

BEFORE THE POWER SITING BOARD OF THE STATE OF OHIO

**In the Matter of the Application of Trishe Wind Ohio,)
LLC for an Amendment to its Certificate to Install and)
Operate a Wind-Powered Electric Generation Facility in) 16-0343-EL-BGA
Paulding County, Ohio.)**

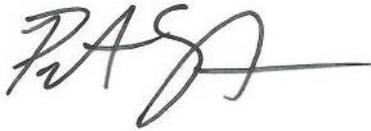
Members of the Board:

Chairman, Public Utilities Commission	Ohio House of Representatives
Director, Development Services Agency	Ohio Senate
Director, Department of Health	
Director, Department of Agriculture	
Director, Environmental Protection Agency	
Director, Department of Natural Resources	
Public Member	

To the Honorable Power Siting Board:

Please review the attached Staff Report of Investigation, which has been filed in accordance with Ohio Power Siting Board rules. The application in this case is subject to an approval process as required by Section 4906.03 of the Ohio Revised Code.

Sincerely,



Patrick Donlon
Director, Rates and Analysis
Public Utilities Commission of Ohio

OPSB STAFF REPORT OF INVESTIGATION

Case Number: 16-0343-EL-BGA
Project Name: Northwest Ohio Wind Energy Wind Farm
Project Location: Paulding County
Applicant: Trishe Wind Ohio, LLC
Application Filing Date: February 18, 2016
Inspection Date: April 14, 2016
Report Date: May 10, 2016
Applicant's Waiver Requests: none
Staff Assigned: G. Zeto, M. Bellamy, A. Conway

Application Description

On December 16, 2013, in case number 13-0197-EL-BGN, the Ohio Power Siting Board (Board) authorized Northwest Ohio Wind Energy, LLC to construct a major utility facility, specifically a wind-powered electric generating facility consisting of up to 60 turbine sites with a combined generation capacity of 100 megawatts (MW).

On August 19, 2014, Trishe Wind Ohio, LLC (Applicant) filed an application to transfer the certificate from Northwest Ohio Wind Energy, LLC to Trishe Wind Ohio, LLC. On November 24, 2014, the Board ordered that the application to transfer the certificate from Northwest Ohio Wind Energy, LLC to the Applicant be granted.

In this application, the Applicant is proposing to add three turbine models for potential operation in this project: the General Electric (GE) 2.3-116 (2.3 MW), the Vestas V110 (2.1 MW), and the Vestas V126 (3.45 MW). The Applicant is also considering two different tower designs for both the GE 2.3-116 and Vestas V110. The different tower designs would result in the GE 2.3-116 with a hub height of either 80 or 94 meters and the Vestas V110 with a hub height of either 80 or 95 meters.¹ The Board approved the Gamesa G114 (2.0 MW) in the original case and the Applicant proposes in this application to increase the output for this turbine model to 2.1 MW as a result of a software upgrade. The dimensions of the Gamesa G114 would not change. Staff has determined that the environmental impacts associated with this turbine model have not changed as a result of the software upgrade.

The output of the proposed turbine models would be an increase over the output of the previously certificated Vestas V100 (1.8MW), GE 1.7-100 (1.7 MW), and Gamesa G114 (2.0 MW) turbine models. Turbine locations T-11, T-12, T-35, T-38, T-51, T-56, T-57, T-58, T-59, and T-60 would be removed if the Applicant were to select one of the proposed turbine models for construction. The removal of these turbine locations would also result in the removal of

¹ Turbine model hub heights are typically described by the manufacturer in meters. However, the Ohio law describes such measurement in feet increments. Therefore, when the heights of these turbine models are subsequently described relative to the Ohio law, Staff references them in feet.

access roads and collection lines associated with these turbine sites. The 100 MW nameplate capacity for the project would not change. The Applicant stated that the total output of the facility would be limited to 100 MW both through fully automatic, software based controls offered by each manufacturer as well as the interconnection agreement. The location of the project's remaining associated facilities, including access roads, collector lines, substation, transmission line tie-in, concrete batch plant, and the operation and maintenance facility would remain unchanged.

Application Review

The Applicant's present filing requests only the addition of three turbine models to the list of acceptable turbine models for this project. As such, Staff's review of the Applicant's request is solely focused on these three turbine models and whether adding them to the previously approved turbine models for this project would impact any of the stipulated conditions or result in a material increase in environmental impact as compared to the original project.

