

**FINAL
ENVIRONMENTAL ASSESSMENT
FOR
CUYAHOGA COUNTY
AGRICULTURAL SOCIETY WIND
ENERGY PROJECT
BEREA
CUYAHOGA COUNTY, OHIO**

**U.S. Department of Energy
Office of Energy Efficiency and Renewable Energy
Golden Field Office**



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COVER SHEET

RESPONSIBLE AGENCY: U.S. Department of Energy

TITLE: *Final Environmental Assessment for Cuyahoga County Agricultural Society Wind Energy Project, Berea, Cuyahoga County, Ohio* (DOE/EA-1815)

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ABSTRACT: The U.S. Department of Energy (DOE) has provided funding to the Ohio Department of Development (ODOD) under the State Energy Program (SEP) and to Cuyahoga County under the Energy Efficiency and Conservation Block Grant Program (EECBG). ODOD would provide \$1,275,000 of its SEP funds to the Cuyahoga County Agricultural Society (Agricultural Society) to design, permit, and construct a single 660-kilowatt wind turbine at the Cuyahoga County Fairgrounds in the center of the Fairgrounds complex on 164 Eastland Road, Berea, Ohio. Cuyahoga County is also seeking to provide \$391,486 of its EECBG funds to the Agricultural Society for the proposed project.

ODOD and Cuyahoga County are authorized to use a percentage of their Federal funding for preliminary activities, which include EA preparation, conducting analyses, and agency consultation. Such activities are associated with the proposed project and do not significantly impact the environment nor represent an irreversible or irretrievable commitment by DOE in advance of its conclusion of the potential environmental impacts from the proposed project. The 660-kilowatt proposed wind turbine would provide renewable energy to fulfill nearly 100 percent of the Cuyahoga County Fairgrounds' annual electricity demand and help to reduce greenhouse gas emissions. The Agricultural Society has selected a Vestas V47-660 kW wind turbine, which has a 154-foot rotor diameter and full turbine height of 274 feet.

The Agricultural Society is also funding and constructing the Energy Center at the Fairgrounds with approximately \$475,000 of Cuyahoga County funds. Both EECBG and SEP would fund the wind turbine project; EECBG would fund educational materials for the Energy Center. The proposed turbine would connect to the Energy Center via approximately 300 feet of underground electrical transmission line. The project would not require new access roads or improvements to existing road.

This Environmental Assessment (EA) analyzes the potential environmental impacts as a result of the proposed construction, operation, and decommissioning of the Cuyahoga County Agricultural Society's Wind Energy Project and the alternative of not implementing this project (the No-Action Alternative).

AVAILABILITY: This EA is available for review on the DOE Golden Field Office Reading Room Website, http://www.eere.energy.gov/golden/Reading_Room.aspx, and the DOE NEPA Website, http://nepa.energy.gov/DOE_NEPA_documents.htm.

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ACRONYMS

APE	area of potential effect
ARRA	<i>American Recovery and Reinvestment Act of 2009</i>
BMP	best management practice
CFR	<i>Code of Federal Regulations</i>
dBA	decibel on an A-weighted scale, used to approximate the human ear's response to sound
DNL	Day Night Average Sound Level
DOE	U.S. Department of Energy
EA	Environmental Assessment
EECBG	Energy Efficiency and Conservation Block Grant (Program)
EISA	<i>Energy Independence and Security Act</i>
EMF	electromagnetic field
EPA	U.S. Environmental Protection Agency
FAA	Federal Aviation Administration
IBA	Important Bird Area
MBTA	<i>Migratory Bird Treaty Act</i>
NHPA	<i>National Historic Preservation Act</i>
NEPA	<i>National Environmental Policy Act</i>
NOA	Notice of Availability
NPDES	National Pollutant Discharge Elimination System
NRHP	National Register of Historic Places
NTIA	National Telecommunications and Information Administration
ODOD	Ohio Department of Development Energy Resources Division
ODNR	Ohio Department of Natural Resources
ODOW	Ohio Department of Natural Resources Division of Wildlife
OHPO	Ohio Historic Preservation Office
OSHA	Occupational Safety and Health Administration
PM _n	particulate matter with an aerodynamic diameter equal to or less than <i>n</i> micrometers
SEP	State Energy Program
SHPO	State Historic Preservation Officer
Stat.	U.S. Statutes at large
U.S.C.	<i>United States Code</i>
USFWS	U.S. Fish and Wildlife Service

1. INTRODUCTION

1.1 National Environmental Policy Act

The *National Environmental Policy Act* (42 U.S.C. 4341 *et seq.*; NEPA), the Council on Environmental Quality's NEPA regulations [40 Code of Federal Regulations (CFR) Parts 1500 to 1508], and the U.S. Department of Energy's (DOE's) NEPA implementing procedures (10 CFR Part 1021) require that DOE consider the potential environmental impacts of a proposed action before making a decision. This requirement applies to decisions about whether to provide different types of financial assistance to States and private entities.

In compliance with these regulations and with its NEPA implementing procedures, DOE must evaluate the potential environmental impacts of its proposed action that could have a significant impact on human health and the environment, including decisions on whether to provide financial assistance to government agencies and private entities. In compliance with these regulations and DOE procedures, this Environmental Assessment (EA):

- Examines the potential environmental impacts of the Proposed Action and the No-Action Alternative;
- Identifies unavoidable adverse environmental impacts of the Proposed Action;
- Describes the relationship between local short-term uses of the environment and the maintenance and enhancement of long-term productivity; and
- Characterizes any irreversible and irretrievable commitments of resources that would be involved should DOE decide to implement its Proposed Action.

DOE must meet these requirements before it can make a final decision to proceed with any proposed Federal action that could cause adverse impacts to human health or the environment. This EA provides DOE and other decisionmakers the information needed to make an informed decision about the installation, operation, and eventual decommissioning of the proposed wind turbine. The EA evaluates the potential individual and cumulative impacts of the proposed project. For purposes of comparison, this EA also evaluates the impacts that could occur if DOE did not provide funding (the No-Action Alternative), under which DOE assumes the project would not proceed. The EA does not analyze other action alternatives, such as alternative technologies or alternative project locations.

1.2 Background

The Cuyahoga County Agricultural Society (Agricultural Society) is proposing to construct, operate, and eventually decommission a single 660-kilowatt wind turbine and install approximately 300 feet of associated underground electrical transmission equipment at the Cuyahoga County Fairgrounds in the center of the complex on 164 Eastland Road, Berea, Ohio. The current estimated cost of the proposed project is \$1,666,486 (which does not include construction of the Energy Center, discussed below). The Ohio Department of Development's (ODOD's) Energy Resources Division selected this project to receive a \$1,275,000 grant because

the proposed project meets the State Energy Program (SEP) criteria for selection of reducing fossil fuel use and because of its educational value in displaying a renewable energy project. This grant would come from funding the State of Ohio received from DOE under the *American Recovery and Reinvestment Act of 2009* (Pub. L. 111-5, 123 Stat. 115; ARRA) and DOE's SEP. The purpose of the SEP is to promote the conservation of energy and reduce dependence on imported oil by helping states develop comprehensive energy programs and by providing them with technical and financial assistance. SEP is authorized under the *Energy Policy and Conservation Act*, as amended (42 U.S.C. 6321 *et seq.*). States can use SEP funds for a wide variety of activities related to energy efficiency and renewable energy (42 U.S.C. 6321 *et seq.* and 10 CFR Part 420.)

Additionally, Cuyahoga County selected the proposed project to receive a portion of its EECBG funds because it meets the EECBG criteria of empowering local communities to make strategic investments to meet the nation's long-term goals for energy independence and leadership on climate change. The EECBG Program was authorized in Title V, Subtitle E of the *Energy Independence and Security Act of 2007* (42 U.S.C. 17001 *et seq.*; EISA) and signed into law on December 19, 2007. EECBG is intended to assist U.S. cities, counties, states, territories, and Indian tribes develop, promote, implement, and manage energy efficiency and conservation projects and programs designed to reduce fossil fuel emissions; reduce the total energy use of the eligible entities; improve energy efficiency in the transportation, building, and other appropriate sectors; and create and retain jobs.

The Agricultural Society is also proposing to construct an Energy Center onsite at the Fairgrounds. The Energy Center would be funded with approximately \$475,000 of Cuyahoga County funds and would tie into the proposed turbine. This would provide educational opportunities to the public about wind energy and other renewable energies. Cuyahoga County proposed the Energy Center to augment the SEP- and EECBG-funded wind turbine at the Fairgrounds. The Energy Center is not part of DOE's Proposed Action; however, this EA analyzes it as a connected action and in the cumulative impacts analysis.

The potential use of Federal SEP and EECBG funds to assist in the financing of the proposed project constitutes a Federal action subject to review under NEPA.

In compliance with NEPA regulations, this EA examines the potential environmental impacts of the DOE's Proposed Action (providing funding for the proposed project) and the No-Action Alternative, under which DOE assumes the proposed project would not proceed. This EA also describes options that the Agricultural Society considered during development of its application to the State of Ohio, which is the recipient of Federal funding under the DOE's SEP and to Cuyahoga County, the recipient of Federal funds under the EECBG Program. This EA will provide DOE with the information needed to make an informed decision about whether allowing the State of Ohio and Cuyahoga County to provide certain Federal funds for the proposed project may result in significant environmental impacts.

1.3 Purpose and Need

1.3.1 DOE'S PURPOSE AND NEED

DOE's purpose and need is to ensure that SEP and EECBG funds are used for activities that meet congressional statutory aims to improve energy efficiency, reduce dependence on imported oil, decrease energy consumption, create and retain jobs, and promote renewable energy. Providing funding as part of the Ohio SEP and the EECBG grant to Cuyahoga County would partially satisfy the needs of these programs to assist U.S. cities, counties, states, territories, and American Indian tribes to develop, promote, implement, and manage energy efficiency and conservation projects and programs designed to:

- Reduce fossil fuel emissions;
- Reduce the total energy use of the eligible entities;
- Improve energy efficiency in the transportation, building, and other appropriate sectors; and
- Create and retain jobs

Congress enacted ARRA to create jobs and restore economic growth through measures that, among other things, modernize the nation's infrastructure and improve energy efficiency. Provision of SEP and EECBG funds for the proposed project would partially meet these goals.

1.3.2 OHIO AND CUYAHOGA COUNTY PURPOSE AND NEED

Ohio's purpose and need is to grow the economy of the state by connecting companies and communities to financial and technical resources to deploy renewable energy technologies, and to support the goals of SEP and ARRA to reduce energy costs, reduce reliance on imported energy, reduce the impacts of energy production and energy use on the environment, and to preserve and create jobs.

Cuyahoga County's purpose and need is to identify and fund projects that support the mission of the EECBG Program, which is implemented by DOE, to reduce energy use and emissions at a local and regional level. Providing EECBG funding to the proposed project would partially satisfy the need of EECBG by assisting in developing, promoting, implementing, and managing energy efficiency and conservation projects and programs designed to:

- Reduce fossil fuel emissions;
- Reduce the total energy use of the eligible entities; and
- Improve energy efficiency in the transportation, building, and other appropriate sectors.

Cuyahoga County received an EECBG formula grant of \$5,783,000 and allocated \$391,486 for construction and installation of the proposed project and associated educational outreach.

Cuyahoga County has allocated approximately \$475,000 of County funds to construct an Energy Center at the Fairgrounds. The proposed turbine would connect to the Energy Center, and EECBG Program-funded educational materials would be available at the Energy Center.

1.4 Ohio's SEP and Cuyahoga County EECBG Project Selection Process

The Ohio SEP is using its ARRA funding for programs to increase the energy efficiency of businesses and industry while promoting deployment of clean energy projects that will help improve the cost-effectiveness and economic stability of businesses and industry in the state.

Ohio's SEP, administered by ODOD, includes five sub-programs:

- Deploying Renewable Energy in Ohio
- Making Efficiency Work
- Targeting Industry Efficiency
- Banking on New Energy Financing
- Setting the Stage for Ohio's Carbon Management Strategy

ODOD has selected the proposed project to receive a grant through its sub-program, "Deploying Renewable Energy in Ohio," which provides grants to public and private entities to fund a variety of renewable energy projects, including solar, wind, fuel cell, and waste to energy technologies. ODOD issued a Request for Proposals for the SEP-funded "Deploying Renewable Energy in Ohio" sub-program and used the following criteria for selection: project readiness; matching capabilities, financing, and cost effectiveness; economic impact on Ohio; project characteristics and potential for innovation; and a project's ability to: (1) provide emission-free energy; and (2) create jobs during the construction of the project.

A criterion of the SEP grant is that funds must be obligated to sub-recipients by September 30, 2010, and spent by March 2012; therefore, all conditions on SEP awards must be removed by March 2012. The Agricultural Society was one of eight wind energy grant applicants awarded SEP funds by ODOD in 2009. A total of \$5,831,000 was awarded to these eight applicants.

The EECBG Program was enacted in part to create jobs, restore economic growth, and strengthen America's middle class through measures that modernize the nation's infrastructure, enhance America's energy independence, expand educational opportunities, preserve and improve affordable health care, provide tax relief, and protect those in greatest need. Cuyahoga County selected the proposed turbine project to receive a portion of its funds through the EECBG Program because it would partially satisfy the goals of EECBG and would reduce energy costs for the Fairgrounds, provide educational opportunities for renewable energy to over 250,000 visitors per year, and assist in leading the region in the development of wind energy manufacturing, a goal of the State of Ohio.

For this proposed project, DOE is the Federal agency, ODOD and Cuyahoga County are the recipients of Federal funding, and the Cuyahoga County Agricultural Society is the sub-recipient of SEP and EECBG funding. The proposed project would be implemented at the Cuyahoga County Fairgrounds.

1.5 Public and Agency Involvement

1.5.1 DOE PUBLIC SCOPING PROCESS

DOE sent scoping letters to potentially interested local, State, and Federal agencies; including the Governor of Ohio, the Ohio Historic Preservation Office (OHPO), the U.S. Fish and Wildlife Service (USFWS), the Federal Aviation Administration (FAA), and the National Telecommunications and Information Administration (NTIA). DOE also sent scoping letters to other potentially interested individuals and organizations, including 24 tribal representatives regularly notified of Federal actions in Cuyahoga County, to solicit public comment (see Appendix D, Attachment D1). These notices solicited comments on the proposed project. DOE published the scoping letter on the DOE Golden Field Office Reading Room Website (http://www.eere.energy.gov/golden/Reading_Room.aspx). The scoping letter described the proposed project and requested assistance in identifying potential issues to be evaluated in this EA (Appendix D, Attachment D1).

In response to the scoping letters, DOE received a letter from the USFWS that was part of the ongoing consultation between DOE and the USFWS and is discussed in detail in Section 3.2.2.6 of this EA. To conclude consultation, the USFWS sent a subsequent letter dated October 29, 2010, indicating that the USFWS believed that the proposed project is not likely to result in the take of, or adverse impacts to, the Indiana bat (*Myotis sodalis*). DOE also received a letter in response to scoping from American Tower Corporation (Appendix D, Attachment D2). This letter stated that American Tower believed the wind turbine would interfere with its cell tower service. In response, a Microwave Study was prepared and the results are discussed in Section 3.2.2.11 of this EA. American Tower's letter objected to the proximity of the proposed wind turbine to its telecommunications facility at 164 Eastland Road, Berea, Ohio.

1.5.2 CUYAHOGA COUNTY AGRICULTURAL SOCIETY PUBLIC INVOLVEMENT

The Agricultural Society has provided opportunities for public involvement since July 4, 2008, in an attempt to educate the public about this project and to provide an opportunity for public comment. These opportunities have included public engagement by the City of Berea, the City of Middleburg Heights, and other presentations, as well as coverage of the project in local media outlets. Although the initial location for the turbine was Middleburg Heights and it was approved in that municipality, the turbine was moved to the City of Berea to increase the distance from two concerned properties: Century Oak Care Center and Quadex. Letters of support for the project have been received from various public and private entities. A complete timeline of public outreach effort and City of Berea meeting minutes are provided in Appendix D, Attachment D3.

Middleburg Heights City Department Public Meetings and Approvals:

DATE	WITH	PURPOSE	RESULT
5/22/08	Mayor	Introduction	Proceed
9/17/08	Building & Zoning	250' Zoning	Approved

10/29/08	Planning	Project	Approved
11/24/08	Council Comm.	Zoning	Approved
12/2/08	Council & Mayor	Final	Approved
9/16/09	Building & Zoning	Permit end date	Expired
12/16/09	Building & Zoning	280' Zoning	Approved
3/10/10	Planning	Project	Approved
3/23/10	Council & Mayor	Final	Denied

Berea City Department Public Meetings and Approvals:

3/26/10	Mayor & Legal	Introduction	Application
4/21/10	Arch & Building	Architectural	Approved
5/6/10	Planning	Project	Approved

1.5.3 DOE PUBLIC INVOLVEMENT

The following agencies and organizations were contacted by the Agricultural Society and/or DOE:

- USFWS
- FAA
- NTIA
- OHPO
- Ohio Department of Natural Resources (ODNR), Ohio Division of Wildlife (ODOW)
- Ohio Department of Transportation, Office of Aviation
- Middleburg Heights Board of Zoning Appeals
- Berea Board of Zoning Appeals
- Berea Historical Society

1.5.4 DRAFT ENVIRONMENTAL ASSESSMENT

DOE issued the Draft EA for comment on November 19, 2010, and posted it on the DOE Golden Field Office Reading Room Website (http://www.eere.energy.gov/golden/Reading_Room.aspx) and the DOE NEPA Website (<http://nepa.energy.gov>). DOE sent postcards to the individuals listed in Appendix D, Attachment D4 of this EA to notify them of the EA's availability on the web and to announce a 15-day public comment period on the EA. The NOA was also published in the local paper, *The Cleveland Plain Dealer* (see Appendix D, Attachment D5). The comment period ended on December 4, 2011. DOE received no comments on the Draft EA.

