

Exhibit #2

AGRICULTURAL IMPACT MITIGATION AGREEMENT
between
TWIN FORKS WIND FARM, LLC
and the
ILLINOIS DEPARTMENT OF AGRICULTURE
pertaining to the construction of a
Commercial Wind Energy Facility
in
Macon County, Illinois

The following standards and policies are required by the Illinois Department of Agriculture (IDOA) to help preserve the integrity of any agricultural land that is impacted by the Construction and Deconstruction of a wind energy facility in accordance with the Wind Energy Facilities Agricultural Impact Mitigation Act, P.A. 99-132. They were developed with the cooperation of agricultural agencies, organizations, Landowners, tenants, drainage contractors, and wind energy companies and comprise this Agricultural Impact Mitigation Agreement (AIMA).

The below prescribed standards and policies are applicable to Construction and Deconstruction activities occurring partially or wholly on privately owned agricultural land.

Conditions

The mitigative actions specified in the Construction and Deconstruction standards and policies set forth below shall be implemented in accordance with the conditions listed below:

- A. All Construction or Deconstruction activities may be subject to County or other local requirements. However, the specifications outlined in this agreement shall be the minimum standards applied to all Construction or Deconstruction activities.
- B. All mitigative actions are subject to modification through negotiation by Landowners and a representative of the Commercial Wind Energy Facility Owner, provided such changes are negotiated in advance of any Construction or Deconstruction.
- C. The Commercial Wind Energy Facility Owner may negotiate with Landowners to carry out the mitigative actions that Landowners wish to perform themselves.
- D. All mitigative actions will extend to associated future Construction, maintenance, repairs, and Deconstruction of the Project referenced by this agreement by the Commercial Wind Energy Facility Owner.
- E. The Commercial Wind Energy Facility Owner will exercise best efforts to determine all tenants affected by the Construction and Deconstruction of a Commercial Wind Energy Facility. The Commercial Wind Energy Facility Owner will endeavor to keep the tenants informed of the project's status, meetings, and other factors that may have an impact upon their farming operations.
- F. The Commercial Wind Energy Facility Owner agrees to include a statement of its adherence to the Construction and Deconstruction standards and policies in any

environmental assessment and/or environmental impact statement that may be prepared in connection with the project.

- G. This AIMA shall be made a condition of any Conditional/Special Use Permit. A copy of this AIMA shall be mailed to each Landowner. Twin Forks Wind Farm, LLC shall provide postage and mailing labels to the IDOA for mailing to all Landowners.

In the case of a new Underlying Agreement with the Landowner, the Commercial Wind Energy Facility Owner shall incorporate this AIMA into such Underlying Agreement.

- H. The Commercial Wind Energy Facility Owner will implement all mitigative actions to the extent that they do not conflict with the requirements of any applicable federal, state and local rules and regulations and other permits and approvals that are obtained by the Commercial Wind Energy Facility Owner for the project.
- I. If any mitigative action(s) is held to be unenforceable, no other provision shall be affected by that holding, and the remainder of the mitigative actions shall be interpreted as if they did not contain the unenforceable provision.
- J. No later than 45 days prior to the Construction and/or Deconstruction of a Commercial Wind Energy Facility, the Commercial Wind Energy Facility Owner will provide the Landowner with a toll-free number the Landowner can call to alert the Commercial Wind Energy Facility Owner should the Landowner(s) have questions or concerns with the work which is being done or has been carried out on his/her property.
- K. If there is a change in ownership of the Commercial Wind Energy Facility, the Commercial Wind Energy Facility Owner assuming ownership of the facility shall provide notice within 90 days to the County of such change and the existing Financial Assurance requirements, plus the other terms of this AIMA, shall apply to the new Commercial Wind Energy Facility Owner.

Definitions

- Abandonment -** Occurs when Deconstruction has not been completed within 18 months after the wind energy facility reaches the end of its useful life.
- Aboveground Cable -** Electrical power lines installed above grade to be utilized for conveyance of power from the Wind Turbine(s) to the Wind Facility substation.
- Agricultural Impact Mitigation Agreement (AIMA) -** The Agreement between the Commercial Wind Energy Facility Owner and the Illinois Department of Agriculture described herein.
- Agricultural land -** Land used for cropland, hayland, pasture land, managed woodlands, truck gardens, farmsteads, commercial ag-related facilities, feedlots, livestock confinement systems, land on which farm buildings are located, and land in government set-aside programs.

- Commercial Operation Date -** The calendar date on which the Commercial Wind Energy Facility is capable of producing power and placing said power on the grid.
- Commercial Wind Energy Facility -** A wind energy conversion facility of equal or greater than 500 kilowatts in total nameplate generating capacity. "Commercial wind energy facility" includes a wind energy conversion facility seeking an extension of a permit to construct granted by a county or municipality before the effective date of this Act. "Commercial wind energy facility" does not include a wind energy conversion facility: (1) that has submitted a complete permit application to a county or municipality and for which the hearing on the completed application has commenced on the date provided in the public hearing notice, which must be before the effective date of this Act; (2) for which a permit to construct has been issued before the effective date of this Act; or (3) that was constructed before the effective date of this Act.
- Commercial Wind Energy Facility Owner -** A private commercial enterprise that owns or operates a wind energy facility of equal to or greater than 500 kilowatts in total nameplate capacity.
- County -** The County where the Commercial Wind Energy Facility is located.
- Construction -** The installation, preparation for installation and/or repair of a Commercial Wind Energy Facility.
- Cropland -** Land used for growing row crops, small grains, or hay; includes land which was formerly used as cropland, but is currently in a government set-aside program and pastureland comprised of prime farmland.
- Deconstruction -** The removal of a Commercial Wind Energy Facility from the property of a Landowner and the restoration of that property as provided in the Agricultural Impact Mitigation Agreement. For purposes of these standards and policies, the terms "Deconstruction" and "Decommissioning" have the same meaning and, therefore, may be Interchanged with each other.
- Deconstruction Plan -** A plan prepared by a Professional Engineer, at the Commercial Wind Energy Facility's Owner expense, that includes:
- (1) the estimated Deconstruction cost per turbine, in current dollars at the time of filing, for the Commercial Wind Energy Facility, taking into account, among other things:
 - i the number of Wind Turbines and related Commercial Wind Energy Facilities involved,
 - ii the original Construction costs of the Commercial Wind Energy Facilities,
 - iii the size and capacity of the Wind Turbines,
 - iv the salvage value of the Commercial Wind Energy Facilities, and

- v the Construction method and techniques for the Wind Turbines and other Commercial Wind Energy Facilities and
- (2) a comprehensive detailed description of how the Commercial Wind Energy Facility Owner plans to pay for the Deconstruction of the Commercial Wind Energy Facility.

- Department -** The Illinois Department of Agriculture.
- Financial Assurance -** A reclamation bond or other commercially available financial assurance that is acceptable to the County, with the County as beneficiary.
- Landowner -** Any person with an ownership interest in property that is used for agricultural purposes and that is party to an Underlying Agreement.
- Prime farmland -** Agricultural land comprised of soils that are defined by the USDA Natural Resources Conservation Service as being "prime" soils (generally considered the most productive soils with the least input of nutrients and management).
- Professional Engineer -** An engineer licensed to practice Engineering in the State of Illinois who has been found to be qualified to perform the work described herein by the County and the Commercial Wind Energy Facility.
- Tenant -** Any person lawfully residing or leasing/renting land that is subject to an Underlying Agreement.
- Topsoil -** The uppermost layer of the soil that has the darkest color or the highest content of organic matter, more specifically defined as the "A" horizon.
- Underlying Agreement -** The written agreement with a Landowner(s) including, but not limited to, an easement, option, lease, or license under the terms of which another person has constructed, constructs, or intends to construct a Commercial Wind Energy Facility on the property of the Landowner.
- Underground Cable -** Electrical power lines installed below grade to be utilized for conveyance of power from the Wind Turbine(s) to the Wind Facility substation.
- Useful Life -** A Commercial Wind Energy Facility will be presumed to have no useful life if (1) no electricity is generated for a continuous period of twelve (12) months, and (2) if the Commercial Wind Energy Facility Owner fails, for a period of 6 consecutive months, to pay the Landowner amounts owed in accordance with the Underlying Agreement.
- Wind Turbine -** A wind energy conversion unit equal to or greater than 500 kilowatts in total nameplate generating capacity.

Construction Standards and Policies

1. Support Structures

- A. Only single pole support structures will be used for overland transmission not located adjacent to the Commercial Wind Energy Facility substation.
- B. Where the electric line is adjacent and parallel to highway and/or railroad right-of-way but on privately owned property, the support structures will be placed as close as reasonably practicable and allowable by the applicable County Engineer or other applicable authorities to the highway or railroad right of way. The only exceptions may be at jogs or weaves on the highway alignment or along highways or railroads where transmission and distribution lines are already present.
- C. The highest priority will be given to locating the electric line parallel and adjacent to highway and/or railroad right-of-way. When this is not possible, best efforts will be expended to place all support poles in such a manner so as to minimize their placement on Cropland (i.e., longer than normal spans will be utilized when traversing Cropland).

2. Aboveground Facilities

Locations for Commercial Wind Energy Facilities shall be selected in a manner so as to be as unobtrusive as reasonably possible to ongoing agricultural activities occurring on the land adjacent to the facilities.

3. Guy Wires and Anchors

- A. Best efforts will be made to place guy wires and their anchors out of crop and hayland, placing them instead along existing utilization lines and on land not used for row crops or hay. Where this is not feasible, best efforts will be made to minimize guy wire impact on cropland.
- B. All guy wires will be shielded with highly visible guards.

4. Underground Cabling Depth

- A. Underground electrical cables will be buried with:
 - 1. a minimum of 5 feet of top cover where it crosses cropland.
 - 2. a minimum of 5 feet of top cover where it crosses pasture land or other agricultural land comprised of soils that are classified by the USDA as being prime soils.
 - 3. a minimum of 3 feet of top cover where it crosses pasture land and other agricultural land not comprised of prime soils.
 - 4. a minimum of 3 feet of top cover where it crosses wooded/brushy land.
- B. Notwithstanding the foregoing, in those areas where (i) rock in its natural formation and/or (ii) a continuous strata of gravel exceeding 200 feet in length are encountered, the minimum top cover will be 30 inches.

5. Topsoil Replacement

- A. Any excavation shall be performed in a manner to preserve topsoil. Best efforts will be made to store the topsoil near the excavation site in such a manner that it will not become intermixed with subsoil materials.
- B. Best efforts will be made to store all disturbed subsoil material near the excavation site and separate from the topsoil.
- C. When backfilling an excavation site, the stockpiled subsoil material will be placed back into the excavation site before replacing the topsoil.
- D. Refer to Item No. 7.A. for procedures pertaining to rock removal from the subsoil and topsoil.
- E. Refer to Items No. 8.A. through 8.C. for procedures pertaining to the alleviation of compaction of the topsoil.
- F. Best efforts will be performed to place the topsoil in a manner so that after settling occurs, the topsoil's original depth and contour (with an allowance for settling) will be restored as close as reasonably practicable. The same shall apply where excavations are made for road, stream, drainage ditch, or other crossings. In no instance will the topsoil materials be used for any other purpose unless agreed to otherwise by the Landowner.

6. Repair of Damaged Tile Lines

If underground drainage tile is damaged by Construction or Deconstruction, it will be repaired in a manner that assures the tile line's proper operation at the point of repair. The following standards and policies shall apply to the tile line repair.

- A. The Commercial Wind Energy Facility Owner will work with the Landowner to identify the tile lines traversing the property included within the Underlying Agreement. All tile lines identified in this manner will be staked or flagged prior to Construction or Deconstruction to alert Construction and Deconstruction crews to the possible need for tile line repairs.
- B. Tile lines that are damaged, cut, or removed shall be staked or flagged with stakes or flags placed in such a manner they will remain visible until the permanent repairs are completed.
- C. If water is flowing through any damaged tile line, the Commercial Wind Energy Facility Owner shall utilize best efforts to immediately and temporarily repair the tile line until such time that the Commercial Wind Energy Facility Owner can make permanent repairs. If the tile lines are dry and water is not flowing, temporary repairs are not required if the permanent repairs can be made by the Commercial Wind Energy Facility Owner within 14 days (weather and soil conditions permitting) of the time damage occurred; however, the exposed tile lines will be screened or otherwise protected to prevent the entry of foreign materials into the tile lines.
- D. Where tile lines are severed by an excavation trench, repairs shall be made using the 2015 IDOA Tile Line Repair Drawings, Tile Bridge Permanent Tile Repair, Temporary and Permanent Drain Tile Repair (Figures 1 and 2).
- E. There will be a minimum of one foot of separation between the tile line and the underground cable whether the underground cable passes over or under the tile

line. If the tile line was damaged as part of the excavation for installation of the underground cable, the underground cable will be installed with a minimum one foot clearance below or over the tile line to be repaired.

- F. The original tile line alignment and gradient shall be maintained. A laser transit shall be used to ensure the proper gradient is maintained. A laser operated tiling machine shall be used to install or replace tiling segments of 100 linear feet or more.
- G. During construction stage, all permanent tile line repairs must be made within 14 days of identification or notification of the damage, weather and soil conditions permitting. At other times, such repairs must be made as mutually agreed by the Commercial Wind Energy Facility Owner and the Landowner.
- H. Following Construction and/or Deconstruction activities, the Commercial Wind Energy Facility Owner will utilize best practices to restore the drainage in the area to the condition it was before the commencement of the Construction/ Deconstruction activities. If the Landowner and Commercial Wind Energy Facility Owner cannot agree upon a reasonable method to complete this restoration, the recommendations of the appropriate County Soil and Water Conservation District shall be considered by the Commercial Wind Energy Facility Owner and the Landowner.
- I. Following completion of the work, the Commercial Wind Energy Facility Owner will be responsible for correcting all tile line repairs that fail due to Construction and/or Deconstruction, provided those repairs were made by the Commercial Wind Energy Facility Owner. The Commercial Wind Energy Facility Owner will not be responsible for tile line repairs that the Commercial Wind Energy Facility Owner pays the Landowner to perform.

7. Rock Removal

The following rock removal procedures only pertain to rocks found in the uppermost 42 inches of soil, the common freeze zone in Illinois, which were exposed or brought to the site as a result of Construction and/or Deconstruction.

- A. Before replacing any topsoil, every effort will be taken to remove all rocks greater than 3 inches in any dimension from the surface of exposed subsoil.
- B. As topsoil is replaced, all rocks greater than 3 inches in any dimension will be removed from the topsoil.
- C. If trenching, blasting, or boring operations are required through rocky terrain, precautions will be taken to minimize the potential for oversized rocks to become interspersed with adjacent soil material.
- D. Rocks and soil containing rocks removed from the subsoil areas, topsoil, or from any excavations, will be hauled off the Landowner's premises or disposed of on the Landowner's premises at a location that is mutually acceptable to the Landowner and the Commercial Wind Energy Facility Owner.

8. Compaction and Rutting

- A. After the topsoil has been replaced, all areas that were traversed by vehicles and Construction and/or Deconstruction equipment will be ripped at least 18 inches deep and all pasture and woodland will be ripped at least 12 inches deep. The

existence of tile lines or underground utilities may necessitate less depth. The disturbed area will then be disked.

- B. Three passes will be made across any agricultural land that is ripped.
- C. All ripping and disking will be done at a time when the soil is dry enough for normal tillage operations to occur on land adjacent to the right-of-way.
- D. The Commercial Wind Energy Facility Owner will restore all rutted land to a condition as close as possible to its original condition.
- E. If there is any dispute between the Landowner and the Commercial Wind Energy Facility Owner as to what areas need to be ripped/disked or the depth at which compacted areas should be ripped/disked, the appropriate County Soil and Water Conservation District's opinion shall be considered by the Commercial Wind Energy Facility Owner and the Landowner.

9. Land Leveling

- A. Following the completion of Construction and/or Deconstruction of a Commercial Wind Energy Facility, the Commercial Wind Energy Facility Owner will utilize every effort to restore the disturbed area to its original pre-construction elevation and contour should uneven settling occur or surface drainage problems develop as a result of said activity.
- B. If, in the future, uneven settling occurs or surface drainage problems develop as a result of the Construction or Deconstruction of a Commercial Wind Energy Facility, the Commercial Wind Energy Facility Owner will provide such land leveling services within 45 days of a Landowner's written notice, weather and soil conditions permitting.
- C. If there is any dispute between the Landowner and the Commercial Wind Energy Facility Owner as to what areas need additional land leveling beyond that which is done at the time of Construction, the appropriate County Soil and Water Conservation District's opinion will be considered by the Commercial Wind Energy Facility Owner and the Landowner.

10. Prevention of Soil Erosion

- A. The Commercial Wind Energy Facility Owner will work with Landowners to prevent excessive erosion on land that has been disturbed by Construction or Deconstruction of a Commercial Wind Energy Facility. Consultation with the local Soil and Water Conservation District by the Commercial Wind Energy Facility Owner will take place to determine the appropriate methods will be implemented to control erosion. This is not a requirement, however, if the land is bare cropland that the Landowner intends to leave bare until the next crop is planted.
- B. If the Landowner and Commercial Wind Energy Facility Owner cannot agree upon a reasonable method to control erosion on the Landowner's right-of-way, the recommendations of the appropriate County Soil and Water Conservation District shall be considered by the Commercial Wind Energy Facility Owner and the Landowner.

11. Repair of Damaged Soil Conservation Practices

Consultation with the local Soil and Water Conservation District (SWCD) by the Commercial Wind Energy Facility Owner will be carried out to determine if there are soil conservation practices (such as terraces, grassed waterways, etc.) that will be damaged by the Construction and/or Deconstruction of a Commercial Wind Energy Facility. Those conservation practices will be restored to their preconstruction condition as close as reasonably practicable in accordance with SWCD standards.

12. Damages to Private Property

The Commercial Wind Energy Facility Owner will reasonably compensate Landowners for damages caused by the Commercial Wind Energy Facility Owner. Damage to Cropland will be reimbursed to the Landowner as prescribed in the applicable Underlying Agreement.

13. Clearing of Trees and Brush

- A. If trees are to be removed for the Construction or Deconstruction of a Commercial Wind Energy Facility, the Commercial Wind Energy Facility Owner will consult with the Landowner to determine if there are trees of commercial or other value to the Landowner.
- B. If there are trees of commercial or other value to the Landowner, the Commercial Wind Energy Facility Owner will allow the Landowner the right to retain ownership of the trees with the disposition of the trees to be negotiated prior to the commencement of land clearing.
- C. Unless otherwise restricted by federal, state or local regulations, the Commercial Wind Energy Facility Owner will follow the Landowner's desires regarding the removal and disposal of trees, brush, and stumps of no value to the Landowner by burning, burial, etc., or complete removal from any affected property.

14. Interference with Irrigation Systems

- A. If the Construction or Deconstruction of a Commercial Wind Energy Facility interrupts an operational (or soon to be operational) spray irrigation system, the Commercial Wind Energy Facility Owner will establish with the Landowner an acceptable amount of time the irrigation system may be out of service.
- B. If, as a result of Construction or Deconstruction of a Commercial Wind Energy Facility, an irrigation system interruption results in crop damages, the Landowner will be compensated for all such crop damages per the applicable Underlying Agreement.
- C. If it is feasible and mutually acceptable to the Commercial Wind Energy Facility Owner and the Landowner, temporary measures will be implemented to allow an irrigation system to continue to operate across land on which a Commercial Wind Energy Facility is also being Constructed or Deconstructed.

15. Access Roads

- A. Access roads will be designed to not impede surface drainage and will be built to minimize soil erosion on or near the access roads.

- B. Access roads may be left intact through mutual agreement of the Landowner and the Commercial Wind Energy Facility Owner unless otherwise restricted by federal, state, or local regulations after the Useful Life.
- C. If the access roads are removed, best efforts will be expended to assure that the land shall be restored to equivalent condition(s) as existed prior to their construction. All access roads that are removed shall be ripped to a depth of 18 inches. All ripping will be done consistent with Items 8.A. through 8.C.

16. Weed Control

- A. The Commercial Wind Energy Facility Owner will provide for weed control in a manner that prevents the spread of weeds onto adjacent lands used for agricultural purposes. Spraying will be done by a pesticide applicator that is appropriately licensed for doing such work in the State of Illinois.
- B. The Commercial Wind Energy Facility Owner will be responsible for reimbursing all reasonable costs incurred by owners of land adjacent to Commercial Wind Energy Facilities where it has been determined that weeds have spread from land impacted by the Facility.

17. Pumping of Water from Open Excavations

- A. In the event it becomes necessary to pump water from open excavations, the Commercial Wind Energy Facility Owner will pump the water in a manner that will avoid damaging adjacent agricultural land, crops, and/or pasture. Such damages include, but are not limited to: inundation of crops for more than 24 hours, deposition of sediment in ditches and other water courses, and the deposition of subsoil sediment and gravel in fields and pastures.
- B. If it is impossible to avoid water-related damages as described in Item 17.A. above, the Commercial Wind Energy Facility Owner will compensate the Landowner for damages to crops as prescribed in the applicable Underlying Agreement.
- C. All pumping of water shall comply with existing drainage laws, local ordinances relating to such activities, and provisions of the Clean Water Act.

18. Advance Notice of Access to Private Property

- A. The Commercial Wind Energy Facility Owner will provide the Landowner or tenant with a minimum of 24 hours prior notice before accessing his/her property for the purpose of Construction or Deconstruction of a Commercial Wind Energy Facility.
- B. Prior notice shall first consist of a personal contact, telephone contact or email contact, whereby the Landowner or tenant is informed of the Commercial Wind Energy Facility Owner's intent to access the land. If the Landowner or tenant cannot be reached in person or by telephone, the Commercial Wind Energy Facility Owner will mail or hand deliver to the Landowner or tenant's home a dated, written notice of the Commercial Wind Energy Facility Owner's intent. The Landowner or tenant need not acknowledge receipt of the written notice before the Commercial Wind Energy Facility Owner can enter the Landowner's property.

19. Indemnification

The Commercial Wind Energy Facility Owner will indemnify all Landowners, their heirs, successors, legal representatives, and assigns from and against all claims, injuries, suits, damages, costs, losses, and reasonable expenses resulting from or arising out of Construction and/or Deconstruction, including damage to such Commercial Wind Energy Facility or any of its appurtenances, except where claims, injuries, suits, damages, costs, losses, and expenses are caused by the negligence or intentional acts, or willful omissions of such Landowners, their heirs, successors, legal representatives, and assigns, whereby said Landowners will indemnify the Commercial Wind Energy Facility Owner, their heirs, successors, legal representatives, and assigns from and against said claims, injuries, suits, damages, costs, losses, and reasonable expenses.

20. Deconstruction of Commercial Wind Energy Facilities and Financial Assurance

- A. The Commercial Wind Energy Facility Owner shall, at its expense, complete Deconstruction of a Commercial Wind Energy Facility within eighteen (18) months after the end of the Useful Life of the Commercial Wind Energy Facility.
- B. Deconstruction of a Commercial Wind Energy Facility shall include the removal/disposition of the following equipment/facilities utilized for operation of the Commercial Wind Energy Facility and located on Landowner property:
 - 1. Wind Turbine towers and blades
 - 2. Wind Turbine generators
 - 3. Wind Turbine foundations (to depth of 5 feet)
 - 4. Transformers
 - 5. Collection/interconnection substation (components, cable, and steel foundations), provided, however, that electrical collection cables at a depth of 5 feet or greater may be left in place, if agreed to by Landowner.
 - 6. Overhead collection system
 - 7. Operations/maintenance buildings, spare parts buildings, and substation/switching gear buildings
 - 8. Access Road(s) (unless Landowner requests in writing that the access road is to remain)
 - 9. Operation/maintenance yard/staging area
 - 10. Debris and litter generated by deconstruction and deconstruction crews
- C. During the County permit process, the Commercial Wind Energy Facility Owner shall file with the County, a Deconstruction Plan. A second Deconstruction Plan shall be filed with the County on or before the end of the tenth year of the Commercial Operation Date.
- D. The Commercial Wind Energy Facility Owner shall provide the County with Financial Assurance to cover the estimated costs of Deconstruction of the Commercial Wind Energy Facility. Provision of this Financial Assurance shall be phased in over the first 11 years of the Project's operation as follows:
 - 1. On or before the first anniversary of the Commercial Operation Date, the Commercial Wind Energy Facility Owner shall provide the County with

Financial Assurance to cover ten (10) percent of the estimated costs of Deconstruction of the Commercial Wind Energy Facility as determined in the Deconstruction Plan provided during the county permit process.

- 2. On or before the sixth anniversary of the Commercial Operation Date, the Commercial Wind Energy Facility Owner shall provide the County with Financial Assurance to cover fifty (50) percent of the estimated costs of Deconstruction of the Commercial Wind Energy Facility as determined in the Deconstruction Plan provided during the county permit process.**
- 3. On or before the eleventh anniversary of the Commercial Operation Date, the Commercial Wind Energy Facility Owner shall provide the County with Financial Assurance to cover one hundred (100) percent of the estimated costs of Deconstruction of the Commercial Wind Energy Facility as determined in the Deconstruction Plan provided during the tenth year of the Commercial Operation Date.**

The Financial Assurance shall not release the surety from liability until the Financial Assurance is replaced. The use of salvage value as a setoff is dependent upon an agreement by the Commercial Wind Energy Facility Owner that all interests in the salvage value are subordinate to that of the County if Abandonment occurs.


- E. The County shall reevaluate the estimated costs of Deconstruction of any Commercial Wind Energy Facility after the tenth anniversary, and every five years thereafter, of the Commercial Operation Date. Based on any reevaluation, the County may require changes in the level of Financial Assurance used to calculate the phased coverages described in Section 20 D. required from the Commercial Wind Energy Facility Owner. If the County is unable to its satisfaction to perform the investigations necessary to approve the Deconstruction Plan filed by the Commercial Wind Energy Facility Owner, then the County may select a separate Professional Engineer independent of the Commercial Wind Energy Facility Owner to conduct any necessary investigations. The Commercial Wind Energy Facility Owner shall be responsible for the cost of any such investigations.**
- F. Upon Abandonment, the County may take all appropriate actions for Deconstruction, including drawing upon the Financial Assurance.**

Concurrence of the Parties to this Agreement

The Illinois Department of Agriculture and Twin Forks Wind Farm, LLC concur that this Agreement is the complete Agreement governing the mitigation of agricultural impacts that may result from the construction of the wind farm project.

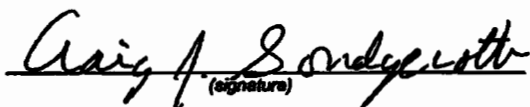
The effective date of this Agreement commences on the date of execution.

STATE OF ILLINOIS
DEPARTMENT OF AGRICULTURE



(signature)

Philip Nelson, Director



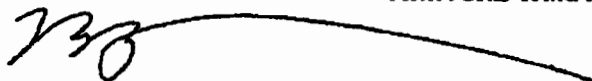
(signature)

By Craig Sondgeroth, General Counsel

State Fairgrounds
801 Sangamon Avenue
Springfield, IL 62702

August 5, 2015

Twin Forks Wind Farm, LLC.

A handwritten signature in black ink, appearing to read 'P. Bowman', is written over a horizontal line.

(signature)

Paul Bowman, Head of Development Onshore NA

**353 N. Clark Street, 30th Floor
Chicago, IL 60654**

August 5, 2015

Exhibit #3

Professional Qualifications

Michael Hankard



Education:

B.S., Electrical Engineering
University of Maine, 1990

Professional Affiliations:

Institute of Noise Control Engineering
Acoustical Society of America

Agency Experience:

Public Service Commissions (various)
World Bank
Federal Highway Administration
Colorado Department of Transportation
U.S. EPA
Numerous Cities and Counties

Background:

Mr. Hankard has been practicing in the fields of acoustics and noise control engineering for the past 25 years. In 1996 he started and remains president of Hankard Environmental Inc. The firm consults in environmental noise and has successfully completed over 400 projects relating to wind turbines, other power generation facilities, oil and gas extraction facilities, highways, mines, entertainment venues, and land development projects.

Mr. Hankard has experience in almost all aspects of environmental noise, including field measurements, predictions, impact assessments, and mitigation design. He has conducted and managed ambient noise surveys lasting from days to years, used a variety of models to predict noise from wind turbines, roadways, and industrial facilities, and designed a wide variety of mitigation measures such as walls, enclosures, baffles, and silencers.

Vibration experience includes the measurement and prediction of ground-borne and structure-borne levels from sources such as rail lines, blasting, and roadways; and the assessment of impact according to internationally accepted methods and standards.

Wind Turbine Acoustics Experience:

Noise Level Compliance Measurements

Mr. Hankard has conducted some of the most extensive utility-scale wind turbine noise compliance measurements in the U.S. Wind turbine measurements present unique challenges due to the need to measure for long periods of time, in windy environments, down lower in frequency than is otherwise typical, and to separate turbine from non-turbine noise. Built on 25 years of measurement experience, he has developed simple, effective, noise monitoring systems that maintain their accuracy over weeks, months, and even years of continuous outdoor measurements, including protecting the microphones from both wind and precipitation. Low frequency noise is measured accurately by understanding windscreen characteristics and microphone sensitivities. Mr. Hankard has developed his own unique methods of separating turbine and non-turbine noise using time, frequency, turbine on/off analyses, and comparing noise levels and operating conditions. This is critically important in assessing compliance.

Ambient Noise Measurements

Mr. Hankard has conducted over 100 ambient sound surveys for the power generation, land development, mining, and other industries. His experience includes the design, execution, and reporting of these studies. Ambient surveys for wind turbine projects are particularly challenging due to the need to measure in a wide variety of windy conditions. A successful study begins with the careful consideration of the project environs, the relative location of turbines and residences, applicable regulations, turbine type, and potential seasonal fluctuations. The selection of the measurement locations is paramount, as is the need to possibly measure for weeks to months at a time, wind screen selection, and microphone mounting and placement. Finally, the analysis of the data is complex, needing to separate ambient sounds from those made by the wind, those resulting from microphone-wind interaction, and transient events.

Low Frequency Noise

LFN, extending from about 20 to 200 Hertz and infrasound (0 to 20 Hz) is often an issue raised on some wind turbine projects and must be addressed. Mr. Hankard continuously reviews the U.S. and International published research on these topics, including measurement techniques and results, compliance assessments, health impacts, and court cases. He has represented clients at public service commission hearings as an expert on noise, including LFN and infrasound. He has measured interior and exterior LFN on multiple utility-scale wind turbine projects.

Modeling

Mr. Hankard has an in-depth understanding of the proper way to model wind turbine noise. The size of this source, as well as its distributed nature and other attributes, make it a non-traditional source to model. He understands the differences between modeling methods (ISO 9613-2, Nord2000, CONCAWE, etc.), the different settings to be used within these methods (ground type, propagation rate, directivity, low frequency considerations), variation in sound power levels determined using IEC 61400-11, and the different results all of these factors can produce.

Representative Projects

Mr. Hankard was the lead consultant for the acoustical aspects of the following projects:
California Ridge Wind Energy Center, Illinois: IPCB Compliance Measurements (2013)
Willow Creek Energy Center, Oregon: Long-term compliance monitoring (present)
Highland Wind, Wisconsin: Ambient survey, Public Service Commission testimony (present)
Shirley Wind, Wisconsin: Ambient noise measurements and compliance testing (2010 to 2012)
Forward Energy, Wisconsin: Post construction compliance testing (2008)
Pleasant Ridge Wind, Illinois: Noise level predictions (2014)
Apple Blossom Wind, Michigan: Ambient measurements and modeling (2014)
Spring Canyon Wind: Noise level predictions (2013)
Ledge Wind, Wisconsin: Ambient noise measurements (2009)
High Sheldon, New York: Compliance noise measurements (2009)

CURRICULUM VITAE

Name: Mark A. Roberts, M.D., Ph.D., FACOEM
Principal Scientist, Health Practice

Address: Exponent
525 West Monroe Street
Suite 1050
Chicago, Illinois 60661
Telephone: 312 999 4202
Facsimile: 312 999 4299
Cell: 312 961 9391
E-mail: mroberts@exponent.com

EDUCATION

1967-69 A.S. Pre-Veterinary Medicine. Murray State College, Tishomingo, OK
1969-71 B.S. Zoology. University of Oklahoma, Norman, OK
1971-72 M.Ed. Higher Education, Student Personnel Services, University of Oklahoma, Norman, OK
1972-74 M.P.H. Biostatistics and Epidemiology. University of Oklahoma, Health Sciences Center, Oklahoma City, OK
1974-79 Ph.D. Biostatistics and Epidemiology. University of Oklahoma, Health Sciences Center, Oklahoma City, OK
1982-86 M.D. College of Medicine. University of Oklahoma, Health Sciences Center, Oklahoma City, OK

POST GRADUATE TRAINING

1986-87 Intern, Family Medicine, University of Oklahoma, Health Sciences Center, Oklahoma City, OK
1987-89 Resident Occupational Medicine Program University of Oklahoma, Health Sciences Center, Oklahoma City, OK
1989-90 Research Fellow in Occupational Medicine Program University of Oklahoma, Health Science Center Oklahoma City, OK
1990 American College of Occupational Medicine, Medical Review Officer Training Course for Urine Drug Testing, October 12-13, 1990, Pittsburgh, PA
1996 American College of Occupational and Environmental Medicine, Medical Review Officer Refresher Course, October 27, 1996, Toronto, Ontario, Canada

MEDICAL SPECIALTY BOARD CERTIFICATION

1991-present American Board of Preventive Medicine, Occupational Medicine

LICENSURE

1988-present Oklahoma 16402
1990-present Wisconsin 31165
1998-present Illinois 0036-098014

PROFESSIONAL EXPERIENCE

1972-1979 Staff Positions, Epidemiology Program, Division of Communicable Disease Control, Oklahoma State Department of Health, Oklahoma City, OK.

1979-1982 State Epidemiologist and Chief of the Epidemiology Service, Oklahoma State Department of Health, Oklahoma City, OK.

1982-1986 Consultant Environmental Epidemiologist, Environmental Health Services, Oklahoma State Department of Health, Oklahoma City, OK.

1987-1990 Medical/Environmental Epidemiologist, Environmental Health Services, Oklahoma State Department of Health, Oklahoma City, OK.

1990-1996 Assistant Professor, Medical College of Wisconsin, Department of Preventive Medicine, Milwaukee, WI.

1991-1997 Medical Director, Employee Health Services, Miller Brewery, Aldrich Chemicals, St. Mary's Hospital, Wisconsin Centrifugal and Wisconsin Bell Milwaukee, WI.

1994-1997 Residency Programs Director, Medical College of Wisconsin, Department of Preventive Medicine, Milwaukee, WI.

1994-1997 Assistant Professor, Medical College of Wisconsin, Health Policy Institute (Epidemiology), Milwaukee, WI.

1995-1997 Acting Chairman, Medical College of Wisconsin, Department of Preventive Medicine, Milwaukee, WI.

1995-1997 Medical Consultant, Rowan & Blewitt, Inc., Washington, DC.

1996-1997 Associate Professor, Medical College of Wisconsin, Department of Preventive Medicine, Milwaukee, WI.

1996-1997 Medical Director, Medical College of Wisconsin, Occupational Health Clinic, Milwaukee, WI.

1996-1997 Medical Advisor to Administrative Law Judge, Social Security Administration, Office of Hearings and Appeals, Milwaukee, WI.

1997-1998 Associate Corporate Medical Director, Amoco Corporation, Chicago, IL.

1998-2000 Associate Corporate Medical Director and Regional Medical Advisor for North America, BP Inc., London, UK.

2000- 2003 Corporate Medical Director and Regional Medical Advisor for North America, BP Inc., London, UK.

2003-2007 Senior Managing Scientist, Exponent, Chicago, IL.

2007-present Medical Advisor, West Allis Health Department, West Allis, WI.

2007-present Medical Advisor, Wauwatosa Health Department, Wauwatosa, WI.

2007-present Principal Scientist, Health Practice, Exponent, Chicago, IL.

PROFESSIONAL EXPERIENCE (continued)

- 2009-2015 Director, Exponent Center for Occupational and Environmental Health
2010-present Member, Exponent Institutional Review Board (IRB)
2011-present Member, Exponent Safety Committee

BOARDS, PANELS, COMMITTEES AND DIRECTORSHIPS

- 1990- 1995 Health Studies Review Group, Agency for Toxic Substances and Disease Registry, Division of Health Studies, Atlanta, GA.
1991- 1996 Member, Public Health Committee, Medical Society of Milwaukee County, Milwaukee, WI.
1991- 1994 Member, Commission on Environmental and Occupational Health, State Medical Society of Wisconsin, Madison, WI.
1991-1998 Representative of the State Medical Society, Wisconsin Hospital Association's Task Force on Environmental Issues, Madison, WI.
1991-1992 Special Committee on Medical Waste Disposal, Wisconsin Department of Natural Resources, Madison, WI.
1991- 1993 Member of Public Health Advisory Forum, Wisconsin Department of Health and Social Services, Division Health, Madison, WI.
1992-1997 Member, Environmental Medicine Committee, American College of Occupational and Environmental Medicine, Arlington Heights, IL.
1993-1997 Chairman, Committee on Liaison with Governmental Agencies, Council on External Affairs, American College of Occupational and Environmental Medicine, Arlington Heights, IL.
1994-1998 Chairman, Commission on Environmental and Occupational Health, State Medical Society of Wisconsin, Madison, WI.
1994-1998 Member, Great Lake Fish Consumption Advisory Protocol Panel, Michigan Environmental Science Board, Lansing, MI.
1995-1998 Member, Board of Scientific Counselors, Agency for Toxic Substances and Disease Registry, Atlanta, GA.
1995-1996 Member, Institutional Strategic Plan Task Force, Education Task Force for the Medical College of Wisconsin, Milwaukee, WI.
1995-1996 Member, Rehabilitation Center Task Force, Medical College of Wisconsin, Milwaukee, Wisconsin.
2000-2007 Member, Board of Directors, American College of Occupational and Environmental Medicine, Chicago, IL.
2008-2011 Member, Board of Directors, American College of Occupational and Environmental Medicine, Chicago, IL.
2001-2002 Member, Board of Directors, Vysis, Inc, Downers Grove, IL.
2004-2010 Member, Institute of Medicine of Chicago, Chicago, IL
2005-2006 Treasure, Medical Directors Club of Chicago, Chicago, IL
2006-2007 President, Medical Directors Club of Chicago, Chicago, IL
2008-present Associate Clinical Professor, Institute of Health and Society, Medical College of Wisconsin, Milwaukee, WI
2010-Present Board of Directors, Chicago Section of American Industrial Hygiene Association, Chicago, IL

BOARDS, PANELS, COMMITTEES AND DIRECTORSHIPS (continued)

- 2010-Present Advisory Board member, Illinois Occupational Surveillance Program at the University of Illinois at Chicago, Environmental and Occupational Health Science Division
- 2010-Present Residency Advisory Committee, University of Illinois at Chicago, Occupational Medicine Residency Program, Chicago, IL
- 2011-Present Board of Governors, Central States Occupational & Environmental Health Association, Chicago, IL
- 2012- 2013 Committee on Potential Health Risks from Recurrent Lead Exposure to DOD Firing Range Personnel, National Research Council, National Academies, Washington, DC
- 2013-2014 Vice President, American College of Occupational and Environmental Medicine, Arlington Heights, IL
- 2015-present President, American College of Occupational and Environmental Medicine, Arlington Heights, IL

PUBLICATIONS

Editor, Oklahoma Communicable Disease Bulletin, a weekly publication covering current topics of public health interest. 1977-82.

Saah A., Mallonee J., Tarpay M., Thornsberry C., Roberts M., Rhoades E. "Relative Resistance to Penicillin in Pneumococcus: A Prevalence and Control Study," J. Am. Med. Assoc., Volume 243, Number 18, 1980, pp. 1824-1827.

Bernard K., Roberts M., Sumner J., Winkler G., Mallonee J., Baer G., Chaney R. "Human Diploid Cell Rabies Vaccine," J. Am. Med. Assoc., Volume 247, Number 8, 1981, pp. 1138-1142.

Morton D., Saah A., Silberg S., Owens W., Roberts M. "Lead Absorption Among Children of Employees in a Lead Related Industry," Am. J. Epid., Volume 115, Number 4, April 1982, pp.549-555.

Vernon A., Thacker S., Roberts M., Mallonee J., Beauchamp H. "Rabies in Oklahoma: An Epidemiologic View of the Problem in Animals," J. Okla. State Med. Assoc., Volume 76, Number 8, August 1982, pp. 293-299.

Helmick C., Vernon A., Schwartz S., Ward M., Roberts M. "Rabies in Oklahoma: Report of a Human Case," J. Okla. State Medical Assoc., Volume 76, Number 8, August 1982, pp. 287-292.

Tacket C., Barrett T., Mann J., Roberts M., Blake P. "Wound Infection Caused by *Vulnificus*, A Marine *Vibrio*, In Inland Areas of the United States," J. Clin. Micro., 1984, Volume 19, pp.97-99.

Felsenfeld A, Roberts M. "A Report of Fluorosis in the United States Secondary to Drinking Well Water," J. Am. Med. Assoc., Volume 265, Number 4, January 1991, pp. 486-488.

PUBLICATIONS (continued)

Roberts M., O'Brien M. "Public Health and the Environment: Where Do We Go From Here?" Invited Article, Wisconsin Public Health Association Newsletter, Milwaukee, Wisconsin, March 1994.

Clarke C., Mowat F., Kelsh M., Roberts M. "Pleural Plaques: A Review Of Diagnostic Issues And Possible Non-Asbestos Factor," Arch. Env. & Occ. Health, Vol. 61, Number 4, July/August 2006, pg. 183-192.

Alexander D., Cushing C., Lowe K., Scurman B., Roberts M. "Meta-analysis of animal fat or animal protein intake and colorectal cancer," Am. J. Clin. Nutr. 2009;89:1-8.

Hymel P, Loepke, R., Baase, C., Burton, W., Hartenbaum, N., Hudson, W., McLellan, R., Mueller, K., Roberts, M., Yarborough, C., Konicki, D., and Larson, P., "Workplace Health Protection and Promotion: A New Pathway for a Healthier and Safer Workforce," J. Occ & Env Health Vol. 53, Number 6, June 2011, pp. 695-702

Roberts, J., Roberts, M., "Wind Turbines: is there a human risk," J. Env. Health, Vol. 75, Number 8, April 8, 2013.

BOOK CHAPTERS

Roberts M., "Role of Aviation in the Transmission of Disease," Fundamentals of Aerospace Medicine, Second Edition, 1996, Chapter 33, pp. 1003-1015.

Hudson, TW, Roberts, M., "Corporate Response to Terrorism," in Clinics in Occupational and Environmental Medicine, "Terrorism: Biological, Chemical and Nuclear, Volume 2, Number 2, February 2003, pages 389-404.

REPORTS/SURVEYS

Roberts, M., Walker F., "Cancer Cluster Investigation in Ponca City Oklahoma," Oklahoma State Department of Health, 1988, Oklahoma City, OK.

Greaves W., Roberts M., Moore S. "Investigation of Employee Health," November 1990, Modine Manufacturing Company, Emporia, KS.

Roberts, M., "Medical Waste Disposal in the State of Wisconsin: A Report of the Special Committee on Medical Waste Disposal, "Report to the Wisconsin Legislature, PUBL-AM-068-91, October 23, 1991, Madison, WI.

Roberts M., "Investigation of Suspected Building Associated Illness in a Public School Building," December 1993, Milwaukee, WI.

Roberts M., Cohen S. "Cancer Mortality Studies of a Petroleum Refinery Employee Cohort," January 1994, Milwaukee, WI.

Roberts M., Cohen S. "Utility of Health Surveillance in a Petroleum Refinery Employee Cohort," April 1994, Milwaukee, WI.

Roberts M., Kitscha D & Blessinger J. "Cohort Mortality Study Update of Employees at the Velsicol Chattanooga Plant 1943-1992," Milwaukee, WI.

REPORTS/SURVEYS (continued)

Fischer L., Bolger P., Calson G., Jacobson J., Knuth B., Radike M., Roberts M., Thomas P., Wallace K., Harrison K. "Critical Review of a Proposed Uniform Great Lakes Fish Advisory Protocol," September, 1995. Michigan Environmental Science Board, Lansing, MI.

Roberts M., Kitscha D. "Evaluation of Respiratory Complaints Associated with Metal Milling Processes," Milwaukee, WI. August 1996

Roberts M., Kitscha D. "Evaluation of Indoor Air Quality in a Public School Setting: A Case Control Study," Kenosha, WI. October 1996

Roberts, M. "Evaluation of the Scientific Literature on the Health Effects Associated with Wind Turbines and Low Frequency Sound", prepare for Wisconsin Electrical Power Company (WEPCO), October 29, 2009, Milwaukee, WI.

COURSE STUDY GUIDES

For Distance Learning Program

Roberts, M., "Environmental Health: A Study Guide," Academic Program in Occupational Medicine, Medical College of Wisconsin, August 1992, Milwaukee, WI.

Roberts, M., O'Brien, M. "Biostatistics: A Study Guide," Academic Program in Occupational Medicine, Medical College of Wisconsin, April 1994, Milwaukee, WI.

PRESENTATIONS

"Preliminary Report on a Statewide Rabies Pre-exposure Prophylaxis Program," The International Northwestern Conference on Diseases in Nature Communicable to Man, August 12-14, 1974, Boise, ID.

"Geographical and Ecological Distribution of Rocky Mountain Spotted Fever in Oklahoma," Twenty-seventh Annual Southwest Conference on Diseases in Nature Transmissible to Man, March 10-11, 1977, Austin, TX.

"Foodborne Illness Incidence and Investigation," National Society of Professional Sanitarians' Annual Meeting, November 1-3, 1979, Springfield, MO.

"A Serosurvey of *Brucella canis* Antibody Titers in Dogs and Their Owners," Thirtieth Annual Southwest Conference on Diseases in Nature Transmissible to Man, March 27-28, 1980, Temple, TX.

"A Human Rabies Case in Oklahoma," Thirty-second Annual Southwest Conference on Diseases in Nature Transmissible to Man, March 25-26, 1982, Austin, TX.

"On the Other Side of the Fence," Seventy-fourth meeting, American Occupational Health Conference, April 29-May 5, 1989, Boston, MA.

"Indoor Air Pollution - Update," University of Tulsa Division of Continuing Education and the Center for Environmental Research and Technology, May 8-9, 1989, Oklahoma City, OK.

PRESENTATIONS (continued)

"Issues and Decisions in Environmental Health," University of Oklahoma Academy of Retired Professors, Sept 26, 1989, Norman, OK.

"Balancing Public Health and Environmental Health," Oklahoma Society of Professional Sanitarians. October 12, 1989, Oklahoma City, OK.

"Occupational Health and Epidemiology," University of Oklahoma, College of Public Health, Alumni Day 1989, Oklahoma City, OK.

"Environmental Aspects of Economic Development: Realities vs. Perceptions," Leadership Oklahoma 1990, March 2, 1990, Ponca City, OK.

"Occupational Health Team Members and Resources," Practical Approaches to Occupational Medicine, March 3, 1990, Oklahoma City, OK.

"Putting Environmental Health Back in Public Health," South Carolina Public Health Association Annual Meeting, May 24, 1990. Myrtle Beach, S.C.

"Board Certification in Occupational Medicine," Industrial Epidemiology Forum, May 1990, Salt Lake City, UT.

"Environmental Epidemiology in Relation to Occupational Medicine," Midwestern Medical Director's Association (Insurance Medicine), October 26, 1990, Wausau, WI.

"Environmental Medicine: Fact or Fantasy," Oklahoma College of Occupational Medicine, Fifteenth Annual Fall Educational Meeting, November 2-3, 1990, Edmond, OK.

"Drug Testing in the Workplace," 21st Annual Winter Refresher Course for Family Physicians, January 21, 1991, Milwaukee, WI.

