

**Appendix H  
Decommissioning Report**

# **BUFFALO RIDGE II WIND FARM DECOMMISSIONING REPORT**

## **System Description**

The Buffalo Ridge II Wind Farm project is a proposed 306 Megawatt (MW) wind energy conversion system. The wind farm will be located in Brookings County, northeast of the town of White South Dakota. The transmission line will be located in Brookings County and is approximately 13 miles in length. The proposed wind farm will consist of the following primary components:

Wind Turbines and Foundations	up to 204
Medium Voltage Cable (overhead collection system)	35,260 lineal foot
High Voltage Cable (overhead transmission system)	51,940 lineal foot
Transformers (step up)	up to 204
Access Roads	179,570 lineal foot

## **Wind Turbine Technical Data**

Properly maintained wind turbines will have a minimum design life of 30 years. At the end of the project life and depending on market conditions and project viability, the wind turbines may be “re-powered” with new nacelles, towers, and/or blades. Alternatively, the wind turbines may be decommissioned. The major components of the wind turbines (the tower, the nacelle and blades) are modular items that allow for ease of construction and disassembly of the wind turbine during decommissioning or replacement. The tower is constructed of a combination of steel along with various other materials. Portions of the components within the nacelle and generators can also be salvaged for scrap value.

## **Decommissioning Sequence**

In the event the Buffalo Ridge II Wind Farm facility requires decommissioning, the following sequence for removal of the components will be used:

- Remove Wind Turbines
- Remove Collection Transformers
- Partially Remove Wind Turbine Foundations
- Remove overhead collection/transmission structures
- Remove Project substation equipment
- Remove access roads (unless landowner requests they remain)

After removal of all foundations to a minimum depth of approximately 4 feet, the disturbed areas will be regraded. Topsoil will be restored and seeded with approved vegetative cover.

## **Salvage Background**

Wind turbine towers, hubs, blades, and generators are modular, which allows for ease in removal, reconditioning, and reinstallation. Unless otherwise stated, the turbine configuration utilized for

this estimate was the Suzlon 2.1-MW turbine. Similar components produced by Gamesa, GE, or Mitsubishi are all of similar composition and weights, for a given power rating.

Based on the construction details presented for the Suzlon 2.1MW turbine and associated tower and components, it is assumed that both the tower and nacelle will yield approximately 90% salvageable materials. Copper salvage estimates were derived by assuming 5% of the total tower and nacelle weight consists of copper bearing materials. Since the construction of the rotor/blades are predominantly non-metallic materials (fiberglass reinforced epoxy and carbon fibers), thus no salvage value for the rotor/blades was used to develop the decommissioning cost estimate. The current market value of copper has increased dramatically this past year. As of April, 2008, the price is approximately \$3.25 per pound (\$6,500 per ton).

Given these assumptions, the total salvage value per turbine is estimated to be approximately \$79,355.

### **SUMMARY OF DECOMMISSION COSTS**

The following is a summary of the total costs for the decommissioning of the Buffalo Ridge II Wind Farm project. This estimate was developed using the salvage value per turbine listed above, and the various cost and salvage estimates listed below:

- Supported Aluminum Transmission Line Salvage of 230 pounds per 1,000 linear feet
- Contractor will be allowed to stage construction to obtain the most efficient work flow possible
- Contractor will be allowed to use the most appropriate, safest, and efficient methods available to them at the time of performing the work
- Contractor will secure and provide any required demolition permits or certificates
- Salvage material buyer will provide own transportation equipment at each demolition site
- Demolition contractor will load salvage materials in appropriate sizes and weights at each site to salvage material buyer's vehicle(s)
- Site restoration includes roadway removal and regrading of site, including deep tiling to remove compaction of soils at road at tower site
- Salvaged roadway material is stockpiled or delivered within a 20 mile radius of each turbine site. No disposal or recycle value is assigned to such roadway material
- Overhead collector and transmission lines poles have average 250' span. All poles and aluminum clad cable is removed
- Two days of decommissioning preparation per site including oil removal are allowed prior to crane dismantling
- All recycled material is processed to manageable sizes for transport from site
- Substation transformers are assumed to be salvaged for metal only

<u>Decommissioning estimate for the Project:</u>	
General Conditions	\$1,433,620
Operation & Maintenance Buildings	\$94,804
Substation Deconstruction	\$64,349
Towers, Wind Turbine Deconstruction	
Access Road Preparation	\$780,249
Blade Disposal	\$2,030,463
Foundation Removal	\$2,556,964
Site Restoration	\$2,633,421
Tower Dismantle and Salvage Preparation	\$6,387,298
Transmission Line and Pole Removal	\$155,495
Total estimated decommissioning cost	\$14,543,889
Total estimated decommissioning cost/turbine	\$90,805
Salvage value/wind turbine	\$(79,355)
<b>Total net decommissioning cost per wind turbine minus salvage value</b>	<b>\$11,450</b>

Therefore, it is anticipated that the total decommissioning costs of the Buffalo Ridge II Energy facility will be mostly offset by the salvage value of the recovered materials. Note that these values are based on 2008 costs and do not assume any inflation costs or other mark-up fluctuations. In any case, the Applicant will pay for any costs of decommissioning that are not covered by the salvage value. The costs of decommissioning will not be burdensome for the Applicant; Iberdrola is the world's fourth largest electric utility and an A-rated company. The value of the turbines for power production will far exceed the costs of decommissioning. The applicant suggests that the SDPUC request an update to the anticipated decommissioning costs and salvage values after 10 years of operation, to determine if financial assurances will be required.