2. PROPOSED ACTION AND ALTERNATIVES

2.1 DOE's Proposed Action

The Cuyahoga County Agricultural Society has received two subgrants under two DOE formula grant programs: one through ODOD's SEP; the other through DOE's EECBG Program. DOE is proposing to authorize the expenditure of these Federal funds to design, permit, and construct a single 660-kilowatt wind turbine at the Cuyahoga County Fairgrounds (proposed project).

DOE has authorized expenditure of a percentage of the Federal funding for preliminary activities related to the proposed project, which include EA preparation and studies. Such activities are associated with the proposed project and would not significantly impact the environment nor represent an irreversible or irretrievable commitment by of resources in advance of DOE completing the NEPA process for the proposed project.

2.2 Proposed Project

The proposed project was chosen based on the following ODOD criteria: project readiness; match, financing, and cost effectiveness; economic impact on Ohio; project characteristics and potential for innovation; and its ability to (1) provide emission-free energy, and (2) create jobs during the construction of the project. For this proposed project, DOE is the Federal agency whose Proposed Action is to authorize funding, ODOD and Cuyahoga County are the recipients of Federal funding, and the Cuyahoga County Agricultural Society is the sub-recipient of SEP funding. The proposed project would be implemented at the Cuyahoga County Fairgrounds.

Cuyahoga County selected the proposed turbine to receive a portion of its EECBG grant because it would partially satisfy the goals of EECBG and would reduce energy costs for the Fairgrounds, provide educational opportunities for renewable energy to over 250,000 visitors per year, and assist in leading the region in the development of wind energy manufacturing, a goal of the State of Ohio. The EECBG funds would also pay for renewable energy outreach and educational materials, which would be available at the Energy Center (which is not Federally funded, but is a connected action).

The proposed project includes the installation and operation of a single 660-kilowatt wind turbine at the Fairgrounds. The turbine model would be a Vestas V47-660 kW with a 154-foot rotor diameter and a 197-foot tower height. Overall, the turbine would stand 274 feet at its tallest blade tip extent. The turbine would be designed to be mounted on a monopole made up of tubular conical steel segments (see Appendix D, Attachment D6). The proposed project also includes approximately 300 linear feet of buried electrical transmission line that would connect the turbine to the proposed Energy Center, which would be funded by Cuyahoga County with non-Federal funds. The monopole design would eliminate the need for guy wires for support of the wind turbine. Guy wires can be a challenge for birds and bats to locate and maneuver around, which can lead to injury or death. The proposed design would not include the use of lattice towers for support, which have been found to be roosting sites for birds at other wind project sites.

2.2.1 PROJECT LOCATION

The proposed turbine would be located at the Cuyahoga County Fairgrounds in Berea, Ohio (see Appendix A, Figures 1a, 1b and 2) in the center of the Fairgrounds, on the south side of the fairway located in the center of the racetrack. The approximate center point of the turbine would be $41^{\circ} 21' 59.50''$ north longitude and $81^{\circ} 50' 21.10''$ west latitude at a ground elevation of 801 feet above mean sea level (see Figure 2-1 and Appendix A, Figures 3 and 4b). The final ground-level footprint once the project was installed would be less than 16 feet in diameter, or 256 square feet.



Figure 2-1. Site Plan

The future Energy Center would be located approximately 300 feet north of the proposed turbine at a ground elevation of 799 feet above mean sea level (see Appendix A, Figures 4a and 4b). The proposed turbine would power the Energy Center via 300 linear feet of underground transmission lines. As proposed, the Energy Center would be a single story, pitched roof building approximately 2,000 square feet and would be oriented for a direct view of the wind turbine (see Appendix A, Figures 5a, 5b, and 5c).

2.2.2 CONSTRUCTION AND INSTALLATION

2.2.2.1 Wind Turbine

Site construction would include installation of the foundation systems, turbine, transformer, electrical distribution wiring, and switchgear. No access roads or road improvements would be required due to the high quality and availability of the site's existing roadways. Construction vehicles are anticipated to access the site from a similar route.

An area equal to the possible fall zone (within a 301-foot radius) would be closed during the erection phase of the project. Crane pads would be used during erection as needed to protect the existing roadways and surfaces. The foundation would be composed of approximately 300 cubic yards of reinforced concrete. The foundation would be buried 10 feet deep and would require approximately 23,000 pounds of reinforcing steel.

The electrical grid interconnect of the turbine would be composed of the turbine's controller (contained within the turbine tower-based section), approximately 300 feet of buried 4-inch electrical conduits, including the portions of the run embedded within the turbine tower foundation, a 690- to 12,470-volt transformer, an automatic disconnect switch, a UL1741-compliant monitoring and control device, and a fused disconnect within the site's existing switchgear. The system would also have a parallel run of 2-inch conduit for data transfer and control runs. The full system would meet all local, State, and Federal codes and regulations.

2.2.2.2 Energy Center

The Energy Center is proposed to be constructed concurrently with the wind turbine and would consist of two exterior doors (designed for flow through), radiant slab heating, base-load heating for air conditioning and hot water, high-efficiency lighting, building structure, components, utilities, and mechanical features that would be visible for educational purposes. The Energy Center would have a south-facing roof that would hold approximately 4 kilowatts of roof-mounted, photovoltaic solar cells (pitched plus or minus 41 degrees). The Energy Center would include a kitchenette, exhibit space, a conference room, two bathrooms; the entire building would be *Americans with Disabilities Act* accessible (see Appendix A, Figures 6a and 6b).

2.2.2.3 Construction Timing and Best Management Practices

Construction would be performed in accordance with an approved Erosion and Sedimentation Control Plan and in compliance with all local, State, and Federal applicable requirements. Construction activities for wind turbine foundations, tower erection, turbine nacelle placement, and blade installation would be contingent on temperature and weather conditions. The turbine nacelle and blades would be installed during calm wind periods. Foundations for the proposed turbine and Energy Center would not be installed during cold winter months. These and similar factors would determine the final construction timeline. The proposed project ground disturbance area would not exceed 1 acre; thus, it would not exceed the State of Ohio threshold for National Pollutant Discharge Elimination System (NPDES) permitting.

The installation of the proposed project, including site preparation, erection, final commissioning, generator installation, and overall systems tie-in and startup, is planned to be completed within approximately 10 months of groundbreaking.

The construction of the Energy Center is planned to be completed in approximately 4 months with the majority of activities occurring during daytime working hours (likely to occur Spring/Summer 2011). All parking and staging would occur on the Fairgrounds property.

Construction activities would occur within a 2-acre footprint that is currently used as open space and overflow parking within the Fairgrounds. Approximately 4,000 square feet of previously disturbed area would be temporarily disturbed during construction. During construction, these areas would be closed and secured using fencing and locked gates to prevent unauthorized individuals from entering the work zone. The Energy Center development footprint would require the removal of three trees, one silver maple approximately 40 feet tall and in poor health and two red maples approximately 9 feet tall and in fair health (discussed in detail in Section 3.2.2.9). Three additional trees located in the vicinity of the Energy Center development footprint would require protective measures during construction.

Aviation Lighting

Aviation lighting for the proposed turbine would be in compliance with the FAA standards (FAA 2007). White strobe lights at the minimum number, minimum intensity, and minimum number of flashes per minute allowable by the FAA would be used at this site.

2.2.3 OPERATIONS AND MAINTENANCE

The Agricultural Society would operate and maintain the proposed turbine according to operating, maintenance, and safety procedures and requirements specifically recommended by the turbine's manufacturer, Vestas. Routine preventive maintenance and inspection of the turbine would be necessary to maximize performance and identify potential problems or escalating maintenance issues. The turbine would be remotely monitored daily to ensure operations were proceeding efficiently. This monitoring would occur through the use of trained onsite staff and remote monitoring via a service provider contract. The turbine would have the ability to monitor and report faults both locally and remotely, as well as automatically shut down if a fault should occur outside the normal operating parameters of the turbine per the manufacturer's specifications. The turbine would also have the capacity for a remote shutdown by authorized personnel. For the first 5 years of operation, the Agricultural Society would subcontract all formal service and maintenance functions to a nationally experienced firm. During this period, local staff and resources would be trained and gain experience in the maintenance and service procedures for the machine. A 5-year extended warranty would also be included in the initial purchase contract of the turbine from the original provider to optimize performance and safety. After this 5-year period, the service and maintenance plans and providers would be reevaluated and contracted as necessary. All routine servicing would be performed without using a crane to remove the turbine from the tower.

2.2.4 DECOMMISSIONING

Impacts evaluated with respect to the decommissioning of the turbine are similar to those examined in the construction section of this EA (Section 2.2.2). The turbine and other infrastructure are expected to have a useful life of at least 20 years. Retrofitting the turbine with upgrades may allow the turbine to produce efficiently for many years after the original useful life. When the project is terminated, the Agricultural Society will decommission the turbine and other infrastructure, and all turbine-related facilities would be removed to a depth of approximately 3 feet below grade. The soil surface would be restored as close as possible to its original condition. Underground facilities would either be removed or safely secured and left in place. Salvageable items (including fluids) would be sold, reused, or recycled as appropriate; unsalvageable material would be disposed of at authorized and approved disposal sites. All decommissioning construction activities would be performed in accordance with the manufacturer's guidelines as well as all applicable Federal, State, and local regulations.

2.3 Alternative

2.3.1 DOE ALTERNATIVE

The Ohio SEP funds are from a formula grant—the amount granted to the State is determined pursuant to a formula established in the DOE SEP grant procedures (10 CFR 420.11). Allocation of funds among the states is based on population and other factors. Recipients of these formula grants have broad discretion in how they use these funds.

Cuyahoga County's funds received under the DOE EECBG Program also are from a formula grant. EECBG Program funds are apportioned under a series of formulas specified by EISA and as determined by DOE (Section 541 of EISA). Recipients must use these funds for activities that are in accordance with Section 544 of the Act.

This EA examines the potential environmental impacts of DOE's Proposed Action (providing funding for the proposed project) and the No-Action Alternative. This EA also describes options that the Agricultural Society considered during development of its application to the State of Ohio, which is the recipient of Federal funding under the SEP, and to Cuyahoga County, the recipient of Federal funds under the EECBG Program. This EA provides DOE with the information necessary to make an informed decision about whether allowing the State of Ohio and Cuyahoga County to provide some of their Federal funds for the proposed project might result in significant environmental impacts.

2.3.2 NO-ACTION ALTERNATIVE

Under the No-Action Alternative, DOE would not allow the State of Ohio and Cuyahoga County to use Federal funds (SEP and EECBG, respectively) for the proposed project. For this EA, DOE assumes that the proposed project would not proceed without Federal funding. This assumption allows a comparison between the potential impacts of the project as proposed and the impacts of not proceeding with the project. Without the proposed project, the Fairgrounds' operations would continue as otherwise planned, but without installation or operation of the proposed wind turbine.

2.3.3 SITING OPTIONS CONSIDERED BY THE CUYAHOGA COUNTY AGRICULTURAL SOCIETY

The Agricultural Society considered three main sites for the location of the wind turbine at its site in Berea, Ohio. All of the potential sites are owned by the Agricultural Society and are similar with regard to environmental considerations, such as wildlife impact avoidance, wetland and stream avoidance, and compatibility with existing zoning and land uses. Further considerations used by the Agricultural Society for siting the turbine within the Fairgrounds are the following:

- Distance from adjacent properties
- Maximization of distances to occupied structures (no closer than 1.25 times the blade tip height)
- Ease of access and adequate room for construction, installation, and maintenance
- Proximity to existing hardened roadways (minimization of new construction)
- Minimization of disruption of Fairgrounds operations
- Availability for educational programs (school, community, and college partnerships)
- Minimization of wind turbulence due to adjacent buildings and trees
- Utilization of previously disturbed land (avoidance of natural areas)
- Soil conditions (foundation suitability)
- Maximum avoidance of potential wildlife habitats
- Topography
- Wind resource optimization
- Existing infrastructure avoidance
- Utility interconnect distances
- Architectural, visual balance and icon siting

The proposed site was selected because it would allow the construction area to be easily controlled, as it is already within an existing fenced area. The proposed project site is also in the closest proximity to the proposed Energy Center, which would allow direct sightlines to the turbine's operation as well as having the shortest utility interconnecting distance.

2.4 Required Agency Permits and Approval Types

Prior to construction, all required Federal, State, and local permits and approvals would be obtained. The required permits and approvals are listed in Table 2-1. All permit documentation and approval letters are contained in Appendix C.

Table 2-1. Federal, State, and Local Permits and Approvals

Agency	Permit Approval / Type
Federal	
Federal Aviation Administration	Federal Aviation Administration Aeronautical Determination (issued July 6, 2010)
National Telecommunications and Information Administration	Radio Frequency Transmission Approval (issued October 19, 2010)
U.S. Fish and Wildlife Service	Compliance with the <i>Endangered Species Act</i> , the <i>Migratory Bird Treaty Act</i> , and the <i>Bald and Golden Eagle Protection Act</i> (letter dated October 29, 2010).
State	
Ohio Historic Preservation Office	Compliance with the <i>National Historic Preservation Act</i> (letter dated February 10, 2011).
Ohio Department of Natural Resources, Division of Wildlife	Concurrence that the proposed project does not pose a substantial risk to State-protected species, including birds (pursuant to Ohio Revised Code Chapter 1531) (received August 27, 2010).
Local	
Berea Township Planning & Zoning Commission	Height Variance Approval (March 23, 2010).

2.5 Project Proponent-Committed Practices

The Agricultural Society has committed to the following measures and procedures to minimize or avoid environmental impacts if the proposed project is implemented.

2.5.1 BIRD, BAT, AND RAPTOR AVOIDANCE AND MINIMIZATION MEASURES

Project coordination occurred with USFWS and ODOW concerning the project's location and potential impacts on birds, bats, and other wildlife; rare, threatened, and endangered species; and other protected natural features. According to the USFWS letter dated September 21, 2009 (see Appendix C, Attachment C2), there are no bald eagle nests within 5 miles of the proposed project. The USFWS letter also noted that an Indiana bat capture was documented approximately 4.5 miles from the project site, and ODOW indicated in its letter dated August 27, 2010 (see Appendix C, Attachment C1) that this occurrence was 4.3 miles away. ODOW stated in its letter that the proposed project was not likely to impact any State-listed species. However, because the proposed project lies within the range of the Indiana bat, ODOW concluded that tree removal should occur between September 30 and April 1 of any given year or Indiana bat mist net surveys would be required. If tree removal associated with the Energy Center construction could not occur between September 30 and April 1, the Agricultural Society would have a qualified biologist conduct mist net surveys. ODOW and USFWS would receive results of the mist net survey prior to tree removal.

2.5.2 HEALTH, SAFETY, AND NOISE

The Agricultural Society has prepared a Health and Safety Plan; this plan, all Occupational Safety and Health Administration (OSHA) requirements, and Vestas V47-660 kW guidelines, would be followed. Therefore, all facilities would include high-voltage warning signs. All

construction activities would occur during normal working hours to avoid noise disturbances to surrounding areas. The construction of the proposed project would comply with all applicable Federal, State, and local requirements.

2.5.3 SOIL

The Agricultural Society would use best management practices (BMPs) during construction and operation to protect topsoil and minimize soil erosion. BMPs would include, at a minimum, the following: containing excavated material, using silt fences, protecting exposed soil, stabilizing restored material, and revegetating disturbed areas.

2.5.4 WASTE MANAGEMENT

Any waste generated during construction, operation, and decommissioning, including used lubricants, would be handled, collected, transferred, and reused/recycled in accordance with applicable Federal, State, and local regulations.

2.5.5 FLICKER EFFECTS

Based on the shadow flicker assessment prepared for this project, shadow flicker is not expected to have an adverse impact on any potential receptors. However, if shadowing becomes a nuisance to a nearby resident, the Fairgrounds would plant screening trees or purchase window coverings for the resident. Also, if flickering is an annoyance during events at the Fairgrounds, the Agricultural Society would temporarily shut down the turbine.