"Risk Communication: Challenge of Today's Society," Oklahoma Public Health Association Annual Meeting, April 4, 1991, Tulsa, OK.

"Social, Political and Legal Aspects of Environmental Health," American College of Occupational Medicine, State of the Art Conference, Seminar Director, October 28, 1991, St. Louis, MO.

"Workplace Standards Applied to the Non-Workplace Population," American College of Occupational Medicine, State of the Art Conference, October 31, 1991, St. Louis, MO.

"Strategic Planning for the Americans with Disabilities Act," Hospital Council of Greater Milwaukee Area, Co-Director, March 31, 1992., Milwaukee, WI.

"Health and Safety in the Health Care Workplace," Krukowski & Costello, S.C., Guest Speaker, June 6, 1992, Oconomowoc, WI.

"Trials and Tribulations of Occupational Medicine in Primary Care," Family Health Plan's Eight Annual Family Practice Symposium, Invited Speaker, August 5, 1992, Milwaukee, WI.

"Business Partnership Opportunities in Occupational and Environmental Medicine," Discussion Leader, Governor's Forum on Technological Transfer and Business Partnerships, September 24, 1992, Milwaukee, WI.

PRESENTATIONS (continued)

"Effects of the Americans with Disability Act on Industry," Wisconsin State Association of Occupational Health Nurses, 6th Annual Meeting, Invited Speaker, October 8, 1992, LaCrosse, WI.

"Community TB Control: The Good, the Bad and the Ugly," American Lung Associations' conference "TB in the '90s: An Aberration or an Epidemic?", Invited Speaker, October 16, 1992, Madison, WI.

"Occupational Medicine in the Hospital Setting," Medical Grand Rounds Williamsport Hospital & Medical Center, Invited Speaker, April 16, 1993, Williamsport PA.

"Sick Building Syndrome: Fact or Fantasy?" Milwaukee Area Medical Directors' Association, January 23, 1994, Milwaukee, WI.

"Biological Monitoring from the Industrial Viewpoint," American Occupational Health Conference, April 15-22, 1994, Chicago, IL.

"Biological Monitoring," Session Moderator, American Occupational Health Conference, April 15-22, 1994, Chicago, IL.

"Occupational Health: Resolve to Reform," Keynote Address, Southeastern Wisconsin Association of Occupational Nurses Annual Meeting, May 11, 1994, Milwaukee, WI.

"ADA Issues in the Hospital Setting," St. Mary's Hospital Administrative Staff, January 11, 1995, Milwaukee, WI.

"Update on the Clinical and Epidemiological Aspects of Indoor Air Complaints," Indoor Air Quality Seminar, January 19, 1995, Madison, WI.

"Plugging Occupational and Environmental Concepts into Medical Schools," ACOEM Session #137, "Integrating Environmental Health into Medical School Curricula," April 28-May 5, 1995, Las Vegas, NV.

"Bloodborne Pathogens: The Standard and Its Implementation," Milwaukee Area Medical Directors' Association, May 18, 1995, Milwaukee, WI.

"The Clinical Importance of Sick Building Syndrome," University of Oklahoma College of Medicine, Department of Family Medicine, Grand Rounds, August 24, 1995, Oklahoma City, OK.

"Psychological Factors in Occupational Medicine and Rehabilitation," Milwaukee Psychiatric Hospital, Invited Speaker, Contemporary Issues in Mental Health and Addiction Medicine, September 6, 1995, Milwaukee, WI.

"Multiple Chemical Sensitivity," Wisconsin State Association of Occupational Health Nurses, 8th Annual Meeting, Invited Speaker, October 4, 1995, Egg Harbor, WI.

"Health Problems Associated with Pesticide Contaminated Well Water" Conference on Common Rural and Agricultural Health Problems, sponsored by the Marshfield Clinic, May 9, 1996 Madison, WI.

"Indoor Air Complaint Evaluations: An Update", Central States Occupational Medicine Association, September 28, 1996, Milwaukee, WI.

PRESENTATIONS (continued)

“Summer and Vacation Safety,” Milwaukee Area Safety Council, May 2, 1997, Milwaukee, WI.

“Basic Safety & Health for Occupational Health Practitioners,” Veterans Affairs Medical Center, September 12, 1997, Little Rock, AR.

“Epidemiological Issues in Welding Fume Exposure.” Harris Martin Welding Rods Conference, June 16th, 2004, San Francisco, CA.

“Silica: Complex Made Simple,” Ohio Association of Civil Trial Attorneys Asbestos & Silica Litigation Conference, September 29, 2004, Cleveland, OH.

“Diagnosing and Proving Manganese Exposure.” Mealey’s Welding Rod Litigation Conference, October 8, 2004, West Palm Beach, Florida.

“Epidemiological Issues in Welding Fume Exposure.” Mealey’s Welding Rod Litigation Conference, November 15, 2004, New Orleans, LA.

“Welding Rod Litigation: A Primer on the Legal and Medical/Science Issues,” DRI Telephone Conference, March 8th, 2005, Chicago, IL.

“Diagnosing and Proving Manganese Exposure.” ACI Second National Forum on Welding Rod Litigation, June 20, 2005, Chicago, IL.

“What’s the Next Deep Pocket Mass Tort to Hit the Automotive Industry?” Product Liability-Hot Topics Seminar for Defense Counsel, September 14, 2005, Troy, MI.

“Emerging Health Issues in Welding.” Chicago Section AIHA and Northeastern IL Chapter of ASSE, November 16, 2005, Palatine, IL.

“Rules of the Communication Road.” AIHce 2007 Roundtable “Communicating Risk / Communicating Cause,” June 6, 2007, Philadelphia, PA.

“Integration of Health and Productivity Programs with Safety Performance” CICI Conference, November 27, 2007, Willowbrook, IL.

“Advanced Epidemiology: The Good, The Bad and The Ugly,” DRI Complex Medicine Seminar, November 13, 2008, San Diego, CA.

“Careers in Occupational and Environmental Health: Public Health, Corporate Practice, Academia or Consulting?” UIC Occupational and Environmental Medicine Conference, March 4, 2009, Chicago, IL.

“Occupational and Environmental Health: Challenges in Public Health, Corporate Practice, Academia and Consulting?” UIC Occupational and Environmental Medicine Conference, August 18, 2010, Chicago, IL.

“Weighty Issues in the Workplace” Central States Occupational & Environmental Medicine, Spring 2013 Meeting, March 15, 2013, Lisle, IL.

“Weighty Issues in the Workplace” WorkSafe Iowa Spring 2013 Network Meeting Heartland Center for Occupational Health and Safety, University of Iowa College of Public Health, Cedar Rapids, IA May 2, 2013

PRESENTATIONS (continued)

"Natural gas extraction -Rising energy demands mandate a multi-perspective approach"
AIHA 2013 Fall Conference Workshop, Miami, FL October 1, 2013

POSTER SESSIONS

Roberts M. "TOMES/CCIS Computerized Information Systems," Health Information Technology Symposium, Medical College of Wisconsin, November 8, 1990, Milwaukee, WI.

Roberts M., Lindemann J, Simpson D., and Tyborski M. "Computerization of the Educator's Portfolio," Central Group on Educational Affairs, Innovations in Medical Education, Central Region Research in Medical Education, April 22, 1994, Chicago, IL.

Roberts M.M., Parks TJ, Wertsch JJ, and Roberts M.A., "Ulnar Sensory Responses in the Elderly", American Academy of Electromyography, Annual Scientific Meeting, September 30-October 1, 1994, San Francisco, CA.

Roberts M.M., Parks TJ, Wertsch JJ, Roberts M.A. "Median, Ulnar, and Radial Sensory Responses in the Elderly," American Academy of Electromyography, Annual Scientific Meeting, September 30-October 1, 1994, San Francisco, CA.

Roberts M., Lindemann J, Simpson D, and Tyborski M "Results of Beta Testing of the Computerized Version of the Educator's Portfolio, 33rd Annual Research in Medical Education Conference, Association of American Medical Colleges, October 30-November 1, 1994, Boston, Massachusetts.

Lindeman J., Roberts M., Simpson D. The Educator's Portfolio: Beta testing of the Computerized Version, Electronic Poster Session, 28th Annual STFM Spring Conference, New Orleans, 1995.

ABSTRACTS

Hegmann KT, Greaves W., Moore SJ, Roberts M. "Case-Control Study of Respiratory and Reproductive Symptoms at an Automobile Parts Manufacturing Facility." Accepted for Society for Epidemiological Research, June 15-18, 1994, Miami Beach, FL.

Alexander D., Cushing C., Roberts M. Quantitative assessment of red and processed meat intake and kidney cancer. Experimental Biology, New Orleans, LA 2009.

EDUCATIONAL ACTIVITIES

Undergraduate

- 1992-97 Lecturer, M-3 Ambulatory Medicine Course, Topic "Low Back and Shoulder Examination"
- 1992-97 Lecturer, M-1 Gross Anatomy, Topic "Plug in Concepts related to Low Back Pain," includes a series of 4 team-taught lectures.
- 1994-97 Senior Elective Preceptor & M-1 Mentor Program, Occupational & Environmental Medicine Medical College of Wisconsin.

Graduate

- 1992-98 MPH Student Project Advisor, Distance Learning Program at Medical College of Wisconsin

Graduate (continued)

- 1992-98 Epidemiology Course Coordinator and Primary Instructor, Master's Degree in Public Health, Medical College of Wisconsin, Department of Preventive Medicine, Milwaukee, Wisconsin (Ave 49 students per trimester.)
- 1992-98 Environmental Health Course Coordinator and Primary Instructor, Masters Degree in Public Health, Medical College of Wisconsin, Department of Preventive Medicine, Milwaukee, Wisconsin (Ave 36 students per trimester).
- 1992-1994 Biostatistics Course Coordinator and Primary Instructor, Master's Degree in Public Health, Medical College of Wisconsin, Department of Preventive Medicine, Milwaukee, Wisconsin (Ave 34 students per trimester).
- 1992-97 Waukesha Memorial Hospital Family Medicine Residency Program, Resident supervisor for rotations in Occupational Medicine.
- 1993-97 Columbia Family Practice Residency Program, Resident supervisor for rotations in Occupational Medicine.
- 1995 Course Director and lecturer, Basic Curriculum in Occupational Medicine Part II presented to physicians attending the American College of Occupational and Environmental Medicine Meeting, October 21-22, 1995 Seattle, Washington.
- 1995-99 Lecturer, Basic Curriculum in Occupational Medicine Part II presented to physicians attending the American College of Occupational and Environmental Medicine Meetings

CME Courses

- Video Production- "Musculoskeletal Workshop Low Back/Shoulder Exam," a one hour presentation distributed by the Division of Educational Services, Medical College of Wisconsin, 1994.
- Employee Health Services in the Hospital Setting, American Practitioners of Infection Control and Epidemiology, St. Michael's Hospital, October 6, 1994.

Educational Software Development

- Educator's Portfolio --Directed the development of a computer software package to track educational activities of faculty members

Professional Courses and Educational Programs

- 2000-present Various positions on the American College of Occupational & Environmental Medicine, Council of Education.
- 2011-present Course Co-Chairman, American College of Occupational & Environmental Medicine, Foundation Courses in Occupational & Environmental Medicine.
- 2013 Program Co-Chairman, Spring Meeting of Central States Occupational & Environmental Medicine, Lisle, IL.

OTHER EDUCATIONAL ACTIVITIES

Community Service Media Relations

- 1994-97 Seminars and Presentations related to Media Interaction
"Working with the Media," Medical College of Wisconsin Symposium, Milwaukee, Wisconsin, September 20, 1995.

National Television

Public Broadcast System (PBS) Series "The World Can Make You Sick," Milwaukee, Wisconsin, November 19, 1993.

CNN News "A Health and Safe Thanksgiving," a five part series on preparation for Thanksgiving produced here in Milwaukee and aired on nationally on CNN November 28, 1996.

TiP-TV "Keys to Good Health: Wellness Programs & Preventive Medicine," June 6, 1997, 2:00-3:30 CTD, General Electric Company, 900 sites worldwide and approximately 15,000 participants.

Educational Outreach Video Conference, Managing Your Health & Health Care Program, "Maintaining a Healthy Lifestyle," a 2 ½ hour broadcast presentation, Brookfield, Wisconsin, November 21, 1996.

Moderator, Spring Educational Outreach Program, Children's' Health and Parenting, "Perinatal to Newborn," a 2 ½ hour broadcast presentation, Brookfield, Wisconsin, April 3, 1997.

Moderator, Spring Educational Outreach Program, Children's' Health and Parenting, "Elementary School Ages," a 2 ½ hour broadcast presentation, Brookfield, Wisconsin, April 17, 1997.

Local Television

1994-97 Write and Co-produce twice weekly segments addressing public health and clinical issues for WITI Channel 6 TV viewing audience estimated at 37,000 in greater Milwaukee area.

Radio (Commercial and Public Stations)

1992-97 Frequent contributor to issues related to Preventive Medicine and Public Health for the Milwaukee radio market.

WTMJ-AM 620 Noon Show "Industrial, Environmental, and Occupational Medicine," July 18, 1994.

PBS Kathleen Dunn, Kathleen Dunn Show, WHAD-FM Wisconsin Public Radio discussing "Ebola Virus in Africa."

PROFESSIONAL SOCIETIES

American College of Occupational and Environmental Medicine
Central States Occupational and Environmental Medical Association
Chicago Area Medical Directors Association
American Industrial Hygiene Association
American Conference of Governmental Industrial Hygienists

REFERENCES UPON REQUEST

2014 WL 1364453

Only the Westlaw citation is currently available.

United States District Court,
S.D. California.

THE PROTECT OUR COMMUNITIES
FOUNDATION, Backcountry Against
Dumps, and Donna Tisdale, Plaintiffs,

v.

Sally JEWELL, et al., Defendants,
and

Tule Wind LLC, Intervenor-Defendant.

No. 13CV575 JLS (JMA).

| Signed March 25, 2014.

Attorneys and Law Firms

Stephan C. Volker, Law Offices of Stephan C. Volker,
Oakland, CA, for Plaintiffs.

US Attorney CV, US Attorneys Office Southern District
of California, San Diego, CA, Stacey Bosshardt, Ty Bair,
United States Department of Justice, Washington, DC, John
H. Martin, United States Department of Justice, Denver, CO,
for Defendants.

Daniel Patrick Brunton, Latham & Watkins LLP, San Diego,
CA, for Intervenor-Defendant.

**ORDER ON CROSS MOTIONS
FOR SUMMARY JUDGMENT**

JANIS L. SAMMARTINO, District Judge.

*1 Presently before the Court is Plaintiffs Protect Our
Communities Foundation, Backcountry Against Dumps,
and Donna Tisdale's (collectively, "Plaintiffs") Motion for
Summary Judgment. (Mot. for Summ. J., ECF No. 18.) Also
before the Court are Intervenor-Defendant Tule Wind LLC's
("Tule") Combined Cross-Motion for Summary Judgment
and Opposition to Plaintiffs' Motion for Summary Judgment,
(Tule Cross Mot. for Summ. J., ECF No. 30), and Federal
Defendants S.M.R. Jewell, Neil Kornze, Tom Zale, the U.S.
Bureau of Land Management, and the U.S. Department of
the Interior (collectively, "Federal Defendants") Combined
Cross Motion for Summary Judgment and Opposition to
Plaintiffs' Motion for Summary Judgment, (Fed. Def. Cross

Mot. for Summ. J., ECF No. 31), as well as the parties'
associated oppositions and replies, (Resp. in Opp'n to Tule
Cross Mot. for Summ. J., ECF No. 34; Resp. in Opp'n to Fed.
Def. Cross Mot. for Summ. J., ECF No. 33; Tule Reply in
Supp., ECF No. 38; Fed. Def. Reply in Supp., ECF No. 39.)

The Court heard oral argument regarding the parties' motions
on March 3, 2014, and thereafter took the matter under
submission. Having considered the parties' arguments and
the law, the Court DENIES Plaintiffs' motion for summary
judgment and GRANTS Tule's and Federal Defendants' cross
motions for summary judgment.

BACKGROUND

In this action, Plaintiffs challenge the Bureau of Land
Management's ("BLM") Record of Decision ("ROD")
authorizing development of the Tule Wind Project, a utility-
scale wind energy facility, on public lands in San Diego
County. Plaintiffs maintain that BLM's approval of a right-
of-way for Tule, a subsidiary of Iberdrola Renewables, Inc.,
to construct, operate, and maintain 62 wind turbines on
12,360 acres of federally-managed lands in the McCain
Valley, approximately 70 miles east of the City of San Diego,
violates the National Environmental Policy Act, 42 U.S.C.
§§ 4321-4370h ("NEPA"); the Migratory Bird Treaty Act,
16 U.S.C. §§ 703-712 ("MBTA"); and the Bald and Golden
Eagles Protection Act, 16 U.S.C. §§ 668-668d ("BGEPA").

Tule's original proposal for a wind energy facility
contemplated up to 128 1.5 to 3.0 megawatt ("MW")
wind turbine generators, producing up to 200 MW, on
lands administered by BLM, the Ewiiapaayp Indian Tribe,
and the California State Lands Commission, as well
as on private lands. To address concerns regarding the
Project's environmental impacts, however, BLM approved
only a scaled-down version of Tule's proposal, eliminating
33 turbines from BLM-administered lands, reducing the
generating capacity of the Project to 186 MW, and requiring
the undergrounding of certain transmission infrastructure.

BLM, together with the California Public Utility Commission
("CPUC"), prepared an Environmental Impact Statement
("EIS") for the Project, which aims to provide a
comprehensive analysis of the Project's impacts on
environmental, social, economic, biological, and cultural
resources. The Draft EIS was released for public comment on
December 23, 2010. (Administrative Record ("AR") 6943-

9742.) The Final EIS was released on October 3, 2011. (AR 1-5877.) BLM published the initial ROD on December 19, 2011, approving the right-of-way on the terms set forth in the Final EIS. (AR 9750-95.)

LEGAL STANDARD

*2 “Because the statutes under which [Plaintiffs] seek[] to challenge administrative action do not contain separate provisions for judicial review, [this Court’s] review is governed by the [Administrative Procedure Act (“APA”)].” *City of Sausalito v. O’Neill*, 386 F.3d 1186, 1205 (9th Cir.2004). Under the APA, agency decisions must be upheld unless the Court finds that the decision or action is “arbitrary, capricious, an abuse of discretion, or otherwise not in accordance with law.” 5 U.S.C. § 706(2)(A). Agency action taken “without observance of procedure required by law” may also be set aside. 5 U.S.C. § 706(2)(D).

Agency action is arbitrary and capricious if:

the agency has relied on factors which Congress has not intended it to consider, entirely failed to consider an important aspect of the problem, offered an explanation for its decision that runs counter to the evidence before the agency, or is so implausible that it could not be ascribed to a difference in view or the product of agency expertise.

City of Sausalito, 386 F.3d at 1206 (quoting *Motor Vehicle Mfrs. Ass’n of U.S. v. State Farm Mut. Auto. Ins. Co.*, 463 U.S. 29, 43, 103 S.Ct. 2856, 77 L.Ed.2d 443 (1983)). “The standard is ‘highly deferential, presuming agency action to be valid and affirming the agency action if a reasonable basis exists for its decision.’” *Protect Our Cmty. Found. v. Salazar*, No. 12cv2211 GPC (PCL), 2013 WL 5947137, at *2 (S.D.Cal. Nov. 6, 2013) (quoting *Nw. Ecosystem Alliance v. U.S. Fish and Wildlife Serv.*, 475 F.3d 1136, 1140 (9th Cir.2007)). Agency action is valid if the agency “‘considered the relevant factors and articulated a rational connection between the facts found and the choices made.’” *Id.* (quoting *Arrington v. Daniels*, 516 F.3d 1106, 1112 (9th Cir.2008)). Plaintiffs bear the burden of showing that agency action is arbitrary or capricious. *Id.* (citing *Kleppe v. Sierra Club*, 427 U.S. 390, 412, 96 S.Ct. 2718, 49 L.Ed.2d 576 (1976)).

ANALYSIS

1. NEPA

NEPA requires that an EIS be prepared for all “major Federal actions significantly affecting the quality of the human environment.” 42 U.S.C. § 4332(2)(C). The EIS should “provide full and fair discussion of significant environmental impacts and ... inform decisionmakers and the public of the reasonable alternatives which would avoid or minimize adverse impacts or enhance the quality of the human environment.” 40 C.F.R. § 1502.1.

Judicial review of an agency’s EIS under NEPA is limited to a “rule of reason that asks whether an EIS contains a reasonably thorough discussion of the significant aspects of the probable environmental consequences.” *City of Sausalito*, 386 F.3d 1186, 1206-07 (quoting *Idaho Conservation League v. Mumma*, 956 F.2d 1508, 1519 (9th Cir.1992)). “The key question is whether the EIS’s form, content, and preparation foster both informed decisionmaking and informed public participation.” *Id.* (quotation omitted).

The Court may not substitute its judgment for that of the agency, however. *See Protect Our Cmty. Found.*, 2013 WL 5947137 at *2 (citing *Selkirk Conservation Alliance v. Forsgren*, 336 F.3d 944, 958 (9th Cir.2003)). NEPA does not contain substantive environmental standards, nor does the statute mandate that agencies achieve particular substantive environmental results. *See id.* (citing *Ctr. for Biological Diversity v. U.S. Forest Serv.*, 349 F.3d 1157, 1166 (9th Cir.2003)). Rather, this Court’s role is to ensure that the agency “has taken a ‘hard look’ at a decision’s environmental consequences.” *City of Sausalito*, 386 F.3d at 1207.

*3 In this action, Plaintiffs contend that BLM violated NEPA by (1) failing to articulate a legitimate public purpose and an actual need for the Tule Wind Project, (2) prematurely dismissing the “distributed generation” alternative without in-depth analysis or discussion, (3) failing to take a “hard look” at the Project’s environmental impacts, and (4) improperly deferring specification and analysis of mitigation measures. The Court considers each of Plaintiffs’ arguments in turn.

A. Did BLM Fail to Articulate an Adequate Purpose and Need for the Project?

NEPA’s implementing regulations state that an agency must “briefly specify the underlying purpose and need to which the

agency is responding in proposing the alternatives including the proposed action.”40 C.F.R. § 1502.13. “Agencies enjoy ‘considerable discretion’ to define the purpose and need of a project.”*Nat’l Parks & Conservation Ass’n (NPCA) v. BLM*, 606 F.3d 1058, 1070 (9th Cir.2009) (quoting *Friends of Se.’s Future v. Morrison*, 153 F.3d 1059, 1066 (9th Cir.1998)). “[A]n agency cannot define its objectives in unreasonably narrow terms,” “ however. *Id.* (quoting *City of Carmel–By–The–Sea v. U.S. Dep’t of Transp.*, 123 F.3d 1142, 1155 (9th Cir.1997)). “An agency may not define the objectives of its action in terms so ... narrow that only one alternative from among the environmentally benign ones in the agency’s power would accomplish the goals of the agency’s action, and the EIS would become a foreordained formality.” *Friends*, 153 F.3d at 1066 (internal quotations omitted). An agency’s statement of purpose is evaluated under a “reasonableness standard.” *NCPA*, 606 F.3d at 1070 (citations omitted).

Here, the Final EIS sets forth BLM’s purpose and need for the proposed action:

Taking into account the BLM’s multiple use mandate, the purpose and need for the proposed action is to respond to a [Federal Land Policy and Management Act (“FLPMA”)] right-of-way application submitted by Tule Wind, LLC to construct, operate, maintain, and decommission a wind energy-generating facility and associated infrastructure on public lands managed by the BLM in compliance with FLPMA, BLM right-of-way regulations, and other applicable Federal laws and policies.

- Executive Order 13212, dated May 18, 2001, which mandates that agencies act expeditiously and in a manner consistent with applicable laws to increase the production and transmission of energy in a safe and environmentally sound manner.

- Section 211 of the Energy Policy Act of 2005[,] ... which established a goal for the [Department of Interior (“DOI”)] (BLM’s parent agency) to approve at least 10,000 megawatts of nonhydropower renewable energy power on public lands by 2015.

- Secretarial Order 3285A1, Renewable Energy Development by the DOI, dated February 22, 2010. This Secretarial Order establishes the development of renewable energy as a priority for the DOI and creates a Departmental Task Force on Energy and Climate Change. It also announced a policy goal of identifying and prioritizing

specific locations (study areas) best suited for large-scale production of solar energy.

- *4 • The BLM will decide whether to deny the proposed right-of-way, grant the right-of way, or grant the right-of-way with modifications. Modifications may include modifying the proposed use or changing the route or location of the proposed facilities (43 CFR 2805.10(a)(1)).

(AR 141–42.) Thus, BLM’s purpose and need, as articulated in the Final EIS, is “grounded in both the [agency’s] duty to act on FLPMA Title V [right-of-way] applications and federal objectives promoting renewable energy.”(Fed. Def. Cross Mot. for Summ. J. 11, ECF No. 31.)

Plaintiffs contend, however, that BLM violated NEPA by “parroting the Project applicant’s statement of purpose and need, thereby improperly constraining [the agency’s] consideration of alternatives and subsequently failing to show that an actual need exists.”(Mot. for Summ. J. 30, ECF No. 18.) Plaintiffs maintain that it is “insufficient for NEPA purposes” for BLM to “reiterate its statutory duty to review ‘right-of-way application[s] submitted’ to it.”(*Id.* at 31.)According to Plaintiffs, a purpose and need statement that “does nothing more than respond to the applicant’s proposed Project” is inadequate because it “simply repeat[s] the applicant’s goals and [fails] to consider the underlying *federal government’s* purpose in considering the application and the *federal government’s* need for the project.”(*Id.* (citing *NPCA*, 606 F.3d at 1071).)

Moreover, Plaintiffs insist that BLM must demonstrate an “actual need” for the Project by explaining “why this Project better achieves [the aforementioned policy objectives] than [other renewable energy sources, such as] rooftop solar, industrial solar, tidal, geothermal, hydroelectric, or rooftop wind power,” as well as specifying “where the electricity to be generated by the Project will be used and whether there is an existing or projected supply shortage.”(*Id.*)

Federal Defendants contend, on the other hand, that “[a]n agency’s obligation to respond to [right-of-way] applications consistent with its statutory authorities is a purpose that is uniquely governmental, but [that also] ... takes into account the private applicant’s objectives,” as required by law. (Fed. Def. Cross Mot. for Summ. J. 13, ECF No. 31.) Thus, Federal Defendants maintain that “BLM formulated its own purpose and need [statement] with not only the Applicant’s goals and needs, but also its unique statutory role and policy prerogatives, in mind.”(*Id.*)

Here, Plaintiffs' argument that BLM's statement of purpose merely parrots Tule's private objectives is simply unsupported by the record. In the Final EIS, BLM sets forth a statement of purpose and need, in a separate section of the document, that reflects the influence not only of Tule's goals, but also of statutory, executive, and administrative directives regarding the promotion of renewable energy on federal lands. See *HonoluluTraffic.com v. Fed. Transit Admin.*, 742 F.3d 1222, 1230 (9th Cir.2014) ("The [EIS's] stated objectives comply with the intent of the relevant federal statutes."). BLM is not only permitted, but required, to consider this statutory and regulatory framework before taking action on a right-of-way application. See *NPCA*, 606 F.3d at 1070 (" [A]n agency should always consider the views of Congress, expressed, to the extent that the agency can determine them, in the agency's statutory authorization to act, as well as in other congressional directives' " (quoting *Citizens Against Burlington, Inc. v. Busey*, 938 F.2d 190, 196 (D.C.Cir.1991))). Although BLM's statement of purpose may overlap with Tule's objectives in certain respects, such overlap is unremarkable in light of BLM's obligation to consider a private applicant's goals in responding to a right-of-way application. See *Alaska Survival v. Surface Transp. Bd.*, 705 F.3d 1073, 1085 (9th Cir.2013) (citation omitted) ("An agency must look hard at the factors relevant to definition of purpose, which can include private goals, especially when the agency is determining whether to issue a permit or license.").

*5 The Court need not second-guess BLM's judgment that there is an actual need for the Project, as Plaintiffs demand. The Court's task is to determine "whether BLM's purpose and need statement properly states ... BLM's purpose and need, against the background of a private need, in a manner broad enough to allow consideration of a reasonable range of alternatives." *NPCA*, 606 F.3d at 1071.

BLM's purpose and need statement was not so narrow as to render the EIS a mere formality or to "unreasonably constrain the possible range of alternatives." *Id.* at 1072. Not only did BLM consider several alternatives to the proposed Project, it ultimately did not adopt Tule's original proposal, authorizing instead a scaled-down version with a substantially more limited generating capacity and a reduced number of wind turbines. (See AR 9763–9767.)

Plaintiffs contend that the range of alternatives analyzed by BLM was too narrow because all of the alternatives considered would have resulted in utility-scale energy

development of some kind. (Resp. in Opp'n to Tule Cross Mot. for Summ. J. 35–36, ECF No. 34 (citing *NPCA*, 606 F.3d at 1072).) Unlike *National Parks & Conservation Association v. BLM*, however, where "a landfill development of some sort" was improperly foreordained by BLM's unreasonably narrow statement of purpose, see 606 F.3d at 1071, the statutory, executive, and administrative directives invoked by BLM here set forth legitimate governmental objectives that justify the agency's limited focus on utility-scale projects on public lands. Cf. *Honolulu Traffic.com*, 742 F.3d at 1231 ("The statement of purpose and need is broad enough to allow the agency to assess various routing options and technologies for a high-capacity ... [transportation] project. [Thus, the agency's statement of purpose] is reasonable ... [because it does] not foreclose *all* alternatives, and because it [is] shaped by federal legislative purposes." (emphasis added)). Accordingly, BLM's purpose and need statement complied with NEPA's requirements.

B. Did BLM Improperly Dismiss the Distributed Generation Alternative?

Judicial review of the range of alternatives considered in an EIS "is governed by a 'rule of reason' that requires an agency to set forth only those alternatives necessary to permit a 'reasoned choice.'" *California v. Block*, 690 F.2d 753, 767 (9th Cir.1982) (quoting *Save Lake Wash. v. Frank*, 641 F.2d 1330, 1334 (9th Cir.1981)). The "touchstone for [a court's] inquiry is whether an EIS's selection and discussion of alternatives fosters informed decision-making and informed public participation." *Id.*

The appropriate range of alternatives is defined by the purpose and need statement. 40 C.F.R. § 1502.13; *Carmel*, 123 F.3d at 1155. An EIS need not consider an alternative that does not respond to the purpose and need, or the implementation of which "is deemed remote and speculative." *Life of the Land v. Brinegar*, 485 F.2d 460, 472 (9th Cir.1973).

*6 Here, BLM considered a variety of different alternatives, ultimately selecting seven of them for in-depth study and analysis, including five alternatives utilizing configurations or designs for the Project that were not proposed by Tule, and two no-action alternatives under which BLM would have denied the requested right-of-way altogether. (See AR 2485–98, 9764–65.) In Section C of the Final EIS, BLM provided a thorough discussion of the alternatives, explaining why the five selected action alternatives were suitable for full analysis,

and why other options were preliminary eliminated after brief examination. (See AR 385–90, 395–417.)

Ultimately, BLM selected the “Reduction in Turbines” alternative, which calls for the removal of 63 turbines from the proposed Project, including 33 turbines planned for BLM-administered lands, most of them near the western side of the Project site. (AR 2498–99, 9789.) BLM determined that removing the selected wind turbines would substantially reduce adverse impacts to golden eagles and other rare and special-status birds. (AR 2498.)

Plaintiffs take issue with the EIS because BLM refused to conduct an in-depth analysis of their preferred alternative, which relies on distributed energy generation. Under this alternative, the Tule Wind Project would not be built, and instead BLM would rely on widespread development of solar photovoltaic systems, or “rooftop solar,” on residential and commercial structures in San Diego County, as well as development of other small-scale renewable energy sources, such as hydrogen fuel cells and biofuels. (AR 20633–34, 20636–37.)

As explained in Section C of the EIS, BLM determined that the distributed generation alternative did not merit in-depth study because it fails to fulfill several Project objectives and is infeasible from a regulatory, technical, and commercial perspective. To begin with, BLM found that the alternative is infeasible because applicable California regulations do not provide sufficient incentives for development of rooftop solar. (AR 412.) Although California recently introduced a system of tradable renewable energy credits, BLM found that the market for such credits “has yet to be defined and is not yet active.”(*Id.*) Next, BLM determined that the alternative remains highly speculative because installation of at least 100,000 new rooftop solar energy systems would be required in order to generate the amount of electricity anticipated from the Project, an unprecedented increase over current installation rates. (*Id.*) Third, BLM found that rooftop solar projects implemented on the scale contemplated by Plaintiffs would create “rapid localized voltage drops” as a consequence of “intermittent performance.” (AR 413.) This development would require “extensive upgrading to local substations,” the environmental impacts of which BLM could not evaluate with certainty. (*Id.*)

Finally, and “most important[ly],” BLM concluded that the distributed generation alternative does not further the policies set forth in the statutory, executive, and administrative

directives invoked in the statement of purpose and need. BLM determined that the referenced policies require evaluation of *utility-scale* renewable energy development, rather than distributed generation, as well as siting and management of renewable energy projects *on public lands*, rather than on private structures. (*Id.*)

*7 Not surprisingly, Plaintiffs disagree with BLM’s grounds for excluding the distributed generation alternative from further study. Plaintiffs reject BLM’s characterization of the regulatory environment for rooftop solar as unfavorable. Plaintiffs emphasize that CPUC has already clarified the structure and rules of the market for tradable renewable energy credits, thereby eliminating any regulatory hurdles to widespread development of distributed energy generation systems. (Resp. in Opp’n to Fed. Def. Cross Mot. for Summ. J. 15, ECF No. 33.)

Plaintiffs also maintain that distributed energy generation is not only commercially feasible, but actually more cost-effective than utility-scale wind energy. According to Plaintiffs, distributed energy projects “‘can get built quickly and without the need for expensive new transmission lines’” and also reduce cost by “minimizing the vulnerability of the electrical grid to fires and other natural disasters.” (Mot. for Summ. J. 13, ECF No. 18 (citing AR 20660–20663).)

Lastly, Plaintiffs maintain that distributed generation would contribute to state and federal renewable energy resource goals, while imposing far less drastic environmental impacts than utility-scale wind. Plaintiffs argue that the statutory, executive, and administrative directives invoked by BLM do not justify the agency’s narrow focus on utility-scale development; indeed, Plaintiffs suggest that there is “nothing about [those provisions] that is mandatory.”(*Id.* at 11.)

The Court agrees with Tule and Federal Defendants that BLM provided more than sufficient discussion and analysis of the distributed generation alternative to satisfy NEPA. Although BLM must consider project alternatives that would avoid or minimize damage to the environment, the agency is not required to provide a comprehensive examination of alternatives that are infeasible or inadequate to meet stated objectives. See *Life of the Land*, 485 F.2d at 472.

BLM’s conclusion that current regulatory conditions in California are unfavorable to the development of rooftop solar is defensible and merits deference from the Court. As Tule points out, the eligibility of distributed energy installations

for renewable energy credits remains unclear, such that the regulatory hurdles to widespread development of rooftop solar that BLM identified in the EIS may continue to exist today. (See Tule Reply in Supp. 5–6, ECF No. 38.)

Moreover, BLM's determination that distributed energy generation is infeasible from a technical and commercial perspective also merits deference, as the agency's conclusion is based on its expertise and on thorough discussion and consideration of the available evidence. See, e.g., *Lands Council v. McNair*, 537 F.3d 981, 1003 (9th Cir.2008) (en banc) (“[The agency] must explain the methodology it used for its ... analysis, ... [but] NEPA does not require [this Court] to ‘decide whether an [EIS] is based on the best scientific methodology available’ “ (quoting *Friends of Endangered Species, Inc. v. Jantzen*, 760 F.2d 976, 986 (9th Cir.1985))), *overruled on other grounds by Winter v. Natural Res. Def. Council*, 555 U.S. 7, 129 S.Ct. 365, 172 L.Ed.2d 249 (2008). BLM relied on its own assessment of the relative capacity of rooftop solar and utility-scale wind in concluding that an unprecedented increase in rooftop solar installations would be necessary to match the Project's anticipated output. (AR 412–13.) The agency also relied on its expertise in finding that widespread development of rooftop solar may lead to imbalances in the grid system that would require additional modifications to existing substations, with uncertain environmental impacts. (AR 413.)

*8 BLM's conclusion that distributed generation is inconsistent with the agency's documented objectives is also supported by the record. The EIS acknowledges that distributed generation projects would contribute to renewable energy sourcing goals, (AR 411), but the Project's objectives are far more specific and demanding than these broad aims. Distributed generation would fall short with respect to these objectives, such as providing renewable energy to meet California's renewable portfolio standard target of 33% renewable sources by 2020, as well as fulfilling BLM's obligation to seek to approve 10,000 MW of renewable energy projects on public lands by 2015. Furthermore, the statutory, executive, and administrative directives invoked by BLM are not merely precatory, as Plaintiffs suggest. These provisions articulate specific policies that BLM must consider in managing the resources within its jurisdiction. See *HonoluluTraffic.com*, 742 F.3d at 1230 (“The [EIS complies] with the *intent* of the relevant *federal statutes*” (emphasis added)). Accordingly, BLM's discussion of Project alternatives complied with NEPA and was not “arbitrary [or] capricious.” 5 U.S.C. § 706(2)(A).

C. Did BLM Fail to Take a “Hard Look” at the Project's Environmental Impacts?

“Under NEPA, an EIS must contain a ‘reasonably thorough’ discussion of an action's environmental consequences.” *NPCA*, 606 F.3d at 1072 (quoting *Block*, 690 F.2d at 761). “An EIS must ‘provide full and fair discussion of significant environmental impacts.’ “ *Id.* (quoting 40 C.F.R. § 1502.1). The Court's review is “limited to whether an EIS took a ‘hard look’ at the environmental impacts of a proposed action.” *Id.* The Court must make a “ ‘pragmatic judgment whether the EIS's form, content, and preparation foster both informed decision-making and informed public participation.’ “ *Id.* (quoting *Block*, 690 F.2d at 761).

Plaintiffs maintain that BLM failed to take a hard look at several of the Tule Wind Project's environmental consequences, including (1) noise impacts, (2) electric and magnetic field (“EMF”) pollution, (3) impacts on avian species, and (4) impacts on climate change. The Court discusses each issue in turn.

(1) Noise Impacts

(a) Audible Noise Impacts

Section D.8 of the EIS addresses potential noise impacts from construction and operation of the Tule Wind Project. Section D.8.1 provides a “description of the existing noise setting,” whereas “applicable noise ordinances and limitations” are discussed in Section D.8.2. (AR 1585.) BLM's analysis of noise impacts within the Project area, along with a discussion of planned mitigation measures, appears in Section D.8.3. (*Id.*)

Section D.8.3 of the EIS identifies several adverse noise impacts resulting from construction and operation of the Project: (1) “[c]onstruction noise would substantially disturb sensitive receptors and violate local rules, standards, and/or ordinances;” (2) “[c]onstruction activity would temporarily cause groundborne vibration;” (3) “[p]ermanent noise levels would increase due to corona noise from operations of the transmission lines and noise from other project components;” and (4) “[r]outine inspection and maintenance activities would increase ambient noise levels.” (AR 1599.)

*9 As the EIS makes clear, BLM adopted a cautious and conservative approach to measuring turbine noise. (AR 1618–19, 3432–33.) BLM modeled a worst-case scenario, utilizing

noise levels associated with the noisiest turbine model, multiplied to reflect the maximum number of proposed turbines. Accordingly, the EIS acknowledges that “wind turbine project-related noise levels range from 36 dBA to 54 dBA” and that “[w]ithout mitigation and assuming all turbines utilized a maximum noise emission of 111 dBA (109 dBA plus 2 dBA for uncertainty), the project would exceed maximum allowable nighttime noise limits ... at five property boundaries and daytime noise limits ... at three properties.”(AR 1618.) The EIS concludes that “[b]ecause the noise generated by wind turbines would exceed the allowable noise level limits at several identified receptors, the impact would be adverse under NEPA.”(*Id.*)

In light of these projections, the EIS outlines a site-specific noise mitigation plan. (AR 1619–20.) The noise mitigation plan is designed to ensure that “noise from turbines will not adversely impact surrounding residences” and that the “operation of the turbines will comply with [applicable local noise ordinances].” (AR 1619.) The mitigation plan calls for measures to diminish noise from turbine operations, including “revising the turbine layout, [curtailing] nighttime use of selected turbines, [utilizing] an alternate turbine manufacturer (or combination of manufacturers), implementation of noise reduction technology,” and other unspecified methods. (AR 1619–20.)

Despite BLM's extensive discussion of noise impacts, Plaintiffs insist that the EIS is deficient because BLM failed to model turbine noise using larger, more powerful 3.0 MW turbines. The Court agrees with Tule and Federal Defendants, however, that BLM's careful analysis of the Project's audible noise impacts was more than sufficient to satisfy NEPA. BLM relied on its expertise in reaching the conclusion that the more powerful 3.0 MW turbines were unsuitable for modeling the Project's noise impacts—the agency found that larger turbines require greater setback distances and produce lower noise emissions, thereby underestimating overall noise levels. (*See* Fed. Def. Cross Mot. for Summ. J. 22, ECF No. 31 (citing AR 1618–19).) The EIS complies with NEPA because it carefully elucidates BLM's conservative methodology for modeling noise emissions, (*see* AR 1618–19, 3417, 52731); NEPA does not require the agency to use an alternative methodology, even one that Plaintiffs believe is superior.¹ *See McNair*, 537 F.3d at 1003.

¹ Plaintiffs also take issue with BLM's use of a 2.6 dB “hot weather adjustment” in modeling the 2.0 MW turbine. Plaintiffs insist that the 3.0 MW turbine would have

been noisier if a similar adjustment had been applied to that model. As Tule and Federal Defendants explain, however, the “hot weather adjustment” reflects a specific component unique to the Gamesa G87 2.0 MW turbine, such that BLM's decision not to apply the adjustment to the 3.0 MW turbine was justified. (*See* Tule Reply in Supp. 9, ECF No. 38.)

(b) Inaudible Infrasound and Low Frequency Noise (“ILFN”) Impacts

i. BLM's Analysis of Potential ILFN Impacts

In addition to audible noise, the EIS also addresses the impacts of infrasound and low frequency noise (“ILFN”). “Low frequency sound is generally sound at frequencies between 20 and 200 Hz,” while “infrasound commonly refers to sound at frequencies below 20 Hz.” (AR 3424.) “Sound is perceived and recognized [both] by its loudness (pressure) and pitch (frequency),” but the “human ear does not respond equally to all frequencies.”(*Id.*) Thus, the human ear can most easily recognize sounds in the “middle of the audible spectrum,” between 1000 to 4000 Hz, but perception is attenuated at the extremes of the spectrum. (*Id.*) For this reason, ILFN is typically inaudible, *i.e.*, outside the range of perception at ordinary pressure levels. ILFN may become audible, however, at very high pressure levels, exceeding 85 dB.

*10 Numerous comments on the Draft EIS raised concerns regarding human exposure to inaudible ILFN from wind turbines:

NOI2: Commenters suggest that the [Final EIS] is inadequate because characteristics of audible and inaudible sound are not fully addressed, including the appropriate measurements of both, and the health effects of prolonged audible and inaudible sound.

...

NOI4: Commenters suggest that the document is inadequate because it does not attempt to calculate the amount of low-frequency noise and infrasound that would be generated.

NOI5: Commenters suggest that the document is inadequate because it does not address the effects of low-frequency noise and infrasound on public health, does not consider peer-reviewed and epidemiological studies to address potential health effects related to low-frequency

noise and infrasound, and does not include any mitigation to address these impacts.

NOI6: Commenters suggest that wind turbines generate significant low-frequency noise, greater than other noise sources. Commenters suggest that health effects related to low-frequency noise are more severe than health effects resulting from community noise in general; therefore, noise sources generating low-frequency noise should be subject to stricter guidelines.

(AR 3412–13.)

BLM addressed these concerns in the Responses to Comments section of the Final EIS. After canvassing the available literature, BLM concluded that inaudible ILFN is not expected to have adverse health effects. Rather, BLM determined that exposure to ILFN has been shown to be harmful only at “very high [pressure] levels,” exceeding the “internationally recognized threshold for perception of infrasound.”(AR 3428, 3425.) In other words, BLM concluded that ILFN poses a risk to human health only when *audible*.

The EIS subsequently discusses exposure to ILFN above 85 dB, the accepted threshold for audibility, noting that excessive exposure at such levels “has been associated with a condition termed ‘vibro-acoustic disease’ (VAD), a thickening of cardiovascular structures, such as cardiac muscle and blood vessels.”(AR 3428.) The EIS explains that risk of VAD is limited to rare situations, such as “military operations” and “work carried out in connection with the Apollo space program,” where infrasound levels can reach 125 dB, vastly exceeding the levels of infrasound produced by wind turbines. (*Id.*)

Plaintiffs contend, however, that the EIS is deficient due to BLM’s refusal to accept the view that ILFN can have adverse effects on human health at pressure levels below the threshold of audibility. According to Plaintiffs, *inaudible* ILFN has been “documented to cause insomnia, vertigo, ear pressure or pain, fatigue, unsteadiness, dizziness, tinnitus, headaches, external auditory canal sensation, irritability, memory, and concentration loss, loss of motion, cardiac arrhythmias, stress, and hypertension....” (Mot. for Summ. J. 16, ECF No. 18 (quoting AR 20749).)

*11 To support these allegations, Plaintiffs rely on a scientific study conducted by Drs. Salt and Hullar, indicating that inaudible ILFN is powerful enough to stimulate the

ear’s cochlear outer hair cells, thereby causing significant annoyance and harm to human beings. (AR 20734.) Plaintiffs also rely on a study conducted by Dr. Nina Pierpont, which discusses “Wind Turbine Syndrome,” an ostensible medical condition caused by wind turbine noise. Dr. Pierpont’s study suggests that ILFN from wind turbines causes significant health problems. (AR 3747–49.)

Federal Defendants and Tule maintain that BLM *did* evaluate the evidence and expert testimony invoked by Plaintiffs, but ultimately rejected it as flawed and unpersuasive. The Court agrees. Where there are conflicting expert opinions, it is not the Court’s role to determine which scientific studies an agency must credit. *See Nat’l Parks & Conservation Ass’n (NPCA) v. U.S. Dep’t of Transp.*, 222 F.3d 677, 682 (9th Cir.2000). Rather, the Court must defer to the agency’s determination. *Id.*

Here, contrary to Plaintiffs’ account, BLM thoroughly reviewed the materials that Plaintiffs submitted, but ultimately chose to rely on its own experts, rather than Plaintiffs’ authorities. For example, BLM relied upon epidemiologist Dr. Mark Roberts’s expert opinion, which calls into question the scientific validity of the Pierpont study. (AR 3748 (“Scientific evidence challenges the notion that adverse health effects from wind turbine sound [are] plausible Dr. Pierpont’s peer-review process appears to be among colleagues and friends and not a single- or double-blind process. Nontraditional references such as newspaper articles and television interviews are used to support Dr. Pierpont’s hypothesis.”)) BLM also invoked expert testimony from Dr. Arlene King, the Chief Medical Officer of Ontario, Canada, disputing any connection between wind turbine noise and human health. (AR 3749.)

