

**FINAL
ENVIRONMENTAL ASSESSMENT**

FOR

**SAUK VALLEY COMMUNITY
COLLEGE'S
WIND ENERGY PROJECT**

**DIXON
LEE COUNTY, ILLINOIS**

**U.S. Department of Energy
Golden Field Office**



DECEMBER 2010

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COVER SHEET

RESPONSIBLE AGENCY: U.S. Department of Energy (DOE)

TITLE: Final Environmental Assessment for Sauk Valley Community College's Wind Energy Project, Dixon, Lee County, Illinois (DOE/EA 1804).

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ABSTRACT: DOE is proposing to authorize the expenditure of Federal funding to design, permit, and construct a single-turbine wind energy project to provide renewable energy to fulfill 100 percent of Sauk Valley Community College's (SVCC) annual electricity demand and help reduce greenhouse gas emissions. DOE has authorized SVCC to use a percentage of their federal funding for preliminary activities, which include EA preparation, studies related to the EA (noise, shadow flicker, visual), and obtaining local permits. The 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 the conclusion of the EA for the Proposed Project. Illinois proposes to provide SVCC a \$500,000 grant, which would come from a formula grant that Illinois received from DOE pursuant to the Department's State Energy Program.

SVCC has not yet finalized the selection of a manufacturer of wind turbine that it would install. Therefore, the analysis in this EA used specifications for one of the largest models under consideration, the Clipper Liberty 2.5-MW C99 wind turbine. The Clipper Liberty 2.5-MW C99 is a tubular steel monopole, three-blade, ground-mounted wind turbine. The turbine rotor diameter is 99 meters (322 feet), which would connect at its hub (midpoint) to an 80-meter (259-foot)-tall tower. The total maximum height of the wind turbine is 127 meters (418 feet) from the bottom of the tower to the blade tip at its highest point. This EA analyzes the potential environmental impacts of the proposed installation, operation, and decommissioning of the SVCC wind energy project and the alternative of not implementing this project (the No-Action Alternative).

PUBLIC INVOLVEMENT: DOE encourages public participation in the NEPA process. The Department placed a Notice of Availability for the draft EA in the Dixon Evening Telegraph and the Sterling *Gazette* on Friday, September 17, 2010. The Notice clearly identified a 15-day period for the public to comment on potential environmental impacts of the proposed project. DOE posted the Draft EA on its NEPA Website (<http://nepa.energy.gov>) and the DOE Golden Reading Room Website (http://www.eere.energy.gov/golden/Reading_Room.aspx). As of October 1, 2010, DOE had received no comments on the draft EA.

AVAILABILITY: This final EA is available at the above websites.

ACRONYMS AND ABBREVIATIONS

ARRA	<i>American Recovery and Reinvestment Act of 2009</i>
BMP	best management practice
CFR	<i>Code of Federal Regulations</i>
CO ₂	carbon dioxide
dB	decibel
dBA	decibel on an A-weighted scale, used to approximate the human ear's response to sound
DOE	U.S. Department of Energy
DOI	U.S. Department of the Interior
DNL	Day Night Average Sound Level
EA	Environmental Assessment
EMF	electromagnetic field
EPA	U.S. Environmental Protection Agency
FAA	Federal Aviation Administration
FR	<i>Federal Register</i>
IDNR	Illinois Department of Natural Resources
IHPA	Illinois Historic Preservation Agency
IL-2	Illinois State Route 2
IPCB	Illinois Pollution Control Board
MBTA	<i>Migratory Bird Treaty Act</i>
NEPA	<i>National Environmental Policy Act</i>
NHPA	<i>National Historic Preservation Act</i>
NRHP	<i>National Register of Historic Places</i>
NTIA	National Telecommunications and Information Administration
OSHA	Occupational Safety and Health Administration
RCRA	<i>Resource Conservation and Recovery Act</i>
SEP	State Energy Program
SHPO	State Historic Preservation Officer
Stat.	United States Statutes at large
SVCC	Sauk Valley Community College
THPO	Tribal Historic Preservation Officer
U.S.C.	United States Code
USFWS	U.S. Fish and Wildlife Service

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1. INTRODUCTION

1.1 National Environmental Policy Act and Related Procedures

The *National Environmental Policy Act* (NEPA), the Council on Environmental Quality NEPA regulations (40 CFR Parts 1500 to 1508), and the U.S. Department of Energy (DOE or the Department) 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 on 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 proposed project would not proceed. The EA does not analyze other action alternatives. Based on the analysis in this EA, DOE will either issue a Finding of No Significant Impact, which could include mitigation measures, or determine that it must prepare an Environmental Impact Statement.

1.2 Background

SVCC is proposing to construct, operate, and eventually decommission a single wind turbine and install approximately 984 feet of associated underground electrical transmission equipment, which would be connected to existing infrastructure. The proposed project would be located on SVCC property 0.17 mile directly southwest of the intersection of Illinois State Route 2 (IL-2)

and Sauk Road, near Dixon, Illinois (Figures 1 to 3 and 8 in Appendix A). The current estimated cost of the proposed project is \$3.7 to \$4.5 million. The Illinois Department of Commerce and Economic Opportunity selected the proposed project to receive a \$500,000 grant.

This grant would come from money the State received from the *American Recovery and Reinvestment Act of 2009* (Pub. L. 111-5, 123 Stat. 115; ARRA) administered by DOE pursuant to the DOE State Energy Program (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. States can use SEP funds for a variety of activities related to energy efficiency and renewable energy. Congress appropriated \$3.1 billion to the DOE SEP through ARRA, and the State of Illinois received \$101,321,000 pursuant to a Federal statutory formula for distributing these funds. Illinois informed DOE that it proposes to use \$500,000 of its SEP funds for the proposed project. The use of SEP funds to assist in the financing of the proposed project constitutes a major Federal action subject to review under NEPA.

DOE is proposing to authorize the expenditure of Federal funding to design, permit, and construct a single-turbine wind energy project to provide renewable energy to fulfill 100 percent of Sauk Valley Community College's (SVCC) annual electricity demand and help reduce greenhouse gas emissions. DOE has authorized SVCC to use a percentage of their federal funding for preliminary activities, which include EA preparation, studies related to the EA (noise, shadow flicker, visual), and obtaining local permits. The 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 the conclusion of the EA for the Proposed Project. Because the proposed project would connect to existing infrastructure an access road or road improvements would be unnecessary.

SVCC has not yet finalized the selection of a manufacturer or wind turbine model. Therefore, the analysis in this EA used specifications for one of the largest models under consideration, the Clipper Liberty 2.5-megawatt C99 wind turbine. Using these specifications serves the purpose of bounding, or providing an upper limit on, the potential impacts associated with the proposed project. The Clipper Liberty 2.5-MW C99, Vestas 1.8-MW, and Siemens 2.3-MW are the largest wind turbine models under consideration. The analysis used the Clipper because it has the largest power generation output and is the loudest of the turbines under consideration, although it is 2 meters (6.6 feet) shorter in overall height than the Vestas 1.8-MW turbine. The Clipper Liberty 2.5-MW C99 is a tubular steel monopole, three-blade, ground-mounted wind turbine. The turbine rotor diameter is 99 meters (322 feet), which would connect at its hub (midpoint) to an 80-meter (259-foot)-tall tower. The total maximum height of the wind turbine is 127 meters (418 feet) from the bottom of the tower to the blade tip at its highest point. The electrical transmission line would connect to a parallel switching circuit in the SVCC physical plant.

The proposed project would provide 100 percent of the facility's annual energy needs using a 1.5-megawatt wind turbine. Using a 2.5-megawatt wind turbine would enable SVCC to sell the unneeded electricity to the electric grid. The existing infrastructure, with some minor internal updates, could facilitate selling the additional electricity to the grid; no additional transmission lines would be required. The existing transmission line can accept up to 5 megawatts of electricity, which is more than sufficient capacity if SVCC chose a 2.5-megawatt wind turbine.

This would enable the College to eliminate energy demands from the existing electricity source and lower its carbon footprint, and would provide an educational resource for the College's wind technician program.

1.3 Purpose and Need

1.3.1 DOE'S PURPOSE AND NEED

DOE's purpose and need is to ensure that SEP 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 Illinois SEP grant to Sauk Valley Community College would partially satisfy the need of those 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
- Create and retain jobs

ARRA enacted legislation 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. Provision of funds under SEP would partially satisfy the needs identified under ARRA.

1.3.2 ILLINOIS' PURPOSE AND NEED

Illinois' 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 preserve and create jobs.

1.3.2.1 Illinois' SEP Project Selection Process

The Illinois 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. The Illinois Office of Energy SEP includes four subprograms:

- Energy Efficiency Development

- Renewable Energy Development
- Green Manufacturing
- Biofuels Development

The Illinois Office of Energy issued a Request for Proposals for the SEP-funded Renewable Energy Development Program. The Illinois Program used the following criteria for selection: project readiness; matching capabilities, financing, and cost-effectiveness; economic impact for Illinois; 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. SVCC was one of many renewable energy grant applicants to which the Office of Energy awarded SEP funds in 2009. Illinois has appropriated \$500,000 to SVCC. For the proposed project, DOE is the Federal action agency, the Illinois Department of Commerce and Economic Opportunity is the recipient of Federal funding, and SVCC is the subrecipient of this funding. The proposed project would be on SVCC property.

1.4 Public and Agency Involvement

In accordance with applicable regulations and policies, DOE sent notices of public scoping to stakeholders and interested parties including local, State, and Federal agencies; organizations; and the public to solicit comment. On July 16, 2010, DOE sent postcards announcing the public scoping process and directing the stakeholders to its Golden Field Office Public Reading Room, where the scoping letter was available for review. The scoping letter described the DOE Proposed Action and SVCC proposed project, and requested assistance in identifying potential issues the Department could evaluate in this EA. The public comment period closed on July 30, 2010; DOE did not receive any comments. Appendix B contains a copy of the scoping letter, the stakeholder distribution list, and the Notice of Availability (discussed below).

SVCC presented the proposed project to the Palmyra Township Planning Committee and Palmyra Township Board on July 31, 2010, for a special use exemption to the present zoning; the Committee and Board deliberated and then accepted the project. (See Appendix G) SVCC also presented the proposed project to the Lee County Zoning Board of Appeals on August 5, 2010, for a special use exemption to the present zoning; the Board also accepted the project. This meeting served as the public hearing for the special use exemption. On August 17, 2010, SVCC met with the Lee County Board of Supervisors to request a special use variance to the existing zoning of the College property to install a 127-meter (418-foot)-high, 2.5-megawatt wind turbine on SVCC property. The Board unanimously approved the request. The County publicized the meetings through its notification process whereby it invited the public to attend and comment at these meetings. Letters to adjacent property owners and notices in the *Dixon Evening Telegraph* and the *Sterling Gazette* also provided public notice.

A member of the public raised a concern about student safety should anything happen to the turbine, such as lightning striking a blade, at the Zoning Board of Appeals meeting. This concern was addressed at the meeting; Section 3.2.2.8 of this EA discusses this matter. Two other individuals at the meeting expressed their support for the project.

Pursuant to Section 7 of the *Endangered Species Act* and Section 106 of the *National Historic Preservation Act* (NHPA), DOE sent letters to the USFWS and Illinois Historic Preservation

Agency (IHPA) describing the proposed project and requesting information on Federally listed species and known historic or cultural resources in the area, respectively, that the proposed project could affect. Appendix D contains copies of the response letters.

Draft Environmental Assessment

The draft EA was available for public comment for 15 days beginning with the publication of a Notice of Availability in the *Dixon Evening Telegraph* and the *Sterling Gazette* on Friday, September 17, 2010. The Notice clearly identified the public's opportunity to comment on potential environmental impacts from the proposed project in compliance with the NEPA process. DOE posted the draft EA on its NEPA Website (<http://nepa.energy.gov>) and the Golden Field Office Public Reading Room Website (http://www.eere.energy.gov/golden/Reading_Room.aspx). DOE had received no comments on the Draft EA.

2. PROPOSED ACTION AND ALTERNATIVES

2.1 DOE's Proposed Action

DOE is proposing to authorize the expenditure of Federal funding to design, permit, and construct a single-turbine wind energy project to provide renewable energy to fulfill 100 percent of SVCC's annual electricity demand and help reduce greenhouse gas emissions. DOE has authorized SVCC to use a percentage of their federal funding for preliminary activities, which include EA preparation, studies related to the EA (noise, shadow flicker, visual), and obtaining local permits. The 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 the conclusion of the EA for the Proposed Project.

