Vinton Solar Energy LLC
Case No. 17-774-EL-BGN

Application Part 1 of 5

Part 1 includes:

- **Letter**
- **Affidavit of Michael Kaplan, Vice President, Business Development, Vinton Solar Energy LLC**
- **Application Narrative**

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Date Filed: July 5, 2017

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July 5, 2017

Ms. Barcy F. McNeal, Secretary
Ohio Power Siting Board
Docketing Division
180 East Broad Street, 11th Floor
Columbus, Ohio 43215-3797

Re: Application
Case No. 17-774-EL-BGN
In the Matter of the Application of Vinton Solar Energy LLC for a Certificate of Environmental Compatibility and Public Need to Construct a Solar-Powered Electric Generation Facility in Vinton County, Ohio.

Dear Ms. McNeal:

Accompanying this letter is an application by Vinton Solar Energy LLC ("Applicant") for a Certificate of Environmental Compatibility and Public Need to Construct a Solar-Powered Electric Generation Facility in Vinton County, Ohio. The original application was electronically filed, and the required number of copies both in hard copy and electronic have been provided to the Docketing Division.

Along with this filing, we also provided the Docketing Division copies of the redacted portions of the application, and have filed a Motion for Protective Order and Memorandum in Support requesting protective treatment of the confidential information contained therein.

The Applicant further notes that there have been no revisions to the information presented in the preapplication notification letter.

In accordance with Ohio Administrative Code Rule 4906-2-04, we make the following declarations:

Name of the applicant:

Vinton Solar Energy LLC
(subsidiary of Invenergy LLC)
One Wacker Drive, Suite 1800
Chicago, Illinois 60606

Name and location of the facility:

Vinton Solar Center
Elk Township
Vinton County, Ohio

Name of authorized representative:

Christine M.T. Pirik
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Notarized Statement:

See attached Affidavit of Michael Kaplan
Vice President, Business Development, Vinton Solar Energy LLC

Respectfully submitted,

/s/ *Christine M.T. Pirik*
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(*Counsel agrees to receive service by email*.)

Attorneys for Vinton Solar Energy LLC

CMTP:KB
Enclosures

BEFORE THE

OHIO POWER SITING BOARD

In the Matter of the Application of Vinton Solar Energy LLC for a Certificate of Environmental Compatibility and Public Need to Construct a Solar-Powered Electric Generation Facility in Vinton County, Ohio.	)))))	Case No: 17-774-EL-BGN

AFFIDAVIT OF VICE PRESIDENT OF VINTON SOLAR ENERGY LLC

STATE OF ILLINOIS :
: ss
COUNTY OF COOK :

I, Michael Kaplan, being duly sworn and cautioned, state that I am over 18 years of age and competent to testify to the matters stated in this affidavit and further state the following based on my personal knowledge:

1. I am the Vice-President of Development at Vinton Solar Energy LLC, which is a wholly-owned indirect subsidiary of Invenergy LLC.

2. I have reviewed Vinton Solar Energy LLC's Application for a Certificate to Construct a Solar-Powered Electric Generation Facility in Vinton County, Ohio.

3. To the best of my knowledge, information, and belief, the information and materials contained in the above-referenced Application are true and accurate.

4. To the best of my knowledge, information, and belief, the above-referenced Application is complete.

Michael Kaplan, Vice President

Sworn to before and signed in my presence this 22 day of June 2017.

Notary Public

"OFFICIAL SEAL"
ALEAH R WREN
Notary Public - State of Illinois
My Commission Expires January 20, 2020

BEFORE
THE OHIO POWER SITING BOARD

In the Matter of the Application of Vinton Solar Energy LLC for a Certificate of Environmental Compatibility and Public Need to Construct a Solar-Powered Electric Generation Facility in Vinton County, Ohio.	**)** **)** **)** **)** **)**	**Case No. 17-774-EL-BGN**

APPLICATION

Submitted by Vinton Solar Energy LLC
July 5, 2017

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ACRONYMS AND ABBREVIATIONS USED IN APPLICATION

Acronym	Reference
AC	alternating current
AEP	American Electric Power
ANSI	American National Standards Institute
BMP	Best Management Practices
CAA	Clean Air Act of 1970
CFR	Code of Federal Regulations
DC	direct current
DOW	ODNR Division of Wildlife
EPA	Environmental Protection Agency
EPC	engineering, procurement, and construction
ESRI	Environmental Systems Research Institute, Inc.
FAA	Federal Aviation Administration
Hardin Wind	Hardin Wind Energy LLC
HVAC	heating, ventilation, and air conditioning
IEEE	Institute of Electrical and Electronics Engineers
IPaC	Information for Planning and Conservation
kV	kilovolt
kW	kilowatt
LiDAR	Light Detection and Ranging Program
MET	meteorological
mph	miles per hour
MV	medium voltage
MW	megawatt AC
MWh	megawatt hour
n.d	no date
n.p	no publisher
NAAQS	National Ambient Air Quality Standards
NAIP	National Agriculture Imagery Program
NCF	net capacity factor
NEC	National Electrical Code
NESC	National Electrical Safety Code
NFPA	National Fire Protection Association
NLCD	National Land Cover Database
NPDES	National Pollutant Discharge Elimination System
NRCS	National Resource Conservation Service
NSPS	New Source Performance Standards
NWI	National Wetlands Inventory
O&M	operations and maintenance
OAC	Ohio Administrative Code
OARDC	Ohio Agricultural Research and Development Center
ODNR	Ohio Department of Natural Resources
ODSA	Ohio Development Services Agency

OGRIP	Ohio Geographically Referenced Information Program
OPSB	Ohio Power Siting Board
OSHA	Occupational Safety and Health Administration
OVRDC	Ohio Valley Regional Development Commission
PJM	PJM Interconnect LLC
POI	point of interconnection
PSD	Prevention of Significant Deterioration
PTI	permit to install
PTIO	permit to install and operate
PV	photovoltaic
PVC	polyvinyl chloride
RTO	Regional Transmission Operator
SPCC	Spill Prevention, Control, and Countermeasure
Study Area	construction impact area and study area
SWPPP	Stormwater Pollution Prevention Plan
UL	Underwriters Laboratories
USACE	U.S. Army Corps of Engineers
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey

4906-4-01 Purpose and scope

(A) General

The materials contained herein and attached hereto constitute Vinton Solar Energy LLC's (Applicant's) submittal (Application) for a Certificate of Environmental Compatibility and Public Need (Certificate). This Application is prepared in accordance with the requirements for the filing of standard certificate applications for electric generation facilities, as prescribed in Ohio Administrative Code (OAC) Chapter 4906-4. This Application has been prepared by the Applicant.

(B) Waivers

The Ohio Power Siting Board (OPSB) may, upon an application or motion, waive any requirement of OAC Chapter 4906-4 other than a requirement mandated by statute.

The Applicant is not requesting any waivers at this time.

4906-4-02 Project summary and Applicant information

(A) Summary of the proposed Project

The Applicant, an affiliate of Invenergy Solar Development North America LLC, is proposing to construct a solar-powered electric generation facility (the Facility or Project) of up to 125 megawatt (MW_{ac}, hereinafter referred to as MW), located in Vinton County, Ohio. The Facility will interconnect to the regional electrical system through a substation adjacent to the Project Area.

Invenergy Solar Development North America LLC is an affiliate of Invenergy Renewables LLC, which is in turn an affiliate of Invenergy LLC (Invenergy). As one of the nation's leading independent power generation companies, Invenergy is applying its renewable energy experience and innovation toward expanding its clean energy portfolio to include solar power generation in the state of Ohio.

(1) General purpose of the Facility

The general purpose of the Project is to produce clean, renewable, reliably-priced, low-cost electricity to the Ohio bulk power transmission grid operated by PJM Interconnection LLC (PJM) or under a power purchase agreement. Solar power provides a clean, sustainable source of electricity, free of fuel pricing volatility. As energy and environmental costs rise, and technology advances, solar-powered generation provides a sustainable, long-term, competitive energy solution.

(2) General location, size, and operating characteristics of the Facility

The proposed Facility will be located on approximately 1,950 acres of leased land in Vinton County, Ohio, in Elk Township (Project Area). Land use within the Project Area is predominantly pasture and was previously used for coal mining. The Applicant has submitted interconnection request AC1-194 to PJM for the American Electric Power (AEP) 138 kilovolt (kV) Elk Substation. The point of interconnection (POI) will be the 138 kV Elk substation adjacent to the Project

Area. Depending on the exact modules used, the Facility is expected to include over 496,000 modules and to produce over 241,000 MW hour (MWh)/year. A detailed description of the Facility, including each Facility component, can be found in OAC Sections 4906-4-03(A) and (B) of this Application.

(3) Description of the suitability of the site for the Facility

The Applicant has determined that the Project Area is an ideal location through a statewide review of transmission line locations and availability, landowner interest, community interest, competitive analysis, and evaluation of site suitability. A detailed description of the Project Area selection and siting constraints can be found in OAC Section 4906-4-04 of this Application.

(4) Project Schedule

Acquisition of land rights for the Project was completed in October 2016. A public information meeting was held on April 5, 2017, in accordance with OAC Section 4906-3-03. Construction of the Facility is expected to begin as early as the First Quarter of 2018, and commercial operation is planned for as early as the Fourth Quarter of 2018. Additional information on the Project schedule can be found in OAC Section 4906-4-03(C)(1) of this Application.

(B) Future plans for additional generation facilities in region

(1) Description of future plans for additional generation

The Applicant does not have any future plans for additional generation in this region at this time.

(2) Description of Applicant's history, affiliate relationships, and current operations

Invenergy develops, owns, and operates power generation and energy storage facilities in the Western Hemisphere, Europe, and Japan. Invenergy has a proven

track record in establishing and maintaining longstanding, profitable relationships with utilities, suppliers, and the communities in which its projects are located.

Invenergy has developed more than 15,915 MW of utility-scale wind, solar, natural gas, and energy storage projects in the United States (U.S.), Central and South America, Canada, Europe, and Japan. This includes more than 10,394 MW of projects in operation, with more than 1,875 MW in construction, and 3,646 MW contracted. Invenergy is North America's largest independent renewable power generation company. Invenergy is focusing on the development and operation of solar energy projects, up to approximately 200 MW in size. Invenergy's first operational solar project is the 20 MW Grand Ridge Solar farm, located adjacent to its Grand Ridge Wind project in LaSalle County, Illinois. Invenergy has 7 additional operating solar facilities in the U.S. and Canada, with numerous other projects in various stages of construction and advanced development.

One of Invenergy's affiliates, Hardin Wind Energy LLC (Hardin Wind), received a certificate from the OPSB in Case No. 09-479-EL-BGN and commenced construction in November 2016.

4906-4-03 Project description and schedule in detail

(A) Project Area's geography, topography, population centers, major industries, landmarks

(1) Project Area map

Figure 03-1 depicts the geography and topography of the Project Area and the surrounding area within a 2-mile radius. This mapping was developed from U.S. Geological Survey (USGS) Topographic Quads: Zaleski, Ohio (USGS Quad ID 39082-C4) and McArthur, Ohio (USGS Quad ID 39082-B4), and includes details from Environmental Systems Research Institute, Inc. (ESRI) and Ventyx. Among other information, Figure 03-1 shows the following:

(a) The proposed Facility

(b) Population centers and administrative boundaries

(c) Transportation routes and gas and electric transmission corridors

(d) Named rivers, streams, lakes, and reservoirs

(e) Major institutions, parks, and recreational areas

The Facility layout provided in Figure 03-1 and all subsequent figures represents the current design of the Project. The Applicant has made considerable effort to depict the layout in its final form to the extent possible at this stage of development. However, the exact placement of Facility components is subject to change prior to construction. Final engineering efforts will determine the exact location of all equipment, which will depend on a number of considerations, including additional geotechnical studies, and the exact models selected for modules and inverters.

However, the final layout will remain within the boundary that has been studied for visual, cultural, and environmental impacts. Any final adjustments to the layout will not cause additional impacts beyond what is discussed in this Application. The final layout will be provided to the OPSB prior to construction.

(2) Project Area, in acres, owned and leased properties, number of properties

The Project Area consists of 1,950 acres of pasture and forest land. The Applicant has secured a total of 2,020 acres under two long-term leases with the same landowner.

