Staff Report of Investigation

Icebreaker Wind Facility
Icebreaker Windpower, Inc.

Case No. 16-1871-EL-BGN

July 3, 2018

Ohio | Power Siting Board

John R. Kasich, Governor | **Asim Z. Haque,** Chairman

In the Matter of the Application of Icebreaker Windpower, Inc. for a Certificate to Construct a Wind-Powered Electric Generation Facility in Cuyahoga County, Ohio	**)** **)** **)** **)**	**Case No. 16-1871-EL-BGN**

Staff Report of Investigation

Submitted to the
OHIO POWER SITING BOARD

BEFORE THE POWER SITING BOARD OF THE STATE OF OHIO

In the Matter of the Application of Icebreaker Windpower, Inc. for a Certificate to Construct a Wind-Powered Electric Generation Facility in Cuyahoga County, Ohio	**)** **)** **)** **)**	**Case No. 16-1871-EL-BGN**

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

To the Honorable Power Siting Board:

In accordance with the Ohio Revised Code (R.C.) 4906.07(C) and rules of the Ohio Power Siting Board (Board), the staff of the Public Utilities Commission of Ohio (Staff) has completed its investigation in the above matter and submits its findings and recommendations in this Staff Report for consideration by the Board.

The findings and recommendations contained in this report are the result of Staff coordination with the following agencies that are members of the Board: Ohio Environmental Protection Agency, the Ohio Department of Health, the Ohio Development Services Agency, the Ohio Department of Natural Resources, and the Ohio Department of Agriculture. In addition, Staff coordinated with the Ohio Department of Transportation, the Ohio Historic Preservation Office, the U.S. Fish and Wildlife Service, the U.S. Army Corps of Engineers, and the U.S. Coast Guard.

In accordance with R.C. 4906.07(C) and 4906.12, copies of this Staff Report have been filed with the Docketing Division of the Public Utilities Commission of Ohio and served upon the Applicant or its authorized representative, the parties of record, and pursuant to Ohio Administrative Code 4906-3-06, the main public libraries of the political subdivisions in the project area.

The Staff Report presents the results of Staff's investigation conducted in accordance with R.C. Chapter 4906 and the rules of the Board, and does not purport to reflect the views of the Board nor should any party to the instant proceeding consider the Board in any manner constrained by the findings and recommendations set forth herein.

Respectfully submitted,

Tamara S. Turkenton
Director, Rates and Analysis
Public Utilities Commission of Ohio

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I. POWERS AND DUTIES

OHIO POWER SITING BOARD

The authority of the Ohio Power Siting Board (Board) is prescribed by Ohio Revised Code (R.C.) Chapter 4906. R.C. 4906.03 authorizes the Board to issue certificates of environmental compatibility and public need for the construction, operation, and maintenance of major utility facilities defined in R.C. 4906.01. Included within this definition of major utility facilities are: electric generating plants and associated facilities designed for, or capable of, operation at 50 megawatts (MW) or more; electric transmission lines and associated facilities of a design capacity of 100 kilovolts (kV) or more; and gas pipelines greater than 500 feet in length and more than nine inches in outside diameter, and associated facilities, designed for transporting gas at a maximum allowable operating pressure in excess of 125 pounds per square inch. In addition, pursuant to R.C. 4906.20, the Board authority applies to economically significant wind farms, defined in R.C. 4906.13(A) as wind turbines and associated facilities with a single interconnection to the electrical grid and designed for, or capable of, operation at an aggregate capacity of 5 MW or greater but less than 50 MW.

Membership of the Board is specified in R.C. 4906.02(A). The voting members include: the Chairman of the Public Utilities Commission of Ohio (PUCO or Commission) who serves as Chairman of the Board; the directors of the Ohio Environmental Protection Agency (Ohio EPA), the Ohio Department of Health, the Ohio Development Services Agency, the Ohio Department of Agriculture, and the Ohio Department of Natural Resources (ODNR); and a member of the public, specified as an engineer, appointed by the Governor from a list of three nominees provided by the Ohio Consumers' Counsel. Ex-officio Board members include two members (with alternates) from each house of the Ohio General Assembly.

NATURE OF INVESTIGATION

The Board has promulgated rules and regulations, found in Ohio Administrative Code (Ohio Adm.Code) 4906:1-01 et seq., which establish application procedures for major utility facilities and economically significant wind farms.

Application Procedures

Any person that wishes to construct a major utility facility or economically significant wind farm in this state must first submit to the Board an application for a certificate of environmental compatibility and public need.[1] The application must include a description of the facility and its location, a summary of environmental studies, a statement explaining the need for the facility and how it fits into the Applicant's energy forecasts (for transmission projects), and any other information the Applicant or Board may consider relevant.[2]

Within 60 days of receiving an application, the Chairman must determine whether the application is sufficiently complete to begin an investigation.[3] If an application is considered complete, the Board or an administrative law judge will cause a public hearing to be held 60 to 90 days after the

1. R.C. 4906.04 and 4906.20.
2. R.C. 4906.06(A) and 4906.20(B)(1).
3. Ohio Adm.Code 4906-3-06(A).

official filing date of the completed application.[4] At the public hearing, any person may provide written or oral testimony and may be examined by the parties.[5]

Staff Investigation and Report

The Chairman will also cause each application to be investigated and a report published by the Board's Staff not less than 15 days prior to the public hearing.[6] The report sets forth the nature of the investigation and contains the findings and conditions recommended by Staff.[7] The Board's Staff, which consists of career professionals drawn from the staff of the PUCO and other member agencies of the Board, coordinates its investigation among the agencies represented on the Board and with other interested agencies such as the Ohio Department of Transportation (ODOT), the Ohio Historic Preservation Office (OHPO), and the U.S. Fish and Wildlife Service (USFWS).

The technical investigations and evaluations are conducted pursuant to Ohio Adm.Code 4906-1-01 et seq. The recommended findings resulting from Staff's investigation are described in the Staff Report pursuant to R.C. 4906.07(C). The report does not represent the views or opinions of the Board and is only one piece of evidence that the Board may consider when making its decision. Once published, the report becomes a part of the record, is served upon all parties to the proceeding and is made available to any person upon request.[8] A record of the public hearings and all evidence, including the Staff Report, may be examined by the public at anytime.[9]

Board Decision

The Board may approve, modify and approve, or deny an application for a certificate of environmental compatibility and public need.[10] If the Board approves, or modifies and approves an application, it will issue a certificate subject to conditions. The certificate is also conditioned upon the facility being in compliance with applicable standards and rules adopted under the Ohio Revised Code.[11]

Upon rendering its decision, the Board must issue an opinion stating its reasons for approving, modifying and approving, or denying an application for a certificate of environmental compatibility and public need.[12] A copy of the Board's decision and its opinion is memorialized upon the record and must be served upon all parties to the proceeding.[13] Any party to the proceeding that believes its issues were not adequately addressed by the Board may submit within 30 days an application for rehearing.[14] An entry on rehearing will be issued by the Board within 30 days and may be appealed within 60 days to the Supreme Court of Ohio.[15]

4. R.C. 4906.07(A) and Ohio Adm.Code 4906-3-08.
5. R.C. 4906.08(C).
6. R.C. 4906.07.
7. Ohio Adm.Code 4906-3-06(C).
8. R.C. 4906.07(C) and 4906.10.
9. R.C. 4906.09 and 4906.12.
10. R.C. 4906.10(A).
11. R.C. 4906.10.
12. R.C. 4906.11.
13. R.C. 4906.10(C).
14. R.C. 4903.10 and 4906.12.
15. R.C. 4903.11, 4903.12, and 4906.12.

CRITERIA

Staff developed the recommendations and conditions in this *Staff Report of Investigation* pursuant to the criteria set forth in R.C. 4906.10(A), which reads, in part:

> The board shall not grant a certificate for the construction, operation, and maintenance of a major utility facility, either as proposed or as modified by the board, unless it finds and determines all of the following:
>
> (1) The basis of the need for the facility if the facility is an electric transmission line or gas pipeline;
>
> (2) The nature of the probable environmental impact;
>
> (3) That the facility represents the minimum adverse environmental impact, considering the state of available technology and the nature and economics of the various alternatives, and other pertinent considerations;
>
> (4) In the case of an electric transmission line or generating facility, that the facility is consistent with regional plans for expansion of the electric power grid of the electric systems serving this state and interconnected utility systems and that the facility will serve the interests of electric system economy and reliability;
>
> (5) That the facility will comply with Chapters 3704, 3734, and 6111 of the Revised Code and all rules and standards adopted under those chapters and under sections 1501.33, 1501.34, and 4561.32 of the Revised Code. In determining whether the facility will comply with all rules and standards adopted under section 4561.32 of the Revised Code, the board shall consult with the office of aviation of the division of multi-modal planning and programs of the department of transportation under section 4561.341 of the Revised Code;
>
> (6) That the facility will serve the public interest, convenience, and necessity;
>
> (7) In addition to the provisions contained in divisions (A)(1) to (6) of this section and rules adopted under those divisions, what its impact will be on the viability as agricultural land of any land in an existing agricultural district established under Chapter 929 of the Revised Code that is located within the site and alternative site of the proposed major utility facility. Rules adopted to evaluate impact under division (A)(7) of this section shall not require the compilation, creation, submission, or production of any information, document, or other data pertaining to land not located within the site and alternative site; and
>
> (8) That the facility incorporates maximum feasible water conservation practices as determined by the board, considering available technology and the nature and economics of the various alternatives.

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II. APPLICATION

APPLICANT

In 2009, various entities came together to form the Lake Erie Energy Development Corporation (LEEDCo) in order to explore the potential for offshore wind energy in Lake Erie.

In 2014, Fred. Olsen Windcarrier, based in Norway, began assisting the LEEDCo effort.[16] Fred. Olsen Windcarrier has assisted with the transport, installation, and maintenance of multiple offshore wind farms. To date they have installed over 200 offshore wind turbines, including the turbines at Block Island, Rhode Island.[17]

Subsequent to Fred. Olsen Windcarrier's involvement, Fred. Olsen Renewables (FOR) formed two new companies:[18]

(1) Icebreaker Windpower Inc.,

(2) Fred. Olsen Renewables USA, Inc.

Icebreaker Windpower, Incorporated (Applicant) is the entity that would build, own, and operate the proposed Icebreaker Wind Farm (facility). Fred. Olsen Renewables USA Inc., formed in September 2016, is the parent company of the Applicant.

HISTORY OF THE APPLICATION

Prior to formally submitting its application, the Applicant consulted with the Staff regarding application procedures.

On September 13, 2016, the Applicant filed a pre-application notification letter regarding the project.

On November 3, 2016, the Applicant held its public information meeting.

On February 1, 2017, the Applicant filed its application for the facility.

On March 13, 2017, the Applicant filed an application supplement consisting of a narrative and numerous attachments.

On April 3, 2017, the Chairman of the Board issued a letter to the Applicant stating that the application, as supplemented, had been found not to comply with the requirements of Ohio Adm.Code 4906-01, et seq.

16. Lake Erie Energy Development Corporation, "Fred. Olsen Windcarrier Joins LEEDCo Team as Installation Partner for Lake Erie Offshore Wind Project," November 19, 2014, accessed October 12, 2017, http://www.leedco.org/press-releases/fred-olsen-windcarrier-joins-leedco-team-as-installation-partner-for-lake-erie-offshore-wind-project.

17. Fred. Olsen Windcarrier, "Fred. Olsen Windcarrier," accessed October 12, 2017, http://windcarrier.com.

18. Fred. Olsen Renewables, also based in Norway, is involved with numerous wind farms in Norway, Sweden, and the United Kingdom that are either operational or under development.

On July 20, 2017, the Applicant filed a second supplement and response to the Chairman's letter of April 3, 2017.

On July 31, 2017, the Chairman of the Board issued a letter to the Applicant stating that the application, as supplemented, had been found to comply with the requirements of Ohio Adm.Code 4906-01, et seq.

On August 15, 2017, the Administrative Law Judge (ALJ) issued an entry scheduling a local public hearing for this case to be held on Wednesday, November 8, 2017 at 6:00 p.m., at the Cleveland City Council Chambers, Cleveland City Hall, 2nd floor, 601 Lakeside Ave., Cleveland, Ohio 44114. The adjudicatory hearing will commence on Friday, November 17, 2017, at 10:00 a.m., 11th floor, Hearing Room 11-C, at the offices of the PUCO, 180 E. Broad St., Columbus, Ohio 43215-3793.

On September 6, 2017, the Applicant filed responses to Staff's first set of interrogatories.

On October 2, 2017, the Applicant filed responses to Staff's second set of interrogatories.

On October 23, 2017, the Staff filed a motion to suspend the procedural schedule with the exception of the public hearing. The Staff's motion was granted by Administrative Law Judge entry issued on October 23, 2017.

On November 7, 2017, the Applicant filed responses to Staff's third set of interrogatories.

On November 8, 2017, the initial local public hearing was held in Cleveland, Ohio. Approximately forty individuals provided statements at the public hearing. The transcripts from this hearing were added to the docket on November 21, 2017.

On January 29, 2018, the Applicant filed responses to Staff's fourth set of interrogatories.

On March 22, 2018, the Applicant filed its fourth supplement to the application.

On April 20, 2018, the ALJ issued an entry scheduling a second local public hearing in this case to be held on July 19, 2018, at 6:00 p.m., at Cleveland City Council Chambers, Cleveland City Hall, 601 Lakeside Avenue, 2nd Floor, Cleveland, Ohio 44114. The adjudicatory hearing will commence on August 6, 2018, at 10:00 a.m., 11th Floor, Hearing Room 11-A, at the offices of the Public Utilities Commission of Ohio, 180 East Broad Street, Columbus, Ohio 43215-3793.

On May 23, 2018, the ALJ issued a ruling on motions to intervene and setting procedural requirements. In this entry, the ALJ granted the intervention requests by Ohio Environmental Council, Regional Council of Carpenters, Sierra Club, Business Network for Offshore Wind, Inc., and Bratenahl Residents. The petition to intervene of Cuyahoga County residents Vicci Weeks, Caryn Good Seward, and Steven Seward was denied.

On June 11, 2018, the Applicant filed responses to Staff's fifth set of interrogatories.

This summary of the history of the application does not include every filing in case number 16-1871-EL-BGN. The docketing record for this case, which lists all documents filed to date, can be found online at http://dis.puc.state.oh.us.