2.2 Illinois' Proposed Project

The Illinois Department of Commerce and Economic Opportunity selected SVCC for a \$500,000 grant based on the following criteria for selection: project readiness; matching capabilities, financing, and cost-effectiveness; economic impact for Illinois; 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. SVCC would implement the proposed project on its property in Dixon, Illinois.

The proposed project is to install, operate, and eventually decommission a wind turbine on the SVCC campus. SVCC has not decided on the make or model of the wind turbine; therefore, the analysis in this EA used one of the largest models under consideration, the Clipper Liberty 2.5-MW C99 wind turbine. Using these specifications bounds, or provides an upper limit on, potential impacts associated with the proposed project. The Clipper Liberty 2.5-MW C99 is a tubular, steel monopole, three-blade, ground-mounted wind turbine. The turbine rotor diameter is 99 meters (322 feet), which would connect at its hub (midpoint) to an 80-meter (259-foot)-tall tower. The total maximum height of the wind turbine is 127 meters (418 feet), from the bottom of the tower to the blade tip at its highest point. An electrical transmission line would connect to a parallel switching circuit in the SVCC physical plant. The proposed project would provide 100 percent of the facility's annual electricity needs using a 1.5-megawatt wind turbine. Using a 2.5-megawatt wind turbine would enable SVCC to sell unneeded electricity to the electric grid. The existing infrastructure, with some minor internal updates, could facilitate selling electricity to the grid; no additional transmission lines would be necessary. The existing transmission line can accept up to 5 megawatt of electricity, which is more than sufficient capacity if SVCC chose a 2.5-megawatt wind turbine. SVCC would install approximately 300 meters (984 feet) of associated underground electrical transmission equipment to connect the wind turbine to the existing parallel switching circuit. Because the proposed project would connect to existing infrastructure, an access road or road improvements for this project would be unnecessary.

The purpose of the wind turbine is to reduce SVCC's carbon footprint, offset electrical usage at SVCC resulting in substantial savings in utility costs that the College could deploy to benefit students, and provide a hands-on classroom for students in the SVCC wind technician program.

2.2.1 PROJECT LOCATION

The proposed project would be on SVCC property 0.27 kilometer (0.17 mile) directly southwest of the intersection of IL-2 and Sauk Road, near Dixon, Illinois. The turbine would be sited in a large field of unmaintained turf north of SVCC buildings and south of IL-2. This field covers approximately 0.32 square kilometer (80 acres). The proposed project would require 0.001 square kilometer (0.33 acre) of permanently committed greenspace that SVCC owns. The College would continue to use the area immediately surrounding the location of the proposed tower as undeveloped greenspace. A prairie plot is to the northwest of the proposed turbine site. Figure 2-1 is a site location map and Figure 2 in Appendix A is a site plan showing the proposed project location and property boundaries.



Figure 2-1. Site Plan Map

2.2.2 CONSTRUCTION AND INSTALLATION

The structural design would determine foundation size and dimensions based on checks of global stability, bearing capacity, stiffness, settlement, concrete and steel strength, and backfill density. The foundation for the Clipper 2.5-MW C99 wind turbine would be 17 to 20 meters (55 to 65 feet) in diameter and 2 to 3 meters (7 to 10 feet) deep. The project structural engineer would determine the final type and size of the foundation after selection of the wind turbine model. SVCC would install the underground transmission line using standard construction methods determined during final design. If SVCC chose the Clipper Liberty 2.5-MW C99 wind turbine,

the Clippers manufacturing and assembly facility in Cedar Rapids, Iowa, would ship it to the College. Existing roads are adequate to manage this delivery.

SVCC would start construction after it obtained all necessary Federal and State permits and approvals (Table 2-1). Construction would involve (1) constructing the turbine pad; (2) constructing a foundation for the tower; (3) trenching for underground utilities; (4) placing underground electrical cables in the trench; (5) connecting to the transformer; (6) transporting tower sections to the site and using a crane to assemble the towers; (7) installing nacelle, rotor, and other turbine equipment; (8) final testing; and (9) site cleanup. Completion of construction would occur within 5 months of project start.

Total land disturbance during construction would be approximately 0.02 square kilometer (5.33 acres) in the project area, including the turbine foundation and the temporary construction areas required for equipment and turbine laydown. Of this, 5 acres would be temporarily disturbed and 0.001 square kilometer (0.33 acre) would be permanently disturbed.

2.2.3 AVIATION LIGHTING

Aviation lighting would comply with Federal Aviation Administration (FAA) standards for marking and lighting structures. In its letter dated April 14, 2009, the FAA determined that the proposed project would not be a hazard to air navigation provided the structure was marked or lighted in accordance with FAA Advisory Circular 70/7460-1K Change 2 (FAA 2007). Appendix D contains a copy of the FAA letter. Because of this determination, SVCC has refined the proposed location of the wind turbine; the proposed project would be 120 meters (394 feet) from the previous location to which the FAA determination of no hazard to air navigation was applicable. This EA analyzes the updated location. This change voids the determination in Appendix D. Under the direction of DOE, SVCC is seeking a new determination from the FAA for the new location.

2.2.4 OPERATION AND MAINTENANCE

Because SVCC has not selected a wind turbine model, it has not determined specific operation and maintenance procedures; however, SVCC would maintain the turbine to manufacturer specifications while incorporating best management practices (BMPs). The College would train workers and students for turbine maintenance and safety. Routine maintenance of the turbine would be necessary to maximize performance and identify potential problems or maintenance issues. SVCC would monitor the turbine remotely to ensure efficient operation. Problems would be reported to operations and maintenance personnel, who would perform routine maintenance in partnership with the SVCC wind technician program. The manufacturer or the manufacturer's representative would perform major repairs. A maintenance crew that would not need to use a crane to remove the turbine from the tower would perform most up-tower servicing.

2.2.5 DECOMMISSIONING PHASE

The turbine and other infrastructure should have a useful life of at least 20 years. Retrofitting the turbine with upgrades could allow efficient production for many more years. As part of the Lee County zoning requirements, a decommissioning plan is required. SVCC would develop this plan after turbine construction. When the College terminated the project, it would decommission

the turbine and other infrastructure and remove all facilities to a depth of approximately 1 meter (3 feet) below grade. SVCC would restore the soil surface 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 activities would be in accordance with the manufacturer's guidelines, the decommissioning plan, and all applicable Federal, State, and local regulations.

2.3 Alternatives

2.3.1 DOE ALTERNATIVES

Illinois' ARRA SEP funds are from a formula grant; the amount is established pursuant to a formula from DOE's SEP grant procedures at 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 as set forth by law and by SEP.

In compliance with applicable statutes and 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. This EA also describes options that SVCC considered during development of its application to the State of Illinois, which is the recipient of SEP funding. This EA provides DOE with the information needed to make an informed decision about whether allowing the State of Illinois to pass through some of its Federal funds for the proposed project may result in significant environmental impacts. Based on this EA, DOE either will issue a Finding of No Significant Impact (FONSI), which may include mitigation measures, or determine that additional study is needed in the form of a more detailed environmental impact statement.

2.3.2 NO-ACTION ALTERNATIVE

Under the No-Action Alternative, DOE would not allow Illinois to use its SEP funds for this project. DOE assumes for purposes of this EA that the project would not proceed without SEP funding. Using 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, SVCC operations would continue as otherwise planned, but without the use and benefit of the proposed wind turbine and its generated energy. Without the wind-generated energy, SVCC would not meet its goals for reducing its reliance on commercially generated energy sources and its overall efforts to continue to operate while reducing its carbon footprint.

2.3.3 ALTERNATIVES CONSIDERED BY THE PROJECT PROPONENT

To meet the goals of a reduced carbon footprint and energy cost savings, SVCC considered the use of a geothermal system for direct heating; however, the College determined that the cost of the system would exceed the benefits. In addition, a geothermal system would not replace nonheating electricity and it would not provide training opportunities for wind technician students.

SVCC considered two alternative locations for the proposed project. The first was 37 kilometers (23 miles) southeast in Sublett, Illinois; this location was approved for wind turbine use. At the Sublett location, SVCC would sell the electricity to the electric grid rather than use it to provide power to the campus. This location was not feasible due to zoning and other feasibility issues and was too far for students to travel; therefore, it would not be an educational resource for the college’s wind technician program. Finally, using this site would not help SVCC meet its goal of a reduced carbon footprint. The second location was 1.6 kilometer (1 mile) west of the proposed project area. This location was not feasible because it was on land not owned by SVCC and the costs associated with the transmission line were prohibitive. In addition, because this site would be closer to the Dixon city center, noise and visual impacts could be greater than those associated with the proposed project area. SVCC chose the proposed project area to conform to county fall zones and manufacturer distance specifications. Therefore, the unlikely event of the collapse of the turbine tower, lightning strikes, or ice throw, would not affect structures, public access, or roads.

2.4 Permits, Approvals, and Notifications

Before construction, SVCC would obtain all required Federal, State, and local permits and approvals. Table 2-1 lists these permits and approvals.

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

Agency	Permit Approval/Type
Federal	
Federal Aviation Administration	FAA Aeronautical Determination
National Telecommunications and Information Administration	Radio Frequency Transmission Notification
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>
U.S. Department of Agriculture, Natural Resources Conservation Service Delegated to Lee County Soil and Water Resources Conservation District.	<i>Farmland Protection Policy Act</i>
State	
Illinois Department of Natural Resources	Title 17 Illinois Admin. Code Parts 1075 and 1090
Illinois Historic Preservation Agency	Compliance with the <i>National Historic Preservation Act of 1966</i> , as amended
Local	
Palmyra Township Planning Committee and Palmyra Township Board	Special use zoning recommendation for approval July 31, 2010
Lee County Zoning Board	Special use zoning approval obtained August 17, 2010

2.5 Project Proponent-Committed Measures

SVCC has committed to the following measures and procedures to minimize or avoid environmental impacts if the proposed project is carried forward.

2.5.1 BIRD, BAT, AND RAPTOR AVOIDANCE AND MINIMIZATION MEASURES

During turbine siting, SVCC has and would continue to give consideration to the guidelines contained within the *Interim Guidelines to Avoid and Minimize Wildlife Impacts* (USFWS 2003). The following measures are part of the proposed project and would be implemented to minimize impact to avian and bat species:

- Electrical distribution line would be installed underground.
- Ground lighting would be limited to the immediate vicinity of the turbine tower base and lighting fixtures would be used that reduce the potential to attract songbirds and other bird species migrating at night.
- The turbine would be a monopole design. Lattice towers, which have become roosting sites for birds at other wind projects, would not be used to support the wind turbine.
- Ground guy wires would not be used for support of the wind turbines. Guy wires can be a challenge for birds and bats to locate, which makes them difficult to maneuver around them and can lead to injury or death.

SVCC has also reviewed and incorporated several of the BMPs from the USFWS Wind Turbine Guidelines Advisory Committee's Site Development and Construction BMPs (USFWS 2010a). Discussion of the applicable recommendations and actions are located within the "Direct and Indirect Impacts" section within Section 3.2.2.6 of this EA. SVCC reviewed the May 2010 Bat Conservation International report, "Effectiveness of Changing Wind Turbine Cut-in Speed to Reduce Bat Fatalities at Wind Facilities" prepared for the Bats and Wind Energy Cooperative and the Pennsylvania Game Commission (BCI 2010a). Based on the findings of this report, SVCC will consider increasing the turbine's cut-in speed during periods of known heavy bat migration (primarily during weather conditions favorable for migration during the period late August to October) after further evaluation of the specific turbine model chosen for the site. SVCC would conduct voluntary post-construction avian and bat mortality surveys. Voluntary monitoring would likely consist of an initial post-construction fall migration season (approximately 8-12 weeks, based predominantly on Indiana bat migration habits). SVCC plans to implement the voluntary monitoring with in-kind support/oversight from SVCC faculty/staff, or with faculty/staff support from nearby Illinois State University. This monitoring will provide data to the USFWS, DOE, and IDNR on potential avian and bat mortality associated with single wind turbines. DOE is working with USFWS Region 3 to establish an appropriate protocol for post-construction monitoring. The final protocol is expected to include details related to timing, frequency, and reporting. SVCC would implement monitoring consistent with the final protocol.

2.5.2 HUMAN HEALTH AND SAFETY

The construction contractor and SVCC would prepare a health and safety plan in compliance with Occupational Safety and Health Administration (OSHA) requirements and the manufacturer's guidelines before starting work. All construction activities would occur during normal working hours to the extent practicable to limit noise and other disturbances to surrounding areas. The proposed project would be in compliance with Illinois Pollution Control Agency Noise regulations. As stated in the special use permit (Appendix G), SVCC would

certify that the project is in compliance with these noise regulations. The construction of the proposed project would comply with all applicable Federal, State, and local requirements.