The EIS does not, however, merely “[critique] one particular doctor’s theory,” as Plaintiffs contend. (Resp. in Opp’n to Fed. Def. Cross Mot. for Summ. J. 23, ECF No. 33.) Rather, the EIS provides reasoned explanation and scientific support for BLM’s conclusion that inaudible ILFN emissions from wind turbines do not adversely impact human health. *See* AR 3749 (“Both Dr. Mark Roberts ... and Dr. Arlene King, the Chief Medical Officer for Ontario, Canada, concluded [that] there is inadequate evidence to establish a causal link between exposure to wind turbine noise and adverse human health effects.”). In sum, BLM carefully evaluated the available scientific evidence regarding the health impacts of ILFN emissions, rejected Plaintiffs’ concerns, and reached a permissible conclusion. *See Protect Our Cmty’s Found.*, 2013

WL 5947137 at *8 (rejecting challenge to a previous EIS in which Plaintiffs invoked the same scientific studies regarding ILFN impacts).

ii. BLM's Modeling of ILFN Emissions

*12 In Section D.8 of the EIS, BLM utilized “A-weighted” and “C-weighted” scales to gauge noise impacts from wind turbine operations. The EIS explains that the “A-weighted” scale was used because it most closely simulates the effects of noise on the human ear:

The A-weighting scale is appropriate because it is a close approximation of the human response to different frequencies of sound and is in broad use across many disciplines that address noise. The A-weighting scale attenuates low-frequency noises in a manner that simulates how human ears attenuate low-frequency noise at low levels (approximately 40 decibels (dB)). The A-weighting scale is the most common weighting scale for environmental acoustics analysis and assessing compliance with applicable noise limits. State and federal agencies that regulate environmental noise throughout the United States rely on the A-weighted decibel, or dB(A), as the appropriate metric for assessing human response to noise. Applicable noise rules in California also rely on the A-weighted decibel.

(AR 3417.) The C-weighted scale was also used to “simulate human perception at higher sound levels, in excess of 70 dB.”(*Id.*)

According to Plaintiffs, BLM was obligated to undertake either “G-weighted” or “unweighted” measurements, either of which would assign greater prominence to low-frequency sound. Plaintiffs maintain that the EIS is deficient without such measurements because “A-weighting considerably underestimates the likely influence of wind turbine noise on the ear.”(*Id.*) Federal Defendants contend, however, that Plaintiffs raise a mere “disagreement over methodology,” such that “the agency’s methodology must be upheld.”(Fed. Def. Cross Mot. for Summ. J. 24, ECF No. 31.)

The Court agrees with Federal Defendants. BLM’s thorough explanation of its choice of methodology complies with NEPA and merits deference from the Court. *See Protect Our Communities Foundation*, 2013 WL 5947137 at *9 (citing *Native Ecosystems Council*, 697 F.3d at 1053) (“Disagreeing with the methodology [utilized] by the agency does not constitute a NEPA violation.”). BLM was not required to accept Plaintiffs’ opinion that an assessment of wind turbine noise must give special prominence to low-frequency sound, or that a “G-weighted” scale is more appropriate for measuring wind turbine noise than other existing scales.²

² Federal Defendants also contend that Plaintiffs failed to preserve this argument for judicial review because Plaintiffs’ comments on the Draft EIS presented “G-weighted” measurements as “only one of several permissible options.”(Fed. Def. Cross Mot. for Summ. J. 23, ECF No. 31.) Plaintiffs requested that BLM “use C-, G-, and/or Z-weighted measurements, which give more weight to infrasound and lower frequencies, in addition to A-weighted measurements.”(AR 5199.) The Final EIS incorporated Plaintiffs’ suggestion and used C-weighted measurements to assess the Project’s noise impacts. Thus, Plaintiffs’ comments did not provide notice that G-weighted measurements were required. Because Plaintiffs’ arguments fail on the merits, the Court declines to address the exhaustion issue.

(2) Electric and Magnetic Field (“EMF”) Pollution

(a) EMF Emissions Measurement and Monitoring

Section D.10.8 of the EIS assesses the potential health impacts of electric and magnetic fields (“EMFs”). The EIS explains that EMFs need not be considered for “determination of environmental impact because there is no agreement among scientists that EMFs create a health risk and because there are no defined or adopted ... NEPA standards for defining health risks from EMFs.”(AR 1845–46.) Nonetheless, the EIS goes on to provide substantial information regarding EMFs “for the benefit of the public and decision makers.”(*Id.*)

*13 To begin with, the EIS distinguishes between electric fields and magnetic fields—electric fields are “typically not of concern because [they] are effectively shielded by materials such as trees, walls, and structures,” whereas magnetic fields are “not easily shielded by objects or materials.”(*Id.*) Consequently, the EIS focuses its discussion primarily on magnetic fields.

The EIS explains that there is “little or no evidence” to support a relationship between magnetic fields and health effects. (AR 1848, 1851–53 (relying on scientific studies and reports by national and international authorities, such as the World Health Organization, the U.S. Environmental Protection Agency, and the Health Council of the Netherlands).) Because there is “inadequate or no evidence of health effects at low exposure levels,” the EIS recommends no specific measures to address EMFs, beyond “no-cost” and “low-cost” mitigation efforts already required by law.³ (AR 1857.)

³ The EIS also notes that in California there are currently no applicable federal or state standards limiting EMF exposure from transmission lines or substation facilities. (AR 1858.)

Plaintiffs contend that the EIS is inadequate under NEPA because BLM failed to “measure EMF pollution through time-weighted averages of magnetic field exposure ... in individual residences.” (Mot. for Summ. J. 20, ECF No. 18). According to Plaintiffs, BLM “never gathered the data necessary to quantify the amount of EMF pollution that the Project would produce,” instead resting on the unsupported conclusion that EMFs do not pose a risk to human health. (*Id.*)

Contrary to Plaintiffs' account, however, BLM did not “shunt aside” Plaintiffs' concerns regarding EMF impacts with mere “conclusory statements,” nor was BLM's analysis of EMF impacts “uninformed.” *Found. for N. Am. Wild Sheep v. U.S. Dep't of Agric.*, 681 F.2d 1172, 1179, 1180 (9th Cir.1982). Rather, BLM presented a thorough overview of the scientific literature regarding the impacts of EMFs on human health and then relied on its own interpretation of the evidence, ultimately concluding that there is no scientific consensus regarding the health impacts of EMF exposure. In sum, BLM did not rely on the absence of evidence or information, but rather on its own expert assessment of the available science. *Cf. Wild Sheep*, 681 F.2d at 1180.

(b) Potential Stray Voltage Impacts

Section D.10.9 of the Final EIS discusses “Other Field-Related Public Concerns,” including “potential health risk impacts,” such as “induced currents, shock hazards, and effects on cardiac pacemakers.” (AR 1869.) The EIS identifies “induced current and shock hazards” as significant Project impacts on public safety in Section D.10.9.2.

The EIS explains that “[i]nduced currents and voltages on conducting objects near the proposed transmission

lines represent a potential significant impact that can be mitigated.” (AR 1877.) Induced current does not “pose a threat in the environment if the conducting objects are properly grounded.” (*Id.*) Thus, the EIS calls for the implementation of Mitigation Measure PS-2 (“MM PS-2”), which requires Tule to “identify objects (such as fences, conductors, and pipelines) that have the potential for induced voltages and work with the affected parties to determine proper grounding procedures.” (*Id.*)

*14 Pursuant to MM PS-2, Tule must “install all necessary grounding measures prior to energizing the line” and must “notify in writing all property owners within and adjacent to the [Project area]” 30 days prior to energizing the line. (*Id.*) The written notice must provide guidance as to “activities that should be limited or restricted within the Project area” and must alert property owners as to their “responsibilities with respect to notification for any new objects that may require grounding.” (*Id.*)

Plaintiffs insist that the EIS's discussion of induced current, or “dirty electricity,” is inadequate. According to Plaintiffs, “grounding” is not an appropriate method for mitigating the safety risks posed by stray voltage, and may actually exacerbate the hazard by facilitating the diversion of induced current through the ground into residences and other structures. (Mot. for Summ. J. 22, ECF No. 18.)

Federal Defendants argue that “Plaintiffs conflate two different phenomena by describing EMF pollution as ‘dirty electricity.’” (Fed. Def. Cross Mot. for Summ. J. 26, ECF No. 31.) As the Final EIS indicates, “electromagnetic energy and ‘dirty electricity’ refer to different phenomena ... [EMF] is a physical field produced by electrically charged objects.... Dirty electricity, on the other hand, is poor power quality ..., which in turn might cause stray voltage.” (AR 3455.) Federal Defendants maintain that any arguments regarding stray voltage, as opposed to EMFs, lack merit because the mitigation plan outlined in the EIS requires “proper grounding prior to commissioning and regular [maintenance] thereafter.” (Fed. Def. Cross Mot. for Summ. J. 26 n. 15, ECF No. 31.)

Similarly, Tule emphasizes that the EIS explicitly recognizes that “improper grounding can cause adverse health effects.” (Tule Cross Mot. for Summ. J. 26, ECF No. 30 (citing AR 3455).) Tule claims that the EIS's discussion is adequate because the document addresses potential impacts through

the aforementioned mitigation plan, which requires proper grounding of turbines and surrounding objects.

The Court agrees with Federal Defendants and Tule that the EIS's discussion of induced current, and its articulation of associated mitigation measures, is sufficient to satisfy NEPA. An EIS is inadequate only if it entirely fails to consider an important aspect of a problem or neglects to examine available data or evidence. *City of Sausalito*, 386 F.3d at 1206 (citations omitted). Yet Plaintiffs' claim that so-called dirty electricity "is not analyzed at all" in the EIS is misleading, as is Plaintiffs' assertion that BLM "never actually addresses [EMFs and stray voltage] separately." In fact, the EIS provides a thorough analysis of stray voltage in Section D.10.9 and a similarly thorough discussion of EMF emissions in Section D.10.8. As indicated, the EIS explicitly acknowledges that stray voltage from the Project poses a potentially significant risk to public safety and proposes a mitigation plan to address this hazard, requiring Tule to ensure that turbines and nearby objects are properly grounded and to monitor the Project site on an ongoing basis. (AR 3455.)

*15 In sum, BLM did not ignore evidence regarding EMF emissions or stray voltage, as Plaintiffs contend, but rather addressed the available scientific evidence in considerable detail—the agency examined competing scientific studies and expert reports, identified risks to public safety where appropriate, and set forth mitigation measures. For this reason, the EIS's discussion of EMF emissions and stray voltage complies with NEPA.

(3) Impacts on Avian Species

(a) Noise Impacts on Birds

Section D.2 of the EIS addresses Project impacts on biological resources, including avian species. In Section D.2.3.3, the EIS lists 11 significant biological resource impacts, including "direct or indirect loss of ... sensitive wildlife" and "potential loss of nesting birds" as a result of construction activities, as well as possible "electrocution of, and/or collisions by, ... sensitive bird and bat species" as a result of wind turbine operations. (AR 560.)

The EIS also discusses the impact of construction noise and human presence on birds in the Project area, specifically analyzing the impacts on golden eagles, California condors, and other special-status raptors, as well as southwestern willow flycatchers and other special-status songbirds. (AR 602–08.) The EIS acknowledges that "increased human

presence and noise has the potential to cause the loss of nesting birds" (AR 608.)

Accordingly, the EIS also sets forth several mitigation measures, such as Mitigation Measure BIO–7j ("MM BIO–7j"), designed to minimize the impact of noise on nearby birds. (AR 593–94.) MM BIO–7j calls for Tule to develop a Nesting Bird Management, Monitoring, and Reporting Plan, including the establishment of buffer zones between Project activity and known or potential nesting sites based on an assessment of anticipated "noise level[s] and quality." (*Id.*)

In the Responses to Comments section, BLM further explains that the Avian and Bat Protection Plan ("ABPP") developed by Tule "incorporate[s] measures to protect bird species from noise associated with project construction and operations." (AR 3766.) The ABPP indicates that noise impacts to birds are likely to be low and will be avoided or mitigated by specific measures taken during the design, construction, and operation of the Project, such as "minimization of surface disturbance, seasonal restrictions on ground disturbance, burial of collector lines, and trash abatement programs." (AR 13475.)

Plaintiffs contend, however, that the EIS fails to take a "hard look" at the impacts of noise on birds in the Project area. According to Plaintiffs, the Final EIS is deficient because (1) it focuses exclusively on construction, rather than operational, noise; (2) it discusses only nesting and fledgling birds, ignoring birds at other stages of life and neglecting to discuss bird reproductive and foraging success; and (3) it relies on conclusory statements about potential impacts, rather than site-specific data and analysis. (Mot. for Summ. J. 24–25, ECF No. 18.) Plaintiffs also dismiss the EIS's discussion of mitigation, arguing that the measures proposed are inadequate, and unlikely to be effective, absent a more thorough analysis of noise impacts. (*Id.* at 24.)

*16 Plaintiffs' argument that the EIS entirely ignores the impacts of operational noise from wind turbines is misleading, however. The EIS discusses both construction and operational noise, and the ABPP, which is incorporated by reference into the EIS, explicitly concedes that operational noise may impact birds and sets forth concrete measures to mitigate this risk. (AR 3766 (noting that the ABPP "incorporate[s] measures to protect bird species from noise associated with project construction and operations."))

Moreover, BLM was not required to credit the testimony of Plaintiffs' expert, Dr. Travis Longcore, as to the potential for turbine noise to disturb birds. BLM did not assign much weight to Dr. Longcore's opinion because his testimony relates to bird species unlikely to be found in the Project area. (Tule Cross Mot. for Summ. J. 28 n. 13, ECF No. 30.) Plaintiffs maintain that BLM had no good reason for discrediting Dr. Longcore's opinion, but the Court's role is not to instruct the agency as to which scientific studies it must follow. *See N. Plains Res. Council, Inc. v. Surface Transp. Bd.*, 668 F.3d 1067, 1075 (9th Cir.2011).

Finally, Plaintiffs' argument that the EIS fails to rely on site-specific data and analysis is inaccurate. The EIS's discussion of noise impacts is based on empirical, site-specific studies undertaken by BLM to help the agency gauge the presence of threatened or special-status species in the Project area. (AR 2795–2849.) BLM chose to give Plaintiffs' expert testimony less weight because it focused on avian species that the agency believed were unlikely to be present near the Project site. (*See* Tule Cross Mot. for Summ. J. 28 n. 13, ECF No. 30.) BLM did not merely “shunt[] aside” Plaintiffs' concerns, *Wild Sheep*, 681 F.2d at 1179, but rather provided a full and fair discussion of the problem, basing its analysis on geographic considerations and an assessment of existing data.

(b) Nocturnal Bird Mortality

Plaintiffs also argue that BLM “entirely failed to conduct any nighttime bird surveys in the Project area, thus leaving the public and decisionmakers alike to speculate about the Project's impacts to burrowing owls, long-eared owls, and other nocturnal bird species.”(Mot. for Summ. J. 25, ECF No. 18.) According to Plaintiffs, BLM was not permitted to rely exclusively on “daytime bird surveys and studies of nocturnal bird migration in other regions” to conclude that nocturnal birds are not prevalent in the Project area and that night-migrating birds fly at altitudes higher than the proposed turbines. (*Id.*)

Federal Defendants and Tule emphasize that the EIS determined that night-migrating birds, even “when flying over or along a ridge that results in them flying at a lower elevation, are at an elevation ranging from 702 to 2,523 feet,” whereas the “proposed turbines of the Tule Wind Project ... [will be] 492 feet tall.”(AR 528–29.) Moreover, Federal Defendants and Tule point out that the nocturnal birds that Plaintiffs are concerned with, *e.g.*, long-eared owls and burrowing owls, have not been located within the Project area at all and are not believed to reside there.

*17 Here, BLM's conclusion that the Project is unlikely to have significant impacts on night-migrating birds is supported by the available evidence. The Final EIS makes clear that “there is no project-specific information describing the Tule Wind Project area as a major route of the Pacific Flyway for birds during migration.”(AR 528.) The EIS explains that “[b]irds migrating in the Pacific Flyway may cross over the Tule Wind Project area, but these birds likely fly at an elevation above the wind turbines and transmission infrastructure proposed as part of the project.”(*Id.*) This finding is not wholly speculative, as Plaintiffs seem to suggest; rather, the EIS supports its reasoning with a citation to a relevant scientific study.⁴ (*Id.* (citing Mabee et al.2006.)) The EIS also adequately discusses impacts to nocturnal birds, such as owls, and sets forth mitigation measures. (AR 587, 3535–36.)

4 Plaintiffs maintain that the EIS mischaracterizes the Mabee study on which it relies. The EIS states that “[r]ecent studies indicate that nocturnal migrants, even when flying over or along a ridge that results in them flying at a lower elevation, are at an elevation ranging from 702 to 2,523 feet.”(AR 528.) According to Plaintiffs, the EIS fails to disclose that the study actually indicates that 13–16% of night-migrating birds fly at significantly lower altitudes. Yet, as Federal Defendants and Tule emphasize, low altitude flight was identified near a wind-energy facility located on a ridgeline, a very different geographical setting. (Tule Reply in Supp. 18–19, ECF No. 38.)

In any case, the Court is not authorized to substitute its judgment for BLM's. *See Selkirk Conservation Alliance*, 336 F.3d at 958. BLM is entitled to utilize its expertise to interpret the available scientific evidence and to determine which portions of a scientific study, if any, are relevant to assessing the Project's potential impacts. *See id.*

(4) Climate Change

In Section D.18 of the Final EIS, BLM evaluated the Project's impacts on climate change. Section D.18.3 presents an analysis of the Project's overall impacts on climate change, while sections D.18 .4 through D.18.7 evaluate the impacts of each of the identified alternatives. The EIS states that greenhouse gas (“GHG”) emissions from the Tule Wind Project, including both operational emissions and amortized annual construction emissions, would amount to 646 metric tons of carbon dioxide equivalent per year (“MTCO₂E/yr”), “well below the CEQA significance threshold of 10,000

MTCO₂E/yr,” as well as the CEQ indicator for further NEPA analysis of GHG emissions. (AR 2454, 35926.) BLM also suggested that the project might “potentially [decrease] overall emissions attributable to electrical generation in California.”(AR 2454.)

Plaintiffs contend, however, that BLM's analysis of the Project's impacts on climate change is inadequate because the agency (1) failed to provide data to support its prediction that the Project will reduce GHG emissions, and (2) failed to conduct a “life-cycle assessment” of the Project's GHG emissions. First, Plaintiffs contend that BLM must indicate the number of “megawatt hours” of energy the Project is expected to generate per year. (Mot. for Summ. J. 27, ECF No. 18.) Without this data, Plaintiffs maintain that BLM has no way of estimating how much conventional energy generation will be displaced by the Project and, consequently, no basis for anticipating that the Project will diminish GHG emissions. (*Id.*) Second, Plaintiffs fault BLM for focusing its climate change analysis exclusively on impacts resulting from “on-site” construction and operation; Plaintiffs claim that BLM should also have considered emissions from off-site equipment manufacture and transportation. (*Id.*)

Here, as Tule emphasizes, the “MW hours” estimate of the Project's anticipated generation that Plaintiffs seek was readily available based on other data already provided by BLM. (Tule Reply in Supp. 21, ECF No. 38 (“To estimate the project's MW-hours production, one simply multiplies the 31% capacity factor times the project size (186 MW) and the number of hours in a year.”)) Regardless, the EIS does not guarantee, or even predict, that the Project will diminish overall GHG emissions. The EIS merely provides that “the project [will] create a renewable source of energy, thereby potentially decreasing overall emissions attributable to electrical generation in California.”(AR 2454.) Indeed, the Responses to Comments clarify that the EIS “does not definitively state that there [will] be any resulting fossil fuel shut-down and GHG emission reduction as a result of the project.”(AR 3709.) BLM's suggestion does not contradict the available evidence and requires no additional quantitative support.

*18 Furthermore, BLM was not obligated to engage in the “life-cycle” assessment of GHG emissions that Plaintiffs demand. This type of evaluation is not required by applicable state or federal regulations and would be largely speculative, as BLM contends, considering that manufacturing and transportation of wind turbines and other

Project components are outside of BLM's control. BLM's choice of methodology in evaluating climate change impacts is grounded in legitimate concerns and is therefore entitled to respect from the Court. *See Native Ecosystems Council*, 697 F.3d at 1053.

D. Did BLM Improperly Defer Specification and Analysis of Mitigation Measures?

NEPA requires that an EIS “discuss measures to mitigate adverse environmental requirements.”*Carmel*, 123 F.3d at 1154. “Mitigation must ‘be discussed in sufficient detail to ensure that environmental consequences have been fairly evaluated.’ “ *Id.* (quoting *Robertson v. Methow Valley Citizens Council*, 490 U.S. 332, 353, 109 S.Ct. 1835, 104 L.Ed.2d 351 (1989)). “An [EIS] need not contain a ‘complete mitigation plan’ that is ‘actually formulated and adopted.’ “ *Id.* (quoting *Robertson*, 490 U.S. at 352). “An [EIS] cannot, however, omit a reasonably thorough discussion of mitigation measures because to do so would undermine the action-forcing goals of [NEPA].” *Id.*(citing *Robertson*, 490 U.S. at 529).

Plaintiffs contend that the EIS “improperly defers formulation of multiple important mitigation plans,” including a habitat restoration plan, an avian protection plan, and a site-specific noise mitigation plan, “until after completion of environmental review.”(Mot. for Summ. J. 34, ECF No. 18.) Plaintiffs argue that the mitigation measures outlined in the EIS fail to provide “sufficient detail to ensure that environmental consequences have been fairly evaluated,”(*Id.*(quoting *S. Fork Band Council of W. Shoshone of Nev. v. U.S. Dep't of the Interior*, 588 F.3d 718, 727 (9th Cir.2009))); according to Plaintiffs, the measures identified do not simply leave room for minor adjustments as the Project moves forward, but rather are left entirely undeveloped.

Federal Defendants maintain, however, that the EIS fleshes out the proposed mitigation measures in far more detail than is required by NEPA. Federal Defendants emphasize that mitigation efforts must be flexible and contingent in order to address “on-the-ground conditions,” and also point out that adaptive management plans that “contemplate post-decision monitoring and modification ... satisfy NEPA's requirements.”(Fed. Def. Cross Mot. for Summ. J. 35, ECF No. 31.)

Here, the Court agrees with Federal Defendants that the EIS provides a reasonably thorough and complete discussion of

mitigation measures. For example, as part of its discussion of construction-related impacts on native vegetation in the Project area, the EIS sets forth Mitigation Measures BIO-1d ("MM BIO-1d") and BIO-1e ("MM BIO-1e"), both of which call for a Habitat Restoration Plan to restore vegetation in areas affected by Project construction. (AR 564-65.) Although the Habitat Restoration Plan is not exhaustively described, MM BIO-1d and MM BIO-1e do set forth specific guidelines for minimizing impacts to native vegetation communities, such as requiring that work areas "be revegetated with native species characteristic of the adjacent native vegetation communities," calling for the designation and approval of a "habitat restoration specialist ... to determine the most appropriate method of restoration," and suggesting possible restoration methods, including "hydroseeding, hand-seeding, imprinting, and soil and plant salvage."(AR 564.) MM BIO-1d and MM BIO-1e also set forth a timeline for implementation, which indicates that the Habitat Restoration Plan shall be approved "prior to construction of the project," and provides that "all construction materials shall be completely removed from the site [after completion of the Project] and that "[a]ll temporary construction access roads shall be permanently closed and restored."(*Id.*)

*19 With respect to areas permanently impacted by Project construction, MM BIO-1e provides that "[h]abitat compensation shall be accomplished through agency-approved land preservation or mitigation fee payment for the purpose of habitat compensation of lands supporting comparable habitats to those lands impacted by the [Project]." (AR 565.) MM BIO-1e also sets a specific deadline, which states that "[l]and preservation or mitigation fee payment for habitat compensation must be completed within 18 months of permit issuance."(*Id.*)

Similarly, the EIS outlines with reasonable specificity steps that Tule must take to minimize noise from Project construction and operation. The EIS acknowledges that "the noise generated by wind turbines [will] exceed the allowable noise level limits" at several locations within the Project area. (AR 1619.) For this reason, the EIS sets forth Mitigation Measure NOI-3 ("MM NOI-3"), which calls for the development and implementation of a site-specific noise mitigation plan. (*Id.*) The noise mitigation plan will be designed to ensure that turbine operations "comply with County General Plan Policy 4b and County Noise Ordinance Section 36.404," provisions that set specific dB-level limits for different zoning districts at various times

of day. (AR 1619, 1593.) MM NOI-3 also provides that "[m]itigation of ... turbine noise may include revising the turbine layout, curtailment of nighttime use of selected turbines, utilization of an alternate turbine manufacturer (or combination of manufacturers), and implementation of noise reduction technology."(AR 1619.)

Finally, the EIS recognizes that "special-status bird species have the potential to collide with towers and transmission lines and have the potential to be electrocuted by the transmission towers associated with the Tule Wind Project, resulting in injury or mortality."(AR 614-15.) To address this risk, the EIS sets forth Mitigation Measure BIO-10b, which requires that "[a]n Avian Protection Plan ... be developed jointly with the U.S. Fish and Wildlife Service [("FWS")] and California Department of Fish and Game and ... provide the framework necessary for implementing a program to reduce bird mortalities."(AR 614.) The EIS provides that the "Avian Protection Plan shall include the following: corporate policy, training, permit compliance, construction design standards, nest management, avian reporting system, risk assessment methodology, mortality reduction measures, avian enhancement options, quality control, public awareness, and key resources."(*Id.*) A draft ABPP was actually developed by Tule, in consultation with FWS, and incorporated by reference in the Final EIS. (AR 13440.) The ABPP is an 85-page document that covers each Project phase, including pre-construction, siting and construction, and post-construction, and outlines a conservation strategy based on the "elements of avoidance, minimization, mitigation and adaptive management."(AR 13444.)

*20 In short, Plaintiffs' claim that proposed mitigation measures were entirely undeveloped is not supported by the record. The EIS outlined several mitigation measures in considerable detail. As indicated, NEPA contains no substantive requirement that environmental impacts be mitigated or avoided-the mitigation measures proposed in an EIS "need not be legally enforceable, funded, or even in final form to comply with NEPA's procedural requirements." *NPCA*, 222 F.3d at 681. Rather, the mitigation discussion must provide only "sufficient detail" to indicate that environmental impacts have been fairly evaluated. *S. Fork*, 588 F.3d at 727. The EIS's discussion of mitigation is more than adequate under NEPA.

2. MBTA and BGEPA

The MBTA provides that, unless otherwise permitted, “it shall be unlawful at any time, by any means or in any manner, to pursue, hunt, take, capture [or] kill ... any migratory bird ... nest, or egg of any such bird” unless permitted by the Secretary of the Interior. 16 U.S.C. § 703(a). “Take” means to pursue, hunt, shoot, wound, kill, trap, capture, or collect.” 50 C.F.R. § 10.12. The MBTA is a criminal statute enforced by the FWS. See 16 U.S.C. §§ 706, 707(a), (d). Although the MBTA does not create a private right of action, Plaintiffs may bring suit under the APA for violations of the MBTA.

The BGEPA prohibits the taking, possession, sale, or transport of bald and golden eagles, except pursuant to Federal regulations. 16 U.S.C. § 668(a); 50 C.F.R. Part 22. Under the BGEPA, FWS issues permits to take, possess, and transport bald and golden eagles for a variety of purposes provided such permits are compatible with the preservation of the bald eagle or the golden eagle. 16 U.S.C. § 668a; 50 C.F.R. §§ 22.21–22.29. In September 2009, FWS published a final rule establishing, among other revisions to Part 22, a new regulation, 50 C.F.R. § 22.26, that provides for permits to take eagles where the taking is associated with, but not the purpose of, otherwise lawful activities, *i.e.*, incidental take. 74 Fed.Reg. 46,836 (Sept. 11, 2009).

Plaintiffs argue that BLM was required to obtain a permit under the MBTA because the Project will inevitably cause bird fatalities, either through collision with wind turbines or transmission lines, or through habitat modification and destruction. (Mot. for Summ. J. 35, ECF No. 18 (citing *Humane Soc’y of the U.S. v. Glickman*, 217 F.3d 882, 884–88 (D.C.Cir.2000)).) Similarly, Plaintiffs claim that BLM was required to seek a permit for incidental take under the BGEPA because the Project will inevitably kill or disturb golden eagles. (*Id.* at 39.)

Federal Defendants contend that Plaintiffs’ expansive interpretation of the MBTA is inconsistent with the long-standing position of FWS and the Department of the Interior that the statute does not apply to government agencies and employees acting in a purely regulatory capacity. (Fed. Def. Cross Mot. for Summ. J. 39, ECF No. 31.) Moreover, Federal Defendants argue that Tule, as the private applicant seeking to construct and operate a wind-energy facility on public land, is the proper party to seek a BGEPA permit for incidental take of golden eagles, not BLM. (*Id.* at 46–47.) Tule maintains that it has worked closely with FWS to develop the ABPP and to take appropriate measures to avoid eagle mortality, such that

FWS determined that a BGEPA permit was not required at this time. (Tule Reply in Supp. 29, ECF No. 38.)

*21 Although the Court is deeply troubled by the Project’s potential to injure golden eagles and other rare and special-status birds, the Court nonetheless agrees with Tule and Federal Defendants that BLM was not required to obtain permits under the MBTA or the BGEPA prior to granting Tule’s right-of-way application. Federal agencies are not required to obtain a permit before acting in a regulatory capacity to authorize activity, such as development of a wind-energy facility, that may incidentally harm protected birds. *Cf. Glickman*, 217 F.3d at 884–88 (holding that an agency must seek an MBTA permit before engaging in “direct” killing of protected birds). Indeed, the governing interpretation of the MBTA in the Ninth Circuit is quite narrow and holds that the statute does not even prohibit incidental take of protected birds from otherwise lawful activity. See *Seattle Audubon v. Evans*, 952 F.2d 297, 302 (9th Cir.1991) (holding that the MBTA applies to “physical conduct of the sort engaged in by hunters and poachers,” but not to “habitat modification or destruction.”). District courts within the Ninth Circuit have also rejected the expansive interpretation of the MBTA proposed by Plaintiffs.⁵ See *Protect Our Cmty’s Found.*, 2013 WL 5947137, at *18–19 (“Plaintiffs have failed to demonstrate that a permit is required under the MBTA for an unintentional killing of migratory birds”); *Native Songbird Care & Conservation v. LaHood*, 2013 WL 335657 at *4 (N.D.Cal. July 2, 2013) (“Plaintiffs’ view [is] that the APA and MBTA authorize private suits against federal agencies whenever an agency authorizes a project implemented by third parties that, years later, has the unintended effect of taking even a single migratory bird. Private suits under the MBTA appear to be rare, and the cases cited by Plaintiffs do not support such an expansive interpretation of its scope.”); see also *Newton Cnty. Wildlife Ass’n v. U.S. Forest Serv.*, 113 F.3d 110, 116 (8th Cir.1997) (“Whatever [the] reason the [FWS] does not require the Forest Service to obtain MBTA permits, this enforcement policy is committed to agency discretion.”).

⁵ Plaintiffs reference a recent criminal prosecution, *United States v. Duke Energy Renewables, Inc.*, Case No. 213-cr-00268-KHR (D. Wyo. filed Nov. 7, 2013), in which FWS chose to bring criminal charges under the MBTA against a wind energy facility for incidental take of protected birds. (See Req. for Judicial Notice, ECF No. 35.) Although the Court takes notice of the filings that Plaintiffs present, FWS’s exercise of its enforcement

discretion does not support Plaintiffs' argument that BLM was required to seek a permit prior to granting Tule's right-of-way application.

Similarly, BLM is not required to seek a BGEPA permit—BLM's approval of Tule's right-of-way application does not, by itself, harm or molest golden eagles. Tule has also satisfied its obligations under the BGEPA by developing the ABPP in consultation with BLM and FWS. FWS has determined that Tule should seek, as an initial matter, to avoid impacts to eagles from the Project through phased implementation, monitoring, and adaptive management. (AR 5904 (“[FWS] believes that the ABPP for the Tule Wind Energy Project is appropriate in its adaptive management approach to avoid and minimize take of migratory birds, bats and eagles within the Phase I project area.”).) Accordingly, BLM's decision to grant Tule's right of way application, prior to obtaining MBTA or BGEPA permits, was not “arbitrary, capricious” or without observance of procedure required by law.⁶ 5 U.S.C. §§ 706(2) (A), (D).

6 Tule argues that Plaintiffs failed to preserve their arguments regarding MBTA and BGEPA permitting for judicial review. (Tule Cross Mot. for Summ. J 39–40, ECF No. 30.) No one informed BLM through the public comment process that the agency was obligated to seek permits from FWS for incidental take of birds. As the Court finds that Plaintiffs' MBTA and BGEPA arguments fail on the merits, the Court declines to address the exhaustion issue.

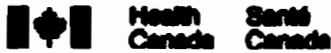
CONCLUSION

*22 For the reasons stated above, the Court DENIES Plaintiffs' motion for summary judgment and GRANTS Tule's and Federal Defendants' cross motions for summary judgment.

IT IS SO ORDERED.

End of Document

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Environmental and Workplace Health

Wind Turbine Noise and Health Study: Summary of Results

Background and Rationale

The Government of Canada is committed to protecting the health and well-being of Canadians. Jurisdiction for the regulation of noise is shared across many levels of government in Canada. Health Canada's mandate with respect to wind power includes providing science-based advice, upon request, to federal departments, provinces, territories and other stakeholders on the potential impacts of wind turbine noise (WTN) on community health and well-being. Provinces and territories, through the legislation they have enacted, make decisions in relation to areas including installation, placement, sound levels and mitigation measures for wind turbines.

Globally, wind energy is relied upon as an alternative source of renewable energy. In Canada wind energy capacity has grown from approximately 137 Megawatts (MW) in 2000 to just over 8.5 Gigawatts (GW) in 2014 (CANWEA, 2014). At the same time, there has been concern from some Canadians living within the vicinity of wind turbine installations that their health and well-being are negatively affected from exposure to WTN.

The scientific evidence base in relation to WTN exposure and health is limited, which includes uncertainty as to whether or not low frequency noise (LFN) and infrasound from wind turbines contributes to the observed community response and potential health impacts. Studies that are available differ in many important areas including methodological design, the evaluated health effects, and strength of the conclusions offered.

In July 2012, Health Canada announced its intention to undertake a large scale epidemiology study in collaboration with Statistics Canada (*Statistics Canada Official Title: Community Noise and Health Study*). The study was launched to support a broader evidence base on which to provide federal advice and in acknowledgement of the community health concerns expressed in relation to wind turbines.

Research Objectives and Methodology

The objectives of the study were to:

- Investigate the prevalence of health effects or health indicators among a sample of Canadians exposed to WTN using both self-reported and objectively measured health outcomes;
- Apply statistical modeling in order to derive exposure response relationships between WTN levels and self-reported and objectively measured health outcomes; and,
- Investigate the contribution of LFN and infrasound from wind turbines as a potential contributing factor towards adverse community reaction.

The study was undertaken in two Canadian provinces, Ontario (ON) and Prince Edward Island (PEI), where there were a sufficient number of homes within the vicinity of wind turbine installations. The study consisted of three primary components: an in-person questionnaire, administered by Statistics Canada to randomly selected participants living at varying distances from wind turbine installations;

collection of objectively measured outcomes that assess hair cortisol, blood pressure and sleep quality; and, more than 4000 hours of WTN measurements conducted by Health Canada to support the calculation of WTN levels at residences captured in the study scope. To support the assessment and reporting of data, and permit comparisons to other studies, residences were grouped into different categories of calculated outdoor A-weighted WTN levels as follows: less than 25 dB; 25-<30dB; 30-<35dB; 35-<40dB; and greater than or equal to 40 dB¹.

Detailed information on Health Canada's *Wind Turbine Noise and Health Study* methodology, including the 60-day public consultation and peer review process is available on the [Health Canada](#) website. The detailed methodology for the study is also available in the peer reviewed literature (*Michaud et al., Noise News International, 21(4): 14-23, 2013*).

Preliminary Research Findings²

Health Canada has completed its preliminary analysis of the data obtained. Research findings are presented below in accordance with the study component in which they were obtained i.e. in-person, self-report questionnaire findings, objectively measured responses, and noise measurements and calculations. As with other studies of this nature, a number of limitations and considerations apply to the study findings including:

- results may not be generalized to areas beyond the sample as the wind turbine locations in this study were not randomly selected from all possible sites operating in Canada;
- results do not permit any conclusions about causality; and,
- results should be considered in the context of all published peer-reviewed literature on the subject.

A. Study Population and Participation

The study locations were drawn from areas in ON and PEI where there were a sufficient number of homes within the vicinity of wind turbine installations. Twelve (12) and six wind turbine developments were sampled in ON and PEI, representing 315 and 84 wind turbines respectively. All potential homes within approximately 600 m of a wind turbine were selected, as well as a random selection of homes between 600 m and 10 km. From these, one person between the ages of 18 and 79 years from each household was randomly selected to participate.

The final sample size consisted of 2004 potential households. Of the 2004 locations sampled, 1570 were found to be valid dwellings³ of which a total of 1238 households with similar demographics⁴ participated, resulting in an overall participation rate of 78.9%. Participation rate was similar regardless of one's proximity to wind turbines and equally high in both provinces. The high response rates in this study help to reduce, but not eliminate, non-response bias⁵.

B. Self-Reported Questionnaire Results

Results are presented in relation to WTN levels. For findings related to WTN annoyance, results are also provided in relation to distance to allow for comparisons with other studies. WTN is a more sensitive measure of exposure level and allows for consideration of topography, wind turbine characteristics and the number of wind turbines at any given distance. To illustrate, two similar homes may exist in similar environments located at the same distance from the nearest turbine operating in areas with 1 small and 75 large wind turbines respectively. These homes would be treated the same if the analysis was conducted using only distance to the nearest wind turbine, however they would be completely different in terms of their WTN exposure levels.

The following were not found to be associated with WTN exposure:

- self-reported sleep (e.g., general disturbance, use of sleep medication, diagnosed sleep disorders);
- self-reported illnesses (e.g., dizziness, tinnitus, prevalence of frequent migraines and headaches) and chronic health conditions (e.g., heart disease, high blood pressure and diabetes); and
- self-reported perceived stress and quality of life.

While some individuals reported some of the health conditions above, the prevalence was not found to change in relation to WTN levels.

1. Self-reported Sleep

Long-term sleep disturbance can have adverse impacts on health and disturbed sleep is one of the more commonly reported complaints documented in the community noise literature. Self-reported sleep disturbance has been shown in some, but not all, studies to be related to exposure to wind turbines.

The Pittsburgh Sleep Quality Index (PSQI) is a frequently used questionnaire for providing a validated measure of reported sleep pathology where scores can range from 0-21 and a global score of greater than 5 is considered to reflect poor sleep quality. The PSQI was administered as part of the overall questionnaire, which was supplemented with questions about the use of sleep medication, prevalence of sleep disorders diagnosed by a healthcare professional and how sleep disturbed people were in general over the last year.

Results of self-reported measures of sleep, that relate to aspects including, but not limited to general disturbance, use of sleep medication, diagnosed sleep disorders and scores on the PSQI, did not support an association between sleep quality and WTN levels.

2. Self-reported Illnesses and Chronic Diseases

Self-reports of having been diagnosed with a number of health conditions were not found to be associated with exposure to WTN levels. These conditions included, but were not limited to chronic pain, high blood pressure, diabetes, heart disease, dizziness, migraines, ringing, buzzing or whistling sounds in the ear (i.e., tinnitus).

3. Self-reported Stress

Exposure to stressors and how people cope with these stressors has long been considered by health professionals to represent a potential risk factor to health, particularly to cardiovascular health and mental well-being. The Perceived Stress Scale is a validated questionnaire that provides an assessment of the degree to which situations in one's life are appraised as stressful.

Self-reported stress, as measured by scores on the Perceived Stress Scale, was not found to be related to exposure to WTN levels.

4. Quality of Life

Impact on quality of life was assessed through the abbreviated version of the World Health Organization's Quality of Life scale; a validated questionnaire that has been used extensively in social studies to assess quality of life across the following four domains: Physical; Environmental; Social and Psychological.

Exposure to WTN was not found to be associated with any significant changes in reported quality of life

for any of the four domains, nor with overall quality of life and satisfaction with health.

The following was found to be statistically associated with increasing levels of WTN:

- annoyance towards several wind turbine features (i.e. noise, shadow flicker, blinking lights, vibrations, and visual impacts).

5 Annoyance

5.1 Community Annoyance as a Measure of Well-being

The questionnaire, administered by Statistics Canada, included themes that were intended to capture both the participants' perceptions of wind turbines and reported prevalence of effects related to health and well-being. In this regard, one of the most widely studied responses to environmental noise is community annoyance. There has been more than 50 years of social and socio-acoustical research related to the impact that noise has on community annoyance. Studies have consistently shown that an increase in noise level was associated with an increase in the percentage of the community indicating that they are "highly annoyed" on social surveys. The literature shows that in comparison to the scientific literature on noise annoyance to transportation noise sources such as rail or road traffic, community annoyance with WTN begins at a lower sound level and increases more rapidly with increasing WTN.

Annoyance is defined as a long-term response (approximately 12 months) of being "very or extremely annoyed" as determined by means of surveys. Reference to the last year or so is intended to distinguish a long term response from one's annoyance on any given day. The relationship between noise and community annoyance is stronger than any other self-reported measure, including complaints and reported sleep disturbance.

5.2 Community Annoyance Findings

Statistically significant exposure-response relationships were found between increasing WTN levels and the prevalence of reporting high annoyance. These associations were found with annoyance due to noise, vibrations, blinking lights, shadow and visual impacts from wind turbines. In all cases, annoyance increased with increasing exposure to WTN levels.

The following additional findings in relation to WTN annoyance were obtained:

- At the highest WTN levels (≥ 40 dBA in both provinces), the following percentages of respondents were highly annoyed by wind turbine noise: ON-16.5%; PEI-6.3%. While overall a similar pattern of response was observed, the prevalence of WTN annoyance was 3.29 times higher in ON versus PEI (95% confidence interval, 1.47 - 8.68).
- A statistically significant increase in annoyance was found when WTN levels exceeded 35 dBA.
- Reported WTN annoyance was statistically higher in the summer, outdoors and during evening and night time.
- Community annoyance was observed to drop at distances between 1-2km in ON, compared to PEI where almost all of the participants who were highly annoyed by WTN lived within 550m of a wind turbine. Investigating the reasons for provincial differences is outside the scope of the current study.
- WTN annoyance significantly dropped in areas where calculated nighttime background noise

exceeded WTN by 10dB or more.

- Annoyance was significantly lower among the 110 participants who received personal benefit, which could include rent, payments or other indirect benefits of having wind turbines in the area e.g., community improvements. However, there were other factors that were found to be more strongly associated with annoyance, such as the visual appearance, concern for physical safety due to the presence of wind turbines and reporting to be sensitive to noise in general.

5.3 Annoyance and Health

- WTN annoyance was found to be statistically related to several self-reported health effects including, but not limited to, blood pressure, migraines, tinnitus, dizziness, scores on the PSQI, and perceived stress.
- WTN annoyance was found to be statistically related to measured hair cortisol, systolic and diastolic blood pressure.
- The above associations for self-reported and measured health endpoints were not dependent on the particular levels of noise, or particular distances from the turbines, and were also observed in many cases for road traffic noise annoyance.
- Although Health Canada has no way of knowing whether these conditions may have either predated, and/or are possibly exacerbated by, exposure to wind turbines, the findings support a potential link between long term high annoyance and health.
- Findings suggest that health and well-being effects may be partially related to activities that influence community annoyance, over and above exposure to wind turbines.

C. Objectively Measured Results

Objectively measured health outcomes were found to be consistent and statistically related to corresponding self-reported results. WTN was not observed to be related to hair cortisol concentrations, blood pressure, resting heart rate or measured sleep (e.g., sleep latency, awakenings, sleep efficiency) following the application of multiple regression models⁶.

1. Measures Associated with Stress

Hair cortisol, blood pressure and resting heart rate measures were applied in addition to the Perceived Stress Scale to provide a more complete assessment of the possibility that exposure to WTN may be associated with physiological changes that are known to be related to stress.

Cortisol is a well-established biomarker of stress, which is traditionally measured from blood and/or saliva. However, measures from blood and saliva reflect short term fluctuations in cortisol and are influenced by many variables including time of day, food consumption, body position, brief stress, etc., that are very difficult to control for in an epidemiology study. To a large extent, such concerns are eliminated through measurement of cortisol in hair samples as cortisol incorporates into hair as it grows. With a predictable average growth rate of 1 cm per month, measurement of cortisol in hair makes it possible to retrospectively examine months of stressor exposure. Therefore cortisol is particularly useful in evaluating the potential impact that long term exposure to WTN has on one of the primary biomarkers linked to stress.

The results from multiple linear regression analysis reveal consistency between hair cortisol concentrations and scores on the Perceived Stress Scale (i.e., higher scores on this scale were associated with higher concentrations of hair cortisol) with neither measure found to be significantly affected by exposure to WTN. Similarly, while self-reported high blood pressure (hypertension) was

associated with higher measured blood pressure, no statistically significant association was observed between measured blood pressure, or resting heart rate, and WTN exposure.

2. Sleep Quality

Sleep was measured using the Actiwatch2™, which is a compact wrist-worn activity monitor that resembles a watch. This device has advanced sensing capabilities to accurately and objectively measure activity and sleep information over a period of several days. This device is considered to be a reliable and valid method of assessing sleep in non-clinical situations. The following measured sleep impacts were considered: sleep latency (how long it took to fall asleep); wake time after sleep onset (the total duration of awakenings); total sleep time; the rate of awakening bouts (calculates how many awakenings occur as a function of time spent in bed); and sleep efficiency (total sleep time divided by time in bed).

Sleep efficiency is especially important because it provides a good indication of overall sleep quality. Sleep efficiency was found to very high at 85% and statistically influenced by gender, body mass index (BMI), education and caffeine consumption.

The rates of awakening bouts, total sleep time or sleep latency were further found in some cases to be related to: age, marital status, closing bedroom windows, BMI, physical pain, having a stand-alone air conditioner in the bedroom, self-reports of restless leg syndrome and being highly annoyed by the blinking lights on wind turbines.

While it can be seen that many variables had a significant impact on measured sleep, calculated outdoor WTN levels near the participants' home was not found to be associated with sleep efficiency, the rate of awakenings, duration of awakenings, total sleep time, or how long it took to fall asleep.

D. Wind Turbine Noise Measures Results

Note - To support a greater understanding of the concepts included in this section, Health Canada has developed a short [Primer on Noise](#).

Scientists that study the community response to noise typically measure different sounds levels with a unit called the A-weighted decibel (dBA). The A-weighting reflects how people respond to the loudness of common sounds; that is, it places less importance on the frequencies to which the ear is less sensitive. For most community noise sources this is an acceptable practice. However, when a source contains a significant amount of low frequencies, an A-weighted filter may not fully reflect the intrusiveness or the effect that the sound may have (e.g. annoyance). In these cases, the use of a C-weighted filter (dBC) may be more appropriate because it is similar to the A-weighting except that it includes more of the contribution from the lower frequencies than the A-weighted filter.

1. A- Weighted

More than 4000 hours of WTN measurements conducted by Health Canada supported the calculations of A-weighted WTN levels at all 1238 homes captured in the study sample.

- Calculated outdoor A-weighted WTN levels for the homes participating in the study reached 46 dBA for wind speeds of 8m/s. This approach is the most appropriate to quantify the potential adverse effects of WTN. The calculated WTN levels are likely to be representative of yearly averages with an uncertainty of about +/- 5dB and therefore can be compared to World Health Organization (WHO) guidelines. The WHO identifies an annual outdoor night time average of 40 dBA as the level below which no health effects associated with sleep disturbance are expected to occur even among the most vulnerable people (WHO (2009) *Night Noise Guidelines for Europe*).

2. Low Frequency Noise

Wind turbines emit LFN, which can enter the home with little or no reduction in energy potentially resulting in rattles in light weight structures and annoyance. Although the limits of LFN are not fixed, it generally includes frequencies from between 20Hz and 200Hz. C-weighted sound levels can be a better indicator of LFN in comparison to A-weighted levels, and were calculated in order to assess the potential LFN impacts.

