

Memorandum

TO: NEIL KIELY, FIRST WIND ENERGY, LLC

FROM: Janine S. Murchison, PE

DATE: April 22, 2011

SUBJECT: Bowers Mountain Wind Project Decommissioning Budget

Sewall was requested to develop this Decommissioning Budget for the 27 wind turbine generator (WTG) Bowers Mountain wind project located in Penobscot and Washington Counties, Maine. The budget represents an opinion of probable cost (OPC), in today's dollars, for decommissioning, based on the assumption that the WTGs, towers, interconnection facilities and other project components will be disassembled and disposed following the end of use of the wind turbines. The budget is also built on the assumption that the cost of decommissioning will be fully or partially offset by the scrap value of the towers, turbine, and electrical components.

Based on information provided by First Wind, the O&M Facilities, Substation and associated interconnection with Line 56 Facilities will not be part of the decommissioning scope. Therefore, these items have not been included in the discussion or calculations herein. It is assumed that all project roads will remain.

INFORMATION SOURCES FOR THIS REVIEW

This review is based on the civil and electrical site plans and quantity information provided by First Wind, discussions with contractors familiar with this type of construction and our own experience with wind projects. Wage rates used in these estimates are based on the State of Maine Department of Labor, Bureau of Labor Standards; 2011 Fair Minimum Wage Rates, Heavy and Bridge; Penobscot and Washington Counties.

DECOMMISSIONING SCOPE

The decommissioning format reflected in this OPC is based on the Decommissioning Plan submitted by First Wind to the Maine Land Use Regulation Commission (LURC) as Exhibit 20, pages 1 through 3.

The decommissioning and restoration scope was based on the following:

- Disassembly and removal of above-ground structures
- Removal of below-ground structures to a depth of 24 inches
- Re-grading of site

Above-ground structures include the turbines, transformers, overhead collection or transmission lines and the meteorological towers. Below-ground structures include turbine and collection system conduit and cable; fiber optic facilities; and drainage control structures (e.g., culverts) as necessary to restore turbine sites. Following removal of all above- and below-ground structures to 24 inches below grade, the individual disturbed areas will be re-graded to be consistent with surrounding areas and reseeded to promote re-vegetation. The cost for disposal for any materials that are not scrapped is considered incidental, unless otherwise noted.

DECOMMISSIONING BUDGET

The decommissioning process has been divided into five (5) general work items. Quantities and unit prices for these individual work items are presented and discussed in detail in the following paragraphs.

1. Project Management and Project Specific/Other
2. Site Work/Civil
3. Wind Turbine Foundations
4. Wind Turbine Generators and Meteorological System
5. Electrical Collection System (mountain top collector, express collector, and communication lines)

1. PROJECT MANAGEMENT AND PROJECT SPECIFIC/OTHER

- Mobilization.
 - Mobilization and demobilization to setup and breakdown the crane and assist crane is estimated to cost a flat fee of \$95,000 per one-way trip, for a total of \$190,000.
 - In addition, it is estimated that the cranes will be re-mobilized an additional two (2) times at an estimated cost of \$30,000 per move to reach all of the turbine sites for a total of \$60,000.
 - Mobilization and demobilization of ancillary equipment (i.e. bull dozers, backhoes, etc.) is estimated to be \$50,000.

Total estimate for mobilization is \$300,000.

- Project Oversight. Oversight of the decommissioning is estimated at \$175,000.
- Incidentals. A budget of \$120,000 (approximately 5% of the decommissioning costs) is recommended for project incidentals.
- Contingency. A contingency of \$240,000 (approximately 10% of the decommissioning costs) is recommended to cover unknowns.

The total opinion of probable costs for **Project Management is \$835,000.**

2. SITE WORK/CIVIL (SITE RECLAMATION)

- Re-grading of turbine sites.
 - The decommissioning plan includes restoring each of the turbine sites. We are assuming that all excavated areas will be brought up to grade and sloped to drain with suitable fill material generated from the re-grading of the turbine site or from off-site sources. Based on an approximate 12,000 SF (12 MSF) disturbed area at each turbine site, the estimated cost per site for additional fill, topsoil or other organic matter to support growth, seed, and mulch is \$330/MSF for a total of about \$4,000, or \$108,000 for all 27 sites.
 - This re-grading and restoration work is estimated to take a dozer and operator approximately eight (8) hours to complete at each turbine site at a labor and equipment rate of \$200 per hour. For all 27 turbine sites, re-grading is approximately \$44,000.

