4906-17-03 Project Description and Schedule

(A) PROPOSED FACILITY DESCRIPTION

(1) Project Description

(a) Types of Turbines

At the time of this submittal, a specific turbine model has not been selected for the Facility. For the purpose of this Application, various studies (e.g., shadow flicker, noise, calculation of setbacks, production potential, tax revenue calculations, and others) were performed using the G-90 on a 328-foot (100-meter) tall wind turbine tower. The G-90 is the most likely turbine to be used because of the Applicant’s experience with this machine in other Midwestern sites and large-scale purchase commitment with Gamesa for the next few years.

The Applicant works with a number of leading turbine manufacturers, including General Electric (GE), Mitsubishi, Vestas, Gamesa, and others. Wind turbine technology continues to improve, and the cost and availability of turbine types can change from year to year. Including multiple turbine models in the Application increases the viability of the Facility, which benefits the community and the Applicant. Therefore, the Applicant requests flexibility to use any new commercially available turbine model ranging in capacity from 1.5 to 2.4 MW. Table 3-1 identifies the range of characteristics for the primary turbines being considered for the Facility. The Applicant will provide the specific turbine model and specifications once selected. If a turbine other than the G-90 is selected, the Applicant will update the relevant studies to illustrate the impacts of the final turbine model.

TABLE 3-1
Wind Turbines Under Primary Consideration for the Facility

Turbine	GE 1.5 MW	Gamesa 2.0 MW	Mitsubishi 2.4 MW
Tower Type	Tubular	Tubular	Tubular
Rotor Diameter	77 - 83 meters (253– 271 feet)	87 - 90 meters (285 – 295 feet)	92 - 95 meters (302 feet)
Hub Height	65 - 100 meters (213 – 328 feet)	78 - 100 meters (256– 328 feet)	80 meters (262 feet)
Total Height	104 -141 meters (340– 463 feet)	122 - 145 meters (399– 476 feet)	126 - 128 meters (413 – 418 feet)

Up to one hundred and seventy-five (175) wind turbine generators would be used for the Facility (for which 167 planned locations have been identified), totaling up to 350 MW in nameplate capacity. If the Mitsubishi 2.4 MW turbine is selected, fewer total turbine locations will be used but the locations used will be selected from the provided set of locations. If the GE 1.5 MW turbine is used, the Applicant will use all of the proposed locations and submit an additional application to use the remaining capacity in the 350 MW interconnection position. It is estimated that the annual net capacity factor would be 25 to 40 percent.[1] A discussion of the detailed components of the wind turbines is provided below in Section 4906-17-03(A)(2)(a), *Wind Energy Turbines*, and Section 4906-17-05(C), *Equipment.*

(b) Land Area Requirements

The Facility is located within an approximately 40,500-acre Project area in Benton, Blue Creek and Latty townships in Paulding County, Ohio and Tully, Union, and Hoaglin townships in Van Wert County, Ohio. The Project area consists primarily of agricultural land situated amongst the communities of Van Wert, Scott, Cavett, Haviland, and Convoy. The actual Facility-related impact covers a much smaller footprint. Table 3-2 depicts the anticipated land area requirements for the Facility under the 167-turbine layout. The construction and operational footprints were calculated using the assumptions below.

[1] More detailed confidential and/or trade secret wind resource estimates are available for review at the offices of Bricker & Eckler LLP, 100 South Third Street, Columbus, Ohio 43215, by OPSB Staff.

TABLE 3-2
Anticipated Land Requirements for Construction and Operation of the Blue Creek Wind Farm