- Calculated outdoor dBC levels for homes ranged from 24 dBC and reached 63 dBC.
- Three (3)% of the homes were found to exceed 60 dBC².
- No additional benefit was observed in assessing LFN because C- and A-weighted levels were so highly correlated ($r=0.94$) that they essentially provided the same information. It was therefore not surprising that the relationship between annoyance and WTN levels was predicted with equal strength using dBC or dBA and that there was no association found between dBC levels and any of the self-reported illnesses or chronic health conditions assessed (e.g., migraines, tinnitus, high blood pressure, etc.)
- Sound pressure levels were found to be below the recommended thresholds for reducing perceptible rattle and the annoyance that rattle may cause.

As LFN is generally considered to be an indoor noise problem, it was of interest to better understand how much outdoor LFN makes its way into the home.

- At a selection of representative homes, Health Canada measurements showed an average of 14dB of outdoor WTN is blocked from entering a home at low frequencies (16 Hz - 100 Hz) with closed windows compared to an average reduction of 10dB with windows partially open.

3. Infrasound

Long-term measurements over a period of 1 year were also conducted in relation to infrasound levels.

- Infrasound from wind turbines could sometimes be measured at distances up to 10km from the wind turbines, but was in many cases below background infrasound levels.
- The levels were found to decrease with increasing distance from the wind turbine at a rate of 3dB per doubling of distance beyond 1km, downwind from a wind turbine.
- The levels of infrasound measured near the base of the turbine were around the threshold of audibility that has been reported for about 1% of people that have the most sensitive hearing.

Due to the large volume of acoustical data, including that related to infrasound, analysis will continue over subsequent months with additional results being released at the earliest opportunity throughout 2015.

Data Availability and Application

Detailed descriptions of the above results will be submitted for peer review with open access in scientific journals and should only be considered final following publication. All publications by Health Canada related to the study will be identified on the Health Canada website.

Raw data originating from the study is available to Canadians, other jurisdictions and interested parties through a number of sources: Statistics Canada Federal Research Data Centres, the Health Canada website (noise data), open access to publications in scientific journals and conference presentations. Plain language abstracts outlining the research and identifying the scientific journals where papers can be found will further be published to the Departmental website.

Health Canada's Wind Turbine Noise and Health Study included both self-reported and physically measured health effects as together they provide a more complete overall assessment of the potential impact that exposure to wind turbines may have on health and well-being.

Study results will support decision makers by strengthening the peer-reviewed scientific evidence base that supports decisions, advice and policies regarding wind turbine development proposals, installations and operations. The data obtained will also contribute to the global knowledge of the relationship between WTN and health.

- 1 Categories are mutually exclusive. Only six out of 1238 dwellings in the study were above 45dBA; an inadequate sample size to create an additional category.
- 2 A more detailed presentation of the results will be submitted for publication in scientific journals. Results should only be considered final following peer-review and publication in the scientific literature.
- 3 434 were not valid dwellings; upon visiting the address Statistics Canada noted that the location was either demolished for unknown reasons, under construction, vacant for unknown reasons, an unoccupied seasonal dwelling, residents were outside the eligible age range, or not a home at all.
- 4 Some minor differences were found with respect to age, employment, type of home and home ownership.
- 5 Non-response bias may be a problem depending upon the extent to which non participation is associated with the exposure of interest (in this case wind turbine exposure). This study did not include a non-response survey, however refusing to participate was not related to the distance between the resident and the nearest wind turbine.
- 6 This type of analysis identifies the personal and situational variables that best explain the variation observed in the objective measures after adjusting for all variables that are known to have an influence on the effects being assessed.
- 7 For sources that operate at night in rural environments, a dBC limit somewhere between 60 dBC and 65 dBC has been recommended to minimize community complaints/annoyance associated with LFN, See discussion in Broner (2011). A simple outdoor criterion for assessment of low frequency noise emission. Acoustics Australia Vol 39, Issue 1, pp 7-14.

Date Modified: 2014-10-30

JoAnne J. Blank

Senior Scientist and Project Manager



JoAnne serves as a senior scientist in the Energy Market Sector, specializing in feasibility, permitting and compliance of power and renewable energy projects across the United States. She has been involved in the design and permitting of more than 2.4 gigawatts of wind energy. Her project and management experience includes feasibility analyses, project siting, preliminary engineering design, environmental permitting, NEPA and PSC permit applications, FAA permits, Phase I site assessments, shadow/flicker analyses, sound studies, property surveys, erosion control plans, geospatial information analysis and management, and post-construction compliance. She has also designed and developed numerous geographically referenced databases and applications for the management and visualization of historic and environmental data.

JoAnne's management experience with contractors, utilities, regulatory agencies and renewable energy developers has provided her with a broad understanding of the processes and requirements necessary for the successful development, monitoring and post-construction compliance of energy projects.

EDUCATION

Master of Science Atmospheric and Oceanic Sciences, University of Wisconsin, Madison, Wisconsin, 2000

Master of Science Environmental Monitoring, University of Wisconsin - Nelson Institute for Environmental Studies, Madison, Wisconsin, 2000

Bachelor of Science Atmospheric and Oceanic Sciences, University of Wisconsin, Madison, Wisconsin, 1996

FERC Environmental Compliance Seminar, 2014

FERC Regulatory Overview and Guidance Seminar, 2014

SELECT PROJECT EXPERIENCE

Wind Power

Apple Blossom Wind Farm, Huron County, Michigan (Task Manager)

JoAnne is task manager for development of the Geronimo Wind Energy 10,000-acre, 100-megawatt Apple Blossom Wind Farm. She managed the preparation and submission of the Huron County permit application, sound/noise modeling, ambient sound survey, shadow/flicker analysis, and decommissioning plan.

Grande Prairie Wind Farm, Holt County, Nebraska (Impact Modeling)

JoAnne managed the analyses of the Geronimo Wind Energy 400-megawatt Grande Prairie Wind Farm. She managed shadow flicker impact analyses, sound modeling studies and authored sections for these studies within the project environmental impact statement.

Highland Wind Farm, Saint Croix County, Wisconsin (Project Manager)

JoAnne is project manager for development of the Emerging Energies, LLC 6,000-acre, 102-megawatt Highland Wind Farm. As lead-author, she completed the preparation and submittal of the PSC CPCN permit application. She was also responsible for the design of the wind farm layout, environmental field studies, wetland/water quality permitting, erosion control permitting, agency meetings, sound/noise modeling, shadow/flicker analysis, photo-simulation studies, road and infrastructure preliminary assessments, public meeting support and expert witness testimony.

Ida Grove Wind Farm, Ida County, Iowa (Impact Modeling)

JoAnne performed sound impact analysis and managed the decommissioning study for the Invenergy 300-megawatt Ida Grove Wind Farm. She modeled potential sound from the 134 proposed turbine locations and authored reports with the sound and decommissioning study results.

JoAnne J. Blank

Senior Scientist and Project Manager

SummitWind Farm, Grant County, South Dakota (Impact Modeling)

JoAnne managed the analyses of the OwnEnergy 90-megawatt SummitWind Farm. She managed shadow flicker impact analyses, sound modeling studies and authored reports with study results.

Highland and Highland II Wind Farms, O'Brien County, Iowa

JoAnne assisted in the permitting and support studies for the Invenergy, LLC 40,000-acre, 500-megawatt Highland Wind Farm Phase I and II. She was lead author on the critical issues analyses and provided support and impact analyses for the O'Brien County permit applications and Phase I Environmental Site Assessments.

Beautiful Hills Wind Farm, Manitowoc County, Wisconsin (Project Manager)

JoAnne was project manager for development of the Emerging Energies, LLC 900-acre, 30-megawatt Beautiful Hills Wind Farm. She managed environmental studies, shadow flicker impact analyses, sound modeling studies and provided public meeting support.

Confidential Wind Farm, Midwest US (Project Manager)

JoAnne assisted the owner of a Midwest wind farm with post-construction compliance related to shadow/flicker impacts on properties. An automatic turbine curtailment system was installed to mitigate flicker on residential buildings. Studies were performed to assess the actual impact of shadow and assist with mitigation measures.

Glacier Hills Wind Park*, Columbia County, Wisconsin (Project Manager)

JoAnne managed multiple projects in support of the We Energies Glacier Hills Wind Park development. The 7,500-acre, 91-turbine, 150-megawatt wind farm. She completed the preliminary site design and was responsible for the environmental field studies and permitting, a sound/noise study and support of land owner negotiations. She assisted We Energies with preparation and submittal of the CPCN application to the Wisconsin PSC.

Forward Wind Energy Center*, Southeastern Wisconsin (Project Manager)

JoAnne managed multiple projects in support of the permitting, design and construction of Invenergy LLC's 86-turbine, 129-megawatt wind farm. She was responsible for the successful completion of the phases including micro-siting and facility layout. Environmental Site Assessments (Phase I's), erosion control plans, wetland permitting and pre/post ALTA property surveys. When Invenergy made the decision to expand the Forward wind farm, she managed and completed the same phases for the additional development.

Shirley Wind Farm*, Brown County, Wisconsin (Project Manager)

JoAnne managed services for the development of the Emerging Energies, LLC 8-turbine, 20-megawatt wind farm. Natural resource assessments, geotechnical investigations Phase I Environmental Site Assessments and property surveys were completed in support of this development.

Blue Sky Green Field Wind Project*, Fond du Lac County, Wisconsin (Project Manager)

JoAnne managed support services for the We Energies 10,000-acre, 88-turbine, 145-megawatt wind farm. Pre-construction responsibilities included facility micro-siting, site civil design, environmental assessments and permitting, land owner agreement documentation and CPCN permit application assistance. Construction and post-construction support included environmental compliance, access road erosion assessments, TV and radio interference mitigation and expansion planning.

Windy Acres, Sheboygan County, Wisconsin (Project Manager)

JoAnne was project manager for development of the Emerging Energies, LLC 30-megawatt Windy Acres Wind Farm. She managed environmental studies, shadow flicker impact analyses, sound modeling studies and provided public meeting support.

* denotes projects completed with other firms

JoAnne J. Blank

Senior Scientist and Project Manager

Dominion Wind Power, Multiple Confidential Sites* (Project Manager)

JoAnne was responsible for the feasibility and analysis of several proposed wind farm sites for Dominion Power across the United States. Research and analyses included assessment of resources, permit restrictions, constructability, environmental and natural resource impacts and community support. The reports and conclusions assisted Dominion in reaching a go/no-go decision on development.

Transmission and Utility Routing

Northern Natural Gas Company, Various Midwest Projects and Locations

JoAnne has managed and supported numerous Northern Natural Gas Company projects throughout the midwestern United States. In addition to managing more than 25 individual permitting and compliance projects, JoAnne has also performed analyses and been lead author on resource reports in support of FERC filing under Section 7(c) of the Natural Gas Act.

ANR Pipeline Company, Stevens Point, Wisconsin

JoAnne served as the phase manager for preparation of resource reports in support of a FERC filing under Section 7(c) of the Natural Gas Act. JoAnne performed needed research and analysis; wrote reports and managed the overall preparation of the documents.

American Transmission Company, Wisconsin

JoAnne has assisted in the preparation of, and analysis for, numerous American Transmission Company permit applications. These have included state and federal environmental permits and Public Service Commission CA and CPCN permit applications on projects throughout Wisconsin.

Xcel Energy*, Wisconsin

JoAnne assisted with the preparation of the CPCN application for the CAPX 2020 transmission line through Minnesota and Wisconsin. Her involvement included data research and acquisition, geo-spatial data management and writing of report sections.

Biomass Energy Generation

Confidential Client*, Wisconsin

As the phase manager for preliminary siting of a biomass-fired power generation facility in northern Wisconsin, JoAnne was responsible for the research and analysis of data deemed critical for the successful development of a brownfield or greenfield biomass facility. Existing facilities, natural and sensitive resources, transportation, transmission, fuel source, and water resources were analyzed to provide the client with information for preliminary siting decision.

* denotes projects completed with other firms



MaROUS & COMPANY

August 5, 2015

Jeep & Blazer, LLC
3023 North Clark Street, No. 214
Chicago, Illinois 60657

Attention: Mr. Michael S. Blazer, Attorney at Law

Subject: Market Impact Analysis
Proposed Twin Forks Wind Farm
Macon County, Illinois

Dear Mr. Blazer:

In accordance with your request, the request for a conditional use permit to allow the development of the Twin Forks Wind Farm in Macon County, Illinois, has been analyzed and this market impact analysis has been prepared.

MaRous & Company has conducted similar market impact studies for a variety of clients and for a number of different proposed developments over the last 30 years. Clients have ranged from municipalities, counties, and school districts, to corporations, developers, and citizen's groups. The types of proposals analyzed include: commercial developments such as shopping centers and big-box retail facilities; religious facilities such as mosques and mega-churches; residential developments such as high-density multifamily and congregate-care buildings and large single-family subdivisions; recreational uses such as skate parks and lighted high school athletic fields; industrial uses such as waste transfer stations, land-fills, and quarries; and utilities such as natural gas power plants, high-tension wires, and wind farms. Most recently we have consulted on the proposed Walnut Ridge Wind Farm in Bureau County, and on a proposed solar farm on Long Island, New York.

In addition to this experience, MaRous & Company has appraised a variety of properties in the general market area of the proposed project, including, most recently: various properties for the University of Illinois in Champaign/Urbana; industrial land and a hotel in Peoria; agricultural land in Bloomington; large big-box retail facilities in Ottawa, in Peru, and in East Peoria; and a large mall and other vacant land in Peru.

Purpose and Intended Use of the Study

The purpose of this appraisal assignment is to analyze the potential impact, if any, on the value of the surrounding residential properties of the approval of a conditional use for the development of a wind farm. Specifically, this study is designed to address Section 155.029 (A) (2) and (3) of the Macon County

Mr. Michael S. Blazer
Proposed Twin Forks Wind Farm
August 5, 2015

Zoning Ordinance which states “No special use shall be recommended by the Zoning Board of Appeals unless the Board shall find that... (2) The special use will not substantially be injurious to the use and enjoyment of other property in the immediate vicinity for the purposes already permitted or substantially diminish and impair property values within the neighborhood;” and “(3) The establishment of the special use will not substantially impede the normal and orderly development and improvement of the surrounding property for uses permitted in the district.” The report is intended specifically for the use of the client as part of an application for a special use in Macon County. Any other use or user of this report is considered to be unintended.

Executive Summary

As a result of the market impact analysis undertaken, it is my opinion that the proposed wind farm will not have a negative impact on the property values in the neighborhood, nor will it impede the orderly development of the area for uses permitted in the zoning districts. Specifically:

- There are significant financial benefits to the local economy and to the local taxing bodies from the development of the proposed wind farm;
- The proposed wind farm will create well-paid jobs in the area which will benefit overall market demand;
- An analysis of recent residential sales in the area of existing wind farms did not support any finding that proximity to a wind turbine had a negative impact on property values;
- An analysis of agricultural land values in the area and in other areas of the state with wind farms did not support any finding that the agricultural land values are negatively impacted by the proximity to wind turbines;
- Reports indicate that wind turbine leases add value to agricultural land;
- A survey of County Assessors in all 18 Illinois counties in which wind farms are located determined that there was no market evidence to support a negative impact upon residential property values as a result of the development of and the proximity to a wind farm, and that there were no reductions in assessed valuations; and
- There is no evidence that development of or proximity to a wind farm impedes the orderly development in the area.

Definition of Market Value

When discussing market value, the following definition is used:

The most probable price a property should bring in a competitive and open market under all conditions requisite to a fair sale, the buyer and seller each acting prudently and knowledgeably, and assuming the price is not affected by undue stimulus. Implicit in this definition is the consummation of a sale as of a specified date and the passing of title from seller to buyer under conditions whereby:

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- Buyer and seller are typically motivated;
- Both parties are well informed or well advised, and acting in what they consider their own best interests;
- A reasonable time is allowed for exposure in the open market;
- Payment is made in terms of cash in U.S. dollars or in terms of financial arrangements comparable thereto; and
- The price represents the normal consideration for the property sold unaffected by special or creative financing or sales concessions granted by anyone associated with the sale.¹

Scope of Work and Reporting Process

Information was gathered concerning the real estate market generally and the market of the area surrounding the proposed conditional use specifically. The uses in the surrounding area were considered. The following summarizes the actions taken:

- Review of the Macon County Zoning Ordinance and map, and the 2009 Macon County and Decatur Comprehensive Plan;
- Review of the application for a special use permit from Twin Forks Wind Farm, LLC, including supporting documents;
- Review of the demographics in the area of the proposed wind farm;
- Data on the general market area of the proposed wind farm;
- Data on the market for single-family houses in the immediate area of the proposed wind farm and from other areas in the county from Realtor.com and the Macon County public records;
- Local real estate professionals were interviewed concerning recent sales in the area, and local market conditions;
- An inspection of the subject area and the areas in the county with existing wind farms by Michael S. MaRous on *August 10, 2015*, and by Anita Rifkind on July 1, 2015.

This document is considered to conform to the requirements of the *Uniform Standards of Professional Appraisal Practice and Advisory Opinions* (USPAP). This letter is a brief recapitulation of the appraisal data, analyses, and conclusions; additional supporting documentation is retained in the MaRous and Company office file. There are no extraordinary assumptions or hypothetical conditions included in the market study.

¹ (12 C.F.R. Part 34.42(g); 55 Federal Register 34696, August 24, 1990, as amended at 57 Federal Register 12202, April 9, 1992; 59 Federal Register 29499, June 7, 1994)

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In order to form a judgment concerning the potential impact, if any, on the value of the surrounding residential properties of the approval of the conditional use for the proposed wind farm, I have considered the following:

- The character and the value of the residential properties in the footprint of the proposed wind farm and properties in the footprint of existing wind farms in nearby counties;
- Agricultural land values in Macon County and in other counties in which wind farms are located;
- Market trends for both residential and agricultural land in the past 6 to 7 years;
- The economic impact on the larger community by the approval of the conditional use as proposed; and
- The impact on the value of the surrounding residential properties by the approval of the proposed wind farm.

Description of Area and Proposed Development

Area Analysis

The proposed wind farm is located in the north western portion of Macon County, primarily in Maroa and Austin townships. Interstate 72 bisects the county northeast to southwest, and is located approximately 8 to 12 miles to the east or south. Illinois Route 51 runs north-south along the eastern edge of the proposed project. Decatur is approximately 10 miles southeast of the proposed wind farm; Clinton is approximately 9 miles northeast.

Major private employers in Macon County include: Archer Daniels Midland; Caterpillar, Inc.; Decatur Memorial Hospital; Tate & Lyle, a British-based agribusiness producing sugar-based food ingredients including Splenda and high fructose corn syrup, industrial chemicals, and animal foods; Millikin University, and Ameren Illinois, an electric utility company.

Portions of the county, primarily in or near Decatur, are included in an Enterprise Zone, which abates property taxes for 10 years for certain industrial and commercial improvements, and provides sales tax relief.

The Moody's Analytics report for the state of Illinois as of January 2015 summarizes the general economic conditions as follows: "Export-oriented manufacturing centers such as Decatur, Peoria and the Quad Cities face pressure from lower commodity prices and weaker demand for mining and farm

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equipment and will be slow to revive...” The stronger dollar results in higher costs for foreign purchasers and a decrease in demand.

The unemployment rate in Macon County in April 2015 was 5.9 percent, down from the high of 14.2 percent in July 2009. The average for the state of Illinois as of April 2015 was 6.0 percent, and the national average was 5.4 percent. The unemployment rate in Decatur was 6.6 percent, decreasing steadily from 14.6 percent in January 2013. However, Decatur remains designated as a “Labor Surplus Area,” indicating that the unemployment rate has been significantly higher than the national average for two calendar years.

Like most other locations, Macon County experienced a softening in housing values during the 2008 economic downturn. Recovery has been tepid. The Moody report cites “Disappointing household formation downstate...” as having been “especially problematic.”

The following table summarizes recent residential sales in rural areas of Macon County in and near the footprint of the proposed wind farm.

**RECENT SINGLE-FAMILY SALES SUMMARY
 MACON COUNTY**

NO.	LOCATION	SALE PRICE	SALE DATE	SITE SIZE (ACRES)	STYLE	BUILDING SIZE Sq. Ft./ BRS./BAS.	SALE PRICE PER SQ. FT. BLDG. AREA INCL. LAND
1	785 E North St. Warrensburg	\$128,000	3/15	1.80	Ranch/Fr. 1985	1,708 4/1.1	\$74.94
2	77 N. Bearsdale Rd. Maroa	\$120,000	1/15	2.42	2-story Fr. Older	2,440 3/2	\$49.18
3	6606 E. Washington St. Maroa	\$72,000	12/14	6.52	2-story Fr. 1865	2,000 3/2.1	\$36.00
4	10938 N. Hawken Rd. Maroa	\$100,000	11/14	1.66	2-story Fr. 1910	2,298 5/1	\$43.55
5	13462 Sawyer Rd. Maroa	\$320,000	11/14	2.50	2-story Fr. 2014	3,343 6/4.1	\$95.72
6	6338 N. Lincoln Memorial Rd. Warrensburg	\$195,000	9/14	5.70	2-story Brick 1935	1,872 4/2	\$104.17

Source: M.S. Public Record, on-line sources

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Existing Wind Farms in Proximity to Macon County

The closest wind farm is the Rail Splitter Wind Farm, located approximately 30 miles northwest of Macon County in northern Logan County and southern Tazewell County. The 67-turbine wind farm came on line in July 2009.

California Ridge is located approximately 42 miles to the east in Champaign and Vermilion counties. This project consists of 134 turbines and came on line in 2012.

Proposed Project

The proposed project consists of up to 140 wind turbines and infrastructure situated on a footprint of approximately 24,000 acres in Maroa, Austin, Illini and Hickory Point townships. Total capacity is estimated to be approximately 280 MW.

The project likely will include one of three different turbine types: GE 1.79 MW-100 turbines; Vestas V110-2.0MW turbines; or Siemens 2.3 MW turbines. The turbines will be constructed to meet applicable standards, and will be monitored to insure compliance with those standards, and to limit the impact of noise, and shadow flicker. Additional efforts are being made to limit the impact on avian and wildlife resources in the area.

Roads will be improved both before and after construction to accommodate the installation of the turbines and to repair any damage caused by the construction. Decommissioning Phase road repairs will be undertaken.

Project Benefits

The estimated amount in annual payments to participating landowners is between \$1,000,000 and \$2,000,000, or \$30,000,000 to \$60,000,000 for the project life. Estimated tax revenues for the 30-year operating life of the project is estimated at \$46,000,000. Road improvements during the construction phase of the project are estimated at \$5,000,000 to \$10,000,000. The project will generate approximately 10 local full-time jobs when fully operational.

Additional direct and indirect impacts from the construction of the project, including permits and approximately 140 construction jobs, as well as "induced impacts" from the increase in household spending also are anticipated.

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Market Impact Analysis

A market impact analysis is undertaken to develop an opinion as to whether the proposed conditional use for the development of a wind farm will “substantially diminish property values within the neighborhood,” or “will impede the normal and orderly development and improvement of the surrounding property.” This analysis includes:

- Matched pairs analyzing the impact on value of residential properties proximate to existing wind farms in Logan, Livingston, and Bureau counties;
- The value of agricultural land in Macon County and in other counties with existing wind farms;
- Interviews of local real estate professionals; and
- The results of a survey of the County Assessors in Illinois counties with existing wind farms.

Matched Pair Analysis

A matched pair analysis is a methodology which analyzes the importance of a selected characteristic, in this instance proximity to a wind turbine, to the value of a property.² This technique compares the sale of a property in proximity to the selected characteristic to the sale of a similar property in the same market area and under similar market conditions but without the proximity to the selected characteristic. An alternative is to review a sale and resale of the same property and to consider whether the proximity to the selected characteristic influenced value.

It is difficult to find properties that are identical except for proximity to a wind turbine, and that occurred under substantially similar market conditions. There were no properties proximate to wind turbines in Macon County. However, there were properties in Logan County proximate to the Rail Splitter Wind Farm that provided a basis for a matched pair analysis, as well as a matched pair in Livingston County near the Cayuga Ridge Wind Farm. In addition, I have provided an analysis of matched pair sales in Bureau and Lee counties near the Big Sky Wind Farm.

Details of these sales are retained in my office files; maps in the addenda to this report illustrate the location of these matched pairs.

Matched Pair #1 considers the recent sale of a property located at 2558 1254th Avenue, Emden, that is 2,200 feet from the nearest wind turbine located in the Rail Splitter Wind Farm, with approximately four

² See the discussion “Paired Sales Analysis” and “Sale/Resale Analysis” in Bell, Randall, MAI, *Real Estate Damages, Applied Economics and Detrimental Conditions, Second Edition*, Appraisal Institute, 2008, pages 25-27.

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additional turbines visible from the property to the northwest. Rail Splitter Wind Farm was constructed in 2008-2009 and came on line in July 2009.

MATCHED PAIR NO. 1		
	1A PROXIMATE TO A WIND TURBINE	1B NOT PROXIMATE TO A WIND TURBINE
Address	2558 1254th Ave. Emden, Ill.	801 1250th Ave. Lincoln, Ill.
Ft. from Turbine	2,200 (nearest)	NA
Sale Date	March 19, 2015	January 15, 2015
Sale Price	\$108,000	\$97,900
Sale Price/Sq. Ft. (A.G.)	\$62.21	\$71.48
Year Built	1985	1970
Building Size	1,736 sq. ft.	1,370 sq. ft.
Lot Size	1.38 acres	1.33 acres.
Style	ranch; brick 3 bdrms., 2 ba.	ranch, siding & stone 3 bdrms., 2 ba.
Basement	Slab	Full
Other	2-car 460 sq. ft. attached garage enclosed porch	2-car 672 sq. ft. attached garage

The house at 2558 1254th Avenue, Emden³, is located approximately 8 miles north of Lincoln, in a rural area. According to the Logan County Assessor's records, this house previously sold in November of 2011 for \$102,500. This indicates an increase in value of approximately 5 percent during a period where residential sale prices were not generally increasing. There is no lease for a wind turbine on this property.

The house at 801 1250th Avenue, Lincoln, has a similar, rural location, approximately 8 miles south of Lincoln. According to the Logan County Assessor's records, this house sold in June 2010 for \$128,500, and then was sold in July 2014 in a Sheriff's sale. The 2015 sale is considered arm's length by the Assessor. Although this house is smaller in size than the Emden property, this is offset by the slightly newer construction and the full basement. The lack of an enclosed porch is offset by the larger garage size. There is no lease for a wind turbine on this property.

³ This address is taken from the Logan County records; some maps indicate that this property is located at 2558 1250th Avenue, in either unincorporated Emden or Atlanta.

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Overall, in comparing the two sales, the differences do not justify a finding that there is any diminution in value resulting from the proximity of the Emden property to wind turbines.

Matched Pair #2 considers the sale of a property in Livingston County that is located proximate to the Cayuga Ridge wind farm. Cayuga Ridge was being discussed in the media as early as June 2007. Construction began in 2009, and the wind farm came fully on line in March 2010. The house at 23090 N 2500 E Road, Odell, is 2,322 feet east of a wind turbine, 3,229 feet west of a turbine, and 3,440 feet south of a turbine. The purchasers do not appear to own any other property in proximity.

MATCHED PAIR NO. 2

	2A PROXIMATE TO A WIND TURBINE	2B NOT PROXIMATE TO A WIND TURBINE
Address	23090 N 2500 E Rd. Odell, Ill.	16101 E 1400 N Rd. Pontiac, Ill.
Ft. from Turbine	2,322 (nearest)	NA
Sale Date	August 15, 2013	November 18, 2013
Sale Price	\$205,000	\$167,500
Sale Price/Sq. Ft. (A.G.)	\$108.41	\$89.33
Year Built	1971	1967
Building Size	1,891 sq. ft.	1,875 sq. ft.
Lot Size	3.63 acres	3.27 acres.
Style	ranch; brick 6 rms., 4 bdrms., 1.5 ba.	ranch, brick 6 rms, 3 bdrms., 2 ba.
Basement	Full, partial finish	Crawl
Utilities	Central Air; Elec. Heat	Central Air; Propane
Other	2.5-car attached garage 2 pole barns; 60 x 90 shed (subsequently demolished)	1-car attached garage 30 x 40 shed; 64 x 42 machine shop

Both properties are located in the Pontiac High School district. The lot sizes are similar, although the Odell sale is approximately 1/8-acre larger. The houses are of similar construction vintage, and are of similar size. The condition is assumed to be similar. The Odell property has an additional bedroom, and also is superior in that it has a full, partially finished basement and a larger garage. However, the Pontiac sale has two full bathrooms, a first-floor laundry room, and propane gas heat. The outbuildings of the Odell sale were in poor condition and were demolished subsequent to the sale; therefore, the Pontiac sale is considered superior in that regard, which offsets the smaller size of the garage.

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Overall, although the Odell sale is somewhat superior to the Pontiac sale, the differences do not justify a finding that there is any diminution in value resulting from the proximity of the Odell sale to wind turbines.

The next set of matched pairs consists of two properties proximate to wind turbines, and a third that is not.

MATCHED PAIRS NO. 3

	3A PROXIMATE TO A WIND TURBINE	3B PROXIMATE TO A WIND TURBINE	3C NOT PROXIMATE TO A WIND TURBINE
Address	29813 County Road 2010 East Ohio, Ill. 61349	1950 Shady Oaks Rd. Amboy, Ill. 61310	29352 Mechling Lane Rock Falls, Ill. 61071
Ft. from Turbine	1,720	4,752	NA
Sale Date	June 12, 2015	November 10, 2014	Contract
Days on Market	24	580	469
Sale/List Price	\$231,000/\$241,000	\$225,000/\$239,900	NA/\$197,000
Sale Price/Sq. Ft. (House Size)	\$99.74	\$126.12	\$84.08
Year Built	2001	2002	2002
Building Size	2,316 sq. ft.	1,784 sq. ft.	2,343 sq. ft.
Lot Size	6.07 Acres	6.35 Acres	8.43 Acres
Style	2-story, vinyl sided, 9 rooms; 4 bdrms., 2.1 ba.	2-story, log construction 9 rooms, 4 bdrms.; 3 ba.	2-story, vinyl sided 9 rooms, 4 bdrms.; 2.1 ba.
Basement	Full; unfinished; walk out	Full; finished; walk out	Full; unfinished; walk out
Utilities	Well & septic Propane	Well & septic Propane	Well & septic Gas
Other	Wooded area with stream 2-car attached garage; horse barn	Wooded area with pond 3-car detached with apartment	2-car attached gravel driveway

The first house in proximity to a wind turbine is located at 29813 2010 East Street, Ohio. It is approximately 1,720 feet northwest of a wind turbine, with additional turbines to the east, south, and southwest. This property is under contract and consideration must be given to this being the asking price and subject to downward negotiation as part of the sale process. There is no lease for a turbine on this property. According to the listing broker, the proximity of wind turbines had no impact on the sale price.

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A similar house is located at 1950 Shady Oaks Road, in nearby Amboy. Wind turbines are located approximately 0.9 mile east and south of the house, but are visible. This property sold under substantially similar market conditions as those currently existing. This house has a similar room count and configuration as the properties considered; however, it is somewhat smaller than the other properties considered. This fact is somewhat offset by the detached garage having additional living space; adding this space would lower the sale price per square foot. According to the listing broker, the log construction had little to do with the sale price. The purchaser does not appear to own any additional property in the area of wind turbines.

The house to which these two properties in proximity to wind turbines is compared is located at 29352 Mechling Lane, Rock Falls. This property is currently under contract. This property is similar in construction age, type, and size compared with the property on 29813 2010 East Street, and is comparable to the Shady Oaks Road property. The lot size is larger; however, this is offset by the lack of amenities on the site such as wooded areas. In addition, this property is located in a less rural area, within an easy drive to the interstate. Consideration must be given to the \$197,000 being the asking price and subject to downward negotiation as part of the sale process. There is no lease for a turbine on this property.

The median single-family house sale in zip code 61349 during the past two years was \$93,000; the median single-family house value in zip code 61310 was \$90,000. The median single-family house value in the 61071 zip code south of Interstate 88 was higher, \$145,500. These median single-family house values would indicate that it is likely a property in the 61071 zip code would sell for a higher price than either of the other two properties.

Based on these data, it does not appear that the proximity to a wind turbine had a negative impact on the market value of either the house at 29813 2010 East Street or the house at 1950 Shady Lane.

Matched Pair #4 is the sale/resale of a property located approximately 3,800 feet northeast of wind turbines, at 40 Pump Factory Road, Ohio. This property is located just north of the Bureau County northern border with Lee County.

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MATCHED PAIR NO. 4

	4A PROXIMATE TO A WIND TURBINE		4B NOT PROXIMATE TO A WIND TURBINE
Address	40 Pump Factory Rd. Ohio, Ill. 61349		28981 Gaulrapp Rd. Rock Falls, Ill. 61071
Ft. from Turbine	3,800	3,800	NA
Sale Date	June 9, 2014	September 17, 2012	February 19, 2015
Days on Market	55	537	113
Sale/List Price	\$125,000/\$135,900	\$90,000/\$137,000	\$110,000/\$119,900
Sale Price/Sq. Ft. House	\$114.47	\$82.42	\$74.12
Year Built	1974		1972
Building Size	1,092 sq. ft		1,484 sq. ft.
Lot Size	2.00 Acres		1.63 Acres
Style	1-story, vinyl sided, 5 rooms; 3 bdrms., 1.1 ba.		1-story, steel sided, 6 rooms, 3 bdrms.;2 ba.
Basement	Full; unfinished		Full; partially finished
Utilities	Well & septic Propane		Well & septic Electric heat
Other	1-car attached and 2-car detached garage	1-car attached garage	2-car attached

The first sale occurred approximately a year after the Big Sky wind farm came on line. A two-car garage was built on this property between sales. Although property values tend to be slightly higher in Lee County as a whole, the general trend of property values in both counties is similar: little improvement in sale prices in the last 5 years. This sale and resale is consistent with market trends in the area. The purchasers receive no lease income from the wind farm.

The most recent sale of the house at 40 Pump Factory Road is compared to a larger house of similar construction age at 28981 Gaulrapp Road, located to the west and north. This property has a smaller site size and is located in a somewhat less rural area, within an easy drive to the interstate. The electric heat is considered to be a negative factor in comparison with the propane heat of the target property.

The median single-family house value in the 61349 zip code during the past two years was \$69,000; the median single-family house value in the 61071 zip code south of Interstate 88 was higher, at \$145,000. These median single-family house values would indicate that it is likely a property in the 61071 zip code would sell for a higher price than in the 61349 zip code.

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Given the more recent sale date and the larger building size of the Gaulrapp Road property, it does not appear that the proximity to turbines of the target property at 40 Pump Factory Road has had a negative impact on the value of the property.

Matched Pair Analysis Conclusions

Based on these matched pairs and sales/resales of properties proximate to wind turbines, there does not appear to have been any measurable negative impact on surrounding property values due to the proximity of a wind farm.

Agricultural Land Values

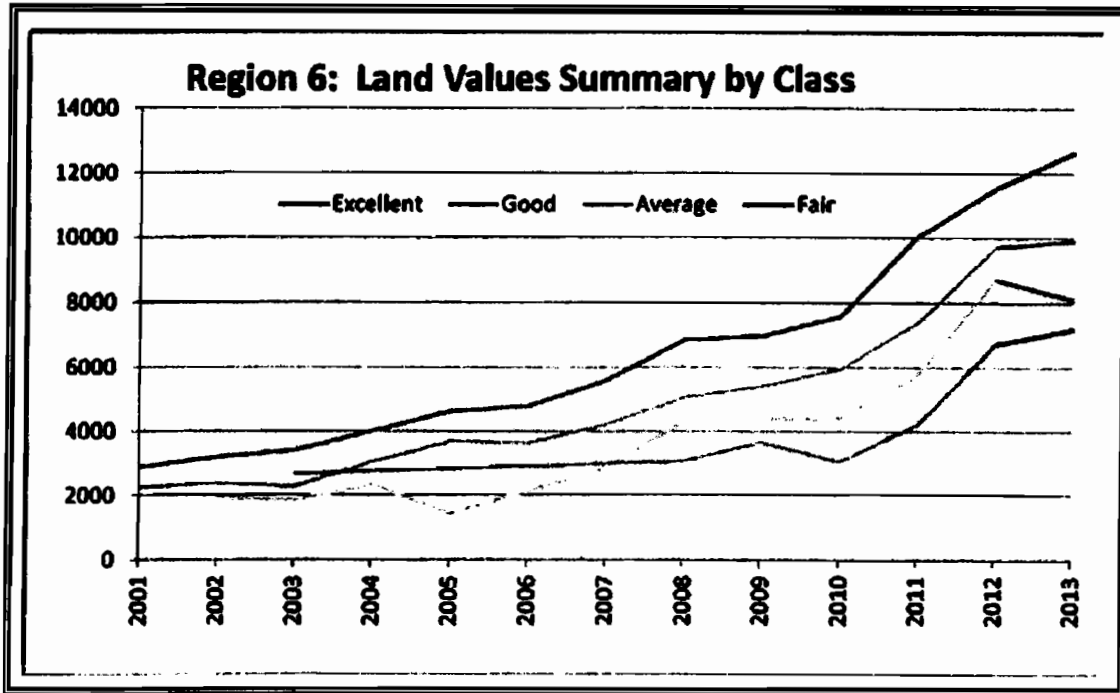
According to the 2015 Illinois Land Values and Lease Trends, published by Illinois Society of Professional Farm Managers and Rural Appraisers, agricultural land values are tied to productivity, i.e. the commodity prices of crops like corn and soy beans. Values have been “sideways” for the period between 2012 and 2014 after rising 80 percent between 2008 and 2012.

The publication reported the following average sale prices per acre in Region 6, which includes Macon County, for 2014.

	<u>Excellent</u>	<u>Good</u>	<u>Average</u>	<u>Fair</u>	<u>Recreational</u>	<u>Transitional</u>
Region 6	\$12,300	\$9,300	\$6,600	\$5,800	\$4,100	\$18,600

The following chart summarizes average sales prices for completed sales in Region 6 for the period 2001 to 2013. The report cautioned that the limited numbers of sales in some years and special features may affect the values reflected in this chart. These number reflect the strength of prime tracts of land, with the trend of other categories of land showing a leveling off in sale price.

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Specifically for excellent quality farmland in Region 6, the 2015 report indicated that the average tract was about 100 acres in size and 98 percent tillable, and that the market was steady to down 2 percent from the prior year. Good quality farmland in the region sold with an average tract size of 68 acres, and was 89 percent tillable; the market was reported down 2.7 percent for the year. Recreational land was reported to have a steady volume of sales and an increase in value of between 5 and 10 percent. There were few sales reported of transitional land; the price reflected an increase of 5 percent.

Representative sales in 2013 in Macon County are summarized below by productivity category.⁴ Again, sales in mid-year are considered to be at the top of the market.

⁴ The 2015 report did not include specific sales by county.

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Excellent

County	Sale Date	Total Acres	% Tillable	P / I on Tillable Ac	\$ Total Price/Ac
Macon	Jan	123.6	97.5	138.4	11,600
Macon	Apr	177.1	97.5	139.8	12,135
Macon	Apr	80.0	96.1	134.4	13,000
Macon	Aug	160.2	99.9	141.6	13,000
Macon	Aug	238.8	100.0	138.1	13,247
Macon	Nov	98.6	99.1	144.0	11,600
Macon	Nov	120.0	100.0	139.4	11,500
Macon	Nov	80.0	101.0	138.0	11,300
Macon	Nov	22.5	94.4	140.1	11,500
Macon	Dec	60.7	95.6	142.7	11,000
Macon	Dec	80.0	94.8	141.8	12,334

Good

County	Sale Date	Total Acres	% Tillable	P / I on Tillable Ac	\$ Total Price/Ac
Macon	Jul	110.4	94.8	132.2	10,700

Recreational

County	Sale Date	Total Acres	% Tillable	P / I on Tillable Ac	\$ Total Price/Ac
Macon	Jan	24.0	0.0	0.0	2,900
Macon	Jul	47.9	0.0	0.0	3,300

The following table summarizes recent agricultural land sales in Macon County in or near the foot print of the proposed wind farm.

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LAND SALES SUMMARY

SALE No.	PARCEL /LOCATION	SALE PRICE	SALE DATE	LAND AREA (ACRES)	PI*	SALE PRICE PER ACRE
1	10-02-02-400-003, -015, -021, & -022 Maroa Township	\$1,209,000	2/15	116.41	120-126	\$10,385.71
2	10-02-23-400-007 Maroa Township	\$862,510	2/15	78.41	120-126	\$11,000.00
3	08-06-14-400-005 Illini Township	\$425,148	5/15	39.13	82-127	\$10,865.01
4	08-06-07-100-002 Illini Township	\$520,000	1/15	40.00	82-126	\$13,000.00
5	01-01-28-100-001 Austin Township	\$1,928,293	6/15	160.00	82-127	\$12,051.83
6	07-07-02-300-011 Hickory Point Township	\$870,020	12/14	51.00	120-127	\$13,137.65
7	01-01-11-200-002 & 01-01-11-400- 007 Austin Township	\$967,500	11/14	63.17	120-126	\$15,315.81
8	01-01-24-100-004 Austin Township	\$824,560	12/14	74.96	120-127	\$11,000.00
9	01-01-28-300-001 Austin Township	\$2,000,000	11/14	160.00	105-126	\$12,500.00
10	08-06-04-200-002 Illini Township	\$346,800	11/14	27.20	111-127	\$12,750.00
11	08-06-18-200-004 Illini Township	\$500,000	11/14	40.64	105-127	\$12,303.15
12	08-06-22-300-003 (part) Illini Township	\$1,199,455	9/14	119.92	93-127	\$10,002.13

*Productivity Index is based on Macon County Assessor's records

Agricultural Land Sales near Wind Farms

There was one reported sale of agricultural land impacted by wind turbines located in McLean County in March of 2013. The farm, comprised of 2 tracts, was considered "highly desirable" with a productivity rating of 135 and 132 respectively (the low end of the excellent range.) The report commented, "...the wind turbine lanes were not a nuisance as they ran the same direction as the farm is planted (north-south.)" In 2014, there were three sales of farms with wind turbines in Region 4, which includes the counties of Marshall, Woodford, Mason, Putnam, Livingston, McLean, and Tazewell. The report stated, "In general, investors may have paid a premium for the wind turbine. High quality farmland with wind turbines is stable."

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Overall, it appears that there is little or no relationship between agricultural land values and the location of wind farms, with productivity being the driving force behind land values. However, wind farm lease revenue appears to add to the marketability and value.

Local Real Estate Professionals

In the preparation of this market impact analysis, I consulted with Joseph M. Webster, MAI, of Webster & Associates, Inc., Decatur, Illinois. Mr. Webster has had extensive experience with agricultural, commercial, and residential values in the Decatur, and Macon County area, as well as the broader market area. Mr. Webster provided background information on the area economic conditions as well as information on agricultural and residential values.

Previously, I consulted Michael Crowley, Sr., SRA of Real Estate Consultants, Ltd., Spring Valley, Illinois. Mr. Crowley has had extensive experience with wind farm development in Central Illinois, including projects in counties with similar demographics and character, such as Bureau, Whiteside, and Lee counties. Mr. Crowley has been unable to document any loss in property values attributable to the proximity of wind turbines.

Assessors Survey

My office initially conducted a survey of the supervisor of assessments or a staff member in 18 counties in Illinois in which wind farms currently are operational in March 2015; this survey has been updated through July 22, 2015. The interviews were intended to allow the assessment officials to share their experience regarding the wind farm(s) impact upon the market values and/or assessed values of surrounding properties. The following is a summary of results of that survey:

- Without exception, the interviewees reported that there was no market evidence to support a negative impact upon residential property values as a result of the development of and the proximity to a wind farm facility.
- There are more than 1,500 wind turbines and more than 1,000,000 properties in these counties. There have been no tax appeals filed in any of the counties based upon wind farm-related concerns, nor have there been any reductions in assessed valuations related to wind turbines.
- As the available market data do not support the claim of a negative impact upon residential values, residential assessed values have fluctuated consistently countywide as influenced by market conditions, with no regard for proximity to a wind farm.
- Agricultural properties are taxed based upon a productivity formula that is not impacted by market data and external influences.

**Mr. Michael S. Blazer
Proposed Twin Forks Wind Farm
August 5, 2015**

The Logan County Assessor indicated that the question of property values in the area of the Rail Splitter Wind Farm had been studied with no decreases found. For example, in setting the assessed value for two newly constructed houses, consideration was given to nine similar properties and no noticeable difference was found. Among the comparable properties considered, the only property with a decreased value was a foreclosure.

The McLean County Assessor reported the construction of a 4,821-square-foot single-family residence in the area of Arrowsmith, Illinois. The residence, located at 8144 North 3100 East Road is located 1,113 feet from a wind turbine in the Twin Groves wind farm. The residential building and surrounding site improvements including a swimming pool have an assessor's opinion of market value of \$878,467. The following photograph and aerial photograph depict the residence and the nearby wind turbine(s).



Mr. Michael S. Blazer
Proposed Twin Forks Wind Farm
August 5, 2015



The proximity of the wind turbine does not appear to have had a negative influence on the development of the single-family residence. According to public records, the owners of this property also own three other large parcels in McLean County which are in the immediate area. None of these parcels include easements for wind turbines.

Conclusions

Based on this analysis of the market, it is my opinion that the approval of the proposed wind farm will not have a negative impact on the property values in the neighborhood, nor will it impede the orderly development of the area for uses permitted in the zoning districts. Specifically:

- There are significant financial benefits to the local economy and to the local taxing bodies from the development of the proposed wind farm;
- The proposed wind farm will create well-paid jobs in the area which will benefit overall market demand;
- An analysis of residential sales in the area of existing wind farms did not support any finding that proximity to a wind turbine had a negative impact on property values;
- An analysis of agricultural land values in the area and in other areas of the state with wind farms did not support any finding that agricultural land values are negatively impacted by the proximity to wind turbines;
- Reports indicate that wind turbine leases add value to agricultural land;

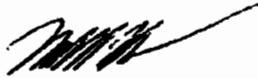
Mr. Michael S. Blazer
Proposed Twin Forks Wind Farm
August 5, 2015

- A survey of County Assessors in all 18 Illinois counties in which wind farms are located determined that there was no market evidence to support a negative impact upon residential property values as a result of the development of and the proximity to a wind farm, and that there were no reductions in assessed valuation; and
- There is no evidence that development of or proximity to a wind farm impedes the orderly development in the area.

This report is based on market conditions existing as of August 5, 2015. This market impact study has been prepared specifically for the use of the client as part of the application for a conditional use permit to allow the development of the Twin Forks Wind Farm in Macon County, Illinois. Any other use or user of this report is considered to be unintended.

