**Supplement Analysis for**
**Cuyahoga County Agricultural Society Wind Energy Project**
**Berea, Cuyahoga County, Ohio (DOE/EA-1815)**

**Responsible Agency:** Department of Energy, Office of Energy Efficiency and Renewable Energy, Golden Field Office

## 1. Introduction

The FONSI issued for DOE –EA 1815 analyzed the federal action of the U.S. Department of Energy (DOE) authorizing 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) for a 660 kilowatt wind turbine at the County Fairgrounds. 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 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. Cuyahoga County now proposes to use a 500 kilowatt wind turbine in lieu of the 660 kilowatt wind turbine analyzed in DOE-EA 1815.

The originally proposed 660-kilowatt 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 Final EA (DOE/EA-1815) evaluated the Agricultural Society's initial turbine selection of a Vestas V47-660 kW wind turbine.

As part of the project, 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.

## 2. NEPA Analysis to Date

The Office of Energy Efficiency and Renewable Energy, Golden Field Office completed its environmental review for the Agricultural Society's Wind Energy Project. An environmental assessment (DOE/EA-1815) was prepared in accordance with the Council on Environmental Quality's *National Environmental Policy Act* (NEPA) regulations (40 CFR Parts 1500 to 1508) and DOE NEPA implementing regulations (10 CFR Part 1021).

The EA analyzed the potential environmental impacts of authorizing funding to ODOD and subsequently to the Agricultural Society for the proposed project to construct, operate, and eventually decommission the single wind turbine. The EA identified the long-term use of less than 2,500 square feet of land (256 sq. ft. for the turbine location and 2,000 sq. ft. for the Energy Center), removal of 3 mature trees, and minimal noise and shadow flicker impacts to the surrounding area as a result of the proposed project. All other environmental impacts analyzed in

the EA would be negligible. Based on the analysis in the EA, DOE determined that authorizing funding to ODOD and subsequently to the Agricultural Society for the proposed project would result in no significant adverse impacts to the human environment. DOE issued the Final EA and Finding of No Significant Impact (FONSI) on February 23, 2011.

**3. Description of the Project**

As stated above, the original EA evaluated the use of a Vestas V-47, 660 kw turbine. The Agricultural Society now proposes to use a Vestas V-39, 500 kw turbine in its place. The Model V-39 turbine is a smaller, shorter, quieter machine with the following comparable attributes:

| **Turbine Model** | **Original V-47** | **Proposed V-39** |
|---|---|---|
| Power | 660 kw | 500 kw |
| Overall height (tower and turbine) | 274 feet | 261 feet |
| Rotor diameter | 47 meters (154 feet) | 39 meters (128 feet) |
| Rotational speed | 30 rpm | 30 rpm |

There are no proposed changes to the Energy Center or the 300-foot underground electrical transmission line.

**4. Analysis**

- The EA justifiably screened the following resource areas from a detailed analysis: floodplains and wetlands, wild and scenic rivers, groundwater, surface water, waste management, and intentional destructive acts. The reduction in size of the proposed turbine would not require any reconsideration of these resource areas.
- The EA evaluated the impacts to land use and the permanent commitment of 256 square feet of land for the turbine location and 2,000 feet of land for the Energy Center. The amount of land commitment would not change with the smaller turbine.
- The EA evaluated the impacts to visual quality and identified that the proposed turbine would add a singular vertical element into the viewshed that included several other vertical elements (i.e., buildings, communications towers, overhead powerlines, etc.). The smaller proposed turbine would result in an incrementally smaller impact to the visual impacts.
- The EA also evaluated the visual impacts from shadow flicker to the surrounding area. No homes or occupied business properties would be expected to receive shadow flicker for more than 30 hours per year. The smaller proposed turbine would have a rotor diameter 17 percent smaller than that evaluated in the EA. Correspondingly, the total area swept by the turbine blades would be over 30 percent smaller than the original turbine. Considering that shadow flicker impacts are proportionate to the rotor diameter and the total swept area of the turbine blades, the expected shadow flicker impacts of the smaller turbine would be even less than that presented in the EA.
- The EA evaluated noise impacts and determined that operation of the proposed wind turbine would not result in noise increases greater than 3 dBA at residences in the project vicinity. The relative power of aerodynamic noise between the two turbines is directly related to the speed of the blade tip. Since the rotational speed of the turbines is the same

and the smaller turbine has a shorter rotor diameter, the blade tip speed of the proposed turbine would be less than that analyzed in the EA. Therefore, the noise impacts of the proposed turbine would be smaller than those presented in the EA.

- The EA evaluated impacts to cultural resources using a below ground Area of Potential Effect (APE) and an above ground APE. The below ground APE is used to evaluate potential archeological impacts and since the area of disturbance for the smaller turbine would be the same as evaluated in the EA, no additional analysis is necessary. The above ground APE is used to determine indirect impacts that could occur to historic properties from noise, visual impacts, and shadow flicker. Since all of these indirect impacts have been shown to be bounded by the existing analysis of the larger turbine, no additional cultural resource impacts would be expected.
- The EA evaluated impacts to geology and soils, which were limited to the area being disturbed for the tower foundation. Since the towers and the construction methods would not change for the proposed turbine, there would be no changes to the impacts presented in the EA.
- The EA presented impacts to biological resources from the 660 kw turbine. It concluded that the project would not be likely to adversely affect the endangered Indiana bat and would not have significant impacts to bald eagles or migratory birds. Considering that the proposed smaller turbine would have the same rotational speed with a smaller rotor diameter and is proposed for the same location, there would be no increase in potential impacts to biological resources.
- The risk of occupational and public health and safety impacts is a function of the potential for tower collapse; which is addressed in the EA. Considering that the same tower is used for both turbines and the probability of tower collapse is extremely unlikely, there would not be an increase in impacts from using the smaller turbine.
- The EA separately addresses impacts to transportation, socioeconomics, and environmental justice. None of these impacts are related to turbine size and therefore would be unaffected by the proposed smaller turbine.
- The sections of the EA that address air quality and utilities and energy discuss the amount of renewable energy that would be generated from the 660 kw turbine; thus replacing the need for other sources of electricity that could be generated using fossil fuels. Considering that the proposed smaller turbine would, on average, generate 24 percent less electricity; the benefits of the smaller turbine would be approximately 24 percent less than those presented in the EA, but would still be positive impacts.

**5. Findings**

The changes proposed by the Cuyahoga County Agricultural Society would not significantly alter the analysis of impacts for any of the resource areas evaluated in the EA. DOE has therefore determined that there would be no substantial changes to the proposal or significant new information relevant to environmental concerns that would require a supplemental EA.

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4/21/11
Date