(B) Description of proposed Facility

The Facility will generate electricity using multiple arrays of solar panels connected to electrical infrastructure and transmitted via a collection system to the Project substation. A short transmission line will connect the Project substation to the POI. Solar panels generate electricity using the photoelectric effect whereby the materials in the panels absorb the sun's energy in the form of photons and release electrons. The capture of these free electrons produces an electrical current that can be collected and supplied to the electrical power grid.

The Facility will be composed of access roads, fencing, racking posts, a racking system, photovoltaic (PV) panels (or modules), inverters/transformers, an underground alternating current (AC) collection system, and a collector substation. The Facility will also include an operations and maintenance (O&M) building for operations staff and associated O&M equipment.

The access roads will be approximately 16 feet wide with 2-foot shoulders and will be constructed near the center and perimeters of the Facility for access by maintenance vehicles. A typical road cross section will have 4 inches of subgrade material with 2-inch caps.

The site fencing will be approximately 7 feet high and will be installed along the perimeter of the Project Area.

The racking posts are expected to be installed with a pile driving machine. A typical post is 10 feet long and its depth is 6 feet below grade. However, in areas with freeze thaw or loose soils, such as Vinton County, the posts are typically installed at 10 to 15 feet below grade, with an additional 4 to 6 feet above grade. The standard solar racking post is the H pile, which is 6 inches across and 4 inches wide.

The racking system will employ a fixed tilt and will not track the sun. The fixed-tilt racking system will be oriented in east-west rows, with the panels facing toward the south to maximize the collection of solar resource.

PV panels are installed on the racking system in either a landscape (horizontal) or portrait (vertical) orientation. The modules are affixed to the racking with clips. The modules will be connected using direct current (DC) cables that can either be buried in a trench or attached to the racking system. The DC cables gather at the ends of the racking systems to combiner boxes to transmit the cables to the inverter/transformer combination locations.

Inverters are installed throughout the Project Area. Inverters will convert the DC system to AC power which will be transmitted to the Project substation/collector substation or switchyard by the underground AC collection system.

An underground 34.5 kV AC collection system will be installed at a minimum depth of 36 inches below grade and will be comprised of medium voltage (MV) AC cable running from each inverter/transformer location to the Project substation.

The Project substation will include all material and equipment needed to electrically interconnect the 34.5 kV collection system to the main high voltage 138 kV step-up transformer and to the interconnection transmission system. The Project substation will be located within the Project boundary and will connect to the Elk Substation via an

approximately 0.2 mile overhead transmission line. The exact location of this transmission line has not yet been determined. When this location is determined all necessary studies will be completed and provided to the OPSB.

The Facility may also include a large-scale advanced battery system. The battery storage facility may complement the Facility by regulating frequency, balancing variations in solar production, energy shifting, and digital peaking and/or transmission and distribution deferral. The possible advanced battery system will consist of lithium-ion battery racks (or equivalent) housed in a custom building or prefabricated shipping containers and will interconnect to the Elk substation.

(1) Generation equipment

(a) Type and number of units

The Facility will include the following generation equipment: PV modules that generate DC power; a fixed-tilt racking system to hold the modules; and inverters to convert the modules' output to AC power.

The Facility will be composed of Jinko solar panels or comparable Tier-1 solar panels, such as the panels shown in Table 1 below. The table provides the module type and the approximate number of panels needed for the Facility. Regardless of the specific model, the modules will be approximately 3.25 feet by 6.5 feet and approximately 1.6 inches deep. Manufacturer specifications for the modules are included in Exhibit A, which has been filed under seal. If the Applicant utilizes a module that is not included in Exhibit A, the Applicant will provide the module specifications to the OPSB prior to construction.

Table 1. Solar Panels/Modules

SOLAR PANEL	MODULE TYPE	APPROXIMATE NUMBER OF PANELS
JINKO SOLAR	Multi-crystalline	628,564
JINKO SOLAR	Monocrystalline	576,901
HANWHA Q CELL	Multi-crystalline	601,626
HANWHA Q CELL	Monocrystalline	571,254
TRINA SOLAR	Multi-crystalline	628,564
TRINA SOLAR	Monocrystalline	576,901
JA	Multi-crystalline	660,513
JA	Monocrystalline	640,497
FIRST SOLAR	Thin Film	1,761,368
CANADIAN SOLAR	Multi-crystalline	640,497
CANADIAN SOLAR	Monocrystalline	621,659

The modules will be mounted to a fixed-tilt racking system. The racking will be mounted on piles, and will be organized in rows. The modules will be arranged in arrays running in a general east-west direction across the site with the panels facing south to maximize solar resource collection. The racking system will hold the bottom edge of the panels a minimum of 18 inches above the ground, but may range up to 36 inches depending on consideration of factors such as site topography, snowfall, natural vegetation growth, and shading from other panels or objects.

The modules' electrical power output will be collected into combiner boxes at the end of each array and then transmitted to inverters. The inverters will transform the DC power produced by the panels into AC power that will be used to transmit the power onto the nearby AEP power infrastructure. The inverters will be located along the interior access roads so as to set them back as far as reasonably possible from adjacent property lines. The inverters are metal boxes that will be approximately 19 feet by 3 feet by 7 feet, and will weigh about 12,000 pounds. The Facility will employ SMA inverters or comparable, such as ABB, Power Electronic, Ingeteam, or GE inverter. Manufacturer specifications for the inverters are included in Exhibit B, which has been filed under seal. If the

Applicant utilizes an inverter that is not included in Exhibit B, the Applicant will provide the specifications to the OPSB prior to construction. The table below shows the approximate number of inverters needed for the Project for the different manufacturers.

Table 2. Inverters

INVERTER	TYPE	APPROXIMATE NUMBER OF INVERTERS
SMA	SC2500-EV	53
ABB	PV980	60
POWER ELECTRONIC	FS3000	40
INGETEAM	SUN 1620	81
GE	LV5	32

The Facility's estimated annual net capacity factor (NCF) is approximately 22% and the expected annual generation is approximately 241,200 MWh. The Applicant notes that neither the heat rate nor the estimated demonstrated net capacity is applicable to solar facilities.

(b) Description of turbine

This section is not applicable for solar facilities.

(c) Fuel quantity and quality

Fuel quantity and quality are not applicable for solar facilities.

(d) Pollutant emissions

Solar facilities generate electricity without combusting fuel or releasing pollutants into the atmosphere. Therefore, this section is not applicable for solar facilities.

(e) Water volume requirement, source, discharge information

The Facility will not require the use of water for cooling or any other activities, nor will the Facility operation involve the discharge of water or wastewater into streams or water bodies. Therefore, this section is not applicable for solar facilities.

(2) Description of generation facility components and construction

(a) Generation facility components/plant

The Facility will include access roads, fencing, racking posts, a racking system, PV modules, inverters/transformers, an underground alternating AC collection system, a collector substation, and an O&M building.

Solar array construction will begin with the installation of support structures and foundations. Array rack foundations are H-Beams/Wide Flange Beams that will be direct driven into the soil using track vehicles. Pull testing will validate the calculated minimum depth of pier foundation that is needed, which is currently assumed as 10-15 foot depth. This method of pull test validation helps minimize the impact to the site with foundation size and depth required. For limited foundations that encounter underground obstructions, voids, or lesser soils conditions, pile foundations may be embedded in concrete to provide the necessary lateral and vertical strength.

Once foundations and support structures are in place, racking assemblies will be constructed on-site and installed on the support structures. Final assembly of the fixed-tilt racking system onto the support structures will require a variety of equipment including: small cranes; tractors; welding machines; gators; pickup trucks; and lifts. Solar modules will be installed by hand on the finished racking system, bolted down and left electrically

disconnected until complete blocks or arrays are ready to be electrically connected and commissioned. Blocks of solar modules will be completed and commissioned in stages, with varying amounts of man-power on site depending on the activity, ranging from approximately 25 to 200+ at peak times. For the last month of the installation, there will be minimal staffing on site to complete small touch-up items with the completed installation and monitor the site during test power generation and equipment testing.

(b) Fuel, waste, water, other storage facilities

There will be no fuel, waste, or water storage facilities needed for the operation of the Facility.

(c) Fuel, waste, water, other processing facilities

There will be no fuel, waste, or water processing facilities needed for the operation of the Facility.

(d) Water supply, effluent, sewage lines

Water will be used for site preparation and grading activities. During earthwork for the grading of roads and other components, the main use of water will be for compaction and dust control. Some water will also be used for preparation of any concrete required for foundations. During construction, 2.5 gallons of potable water per person will be available for drinking water and will be stored in the office trailers.

All water will be brought in from off-site sources as needed. Water for site preparation, grading, concrete, and dust control will be brought by 3,500-gallon water trucks, whereas potable water will be transported in 5-gallon containers.

(e) Associated electric transmission and distribution lines, and gas pipelines

A transmission line of approximately 0.2 miles will be needed to connect the Project substation to the POI. The Facility will not require any gas pipelines.

(f) Electric collection lines

Solar modules are connected in DC series to form strings. Electricity from these strings is aggregated in combiner boxes. A single DC circuit then leaves each combiner box, which is installed underground and connects to the inverter/transformer combination. The DC cables can either be installed buried in a trench or attached to the racking system. This last option is the most common and likely the one that will be used in the Project.

In order to be sent to the electrical grid, the DC current must be converted into AC power, and inverters serve this function. The conversion is accomplished by rapidly switching the DC power supply. By varying the length of time that the switch is on, as well as the polarity, the positive and negative swells of an AC wave are created. This waveform is then smoothed with an output filter. Inverters employ several advanced control systems, switching algorithms, and ancillary services for both the input and output stages. For the input stage, the inverters can manipulate the DC voltage to ensure maximum power harvest of input, and on the output various sensors ensure that AC power production is in accordance with regulatory requirements.

A set of MV AC cabling runs from each of these inverter/transformer combination locations to the collector substation location. The electrical cable is buried using a trencher, at a minimum clearance of 36 inches from

the top of the cable. The cables will be arranged in several branch circuits, each circuit consisting of 34.5 kV three single conductor cables in a trefoil arrangement with polyvinyl chloride (PVC) jackets that connect groups of solar modules to an open air isolation switch in the Project substation. This installation is similar in design to the ones used by electric utilities for MV buried installations.

(g) Substations, switching substations, transformers

A foundation (typically 3 feet deep) is installed for the inverter/ transformer combination. The inverter will convert the system to AC power. The inverter AC output voltage (480 volts) will then be stepped up to a higher voltage (34.5 kV) using padmount transformers located next to each inverter. The transformer is designed to integrate with the inverter. Underground collection cables, as described in the above section, will connect the electrical output of these transformers to the Project substation.

At the Project substation, the voltage will again be stepped up (from 34.5 kV to 138 kV) to prepare it to connect to the grid at the Elk substation. The Project substation will include several 34.5 kV branch circuit breakers in combination with open air type isolation switches to connect the collection system feeders to the main 34.5 kV substation bus, a 34.5 kV main bus open air isolation switch, a 34.5- to 138 kV step-up transformer, and a 138 kV circuit breaker and open air isolation switch. The Project substation will also include protective relay and metering equipment, utility and customer revenue metering, and a 34.5 kV to 120/240-volt station service transformer to provide power to the Project substation service load and the control house.

(h) Temporary and permanent meteorological towers

The Facility will include approximately 1 meteorological (MET) tower for every 15 MW of solar capacity. Each MET tower will be approximately 10 feet tall, and will include sensors such as an anemometer, a wind vane, a pyranometer, a pressure sensor, and a thermometer. The MET towers typically have a concrete foundation and sit next to the Project's inverters.

(i) Transportation facilities, access roads, crane paths

Equipment deliveries and workers will have easy access to the site. Access to the site for most construction traffic will be from Highway 93, as the bridge near Highway 677 has a weight restriction of 23 tons. Another option is to access the Project site at the existing trail from Highway 677. This trail accesses the Project Area on the east end of the Facility and can be upgraded to a gravel road to better suit construction traffic. See Exhibit C for a road survey performed in compliance with the Vinton County Engineer's requirements.

New service roads will facilitate access within the Project site (See Figure 03-1). The roads will be approximately 20 feet wide and have aggregate as cover, adequate to support the size and weight of construction, maintenance, and rescue vehicles.