2.5.6 ICING AND FIRE

The turbine system would have an automated system fault shut-off triggered at a minimum by the following sensors: system temperature, power quality, vibration, over-speed, fire and icing (vibration caused by blade icing induced imbalances would automatically shut down the turbine). This system is designed to automatically send fault codes to preauthorized personnel through a “Web” interface. The turbine’s nacelle would have a cold-weather package including nacelle heaters. All icing related turbine shutdowns would require a direct inspection and an onsite manual restart. The site personnel and the system maintenance personnel would shut down the turbine in the event of an icing condition. The site would adopt an ice safety zone around the turbine for implementation during icing events.

2.5.7 CULTURAL RESOURCES

Based on the cultural and historic resources analysis, encountering archaeological resources during excavation activities is considered unlikely and not anticipated. Due to extensive snow cover a field survey of the area of ground disturbance associated with the proposed project was not feasible. As part of DOE’s ongoing Section 106 Consultation, OHPO recommended that a Phase 1 survey be conducted within the area of ground disturbance for the Energy Center. In light of this recommendation, prior to ground disturbing activities, the Agricultural Society has committed to a preparation of a Phase 1 survey for archaeological resources that will be conducted by a qualified archaeologist and submitted to the OHPO for their review. If archaeological resources are discovered as part of the survey, an appropriate treatment plan would be developed in consultation with OHPO in accordance with the *National Historic Preservation Act* (16 U.S.C. 470 *et seq.*; NHPA).

3. AFFECTED ENVIRONMENT AND ENVIRONMENTAL IMPACTS

This chapter of this EA examines in detail the potential environmental impacts of the proposed project and the No-Action Alternative on the affected environmental resource areas.

3.1 No-Action Alternative

The No-Action Alternative would result in the continued use of fossil fuel energy to meet the demands of the Fairgrounds. The current composition of emissions generated by energy production at the Fairgrounds is, in general, similar to the overall national composition and includes carbon dioxide, nitrogen dioxide, and sulfur dioxide (EPA 2010a). Under the No-Action Alternative, DOE would not authorize the use of Federal funds for the design, and construction of the proposed project; therefore there would not be any impacts to the resource areas analyzed in this EA. Additionally, without the proposed project, it is unlikely that the Energy Center would be constructed and there would be no temporary construction impacts and no permanent commitment of approximately 2,000 square feet of previously disturbed land to the Energy Center footprint. Additionally, it is unlikely that the trees which would need to be removed for construction of the Energy Center would occur in the immediate future.

However, if the proposed project is not implemented, construction of the wind turbine or Energy Center is unlikely to occur, and baseline conditions would continue pursuant to current Fairgrounds energy usage and operations and the nearly 100 percent of the Fairgrounds' electrical power that could be provided by the proposed project would continue to be purchased First Energy Solutions. In 2009, First Energy Solutions generated electricity using coal (72.8 percent), oil (0.4 percent), natural gas (2.7 percent), nuclear (22.3 percent), and renewable energy sources (1.1 percent) (EPA 2010a). Thus, carbon dioxide emissions from electricity generation to serve the Fairgrounds would be higher under the No-Action Alternative and neither the Agricultural Society nor ODOD would meet their objective of providing emission-free energy.

3.2 Ohio and Cuyahoga County's Proposed project

3.2.1 CONSIDERATIONS NOT CARRIED FORWARD FOR FURTHER ANALYSIS

Consistent with NEPA implementing regulations and guidance, DOE focuses the analysis in an EA on topics with the greatest potential for significant environmental impact. For the reasons discussed below, the proposed project is not expected to have any measurable effects on certain resources; therefore, those resources are not carried forward for further analysis.

3.2.1.1 Water Resources

Floodplains and Wetlands

Pursuant to 10 CFR Part 1022, DOE reviewed USFWS National Wetlands Inventory maps (USFWS 2010) and Federal Emergency Management Agency floodplain maps (FEMA 1979) and identified no floodplains, wetlands, or surface water sources, such as streams or drainage channels, that are located on the proposed project site or that could be affected by the construction and operation of the proposed project (see Appendix A, Figure 7a and 7b).

Additionally, the site was field-checked and no evidence of wetlands or other potentially jurisdictional aquatic features are present at the proposed turbine or Energy Center site.

Wild and Scenic Rivers

No Ohio Scenic Rivers or waterways included in the National Wild and Scenic River System occur in the project vicinity (USFWS 2010). The closest Ohio Scenic River is the Chagrin River, located in Cuyahoga County, approximately 25 miles east of the proposed project site (see Appendix A, Figure 8). The proposed project would not be visible from the Chagrin River (ODNR 2010). The closest National Wild and Scenic River is Little Beaver Creek, located mainly in Columbiana County and about 83 miles southeast of the Fairgrounds (USDA Forest Service 2009). The proposed project would not affect Federal or state wild and scenic rivers.

Ground Water

Based on the review of existing Ohio Environmental Protection Agency and ODNR groundwater resource maps, the proposed project site is not located in an endorsed well-head protection area, where certain activities are restricted within an Ohio Environmental Protection Agency-designated protection area. Additionally, the proposed project site is not located within any designated Public Water System supply areas (sole-source aquifer, community/non-community systems, and drinking-water source protection areas using groundwater/surface water). Groundwater is generally not a source of drinking water in this part of Cuyahoga County. There are no private well-water supplies on or near the project site. The proposed project would have no adverse effect on any groundwater resources.

Surface Water

In compliance with the Clean Water Act, the proposed project site was investigated for surface water. The nearest surface-water bodies are Baldwin Lake and Wallace Lake (also known as Coe Lake), which are both located about 0.60 miles to the west and are part of the Roadside Park Area. The nearest streams are Baldwin Creek and Rocky Creek; both are located approximately 0.65 mile southwest of the Fairgrounds and are part of the Lake Erie drainage system. No runoff or discharges from the construction of the proposed project would directly enter neighboring bodies of water, including the lakes to the west or the two creeks to the southwest. Because ground-disturbing activity would affect less than 1 acre, an NPDES permit would not be required prior to any construction-related earthwork. However, the Agricultural Society has committed to using sediment and erosion pollution control BMPs in conformance with a plan specific to the proposed project.

3.2.1.2 Waste Management

Solid wastes that are anticipated to be generated during construction include equipment packaging materials and construction-related material debris. Solid wastes generated during operation of the turbines would be minimal. Solid waste generated by the operation of Energy Center is anticipated to generate typical household/commercial waste and would be removed via existing municipal waste handling services that serve the Fairgrounds. Solid wastes that are anticipated to be generated during decommissioning of the wind turbine include dismantled equipment, which would likely be recycled, and construction-related material debris would be handled in accordance with all local, state and Federal regulations. Hazardous, regulated nonhazardous, and universal wastes are not anticipated to be generated during construction,

operation, or decommissioning. All wastes generated over the life of the proposed project would be handled, collected, transferred, reused/recycled, and disposed of in accordance with all applicable Federal, State, and local regulations. Used oil (e.g., spent gear box oil, hydraulic fluid, and gear grease) would not be considered a waste because it can be reused and/or recycled. Used oil would be generated during operation of the wind turbine and recycled utilizing a qualified recycling facility.

3.2.1.3 Intentional Destructive Acts

DOE considers intentional destructive acts (i.e., acts of sabotage or terrorism) in all its EAs and environmental impact statements (DOE 2006). Construction and operation of the proposed project would not involve the transportation, storage, or use of radioactive, explosive, or toxic materials. The proposed project would not offer any particularly attractive targets of opportunity for terrorists or saboteurs to inflict adverse impacts on human life, health, or safety.

3.2.2 CONSIDERATIONS CARRIED FORWARD FOR FURTHER ANALYSIS

This section of this EA examines in detail the potential environmental impacts of the proposed project on the following resource areas:

- Land use
- Visual
- Noise
- Cultural resources
- Geology and soils
- Biological resources
- Human health and safety
- Transportation
- Socioeconomics and environmental justice
- Air quality and climate change
- Utilities and energy

3.2.2.1 Land Use

The project site is located on the Cuyahoga County Fairgrounds property. The Fairgrounds are bounded to the north by Bagley Road, a four-lane highway made up mostly of commercial and light industrial use; to the northeast by University Street and a residential area; to the east by Old Oak Boulevard with commercial and light industrial use; to the south by Waverly Street with residential areas; and to the west by Eastland Road with residential areas and portions of Baldwin-Wallace College. Interstate 71 and its industrial corridor is less than a mile to the east of the site.

The Fairgrounds are located partially within the city of Berea and partially within the city of Middleburg Heights. Most of the Fairgrounds buildings and structures, including the proposed project site, as well as the Fairgrounds' regular activities, are located in the city of Berea. The area of the Fairgrounds located in Middleburg Heights consists of open fields used for parking.

The majority of land in the immediate vicinity of the Fairgrounds in Berea is zoned as Standard Single Family Residential-B District. In addition to this designation, the following zoning areas exist within a 1-mile radius of the proposed project site: Standard Single Family Residential-A District, Multiple Family Medium Density, Residence Office, Townhouse, and Commercial Center (City of Berea 2010) (see Figure 3-1 and Appendix A, Figure 9a).

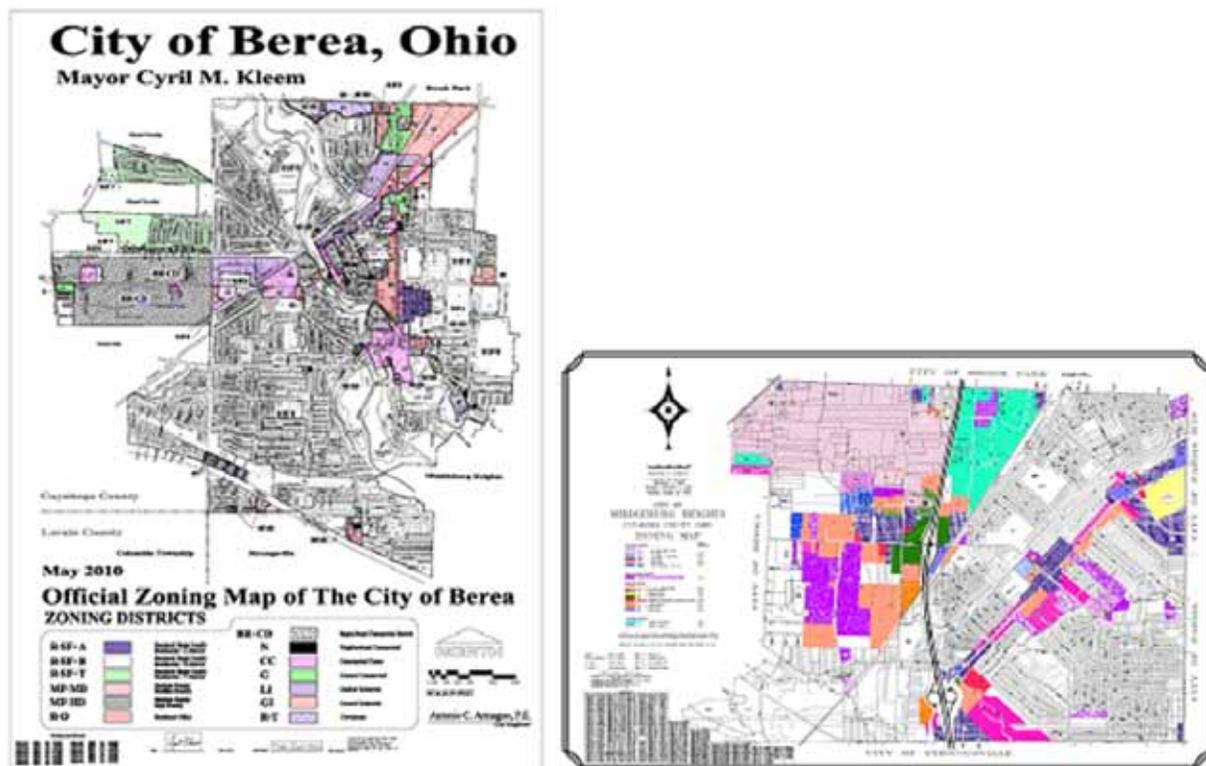


Figure 3-1. City of Berea and Middleburg Heights Zoning Maps

The majority of land in the immediate vicinity of the Fairgrounds in Middleburg Heights (see Figure 3-1 and Appendix A, Figure 9b) is zoned as Mixed Use, General Business, Motorist Services, Office Building, Public Facilities Districts, and General Industrial (City of Middleburg Heights 2003). The landscape surrounding the Fairgrounds is generally urban and commercial interspersed with some light industry. Lake Abram Metropolitan Reservation lies less than 0.5 mile to the north of the Fairgrounds.

On December 16, 2009, an application for zoning variance for the height of the proposed turbine was submitted to and approved by the Middleburg Board of Zoning Appeals (CBMPC 2010). The zoning and height variance approval expired on September 16, 2009 and was reapplied for by the Fairgrounds. On December 16, 2009 Middleburg Heights Building and Zoning re-approved the variance, and project approval from the Middleburg Heights Planning Commission was received on March 10, 2010. On March 23, 2010, the re-approved variance was heard before the Middleburg Heights City Council and was denied.

The denial by the City Council meant the proposed project could not be constructed within Middleburg Heights. However, the Fairgrounds are located in both the cities of Middleburg

Heights and Berea, and project proponents determined that the proposed turbine should be relocated to that portion of the Fairgrounds located in Berea. On December 16, 2009, the City of Berea Building and Zoning approved the proposed project and a height variance. On March 20, 2010, Berea Planning approved the proposed project and height variance. On March 23, 2010, the project was placed on the calendar for hearing by the Berea City Council who approved the proposed project and variance (see Appendix D, Attachment D3).

The Energy Center would require a City of Berea building permit, but is not likely to require a zoning or other variance.

Direct and Indirect Impacts

Implementation of the proposed project would permanently commit 256 square feet of previously disturbed and developed land aboveground for the wind turbine foundation and 300 linear feet of belowground for the underground transmission line. Approximately 2,000 square feet of land would be temporarily disturbed for construction of the wind turbine. Approximately 4,000 square feet of previously disturbed land would be disturbed for construction of the future Energy Center. The future Energy Center would permanently commit approximately 2,000 square feet. The overall use of the general area would not change as a result of construction and operation of the proposed project.

Neither direct nor indirect impacts on land use are expected to occur outside of the project site. Land-disturbing activities would be relegated to the area needed for construction and operation of the proposed project. No other lands, including natural or residential areas, would be affected.

3.2.2.2 Visual Quality

Viewshed

A visual analysis was conducted for the proposed project, the wind turbine (as the Energy Center would not be visible beyond the Fairgrounds property) to assess potential impacts on the local viewshed (Appendix B, Attachment B1). The results of a visual analysis are intended to give a sense of how the proposed turbine would appear to potential receptors in the surrounding landscape. The actual visibility of the proposed turbine in the surrounding area is affected by many factors: the size of the machine; tower and blade tip heights; turbine color; distance to the viewer; obstructions such as trees, hills, and buildings; atmospheric conditions; sun angle; and the curvature of the earth. Of these factors, the overall height of a turbine, obstructions in the sightline between the viewer and the turbine, and the distance between the machine and the viewer have the potential for the greatest impact.

The Fairgrounds are located in a fairly urbanized and suburban environment. Areas to the east, north and west of the proposed project are entirely developed with residential and commercial facilities, roadways and Interstate 71 (due east). Residential development borders the Fairgrounds to the west, north and southeast, with parking facilities and commercial development to the south and to the east. Also present are urban forested areas around the Fairgrounds property. The landscape surrounding the Fairgrounds contains relatively low topographic relief. Expansive views over the surrounding area are not readily present due to the surrounding urban forest, topography, and existing infrastructure. Trees vary in height, but tend to range from 15 to 75 feet.

Visual simulations were used to illustrate the effect of the proposed project from vantages that are representative of typical views that would be affected from the total height of 274 foot wind turbine. Vertical elements present in the landscape include buildings, existing communications towers, overhead power lines, and other vertical elements that dominate the viewshed (see Figure 3-2). Existing viewer groups in the area include residents, roadway users, commercial facilities, and educational facilities.

Visual simulations for properties listed in Table 3-1 are located in Appendix B, Attachment B1. Due to local obstruction proximities and densities to typical sightlines such as trees and buildings, much of the surrounding area would not be able to see the proposed turbine. However, some of the surrounding residents and commercial facilities would be able to see the turbine due to their proximity to the project site.