Respectfully submitted,

MaRous & Company




Michael S. MaRous, MAI, CRE
Illinois Certified General - #553.000141 (9/15 expiration)

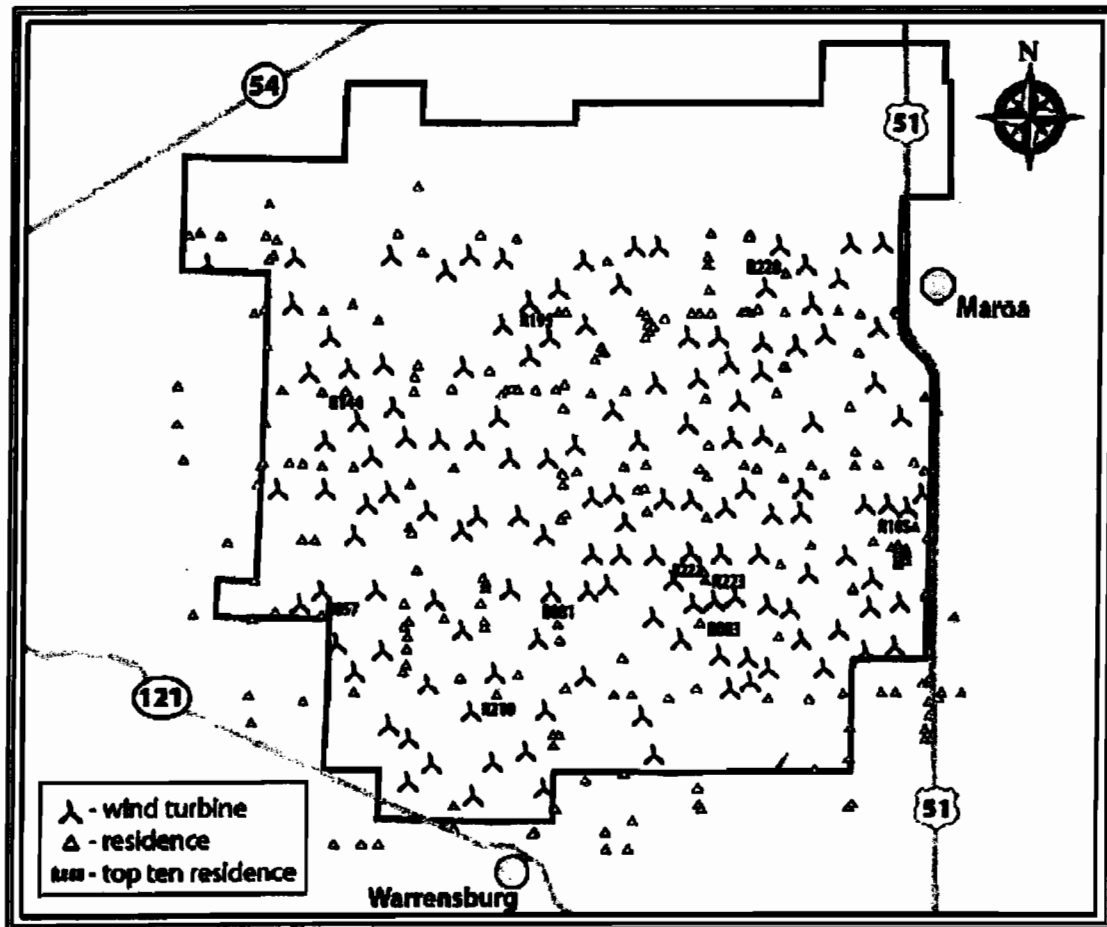
CERTIFICATE OF REPORT

I do hereby certify that:

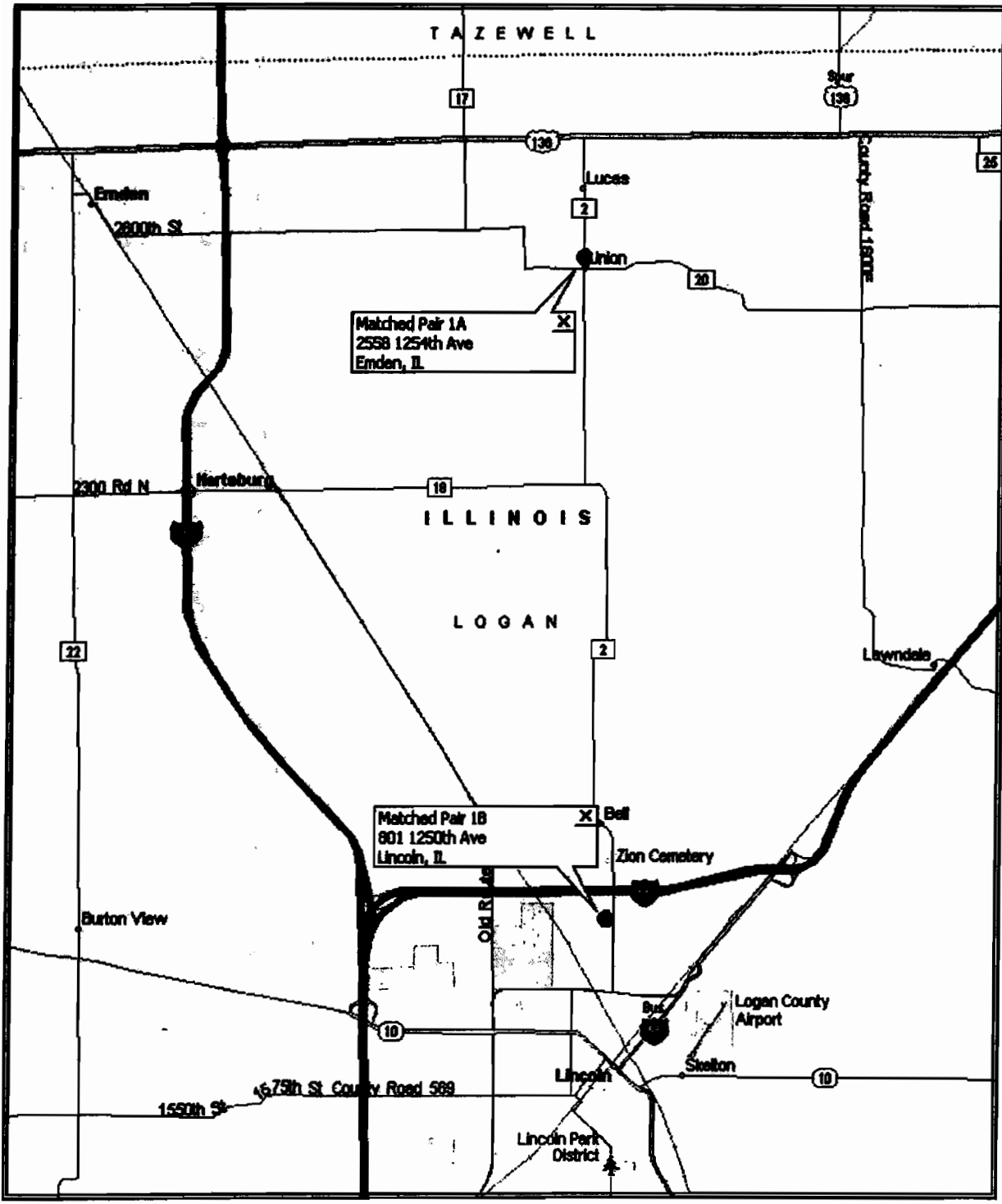
1. The statements of fact contained in this report are true and correct;
2. The reported analyses, opinions, and conclusions are limited only by the reported assumptions and limiting conditions, and are my personal, impartial, and unbiased professional analyses, opinions, conclusions, and recommendations;
3. I have no present or prospective personal interest in the property that is the subject of this report and no personal interest with respect to the parties involved;
4. I have performed no services, as an appraiser or in any other capacity, regarding the property that is the subject of this report within the three-year period immediately preceding acceptance of this assignment;
5. I have no bias with respect to the property that is the subject of the work under review or to the parties involved with this assignment;
6. My engagement in this assignment was not contingent upon developing or reporting predetermined results;
7. My compensation for completing this assignment is not contingent upon the development or reporting of predetermined value or direction in value that favors the cause of the client, the amount of the value opinion, the attainment of a stipulated result, or the occurrence of a subsequent event directly related to the intended use of this appraisal consulting assignment;
9. My analyses, opinions, and conclusions were developed, and this report has been prepared in conformity with the *Uniform Standards of Professional Appraisal Practice*;
10. I have made a personal inspection of the subject of the work under review;
11. Anita Rifkind provided significant appraisal review assistance to the person signing this certification;
12. The reported analysis, opinions, and conclusions were developed, and this report has been prepared, in conformity with the Code of Professional Ethics and Standards of Professional Appraisal Practice of the Appraisal Foundation;
12. The use of the report is subject to the requirements of the Appraisal Institute relating to review by its duly authorized representatives; and
13. As of the date of this report, Michael S. MaRous, MAI, CRE, has completed the continuing education requirements for Designated Members of the Appraisal Institute.

MaRous & Company

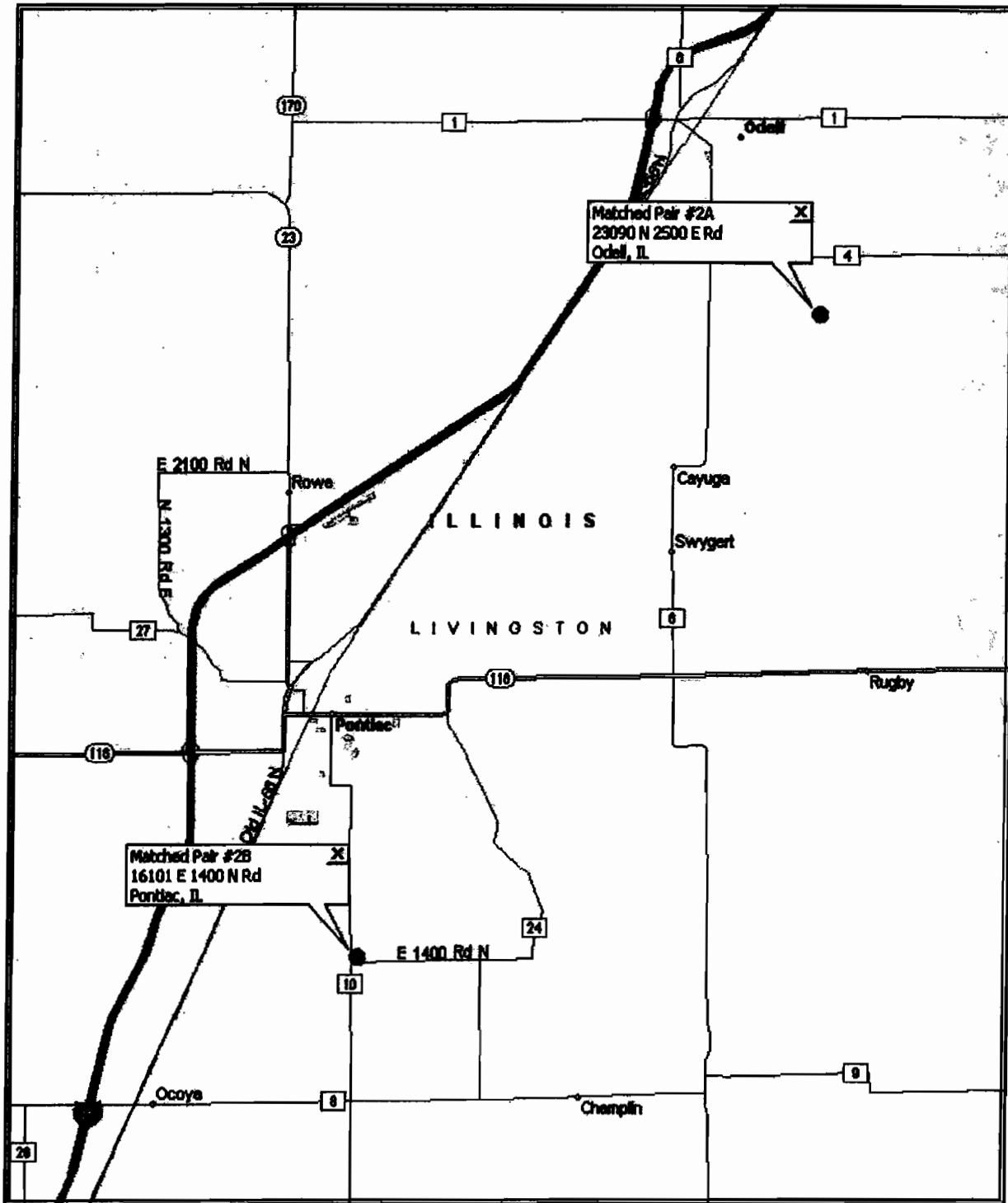

Michael S. MaRous, MAI, CRE
Illinois Certified General - #553.000141 (9/15 expiration)



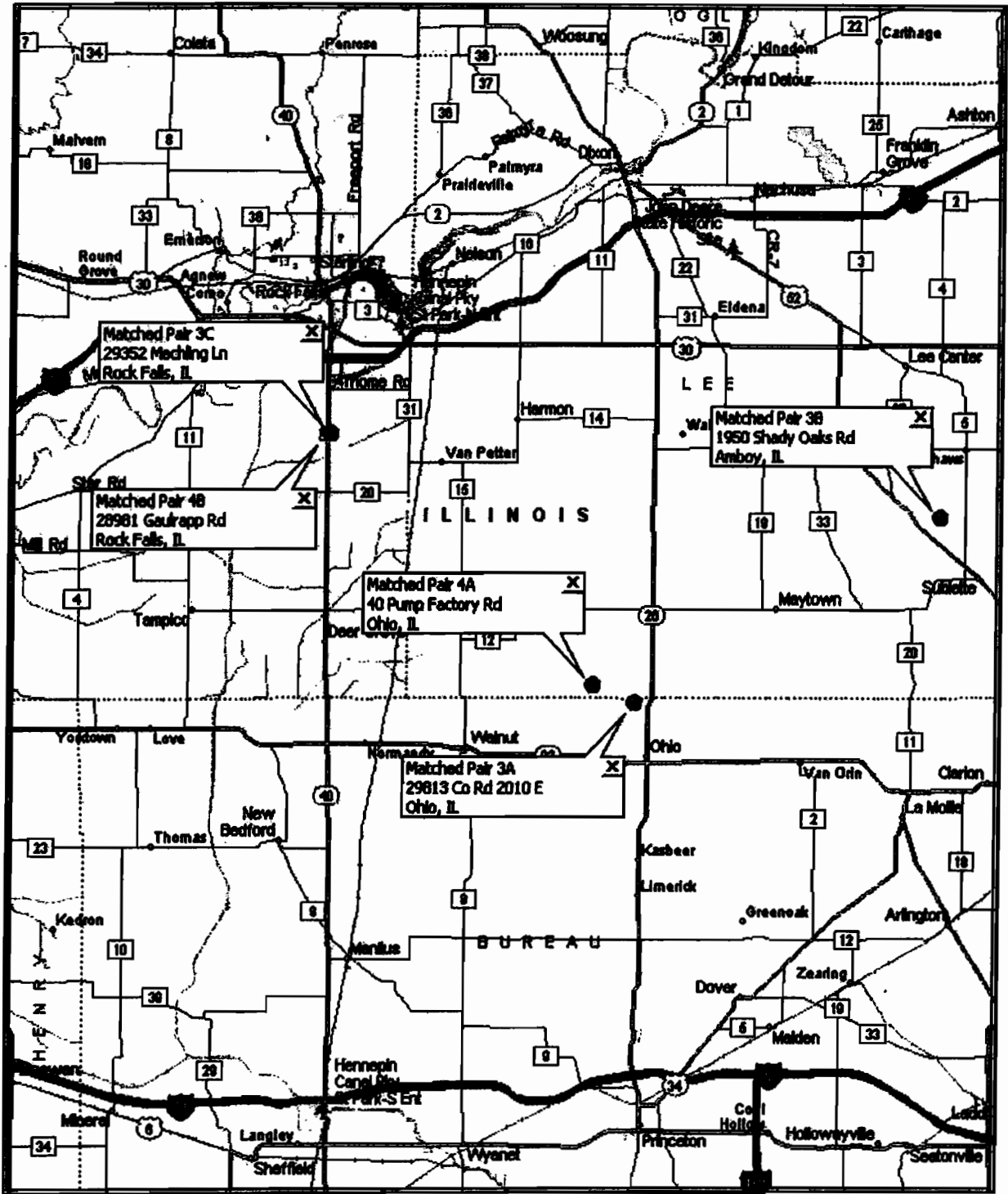
PROPOSED TWIN FORKS WIND FARM LOCATION MAP



MATCHED PAIRS NUMBER 1 LOCATION MAP



MATCHED PAIRS NUMBER 2 LOCATION MAP



MATCHED PAIRS NUMBERS 3 AND 4 LOCATION MAP

PHOTOGRAPHS OF PROPOSED TWIN FORKS AREA



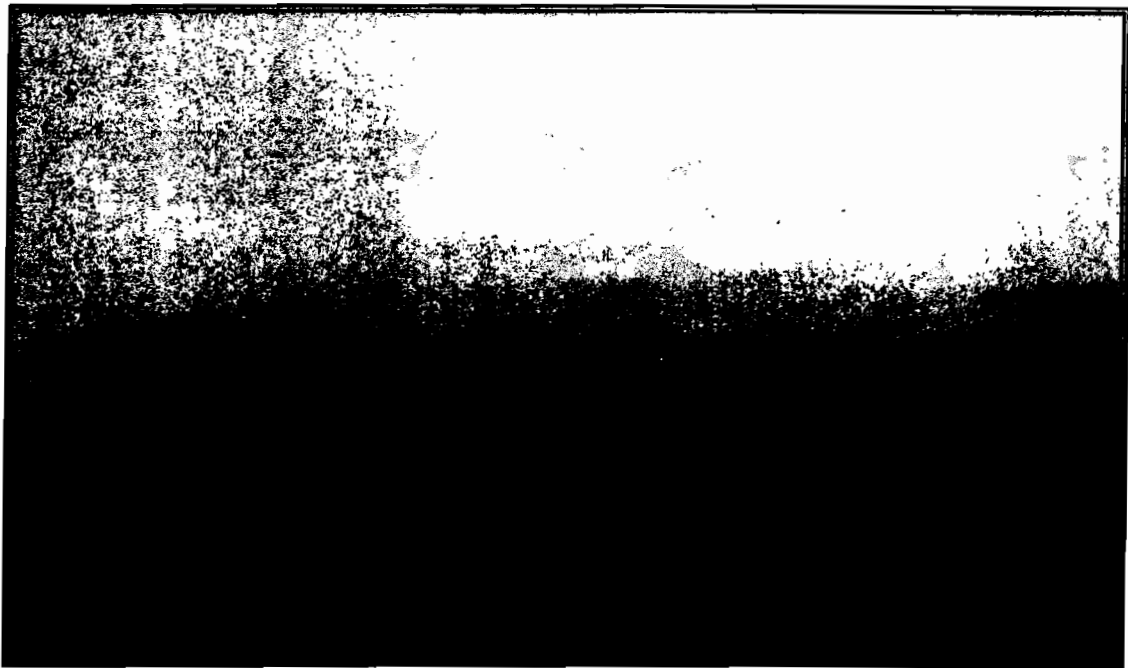
VIEW EAST INTO PROJECT AREA AT WARRENSBURG



VIEW NORTHWEST FROM WISE ROAD

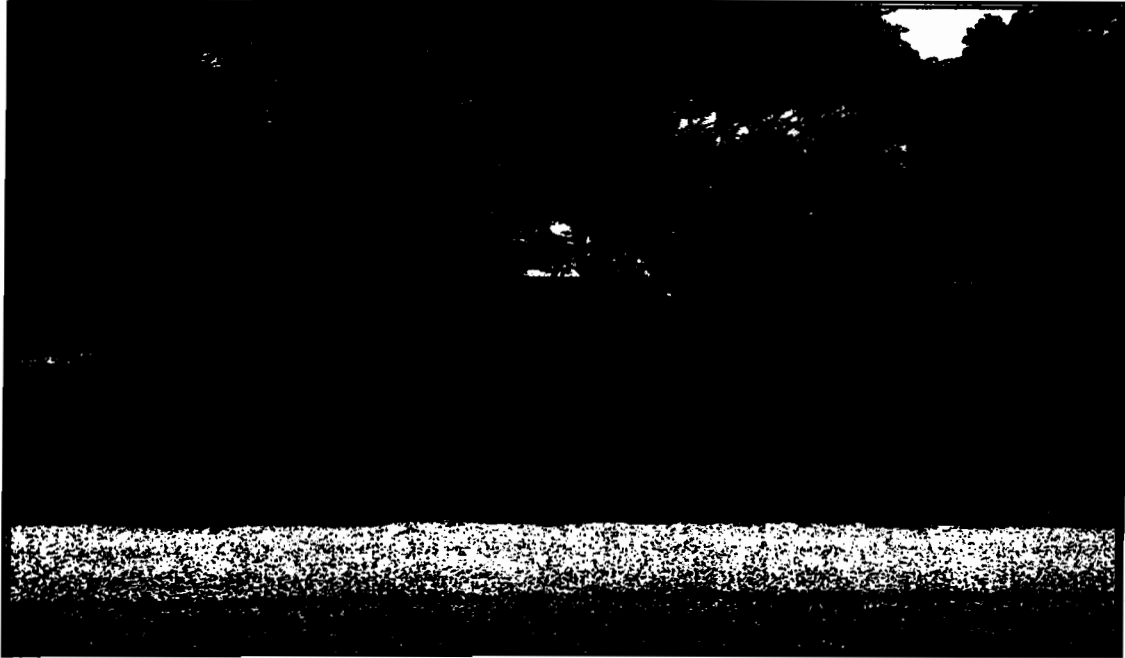


EXISTING HIGH TENSION WIRES NEAR GLASGOW AND SCHOOL ROADS



TYPICAL VIEW OF NORTHERN EDGE OF PROJECT

MATCHED PAIRS NUMBER 1



MATCHED PAIR 1A - 2558 1254TH AVENUE, EMDEN



VIEW OF TURBINES FROM 2558 1254TH AVENUE, EMDEN

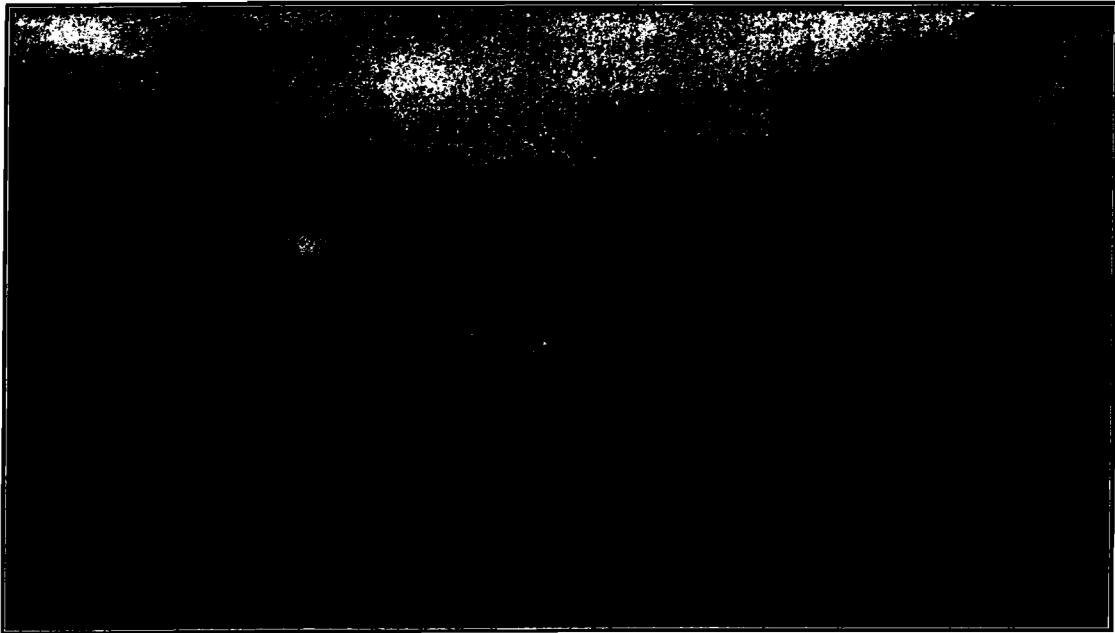


MATCHED PAIR 1B - 801 1250TH AVENUE, LINCOLN

MATCHED PAIRS NUMBER 2



MATCHED PAIR 2A - 23090 N 2500 E ROAD, ODELL



VIEW OF TURBINES FROM 23090 N 2500 E ROAD, ODELL

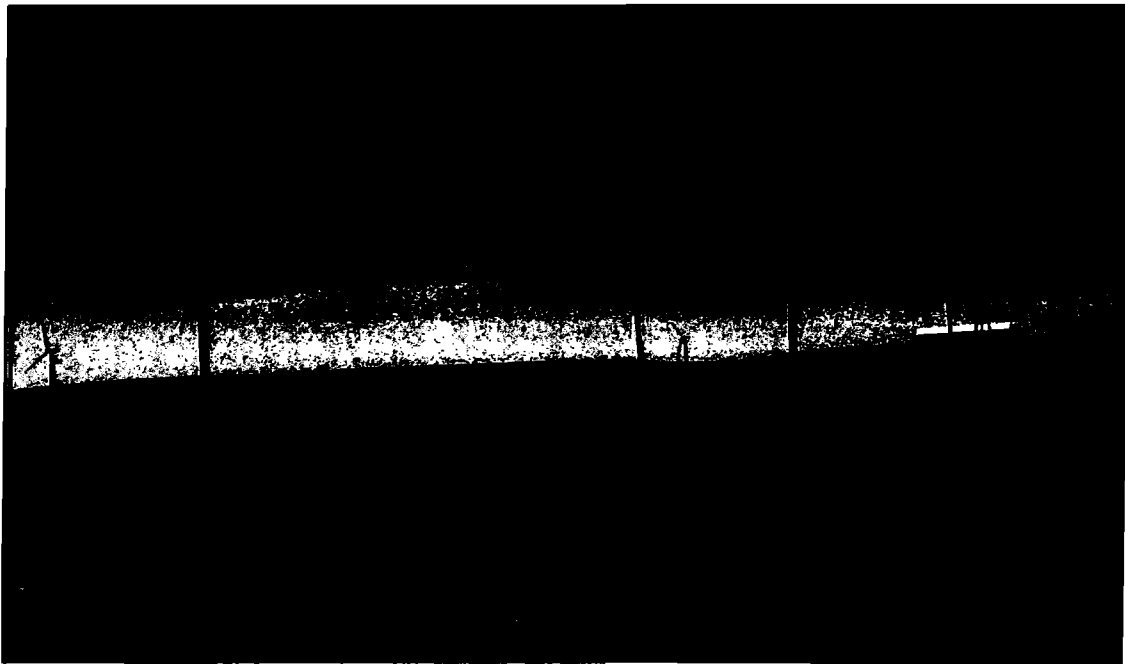


MATCHED PAIR 2B - 16101 E 1400 N ROAD, PONTIAC

MATCHED PAIRS NUMBER 3



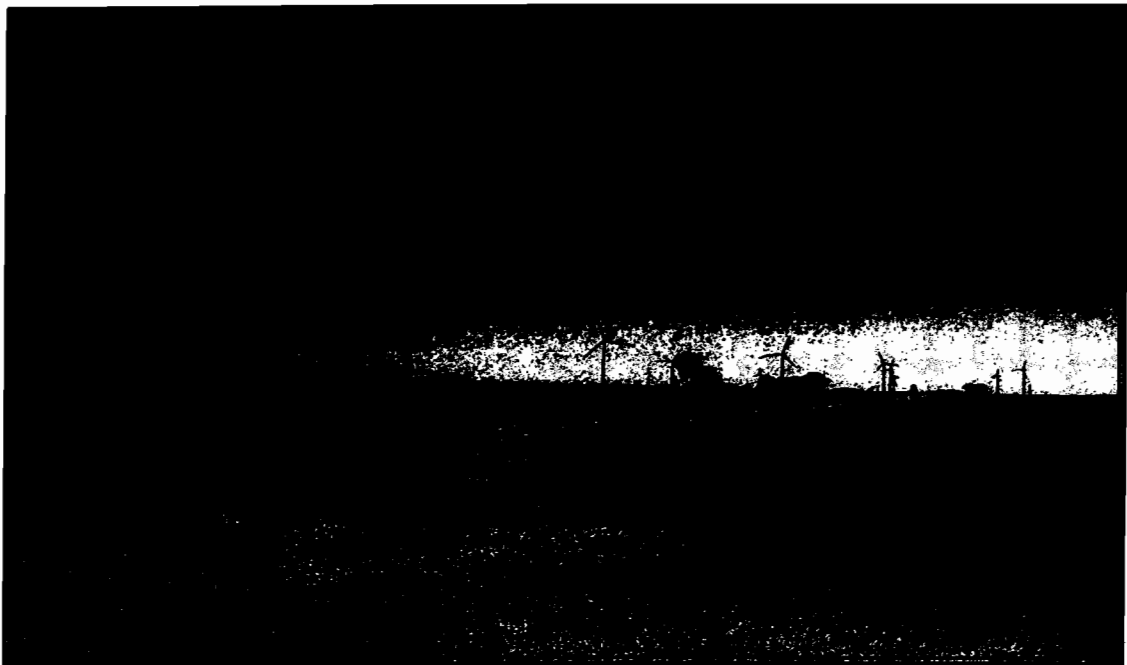
MATCHED PAIR 3A - 29813 2010 EAST, OHIO



VIEW OF TURBINES FROM 29813 2010 EAST, OHIO



MATCHED PAIR 3B - 1950 SHADY OAKS ROAD, AMBOY



VIEW OF TURBINES FROM 1950 SHADY OAKS ROAD, AMBOY



MATCHED PAIR 3C - 29352 MECHLING LANE, ROCK FALLS

MATCHED PAIRS NUMBER 4



MATCHED PAIR 4A - 40 PUMP FACTORY ROAD, OHIO



VIEW OF TURBINES FROM 40 PUMP FACTORY ROAD



MATCHED PAIR 4B - 28981 GAULRAPP ROAD, ROCK FALLS

MICHAEL S. MAROUS

STATEMENT OF QUALIFICATIONS

Michael S. MaRous, MAI, CRE, is president and owner of MaRous and Company. He has appraised more than \$15 billion worth of primarily investment-grade real estate in more than 25 states. In addition to providing documented appraisals, he has served as an expert witness in litigation proceedings for many law firms; financial institutions; corporations; builders and developers; architects; local, state, county, and federal governments and agencies; and school districts in the Chicago metropolitan area. His experience in partial interest, condemnation, damage impact, easement (including aerial and subsurface), marital dissolutions, bankruptcy proceedings, and other valuation issues is extensive. He has provided highest and best use, marketability, and feasibility studies for a variety of properties. Many of the largest redevelopment areas and public projects, including Interstate 355, the O'Hare International Airport expansion, the Midway Airport expansion, and the McCormick Place expansion, are part of Mr. MaRous' experience. Also, he purchases and develops real estate for his own account.

APPRAISAL AND CONSULTATION EXPERIENCE

Business Parks Distribution Centers	Industrial Properties Manufacturing Facilities Research Facilities	Self-storage Facilities Warehouses
Auto Sales/Service Facilities Banquet Halls Big Box Stores	Commercial Properties Gasoline Stations Hotels and Motels Office Buildings	Restaurants Shopping Centers Theaters
Bowling Alleys Cemeteries Farms Golf Courses	Special-Purpose Properties Lumber Yards Nurseries Riverboat Gambling Facilities Schools Stadium Expansion Issues	Tank Farms Underground Gas Aquifers Utility Corridors Waste Transfer Facilities
Apartment Complexes Condominium Conversions	Residential Properties Condominium Developments Single-family Residences	Subdivision Developments Townhouse Developments
Agricultural Alleys Commercial	Vacant Land Easements Industrial Residential	Right of Ways Streets Vacations
Corporations Financial Institutions	Clients Law Firms Not-for-profit Associations	Private Parties Public Entities

EDUCATION

B.S., Urban Land Economics, University of Illinois, Urbana-Champaign
Continuing education seminars and programs through the Appraisal Institute
and the American Society of Real Estate Counselors and real estate brokerage classes

PUBLIC SERVICE

Mayor, City of Park Ridge, Illinois (2003-2005)
Alderman, City of Park Ridge, including Liaison to the Zoning Board of Appeals and Planning and Zoning and
Chairman of the Finance and Public Safety Committees (1997-2005)

PROFESSIONAL AFFILIATIONS AND LICENSES

Appraisal Institute, MAI designation, Number 6159
American Society of Real Estate Counselors, CRE designation
Illinois Certified General Real Estate Appraiser, License Number 553.000141 (9/15)
Licensed Real Estate Broker (Illinois)

PROFESSIONAL ACTIVITIES

Mr. MaRous is past president of the Chicago Chapter of the Appraisal Institute. He is former chair and vice chair of the National Publications Committee and has sat on the board of *The Appraisal Journal*. In addition, he has served on and/or chaired more than fifteen other committees of the Appraisal Institute, the Society of Real Estate Appraisers, and the American Institute of Real Estate Appraisers.

Mr. MaRous served as chair of the Midwest Chapter of the American Society of Real Estate Counselors in 2006 and 2007. He has sat on the Chicago Chapter Board of Directors, the Editorial Board of *Real Estate Issues*, and on various other committees.

Mr. MaRous also is past president of the Illinois Coalition of Appraisal Professionals. He has sat on the board of directors, has held office, and has served on numerous committees of many other professional associations, including the National Association of Security Dealers, the International Research Council, the Chicago Real Estate Board, the Northwest Suburban Real Estate Board, the National Association of Real Estate Boards, and the Northern Illinois Commercial Association of Realtors.

PUBLICATIONS AND PROFESSIONAL RECOGNITION

Mr. MaRous has spoken at more than 20 programs and seminars related to real estate appraisal and valuation.

Author

- "Low-income Housing in Our Backyards," *The Appraisal Journal*, January 1996
- "The Appraisal Institute Moves Forward," *Illinois Real Estate Magazine*, December 1993
- "Chicago Chapter, Appraisal Institute," *Northern Illinois Real Estate Magazine*, February 1993
- "Independent Appraisals Can Help Protect Your Financial Base," *Illinois School Board Journal*, November-December 1990
- "What Real Estate Appraisals Can Do For School Districts," *School Business Affairs*, October 1990

Awards

- Chicago Chapter of the Appraisal Institute - F. Gregory Opelka Award, 2002
- Appraisal Institute - George L. Schmutz Memorial Award, 2001
- Chicago Chapter of the Appraisal Institute - Heritage Award, 2000
- Chicago Chapter of the Appraisal Institute - Herman O. Walther, 1987 (Distinguished Chapter Member)

Reviewer or Citation in the Following Books

- Appraisal of Real Estate*, Twelfth Edition, 2001
- Appraisal of Real Estate*, Thirteenth Edition, 2008
- Subdivision Valuation*, 2008
- Real Estate Damages*, 2008
- Valuation of Apartment Properties*, 2007
- Valuation of Billboards*, 2006
- Appraising Industrial Properties*, 2005
- Valuation of Market Studies for Affordable Housing*, 2005
- Valuing Undivided Interest in Real Property: Partnerships and Cotenancies*, 2004
- Analysis and Valuation of Golf Courses and Country Clubs*, 2003
- Dictionary of Real Estate Appraisal*, Fourth Edition, 2002
- Valuing Contaminated Properties: An Appraisal Institute Anthology*, 2002
- Hotels and Motels: Valuation and Market Studies*, 2001
- Land Valuation: Adjustment Procedures and Assignments*, 2001
- Appraisal of Rural Property*, Second Edition, 2000
- Capitalization Theory and Techniques, Study Guide*, Second Edition, 2000
- Guide to Appraisal Valuation Modeling Land*, 2000
- Appraising Residential Properties*, Third Edition, 1999
- Business of Show Business: The Valuation of Movie Theaters*, 1999
- GIS in Real Estate: Integrating, Analyzing and Presenting Locational Information*, 1998
- Market Analysis for Valuation Appraisals*, 1995

REPRESENTATIVE WORK OF MICHAEL S. MAROUS

Headquarters/Corporate Office Facilities in Illinois

Fortune 500 corporation facility, 200,000 sq. ft., Libertyville
Corporate headquarters, 300,000 sq. ft. and 500,000 sq. ft., Chicago
Fortune 500 corporation facility, 450,000 sq. ft., Northfield
Major airline headquarters, 1,100,000 million sq. ft. on 47 acres, Elk Grove Village
Former communications facility, 1,400,000 million sq. ft. on 62 acres, Skokie and Niles
Corporate Headquarters, 1,500,000+ sq. ft., Lake County
Former Sears Headquarters Redevelopment Project, Chicago

Office Buildings in Chicago

401 South LaSalle Street, 140,000 sq. ft.
134 North LaSalle Street, 260,000 sq. ft.
333 North Michigan Avenue, 260,000 sq. ft.
171 West Randolph Street, 360,000 sq. ft.
20 West Kinzie Street, 405,000 sq. ft.
55 East Washington Street, 500,000 sq. ft.
10 South LaSalle Street, 870,000 sq. ft.
222 West Adams, 1,000,000 sq. ft.
175 West Jackson Boulevard, 1,450,000 sq. ft.
227 West Monroe, 1,800,000 sq. ft.
10 South Dearborn Street, 1,900,000 sq. ft.

Hotels in Chicago

10 E. Grand Avenue (Hilton Garden Inn)
106 East Superior Street (Peninsula Hotel)
140 East Walton Place (The Drake Hotel)
676 North Michigan Avenue (Omni Chicago Hotel)
One West Wacker Drive (Renaissance Chicago Hotel)
320 North Dearborn Street (Westin Chicago River North)
505 North Michigan Avenue (Hotel InterContinental)

Large Industrial Properties in Illinois

Large industrial complexes, 400,000 sq. ft., 87th Street and Greenwood Avenue, Chicago
Distribution warehouse, 580,000 sq. ft. on 62 acres, Champaign
Publishing house, 700,000 sq. ft. on 195 acres, U.S. Route 45, Mattoon
AM Chicago International, 700,000± sq. ft. on 41 acres, 1800 West Central, Mt. Prospect
Nestlé distribution center, 860,000 sq. ft. on 153 acres, DeKalb
Fortune 500 company distribution center, 1,000,000 sq. ft., Elk Grove Village
U.S. Government Services Administration distribution facility, 860,000 sq. ft., 76th Street and Kostner Avenue, Chicago
Self-storage facilities, various Chicago metropolitan locations

Vacant Land in Illinois

15 acres, office, Northbrook	450 acres, residential, Wauconda
20 acres, residential, Glenview	475± acres, various uses, Lake County
25 acres, Hinsdale	650 acres, Hawthorne Woods
55 acres, mixed-use, Darien	650 acres, Waukegan/Libertyville
75 acres, I-88 at I-355, Downers Grove	800 acres, Woodridge
100± acres, various uses, Lake County	900 acres, Matteson
140 acres, Flossmoor	1,000± acres, Batavia area
142 acres, residential, Lake County	2,000± acres, Northern Lake County
160 acres, residential, Cary	5,000 acres, southwest suburban Chicago area
200 acres, mixed-use, Bartlett	Landfill expansion, Lake County
250 acres, Island Lake	

Business and Industrial Parks

Chevy Chase Business Park, 30 acres, Buffalo Grove
Carol Point Business Center, 300-acre industrial park, Carol Stream, \$125,000,000+ project
Internationale Centre, approximately 1,000 acre-multiuse business park, Woodridge

Retail Facilities

10 Community shopping centers, various Chicago, Metropolitan locations
Big-box uses, various Chicago metropolitan locations
Gasoline Stations, various Chicago metropolitan locations
More than 30 single-tenant retail facilities larger than 80,000 sq. ft., various Chicago metropolitan locations

Residential Projects

Federal Square townhouse development project, 118 units, \$15,000,000+ sq. ft. project, Dearborn Place, Chicago
Marketability and feasibility study, 219 East Lake Shore Drive, Chicago
Riverview II, Chicago, Old Town East and West, Chicago, Museum Park Lofts II, Museum Park Tower 4,
University Commons, Two River Place, River Place on the Park, Chicago

Market Studies

Impact of land fill on adjacent property values
Impact of low-income housing on adjacent residential property values
Impact of proposed quarry expansion on neighboring properties
Impact of commercial and parking uses on adjacent residential property values
Impact of significant zoning changes on residential property values
Sanitary sewer value impact study
Waste transfer facility impact study

Properties In Other States

330,000 sq. ft., Newport Beach, California
Former government depot/warehouse and distribution center, 2,500,000 sq. ft. on 100+ acres, Ohio
Shopping Center, St. Louis, Missouri
Office Building, Clayton, Missouri
Condominium Development, New York, New York

Airport Related Properties

Mr. MaRous has done valuations on more than 100 parcels in and around O'Hare International Airport,
Chicago Midway Airport, Palwaukee Municipal Airport, Chicago Aurora Airport, DuPage Airport,
and Lambert-St. Louis International Airport

REPRESENTATIVE CLIENT LISTING OF MICHAEL S. MAROUS

Law Firms

Botti Law Firm, P.C.
Alschuler, Simantz & Hem, LLC
Arnstein & Lehr LLP
Steven B. Bashaw, P.C.
Berger, Newmark & Fenchel P.C.
Berger Schatz
Carmody MacDonald P.C.
Crane, Heyman, Simon, Welch & Clar
Daley & Georges, Ltd.
DLA Piper
Drinker, Biddle & Reath LLP
Figliulo & Silverman, P.C.
Foley & Lardner LLP
Foran, O'Toole & Burke LLC
Franczek Radelet P.C.
Freeborn & Peters LLP
Goldberg Kohn
Gould & Ratner LLP
Graft & Jordan
Greenberg Traurig LLP
Helm & Wagner
Robert Hill Law, Ltd.
Hinshaw & Culbertson LLP

Holland & Knight LLP
Jenner & Block
Donald L. Johnson
Kinnally, Flaherty, Krentz & Loran PC
Kirkland & Ellis LLP
Klein, Thorpe & Jenkins, Ltd.
Locke Lord LLP
McDermott, Will & Emery
Mayer Brown
McGuireWoods LLP
Michael Best & Friedrich LLP
Miller & Sweeney CO
Morrison & Morrison, Ltd.
Bryan E. Mraz & Associates
Neal, Gerber & Eisenberg, LLP
Neal & Leroy LLC
O'Donnell Law Firm Ltd.
O'Halloran Kosoff Geitner & Cook, LLC
Owens, Owens & Rinn, Ltd.
Prendergast & DelPrincipe
Rathje & Woodward, LLC
Raysa & Zimmermann, LLC
Righeimer, Martin & Cinquino, P.C.

Mary Riordan, Attorney
Robbins, Salomon & Patt, Ltd.
Rosenfeld Hafron Shapiro & Farmer
Rosenthal, Murphey, Coblentz & Donahue
Rubin & Norris, LLC
Ryan and Ryan Attorneys at Law, P.C.
Reed Smith LLP
Sarnoff & Baccash
Scariano, Himes & Petrarca, Chtd.
Schiff Hardin LLP
Schiller, DuCanto & Fleck LLP
Schlott, Luetkehans & Garner, LLC
Schuyler, Roche & Crisham, P.C.
Sidley Austin LLP
Sommerschien, Nath & Rosenthal LLP
Storino, Ramello & Durkin
Thomas M. Tully & Associates
Thompson Coburn, LLP
Tuttle, Vedral & Collins, P.C.
Vedder Price
Wildman, Harrold, Allen & Dixon
Winston & Strawn LLP
Worsek & Vihon LLP

Financial Institutions

AmericaUnited Bank and Trust
Charter One
Citibank
Cole Taylor Bank
Covest Banc
First Bank of Highland Park
First Midwest Bank

First Northwest Bank
Glenview State Bank
Harris Bank
Itasca Bank and Trust
Lake Forest Bank & Trust
MB Financial Bank
Midwest Bank & Trust Company

Northern Trust Bank
Northview Bank & Trust
Private Bank & Trust Co.
State Financial Bank
Winfield Community Bank
Wintrust Bank Group

Corporations

Advocate Health Care System
American Stores Company
Archdiocese of Chicago
Arthur J. Rogers and Company
BP Amoco Oil Company
Christopher B. Burke Engineering,
Ltd.
Cambridge Homes
Canadian National Railroad
Capital Realty Services, Inc.
Chicago Cubs
Children's Memorial Hospital
Chrysler Realty Corporation
Citgo Petroleum Corporation

CorLands
Edward R. James Partners, LLC
Enterprise Development Corporation
Enterprise Leasing Company
Exxon Mobil Corporation
Hamilton Partners
Hewitt Associates LLC
Hollister Corporation
Imperial Realty Company
Kenard Corporation
Kimco Realty Corporation
Kinder Morgan, Inc.
Kmart Corporation
Lakewood Homes

Loyola University Health System
Marathon Oil Corporation
Meijer, Inc.
Mesirow Stein Real Estate, Inc.
Prime Group Realty Trust
Public Storage Corporation
RREEF Corporation
Shell Oil Company
Stewart Warner Corporation
Union Pacific Railroad Company
United Airlines, Inc.
United of America Insurance Company

Public Entities

Illinois Local Governments and Agencies

Village of Arlington Heights	Village of Glenview	Village of Orland Park
Village of Barrington	Glenview Park District	City of Palos Hills
Village of Bartlett	Village of Harwood Heights	City of Prospect Heights
Village of Bellwood	City of Highland Park	City of Rolling Meadows
Village of Brookfield	Village of Hinsdale	Village of Rosemont
Village of Burr Ridge	Village of Inverness	City of St. Charles
Village of Cary	Village of Kildeer	Village of Schaumburg
City of Chicago	Village of Lake Zurich	Village of Schiller Park
Village of Deer Park	Leyden Township	Village of Skokie
City of Des Plaines	Village of Lincolnshire	Village of South Barrington
Des Plaines Park District	Village of Lincolnwood	Village of Streamwood
Downers Grove Park District	Village of Morton Grove	Metropolitan Water Reclamation District of Greater Chicago
City of Elgin	Village of Mount Prospect	City of Waukegan
Elk Grove Village	Village of North Aurora	Village of Wheeling
City of Elmhurst	Village of Northbrook	Village of Wilmette
Village of Elmwood Park	City of North Chicago	Village of Willowbrook
City of Evanston	Village of Northfield	Village of Winnetka
Village of Forest Park	Northfield Township	Village of Woodridge
Village of Franklin Park	Village of Oak Brook	

County Governments and Agencies


Boone County State's Attorney's Office	Forest Preserve District of DuPage County	Lake County
Forest Preserve of Cook County	Kane County	Lake County Forest Preserve District
Cook County State's Attorney's Office	Kendall County Board of Review	Lake County State's Attorney's Office
DuPage County Board of Review		

State and Federal Government Agencies

Federal Deposit Insurance Corporation	Illinois Housing Development Authority	Internal Revenue Service
U.S. General Services Administration	Illinois State Toll Highway Authority	The U.S. Postal Service

Schools

Argo Community High School District No. 217	Consolidated High School District No. 230	Morton College
Arlington Heights District No. 25 Township High School District No. 214, Arlington Heights	Darien District No. 61	Niles Elementary District No. 71
Barrington Community Unit District No. 220	DePaul University	North Shore District No. 112, Highland Park
Chicago Board of Education	Elmhurst Community Unit School District No. 205	Northwestern University
Chicago Ridge District No. 127½	Indian Springs School District No. 109	Rosalind Franklin University
College of Lake County	LaGrange School District No. 105	Roselle School District No. 12
Community Consolidated School District No. 146	Loyola University	Schaumburg Community Consolidated District No. 54
	Lyons Township High School District No. 204	University of Illinois
	Maine Township High School District No. 207	Wheeling Community Consolidated District No. 21
		Wilmette District No. 39



Ms. Dohoney has supported E & E environmental investigations, water resource/water quality projects, and projects for wind energy, transmission line, and pipeline facilities for eight years. She manages and conducts environmental regulatory compliance evaluations; supports facility permitting programs; and supports E & E's preparation of habitat conservation plans, EAs, EISs, and ERs for proposed transmission, pipeline, solar, and wind energy facilities. Her areas of expertise include identification of permitting requirements, consultation regarding agency and public perceptions and concerns, wetland delineation and water resource permitting, and investigation of threatened and endangered (T/E) species.

