BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF SOUTH DAKOTA

IN THE MATTER OF THE APPLICATION BY DEUEL HARVEST WIND ENERGY LLC FOR ENERGY FACILITY PERMITS OF A WIND ENERGY FACILITY AND A 345-KV TRANSMISSION LINE IN DEUEL COUNTY, SOUTH DAKOTA FOR THE DEUEL HARVEST NORTH WIND FARM

SD PUC DOCKET NO. _____

PRE-FILED DIRECT TESTIMONY OF MICHAEL SVEDEMAN
ON BEHALF OF DEUEL HARVEST WIND ENERGY LLC

November 30, 2018

I. INTRODUCTION AND QUALIFICATIONS

Q. Please state your name and business address.

A. My name is Michael Svedeman. I am a Manager, Project Development, at Invenergy LLC ("Invenergy"). My business address is 1401 17th Street, Suite 1100, Denver, CO 80202.

Q. Briefly describe your educational and professional background.

A. I have a Bachelor of Business Administration in Energy Management, with a Minor in Finance, from the University of Oklahoma. I have been employed with Invenergy for more than four years in roles with increasing responsibility. In my current position, I oversee development of multiple wind and solar projects across the upper Midwest. A copy of my resume is attached as **Exhibit 1**.

Q. What is the relationship between Deuel Harvest Wind Energy LLC ("Deuel Harvest" or the "Applicant") and Invenergy with respect to the Project?

A. Deuel Harvest is an affiliate of Invenergy, and Invenergy is assisting with development of the Deuel Harvest North Wind Farm ("Project").

Q. Please describe Invenergy's experience in the renewable energy industry.

A. Invenergy develops, builds, owns, and operates large-scale power plants across four core technologies: wind (90 projects, 12,864 megawatts ("MW")); natural gas (11 projects, 5,642 MW); solar (25 projects, 2,150 MW); and battery storage (5 projects, 72 MW). Invenergy has a proven development track record of 131 large-scale projects and currently provides wind turbine operations and maintenance services on more than 3,400 wind turbines currently in operation. As part of Invenergy's various generation projects, Invenergy has permitted and built 414 miles of transmission lines greater than 69 kV and continues to operate 182 miles of those lines.

Q. What is your role with respect to the Project?

A. I am the Project manager, and in that role, I oversee development of the Project.

II. PURPOSE OF TESTIMONY

Q. What is the purpose of your Direct Testimony?

A. The purpose of my testimony is to provide an overview of the Project's development history, including: Project site selection, site analysis, and layout and facility design. I also provide testimony regarding Project operational considerations and analysis of the Project's potential effect on the physical environment, hydrology, and cultural resources.

Q. Please identify which sections of the Application to the South Dakota Public Utilities Commission ("Commission") for Facility Permits ("Application") you are sponsoring for the record.

A. I am sponsoring the following sections of the Application:

- Section 1.0: Introduction
- Section 2.0: Project Development Summary
- Section 3.0: Facility Permit Application
- Section 4.0: Names of Participants
- Section 5.0: Names of Owner and Manager
- Section 6.0: Purpose of, and Demand for, the Facilities
- Section 7.0: Estimated Cost of the Facilities
- Section 8.0: General Site and Project Component Description
- Section 9.0: Alternate Sites and Siting Criteria
- Section 11.0: Effect on Physical Environment
- Section 12.0: Effect on Hydrology
- Section 15.6: Electromagnetic Interference
- Section 16.0: Local Land Use Controls
- Section 19.0: Time Schedule
- Section 20.0: Community Impact
- Section 21.0: Employment Estimates
- Section 22.0: Future Additions and Modifications
- Section 23.0: Decommissioning of Wind Energy Facilities
- Section 24.0: Reliability and Safety
- Section 25.0: Information Concerning Wind Energy Facilities

- Section 26.0: Information Concerning Transmission Facilities
- Section 27.4: Applicant's Burden of Proof
- Section 28.0: Testimony and Exhibits
- Section 29.0: References
- Appendix A: Figures
- Appendix C: WES Ordinance, SEP, and Findings
- Appendix E: Level III Intensive Cultural Resources Survey
- Appendix H: Interconnection Area Siting Study
- Appendix P: AM and FM Radio Report
- Appendix Q: Communication Tower Study
- Appendix R: Microwave Study
- Appendix S: Aviation Report
- Appendix T: Historical/Architectural Survey
- Appendix U: Decommissioning Cost Analysis
- Appendix V: General Electric's Setback Considerations for Wind Turbine Siting

