

# Appendix G: Decommissioning Plans

## **DECOMMISSIONING SUMMARY | Fremont Township, Sanilac County**

The Riverbend Wind Energy Center (“project”) will have a lifetime after which it may no longer be effective to continue operation. Based on our projects, models, and technology we anticipate this timeframe to be 40 years. We understand that per the latest zoning ordinance that a financial security instrument (cash bond, irrevocable Letter of Credit (LOC), or performance bond) will be required to assure payment of any decommissioning costs issued to Fremont Township. Riverbend Wind, LLC (“Riverbend Wind”) will comply with its obligation as required by Fremont Township ordinance to provide the appropriate security for decommissioning of the project.

The legal obligations to decommission facilities after they cease to function or after the expiration of their contracts, are contained within each landowner lease agreement. These obligations automatically transfer to any new owner of the project.

Per the attached “Decommission Cost Estimate,” we estimate the total decommissioning costs per turbine in Fremont Township to equate to \$153,093. Total salvage value/resale per turbine is estimated at \$140,000. The project anticipates permitting up to 30 turbines in Fremont Township, which will have a total estimated out-of-pocket decommissioning burden of \$13,093 per turbine after taking into account salvage/resale of materials. The final turbine count for scenario 16 and 16a will be determined prior to the start of construction, this will revise the calculation totals stipulated in the below table.

The goal of project decommissioning is to remove the installed power generation equipment and return the site to a condition as close to a pre-construction state as feasible. The major activities required for the decommissioning include the following:

- Creation of temporary work areas to enable decommissioning of equipment;
- Wind turbine and meteorological tower removal;
- Structural foundation removal to 6 feet below grade;
- Access Road removal (if requested by landowner);
- Re-grading;
- Re-vegetation; and
- Restoration of temporary work areas.

The decommissioning activity most notable to the general public will be the removal of the wind turbines. The disassembly and removal of this equipment will essentially be the same as its installation, but in reverse order. The large components that make up a wind turbine will be disassembled in the reverse order they were assembled. The rotor (hub and blades) are removed from the nacelle and, with the help of a smaller crane, turned horizontally and set on the ground. Next, the nacelle will be removed from the top of the tower, followed by each portion of the tower. The meteorological tower will similarly be disassembled by a crane, starting with the upper tower section and moving downward. Once the turbine rotor has been removed, a crew and small crane will disassemble it into the hub and three loose turbine blades. The most efficient manner for component removal will be for each large component (other than the rotor) to be placed directly onto a truck bed when it is removed from the turbine. These trucks could then immediately take the component off the site. This approach will limit the need for clearing an area around the turbine base to just enough area to set down the rotor. When the rotor is disassembled, the blades will be placed into a carrying frame, which can then be loaded onto a truck for removal from the site. The hub can also be removed once it is disassembled from the blades. Although strict spill prevention procedures will be in place, there is the potential through the decommissioning process for small spills of solvents or fuels. The soil conditions of the turbine areas will be surveyed to determine if any impacts have occurred. Should soil impacts be noted, above the criteria referenced in the Michigan Department of Environment, Great Lakes, and Energy (EGLE) Part 201 cleanup criteria requirements, the affected soils will be identified, excavated, and removed to the applicable standards from the site for disposal at an approved and appropriate facility. The removed soils will be replaced with stockpiled subsoil and topsoil, if available. If none are available, clean fill and topsoil will be delivered to the site.

Between each of the turbine locations will be a buried electrical cable and fiber optic cable. In general the project owners plan to leave buried cables in the ground. Requests from landowners to remove cable will be considered on a case-by-case basis. Once the project and transmission line are de-energized, the substation will

be disassembled if no longer in use. Major components will be removed from their foundations and placed onto trucks, for recycling or proper disposal, as per regulatory requirements, using a small crane. The fence will be taken down, and fence posts removed for recycling or proper disposal, as per regulatory requirements. The gravel placed in the substation will be removed, and native soils will be spread on-site to return it to its prior condition.

When the wind turbine components are removed from their foundations, the foundations will be removed to a depth 6' below the existing surface per the lease agreement executed with the landowners.

The landowner will have the choice, when the project is decommissioned, as to whether the project access roads are to be removed. To facilitate the various uses for the property, the owner may choose to leave the roads in place. If the roads are left, maintenance of the roads will become the responsibility of the landowner. Once all the necessary equipment and materials have been removed from an area and the road to that area is no longer needed, it can be removed. The road surface and bed materials will be removed down to grade. Any materials native to the site will be scattered across the site, and foreign materials will be removed. For areas where equipment or materials are removed, those areas will be re-graded back to pre-construction contours (if possible). Removed access roads will be re-graded to original contours if cuts and fills make such re-grading practical. Crane pads will also be re-graded. All disturbed areas will be seeded and mulched.