FAA Advisory Circular AC70/7460-1K Change 2 (FAA 2007) states the monopole (turbine tower) should be painted bright white and the lights should be placed as high as possible on the turbine nacelle for 360-degree visibility. In accordance with 14 CFR Part 77, SVCC has applied for an FAA Aeronautical Determination, which it would obtain before construction.

To minimize the risk associated with ice shedding and ice throw, SVCC would include physical and visual warnings, such as placing fences and warning signs as appropriate for the protection of site personnel and the public, and deactivating the turbine remotely when site personnel detected ice accumulation (GE Energy 2006).

Wind turbine facilities are subject to vandalism, such as unauthorized persons climbing towers, opening electrical panels, or encountering other hazards. SVCC would take precautionary actions by installing a chain link fence around the tower base to control access, and would use the 24-hour campus security. In addition, the turbine design would allow no opportunities for external climbing of the tower.

Lightning strikes can cause extensive damage to turbine blades, controllers, and power electronics. However, this damage would be reduced by 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.

2.5.3 SOIL

SVCC would require its construction contractor to use BMPs during installation and operation to protect topsoil and minimize soil erosion, including containing excavated material, using silt fences, protecting exposed soil, stabilizing restored material, and revegetating disturbed areas directly after construction activities.

2.5.4 WASTE MANAGEMENT

Construction and operation of the proposed project would generate used oil. SVCC would handle, collect, transfer, and reuse or recycle used oil in accordance with applicable Federal, State, and local regulations.

2.5.5 CULTURAL AND HISTORIC RESOURCES

Through the IHPA review of its internal archaeological database, the Agency concluded that impacts to archaeological resources during construction of the proposed project would be unlikely (Appendix D). However, if construction activities encountered archaeological resources, ground-disturbing activities would stop, and SVCC would contact the IHPA for resolution and further instruction on additional studies or potential mitigation measures in accordance with the NHPA.

2.5.6 OPERATION AND MAINTENANCE

Because SVCC has not selected the make and model of the wind turbine, it has not determined specific operation and maintenance procedures; however, the College would maintain the turbine to manufacturer specifications while incorporating BMPs. SVCC would train workers and students for turbine maintenance and safety. Routine maintenance of the turbine would be necessary to maximize performance and identify potential problems or maintenance issues. SVCC would monitor the turbine remotely to ensure efficient operation. Problems would be reported to SVCC operations and maintenance personnel, who would perform all routine maintenance in partnership with the College's wind technician program. Major repairs would be completed by the manufacturer or the manufacturer's representative. A maintenance crew that would not need to use a crane to remove the turbine from the tower would perform most up-tower servicing.

2.5.7 VISUAL RESOURCES

Based on the analysis DOE prepared for this EA, shadow flicker would be unlikely to have a significant effect on potential receptors. However, if shadow impacts became an annoyance for any receptor(s), as stated in the special use permit conditions, SVCC would plant trees or install awnings or use another remedy to resolve shadow flicker effects. In addition, if SVCC received a verifiable complaint about shadow flicker visibility from within a home owned by a person not participating in the project, the turbine would be shut down during the brief period during which shadow flicker could occur.

3. AFFECTED ENVIRONMENT AND ENVIRONMENTAL IMPACTS

3.1 No-Action Alternative

Under the No-Action Alternative, baseline conditions would continue pursuant to SVCC's current plan of purchasing energy from ComEd (parent company Exelon). If the College did not implement the proposed project, it would continue to purchase at least 3.3 million kilowatt-hours of electric power that the project could have provided. In 2009, ComEd generated about 38 percent of its total electricity with fossil fuels. The remaining 62 percent came from sources that do not directly emit carbon dioxide (renewables and nuclear); see Appendix C for the ComEd Environmental Disclosure Statement. Therefore, carbon dioxide emissions from electricity generation to serve SVCC would be higher under the No-Action Alternative, and the College would not meet its objective to reduce its carbon footprint. In addition, SVCC would not have a convenient, high-quality, on-campus, hands-on laboratory for its wind technician program students to apply newly acquired turbine operation and maintenance skills. The small number of jobs created by installation and operation of the wind turbine would not occur, and the local area would forego the economic benefit associated with these new jobs.

3.2 Sauk Valley Community College'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 unlikely to have a measurable impact on the resources discussed in the following paragraphs. Therefore, DOE has not carried these resources forward for further analysis.

3.2.1.1 Waste Management

Solid wastes likely to be generated during installation would include equipment packaging materials and construction-related material debris. Solid wastes generated during operation of the turbines would be minimal. Solid wastes likely to be generated during decommissioning would include dismantled equipment and decommissioning-related material debris. Installation, operation, or decommissioning activities would be unlikely to generate hazardous and universal wastes. SVCC would handle, collect, transfer, and dispose of all wastes generated over the life of the proposed project in accordance with applicable Federal, State, and local regulations. Operations of the proposed project would generate used oil (for example, spent gear box oil, hydraulic fluid, and gear grease), which is not a waste because it can be reused or recycled. SVCC has a recycling program for used oil generated from its maintenance vehicles; it would handle, collect, transfer, and dispose of used oil from the wind turbine in accordance with this existing program and with applicable Federal, State, and local regulations.

Hazardous waste is a category of waste regulated under the Resource Conservation and Recovery Act (RCRA). To be considered hazardous, a waste must be a solid waste under RCRA and must exhibit at least one of four characteristics described in 40 CFR 261.20 through 40 CFR 261.24 (i.e., ignitability, corrosivity, reactivity, or toxicity) or be specifically listed by the EPA in 40 CFR 261.31 through 40 CFR 261.33.

Universal Waste includes batteries, pesticides, mercury-containing equipment, and lamps that are subject to the universal waste requirements of 40 CFR Part 273.

3.2.1.2 Intentional Destructive Acts

DOE considers intentional destructive acts (such as 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 particularly attractive targets of opportunity for terrorists or saboteurs to inflict adverse impacts to human life, health, or safety.

3.2.1.3 Water Resources

3.2.1.3.1 Groundwater

According to the Illinois Environmental Protection Agency's Source Water Assessment and Protection Program, the proposed project location is not in a Phase I or II community water supply wellhead protection area or a noncommunity water supply wellhead protection area (IEPA 2010). Figure 7 in Appendix A is a map showing the Assessment and Protection Program output. There are no identified private domestic potable supply wells within 61 meters (200 feet) of the proposed project location, which is the default setback area for private domestic wells in Illinois. The proposed project would not use groundwater. Therefore, DOE does not anticipate impacts to groundwater resources.

3.2.1.3.2 Surface Water

The site of the proposed project was surveyed for the presence of surface water. There are no ponds, streams, or wetlands within 305 meters (1,000 feet) of the proposed project area. The nearest surface-water body is the Rock River, approximately 560 meters (1,837 feet) south of the project area. Two small tributaries to the Rock River are 635 meters (2,083 feet) to the east and 750 meters (2,461 feet) to the west of the project area. SVCC would use BMPs to prevent erosion and stormwater runoff; these would include containing excavated material, using silt fences, protecting exposed soil, stabilizing restored material, and revegetating disturbed areas. Therefore, DOE does not anticipate impacts to surface-water resources.

3.2.1.3.3 Floodplains and Wetlands

Pursuant to 10 CFR Part 1022, DOE reviewed the results from the Illinois Department of Natural Resources (IDNR) Ecological Compliance Assessment Tool and the USFWS National Wetlands Inventory, and determined that there are no wetlands within 305 meters (1,000 feet) of the proposed project area. In addition, according to the IDNR Office of Water Resources, the site is not in the floodplain of the Rock River or of a stream draining 26 square kilometers (10 square

miles) or more in a rural area; therefore, the project would not require an IDNR Office of Water Resources floodplain construction permit.

3.2.1.3.4 National Wild and Scenic Rivers

A review of the proposed project area confirmed that there are no nationally recognized Wild and Scenic Rivers in or near the project site. The closest recognized Wild and Scenic River to the proposed project area is the Middle Branch of the Vermillion River, approximately 322 kilometers (200 miles) southeast of the proposed project area near Danville, Illinois.

3.2.2 CONSIDERATIONS CARRIED FORWARD FOR FURTHER ANALYSIS

3.2.2.1 Land Use

The proposed project area is primarily unmaintained turf with the SVCC facilities to the southwest. Figure 3-1 is a site plan showing adjacent and nearby properties that the EA analysis considered potential receptors. The northern boundary of the campus is IL-2, a four-lane highway, and then agricultural property. The eastern boundary of the campus is Sauk Road and then agricultural property, a commercial property, and a student housing complex approximately 550 meters (1,805 feet) southeast from the proposed wind turbine location (Potential Receptors 1 and 2 on Figure 3-1). The Rock River forms the southern boundary of the campus. The Hennepin Canal Parkway State Park is across the Rock River to the southwest of the project site. The campus is bounded on the west by agricultural land and a riverfront residential subdivision on the southwestern corner, approximately 965 meters (3,166 feet) from the proposed wind turbine location (Potential Receptor 16 on Figure 3-1). The nearest residence to the proposed location is approximately 850 meters (2,789 feet) northeast of the proposed project location (Potential Receptor 11). The nearest residential area with a zoning “R-1” [“Single Family Residential Area,” Illinois Compiled Statutes (55 ILCS 515-12001 et seq.)] is approximately 1,190 meters (3,904 feet) northeast of the proposed location (Potential Receptor 8). To the southwest of the campus along Shoreline Heights Road is a residential subdivision of riverfront houses (Potential Receptor 16).

The Palmyra Township Planning Committee and Palmyra Township Board accepted the proposed project on July 31, 2010, for a special use exemption to the present zoning. In addition, the Lee County Zoning Board of Appeals accepted the project on August 5, 2010, for a special use exemption to the present zoning. This meeting served as the public hearing for the special use exemption. On August 17, 2010, SVCC met with the Lee County Board of Supervisors to request special use variance to the existing zoning to install a 127-meter (418-foot)-high, 2.5-megawatt wind turbine on College property. The Board unanimously approved the request on August 17, 2010. Appendix G contains the August 5, 2010, meeting minutes for the Lee County Zoning Board of Appeals and the August 17, 2010, Lee County Zoning Board meetings.

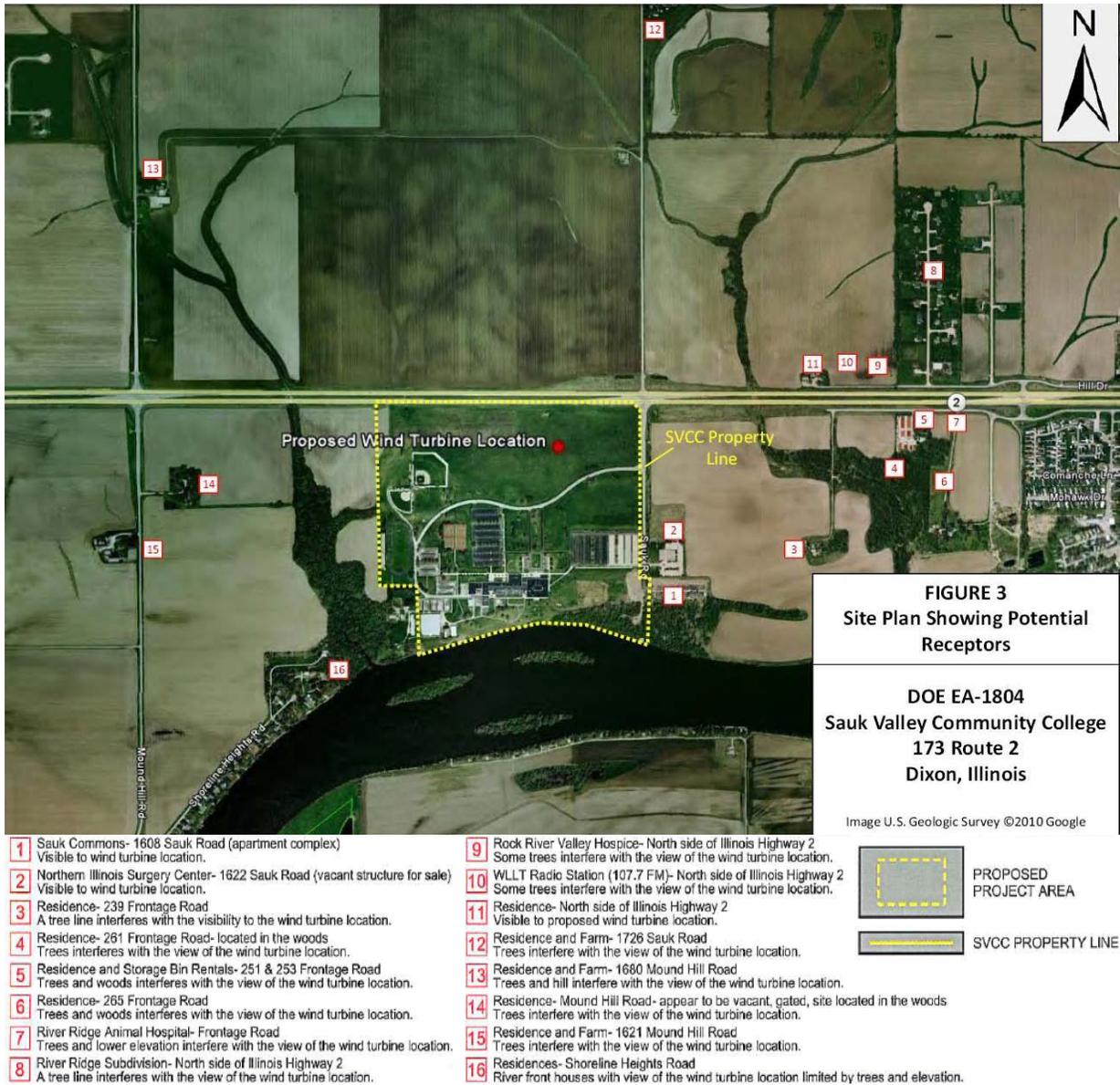


Figure 3-1. Site Plan Showing Potential Receptors

The special use exemption established a setback requirement of 152 meters (500 feet) or more for the turbine from all existing public roads, and distances to public utilities must be 1.1 times the height of the turbine with the blade tip at its highest point. In addition, the turbine would have to maintain a setback of 427 meters (1,400 feet) or more from any existing or occupied residence.