Table 3-1. Cuyahoga County Visual Simulations

Fairgrounds Visualizations						
Set Number	Picture Number	Distance from Turbine (miles)	Site Description	Latitude	Longitude	Direction
1	1388	1.24	Berea Union Depot	41° 22' 51.12" N	81° 51' 15.93" W	140°
2	1418	0.40	Berea District 7 School	41° 22' 20.93" N	81° 50' 28.07" W	165°
3	1427	0.26	Nursing Home on Old Oak Blvd	41° 22' 06.09" N	81° 50' 05.06" W	246°
4	1434	0.39	Southwest General Hospital Parking Garage	41° 22' 08.65" N	81° 49' 56.40" W	247°
5	1441	0.41	Quadax	41° 21' 41.89" N	81° 50' 09.39" W	335°
6	1448	0.34	Corner of Austin & Andrew	41° 21' 43.62" N	81° 50' 22.86" W	4°
7	1480	0.27	352 Waverly	41° 21' 48.35" N	81° 50' 28.78" W	24°
8	1499	0.25	211 Eastland	41° 21' 59.93" N	81° 50' 38.87" W	84°
9	1516	0.15	University Drive	41° 22' 09.11" N	81° 50' 21.33" W	181°
10	1518	0.37	Bagley Road - Fairgrounds Entrance	41° 22' 19.22" N	81° 50' 11.77" W	202°
11	1733	0.67	Coe Lake	41° 21' 49.26" N	81° 51' 04.65" W	70°
12	1515	0.45	Corner of Eastland and Bagley	41° 22' 21.00" N	81° 50' 37.94" W	148°
13	1505	0.71	Corner of Front Street	41° 22' 01.11" N	81° 51' 10.85" W	90°

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Figure 3-2. An Existing Tower at the Fairgrounds



**Figure 3-3. Visual Simulation
Depicted from the Corner of
Austin and Andrews Streets**



**Figure 3-4. Visual Simulation
Depicted from the Top of the
Southwest General Hospital
Parking Garage**



**Figure 3-5. Visual Simulation
Depicted from 352 Waverly**



Figure 3-6. Visual Simulation Depicted from 211 Eastland

Shadow Flicker

Shadow flicker is the moving/flickering shadows produced when sunlight passes through the spinning rotor blades of a turbine. This phenomenon can become an annoyance to nearby residents when the shadows pass directly over their line of sight, i.e., windows or other transparent surfaces. While the adverse effects of shadows can be subjective, the shadows themselves can be precisely modeled for location and duration.

For shadow receptor sites within a turbine's shadow's reach, not all would receive shadow due to existing obstructions that block the shadows path such as other buildings, hills or trees. While evergreen trees would fairly consistently block shadows year-round, deciduous trees would have a lesser impact in the winter months when they have no leaves. Although no official U.S. policy has been adopted, international standards appear to be in consensus that flickering shadows in excess of thirty hours per year impacting a particular location are considered a potential nuisance (see Appendix B, Attachment B2).

A shadow flicker analysis (see Appendix B, Attachment B2) was completed for the proposed project to evaluate the amount of shadow flicker that would be experienced by local receptors. The analysis considered several aspects affecting the casting of shadows and potential impacts on local receptors, including the distance to receptors, angle of incoming solar insolation, and the amount of sunlight experienced at the project site during each of the four seasons.

The following are the closest receptors to the proposed wind turbine.

Receptor A: LifeWorks Fitness to the Southeast, 7390 Old Oak Blvd, approximately 1000, feet. Shadows would not impact this receptor.

Receptor B: 208 Eastland Road, approximately 1150 feet: Shadows would be highly diffused, to completely blocked, as the receptor is substantially blocked by multiple trees. It is possible that this receptor would receive shadow flicker during portions of mid-April and mid-August to early-September mornings with a total average of less than 5 hours of morning shadow flicker per year.

Receptor C: Fair buildings to the Northwest, approximately 650 feet: Shadows would be limited, but may be possible during portions of late-November to mid-January mornings with a total average of less than 4 hours of shadow flicker per year.

Receptor D: 142 Eastland Road, approximately 1,270 feet: Shadows would be highly diffused, to completely blocked, as the receptor is substantially blocked by multiple trees. It is possible that this receptor would receive shadow flicker during portions of mid-May through July with a total average of less than 11 hours of moving morning shadow per year.

Because of the strobe-like effect of shadow flicker, there have been investigations into whether it might have the potential to produce epileptic seizures in individuals with photosensitivity. It has been determined that modern utility-scale wind turbines do not have the potential to cause these types of problems because of their relatively slow blade rotation. One study (Harding et al. 2008) reported that flickers with a frequency greater than 3 hertz could pose a potential for inducing photosensitive seizures (that is, a light flashing at a rate of more than 3 times per second). The American Epilepsy Foundation reports that lights flashing in the range of 5 to 30 hertz are most likely to trigger seizures and recommends that flash rates of visual alarms be kept under 2 hertz (Epilepsy Foundation 2010). A wind turbine with three blades would have to make a full revolution every second (or 60 revolutions per minute) to reach a frequency of 3 hertz. The Vestas-V47 wind turbine proposed for this project operates at 28.5 revolutions per minute (Appendix D, Attachment D6). This would indicate a flicker frequency created by this wind turbine at less than one-half the rates identified with photosensitivity issues.

Some data suggest that shadow flicker has the potential to cause a disorienting effect on a small segment of the population. The data also suggest that rotor rotation below 2.5 hertz can avoid such effects (BLM 2005). As stated above, the rotor speeds involved with the project would be well below this level.

Direct and Indirect Impacts

Visual

The results of the visual analysis indicate that the proposed project would be visible to the nearest receptors, particularly during winter months. However, much of the local community's viewshed is already dominated by existing vertical features. Due to obstruction proximities and densities because of trees and buildings, the local viewshed would not be substantially altered by the proposed project. In the instances where the proposed project could be viewed by the larger community, it would be similar in appearance to the region's existing communication towers. Overall, effects on the local viewshed are anticipated to be minimal.

Of the representative visual simulations, the sites with the most unobstructed view of the turbine would be: FG-V-3 Nursing Home on Old Oak Blvd, FG-V-4 Southwest General Hospital; FG-V-7 352 Waverly; and FG-V-9 University Drive (see photos above). The proposed turbine would be fairly clear from these locations. The simulation shows that the turbine would be readily seen in the foreground from some vantages and would be a prominent visual element because its light-colored surface makes it stand out against its surroundings. While the proposed turbine appears to be of similar height to other vertical features for the receptors that have partial or very obscured views of the turbine, the light coloring prevents the turbine from melding into the

existing landscape. In other locations, the turbine would be much less visible due to existing obstructions and distance, such as the view that appears in FG-V-6 Austin Road and FG-V-8 University Drive (see Appendix B, Attachment B2).

Shadow Flicker

The shadow flicker study completed for the proposed project indicated that no homes or occupied business structures outside the Fairgrounds property within the proposed turbines shadow influence would receive flickering shadows of over 30 hours per year. While some of the surrounding buildings would receive shadows, none of the offsite receptors would receive more than 11 hours of shadowing annually. Some of the Fairgrounds' buildings would receive shadow flicker, but most of these are out-buildings and do not have windows. The northern part of the track inside the grandstand would receive moving shadows year round; however, the Agricultural Society will turn off the turbine during events at the track if shadows would be an annoyance (see Appendix D, Attachment D7). The following are the closest receptors to the proposed wind turbine.

Receptor A: LifeWorks Fitness to the Southeast, 7390 Old Oak Blvd, approximately 1000, feet. Shadows would not impact this receptor.

Receptor B: 208 Eastland Road, approximately 1150 feet: Shadows would be highly diffused, to completely blocked, as the receptor is substantially blocked by multiple trees. It is possible that this receptor would receive shadow flicker during portions of mid-April and mid-August to early-September mornings with a total average of less than 5 hours of morning shadow flicker per year.

Receptor C: Fair buildings to the Northwest, approximately 650 feet: Shadows would be limited, but may be possible during portions of late-November to mid-January mornings with a total average of less than 4 hours of shadow flicker per year.

Receptor D: 142 Eastland Road, approximately 1,270 feet: Shadows would be highly diffused, to completely blocked, as the receptor is substantially blocked by multiple trees. It is possible that this receptor would receive shadow flicker during portions of mid-May through July with a total average of less than 11 hours of moving morning shadow per year.

Off-property shadow impacts would be very limited due to the distance of all the nearest receptors, with all offsite properties sites receiving less than 10 hours of shadow flicker per year, with most being blocked by existing trees. Impacts on Fairgrounds buildings would also be limited due to their locations and the fact that most structures do not have windows. The northern part of the horse racetrack that surrounds the project site would receive moving shadows year-round. Although current use of this track is very limited, if horse races or similar events were scheduled in periods of potential shadow, the Fairgrounds Board will temporarily turn off the turbine to avoid event distractions or annoyance (see Appendix D, Attachment D7). Shadow flicker effects as a result of the proposed project would not be adverse.

3.2.2.3 Noise

Noise is any unwanted, undesirable sound. It has the potential to interfere with communication, damage hearing, and, in many cases, is viewed as an annoyance. Noise can occur at different levels and frequencies, depending on the type of source and the distance away from the listener.

The standard unit for measuring sound pressure levels is the decibel. A decibel is a unit that describes the amplitude (or difference between levels) of sound, equal to 20 times the logarithm to the base 10 of the ratio of the measured pressure to the reference pressure, which is 20 micropascals. Typically, environmental and occupational sound pressure levels are measured in decibels on an A-weighted scale (dBA). The A-weighted scale de-emphasizes the very low and very high frequency components of the sound in a manner similar to the frequency response of the human ear [i.e., using the A-weighting filter adjusts certain frequency ranges (those that humans detect poorly)] (Colby et al. 2009). Table 3-2 shows some sound pressure levels associated with common activities measured in dBA.

Table 3-2. Typical Sound Pressure Levels Measured in the Environment and Industry

Noise Source At a Given Distance	A-Weighted Sound Level in Decibels	Qualitative Description
Carrier deck jet operation	140	
	130	Pain threshold
Jet takeoff (200 feet)	120	
Auto horn (3 feet)	110	Maximum vocal effort
Jet takeoff (1000 feet) Shout (0.5 feet)	100	
N.Y. subway station Heavy truck (50 feet)	90	Very annoying Hearing damage (8-hour, continuous exposure)
Pneumatic drill (50 feet)	80	Annoying
Freight train (50 feet) Freeway traffic (50 feet)	70 to 80	
	70	Intrusive (Telephone use difficult)
Air conditioning unit (20 feet)	60	
Light auto traffic (50 feet)	50	Quiet
Living room Bedroom	40	
Library Soft whisper (5 feet)	30	Very quiet
Broadcasting/Recording studio	20	
	10	Just audible

Adapted from Table E, "Assessing and Mitigating Noise Impacts", NY DEC, February 2001.
Table 3-2 is cited in Colby et al. 2009.

For a point source such as a stationary compressor or construction equipment, sound attenuates based on geometry at rate of 6 decibels per doubling of distance. For a line source such as free flowing traffic on a freeway, sound attenuates at a rate of 3 decibels per doubling of distance. Atmospheric conditions including wind, temperature gradients, molecular absorption, and humidity can change how sound propagates over distance and can affect the level of sound received at a given location. The degree to which the ground surface absorbs acoustical energy also affects sound propagation for sources located close to the ground. Sound that travels over an acoustically absorptive surface such as grass attenuates at a greater rate than sound that travels over a hard surface such as pavement. The increased attenuation is typically about 1.5 per doubling of distance (Caltrans 2009). Barriers such as buildings and topography that block the line of sight between a source and receiver also increase the attenuation of sound over distance.

Table 3-3 provides definitions of commonly used acoustical terms.

Table 3-3. Definition of Commonly Used Acoustical Terms

Sound Measurements	Definition
Decibel (dB)	A unitless measure of sound on a logarithmic scale, which indicates the squared ratio of sound pressure amplitude to a reference sound pressure amplitude. The reference pressure is 20 micropascals.
A-Weighted Decibel (dBA)	An overall frequency-weighted sound level in decibels that approximates the frequency response of the human ear.
Maximum Sound Level (L_{max})	The maximum sound level measured during the measurement period.
Minimum Sound Level (L_{min})	The minimum sound level measured during the measurement period.
Equivalent Sound Level (L_{eq})	The equivalent steady state sound level that in a stated period of time would contain the same acoustical energy as a time-varying sound level.
Percentile-Exceeded Sound Level (L_{xx})	The sound level exceeded “x” percent of a specific time period. L10 is the sound level exceeded 10 percent of the time. L90 is the sound level exceeded 90 percent of the time. L90 is often considered to be representative of the background ambient noise level in a given area.
Day-Night Level (DNL or L_{dn})	The energy average of the A-weighted sound levels occurring during a 24-hour period, with 10 decibels added to the A-weighted sound levels occurring during the period from 10 p.m. to 7 a.m.
Frequency: Hertz (Hz)	The number of complete pressure fluctuations per second above and below atmospheric pressure.

Background Information on Wind Turbines and Noise

Operating wind turbines can generate two types of sound: first, the mechanical sound from components such as gearboxes, generators, yaw drives, and cooling fans, and second, the aerodynamic sound from the flow of air over and past the rotor blades. Modern wind turbine design has greatly reduced mechanical sound and it generally can be ignored in comparison to the aerodynamic sound, which is often described as a “swishing” or “whooshing” sound (BLM 2005).

Wind turbines produce a broadband sound; that is, the sound occurs over a wide range of frequencies, including low-frequencies. Low-frequency sounds are in the range of 20 to 100 hertz and infrasonic sound (or infrasound) is low-frequency sound of less than 20 hertz. Compared to higher frequency sound, low-frequency sound propagates over longer distances, is transmitted through buildings more readily, and can excite structural vibrations (for example, rattling windows or doors). The threshold of perception, in decibels, also increases as the frequency decreases. For example, in the frequency range where humans hear best (in the low kilohertz), the threshold of hearing is at about 0 decibel, but at a frequency of only 10 hertz, the threshold of human hearing is at about 100 decibels (Rogers 2006).

Older designs of wind turbines, particularly those in which the blades were on the downwind side of the turbine tower, produced more low frequency sound as a result of the blades passing through more turbulent air as a result of the tower blocking wind flow. Modern, upwind turbines produce a broad band sound emission that includes low-frequency sounds, but not at the levels produced by older wind turbines. A primary cause for low-frequency sounds in modern turbines is the blade passing through the change in air flow at the front of the tower and this can be aggravated by unusually turbulent wind conditions.

The University of Massachusetts at Amherst reported (Rogers 2006) on noise measurements made at four different wind turbines ranging in size from 450 kilowatts to 2 megawatts. The results indicated that at distances of no more than 118 meters (387 feet) from the turbines, all infrasound levels were below human perception levels. The report further states that there is “no reliable evidence that infrasound below the hearing threshold produces physiological or psychological effects.” This lack of effects at levels below the hearing threshold was supported by a scientific advisory panel comprised of medical doctors, audiologists, and acoustic professionals established by the American and Canadian Wind Energy Associations to review wind turbine sound and health effects (Colby et al. 2009). It was also supported by the findings from Canadian and Australian government reviews of available scientific literature (CMOH 2010; Australia NHMRC 2010).

Existing Noise Conditions

Ambient noise monitoring was conducted to establish baseline sound conditions in the area of the proposed wind turbine. Ambient noise monitoring was conducted at three locations indicated in Figure 3-7 and Appendix A, Figure 10. The monitoring sites surround the proposed wind turbine site and were selected to be representative of the residential receptor areas that would be the closest to the wind turbine.



Figure 3-7. Monitoring Sites for Measuring Baseline Sound Conditions and Sound Power Output

Measurements were conducting using Larson-Davis Model 820 Type I sound level meters. Data at each site were collected between the hours of 2 p.m. on Thursday November 11, 2010 and 2 p.m. on Thursday November 12, 2010. Table 3-4 provides a summary of the baseline sound monitoring results.

Table 3-4. Summary of Baseline Sound Monitoring Results in A-weighted Decibels

Monitoring Site	Distance to Turbine Site (feet)	L _{eq} 24 Hours	Hourly L ₉₀ Range	Leq		DNL
				Daytime	Nighttime	
Position 1	1,100	60.2	37.6 to 51.6	61.9	49.0	61.3
Position 2	1,030	52.0	40.5 to 51.0	53.1	47.5	55.4
Position 3	1,010	51.1	36.5 to 49.7	52.2	47.8	55.2

Daytime: 7 a.m. to 10 p.m.

Nighttime: 10 p.m. to 7 a.m.

DNL = Day Night Average Sound Level.

The types of sounds consistently heard in and around the site were car and truck traffic, air conditioning units, trains with whistles, track noise from multiple tracks, and rail lines in every direction around the Fairgrounds. These trains run as much as 40 times a day and 40 times a night (PUCO 2010) with multiple grade crossings where locomotive warning horns are sounded. Other sounds heard during the field monitoring included those from commercial and industrial sources, aircraft associated with the Cleveland Hopkins Airport, insects, birds, and activities at the Fairgrounds, itself.

Noise Guidelines and Regulations

The U.S. Environmental Protection Agency (EPA) identifies noise levels necessary to protect public health and welfare against hearing loss, annoyance, and activity interference in its document, *Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety* (EPA 1974). This document recommends an exterior Day Night Average Sound Level (DNL) of 55 dBA for residential uses. However, this document contains recommendations only and the levels are not Federally enforceable. Furthermore, in 1981, the Federal Government concluded that noise issues were best handled at the State or local government level. As a result, EPA phased out Federal oversight of noise issues to transfer the primary responsibility of regulating noise to the State and local governments. However, EPA recommendations remain useful for assessing the affected environment.

EPA has also evaluated general public response to changes in noise levels. In general, an increase to ambient or average noise levels of 5 decibels would be noticeable to most people and may elicit widespread complaints. An increase of 20 decibels would likely result in vigorous community response. An increase of ambient noise levels of less than 3 dBA is usually considered minute.