III. PROJECT OVERVIEW

Q. Who will own and operate the Project?

A. Deuel Harvest will own, manage, and operate the Project.

Q. Please provide a general description of the Project, including where it is located.

A. The Project includes a wind energy conversion facility ("Wind Farm") and a 345-kilovolt (kV) transmission line with associated 345-kV interconnection substation ("Transmission Facility"). The Project will have a rated capacity of 310.1 MW of electricity and will include construction of up to 112 turbines. The Project is located entirely within Deuel County in the townships of Portland, Lowe, Altamont, Glenwood, and Herrick (Project Area; see Figure A-1 in Appendix A). The Project Area encompasses approximately 48,730 acres, 41,980 of which are under lease for the Project. Project facilities will include the following:

- Up to 112 wind turbines;
- Access roads to turbines and associated facilities;
- Underground 34.5-kV electrical collector lines connecting the turbines to the collection substation;
- Underground fiberoptic cable for turbine communications co-located with the collector lines;
- An operations and maintenance ("O&M") building;
- Up to four permanent meteorological ("MET") towers;
- A 34.5 to 345-kV collection substation ("Project Substation");
- A 345-kV interconnection substation ("Interconnection Substation");
- An approximately 150-foot long 345-kV transmission line ("Transmission Line") connecting the Project Substation and the Interconnection Substation; and
- Additional temporary construction areas, including crane paths, public road improvements, a laydown yard, and a concrete batch plant(s) (as needed).

Q. Has Deuel Harvest secured all of the necessary private property rights for the Project?

A. Yes. Deuel Harvest has secured all of the private land rights necessary to construct and operate the Project. Deuel Harvest will work with local units of government to obtain the necessary road crossing and utility permits for the Project.

Q. How and where will the Project interconnect to the electric grid?

A. Deuel Harvest is negotiating a Generator Interconnection Agreement ("GIA") with Otter Tail Power Company and the Midcontinent Independent System Operator, Inc. ("MISO"). The Project will interconnect to the regional electric grid via a new 345-kV Interconnection Substation to be located in Glenwood Township. The

Interconnection Substation will be constructed by the Applicant or Otter Tail Power Company and will be owned and operated by Otter Tail Power Company.

Q. Has the Project identified an off-taker for the energy it will produce?

A. No, not at this time. The Project is being actively marketed to potential offtakers, including public utilities serving South Dakota customers and commercial industrial companies.

Q. What is the proposed development schedule for the Project?

A. The Applicant expects to have the Project operational in the fourth quarter of 2020. A preliminary permitting and construction schedule is included as Table 19-1 in the Application and below:

Milestone	Start Date	Completion Date
Land acquisition	Q2 2015	Q4 2017
Environmental studies	Q1 2016	Q2 2018
Special Exception Permit / WES process with Deuel County	Q4 2017	Q1 2018
SDPUC Wind Energy Facility Permit process	Q4 2018	Q2 2019
Other federal, state, and local permits	Q2 2019	Q4 2019
Project construction	Q4 2019	Q4 2020
Commercial operations	N/A	Q4 2020

IV. OVERVIEW OF SITE SELECTION

Q. Please provide an overview of the Project's development history.

A. Deuel Harvest began developing the Project in mid-2015 with initial landowner outreach, establishment of a local office on Main Street in Clear Lake, South Dakota, and the construction of three MET towers to verify and quantify the strong wind resource in the area. Leasing, stakeholder outreach, engineering, and additional Project development activities have continued through 2018. Deuel Harvest's outreach efforts have included: meeting with individual landowners and landowner groups, regulatory agencies, local government units, and the general public to discuss the Project; and gathering comments to

address in the Project's planning, design, permitting, construction, and operation phases.

Q. How was the location of the Project initially identified?

A. Deuel Harvest conducted feasibility studies in 2015 to identify a wind farm location in South Dakota within the MISO service territory. Initial studies included a desktop review of environmental resources and any potentially sensitive areas, looking for potential wind turbine locations in South Dakota that could connect to the then-under-construction Big Stone to Brookings 345-kV transmission line, and were within windy areas per proprietary wind resource screening tools. With that initial information and given Deuel Harvest's knowledge of other wind developments in the region, the Project Area was identified after working closely and gauging interest with local landowners and stakeholders.