Total estimate for re-grading turbine sites is \$152,000.

- Road Maintenance. Dust control, road maintenance, and post construction road repairs is difficult to estimate. A budget of \$265,000 (approximately 5% of the \$5.3 million estimated for road construction) is recommended to address these items.

The total opinion of probable costs for **Site Work/Civil is \$417,000.**

3. WIND TURBINE FOUNDATIONS

- Removal of WTG foundation to 2 FT below grade. Removal of the turbine foundations will likely require a hydraulic excavator equipped with a hydraulic ram (hoe-ram), an additional excavator with bucket for loading, and various dozers and loaders. The total labor and equipment cost is estimated to be \$6,000 per site (based on 60 cubic yards at \$100/cubic yard) for a total of \$162,000 for all 27 sites.
- Transportation of rubble and disposal. Concrete demolition rubble generated at each turbine site is estimated to be approximately 60 cubic yards (assuming removal to two feet below grade). As the steel rebar will likely be separated from the concrete debris, the rubble essentially becomes an inert material. We have assumed that the concrete rubble generated will not be transported offsite but be used onsite as fill at toes of slopes, for road base or topping material, or at other locations in need of fill as desired by the property owner. Costs to transport the foundation rubble within the Bowers Mountain Wind project boundaries, in comparison to other decommissioning costs, are assumed to be negligible. In the unlikely event the material cannot be used on-site, the material will be transported for offsite use. Costs to transport the foundation rubble to disposal are based on an estimated requirement of six (6) dump truck trips for each turbine site. Total material, labor and equipment costs for each dump truck trip are estimated to be \$400. At six (6) trips per site and 27 sites, our opinion of probable cost for transporting foundation rubble to disposal is approximately \$65,000.

The total opinion of probable costs for removal of **WTG Foundation is \$227,000.**

4. WIND TURBINE GENERATORS AND METEOROLOGICAL SYSTEM

- Disassembly of turbine generators.
 - Disassembly costs for the WTGs are based on the assumption that it will take a 5-man crew 20 hours to disassemble each tower and turbine, which is roughly equivalent to half the labor effort required for tower and turbine assembly. For all 27 turbines, this is equivalent to 2,700 man-hours. At a rate of \$25/man-hour, this is about \$68,000 of labor effort.
 - The crane costs (erector and assist cranes) are estimated at \$30,000/week. Based on an assumption that the cranes can disassemble two (2) turbines per week, the crane rental is estimated to be 14 weeks. Adding three (3) additional weeks for wind day delays yields \$510,000 for the crane rental.
 - Additionally, once the towers and turbines are on the ground, they will need to be cut up into manageable sized pieces in preparation for transportation to scrap, recycle, or disposal facilities. We are assuming it will take a 5-man crew 20 hours to do this work per turbine at a rate of \$30/man-hour for each WTG. For all 27 WTGs, this is equal to about \$81,000.

The total estimate for WTG disassembly is \$659,000

- Nacelle housing and blade disposal. Disposal of the nacelle housing and blades are based on an estimated 40 tons per turbine. Disposal fees are estimated to be approximately \$68/ton. At 27 turbines, our opinion of probable cost for disposal of the blades and nacelle housing is about \$74,000.
- Transportation of turbine components to disposal/reclamation site. Cost to transport the tower and turbine components to facilities for scrap, recycling or disposal are based on a estimated requirement of ten (10) transport vehicles per turbine site (note: transport of new turbine and tower components to a site requires 12 to 14 transport vehicles). Total labor and equipment costs for each transport vehicle trip are estimated to be \$1,200. At ten (10) vehicle trips per turbine and 27 turbine sites, our opinion of probable cost for trucking turbine and tower components to disposal/reclamation is \$324,000.
- MET Tower disassembly/removal.
 - Disassembly costs for the 80-meter MET towers are based on the assumption that it will take a 5-man crew 8 hours to disassemble each MET tower which is roughly equivalent to half the labor effort required for assembly. For all four (4) MET towers, this is equivalent to 160 man-hours. At a rate of \$25/man-hour, this is equivalent to about \$4,000 of labor effort.
 - Additionally, equipment rental is estimated at approximately \$200 per hour for 8 hours to assist with the disassembly, partially remove the foundations, and reclaim the site. For all four (4) MET towers, this is approximately \$7,000.

