.S. Highway 287. A Wyoming Department of Transportation highway widening project to 4 lanes should be completed before the proposed construction of the Project. Cherokee Ranch Road / County Road 31 may need to be widened to accommodate truck travel, such as trucks needed to haul turbine blades and nacelles. On-site access roads would be approximately 25 feet wide.

TETRA TECH EC, INC.