V. LOCAL PERMITTING

Q. Has the Project obtained the land use approvals required for the Project from Deuel County?

A. Yes. Pursuant to the Wind Energy System ("WES") Ordinance, a WES in Deuel County requires a Special Exception Permit ("SEP") for a Wind Energy System. Deuel Harvest applied for an SEP for the Project (including both the Wind Farm and Transmission Line) in December 2017, and the Project's SEP was issued in March 2018. The WES Ordinance includes specific requirements concerning setbacks, lighting, decommissioning, and multiple mitigation measures. Deuel Harvest has designed the Project to meet the requirements contained in the WES Ordinance.

Q. Is the Project compatible with existing land uses and future development in and around the Project Area?

A. Yes. The Project is compatible with existing land uses, which are primarily agricultural. Wind development is particularly compatible with agricultural land because the existing uses can continue around the wind energy facility. As a result, wind development allows landowners to diversify their operations with

minimal disruption to existing agricultural uses. As I previously stated, the Project has also been designed to be compatible with local zoning requirements in Deuel County.

VI. TURBINE MODEL SELECTION

Q. Has Deuel Harvest made a final turbine model selection for the Project?

A. The Applicant proposes to erect up to 112 wind turbines for the Project which will be comprised of two turbine models. One of the turbine models will be the GE 2.3-116 turbine. Use of these turbines qualifies the Project for the Production Tax Credit. The other turbine model is anticipated to be the GE 2.82-127.

VII. PROJECT CONFIGURATION

Q. Is the Project's proposed configuration depicted in Figure A-4 of the Application?

A. Yes.

Q. Is the same configuration proposed for any turbine model selected?

A. Generally, yes. However, turbines 7, 16, A22, 78, 81, 82, 83, 98, A99, 111, 112, 122, and 124 can support a GE 2.3 -116 model only due to sound and shadow flicker requirements. All other turbine locations within the layout can accommodate either turbine model listed in Table 8-2.

Q. Is the configuration sited so as to minimize potential environmental impacts?

A. Yes. As discussed in the Direct Testimony of Andrea Giampoli and Sections 10.0 through 18.0 and 20.5 of the Application, the Project was sited to minimize potential environmental impacts. For example, no permanent Project facilities will be placed on U.S. Fish and Wildlife Service ("USFWS") Grassland Easements or within wetland basins subject to USFWS Wetland Easements, no sensitive species habitat will be impacted, and previously-recorded cultural resources have been avoided.

Q. Is the Project configuration designed to comply with all applicable county and state turbine setback requirements?

A. Yes.

Q. Please identify the applicable specific setbacks for the Project and other requirements and commitments that affect turbine setbacks.

A. The applicable setbacks, requirements, and commitments are listed in Table 9-1 in the Applicable and provided below:

Category	Requirements / Commitments
State Requirements	
Setbacks[1]	Turbines shall be set back at least 500 feet or 1.1 times the height of the tower, whichever is greater, from any surrounding property line, unless the owner of the wind turbine tower has a written agreement with an adjacent land owner allowing the placement of the tower closer to the property line.
Deuel County Requirements	
Setbacks[2]	Distances from existing Non-Participating residences and businesses shall be not less than four times the height of the wind turbine. Distance from existing Participating residences, business and public buildings shall be not less than 1,500 feet. Non-Participating property owners shall have the right to waive the respective setback requirements. Distance from public right-of-way shall be one hundred and ten percent (110%) the height of the wind turbines, measured from the ground surface to the tip of the blade when in a fully vertical position. Distance from any property line shall be one hundred and ten percent (110%) the height of the wind turbine, measured from the ground surface to the tip of the blade when in a fully vertical position unless wind easement has been obtained from adjoining property owner. Distance from the Lake Park District located at Lake Cochrane is at least 3 miles, from Lake Alice at least 2 miles and 1 mile from the Lake Park District at Bullhead

[1] Per SDCL 43-13-24

[2] Per Deuel County Zoning Ordinance § 1215.03(2)

Category	Requirements / Commitments
	Lake. Distance from the municipalities of Altamont, Astoria, Brandt and Goodwin of 1 mile from the nearest residence and 1.5 miles from the city limits of the towns of Gary, Toronto and Clear Lake, except the area of Clear Lake located in sections 11, 12 and 14.
Noise [3]	Noise level shall not exceed 45 dBA average A-weighted sound pressure at the perimeter of existing residences, for Non-Participating residences.
Shadow Flicker[4]	Limit for allowable shadow flicker at existing residences to no more than 30 hours annually.