PROJECT DESCRIPTION

Icebreaker Windpower, Incorporated proposes to construct and operate the facility with up to six wind turbines for a total generating capacity of up to 20.7 MW in Lake Erie, north of Cleveland, Ohio. As such, the proposed facility qualifies for review by the Board as an economically significant wind farm, pursuant to R.C. 4906.20. Characterized as a demonstration-scale project, the Applicant has indicated that it has no plans for further expansion at this point of interconnection.

Project Area

As proposed, the turbines would be installed in Lake Erie ranging from eight to ten miles off the shoreline in Cuyahoga County. In this proceeding, the Applicant plans to install no more than six turbines, but it has proposed seven turbine locations in order to allow some flexibility during the final planning stages. An electric cable buried under the lakebed would connect the turbines to a new onshore substation, which in turn would connect to the adjacent Cleveland Public Power (CPP) substation. The Applicant obtained both a submerged lands lease from the State of Ohio and an easement from the City of Cleveland. The project area and proposed facilities are shown on the maps in this report.

Submerged Lands Lease

Initially, LEEDCo obtained a Lake Erie submerged lands lease (SLL) from the State of Ohio in order to host a proposed offshore wind project.[19] The SLL, which commenced on February 1, 2014, has a term of 50 years. The SLL covers a total of 139.3810 acres. Of that total, 0.3925 acre is devoted to the substation and surrounding area, 4.1899 acres are for the footprint of the turbines, and the remaining 134.7985 acres are intended for the export cable and array cables.

On January 18, 2017, the SLL was assigned from LEEDCo to the Applicant.

As mentioned above, the existing SLL commenced in 2014. Since that time, minor adjustments to the proposed project have been made. Staff understands from the ODNR that the current SLL will be modified to incorporate small adjustments to the proposed locations for the turbines, electric line, and associated facilities. In addition, the performance metrics contained within Exhibit C of the current SLL would be updated.

Wind Turbines

The Applicant proposes to use six Mitsubishi Heavy Industries Vestas Offshore Wind (MVOW) model V126 turbines that are each rated at 3.45 MW. The MVOW structures would consist of a 3-bladed horizontal axis turbine and nacelle on top of a light gray tubular conical steel tower. The total structural maximum height, as measured from the water surface, would be up to 479 feet, which is comprised of a turbine hub height of 272 feet and a blade length of approximately 207 feet (i.e., a maximum rotor diameter of 413 feet).[20] The lowest point of a blade is designed to be 65 feet above the water surface.

19. Ohio Department of Natural Resources, "State of Ohio Lake Erie Submerged Lands Lease, File Number SUB-2356-CU."

20. In meters, the total maximum turbine height would be up to 146 meters, the hub height of each turbine would be 83 meters, and the maximum rotor diameter would be 126 meters.

The Applicant expects that the annual energy production for the facility would be approximately 75,000-megawatt hours (MWh).

Turbine Foundations

In order to determine a suitable foundation design for the turbines, the Applicant evaluated the Lake Erie geology, analyzed potential lake ice effects, performed a full geotechnical survey at each of the turbine foundation sites, analyzed of several foundation design types, and conducted a turbine design analysis. The Applicant selected the mono bucket as the foundation design for this project. The Applicant expects that final engineering plans and detailed construction drawings will be completed in the fourth quarter of 2018.

The mono bucket foundation would have a general appearance of an inverted bucket, and consist of three sections: a steel skirt embedded in the lakebed, a lid section, and a shaft that would protrude above the mudline. There will also be a portion of the foundation above the waterline that would be painted yellow. The mono bucket foundation system would be installed by gravity and a suction pump system with skirt nozzles and internal pressure chambers. The several hundred-ton foundation would be placed on the lakebed, and the steel skirt initially would penetrate into the soil a few feet. Then water would be pumped from the bucket causing the foundation to penetrate further into the lakebed. The Applicant states that this installation method would not need blasting, pile driving, or dredging. The Applicant has stated that the mono bucket foundation would minimize environmental impacts and eliminate significant installation steps, compared to other types of foundations. Staff has found that this is a commonly used foundation design for offshore facilities including wind turbines and is reasonable to use at this proposed wind farm.

Electric Collection System and Collection Switching Substation

The electric collection system would consist of a set of cables (inter-array cables) that would interconnect the wind turbines, and an export cable that transmits the generated electricity to the new substation. Both the inter-array cables and the export cables would be rated at 34.5 kV.

The export cable would connect the wind turbines to a new substation that would be constructed on shore, adjacent to the existing CPP 138 kV Lake Road substation. The new substation would include a 34.5 kV to 138 kV transformer.

Although the Applicant discusses plans for an electric transmission line connecting the new substation to the existing CPP substation in the present application, Staff recommends the Board consider the transmission interconnection to be the subject of a separate filing before the Board. Staff considers the electric transmission interconnection to qualify as a major utility facility, pursuant to the definition of that term provided in R.C. 4906.01. Further, Staff has recently received updated descriptions of the Applicant's plans for the transmission interconnection, including a current description that the overhead 150-foot transmission line would now be an underground section approximately 225 feet in length. A separate filing would provide time for the Applicant to finalize its plans for the transmission interconnection, as well as time for the Staff to evaluate those finalized plans, and present its recommendation to the Board. Therefore, Staff's investigation presented in this case is exclusive of the proposed 138 kV transmission line referenced in the Application.

The total length of all cabling would be approximately 12 miles. The inter-array cables and the majority of the export cable would be installed approximately 5 feet below the lake bottom either

using a cable plow or jetting tool. Approaching the shore, the final approximately 3,700 feet of export cable would be installed using horizontal directional drilling (HDD) allowing the cable to travel under the Cleveland Harbor breakwater and Cleveland Harbor.

Operations and Maintenance Building

For its operations and maintenance (O&M) building, the Applicant proposes to lease space at an existing Great Lakes Towing building on the Old River. While the Great Lakes Towing site is estimated to be 6.3 acres, the Applicant indicates it will lease no more than 0.5 acre. The Applicant does not expect to make any modifications to the site or the existing building.

Permanent Meteorological Towers

Green Energy Ohio received financial support from several entities to install a permanent meteorological tower at the Cleveland Water Intake Crib in 2005.[21,22] The meteorological tower at the crib, which is approximately 3.5 miles offshore, has measuring instruments installed at 30, 40, and 50 meters above the lake's surface. The Applicant used data from the crib meteorological tower as part of its efforts to evaluate the local wind resources.

Construction Laydown Areas

The Applicant intends to utilize approximately 12 acres of previously disturbed space at the Port of Cleveland as its project laydown and staging area. Site preparation is expected to be minimal, consisting of security fencing, office trailers, and secured storage areas. Upon completion of the project, the temporary installations at the laydown/staging area would be removed. The potential site for the temporary laydown area is shown on the maps in this report.

Schedule

The Applicant currently expects to begin construction activities in the summer of 2020, with construction to be completed near the end of September 2021. Following testing and commissioning of the facility, the Applicant anticipates placing the facility in service in approximately December 2021.

21. Green Energy Ohio is a statewide nonprofit organization dedicated to prompting economically and environmentally sustainable energy policies and practices in Ohio. www.greenenergyoh.org.

22. Green Energy Ohio, "A Wind Resource Assessment for Near-Shore Lake Erie: Cleveland Water Crib Monitoring Site Two-Year Report," January 10, 2008.

Cuyahoga County

NORTH

0 5 10

Miles

1:400,000

NAD 83 SP Ohio North (Feet)

Proposed Wind Turbine Sites

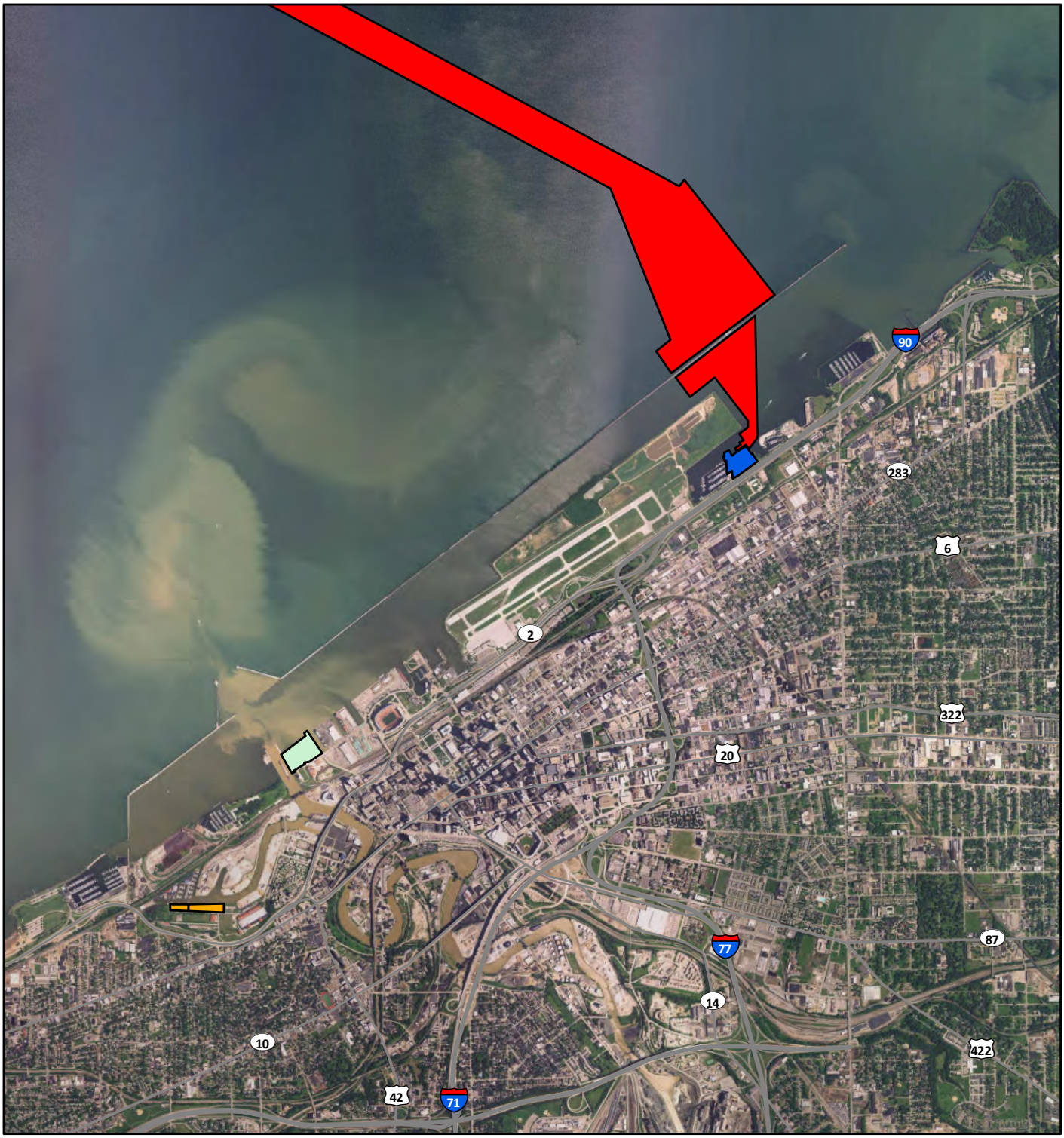
Electric Collection Line

Overview Map

16-1871-EL-BGN

Icebreaker Wind Farm

Maps are presented solely for the purpose of providing a visual representation of the project in the staff report, and are not intended to modify the project as presented by the Applicant in its certified application and supplemental materials.



Cuyahoga County

NORTH

0 0.5 1

Miles

1:50,000

NAD 83 SP Ohio North (Feet)

- Electric Collection Line
- Substation
- Operations and Maintenance
- Staging Area

Detail Map

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Icebreaker Wind Farm

Maps are presented solely for the purpose of providing a visual representation of the project in the staff report, and are not intended to modify the project as presented by the Applicant in its certified application and supplemental materials.

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III. CONSIDERATIONS AND RECOMMENDED FINDINGS

In the Matter of the Application of Icebreaker Windpower, Inc. for a Certificate to Construct a Wind-Powered Electric Generation Facility in Cuyahoga County, Ohio, Staff submits the following considerations and recommended findings pursuant to R.C. 4906.07(C) and 4906.10(A).

Considerations for R.C. 4906.10(A)(1)

BASIS OF NEED

Pursuant to R.C. 4906.10(A)(1), the Board must determine the basis of the need for the facility only if the facility is an electric transmission line or gas pipeline. As previously described, the nature of Staff's investigation is exclusive of the proposed 138 kV transmission line. Before the construction of any transmission line is commenced, Staff expects the transmission line to be the subject of a separate filing before the Board. Therefore, Staff has found an analysis of R.C. 4906.10(A)(1) to be inapplicable to the facility in question.

Recommended Findings

Staff recommends that the Board find that the basis of need as specified under R.C. 4906.10(A)(1) is not applicable to this facility, as the facility is neither an electric transmission line nor a gas pipeline.

Considerations for R.C. 4906.10(A)(2)

NATURE OF PROBABLE ENVIRONMENTAL IMPACT

Pursuant to R.C. 4906.10(A)(2), the Board must determine the nature of the probable environmental impact of the proposed facility. Staff has found the following with regard to the nature of the probable environmental impact.

Socioeconomic Impacts

Demographics and Regional Planning

The proposed wind turbines would be placed within the waters of Lake Erie, with a portion of the electric collector system and substation facility located on shore, in Cuyahoga County. The population of Cuyahoga County decreased between 2000 and 2010, from 1.39 million to 1.28 million people representing an eight percent decline.[23] The population of Cuyahoga County is projected to be around 1.2 million by 2020. The largest city near the onshore portion of the project is the city of Cleveland. The Applicant indicates in Table 13 of the application that the population of the city of Cleveland is projected to decrease approximately 29 percent from 2010 to 2030.

The Applicant states that the project is compatible with the City of Cleveland Planning Commission's "Connecting Cleveland 2020 Citywide Plan" from an economic development perspective, and policy and strategic goals.[24] Additionally, the Board of Directors of the Port of Cleveland considered and approved a resolution concluding that the land requested for the laydown area for this project is in accordance with the permissible land use under the waterfront plan of the Port.[25]

Land Use

The permanent onshore portion of the wind turbine project would consist of a short section of the electric line, a substation and an O&M building. The substation footprint would be approximately 0.2 acre and is proposed to be located on property currently used for utility purposes by CPP, directly adjacent to the existing CPP Lake Road Substation. The O&M building is proposed to be located at the Great Lakes Towing complex in an existing structure that is currently utilized for offices and warehouse space. Additionally, a temporary turbine component laydown/staging area would be located on 12 acres at the Port of Cleveland industrial property.