Facility Component	Assumptions	Total Area Disturbed During Construction (including temporary and permanent operational impacts)	Area of Permanent Disturbance
Wind Turbines	167 turbines, 1,200-foot radius construction and permanent buffer (12,178 acres total, considering overlap of adjacent turbines)	271.0 acres (150-foot radius around each turbine location)	28.8 acres (75-foot by 100-foot area)
Access Roads	37.0 miles, 40-foot wide construction; 20-foot wide permanent (20 feet of permanent gravel with 10-foot compacted shoulders during construction on each side for a total width of approximately 40 feet)	179.2 acres	89.6 acres
Underground collection lines (34.5 kV)	78.6 miles, 20-foot wide construction impact area (per circuit); No impact for permanent (per circuit)	190.6 acres	Zero
Aboveground collection lines (34.5 kV)	3.7 miles, 100-foot wide construction corridor; 75-foot wide permanent	45.1 acres	33.8 acres
Aboveground collection lines (115 kV)	6.0 miles, 100-foot wide construction corridor; 75-foot wide permanent	72.5 acres	54.4 acres
Southern 20-acre Parcel (see below)		20 acres all components	20 acres all components
Interconnection Substation	5 acres construction; 5 acres permanent (within 20-acre parcel on southern portion of Project area)	Within above calculation	Within above calculation
Project Collection Substation	5 acres construction; 5 acres permanent (within 20 acre parcel on southern portion of Project area)	Within above calculation	Within above calculation
Operations and Maintenance Building	Within 20-acre parcel on southern portion of Project area	Within above calculation	Within above calculation
Staging Area and Construction Laydown Area	Within 20-acre parcel on southern portion of Project area	Within above calculation	Within above calculation
Temporary Concrete Batch Plant	Within 20-acre parcel on southern portion of Project area	Within above calculation	Within above calculation
Collector Substation #1	5 acres construction; 5 acres permanent	5 acres	5 acres

TABLE 3-2
Anticipated Land Requirements for Construction and Operation of the Blue Creek Wind Farm

Facility Component	Assumptions	Total Area Disturbed During Construction (including temporary and permanent operational impacts)	Area of Permanent Disturbance
Collector Substation #2	5 acres construction; 5 acres permanent	5 acres	5 acres
Up to Two Permanent Met Tower	320 feet by 320 feet construction; 50 feet by 50 feet permanent	4.7 acres	0.11 acres
SODAR Facility	45 feet by 45 feet construction; 15 feet by 15 feet permanent	0.05 acres	0.005 acres
	Facility Total Impact	793.2 acres	236.7 acres

As depicted in Table 3-2, the total construction impact area (including turbine construction area, access roads, collection lines, substations, temporary staging and construction laydown areas, O&M building, a permanent met tower, a SODAR facility, and temporary concrete batch plant) would be 793.2 acres. The permanent impact of the Facility would be significantly less (approximately 236.7 acres).

(i) Access Roads

The facility would utilize 37.0 miles of access roads. The access road and adjacent cleared areas would be approximately 40 feet wide during construction of the Facility. The post-construction access road width would be up to 20 feet (including the access road and stormwater drainage). Figure 3-1 shows the location of the access roads. The access roads would connect each wind turbine to a local roadway and allow access to the wind turbine during construction and operation. The access roads would be constructed of gravel.

(ii) Temporary Staging and Construction Laydown Area

A temporary staging and construction laydown area would be required during construction of the Facility. This location would serve as an area to stage construction activities and store supplies and equipment. As Figure 3-1 shows, the temporary staging and construction laydown area would be located on a 20-acre parcel of land in the southern portion of the Project area, and on the same parcel of land that would house the O&M building, temporary concrete batch plant, project collection substation and interconnection substation. The temporary staging and construction laydown area would be fenced and consist of a gravel foundation.

(iii) Operation and Maintenance Building

A permanent O&M building would be constructed as part of the Facility and would be located on a 20-acre parcel in the southeastern portion of the Project area. The O&M building would be located on the same 20-acre parcel as the temporary staging and construction laydown area, the temporary concrete batch plant, the project collection substation and the Interconnection Substation. Approximately 20 acres of land would be temporarily disturbed during construction activities for these components; approximately 20 acres would be permanently impacted. The O&M building would be of sheet metal construction and be used to house equipment to operate and maintain the Facility. The O&M building would also include administrative offices, monitoring stations and storage for wind turbine parts and other small equipment. The O&M building is anticipated to be approximately 6,000 square feet of enclosed space and include an office and workshop area, parts warehouse, kitchen, bathroom, shower and utility sink. The O&M building is anticipated to be approximately 20 feet in height (to the roof peak). Appendix A provides a drawing and photo of a typical O&M facility.