VIII. FINAL MICRO-SITING

Q. Where is the Project at with respect to micrositing of the turbines?

A. As discussed previously and in the Application, significant analysis has been completed to identify the Project configuration shown on Figure A-4 of the Application. Final micrositing will occur based on geotechnical analysis, final engineering design, and other site specific factors.

Q. Could remaining work require changes to the turbine locations?

A. Yes. The remaining work could necessitate minor shifts to the proposed turbine locations.

Q. What is Deuel Harvest's request with respect to flexibility for future minor shifts in the turbine locations presented in Figure A-4 of the Application?

A. Consistent with prior Commission decisions, Deuel Harvest requests that the permit allow turbines to be shifted within 250 feet or less from the turbine location identified in the Application without prior Commission approval, so long as the turbine shifts comply with county and State setback requirements and specified noise and shadow flicker requirements; cultural resource impacts are avoided or mitigated in consultation with the South Dakota State Historic Preservation Office ("SHPO"); environmental setbacks are adhered to as agreed upon with the

[3] Per Deuel County Zoning Ordinance § 1215.03(13)(a)

[4] Per Deuel County Zoning Ordinance § 1215.03(13)(b)

USFWS and the South Dakota Game, Fish and Parks ("SDGFP"); and wetland impacts are avoided. Prior to implementing the turbine adjustment, the Applicant would file in the docket an affidavit demonstrating compliance with the limitations set forth above. Any turbine adjustment that does not comply with the aforementioned limitations would be considered a "material change," and the Applicant shall file a request for approval of the "material change' prior to making the 11 adjustment pursuant to the following approval process:

- Applicant will file with the Commission and serve on the official Service List a request for approval of the adjustment that includes:
  - An affidavit describing the proposed turbine adjustment, the reason for the adjustment, the reason the adjustment does not comply with one or more turbine flexibility limitations set forth above, and information regarding compliance with all other applicable requirements; and
  - A map showing both the approved location and the proposed adjustment (in different colors).
- Once received, the information would be reviewed by Commission staff, and Commission staff will have 10 calendar days within which to request further Commission review.
- If no further review is requested, Applicant may proceed with the adjustment.
- If further review is requested, the Commission will issue a decision regarding Applicant's request at its next available regularly scheduled Commission meeting, subject to notice requirements, after the request for further review is made by Commission staff.

Q. Why is the Project proposing alternate turbine locations?

A. Alternate turbine locations are proposed to provide optionality during final micro-siting or a change in the nameplate capacity of the turbine. Furthermore, these additional locations provide layout flexibility to hedge against potential capacity factor reductions in cases where a necessary turbine shift within 250 feet of its

original location lowers the capacity factor greater than activating an alternate location. Alternate turbine locations also help prevent unforeseen findings from reducing the size of the Project or from significantly injuring the productivity of the Project. In all cases, the final turbine locations constructed will adhere to county and State setback requirements and specified noise and shadow flicker requirements; cultural resource impacts are avoided or minimized; environmental setbacks are adhered to as agreed upon with the USFWS and the SDGFP; and wetland impacts are avoided.

Q. With respect to other facilities, what is Deuel Harvest's request with respect to final micro-siting?

A. As a result of final micrositing and the utility coordination needed to facilitate Project interconnection, shifts in the access roads and collector system, as well as changes in the locations of the O&M facility, Project Substation, MET towers, concrete batch plant, Transmission Line, Interconnection Substation, and laydown/staging areas, may be necessary. Therefore, Deuel Harvest requests that the permit allow those facilities to be modified, as needed, so long as the new locations are on land leased for the Project, cultural resource impacts are avoided, environmental setbacks are retained, wetland impacts are avoided to the extent practicable, and all other applicable regulations and requirements are met.

Q. Are any future modifications or expansions of the Project planned?

A. With the exception of the final micro-siting flexibility requested in the Application, the Applicant does not have any current plans for future additions to or modifications of the Project.

IX. SITE-SPECIFIC ANALYSIS

Q. Describe the existing geological and soil resources, seismic risks, and subsidence potential in the Project Area.

A. Discussions of existing geological and soil resources are provided in Sections 11.1 and 11.2 of the Application, respectively. The risk of seismic activity in the

vicinity of the Project Area is low, and the risk for subsidence within the Project Area is considered negligible.