Lakebed impacts would be isolated to the wind turbine foundation locations and the collector line system. Proposed turbine foundations would be mostly buried under the lakebed. Their installation is discussed in detail later in this section of the Staff report. Collection lines would also be buried under the lakebed. Their installation would constitute a temporary disturbance, but it is anticipated that the collection lines would be covered by lakebed sediment following installation.

The nearest residential structure to the onshore components is a multi-family residential unit located over 1,000 feet away from the existing CPP utility complex where the substation would be

23. Ohio Development Services Agency Office of Research, "Ohio County Profiles: Cuyahoga County," accessed September 25, 2017, https://www.development.ohio.gov/files/research/C1019.pdf.

24. "Application of Icebreaker Windpower, Inc. for a Certificate to Construct a Wind-Powered Electric Generation Facility in Cuyahoga County, Ohio," (Application), *Icebreaker Windpower, Inc.*, Case No. 16-1871-EL-BGN, February 1, 2017 as supplemented February 1, 2017 and July 20, 2017: 128.

25. Ibid., 132.

located. No residences or other structures would need to be removed for construction or operation of the turbines, collector lines or onshore substation.

Recreational Areas

The onshore project components either would utilize existing facilities (i.e., Port of Cleveland, Great Lakes Towing building) or would be built in already disturbed industrial areas (i.e., new project substation). Therefore, Staff does not expect any impact to recreational areas associated with the construction or operation of the onshore components.

With respect to the offshore components, Staff expects differing impacts for the buried electric collection system and the turbines. Offshore recreational activities in Lake Erie include, but are not limited to, boating (i.e., sailboats, powerboats, etc.), fishing, and swimming.

The electric line would be buried beneath the lake bottom, so it should not have any impacts on recreational activities during operation of the facility. During installation of the electric line, there may be temporary minor impacts to recreational boating as a result of construction vessels in the area. However, it should be noted that the installation of the electric line from the HDD exit point to approximately five miles out into the lake – the area subject to most recreational boat traffic according to the Applicant's research – is anticipated to require approximately one week to complete.

Because the turbines would be located approximately eight to ten miles off the Cleveland shoreline, they are not expected to introduce significant impacts to recreational use of the lake during construction or operation. The Applicant's research shows that the majority of recreational boating activity occurs outside the area proposed for the turbines, thereby limiting any potential impact to recreational boating activities. In addition, recreational fishing would not be prohibited near the turbines. However, the Applicant's research has shown that the proposed location of the turbines is not an area that historically receives significant recreational fishing traffic. In addition, as mentioned previously, the current SLL consists of 4.1899 acres for the footprint of the turbines compared to a total lake surface area of approximately 9,900 square miles.[26] Therefore, the six turbines are not expected to materially alter recreational use of the lake.

There are multiple parks near Cleveland along the lake's shoreline. While activities at these parks would not be directly impacted by the project, the turbines may be visible from the parks depending on specific location of the viewer and weather conditions. Given their distance from shore, the turbines would not dominate the landscape but they may be visible along the horizon. Staff expects the impact of such visibility among park users to vary, including both positive and negative reactions. Given the relatively small footprint of the turbines in relation to the size of the lake, Staff does not expect the park users' experience to be significantly diminished.

The Applicant is aware of summer marine events (i.e., sailing regattas, fireworks displays, etc.) that occur in Lake Erie in the vicinity of the project area, as detailed in its Navigational Risk Assessment. Although the Applicant does not expect construction or operation of its project to

26. Lake Erie Partnership for Education and Outreach, "Lake Erie Literacy: An understanding of Lake Erie's influence on you and your influence on the freshwater lake," accessed July 2, 2018, https://coastal.ohiodnr.gov/portals/coastal/pdfs/factsheets/DisLE_FS_LakeEriePartnership.pdf.

impact any of the events, the Applicant commits to communicating with marinas and event organizers pursuant to its proposed communications and outreach plan.

Cultural, Archaeological, and Architectural Resources

The Applicant conducted a cultural resources literature review of the proposed project in order to identify known cultural resources in the vicinity of the project.[27] The Applicant's consultant identified an area of potential effect (APE) for direct effects of the project, which includes the wind turbine locations and associated construction workspace, the corridor of cable disturbance, and onshore areas and facilities such as the staging area and substation, as well as indirect effects such as viewshed.

The literature review revealed that 23 National Register of Historic Places listed properties are present within the APE of the project. One of these properties is also included as a National Historic Landmark property – the USS Cod, which is a submarine docked at the USS Cod Submarine Memorial in Cleveland.

The literature review of the APE also revealed over 450 Ohio Historic Inventory properties spread across three counties (Cuyahoga, Lake, and Lorain) and 14 Ohio Archaeological Inventory sites.

In addition to the literature review, the Applicant had studies performed in order to determine the impacts to potentially significant submerged cultural resources within the APE as well as potential visual impacts. These studies were submitted with the application.[28] As of the time of preparation of this report, the OHPO was still reviewing the material provided in the application.

The Applicant indicates that 13 shipwrecks and obstructions are listed in the Cleveland area of Lake Erie by the National Oceanic and Atmospheric Administration (from the Automated Wreck and Obstruction Information System). Data from a geophysical survey performed for the Applicant of the underwater cable route and the turbine locations, indicated that no historic structures (such as shipwrecks) or potentially significant artifacts were present along the cable route and turbine locations. The Applicant stated that impacts to culturally significant underwater structures or potentially significant artifacts would be negligible since no structures or potentially significant artifacts were identified in the geophysical survey nor in the literature review. Based upon these representations, Staff concluded that the turbine locations and placement of the buried electric collection system would not physically affect these features.

Staff is aware that coordination has been ongoing regarding the potential visual impact of this project on cultural resources between the Applicant and the U. S. Department of Energy (USDOE) per Section 106 of the National Historic Preservation Act of 1966, as amended. Staff recommends continued coordination between the Applicant, the USDOE, and the OHPO prior to construction to ensure minimal adverse impacts from this six-turbine project on cultural resources.

Aesthetics

The project's onshore facilities would include the O&M facility, the new project substation, and the staging area. The Applicant proposed to use a portion of an existing building for its O&M

27. Application, Exhibit AA.
28. Ibid., Exhibit BB (Geophysical survey) and Exhibit CC (Visual Impact Assessment).

facility. The use of this existing structure should not introduce any new aesthetic impacts to this area.

The new project substation would be located adjacent to an existing CPP substation. Interconnection of the project substation with the existing CPP substation would require a short underground electric transmission line, which will be presented for Board consideration in a separate filing. While the new substation would be visible from certain locations, its presence at this site would be consistent with surrounding use. Therefore, any incremental aesthetic impact would be minimal.

The staging area would temporarily host project equipment. However, the proposed location of the staging area is within an industrial use area at the Port of Cleveland, and therefore it should present minimal temporary aesthetic impact.

Based on the results of the Applicant's Visual Impact Assessment (VIA), the turbines may be visible on the lake's horizon depending on the viewer's location and weather conditions. The VIA notes that the turbines' location eight to ten miles offshore would decrease, but not eliminate, the potential to see the turbines from certain onshore locations. In addition, commonly cloudy conditions, combined with the proposed light-grey coloration of the turbines, would further reduce the visibility of the turbines on shore. Steps taken to minimize the visibility of the turbines include their location well offshore and using minimal lighting necessary to satisfy safety requirements. Whether viewing the turbines has a positive or negative aesthetic impact is subjective, and will likely vary by viewer.

Any visual impacts associated with the turbines would exist for the life of the turbines, but may diminish over time as their novelty fades. As the facility would be decommissioned and removed once it reaches the end of its useful life, any concerns about damaged or non-operational units impacting the view shed in perpetuity are unwarranted.

Turbine Foundations and Ice Cone

The mono bucket would be utilized as the turbine foundation for the facility. The mono bucket foundation design is a suction installed caisson steel foundation system designed to support offshore facilities including wind turbines.

The Applicant has chosen Universal Foundation, a Danish offshore foundation company, to be responsible for the completion of the detailed engineering design, fabrication, and installation of the mono bucket foundations. Universal Foundation would subcontract the fabrication of the mono bucket foundations to a U.S.-located fabricator. Universal Foundation's preliminary analysis has identified two likely scenarios for the final assembly and delivery logistics. The first scenario is that the mono bucket foundations would be fabricated and shipped in final form via barge directly to the installation site. In the second scenario, the mono bucket components would be fabricated and shipped via barge or truck to the Port of Cleveland staging area. Then the mono bucket would be assembled at the Port of Cleveland and towed directly to the installation site.

To construct and install the foundation, the Applicant stated that a heavy lift crane vessel would be utilized to perform the lifting operations related to the foundation and turbine installation process. The crane vessel would consist of a barge outfitted with legs that can be raised and lowered to stabilize the barge during lifting operations. In addition, a mobile crane would be deployed on the barge. The Applicant states that the crane vessel would be towed to the site where

it would jack-up and wait for a feeder barge carrying the mono bucket foundation. The Applicant states that construction contractors would follow safety procedures and best practices for offshore wind construction as specified or outlined in the Applicant's Construction Phase Health, Safety, and Environmental Plan to be finalized prior to construction. Staff concurs that adherence to these plans, procedures, and best practices would assure a safety culture and help minimize potential adverse impacts.

Next, a pumping assembly (also known as a click-on unit) that includes all of the pumps, valves, and piping necessary to control the suction process would be temporarily attached to the lid of the mono bucket. The mono bucket would be lifted off the barge, and lowered into the lakebed. Water would be pumped out of the mono bucket through an exhaust port on the pumping assembly into the lake causing the mono bucket to penetrate further into the lakebed. Technicians on a nearby barge would control the process. Staff has found that the mono bucket design is a commonly used foundation design for offshore wind turbines and believes that it is reasonable to use at this proposed facility.

The Applicant engaged DNV GL to serve as the third party certified verification agent, and it would be providing a design verification certificate covering the final design of the mono bucket. DNV GL is an international consulting company that provides independent and accredited certification services for wind turbines and the renewable energy industry.

Wind farms typically submit to the OPSB detailed engineering drawings of their proposed foundations. The Applicant indicated that in the design phase, a licensed professional engineer would review and approve the structural elements of the turbine foundations. Staff recommends that when the Applicant submits the detailed engineering drawings of the foundation and ice cone designs, that it include the identity of the registered professional engineer, structural engineer, or engineering firm, that approved the designs, and that the entity be licensed to practice engineering in the state of Ohio.

The Applicant has analyzed the potential effect of Lake Erie ice on the wind turbine. The Applicant found that ice cover in Lake Erie has the potential to produce two different types of loading on the wind turbine towers. First, large wind-driven thick surface ice sheets can cause steady and periodic loads on the wind turbine tower. Second, the ice can form pressure ridges, when ridges and keels are formed as the ice moves during the winter, which could cause a load on the wind turbine tower. The Applicant has selected a downward icebreaking cone to be installed on the towers at the water line to reduce loads from ice and to counteract its effects on the wind turbine towers and foundations.

Economics

The Applicant stated that it acquired ownership of the project from LEEDCo, and currently owns all project assets. The Applicant anticipates that it would continue as owner of project assets during development of the project. Electrical infrastructure associated with the Icebreaker project that is currently owned by CPP would remain with CPP.

The Applicant chose to file its estimated capital and intangible costs, estimated operation and maintenance expenses, and estimated delay costs, under seal, and filed a motion for protective order to keep the information confidential. Similar requests have been common practice in many, but not all, wind farm applications. As of the date of filing this Staff report, there has not been a

ruling on the Applicant's motion. Therefore, Staff is treating the cost information that was filed under seal as confidential for purposes of this report.

Total cost comparisons between the proposed facility and other comparable facilities are to be provided in the application. The Applicant stated that it had no similar facilities to provide for cost comparisons. However, the Applicant did provide summary cost information for the recently completed Block Island Wind Farm for comparison. Additionally, the Applicant referenced average installed project costs presented in a September 2015 USDOE publication, *2014-2015 Offshore Wind Technologies Market Report*. Staff verified that the referenced report shows that the average cost for projects installed in 2014 is $5,925/kilowatt (kW), and that the Applicant's assertion that this cost level is not substantially different from its projected cost per kW, as originally provided in its application, is reasonable.

Operation and maintenance expense comparisons between the proposed facility and other comparable facilities are to be provided in the application. The Applicant stated that it had no similar facilities to provide for cost comparisons. However, the Applicant did reference operation and maintenance expense information presented in an October 2015 USDOE publication, *2014 Cost of Wind Energy Review*. Staff verified that the referenced report assumed an average operation and maintenance expense of $37/MWh, with a range of $20/MWh to $70/MWh, and that the Applicant's estimated operation and maintenance expense for the facility is consistent with this range.

The Applicant provided its estimates of the cost of delays in permitting and construction of the proposed facility, although the cost estimates were filed under seal. The Applicant characterized permitting stage delay costs as being associated with continuance of its project team and with the time value of delayed revenue payments. Costs of delay during construction would be associated with an idle workforce, idle equipment, and the time value of delayed revenue payments. Delays that would prevent the project from meeting federal Investment Tax Credit deadlines would result in the loss of those benefits to the Applicant. Additionally, the Applicant stated that significant delays could result in the loss of funding under its USDOE financial assistance award. Although the Applicant's estimate of this amount was filed under seal, the USDOE states on its website that "(T)his project is eligible for up to $40 million in additional funding in future project performance periods after reaching specific milestones, and subject to DOE progress reviews."[29] The Applicant's characterization of its estimated costs of delays appears reasonable to Staff.

EDR Environmental Services (EDR), on behalf of the Applicant, evaluated the potential economic impacts of the facility on the local region. EDR's report was included as Exhibit M in the application. EDR used the USDOE's Job and Economic Development Impact (JEDI) model to develop its estimates of potential economic impacts. Economic impacts identified by EDR include direct employment and payroll associated with construction and operation of the facility; turbine supply chain employment and payroll during construction; and, jobs induced from increased spending of household income. EDR's summary of quantified projected economic benefits of the project during construction includes a total of $41 million in wages a total of $86 million in

29. U.S. Department of Energy Office of Energy Efficiency & Renewable Energy, "Offshore Wind Advanced Technology Demonstration Projects," accessed May 22, 2018, https://www.energy.gov/eere/wind/offshore-wind-advanced-technology-demonstration-projects .

economic output. During operation, EDR estimates the total annual wage and economic output benefits to be $1.6 million and $6.7 million, respectively.