Direct and Indirect Impacts

Implementation of the proposed project would temporarily commit 0.02 square kilometer (5 acres) and permanently commit 0.001 square kilometer (0.33 acre) of greenspace that SVCC maintains as turf for possible future expansion. The overall use of the general area is primarily agricultural. The College would continue to use the area immediately surrounding the proposed

wind turbine location as undeveloped greenspace. The project area would comply with the setback requirements specified in the special use exemption.

3.2.2.2 Visual Quality

The existing view of the proposed project area is primarily agricultural, with the SVCC facilities on the southwestern portion (see Figure 3-1). The northern boundary of the campus is IL-2, a four-lane highway, and then agricultural property. The eastern boundary of the campus is Sauk Road and then agricultural property, a commercial property, and a student housing complex approximately 550 meters (1,805 feet) from the proposed turbine location. The Rock River forms the southern boundary of the campus. The campus is bounded on the west by agricultural land and a riverfront residential subdivision on the southwestern corner of the campus along Shoreline Heights Road, approximately 965 meters (3,166 feet) from the proposed wind turbine. The nearest residence is approximately 850 meters (2,789 feet) northeast of the proposed location. The nearest residential area with a zoning “R-1” [“Single Family Residential Area” Illinois Compiled Statutes (55 ILCS 515-12001 *et seq.*)] is approximately 1,190 meters (3,904 feet) to the northeast. To address potential concerns about the aesthetic impacts of the proposed project, SVCC commissioned a visual simulation of the turbine from various points in the viewshed (Appendix H). The simulation estimated the scale of the turbine in relation to distance and is not an exact rendering of the proposed viewshed.

Shadow flicker is defined as alternating changes in light intensity caused by a moving object (such as a rotating rotor blade) casting shadows on another object. Shadow flicker from wind turbines can occur when moving turbine blades pass in front of the sun, creating alternating changes in light intensity or shadows. These flickering shadows can cause an annoyance when cast on nearby residences or other buildings (“receptors”). The spatial relationship between a wind turbine and a receptor, the location of trees, buildings, and other obstacles, and weather characteristics such as wind speed and direction and sunshine probability are key factors related to shadow flicker impacts. Shadow flicker becomes much less noticeable at distances beyond 305 meters (1,000 feet), except at sunrise and sunset when shadows are long.

Direct and Indirect Impacts

The proposed project would affect the viewshed in the project area. The turbine would be a dominant vertical structure in the landscape due to its height, but it would not obstruct views in the way a large building might. Because the proposed turbine would be in a landscape with other vertical elements (for example, mature trees and buildings), the visual impact would be minimized. Installation of the turbine in a landscape that already has vertical features typically has less impact than placing it in a flat landscape with no other vertical development.

The visibility of the proposed wind turbine would vary by location due to existing tree cover. The nearest day-to-day viewers of the turbine would be employees at SVCC, Rock River Hospice, radio station WLLT, Rock Ridge Animal Hospital, future occupants of the former Northern Illinois Surgery Center (currently for sale), and the residents of the surrounding area. Users of IL-2, Sauk Road, and SVCC access roads would have clear views of the turbine.

According to various sources, including the American Wind Energy Association and the U.S. Department of the Interior (DOI), shadow flicker is rarely a problem for residences near new

wind farms, especially in the United States, due to zoning restrictions, a less northerly latitude, and a higher angle of the sun in the winter sky (AWEA 2010a, 2010b; Windustry 2008). A study by Meridian Energy evaluated the effects of shadow flicker and concluded that the nearest affected receptors should be no closer than 10 rotor diameters from the turbines (Meridian Energy 2005). DOI also supports using 10 times the rotor's diameter as a threshold for conducting an assessment of shadow flicker impacts (DOI 2005), as have other flicker studies (DOE 2010a, 2010b; Saratoga Associates 2007). This would put the flicker assessment area at 990 meters (3,220 feet), which is three times the distance of AWEA's designated high-impact flicker area [300 meters (984 feet)] and half the distance of AWEA's no-impact flicker area [2 kilometers (1.2 miles)] (AWEA 2008). The EA analysis considered receptors within 1,000 meters (3,280 feet, or approximately 10 times the largest rotor diameter of one of the largest models under consideration) for potential impact. DOE performed a study (Appendix H) to determine if shadow flicker from the proposed project would produce adverse impacts to any nearby occupied dwelling. This study used a program available from the Danish Wind Energy Association to predict the shadow zone, which was superimposed on Figure 5 in Appendix A.

The results of the shadow flicker study indicate that, due to the isolated location for the proposed wind turbine, the presence of trees and tree lines, and the rolling terrain of the area, shadow flicker would affect a relatively small number of receptors. The nearest residence to the proposed project is approximately 850 meters (2,789 feet) to the northeast. The nearest residential area with a zoning "R-1" is approximately 1,190 meters (3,904 feet) to the northeast. Both locations are outside the shadow zone. A student housing complex is approximately 550 meters (1,805 feet) from the proposed location but is outside the shadow zone. The North Illinois Surgery Center is 460 meters (1,509 feet) from the proposed project location and is on the edge of the shadow zone. Figure 4 in Appendix A is a site plan showing the 1,000-meter (3,280-foot) radius and Figure 5 in Appendix A is a site plan showing the shadow flicker zone.

Based on the analysis for this EA, DOE does not expect shadow flicker to have a significant effect on potential receptors. However, if shadow impacts became an annoyance for receptor(s), in compliance with the special use permit conditions, SVCC would plant trees or install awnings or use another remedy to resolve such impacts. In addition, if SVCC received a verifiable complaint about shadow flicker visibility in any home owned by a person not participating in the project, it would shut the turbine down during the brief periods during which the shadow flicker occurred.

There is some concern that shadow flicker from wind turbines can cause epileptic seizures. Shadow flicker from wind turbines occurs much more slowly than the light "strobing" associated with seizures. The strobe rate necessary to cause seizures in people with photosensitive epilepsy is 3 to 5 flashes per second. Large wind turbine blades do not rotate at such a high rate (AWEA 2009). The rate at which modern three-bladed wind turbines rotate generates blade-passing frequencies of less than 1.75 hertz, below the threshold frequency of 2.5 hertz, indicating that seizures should not be an issue (Burton et al. 2001 as cited in DOI 2005)

The proposed project area does not have any nearby occupied dwelling that shadow flicker from the project would adversely affect. If shadow impacts became an annoyance for any receptor, SVCC would assist those receptors to purchase awnings and screening trees. In addition, on a case-by-case basis, SVCC would shut down the proposed wind turbine during the brief period

during which such shadow flicker occurred. The main receptors potentially affected by shadow flicker would be the traffic on IL-2, Sauk Road, around campus buildings, the entrance road to the campus, and the North Illinois Surgery Center. The proposed project would not result in any adverse impacts from shadow flicker.

3.2.2.3 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. The U.S. Environmental Protection Agency (EPA) has established National Ambient Air Quality 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. Lee County, Illinois, is in attainment for National Ambient Air Quality Standards (EPA 2010) and is also in attainment for the Air Quality Index (EPA 2008).

As part of its Final Rule on “Endangerment and Cause or Contribute Findings for Greenhouse Gases Under Section 202(a) of the Clean Air Act,” the EPA stated that the “aggregate group of the well-mixed greenhouse gases” constitutes an air pollutant that contributes to climate change (74 FR 66496, December 15, 2009). Carbon dioxide is a greenhouse gas, and the SVCC wind turbine would have an indirect impact on carbon dioxide emissions from fossil fuel sources.

Direct and Indirect Impacts

The proposed project would be an emission-free energy generation project that would not degrade air quality. Aside from temporary dust generated during construction and decommissioning, which SVCC would minimize to the extent practicable (for example, by watering dry roads), the proposed project would not result in adverse impacts to air quality. The project would not require any air permits.

Carbon dioxide is a greenhouse gas that contributes to climate change, which in turn causes harm to many physical and biological systems. The proposed project would reduce SVCC’s carbon footprint by reducing reliance on fossil fuels. A 1.5-megawatt wind turbine would generate approximately 3.3 million kilowatt-hours per year and, if SVCC built the proposed project, it would supply approximately 100 percent of the electricity the College used. In 2009, ComEd generated about 38 percent of its total electricity with fossil fuels. The remaining 62 percent came from sources that do not directly emit carbon dioxide (renewables and nuclear); see Appendix C. The proposed project’s carbon reduction is calculated as follows:

$$38\% \text{ coal} \times 2.0562 \text{ pounds of carbon dioxide/kilowatt-hour} \times 3,338,897 \text{ kilowatt-hour/year} = 2,608,867 \text{ pounds or } 1,304 \text{ short tons or } 1,183 \text{ metric tons or } 1,165 \text{ long tons of carbon dioxide/year.}$$

Under the proposed project, the wind turbine would reduce SVCC carbon usage and enable the College to meet its objective to reduce its carbon footprint. Under the No-Action Alternative, SVCC would not reduce its carbon footprint and the status quo would prevail.

SVCC would sell any excess energy from the proposed project to the electric grid for other users with credit for SVCC. If the project did not provide its entire energy need, SVCC could draw on the grid, using its credits.

The proposed project would produce significant amounts of clean electricity during its 20-year design life. In 20 years, a 1.5-megawatt wind turbine would generate 66,777,940 kilowatt-hours.

3.2.2.4 Biological Resources

Migratory Birds

The *Migratory Bird Treaty Act* (MBTA; 16 U.S.C. 703-7012) implements four international conventions that provide for international protection of migratory birds. The MBTA prohibits taking, killing, possession, transportation, and importation of migratory birds, their eggs, parts, and nests, unless specifically authorized by the DOI. While the MBTA has no provision for allowing unauthorized take, the USFWS recognizes that some migratory birds could be taken during activities such as wind turbine operation even with the implementation of reasonable avoidance measures.

There are no existing bird surveys for the project area. Information of breeding bird use in the vicinity of the project area is limited to Illinois Breeding Bird Atlas survey block 039D3 (Dixon West-3). A total of 63 bird species were recorded for this block, of which 22 species were confirmed to be breeding, 10 were probable breeders, and 31 were possible breeders. Nine of these species are Species of Greatest Conservation Need (Sauer 2008). The nearest breeding bird survey route is the Halcomb Route, approximately 32 kilometers (20 miles) northeast of the project area.

The proposed project area is currently a landscaped lawn that is mowed regularly and is part of the SVCC campus. This decreases the amount of foraging and nesting habitats for migrating birds directly around the project area. The campus is surrounded to the north, east, and west by agricultural lands. The Rock River is just to the south of the campus, approximately 560 meters (1,837 feet) south of the proposed project site. This portion of the Rock River is not identified as a major migration corridor (Figure 3-2). There are no National Audubon Society-designated “Important Bird Areas” or other areas of high bird concentration or use close to the project area.

Based on the lack of suitable stopover habitat, migrating birds moving across the project area are not likely to use or stop at this site. The potential for project impacts to nonmigrating birds is greater for grassland species than for forest species or waterfowl, given the landcover composition in the area. The predominance of cultivated crops and the lack of highly suitable nesting or foraging habitats reduce the overall risk to birds from the project.