Fremont Township Decommissioning Cost Estimate - Riverbend Wind Energy Center						
<b>1.0 Demolition of Turbines and Towers</b>						
Item	Quantity	Unit Cost	Total Cost	Assumptions		
1.1 Dismantle Turbine & Towers	30	EA	\$85,000	\$2,550,000	Cost includes removal of all material within towers & turbines and hauling off-site, and grading.	
				<b>1.0 Turbine &amp; Tower Totals:</b>	<b>\$2,550,000</b>	
<b>2.0 Demolition of Tower Foundations</b>						
Item	Quantity	Unit Cost	Total Cost	Assumptions		
2.1 Foundation Removal, Disposal, Grading, Restoration	30	EA	\$16,000	\$480,000	Cost includes demolition and foundation removal of 6' below grade concrete and steel and hauling off-site.	
2.2 Transformer Pad Removal and Disposal	30	EA	\$2,150	\$64,500	Complete removal and hauling off-site, grading & restoration.	
				<b>2.0 Demolition of Tower Foundation totals:</b>	<b>\$544,500</b>	
<b>3.0 Demolition of Access Roads &amp; Collection</b>						
Item	Quantity	Unit Cost	Total Cost	Assumptions		
3.1 Removal of Access Roads	60,300	LF	\$4.25	\$256,275	Aggregate base will be removed and hauled off-site, grading. Linear feet estimate based on access roads for 30 turbines in Fremont Township.	
				<b>3.0 Demolition of Access Roads &amp; Collection:</b>	<b>\$256,275</b>	
<b>4.0 Demolition of Substation</b>						
Item	Quantity	Unit Cost	Total Cost	Assumptions		
4.1 Dismantle and Removal of Substation	1	LS	\$500,000.00	\$500,000	One substation to dismantle, located in Fremont Township.	
				<b>4.0 Demolition of Substation:</b>	<b>\$500,000</b>	
<b>5.0 Construction Closeout</b>						
Item	Quantity	Unit Cost	Total Cost	Assumptions		
5.1 Restoration, Seeding	1	LS	\$212,000	\$212,000		
5.2 Mobilization, Permitting, Oversight	1	LS	\$530,000	\$530,000		
				<b>5.0 Construction Closeout</b>	<b>\$742,000</b>	
				<b>Total Decommissioning Estimate</b>	<b>\$4,592,775</b>	
<b>6.0 Estimated Salvage Reimbursements</b>						
Item	Quantity	Unit Cost	Total Cost	Assumptions		
6.1 Turbine Resale (\$100k per MW)	6	EA	\$600,000	\$3,600,000	20% of turbines will have resale value	
6.2 Scrap Salvage per Turbine	24	EA	\$25,000	\$600,000		
				<b>6.0 Estimated Salvage/Resale Reimbursements Total</b>	<b>\$4,200,000</b>	
				<b>Estimated Total Decommissioning Per Turbine Cost (including salvage value/resale):</b>	<b>\$13,093</b>	

## **DECOMMISSIONING SUMMARY | Fremont Township, Sanilac County**

The Riverbend Wind Energy Center (“project”) will have a lifetime after which it may no longer be effective to continue operation. Based on our projects, models, and technology we anticipate this timeframe to be 40 years. We understand that per the latest zoning ordinance that a financial security instrument (cash bond, irrevocable Letter of Credit (LOC), or performance bond) will be required to assure payment of any decommissioning costs issued to Fremont Township. Riverbend Wind, LLC (“Riverbend Wind”) will comply with its obligation as required by Fremont Township ordinance to provide the appropriate security for decommissioning of the project.

The legal obligations to decommission facilities after they cease to function or after the expiration of their contracts, are contained within each landowner lease agreement. These obligations automatically transfer to any new owner of the project.

Per the attached “Decommission Cost Estimate,” we estimate the total decommissioning costs per turbine in Fremont Township to equate to \$159,353. Total salvage value/resale per turbine is estimated at \$135,577. The project anticipates permitting up to 26 turbines in Fremont Township, which will have a total estimated out-of-pocket decommissioning burden of \$23,777 per turbine after taking into account salvage/resale of materials.

The goal of project decommissioning is to remove the installed power generation equipment and return the site to a condition as close to a pre-construction state as feasible. The major activities required for the decommissioning include the following:

- Creation of temporary work areas to enable decommissioning of equipment;
- Wind turbine and meteorological tower removal;
- Structural foundation removal to 6 feet below grade;
- Access Road removal (if requested by landowner);
- Re-grading;
- Re-vegetation; and
- Restoration of temporary work areas.