During the construction phase, several types of light and medium construction vehicles will travel to and from the site. Private vehicles will also be used by the construction personnel. At this time, Invenergy estimates the below total truck trips in the area distributed throughout the construction period:

Table 3. Truck Trips During Construction

Vinton		
Module Deliveries	625	semi-trucks
Inverter/Transformer Pads	125	concrete trucks
Module Racking	1875	semi-trucks
Electrical misc.	1250	semi-trucks
Access Roads	1500	dump trucks
TOTAL TRUCK LOADS	5375	

The highest traffic volume will occur during the peak construction periods when the rack foundation posts, rack, and module assembly is taking place concurrently. Oversize and overweight loads are only expected for delivery of the generator step-up (GSU) transformer in the Project substation.

Routine maintenance will require 2 to 4 light-duty trucks.

With regard to the question of crane pads, the Applicant notes that crane pads are not applicable for solar projects.

(j) Construction laydown areas

Throughout the construction period, Invenergy's contractor will provide temporary construction facilities. These facilities will be comprised of contractor construction trailer(s), space for subcontractor trailers and parking, and a graveled construction laydown area to meet contractor requirements complying with Best Management Practices (BMPs). These trailers will be placed in the proximity of the substation or inside of the Project properties. The laydown area will be approximately 7-10 acres and will be reclaimed at the end of construction.

(k) Security, operations, and maintenance facilities or buildings

A 7-foot-high chain link fence will be installed around facilities as they are constructed, and access will be controlled by gates around both the Project and the Project substation. High voltage equipment will be separately fenced with warning signage.

A control enclosure will be installed next to the Project substation inside the fenced limits for the purpose of storing protective relay and communications equipment. It will also store Project documents for technicians. The control enclosure will have fire and safety equipment such as smoke detectors, fire extinguishers, and an eyewash station. The control enclosure will come with a heating, ventilation, and air conditioning (HVAC) system. The HVAC system and other equipment in the control enclosure will be powered with station power.

Access within the Project perimeter fence is limited only to trained and authorized site personnel.

The Applicant may choose to purchase or rent an existing building to utilize as an O&M facility for the Project. However, if this is not feasible, the Applicant will construct an O&M building of approximately 1,500 square feet in the vicinity of the Project substation, keeping 1-2 staff daily.

(l) Other pertinent installation information – site preparation

Construction of the Facility will begin with surveying and staking the construction limits, as well as some limited clearing and grading. The entire Project Area will be cleared of any obstacles, including bushes or boulders. The site grading will remove slopes greater than 5% so that the land is as flat as possible before installing the racking.

Grading may require excavation, soil redistribution, and soil compaction in order to achieve desired grades and elevations, and to ensure proper soil compaction as identified in the detailed design. Grading will be most extensive in areas for the access roads and Project substation yard, while grading and vegetation removal will be minimized to the extent practicable for the rest of the components. The site cut and fill will be balanced across the entire site; however, temporary stockpiling and grading will require the use of backhoes, graders, and rollers/compactors. Rocks and gravel found and removed on site will be reused within the site construction to the extent possible. Construction activities will be in stages as much as possible in order to minimize dust generation and decrease the time for site soils stabilization.

After Project construction, all areas outside the Project perimeter fence impacted by construction and not needed for on-going operations will be reclaimed to the state prior to construction.

(3) Need for new electric transmission lines

An approximately 0.2-mile-long, single circuit 345 kV transmission line will connect the Project substation to the POI at the Elk Substation.

(4) Project Area map

Figure 03-01 depicts the layout of the Facility and Figure 03-2 depicts the aerial view of the Facility. These figures are prepared at a 1:12,000 scale using 2015 National Agriculture Imagery Program (NAIP) orthophotography imagery as the base mapping. These figures include the following information:

(a) An aerial photograph

(b) The proposed Facility, including all components listed in (B)(2)

(c) Road names

(d) Property lines

(C) Project schedule

(1) Schedule in Gantt format

The Project schedule is discussed below and presented in Table 4 that includes all of the following information:

(a) Land acquisitions and land rights

The Facility will be built on private land under lease and easement to the Applicant. Acquisition of the land was completed in October 2016.

(b) Wildlife and environmental studies/surveys

The Applicant does not anticipate impacts to potential major species habitats (i.e., streams, woodlots). The Applicant has contracted for appropriate species-specific studies. The results of the studies are included as Exhibits D, E, and F. Additional details regarding the studies are included in OAC Section 4906-4-08(B)(1).

(c) Grid interconnection studies and other critical path milestones

The Applicant has a 125 MW queue position with PJM, AC1-194. The Applicant received its Feasibility Study for queue number AC1-194 on May 12, 2017 (See Exhibit G). The Applicant expects to receive the System Impact Study in October 2017. Additional queue position details are provided in OAC Section 4906-04-05.

(d) Preparation of OPSB Application

Preparation of the Application submitted to the OPSB has been ongoing since the fourth quarter of 2016.

(e) Submittal of Application to OPSB

This Application will be submitted on or before July 5, 2017.

(f) Certificate issuance by OPSB

The Applicant anticipates that OPSB will issue a Certificate by the end of 2017.

(g) Preparation of the final design

The final design will be prepared at the beginning of the fourth quarter of 2017.

(h) Construction of the Facility

Construction of the Facility is scheduled to begin in the first quarter of 2018.

(i) Placement of Facility in Service

The Facility is scheduled to begin commercial operation in the fourth quarter of 2018. Table 4 sets forth the Project schedule.

Table 4. Project Schedule

Year	2016				2017				2018			
Quarter	1	2	3	4	1	2	3	4	1	2	3	4
Land Rights Acquisition												
Wildlife Studies/Survey												
Receipt of Feasibility Study												
Receipt of System Impact Study												
Receipt of Interconnection Agreement												
Submittal of OPSB Application												
Issuance by the OPSB of the Certificate												
Preparation of Final Design												
Construction of the Facility												
Placement of Facility in Service												

(2) Construction Sequence

An engineering, procurement, and construction (EPC) contractor will be selected to complete construction of the Project. Construction of specific Project components will be completed by subcontractors under the direction of the EPC contractor and Invenergy. The EPC contractor will prepare a construction plan that it and its subcontractors will follow that will provide detailed guidance on

Project design, construction process, safety, permitting, schedule, and other related construction items.

Project construction will follow a progressive approach. Construction of the Facility will begin with surveying and staking the construction limits. The site will then be cleared and fenced with security fencing prior to installation of the roads, solar panels, inverters/transformers, Project substation, and control house.

Several activities must be completed prior to the commercial operation date. The majority of the activities relate to equipment ordering lead-time, as well as design and construction of the Facility. A construction schedule is shown in Table 4. Pre-construction, construction, and post-construction activities, some of which will occur concurrently, include:

- Finalize Project design;
- Soil borings, testing, and analysis for proper foundation design and materials;
- Ordering of all necessary components, including solar modules, inverters/transformers;
- Survey to establish locations of structures and roadways;
- Construction of access roads to be used for construction and maintenance;
- Installation of rack foundations (vibratory or pile driving);
- Installation of racks;
- Installation and stringing of modules;
- Installation of underground cables;
- Construction of underground feeder lines;

- Design and construction of Project substation;
- Commissioning of modules and inverters; and
- Commencement of commercial operation.

(3) Impact of critical delays on in-service date

Invenergy does not expect any significant delays to the Project schedule. Should such a delay occur, the Applicant and Vinton County would both experience significant financial burden. The cost of potential delays is discussed in OAC Section 4906-4-06(D) of this Application.

4906-4-04 Project Area selection and site design

(A) Description of the Project Area selection

(1) Description and rationale for selecting study area or geographic boundaries

The Applicant began to identify potential solar sites in the Appalachian region of Ohio in response to the Public Utilities Commission of Ohio's directive to pursue solar in that part of the state.

(2) Map of study area

A map of the study area is provided as Figure 04-1. The Applicant studied the land within the Vinton County area for solar suitability.

(3) List and description of all qualitative and quantitative siting criteria

The factors that need to be present for a viable solar energy project are: transmission availability, competitive analysis, compatible land use, and interest from landowners.

(4) Description of the process and how the Applicant used the siting criteria

The Applicant followed its standard solar power site selection process which Invenergy has used to successfully locate and develop projects throughout the U.S. The entire state of Ohio was reviewed to locate possible development sites which meet the following criteria:

- **Sufficient power transmission facilities:** Due to the difficulty of a private company siting new transmission lines over long distances, ideal solar facility sites are those where transmission lines intersect. The Applicant reviewed areas that had transmission lines intersecting them.

- **Competitive analysis:** Solar energy sites have been in the process of being developed, largely through land acquisition by the Applicant, for several years. The Applicant reviewed publicly available information to determine where competitors can establish active developments and narrowed the pool of potential project areas based on this information.

- **Compatible land use:** The Applicant reviewed potential project areas to determine the level of residential development and focused on areas that had lower numbers of homes. Additionally, the Applicant focused on areas with large tracts of previously disturbed land in order to minimize environmental impact to existing habitat.

- **Landowner interest:** Solar developers have no way to compel landowners to participate in their solar facility as some utilities, such as those with eminent domain rights, do. Rather, the Applicant met with the landowners located within the Project Area and negotiated terms of a lease of their property. Lack of interest from landowners can stop a project. The overwhelmingly positive response from Vinton County was the impetus to move forward with permitting this solar Facility.

(5) Description of Project Area selected for evaluation

The Applicant located several sites which could potentially host a solar facility. The Applicant selected the subject site for further development because of an overwhelming positive welcome from area landowners and community leaders, and positive results from initial transmission studies. In addition, the site's former use as a strip mine eased concerns of potential environmental issues or sensitive habitat.

(B) Process for designing Facility layout

(1) Constraint map

A map of constraints for the proposed solar Facility are provided in Figure 04-02.

(2) Criteria used to determine site layout/comparison of alternative designs

The primary goal in determining the site layout is to both optimize energy production and minimize impacts. The main criteria that influenced the site layout to maximize the collection of solar energy include: row spacing; topography; utility offsets; landowner requests; and other site-specific constraints.

(3) Number and types of comments received

The public information meeting was held on April 5, 2017 at the Vinton County Community Building, at 31935 State Route 93, McArthur, Ohio 45651. The meeting was held from 4:30 p.m. to 7:30 p.m. In addition to providing stations where Invenergy personnel explained the proposed Project plans and responded to questions from community members, the Applicant provided comment sheets for attendees to make comments.

Invenergy estimates that 25 local landowners attended the public information meeting. Unfortunately, no attendees chose to leave written comments. However, this was likely due to the fact that none of the local landowners expressed opposition to the Project. The feedback was exceedingly positive. Invenergy received a range of comments and questions including:

- What will the Project look like?
- Will there be a fence around the site?
- Will there be hunting allowed within the site?

- Will local residents be able to work on the Facility?

- How much money will the county receive?

- How can we get more solar projects in our county?

Invenergy responded to the inquiries consistent with the responses in this Application. Contact information for the Applicant was available in the event any of the public had further questions.

4906-4-05 Electric grid interconnection

(A) Connection to the regional electric grid

PJM is the Regional Transmission Operator (RTO) that coordinates the movement of wholesale electricity throughout the region that includes Ohio. The Applicant will be connecting the solar Facility to the Elk substation, which is part of PJM. The Elk substation is owned by AEP, and is adjacent to the proposed Project boundary.

The Project will include a 345 kV circuit breaker and open air isolation switch that connects to the POI via an approximately 0.2 mile transmission line terminating at the POI.

(B) Interconnection information

(1) Generation interconnection request information

The Applicant has a 125 MW queue position. AC1 -194 is currently in the System Impact Study phase.

(2) System studies on generation interconnection

AC1-194 received its Feasibility Study on May 12, 2017. The System Impact Study is expected on October 31, 2017, and the Facility Study is expected on February 28, 2017. Upon completion of the studies by PJM, the Applicant will provide the studies to the OPSB. The Interconnection Service Agreement is expected on April 30, 2018.

The Feasibility Study (Exhibit G) is attached for further information.

4906-4-06 Economic impact and public interaction

(A) Ownership

The Applicant is an affiliate of Invenergy Solar Development North America LLC. All of the solar Facility will be owned and operated by Vinton Solar Energy LLC. This includes racking and foundations, modules, inverters, the Project substation, and all collection lines and cabling. It is expected that equipment ownership will be delineated at the dead end structure outside of the Project substation, on the high side of the transformer, with AEP ownership of any equipment beyond this point.

The Project Area consists of land owned by Benedict Inc. and W.E. Engle Trust, under long-term lease by Invenergy.

A right of way to run a transmission line from the Project Area to the POI will be secured. It is likely that the right or way will be secured under easement.