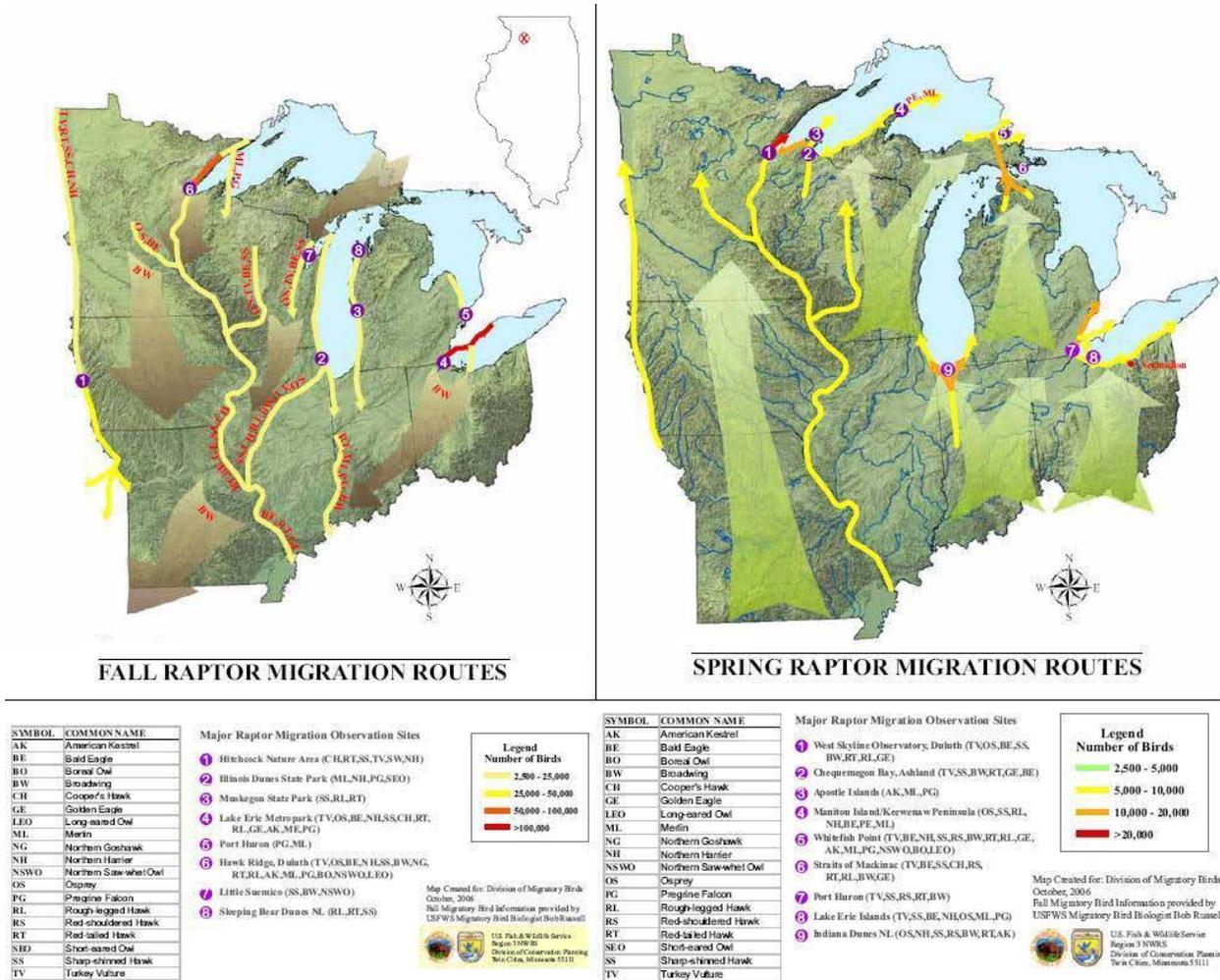


Figure 3-2. Fall and Spring Raptor Migration

Bald and Golden Eagles

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). On August 8, 2007, the bald eagle was removed from the list of threatened and endangered wildlife (72 FR 37345, July 9, 2007). After the delisting, the USFWS issued a final rulemaking (73 FR 29075, May 20, 2008) that provided a vehicle for limited take of bald and golden eagles, where the take to be authorized is associated with otherwise lawful activities. These regulations established permit provisions for intentional take of eagle nests under particular limited circumstances.

There has been considerable increase in the number of nesting bald eagles in Illinois in the past 10 to 15 years. By 2006, there were 100 known nesting pairs in the State, with the trend continuing upward. There are known occurrences of bald eagles nesting in Lee County (Illinois Endangered Species Protection Board 2009). IDNR has identified the nearest bald eagle nest approximately 6.4 kilometers (4 miles) southwest of the proposed project site and indicated that it was active in 2009 (Branham 2010). The nest is along the Rock River, downriver from the site of the proposed wind turbine. Ideal habitat for the bald eagle contains an appropriate mixture of tall perch, nest, and roost trees and snags containing exposed lateral limbs or dead tops, in

proximity to food sources (USFWS 2007a). The diet of a bald eagle consists primarily of fish, but can include waterfowl, shorebirds and colonial waterbirds, small mammals, turtles, snakes, rodents, and carrion (dead animals) (USFWS 2007a). The proposed wind turbine and college campus are within 0.8 kilometer (0.5 mile) of the Rock River corridor, which bald eagles might use for foraging. However, the campus area itself is well developed, consisting mainly of buildings, parking lots, and other hardscaped areas, landscaped grass, and other disturbed areas; it does not contain a significant tree canopy. The nest is sufficiently distant from the proposed wind turbine site such that it is unlikely to affect bald eagle nesting or foraging behavior. In addition, wind turbines do not tend to kill bald eagles. There are no reported bald eagle mortalities from wind turbines in Midwestern states (GAO 2005; Erickson et al. 2001; Kingsley and Whittam 2005), and only one record of mortality exists for the bald eagle from a wind turbine strike in North America (Norfolk County, Ontario, 2009) (Pearce 2010).

Golden eagles are not known to nest in Illinois. They are known to overwinter in the state, although not in Lee County (INHS 2005a).

Bats

The EA analysis found no records of specific bat surveys in Lee County. However, the proposed project area is in a national region of moderately high bat species density (Cryan 2008). Based on review of national and state range maps (BCI 2010; INHS 2005b), a total of four bat species have geographic distributions that might include the project area:

- Little brown bat (*Myotis lucifugus*)
- Big brown bat (*Eptesicus fuscus*)
- Eastern red bat (*Lasiurus borealis*)
- Hoary bat (*Lasiurus cinereus*)

The threatened and endangered species section of this EA (below) discusses the Indiana bat (*Myotis sodalis*).

The IDNR reviewed the proposed project and provided feedback and information concerning special-status species, habitat suitability, and other protected resources within or near the project area. According to the IDNR EcoCAT, there were no occurrences of the Indiana bat in the vicinity of the project (Appendix D).

All of these species use woodland habitat for feeding or roosting during the year (BCI 2010). Many forage along stream corridors or over water. A narrow, relatively small patch of trees occurs just to the west of the SVCC campus, approximately 0.8 kilometer (0.5 mile) from the project area. This area could provide a limited amount of suitable habitat. There are also patchy clusters of trees along the bank of the Rock River, which provides suitable foraging habitat for these bat species. The agricultural fields in and adjacent to the project area could also provide suitable foraging habitat.

Threatened, Endangered, and Special Concern Species

The EA analysis used the USFWS Endangered Species Website to review information on the potential occurrence of Federally listed species, which led to a list of potentially occurring listed species for Lee County, Illinois. The USFWS list identifies three Federally listed species as

potentially occurring in Lee County – the prairie bush clover (*Lespedeza leptostachya*), the Eastern prairie fringed orchid (*Platanthera leucophaea*), and the Indiana bat (USFWS 2009). Based on review of habitat requirements of prairie bush clover and Eastern prairie fringed orchid, the site of the proposed wind turbine does not provide suitable habitat due to its previously disturbed nature. DOE contacted USFWS for information on rare, threatened, and endangered species, and USFWS concurred with DOE's determination that the proposed site does not provide suitable habitat for either species (see USFWS letter dated September 10, 2010, in Appendix D of this EA).

There are no known Indiana bat occurrences in the project area or in Lee County based on a review of the Illinois Natural History Survey 2005 (INHS 2005a, 2005b). There are no summer records for the Indiana bat in Lee County and the nearest known hibernaculum (winter habitat) and designated critical habitat area is Blackball Mine in LaSalle County, Illinois (Priority 2 hibernaculum), about 69 kilometers (43 miles) southeast of the proposed project (USFWS 2007b). The proposed site does not include hibernacula, summer (maternal roosting habitat), or highly suitable foraging habitat for this species, which includes forested areas and habitat near or along open water and wetlands (USFWS 2007b). Mature trees or undisturbed habitats do not occur on the site.

Indiana bats do not tend to traverse open expanses of more than 305 meters (1,000 feet) for foraging (USFWS 2010a). The area surrounding the proposed project is predominately agricultural, with wooded areas no closer than approximately 518 meters (1,700 feet). The risk to migrating individuals is difficult to characterize because little is known of the migratory patterns of this species. Because the site of the proposed project does not include suitable hibernaculum, roosting, or foraging habitat and, due to the distance to the nearest known such habitat, it is not believed to be a migratory pathway for the Indiana bat.

The IDNR reviewed the proposed project and provided feedback and information on special-status species, habitat suitability, and other protected resources in or near the project area. This review searched the IDNR Illinois Natural Heritage Database (INHD 2010) for known occurrences of State-listed threatened or endangered species in Lee County. The database identified the closest known documented occurrence of an Indiana bat as 69 kilometers (43 miles) from the project location (Branham 2010), which is the Blackball Mine location discussed above. The INHD does not include records of Illinois Natural Area Inventory Sites, dedicated Illinois Nature Preserves, registered Land and Water Reserves, or wetlands in the vicinity of the project area. The IDNR has, therefore, concluded that adverse effects to State-listed species resulting from the proposed project would be unlikely (Appendix D).

Direct and Indirect Impacts

Migratory Birds, Bald Eagle, and Golden Eagle

SVCC has and will continue to give consideration to the *Interim Guidelines to Avoid and Minimize Wildlife Impacts from Wind Turbines* (USFWS 2003). The college has committed to incorporate all applicable recommendations and has included them as project proponent-committed practices to avoid and minimize potential impacts to migratory birds and bald and golden eagles. SVCC has also reviewed and incorporated several BMPs from the USFWS *Wind Turbine Guidelines Advisory Committee's Site Development and Construction Best Management*

Practices (USFWS 2010b). The following demonstrates how the proposed project would incorporate the USFWS's Interim Guidelines:

- The project is a single wind turbine in already disturbed habitat and configuration of turbines is not applicable.
- The proposed turbine design is a monopole; SVCC proposes no external features to the design and all electric lines would be underground.
- The area around the turbine is mainly agricultural and does not provide significant bird habitat or fragment any such habitat.
- Although the proposed project would require temporary access and staging of approximately 0.02 square kilometer (5.33 acres), this area is unmaintained grass, and SVCC would implement construction BMPs.
- SVCC would revegetate all but the 0.001-square-kilometer (0.33-acre) footprint of the wind turbine and would continue to maintain it as landscaped grass.
- SVCC would use aviation lighting at the minimum required by FAA to minimize potential bird and bat impacts.

DOE consulted both the USFWS and IDNR before preparing this EA. Based on the feedback from IDNR (Appendix D) and the research on the proposed turbine design, height, and location, the risk of collisions by migratory birds, including bald and golden eagles, would be low. The proposed turbine location is not in a migratory pathway or in any area designated as an Important Bird Areas. Based on the lack of suitable stopover habitat, migrating birds moving across the project area are not likely to use or stop at this site. In fact, the potential for project impacts to nonmigrating birds is greater for grassland bird species than for forest bird species or waterfowl, given the landcover composition in the project area. The predominance of cultivated crops and lack of highly suitable nesting or foraging habitats lowers the overall risk to birds from the project. Avian habitat in the project area is of limited quality, given the predominance of disturbed habitat, cultivated crops, and proximity to human development. Therefore, the footprint of the proposed project would be unlikely to cause serious disturbance to networks of high-quality avian habitat in the region; therefore, a habitat restoration plan is not warranted. Moreover, wind farms typically result in the loss of 0.7 to 1.0 acre per turbine, leaving the majority of existing habitats on the project area intact (Strickland 2004).