Additional Turbine Models

The previously proposed turbine models included the Vestas V100, GE 1.7-100, and the Gamesa G114. The maximum turbine height of the approved turbine models is 492 feet. The maximum rotor diameter of the approved turbine models is 374 feet. The dimensions of the previously certificated turbine models differ from the three proposed turbine models as detailed in the following table.

Turbine Model	Rotor Diameter	Total Height
GE 2.3-116	381 feet	453 or 499 feet
Vestas V110	361 feet	443 or 492 feet
Vestas V126	413 feet	492 feet

Applicable to the original certificate in case number 13-0197-EL-BGN, 750 feet in horizontal distance from the tip of the turbine's nearest blade at 90 degrees to the exterior of the nearest, habitable, residential structure is the minimum distance a turbine is authorized to be located in proximity to a habitable structure on an adjacent property, without property owner approval. Likewise, applicable to the original certificate, the property line setback is equal to a horizontal distance, from the turbine's base to the property line of the wind farm property, equal to one and one-tenth times the total height of the turbine structure as measured from its base to the tip of its highest blade.

The maximum turbine blade length of the turbine models approved in the original application led to a minimum residential setback calculation of 937 feet from the turbine base to the exterior of the nearest habitable residential structure. Using the maximum turbine height of the three turbine models proposed by this amendment (i.e. the blade length of the Vestas V126 turbine model) and the minimum setback requirement applied in the original case, the residential setback requirement would be 957 feet from the turbine base to the exterior of the nearest habitable residential structure.

Using the maximum turbine height of the turbine models approved in the original application, the minimum property line setback would be 541 feet from the turbine base to the property line

of the wind farm. Using the maximum turbine height of the three turbine models proposed in this filing (i.e. the GE 2.3-116 turbine model with 94 meter hub height), the minimum setback requirement applied in the original case calculates to 549 feet from the turbine base to the property line of the wind farm.

The Applicant has indicated that the project would not violate any of the originally applied setbacks. With regard to compliance with the required minimum setback distances for each turbine, Staff finds that the addition of the proposed turbine models does not create the need for any additional stipulated conditions or result in a material increase in environmental impact when compared to the original project. Consistent with the originally approved project, if the location of a wind turbine does not meet the required setback, it may not be constructed unless the Applicant secures appropriate executed waiver(s) of the minimum setback requirement.

Safety Manuals

Staff reviewed the safety manuals for the proposed turbine models. Staff finds that the conditions of the original certificate adequately address safety considerations. Staff also finds that the addition of the proposed turbine models does not result in a material increase in environmental impact when compared to the original project.

Noise

In the present application, the Applicant committed to adhering to the noise condition specified in the Board's Opinion and Order for the original certificate in case number 13-0197-EL-BGN, Condition 38, specifically:

(38) The facility shall be operated so that the facility noise contribution does not result in noise levels at the exterior of any currently existing nonparticipating sensitive receptor that exceed the project area ambient nighttime average sound level (LEQ) (42 dBA) by five dBA. During daytime operation only (7:00 a.m. to 10:00 p.m.), the facility may operate at the greater of: the project area ambient nighttime LEQ (42 dBA) plus five dBA; or the validly measured ambient LEQ plus five dBA at the location of the sensitive receptor. After commencement of commercial operation, the Applicant shall conduct further review of the impact and possible mitigation of all project-related noise complaints through its complaint resolution process.

On November 24, 2015, in case no. 13-0197-EL-BGN, the Applicant filed an updated noise study modeling the noise impact of the Gamesa G114 2.1 MW. The Applicant also conducted a noise study to model the noise impact of the five proposed turbine model/hub height combinations, including the GE 2.3-116 (80 and 94 meter hub heights), Vestas V110 (80 and 95 meter hub heights), and Vestas V126. The Applicant compared the modeled impact of the proposed turbine models to the ambient noise level presented in the original application. The noise studies of the Gamesa G114 2.1 MW as well as the five proposed turbine model/hub height combinations show that the modeled impact would be less than the nighttime ambient plus five dBA, or 47 dBA, for all nonparticipating receptors.

With regard to the potential noise impact of the Gamesa G114 2.1 MW turbine model and the five proposed turbine model/hub height combinations, Staff finds that their addition would not create the need for any additional stipulated conditions or result in a material increase in environmental impact when compared to the previously certificated turbine models.

Shadow Flicker

The Applicant's original application in case number 13-0197-EL-BGN was approved with a condition limiting shadow flicker, Condition 39, which states:

(39) The facility shall be operated so that the facility shadow flicker contribution does not result in shadow flicker levels that exceed 30 hours per year for any nonparticipating sensitive receptor. After commencement of commercial operation, the Applicant shall conduct further review of the impact and possible mitigation of all project-related shadow flicker complaints through its complaint resolution process.