Q. What steps will Deuel Harvest take to avoid or minimize potential impacts to geologic and soil resources?

A. In general, it is not anticipated that impacts to geologic resources will occur. With respect to soil resources, the minimum amount of vegetation required to develop the Project will be removed in the areas associated with proposed Project components. The Project layout has been designed to limit construction cut and fill work and limit construction in steep slope areas. During Project construction, Deuel Harvest will also develop and implement a Storm Water Pollution Prevention Plan ("SWPPP") in accordance with South Dakota Department of Environmental and Natural Resources storm water permitting requirements, which will include the implementation of best management practices ("BMPs") to control storm water runoff and mitigate erosion and sedimentation.

Q. Describe the hydrologic resources, including surface and underground resources, present within the Project Area.

A. A discussion of hydrologic resources within the Project Area is provided in Section 12.0 of the Application. The following types of hydrologic resources were analyzed with respect to the Project:

- Groundwater resources: Within the Project Area, the Altamont aquifer is present at a depth of 755 feet below the surface near the city of Altamont and 177 feet below the surface in the northeast corner of the Project Area. Water quality in the Altamont aquifer generally is not suitable to use for irrigation, although it may be acceptable in some places. Elsewhere, the water ranges from marginally acceptable to unsatisfactory for use as a domestic or public supply. Although little used for livestock supplies, the water is acceptable for such use and is a potential source of stock water.
- Surface water resources: Most of the Project Area is within the Lac qui Parle Sub-basin. This sub-basin is characterized by dendritic parallel meltwater

channels with few lakes. Outflow from the Project Area within this basin is via Lost Creek, Timber Creek, Crow Timber Creek, and Monighan Creek, as well as their unnamed tributaries, which flow west to east to the West Branch Lac qui Parle River. Approximately 28 percent of the Project Area is within the Upper Minnesota Sub-basin. Drainage in this area generally flows west to east via several unnamed tributaries to Caine Creek, which then flows north to the South Fork Yellow Bank River. Lake Alice, which is the largest waterbody within the sub-basin, is owned by the State of South Dakota and supports a fishery managed by the SDGFP. The remaining portion of the Project Area (less than one percent) lies within the Middle Big Sioux Sub-basin.

- National Park Service Nationwide Rivers Inventory ("NRI"): No NRI-listed rivers occur within the Project Area. The nearest NRI-listed river to the Project Area is the South Fork Yellow Bank River located on the north boundary of the Project Area paralleling the Deuel/Grant county line in Grant County.
- Impaired waters: There are no impaired waters within the Project Area. The nearest 303(d)-listed waterbody is the South Fork Yellow Bank River, located on the north boundary of the Project Area paralleling the Deuel / Grant county line in Grant County.
- Floodplains: The Federal Emergency Management Agency has not completed a study to determine flood hazard for the Project Area; therefore, a flood map has not been published at this time. The nearest mapped floodplains to the Project Area are Zone A designations associated with the South Fork Yellow Bank River on the northern boundary of the Project Area and the West Fork of the Lac qui Parle River on the eastern Project Area boundary.

Q. Are significant impacts to hydrologic resources anticipated?

A. No. Construction of Project facilities could require groundwater dewatering. However, dewatering is not anticipated to be a major concern because wind

turbines are typically placed at higher elevations where the water table tends to be deeper. Project facilities have been designed to avoid impacts on surface water resources.

Q. What measures will Deuel Harvest employ to avoid, minimize, and/or mitigate potential impacts to hydrologic resources?

A. As I previously noted, Deuel Harvest will develop and implement a SWPPP, which will result in the implementation of BMPs to control storm water runoff and mitigate erosion and sedimentation in connection with Project construction activities.

Q. What steps has Deuel Harvest taken to identify cultural resources within the Project Area?

A. Deuel Harvest retained Burns & McDonnell to conduct an evaluation of cultural resources. A literature review was conducted for the Project in accordance with SHPO guidelines to provide an inventory of previously recorded cultural resources. In addition, a Level III cultural resource investigation was completed for all areas that would be physically impacted by the Project Facilities in August and September 2018. Results will be used avoid or minimize potential impacts to cultural resources during micrositing and construction of the Project.