Bats

The estimated mean bat fatality per turbine per year for Midwest sites is between 0.1 and 7.8 (Arnett et al. 2008). Given the similarity of the proposed project site to other Midwest sites with minimal suitable bat habitat, bat fatality for the SVCC project would probably be on the lower end of this range. Therefore, impacts to bat populations would not be significant.

Threatened and Endangered Species

The USFWS stated that, based on the habitat requirements of prairie bush clover and Eastern prairie fringed orchid, the site of the proposed wind turbine does not provide suitable habitat for

these species because of the disturbed nature of the area. As stated in the USFWS letter dated September 10, 2010 (Appendix D), the proposed project would have no effect on these species.

There are no known occurrences of the Indiana bat in Lee County; the nearest known occurrence is 69 kilometers (43 miles) from the site of the proposed project. Based on the lack of suitable hibernacula or roosting habitat and the distance to the nearest known occurrence of the Indiana bat, DOE determined that the site is not likely in a major migratory pathway. The likelihood that this project would affect individuals of this species or suitable habitats is negligible. “The risk to migrating individuals is more difficult to characterize because little is known of the migratory patterns of this species” USFWS letter dated September 10, 2010 (Appendix D). However, IDNR concluded that adverse effects to State-listed species resulting from the proposed project would be unlikely (Appendix D). In addition, in a letter dated September 10, 2010, the USFWS concurred with the DOE determination that the proposed project may affect, but is not likely to adversely affect, the Indiana bat. Further, that letter stated that “the likelihood for take is discountable” (Appendix D).

Monitoring

SVCC would conduct voluntary post-construction avian and bat mortality surveys. Voluntary monitoring would likely consist of an initial post-construction fall migration season (approximately 8-12 weeks, based predominantly on Indiana bat migration habits). SVCC plans to implement the voluntary monitoring with in-kind support/oversight from SVCC faculty/staff. This monitoring will provide data to the USFWS, DOE, and IDNR on potential avian and bat mortality associated with single wind turbines. SVCC will also comply with the conditions stated in the Special Use Permit issued by Lee County, by cataloging and reporting annually to the Lee County Zoning Office any birds discovered injured or killed by the project. DOE is working with USFWS Region 3 to establish an appropriate protocol for post-construction monitoring. The final protocol is expected to include details related to timing, frequency, and reporting. SVCC would implement monitoring consistent with the final protocol.

3.2.2.5 Cultural and Historic Resources

3.2.2.5.1 Section 106 of the National Historic Preservation Act

The NHPA is the primary Federal law protecting cultural, historic, American Indian, and Native Hawaiian resources. Section 106 of the NHPA (36 CFR Part 800) requires DOE and other Federal agencies to assess and determine the potential effects of their proposed undertakings on prehistoric and historic resources and to develop measures to avoid or mitigate any adverse impacts associated with the proposed project. Compliance with Section 106 requires consultation with the State Historic Preservation Officer (SHPO), Tribal Historic Preservation Officers (THPOs), and affected tribes.

“Historic resources” mean any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the *National Register of Historic Places* (NRHP) maintained by the Secretary of the Interior. This term also includes artifacts, records, and remains that are related to and located in such properties as well as properties of traditional

religious and cultural importance to an American Indian tribal organization that meet the NRHP criteria [36 CFR 800.16(1)].

The Section 106 process contains six steps:

1. Initiate Section 106 consultation with SHPO and THPO.
2. Identify historic properties.
3. Assess adverse effects.
4. Resolve adverse effects.
5. Complete consultation.
6. Implement project.

For this project, a programmatic agreement between DOE and the IHPA (Appendix F) outlines these steps. Under this agreement, DOE is responsible for providing oversight of the programmatic agreement to ensure administration of the SEP (among other programs) in compliance with DOE Section 106 responsibilities for all individual undertakings. DOE would provide guidance on the NHPA to recipients before the release of any financial awards for undertakings under SEP (among other programs). In an effort to streamline the process, DOE authorized recipients to consult with SHPOs for compliance with all regulations under Section 106. The recipient responsibility under the programmatic agreement is to prepare and maintain all documentation for the SHPO and DOE and inform DOE of any adverse impacts on historic and cultural resources. On March 15, 2010, SVCC submitted a cultural and historic resources consultation letter to the IHPA for the proposed project in accordance with the submittal guidelines established by IHPA (IHPA 2010).

3.2.2.5.2 Definition of Historic Property

NEPA and NHPA require Federal agencies to consider the effect of their undertakings on historic properties. The criteria for listing an historic property, as defined in 36 CFR 60.4, state that a resource must be at least 50 years old (unless meeting exceptional criteria) and possess the quality of significance in American history, architecture, archaeology, engineering, or culture and is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, or association and meet one or more of the following criteria:

- Is associated with events that have made a significant contribution to the broad patterns of history;
- Is associated with the lives of persons significant in the past;
- Embodies the distinctive characteristics of a type, period, or method of construction, represents the work of a master, possesses high artistic values, or represents a significant and distinguishable entity whose components might lack individual distinction; or
- Has yielded, or might be likely to yield, information important in prehistory or history.

If a particular unlisted resource meets one of these criteria and retains integrity, it is an eligible “historic property” for listing in the NRHP.

3.2.2.5.3 Application of the Criteria of Adverse Effect

To comply with Section 106 of the NHPA, any effects of the proposed undertaking on properties listed in or determined eligible for inclusion in the NRHP must be analyzed by applying the Criteria of Adverse Effect [36 CFR 800.16(1)]:

An adverse effect is found when an undertaking may alter, directly or indirectly, any of the characteristics of a historic property that qualify the property for inclusion in the National Register in a manner that would diminish the integrity of the property’s location, design, setting, materials, workmanship, feeling, or association.

Known and Predicted Resources

DOE and the IHPA evaluated the proposed project by using an aboveground “area of potential effect” with a 1.6-kilometer (1-mile) radius around the proposed project location. The area of potential effect is the distance within which there is a potential to cause alterations in the character or use of historic properties, if present.

The closest known NRHP properties are approximately 8.8 kilometers (5.5 miles) from the proposed project area and include the bridge over Five Mile Branch carrying Schilpp Road (south, eligible for listing); properties in Dixon (east, entered in the NRHP – Illinois Central Stone Arch Railroad Bridges, Nachusa House, President Ronald Reagan’s boyhood home, and William H. Van Epps House); and properties in Sterling (west, entered in the NRHP – Colonel Edward N. Kirk House, First Congregational Church of Sterling, and Sterling Masonic Temple).

There are no Federally recognized American Indian Tribes in the State of Illinois today. The *Native American Graves Protection and Repatriation Act* Native American Consultation Database identified six tribes with an historic presence in Lee County, Illinois: Citizen Potawatomi Nation, Oklahoma; Forest County Potawatomi Community, Wisconsin; Potawatomi Hannahville Indian Community, Michigan; Ho-Chunk Nation of Wisconsin; Prairie Band of Potawatomi Indians; and Winnebago Tribe of Nebraska. DOE sent the scoping notification postcard to these and the Sac and Fox Nation of Mississippi in Iowa, Sac and Fox Nation of Missouri, and Sac and Fox Nation of Oklahoma Tribes, but received no comments. DOE included these tribes on the distribution list of the Notice of Availability for this EA, which contained information on providing feedback on the proposed project.

Direct and Indirect Impacts

The proposed turbine is not in the viewshed of any NRHP-listed properties. In compliance with the programmatic agreement, SVCC contacted the IHPA to determine potential historic resources on the site. In its response dated March 29, 2010, the IHPA determined that implementation of the proposed project would not affect historic properties. Appendix D contains a copy of the IHPA response letter.

The IHPA review of its internal archaeological database concluded that impacts to archaeological resources during construction of the proposed project would be unlikely. The

proposed site has been previously disturbed. Further, if construction activities encountered archaeological resources, ground-disturbing activities would stop and SVCC would contact the IHPA for resolution and further instruction on additional studies or potential mitigation measures required in accordance with the NHPA.

DOE conducted a review for potential historic properties within a 1.6-kilometer (1-mile) area of potential effect. Based on this review and consultation with the IHPA, DOE determined there are no historic properties within this area; therefore, there would be no impacts to historic properties.

3.2.2.6 Environmental Justice and Socioeconomics

Executive Order 12898, “Federal Actions To Address Environmental Justice in Minority Populations and Low-Income Populations” (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.” SVCC is about 11 kilometers (7 miles) west of the city center of Dixon, Illinois. The racial makeup of Dixon in 2008 was 83.4 percent white, compared with 93 percent for Lee County. The median income in 2008 for a household within a 16-kilometer (10-mile) radius of Dixon was \$42,312, compared with \$56,235 for the State of Illinois. Between 6 and 10 percent of individuals were below the poverty level in Lee County in 2000 (which was \$17,050 for a family of four) (Bureau of the Census 2010).

SVCC currently employs approximately 266 associates and educates more than 5,800 students. The SVCC workforce comprises 7 percent minority workers and 67 percent female workers.

Direct and Indirect Impacts

There are no disproportionately high populations of low-income or minority people in the project area. The analysis for this EA identified no potential high and adverse impacts to human health or environmental effects. Therefore, there would be no disproportionately high and adverse human health or environmental effects on minority populations and low-income populations.

DOE used the results of an extensive report titled *Economic Impact, Wind Energy Development in Illinois* (Center for Renewable Energy 2010) to calculate the job creation impact of the proposed project. The report cites that on average 5.38 construction jobs and 0.26 permanent jobs are created per each installed megawatt. Smaller projects have double that effect because of a similar amount of work required for a project and fewer megawatts over which to spread any effect. SVCC anticipates that its project would generate as many as 16 jobs during the selection, evaluation, and construction phases; in addition, the project would retain one permanent faculty position during the operation phase.

3.2.2.7 Geology and Soils

The site of the proposed project is on soil classified as Parkway silt loam, which is a well-drained soil on 2- to 5-percent slopes on the shoulders and summits of ground moraines (glacial depositional features). The soil does not have a frequency for ponding or flooding with low surface runoff. The high water table is between 1.2 and 1.8 meters (4 and 6 feet) below ground surface. The parent material to the Parkway soil is loess (windblown silt) and glacial till (an unsorted mix of sand and gravel in a silt and clay matrix).

DOE reviewed Illinois State Geological Survey Circular 532 (Berg et al. 1984) for information on the shallow subsurface materials in the area. According to the circular, the proposed project area is on the boundary of map units A2 and AX, which are defined as thick, permeable sand and gravel within 6 meters (20 feet) of land surface and alluvium (a mixture of gravel, sand, silt, and clay along streams, variable in composition and thickness), respectively.

According to Illinois State Geological Survey Circular 490 (Piskin and Bergstrom 1975), the thickness of glacial drift (subsurface materials that lie on top of the bedrock surface) in the vicinity of the proposed project area is less than 15 meters (50 feet). Bedrock is exposed in some areas. Bedrock in the area consists of Ordovician dolomite and limestone, which is widely exposed in the Rock River valley. Ordovician bedrock can be as thick as 244 meters (800 feet) in the project area.

The LaSalle Anticline fault trends northwest to southeast through the middle of Lee County, and the ancient Sandwich fault zone runs through the northeastern portion of the county. There are no known modern active fault zones in northern Illinois. Many small earthquakes have been reported in Lee County; however, none were measured to be greater than a magnitude of 5 on the Richter scale. According to the U.S. Geological Survey National Seismic Hazard Map, the proposed project location is between 6 and 8 percent of peak acceleration (USGS 2008), which is a low potential for an earthquake hazard.

Direct and Indirect Impacts

SVCC consulted with the Lee County Soil and Water Resources Conservation District about prime farmland. The District concluded in its June 10, 2010, letter that “no farm land will be taken out of production for this construction” (Appendix D). Therefore, should SVCC implement the proposed project, impacts to prime farmland would be unlikely.

Site preparation and project construction would result in soil disturbance. Construction would disturb approximately 0.001 square kilometer (0.33 acre) of open space currently held as SVCC greenspace. In addition, the burial of the transmission lines would disturb the path from the wind turbine to the physical connection point on the SVCC. Because ground-disturbing activity would involve less than 0.004 square kilometer (1 acre), a National Pollutant Discharge Elimination System Stormwater Program permit would not be required. Onsite construction personnel would perform weekly inspections of the erosion and sediment control structures and a third-party construction management and engineering firm would perform monthly inspections. SVCC would use BMPs to prevent erosion and stormwater runoff; these would include containing excavated material, using silt fences, protecting exposed soil, stabilizing restored material, and revegetating disturbed areas.