The Noise Control Ordinance of the City of Berea does not place specific limits on noise, but rather states that “[n]o person shall unreasonably make, continue or cause to be made or continued, or permit a noise disturbance.”

Direct and Indirect Impacts

Construction of the wind turbine will temporarily result in increased noise and vibration. Operation of the wind turbine would be a permanent source of noise until the turbine was decommissioned.

Construction of the turbine would involve the use of heavy construction including the equipment listed in Table 3-5. Table 3-5 also summarizes typical noise levels produced by this equipment. Lmax sound levels at 50 feet are shown along with the typical acoustic use factor. The acoustic use factor is the percentage of time each piece of construction equipment is assumed to be operating at full power (i.e., its noisiest condition) during construction operation and is used to estimate Leq values from Lmax values. For example the Leq value for a piece of equipment that operates at full power 50 percent of the time (acoustical use factor of 50) is 3 decibels less than the Lmax value.

Table 3-5. Typical Construction Noise Emission Levels

Equipment	Typical Noise Level (L _{max}) ^a	Acoustical Use Factor	Typical Noise Level (L _{eq}) ^a
Compactor (ground)	83	20	76
Dozer	82	40	78
Dump Truck	76	40	72
Excavator	81	40	77
Generator	81	50	78
Grader	85	40	81
Pickup Truck	75	40	71
Warning Horn	83	5	70
Crane	81	16	73

Source: US DOT 2006.

a. A-weighted decibel level, measured at 50 feet.

The three noisiest pieces of equipment likely to operate at the same time include a grader, a dozer, and a generator. Simultaneous operation of this equipment would result in a noise level of 84 dBA (L_{eq}) at 50 feet. Based on the assumed simple geometric attenuation of 6 decibels per doubling of distance, the noise level at the nearest residences (at about 1,000 feet) would be 71 dBA (L_{eq}). Because construction noise would be temporary and intermittent during daytime hours, no adverse effect from construction noise is expected. With regard to vibration, no highly dynamic equipment such as a pile driver would be used. Given this and the fact that residences are about 1,000 feet from the turbine site, no adverse vibration impacts from construction activity would occur.

Agricultural Society has selected the Vestas V-47 wind turbine, and it has several characteristics that reduce aerodynamic sound levels in comparison with other and primarily older wind turbine designs. The Vestas V-47 is an upwind turbine, meaning the turbine faces into the wind and the wind encounters the rotor blades before the tower and the nacelle, which makes for quieter operations than a downwind turbine. It has relatively low rotational speeds and pitch control on the rotors, both of which reduce sound levels. Complete technical information including sound data is provided in Appendix D, Attachment D6 of this EA. Figure 3-8 shows wind turbine noise levels at a wind speed of 8 meters (26 feet) per second as a function of distance from the turbine. These levels include geometric and atmospheric attenuation.

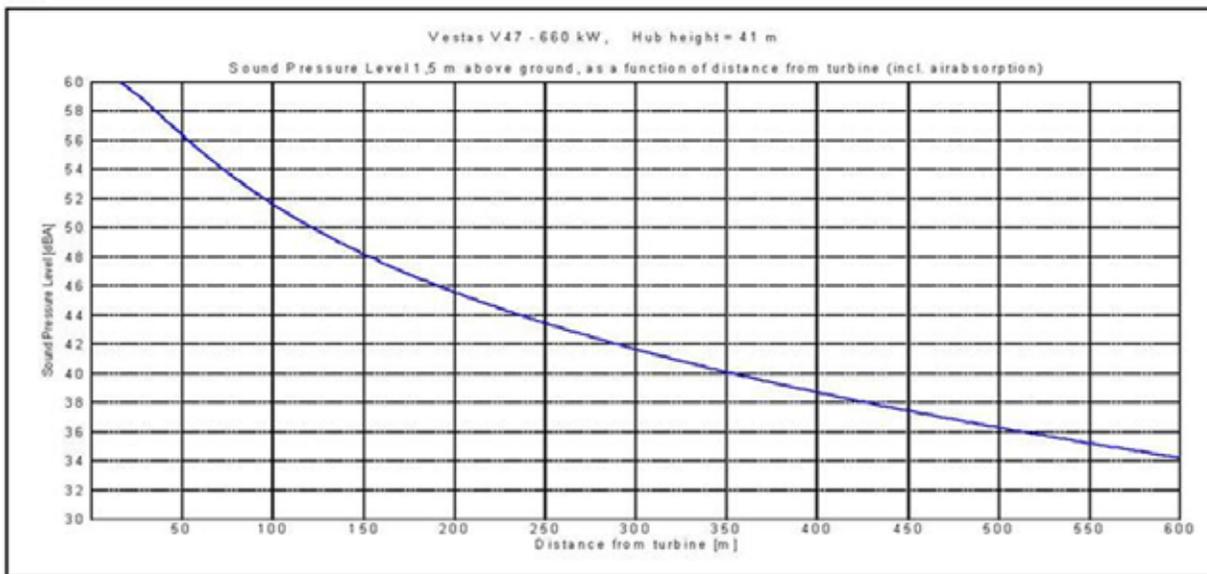


Figure 3-8. Vestas V47 Sound Pressure Level as a Function of Distance

The closest residences are about 1,000 feet from the turbine site. Based on Figure 3-8, the turbine sound level at this distance would be 41.5 dBA. DNL can be calculated from this value assuming that the turbine operates continuously over a 24-hour period. The calculated DNL value at the nearest residences would be 48 dBA.

Since the City of Berea does not have a specific limit on noise, the EPA-recommended sound level of 55 dBA (DNL) is used here. The predicted turbine sound level of 41.5 dBA is below this level.

Figure 3-7 shows that the predicted noise levels on the Fairgrounds closest to the wind turbine would be within the range of 40 to 50 dBA. Turbine sound is likely to occur on the Fairgrounds but is not expected to have an adverse effect because sound levels would be well below the speech interference level (60 to 65 dBA). Ambient noise levels (e.g., crowd noise) would likely be high and would mask turbine noise levels.

Wind turbine noise levels are expected to be at or above many of the hourly L_{90} values measured at each site. Therefore turbine sound may be audible at nearby residences. Audibility does not necessarily mean an adverse noise effect will occur. The magnitude of the increase in noise level relative to ambient noise conditions is evaluated to determine the severity of the noise impact.

An adverse noise impact is considered to occur if the wind turbine noise is predicted to increase the ambient daytime or nighttime L_{eq} value at residences by more than 3 dBA. Tables 3-6 and 3-7 summarize the noise impact analysis.

Table 3-6. Daytime Noise Impact Analysis

Site	Daytime Ambient L_{eq} (dBA)	Turbine Sound (dBA)	Daytime Ambient plus Turbine Sound	Increase (dBA)
1	61.9	41.5	61.9	0
2	53.1	41.5	53.4	0.3
3	52.2	41.5	52.6	0.4

dBA = A-weighted decibel.

Table 3-7. Nighttime Noise Impact Analysis

Site	Nighttime Ambient L_{eq} (dBA)	Turbine Sound (dBA)	Nighttime Ambient plus Turbine Sound	Increase (dBA)
1	49.0	41.5	49.7	0.7
2	47.5	41.5	48.5	1.0
3	47.8	41.5	48.7	0.9

dBA = A-weighted decibel.

The results in Tables 3-6 and 3-7 indicate that operation of the proposed wind turbine would not result in noise increases greater than 3 dBA at residences in the project vicinity. Operation of the proposed wind turbine is not expected to result in an adverse noise impact.

3.2.2.4 Cultural Resources

Cultural resources are archaeological sites, historical structures and objects, and traditional cultural properties. Historic properties are cultural resources that are listed on or eligible for listing on the National Register of Historic Places because they are significant and retain integrity (36 CFR 60.4). Section 106 of the NHPA requires that Federal agencies take into account the effects of their actions on historic properties. Section 101(b)(4) of NEPA requires a Federal agency to coordinate and plan its actions to identify any unique historic or cultural characteristics of the geographic area (40 CFR 1508.27) of the proposed project and act accordingly. Regulations for Protection of Historic Properties (36 CFR Part 800) describe the process for compliance with Section 106, including defining the APE, steps to identifying resources, evaluate effects, and consultation with interested parties including the State Historic

Preservation Officer (SHPO) and other concerned parties regarding the Federal action (Undertaking).

A Section 106 Compliance Report, *Section 106 Compliance Report for Cuyahoga County Agricultural Society Wind Energy Project* for the proposed project was prepared and submitted to DOE and the OHPO in October 2010 and is provided in Appendix E, Attachment E-2. The OHPO issued a response to the October 2010 Section 106 compliance submission on December 10, 2010 requesting additional information on the following: (1) establishment of the area of potential effect (APE) for the Undertaking; (2) inventory and evaluation efforts to identify National Register of Historic Places-eligible properties within the APE; (3) a Finding of Effect, linking the presence of historic properties within the APE with the known impacts associated with the Undertaking; and (4) determination of potential archaeological resources within the area of ground disturbance.

Consulting Party Participation

The Renaissance Group, on behalf of the Agricultural Society, conducted analyses and data retrieval for historic properties located within two miles of the proposed turbine site. This underlying data was reviewed and analyzed by a senior architectural historian who meets the Secretary of the Interior's Professional Qualification Standards (36 CFR Part 61) in architectural History, History or Archeology. The report and The Renaissance Group's underlying technical data was submitted with DOE's cultural/historical resources Section 106 consultation request to OHPO on October 29, 2010. In response to the OHPO's comments regarding the initial Section 106 submission, DOE had a certified historical architect conduct a field visit to address items 1 through 3 listed above. The results of the field survey are included in the supplemental report that was submitted to OHPO on February 1, 2011 (Appendix E, Attachment E4).

According to "Indian Entities Recognized and Eligible to Receive Services" from the U.S. Bureau of Indian Affairs in 72 FR 13648, dated March 22, 2007, there are no Federally recognized tribes in the state of Ohio. There is no Tribal Historic Preservation Officer for the State of Ohio according to the National Association of Tribal Historic Preservation Officers at: www.nathpo.org. However, DOE has provided the Notice of Scoping and NOA to a total of 24 tribal representatives that are regularly notified of Federal actions in Cuyahoga County. To date, none of the tribal representatives contacted has responded to DOE's scoping letter or the Notice of Availability (NOA) for the Draft EA. DOE will continue its outreach to these tribes by providing them with the NOA of this Final EA.

The following organizations were notified of the project through the DOE EA scoping process, were sent a full copy of the Section 106 report and all attachments and were invited to comment on the draft EA:

- Cuyahoga Department of Development
- Cuyahoga County Commissioners
- Cuyahoga County Planning Commission
- Western Reserve Historical Society
- Western Reserve Heritage Association
- Cuyahoga County Fairgrounds Board
- City of Berea

- City of Middleburg Heights
- Berea Historical Society
- Board of Trustees, The Berea Little Red Schoolhouse, Center for the Fine Arts

A complete list of public meetings and newspaper articles related to the proposed project are located in Appendix D, Attachment D3. DOE sent Notice of Scoping postcards and the NOA for the Draft EA (Appendix D, Attachment D5) to Federal, State, and local agencies to solicit comments on the scope of potential environmental issues to be examined in this EA. Discussion of the scoping process and the NOA for the proposed project is provided in Section 1.4.

Archaeological and Aboveground APEs

The direct APE is defined as the area disturbed for construction of a project. However there is no definitive rule for determining an indirect APE for a wind turbine, which can create both visual and audible effects on the adjacent properties (the aboveground APE).

Clarification of the Archaeological APE

The APE determined for archaeological resources focuses on the zone of direct ground disturbance associated with the construction of the proposed project. The installation of the proposed project would result in temporary ground disturbing activities to 1,600 square feet for the turbine foundation (ultimately a 256 square foot permanent footprint). The wind turbine foundation would extend approximately 20 feet below the ground surface.

The direct APE also includes an approximately 2,000 square foot Energy Center building that would be constructed approximately 380 feet north of the turbine site and would receive power directly from the turbine via an underground transmission line. Total excavation for the Energy Center and transmission line would be approximately 4,000 square feet. The final footprint of the Energy Center would be approximately 2,000 square feet.

Clarification of the Aboveground APE

In defining the aboveground APE, both direct and indirect effects were considered. In the initial submission to OHPO, DOE used a conservative 1-mile APE for indirect effects to potentially historic properties. This aboveground APE was developed based on previous wind turbine projects submitted to OHPO that used a 1-mile radius that considered the height of the proposed wind turbine, the surrounding topography, tree cover and urban forest in the vicinity of the proposed tower and simulated visualizations of the proposed wind turbine. Noise and flicker effects are quite localized and would not extend far beyond the Fairgrounds' property, and therefore selection of the indirect APE was based on the visual analysis. The 1-mile APE was initially selected as the maximum distance from which the turbine would be seen (see Appendix E, Attachment E2), and based on previous Section 106 consultations with the OHPO wherein 1-mile seemed acceptable. In determining the APE for indirect effects, the visual character and the setting of the surrounding area was considered, especially the presence of existing industrial towers in the viewshed. A computer-generated visual simulation of the viewshed of the proposed project as it would be viewed from public spaces was analyzed to determine an appropriate APE. This visual simulation, as well as potential impacts on the visual character of the community and the region's associated landscape, is discussed in greater detail in Section 3.2.2.2 of this EA. Based on the visual simulations prepared for the proposed project and the field survey conducted in January 2011 by the certified historian, it was determined that the proposed project turbine

would not be seen from most vantages beyond one half mile due to the developed and urban nature of the area and the urban forest. A detailed analysis of the visual impacts on historic aboveground properties in the APE can also be found in the Section 106 report and the supplemental Section 106 report found in Appendix E, Attachments E2 and E4, respectively.

The likelihood of a clear, unobstructed view of the proposed project beyond one mile is almost non-existent and is unlikely from beyond one half mile. The simulations depict that the proposed wind turbine would be small and diminishes rapidly as one travels farther away from the site. Varied topography, such as elevation changes, and other site-specific characteristics, such as power line corridors, structures associated with human development, tall towers, the tree canopy, and natural areas of dense vegetation, all serve as common visual obstructions that block expansive views of a given project site from various directions. In particular, the extent to which a single turbine dominates the landscape diminishes with distance. Based on the supplemental Section 106 analysis, the aboveground APE for the proposed project was reevaluated relying upon the onsite observations of the historian, the earlier and additional photo simulation, the APE was reduced in size. Based on the foregoing analyses, DOE defined a more-focused rectangular-shaped APE as follows: Waverly Road on the south; Eastland Road on the west; University Road on the north; and Old Oak Road on the east (Figure 3-9).



Figure 3-9. APE for Proposed Project

Identification of Historic Aboveground Properties in the APE

The Fairgrounds are located in the City of Berea, Ohio, and is effectively suburb of Cleveland. Berea has a long history independent of its larger metropolitan neighbor. It was founded in 1836 and the community prospered in the 19th century as a stone working industrial area; and local sandstone was used in much of the city architecture. Because it is an older city, the one half-mile radius indirect APE includes thousands of pre-1960 properties, as well as numerous properties that are listed in the National Register, in the Ohio inventory, or under local landmark ordinances and private lists. Berea is historically sensitive because it has been settled by Euro-Americans for 180 years and there are many buildings that have survived from that period.

Initial 1-mile APE Properties

The old Berea downtown is located approximately 0.8 mile northwest of the fairgrounds, and all existing National Register-listed properties are within this area. Similarly, the vast majority of the properties on the Ohio Inventory are also within the old downtown. Some of the historical properties listed in these areas include: the Berea Historical Museum, sited in a home from the late 1850s; the Victorian Gothic Berea Depot built in 1876, (still a prominent landmark in downtown Berea); Baldwin-Wallace College, a Methodist university dating to the 1840s; and the Rectory for St. Adelbert Church. The old downtown includes a wide array of functional building types from the turn of the last century, including college buildings, the depot, churches, commercial buildings, and a number of older residences. The Berea Historical Society has a “Century Home” program and it installs plaques on residences that are at least 100 years old. It has placed plaques on at least 53 century-plus homes. These are all near old downtown Berea.

The character of the indirect APE is considerably different southwest, southeast, and northeast of the proposed turbine site. The area southwest of the proposed turbine site is a floodplain that historically defined the limits of the old town. There are no National Register, state inventory, or other known designated historic buildings in the southwest area. The region to the southeast is dominated by parks associated with the river. Due east of the proposed turbine site is the community of Middleburg Heights, which was incorporated in 1961, with very few pre-1960 buildings. There are two properties on the Ohio inventory that are located in Middleburg Heights, a house and a barn built in the late 1860s and located across from one another on Eastland Road, almost due south of the turbine site. The northeast is predominantly industrial and Cleveland-Hopkins Airport (the largest airport in Ohio) is several miles northeast of the proposed turbine site. No pre-1960s properties were identified.

The Renaissance Group inventoried all buildings and structures built before 1960, located within a 1.5-mile radius of the project site. A full inventory of these properties is summarized in the October 2010 Section 106 report submitted to the OHPO (Appendix E, Attachment E2).