A historic-age non-archaeological resource survey was completed for the Project in August and September 2018. During the field survey effort, surveyors sought to document all buildings, structures, objects, districts, etc. constructed prior to 1973 (45 years of age or older) within the Project Area and a one-mile buffer (Area of Potential Effect ("APE")). The survey was conducted solely from publicly accessible roads unless permissible access was available to private property. The historians recorded 338 historic-age non-archaeological resources on 123 properties in the APE. Eight resources that were identified as historic-age according to maps and aerial photographs were not accessible from the public ROW. Though some of these resources have unknown eligibility, none would be subject to direct or otherwise adverse effects from the Project. Of the accessible

resources, one (the Hoffman Brothers Barn) is currently listed on the National Register of Historic Places ("NRHP"), and four appear to meet NRHP eligibility criteria. The remaining resources lack historical associations and architectural integrity and are not recommended for NRHP inclusion. None of the NRHP-listed or eligible resources would be adversely affected by the Project because their settings do not contribute to their significance and because the Project will not result in direct impacts.

These surveys are described in more detail in Section 20.5 and Appendices E and T to the Application.

Q. What steps will Deuel Harvest take to avoid, minimize, and/or mitigate impacts to cultural resources?

A. Known sites or historic architectural resources determined to be NRHP-eligible are avoided by Project Facilities.

X. PROJECT DESIGN AND CONSTRUCTION

Q. Please describe the foundations that will be constructed for the turbines.

A. Foundations for the towers are anticipated to be a spread foundation design. The foundation extends above ground by less than 1 foot and is approximately 13 feet in diameter when above ground.

Q. Will the collection system be installed underground?

A. Yes. Approximately 67.5 miles of underground collector lines will be installed, depending on the turbine model selected, and final electrical design. The collector lines are to be located primarily on privately-owned parcels but may also include some installations in public right-of-way ("ROW") subject to the permitting requirements of the ROW authority. A fiber optic cable and an additional separate ground wire would also be installed with the collector system. The fiber optic cable would be used for telemetry, control, and communication purposes. Aboveground junction boxes would be installed as required for connections or splices. For purposes of calculating temporary impacts in this Application, the

Applicant anticipates approximately 114 acres of total temporary disturbance from underground collector system construction. The Applicant assumes that some of the construction disturbance for the underground collector system would be shared with construction disturbance for access roads where these facilities overlap.

Q. Please describe the Project substation.

A. The Project Substation will be approximately two acres in size, located generally in the center of the Project Area, and will consist of two substation transformers, circuit breakers, disconnect breakers, disconnect switches, bus conductors, switching devices, auxiliary equipment, a control enclosure containing equipment for proper control, protection, monitoring, and communications, and associated equipment and facilities. The principal function of the substation is to increase the voltage from the collector system (34.5 kV) to the voltage of the transmission line (345 kV), which will transport the electricity of the entire Project to the MISO grid via the Interconnection Substation. The Project Substation will be located within a fenced area that is designed in accordance with industry standards to provide safety and security.

Q. Please describe the O&M building.

A. An O&M building will be constructed adjacent to the Project Substation and Interconnection Substation, or another suitable location within the Project Area, and will provide access and storage for Project O&M equipment. The O&M building will be an approximately 7,000 to 10,000 square-foot building, which would house operating personnel, offices, operations and communication equipment, parts storage and maintenance activities, and a vehicle parking area. An area for outdoor storage of larger equipment and materials would also be included within a fenced area for safety and security.

Q. Please discuss the design and installation of the permanent MET towers.

A. Up to four permanent MET towers may be installed as part of the Project. These MET towers are used to acquire wind data to confirm turbine performance once

the Project is operational. The MET towers will be self-supporting with heights not to exceed the hub height of the wind turbines. The permanent MET towers will be marked and lighted as specified by the FAA. The proposed locations of these MET towers are shown on Figure A-4. Final location may depend on the final location of the turbines and specifications of the turbine manufacturer and financing parties. Locations will be within the Project Area, on land that is under lease with Deuel Harvest, and will meet all County setbacks and requirements.

Q. Please discuss the design and installation of the Interconnection Substation.

A. The Interconnection Substation will be approximately two acres in size and will serve as the electrical interconnection between the Project and the regional transmission system. The Interconnection Substation will include, but is not limited to, the following: 345 kV circuit breakers, disconnect breakers, disconnect switches, bus conductors, auxiliary equipment, and a control enclosure containing equipment for proper control, protection, monitoring, and communications. The Interconnection Substation will be located within a fenced area that will be designed in accordance with industry standards to provide safety and security.