3.2.2.8 Human Health and Safety

Workers can be injured or killed during the installation, 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 for the most part 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 are possible but very unlikely occurrences. Debris falling from these occurrences would likely be limited to a calculated fall zone, which is the approximate area around the base of the turbine that would be likely to receive the tower and turbine if it fell (that is, the turbine's total height at blade tip) (MacQueen et al. 1983). Estimates of blade throw vary, but MacQueen et al. (1983) estimate the probability of being struck outside this area (that is, 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 construction contractor and facility operator would prepare a health and safety plan pursuant to OSHA requirements before beginning work and, by following this plan, greatly reduce the potential for worker injury and fatalities.

Another potential source of accidents is ice shedding and ice throw. 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. This is a potential safety concern; however, 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). The proposed wind turbine would have ice sensors on the blades. When ice formed, the sensors would engage and the turbine would not be able to rotate until the ice had melted. The purpose of this technology is to prevent ice throws. Ice that had accumulated on the blades would fall to the foot of the turbine as it melted. To prevent accident or injury from ice that fell as it melted, the area directly under the turbine would have to be a clear zone. This was a factor in the SVCC choice of a site for the turbine. The proposed location provides an adequate clear zone under the turbine. However, ice shedding does occur, and would be a potential safety concern. Recommendations to mitigate this risk, which SVCC would implement, include physical and visual warnings such as placing fences and warning signs for the protection of site personnel and the public, and turbine deactivation (that is, remotely switching off the turbine when site personnel detect ice accumulation) (GE Energy 2006). Another risk mitigation strategy SVCC could implement would be for site personnel to stay slightly upwind of the turbine during potential ice accumulation conditions (Morgan et al. 1998).

Wind turbine facilities have the potential for vandalism, including members of the public attempting to climb towers, open electrical panels, or encounter other hazards. SVCC restricts public access to the site and would continue to do so. Moreover, chain link fencing would surround the tower base to control access, and SVCC employs 24-hour campus security. In addition, the turbine design would provide no opportunities for external climbing of the tower.

A study conducted for the DOE National Renewable Energy Laboratory identified damage mechanisms due to direct and indirect effects of lightning strikes on wind turbines. Lightning strikes can cause extensive damage to turbine blades, controllers, and power electronics (NREL 2002). However, nearby tall communication towers can provide protection from such damage. Other ways to reduce damage that SVCC would implement include 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 height and prominence of the turbine, the terrain, and the lightning protection system in place are factors related to lightning damage. According to the National Oceanic and Atmospheric Organization, Illinois has midrange lightning activity (between 40 and 50 annual thunderstorm days) (NWS 2010).

Direct and Indirect Impacts

For this analysis, DOE calculated the fall zone radius to be the total height of the turbine, 127 meters (418 feet). In a turbine collapse, the turbine would tend to buckle and, therefore, fall somewhere in the fall zone. SVCC chose the project location so that, in the unlikely event of turbine collapse, lightning strikes, or ice throw, there would be no impacts to structures, public access, or roads. Some lubricants used in wind turbines, including gearbox oil, hydraulic fluid, and gear grease, require periodic replacement. SVCC would collect, handle, and dispose of these lubricants in accordance with all applicable local, State, and Federal regulations.

DOE and SVCC anticipate no adverse public safety or security impacts due to the proposed project. Chain link fencing and SVCC security would prevent members of the public from accessing the area. The College would post safety signage around the tower (where necessary), and transformers and other high-voltage facilities would conform to applicable Federal and State regulations. SVCC would educate its employees on security procedures in the vicinity of the turbine.

3.2.2.9 Noise

SVCC would install a single wind turbine in an undeveloped portion of the College campus, between the college buildings and IL-2. The College has not finalized the selection of the turbine model it would install. The analysis in this EA used one of the largest models under consideration, the Clipper Liberty 2.5-MW C99. This is a tubular steel monopole, three-blade, ground-mounted wind turbine. It has a hub height of 80 meters (262 feet), a rotor diameter of 99 meters (325 feet), with an overall height of 127 meters (418 feet) to the blade tip at its highest point. Table 3-1 lists the manufacturer’s guaranteed octave band sound power levels at the nacelle.

Table 3-1. Clipper Liberty 2.5-MW C99 Wind Turbine Sound Power Levels

Frequency (Hz)	31	63	125	250	500	1,000	2,000	4,000	8,000
Sound Power Level (dB)	126.9	120.1	114.7	110.2	107.9	102.9	97.8	90.7	81.9

Source: Guldberg 2009.
dB = decibel; Hz = hertz.

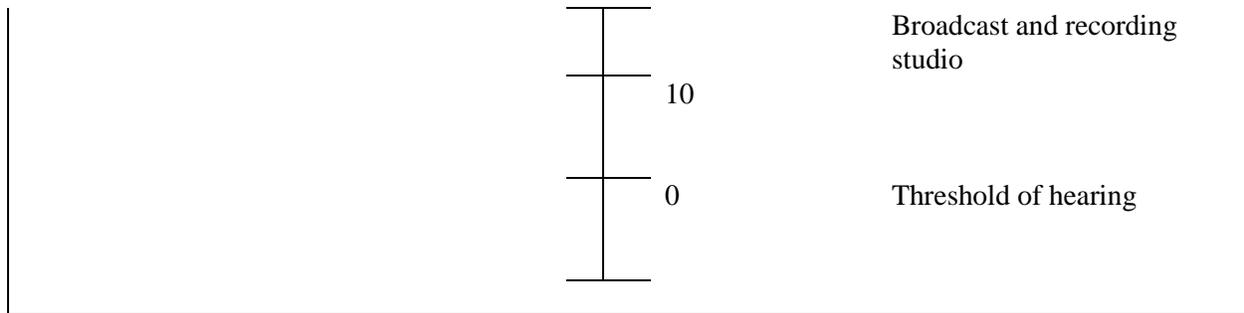
The standard unit of measure for sound pressure or sound power levels is the decibel (dB), which describes the amplitude of sound, equal to 20 times the logarithm to the base 10 of the ratio of the measured pressure to the reference pressure, which is 20 micropascals. Typically, environmental sound pressure levels are measured in decibels on an A-weighted scale (dBA). The A-weighted scale deemphasizes 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). The Day Night Average Sound Level (DNL), a standard environmental noise descriptor, is essentially a 24-hour average noise level with 10 dB added to nighttime noise levels. This 10-dBA adjustment accounts for people’s increased sensitivity to noise at night.

The EPA has an existing design goal of DNL less than or equal to 65 dBA and a future design goal DNL of 55 dBA for exterior sound levels (EPA 1977). (The EPA noise guidelines are design goals and not enforceable regulations.) These guidelines and design goals are useful tools for assessing the affected environment. The Illinois Pollution Control Board (IPCB) noise regulations are in Illinois Administrative Code Title 35, Subtitle H, Chapter I, Part 901 “Sound Emissions Standards and Limitations for Property-Line Noise-Sources.” The Code sets limits of allowable sound criteria for a variety of different land classifications (that is, business, industrial, agricultural, residential). Unlike the EPA noise guidelines, the IPCB noise regulations are enforceable. As part of the Lee County special use exempt conditions, SVCC must certify that the proposed project would be in compliance with the IPCB noise regulations.

Table 3-2 lists common outdoor and indoor sound sources and typical associated sound levels. It is important to list the distance to the source as well as the level. Indoor and outdoor sound levels technically should not be compared with each other because of context and expectations of different acoustical environments.

Table 3-2. Common Outdoor and Indoor Sound Sources and Typical Associated Sound Levels (dBA)

Common Outdoor Sound Levels	dBA	Common Indoor Sound Levels
Jet flyover at 1,000 feet	110	Rock band
Gas lawnmower at 3 feet	100	Inside subway train (New York)
Diesel truck at 50 feet Noisy urban daytime	90	Food blender at 3 feet Garbage disposal at 3 feet
Gas lawnmower at 100 feet	80	Very loud speech at 3 feet
Commercial area Heavy traffic at 300 feet	70	Normal speech at 3 feet
	60	Large business office Quiet speech at 3 feet Dishwasher next room
	50	Small theater, large conference room (background)
Quiet urban nighttime	40	
Quiet suburban nighttime	30	Library
Quiet rural nighttime	20	Bedroom at night Concert hall (background)
	20	



dBA = A-weighted decibel.

The existing noise environment for the proposed wind turbine is an undeveloped area near the north boundary of the SVCC campus, which is IL-2, a four-lane highway, and then agricultural property. The eastern boundary of the campus is Sauk Road and then agricultural property, a commercial property, and a student housing complex approximately 550 meters (1,805 feet) from the proposed location. The Rock River forms the southern boundary of the campus. The campus is bounded on the west by agricultural land and a riverfront residential subdivision on the southwestern corner of the campus along Shoreline Heights Road [approximately 965 meters (3,166 feet) from the proposed wind turbine location].

Between 10:00 a.m. and 2:00 p.m. on July 14, 2010, an ambient noise survey recorded sound readings at eight locations on the campus and in the vicinity of the proposed wind turbine. The survey consisted of a series of five recording intervals of 5 minutes each. The minimum and maximum readings during each interval were recorded with a sound level meter with a windscreen over the microphone. The unit was set for dBA measurements. Ambient sound sources in the vicinity include traffic on campus and on IL-2, wind [gusting from 11 to 24 kilometers (7 to 15 miles) per hour], and activities on campus and the surrounding area. Figure 6 in Appendix A is a site plan showing sound reading locations. Appendix H contains the Noise Report.

The ambient sound level at the farmhouse approximately 850 meters (3,669 feet) from the proposed turbine location was 59 dBA. The ambient sound level at the student housing building approximately 550 meters (1,805 feet) away was 53 dBA.

Direct and Indirect Impacts

Construction equipment would generate temporary noise during the approximately 5-month active construction phase. However, due to the noise-generating activities from existing activities and traffic as described above, the wind turbine construction noise would be unlikely to increase ambient noise levels significantly.

Modern wind turbines have been designed to reduce the noise of mechanical components significantly, so the most audible noise is the sound of the wind interacting with the rotor blades. Such turbines are generally quiet in operation and the sound would be very low compared with that of the traffic and campus activities.

Sound pressure levels from point sources diminish at a rate of approximately 6 dB per doubling of distance from the source. At a distance sufficiently far from the turbine, turbine noise levels would be below ambient noise levels and inaudible. Table 3-3 lists the estimated octave band

sound pressure level due to the turbine at the nearest residence (student housing apartments), approximately 550 meters (3,669 feet) northeast of the proposed location and the farmhouse approximately 875 meters (2,871 feet) from the proposed location. Table 3-3 also lists the IPCB nighttime (most stringent) noise standard for Class A lands, which include residences.

Table 3-3. Estimated Turbine Sound Pressure Level at Nearest Residences

Frequency (Hz)	31	63	125	250	500	1,000	2,000	4,000	8,000	dBA
Student Housing Building	64	57	52	47	45	40	35	28	19	46
Farmhouse	60	53	48	43	41	36	31	24	15	42
*IPCB Nighttime Standard	69	67	62	54	47	41	36	32	32	51

*Source: 35 IAC Part 901.

dBA = A-weighted decibel; Hz = hertz; IPCB = Illinois Pollution Control Board.

Estimated turbine noise levels at both the farmhouse and student housing building would be below IPCB noise standards; therefore, significant noise impacts would be unlikely. Turbine noise levels would be lower than the EPA noise level guidelines of 55 to 65 DNL. In addition, turbine noise levels would be lower than existing ambient noise levels at the nearest residence.

3.2.2.10 Transportation

IL-2 and Sauk Road serve the SVCC campus, including the site of the proposed project. There is a campus access drive through the property to provide access to SVCC facilities. Access to the Interstate Highway System (specifically Interstate Highway 88) is available by IL-26 in Dixon to the east or IL-40 in Sterling/Rock Falls to the west of the proposed location. SVCC has not finalized plans for transportation of project materials and equipment; however, it is likely all could use existing infrastructure. Therefore, no new access or other roads would be necessary for the installation of the wind turbine.

The project would be approximately 0.7 nautical mile (4,253 feet) southwest of the Collins Airstrip.

Direct and Indirect Impacts

Large pieces of equipment, such as the turbine tower, rotor blade, and nacelle, would be oversized loads and would temporarily slow traffic on Interstate Highway 88, IL-2, and Sauk Road. However, these would be short-term impacts. The Illinois Department of Transportation would require permits for this transportation before movement of these pieces to the proposed location could occur.

During the heavy construction phase of the project, there would be a temporary increase in the number and frequency of vehicles on the local roads surrounding the project site (identified above). No long-term or permanent impacts to the local transportation systems would occur as a result of this project.

According to the FAA in a letter dated April 14, 2009, the proposed project would have no substantial adverse effect on the safe and efficient utilization of the navigable airspace by aircraft or on the operation of air navigation facilities. Therefore, the structure would not be a hazard to air navigation, provided SVCC marked or lit the structure in accordance with FAA Advisory Circular 70/7460-1K Change 2. Appendix D contains a copy of the FAA letter.