(iv) Temporary Concrete Batch Plant

As part of the Facility, the Applicant is evaluating the option of constructing a temporary concrete batch plant for producing concrete required during construction. A temporary concrete batch plant would be constructed in the temporary staging and construction laydown area in order to provide the concrete necessary for the turbine foundations. An aboveground storage tank may also be constructed at this location to provide for storage of water that would be required for batch plant operations during construction of the Facility. After construction is complete, the temporary concrete batch plant and associated water storage tank would be disassembled and removed.

(2) Description of Equipment

The major equipment that would be used for the Facility are the wind turbines. Discussions of the electrical components of the Facility, including the electrical collection system (consisting of underground and aboveground collection lines), four substations, up to two permanent met towers, and a SODAR facility are discussed in Section 4906-17-03(A)(3), *Description of New Transmission Lines,* through Section 4906-17-03(A)(6), *Description of SODAR.*

(a) Wind Energy Turbines

At the time of this submittal, a specific turbine model has not been selected for the Facility for reasons given above. For the purpose of this Application, the G-90 turbine was selected as the representative turbine for the various analyses. The G-90 turbine would be a maximum of 328 feet (100 meters) tall at the turbine hub. With the nacelle and blades mounted, the total height of the G-90 blade tip would be a maximum of 475 feet (145 meters) in height. The footprint for each turbine would be 75 feet by 100 feet in size. Appendix B shows a typical wind turbine and tower. Table 3-1 shows the range of characteristics for the primary turbines being considered for this Facility. Each turbine listed should be considered a representative model for that size of turbine. For example, the Mitsubishi turbine is representative of all possible turbine models in the approximately 2.4 to 2.5 MW size.

The G-90 would begin to produce electricity when wind speeds reach 3 meters per second (m/s) (6.7 miles per hour [mph]) and would achieve maximum output at a wind speed of approximately 17 m/s (38.0 mph). The cut-out wind speed for the G-90 is 21 m/s (47.0 mph), where the wind turbine would automatically shut down. A discussion of the detailed components of the wind turbines is provided in Section 4906-17-05(C), *Equipment*.

(3) Description of New Transmission Lines

The Facility's electrical system would consist of an electrical collection system and associated substations. This section provides a description of each of these components.

Each wind turbine would generate power at 690 volts. The turbines would be arranged in strings or linear groups, connected by underground or aboveground collection lines. A transformer within each turbine nacelle would be used to convert the power to 34.5 kV. The power would then be transmitted down the tower into the underground 34.5 kV collection line. Where more than three parallel underground collection lines would be necessary, aboveground collection lines would be constructed instead. Aboveground collection lines minimize impact on farm drainage tile, provide more efficient transmission of electricity, and are more cost effective. Approximately 78.6 miles of underground collection lines and approximately 3.7 miles of aboveground 34.5 kV collection lines would be required for the Facility. A typical product data sheet for the underground collection line material is attached as Appendix C (document General Cable PC 189469). Figure 3-1 shows the location of these underground and aboveground collection lines. Where more than one set of aboveground 34.5 kV lines are needed, a small substation would be constructed to transform the electricity to 115 kV so that only one set of poles would be needed. Approximately 6.0 miles of aboveground collection lines at 115 kV would also be required. Typical drawings showing support structures for these aboveground lines are provided as Appendix D. Figure 3-1 shows the location of these lines.

(4) Description of New Substations

Four new substations would be required for the Facility. The first substation (the interconnection substation) would function to connect the generated power with AEP's existing 345 kV transmission line for delivery of the power to the PJM transmission grid system. This substation would consist of circuit breakers, switches, and associated bus work, cabling, and control and relaying systems. The area required for this substation would be approximately 5 acres (located within the 20-acre parcel at the southern portion of the Facility), and it is anticipated that AEP would eventually own this substation. Figure 3-1 shows the location of this substation.