After the certificate was issued in case no. 13-0197-EL-BGN, the Haviland Plastics Products company constructed three 1.5 MW wind turbines in and around project area in Haviland, Ohio. The three Haviland Plastics turbines have caused five nonparticipating receptors to be modeled with shadow flicker in excess of 30 hours per year. The Applicant modeled the shadow flicker impact of five turbine model/hub height combinations as well as the existing Haviland Plastics turbines. . The Applicant's turbines are modeled to add less than two minutes of annual shadow flicker to the five nonparticipating receptors modeled to receive shadow flicker in excess of 30 hours per year by the Haviland Plastics turbines.

Aside from the five nonparticipating receptors impacted by the Haviland Plastics turbines, of the five proposed turbine model/hub height combinations modeled, four (the General Electric 2.3-116 80 meter hub height, General Electric 2.3-116 94 meter hub height, Vestas V110-2.0 80 meter hub height, and Vestas V110-2.0 95 meter hub height) are modeled to not exceed 30 hours of shadow flicker at all nonparticipating receptors. Additionally, Staff determined the Applicant's proposed increase in output for the previously approved Gamesa G114 from 2.0 MW to 2.1 MW would not result in a change to environmental impacts, including shadow flicker, associated with this turbine model. The Vestas V126, is modeled to exceed 30 annual hours of shadow flicker impact at five additional nonparticipating receptors in addition to the five nonparticipating receptors impacted by the Haviland Plastics turbines.

The Applicant's shadow flicker study suggests that removing certain turbine locations could reduce shadow flicker impact below 30 hours per year for the five additional nonparticipating receptors modeled to be impacted by the Vestas V126. If the Vestas V126 turbine is chosen, the Applicant has indicated it would only build up to 29 turbines, compared to up to 50 of the other turbine models.

With regard to the potential impact of shadow flicker from the five proposed arrays, Staff finds that upon application of Condition 39 in case number 13-0197-EL-BGN to all applicable receptors and the ability to reduce turbine locations if the Vestas 126 is chosen, the addition of the five proposed turbine model/hub height combinations does not result in a material increase in environmental impact when compared to the original project.

Ice Throw

Staff evaluated the potential for ice throw for the proposed turbine models as compared to the certificated turbine models. Both the previously certificated and proposed turbine models will have ice detection equipment and safety features that would shut down a turbine if the buildup of ice would cause excess vibrations or the speed to power ratio to become too high.

Staff found that the addition of the proposed turbine models does not create the need for any additional stipulated conditions and does not result in a material increase in environmental impact when compared to the original project.

Blade Shear

Staff evaluated the potential for blade shear for the proposed turbine models as compared to the certificated turbine models. Both the previously certificated and proposed turbine models have multiple safety features to address blade shear, including two fully independent braking systems, a pitch control system, and turbine shut-offs in the event of excessive wind speeds, excessive blade vibration, or stress.

Therefore, in terms of potential blade shear, Staff finds that the addition of the proposed turbine models does not create the need for any additional stipulated conditions and does not result in a material increase in environmental impact when compared to the original project.

Conclusion

Staff's review of the Applicant's request regarding the three proposed turbine models focuses solely on the potential impacts associated with the turbine models and whether the proposed turbine models impact any of the stipulated conditions or result in a material increase in environmental impact when compared to the original project. The proposed addition of three turbine models to the list of authorized turbine models would not require any substantial change in location of any turbine sites or non-turbine associated facilities. Staff finds, if any of the three proposed turbine models is selected, the original conditions of the certificate are adequate to ensure that adverse environmental impacts would continue to be minimized for this project.

Recommended Findings

Staff recommends that the Board approve the application related to the three proposed wind turbine models, provided that the certificate continues to include the 40 conditions specified in the Opinion, Order, and Certificate for case number 13-0197-EL-BGN, including the Applicant's compliance with the applicable statutory setback requirements.

Recommended Condition

1. The Applicant shall continue to adhere to all conditions of the Opinion, Order, and Certificate for the Northwest Ohio Wind Farm Project in case number 13-0197-EL-BGN, and as modified by this amendment, with the GE 2.3-116 (including 80 and 94 meter hub heights), Vestas V110 (including 80 and 95 meter hub heights), Vestas V126, and upgraded Gamesa G114 turbine models to be added as acceptable turbine models.

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Case No(s). 16-0343-EL-BGA

Summary: Staff Report of Investigation electronically filed by Mrs. Yvonne W Cooper on behalf of Staff of OPSB