Since this determination, SVCC has refined the proposed location of the wind turbine. This updated location is what DOE has analyzed in this EA; the wind turbine would be 120 meters (394 feet) from the location on which the FAA determination of no hazard to air navigation was applicable. This change voids the determination in the FAA letter in Appendix D. Under DOE direction, SVCC is seeking a new determination from FAA for the new location. DOE anticipates that the wind turbine at the new location, due to the minimal change in distance, would not be a hazard to air navigation.

3.2.2.11 Utilities and Energy

ComEd currently provides electricity to SVCC. In 2009, ComEd generated about 33 percent of its total electricity from coal and 5 percent from natural gas. The remaining 62 percent came from sources that do not directly emit carbon dioxide (renewables and nuclear); see Appendix C.

The term *electromagnetic field* (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 from the flow of electricity or current traveling 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). EMFs 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 can cause biological responses or even health effects continues to be the subject of research and debate (Ontario Chief Medical Officer of Health 2010).

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 the private sector. This information aids in siting wind turbines so they do not cause interference in radio, microwave, radar, and other frequencies, thereby disrupting critical lines of communication. While a voluntary process, on submittal by a wind project proponent, the NTIA provides project-specific information to the members of the Administration's Inter-department Radio Advisory Committee for review and comment on whether the proposed project could interfere with Federal radio communication links.

Direct and Indirect Impacts

A 1.5-megawatt wind energy project would generate approximately 3.3 million kilowatt-hours per year, or enough electricity to supply as many as 185 homes (at an average of 18,000 kilowatt-hours per year per home). The energy generated from the proposed project would meet approximately 100 percent of SVCC's annual electricity needs. The project would produce significant amounts of clean electricity for its 20-year design life.

At 20 years, a 1.5-megawatt wind energy project would generate approximately 66.8 million kilowatt-hours. Using a 2.5-megawatt wind turbine would enable SVCC to sell the unneeded electricity to the electrical grid. The existing infrastructure with some minor internal updates could facilitate selling the additional electricity back to the grid; no additional transmission lines would be necessary. The existing transmission line is capable of accepting up to 5 megawatt of electricity, which is more than sufficient capacity if SVCC chose the largest model under consideration, the Clipper Liberty 2.5-MW C99. No adverse energy impacts would result from the project.

The positive energy impact of the implementation of this project is that the project and not ComEd could supply approximately 100 percent of the electricity used by SVCC. This would reduce carbon emissions by 1,183 metric tons (1,304 tons) of carbon dioxide per year and enable SVCC to meet its objective to reduce its carbon footprint.

Implementation of the proposed project would not increase demand for natural resources or energy supplies to levels exceeding availability. The project's net impact on energy supplies would be positive, because the wind energy would be a renewable resource. Therefore, adverse impacts would be unlikely.

Wind turbines are not a significant source of EMF exposure because emission levels around wind farms are low (Ontario Chief Medical Officer of Health 2010). Based on the most current research on EMF, and the distance between any turbine and occupied residences, the proposed turbine would have no impact to public health and safety due to EMF.

On August 25, 2010, DOE received the NTIA finding of "no harmful interference anticipated." Four agencies provided responses: the U.S. Coast Guard, U.S. Department of Commerce, U.S. Department of Justice, and Department of the Navy. All responses stated that interference due to the proposed turbine would be unlikely. The other Inter-department Radio Advisory Committee agencies provided no comment, which NTIA interprets as no objections. DOE has determined that telecommunications interference due to the proposed project would be unlikely. In accordance with the special use permit conditions, if the proposed project caused television broadcast interference, SVCC would use reasonable mitigation measures on a case-by-case basis.

4. CUMULATIVE IMPACTS

4.1 Introduction

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).

4.2 Existing and Reasonably Foreseeable Projects

DOE reviewed information on past, present, and reasonably foreseeable future projects and actions that could result in impacts to a particular resource over the same period and in the same general location as the proposed Wind Energy Project. DOE consulted with local planning departments and local chapters of the Chamber of Commerce via phone and email, and conducted searches via the internet, to identify current and future projects in the vicinity of the proposed SVCC wind turbine location. No pending or planned projects were identified within the area to be affected by the turbine’s land use, visual impacts, or noise impacts. Additionally no past projects have been identified that could have a cumulative impact when combined with the impacts of the proposed project.

In regard to cumulative impacts to biological resources, i.e., migratory birds and bats, and threatened and endangered species, DOE reviewed the April 2007 USFWS Indiana Bat (*Myotis sodalis*) Draft Recovery Plan (USFWS 2007). The Draft Recovery Plan notes that Indiana bat migration and swarming patterns "have not been extensively studied and are poorly understood" and summarizes existing data (USFWS 2007). Eight fall swarming period studies indicated a migratory range of 0.32 to 30.6 km (0.2 to 19 miles). Eight spring emergence studies indicated a migratory range of 16.1 to 96.6 km (10 to 60 miles) and two spring emergence studies indicated migratory distances of 477 and 575 km (296 and 357 miles) (USFWS 2007, pp. 41-44). Based on this data, DOE determined that 96.5 km (60 miles) is a reasonable distance for evaluating the potential for cumulative impacts to migrating individuals.

Existing projects

Communication Tower

A 34-meter (110-foot) tower approximately 1,219 meters (4,000 feet) south-southeast of the proposed turbine location

Bureau Valley Community Unit School District, Manlius, Illinois

Approximately 48 kilometers (30 miles) south

Operating one 660-kilowatt turbine

Erie Community Unit School District #1, Erie, Illinois

Approximately 55 kilometers (34 miles) west-southwest

1.2-megawatt capacity

GSG I and II wind farms, Lee and LaSalle Counties near La Salle, Illinois
Approximately 80 kilometers (50 miles) southeast
Operating 40 turbines totaling 80-megawatt output

Lee DeKalb Wind Energy Center west of Shabbona, Illinois
Approximately 64 kilometers (40 miles) east
Operating 145 turbines totaling 51.66-megawatt output

Mendota Hills wind farm near Paw Paw in Lee County.
Approximately 64 kilometers (40 miles) southeast
Operating 63 turbines totaling 51.66-megawatt output

Proposed Projects

Big Sky Wind Farm (under construction), near Ohio, Illinois
Approximately 45 kilometers (28 miles) south-southeast
239.4-megawatt capacity

Turbine EVE (permitted)
Exact location unknown, Lee County
2.5-megawatt capacity

Shady Oaks Windfarm (permitted)
Exact location unknown, Lee County
120-megawatt capacity

Marion Wind Farm (proposed)
Exact location unknown, Lee County
100-megawatt capacity

Walnut Ridge Wind Farm
Approximately 56 kilometers (35 miles) south
Capacity unknown at this time

NextEra Wind Farm
Approximately 64 kilometers (40 miles) east
Capacity unknown at this time

In addition, these projects have a cumulative impact on greenhouse gases; DOE identified the Rock Falls biomass power plant as appropriate for inclusion in the greenhouse gas cumulative impacts analysis.

Rock Falls 25 Megawatt Biomass power plant
Approximately 13 kilometers (8 miles) west
Scheduled to start construction late fall or December 2010 and begin operations in the fall of 2011 (Kuster 2010)

In addition, the *Sustainable Energy Plan*, which the Governor of Illinois proposed in early 2005, consists of a Renewable Portfolio Standard, which requires use of renewable energy such as wind, biomass, solar, and other sources. The State anticipates that about 95 percent of the renewable energy generated in Illinois will come from wind by 2025. There will be approximately 3,300 wind turbines constructed between 2010 and 2025; a small subset of the 3,300 would be within 97 kilometers (60 miles) of the proposed project. The average size of a wind turbine installed in 2008 in the United States was 1.67 megawatt; in 2007 it was 1.65 megawatt (AWEA 2009). Although it is reasonable to conclude from the Governor's Plan that more there will be more wind turbines proposed than those listed above, their locations and timing are not reasonably foreseeable at this time.

4.3 Summary of Cumulative Impacts

4.3.1 CUMULATIVE GREENHOUSE GAS IMPACTS

While the scientific understanding of climate change continues to evolve, the Intergovernmental Panel on Climate Change Fourth Assessment Report stated that warming of the earth's climate is unequivocal, and that warming is likely attributable to increases in atmospheric greenhouse gases caused by human (anthropogenic) activities (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 might be irreversible (IPCC 2007).

The release of anthropogenic greenhouse gases and their potential contribution to global warming are inherently cumulative phenomena. DOE assumes that the proposed project would displace fossil fuel electricity currently used by SVCC, resulting in a net decrease in emissions of approximately 1,183 metric tons (1,304 tons) of carbon dioxide equivalents for each year of operation. In addition, the planned Biomass Power Plant in Rock Falls will replace fossil fuel energy and result in a net decrease of carbon dioxide emissions. The proposed project, in combination with the above-listed wind turbine projects and plans for additional turbines in Illinois by 2025, would neither measurably reduce the concentration of greenhouse gases in the atmosphere nor reduce the annual rate of greenhouse gas emissions. Rather, they would marginally decrease the rate at which greenhouse gas emissions are increasing every year and contribute to efforts ongoing globally to reduce greenhouse gases and slow climate change.

4.3.2 VISUAL RESOURCES

The proposed project would affect the viewshed in the project area. The wind turbine would be a dominant vertical component in the landscape due to its height. Although there are several wind projects in the region surrounding the proposed turbine, none of them are in the likely viewshed of the proposed project. The closest turbine, Bureau Valley Community Unit School District in Manlius, Illinois, is approximately 48 kilometers (30 miles) away. The closest communications tower is 1,219 meters (4,000 feet) from the proposed project site and is 34 meters (110 feet) tall.

This tower would partially be in the viewshed of the proposed project; therefore, there would be a small cumulative visual impact.

4.3.3 BIOLOGICAL RESOURCES

The USFWS lists all of Illinois as potential habitat for the Indiana bat, a threatened and endangered species (USFWS 2010c). There have been no known occurrences, however, of the Indiana bat in Lee County (USFWS 2010c). The closest known location of the Indiana bat is Black Ball Mine, a designated Critical Habitat, which is approximately 69 kilometers (43 miles) from the proposed project. Although some recent studies have shown that Indiana bat may migrate to hibernaculum up to 575 km (357 miles), the *Indiana Bat Draft Recovery Plan* (USFWS 2007) also indicates that the Indiana bat's typical migration is within a distance of 96 km (60 miles). Based on the existing 1004 turbines operating and the other reasonably foreseeable projects (estimated to be greater than 860 turbines) within 96 km (60 miles) of the proposed project, the potential for cumulative impacts to the Indiana bat cannot be ruled out. However, the proposed project includes the installation of a single turbine, which would provide only a small increment to any potential cumulative impact. Additionally, the USFWS Region 3 office recently began preparation of a regional habitat conservation plan. Although this plan likely will take several years to complete, it is intended to address cumulative impacts to the Indiana bat and develop avoidance, minimization and mitigation measures for existing and proposed wind turbines.

5. IRREVERSIBLE/IRRETRIEVABLE COMMITMENT OF RESOURCES

An irreversible and irretrievable commitment of resources is a permanent reduction or loss of a resource that, once lost, cannot be regained. The primary irretrievable and irreversible commitment of resources for the proposed project would be the labor, materials, and energy expended in clearing the site and installing the wind turbine. Approximately 0.001 square kilometer (0.33 acre) of land would be irreversibly committed during the functional life of the project.

6. 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 used here, is that used during the life of the project, whereas long-term productivity refers to the period after project decommissioning, equipment removal, and land reclamation and stabilization. The short-term use of the proposed project area would not affect the long-term productivity of the area. If in the future SVCC decided the project has reached its useful life, it could decommission and remove the turbine, tower, and foundation, and reclaim and revegetate the site with indigenous plant species to resemble a habitat similar to predisturbance conditions. The installation of a wind turbine at this site would not preclude using the land for purposes that were suitable before implementation of the proposed project.

7. UNAVOIDABLE ADVERSE IMPACTS

Unavoidable adverse impacts associated with the proposed project would include:

- Long-term loss of approximately 0.001 square kilometer (0.33 acre) of vegetation resulting from the construction and installation of the tower foundation,
- An increase in noise levels during construction and operation,
- The introduction of a dominant vertical element into the existing viewshed, and
- Shadow flicker impacts for onsite campus buildings.

These impacts would be temporary, in the case of the construction noise, and long-term, in relation to the loss of vegetation and visual and shadow flicker impacts. Overall, impacts of the proposed project on the environment and human health would not be significant.

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