EDR additionally estimated revenue derived from lease payments and local tax revenue or payments in lieu of taxes (PILOT). Lease payment estimates include approximately $8,000 per year associated with the submerged lands lease and $60,000 per year for a docking location in the Port of Cleveland. Estimated PILOT payments were between $124,000 and $186,000 per year. Although these annual payment estimates are significantly lower than previously listed economic impacts, they would provide a positive economic benefit to the region.

All Staff recommendations for the requirements discussed in this section of the *Staff Report of Investigation* are included under the **Socioeconomic Conditions** heading of the Recommended Conditions of Certificate section.

Ecological Impacts

Geology Features and Suitability

Lake Erie was one of the first of the Great Lakes to be uncovered by glacial ice during the most recent glacial retreat, and it is the shallowest of the Great Lakes. Lake Erie is also the only Great Lake with a bottom depth that is entirely above sea level. The lake is typically viewed as consisting of three basins. The western basin is the shallowest at an average depth of 21 feet. The eastern basin is the deepest at an average of 75 feet. The central basin, where the proposed project would be located, covers the largest area and averages about 57 feet in depth. Ohio waters occupy the western and central basins.

The bedrock geology of Lake Erie consists of Upper Silurian age carbonate rocks west of Sandusky and Devonian shales east of Sandusky. The Applicant has conducted a detailed geotechnical exploration and evaluation at the proposed project site. A collaboration of McNeilan & Associates, DOSECC Exploration Services, and Gardline performed work at the project site that included sample borings plus two or three cone penetration test sounding at each of the seven proposed turbine locations. Final work results included 17 cone penetration tests, ten boreholes, six surficial samples, and more than 340 various lab tests.

The exploratory work revealed lake-bottom sediments predominately composed of clay and silt, with sand and gravel observed as well. The silt sized material increased with depth. The drilling encountered bedrock at two boring locations. At borehole ICE1-BH1 the contractor drilled to a depth of 81.4 feet and encountered shale at 72.5 feet. The water depth at this location was 60.4 feet. Sandstone was encountered at 72.5 feet at borehole ICE6-BH1. The water depth at this location was 64.0 feet. The other eight borings all were terminated at various depths above the bedrock.

Additional exploratory work was performed between August and October 2016 along the proposed route of the electric collection lines. Preliminary findings indicate the cable routes were clear of debris and any cultural resources.

The design for installing cable would be the bury-while-lay method. This method would entail using either a cable plow or water-jetting tool to cut into the soil forming a trench. In the case of the plow, the cable would be laid directly into the trench. With the jetting tool, high-pressure water jets would cut a trench by fluidizing the sediments in place within a narrow trench where the cable

would be laid. Both of these methods have a minimal and temporary disturbance of the lakebed. The Applicant would not backfill the trench due to the fact that the trench formed by the installation effort would fill in over time with sediments.

Much of the subsoil revealed from the test borings in the project site were characterized as sand, silt, clay, and traces of gravel. No soil samples were determined to be toxic or contaminated to the extent that there would be an adverse effect to the lake environment from the construction of this project. The geotechnical investigation did not encounter geological or soils conditions at the project site that would restrict or limit the construction of this facility.

Seismology

The project area lies within an area of Cuyahoga County and Lake Erie that has a history of seismic activity as recent as 2013. Most of the seismic activity has occurred east of the project area and has been less than a magnitude of 4.0 on the Richter scale. The largest recorded earthquake in the area occurred in 1986, at an epicenter located 30 miles east in Lake County. The earthquake registered a magnitude of 4.9 on the Richter scale.

In 1991, less than ten miles east of the project site and approximately two miles from the shoreline of the Cleveland Lakefront State Park at Wildwood Park, an earthquake occurred that registered a magnitude of 3.5 on the Richter scale. The Applicant states that it has incorporated design parameters for both soil and rock conditions anticipated to address seismic considerations for this project appropriately.

Surface Waters

The onshore project components would not be expected to impact any streams or wetlands. However, the offshore project components – the turbines and transmission line – would be expected to produce minor and temporary water impacts during the construction phase.

The installation of the mono bucket foundations would not require any drilling or excavation, thereby minimizing environmental impact. However, the foundation installation would result in some disturbance due to potential resuspension of lakebed sediments. The disturbance would be produced both by the foundations, as well as by the supports of the jack-up vessel(s) expected to be used during construction. The Applicant expects this disturbance to be short-term and relatively contained, due to minimal water current in the area.

Similarly, the installation of the electric cable would result in temporary sediment disturbance. While the use of HDD for installation of the section of electric line near the shore would limit disturbance, the portion of the cable that would be installed using a trenching technology would result in some temporary disturbance to the bottom sediments. As with the turbine impacts, the cable line impacts are expected to be short-term and localized.

For the section of the electric line to be installed using HDD, the Applicant has developed a preliminary inadvertent return contingency plan.[30] The plan would be finalized when the HDD contractor is selected. The preliminary plan includes details on drilling fluids, monitoring, notification procedures, and containment/remediation.

30. Application, Exhibit Y.

The turbines would contain oil, hydraulic, and cooling fluids. In order to minimize the potential for discharge of fluids to the lake, the turbines would employ three levels of containment. The first level consists of sealed systems with sensors to monitor fluid volumes. The second system consists of fluid containment reservoirs within the nacelle. The third and final system is the bottom of the tower, which includes a fluid reservoir. In addition to the systems within the turbine structure, the Applicant has committed to using service vessels equipped with oil spill handling materials in the event of a spill.

The Applicant has also indicated that the turbine blades would be inspected at least once per year. That inspection would typically include cleaning of the blades. The Applicant has asserted that the blades would be cleaned using biodegradable solutions that would not impact water quality.

The Applicant has identified approximately twenty water intake structures in the central basin of Lake Erie. Except for four City of Cleveland Water Department (Cleveland Water) water intake structures, these other intake structures are all located at least 13 miles from the proposed turbine locations and electric collection system. Figure 08-1 of the Application shows the location of the four Cleveland Water offshore water intake structures in the vicinity of the project area. Three of the intake structures are to the west of the proposed electric line route, while one intake structure is to the east of the electric line route. According to the Applicant, the Cleveland Water intake structure closest to the proposed turbine locations is just over four miles away, while the intake structure closest to the export cable is just under two miles away.

In a September 2017 letter from Cleveland Water to the Applicant, Cleveland Water indicated that its interest focused primarily on the potential for increased turbidity associated with the construction of the electric line.[31] The letter includes four agreements between Cleveland Water and the Applicant, which touch on such topics as advance notice and communication, avoidance of open lake placement, and monitoring for turbidity. In the event that turbidity were to increase above a certain level, Cleveland Water may seek relief from the Applicant associated with any incremental treatment expenses. Cleveland Water finds it unlikely that this outcome would occur.

Wildlife

Coordination with the ODNR and the USFWS began in 2008 to assess potential project impacts on wildlife. Concurrently, the ODNR developed a suite of Wind Turbine Favorability Analysis Maps (2009) that summarize the geographic distribution of potential impact scores based on multiple factors for the Ohio waters of Lake Erie. The Applicant used these maps to identify a proposed project site that would minimize potential impacts to wildlife and to Lake Erie.

The Applicant has subsequently reviewed literature on wildlife and performed monitoring and assessment studies near and within the proposed project site. Based on these studies, the Applicant believes that the potential risk to avian, bat, and aquatic wildlife from construction, operation, and maintenance at the project site would be low due to the location and small size of the project. Furthermore, the USFWS has also determined that the proposed project site does not contain critical habitat for any federally listed species, and the Applicant has not identified any state listed species or their habitat within the project area, although other wildlife species are expected to utilize the project area. Birds and bats are likely to be impacted by this project. Preliminary aquatic

31. "Responses to the Second Set of Interrogatories from the Staff of the Ohio Power Siting Board: Attachment B," *Icebreaker Windpower, Inc*., Case No. 16-1871-EL-BGN, October 2, 2017.

surveys indicate limited potential impacts to fish and aquatic organisms. Due to the relatively small size of the project and proposed conditions included herein, Staff generally concurs that significant direct impacts are not expected. However, there are still elements of avoidance, attraction, and/or displacement that cannot be evaluated until the project is constructed.

To help address these uncertainties and establish a framework for mitigation in the event that unforeseen impacts occur, the Applicant filed, in the case docket, two signed memoranda of understanding (MOU) with the ODNR on July 20, 2017. One MOU pertains to avian and bat species (Avian and Bat MOU), while the other MOU pertains to fisheries and aquatic resources (Fisheries and Aquatic Resources MOU).

Avian and Bat Species

According to the ODNR, the proposed project site is primarily utilized by bats, waterfowl, gulls, and migrating passerines. The assessments of potential impacts to these species, and mitigation for any such impacts, are covered by the recommended conditions of this certificate and the Avian and Bat MOU.

The primary purpose of the Avian and Bat MOU is to establish a monitoring plan to assess the impacts of construction and operation to avian and bat species and resources. The goals of these assessments relative to this project are to: (1) document existing conditions and patterns of use of species of concern at the project site; (2) document changing conditions and patterns of species of concern and their associated habitats as a result of the project; (3) develop and implement effective mitigation and adaptive management strategies to minimize avian and bat resource impacts; and (4) evaluate the feasibility of various monitoring protocols in an offshore setting.

Studies agreed to within the Avian and Bat MOU include pre and post-construction bat acoustical monitoring, pre and post-construction aerial waterfowl surveys, pre and post-construction radar monitoring for birds and bats, and post-construction collision monitoring for birds and bats. Construction of the facility would not be permitted until all parameters of the studies were mutually agreed upon by the ODNR and the Applicant, and the Applicant is in compliance with the parameters of those studies. The acoustical monitoring and aerial waterfowl survey parameters have already been developed in coordination with the ODNR. However, the radar monitoring and collision monitoring are still in development.

Radar monitoring would be used to determine several key data points for patterns of project area use for nocturnal migration and feeding of birds and bats. Technology for radar monitoring is still being evaluated by the Applicant. Radar monitoring would play a key role in documenting peak times of activity such as migration and other seasonal patterns, and would help to document avoidance, attraction, and/or displacement. The Applicant retained a third party, Dr. Robert Diehl of the US Geological Survey, to assess the feasibility of three proposals for implementing an offshore radar program. All three proposals relied on deploying vessel-based radar using a barge anchored at four corners. Dr. Diehl identified the strengths and weaknesses of the three proposals, and offered suggestions to improve results, but was not able to confirm definitively that any of the three proposals would be successful. Dr. Diehl stated, “Far too many unknowns are present to anticipate the outcome of radar work in relation to this project.” It still appears at this point that the movement of a barge may introduce errors to the radar data. However, some of these errors could be corrected through the use of stabilizing instrumentation (such as a gimbal), post-collection processing and statistical analysis.

The Applicant's conclusion that impacts would be low was based, in part, on the assumption that migratory species would remain close to the shore and not cross over the lake. However, recent USFWS radar monitoring in Cleveland has shown large numbers of nocturnal migrants exhibiting flight patterns that suggest they are crossing the lake, which demonstrates the importance of a successful radar study.

The Applicant has agreed to go forward with vessel-based radar monitoring, as they believe it would provide suitable information on the impacts of the project. Staff recommends that the certificate be conditioned to require the radar-monitoring program to include the following:

- Radar must be able to detect and track directional movement and altitude of individual 10-gram and larger vertebrates.
- Radar must have the ability to collect data continuously, due to the pulsed nature of migration.
- Radar must suppress false detections from insects, wave clutter, and weather and without downtime bias with respect to biological periods (dawn, dusk, night) (80 percent or greater of survey time producing viable data, including during heavy precipitation events).
- Radar must be able to determine flight altitude of migrants at altitudes near and entirely within the rotor-swept zone at the project site to quantify collision risk.
- Radar must be able to provide information that can be used to determine and quantify behavioral avoidance or attraction to turbines in the open water setting.
- Radar must collect data for both small bird migratory seasons and bat migratory seasons (April to mid-June; August to mid-November) preconstruction.
- Radar must collect data for at least two spring/fall migratory seasons post-construction to determine behavioral changes that make collision more or less likely.

At this time, it is unclear if a moving platform would be able to meet these criteria. A stable platform appears to be the most viable option to collect this data. Staff recommends that if the preconstruction radar data does not meet the above listed criteria, as determined by Staff and the ODNR, construction should not be allowed to commence until such requirements are satisfied.

There are currently no proven post-construction collision monitoring technologies or methodologies available for the offshore wind setting. The Avian and Bat MOU states that the Applicant is committed to "continuing to evaluate developing technologies and available options with the expectation of implementing a robust collision-monitoring program during" operation. The MOU further states that "(t)he specific technology, protocol, and sampling parameters would need to be determined through continued consultation with wildlife agencies, experts, and stakeholders."

Post-construction monitoring protocols would be approved by the ODNR prior to construction. Staff recognizes that having an approved post-construction monitoring protocol in place prior to construction is a critical component of assuring the project does not result in significant impacts to avian and bat species. Once the project is constructed, Staff recommends that turbines be feathered completely from dusk to dawn from March 1 through January 1, when bats and migratory

species would be most vulnerable to collision, with limited allowances of operation for testing purposes assigned by the ODNR. These feathering requirements would be in place until the post-construction monitoring plan is proven effective as determined by the ODNR and Staff.

The Applicant has committed to taking adaptive management steps to further minimize and mitigate any unforeseen adverse impacts to wildlife. An adaptive management plan would be included as part of an avian and bat impact mitigation plan, to be developed in consultation with the ODNR, the USFWS, and stakeholders. Staff recommends that the certificate be conditioned so that the avian and bat impact mitigation plan must be completed prior to commencement of construction. Staff also recommends that the certificate be conditioned so that if Staff and the ODNR, in coordination with the USFWS, determine that a significant adverse impact has occurred to avian or bat species, then mitigation measures would be prescribed to the Applicant. Prescribed mitigation measures may include operational restrictions of up to a complete feathering of turbines from dusk to dawn from March 1 through January 1.

The project would follow lighting recommendations per the USFWS 2012 land-based wind energy guidance documents and use flashing red lights for bird safety as stipulated by the Federal Aviation Administration (FAA).

The Applicant has committed to continue coordination with wildlife agencies throughout the lifetime of the project to address any bird and bat issues that may arise.

Fisheries and Aquatic Resources

According to the ODNR, the proposed project site is primarily utilized by migratory offshore fish species such as walleye, yellow perch, and rainbow smelt. The primary impact of the project on aquatic species would most likely be temporary displacement, and no major impacts to aquatic wildlife are anticipated. The assessment of potential impacts to these species, and mitigation for any such impacts, are covered by the recommended conditions of this certificate and the Fisheries and Aquatic Resources MOU. The ODNR would review data and reports annually and provide further recommendations. The ODNR and the Applicant would mutually agree on adjustments to monitoring, and these same reports would be provided to the OPSB, the Ohio EPA, and the USFWS for comment.