Black Fork Wind Project, Crawford and Richland Counties, Ohio. For the proposed 200-MW facility of Black Fork Wind Energy, LLC, Ms. Dohoney managed E & E's preparation of the successful application for a certificate of environmental compatibility from the Ohio Power Siting Board (OPSB). The

newly mandated permitting process involves a completion of a comprehensive assessment of the ecological, agricultural, land use, human health, visual, and historical impacts that could result from project construction and operation. Ms. Dohoney managed E & E's completion of avian and bat surveys to address the "On-Shore Bird and Bat Pre- and Post-Construction Monitoring Protocol for Commercial Wind Energy Facilities in Ohio" of the Ohio Department of Natural Resources (Ohio DNR). The work included migratory raptor and passerine surveys, a raptor nest search, owl playback surveys, and bat acoustic monitoring and mist-netting. Following completion of the biological surveys, she led meetings and follow-up consultation with representatives of the Ohio DNR and USFWS. In support of the OPSB application and future wetland permitting requirements, she also managed the completion of wetland and stream delineation surveys and a habitat assessment survey. In addition to the ODNR-required biological surveys, Ms. Dohoney led consultation with USFWS to develop a bald eagle survey methodology to comply with draft USFWS *Eagle Conservation Plan Guidance*. She also presented the project at public meetings and testified at the adjudicatory hearing.

Criterion Wind Project, Garrett County, Maryland. For the USFWS Chesapeake Bay Field Office and Constellation Holdings (now Exelon Corporation), Ms. Dohoney was E & E's co-lead author of a third-party EA being prepared in accordance with NEPA for this wind energy site located on Backbone Mountain. The EA addressed the environmental effects of the proposed issuance of an incidental take permit (ITP) and approval of a habitat conservation plan for Indiana bat (*Myotis sodalis*) under Section 10(a)(1)(B) of the Endangered Species Act. Because this potentially would be the first ITP for the Indiana bat issued by USFWS for an operating wind energy facility, the lack of precedent required E & E and USFWS to work collaboratively to develop a method to assess resource impacts from four potential alternatives, including the operating project, over the 20-year operational life of the project. The draft EA was one of the first NEPA documents to evaluate cumulative impacts of the wind industry on birds and bats.

Wind Energy Projects, Nationwide. For a major wind energy developer, she is E & E's project manager for 10 projects located in six states throughout the Midwest. She also has conducted constraint assessments and permit requirement reviews for over 25 potential wind projects across the Midwest. As many Midwestern states do not have defined preconstruction monitoring protocol, Ms. Dohoney provided extensive agency consultation to identify site-specific concerns and subsequently develop field surveys to address them while satisfying the needs of both the agencies and the wind energy developer.

Courtney M. Dohoney (Cont.)

For a 300-MW wind project in Missouri, she managed the preparation of a habitat conservation plan to support the acquisition of a Section 10 Incidental Take Permit from USFWS for the federally endangered Indiana bat. As part of this effort, she led extensive consultation with USFWS regarding siting of the project away from areas with high bat activity, development of curtailment scenarios, post-construction monitoring, and additional mitigation efforts. She also participated in the greater prairie-chicken surveys, habitat mapping, and wetland delineation. Because the greater prairie-chicken is a state-listed endangered species, Ms. Dohoney led consultation with the Missouri Department of Conservation regarding mitigation and minimization options.

Wind Energy Farm, Indiana. For a confidential client, E & E has conducted extensive biological surveys for a proposed 100-MW wind energy project in Randolph and Delaware counties, Indiana. E & E initiated agency consultation with USFWS and the Indiana Department of Natural Resources to identify known threatened and endangered species occurrences within the Project area and/or surrounding area. After identifying potential agency concerns, E&E developed and implemented preconstruction avian and bat field surveys including: four season bird and raptor surveys, a raptor stick-nest survey, bat acoustic monitoring, and bat mist-netting surveys. E & E also completed habitat mapping of the project area in order to determine the extent and quality of habitat for the federally-listed endangered Indiana bat.

Wind Energy Farm, Illinois. For a confidential client, E & E has conducted extensive biological surveys for a proposed 300-MW wind energy project in Macon and DeWitt Counties, Illinois. As a first step, E & E completed a desktop critical issues analysis (CIA) to identify potential environmental constraints and permits necessary for project development. Following completion of the CIA and consultation with USFWS and the Illinois Department of Natural Resources, E&E developed and implemented preconstruction avian and bat field surveys to determine the presence and distribution of avian and bat resources within the project area. In addition to conducting migratory bird and raptor surveys, bat acoustic monitoring, and bat mist-netting surveys, E & E also completed habitat mapping of the project area in order to determine whether the site contains suitable habitat for federally or state-listed threatened and endangered species.

Wind Energy Facility Environmental Compliance Audits, 10 States. Ms. Dohoney was a member of the E & E team that helped a confidential client with its permit compliance for over 20 wind energy facilities in Washington, Oregon, Texas, Oklahoma, Kansas, Minnesota, Iowa, Illinois, Indiana, and New York. To support the client's ongoing environmental management system, she contributed to the development of an annual assessment and evaluation process that each facility could use to facilitate its day-to-day compliance. She also participated in the regulatory and management gap analysis and provided guidance regarding identified corrective actions.

Third Planet Wind Projects, Nebraska. For Third Planet Windpower, Ms. Dohoney prepared a comprehensive constraints analysis evaluating potential issues regarding airports, cultural and recreational properties, regional geology and soil, floodplains, water resources, wetlands, land use, visual impacts, T/E species, and risks posed to local and migratory avian and bat populations resulting from the Patriot wind project. Within the constraints analysis, she included a comprehensive assessment of permits and approvals that the project would require from federal, state, and local authorities. As part of her analysis, she conducted a site visit to document other potentially critical issues that could not be identified by the desktop land use constraints analysis (e.g., the locations of oil and gas wells and pipelines, transmission lines, roads, and houses). For the Madison and Petersburg wind projects, she conducted a permitting and T/E species analysis and developed a permitting matrix delineating federal, state, and local permitting requirements.

Courtney M. Dohoney (Cont.)

Three Wind Energy Projects, California, New Mexico, and Texas. For NRG Energy, Inc., she conducted a fatal flaw and permit analysis as part of E & E's due diligence review for three 150-MW wind projects, in support of NRG's acquisition/investment decision making. She reviewed existing site information and permits and identified future permits needed to site and construct the projects. Issues of concern included endangered species, cultural resources, land use, the crossing of federal lands, and constraints associated with military airspace.

Wind Generating Facilities, Six States. To support TransCanada with its acquisition decision making for 11 wind energy projects, Ms. Dohoney contributed to E & E's due diligence and permit assessments for operational and nearly completed wind facilities in Texas, Oklahoma, Oregon, New York, Minnesota, and Illinois. She evaluated outstanding permits and documented their status. When additional permits or studies were required, she helped determine the time, cost, and resources necessary to complete the permit applications and associated studies. She used site-specific information to help determine the environmental risk level for each facility.

Noble Power Wind Farm Sites, New York State. For Noble Environmental Power, LLC, she helped delineate wetlands for the Chateaugay and Wethersfield wind farms using the guidelines established by USACE.

Rockfish Solar Project, Charles County, Maryland. Ms. Dohoney was the project manager for the E & E team that provided turn-key environmental services for juwi's Rockfish Solar project, located in Charles County, Maryland. E & E initially prepared a CIA for the site, identifying permitting requirements and significant environmental constraints. Using the information obtained in the CIA, we prepared the ERD to support the CPCN application. As part of the ERD and to support agency consultation, E & E also conducted a habitat assessment and detailed wetland delineation survey, and led agency consultation with MDE and MDNR. Through this coordination effort and collaborative revisions to the project layout, juwi was able to avoid the need to obtain a non-tidal wetlands permit which can take up to four months to obtain and requires wetland mitigation efforts (creation, restoration, or enhancement), keeping the project on schedule and saving additional permitting costs.

Great Northern Transmission Line Third Party EIS, Minnesota. E & E was selected for the third party EIS team for the high profile Minnesota Power project, delivering low carbon hydro power from Manitoba to the Iron range of Minnesota. This proposed 220-mile, 500 kV project has national importance because the U.S. Department of Energy (DOE) is looking to use this project to demonstrate how a joint state/federal EIS can be completed in an expedited manner. Ms. Dohoney is project manager for E & E's efforts to analyze resources and write sections of the EIS related to cultural, visual, land use, air quality, socioeconomics, and human health and safety related resources on an aggressive schedule that aims to produce a Final EIS in less than one year. She will also manage E & E's support of DOE in Section 106 consultation, among other regulatory support.

Northern Pass Transmission Line Third-Party EIS, Quebec, Canada to Deerfield, New Hampshire. Ms. Dohoney is E & E's deputy project manager for a third-party EIS for the U.S. Department of Energy (DOE) for this proposed \$1.4 billion, 187-mile, 345kV transmission line extending from Quebec, Canada into New Hampshire. E & E was chosen by DOE to assist in part because of our history of addressing controversial projects with objectivity and integrity. E & E is providing all biological, cultural, and social resource analyses. The work involves consultation with EPA Region 1, USACE, USFWS, the USDA Forest Service (White Mountain National Forest), New Hampshire Fish and Game Department, and the New Hampshire State Historic Preservation Office. Ms. Dohoney oversees all consultation with cooperating agencies and other resource agencies and is managing the production of all project documentation.

Courtney M. Dohoney (Cont.)

Northern Lights Pipeline, Iowa and Wisconsin. She was a member of the E & E team that prepared the FERC third-party NEPA EA on behalf of Northern Natural Gas Company. The project included 73 miles of pipeline extensions and looping, approximately 5 miles of new Greenfield pipeline, and construction of associated aboveground facilities. Specifically, Ms. Dohoney helped write Sections of FERC Resource Reports 2 and 3 addressing water resources and wetlands and vegetation, wildlife, and T/E species, respectively.

Riverport Pipeline, Memphis, Tennessee. For Praxair, she was a member of the E & E team that completed a feasibility study for the siting of a 6.5-mile oxygen pipeline. Her analysis included reviews of publicly available information from a wide variety of federal, state, and local agencies, as well as a literature review and Internet research. She used the results to develop a strategy for traversing several streams, wetlands, a state park, federal property, hazardous waste areas, and culturally sensitive lands. Praxair subsequently used the results to develop a preferred route that minimized environmental impact and decreased the risk of unexpected costs and delays.

Ms. Dohoney subsequently was E & E's project manager for the follow-up work to obtain the permits for Riverport Pipeline construction, including the Section 401 water quality certification; the stormwater pollution prevention plan, the construction stormwater discharge notice of intent (NOI), and the hydrostatic test water NOI of the Tennessee Department of Environment and Conservation. All of the permits and approvals were obtained in a timely manner that enabled project construction within the tight time frame desired by the client.

ANR Pipeline Expansion, Wisconsin. For ANR Pipeline Company, Ms. Dohoney conducted environmental surveys along an 8.8-mile pipeline route through Rock County. She completed surveys to identify wetlands and bodies of surface water, T/E species habitat, and land use. She also conducted surveys for several state-listed T/E plant species, participating in agency consultation with USFWS, the Wisconsin Department of Natural Resources (WDNR), and the City of Janesville. ANR used the results to successfully obtain a joint USACE/WDNR wetland permit and filed the resource reports with FERC.

Sabine National Wildlife Refuge, Louisiana. Ms. Dohoney was a member of the E & E team that worked with representatives of the United States Coast Guard (USCG), USFWS, and EPA to help guide the cleanup and repair of Sabine National Wildlife Refuge, which had been extensively damaged Hurricanes Katrina and Rita. She provided written and photodocumentation of impacts on the surrounding wetland as a result of clearing debris from the levee. She used a Trimble Global Positioning System handheld unit to document hazardous material-related items such as drums, cylinders, tanks, and totes; white goods such as refrigerators and ice machines; electronic goods such as televisions and microwaves; and munitions found during the clearing operations. In addition, Ms. Dohoney was the field health and safety officer for her three-person team.

EMPLOYMENT:

Ecology and Environment, Inc., Arlington, Virginia, 2006-present

Tetra Tech, Inc., Fairfax, Virginia, Water Resource Intern, summer 2005

Duke University, Nicholas School of the Environment and Earth Sciences, Durham, North Carolina, Graduate Teaching Assistant, spring 2006; Soils Laboratory, Laboratory Technician, 2004-2005

Ohio Environmental Protection Agency, Bowling Green, Ohio, Water Quality Intern, summers 2003 and 2004

David G. Loomis
Illinois State University
Department of Economics
Campus Box 4200
Normal, IL 61790-4200
(309) 438-7979
dloomis@ilstu.edu

Education

Doctor of Philosophy, Economics, Temple University, Philadelphia, Pennsylvania, May 1995.

Bachelor of Arts, Mathematics and Honors Economics, Temple University, Magna Cum Laude, May 1985.

Experience

2011-present Strategic Economic Research, LLC

President

- Performed economic impact analyses on policy initiatives and energy projects such as wind energy and transmission lines and at the county and state level.
- Provided expert testimony before state legislative bodies, public utility commissions, and county boards.
- Wrote telecommunications policy impact report comparing Illinois to other Midwestern states.

1996-present Illinois State University, Normal, IL

Full Professor – Department of Economics (2010-present)

Associate Professor - Department of Economics (2002-2009)

Assistant Professor - Department of Economics (1996-2002)

- Taught Regulatory Economics, Telecommunications Economics and Public Policy, Industrial Organization and Pricing, Individual and Social Choice, Economics of Energy and Public Policy and a Graduate Seminar Course in Electricity, Natural Gas and Telecommunications Issues.
- Supervised as many as 5 graduate students in research projects each semester.
- Served on numerous departmental committees.

1997-present Institute for Regulatory Policy Studies, Normal, IL

Executive Director (2005-present)

Co-Director (1997-2005)

- Grew contributing membership from 5 companies to 16 organizations.
- Doubled the number of workshop/training events annually.
- Supervised 2 Directors, Administrative Staff and internship program.
- Developed and implemented state-level workshops concerning regulatory issues related to the electric, natural gas, and telecommunications industries.

Experience (cont'd)

2006-present Illinois Wind Working Group, Normal, IL

Director

- Founded the organization and grew the organizing committee to over 200 key wind stakeholders
- Organized annual wind energy conference with over 400 attendees
- Organized strategic conferences to address critical wind energy issues
- Initiated monthly conference calls to stakeholders
- Devised organizational structure and bylaws

2007-present Center for Renewable Energy, Normal, IL

Director

- Created founding document approved by the Illinois State University Board of Trustees and Illinois Board of Higher Education.
- Secured over \$150,000 in funding from private companies.
- Hired and supervised 4 professional staff members and supervised 3 faculty members as Associate Directors.
- Reviewed renewable energy manufacturing grant applications for Illinois Department of Commerce and Economic Opportunity for a \$30 million program.
- Created technical "Due Diligence" documents for the Illinois Finance Authority loan program for wind farm projects in Illinois.

1997-2002 International Communications Forecasting Conference

Chair

- Expanded Planning Committee with representatives from over 18 different international companies and delivered high quality conference attracting over 500 people over 4 years.

1985-1996 Bell Atlantic, Philadelphia, Pa.

Economist - Business Research

- Wrote and taught Applied Business Forecasting multimedia course.
- Developed and documented 25 econometric demand models that were used in regulatory filings.
- Provided statistical and analytic support to regulatory costing studies.
- Served as subject matter expert in switched and special access.
- Administered \$4 million budget including \$1.8 million consulting budget.

Professional Awards and Memberships

2011 Midwestern Regional Wind Advocacy Award from the Department of Energy's Wind Powering America presented at WindPower 2011

2009 Economics Department Scott M. Elliott Faculty Excellence Award – awarded to faculty who demonstrate excellence in teaching, research and service.

2009 Illinois State University Million Dollar Club – awarded to faculty who have over \$1 million in grants through the university.

2008 Outstanding State Wind Working Group Award from the Department of Energy's Wind Power America presented at WindPower 2008.

1999 Illinois State University Teaching Initiative Award

Member of the American Economic Association, National Association of Business Economists, International Association for Energy Economics, Institute for Business Forecasters; Institute for International Forecasters, International Telecommunications Society.

Expert Testimony

12. Livingston County (Illinois) Zoning Board of Appeals, Application for Special Use Permit for a Wind Energy Conversion System, on behalf of Invenergy, Oral Cross-Examination, December 8-9, 2014.
11. Missouri Public Service Commission, Case No. EA-2014-0207, Oral Cross-examination Testimony on behalf of Grain Belt Express Clean Line LLC appeared before the Commission on November 21, 2014.
10. Livingston County (Illinois) Zoning Board of Appeals, Application for Special Use Permit for a Wind Energy Conversion System, on behalf of Invenergy, Direct Oral Testimony, November 17-19, 2014.
9. Missouri Public Service Commission, Case No. EA-2014-0207, Written Surrebuttal Testimony on behalf of Grain Belt Express Clean Line LLC, filed October 14, 2014.
8. Missouri Public Service Commission, Case No. EA-2014-0207, Written Direct Testimony on behalf of Grain Belt Express Clean Line LLC, filed March 26, 2014.
7. Illinois Commerce Commission, Case No. 12-0560, Oral Cross-examination Testimony on behalf of Rock Island Clean Line LLC appeared before the Commission on December 11, 2013.

Expert Testimony (cont'd)

6. Illinois Commerce Commission, Case No. 12-0560, Written Rebuttal Testimony on behalf of Rock Island Clean Line LLC filed August 20, 2013.
5. Boone County (Illinois) Board, Examination of Wind Energy Conversion System Ordinance, Direct Testimony and Cross-Examination, April 23, 2013.
4. Illinois Commerce Commission, Case No. 12-0560, Written Direct Testimony on behalf of Rock Island Clean Line LLC filed October 10, 2012.
3. Whiteside County (Illinois) Board and Whiteside County Planning and Zoning Committee, Examination of Wind Energy Conversion System Ordinance, Direct Testimony and Cross-Examination, on behalf of the Center for Renewable Energy, April 12, 2012.
2. State of Illinois Senate Energy and Environment Committee, Direct Testimony and Cross-Examination, on behalf of the Center for Renewable Energy, October 28, 2010.
1. Livingston County (Illinois) Zoning Board of Appeals, Application for Special Use Permit for a Wind Energy Conversion System, on behalf of the Center for Renewable Energy, Direct Testimony and Cross-Examination, July 28, 2010.

Professional Publications

29. Tegen, S., Keyser, D., Flores-Espino, F., Miles, J., Zammit, D. and Loomis, D. (2015). Offshore Wind Jobs and Economic Development Impacts in the United States: Four Regional Scenarios, National Renewable Energy Laboratory Technical Report, NREL/TP-5000-61315, February.
28. Loomis, D. G. and Bowden, N. S. (2013). Nationwide Database of Electric Rates to Become Available, *Natural Gas & Electricity*, 30 (5), 20-25.
27. Jin, J. H., Loomis, D. G., and Aldeman, M. R. (2013). Optimum penetration of utility-scale grid-connected solar photovoltaic systems in Illinois, *Renewable Energy*, 60, 20-26.
26. Malm, E., Loomis, D. G., DeFranco, J. (2012). A Campus Technology Choice Model with Incorporated Network Effects: Choosing Between General Use and Campus Systems, *International Journal of Computer Trends and Technology*, 3(4), 622-629.
25. Chupp, B. A., Hickey, E.A. & Loomis, D. G. (2012). Optimal Wind Portfolios in Illinois, *Electricity Journal*, 25, 46-56.

Professional Publications (cont'd)

24. Hickey, E., Loomis, D. G., & Mohammadi, H. (2012). Forecasting hourly electricity prices using ARMAX-GARCH models: An application to MISO hubs, *Energy Economics*, 34, 307-315.
23. Theron, S., Winter, J.R, Loomis, D. G., & Spaulding, A. D. (2011). Attitudes Concerning Wind Energy in Central Illinois. *Journal of the America Society of Farm Managers and Rural Appraisers*, 74, 120-128.
22. Payne, J. E., Loomis, D. G. & Wilson, R. (2011). Residential Natural Gas Demand in Illinois: Evidence from the ARDL Bounds Testing Approach. *Journal of Regional Analysis and Policy*, 41(2), 138.
21. Loomis, D. G. & Ohler, A. O. (2010). Are Renewable Portfolio Standards A Policy Cure-all? A Case Study of Illinois's Experience. *Environmental Law and Policy Review*, 35, 135-182.
20. Gil-Alana, L. A., Loomis, D. G., & Payne, J. E. (2010). Does energy consumption by the U.S. electric power sector exhibit long memory behavior ? *Energy Policy*, 38, 7512-7518.
19. Carlson, J. L., Payne, J. E., & Loomis, D. G. (2010). An assessment of the Economic Impact of the Wind Turbine Supply Chain in Illinois. *Electricity Journal*, 13, 75-93.
18. Apergis, N., Payne, J. E., & Loomis, D. G. (2010). Are shocks to natural gas consumption transitory or permanent? *Energy Policy*, 38, 4734-4736.
17. Apergis, N., Payne, J. E., & Loomis, D. G. (2010). Are fluctuations in coal consumption transitory or permanent? Evidence from a panel of U.S. states. *Applied Energy*, 87, 2424-2426.
16. Hickey, E. A., Carlson, J. L., & Loomis, D. G. (2010). Issues in the determination of the optimal portfolio of electricity supply options. *Energy Policy*, 38, 2198-2207.
15. Carlson, J. L., & Loomis, D. G. (2008). An assessment of the impact of deregulation on the relative price of electricity in Illinois. *Electricity Journal*, 21, 60-70.
14. Loomis, D. G., (2008). The telecommunications industry. In H. Bidgoli (Ed.), *The handbook of computer networks* (pp. 3-19). Hoboken, NJ: John Wiley & Sons.
13. Cox, J. E., Jr., & Loomis, D. G. (2007). A managerial approach to using error measures in the evaluation of forecasting methods. *International Journal of Business Research*, 7, 143-149.

Professional Publications (cont'd)

12. Cox, J. E., Jr., & Loomis, D. G. (2006). Improving forecasting through textbooks – a 25 year review. *International Journal of Forecasting*, 22, 617-624.
11. Swann, C. M., & Loomis, D. G. (2005). Competition in local telecommunications – there's more than you think. *Business Economics*, 40, 18-28.
10. Swann, C. M., & Loomis, D. G. (2005). Intermodal competition in local telecommunications markets. *Information Economics and Policy*, 17, 97-113.
9. Swann, C. M., & Loomis, D. G. (2004) Telecommunications demand forecasting with intermodal competition – a multi-equation modeling approach. *Telektronikk*, 100, 180-184.
8. Cox, J. E., Jr., & Loomis, D. G. (2003). Principles for teaching economic forecasting. *International Review of Economics Education*, 1, 69-79.
7. Taylor, L. D. & Loomis, D. G. (2002). *Forecasting the internet: understanding the explosive growth of data communications*. Boston: Kluwer Academic Publishers.
6. Wiedman, J. & Loomis, D. G. (2002). U.S. broadband pricing and alternatives for internet service providers. In D. G. Loomis & L. D. Taylor (Eds.) Boston: Kluwer Academic Publishers.
5. Cox, J. E., Jr. & Loomis, D. G. (2001). Diffusion of forecasting principles: an assessment of books relevant to forecasting. In J. S. Armstrong (Ed.), *Principles of Forecasting: A Handbook for Researchers and Practitioners* (pp. 633-650). Norwell, MA: Kluwer Academic Publishers.
4. Cox, J. E., Jr. & Loomis, D. G. (2000). A course in economic forecasting: rationale and content. *Journal of Economics Education*, 31, 349-357.
3. Malm, E. & Loomis, D. G. (1999). Active market share: measuring competitiveness in retail energy markets. *Utilities Policy*, 8, 213-221.
2. Loomis, D. G. (1999). Forecasting of new products and the impact of competition. In D. G. Loomis & L. D. Taylor (Eds.), *The future of the telecommunications industry: forecasting and demand analysis*. Boston: Kluwer Academic Publishers.
1. Loomis, D. G. (1997). Strategic substitutes and strategic complements with interdependent demands. *The Review of Industrial Organization*, 12, 781-791.

Selected Presentations

"Where Are All the Green Jobs?" presented January 28, 2015 at the 2015 Illinois Green Economy Network Sustainability Conference, Normal, IL.

"Teaching Next Generation Energy Concepts with Next Generation Science Standards: Addressing the Critical Need for a More Energy-Literate Workforce," presented September 30, 2014 at the Mathematics and Science Partnerships Program 2014 Conference in Washington, DC.

"National Utility Rate Database," presented October 23, 2013 at Solar Power International, Chicago, IL.

"Potential Economic Impact of Offshore Wind Energy in the Great Lakes," presented September 23, 2013 at Great Lakes Wind Collaborative Annual Meeting, Columbus, OH.

"Potential Economic Impact of Offshore Wind Energy in the Great Lakes," presented May 6, 2013 at WindPower 2013, Chicago, IL.

"Why Illinois? Windy City, Prairie Power," presented May 5, 2013 at WindPower 2013, Chicago, IL.

"Siting Illinois Wind Energy," testified April 23, 2013 before the Boone County Board, Belvidere, IL.

"Illinois Wind Energy," Emerging Illinois Electric Topics Conference, Electrical Board of Missouri and Illinois, March 12& 19, 2013 in Collinsville, IL and Bloomington, IL.

"National Utility Rate Database," presented January 29, 2013 at the EUEC Conference, Phoenix, AZ.

"Energy Learning Exchange and Green Jobs," presented December 13, 2012 at the TRICON Meeting of Peoria and Tazewell County Counselors, Peoria, IL.

"Paradigm Bio-Aviation and the Center for Renewable Energy," presented December 10, 2012 at the Bloomington City Council Meeting, Bloomington, IL.

"Potential Economic Impact of Offshore Wind Energy in the Great Lakes," presented November 12, 2012 at the Offshore Wind Jobs and Economic Development Impacts Webinar.

"Energy Learning Exchange," presented October 31, 2012 at the Utility Workforce Development Meeting, Chicago, IL.

"Potential Economic Impact of Offshore Wind Energy in the Great Lakes," presented September 26, 2012 at the Great Lakes Wind Collaborative's Fifth Annual Meeting, Erie, PA.

Presentations (cont'd)

"Energy-Related Research at ISU," presented July 18, 2012 at the Sixth Annual Advancing Wind Power in Illinois Conference, Normal, IL.

"Illinois Wind Energy," presented July 17, 2012 at the Sixth Annual Advancing Wind Power in Illinois Conference, Normal, IL.

"Wind Energy in McLean County," presented June 26, 2012 at BN By the Numbers, Normal, IL.

"Wind Energy," presented June 14, 2012 at the Wind for Schools Statewide Teacher Workshop, Normal, IL.

"National Utility Rate Database," presented June 13, 2012 at the Department of Energy SunShot Conference, Denver, CO.

"Economic Impact of Wind Energy in Illinois," presented June 6, 2012 at AWEA's WINDPOWER 2012, Atlanta, GA.

"National Utility Rate Database," presented April 26, 2012 at the IRPS Conference, Springfield, IL.

"Wind Farms in Your Community," presented April 19, 2012 to the University of Illinois Extension Teleconference: Siting and Permitting Wind Farms in Illinois.

"Wind Energy 101," presented March 29, 2012 to the Presidential Scholars, Illinois State University, Normal, IL.

"Trends in Illinois Wind Energy," presented March 6, 2012 at the AWEA Regional Wind Energy Summit – Midwest in Chicago, IL.

"Trends in Illinois Wind Energy," presented February 8, 2012 at the Illinois Wind Working Group Siting, Taxing and Zoning of Wind Farms, Normal, IL.

"Center for Renewable Energy Overview," presented December 2, 2011 at the Midwest Energy Policy Conference in St. Louis, MO.

"Challenges and New Growth Strategies in the Wind Energy Business," invited plenary session speaker at the Green Revolution Leaders Forum, November 18, 2011 in Seoul, South Korea.

"Economic Impact of Wind Farms," presented August 26, 2011 at the Illinois Department of Commerce and Economic Opportunity Peer Exchange, Peru, IL.

"Current Research by the Center for Renewable Energy," presented July 22, 2011 at the Fifth Annual Advancing Wind Power in Illinois Conference in Chicago, IL.

Presentations (cont'd)

"Overview of the Center for Renewable Energy," presented July 20, 2011 at the University-Industry Consortium Meeting at Illinois Institute of Technology, Chicago, IL.

"Building the Wind Turbine Supply Chain," presented May 11, 2011 at the Supply Chain Growth Conference, Chicago, IL

"Building a Regional Energy Policy for Economic Development," presented April 4, 2011 at the Midwestern Legislative Conference's Economic Development Committee Webinar.

"Wind Energy 101," presented February 7, 2011 at the Wind Power in Central Illinois - A Public Forum, CCNET Renewable Energy Group, Champaign, IL.

"Overview of County Wind Farm Activity," presented February 9, 2011 at the Illinois Wind Working Group Siting, Taxing and Zoning of Wind Farms, Normal, IL.

"Wind Energy 101," presented February 9, 2011 at the Illinois Wind Working Group Siting, Taxing and Zoning of Wind Farms, Normal, IL.

"Alternative Energy Strategies," presented with Matt Aldeman November 19, 2010 at the Innovation Talent STEM Education Forum, Chicago, IL.

"Siting and Zoning in Illinois," presented November 17, 2010 at the Wind Powering America Webinar.

"What Governor Quinn Should Do about Energy?" presented November 15, 2010 at the Illinois Chamber of Commerce Energy Forum Conference, Chicago, IL.

"Is Wind Energy Development Right for Illinois," presented with Matt Aldeman October 28, 2010 at the Illinois Association of Illinois County Zoning Officials Annual Seminar in Utica, IL.

"Solar Market Transformation," presented October 29, 2010 at the Solar Market Transformation Conference in Normal, IL.

"Economic Impacts; Public Beliefs and Opinions," presented with Matt Aldeman October 28, 2010 at the Illinois Association of Illinois County Zoning Officials Annual Seminar in Utica, IL.

"Wind Energy Development in Illinois," presented with Matt Aldeman October 28, 2010 at the Illinois Association of Illinois County Zoning Officials Annual Seminar in Utica, IL.

"Latest Trends in Wind Energy," presented September 30, 2010 at the Soil and Water Conservation District Wind Farm Workshop in Normal, IL.

Presentations (cont'd)

"Understanding the Economic Impact of Wind Energy in Illinois," presented September 20, 2010 at the Third Annual Meeting of the Great Lakes Wind Collaborative in Cleveland, OH.

"Economic Impact of Wind Energy in Illinois," presented July 28, 2010 at the Livingston County Zoning Board of Appeals Hearing in Pontiac, IL.

"Renewable Energy," presented July 26, 2010 at the Children's Discovery Museum in Normal, IL.

"Economic Impact of Wind Energy in Illinois," presented July 22, 2010 at the AgriEnergy Conference in Champaign, IL.

"Renewable Energy Major at ISU," presented July 21, 2010 at Green Universities and Colleges Subcommittee Webinar.

"Center for Renewable Energy Research," presented July 15, 2010 at the Advancing Wind Power in Illinois Conference in Peoria, IL.

"Economic Impact of Wind Energy in Illinois," presented June 22, 2010 at the GLWC Presents: JEDI Analysis in the Great Lakes Webinar.

"From Wind Farms to Residential Wind and Solar: What's Happening in Illinois?," presented June 10, 2010 at the Eastern Illini Electric Cooperative Annual Meeting in Paxton, IL.

"Economics of Wind Energy," presented May 19, 2010 at the U.S. Green Building Council meeting in Chicago, IL.

"Economic Costs and Benefits of Wind Energy," presented May 7, 2010 at the Rockford Area Realtors Association meeting in Rockford, IL.

"Forecasting: A Primer for the Small Business Entrepreneur," presented with James E. Cox, Jr. April 14, 2010 at the Allied Academies' Spring International Conference in New Orleans, LA.

"Wind Energy 101," presented March 10, 2010 at Peoria Christian School in Peoria, IL and March 30, 2010 at the Illinois State University Presidential Scholars Symposium in Normal, IL.

"Are Renewable Portfolio Standards a Policy Cure-All? A Case Study of Illinois' Experience," presented January 30, 2010 at the 2010 William and Mary Environmental Law and Policy Review Symposium in Williamsburg, VA.

"Creating Partnerships between Universities and Industry," presented November 19, 2009, at New Ideas in Educating a Workforce in Renewable Energy and Energy Efficiency in Albany, NY.

Presentations (cont'd)

"Educating Illinois in Renewable Energy, presented November 14, 2009 at the Illinois Science Teachers Association in Peoria, IL.

"Green Collar Jobs," invited presentation October 14, 2009 at the 2009 Workforce Forum in Peoria, IL.

"Economic Impact of Wind Energy in Illinois," presented August 11, 2009 at the AgriEnergy Conference in Champaign, IL.

"Economic Impact of Wind Energy in Illinois," presented July 16, 2009 at the Advancing Wind Power in Illinois Conference in Bloomington, IL.

"Illinois Wind Working Group," presented July 15, 2009 at the Advancing Wind Power in Illinois Conference in Bloomington, IL.

"Wind Energy," presented June 11, 2009 at State Farm Insurance Lunch 'n Learn in Bloomington, IL.

"Illinois Wind and Economic Development," with Wayne Hartel, presented June 4, 2009 at the Great Lakes Wind Collaborative Economic Development Group Webinar.

"The Economic Benefits of Wind Farms," presented May, 21, 2009 at the Central Illinois Economic Development Council Meeting in Normal, IL.

"The Role of Wind Power in Illinois," presented March 4, 2009 at the Association of Illinois Electric Cooperatives Engineering Seminar in Springfield, IL.

"The Economic Benefits of Wind Farms," presented January 30, 2009 at the East Central Illinois Economic Development District Meeting in Champaign, IL.

"Wind Energy 101," presented January 7, 2009 at the Northern Illinois Farm Show in DeKalb, Illinois.

"Green Collar Jobs in Illinois," presented January 6, 2009 at the Illinois Workforce Investment Board Meeting in Macomb, Illinois.

"Wind Energy 101," presented December 16, 2008 at the Landowner's Forum in Monmouth, Illinois; January 23, 2009 in Manito, IL; February 13, 2009 in Champaign, IL and Pontiac, IL; March 16, 2009 in Monmouth, IL; June 15, 2009 in Jacksonville, IL; October 7, 2009 in Chicago, IL; October 7, in Lemont, IL; November 9, 2009 in Ottawa, IL; December 9, 2009 in Pontiac, IL.

"Wind Energy 101," presented September 4, 2008 at the Chillicothe Rotary, Chillicothe, Illinois.

Presentations (cont'd)

"Green Collar Jobs: What Lies Ahead for Illinois?" presented August 1, 2008 at the Illinois Employment and Training Association Conference.

"Wind Energy: What Lies Ahead for Illinois?" presented June 26, 2008 at the Advancing Wind Power in Illinois 2008 Conference.

"Mapping Broadband Access in Illinois," presented October 16, 2007 at the Rural Telecon '07 conference.

"A Managerial Approach to Using Error Measures to Evaluate Forecasting Methods," presented October 15, 2007 at the International Academy of Business and Economics.

"Wind Energy: Is It Right For Illinois?" presented October 10, 2007 to DeKalb County Farm Bureau.

"Dollars and Sense: The Pros and Cons of Renewable Fuel," presented October 18, 2006 at Illinois State University Faculty Lecture Series.

"Broadband Access in Illinois," presented July 28, 2006 at the Illinois Association of Regional Councils Annual Meeting.

"Broadband Access in Illinois," presented November 17, 2005 at the University of Illinois' Connecting the e to Rural Illinois.

"Electricity, Natural Gas and Telecommunications," presented November 7, 2005 at Illinois Wesleyan University.

"Improving Forecasting Through Textbooks – A 25 Year Review," with James E. Cox, Jr., presented June 14, 2005 at the 25th International Symposium on Forecasting.

"Telecommunications Demand Forecasting with Intermodal Competition, with Christopher Swann, presented April 2, 2004 at the Telecommunications Systems Management Conference 2004.

Wind Energy at Illinois State University" presented March 4, 2004 at University of Illinois' Urban Planning Institute.

"Intermodal Competition," with Christopher Swann, presented April 3, 2003 at the Telecommunications Systems Management Conference 2003.

"Lectora Versus Presenter: Student and Instructor Reactions," presented March 26, 2003 at the Illinois State University Conference on Teaching with Technology.

Presentations (cont'd)

"Intermodal Competition in Local Exchange Markets," with Christopher Swann, presented June 26, 2002 at the 20th Annual International Communications Forecasting Conference.

"Assessing Retail Competition," presented May 23, 2002 at the Institute for Regulatory Policy Studies' Illinois Energy Policy for the 21st Century workshop.

"Tips, Tricks and Techniques for Telecom Forecasters," presented June 28, 2001 at the 19th Annual International Communications Forecasting Conference.

"The Devil in the Details: An Analysis of Default Service and Switching," with Eric Malm presented May 24, 2001 at the 20th Annual Advanced Workshop on Regulation and Competition.

"Resources for Forecasters," presented September 28, 2000 at the 18th Annual International Communications Forecasting Conference, Seattle, WA.

"Forecasting Challenges for U.S. Telecommunications with Local Competition," presented June 28, 1999 at the 19th International Symposium on Forecasting.

"Acceptance of Forecasting Principles in Forecasting Textbooks," presented June 28, 1999 at the 19th International Symposium on Forecasting.

"Forecasting Challenges for Telecommunications With Local Competition," presented June 17, 1999 at the 17th Annual International Communications Forecasting Conference.

"Measures of Market Competitiveness in Deregulating Industries," with Eric Malm, presented May 28, 1999 at the 18th Annual Advanced Workshop on Regulation and Competition.

"Trends in Telecommunications Forecasting and the Impact of Deregulation," Proceedings of EPRI's 11th Forecasting Symposium, 1998.

"Forecasting in a Competitive Age: Utilizing Macroeconomic Forecasts to Accurately Predict the Demand for Services," invited speaker, Institute for International Research Conference, September 29, 1997.

"Who Can you Trust? Using the Best Macroeconomic Forecasts," and **"What's on the Internet in Telecommunications and Forecasting?"** presented June 26, 1997 at the 1997 International Communications Forecasting Conference.

"Regulatory Fairness and Local Competition Pricing," presented May 30, 1996 at the 15th Annual Advanced Workshop in Regulation and Public Utility Economics.

"Optimal Pricing For Special Access Demand," presented July 8, 1993 at the 1993 National Telecommunications Forecasting Conference.

Presentations (cont'd)

"Optimal Pricing For a Regulated Monopolist Facing New Competition: The Case of Bell Atlantic Special Access Demand," presented May 28, 1992 at the Rutgers Advanced Workshop in Regulation and Public Utility Economics.

"The FCC Price Cap Proposal: A Fairness Analysis," presented October 26, 1989 at the 1989 Business Research Conference.

"The Fairness of Price Cap Regulation," presented April 14, 1989 at the Rutgers Advanced Workshop in Regulation and Public Utility Economics.

Grants

"SmartGrid for Schools 2015," with William Hunter and Matt Aldeman, Illinois Science and Energy Innovation Foundation, February 2015, \$400,000.

"Partnership with Midwest Renewable Energy Association for Solar Market Pathways" with Missy Nergard and Jin Jo, U.S. Department of Energy Award Number DE-EE0006910, October, 2014, \$109,469 (ISU Award amount).

"Renewable Energy for Schools," with Matt Aldeman and Jin Jo, Illinois Department of Commerce and Economic Opportunity, Award Number 14-025001, June, 2014, \$130,001.

"SmartGrid for Schools 2014," with William Hunter and Matt Aldeman, Illinois Science and Energy Innovation Foundation, RSP # 14B116, March 2014, \$451,701.

"WINDPOWER 2014 Conference Exhibit," Illinois Department of Commerce and Economic Opportunity, RSP #14C167, March, 2014, \$95,000.

"Lake Michigan Offshore Wind Energy Buoy," with Matt Aldeman, Illinois Clean Energy Community Foundation, Request ID 6435, November, 2013, \$90,000.

"Teaching Next Generation Energy Concepts with Next Generation Science Standards," with William Hunter, Matt Aldeman and Amy Bloom, Illinois State Board of Education, RSP # 13B170A, October, 2013, second year, \$159,954; amended to \$223,914.

"Solar for Schools," with Matt Aldeman, Illinois Green Economy Network, RSP # 13C280, August, 2013, \$66,072.

"Energy Learning Exchange Implementation Grant," with William Hunter and Matt Aldeman, Illinois Department of Commerce and Economic Opportunity, Award Number 13-052003, June, 2013, \$350,000.

Grants (cont'd)

"Teaching Next Generation Energy Concepts with Next Generation Science Standards," with William Hunter, Matt Aldeman and Amy Bloom, Illinois State Board of Education, RSP # 13B170, April, 2013, \$159,901.

"Illinois Sustainability Education SEP," Illinois Department of Commerce and Economic Opportunity, Award Number 08-431006, March, 2013, \$225,000.

"Illinois Pathways Energy Learning Exchange Planning Grant," with William Hunter and Matt Aldeman, Illinois State Board of Education (Source: U.S. Department of Education), RSP # 13A007, December, 2012, \$50,000.

"Illinois Sustainability Education SEP," Illinois Department of Commerce and Economic Opportunity, Award Number 08-431005, June 2011, amended March, 2012, \$98,911.

"Wind for Schools Education and Outreach," with Matt Aldeman, Illinois Department of Commerce and Economic Opportunity, Award Number 11-025001, amended February, 2012, \$111,752.

"A Proposal to Support Solar Energy Potential and Job Creation for the State of Illinois Focused on Large Scale Photovoltaic System," with Jin Jo (lead PI), Illinois Department of Commerce and Economic Opportunity, Award Number 12-025001, January 2012, \$135,000.

"National Database of Utility Rates and Rate Structure," U.S. Department of Energy, Award Number DE-EE0005350TDD, 2011-2014, \$850,000.

"Illinois Sustainability Education SEP," Illinois Department of Commerce and Economic Opportunity, Award Number 08-431005, June 2011, \$75,000.

"Wind for Schools Education and Outreach," with Matt Aldeman, Illinois Department of Commerce and Economic Opportunity, Award Number 11-025001, March 2011, \$190,818.

"Using Informal Science Education to Increase Public Knowledge of Wind Energy in Illinois," with Amy Bloom and Matt Aldeman, Scott Elliott Cross-Disciplinary Grant Program, February 2011, \$13,713.

"Wind Turbine Market Research," with Matt Aldeman, Illinois Manufacturers Extension Center, May, 2010, \$4,000.

"Petco Resource Assessment," with Matt Aldeman, Petco Petroleum Co., April, 2010 amended August 2010 \$34,000; original amount \$18,000.

"Wind for Schools Education and Outreach," with Anthony Lombach and Matt Aldeman, Scott Elliott Cross-Disciplinary Grant Program, February, 2010, \$13,635.

Grants (cont'd)

"IGA IFA/ISU Wind Due Diligence," Illinois Finance Authority, November, 2009, \$8,580 amended December 2009; original amount \$2,860.

"Green Industry Business Development Program, with the Shaw Group and Illinois Manufacturers Extension Center, Illinois Department of Commerce and Economic Opportunity, Award Number 09-021007, August 2009, \$245,000.

"Wind Turbine Workshop Support," Illinois Department of Commerce and Economic Opportunity, June 2009, \$14,900.

"Illinois Wind Workers Group," with Randy Winter, U.S. Department of Energy, Award Number DE-EE0000507, 2009-2011, \$107,941.

"Wind Turbine Supply Chain Study," with J. Lon Carlson and James E. Payne, Illinois Department of Commerce and Economic Opportunity, Award Number 09-021003, April 2009, \$125,000.

"Renewable Energy Team Travel to American Wind Energy Association WindPower 2009 Conference, Center for Mathematics, Science and Technology, February 2009, \$3,005.

"Renewable Energy Educational Lab Equipment," with Randy Winter and David Kennell, Illinois Clean Energy Community Foundation (peer-reviewed), February, 2008, \$232,600.

"Proposal for New Certificate Program in Electricity, Natural Gas and Telecommunications Economics," with James E. Payne, Extended Learning Program Grant, April, 2007, \$29,600.

"Illinois Broadband Mapping Study," with J. Lon Carlson and Rajeev Goel, Illinois Department of Commerce and Economic Opportunity, Award Number 06-205008, 2006-2007, \$75,000.

"Illinois Wind Energy Education and Outreach Project," with David Kennell and Randy Winter, U.S. Department of Energy, Award Number DE-FG36-06GO86091, 2006-2010, \$990,000.

"Wind Turbine Installation at Illinois State University Farm," with Doug Kingman and David Kennell, Illinois Clean Energy Community Foundation (peer-reviewed), May, 2004, \$500,000.

"Illinois State University Wind Measurement Project," Doug Kingman and David Kennell, Illinois Clean Energy Community Foundation (peer-reviewed), with August, 2003, \$40,000.

"Illinois State University Wind Measurement Project," with Doug Kingman and David Kennell, NEG Micon matching contribution, August, 2003, \$65,000.

Grants (cont'd)

"Distance Learning Technology Program," Illinois State University Faculty Technology Support Services, Summer 2002, \$3,000.

"Providing an Understanding of Telecommunications Technology By Incorporating Multimedia into Economics 235," Instructional Technology Development Grant (peer-reviewed), January 15, 2001, \$1,400.

"Using Real Presenter to create a virtual tour of GTE's Central Office," with Jack Chizmar, Instructional Technology Literacy Mentoring Project Grant (peer-reviewed), January 15, 2001, \$1,000.

"An Empirical Study of Telecommunications Industry Forecasting Practices," with James E. Cox, College of Business University Research Grant (peer-reviewed), Summer, 1999, \$6,000.

"Ownership Form and the Efficiency of Electric Utilities: A Meta-Analytic Review" with L. Dean Hiebert, *Institute for Regulatory Policy Studies* research grant (peer-reviewed), August 1998, \$6,000.

Total Grants: \$6,331,913

External Funding

Corporate Funding for Institute for Regulatory Policy Studies, Ameren (\$7,500), Alliance Pipeline (\$7,500); Aqua Illinois (\$7,500); AT&T (\$7,500); Commonwealth Edison (\$7,500); Exelon/Constellation NewEnergy (\$7,500); Illinois American Water (\$7,500) ITC Holdings (\$7,500); Midcontinent ISO (\$7,500); NICOR Energy (\$7,500); People Gas Light and Coke (\$7,500); PJM Interconnect (\$7,500); Fiscal Year 2015, \$90,000 total.

Corporate Funding for Energy Learning Exchange, Calendar Year 2014, \$55,000.

Workshop Surplus for Institute for Regulatory Policy Studies, with Adrienne Ohler, Fiscal Year 2014, \$12,381.

Corporate Funding for *Institute for Regulatory Policy Studies*, Ameren (\$7,500), Alliance Pipeline (\$7,500); Aqua Illinois (\$7,500); AT&T (\$7,500); Commonwealth Edison (\$7,500); Constellation NewEnergy (\$7,500); Illinois American Water (\$7,500) ITC Holdings (\$7,500); Midwest Energy Efficiency Alliance (\$4,500); Midwest Generation (\$7,500); MidWest ISO (\$7,500); NICOR Energy (\$7,500); People Gas Light and Coke (\$7,500); PJM Interconnect (\$7,500); Fiscal Year 2014, \$102,000 total.

Corporate Funding for Energy Learning Exchange, Calendar Year 2013, \$53,000.

Workshop Surplus for Institute for Regulatory Policy Studies, with Adrienne Ohler, Fiscal Year 2013, \$17,097.

Corporate Funding for *Institute for Regulatory Policy Studies*, Ameren (\$7,500), Alliance Pipeline (\$7,500); Aqua Illinois (\$7,500); AT&T (\$7,500); Commonwealth Edison (\$7,500); Constellation NewEnergy (\$7,500); Illinois American Water (\$7,500) ITC Holdings (\$7,500); Midwest Generation (\$7,500); MidWest ISO (\$7,500); NICOR Energy (\$7,500); People Gas Light and Coke (\$7,500); PJM Interconnect (\$7,500); Fiscal Year 2013, \$97,500 total.

Corporate Funding for Illinois Wind Working Group, Calendar Year 2012, \$29,325.