Immediately adjacent to the interconnection substation is the project collection substation, which would gather the power from the turbines at 115 kV and transform it to 345 kV for interconnection. This substation would consist of circuit breakers, switches, voltage transformers (115 kV to 345 kV) and associated bus work, cabling, and control and relaying systems. The area required for this substation would be approximately 5 acres (located within the 20-acre parcel at the southern portion of the Facility).

The third substation (Collector Substation 1) would gather power from approximately half of the turbines (the turbines constructed during Phase I) and transform the voltage from 34.5 kV to 115 kV for delivery to the Interconnection Substation. Collector Substation 1 would consist of circuit breakers, switches, voltage transformers (34.5 kV to 115 kV) and associated bus work, cabling, and control and relaying systems. The area required for this substation would be approximately 5 acres. Figure 3-1 shows the planned location of this substation, but the final location would be determined as a part of final electrical design.

The fourth substation (Collector Substation 2) would gather power from the remaining turbines (the turbines constructed during Phase II) and transform the voltage from 34.5 kV to 115 kV for delivery to the Interconnection Substation. This substation would consist of circuit breakers, switches, voltage transformers (34.5 kV to 115 kV) and associated bus work, cabling, and control and relaying systems. The area of this substation would be approximately 5 acres. Figure 3-1 shows the planned location, but the final location would be determined as a part of final electrical design.

(5) Description of Met Tower

Up to two permanent met towers would be located within the Project area for the collection of meteorological data. The permanent met tower(s) would be freestanding (unguyed) structures. The tower(s) would be up to approximately 330 feet high with an equilateral triangle base, each side of which would be about 32 feet long. The met tower(s) foundation would consist of three steel-reinforced concrete piles, each at a corner of the tower base. The met tower(s) would be placed within a 50- by 50-foot fenced-in gravel area. Appendix E provides general design information for the met tower foundation(s). The location of the met tower(s) would be determined during the micro-siting process; however, its location would be within the Project area.

(6) Description of SODAR

The Facility would also include one SODAR unit that is typically located near one of the permanent met towers. SODAR systems are used to measure wind speed at various heights above the ground, and the thermodynamic structure of the lower layer of the atmosphere. SODAR systems are typically housed in a small trailer approximately 10 feet tall with an attached 20-foot wind sensor boom. Appendix F provides a general photo of a typical SODAR facility.

(B) DETAILED PROJECT SCHEDULE

(1) Project Schedule

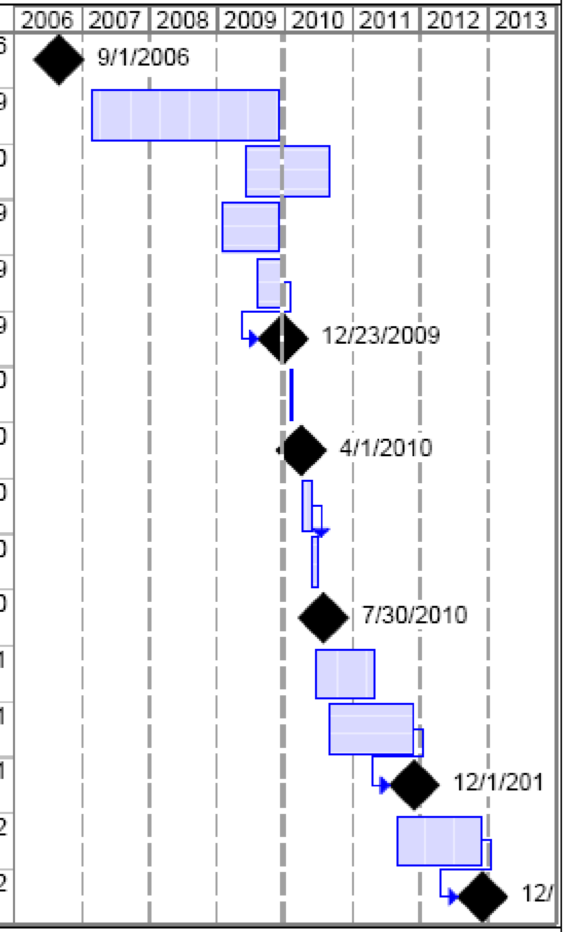
The Applicant began development of the Facility in Fall 2006. Due diligence of potential Facility environmental and regulatory constraints began in September 2008. Acquisition of land and land rights began in March 2007 and continued through November 2009. Wildlife surveys, including bird, bat, wetland, habitat, and vegetative surveys, began in