The primary purpose of the Fisheries and Aquatic Resources MOU is to establish a monitoring plan to assess the impacts of construction and operation to aquatic species and resources. The goals of these assessments relative to this project are to: (1) document existing conditions and patterns of use by species of concern at the project site; (2) document changing conditions and patterns of species of concern and their associated habitats as a result of the project; (3) develop and implement effective mitigation and adaptive management strategies to minimize impacts to fisheries and aquatic resources; and, (4) evaluate feasibility of monitoring protocols in an offshore setting

The monitoring plan is designed to study impacts to the fish community, physical habitat, and fish behavior before, during and after construction. The study of the aquatic community would include hydro acoustic monitoring, larval fish sampling, juvenile fish sampling, zooplankton sampling, phytoplankton sampling, and benthos sampling. The study of the physical habitat would include water chemistry, substrate mapping, and hydrodynamic surveys. The study of behavioral impacts

would include acoustic telemetry, fixed acoustics, noise production, and aerial surveys of boating usage and fishing pressure.

The initial site selection process considered aquatic variables such as substrate type, recreational fishing and boating use patterns, commercial fishing activity, and commercial shipping lanes. The intent was to choose an area that would minimize the project's potential impact on fish populations and other aquatic organisms, along with avoiding areas of recreational and commercial activities. The project, including turbines and cables, would be in an area where the lake bottom is generally devoid of unique habitat features. According to a Lake Erie lakebed substrates map produced by the ODNR, mud is the primary substrate at the turbine locations. The ODNR ranks mud as the most favorable sediment type for wind turbine placement as it is a poor substrate to sustain aquatic biodiversity and offers little to no value for spawning. The turbine locations are far from identified fish spawning areas, larval nursery areas, and areas of critical fish habitat. Most fish interactions with the proposed site would be seasonal as they migrate through the area. Seasonally anoxic sediments minimize the presence of benthic macroinvertebrates.

Approximately 12 miles of buried electric cable would be laid from the proposed turbine location to the facility substation. The ODNR's Lake Erie lakebed substrates map shows that the primary substrates along the electric cable route are bedrock, sand/gravel, and sand/mud. The proposed use of HDD for approximately the first 3,700 feet offshore would help minimize potential effects to sensitive underwater nearshore habitats. The Applicant cited a 2014 study by Ludsin, which identified the spawning habitats for 24 fish species, including the most harvested commercial and/or recreational fish in Lake Erie, as well as important prey species. According to this study, none of these fish species has preferred spawning habitat in the offshore project area.

The collection of adequate pre, during, and post-construction environmental monitoring data is a critical aspect of this small-scale project. Conclusions about potential impacts of offshore wind turbines on avian, bat, and aquatic resources would require a comparative analysis of both pre- and post-construction data. The Applicant is currently working with the ODNR to collect additional data to assure potential environmental risk and impact would be properly reviewed as the project progresses. Staff recommends implementation of the Avian and Bat MOU and the Fisheries and Aquatic Resources MOU. Through implementation of the two MOUs, adaptive management (where applicable), the commitments of the Applicant, and Staff's recommended conditions, project impacts would be minimized.

Vegetation

Given the project area for the proposed facility, vegetation impacts from project construction and maintenance would be minimal. The onshore components either use existing structures (i.e., O&M building and Port of Cleveland staging area) or are planned for already disturbed industrial areas (i.e., new substation site), thereby avoiding the need for clearing of vegetation. The offshore components, including the turbines and the electric line, are not expected to materially impact any aquatic vegetation due to water depth and installation methodology.

All Staff recommendations for the requirements discussed in this section of the *Staff Report of Investigation* are included under the **Ecological Conditions** heading of the Recommended Conditions of Certificate section.

Public Services, Facilities, and Safety

Setbacks

The setback provision of R.C. 4906.20(B)(2) states the minimum setback for a wind turbine shall be equal to a horizontal distance, from the turbine's base to the property line of the wind farm property, equal to 1.1 times the total height of the turbine structure and be at least 1,125 feet in horizontal distance from the tip of the turbine's nearest blade at 90 degrees to the property line of the nearest adjacent property.

In determining the first component of this requirement, the minimum distance from a turbine's base to the property line must be at least 1.1 times the total height of the turbine. Staff determined a total turbine height as comprised of 272.6 feet of above water turbine base height, an average water depth of 62 feet for the subsurface turbine base height, and turbine blade lengths of 206.4 feet, which yielded a total of 541 feet. Staff then multiplied 541 feet by 1.1, as required by the statute, to yield a setback requirement of 595 feet.

That statute continues with a second required calculation and states that this distance to the property line must be at least 1,125 feet from the nearest blade. Therefore, when adding the blade length of 206.4 feet to this 1,125-foot distance, Staff determined each turbine's base must be located at least 1,331 feet from the nearest property line.

Staff notes, pursuant to Ohio law, 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. Staff also notes that all turbine locations would be located approximately eight to ten miles offshore.

With respect to pipelines in the area, the Applicant has indicated that there are no known gas pipelines near the turbine locations or electric line route.

Public Services and Traffic

The principal impact on public services would be minimal increases in traffic on routes leading to the O&M building, the staging area, and the facility substation. Some traffic management during the construction phase may be necessary in the immediate vicinity of the project area to ensure safe and efficient maintenance of existing traffic patterns and usages. However, the Applicant does not expect a need for lane or road closures during the construction or operation of the facility. The Applicant has committed to coordinating with local officials to ensure that shift times and travel routes would be optimized to the extent possible.

Once the proposed facility would become operational, related traffic would be minimal and would not be expected to impact local roadways significantly. Potential emergency service requirements would be coordinated with local officials.

Roads and Bridges

Due to the location of the project, the Applicant anticipates that the majority of the large project components would be delivered via barge. In addition, some of the components may arrive by rail depending on the manufacturer. The limited truck delivery that would occur, such as to the proposed substation site during construction, is not expected to materially impact existing roads and bridges. No new access roads would be required, nor would there be a need for new crane

paths. The transportation management plan would be finalized following the selection of a manufacturer.

Staff recommends a requirement for the Applicant to develop a final transportation management plan prior to initiating construction that would include a road use agreement. Any damaged public roads and bridges should be repaired promptly to at least their previous condition by the Applicant under the guidance of the appropriate entities (i.e., ODOT, county, municipalities, etc.). Any temporary improvements should be removed unless the appropriate entities request that they remain in place.

Blade Shear

Blade shear occurs when a wind turbine blade, or segment, separates from the rotor and is thrown or dropped from the tower. The proposed turbine models would 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.

With the turbines located eight to ten miles offshore, blade shear should have no impact to mainland roads and buildings. In addition, the Applicant's Navigational Risk Assessment showed limited boat activity in the vicinity of the proposed turbine locations. The probability for a rare blade shear event to coincide with infrequent boat traffic would be very low. Nevertheless, the Applicant has committed to posting signs on the turbine platforms or on the turbines themselves, warning the public of the risk of blade shear in the vicinity of the turbines.

High Winds

The turbines proposed in the application are designed to withstand high wind speeds. The Vestas V126 is designed to meet the standards of the International Electrotechnical Commission (IEC)-61400 series. The IEC is an organization that prepares and publishes international standards for all electrical, electronic, and related technologies including wind turbines. The wind turbines would automatically shut down and stop producing energy at their cutout wind speed, which is 27.5 meters per second (m/s), or 61.5 miles per hour (mph). The Vestas V126 wind turbine has been certified by the IEC and is available as a Class IIA or Class IIB wind turbine. IEC Class II provides that the structure is designed to withstand an annual average wind speed of 8.5 m/s (19 mph) and extreme 10-minute average wind speeds of 42.5 m/s (95 mph). The wind turbine design specifies two levels of wind turbulence intensity that the Vestas V126 turbine model is designed to withstand Category A for higher intensity and Category B for lower intensity. According to the Applicant, historical wind turbulence for the project area is within the range of 6 to 8 percent, a turbulence range for which the Vestas V126 is suited.

The Applicant indicates that the turbines have the following safety features for the event of high winds: a supervisory control and data acquisition control system to monitor weather, anemometers on each turbine, two independent braking systems, and an automatic turbine shut down mechanism that would engage at excessive wind speeds or vibrations. The Applicant indicated it would monitor meteorological conditions in the area and take appropriate precautions in the event of extreme weather. Installing and utilizing these safety control measures minimizes potential impacts from high winds.

Ice Throw

Ice throw occurs when accumulated ice on the wind turbine blades separates from the blade and falls, or is thrown, from the blade. The Applicant indicates that the proposed turbines have ice detection equipment and safety features that would shut down a turbine if the buildup of ice causes excess vibration or the speed to power ratio to become too high.

Ice throw presents a potential but unlikely danger to ships operating in the turbine area. Shipping traffic is minimal when ice is most likely to be present. Marinas in the area close during the winter, so recreational boating in the turbine area would be rare in the winter. Commercial shipping occurs during the winter but the closest shipping lane is two miles away, which puts the ships outside of the area in danger of ice throw. Therefore, the potential impact of ice throw to commercial and recreational vessels would be minimal.

Noise

Noise would be generated during both construction and operation of the facility. The wind turbine generators would be constructed eight to ten miles offshore, so noise impacts to onshore receptors would be limited to the construction of the substation. The Applicant has stated pile driving would not be used when installing the turbines (or any other facility component), but that it would instead install mono bucket foundations. Mono bucket foundation installation, as well as the rest of turbine construction, may result in noise impacts to aquatic organisms but these impacts would be minimal because of the short duration of these construction activities.

The construction of the substation and the use of the laydown area would involve noise associated with construction equipment and construction procedures that are common to many construction activities. However, the adverse impact of this noise would be minimal because of the transient nature of the construction activities, the distance of the activities from most residential structures, the site's proximity to a heavy traffic area, and the industrial nature of the substation area.

In order to limit potential construction noise-related impacts on aquatic organisms, the Applicant is working with the ODNR to avoid construction activities during sensitive fish spawning periods. In addition, the Applicant would use HDD to install the nearshore conduit for the electric line. The use of HDD should result in minimal noise impact to the aquatic environment.

Operation of the wind turbines may result in noise impacts to fish as a study has shown that fish can detect offshore wind turbines up 15.5 miles away.[32] This study found no evidence of hearing loss in fish due to offshore wind turbines. At high wind speeds, the wind turbines may produce enough noise to cause fish to avoid the area approximately 13 feet around the wind turbines.

Fish in the project area are exposed to noise impacts from shipping vessels at much higher levels than the operational noise impacts from the wind turbines. Although operational noise impacts from the wind turbines are expected to be minimal, the Applicant has committed, in an MOU with the ODNR, to further study the impact of the wind turbines on fish in the area around the turbines.

32. Magnus Wahlberg and Hakan Westerberg, "Hearing in fish and their reactions to sounds form offshore wind farms," *Marine Ecology Progress Series, Vol. 288: 295-309*, March 10, 2005, accessed October 6, 2017, https://www.int-res.com/articles/meps2005/288/m288p295.pdf.

Shadow Flicker

Shadow flicker from wind turbines occurs when rotating wind turbine blades pass between the sun and the viewer at low solar elevation angles. Shadow flicker is generally experienced in areas near wind turbines where the distance between the viewer and blade is short enough that the glare from the sunlight is insufficient to conceal the blade. When the blades rotate, this shadow creates a visual effect with the sun known as shadow flicker.

Shadow flicker impacts become negligible at a distance of about ten rotor diameters from the turbine base. For the wind turbines in this application, this distance is 4,134 feet. As the wind turbines would be located eight to ten miles offshore, no onshore receptors would be impacted by shadow flicker. Users of the lake may experience some exposure to shadow flicker, depending on such factors as their location, weather, and time of day. However, such exposure could be managed, as these receptors would be mobile.

Communications

The proposed wind turbines would be located at least eight to ten miles (13 to 16 kilometers) from fixed radio and television transmitter sites and onshore receiver sites. The Applicant found that potential problems with AM radio broadcast coverage are only anticipated when AM broadcast stations with non-directive antennas are within 3.2 kilometers (km) of wind turbine towers and AM broadcast stations with directive antennas are within 0.8 km. The coverage of FM radio stations, when the stations are at distances greater than 4 km from wind turbines, is not subject to degradation. Television stations broadcast signals from land-based facilities directly to television receivers. Due to the eight to ten miles distance between the facility's turbines and transmitter/receiver sites, neither the Applicant nor the Staff anticipates that the facility would affect television or radio reception.

The Applicant does not anticipate impacts to maritime radio communication (VHF radio) impacts based on research involving other offshore wind facilities and a modeling study. Staff recommends a condition to avoid or mitigate any possible maritime radio communication system impacts.

Microwave communication systems are wireless point-to-point links that communicate between two antennas and require clear line-of-site paths between each antenna. These transmit video, audio, or data for the telecommunications industry. Wind farm developers generally avoid locating wind turbines within the clear line-of-site path necessary for these antennas. The Applicant found no microwave paths in the project area and does not expect degradation of microwave telecommunications.

Wind turbines can interfere with civilian and military radar in certain scenarios. Potential interference is highly site-specific and depends on local features, the type of radar, and wind farm characteristics. The Applicant sent a notification letter to the National Telecommunications and Information Administration (NTIA) on August 11, 2016. Upon receipt of notification, the NTIA provided plans for the proposed facility to the federal agencies represented in the Inter-department Radio Advisory Committee (IRAC). In response to the notification, the Department of Commerce/National Oceanic and Atmospheric Administration identified a concern with degradation of its radar systems' ability to detect lake effect snow. Since that initial response, the Applicant has been in communication with the National Oceanic and Atmospheric Administration who further analyzed the situation and found that the impacts to its radar would be acceptably low. There were no concerns from any other IRAC agencies.

Decommissioning

The Applicant has committed to the complete decommissioning of the facility, or individual wind turbines, within 12 months after the end of the useful life of the facility or individual wind turbines. Useful life, in this context, is defined as having no electricity generated for a continuous 12-month period. The Applicant acknowledges that the OPSB may under other circumstances determine that the facility or a turbine is in a state of disrepair warranting decommissioning.

Decommissioning the facility would consist of removing the wind turbines, including the mono bucket foundations. The electric cables would be disconnected and would remain buried in place, and the project substation would be removed upon decommissioning all of the turbines. Upon decommissioning, the project components (other than the electric cable) would be properly disposed of in the event they cannot be recycled.