The total estimate for MET tower disassembly/removal is \$11,000

- Transportation of MET tower components to disposal/reclamation site.
 - Cost to transport the MET tower components to facilities for scrap, recycling or disposal are based on an estimated requirement of one (1) truck trip for each MET tower. Total labor and equipment costs for each truck trip are estimated to be \$800. At one (1) truck trip per each of the four (4) MET towers, our opinion of probable cost for trucking MET tower components to disposal/reclamation is about \$4,000.
 - We have assumed that the concrete rubble generated from the foundations (while separating rebar as necessary) will not be transported offsite but be used onsite as fill at toes of slopes, for road base or topping material, or at other locations in need of fill as desired by the property owner. In the unlikely event the material cannot be used on-site, the material will be transported for offsite use. Costs to transport the foundation rubble to disposal are based on six (6) cubic yards of rubble per MET tower site totaling 24 cubic yards for all four (4) MET towers. Estimating three (3) dump truck trips and a total material, labor and equipment costs for each dump truck trip estimated at \$400, our opinion of probable cost for transporting foundation rubble to disposal is approximately \$2,000.

The total estimate for MET tower transportation to disposal/reclamation site is \$6,000.

The total opinion of probable costs for removal of **WTGs and MET System** is **\$1,074,000.**

5. ELECTRICAL COLLECTION SYSTEM

- Disassembly of overhead collector and associated components.
 - Disassembly and spooling costs for the overhead collector lines (mountain top collector, express collector, and communication lines) and associated components, are based on the assumption that the labor effort required will be a 3-man crew working for four (4) hours per 1,000 feet of overhead line. Based on an overhead express collector, mountain top collector, and communication line total system length of 62,500 feet and a rate of \$40/man-hour for labor, this totals approximately \$30,000.
 - Equipment rates are estimated at \$1,600/day for approximately 32 days which is about \$52,000.
 - Pole removal and filling of remaining hole, based on approximately 300 poles, is estimated at \$150/pole; this totals \$45,000.

The total for disassembly of overhead collector is \$127,000.

- Removal of underground collector in conduit.
 - Disassembly and spooling costs for the removal of underground collector (including communication lines) and associated components from the conduit are based on the assumption that the labor effort required will also be a 3-man crew working for four (4) hours per 1,000 feet of underground line in conduit. Based on an underground-in-conduit express collector, mountain top collector, and communication lines total system length of 15,000 feet and a rate of \$40/man-hour for labor, this totals approximately \$7,000. (Note that conduit and associated materials within 24-inches of finished grade will be removed.)
 - Equipment rates are estimated at \$1,600/day for approximately 8 days which is about \$13,000.

The total for removal of underground collector in conduit is \$20,000.

- Transportation of collector lines and associated components to disposal/reclamation site.
 - The cost to transport the collector line and associated components to facilities for scrap, recycling or disposal is based on the number of spools required per collector line sizes and lengths for the project. With a total of 120 spools of collector line and eight (8) spools per truck, there will be approximately 15 truck trips at \$1,200 per truck trip totaling \$18,000.
 - The 300 removed poles will be transported at a rate of 30 poles per logging truck. Poles are assumed to be sold for a small fee or given away and no disposal fee is expected. The transportation cost equals 10 truck trips at \$2,000 per truck trip totaling \$20,000.

The total for transportation of collector line and associated components is \$38,000.

- Removal of pad-mount transformers. Removal of the pad-mount transformers is estimated to require a total labor and equipment cost of \$500 per each for a total of about \$14,000 for all 27 sites.
- Transportation of pad-mount transformers. The cost to transport the pad-mount transformers to facilities for scrap, recycling or disposal is estimated to be one (1) truck trip at \$800 per transformer totaling approximately \$22,000 for all 27 sites.