(B) Capital and intangible costs

(1) Estimated capital and intangible costs for various alternatives

Based on Invenergy's experience constructing solar facilities, and assuming a late 2018 start of commercial operations, it expects the overall capital cost of the Project to be approximately $[redacted]. The intangible costs are expected to be approximately $[redacted]. Final costs will depend on final solar panel pricing, material costs, design details, and contractor bids.

As described in OAC Section 4906-4-04, the Applicant has not proposed alternative Project areas; therefore, no cost comparison between alternatives is available.

(2) Cost comparison with similar facilities

The largest component of the cost to build a solar facility is the cost of the solar panels themselves, and these are priced the same regardless of where the solar facility is located in the U.S.

The construction costs for this site are estimated to be somewhat higher than other sites in the Midwest, due to the site's terrain. The topography of the site requires more extensive grading, and the subsurface soil conditions of the former strip mine may add cost to ensure stability. However, the fixed racking employed at this site will largely offset those construction costs, so that the cost per kilowatt (kW) of approximately $[redacted] remains similar to other sites Invenergy has built.

(3) Present worth and annualized capital costs

Capital costs will include development costs, solar Facility design, Project planning, equipment procurement, and construction. These costs will all be incurred within one to two years of the start of construction. As such, the present value of these costs are essentially the same as the costs presented for OAC Section 4906-4-06(B)(1). Capital cost calculations are limited to this solar Facility, as alternative project sites were not considered.

(C) Operation and maintenance expenses

(1) Estimated annual operation and maintenance expenses

Based on Invenergy's experience operating and maintaining its other solar facilities in the U.S., and based on a late 2018 start of commercial operations, the Applicant estimates that annual O&M costs for the solar Facility will be approximately $[redacted] per year for the first two years of operations, not including taxes, costs for land leases, or inflation increases.

(2) Operation and maintenance cost comparison

Based on Invenergy's experience, O&M costs for this solar Facility, not including costs for taxes or land leases, should not be substantially different than O&M costs for other U.S. solar facilities. The estimated $[redacted] O&M cost is expected to be very similar to other facilities.

(3) Present worth and annualized cost for capital costs

The estimated annual O&M cost is shown above in response to OAC Section 4906-4-06(B)(1). Assuming an 8.5% discount rate and a 2% escalation over the 30-year lifespan of the solar Facility, the present worth of the O&M costs is approximately $[redacted]. This calculation is limited to this solar Facility, as alternative project sites were not considered.

(D) Cost of delays

Any delay based purely on the lost revenue from the solar Facility and assuming a power price similar to other comparable solar facilities, with the cost of delay prorated on a monthly basis, is likely to be greater than $1 million per month. Depending on the length of the delay, it is possible that the Applicant could lose the value of federal tax credits, which would inflict additional financial burden. Should the Applicant have an agreement with a potential offtaker for the Facility, the Applicant may also be subjected to additional costs from delays due to breach of contract.

In addition to costs to the Applicant, Vinton County would be financially harmed by delays, as this would limit the county's ability to receive tax money from the Project, and would delay the economic benefits brought by the construction of the Facility.

(E) Economic impact of the Project

(1) Estimate of construction and operation payroll

Invenergy estimates the annual total and present worth of construction and operation payroll for the solar Facility to be over $[redacted].

(2) Estimate of construction and operation employment

Invenergy estimates that construction and operation of the solar Facility will employ approximately 200 onsite workers during construction and 2 ongoing workers for the life of the Project. The Applicant estimates that approximately 160 workers will be from Vinton County during construction and 1 ongoing worker will be from Vinton County.

(3) Estimated county, township, and municipal tax revenue

Invenergy estimates county, township, city, and school district tax revenue will significantly increase as a result of the solar Facility. The Vinton County Local School District is expected to receive over $367,000 annually from the Vinton Solar Project and the Vinton County General Fund will receive over $76,000 annually. Other taxing districts will receive between $5,084 and $50,836 annually. See Exhibit H, Economic Impact Report, for details.

(4) Estimated economic impact on local commercial and industrial activities

The expected new local output during construction totals almost $30 million for Vinton County and almost $60 million for the state of Ohio. The new local long-term output totals almost $460,000 for Vinton County and over $1.2 million for the state of Ohio. See attached Exhibit H, Economic Impact Report, for details on the Project's impact on local commercial and industrial activities.

(F) Public responsibility

(1) Public interaction

The Applicant has been working in Vinton County and meeting with landowners for over a year. Throughout this time, the Applicant has formed strong relationships with local landowners, as well as county officials. In addition, the Applicant has become the presenting sponsor of the 2017 Vinton County Junior Fair. The Fair is a week-long event for the families of Vinton County.

Over the past year, Invenergy has also begun to engage with the community with regards to the Vinton Solar Facility. In preparation for the public meeting prior to the initial filing with OPSB, the Applicant posted a notice in the *Vinton Courier* to announce a public information meeting. The public information meeting gave local residents an opportunity to learn more about the proposed Facility, ask questions, and provide written and spoken comments.

In the construction period, the Applicant's contractor will have a 24/7 "hot line" for emergency and complaint notices. During operations, site staff will be qualified to attend to requests and complaints with the necessary corporate support. Surrounding landowners will be provided with contact information for site staff. The Applicant has provided a Complaint Resolution Process in Exhibit I.

Per recommendation from OPSB staff, the Applicant met with adjacent landowners immediately surrounding the proposed site in June 2017 to discuss the proposed plans. All of these landowners were in support of the Project, and did not request any specific follow up. These landowners surrounding the Project Area will be mailed information about construction activities and provided with complaint resolution contact information at least 7 days prior to construction.

(2) Liability insurance and corporate programs

All solar panels will be installed on property under lease or easement to the Applicant. Terms of the leases or easements include requirements for the Applicant to pay annual rent, to pay for all tax-related payments, to minimize impacts on the landowner's current use of the property, and to remove the solar panels upon termination of the land agreement.

In addition, the terms of the leases require the Applicant to provide insurance for all solar Facility components and to indemnify the landowner and other third parties from liability claims resulting from the solar Facility's construction and operation.

The Applicant has consulted with Aon Risk Services Central, Inc. (Aon) on the possible impacts of installation and operation of the solar Facility. Aon has years of experience providing insurance and risk management services to the solar industry and works with the industry's leading experts and underwriters in the solar power generation field.

The Facility will carry insurance during development, construction, operation, and decommissioning that will ensure proper indemnification for third parties and for the interests of the Applicant. A program will be specifically tailored to meet the risk management and indemnification needs of all of the solar Facility stakeholders.

A Certificate of Liability Insurance is provided as Exhibit J, which has been filed under seal.

(3) Impact to roads and bridges

The Applicant retained Barr Engineering Co. to review local roads and bridges and the resulting report is provided as Exhibit C. A road survey consisting of a pavement visual assessment and an identification of areas of concern from the visual inspection was performed for the Project.

For purposes of the report, the roads associated with the Project were divided into four sections: two sections of approximately 2,000 feet each near Highway 23; one section of 800 feet near Highway 677; and one section for the remainder of the road.

Sections 1 and 2 were observed in failed conditions; section 4 in very poor conditions; section 3 is aggregate and not subject to pavement condition indexing.

Infirmary Road is in extremely poor conditions and would require reconstruction of paved sections. The gravel sections are in adequate condition and only require some maintenance to fill in washed out areas and to smooth out the surface. Since

it appears that maintenance for the paved areas consists of adding gravel instead of bituminous patching, it is recommended to mill the entire road, leave millings in-place, mix with aggregate, and compact. This will create a more uniform section throughout.

Access to the site for most construction traffic will most likely be from Highway 93, since the bridge near Highway 677 has a weight restriction of 23 tons. Another option is to access the Project site from Highway 677 on the existing trail. This trail accesses the Project Area on the east end of the Facility and can be upgraded to a gravel road to better suit construction traffic.

(4) Transportation permits for construction and operation

The Applicant is in coordination with the Vinton County Engineer and will ultimately pursue a Road Agreement with the county. Road closures and restrictions are not expected to be necessary, but the Applicant will work with the County Engineer if such measures are needed. The Applicant will abide by any and all required transportation permits.

(5) Plan for decommissioning

At the end of the useful life of the solar Facility, or in the unlikely event that it becomes necessary prior to that, the Applicant is prepared to decommission the Facility. A Decommissioning Report completed by Stantec Consulting Services Inc. will be provided within 45 days following Application submittal.

4906-4-07 Compliance with air, water, solid waste, and aviation regulations

(A) Purpose

This section provides environmental data regarding air, water, and solid waste in terms of current site conditions, potential impacts of the proposed Facility, and any proposed mitigation measures.

(B) Compliance with air quality regulations

(1) Preconstruction air quality and permits

(a) Ambient air quality

The Ohio Environmental Protection Agency (EPA) Division of Air Pollution Control publishes air quality data for the state of Ohio annually. The report summary of air quality data available for the state is found in the Division of Air Pollution Control 2014 Air Quality Report (Ohio EPA, 2014). Included in this report are a summary of 2013 air quality data, a discussion of toxics monitoring projects, and trend studies for selected pollutants. While no air monitoring sites are located in Vinton County, ambient air quality for the Project Area has been characterized with data measured at the nearest monitoring stations to Vinton County for each pollutant. No violations of National Ambient Air Quality Standards (NAAQS) were reported in the vicinity of the Project Area. In addition, the Ohio EPA lists Vinton County as an attainment or unclassified with the NAAQS for all pollutants.

Air emissions in the general areas are related primarily to farm operations, vehicular travel, and manufacturing. Vehicles traveling area roads and farm equipment produce exhaust emissions, along with dust from unpaved

road surfaces. In addition, routine odors are associated with certain farming practices (e.g., manure-spreading).

(b) Air pollution control equipment

Solar panels generate electricity without releasing pollutants into the atmosphere. Therefore, no air control equipment is required.

(c) Air quality standards and limitations

In accordance with Section 111 of the Clean Air Act of 1970 (CAA), the U.S. EPA established New Source Performance Standards (NSPS) to regulate emissions of air pollutants from new stationary sources. The OAC regulations do not contain any NSPS regulations for the Project Area beyond those promulgated at the federal level. These standards apply to a variety of facilities including: landfills; boilers; cement plants; and electric generating units fired by fossil fuels. Because solar panels generate electricity without releasing pollutants into the atmosphere, NSPS do not apply to the proposed Facility.

The CAA, as amended in 1990, requires the U.S. EPA to set NAAQS (40 Code of Federal Regulations [CFR] part 50) for pollutants considered harmful to public health and the environment. The U.S. EPA Office of Air Quality Planning and Standards has set NAAQS for 6 principal pollutants, which are called "criteria" pollutants and include carbon monoxide, lead, nitrogen dioxide, particulate matter, ozone, and sulfur dioxide. As described above, no air quality monitoring takes place in Vinton County; however, monitoring does occur in one of the 6 adjacent counties. No violations of NAAQS were reported in the vicinity of the Project Area (Ohio EPA, 2014).

All new sources of air emissions in Ohio are required to obtain a Permit to Install (PTI) for Title V facilities, or a Permit to Install and Operate (PTIO) for non-Title V facilities. Because solar panels generate electricity without releasing pollutants into the atmosphere, the proposed Facility will not require a PTI or PTIO.

Administered by the U.S. EPA, the Acid Rain Program was established by the CAA of 1990 to reduce emission of sulfur dioxide and mono-oxygen oxides through regulatory and market-based approaches. Because solar panels generate electricity without releasing pollutants into the atmosphere, the proposed Facility will not require an acid rain permit.

Prevention of Significant Deterioration (PSD) applies to new major sources of pollutants, and/or major modifications at existing sources for pollutants where the source is located in an area in attainment or unclassifiable with the NAAQS. The proposed Facility will not be a major source of any pollutants. Therefore, PSD does not apply to this Facility.

(d) List of required permits to install and operate air pollution sources

Solar panels generate electricity without releasing pollutants into the atmosphere. Therefore, air pollution permits are not required for the proposed Facility.

(e) Air quality map

As the Facility will generate electricity without releasing pollutants, air quality is not expected to be impacted. Therefore, a map of air monitoring stations is not applicable.

(f) Compliance with permits and standards

As indicated above, solar panels generate electricity without releasing pollutants into the atmosphere. Therefore, no air pollution permits are required. However, fugitive dust rules adopted pursuant to the requirements of RC Chapter 3704 may be applicable. The Applicant will control fugitive dust through the use of several practices, as described below in response to OAC Section 4906-4-07(B)(2).