The Applicant commits to providing a final decommissioning plan to the OPSB at least 30 days prior to the preconstruction conference. This final plan is to include at least a description of the engineering techniques and equipment used in the decommissioning, as well as a detailed schedule for each task.

The Applicant has also indicated that it would enter into a road use agreement with Cuyahoga County and local municipalities to address project activity use of roads in the event of decommissioning.

Prior to initiating construction, the Applicant proposes to determine an appropriate removal deposit amount to be set aside for decommissioning activities. These funds, as proposed by the Applicant, would take the form of a surety bond or similar financial instrument. The deposit amount would be subject to State of Ohio approval.

The Applicant proposes to update the estimate of decommissioning costs every five years once the facility is operational. This update, to be performed by a registered professional engineer, would be submitted to the OPSB. Although determined by the Applicant, the removal deposit would be subject to State of Ohio approval.

All Staff recommendations for the requirements discussed in this section of the *Staff Report of Investigation* are included under the **Public Services, Facilities, and Safety Conditions** heading of the Recommended Conditions of Certificate section.

Recommended Findings

Staff recommends that the Board find that the Applicant has determined the nature of the probable environmental impact for the proposed facility, and therefore complies with the requirements specified in R.C. 4906.10(A)(2), provided that any certificate issued by the Board for the proposed facility include the conditions specified in the section of this *Staff Report of Investigation* entitled Recommended Conditions of Certificate.

Considerations for R.C. 4906.10(A)(3)

MINIMUM ADVERSE ENVIRONMENTAL IMPACT

Pursuant to R.C. 4906.10(A)(3), the proposed facility must represent the minimum adverse environmental impact, considering the state of available technology and the nature and economics of the various alternatives, along with other pertinent considerations.

Site Selection

During 2009, the Great Lakes Energy Development Task Force released a feasibility study that was conducted on its behalf.[33] This feasibility study considered numerous factors that helped inform initial thoughts on the location of a potential offshore wind project. The initial focus area for a potential project was approximately three to five miles off the Cuyahoga County shoreline.

The site selection process continued to evolve with the issuance of the ODNR's Wind Turbine Placement Favorability Analysis (favorability analysis). The favorability analysis assigned a color-coded scheme to grids within the lake indicating the perceived existence of limiting factors. Factors considered in this analysis included, but were not limited to, shipping lanes, fish habitat, sport fishery effort, birding areas, aesthetics, lakebed substrates, and shipwrecks. For the central basin of Lake Erie, this favorability analysis generally identified fewer limiting factors as the potential project moved farther from shore. This finding contributed to the Applicant's decision to propose locating the turbines farther into the lake than initially envisioned.

With the information gleaned from both the feasibility study and favorability analysis, as well as results from additional studies, the Applicant was able to avoid many perceived constraints when identifying its proposed project site.

Minimizing Impacts

By virtue of being located eight to ten miles offshore, the proposed project minimizes, if not eliminates, several potential impacts.

There are no potential impacts to individuals onshore associated with operational noise, shadow flicker, ice throw, or blade shear. The visual impact is also reduced by virtue of the distance of the proposed turbines from individuals on shore.

In addition, the offshore environment permits for delivery of much of the project equipment via barge, thereby reducing potential traffic increases and road damage. The Applicant has also committed to obtain both the necessary transportation permits and a road use agreement from the authorizing entities.

As sited, the facility is not expected to negatively impact television or radio reception, nor would it materially impact microwave communication systems or radar.

The turbines would be located outside of any navigational channels, thereby minimizing impacts to commercial transportation. Further, the Applicant's research indicates limited recreational

33. In August 2006, a group representing various private and public entities and named the Cuyahoga Regional Energy Development Task Force (now Great Lakes Energy Development Task Force) began exploring the legal, technical, environmental, and financial determinants of developing advanced energy technologies in the region of Cuyahoga County, Ohio. Source: "Great Lakes Wind Energy Center Final Feasibility Report," page 2-1.

boating in the area of the turbines. In addition, the turbines would be equipped with both lighting and foghorns to enhance safety for boaters in the vicinity.

The use of the existing facilities, such as with the Great Lakes Towing complex for the O&M facility and the Port of Cleveland for laydown/staging, limits any potential incremental impacts associated with those components of the project.

The Applicant has proposed a number of steps they believe will minimize potential ecological impacts associated with the project, including at least the following:

- Locating the proposed turbines well offshore to avoid potential near-shore habitat and identified spawning areas;
- The use of a mono bucket foundation, which would not require any drilling, excavations, or pile driving during the installation process;
- Installing lighting at the turbines that satisfies the necessary safety requirements but also minimizes its potential as an attractant to birds;
- The use of HDD to install the near-shore portion of the export cable which would minimize impacts along that segment of the route;
- Monitoring turbidity during the cable installation process and adjusting installation speeds as appropriate; and
- Limiting operations during the fall migration period in order to reduce potential bird and bat impacts.

Despite the Applicant's proposed effort, some impacts to birds, bats, and aquatic resources may still occur. The Applicant has committed to conduct post-construction monitoring of the direct and indirect impacts to wildlife and will implement an adaptive management strategy, in coordination with the ODNR and Staff, in an effort to minimize any adverse impacts to wildlife.

Conclusion

Staff concludes that the proposed project would result in both temporary and permanent impacts to the project area and surrounding areas. However, the Applicant's efforts during the extensive site selection process, as well as their commitments during facility construction and operation, would reduce these impacts. When combined with Staff's recommended conditions, Staff concludes that the project represents the minimum adverse environmental impact.

Recommended Findings

Staff recommends that the Board find that the proposed facility represents the minimum adverse environmental impact, and therefore complies with the requirements specified in R.C. 4906.10(A)(3), provided that any certificate issued by the Board for the proposed facility include the conditions specified in the section of this *Staff Report of Investigation* entitled Recommended Conditions of Certificate.

CONSIDERATIONS FOR R.C. 4906.10(A)(4)

ELECTRIC GRID

Pursuant to R.C. 4906.10(A)(4), the Board must determine that the proposed electric facilities are consistent with regional plans for expansion of the electric power grid of the electric systems serving this state and interconnected utility systems, and that the facilities will serve the interests of electric system economy and reliability.

The purpose of this section is to evaluate the impact of integrating the proposed facility into the existing regional transmission grid. The Applicant proposes to construct a wind-powered facility located in Lake Erie, capable of producing 20.7 MW. The proposed facility would interconnect to CPP's Lake Road Substation at 138 kV. The Lake Road Substation interconnects to the American Transmission Systems, Incorporated (ATSI) transmission grid.

NERC Planning Criteria

The North American Electric Reliability Corporation (NERC) is responsible for the development and enforcement of the federal government's approved reliability standards, which are applicable to all owners, operators, and users of the bulk power system. As an owner, operator, and/or user of the bulk power system, the Applicant is subject to compliance with various NERC reliability standards, including but not limited to those related to transmission planning for contingency events. NERC reliability standards are included as part of the system impact evaluations conducted by PJM Interconnection, LLC (PJM).

PJM Interconnection

The Applicant submitted its generation interconnection request for the proposed facility to PJM on July 5, 2013. PJM gave the application a queue position of Z1-035. The initial System Impact Study (SIS) was released by PJM in May 2015. An updated SIS was released in October 2017.[34, 35]

PJM studied the interconnection as an injection into CPP's electric system via a tap to the Lake Road substation. The Applicant requested an injection of 18 MW, of which 2.3 MW could be available in the PJM capacity market.[36] The capacity market ensures the adequate availability of necessary generation resources can be called upon to meet current and future demand.

The Applicant would make 7.5 MW of energy available in the PJM market. The remaining 13.2 MW would be sold to CPP and considered by PJM to be behind-the-meter-generation.[37]

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34. PJM Interconnection, LLC is the regional transmission organization charged with planning for upgrades and administrating the generation queue for the regional transmission system in Ohio. Generators wanting to interconnect to the bulk electric transmission system located in the PJM control area are required to submit an interconnection application for review of system impacts. The interconnection process provides for the construction of expansions and upgrades of the PJM transmission system, as needed to maintain compliance with reliability criteria with the addition of generation in its footprint.

35. PJM Interconnection, LLC, "System Impact Study, Queue Number Z1-035," accessed October 2017, http://pjm.com/planning/generation-interconnection/generation-queue-active.aspx.

36. For wind resources, PJM Interconnection, LLC recognizes 13 percent of a wind facility's capacity in the PJM capacity market. 18 MW * 13% = 2.3 MW.

37. With 63.6 percent of the facility's output committed to CPP, that leaves 36.4 percent of the output to be available for the PJM market. 20.7 MW * 36.4% = 7.5 MW.

PJM Network Impacts

PJM analyzed the bulk electric system with the proposed facility interconnected to the bulk power system. A 2019 summer peak power flow model was used to evaluate the regional reliability impacts. The studies revealed that, at an output of up to 18 MW, there would be no reliability problem. The below chart displays the results of the PJM System Impact Study for the PJM regional footprint.[38]

PJM REGIONAL SYSTEM IMPACTS	
Generator Deliverability - System Normal & Single Contingency Outage	
Plant Output: Capacity Level – 2.3 MW	No problems identified
Category C and D - Multiple Contingency Outages	
Plant Output: 18 MW	No problems identified

Contribution to Previously Identified Overloads - Network Impacts

PJM studied overloading where the proposed facility may affect earlier projects in the PJM Queue.

CONTRIBUTION TO PREVIOUSLY IDENTIFIED OVERLOADS	
Plant Output: 18 MW	No problems identified

Potential Congestion due to Local Energy Deliverability- Energy Delivery Impacts

PJM studied the delivery of the energy portion. Network upgrades under this section would allow for the delivery of energy with operational restrictions. The upgrades are at the discretion of the Applicant.

POTENTIAL CONGESTION DUE TO LOCAL ENERGY DELIVERABILITY	
Plant Output: Capacity Level – 2.3 MW *Energy Level – 18 MW*	No problems identified

Short Circuit Analysis

The short circuit analysis study, which is part of the System Impact Study, evaluates the interrupting capabilities of circuit breakers that would be impacted by the proposed generation addition. The results identified no circuit breaker problems.

Conclusion

PJM analyzed the bulk electric system, with the facility interconnected to the transmission grid, for compliance with NERC and PJM reliability criteria. The PJM system studies indicated that, at an output of up to 18 MW, no reliability violations would occur during single and multiple contingencies. In addition, no violations were found during the short circuit analysis.

38. PJM Interconnection, LLC, "System Impact Study, Queue Number Z1-035," accessed October 2017, http://pjm.com/planning/generation-interconnection/generation-queue-active.aspx.

The facility would provide additional electrical generation to the regional transmission grid, would be consistent with plans for expansion of the regional power system, and would serve the interests of electric system economy and reliability.

Recommended Findings

Staff recommends that the Board find that the proposed facility is consistent with regional plans for expansion of the electric power grid of the electric systems serving this state and interconnected utility systems, and that the facility would serve the interests of electric system economy and reliability. Therefore, Staff recommends that the Board find that the facility complies with the requirements specified in R.C. 4906.10(A)(4), provided that any certificate issued by the Board for the proposed facilities include the conditions specified in the section of this *Staff Report of Investigation* entitled Recommended Conditions of Certificate.

Considerations for R.C. 4906.10(A)(5)

AIR, WATER, SOLID WASTE, AND AVIATION

Pursuant to R.C. 4906.10(A)(5), the facility must comply with Ohio law regarding air and water pollution control, withdrawal of waters of the state, solid and hazardous wastes, and air navigation.

Air

The operation of the proposed facility would not produce air pollution. Therefore, air quality permits, pursuant to R.C. Chapter 3704, would not be required for this facility. However, construction of certain land-based components of the facility could require compliance with fugitive dust rules adopted under R.C. Chapter 3704.

The Applicant would comply with fugitive dust rules by the use of water spray or other appropriate dust suppressant measures whenever necessary.

Construction and operation of the facility, as described in the application and in the Applicant's data request responses, and in accordance with the conditions included in this *Staff Report of Investigation*, would be in compliance with air emission regulations in R.C. Chapter 3704, and the rules and laws adopted under this chapter.

Water

Neither construction nor operation of the proposed facility would require the use of significant amounts of water, thus requirements under R.C. 1501.33 and 1501.34 are not applicable to this project.

The Applicant has indicated it would seek the following permits and approvals:

- A permit under Sections 404 and 10 of the Clean Water Act;
- A Section 401 Water Quality Certification from the Ohio EPA;
- Approval under Section 408 from the US Army Corp of Engineers;
- A Permit for Private Aid to Navigation from the US Coast Guard;
- A Coastal Zone Management Act Consistency Determination from the ODNR; and
- A Finding of No Significant Impact pursuant to the National Environmental Policy Act.

Obtaining and complying with these permits and approvals would ensure that construction and operation of this facility would comply with requirements of R.C. Chapter 6111, and the rules and laws adopted under this chapter.

Solid Waste

Solid waste generated from construction activities are expected to include packing materials, metals, wood, cardboard, and other general refuse. The Applicant also expects some minimal solid waste during the facility's operation, principally in the form of cardboard, replacement parts, used oil, general refuse, and office waste.

Solid waste generated during both construction and operation would be collected and delivered to dumpsters located at the O&M building, with such dumpsters emptied by private contractors as

needed. The Applicant commits to recycling those wastes for which it is possible. In addition, the Applicant asserts that used oil and other wastes would be managed and disposed of consistent with applicable regulations.

The Applicant's solid waste disposal plans comply with solid waste disposal requirements in R.C. Chapter 3734, and the rules and laws adopted under this chapter.

Aviation

Due to the location of the proposed wind turbines eight to ten miles offshore, there are no airports, helicopter pads, or landing strips within five miles of the proposed turbines. However, the proposed substation site is located within five miles of seven aviation hubs: Burke Lakefront Airport, PHI Air Medical, Cleveland Clinic Foundation Heliport, Cleveland Police Department 4th District Heliport, Metro Health Medical Center Heliport, University of Cleveland Heliport, and St. Vincent Charity Medical Center. The proposed substation would be constructed adjacent to an existing CPP substation, and would be no taller than the existing facilities. The Applicant has notified in writing the owners of all known airports and helicopter pads located within five miles of the facility boundaries.

The FAA conducted aeronautical studies of the proposed turbine layout under the provisions of 49 U.S.C. § 44718, 14 C.F.R 77a and R.C. 4561.32 respectively. The aeronautical studies conducted for the proposed facility concluded that all of the turbines in the proposed layout would not exceed obstruction standards and would not be a hazard to air navigation.