Q. Please discuss the design and installation of the Transmission Line.

A. The Project will include an overhead 345-kV Transmission Line connecting the Project Substation and Interconnection Substation. The 345-kV Transmission Line will be approximately 150 feet in length and span between the Project Substation and Interconnection Substation. Due to the short span, the Transmission Line will only require dead-end structures within the Project Substation and Interconnection Substation. The Transmission Line will be located on land under lease for the Project and wholly within the Project Area. Deuel Harvest anticipates that construction of the Transmission Line will not impact land outside of the Project Substation and Interconnection Substation. The 660-foot Transmission Line corridor is identified on Figure A-4.

Q. Discuss the personnel that that will be involved in construction of the Project.

A. The Project is expected to employ approximately 400 temporary workers over approximately 12 months for approximately 820,000 to 840,000 worker-hours to support Project construction. The construction crews would include skilled labor, such as foremen, carpenters, iron workers, electricians, millwrights, and heavy equipment operators, as well as unskilled laborers.

XI. PROJECT OPERATION AND MAINTENANCE

Q. Discuss the personnel that will be involved in operation and maintenance of the Project.

A. Deuel Harvest anticipates that Project operation and maintenance will result in 15 full-time jobs. The Applicant will manage operations, maintenance, and service of the Project and its related facilities. The Project will have a full-time staff of technicians, a supervisor, and others as necessary to conduct scheduled and non-scheduled maintenance activities. Onsite service and maintenance activities include routine inspections, regular preventive maintenance on all turbines and related facilities, and unscheduled maintenance and repair on the wind turbines, electrical power systems, and communications systems.

Q. How will the Project be monitored between inspections?

A. The Project's design includes safety and control mechanisms. These mechanisms are generally monitored using a SCADA system. Each turbine is connected to the SCADA system via fiber optic cable, which allows the turbines to be monitored in real time by the O&M staff. The SCADA system also allows the Project to be remotely monitored, thus increasing Project oversight, as well as the performance and reliability of the turbines. Not only would the local O&M building have full control of the wind turbines, but a 24/7 remote operations facility would also have control of the individual turbines. These two teams coordinate to ensure that the wind turbines operate safely and efficiently.

A third mechanism for safety and control is within the turbines themselves. Each turbine monitors the wind speed and direction to ensure its current position is most efficient to produce electricity. These data are also used for feathering the blades; applying the brakes in high wind speeds or if there is ice build-up on the blades; and to tell the turbine when the wind is strong enough to begin turning the generator and producing electricity at the "cut-in" wind speed.

Q. How reliable will the wind turbines and associated infrastructure be?

A. Invenergy's fleet-wide availability wind portfolio was more than 97% for 2016 and 2017 – among the best in the industry in North America. Invenergy has a department dedicated to monitoring and improving performance of its fleet. Performance monitoring includes fault analysis, predictive analysis and condition monitoring. Additional departments are dedicated for monitoring of blades, gearboxes, generators and oils/greases, and monitoring the fleets centralized SCADA system. Invenergy has won the American Wind Energy Association Award for Achievement in Operations twice, most recently in 2017.

XII. DESIGN, CONSTRUCTION, AND OPERATIONAL CONSIDERATIONS

Q. What safety features will be incorporated into the Project?

A. Among other, the safety measures identified below will be used for the Project. Additional detail regarding the Project's safety measures is provided in the Application – specifically in Section 24.0.

- Wind turbines will be sited 550 feet from existing roadways, 4 times the turbine height from Non-Participating Residences (approximately 2,000 feet), 1,500 feet from Participating Residences, and 550 feet from Non-Participating property lines per the applicable planned setback requirements described in Section 9.2;
- Security measures will be implemented during the construction and operation of the Project, including temporary (safety) and permanent fencing, warning signs, and locks on equipment and wind power facilities;

- Prior to construction, the Project contractor will work with local and county emergency management to develop procedures for response to emergencies and potential incidents concerning Project construction;
- During Project operations, the Project will coordinate with local and county emergency management to develop an emergency management plan to be implemented in the event of an emergency at the Project site;
- The Project will use an ice detection system to detect icing conditions on turbine blades that will result in turbines being shut down if icing conditions are identified. Turbines will not return to normal operation until icing is no longer a concern; and
- The Project design conforms with GE's setback considerations for wind turbine siting, as identified in Section 7 of Appendix V.