(2) Plans to control air quality during site clearing and construction

BMP will be utilized and implemented to minimize the amount of dust generated by construction activities. These operations will be temporary and distributed throughout the Project Area and, therefore, will not result in significant impacts on air quality.

All construction vehicles will be maintained in good working condition to minimize emissions from construction-related activities. In addition, the extent of exposed/disturbed areas on the site at any one time will be minimized and restored/stabilized as soon as possible. Water or a dust suppressant such as calcium carbonate will be used to suppress dust on unpaved roads (public roads, as well as Facility access roads) as needed throughout the duration of construction activities. If necessary, temporary paving could be used to stabilize dusty surfaces in certain locations (e.g., the laydown yard). However, oil and stone dust suppression methods will not be applied within or immediately adjacent to sensitive areas, such as streams or wetlands. Any unanticipated construction-related dust problems will be identified and immediately reported to the construction manager and contractor.

(3) Plans to control air quality during Facility operation

(a) Ambient air quality monitoring

Solar panels generate electricity without releasing pollutants into the atmosphere. Therefore, there is no need for ambient air quality monitoring plans for air pollutants regulated by the federal or state EPA.

(b) Map of estimated concentrations in excess of significant emissions rates

Solar panels generate electricity without releasing pollutants into the atmosphere. Therefore, there will be no concentrations in excess of the significant emissions rate and there is no need to provide a map setting forth estimated concentrations.

(c) Procedures if air pollution control equipment fails

Solar panels generate electricity without releasing pollutants into the atmosphere. Therefore, there is no need to describe procedures in the event of a failure for air pollution control equipment.

(C) Compliance with water quality regulations

(1) Preconstruction water quality and permits

(a) List of permits

Prior to the start of construction, if required, the Applicant will obtain the following permits:

- The Ohio National Pollutant Discharge Elimination System (NPDES) construction storm water general permit, Ohio EPA Permit No OHC000004.

- An individual permit or nationwide permit under Section 404 of the Clean Water Act (if necessary as determined after final engineering).

- A Water Quality Certification Section 401 from the Ohio EPA (if necessary as determined after final engineering).

- An Ohio Isolated Wetland Permit (if necessary as determined after final engineering).

(b) Water quality map

This Facility will not utilize water and is not expected to impact bodies of water or water quality. Therefore, this section is not applicable.

(c) Water monitoring and engagement stations

This Facility will not utilize water and is not expected to impact bodies of water or water quality. Therefore, this section is not applicable.

(d) Existing water quality of receiving stream

This Facility will not utilize water and is not expected to impact bodies of water or water quality. Therefore, this section is not applicable.

(e) Permit application data

This Facility will not utilize water and is not expected to impact bodies of water or water quality. Therefore, this section is not applicable.

(2) Construction water quality

(a) Water quality map

This Facility will only utilize water during construction for inverter/transformer pad foundations and potentially for dust control as needed. This is not expected to impact bodies of water or water quality. Therefore, this section is not applicable.

(b) Estimate of quality and quantity of aquatic discharges

A Spill Prevention, Control, and Countermeasure (SPCC) Plan will be prepared that outlines procedures to be implemented to prevent the release of hazardous substances into the environment. In the event of a release, the SPCC Plan discusses how to contain and respond to the release.

The SPCC Plan will ensure that contractors maintain equipment so that it does not leak oil, hydraulic fluids, petroleum fuels, greases, cutting oils, anti-freeze, or other chemicals. If leaks or spills of these or other similar materials occur, contractors will promptly clean up the spill and will promptly notify the Applicant's site manager of the incident. Contractors will be responsible for offsite disposal of resulting waste materials in full compliance with applicable law. Contractors will be responsible for contacting Ohio EPA, the local fire department, and the local emergency planning committee (LEPC) within 30 minutes of a spill of 25 or more gallons.

Equipment and vehicle fueling is not expected to occur at this site. If needed, the contractor will fuel equipment in designated areas only, which will be identified once these areas are selected. Contractors will have spill kits sized for the amount of refueling taking place, with spill kits located at designated fueling areas (if any).

(c) Mitigation plans

Fuel storage and dispensing of liquid fuels, if any are required, will comply with applicable law, including: Occupational Safety and Health Administration (OSHA); U.S. and Ohio EPA; the SPCC Plan; and other applicable regulations, as well as the National Fire Protection Association (NFPA) standards.

The Applicant will comply with requirements in the NPDES storm water permit. The Applicant will ensure the contractor used for the Project implements appropriate BMPs to prevent erosion and control sediment in the areas of construction. BMPs will be included in the Stormwater Pollution Prevention Plan (SWPPP) that will be completed prior to construction.

(d) Changes in flow patterns and erosion due to clearing and grading

Changes to the flow patterns and erosion are not anticipated and the site will be designed and managed with adequate drainage to maintain natural flow patterns.

(e) Equipment for control of effluents discharged into water and streams

Since solar panels generate electricity without releasing pollutants into bodies of water, no equipment is needed for control of effluents discharged into bodies of water and receiving streams. Therefore, this section is not applicable for this Facility.

(3) Operation water quality

(a) Water quality map

Since solar panels generate electricity without releasing pollutants into bodies of water, no water quality maps are required. Therefore, this section is not applicable for this Facility.

(b) Water pollution control equipment and treatment process

Since solar panels generate electricity without releasing pollutants into bodies of water, no pollution control equipment is needed for the Facility. Therefore, this section is not applicable for this Facility.

(c) Receipt of permits

Since solar panels generate electricity without releasing pollutants into bodies of water, no NPDES permit is needed. Therefore, this section is not applicable for this Facility.

(d) Quantitative flow diagram or description of wastes

Since solar panels generate electricity without releasing pollutants into bodies of water, no quantitative flow diagrams pertaining to the following are needed:

(i) Sewage

(ii) Blow-down

(iii) Chemical and additive processing

(iv) Waste water processing

(v) Run-off and leachates from fuels and solid wastes

(vi) Oil/water separators

(vii) Run-off from soil and other surfaces

Therefore, this section is not applicable for this Facility.

(e) Conservation Practices

The O&M facility will use water at a rate comparable to a typical small business office. No other Facility components will use measurable quantities of water. Therefore, conservation practices are not applicable.

(D) Compliance with solid waste regulations

(1) Preconstruction solid waste

(a) Nature and amount of solid waste

The Applicant is not aware of any debris or solid waste within the Project Area that would require removal for Facility development.

(b) Plans to deal with waste

Since there will be no debris or solid waste prior to construction, no waste removal is necessary or planned.

(2) Construction solid waste

(a) Nature, amount, and composition of solid waste

Facility construction will generate some nonhazardous solid waste, primarily plastic, wood, cardboard and metal packing/packaging materials,

construction scrap, and general refuse. The amount of construction waste will be minimal.

(b) Storage, treatment, transportation, and disposal of waste

Construction waste will be collected from the site and other Facility work areas, and disposed of in dumpsters located at the laydown yard. A private contractor will empty the dumpsters on an as needed basis and dispose of the refuse at a licensed solid waste disposal facility.

(3) Operation solid waste

(a) Nature, amount, and composition of solid waste

Facility operations will not result in generation of debris or solid waste. The small mount generated by the O&M facility will be nonhazardous and will be managed and disposed of in accordance with federal, state, and local regulations.

(b) Storage, treatment, transportation, and disposal of waste

Facility operations will not result in generation of debris or solid waste. The small mount generated by the O&M facility will be nonhazardous and will be managed and disposed of in accordance with federal, state, and local regulations.

(4) Licenses and Permits

The solar Facility's operations will not require acquisition of waste generation, storage, treatment, transportation, and/or disposal licenses or permits.

(E) Compliance with aviation regulations

(1) Aviation facilities and map

The Vinton County Airport is approximately 3 miles north of the Project Area, as shown on Figure 07-1. The Vinton County Pilots & Boosters Association was notified of the proposed Facility on May 25, 2017, via the letter shown in Exhibit K. There are no other airports, helicopter pads, or landing strips within 5 miles of the Project Area.

(2) Federal Aviation Administration

The Vinton County Airport is registered with the Federal Aviation Administration (FAA). The FAA site number is 18123.1*A, and the Location Identifier is 22I.

The Facility poses no potential conflict with air navigation or air traffic communications.

4906-4-08 Health and safety, land use, and ecological information

(A) Health and safety

(1) Safety and reliability of equipment

(a) Major public safety equipment

Public safety concerns associated with construction of the Facility include: the movement of large construction vehicles; equipment; and materials. These issues are most relevant to construction personnel who will be working in close proximity to construction equipment and materials and exposed to construction-related hazards on a daily basis. However, the risk of construction-related injury will be minimized through daily safety meetings, regular safety training, and the use of appropriate safety equipment.

As construction activities will adhere to industry safety standards, such as OSHA and NFPA, and will occur primarily on private land well removed from adjacent roads and residences, exposure of the general public to construction-related risks and hazards is expected to be very limited. The Applicant will work with local fire departments and other emergency responders to provide training for response to emergency situations related to the Project and equipment.

Measures to prevent unauthorized site entry and unsafe practices will be implemented during construction and operation of the solar Facility. During the construction phase, temporary, highly visible, plastic mesh fencing will be erected around equipment and spare part storage yards, staging areas, and other potential construction hazards. The temporary fencing will be supplemented by signs cautioning the public of potential dangers, and providing 24-hour emergency numbers, operator contact information, and instructions for emergency personnel. The permanent

fencing surrounding the Project boundary will have similar notices to caution the public of potential dangers.

(b) Equipment reliability

Exhibits A and B, which were filed under seal, consist of the datasheets for equipment considered representative of the equipment to be used at the proposed solar Facility. These datasheets address equipment reliability. All equipment is expected to be compliant with applicable Underwriters Laboratories (UL), Institute of Electrical and Electronics Engineers (IEEE), National Electrical Code (NEC), National Electrical Safety Code (NESC), and American National Standards Institute (ANSI) listings.

(c) Generating equipment safety manuals

Exhibits A and B, which were filed under seal, consist of the datasheets for equipment considered representative of the equipment to be used at the proposed solar Facility. These datasheets address equipment safety certifications and tests. All equipment is expected to be compliant with applicable UL, IEEE, NEC, NESC, and ANSI listings.

The solar Facility will be fully enclosed by a security fence and will pose minimal risk to public safety as communicated through the information provided in this Application.

Prior to construction, once it is determined which type of module, rack, and inverter will be utilized for the Facility, the Applicant will provide the safety manuals for the equipment to the OPSB.

(d) Measures to restrict public access

The Facility will be enclosed by a 7-foot chain-link fence around the perimeter of the Project Area. Access will be controlled by gates around both the Project and the Project substation. High voltage equipment will be separately fenced with warning signage.

Access within the Project perimeter fence is limited only to trained and authorized site personnel.

(e) Fire protection, safety, and medical emergency plans during construction and operation

Generally, emergency/fire situations that are beyond the capabilities of the local service providers will be the responsibility of the owner/operator of the solar Facility. Construction and maintenance personnel will be trained and will have the equipment to deal with emergency situations that may occur at the Facility. In addition, the Applicant will ensure that local fire and emergency medical service providers are trained in how to respond to emergency/fire situations that could occur at the solar Facility. Prior to construction, the Applicant will provide an Emergency Action Plan.

(2) Probable impacts due to failure of air pollution control equipment

Solar panels generate electricity without releasing air pollutants. Therefore, no air pollution controls will be needed at the Facility.

(3) Construction and operational sound

(a) Construction sound levels at the nearest property boundary

The Applicant will provide the OPSB with a report from Hankard Environmental Inc. (Hankard) within 45 days of Application submittal.

This report will address construction sound levels at the nearest property boundary. To the extent not addressed below, when the report is submitted, the Applicant will address the sound level at the Facility as it relates to the following:

(i) Blasting activities

The use of explosives is not anticipated for this Project.

(ii) Operation of earthmoving equipment

(iii) Driving of piles, rock breaking or hammering, and horizontal directional drilling

(iv) Erection of structures

(v) Truck traffic

(vi) Installation of equipment

(b) Operational sound levels at the nearest property boundary

The Applicant will provide the OPSB with a report from Hankard within 45 days of application submittal. This report will address operational sound levels at the nearest property boundary. To the extent not addressed below, when the report is submitted, the Applicant will address the sound level at the Facility as it relates to the following:

(i) Generation equipment

(ii) Processing equipment

This section is not applicable to a solar generation facility.