The FAA issued a Determination of No Hazard for all seven of the proposed turbine locations. The Applicant has committed to meeting all recommended and prescribed FAA and ODOT Office of Aviation requirements to construct an object that may affect navigable airspace. This includes submitting coordinates and heights for all towers exceeding 200 feet above ground level for ODOT Office of Aviation and FAA review prior to construction, and the non-penetration of any FAA Part 77 surfaces. The Applicant would also ensure that all applicable structures, including qualifying construction equipment, would be lit in accordance with FAA circular 70/7460-1 K Change 2, Obstruction Marking and Lighting, or as otherwise prescribed by the FAA. The Applicant obtained the ODOT Office of Aviation's construction permit in April 2017.

In accordance with R.C. 4561.32, Staff contacted the ODOT Office of Aviation during review of this application in order to coordinate review of potential impacts the facility might have on public use airports. Staff included FAA and/or ODOT Office of Aviation recommendations in its recommended conditions of the certificate.

All Staff recommendations for the requirements discussed in this section can be found under the **Air, Water, Solid Waste, and Aviation Conditions** heading of the Recommended Conditions of Certificate.

Recommended Findings

Staff recommends that the Board find that the proposed facility complies with the requirements specified in R.C. 4906.10(A)(5), provided that any certificate issued by the Board for the proposed facility include the conditions specified in the section of this *Staff Report of Investigation* entitled Recommended Conditions of Certificate.

Considerations for R.C. 4906.10(A)(6)

PUBLIC INTEREST, CONVENIENCE, AND NECESSITY

Pursuant to R.C. 4906.10(A)(6), the Board must determine that the facility will serve the public interest, convenience, and necessity.

Public Interaction

Applicant's Public Information Program and Service of Application

The Applicant hosted a public informational open house for this project on November 3, 2016. Attendees were provided the opportunity to speak with representatives of the Applicant about the proposed project and to provide feedback. The Applicant has held various other public meetings to provide the community, elected officials, and the media with information about the project.

The Applicant served copies of the complete application on officials representing Cuyahoga County; the cities of Cleveland, Euclid, Lakewood, and Rocky River; and the villages of Bay Village and Bratenahl. The Applicant indicated that it also sent copies of the complete application to the Cleveland Public Library, the Cuyahoga County Public Library, the Euclid Public Library, the Lakewood Public Library, and the Rocky River Public Library. Additionally, copies of the complete application are available for public inspection at the offices of the PUCO and online at http://opsb.ohio.gov. The Applicant provides information about the project online at http://www.leedco.org/index.php/about-icebreaker.

Applicant's Complaint Resolution Plan

During the siting, construction and operation of the project, the Applicant stated that it would make representatives available to respond to questions and concerns regarding the project. During the construction and operation of the project, the Applicant also committed to implement the complaint resolution plan described in Appendix N of the application. Complaints may be submitted by phone, online form, or in-person at the Applicant's Cleveland office. In the complaint resolution plan, the Applicant has committed to submit any complaints received, and their resolutions, to Staff on a quarterly basis. However, Staff recommends the Applicant file these quarterly reports in the case record.

The Applicant has also committed to provide notice to any affected property owners and tenants, the cities along the shore in the project viewshed, Cuyahoga County, emergency responders, libraries, and the OPSB about the complaint resolution process at least seven days prior to the start of any construction activities. However, Staff recommends that the Applicant be required to provide this notice at least 30 days prior to the start of any construction activities.

Public Comments Received by the OPSB

As of July 2, 2018, 239 documents have been filed in the public comments of the case record for this proceeding.[39] Because comments are typically filed in groups by the PUCO Docketing Division, many of these documents include comments from multiple individuals or organizations. The OPSB received comments both in opposition to and in support of the proposed facility.

39. *In the Matter of the Application of Icebreaker Windpower, Inc. for a Certificate to Construct a Wind-Powered Electric Generation Facility in Cuyahoga County, Ohio*, Case No. 16-1871-EL-BGN, Public Comments, accessed July 2, 2018, http://dis.puc.state.oh.us.

Commenters in opposition cite concerns with potential impacts to wildlife and aesthetic impacts, among other issues. Those in support highlight the positive impacts of the use of renewable energy, benefits to the local economy, and the construction employment that would result from the project. Public comments are made available for Board members and the public to view online in the case record at http://dis.puc.state.oh.us.

Procedural Schedule

The Board conducted the first local public hearing in this case in Cleveland on November 8, 2017. During the hearing, 41 witnesses offered sworn testimony regarding the proposed facility. A transcript of the proceedings is available in the case record at http://dis.puc.state.oh.us. The adjudicatory initially scheduled for November 17, 2017 was postponed.

The Administrative Law Judge issued an entry on April 20, 2018 scheduling a second local public hearing and an adjudicatory hearing for this proceeding. The second local public hearing, at which the Board will accept written or oral testimony from any person, is scheduled for July 19, 2018 at 6:00 p.m., at the Cleveland City Council Chambers, Cleveland City Hall, 2nd Floor – Room 216, 601 Lakeside Ave., Cleveland, Ohio 44114. The adjudicatory hearing is scheduled for August 6, 2018, at 10:00 a.m., at the offices of the PUCO, 11th floor, Hearing Room 11-C, 180 E. Broad St., Columbus, Ohio 43215.

Motions to intervene were filed by Ohio Environmental Council, Cuyahoga County Residents, the Indiana/Kentucky/Ohio Regional Council of Carpenters, Sierra Club, the Business Network for Offshore Wind, and Bratenahl Residents. The Administrative Law Judge granted the motions filed by all, except Cuyahoga County Residents.

Safety

The Applicant is required to provide the generation equipment manufacturer's safety standards, such as a safety manual or similar document. Staff reviewed the safety manual for the Vestas V126 (3.45 MW) turbine model. The purpose of Staff's review of this safety information is to ensure safety requirements or recommendations would be upheld by the wind farm owner/operator and for inclusion in the wind farm operator's overall safety culture. Staff recommends that the Applicant comply with the turbine manufacturer's most current safety manual and that the Applicant shall maintain a copy of that safety manual in the O&M building of the facility.

Public safety during construction of the facility would be maintained through several means. The Applicant stated that it intends to restrict public access to the facility during construction by implementing a temporary 1,640-foot safety avoidance zone around the installation vessels, a 328-foot safety avoidance zone around each wind turbine, and the substation. This safety avoidance zone would be accomplished through the use of buoys, a safety vessel, and notice to mariners. In addition, the Applicant intends to maintain a 24-hour security presence during construction. Shipping vessels would be notified to maintain a safe clearance distance though notices to marine and radio navigational warning broadcasts.

The Applicant stated that turbines would have safety lighting to comply with FAA and U.S. Coast Guard standards. The Applicant also would fit two turbines with foghorns with visibility detectors that sense fog and poor visibility conditions. These detectors would trigger an omnidirectional foghorn signal. The foghorn should be audible for two nautical miles from the turbines.

At the substation, the Applicant plans to secure the substation with fencing and use a security company to prevent unauthorized access.

When the turbines would be operational, the Applicant intends to allow the turbine platforms to serve as a refuge for stranded boaters during dire situations. However, public access to the turbines would be restricted by keeping the entrances to the tower structures locked.

The Applicant intends to require its contractors to develop and implement emergency action plan(s) and consult with all necessary local emergency services, including medical facilities. The Applicant also intends to provide proper equipment to fire and emergency responders to enable them to respond to emergencies.

Liability Insurance

Per Ohio Adm.Code 4906-4-06(F)(2), a certificate application must include a description of any insurance programs or other corporate programs for providing liability compensation for damages to the public during construction, operation, or decommissioning of the proposed facility. In addition, the Applicant's SLL includes a provision requiring that the Applicant shall carry and maintain a policy of comprehensive general liability insurance. According to the Applicant, it would maintain an insurance policy for the term of the SLL to cover any potential bodily injury, personal injury, wrongful death, and property damage associated with the operation of the proposed facility. At a minimum, the policy would include the following coverage:

- Claims of $250,000 per person and $500,000 per occurrence for bodily injury;
- $250,000 per person and $1,000,000 aggregate for property damage; and
- Combined single limit of $5,000,000 per occurrence.

Renewable Portfolio Standard

The renewable portfolio standard (RPS) contained within R.C. 4928.64 requires a portion of the electricity sold to retail customers in Ohio to come from renewable energy resources. This requirement, which began in 2009, includes annually increasing renewable benchmarks through 2026. Renewable energy resources, as defined by statute, include wind-generating technologies. Electric distribution utilities or competitive retail electric service companies have several options for demonstrating compliance with the RPS, including entering into renewable power supply agreement or through the use of renewable energy credits (REC).

To be eligible for use towards a renewable benchmark, RECs must originate from a renewable energy resources facility certified by the PUCO as an eligible energy generating facility. The proposed facility would likely qualify as a renewable energy resource under the RPS, and therefore, it could contribute to assisting affected entities' compliance with statutory requirements under the RPS.

Public Interest

When evaluating the project for public interest, the Staff identified both positive and negative impacts associated with the proposed project. The positive impacts include:

- A small amount of additional electric generation;

- Added renewable generation, an effort that has been promoted by state legislation (i.e., the RPS);
- The creation of approximately 160 direct on-site construction jobs with annual earnings of approximately $24 million; and
- An opportunity to gain tangible experience with an offshore wind project on a small scale.

While the Applicant's proposed location for the facility eight to ten miles offshore minimizes many potential impacts to the public, the Applicant's commitments, combined with Staff's recommended conditions, further serve to avoid or minimize potential negative impacts resulting from the project. These efforts include, but are not limited to, seasonal curtailments for wildlife, along with ongoing monitoring requirements; decommissioning commitments; requirements for a road use agreement to remedy any potential road impacts; a complaint resolution process; and a condition to resolve any impacts to communication systems from the proposed project.

When viewed in the aggregate, and with its recommended conditions, Staff concludes that the project is in the public interest.

All Staff recommendations for the requirements discussed in this section of the *Staff Report of Investigation* are included under the Recommended Conditions of Certificate section.

Recommended Findings

Staff recommends that the Board find that the proposed facility would serve the public interest, convenience, and necessity, and therefore complies with the requirements specified in R.C. 4906.10(A)(6), provided that any certificate issued by the Board for the proposed facility include the conditions specified in the section of this *Staff Report of Investigation* entitled Recommended Conditions of Certificate.

Considerations for R.C. 4906.10(A)(7)

AGRICULTURAL DISTRICTS

Pursuant to R.C. 4906.10(A)(7), the Board must determine the facility's impact on the agricultural viability of any land in an existing agricultural district within the project area of the proposed facility. The agricultural district program was established under R.C. Chapter 929. Agricultural district land is exempt from sewer, water, or electrical service tax assessments.

Agricultural land can be classified as an agricultural district through an application and approval process that is administered through local county auditors' offices. Eligible land must be devoted exclusively to agricultural production or be qualified for compensation under a land conservation program for the preceding three calendar years. Furthermore, eligible land must be at least ten acres or produce a minimum average gross annual income of $2,500.

No agricultural district land would be disturbed in association with the construction of the proposed facility. No impacts to field operations, irrigation, or field drainage systems associated with agricultural lands of any type would occur as a result of the construction, operation, or maintenance of the proposed facility.

Recommended Findings

Staff recommends that the Board find that the impact of the proposed facility on the viability of existing agricultural land in an agricultural district has been determined, and therefore complies with the requirements specified in R.C. 4906.10(A)(7), provided that any certificate issued by the Board for the proposed facility include the conditions specified in the section of this *Staff Report of Investigation* entitled Recommended Conditions of Certificate.

Considerations for R.C. 4906.10(A)(8)

WATER CONSERVATION PRACTICE

Pursuant to R.C. 4906.10(A)(8), the proposed facility must incorporate maximum feasible water conservation practices, considering available technology and the nature and economics of the various alternatives.

This wind-powered facility would not utilize water in the process of electricity production. Therefore, water consumption associated with the proposed electric generation equipment does not warrant specific conservation efforts. Potable water would be supplied to the O&M building for project and personal needs of the employees using the facility, but the amount of water consumed for these purposes would be minimal.

Recommended Findings

The Staff recommends that the Board find that the proposed facility would incorporate maximum feasible water conservation practices, and therefore complies with the requirements specified in R.C. 4906(A)(8). Further, the Staff recommends that any certificate issued by the Board for the certification of the proposed facility include the conditions specified in the section of this *Staff Report of Investigation* entitled Recommended Conditions of Certificate.

IV. RECOMMENDED CONDITIONS OF CERTIFICATE

Following a review of the application filed by the Applicant, and the record compiled to date in this proceeding, Staff recommends that a number of conditions become part of any certificate issued for the proposed facility. These recommended conditions may be modified as a result of public or other input received subsequent to the issuance of this report. At this time, Staff recommends the following conditions:

GENERAL CONDITIONS

Staff recommends the following conditions to ensure conformance with the proposed plans and procedures as outlined in the case record to date, and to ensure compliance with all conditions listed in this Staff Report:

(1) The Applicant shall install the facility, utilize equipment and construction practices, and implement mitigation measures as described in the application and as modified and/or clarified in supplemental filings, replies to data requests, and recommendations in this *Staff Report of Investigation*.

(2) Prior to constructing a transmission line associated with this generating facility, the Applicant shall complete a separate filing with the Board to address its proposed electric transmission line. The separate filing shall take the form indicated by Ohio Adm.Code 4906-1-01 and its applicable appendices.

(3) The Applicant shall not commence construction of the facility until it has a signed Interconnection Service Agreement with PJM Interconnection, LLC, which includes construction, operation, and maintenance of system upgrades necessary to integrate the proposed generation facility reliably and safely into the regional transmission system. The Applicant shall file in this proceeding either a letter stating that the Agreement has been signed or a copy of the signed Interconnection Service Agreement.

(4) The facility shall be operated in such a way as to assure that no more than 18 megawatts would be injected into the American Transmission Systems, Inc. transmission grid at any time.

(5) The Applicant shall conduct a preconstruction conference prior to the start of any construction activities. Staff, the Applicant, and representatives of the primary contractor and all subcontractors for the project shall attend the preconstruction conference. The conference shall include a presentation of the measures to be taken by the Applicant and contractors to ensure compliance with all conditions of the certificate, and discussion of the procedures for on-site investigations by Staff during construction. Prior to the conference, the Applicant shall provide a proposed conference agenda for Staff review. The Applicant may conduct separate preconstruction conferences for each stage of construction.