Workshop Surplus for Institute for Regulatory Policy Studies, with Adrienne Ohler, Fiscal Year 2012, \$16,060.

Corporate Funding for *Institute for Regulatory Policy Studies*, Alliance Pipeline (\$7,500); Aqua Illinois (\$7,500); AT&T (\$7,500); Commonwealth Edison (\$7,500); Constellation NewEnergy (\$7,500); Illinois American Water (\$7,500) ITC Holdings (\$7,500); Midwest Generation (\$7,500); MidWest ISO (\$7,500); NICOR Energy (\$7,500); People Gas Light and Coke (\$7,500); PJM Interconnect (\$7,500); Fiscal Year 2012, \$90,000 total.

External Funding (cont'd)

Corporate Funding for Illinois Wind Working Group, Calendar Year 2011, \$57,005.

Workshop Surplus for Institute for Regulatory Policy Studies, with Adrienne Ohler, Fiscal Year 2011, \$13,562.

Corporate Funding for *Institute for Regulatory Policy Studies*, Alliance Pipeline (\$7,500); Aqua Illinois (\$7,500); AT&T (\$7,500); Commonwealth Edison (\$7,500); Constellation NewEnergy (\$7,500); Illinois American Water (\$7,500) ITC Holdings (\$7,500); Midwest Generation (\$7,500); MidWest ISO (\$7,500); NICOR Energy (\$7,500); People Gas Light and Coke (\$7,500); PJM Interconnect (\$7,500); Fiscal Year 2011, \$90,000 total.

Corporate Funding for *Center for Renewable Energy*, Calendar Year 2010, \$50,000.

Corporate Funding for *Illinois Wind Working Group*, Calendar Year 2010, \$49,000.

Workshop Surplus for *Institute for Regulatory Policy Studies*, with Lon Carlson, Fiscal Year 2010, \$17,759.

Corporate Funding for *Institute for Regulatory Policy Studies*, Alliance Pipeline (\$7,500); Ameren (\$7,500); AT&T (\$7,500); Commonwealth Edison (\$7,500); Constellation NewEnergy (\$7,500); ITC Holdings (\$7,500); Midwest Generation (\$7,500); MidWest ISO (\$7,500); NICOR Energy (\$7,500); People Gas Light and Coke (\$7,500); PJM Interconnect (\$7,500); Fiscal Year 2010, \$82,500 total.

Corporate Funding for *Illinois Wind Working Group*, Calendar Year 2009, \$57,140.

Workshop Surplus for *Institute for Regulatory Policy Studies*, with Lon Carlson, Fiscal Year 2009, \$21,988.

Corporate Funding for *Institute for Regulatory Policy Studies*, Alliance Pipeline (\$7,500); Ameren (\$7,500); AT&T (\$7,500); Commonwealth Edison (\$7,500); Constellation NewEnergy (\$7,500); MidAmerican Energy (\$7,500); Midwest Generation (\$7,500); MidWest ISO (\$7,500); NICOR Energy (\$7,500); People Gas Light and Coke (\$7,500); PJM Interconnect (\$7,500); Fiscal Year 2009, \$82,500 total.

Corporate Funding for *Center for Renewable Energy*, Calendar Year 2008, \$157,500.

Corporate Funding for *Illinois Wind Working Group*, Calendar Year 2008, \$38,500.

External Funding (cont'd)

Workshop Surplus for *Institute for Regulatory Policy Studies*, with Lon Carlson, Fiscal Year 2008, \$28,489.

Corporate Funding for *Institute for Regulatory Policy Studies*, Alliance Pipeline (\$5,000); Ameren (\$5,000); AT&T (\$5,000); Commonwealth Edison (\$5,000); Constellation NewEnergy (\$5,000); MidAmerican Energy (\$5,000); Midwest Generation (\$5,000); MidWest ISO (\$5,000); NICOR Energy (\$5,000); Peabody Energy (\$5,000), People Gas Light and Coke (\$5,000); PJM Interconnect (\$5,000); Fiscal Year 2008, \$60,000 total.

Corporate Funding for *Illinois Wind Working Group*, Calendar Year 2007, \$16,250.

Workshop Surplus for *Institute for Regulatory Policy Studies*, with Lon Carlson, Fiscal Year 2007, \$19,403.

Corporate Funding for *Institute for Regulatory Policy Studies*, AARP (\$3,000), Alliance Pipeline (\$5,000), Ameren (\$5,000); Citizens Utility Board (\$5,000); Commonwealth Edison (\$5,000); Constellation NewEnergy (\$5,000); MidAmerican Energy (\$5,000); Midwest Generation (\$5,000); MidWest ISO (\$5,000); NICOR Energy (\$5,000); Peabody Energy (\$5,000), People Gas Light and Coke (\$5,000); PJM Interconnect (\$5,000); SBC (\$5,000); Verizon (\$5,000); Fiscal Year 2007, \$73,000 total.

Workshop Surplus for *Institute for Regulatory Policy Studies*, with Lon Carlson, Fiscal Year 2006, \$13,360.

Corporate Funding for *Institute for Regulatory Policy Studies*, AARP (\$1,500), Alliance Pipeline (\$2,500), Ameren (\$5,000); Citizens Utility Board (\$5,000); Commonwealth Edison (\$5,000); Constellation NewEnergy (\$5,000); DTE Energy (\$5,000); MidAmerican Energy (\$5,000); Midwest Generation (\$5,000); MidWest ISO (\$5,000); NICOR Energy (\$5,000); Peabody Energy (\$2,500), People Gas Light and Coke (\$5,000); PJM Interconnect (\$5,000); SBC (\$5,000); Verizon (\$5,000); Fiscal Year 2006, \$71,500 total.

Workshop Surplus for *Institute for Regulatory Policy Studies*, with L. Dean Hiebert, Fiscal Year 2005, \$12,916.

Corporate Funding for *Institute for Regulatory Policy Studies*, with L. Dean Hiebert, AmerenCIPS (\$5,000); Citizens Utility Board (\$5,000); Commonwealth Edison (\$5,000); Constellation NewEnergy (\$5,000); Illinois Power (\$5,000); MidAmerican Energy (\$5,000); Midwest Generation (\$5,000); MidWest ISO (\$5,000); NICOR Energy (\$5,000); People Gas Light and Coke (\$5,000); PJM Interconnect (\$5,000); SBC (\$2,500); Verizon (\$2,500); Fiscal Year 2005, \$60,000 total.

External Funding (cont'd)

Workshop Surplus for *Institute for Regulatory Policy Studies*, with L. Dean Hiebert, Fiscal Year 2004, \$17,515.

Corporate Funding for *Institute for Regulatory Policy Studies*, with L. Dean Hiebert, AmerenCIPS (\$5,000); Commonwealth Edison (\$5,000); Constellation NewEnergy (\$5,000); Illinois Power (\$5,000); MidAmerican Energy (\$5,000); Midwest Generation (\$5,000); NICOR Energy (\$5,000); People Gas Light and Coke (\$5,000); PJM Interconnect (\$5,000); Fiscal Year 2004, \$45,000 total.

Workshop Surplus for *Institute for Regulatory Policy Studies*, with L. Dean Hiebert, Fiscal Year 2003, \$8,300.

Corporate Funding for *Institute for Regulatory Policy Studies*, with L. Dean Hiebert, AmerenCIPS (\$5,000); AT&T (\$2,500); Commonwealth Edison (\$5,000); Illinois Power (\$5,000); MidAmerican Energy (\$5,000); NICOR Energy (\$5,000); People Gas Light and Coke (\$5,000); Fiscal Year 2003, \$32,500 total.

Workshop Surplus for *Institute for Regulatory Policy Studies*, with L. Dean Hiebert, Calendar Year 2002, \$15,700.

Corporate Funding for *Institute for Regulatory Policy Studies*, with L. Dean Hiebert, AmerenCIPS (\$2,500); AT&T (\$5,000); Commonwealth Edison (\$2,500); Illinois Power (\$2,500); MidAmerican Energy (\$2,500); NICOR Energy (\$2,500); People Gas Light and Coke (\$2,500); Calendar Year 2002, \$17,500 total.

Corporate Funding for *International Communications Forecasting Conference*, National Economic Research Associates (\$10,000); Taylor Nelson Sofres Telecoms (\$10,000); Calendar Year 2002, \$20,000 total

Corporate Funding for *Institute for Regulatory Policy Studies*, with L. Dean Hiebert, AmerenCIPS (\$5,000); AT&T (\$5,000); Commonwealth Edison (\$5,000); Illinois Power (\$5,000); MidAmerican Energy (\$5,000); NICOR Energy (\$5,000); People Gas Light and Coke (\$5,000); Calendar Year 2001, \$35,000 total.

Workshop Surplus for *Institute for Regulatory Policy Studies*, with L. Dean Hiebert, Calendar Year 2001, \$19,400.

Corporate Funding for *International Communications Forecasting Conference*, National Economic Research Associates (\$10,000); Taylor Nelson Sofres Telecoms (\$10,000); SAS Institute (\$10,000); Calendar Year 2001, \$30,000 total.

Corporate Funding for *Institute for Regulatory Policy Studies*, with L. Dean Hiebert, AmerenCIPS (\$5,000); AT&T (\$5,000); Commonwealth Edison (\$5,000); Illinois Power (\$5,000); MidAmerican Energy (\$5,000); NICOR Energy (\$5,000); People Gas Light and Coke (\$5,000); Calendar Year 2000, \$35,000 total.

External Funding (cont'd)

Workshop Surplus for *Institute for Regulatory Policy Studies*, with L. Dean Hiebert, Calendar Year 2000, \$20,270.

Corporate Funding for *International Communications Forecasting Conference*, National Economic Research Associates (\$10,000); Taylor Nelson Sofres Telecoms (\$10,000); Calendar Year 2000, \$20,000 total.

Corporate Funding for *Institute for Regulatory Policy Studies*, with L. Dean Hiebert, AmerenCIPS (\$5,000); AT&T (\$5,000); Commonwealth Edison (\$5,000); Illinois Power (\$5,000); MidAmerican Energy (\$5,000); NICOR Energy (\$5,000); People Gas Light and Coke (\$5,000); Calendar Year 1999, \$35,000 total.

Workshop Surplus for *Institute for Regulatory Policy Studies*, with L. Dean Hiebert, Calendar Year 1999, \$10,520.

Corporate Funding for *International Communications Forecasting Conference*, National Economic Research Associates (\$10,000); PNR Associates (\$10,000); Calendar Year 1999, \$20,000 total.

Corporate Funding for *Institute for Regulatory Policy Studies*, with L. Dean Hiebert, AmerenCIPS (\$5,000); CILCO (\$5,000); Commonwealth Edison (\$5,000); Illinois Power (\$5,000); MidAmerican Energy (\$5,000); People Gas Light and Coke (\$5,000); Calendar Year 1998, \$30,000 total.

Workshop Surplus for *Institute for Regulatory Policy Studies*, with L. Dean Hiebert, Calendar Year 1998, \$44,334.

Corporate Funding for *International Communications Forecasting Conference*, National Economic Research Associates (\$10,000); PNR Associates (\$10,000); Calendar Year 1998, \$20,000 total.

Corporate Funding for *Institute for Regulatory Policy Studies*, with L. Dean Hiebert, AmerenCIPS (\$5,000); CILCO (\$5,000); Commonwealth Edison (\$5,000); Illinois Power (\$5,000); MidAmerican Energy (\$5,000); People Gas Light and Coke (\$5,000); Calendar Year 1997, \$30,000 total.

Workshop Surplus for *Institute for Regulatory Policy Studies*, with L. Dean Hiebert, Calendar Year 1997, \$19,717.

Total External Funding: \$2,170,491

Exhibit #11



ecology and environment, inc.

Global Environmental Specialists

33 West Monroe Street, Suite 1410
Chicago, Illinois 60603
Tel: (312) 578-9243, Fax: (312) 578-9345

Mr. Greg Elko
E.ON Climate & Renewables
353 N. Clark Street, 30th Floor
Chicago, IL 60654

Re: Twin Forks Wind Farm Illinois Department of Natural Resources EcoCAT Review #1409713 Response

Dear Mr. Elko:

In a letter dated May 19, 2015, Mr. Keith Shank, from the Illinois Department of Natural Resources provided a letter to Ms. Jennifer Hoffman, Director of the Macon County Planning and Zoning Department, regarding consultation for the E.ON Twin Forks Wind Energy Facility pursuant to the Illinois Endangered Species Protection Act (EcoCAT Review #1409713). Within Mr. Shank's letter he noted that "The portion of the proposed facility within Macon County is not in the vicinity of any existing records of occurrence of State-listed endangered or threatened species, Illinois Natural Areas Inventory Sites, or Illinois Nature Preserves which could be affected by the construction and operation of such a facility." Further he confirmed that "The applicant performed avian surveys of the project area in 2011 to assess its use as habitat by migratory birds and found no unusual concentrations or species atypical of the agricultural habitat which is available." and that "...based on available information, a wind energy facility in this location poses no unusual avian risk..."

Despite the low environmental risk the site poses to wildlife, including state-listed endangered or threatened species, and environmental resources, Mr. Shank had nine recommendations, some of which have already been addressed and others which we do not believe are necessary or applicable to reducing the environmental impact of the Project.

Recommendation #1: *The Department recommends the County consider a requirement the applicant provide evidence of consultation with the U. S. Fish & Wildlife Service regarding potential effects of the proposed action to the Bald Eagle and Golden Eagle.*

The Applicant has coordinated with the USFWS regarding known Bald and Golden Eagle nests in the vicinity of the Project. The most recent correspondence with USFWS related to this issue was on March 13, 2014, where USFWS determined that the nearest Bald Eagle nest locations were at Clinton Lake, east of the town of Clinton, and southwest of the town of Decatur, along the Sangamon River. The email documenting this correspondence is attached.

Recommendation #2: *The Department recommends the County consider a requirement the applicant perform at least one year (March through October) of post-construction avian mortality monitoring to*

detect any unexpected degree of loss, and provide a report of the results to both the County and the Department.

Through coordination with USFWS and preparation of a Bird and Bat Conservation Strategy (BBCS), the Applicant has committed to two years of post-construction monitoring for avian and bat mortality at the site. The mortality monitoring surveys will be conducted between April 1 and September 30. The post-construction monitoring protocol is provided in the attached BBCS. Based on regional trends and site-specific data collected during the pre-construction survey effort where late April (April 20, 2011) and late September (September 27, 2011) were found to be the peak of spring and fall passerine migration (see survey results in BBCS), the Applicant believes that April through September is the most appropriate time period to conduct the mortality monitoring effort.

Recommendation #3: The Department recommends the County consider a requirement for the applicant to feather wind turbines whenever wind speeds fall below manufacturer's recommended cut-in speed between April 1 and October 31 annually.

As specified in the BBCS, the Applicant has committed to feathering turbines up to the manufacturers cut-in speed from sunset to sunrise throughout the year.

Recommendation #4: The Department recommends the County consider a requirement for the applicant to feather wind turbines between sunset and sunrise at wind speeds below 5.0 meters per second whenever temperatures rise above 15°C between the dates of July 15 and October 15 annually.

In addition to feathering turbines up to the manufacturers cut-in speed throughout the year, the Applicant has also committed to feathering the turbines from sunset to sunrise during the fall migratory season for bats (August 1- September 30) until wind speeds reach 6.9 meters per second (m/s), regardless of the ambient temperature. The bat acoustic monitoring data collected at the site shows that bat activity peaked between July 21 and August 10, 2011 with a smaller peak in late September (see BBCS for survey result details). Considering the results of the site-specific bat acoustic monitoring data the Applicant believes that the August through September period is the most effective time period for curtailment in order to minimize bat fatalities.

Recommendation #5: The Department recommends the County consider a requirement for the applicant to perform post-construction bat mortality monitoring between July 1 and October 30 annually for three years, providing annual reports of the results to both the County and to the Department.

Per the BBCS, the Applicant has committed to conducting baseline post-construction bat mortality monitoring at the site for a period of two years, between April 1 and September 30. Follow-up monitoring will then be conducted every five years after the completion of the baseline monitoring period, for the life of the Project. The Applicant believes that two years of post-construction mortality monitoring data is enough to establish a baseline for bat mortality at the Project and that a third year is unnecessary, especially in light of the continued monitoring that will be conducted at the site every five years throughout the life of the Project. As explained as part of Recommendation #4, the pre-construction bat acoustic monitoring data shows that the period of greatest bat activity at the site occurs between late July and early August, with a

smaller peak in late September. As such, that period poses the greatest risk for bat mortality, therefore the Applicant believes post-construction mortality monitoring through the end of September is sufficient to document bat mortality for the Project.

Recommendation #6: *The Department recommends the County consider a requirement for the applicant to promptly repair damaged field tiles to maintain the thermal regime of local streams.*

As has been negotiated with all Project landowners, any agricultural drainage tile located underneath construction stage areas, access lanes, driveways, and substations shall be replaced properly if damaged during construction. Permanent repairs will be made within 14 days of the tile damage provided that weather and soil conditions are suitable; if conditions are not suitable within that time, a temporary tile repair will be made. Immediate temporary repair will be made if water is flowing through any damaged tile line.

Recommendation #7: *The Department recommends the County consider a requirement for the applicant to conduct a biological trapping survey of the North Fork to determine the presence or absence of the State-listed threatened Mudpuppy Salamander, if possible prior to operation of the facility or during the first early winter season thereafter. If the species is present, periodic monitoring should follow to document any changes in population density.*

The Project will utilize best practices during construction to avoid impacts to North Fork. Therefore, the Project will not result in any stream impacts to North Fork, and is unnecessary for the Applicant to conduct surveys in North Fork to determine the presence or absence of the Mudpuppy Salamander as the species, even if present, will not be affected by construction or operation of the Project.

Recommendation #8: *The Department recommends the County consider a requirement for the applicant to characterize the aquatic acoustic environment of the North Fork prior to and during wind energy facility operations to quantify the facility's contribution to aquatic noise.*

Wind turbines in operation and even while static will create a broad spectrum of noise, including audible low-frequency, inaudible infrasonic, and microseismic vibrations, which are transmitted through the concrete turbine pad and into the ground or transduced through the air and into the ground. These below-grade acoustics may then potentially be transmitted into nearby waterbodies. The amplitude, frequency, sound pressure, and travel-distance of turbine-generated low-band waves have been documented to a limited extent, but the impacts, if any, they pose on wildlife, fish, and amphibian species are not widely known. A comprehensive review of available scientific literature, data, and research resulted in no published scientific studies documenting the effect of wind turbine acoustical emissions on fish or amphibian species. At this time, there appears to be no conclusive scientific documentation of wind turbines acoustical emissions affecting freshwater fish or amphibians.

While documentation of wind turbines affecting freshwater fish or amphibians have not occurred, biological studies have shown fishes to be receptive to low-frequency and infrasonic acoustics, even down to 1 Hz, and that the otolith organs are responsible for the fishes' detection of these acoustics. The low-frequency (20 to 250 Hz) and infrasonic (less than 20 Hz) acoustics produced by wind turbines are primarily caused by the aerodynamics of the turbines, and are

directly correlated to the frequency of the blade passage and from the wind passing around the turbine tower. These low and infrasonic frequencies travel the farthest of all acoustics produced, and in the 0.5-Hz range have been documented at distances up to and exceeding 10 km. In 2001, Enger et al.¹ showed that it is possible to create an acoustic fish barrier using infrasonic acoustics (i.e., 10 Hz); however, their research noted that a high-intensity source is needed to create this barrier, and this field is difficult to establish in a shallow water system (such as North Fork) where reflection off the water's surface and stream substrate decreases pressure attenuation across the water column. Enger et al. were attempting to create an infrasonic barrier by placing a submersible device directly in the water column of the stream. This device likely produced a higher-pressure acoustic wave than would be transmitted down the turbine tower's base, through the strata, and into the stream's water column.

Because of the lack of data and published studies analyzing the relationship between aquatic acoustic environments and turbine operation contributing to aquatic noise, it would be challenging to complete this characterization with scientific certainty due to the dynamic nature of the systems being studied.

Recommendation #9: *The Department recommends the County consider a requirement for the applicant to characterize the incidence of solar shadow-flicker on waters of the North Fork to identify those turbines which will contribute to this effect, as well as the time of day and day of the year they will do so.*

As part of the Macon County Special Use Permit application, the Applicant has completed a shadow flicker study to identify locations within the Project area where shadow flicker at residences would exceed 30 hours per year. The shadow flicker study shows that homes nearest the North Fork would not exceed 30 hours of shadow flicker per year. Shadow flicker has not been found to result in human health impacts but can be considered a nuisance, although that is subjective². There are no known studies documenting shadow flicker effects on wildlife, including aquatic species³. When conditions allow, the shadows would appear as moving dark areas on the surface of the water, similar to shadows from a swaying tree or a passing car along a bridge. As aquatic species in North Fork are mobile, it would be nearly impossible to quantify the amount of shadow flicker that the Mudpuppy Salamander's prey would be subjected to and therefore assess the impacts to the prey.

¹ Enger, P.S., F.R. Karlsen, O. Sand. 1993. Detection and Reaction of Fish to Infrasound. Published in ICES Journal of Marine Science; Mar. Sci. Symp., 196: 108-112. Available online at: <http://mit.biology.au.dk/images/Reaction%20infrasound.pdf>.

² Ellenbogen J.M., S. Grace, W.J. Heiger-Bernays, J.F. Manwell, D.A. Mills, K.A. Sullivan, and M.G. Weisskopf. 2012. Wind Turbine Health Impact Study: Report of Independent Expert Panel. Prepared for Massachusetts Department of Environmental Protection and Massachusetts Department of Public Health.

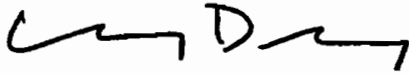
³ Lovich, J.E., and J.R. Edden, 2012. Assessing the State of Knowledge of Utility-Scale Wind Energy Development and Operation on non-Volant Terrestrial and Marine Wildlife. Publication of the United States Geological Survey (USGS), published in Applied Energy, Vol. 103. Available online at: https://profile.usgs.gov/myscience/upload_folder/ci2012Dec1411215633446Wind%20energy%20and%20wildlife%20Lovich%20and%20Edden.pdf. Accessed March 2014.

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If you have any questions about this response, please do not hesitate to contact me at (703) 522-6065 or by e-mail at cdohoney@ene.com. We look forward to continuing to support you on this project.

Sincerely,

ECOLOGY AND ENVIRONMENT, INC.

A handwritten signature in black ink, appearing to read 'C. Dohoney', with a stylized flourish at the end.

Courtney Dohoney
Project Manager

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From: Schorg, Amber [mailto:amber_schorg@fws.gov]
Sent: Thursday, March 13, 2014 11:11 AM
To: King, Bradford; Elko, Greg; Dohoney, Courtney; kday
Cc: Drew Becker
Subject: Bald Eagle Locations from our records

All,

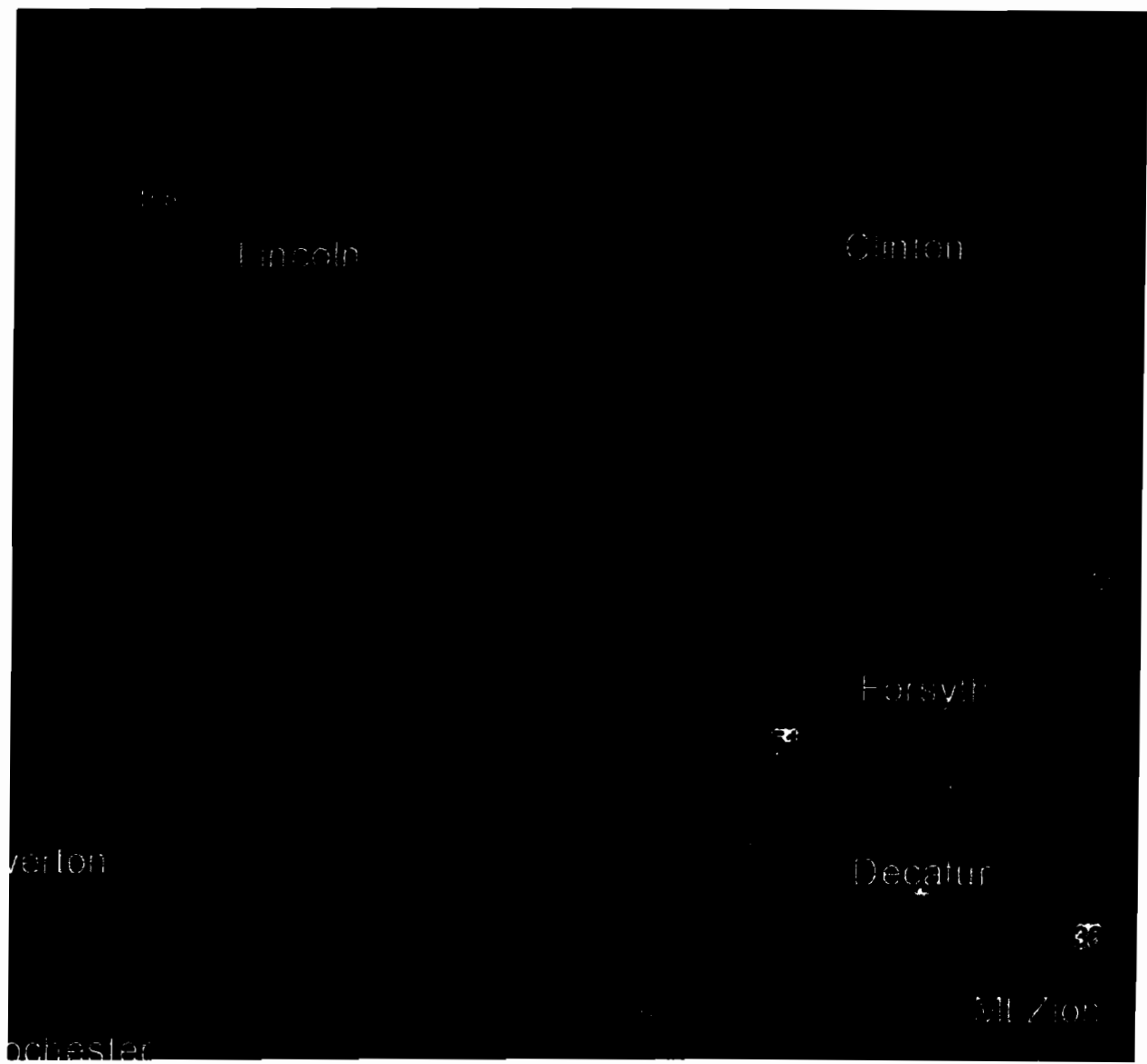
Attached are the general bald eagle nest locations in the Twin Forks project vicinity, for your information. It appears that both of these nests are well away from this project area, so our discussion of low eagle risk at the meeting certainly appears to be supported by this location data also. As I mentioned, I will share the information you provided today with Drew, and I will get back to you if we have any additional information or recommendations from a BGEPA perspective.

Thanks again,
Amber

Amber Schorg
U.S. Fish and Wildlife Service
Rock Island Ecological Services Field Office
1511 - 47th Ave
Moline, IL 61265
309-757-5800 x222
amber_schorg@fws.gov

*"To keep every cog and wheel is the first precaution of intelligent tinkering."
-Aldo Leopold, Round River*

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Lincoln

Clinton

Forsyth

verton

Decatur

Mt Zion

ochester

Wind Power GeoPlanner™

Microwave Study

Twin Forks Wind Farm



Prepared on Behalf of
E.ON
December 18, 2014



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1. Introduction

Microwave bands that may be affected by the installation of wind turbine facilities operate over a wide frequency range (900 MHz – 23 GHz). Comsearch has developed and maintains comprehensive technical databases containing information on licensed microwave networks throughout the United States. These systems are the telecommunication backbone of the country, providing long-distance and local telephone service, backhaul for cellular and personal communication service, data interconnects for mainframe computers and the Internet, network controls for utilities and railroads, and various video services. This report focuses on the potential impact of wind turbines on licensed, proposed and applied non-federal government microwave systems.

2. Project Overview

Project Information

Name: Twin Forks Wind Farm

County: Macon and DeWitt

State: Illinois

Number of Turbines: TBD

Blade Diameter: 110 meters

Hub Height: 95 meters

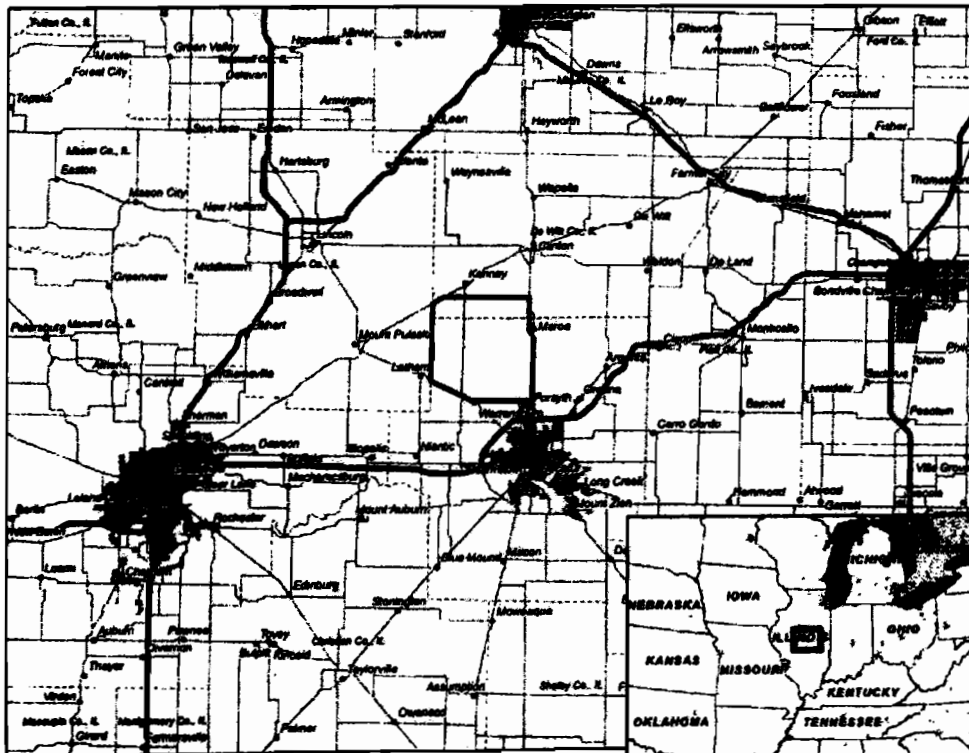


Figure 1: Area of Interest

3. Fresnel Zone Analysis

Methodology

Our obstruction analysis was performed using Comsearch's proprietary microwave database, which contains all non-government licensed, proposed and applied paths from 0.9 - 23 GHz¹. First, we determined all microwave paths that intersect the area of interest² and listed them in Table 1. These paths and the area of interest that encompasses the planned turbine locations are shown in Figure 2.

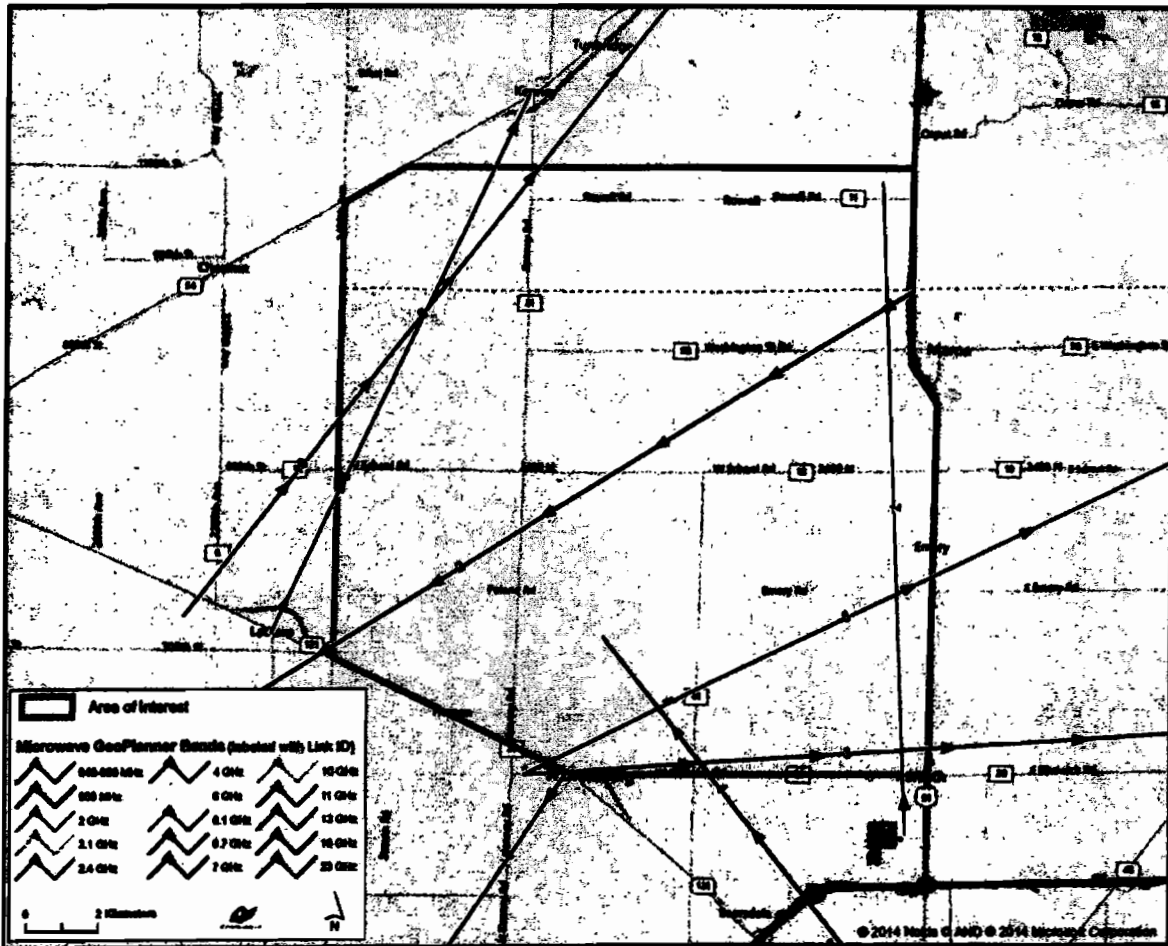


Figure 2: Microwave Paths that Intersect the Area of Interest

¹ Please note that this analysis does not include unlicensed microwave paths or federal government paths that are not registered with the FCC.

² We use FCC-licensed coordinates to determine which paths intersect the area of interest. It is possible that as-built coordinates may differ slightly from those on the FCC license.

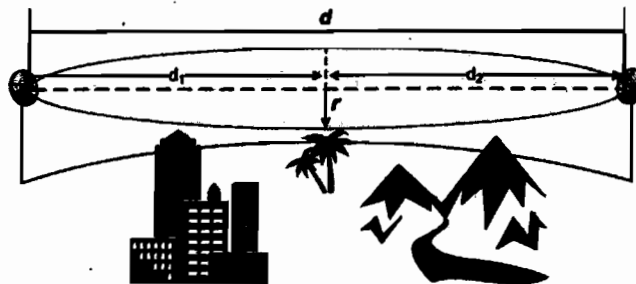
1	Licensed	KTZ93	RXONLY	7 GHz	50.52	WCS Licensee, LLC	23.24
2	Licensed	WKZ31	RXONLY	7 GHz	50.53	WCS Licensee, LLC	23.24
3	Licensed	WLDB45	RXONLY	7 GHz	21.06	GOCOM MEDIA OF ILLINOIS, LLC	15
4	Licensed	WPNF342	RXONLY	950 MHz	25.18	WDKR, INC	44.53
5	Licensed	WPTH538	RXONLY	7 GHz	32.24	GOCOM MEDIA OF ILLINOIS, LLC	18.56
6	Licensed	WQQV239	WQQV240	11 GHz	15.91	Essex Telecom, Inc.	10.31
7	Licensed	WQRG252	WQRC251	Lower 6 GHz	17.45	New Cingular Wireless PCS, LLC - IL	14.54
8	Licensed	WQUK876	WQSE876	11 GHz	13.75	Sprintcom, Inc	9.58
9	Proposed	WSX43	WPNC425	Lower 6 GHz	39.40	ComEd a.k.a. Commonwealth Edison	21.85
10	Licensed	WSX43	WPNC425	Upper 6 GHz	39.40	ComEd a.k.a. Commonwealth Edison	20.98

Table 1: Summary of Microwave Paths that Intersect the Area of Interest

(See enclosed *mw_geopl.xlsx* for more information and
GP_dict_matrix_description.xls for detailed field descriptions)

Next, we calculated a Fresnel Zone for each path based on the following formula:

$$r \approx 17.3 \sqrt{\frac{n}{F_{\text{GHz}}} \left(\frac{d_1 d_2}{d_1 + d_2} \right)}$$



Where,

- r = Fresnel Zone radius at a specific point in the microwave path, meters
- n = Fresnel Zone number, 1
- F_{GHz} = Frequency of microwave system, GHz
- d₁ = Distance from antenna 1 to a specific point in the microwave path, kilometers
- d₂ = Distance from antenna 2 to a specific point in the microwave path, kilometers

The calculated Fresnel Zone shows the narrow area of signal swath and is calculated for each microwave path in the project area. In general, this is the area where the planned wind turbines should be avoided, if possible. A depiction of the individual Fresnel Zones is shown in Figure 3, and is also included in the shapefiles^{3,4}.

³ The ESRI® shapefiles enclosed are in NAD 83 UTM Zone 16 projected coordinate system.

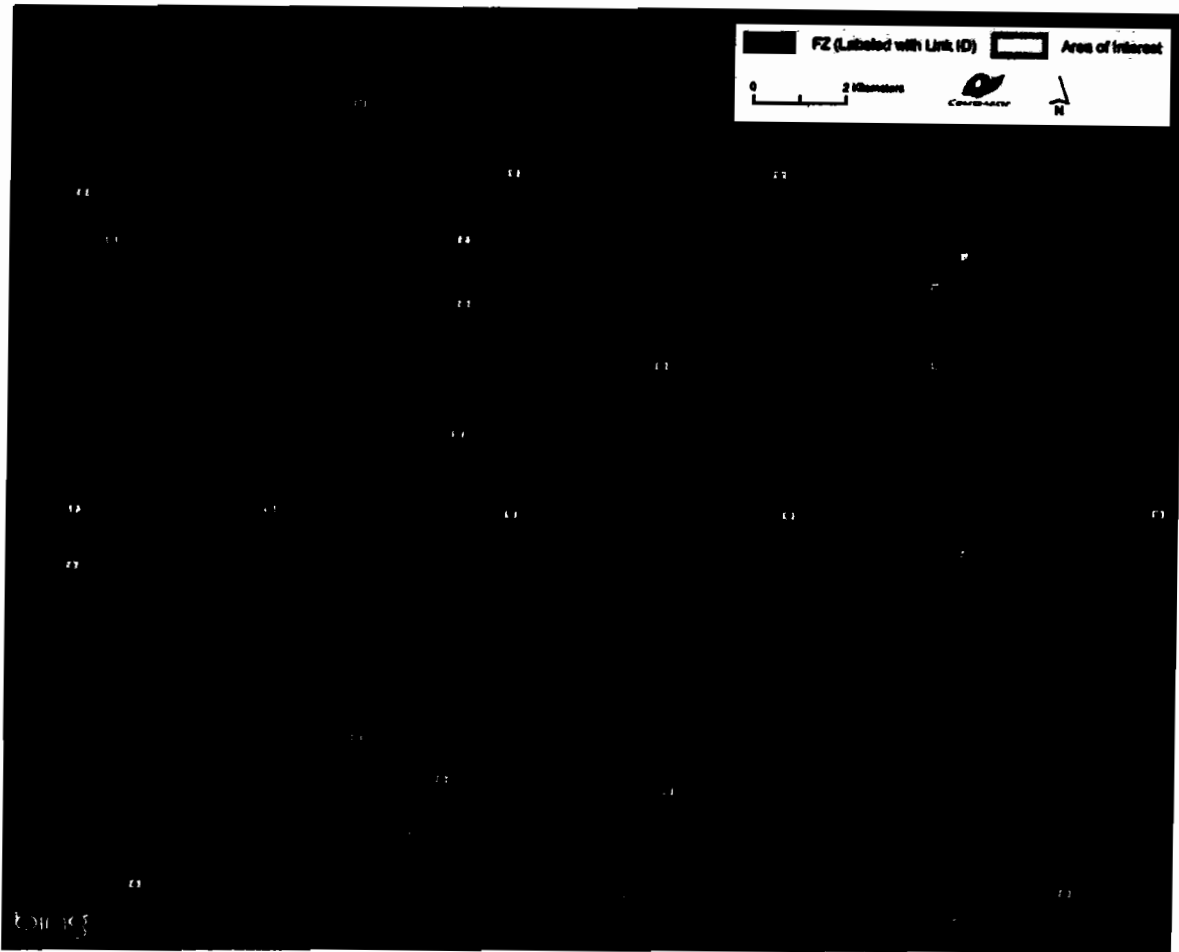


Figure 3: Fresnel Zones in the Area of Interest

Discussion of Potential Obstructions

10	N/A	N/A	N/A

⁴ Comsearch makes no warranty as to the accuracy of the data included in this report beyond the date of the report. The data provided in this report is governed by Comsearch's data license notification and agreement located at http://www.comsearch.com/files/data_license.pdf.



For this project, turbine locations were not provided; thus we could not determine if any potential obstructions exist between the planned wind turbines and the incumbent microwave paths. If the latitude and longitude values for turbine locations are provided, Comsearch can identify where a potential conflict might exist.

4. Conclusion

Our study identified 10 microwave paths intersecting the Twin Forks Wind Farm project area. The Fresnel Zones for these microwave paths were calculated and mapped. We recommend that all turbines be sited in locations that will not obstruct the Fresnel Zones.

5. Contact

For questions or information regarding the Microwave Study, please contact:

Contact person:	Denise Finney
Title:	Account Manager
Company:	Comsearch
Address:	19700 Janelia Farm Blvd., Ashburn, VA 20147
Telephone:	703-726-5650
Fax:	703-726-5595
Email:	dfinney@comsearch.com
Web site:	www.comsearch.com

Exhibit #13

Wind Power GeoPlanner™

AM and FM Radio Report

Twin Forks Wind Project



Prepared on Behalf of
E.ON
July 20, 2015





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1. Introduction

Comsearch analyzed AM and FM radio broadcast stations whose service could potentially be affected by the proposed Twin Forks Wind Project in De Witt and Macon Counties, Illinois.

2. Summary of Results

AM Radio Analysis

Comsearch found eight database records¹ for AM stations within approximately 30 kilometers of the project, as shown in Table 1 and Figure 1. These records represent station WHOW, which broadcasts out of Clinton, Illinois, to the north of the project, Decatur-based stations WDZ and WSOY, to the south, and Lincoln-based station WLLM, to the northwest. All of these stations are licensed separately for operation during daytime, nighttime, and *critical hours* (sunrise to two hours after sunrise and two hours before sunset to sunset).

1	WHOW	LIC	1520	1.0	Critical Hrs.	40.095278	-88.964167	0.20	5.05
2	WHOW	LIC	1520	5.0	Daytime	40.095278	-88.964167	0.20	5.05
3	WDZ	LIC	1050	1.0	Daytime	89.815000	-89.002222	0.28	14.98
4	WDZ	LIC	1050	0.25	Nighttime	89.815000	-89.002222	0.28	14.98
5	WSOY	LIC	1340	1.0	Daytime	89.815000	-89.002222	0.22	14.98
6	WSOY	LIC	1340	1.0	Nighttime	89.815000	-89.002222	0.22	14.98
7	WLLM	LIC	1370	1.0	Daytime	40.140000	-89.388111	0.22	23.72
8	WLLM	LIC	1370	0.035	Nighttime	40.140000	-89.388111	0.22	23.72

Table 1: AM Radio Stations within 30 Kilometers

¹ Comsearch makes no warranty as to the accuracy of the data included in this report beyond the date of the report. The data presented in this report is derived from the AM/FM station's FCC license and governed by Comsearch's data license notification and agreement located at http://www.comsearch.com/files/data_license.pdf.

² LIC = Licensed and operational station; APP = Application for construction permit; CP=Construction permit granted; CP MOD = Modification of construction permit.

³ ERP = Transmit Effective Radiated Power.

⁴ The required separation distance is based on the lesser of 10 wavelengths or 3 kilometers for directional antennas and 1 wavelength for non-directional antennas.

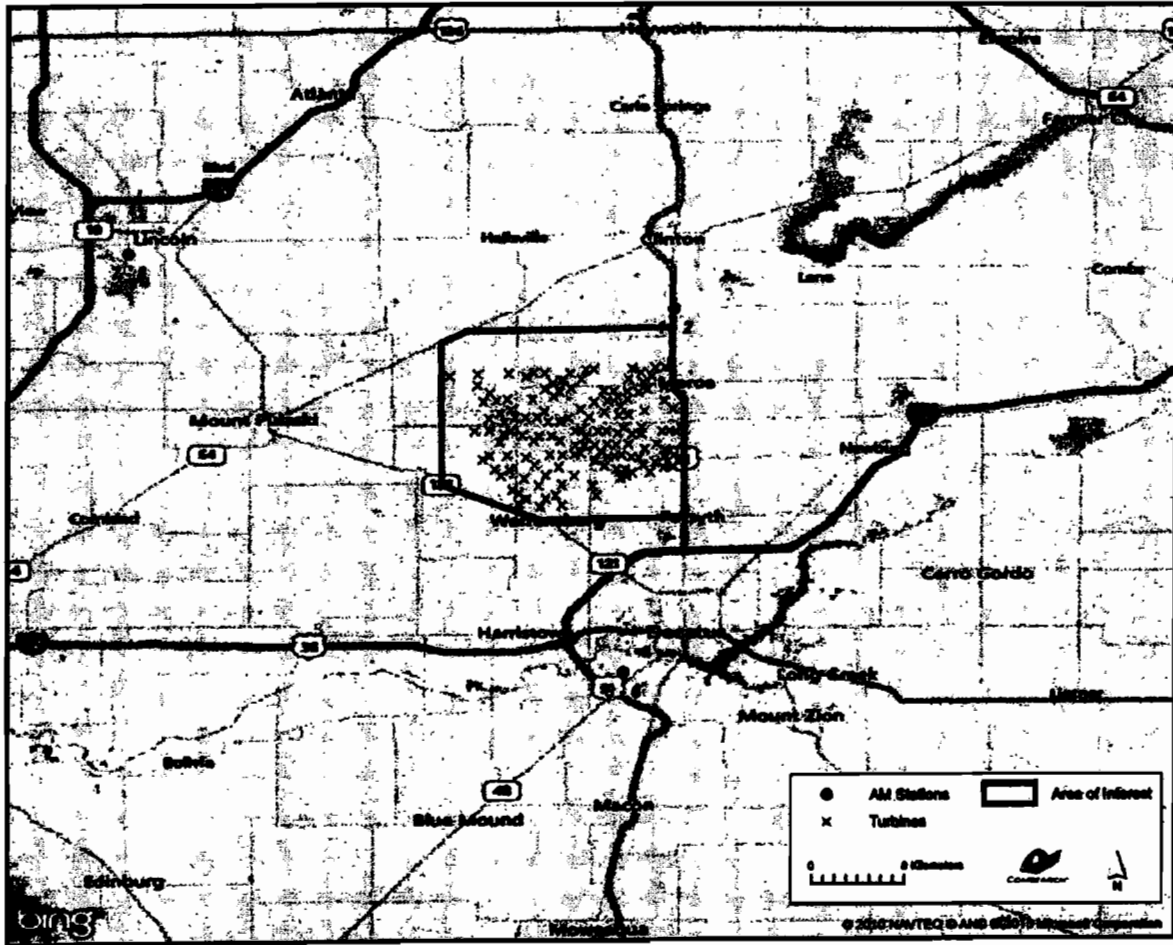


Figure 1: AM Radio Stations within 30 Kilometers

FM Radio Analysis

Comsearch determined that there were thirty-two database records for FM stations within a 30-kilometer radius of the Twin Forks Wind Project, as shown in Table 2 and Figure 2. Only twenty-five of these stations are currently licensed and operating, thirteen of which are translator stations that operate with limited range. Station WDKR is the only station that falls within the limits of the project area of interest (AOI).