February 2009 and continued into November 2009. The acoustic bat survey data report will be submitted in early February 2010. Site-specific geotechnical studies will be conducted from April to May 2010, with the final geotechnical report to be submitted in June 2010. Additional studies associated with eight additional turbines (and associated equipment) will be completed in early 2010 and submitted to the OPSB by April 1, 2010. The Facility schedule anticipates that the Certificate would be issued by late July 2010. The final design drawings for the Facility would be prepared beginning in June 2010. Phase I of Facility construction is anticipated to begin in September 2010 and extend through November 2011. Phase I of the Facility would be placed into service in December 2011. Phase II of Facility construction is anticipated to begin in September 2011 and extend through November 2012. Phase II of the Facility would be placed into service in December 2012. Figure 2-2 shows the anticipated Facility schedule.

FIGURE 3-2
Blue Creek Project Schedule

Blue Creek Wind Farm

ID	Task Name	Start	Finish
1	Applicant Begins Development of the Facility	Fri 9/1/06	Fri 9/1/06
2	Land Acquisitions and Land Rights	Thu 3/1/07	Mon 11/30/09
3	Good Neighbor Agreements	Mon 6/1/09	Wed 9/1/10
4	Wildlife Studies/Surveys	Mon 2/2/09	Mon 11/30/09
5	OPSB Application Preparation	Mon 8/3/09	Fri 12/18/09
6	OPSB Application for Certificate Submittal	Wed 12/23/09	Wed 12/23/09
7	Acoustic Bat Survey Data Report	Mon 2/1/10	Fri 2/12/10
8	Additional Site Specific Information	Thu 4/1/10	Thu 4/1/10
9	Geotechnical Studies (Site Specific)	Thu 4/1/10	Mon 5/31/10
10	Geotechnical Report (Final)	Tue 6/1/10	Wed 6/30/10
11	Issuance of the OPSB Certificate	Fri 7/30/10	Fri 7/30/10
12	Preparation of Final Design	Tue 6/15/10	Fri 4/29/11
13	Facility Construction (Phase I)	Wed 9/1/10	Wed 11/30/11
14	Placement of Facility in Service (Phase I)	Thu 12/1/11	Thu 12/1/11
15	Facility Construction (Phase II)	Thu 9/1/11	Fri 11/30/12
16	Placement of Facility in Service (Phase II)	Mon 12/3/12	Mon 12/3/12



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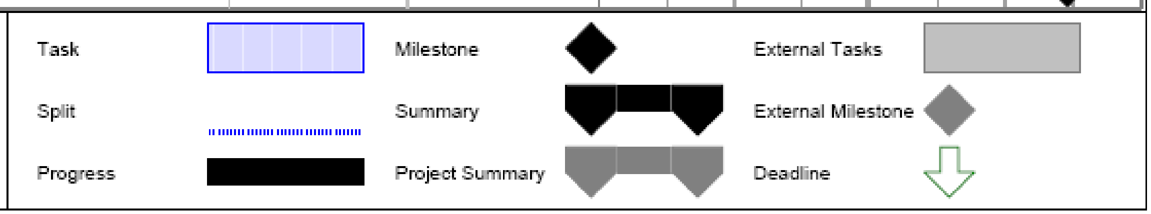

(2) Delays

Any delays that would impact the in-service date beyond December 2011 would have a significant impact on the Facility and could result in the Facility being significantly delayed or cancelled. Based purely on lost revenue, a delay is expected to cost approximately $250,000 a day, $1.9 million a week, or $7.5 million on average per month. Delays that extend into winter months (January and February) are costlier, as these are typically high-wind months. Additionally, a delay in issuing a Certificate that would postpone the start of construction beyond 2010 would jeopardize the Facility's eligibility for the federal Investment Tax Credit (ITC). The ITC provides significant incentive to build renewable energy projects and would enhance the viability of this Facility, if it is eligible.