Q. Has Deuel Harvest accounted for existing infrastructure (including existing communications systems) in designing the Project?

A. Yes. Electrical service in the Project Area is provided by H-D Electric Cooperative. The Brookings-Deuel rural water system supplies rural water to the Project Area and maintains a network of distribution lines within the Project Area. Deuel Harvest is currently in discussions with Interstate Telecommunications Cooperative, Inc. ("ITC"), an owner of existing telephone and telecommunication lines in Deuel County, regarding the Project.

Q. Will the Project participate in the South Dakota One-Call program?

A. Yes.

Q. With respect to use of existing local roads as haul roads, will Deuel Harvest coordinate with local road authorities regarding the use and restoration of those roads?

A. Yes.

Q. What steps will the Project take to prepare for a potential emergency situation at the Project site during construction and when the Project is operational?

A. During Project construction, the Project contractor will work with local and county emergency management to develop procedures for response to emergencies, natural hazards, hazardous materials incidents, manmade problems, and potential incidents concerning Project construction. The contractor will provide site maps, haul routes, Project schedules, contact numbers, training, and other requested Project information to local and county emergency management.

During Project operations, the Project operator will coordinate with local and county emergency management to protect the public and the property related to the Project during natural, manmade or other incidents. The Project will register each turbine location and the O&M building with the rural identification/addressing (fire number) system and 911 systems.

Q. Has Deuel Harvest considered electromagnetic interference in connection with the construction and operation of the Project?

A. Yes. Deuel Harvest retained consultants to conduct the following studies for the Project to analyze potential electromagnetic interference (including radar): AM and FM Radio Report (Appendix P); Communication Tower Study (Appendix Q); Microwave Study (Appendix R); and Aviation Report (Appendix S).

Q. Will the Project be designed, constructed, and operated in compliance with all applicable federal, state, and local regulations?

A. Yes.

XIII. DECOMMISSIONING

Q. What is the estimated life of the Project?

A. Applicant anticipates that the life of the Project (including both the Wind Farm and Transmission Line) would be approximately 30 years and reserves the right to extend the life of the Project as well as explore alternatives regarding Project

decommissioning. One such option may be to retrofit the turbines and power system with upgrades based on new technology, which may allow the wind farm to produce efficiently and successfully for many more years.

Q. Will the Project be decommissioned at the end of its useful life?

A. Yes.

Q. If the Project is decommissioned, will the Project comply with all applicable state and local requirements for structure removal and site restoration?

A. Yes. Decommissioning will comply with applicable state and local requirements, including any Deuel County requirements.

Q. Has Deuel Harvest analyzed the cost of decommissioning the Project?

A. Yes. The Decommissioning Cost Analysis (Appendix U) analyzes the cost of decommissioning the Project. The net decommissioning cost (in 2018 U.S. dollars) is estimated to be $3,256,300 assuming salvage and no resale of Project components. The decommissioning cost per wind turbine with salvage and no resale is estimated to be $29,074.

Q. Who will be responsible for covering all anticipated decommissioning costs?

A. Deuel Harvest will be responsible for covering all anticipated decommissioning costs.

XIV. PROJECT BENEFITS

Q. Please describe the local and state benefits the Project will provide.

A. Apart from the employment benefits I discussed previously, the Project is expected to create both short-term and long-term positive impacts to the local economy. Over its estimated 30-year life, the Project is anticipated to directly generate more than $145 million in direct economic benefits, including property

taxes[5], lease payments, and local staff salaries. Over the 30-year life of the Project, direct payments will be:

- Approximately $84 million to Deuel County landowners, an average of approximately $2.8 million every year;
- Approximately $10.5 million to Deuel County, an average of approximately $350,000 every year;
- Approximately $24.8 million to the State of South Dakota, an average of approximately $825,000 every year;
- Approximately $3.5 million to the local school district in the first 10 years of Project operations; and
- A $30,000 annual scholarship provided to fund for Deuel school, funded by Invenergy (in addition to annual generation tax payments made to the school);

XV. CONCLUSION

Q. Does this conclude your direct testimony?

A. Yes.

[5] To estimate the generation based property tax portion of payments that comprise the above property tax payments, Deuel Harvest utilized a net capacity factor of 47% that was calculated using the methodologies described in Chapter 6.1 of the Application.

Dated this 30th day of November, 2018.

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Michael Svedeman