1	WDKR	LIC	FM	107.3	3.0	38.965556	-89.057500	0.51
2	W222BG	LIC	FX	92.3	0.25	40.095278	-88.984167	5.05
3	WEZC	LIC	FM	95.9	6.0	40.095278	-88.964167	5.95
4	W217BB	LIC	FX	91.3	0.018	39.876111	-89.015278	8.18
5	WDCR	LIC	FM	88.9	1.1	39.930528	-88.861389	10.02
6	WSOY-FM	LIC	FM	102.9	54.0	39.878056	-88.942222	10.67
7	W246BD	LIC	FX	97.1	0.038	40.158444	-88.947639	11.97
8	WJMU	LIC	FM	89.5	1.65	39.841667	-88.974722	12.90
9	W290CL	LIC	FX	105.9	0.25	39.845278	-88.953611	13.22
10	W272CB	LIC	FX	102.3	0.08	39.861944	-88.894444	13.77
11	WLLU-LP	CP	FL	107.9	0.1	39.821806	-88.982417	14.52
12	W213BI	LIC	FX	90.5	0.055	39.824444	-88.967500	14.90
13	W251BN	LIC	FX	96.1	0.25	39.824444	-88.967500	14.90
14	W282EO	GP MOD	FX	106.3	0.045	39.824444	-88.967500	14.90
15	WNLB	LIC	FM	88.1	1.0	39.809722	-88.991944	15.80
16	W203BD	LIC	FX	88.5	0.013	39.809722	-88.991944	15.80
17	WXFM-FM	LIC	FM	99.3	1.15	39.809722	-88.991944	15.80
18	W243DF	GP MOD	FX	96.5	0.013	39.806694	-88.991861	15.80
19	W281CQ	LIC	FX	100.1	0.099	39.811944	-88.932778	17.33
20	WYDS	LIC	FM	93.1	4.6	39.786389	-88.991389	18.29
21	W228GK	LIC	FX	93.5	0.175	39.786389	-88.991389	18.29
22	W234CI	GP MOD	FX	94.7	0.063	39.786389	-88.991389	18.29
23	W238CH	LIC	FX	95.6	0.25	39.786389	-88.991389	18.29
24	WZUS	LIC	FM	100.9	6.0	39.786389	-88.991389	18.29
25	WLNK	LIC	FM	88.9	0.225	40.158389	-89.381111	22.79
26	W246GO	CP	FX	97.1	0.055	40.141667	-89.385278	23.74
27	W261AF	LIC	FX	100.1	0.055	40.141667	-89.385278	23.74

⁵ LIC = Licensed and operational station; APP = Application for construction permit; CP=Construction permit granted; CP MOD = Modification of construction permit.

⁶ FM = FM broadcast station; FX = FM translator station; FL = FM low-power station; FB = FM booster station.

⁷ ERP = Transmit Effective Radiated Power.

28	W287BP	LIC	FX	105.3	0.055	40.141667	-89.385278	23.74
29	W287BP	CP	FX	105.3	0.1	40.141667	-89.385278	23.74
30	WLGN	LIC	FM	96.3	6.0	40.244167	-89.264167	24.76
31	W252CQ	CP	FX	96.3	0.12	40.244167	-89.264167	24.76
32	WILL-FM	LIC	FM	90.9	105.0	40.038333	-88.669444	24.99

Table 2: FM Radio Stations within 30 Kilometers

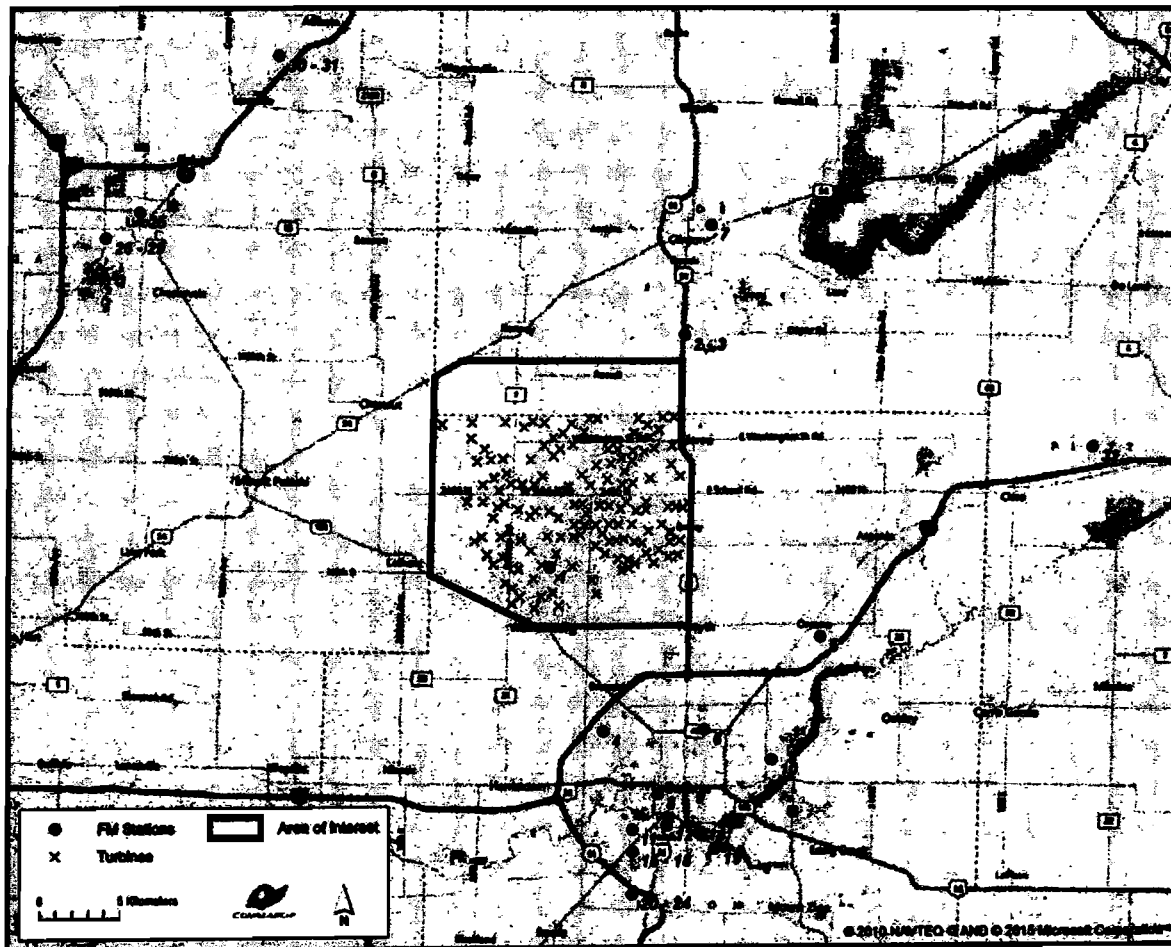


Figure 2: FM Radio Stations within 30 Kilometers

3. Impact Assessment

The exclusion distance for AM broadcast stations varies as a function of the antenna type and broadcast frequency. For directional antennas, the exclusion distance is calculated by taking the lesser of 10 wavelengths or 3 kilometers. For non-directional antennas, the exclusion distance is simply equal to 1 wavelength. Potential problems with AM broadcast coverage are only anticipated when AM broadcast stations are located within their respective exclusion distance limit from wind turbine towers. The closest AM station to the Twin Forks Wind Project, WHOW, is more than 5 kilometers from the nearest turbine. As there were no stations found within 3 kilometers of the project, which is the maximum possible exclusion distance based on a directional AM antenna broadcasting at 1000 KHz or less, the project should not impact the coverage of local AM stations.

The coverage of FM stations is generally not susceptible to interference caused by wind turbines, especially when large objects, such as wind turbines, are sited in the far field region of the radiating FM antenna in order to avoid the risk of distorting the antenna's radiation pattern. The closest operational station to the Twin Forks Wind Project, WDKR, is located approximately 511 meters from the nearest turbine (T134). At this distance, there should be adequate separation to avoid radiation pattern distortion.

4. Recommendations

Since no impact to the AM or FM broadcast stations was identified in our analysis, no recommendations or mitigation techniques are required for this project.

5. Contact

For questions or information regarding the AM and FM Radio Report, please contact:

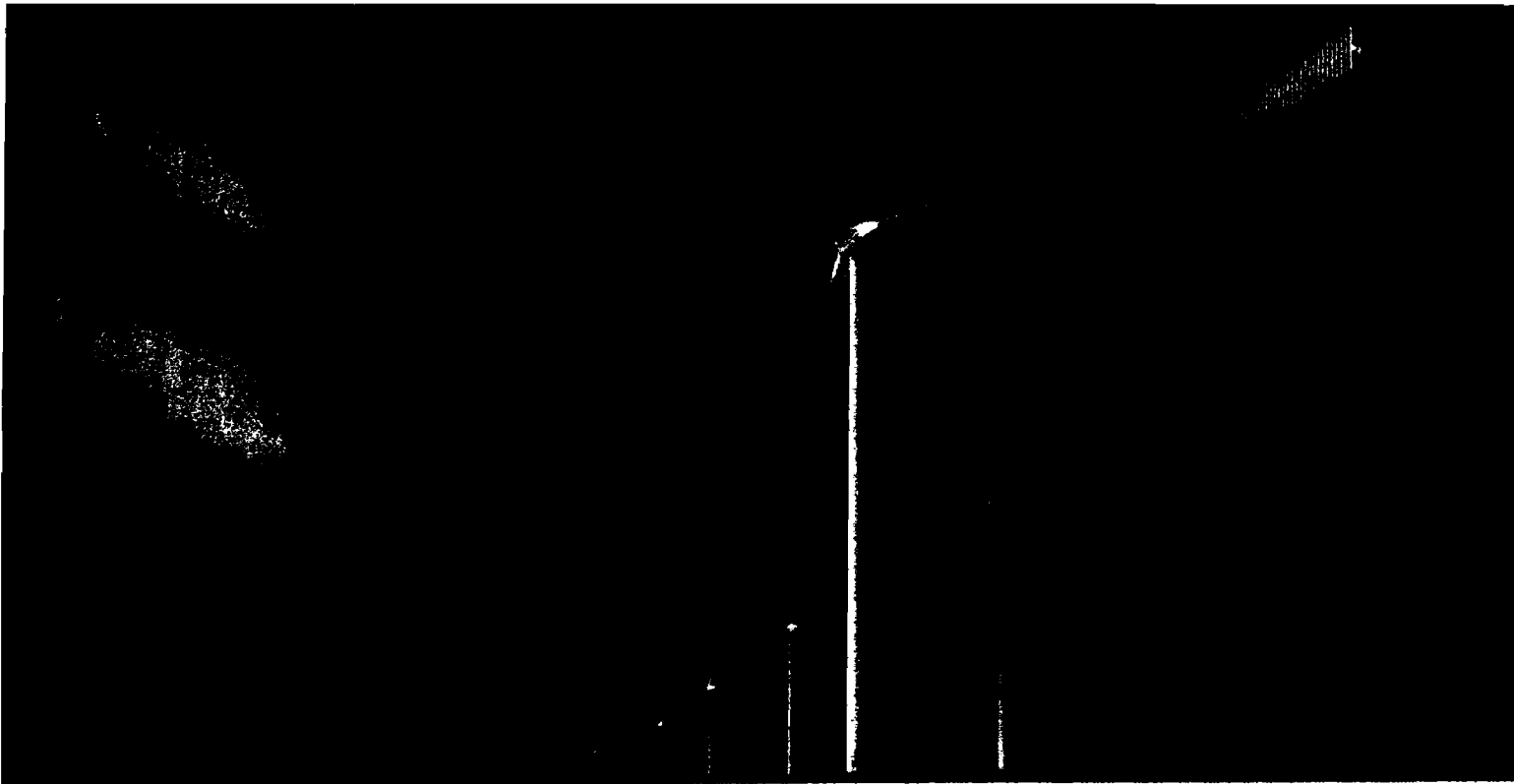
Contact person:	Denise Finney
Title:	Account Manager
Company:	Comsearch
Address:	19700 Janelia Farm Blvd., Ashburn, VA 20147
Telephone:	703-726-5650 (office) / 703-726-5595 (fax)
Email:	dfinney@comsearch.com
Web site:	www.comsearch.com

Exhibit #14

Wind Power GeoPlanner™

Mobile Phone Carrier Report

Twin Forks Wind Project



Prepared on Behalf of
E.ON

July 20, 2015



COMSEARCH
A CommScope Company



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1. Introduction

Comsearch has developed and maintains comprehensive technical databases containing information on licensed mobile phone carriers across the US. Mobile phone carriers operate in multiple frequency bands and are often referred to as Advanced Wireless Service (AWS), Personal Communication Service (PCS), 700 MHz Band, Wireless Communications Service (WCS), and Cellular. They hold licenses on an area-wide basis which are typically comprised of several counties.

This report focuses on the potential impact of wind turbines on mobile phone operations in and around the project area. Comsearch provides additional wind energy services, a description of which is available upon request.

2. Summary of Results

Methodology

Our mobile phone analysis was performed using Comsearch's proprietary carrier database, which is derived from a variety of sources including the Federal Communications Commission (FCC). Since mobile phone market boundaries differ from service to service, we disaggregated the carriers' licensed areas down to the county level. Then we compiled a list of all mobile phone carriers in the main counties that intersect the area of interest. The area of interest was defined by the client and encompasses the planned turbine locations. A depiction of the wind project area and counties appears below.

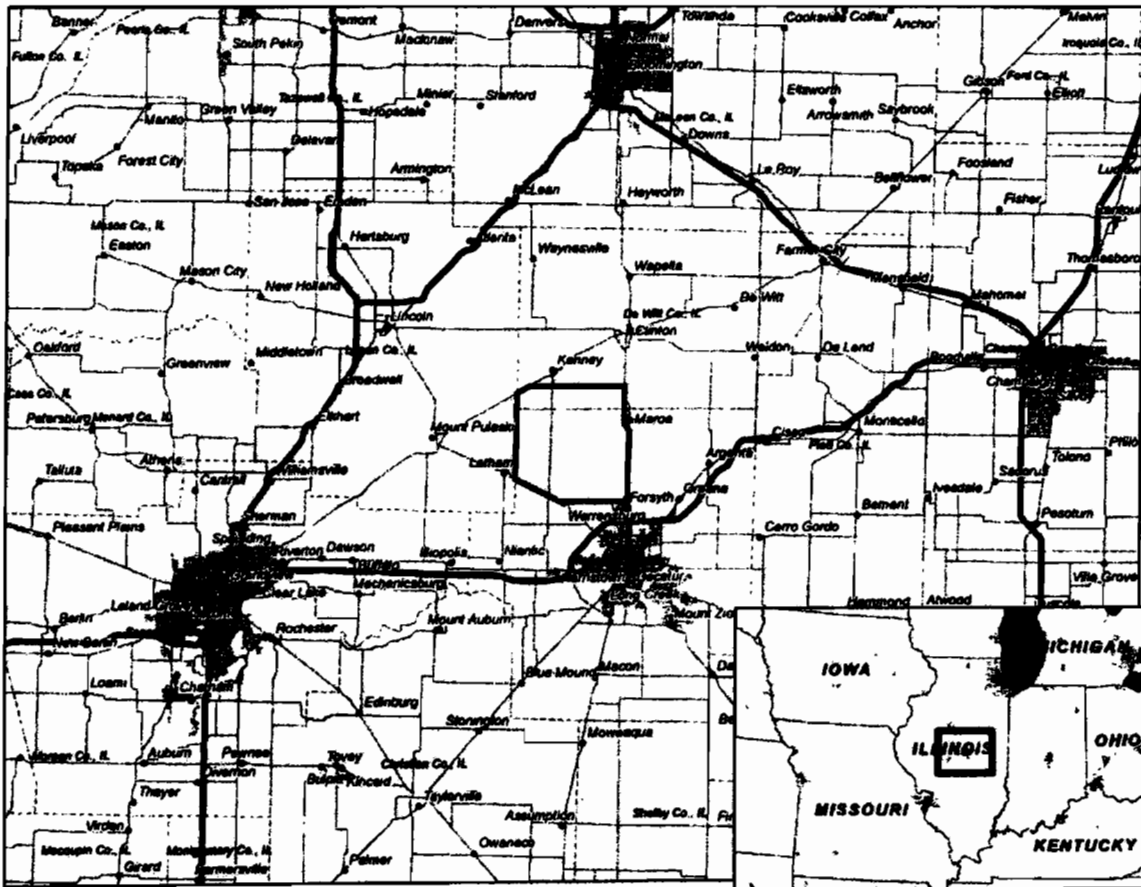


Figure 1: Counties that intersect the Area of Interest

Results

The Twin Forks Wind Project is located in Macon County, Illinois. We have identified the type of service, channel block, market ID and FCC callsign for each carrier in the county of interest. A description of the various service types and geographic market areas is below with a summary table on the following page.

AWS

AWS licensees won their spectrum in an auction that started in August 2006. The licensees are authorized by 734 Cellular Market Areas (CMA) for Block A, 176 Economic Areas (BEA) for Blocks B and C, and 12 Regional Economic Area Groupings (REAG) for Blocks D, E and F. This spectrum at 1.7 and 2.1 GHz was allocated for mobile broadband and advanced wireless services. Partitioning and leases are permitted in the band.

Cellular

Licensees are authorized by Metropolitan and Rural Statistical Areas, also known as CMAs. Unserved areas can be covered by licensees other than the original A or B block licensee. To determine the most realistic coverage, we compiled the Cellular Geographic Service Areas (CGSA) from the 32 dBu contours defined by Part 22.911(a) of the FCC rules. Mobile services are provided at 800 MHz and partitioning and leases are permitted in the band.

PCS

There have been nine auctions for this band, with the last one being held in August 2008. Licensees are authorized by 51 Major Trading Areas (MTA) for Blocks A and B, 493 Basic Trading Areas (BTA) for Blocks C through F, and 176 Economic Areas (EA) for Block G. This band has been heavily partitioned and disaggregated both by counties and by smaller polygons within counties (known as undefined areas or partial counties). The 1.9 GHz PCS carriers provide mobile services and leases are permitted in the band.

700 MHz Band

Originally used for analog television broadcasting, this band consists of an upper and lower band, each having its own set of frequency blocks. There have been three auctions in this band with the last one (Auction 73) being held in 2008 and mobile phone carriers eventually winning licenses for Blocks A, B, and C of the Lower 700 MHz band and Block C of the Upper 700 MHz band. Licensees are authorized by 176 Economic Areas (EA) for Lower Block A, 734 Cellular Market Areas (CMA) for Lower Blocks B and C, and 12 Regional Economic Area Groupings (REAG) for Upper Block C. Partitioning and leases are permitted in the band.

WCS

Mobile services provided in the 2.3 GHz band occupy frequency blocks above and below the spectrum allocated for Satellite Digital Audio Radio Service (SDARS) from 2320 MHz to 2345 MHz. WCS licensees are authorized by 52 Major Economic Areas (MEA) for Blocks A and B and 12 Regional Economic Area Groupings (REAG) for Blocks C and D. Partitioning and leases are permitted in the band.

700 MHz	US Cellular	Macon	IL	A	BEA068	WQLE685
700 MHz	US Cellular	Macon	IL	B	CMA230	WQLE697
700 MHz	AT&T	Macon	IL	C	CMA230	WFWV395
700 MHz	Verizon Wireless	Macon	IL	C	REA003	WQJQ691
700 MHz	AT&T	Macon	IL	D	EAG704	WPZA238
700 MHz	EchoStar	Macon	IL	E	BEA068	WQJZ210
AWS	Verizon Wireless	Macon	IL	A	CMA230	WQGD465
AWS	Verizon Wireless	Macon	IL	B	BEA068	WQGA956
AWS	AT&T	Macon	IL	C	BEA068	WQGT877
AWS	T-Mobile	Macon	IL	D	REA003	WQQA471
AWS	T-Mobile	Macon	IL	E	REA003	WQGB376
AWS	T-Mobile	Macon	IL	F	REA003	WQVP883
CELL	AT&T	Macon	IL	A	CMA230	KNKA742
CELL	Verizon Wireless	Macon	IL	B	CMA230	KNKA778
PCS	AT&T	Macon	IL	A	MTA003	KNLF206
PCS	Verizon Wireless	Macon	IL	B	MTA003	KNLF207
PCS	Sprint Nextel	Macon	IL	B	MTA003	WQRJ905
PCS	T-Mobile	Macon	IL	C	BTA109	WPOL274
PCS	Sprint Nextel	Macon	IL	D	BTA109	KNLH511
PCS	Sprint Nextel	Macon	IL	E	BTA109	KNLG870
PCS	AT&T	Macon	IL	F	BTA109	KNLG647
PCS	Sprint Nextel	Macon	IL	G	BEA068	WQKT282
WCS	AT&T	Macon	IL	A	MEA018	KNLB305
WCS	AT&T	Macon	IL	B	MEA018	KNLB279
WCS	AT&T	Macon	IL	C	REA003	WPQL712
WCS	AT&T	Macon	IL	D	REA003	KNLB325

Table 1: Mobile Phone Carriers in the Area of Interest

¹ AWS: Advanced Wireless Service at 1.7/2.1 GHz
 CELL: Cellular Service at 800 MHz
 PCS: Personal Communication Service at 1.9 GHz
 700 MHz: Commercial Mobile Phone at 700 MHz
 WCS: Wireless Communication Service at 2.3 GHz

FCC-Licensed Sites

For competitive and confidentiality reasons, most mobile phone carriers' individual sites are not licensed with the FCC. However, in the cellular band, if a base station extends the existing Cellular Geographic Service Area (CGSA), then it must be recorded with the FCC. We identified two cellular sites within the Twin Forks Wind Project area of interest. Figure 2 on the next page depicts its location in relation to the area of interest and Table 2 contains the technical parameters on the FCC license.

KNKA778	Verizon	50.9	14510 Janvrin Road	40.036694	-88.993972	580
KNKN488	AT&T	60.7	127 N900 EAST (42511)	40.077444	-88.975361	3063

Table 2: FCC-Licensed Mobile Phone Sites

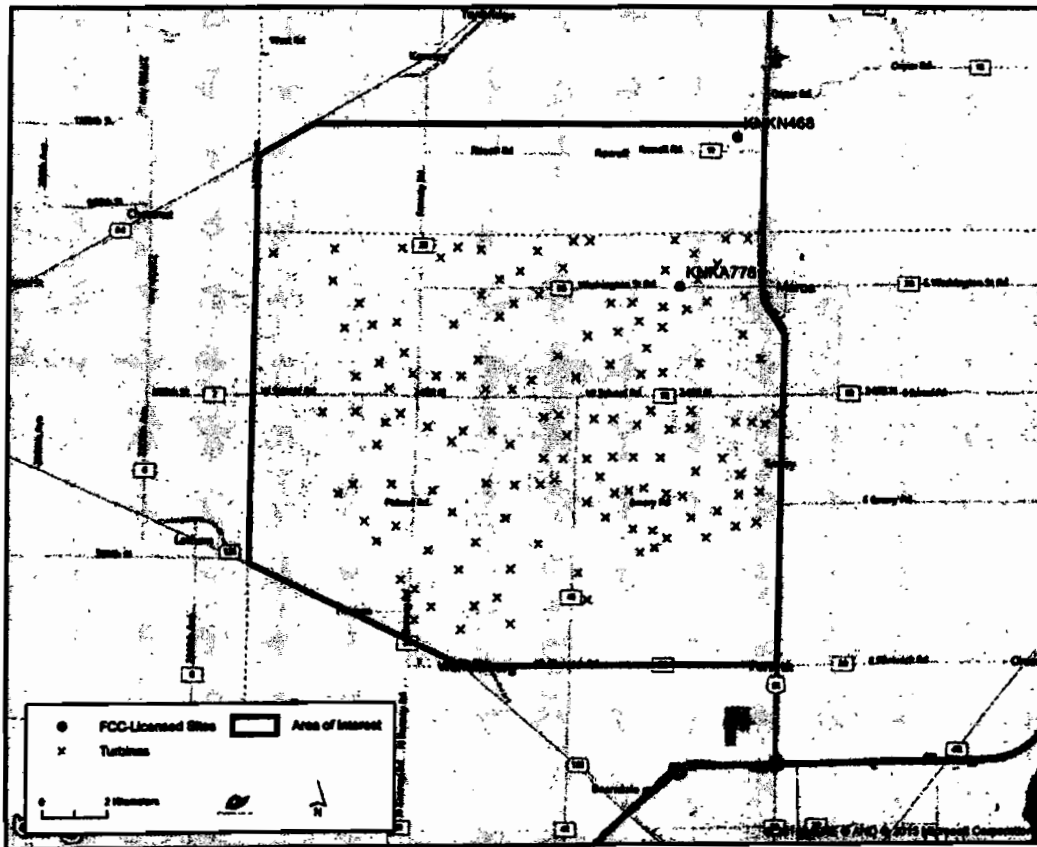


Figure 2: FCC-Licensed Mobile Phone Sites in the Area of Interest

Impact Assessment and Distance Setback Requirements

The cellular mobile phone signal propagation is typically not affected by physical structures because the beam widths of the radiated signal from the base stations and mobile units are very wide and the wavelength of the signal is long enough to wrap around objects such as wind turbine towers and blades. In addition, the cellular network consists of multiple base stations that are designed so that if the connection cannot be made to one base station it will shift to adjacent base stations to make the connection. This enables cellular mobile telephone systems to provide coverage in areas that are congested with physical structures such as downtown urban areas. Areas containing wind turbines have less of a coverage issue than urban areas, so the wind turbines presence does not require any special setback for signal obstruction consideration other than physical clearance of the blades. From an electromagnetic interference standpoint, the emissions from the wind turbines, which are specified by the FCC, should be taken into account to ensure they will not interfere with the base stations or the mobile units. Part 15 of the FCC regulations covers the emissions from unintentional radiating devices, such as wind turbines. The field strength limits for the emissions from unintentional radiators is given in paragraph 15.109 of Part 15 of the FCC rules. The emission limits are stated for a distance of 3 meters or approximately 10 feet and are shown below.

Radiated Emission Limits at 3 Meters

<u>Frequency of Emission (MHz)</u>	<u>Field Strength (microVolts/meter)</u>
30 – 88	100
88 – 216	150
216 – 960	200
> 960	500

From these limits and the receiver sensitivity of the cellular base stations and mobile units we can determine a setback requirement for wind turbines and cellular system. The typical sensitivity of mobile units is -90 dBm (1×10^{-12} Watts) and the typical sensitivity of base stations is -93 dBm (5×10^{-13} Watts). The gain of mobile unit antennas are -10dB or 0.1 and the gain of base station antennas are 17 dB or 50. The effective area (A) of the mobile unit and base station antennas are determined from the following formula.

$$A = G \cdot \lambda^2 / 4 \cdot \pi$$

Where,

G = Antenna Gain, number

λ = Wavelength, 0.353 meters

π = 3.14

This gives us an effective area for the mobile unit antenna of 9.9×10^{-4} meter² and the effective area for the base station antenna of 0.496 meter². Using the typical receiver sensitivities of the mobile and base units above, we can determine their power flux density (P_D) from the following formula:

$$P_D = S/A$$

Where S is defined as the sensitivity for Mobile Unit or for the Base Station expressed in Watts

To calculate the electric field strength (E) we use the following formula:

$$E = (P_D * 377)^{1/2}$$

So for the mobile unit, $P_D = 1.01 \times 10^{-9}$ Watts/meter² and $E = 617$ microVolts/meter. And, for the base station unit, $P_D = 1.008 \times 10^{-12}$ Watts/meter² and $E = 19.4$ microVolts/meter.

These results show that the mobile units' sensitivity expressed as field strength is above the level allowed as an emission for the wind turbines at a distance of 3 meters. Therefore, no setback for the use of a mobile unit is needed beyond 3 meters. Since the base station has field strength sensitivity below the allowed emission level of the wind turbines a setback distance is needed to ensure that the base stations will not be affected. The field strength of the emission is inversely proportional to separation distance in meters. To determine the setback distance to reduce the field strength to 19.4 microVolts/meter the following formula is used.

$$D = (500 \text{ MicroVolts/meter}) * (3 \text{ meters}) / 19.4 \text{ MicroVolts/meter}$$

Where,

D = Setback Distance for Base Station to avoid interference, meters

Thus the setback distance for the cellular tower base station from the wind turbines should be 77.3 meters or greater.

Summary

The telephone communications in the mobile phone carrier bands are typically unaffected by the presence of the wind turbines and we do not anticipate any significant harmful effect to mobile phone services with the Twin Forks Wind Project. Mobile phone systems are designed with multiple base transmitter stations covering a specific area. Since mobile telephone signals are designed with overlap between adjacent base transmitter sites in order to provide handoff between cells, any signal blockage caused by the wind turbines does not materially degrade the reception because the end user may be receiving from multiple transmitter locations. For example, if a particular turbine attenuates the signal reception into a mobile phone, the phone may receive an alternate signal from a different transmit location, resulting in no disruption in service. Mobile phone systems that are implemented in urban areas near large structures and buildings often have to combat even more problematic signal attenuation and reflection conditions than rural areas containing a wind energy turbine facility.



For the cellular towers located within the project area, no setback distance is required from an interference standpoint other than physical clearance of the blades. From an electromagnetic standpoint, a setback distance of 77.3 meters should be used to meet FCC emission requirements. The closest turbine to either of these towers is 580 meters.

In the unlikely event that a mobile phone carrier believes their coverage has been compromised by the presence of the wind energy facility, they have many options to improve their signal coverage to the area through optimization of a nearby base transmitter or even adding a new sector or cell site. Utility towers, meteorological towers or even the turbine towers within the wind project area can serve as the platform for a base transmit site or cell enhancer.

3. Contact Us

For questions or information regarding the Mobile Phone Carrier Report, please contact:

Contact person:	Denise Finney
Title:	Account Manager
Company:	Comsearch
Address:	19700 Janelia Farm Blvd., Ashburn, VA 20147
Telephone:	703-726-5650
Fax:	703-726-5595
Email:	dfinney@comsearch.com
Web site:	www.comsearch.com

Petition to Request that the Macon County Zoning Board of Appeals, the Macon County Board Sub-Committee, and the Macon County Board Reject the Special Use Permits for the Construction of the Twin Forks Wind Farm

The Twin Forks Wind Farm will have a negative health, safety, and economic implications on the residents of Northern Macon County. But, most of all, the turbines will deny us of the very reason we chose to live in a rural Macon County—unaltered sunsets and sunrises, tranquil surroundings, and a peaceful existence.

We, the undersigned, are concerned citizens, taxpayers, and homeowners who urge our leaders to act now to reject the Twin Forks Wind Farm

Printed Name	Signature	Address	City	Date
MARK KEMP	<i>mk</i>	9828 W School Rd	Botham	9/9/15
Kaley Hundt	<i>K. Hundt</i>	9828 W. School Rd Botham GA 31543		9/9/15
BZLLR HEFT	<i>Bull R. Heft</i>	10176 W. School Rd		8/9/15
Scott Chambers	<i>Scott Chambers</i>	10235 W. School Rd.		8/9/15
Danna Chambers	<i>Danna Chambers</i>	10235 W School Rd		9/9/15
Marc Blackorby	<i>Marc Blackorby</i>	8935 W. School Rd Latham, GA		8/10/15
Sylvia Blackorby	<i>Sylvia Blackorby</i>	" "		8/10/15
Raymond D. ...	<i>Raymond D. ...</i>	1144 W. School Rd	61752	8/10/15

Petition to Request that the Macon County Zoning Board of Appeals, the Macon County Board Sub-Committee, and the Macon County Board Reject the Special Use Permits for the Construction of the Twin Forks Wind Farm

Petition summary and background
 The Twin Forks Wind Farm will have a negative health, safety, and economic implications on the residents of Northern Macon County. But, most of all, the turbines will deny us of the very reason we chose to live in a rural Macon County—unaltered sunsets and sunrises, tranquil surroundings, and a peaceful existence.

Action petitioned for
 We, the undersigned, are concerned citizens, taxpayers, and homeowners who urge our leaders to act now to reject the Twin Forks Wind Farm

Printed Name	Signature	Address	Comment	Date
ALAN RUWE	<i>Alan Ruwe</i>	13247 OAKLAND A, MAROA		8/5/15
PHYLLIS RUWE	<i>Phyllis Ruwe</i>	13247 OAKLAND A, MAROA		8/5/15
GARY KNOPE	<i>Gary Knope</i>	11345 Courtyard Lane		8/5/15
Michelle Townes	<i>Michelle Townes</i>	12707 Oakland Ave Maroa		8/5/15
Kent Ann Brown	<i>Kent Ann Brown</i>	10741 US 51 North		8/5/15
KEN STONE	<i>Ken Stone</i>	8979 Noxaplane	and Decatur	8-6-15
TREVOR LEACH	<i>Trevor Leach</i>	802 W SCHOOL RD	MAROA	8-6-15
Janice Leach	<i>Janice Leach</i>	802 W. School Rd. Maroa		8-6-15
JOHN KNOPE	<i>John Knope</i>	13963 OAKLAND AVE.		8-8-15
Frances Knope	<i>Frances Knope</i>	13963 Oakland Ave	Maroa	8-8-15
Walt Nessel	<i>Walt Nessel</i>	9650 N 24 51	Decatur	8-8-15

* -

Petition to Request that the Macon County Zoning Board of Appeals, the Macon County Board Sub-Committee, and the Macon County Board Reject the Special Use Permits for the Construction of the Twin Forks Wind Farm

The Twin Forks Wind Farm will have a negative health, safety, and economic implications on the residents of Northern Macon County. But, most of all, the turbines will deny us of the very reason we chose to live in a rural Macon County—unaltered sunsets and sunrises, tranquil surroundings, and a peaceful existence.

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Signature	Address	City	Comments	Date
Ruth A. Wilson	7879 Bus. US 51	Clinton	of the wind farm has to be - put the towns on map. Industrial area	Aug 9-15
Joyce Wilson	7879 Bus. US 51	Clinton	The towns will make our farms less valuable	Aug 9-2015
Terry Hoffman	1073 US Hwy 51	Macon	waste of tax payer monies NOT EFFICIENT.	Aug 9 15
Cindy A Hoffman	" " "	" "	" "	8-9-15
Joyce Tibbs	13806 Jeanine Rd	Macon	" "	8-9-15
Diane Fobbs	13809 Jeanine Rd	Macon	all negatives ... nothing to benefit us in this area	8-8-15
Rick Dobb	13809 Jeanine Rd	Macon	" "	" "
Marjorie A Cook	125 S Cedar St	Macon	" "	8-10-15
Diane Tibbs	109 W Jackson	Macon	" "	8-10-15

Sian & Julie

Petition to Request that the Macon County Zoning Board of Appeals, the Macon County Board Sub-Committee, and the Macon County Board Reject the Special Use Permits for the Construction of the Twin Forks Wind Farm

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Michael Kulay	Michael Kerley	14019 Bantam Loop	8/10/15
Louise Davis	[Signature]	3 Monroe Drive	8/10/15
Kenneth Russell	[Signature]	1755 N. Hampshire	NO WINDMILL CONSTRUCTION 8/10/15
Carrie Russell	[Signature]	1755 W Hampshire Rd	8/10/15
Rick Dobbs	Rich L. Dolbe	13809 JANUARY RD	8-10-15
Diane Dobbs	Diane Dolbe	13809 JANUARY RD	8-10-15
Demaris Cordes	Demaris Cordes	14077 Bantam Rd	8-10-15
Betty Cordes	Betty Cordes	14077 Bantam Rd	8-10-15
[Signature]	[Signature]	15437 Beepsdale Rd.	8-10-15
Paula Matthews	Paula Matthews	9424 W Washington St Rd	8/10/15

Scott Smith	<i>[Signature]</i>	L. Moraine, Wernersburg	Oppose!	8-10-15

Petition to Request that the Macon County Zoning Board of Appeals, the Macon County Board Sub-Committee, and the Macon County Board Reject the Special Use Permits for the Construction of the Twin Forks Wind Farm

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Printed Name	Signature	Address	Comment	Date
Nicole Householder	<i>Nicole Householder</i>	8873 N Glasgow Warrensburg 62573		8-7-15
Casey McPariles	<i>Casey McPariles</i>	5 Moraine Dr Warrensburg 62573		08-08-15
Louise Duon	<i>Louise Duon</i>	3 Moraine Dr. Warrensburg 62573		08-08-15
Dilana Dunn	<i>Dilana Dunn</i>	3 Macaighaugh Warrensburg 62573		8-8-15
Chris Thomas	<i>Chris Thomas</i>	10 Gallagher St Warrensburg		8-8-15
CLOYD THOMAS	<i>Cloyd Thomas</i>	10 GALLAGHER ST. WARRENSBURG, MO		8-8-15
GARY SEBENS	<i>Gary Sebens</i>	6 FALCAGHER SR. WARRENSBURG, MO		8-8-15
Anita Sebans	<i>Anita Sebans</i>	6 Gallagher Warrensburg, MO		8-8-15
Glen Casstevens	<i>Glen Casstevens</i>	5 Gallagher Warrensburg, MO		8-8-15
KARLY HICKEY	<i>Karly Hickey</i>	530 E NORTH ST "		8-8-15

Petition to Request that the Macon County Zoning Board of Appeals, the Macon County Board Sub-Committee, and the Macon County Board Reject the Special Use Permits for the Construction of the Twin Forks Wind Farm

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Printed Name Signature Address Comment Date

LARRY CUNNINGHAM
 Falade Cunningham
 Kimberly Miller
 Brian Miller

Deey Cunningham
 Friends Cunningham
 Kimberly
 B. J. M.

13655 N. KENNEY RD MAE
 13655 N. KENNEY RD MAE
 920 Kenney Rd, Kenney
 920 Kenney Rd Kenney
 6175

Macon County Zoning Board of Appeals

Findings of Fact / Recommendation

Twin Forks Wind Farm, LLC

S-10-08-15

- Petition:** For a Special Use permit to construct and operate a utility scale wind farm that consists of up to 140 large wind energy conversion system (LWECS), consisting of wind turbine generators and associated roads, underground collection lines, an overhead transmission line, a collector substation, a switching station, operations and maintenance facility, ancillary facilities, and temporary sites for staging, laying down equipment and preparing concrete.
- Location:** This property is commonly located within Illini Township, Austin Township, Maroa Township, and Hickory Point Township.
- Acreage:** Approximate over 24,000 Acres
- Zoning:** (A-1) Agricultural

Findings of Fact

- In December 12, 2013, a special use permit was granted to E.ON to construct an electrical substation for electrical lines for an approximate 200 MW wind farm.
- In the Macon County Wind Energy Conversion System Ordinance it states Section 4 a special use permit is required for each LWECS and/or for each Wind Farm Project involving multiple LWECS located within the unincorporated lands.
- A Special Use Permit is defined as a use, either public or private, which, because of its unique characteristics, cannot be properly classified as a permitted use in any particular district or districts.
- As of August 10, 2015 at noon, our office had received 3 letters of support, 1 phone call of support and 7 letters of opposition.

Special Use Permit Requirements for a Wind Farm:

1. General summary of the project:
 - a. Approximate Name Plate Generating Capacity: 280 MW
 - b. Equipment manufacturer and type of WEC(s):
 - Vestas V110-2.0 MW
 - GE 1.79 MW-100
 - Siemens 2.3 MW

Turbine Summary:

Turbines #T001-T005: Meets Requirements

Turbine #T006:

The concerns for this turbine is the access road will cross the Enbridge Pipeline to access the turbine. Macon County would suggest E.ON work closely with Enbridge Pipeline to ensure no safety problems during and after construction.

Turbine #T007-T012: Meets Requirements

Turbine #T013:

The concerns for this turbine is the access road is proposed within a FEMA designated floodplain. The turbine is not located within the floodplain. Macon County would suggest when the road is built the drainage shall remain in a positive flow and not impede any natural flow.

Turbine #T014: Meets Requirements

Turbine #T015:

The concerns for this turbine is the access road is proposed within a FEMA designated floodplain. The turbine is not located within the floodplain. Macon County would suggest when the road is built the drainage shall remain in a positive flow and not impede any natural flow.

Turbine #T016-T102: Meets Requirements

Turbine #T103:

The concerns for this turbine is the access road is proposed within a FEMA designated floodplain. The turbine is not located within the floodplain. Macon County would suggest when the road is built the drainage shall remain in a positive flow and not impede any natural flow.

Turbine #T104-#T108: Meets Requirements

Turbine #T109:

The turbine is located approximate 532 feet from the public/ private right-of-way lines. Therefore it doesn't meet the setback of 1.1 times the total tower height measured from the center of the base of the tower to the edge of the right-of-way line.

Turbine #T110-T#125: Meets Requirements

Turbine #T126:

The concerns for this turbine is the access road is proposed within a FEMA designated floodplain. The turbine is not located within the floodplain. Macon County

would suggest when the road is built the drainage shall remain in a positive flow and not impede any natural flow.

Turbine #T127-T#140: Meets Requirements

Spacing & Density:

All turbines are located over 200 feet apart from each other.

Height:

All turbines are anticipated to be approximate 426-500 feet tall.

Clearance:

The ordinance requires that the vertical distance from ground level to the tip of a wind turbine blade when the blade is at its lowest point must be at least thirty (30) feet. E.ON states there will be at least sixty (60) feet of vertical distance from the ground level to the tip of the wind turbine blade.

Access:

The ordinance requires that all LWECs shall be constructed to prevent unauthorized climbing to include locking portals. E.ON states that all LWECs are unclimbable by design.

Lighting:

E.ON will obtain "Determinations of No Hazard" certificates from the Federal Aviation Administration for each wind turbine site prior to obtaining building permits.

Noise:

A noise study was submitted and completed by Hankard Environmental Acoustical Consultants in May of 2015. See Appendix D in the Special Use Permit Application.

Decommissioning Plan:

A decommissioning plan is not required to be submitted by Macon County ordinance prior to the application for special use permit. The applicant has stated in its application its understanding of its requirements in the event of decommissioning.

Standard Conditions for Environmental Impact Study

E.ON has submitted an impact study performed by Ecology and Environment (E&E), in the application under Appendix E.

On May 19, 2015, Macon County Planning & Zoning Department received an ECO CAT and Consultation report that was completed by Illinois Department of Natural Resources (IDNR). In the report, IDNR stated a wind energy facility in this location poses no unusual avian risk, bat risk, and aquatic species and the Department notes that isolated incidents of taking protected species are still possible, and circumstances may exist which will become evident only after operation of the facility has begun. The IDNR suggested a couple of recommendations.

On May 21, 2015, Macon County Conservation District sent a letter stating they concur with the findings and recommendations of IDNR. They would also like to see construction

minimized around the Lake Fork Creek for harboring aquatic life and also minimize habitat loss in that area.

Erosion and Sediment Control Plan

Prior to obtaining building permits, E.ON will obtain land disturbance permits for each site and provide a permanent soil erosion and sediment plan prepared by an Illinois Licensed Professional Engineer.

Natural Resource Inventory (NRI)

Per the Macon County Wind Ordinance, Macon County Planning & Zoning Department requested a Natural Resource Inventory (NRI) from Macon County Soil and Water Conservation District. In this report they look at each turbine site and assess the placement in relation to wetlands, natural flow, designated water ways or other conservation practices. They also look at the type of soils that will be affected too.

Signal Interference

E.ON has submitted a completed Wind Power GeoPlanner Communication Tower Study for the project, identifying all communication signal towers and their respective signal tower owners within the Project. This is included in Appendix I. Comsearch, a CommScope Company, performed the study and concluded that the Twin Forks wind farm project should be sited so as to avoid or minimize impacts to normal operation of these communication towers.

Shadow Flicker

A shadow flicker study was completed by Stantec and included in Appendix H. In the conclusion of the report, Stantec reported no receptors within the project area are expected to receive more than 30 hours of shadow flicker each year. Thirty-two of the receptors analyzed are expected to receive between 20 to 30 hours of shadow flicker per year. This analysis was performed using conservative model inputs and does not include the blocking of shadow flicker due to vegetation or other obstacles. Obstacles such as barns, garages or silos may further reduce the effect of shadow flicker on an individual receptor.

Use of Public Roads in Macon County

No road use agreements have been signed at this time between Austin Township, Maroa Township, Illini Township, and Hickory Point Township or Macon County Highway Department. On August 10, 2015, I received a signed letter from the attorney of the affected road commissioners stating they are currently working on a road agreement with E.ON.

EFFECTS ON GENERAL WELFARE:

The establishment, maintenance, or operation of this Special Use could be detrimental to or endanger the public health, safety, welfare, and morals. However studies have been conducted to minimize and ensure the public health and safety of citizens of Macon County.

EFFECTS ON NEARBY PROPERTY: The Special Use could be injurious to the use and enjoyment of other property in the immediate vicinity for the purposes already permitted or substantially diminish and impair property values with the neighborhood. However studies have been conducted to minimize and ensure the public health and safety of citizens of Macon County.

EFFECT ON DEVELOPMENT OF SURROUNDING PROPERTY:
The establishment of the Special Use Permit could impede the normal and orderly development and improvement of surrounding property for uses permitted in the district.

ADEQUACY OF UTILITIES & FACILITIES: No known problems with required utilities and facilities.

INGRESS & EGRESS: If the problems with ingress and egress are addressed within the floodplain boundaries or wetlands then the ingress and egress will conform.

CONFORMITY TO REGULATIONS: With the passage of the Special Use Permit by the Macon County Board the property will conform.

STAFF RECOMMENDATION: While you may vote to recommend approval or denial of this petition, staff has inspected the property and staff recommends **approval** with the following stipulations:

1. This Special Use Permit does not constitute a license issued to the name Petitioners only. The Special Use Permit is intended to “run with the land.”
2. The Special Use Permit is assignable or transferable only upon the sale or transfer in ownership of the subject property.
3. Building permits shall be obtained as required.
4. Building permits will not be issued until a decommissioning plan is submitted along with the decommissioning bond paid in full.
5. Building permits will not be issued until an updated noise study is completed for the specific brand of turbine that is going to be constructed for Twin Forks Wind Farm.
6. Building permits will not be issued until a road use agreement is approved among Maroa Township, Illini Township, Austin Township, Hickory Point Township Road Commissioners, along with Macon County Highway Department. Dewitt County shall

have a signed road use agreement for the use of any roads where their jurisdiction is marked.

7. All turbine sites shall have an E-911 address sign marked at the intersection of the access road and the public road to ensure in an emergency appropriate people can respond to the correct site.
8. On the collection and switching substations all equipment and appurtenances upon said property, specifically including but not limited to electrical motors and pumps, shall be enclosed in properly designed and constructed sound dampening structures with sufficient sound insulating properties.
9. Said property and all operations shall be in compliance at all times with all applicable federal, state, and local laws and regulations. Failure to be in compliance may result in the suspension or revocation of this special use permit.
10. With respect to Turbine #T006, a building permit will not be issued until E.ON submits proof that they have worked with Enbridge Pipeline to ensure no safety problems will result from the turbine access road crossing the Enbridge pipeline.
11. With respect to Turbines #T013, T015, T103, and T126, building permits will not be issued until E.ON submits proof that the turbine access road will not impede the natural flow of the floodplain and that drainage shall remain in a positive flow.
12. This Special Use Permit will be voided if construction does not begin within eighteen (18) months of approval of said permit by the Macon County Board. This permit will be reviewed periodically for compliance as frequently as is deemed necessary by the Macon County Zoning Administrator, but not less frequently than once every ten (10) years.