(iii) Associated road traffic

Transportation sound during Facility construction is addressed above in OAC Section 4906-4-08(A)(3)(v). Once operational, the proposed Facility will not contribute to traffic on local roads. Post-construction traffic will be associated with operations personnel traveling to and from the solar Facility. Routine maintenance will typically be required on a quarterly basis at the solar Facility, as well as the Project substation.

(c) Location of noise-sensitive areas within 1 mile of the Facility

The Applicant will provide the OPSB with a report from Hankard within 45 days of Application submittal. This report will address the location of noise-sensitive areas within 1 mile of the Facility.

(d) Mitigation of sound emissions during construction and operation

The Applicant will provide the OPSB with a report from Hankard within 45 days of Application submittal. This report will address mitigation of sound emissions during construction and operation.

(e) Preconstruction background sound study

The Applicant will provide the OPSB a report from Hankard within 45 days of Application submittal. This report will include a preconstruction background sound study.

(4) Water impacts

(a) Impacts to public and private water supplies from construction and operation

The Facility will not have any impact on public or private water supplies. Therefore, this section is not applicable to this Facility.

(b) Impacts to public and private pollution control equipment failure

Solar facilities generate electricity without combusting fuel or releasing pollutants into the atmosphere. They do not require pollution equipment. Therefore, this section is not applicable to this Facility.

(c) Water resource map of areas directly affected

The proposed Facility will not directly affect any aquifers, water wells, and drinking water source protection areas. Therefore, this section is not applicable to this Facility.

(d) Compliance with local water source protection plans

Construction and operation of the Facility will not affect the local water source. Therefore, this section is not applicable to this Facility.

(e) Analysis of prospects of floods in the area

The Applicant hired Aon to analyze the probability of flood occurrences for the Project Area. Aon determined that the site does not fall within a flood zone and did not recommend any mitigation efforts.

(5) Geological features map

Figure 08-1 sets forth the geological features of the proposed Facility site, including: the topographic contours; the existing gas and oil wells; and injection wells.

(a) Geological suitability

The Applicant will provide the OPSB with a preliminary geotechnical engineering report within 45 days of application submittal.

(b) Soil suitability for grading, compaction, and drainage

The Applicant will provide the OPSB with a preliminary geotechnical engineering report within 45 days of application submittal.

(c) Plans for test boring

Borings will be performed around the Project Area. The Applicant will provide a preliminary geotechnical engineering report within 45 days of application submittal. To the extent not addressed below, when the report is submitted, the Applicant will address the plans for test boring at the Facility as it relates to the following:

(i) Subsurface soil properties

(ii) Static water level

(iii) Rock quality description

(iv) Percent recovery

(v) Depth and description of bedrock contact

This section is not applicable to this Project, as there will be no contact with bedrock.

(6) Prospects of high winds for the area

The table below estimates the percentage of time in which the wind velocity in Vinton County falls at various speeds. Data was taken from the Ohio Agricultural Research and Development Center (OARDC) out of The Ohio State University. As the OARDC physically records this data, the Applicant chose the closest measurement site to the Project Area, which was Jackson in Jackson County. The sensor height is 5 meters (16.4 feet), which is higher than the height of the proposed Facility. The speeds below are in miles per hour (mph) and reflect the 2016 calendar year.

Table 5. Wind Velocity

Wind Speed Range (mph)		% of occurrences
0	0.5	39.40
0.5	1	1.31
1	1.5	1.31
1.5	2	1.54
2	2.5	2.10
2.5	3	2.65
3	3.5	3.37
3.5	4	3.92
4	4.5	4.08
4.5	5	4.02
5	5.5	3.95
5.5	6	3.68
6	6.5	3.40
6.5	7	3.05
7	7.5	2.81
7.5	8	2.60
8	8.5	2.29
8.5	9	2.06

9	9.5	1.84
9.5	10	1.69
10	10.5	1.48
10.5	11	1.26
11	11.5	1.14
11.5	12	0.90
12	12.5	0.80
12.5	13	0.68
13	13.5	0.55
13.5	14	0.43
14	14.5	0.34
14.5	15	0.26
15	15.5	0.23
15.5	16	0.20
16	16.5	0.15
16.5	17	0.13
17	17.5	0.09
17.5	18	0.08
18	18.5	0.06
18.5	19	0.03
19	19.5	0.02
19.5	20	0.02
20	20.5	0.02
20.5	21	0.01
21	21.5	0.01
21.5	22	0.01
22	22.5	0.01
22.5	23	0.00
23	23.5	0.00
23.5	24	0.00
24	24.5	0.00
24.5	25	0.00
25	25.5	0.00
25.5	26	0.00
26	26.5	0.00
26.5	27	0.00
27	27.5	0.00
27.5	28	0.00
28	28.5	0.00
28.5	29	0.00

29	29.5	0.00
29.5	30	0.00

The probabilities of high wind speeds shown in the table above do not require the Applicant to mitigate any adverse consequences.

(7) Blade sheer

The proposed Facility is not a wind turbine facility. Therefore, this section is not applicable to this Facility.

(8) Ice throw

The proposed Facility will not experience ice throw. Therefore, this section is not applicable to this Facility.

(9) Shadow flicker

The proposed Facility will not generate shadow flicker. Therefore, this section is not applicable to this Facility.

(10) Radio and television reception

The proposed Facility will be less than 15 feet tall and will not interfere with radio or television reception. Therefore, this section is not applicable to this Facility.

(11) Military and civilian radar systems

The proposed Facility will be less than 15 feet tall and will not interfere with military or civilian radar systems. Therefore, this section is not applicable to this Facility.

(12) Microwave communication paths and systems

The proposed Facility will be less than 15 feet tall and will not interfere with microwave communication paths or systems. Therefore, this section is not applicable to this Facility.

(B) Ecological resources

(1) Ecological information in the Project Area

(a) Map

The Applicant has provided a map at 1:24,000 scale containing a one-half mile radius from the solar Facility and showing the Project Area boundary, undeveloped or abandoned land, and recreational areas. See Figures 08-2 and 08-3. The map includes:

(i) Proposed Facility and Project Area boundary

(ii) Undeveloped or abandoned land such as wood lots, wetlands, or vacant fields

(iii) Wildlife areas, nature preserves, and conservation areas

(iv) Surface bodies of water, including wetlands, ditches, streams, lakes, reservoirs, and ponds

(v) Highly-erodible soils and slopes of 12% or greater

(b) Field survey and map of vegetative communities and surface water within 100 feet of construction

The Applicant retained a third-party environmental consultant, TRC Environmental Corporation (TRC), to perform a field survey of the vegetative communities and delineations of wetlands and streams on and

within 100 feet of the 710-acre construction impact area and the 1,250-acre Study Area (Study Area), which was conducted on April 4 and 7, 2017 (See Exhibit D , Site Characterization Study Report, Vinton Solar Energy Center, Vinton County, Ohio, June 2017; Exhibit F, Wetlands and other Waters of the U. S. Delineation Report, Vinton Solar Energy Center, Vinton County, Ohio, June 2017).

The Study Area primarily consists of grazed pastureland, cultivated cropland, emergent herbaceous wetlands, developed land, and forested areas along the boundaries. The Study Area had been surface mined for coal and reclaimed to modern standards, i.e., grading to approximate original contour, replacement of topsoil and revegetation with a stable ground cover. (U.S. Department of Agriculture [USDA]/National Resource Conservation Service [NRCS], 2013, *Watershed Boundary Dataset*, Apr. 7, 2017, https://datagateway.nrcs.usda.gov/GDGOrder.aspx; USGS, 1994. "Topographical Quadrangle Maps [7.5-minute series]").

To determine land cover and vegetative communities, a review of the USGS National Land Cover Database (NLCD) was utilized. (USGS, LCS Program: NLCD, no publisher (n.p.), no date (n.d.), Web. Apr. 10, 2017, https://www2.usgs.gov/climate_landuse/lcs/projects/nlcd.asp). A field reconnaissance of the Study Area was conducted on April 4 through 7, 2017, to ground-truth NLCD land cover types and locations. Based on field observations, the NLCD classification map units were either confirmed or reclassified. Readily identifiable land cover changes (i.e., areas that had been converted to cultivated crops) were recorded and mapped based on vegetative structure and dominant species composition. Incidental wildlife observations were recorded.

Field-verified land cover showed the influence of mine reclamation as 89% of the area was in a cover type of hay/pasture. Deciduous forest, which is located outside the construction impact area comprised 8%, and

barren land (roads) and wetlands comprised the remaining 3%. Table 6 shows the field verified land cover for the Study Area.

Table 6. Field Verified Land Cover Types within the Vinton Solar Energy Center Study Area, Vinton County, Ohio, 2017

Cover Type	Acres	Hectares	Percent (%)
Hay/Pasture	1,109	449	89
Deciduous Forest	102	41	8
Barren Land	22	9	1
Emergent Herbaceous Wetlands	14	5	1
Open Water	2	<1	<1
Shrub/Scrub	1	<1	<1
Total	**1,250**	**506**	**100.00**

Wetlands and waterways were delineated in accordance with the U.S. Army Corps of Engineers (USACE) wetlands and other waters of the U.S. delineation methodology. Wetland resources within the Study Area were identified and their boundaries determined in accordance with the USACE Wetlands Delineation Manual (1987 Manual) (USACE, 1987), utilizing the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Midwest Region (Version 2.0) (Regional Supplement) (USACE, 2010). Consistent with the 1987 Manual, wetland determinations were based on dominant plant species, soil characteristics, and hydrologic characteristics. In addition, wetlands and other waters of the U.S. were evaluated in accordance with the Ohio EPA as part of the state of Ohio's Water Quality Standards (OAC Chapter 3745-1).

Potential wetland and other waters of the U.S. located within the Study Area were identified, delineated, and mapped through the combined use of existing available public source information and field investigations. Areas that exhibited hydric soils, wetland hydrology, and a dominance of hydrophytic vegetation were considered wetlands.

Of the 17 delineated wetlands, 15 were characterized by emergent vegetation (See Figure 08-4). The emergent vegetation observed within the wetlands primarily contained reed canary grass (Phalaris arundinacea), common rush (Juncus effuses), broadleaf cattail (Typha latifolia), narrowleaf cattail (Typha angustifolia), fox sedge (Carex vulpinoidea), woolgrass (Scirpus cyperinus), and yellow nutsedge (Cyperus esculentus). Wetland 3 and Wetland 10 contained over 15% cover with shrub species. The shrub wetlands contained American sycamore (Plantanus occidentalis), autumn olive (Elaegnus umbellata), and multiflora rose (Rosa multiflora). The 17 streams identified were primarily small drainages located along the boundary of the Study Area. Of the 17 streams, 5 were categorized as containing a perennial flow regime, 11 with intermittent flow regimes, and one with an ephemeral flow regime. The streams and tributaries found within the Study Area include unnamed tributaries to Raccoon Creek and Elk Fork. The 17 open waters (ponds) in the Study Area were categorized as farm ponds. For each pond, a wetland or stream was found, connecting the pond to a jurisdictional water.

The 13 wetlands, ponds, and streams located within the construction impact area were determined to be low quality resources, attributable to prior disturbances caused by historic mining impacts. These wetlands, ponds, and streams may have potential impacts due to the proposed Facility, and are summarized in Table 7.