Five properties listed on the National Register of Historic Places (NRHP) were identified within the 1-mile of the proposed project. However, all of these properties are outside the refined rectangular-shaped APE that is shown in Figure 3-9. None of the properties were found to have specific architectural elements or orientations designed to capitalize on a particular view or viewshed. The nearest NRHP property is the School House District #7 building, located approximately 0.5 miles from the project site. The view of the proposed project from the School House District #7’s building would be blocked by trees and the Berea School (see Appendix B, Attachment B1 Visualization number FG-V-2).

Refined Rectangular APE

The refined APE includes a diverse group of homes, in terms of dates of construction as well as style. The oldest homes are along Eastland Road and the western edges of University and Waverly streets, with a large number of 19th Century residences located there. These are joined, however, by buildings from the 1920s as well as a substantial number of homes from the immediate post-World War II era. Seventy-four buildings within the refined APE were constructed before 1960, and therefore potentially eligible for listing on the National Register of Historic Places. Most of these properties have been modified and only three were determined to be eligible for listing in the National Register of Historic Places. The properties located at 120, 227, and 244 Eastland Road were all determined to be eligible for the national-register by the certified historian (see Appendix E, Attachment E4 for photos and eligibility characteristics).

As part of the field investigation in January 2011, research using data gathered from the Fair Board on the Cuyahoga County Fairgrounds was conducted. The historical data included reliable dates of construction and function for each of the 33 buildings at the Fairgrounds. DOE prepared an inventory and evaluation document and concluded that none of the properties within the Fairgrounds qualify for the National Register, individually or as a group (Appendix E, Attachment E4).

Identification Historic Belowground Properties in APE

There are no National Register-listed properties within the direct APE for this proposed project. The direct APE, as discussed earlier, is the area that would experience ground disturbance for installation of the turbine foundation, associated underground transmission line, and the Energy Center (approximately 4,000 square feet). There are no buildings at the site where the turbine would be constructed, and the only structure in the near vicinity is the grandstands for the racetrack. In terms of potential for buried properties (e.g., archaeological sites), the December 10, 2010, letter from OHPO indicated a need for a pedestrian survey of the immediate construction area. However, such a survey was not possible in December 2010 and January 2011 due to heavy snow cover at the site. During construction a certified archeologist will be on site to survey the area. Background research conducted as part of the supplemental Section 106 report showed little about the use of the specific site, except that it has been used by the Fair Board since the property was acquired in the 1890s. The infield area where the turbine would be installed has been used for rodeo events, concerts, demolition derbies, and other entertainment venues for more than a century. The Energy Center site would be about 300 feet from the racetrack and has been part of the Fairgrounds parcel since the 1890s.

Direct and Indirect Impacts

As discussed in Section 3.2.2.3, no eligible or listed property adjacent to the proposed project site would be adversely affected by noise above or near the local ordinance levels or above the existing ambient levels. Also, no eligible or listed property adjacent to the proposed project site would receive shadow flicker (see Section 3.2.2.2).

Based on the information provided herein and through consultation with the OHPO, no direct impacts (ground-disturbing impacts) on listed or potentially listed historic properties or cultural resource are anticipated. However, as part of the DOE's ongoing Section 106 Consultation, OHPO recommended that a Phase 1 survey be conducted within the area of ground disturbance for the Energy Center. In light of this recommendation, prior to ground disturbing activities, the

Agricultural Society has committed to a preparation of a Phase 1 survey for archaeological resources that would be conducted by a qualified archaeologist and submitted to the OHPO for their review. If archaeological resources are discovered as part of the survey, an appropriate treatment plan would be developed in consultation with OHPO in accordance with the NHPA.

Visual impacts to historic properties are diminished greatly by the three variables which affect the potential for such impact: distance from the source; intervening barriers, and the degree to which the significance of historic properties depends upon an unobstructed setting. The greatest concentration of historic properties, located in old downtown Berea, is sheltered by distance and intervening barriers, including buildings and trees. Most of the old downtown is 0.75 to 1 mile from the proposed turbine site. The areas in which the proposed turbine may be most clearly seen, a business park to the northeast, has no historic properties. The results of the Visual Simulation indicate that the turbine would be most visible within a 0.5 mile radius of the proposed turbine site and most noticeable to the hospital and business park, neither of which are historic properties. DOE’s historian concluded that there were three National-Register eligible properties within the designated rectangular-shaped indirect APE. However, in OHPO’s letter of concurrence issued February 10, 2011 (Appendix E, Attachment E1), it indicated that none of these three properties met the NHPA Criteria for placement on the National Register of Historic Places. Therefore, DOE has concluded that the proposed project would result in No Adverse Effect to any historic properties within the APE (Appendix E, Attachments E2 and E4).

3.2.2.5 Geology and Soils

According to the Natural Resources Conservation Service, the majority (63 percent) of the soil found within the project site consists of Mahoning silt loam and Bogart loam (see appendix D, Attachment D9). Table 3-4 shows a complete list of soils present within the project site. No soils listed by the U.S. Department of Agriculture as prime farmlands or unique or rare soils exist within the project site (see Appendix D, Attachment D9).

Table 3-8. Cuyahoga County, Ohio Project Site Soil Comparison

Map Unit Symbol	Map Unit Name	Acres in Area of Interest	Percent of Area of Interest
BgB	Bogart loam, 2 to 6 percent slopes	15.6	11.0
Ct	Condit silty clay loam	13.4	9.5
HaA	Haskins loam, 0 to 2 percent slopes	1.4	1.0
HbA	Haskins-Urban land complex, nearly level	13.3	9.4
JtA	Jimtown loam, 0 to 3 percent slopes	6.3	4.5
MgA	Mahoning silt loam, 0 to 2 percent slopes	73.1	51.7
MgB	Mahoning silt loam, 2 to 6 percent slopes	9.1	6.5
MmB	Mahoning-Urban land complex, undulating	9.0	6.4
Totals for Area of Interest		141.4	100.0

Direct and Indirect Impacts

Site preparation and project construction would result in soil disturbance. As part of the proposed project construction, approximately 2,000 square feet of current open space would be temporarily disturbed for the turbine foundation. Construction of the Energy Center and electric transmission line would temporarily disturb 4,000 square feet, with the permanent development

footprint of approximately 2,000 square feet for the Energy Center and 256 square feet for the wind turbine foundation. Overall, ground-disturbing activity would be less than 1 acre, thus would not require an NPDES Storm Water Program Permit. However, the Agricultural Society has committed to using sediment and erosion pollution control BMPs in conformance with a plan specific to the proposed project.

3.2.2.6 Biological Resources

Biological resources include native or naturalized plants and animals and the habitats that support their various life stages. Species that are considered sensitive, either under pertinent Federal or state government agencies, are specifically addressed in this section.

Project Site

The proposed project site consists of approximately 100 acres of primarily disturbed land that is mowed grass, unvegetated exposed dirt and paved areas with several outbuildings and a grandstand, all of which is regularly used for various Fairgrounds events. The greater surrounding area is mainly suburban and urban development that is part of the Cleveland Metropolitan area. However, a 12-acre isolated wooded lot is located adjacent to the proposed project site approximately 750 feet east, with other scattered trees/wooded areas located south of the project site. The wooded areas surrounding the site are not contiguous with larger wooded tracts and there are no streams within 1,000 feet.

State- and Federally Listed Species

Information regarding the potential occurrence of Federally listed species was reviewed using the USFWS Endangered Species website and a list of potentially occurring listed species for Cuyahoga County, Ohio (USFWS 2010). Species with potential to occur in Cuyahoga County include Indiana bat (*Myotis sodalis*), Kirtland's warbler (*Dendroica kirtlandii*) and Piping plover (*Charadrius melodus*).

Kirtland's warblers are known to migrate along the Lake Erie shoreline counties (Ashtabula, Cuyahoga, Erie, Lake, Lorain, Lucas, Ottawa, Sandusky counties) through Ohio in late April-May and late August-early October. The Lake Erie shoreline also provides habitat for piping plover. The project site lies over 8 miles south of the Lake Erie shoreline and does not provide suitable habitat for either of these species.

The project site lies within the range of Indiana bat and there is a known occurrence of Indiana bat approximately 4.5 miles away. Indiana bat are known to utilize wooded lots for foraging, roosting and maternity colonies. The wooded areas surrounding the site are not contiguous with larger wooded tracts and there is no riparian corridor within 1,000 feet. There is no suitable roosting or hibernacula habitat on the project site and no known or suspected hibernacula is located within 20 miles of the project site (see Appendix C, Attachment C4).

ODOW, a division under ODNR, was contacted to complete a review of the proposed project and the proposed project's potential to impact state-listed species that may occur in the vicinity of the proposed project. According to their letter regarding the proposed project dated August 27, 2010, ODNR conducts their review "by an interdisciplinary team within ODOW in accordance with its authority under the *Fish and Wildlife Coordination Act* (48 Stat. 401, as

amended; 16 U.S.C. 661 *et seq.*), NEPA, the *Coastal Zone Management Act*, Ohio Revised Code, and other applicable laws and regulations: (Appendix C, Attachment C1)

ODOW responded with information concerning the proposed project's potential impacts on wildlife species on August 27, 2010 (Appendix C, Attachment C1) and stated that the ODOW Ohio Biodiversity Database did not contain data for the project site. ODOW also determined that the project site lies within the range of the Indiana bat (both State- and Federally listed as an endangered species), and an occurrence of an Indiana bat was documented just over 4 miles away from the project site. Their letter stated that Indiana bat habitat consists of suitable trees that include dead and dying trees of the species listed below with exfoliating bark, crevices, or cavities in upland areas or riparian corridors and living trees of the species listed below with exfoliating bark, cavities, or hollow areas formed from broken branches or tops. ODOW identified the following species of trees as having relatively high value as potential Indiana bat roost trees: shagbark hickory (*Carya ovata*), shellbark hickory (*Carya laciniosa*), bitternut hickory (*Carya cordiformis*), black ash (*Fraxinus nigra*), green ash (*Fraxinus pennsylvanica*), white ash (*Fraxinus americana*), shingle oak (*Quercus imbricaria*), northern red oak (*Quercus rubra*), slippery elm (*Ulmus rubra*), American elm (*Ulmus americana*), Eastern cottonwood (*Populus deltoides*), silver maple (*Acer saccharinum*), sassafras (*Sassafras albidum*), post oak (*Quercus stellata*), and white oak (*Quercus alba*).

The project site also lies within the range of the bald eagle (*Haliaeetus leucocephalus*), a State-listed threatened species. However, ODOW determined that the Ohio Biodiversity Database currently has no records of this species near the project site.

The project site is within the range of the Canada darner (*Aeshna canadensis*), a State-Listed endangered dragonfly. This species is highly mobile and may or may not be in the vicinity of the proposed project.

The project site is within the range of the black bear (*Ursus americanus*) and the bobcat (*Lynx rufus*), both of which are State-listed endangered species. The project site is developed and is surrounded by urban and suburban uses and is not likely suitable habitat for either of these species.

The project site is within the range of the golden-winged warbler (*Vermivora chrysoptera*), a State-listed endangered bird; the king rail (*Rallus elegans*), a State-listed endangered bird; and the yellow-bellied sapsucker (*Sphyrapicus varius*), a State-listed endangered bird. The proposed project site is a developed area and is surrounded by urban and suburban uses and does not contain suitable habitat for any of these species.

Migratory Birds and Bald Eagle

The *Migratory Bird Treaty Act* (16 U.S.C. 703-7012; MBTA) implements four treaties that provide for international protection of migratory birds. The MBTA prohibits taking, killing, possessing, transporting, and importing migratory birds, their eggs, parts, and nests, except when specifically authorized by the U.S. Department of the Interior. While the MBTA has no provision for allowing unauthorized take, USFWS recognizes that some migratory birds may be taken during activities such as wind turbine operation even if all reasonable measures to avoid a take have been implemented.

Bald and golden eagles are included under the MBTA, and are afforded additional legal protection under the *Bald and Golden Eagle Protection Act* (16 U.S.C. 668-668d). In its letter dated September 18, 2009, USFWS indicated that no bald eagle nests exist within 5 miles of the project site and that the project area does not appear to support suitable bald eagle habitat (e.g., mature woods, ponds, streams). Therefore, bald eagles are not likely to regularly occur in the project area (see Appendix C, Attachment C2). In a subsequent letter from the USFWS dated September 2, 2010, they noted that an eagle nest does exist within 5 miles, but that it is approximately 4.5 miles away (see Appendix C, Attachment C3).

The proposed project site is located in an area that is predominantly developed with urban and suburban, residential and commercial development, which does generally provide highly suitable nesting habitat for migrating birds. Portions of the Audubon-designated Rocky River East Branch Important Bird Area (IBA) are approximately 1 mile west of the proposed turbine location. The Rocky River East Branch IBA runs north and south and is within the greater Cleveland area and Rocky River Reservation parklands, which are located in the municipalities of Berea, Brook Park, Cleveland, Fairview Park, Lakewood, North Olmsted, Olmsted Township, and Rocky River. The Rocky River East Branch IBA consists of the watershed for the East Branch of the Rocky River, which extends from Hinckley to North Olmsted and then north to the mouth of the river in Lake Erie near downtown Cleveland. The valuable forests and wetlands of Rocky River, Mill Stream Run, and Hinckley reservations are all part of the Rocky River East Branch IBA. The project site is closest to Mill Stream Run, located midway along the IBA, which stretches over 30 miles. Mill Stream Run is surrounded on both sides by urban and suburban development.

USFWS indicated in its letter that one bald eagle nest is located approximately 4.5 from the proposed project site and that the project site does not provide suitable habitat.

Vegetation

As part of the Energy Center construction it was determined that tree removal may be necessary. A Tree Survey was conducted to determine the need for tree removal and any protective measures that may be required for trees that were in close proximity to construction activities, but could be avoided (Appendix D, Attachment D10). The tree survey examined a total of seven trees that were located within or in close proximity to the construction area. Species of trees identified in this area included: three silver maple (*Acer saccharum*), two red maple (*Acer rubrum*), one river birch (*Betula nigra*), and one shagbark hickory (*Carya tomentosa*). The report noted health and vigor, size of the trees as well as their potential to be affected by construction. The large silver maple was noted to be in poor health and two of the red maples were determined to be in fair health. The remaining trees were noted as being in excellent condition.

Direct and Indirect Impacts

Federal- and State-Listed Species

ODOW indicated in the letter to the recipient that the Ohio Biodiversity Database currently has no records of bald eagle near the project site. Based on the lack of records for bald eagle near the project site, therefore the proposed project is not anticipated to affect this species. Although the project site lies within the range of the Canada darner, ODOW concluded that, due to the mobility of this species, the proposed project is not likely to affect this species. The project site

is also within the range of the black bear and bobcat. However, ODOW concluded that, due to the mobility of these species, the proposed project is not likely to have an impact on these species.

Although the project site is within the range of the golden-winged warbler, the king rail and the yellow-bellied sapsucker, ODOW concluded that, due to the location of the project site and the habitat requirements of these species, the proposed project is not likely to affect these species.

An initial letter sent to the recipient in September 2009 from the USFWS (Appendix C, Attachment C2) indicated that the proposed project would have no effect on Indiana bat based on lack of suitable habitat at the project site. In a subsequent letter sent to the DOE in September 2010 (Appendix C, Attachment C3), the USFWS indicated that although the project site did not provide suitable habitat for Indiana bat, that it was within 1,000 feet of a wooded lot, which, based on new information, may be considered suitable habitat for Indiana bat. Additional information was provided to the USFWS by the project proponent regarding the project site and specifics related to the urban nature of the area surrounding the project site and the lack of contiguous other habitat with the wooded lot, which is located approximately 750 feet east of the turbine site. In a letter received in November 2010, the USFWS concluded that, based on the additional information and due to the lack of suitable habitat on the project site and the fact that the proposed project is a single small turbine, take of Indiana bat as a result of the proposed project was extremely unlikely and the project was not likely to adversely affect this species (Appendix C, Attachment C4).

The USFWS also concluded that due to the project type, size and location, it did not anticipate any impact on the piping plover. For these same reasons, the proposed project would not adversely affect Kirtland's warbler.

Migratory Birds and Bald Eagle

Bald eagles are not anticipated to be affected by the proposed project. Additionally, as part of turbine siting, and design and installation of the Proposed Action, the Agricultural Society gave consideration to the recommendations contained within the *Interim Guidelines to Avoid and Minimize Wildlife Impacts from Wind Turbines* (USFWS 2003) and incorporated those recommendations, including them as Project Proponent Committed Measures as appropriate, to avoid and minimize potential impacts on migratory birds and bald and golden eagles. The proposed project consists of a single wind turbine located in already disturbed and urbanized habitat. The proposed turbine design is a monopole, no external features are proposed to the design, and all electric lines would be placed underground. The area around the project site is developed and does not provide significant bird habitat nor would the proposed project fragment any such habitat. Although the proposed project site lies approximately 1 mile west of an Audubon-designated IBA, the area between the IBA and the project site is developed and does not contain suitable nesting or stopover habitat for migratory birds (with the exception of a few scattered large trees within the developed area). The proposed project would not require temporary access roads or excavation for staging areas, as the site is predominantly devoid of vegetation, including asphalt areas that are used for the fair and other venues. Aviation lighting would utilize the minimum required by FAA in order to minimize potential bird and bat impacts. Impacts on migratory birds as a result of the proposed project are not anticipated to be significant.