The decommissioning activity most notable to the general public will be the removal of the wind turbines. The disassembly and removal of this equipment will essentially be the same as its installation, but in reverse order. The large components that make up a wind turbine will be disassembled in the reverse order they were assembled. The rotor (hub and blades) are removed from the nacelle and, with the help of a smaller crane, turned horizontally and set on the ground. Next, the nacelle will be removed from the top of the tower, followed by each portion of the tower. The meteorological tower will similarly be disassembled by a crane, starting with the upper tower section and moving downward. Once the turbine rotor has been removed, a crew and small crane will disassemble it into the hub and three loose turbine blades. The most efficient manner for component removal will be for each large component (other than the rotor) to be placed directly onto a truck bed when it is removed from the turbine. These trucks could then immediately take the component off the site. This approach will limit the need for clearing an area around the turbine base to just enough area to set down the rotor. When the rotor is disassembled, the blades will be placed into a carrying frame, which can then be loaded onto a truck for removal from the site. The hub can also be removed once it is disassembled from the blades. Although strict spill prevention procedures will be in place, there is the potential through the decommissioning process for small spills of solvents or fuels. The soil conditions of the turbine areas will be surveyed to determine if any impacts have occurred. Should soil impacts be noted, above the criteria referenced in the Michigan Department of Environment, Great Lakes, and Energy (EGLE) Part 201 cleanup criteria requirements, the affected soils will be identified, excavated, and removed to the applicable standards from the site for disposal at an approved and appropriate facility. The removed soils will be replaced with stockpiled subsoil and topsoil, if available. If none are available, clean fill and topsoil will be delivered to the site.

Between each of the turbine locations will be a buried electrical cable and fiber optic cable. In general the project owners plan to leave buried cables in the ground. Requests from landowners to remove cable will be considered on a case-by-case basis. Once the project and transmission line are de-energized, the substation will be disassembled if no longer in use. Major components will be removed from their foundations and placed onto trucks, for recycling or proper disposal, as per regulatory requirements, using a small crane. The fence will be

taken down, and fence posts removed for recycling or proper disposal, as per regulatory requirements. The gravel placed in the substation will be removed, and native soils will be spread on-site to return it to its prior condition.

When the wind turbine components are removed from their foundations, the foundations will be removed to a depth 6' below the existing surface per the lease agreement executed with the landowners.

The landowner will have the choice, when the project is decommissioned, as to whether the project access roads are to be removed. To facilitate the various uses for the property, the owner may choose to leave the roads in place. If the roads are left, maintenance of the roads will become the responsibility of the landowner. Once all the necessary equipment and materials have been removed from an area and the road to that area is no longer needed, it can be removed. The road surface and bed materials will be removed down to grade. Any materials native to the site will be scattered across the site, and foreign materials will be removed. For areas where equipment or materials are removed, those areas will be re-graded back to pre-construction contours (if possible). Removed access roads will be re-graded to original contours if cuts and fills make such re-grading practical. Crane pads will also be re-graded. All disturbed areas will be seeded and mulched.

**Fremont Township Decommissioning Cost Estimate - Riverbend Wind Energy Center**

**1.0 Demolition of Turbines and Towers**

Item	Quantity	Unit Cost	Total Cost	Assumptions	
1.1 Dismantle Turbine & Towers	26	EA	\$85,000	\$2,210,000	Cost includes removal of all material within towers & turbines and hauling off-site, and grading.
<b>1.0 Turbine &amp; Tower Totals:</b>				<b>\$2,210,000</b>	

**2.0 Demolition of Tower Foundations**

Item	Quantity	Unit Cost	Total Cost	Assumptions	
2.1 Foundation Removal, Disposal, Grading, Restoration	26	EA	\$16,000	\$416,000	Cost includes demolition and foundation removal of 6' below grade concrete and steel and hauling off-site.
2.2 Transformer Pad Removal and Disposal	26	EA	\$2,150	\$55,900	Complete removal and hauling off-site, grading & restoration.
<b>2.0 Demolition of Tower Foundation totals:</b>				<b>\$471,900</b>	

**3.0 Demolition of Access Roads & Collection**

Item	Quantity	Unit Cost	Total Cost	Assumptions	
3.1 Removal of Access Roads	51,600	LF	\$4.25	\$219,300	Aggregate base will be removed and hauled off-site, grading. Linear feet estimate based on access roads for 26 turbines in Fremont Township.
<b>3.0 Demolition of Access Roads &amp; Collection:</b>				<b>\$219,300</b>	

**4.0 Demolition of Substation**

Item	Quantity	Unit Cost	Total Cost	Assumptions	
4.1 Dismantle and Removal of Substation	1	LS	\$500,000.00	\$500,000	One substation to dismantle, located in Fremont Township.
<b>4.0 Demolition of Substation:</b>				<b>\$500,000</b>	

**5.0 Construction Closeout**

Item	Quantity	Unit Cost	Total Cost	Assumptions
5.1 Restoration, Seeding	1	LS	\$212,000	\$212,000
5.2 Mobilization, Permitting, Oversight	1	LS	\$530,000	\$530,000
<b>5.0 Construction Closeout</b>				<b>\$742,000</b>

**Total Decommissioning Estimate \$4,143,200**

**6.0 Estimated Salvage Reimbursements**

Item	Quantity	Unit Cost	Total Cost	Assumptions	
6.1 Turbine Resale (\$100k per MW)	5	EA	\$600,000	\$3,000,000	20% of turbines will have resale value
6.2 Scrap Salvage per Turbine	21	EA	\$25,000	\$525,000	
<b>6.0 Estimated Salvage/Resale Reimbursements Total</b>				<b>\$3,525,000</b>	

**Estimated Total Decommissioning Per Turbine Cost (including salvage value/resale): \$23,777**