Table 7. Potential Wetlands and Other Waters of the U.S. within the Construction Impact Area of the Proposed Facility

Resource ID	Location (Latitude, Longitude)	Acreage of Waters Impacted	Linear Feet of Waters Impacted
Wetland 4	39.276315, -82.448510	0.18	-
Wetland 6	39.274811, -82.441962	0.02	
Wetland 7	39.276210, -	1.31	-

Resource ID	Location (Latitude, Longitude)	Acreage of Waters Impacted	Linear Feet of Waters Impacted
	82.437901		
Wetland 9	39.259318, -82.450941	0.11	-
Wetland 11	39.269150, -82.440516	0.32	-
Wetland 12	39.265649, -82.437574	0.07	
Wetland 13	39.270208, -82.449238	0.17	-
Stream 4	39.259100, -82.451057	0.02	161.30
Stream 13	39.268093, -82.448709	0.11	773.93
Pond 2	39.280488, -82.438724	0.20	-
Pond 4	39.281334, -82.444956	0.21	-
Pond 10	39.249763, -82.456215	0.17	-
Pond 11	39.250770, -82.452287	0.01	-

(c) Literature review of plant and animal life within 0.25 miles of construction

The Applicant retained a third-party environmental consultant, TRC, to perform a literature review survey of the plant and animal life within the Study Area and within at least one-fourth mile of the planned Project. The following publicly available data sources were reviewed for the literature review:

- Google Earth™, n.d., Web. Apr. 10, 2017. https://earth.google.com/
- National Audubon's Important Bird Areas, n.p., n.d., Web. Apr. 10, 2017. http://www.audubon.org/important-bird-areas
- National Audubon's Christmas Bird Count, n.p., n.d., Web. Apr. 10, 2017. http://www.audubon.org/conservation/science/christmas-bird-count

- USGS, LCS Program: NLCD, n.p., n.d., Web. Apr. 10, 2017. https://www2.usgs.gov/climate_landuse/lcs/projects/nlcd.asp

- Ohio Department of Natural Resources (ODNR), Division of Wildlife (DOW), National Heritage Database, n.p., n.d., Web. Apr. 10, 2017. http://wildlife.ohiodnr.gov/species-and-habitats/ohio-natural-heritage-database

- USDA, NRCS, Web-Soil Survey, n.p., n.d., Web. Apr. 10, 2017. https://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx

- U.S. Fish and Wildlife Service (USFWS) Information for Planning and Conservation (IPaC), IPaC: Home, n.p., n.d., Web. Apr. 10, 2017. https://ecos.fws.gov/ipac/

- USFWS, National Wetlands Inventory (NWI), National Standards and Support Team. "Wetlands Mapper." Official Web page of the USFWS, n.p., n.d., Web. Apr. 10, 2017. https://www.fws.gov/wetlands/data/Mapper.html

Agency inquiries were conducted to supplement the literature review. The findings are summarized below.

The USFWS Technical Assistance Letter dated April 12, 2017, documented that no federal wilderness areas, wildlife refuges, or designated critical habitat are located within 1 mile of the planned Project. (See Exhibit L). The letter stated that all counties in the state of Ohio are within the range of the federally endangered Indiana bat and federally threatened northern long-eared bat. These bat species utilize woodlands for roosting. Based on the literature review and field survey (See Exhibit D, Site Characterization Report), no wooded habitat is present within the Study Area.

ODNR-DOW provided a letter dated April 13, 2017, to report its findings from the ODNR National Heritage Database. ODNR reported that no records of rare or endangered species occurrences were reported in the Study Area (See Exhibit P). The ODNR-DOW reported it is unaware of

any unique ecological sites, geologic features, animal assemblages, scenic rivers, state wildlife areas, nature preserves, parks or forests, national wildlife refuges, or other protected natural areas within a 1-mile radius of the proposed Facility. ODNR-DOW reported it did not have any records for Indiana bat (Myotis sodalis) capture locations within a 5-mile radius nor records of hibernacula within a 10-mile radius of the proposed Facility. ODNR-DOW reported it did not have sufficient data on the northern long-eared bat (Myotis septentrionalis) to provide a statement.

A USFWS IPaC search was conducted April 10, 2017 (IPaC, April 10, 2017). The search returned a listing of one plant, running buffalo clover (Trifolium stoloniferum), one insect, American burying beetle (Nicrophorus americanus), and 21 migratory birds of conservation concern. Based on the literature review and field survey (See Exhibit D, Site Characterization Study), no suitable habitat for these species is present within the Study Area.

None of these federally listed species are expected to be adversely impacted by Project construction because of a lack of and avoidance of suitable habitat.

(d) Results of field surveys for plant and animal species identified in literature review

During field surveys conducted on April 4 through 7, 2017, grazed pasture was observed throughout the Study Area, with forested areas along the boundary. The plant and animal life has been heavily influenced by historic habitat loss and modification by previous surface-mining activities for coal, although the land was restored in accordance with modern state and federal regulatory standards to pasture and hayland. The field survey confirmed that no unique, sensitive or critical habitats were present, and no listed or sensitive plant or animal species were identified during the

field surveys (See Exhibit D, Site Characterization Study). Incidental observations of raptors identified in the Study Area were the American kestrel (Falco sparverius), broad-winged hawk (Buteo platypterus), red-tailed hawk (Buteo jamaicensis), and turkey vulture (Cathartes aura). None of these raptors are listed as state or federal species of concern.

(e) Additional ecological impact studies

TRC performed a raptor nest survey within the Study Area and a 1-mile buffer. TRC conducted a literature review and agency inquiry to determine if records of historic nest sites were reported. Based on review of the literature and agency correspondence (See Exhibit P, ODNR-DOW, April 13, 2017; Exhibit L, USFWS, April 12, 2017; IPaC report, April 10, 2017), no records of raptor nests were reported to occur within the Study Area. The IPaC report identified the Study Area to be within the known range of the bald eagle. In a telephone conversation with TRC on April 3, 2017, USFWS indicated the nearest bald eagle nest record is associated with Lake Rupert, 2.6 miles to the southwest of the study area.

To determine the potential for raptor nesting habitat within 1 mile of the Study Area, aerial photographs were reviewed to determine the potential locations of forested riparian areas, woodlots, and utility poles within 0.5 mile of streams greater than 30 feet in width, and open water wetlands and/or waterbodies greater than 20 acres in size (See Exhibit E, Raptor Nest Survey Report, Vinton Solar Energy Center, Vinton County, Ohio, June 2017). TRC biologists conducted an aerial Raptor Nest Survey on April 21, 2017, via helicopter over the Study Area and a 1-mile buffer area to view potentially suitable habitat where raptor nests could occur. No raptor nests were detected within the Study Area.

TRC conducted a ground-based survey for raptor nests using the "Ohio Department of Natural Resources On-Shore Bird and Bat Pre- and Post-

Construction Monitoring Protocol for Commercial Wind Energy Facilities in Ohio Protocol. An Addendum to the Ohio Department of Natural Resource's Voluntary Cooperative Agreement." A total of 6 inactive raptor nests were identified. All were outside the construction impact area.

(2) Potential ecological resource impacts during construction

(a) Impact of construction on resources surveyed

Wildlife/Vegetation. No impacts are expected to high quality habitat or sensitive species. The existing grazed pastures do not support the habitat or nesting requirements of the sensitive species known to occur in the region. No unique habitat or high quality vegetation will be removed as part of the Project. Installation of solar panels will use existing township and farm roadways for equipment access. Wide tracked equipment will minimize vegetation damage and impacts to soils.

Waters. No stream crossings will be required or are proposed. Streams will be impacted as summarized below because they are within the construction footprint; however, no direct excavation or modification of identified stream channels are planned or expected at this time. The wetlands contained within the construction impact area are on previously mined land and are low quality (Class 1 and 2). Wetland impacts may include driving equipment and driving piles. Ponds within the construction impact area are planned to be kept in place to be used for sediment control. In total, 7 wetlands, 2 streams, and 4 open water resources are within the potential construction impact area (See Exhibit F, Wetlands and other Waters of the U. S. Delineation, Report, Vinton Solar Energy Center, Vinton County, Ohio, June 2017).

Potential impacts to wetlands will be 2.18 acres, impacts to streams will be 935.23 linear feet, and impacts to open water will be 0.59 acres. See Table

7 above for a summary of potential impacts. Appropriate permits will be obtained prior to any disturbances.

Installation of solar panels will have relatively small impact on aquatic resources because excavation and vegetation clearing will be minimal and disturbance of waters will be avoided as much as possible. Acreage and linear feet of impacts by resource are summarized in Table 7. Construction activities for the proposed Facility will not require clearing of woody vegetation, and it is not expected to result in disturbance to streams or the wetland. No streams will be crossed and wetland habitat will be avoided.

(b) Mitigation procedures to minimize short- and long-term construction impacts

(i) Post-construction restoration of disturbed soils

Following construction of the proposed Facility, the Applicant will restore and stabilize disturbed areas. Restoration will include decompaction of soils (if needed) and revegetation of disturbed areas. The Applicant will reseed disturbed areas that are temporarily impacted during construction with appropriate native seed mixes. The Applicant will also seed the area around the panels with a natural grassland mix. Final stabilization is a BMP that will be achieved when all soil disturbing activities are completed and the temporarily impacted areas are returned to their natural state. The Applicant will remove all trash, debris and stockpiles, and leave the area graded to facilitate proper drainage. The Applicant will ensure that the access road will be in workable condition through replenishing road aggregate and repairing ruts that may have occurred during the course of construction.

(ii) Frac out contingency plan for stream and wetland crossings

This section is not applicable to this Facility because the Applicant will not be crossing streams or wetlands.

(iii) Methods to demarcate surface waters and wetlands

The Applicant, at a minimum, will install orange construction fencing, as well as necessary sediment controls, at the perimeter of the surface waters and wetlands to protect them from incidental entry of construction equipment and material storage or disposal. The Applicant may also install an "Environmental Sensitive" sign at the perimeter of the surface waters and wetlands to ensure additional protection of these resources.

(iv) Inspection and repair of erosion control measures

The Applicant will develop and SWPPP. The SWPPP will include inspections of erosion, stormwater, and sediment controls as required by the permit/plan, including inspection of installed controls following rainfall events (≥ 1 inch of rainfall within 24 hours). Inspections will include verification that proper documentation exists for all site activities. These inspections will be conducted by the Applicant to ensure compliance. Critical areas where water flow is being controlled, including channels, diversions, and outlets, which tend to have high velocities and can create erosion if not properly protected will be inspected. The Applicant will look at the surrounding properties during perimeter inspection, and will inspect for water flows entering the site from offsite locations (run-off). The Applicant will ensure discharge points are adequately protected with the proper BMPs, and that BMPs are installed correctly, effectively working, and do not

require maintenance. If a problem is discovered, the SWPPP designer will be contacted by the Applicant.

The Applicant will conduct inspections to meet a minimum level of compliance at federal, state, and local levels. The Applicant will ensure the construction activities meet the criteria set forth in the SWPPP to minimize the release of sediment and other pollutants. The key elements of the SWPPP include:

- The Applicant will ensure that the SWPPP considers site-specific conditions.

- The Applicant will ensure that all practices during construction follow the SWPPP, including proper installation, use, and maintenance of structural and non-structural practices.

- The Applicant will verify that all BMPs are installed correctly and in the proper location.

- The Applicant will verify that performance standards are being met and that there is no offsite discharge of sediment or other pollutants.

The Applicant will conduct inspections and maintain records of inspections as required by the construction stormwater permit. The inspections will verify and document that BMPs are installed correctly and that sediment or other pollutants are not being discharged. If sediment is leaving the Project Area, appropriate BMPs are not installed to SWPPP or at the right locations, and/or practices are not being followed, the Applicant will document

present conditions and take measures to resolve these situations in a timely manner.

(v) Measures to divert stormwater runoff

If deemed necessary, the Applicant will install diversion berms or other applicable BMPs to divert stormwater runoff away from fill slopes and other exposed surfaces.

(vi) Methods to protect vegetation

Minimization and avoidance measures for major species and their habitat were achieved during Project siting. Careful site selection and planning resulted in the ability to avoid impacts to wetlands, water bodies, streams, forests, and native grasslands.

The Applicant will install orange construction fencing, where necessary, to protect vegetation in proximity to any Project facilities.

(vii) Options for disposal of trees, brush, and other vegetation

If any vegetation becomes necessary for removal (such as crop residue), it will be stockpiled in an upland area and removed to a proper facility off-site.

(viii) Avoidance measures for major species and their habitat

Minimization and avoidance measures for major species and their habitat were achieved during Project siting. Careful site selection and planning resulted in the ability to avoid impacts to wetlands, water bodies, streams, forests, and native grasslands.

(3) Potential impacts to ecological resources during O&M

(a) Evaluation of impact of O&M on undeveloped areas, plants, and animals

No impacts are expected to ecological resources during O&M. Panel maintenance will not disrupt high quality vegetative cover, because no heavy equipment will be required. Maintenance of the solar Facility will be completed using a pick-up sized vehicle to deliver parts for update and replacement. Driving on the replanted grassy lanes between the rows of solar panels will allow for periodic inspections via pick-up truck. The deep-rooted grassland cover will provide ecological improvement over current cropped conditions. No adverse impacts are expected.

(b) Procedures to avoid/minimize/mitigate short- and long-term O&M impacts

Impacts to streams, wetlands, or riparian vegetation are not expected during O&M, since grassland cover will be present. Maintenance of the vegetative cover within the proposed Facility will include periodic mowing. Herbicides are not expected to be utilized for maintaining the native grassland.