- Removal of pad-mount transformer foundations and cutting of cables. Removal of the pad-mount transformer foundations and cutting of cables and conduits to a depth of two feet below grade will require various types of hydraulic equipment. The total labor and equipment cost is estimated to be \$1,000 per site (based on 10 cubic yards at \$100/cubic yard) for a total of \$27,000 for all 27 sites.
- Transportation of pad-mount transformer foundation rubble and disposal. The rubble from the pad-mount transformer foundations is approximately ten (10) cubic yards per turbine site for a total of 270 cubic yards. As the steel rebar will likely be separated from the concrete debris, the rubble essentially becomes an inert material. Therefore, we have assumed that the concrete rubble generated will not be transported offsite but be used onsite as fill at toes of slopes, for road base or topping material, or at other locations in need of fill as desired by the property owner. Costs to transport the foundation rubble within the Bowers Mountain Wind project boundaries, in comparison to other decommissioning costs, are assumed to be negligible. In the unlikely event the material cannot be used on-site, the material will be transported for offsite use. Costs to transport the foundation rubble to disposal are based on an estimated requirement of one (1) dump truck trip for each turbine site. Total material, labor and equipment costs for each dump truck trip are estimated to be \$400. At one (1) trip per site and 27 sites, our opinion of probable cost for transporting foundation rubble to disposal is approximately \$11,000.

The total opinion of probable costs for removal of **Electrical Collection System is \$259,000.**

DISASSEMBLY AND REMOVAL SUMMARY

The total opinion of probable cost for decommissioning from summing the above items is **\$2,812,000.**

SCRAP VALUE

The presumed scrap value is based on the following conservative estimates.

- Presumed scrap value of WTGs. In estimating the scrap value of the WTGs, the following component weight estimates were used:

Nacelle:	193,000 lb	Tower Base:	127,000 lb
Hub/Spinner:	78,000 lb	Tower Mid:	132,000 lb
Power Unit:	10,000 lb	Tower Top:	108,000 lb

The total estimated metal weight for each WTG is 648,000 lb or 324 tons. The current price for #1 steel scrap at a Bangor area metal recycling center is \$270/ton and \$200/ton for #2. Using an average of \$235/ton this comes to a potential scrap value of about \$76,000 per WTG or a total of \$2,052,000 for all 27. No scrap value was assumed for the blades or nacelle housing.

Total opinion of **presumed scrap value of the WTGs is \$2,052,000.**

- Presumed scrap value of the MET towers. Based on a MET tower component weight of 6,000 lb and an average price for steel scrap at \$235/ton, the potential scrap value of the four (4) MET towers is about \$3,000.

Total opinion of **presumed scrap value of the MET towers is \$3,000.**

- **Presumed scrap value of the pad-mount transformers.** Based on an estimated cost of \$48,000 for a pad-mount transformer, the scrap value is estimated at 10% of the original equipment cost, which gives a scrap value of about \$4,800 each. The total for all 27 transformers is approximately \$130,000.

Total opinion of **presumed scrap value of the pad-mount transformers is \$130,000.**

- **Overhead and underground wiring scrap value.** There is approximately 304,500 linear feet of overhead and underground wiring consisting of aluminum (steel reinforced) and copper conductors and/or grounds. Based on wire sizes and lengths provided, the metal scrap is estimated to be 195,000 lb. of aluminum and 7,000 lb. of copper. The current price for aluminum scrap is \$0.50/lb and \$3.25/lb for copper at a Bangor area metal recycling center. This equates to a potential scrap value of about \$97,000 for the aluminum and \$22,000 for the copper. The total scrap value for all wire is \$119,000.

Total opinion of **presumed scrap value of the overhead and underground wiring is \$119,000.**

SCRAP VALUE SUMMARY

The total opinion of presumed scrap value from summing the above items is **\$2,304,000.**

DECOMMISSIONING SUMMARY

- The total opinion of probable disassembly and removal costs is \$2,812,000.
- The total opinion of probable scrap/salvage value for the project is \$2,304,000.

The net estimated opinion of probable cost for the decommissioning is \$508,000.

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