(6) Within 60 days after the commencement of commercial operation, the Applicant shall submit to Staff a copy of the as-built specifications for the entire facility. If the Applicant demonstrates that good cause prevents it from submitting a copy of the as-built specifications for the entire facility within 60 days after commencement of commercial

operation, it may request an extension of time for the filing of such as-built specifications. The Applicant shall use reasonable efforts to provide as-built drawings in both hard copy and as geographically referenced electronic data.

(7) The certificate shall become invalid if the Applicant has not commenced a continuous course of construction of the proposed facility within five years of the date of journalization of the certificate.

(8) As the information becomes known, the Applicant shall file in this proceeding the date on which construction will begin, the date on which construction was completed, and the date on which the facility begins commercial operation.

(9) Prior to the commencement of construction activities in areas that require permits or authorizations by federal or state laws and regulations, the Applicant shall obtain and comply with such permits or authorizations. The Applicant shall provide copies of permits and authorizations, including all supporting documentation, to Staff within seven days of issuance or receipt by the Applicant. The Applicant shall provide a schedule of construction activities and acquisition of corresponding permits for each activity at the preconstruction conference.

(10) At least 30 days prior to the preconstruction conference, the Applicant shall submit to Staff, for review and acceptance, one set of detailed engineering drawings of the final project design, including the facility, construction staging areas, and any other associated facilities and access points, so that Staff can determine that the final project design is in compliance with the terms of the certificate. The final project layout shall be provided in hard copy and as geographically referenced electronic data. The final design shall incorporate all conditions of the certificate and references at the locations where the Applicant and/or its contractors must adhere to a specific condition in order to comply with the certificate. The detailed engineering drawings of the foundation design and ice cone shall include the identity of the registered professional engineer, structural engineer, or engineering firm, licensed to practice engineering in the state of Ohio who reviewed and approved the designs.

SOCIOECONOMIC CONDITIONS

Staff recommends the following conditions to address the impacts discussed in the **Socioeconomic Impacts** section of the Nature of Probable Environmental Impact:

(11) Prior to construction, the Applicant shall finalize coordination with the appropriate federal agency (U.S. Department of Energy) in consultation with the Ohio Historic Preservation Office with regards to completing Section 106 of the National Historic Preservation Act of 1966, as amended. If the resulting coordination results in any mitigation efforts in order to ensure minimal effects on cultural resources, those results shall be submitted to Staff for review to ensure compliance with this condition.

(12) No commercial signage or advertisements shall be located on any turbine, tower, or related infrastructure. If vandalism should occur, the Applicant shall remove or abate the damage within 30 days of discovery or as extended by Staff for good cause shown, to preserve the aesthetics of the project. Any abatement other than the restoration to

pre-vandalism condition is subject to review by Staff to ensure compliance with this condition.

(13) At least 30 days prior to construction, the Applicant shall provide Staff, any affected property owners and tenants, the municipalities along the shore in the project viewshed, Cuyahoga County officials, emergency responders, and libraries with written notice regarding the start of construction and the complaint resolution process outlined in Appendix N of the application. The notice shall include a description of the nature of the project, contact information for the project, and the proposed timeframe for project construction. A copy of the notice shall be filed on the docket in this case.

(14) During the construction and operation of the project, the Applicant shall file on the docket in this case a summary report of any complaints received through its complaint resolution process, a description of actions taken to resolve each complaint, and a status update if the complaint has yet to be resolved in the case record by the fifteenth day of April, July, October, and December of each year.

ECOLOGICAL CONDITIONS

Staff recommends the following conditions to address the impacts discussed in the **Ecological Impacts** section of the Nature of Probable Environmental Impact:

(15) The Applicant shall comply with all terms in the Avian and Bat memorandum of understanding (MOU) and the Fisheries and Aquatic Resources MOU, as well as any other protocols or documents resulting from these MOUs. Any modifications to the MOUs or resulting documents shall be filed in the case docket upon completion.

(16) Prior to construction, the Applicant shall execute a modified submerged lands lease (SLL) with the Ohio Department of Natural Resources (ODNR) and adhere to all terms and conditions stated in the modified SLL. A copy of the modified SLL shall be filed in the case docket upon completion.

(17) At least 60 days prior to commencement of construction, the Applicant shall submit a fisheries and aquatic resources construction monitoring plan to the ODNR and Staff for review and acceptance. The Applicant's plan shall be consistent with the ODNR approved Fisheries and Aquatic Resources MOU. The monitoring start date and reporting deadlines will be provided in the ODNR approval letter and the Staff concurrence letter.

(18) At least 60 days prior to commencement of construction, the Applicant shall submit an avian and bat impact mitigation plan which incorporates the most current survey results and post-construction avian and bat monitoring plan to the ODNR and Staff for review and acceptance that implementation of the plans would be effective in avoiding significant impacts to avian and bat species. The Applicant shall also provide the monitoring plan to, and seek consultation with, the U.S. Fish and Wildlife Service (USFWS). The Applicant shall update the mitigation plan as new information is attained through surveys. Any proposed modifications to the plans shall be submitted to the ODNR and Staff for review and acceptance.

(19) Turbines shall be feathered completely from dusk to dawn from March 1 through January 1 until the Applicant has demonstrated that the post-construction avian and bat collision

monitoring plan is sufficient, as determined by the ODNR in consultation with Staff. The ODNR may approve modifications to turbine operation for testing purposes.

(20) At least 60 days prior to commencement of construction, the Applicant shall submit a fisheries and aquatic resources mitigation plan which incorporates the most current survey results and post-construction fisheries and aquatic resources monitoring plan to the ODNR and Staff for review and acceptance that implementation of the plans would be effective in avoiding significant impacts to fisheries and aquatic resources. The Applicant shall also provide the plans to and seek consultation from the USFWS. The Applicant shall update the mitigation plan as new information is attained through surveys. Any proposed modifications to the plans shall be submitted to the ODNR and Staff for review and acceptance.

(21) If state or federally listed endangered or threatened species are encountered during construction, operation, or monitoring activities, the Applicant shall contact Staff, the ODNR, and the USFWS, as applicable, within 24 hours. Construction or operation activities that could adversely impact the identified animals shall be modified to minimize risk to the identified species until an appropriate course of action has been agreed upon by the Applicant, Staff, and the ODNR in consultation with the USFWS. Nothing in this condition shall preclude agencies having jurisdiction over the facility with respect to wildlife from exercising their legal authority over the facility consistent with law.

(22) The Applicant shall implement a radar monitoring program which includes the following:

(a) Radar must be able to detect and track directional movement and altitude of individual 10-gram and larger vertebrates.

(b) Radar must have the ability to collect data continuously, due to the pulsed nature of migration.

(c) Radar must suppress false detections from insects, wave clutter, and weather and without downtime bias with respect to biological periods (dawn, dusk, night) (80 percent or greater of survey time producing viable data, including during heavy precipitation events).

(d) Radar must be able to determine flight altitude of migrants at altitudes near and entirely within the rotor-swept zone at the project site to quantify collision risk.

(e) Radar must be able to provide information that can be used to determine and quantify behavioral avoidance or attraction to turbines in the open water setting.

(f) Radar must collect data for both small bird migratory seasons and bat migratory seasons (April to mid-June; August to mid-November) preconstruction.

(g) Radar must collect data for at least two spring/fall migratory seasons post-construction to determine behavioral changes that make collision more or less likely.

(23) Prior to construction, the Applicant shall demonstrate that these requirements can be satisfied through implementation of the radar-monitoring program for one spring and one fall migration season. Proof of completion of these requirements shall be submitted to the ODNR and Staff for review and acceptance least 90 days prior to construction.

(24) If Staff and the ODNR, in consultation with the USFWS, determine the project results in significant adverse impact to wild animals, adaptive management shall be prescribed to the Applicant.

(25) All annual and final reports, as outlined in the MOUs shall be filed on the docket in this case upon completion.

(26) Should construction be delayed beyond five years of the date of the certificate, certain wildlife and aquatic surveys would need to be updated and approved by Staff and the ODNR.

PUBLIC SERVICES, FACILITIES, AND SAFETY CONDITIONS

Staff recommends the following conditions to address the impacts discussed in the **Public Services, Facilities, and Safety** section of the Nature of Probable Environmental Impact:

(27) The Applicant shall comply with the turbine manufacturer's most current safety manual and shall maintain a copy of that safety manual in the operations and maintenance building of the facility.

(28) Prior to commencement of construction activities that require transportation permits, the Applicant shall obtain all such permits. The Applicant shall coordinate with the appropriate authority regarding any traffic management issues. Coordination shall include, but not be limited to, the county engineer, the Ohio Department of Transportation (ODOT), local law enforcement, and health and safety officials. This coordination shall be detailed as part of a final transportation management plan submitted to Staff prior to the preconstruction conference for review and confirmation that it complies with this condition.

(29) The Applicant shall enter into a road use agreement with the appropriate authorities prior to construction and subject to Staff review and confirmation.

(30) The Applicant shall mitigate any observed impacts of the project to communication systems, including maritime VHF radio, within seven days or if good cause is shown within a longer time period acceptable to Staff. Avoidance and mitigation for any known communication systems shall consist of measures acceptable to Staff, the Applicant, and the affected path owner, operator, or licensee.

(31) The Applicant shall comply with the following conditions regarding decommissioning:

(a) The Applicant shall provide the final decommissioning plan to Staff for review and confirmation of compliance with this condition, at least 30 days prior to the preconstruction conference. The plan shall:

(i) Indicate the intended future use of the land following reclamation.

(ii) Describe the following: engineering techniques and major equipment to be used in decommissioning and reclamation.

(iii) Provide a detailed timetable for the accomplishment of each major step in the decommissioning plan, including the steps to be taken to comply with applicable air, water, and solid waste laws and regulations and any applicable health and safety standards in effect as of the date of submittal.

(b) The Applicant shall file with the Board a revised decommissioning plan every five years from the commencement of construction. The revised plan shall reflect advancements in engineering techniques and reclamation equipment and standards. The revised plan shall be applied to each five-year decommissioning cost estimate. Prior to implementation, the decommissioning plan and any revisions shall be reviewed by Staff, in consultation with the ODNR, to confirm compliance with this condition.

(c) The Applicant shall, at its expense, complete decommissioning of the facility, or individual wind turbines, within 12 months after the end of the useful life of the facility or individual wind turbines. If no electricity is generated for a continuous period of 12 months, or if the Board deems the facility or turbine to be in a state of disrepair warranting decommissioning, the wind energy facility or individual wind turbines will be presumed to have reached the end of its useful life. The Board may extend the useful life period for the wind energy facility or individual turbines for good cause as shown by the Applicant. The Board may also require decommissioning of individual wind turbines due to health, safety, wildlife impact, or other concerns that prevent the turbine from operating within the terms of the Certificate.

(d) Decommissioning shall include the removal and transportation of the wind turbines off site. Decommissioning shall also include the removal of buildings, electrical components, and any other associated facilities, unless otherwise mutually agreed upon by the Applicant and the landowner. The disturbed area shall be restored to the same physical condition that existed before erection of the facility.

(e) During decommissioning, all recyclable materials, salvaged and non-salvaged, shall be recycled to the furthest extent practicable. All other non-recyclable waste materials shall be disposed of in accordance with state and federal law.

(f) The facility owner and/or facility operator shall not remove any improvements made to the electrical infrastructure if doing so would disrupt the electric grid, unless otherwise approved by the applicable regional transmission organization and interconnection utility.

(g) Subject to confirmation of compliance with this condition by Staff in consultation with the ODNR, and seven days prior to the preconstruction conference, an independent, registered Professional Engineer, licensed to practice engineering in the state of Ohio, shall be retained by the Applicant to estimate the total cost of decommissioning in current dollars, without regard to salvage value of the equipment. Said estimate shall include: (1) an identification and analysis of the activities necessary to implement the most recent approved decommissioning plan including, but not limited to, physical construction and demolition costs assuming good industry practice and based on ODOT's Procedure for Budget Estimating and RS Means material and labor cost indices or any other publication or guidelines

approved by Staff; (2) the cost to perform each of the activities; (3) an amount to cover contingency costs, not to exceed 10 percent of the above calculated reclamation cost. Said estimate will be converted to a per-turbine basis (the "Decommissioning Costs"), calculated as the total cost of decommissioning of all facilities as estimated by the professional engineer divided by the number of turbines in the most recent facility engineering drawings. This estimate shall be conducted every five years by the Applicant.

(h) The Applicant shall post and maintain for decommissioning a performance bond in an amount equal to the per-turbine Decommissioning Costs multiplied by the sum of the number of turbines constructed and under construction. The performance bond need not be posted separately for each turbine so long as the total amount reflects the aggregate of the Decommissioning Costs for all turbines constructed or under construction. For purposes of this condition, a turbine is considered to be under construction at the installation of the foundation. The performance bond shall be a financial instrument mutually agreed upon by the Board and the Applicant. The performance bond shall ensure the faithful performance of all requirements and reclamation conditions of the most recently filed and approved decommissioning and reclamation plan. At least 30 days prior to the preconstruction conference, the Applicant shall provide an estimated timeline for the posting of decommissioning funds based on the construction schedule for each turbine. Prior to commencement of construction, the Applicant shall file a statement from the holder of the performance bond demonstrating that adequate funds have been posted for the scheduled construction. Once the performance bond is provided, the Applicant shall maintain such funds or assurance throughout the remainder of the applicable term and shall adjust the amount of the assurance, if necessary, to offset any increase or decrease in the Decommissioning Costs.

(i) The performance bond shall be released by the holder when the Applicant has demonstrated, and the Board concurs, that decommissioning has been satisfactorily completed, or upon written approval of the Board, in order to implement the decommissioning plan.

AIR, WATER, SOLID WASTE, AND AVIATION CONDITIONS

Staff recommends the following conditions to address the requirements discussed in Air, Water, Solid Waste, and Aviation:

(32) The Applicant shall meet all recommended and prescribed Federal Aviation Administration (FAA) and ODOT Office of Aviation requirements to construct an object that may affect navigable airspace. This includes submitting coordinates and heights for all towers exceeding 200 feet AGL for ODOT Office of Aviation and FAA review prior to construction, and the non-penetration of any FAA Part 77 surfaces.

(33) All applicable structures, including construction equipment, shall be lit in accordance with FAA circular 70/7460-1 K Change 2, Obstruction Marking and Lighting; or as otherwise prescribed by the FAA. This includes all cranes and construction equipment.

(34) The Applicant shall comply with fugitive dust rules by the use of water spray or other appropriate dust suppressant measures whenever necessary.

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Summary: Staff Report of Investigation electronically filed by Mr. Matt Butler on behalf of Staff of OPSB