The existing grazed pastures do not support the habitat or nesting requirements of the sensitive species known to occur in the region. The existing pasture grass will be maintained or reseeded where vegetation is damaged during construction.

(c) Post-construction monitoring of wildlife impacts

No post-construction monitoring is proposed, because no adverse impacts to wildlife are expected.

(C) Land use and community development

(1) Regional land uses and potential impacts of the Facility

(a) Land use map

The Applicant has included a 1:24,000 scale map of land uses within 1 mile of the Project boundary as Figure 08-5 that depicts the following:

(i) The proposed Facility

(ii) Land use

(iii) Structures

(iv) Incorporated areas and population centers

(b) Structures table

Table 8 includes the following information:

(i) Wind turbine locations

Wind turbines are not applicable to this Project.

(ii) Distance between structures and associated facilities

(iii) Land lease status of the property for each structure

Table 8. Structures

Structure Type	Distance to Facility	Lease Status
Shed	135 feet to modules	Under lease
Shed	0 feet to modules (will be removed/relocated)	Under lease
Shed	0 feet to modules (will be removed/relocated)	Under lease
Shed	0 feet to modules (will be removed/relocated)	Under lease

(c) Impact of Facility on land uses

All parcels within the Project Area are designated by Vinton County as either Other Agricultural Use or Agricultural Vacant Land. The Applicant will utilize the majority of this land for the purposes of generating solar energy. The Applicant has provided Table 9 below to illustrate the impacts to various land uses. These estimates were calculated by reviewing the proposed Project layout and determining the acreage that falls within the fence that surrounds the equipment. The permanent acres impacted were calculated by adding the area of the access roads, the piles, the inverter pads, and the Project substation.

Table 9. Temporary and Permanent Land Use Impacts

Land Use Type	Total Acres in Project Area	Temporary Acres Impacted	Percent Temporarily Impacted	Permanent Acres Impacted	Percent Permanently Impacted
Other Agricultural Use	437	192	44%	7	1.7%
Agricultural Vacant Land	1513	463	31%	25	1.7%
Total	**1950**	**655**	**33%**	**32**	1.6%

(d) Structures that will be removed or relocated

The Applicant will remove or relocate a number of small, temporary structures used for cattle production to an area within the leased land that is not utilized for solar production.

(2) Wind turbine locations

Wind turbines are not applicable to this Project.

(3) Plans for land use

(a) Formally adopted plans for future use of Project Area and surrounding lands

Other than the proposed Facility, the Applicant has no plans for future use of the Project Area. The Applicant knows of no such plans having been adopted by government agencies.

(b) Applicant's plans for concurrent or secondary uses

The Applicant has no plans for concurrent or secondary use of the site.

(c) Impact on regional development

The solar Facility is expected to aid regional development by increasing local tax revenues and contributing to the local economy, as shown in Exhibit H, the Economic Impact Report, and discussed in OAC Section 4906-4-06(E). Aside from these economic benefits, including the significant increase in funding to local schools, the Facility is not expected to significantly impact housing, transportation system development, or other public services and facilities.

(d) Compatibility with current regional plans

Vinton County is a member of the Ohio Valley Regional Development Commission (OVRDC). The OVRDC acts as a regional economic and community development agency and encourages development in 12 southern Ohio counties, including Vinton County. The Applicant has

reviewed the 2015 Comprehensive Economic Development Strategy Performance Report (Report) to evaluate the compatibility of the Facility with the regional goals.
See http://www.ovrdc.org/media/CEDSFinal2015.pdf

The primary goal of the Report is to increase economic growth in the region. The Report mentions the importance of both retaining existing jobs and creating new jobs. As shown in Exhibit H, Economic Impact Report, the Facility will help to create a number of jobs in the area and will significantly increase economic growth.

The Report notes that Vinton County has been designated as a "distressed" county by the Appalachian Regional Commission, due to the county's unemployment rate, per capita income, and poverty rate. Redeveloping the Project Area from a former strip mine into a productive tax and revenue-generating solar Facility will greatly help the economic situation in the county, as described in Exhibit H.

Specifically, with respect to solar energy, the Report notes that "solar energy is also a viable option for OVRDC's region, as southern Ohio receives more annual average solar resource potential than northern Ohio….Renewable energy is here to stay and, because of it, the region holds potential to generate power and create jobs. The region would benefit best by combining multiple renewable energy resources to generate power and fuel rather than relying on one source of energy."

Overall, the Facility greatly supports the goals highlighted by the OVRDC.

(e) Current and projected population estimates and projections

According to the U.S. Census Bureau, as of July 1, 2016, the population of Vinton County was 12,921.

See https://www.census.gov/quickfacts/table/PST045215/39163,39065,00. The population is expected to increase by about 7% over the next 10 years, as the Ohio Development Services Agency (ODSA) projects a population of 13,860 in the year 2025.

See https://development.ohio.gov/files/research/P6083.pdf.

(D) Cultural and archaeological resources

(1) Map of landmarks of cultural significance and recreational areas

A 1:24,000 scale map of landmarks of cultural significance and recreational areas is provided as Figure 2 of Exhibit M, the Cultural Resources Record Report from TRC. This map shows the Project Area and a 5-mile buffer. Contents include: any formally adopted land and water recreation areas; recreational trails; scenic rivers; scenic routes or byways; registered landmarks of historic religious; archaeological scenic natural; or other cultural significance. The landmarks considered were those districts, sites, buildings structures, and objects that are recognized by, registered with, or identified as eligible for registration by the National Registry of Natural Landmarks, the Ohio Historical Society, or ODNR.

(2) Estimated impact on landmarks and plans to avoid or mitigate

The Applicant retained TRC to gather background information to assess archaeological sensitivity of the Project Area and potential effects on cultural resources, including archaeological and architectural sites, from the solar Facility. TRC conducted this Phase I review in April, 2017.

The records review indicated that there are no previously surveyed architectural resources located within the Project's area of impact, and 8 previously surveyed resources within a 1-mile radius. While there were 22 archaeological resources previously documented within the Project's impact area, all were located in areas previously disturbed by past surface coal mining. The Facility is expected to have a minimal impact on architectural and archaeological landmarks.

The Applicant will continue to coordinate its efforts with the appropriate regulatory agencies as necessary to assess impacts to cultural resources and to ensure impacts are minimized. The Applicant has provided TRC's Cultural Resources Records Report as Exhibit M.

(3) Impact to recreational areas and plans to mitigate

As shown in the attached Cultural Resources Records Report from TRC, Exhibit M, as well as in the attached Summary of the Viewshed Analysis and Aesthetic Resources Inventory found in Exhibit N, the expected impact to recreational areas is minimal. The Applicant will coordinate its efforts to evaluate the impacts of the solar Facility on the above recreational areas with the appropriate regulatory agencies.

(4) Visual Impacts

The Applicant evaluated the visual impact of the proposed Facility within a 5-mile radius of the Project Area. The results of this evaluation are included in the attached Summary of the Viewshed Analysis and Aesthetic Resources Inventory contained in Exhibit N. The evaluation included the following:

(a) Visibility, viewshed analysis, and map

The visual impact analysis began with an examination of the visibility of the Project within a 5-mile radius. The analysis utilized Light Detection

and Ranging (LiDAR) data provided by the Ohio Geographically Referenced Information Program (OGRIP) and ESRI Spatial Analyst GIS software to develop the viewshed model. A map of the viewshed analysis at 5 miles is included in the attached report, Exhibit N.

However, due to the low-profile nature of solar photovoltaic generation plants, it is extremely unlikely that the site will be visible beyond 2 miles. Given the limitations of human eyesight, even the locations that appear to show visibility beyond 2 miles in the viewshed map are unlikely to be visible, as the Facility will be less than 15 feet tall. Unfortunately, the viewshed model is not able to account for limitations of human vision at greater distances.

Given the lack of visibility at greater distances, the viewshed analysis was also conducted for a 2-mile radius, to provide a more realistic depiction of the Project's impact. Results of this analysis show that the tree cover surrounding the Project Area and the Project Area's elevation in comparison to the surrounding area make the visibility very minimal. Additional information can be found in the attached report, Exhibit N.

(b) Scenic quality of existing landscape

The Project Area is generally surrounded by dense forested areas and rolling hills, which naturally reduce visibility of the Project. The Project Area itself is a former coal mine and has since been utilized as pasture land. It is somewhat elevated from the surrounding area and is generally along the ridgetop of a network of hills approximately centered between State Route 93 to the west of the Project, U.S. Highway 50 to the south of the Project, and State Route 667 to the east of the Project, all of which are relatively low compared to the planned development area of the Project.

(c) Landscape alterations and impact to scenic quality

The primary landscape alteration will be the Facility itself, which will be less than 15 feet tall, and is not likely to be visible beyond 2 miles. For this reason, the impact to scenic quality is believed to be minimal.

(d) Visual impacts within 10 miles

As discussed in OAC Section 4906-4-08(D)(4)(a), it is extremely unlikely that the site will be visible beyond 2 miles, due to the low-profile nature of solar facilities. The attached Summary of the Viewshed Analysis and Aesthetic Resources Inventory, Exhibit N, evaluates the impact on cultural resources within a 2-mile radius. Cultural resources further than 2 miles from the Project boundary are not expected to be impacted by the Facility.

(e) Photographic simulations/pictorial sketches

The attached Summary of the Viewshed Analysis and Aesthetic Resources Inventory, Exhibit N, provides photographic simulations from 7 vantage points. The Applicant attempted to provide one vantage point from each of the 4 cardinal directions.

In addition, the Applicant included a photographic simulation from the nearby town of McArthur.

During the Applicant's pre-application meeting with the OPSB, OPSB staff communicated a concern of potential impacts to drivers on nearby roadways. For this reason, the Applicant selected vantage points from Highway 93, Highway 677, and Highway 50. A vantage point was also provided from Infirmary Road, which runs through the Project Area.

The Applicant also conducted a glare analysis that examines glare from nearby roadways and from the Vinton County Airport, located almost 9 miles away from the Project Area. This analysis is included in Exhibit O.

(f) Visual impact mitigation measures

The remote, rural location of the Facility minimizes potential visual impacts. In addition, modules will employ anti-glare coating to maximize the amount of solar energy captured by the panels, which reduces the potential for glare.

(E) Agricultural districts and potential impacts to agricultural land

(1) Agricultural district map

The Vinton County Auditor, Cindy Owings, has confirmed that none of the land within the Project boundary is classified as agricultural district land. Therefore, this map is not applicable.

(2) Impact on agricultural land, uses, and districts

(a) Acreage impacted

Of the 1,950-acre Project boundary, the Applicant expects to utilize approximately 658 acres for the solar modules. The vast majority of this disturbance area will be in areas currently used as pasture for cattle and not for agricultural production.

(b) Impact of construction and O&M on land, agricultural facilities, and practices

Access roads will be installed, where possible, to be at the same elevation as the surrounding farmland. The Applicant will avoid using swales wherever possible while following Ohio EPA BMP.

(i) Field operations

The solar Project will utilize the vast majority of the land currently used for pasture. Cattle operations will not continue inside of the Project Area fence; however, it may continue outside of the fence in areas not utilized for solar equipment. Following decommissioning of the site, the landowner will be able to return the site to pastureland.

(ii) Irrigation

The site is not currently irrigated, and it will not be irrigated following construction of the solar Facility.

(iii) Field drainage systems

There is not currently a field drainage system on site. The Applicant will be responsible for maintaining adequate drainage during operations.

(iv) Structures used for agricultural operations

There are not currently structures used for agricultural production. There are currently a number of small structures used for cattle operations that will be removed or relocated during construction of the solar Facility.

(v) Viability as agricultural district land

There are zero acres of agricultural district land in the Project Area. Therefore, this section is not applicable.

(c) Measures to mitigate during construction and O&M impacts to agricultural land, structures, and practices

As the land is not currently used for agricultural production, this section is not applicable.

(i) Damage avoidance/minimization to field tile drainage and soils

There are not currently drain tiles within the Project Area.

(ii) Timely repair of damaged field tiles to original conditions

There are not currently drain tiles within the Project Area.

(iii) Excavated topsoil treatment

Topsoil that is displaced due to grading and excavation will be stored on site and will either be used on site to evenly grade the site, or will be available for the landowner's other use.

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Summary: Application electronically filed by Christine M.T. Pirik on behalf of Vinton Solar Energy LLC