The USFWS concluded that the nearest bald eagle nest is approximately 4.5 miles away, but the project site did not provide high quality bald eagle habitat and that the rotor sweep of the single wind turbine was small, therefore, it did not anticipate take of bald eagles as a result of the proposed project (see Appendix C, Attachment C4).

Vegetation

All construction activities would occur on Fairgrounds property on previously disturbed areas and there would be no effects to ground vegetation. However, a total of three trees would be removed for construction of the Energy Center, including, one 41 foot tall silver maple which was determined to be in poor health would be removed prior to construction activities. Additionally, two nine foot tall red maples would be removed prior to construction activities. Two other trees were recommended for protective measures during construction, a 12-foot river birch and 26-foot shagbark hickory.

Tree removal would occur in accordance with the ODOW requirement that all trees are to be cut down between September 30 and April 1 or a mist net survey be conducted if tree removal occurs between April 2 and September 29. All other trees would be either avoided or protected during construction activities and are not anticipated to be affected as a result of the proposed project. These measures are included in Section 2.4 Applicant Committed Measures. Based on implementation of the foraging, there would be minimal impacts to vegetation would result from the proposed project.

3.2.2.7 Human Health and Safety

Workers have the potential to be injured or killed during construction, operation, and decommissioning of wind turbines through industrial accidents such as falls, fires, and dropping or collapsing equipment. Such accidents are uncommon in the wind industry and are avoidable through implementation of proper safety practices and equipment maintenance.

Collapse of a turbine or breakage (and throwing) of one or more turbine blades is possible, but both are very unlikely occurrences. Debris falling from these occurrences would likely be limited to a calculated fall zone, which is defined to approximate the area around the base of the turbine that would likely receive the tower and turbine if it were to fall. Estimates of blade throw vary, but MacQueen, et al., (1983) estimate the probability of being struck outside of the fall zone (i.e., within one blade diameter of the tower base) is about 10^{-7} per year for a fixed building, and substantially less for people who are mobile. The fall zone for the proposed project was determined to be 301 feet, well short of the nearest receptor which is approximately 940 feet to the north (see Appendix A, Figure 3).

Another potential source of accidents is ice shedding. Ice shedding, or ice throw, refers to the phenomenon that can occur when ice accumulates on rotor blades and subsequently breaks free or melts and falls to the ground. Although a potential safety concern, it is important to note that, while more than 90,000 wind turbines have been installed worldwide, there has been no reported injury caused by ice thrown from a turbine (Tetra Tech EC, Inc. 2007).

A study conducted for the National Renewable Energy Laboratory was successful in identifying damage mechanisms due to direct and indirect effects of lightning strikes on wind turbines.

Lightning strikes can cause extensive damage to the turbine blades, controllers, and power electronics (NREL 2002). However, this damage can be reduced by protection from tall nearby communication towers, integral blade protection in the form of conductors, bonding to minimize arcing, good turbine grounding, controller cable and controller shielding, and transient voltage surge suppression. The amount of lightning damage is a factor of the lightning activity in the area, the height and prominence of the turbine, the terrain, and the lightning protection system in place. According to the National Oceanic and Atmospheric Organization, Ohio has mid-range lightning activity (between 40 and 50 annual thunderstorm days).

The Agricultural Society has no plans of installing a fence around the turbine pedestal. However, during construction, the site would be secured as described in the *Turbine Use, Safety Policies and General Background* document (see Appendix D, Attachment D7). In addition, the Vestas V-47V47-660 kW does not allow opportunities for outside climbing.

Because no fuel is used in wind energy projects, there would be no process waste streams generated during operation of the wind turbine that could cause health and safety concerns. Some lubricants are used in wind turbines, including gearbox oil, hydraulic fluid, and gear grease, that require periodic replacement. These lubricants would be managed in accordance with Federal and state regulations.

According to FAA, the Cleveland Hopkins International Airport in Cleveland, Ohio, is located 2.67 nautical miles north of the project site.

The term electromagnetic fields (EMF) refers to electric and magnetic fields that are present around any electrical device. Electric fields arise from the voltage or electrical charges and magnetic fields arise from the flow of electricity or current that travels along transmission lines, collector lines, substation transformers, house wiring, and electrical appliances. The intensity of the electric field is related to the voltage of the line and the intensity of the magnetic field is related to the current flow through the conductors (wire). EMF can occur indoors and outdoors. While the general consensus is that electric fields pose no risk to humans, the question of whether exposure to magnetic fields potentially can cause biological responses or even health effects continues to be the subject of research and debate. However, wind turbines are not considered a significant source of EMF exposure since emissions levels around wind farms are low (CMOH 2010).

Direct and Indirect Impacts

No adverse public security impacts are anticipated due to the proposed project. Safety signage would be posted around the tower (where necessary); transformers and other high-voltage facilities would be in conformance with applicable Federal and state regulations and no residences or buildings that are not part of the Fairgrounds are located within the 301 foot fall zone.

All contractors, subcontractors, and their personnel are required to comply with all Federal and state worker safety requirements, specifically all of the applicable requirements of OSHA. Safety procedures specific to the Vestas V47-660 kW turbine would be observed whenever work is being done on the turbine.

The soil sample collected as part of the initial soil field and laboratory study exhibited concentrations of volatile organic compounds, semivolatile organic compounds, and metals well below Ohio Voluntary Action Plan standards. Therefore, excavation of the soils would pose no risks to contractor health or to the environment in general (PSI 2009).

The turbine system would have an automated system fault shut-off triggered at a minimum by the following sensors: System temperature, power quality, vibration, over-speed, fire and icing (vibration caused by blade icing induced imbalances would automatically shut down the turbine). This system would also automatically send fault codes to preauthorized personnel through a “Web” interface. The turbine’s nacelle would have a cold-weather package including nacelle heaters. These heaters are designed to maintain nacelle temperatures above the dew-point and well above freezing. This system would automatically melt snow and ice accumulation on top of the nacelle. The turbine system would have a staff accessible emergency shut-offs. All icing related turbine shutdowns would require a direct inspection and an onsite manual restart. The site personnel and the system maintenance personnel would shut down the turbine during icing conditions. The site would adopt an ice safety zone around the turbine for implementation during icing events, if they should occur.

The FAA has issued a Determination of No Hazard to Air Navigation July 6, 2010 for the proposed project (Appendix C Attachment C6). Based on this determination, the proposed project is not anticipated to have a substantial adverse effect on the safe and efficient utilization of navigable airspace by aircraft or on the operation of air navigation facilities. Aviation lighting would be in compliance with FAA standards (FAA 2007). The proposed turbine’s proximity to the Cleveland Hopkins International Airport was considered and found to be acceptable.

Based on the most current research on EMF, the turbine would have no impact to public health and safety due to EMF.

3.2.2.8 Transportation

The project site is served locally by Bagley Road, Eastland Road, and Bagley Drive. Access to the interstate transportation system is available via the nearby interchange with I-71 less than 1 mile to the west. No new access or other roads would be necessary for construction and operation of the proposed project. Construction equipment would travel to the project site via I-90 and I-71 (see Appendix D, Attachment D8).

Direct and Indirect Impacts

During the construction phase of the proposed project, a minor increase in vehicular traffic on the local roads surrounding the project site is anticipated. This traffic increase would occur for a period of approximately 6 to 8 weeks throughout the course of construction. No long-term or permanent impacts on the local transportation systems would occur as a result of this project. No new access or other roads would be required for construction and operation of the proposed project. Heavy equipment traffic would be spread through the initial construction phase and likely limited to two to three weeks of cumulative days where this type of traffic would occur (cement trucks, excavation equipment, delivery trucks and possibly a small crane). Other project traffic would be construction worker commuter vehicles such as pickup trucks and cars for

approximately 2 to 10 workers per day. No long-term or permanent impacts on the local transportation systems would occur as a result of the Proposed Action.

3.2.2.9 Socioeconomics and Environmental Justice

Executive Order 12898 (February 11, 1994) directs Federal agencies to identify and address “disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations.” The racial makeup of Cuyahoga County in the 2000 census was 66.7 percent white, compared to 84.7 percent for the state of Ohio as a whole, with the remainder of both populations constituting minorities. The median household income in dollars for a household in Cuyahoga County in 2008 was \$44,324, compared to \$48,011 for the state of Ohio as a whole. About 15.9 percent of individuals were below the poverty level in 2008, compared to 13.3 percent for the state of Ohio as a whole (Bureau of the Census 2010).

Direct and Indirect Impacts

No potential high and adverse impacts related to socioeconomics or environmental justice would occur as a result the proposed project. Therefore, there would be no disproportionately high and adverse socioeconomics- or environmental justice-related impacts on minority populations and low-income populations.

The construction of the proposed project is expected to generate short-term and small increase in employment due to temporary construction related jobs for both the wind turbine and Energy Center construction. Operation of the proposed project is anticipated to generate approximately 0.5 full time job as most of the building operations will be volunteer driven. Additional revenue due to the presence of the wind turbine may be experienced due to both its tourist attraction and educational value.

3.2.2.10 Air Quality and Climate Change

The affected air environment can be characterized in terms of concentrations of the criteria pollutants carbon monoxide, sulfur dioxide, particulate matter, nitrogen dioxide, ozone, and lead. EPA has established National Ambient Air Quality affected environment and environmental impacts standards for these pollutants. There are two standards for particulate matter, one for particulates with an aerodynamic diameter less than or equal to a nominal 10 micrometers and one for particulates with an aerodynamic diameter less than or equal to a nominal 2.5 micrometers (PM_{2.5}). According to the Northeast Ohio Area-wide Coordinating Agency (NOACA 2005), Cuyahoga County, Ohio, is located in a nonattainment area for PM_{2.5}. The EPA has found that the “aggregate group of the well-mixed greenhouse gases” constitutes an air pollutant that contributes to climate change (EPA 2009).

Electricity is provided to the Fairgrounds by First Energy Solutions. First Energy Solutions currently has a mix of fuel sources (Table 3-9). First Energy Solutions reports an average estimated Grid Line Loss of 6.14 percent, resulting in higher realized grid power offsets for renewable energy generating sites than their actual onsite production (EPA 2010b).

Table 3-9. First Energy Fuel Mix and Emissions

Source Fuel Mix (percent)	
Coal	72.8
Oil	0.4
Natural Gas	2.7
Nuclear	22.3
Renewable	1.1

Direct and Indirect Impacts

The proposed project would essentially be an emissions-free energy generation project that would not degrade air quality. Grading and construction for the proposed project would result in short-term air quality impacts, such as dust generated by clearing and grading activities, exhaust emissions from gas- and diesel-powered construction equipment, and vehicular emissions associated with the commuting of construction workers. Emissions from construction would be minimized to the extent practicable (for example, by watering dry exposed or excavated dirt areas).

The proposed project is expected to generate approximately 861,890 kilowatt-hours per year, offsetting nearly 100 percent of electricity used by the Fairgrounds, which is currently provided by First Energy Solutions. The proposed project would not result in any adverse impacts on air quality and would reduce the reliance on and emissions from fossil fuels for electricity for the Fairgrounds. The proposed project would not require any air permits.

The information reported from the EPA's eGRID database for calendar year 2005 shows the fuel mix for the Cleveland area as 72.8 percent coal, 2.7 percent natural gas and 0.4 percent oil resulting in 75.9 percent fossil fuel use (EPA 2010a). Therefore, the project carbon reduction is calculated as follows:

75.9 percent fossil fuel use × 2.0562 pounds of carbon dioxide per kilowatt-hour
 × 861,890 kilowatt-hours per year = 1,345,511 pounds of carbon dioxide per year.
 The proposed project would reduce the Fairgrounds' carbon footprint by reducing its reliance on fossil fuels.

3.2.2.11 Utilities and Energy

The Fairgrounds are well served by utility infrastructure, including electric power transmission and municipal potable water and sanitary sewer. Electricity is provided to the Fairgrounds by First Energy Solutions and the Illuminating Company; municipal sewer is provided by Northeast Ohio Sewer District; and electric and solid waste removal is provided by Allied.

The National Telecommunications and Information Administration (NTIA) is responsible for managing the Federal spectrum and is involved in resolving technical telecommunications issues for the Federal government and private sector. This information aids in siting wind turbines, so they do not cause interference in radio, microwave, radar, and other frequencies, disrupting critical lines of communication. Upon submittal by a wind project proponent, the NTIA provides project specific information to the members of the Administration's Interdepartment Radio

Advisory Committee for review and comment on whether the proposed project could potentially interfere with Federal radio communication links. On August 30, 2010 DOE received a letter from American Tower Corporation, a telecommunications company that owns a tower close to the proposed project, stating that they objected to the wind turbine at the proposed location (Appendix D, Attachment D2).

A Microwave Study was performed in October 2010 for towers and radio frequency facilities licensed by the Federal Communications Commission near the proposed project site. No microwave paths of transmission of Commission-licensed facilities were found to be within the microwave path of the proposed turbine. The closest radio frequency facilities are 0.17 mile and 0.88 mile away (Appendix D, Attachment D11) owned by Verizon Wireless and Sprint Wireless, respectively.

Direct and Indirect Impacts

The electrical grid interconnect of the proposed project would be composed of the turbine's controller (contained within the turbine tower-based section), approximately 300 feet of buried 4-inch electrical conduits, including the portions of the run embedded within the turbine tower foundation, a 690- to 12,470-volt transformer, an automatic disconnect switch, a UL1741-compliant monitoring and control device and a fused disconnect within the Fairgrounds' existing switchgear. The system would also have a parallel run of 2-inch conduit for data transfer and control runs. The full system would meet all local, State, and Federal codes and regulations.

The proposed project would have a capacity of 660 kilowatts and generate approximately 861,890 kilowatt-hours per year on average, or enough electricity to supply up to 78 homes each year (DOE 2010). The energy generated from the proposed project would meet nearly 100 percent of the Fairgrounds' annual electricity needs. The proposed project is anticipated to produce a total of 17,237,800 kilowatt-hours of clean electricity for the 20-year design life of the project. The Energy Center would be directly connected to the turbine and it is anticipated that it would be powered by the proposed turbine. Alternate electric power, if necessary and all other utilities for the Energy Center would be supplied by the existing utilities serving the Fairgrounds.

The proposed project would not result in any adverse energy impacts and would reduce carbon emissions by 1,345,511 pounds of carbon dioxide per year and allow the Agricultural Society to meet its objective to reduce its carbon footprint.

On October 19, 2010 NTIA issued a letter indicating that no Federal agencies identified any concerns regarding the blockage of their radio frequency transmissions (Appendix C, Attachment C7). No microwave communications exist in the areas surrounding the proposed project site. It is not expected that the proposed project would interfere with the existing telecommunications tower located at the Fairgrounds.

Although American Tower expressed potential concerns to the siting of the wind turbine at this location, the Microwave Study did not find that there would be any direct interference with these transmitting stations.

3.3 Irreversible/Irretrievable Commitment of Resources

A commitment of resources is irreversible when its primary or secondary impacts limit the future options for a resource or limit those factors that are renewable only over long periods of time. Examples of nonrenewable resources are minerals, including petroleum. An irretrievable commitment of resources refers to the use or consumption of a resource that is neither renewable nor recoverable for use by future generations. Examples of irretrievable resources are the loss of a recreational use of an area. While an action may result in the loss of a resource that is irretrievable, the action may be reversible. Irreversible and irretrievable commitments of resources are primarily related to construction activities.

For the proposed project, resources consumed during construction of the project, including labor, fossil fuels and construction materials, would be committed for the life of the project. Nonrenewable fossil fuels would be irretrievably lost through the use of gasoline- and diesel-powered construction equipment during construction. Approximately 256 square feet of land would be irreversibly committed for the wind turbine foundation and approximately 2,000 square feet for the Energy Center during the functional life of the project. The expenditure of ARRA funding from DOE would also be irreversible.

3.4 Unavoidable Adverse Impacts

Unavoidable adverse impacts associated with the proposed project include:

- Long-term loss of approximately 2,500 square feet of vegetation resulting from the construction of the tower foundation and Energy Center
- Removal of one silver maple and two red maple trees
- A minimal increase in noise levels during construction and operation
- Introduction of an additional vertical element into the existing viewshed
- Minimal shadow flicker impacts for the adjacent horse racetrack
- A risk of tower collapse within 684 feet of the tower

These impacts are both temporary, in the case of the construction noise, and long-term, in regard to the loss of vegetation, visual and shadow flicker impacts, and the risk of tower collapse. Overall, impacts of the proposed project on the environment and human health would be minimal.

3.5 The Relationship Between Local Short-Term Uses of the Human Environment and the Maintenance and Enhancement of Long-Term Productivity

Short-term use of the environment, as the term is used in this document, is that used during the life of the project, whereas long-term productivity refers to the period of time after the project

has been decommissioned, the equipment removed, and the land reclaimed and stabilized. The short-term use of the project area for the proposed project would not affect the long-term productivity of the area. If it is decided at some time in the future that the project has reached its useful life, the turbine, tower, and foundation could be decommissioned and the site reclaimed and revegetated to resemble the pre-disturbance conditions (mowed grass). The installation of a wind turbine at this site would not preclude using the land for purposes that were suitable prior to this project.

4. CUMULATIVE IMPACTS

Cumulative impacts are those potential environmental impacts that result “from the incremental impact of the action when added to other past, present, or reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time” (40 CFR 1508.7).

4.1 Reasonably Foreseeable Projects

DOE considered other proposed wind turbine projects for which ARRA grants have been sought in Ohio, as well as the proposed 20-megawatt offshore wind turbine project in Lake Erie anticipated to begin construction in 2012, in connection with this project with respect to potential cumulative impacts. According to the Ohio Siting Board (<http://www.opsb.ohio.gov/Opsb/>), there are three other proposed wind turbine projects in Ohio, all located from 130 to 210 miles from the project site. The following is a list of ARRA SEP-awarded project. Specific locations are shown in Appendix A, Figure 10. NEPA documentation related to these projects is available on the DOE Golden Field Office Reading Room website at http://www.eere.energy.gov/golden/Reading_Room.aspx.

Green City Growers Wind Development – DOE/EA-1817

(Notice of Scoping issued august 2010)

1.5-megawatt wind turbine

Inner City of Cleveland Greenhouse 55th St. and Woodland Ave, Cleveland, Ohio 44104

Archbold Area Schools Wind Energy Project – DOE/EA-1820

(Draft EA issued January 2011)

500-kilowatt wind turbine

600 Lafayette Street, Archbold, Ohio 43502

Toledo Joint Apprenticeship and Training Committee – Categorical Exclusion

(Issued February 2010)

100-kilowatt wind turbine

803 Lime City Road, Rossford, Ohio, 43460

Lincoln Electric – DOE/EA-1777

(Final EA and FONSI issued August 2010)

2.5-megawatt wind turbine

22800 St. Clair Ave, Euclid, OH

City of Toledo – EA

(Project is in the early design phase)

1- megawatt Wind Turbine at Collins Park Wastewater Treatment Facility

Toledo, Ohio

Kilowatts for Kenston – DOE/EA-1819

(Draft issued January 2011)

600-kilowatt wind turbine
9500 Bainbridge Road, Chagrin Falls, Ohio 44023

Pettisville Local Schools Wind Energy Project – DOE /EA-1818
(Draft EA issued February 2011)
500-kilowatt wind turbine
232 Summit Street, Pettisville, Ohio 43553

Each of the DOE-funded projects includes the construction and operation of a single turbine. Two are located in Cuyahoga County. The closest, Green City Growers Wind Development Project, is approximately 13 miles northeast of the Fairgrounds site, and Lincoln Electric is approximately 22 miles northeast of the site. The Kilowatts for Kenston project, located in Geauga County, is approximately 32 miles northeast of the Fairgrounds. The Cuyahoga County Fairgrounds project, Green City Growers, and Lincoln Electric all are in highly developed and urban areas. Although the Lake Erie shoreline is known to provide habitat for migrating birds, the projects do not share a major migratory bird pathway. The Archbold Area Schools and Pettisville Local Schools wind energy projects are approximately 140 miles west of the Fairgrounds site, and the Toledo Joint Apprenticeship and Training Committee and City of Toledo projects are approximately 100 miles to the west.

Kenston, Green City Growers, and the Lake Erie wind turbine projects are the nearest projects that have been analyzed for potential cumulative impacts to biological resources. The proposed offshore wind farm on Lake Erie is approximately 15 miles from the Fairgrounds and will be installed approximately 5 miles offshore. The Indiana bat would not likely fly 5 miles offshore in a vast open space such as the lake and these projects do not share a major migratory pathway for birds. The nearest non-prioritized, suspected Indiana bat hibernacula lies 7 miles east-northeast of the Fairgrounds project, near the city of Twinsburg, Ohio. The USFWS determined that the proposed project was not likely to adversely affect the Indiana bat, but it is within the overall range of migrating Indiana bats. Although impacts to migrating Indiana bats as a result of the proposed project are thought to be very unlikely, the proposed project may add to the overall small potential cumulative impact to migrating Indiana bats. The addition of the proposed project to potential cumulative impacts to migratory birds is considered very low.

4.2 Summary of Cumulative Impacts

4.2.1 GREENHOUSE GAS IMPACTS

While the scientific understanding of climate change continues to evolve, the Intergovernmental Panel on Climate Change Fourth Assessment Report has stated that warming of the earth's climate is unequivocal, and that warming is very likely attributable to increases in atmospheric greenhouse gases caused by human activities (anthropogenic) (IPCC 2007). The Panel's Fourth Assessment Report indicates that changes in many physical and biological systems, such as increases in global temperatures, more frequent heat waves, rising sea levels, coastal flooding, loss of wildlife habitat, spread of infectious disease, and other potential environmental impacts are linked to changes in the climate system, and that some changes may be irreversible (IPCC 2007).

The proposed project would not have direct greenhouse gas emissions but would result in some emissions of greenhouse gases associated with electricity from sources used to power the facility. The facility would consume 1,336,305 kilowatts of electricity per year, corresponding to 1,354,511 tons per year of carbon dioxide-equivalent emissions. There would also be small amounts of greenhouse gases emitted as a result of construction and transportation activities related to the facility.

The release of anthropogenic greenhouse gases and their potential contribution to global warming are inherently cumulative phenomena. Greenhouse gas emissions from the proposed facility are relatively small compared with the 8,026 million tons of carbon dioxide-equivalent greenhouse gases emitted in the United States in 2007 (DOE 2007) and the 54 billion tons of carbon dioxide-equivalent anthropogenic greenhouse gases emitted globally in 2004 (IPCC 2007). However, emissions from the proposed project in combination with past and future emissions from all other sources would contribute incrementally to the climate change impacts described above. At present, there is no methodology that would allow DOE to estimate the specific impacts (if any) this increment of climate change would produce in the vicinity of the facility or elsewhere.

4.2.2 VISUAL RESOURCES

None of the projects listed in Section 4.1 would present significant cumulative impacts on visual resources. Because of the small scale of each DOE-funded individual project and the distance between the proposed project and those turbines, no cumulative visual impacts from these projects are anticipated. Additionally, there would be limited visibility of the offshore wind farm from any upland vantage point due to its distance from the shoreline, and the fact it is over 15 miles distant from the proposed project precludes cumulative visual impacts. The closest communication tower is approximately 190 feet in height and is located approximately one half mile from the proposed project site. Within 3 miles of the proposed project site there are 18 vertical structures that range from 75 to 200 feet in height. Although the installation of the proposed wind turbine would provide an additional vertical structure within the viewshed, because the area is highly urbanized and developed, and because of there are so many other vertical structures in the region, there would not be a cumulative impact on the viewshed.

4.2.3 BIOLOGICAL RESOURCES

All of the DOE-funded wind turbine projects are reasonably foreseeable single wind turbine projects and have received a letter from the USFWS and ODNR indicating that the Indiana bat is not at risk as a result of the turbines individually (with the exception of the City of Toledo project, which is still in early design phase, and the Toledo Joint Apprenticeship, which was categorically excluded). ODOW and USFWS would require all of the above-referenced wind projects to consider or have considered the recommendations contained in the *Interim Guidelines to Avoid and Minimize Wildlife Impacts from Wind Turbines* (USFWS 2003) as part of their siting, design, and installation, thereby reducing potential impacts to migratory birds and other species. The closest wind projects (Lake Erie, Green City Growers, and Lincoln Electric) do not share a known migratory bird pathway with the proposed project, and the areas between these projects consist mainly of developed and suburban land, with scattered wooded areas. The potential for cumulative impacts on migratory birds is minimal. The installation of single wind

turbines in this part of eastern Ohio would negligibly increase a potentially low cumulative impact on migrating Indiana bats.

Because of the small scale of each individual project and the sufficient distance between projects, there are no reasonably foreseeable potentially cumulative impacts.

5. REFERENCES

- Australia NHMRC (Australia National Health and Medical Research Council) 2010. *Wind Turbines and Health – A Rapid Review of the Evidence*. July. Available online at: <http://www.nhmrc.gov.au/publications/synopses/new0048.htm> (accessed September 8, 2010).
- BLM (Bureau of Land Management) 2005. “Chapter 5. Potential Impacts of Wind Energy Development and Analysis of Mitigation Measures.” *Final Programmatic Environmental Impact Statement on Wind Energy Development on BLM-Administered Lands in the Western United States*. FES -5-11. June. U.S. Department of the Interior, Bureau of Land Management.
- Bureau of the Census 2010. Cuyahoga County QuickFacts. Available online <http://quickfacts.census.gov/qfd/states/39/39035.htm> (accessed September 28, 2010).
- Caltrans (California Department of Transportation) 2009. “Technical Noise Supplement.” Traffic Noise Analysis Protocol. Sacramento, California. http://www.dot.ca.gov/hq/env/noise/pub/tens_complete.pdf
- CBMPC (City of Berea Municipal Planning Commission) 2010. “Re: Wind Turbine Project Cuyahoga County Fairgrounds.” August 2.
- City of Berea 2010. City of Berea Official Zoning Map. Antonio C. Armango, City Engineer. May.
- City of Middleburg Heights 2003. City of Middleburg Heights Zoning Map, Ohio Zoning Map. Richard R. Mackay, City Engineer. August 29.
- CMOH (Ontario Chief Medical Officer of Health) 2010. *The Potential Health Impact of Wind Turbines*. Available online: http://www.southpointwind.com/files/The_Potential_Health_Impact_of_Wind_Turbines_May_2010_Dr._Arlene_King.pdf (accessed September 29, 2010).
- Colby, W.D.; Dobie, R.; Leventhall, G.; Lipscomb, D.M.; McCunney, R.J.; Seilo, M.T.; and Søndergaard, B. 2009. *Wind Turbine Sound and Health Effects: An Expert Panel Review*. Prepared for: American Wind Energy Association and Canadian Wind Energy Association. Available online: http://www.awea.org/newsroom/releases/AWEA_CanWEA_SoundWhitePaper_12-11-09.pdf
- DOE (U.S. Department of Energy) 2006. “Need to Consider Intentional Destruction Acts in NEPA Documents.” Memorandum dated December 1, 2006. Office of NEPA Policy and Compliance.
- DOE (U.S. Department of Energy) 2007. Emissions of Greenhouse Gases in the United States 2006. DOE/EIA-0573(2006). Energy Information Administration. Available online at:

- <http://www.eia.doe.gov/pub/oiaf/1605/cdrom/pdf/ggrpt/057306.pdf> (accessed December 30, 2010).
- DOE (U.S. Department of Energy) 2010. "Frequently Asked Questions – Electricity." Energy Information Administration. Available online:
http://www.eia.doe.gov/ask/electricity_faqs.asp#electricity_use_home (accessed September 28, 2010).
- EPA (U.S. Environmental Protection Agency) 1974. *Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety*. EPA Office of Noise Abatement and Control. March.
- EPA's (U.S. Environmental Protection Agency) 2009. Proposed Endangerment and Cause or Contribute Findings for Greenhouse Gases Under Section 202(a) of the Clean Air Act, published at 74 FR 18886. Available online:
<http://www.epa.gov/climatechange/endangerment/comments/volume10.html> (accessed November 12, 2010).
- EPA (U.S. Environmental Protection Agency) 2010a. "Berea, Ohio Pollution Mix Current Grid Fuel Mixes and Resulting Pollution." eGrid Online Database. Available online:
http://oaspub.epa.gov/powpro/ept_pack.charts (accessed September 27, 2010).
- EPA (U.S. Environmental Protection Agency) 2010b. "Currently Designated Nonattainment Areas for All Criteria Pollutants: Ohio." Available online:
<http://epa.gov/airquality/greenbk/ancl.html#OHIO> (accessed September 16, 2010).
- Epilepsy Foundation (American Epilepsy Foundation) 2000. "Photosensitivity and Epilepsy, Photosensitivity and Seizures." Available online at:
<http://www.epilepsyfoundation.org/about/photosensitivity> (accessed March 20, 2010).
- FAA (Federal Aviation Administration) 2007. "Obstruction Marking and Lighting," Advisory Circular, AC 70/7460-1K, Change 2, White Paint/Synchronized Red Lights – Chapters 4, 12 and 13 (Turbines). U.S. Department of Transportation.
- FEMA (Federal Emergency Management Agency) 1979. "FIRM (Flood Insurance Rate) Map for the City of Berea, Cuyahoga County, Ohio." June.
- Harding, G.; Harding, P.; and Wilkins, A., 2008. "Wind turbines, flicker, and photosensitive epilepsy: Characterizing the flashing that may precipitate seizures and optimizing guidelines to prevent them." *Epilepsia*, 49(6): 1095-1098.
- IPCC (Intergovernmental Panel on Climate Change) 2007. *Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change* [Solomon, S., D. Qin, M. Manning, Z. Chen, M. Marquis, K.B. Averyt, M. Tignor and H.L. Miller (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, 996 pp.
<http://www.ipcc.ch/ipccreports/ar4-wg1.htm> (accessed August 18, 2010).

- MacQueen, J.F.; Ainslie, J.F.; Milborrow, D.J.; Turner, D.M.; Swift-Hook, D.T. 1983. "Risks associated with wind-turbine blade failures." Abstract. In *IEE Proceedings, Part A - Physical Science, Measurement and Instrumentation, Management and Education, Reviews* (ISSN 0143-702X), vol. 130, pt. A, no. 9, Dec. 1983, pp. 574-586.
- NOACA (Northeast Ohio Areawide Coordinating Agency) 2005. *Northeast Ohio Is In Nonattainment of the Clean Air Act's National Ambient Air Quality Standards*. Fact Sheet. Available online: <http://www.noaca.org/Nonattainmentfactsheet.pdf> (accessed September 28, 2010).
- NREL (National Renewable Energy Laboratory) 2002. Wind Turbine Lightning Protection Project 1999 – 2001. NREL/SR-500-31115, May 2002. Prepared by McNiff Light Industry for NREL. Available online at: <http://www.nrel.gov/docs/fy02osti/31115.pdf> (accessed October 19, 2010). ODNR (Ohio Department of Natural Resources) 2010. "Ohio Scenic Rivers Program." Available online: <http://www.dnr.state.oh.us/tabid/985/default.aspx> (accessed September 27, 2010).
- Rogers, A.L.; Manwell, J.F.; and Wright, S. 2006. "Wind Turbine Acoustic Noise," a white paper prepared by the Renewable Energy Research Laboratory, Department of Mechanical and Industrial Engineering, University of Massachusetts at Amherst. Available online at: http://www.windpoweringamerica.gov/ne_issues_sound.asp (accessed August 24, 2010).
- PSI (Professional Services Industries) 2009. *Report of Geotechnical Subsurface Exploration for the Proposed Wind Turbine Cuyahoga Fairgrounds Middleburg Heights, Ohio*, PSI File# 142-95003. January.
- PUCO (Public Utilities Commission of Ohio) 2010. Railroad Information System Crossing Information. Ohio Rail Development Commission. Available online: <http://gradecrossings.puco.ohio.gov/item.php?ID=13674&f1=CUYAHOGA> (accessed August 21, 2010).
- Tetra Tech EC, Inc. 2007. "Exhibit 14 - Wind Turbine Ice Blade Throw." *Ice Shedding/Blade Throw Analysis*. Available online: http://www.horizonwindfarms.com/northeast-region/documents/under-dev/arkwright/Exhibit14_IceSheddingandBladeThrowAnalysis.pdf (accessed September 30, 2010).
- USDA (U.S. Department of Agriculture) Forest Service 2009. "National Wild and Scenic Rivers Map." Continental United States, U.S. Forest Service, U.S. Bureau of Land Management, U.S. Fish and Wildlife Service, National Park Service, and National Atlas of the United States. Available online: <http://www.rivers.gov/maps/zoom/conus/conus.html> (accessed September 27, 2010).
- US DOT (U.S. Department of Transportation) 2006. *Construction Noise Handbook*. Final Report August 2006. Federal Highway Administration. Available online: <http://www.fhwa.dot.gov/Environment/noise/handbook/index.htm> (accessed August 5, 2010).

USFWS (U.S. Fish and Wildlife Service) 2003. "Service Interim Guidelines to Avoid and Minimize Wildlife Impacts from Wind Turbines." Memorandum from the Deputy Director to Regional Directors, Regions 1–7. May 13. Available online: [http://www.fws.gov/habitatconservation/Service% 20Interim%20Guidelines.pdf](http://www.fws.gov/habitatconservation/Service%20Interim%20Guidelines.pdf) (accessed September 28, 2010).

USFWS (U.S. Fish and Wildlife Service) 2010. "National Wetlands Inventory for Berea, Ohio." Available online: <http://www.fws.gov/wetlands/Data/Mapper.html> (accessed August 2, 2010).