

**Exhibit P**  
**Preliminary Decommissioning Plan**

PREPARED FOR:

**NOTTINGHAM SOLAR LLC**

**DECOMMISSIONING PLAN**  
**NOTTINGHAM SOLAR PROJECT**

Ohio Power Siting Board  
Case Number: 21-0270-EL-BGN



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# DECOMMISSIONING PLAN NOTTINGHAM SOLAR PROJECT

Prepared for:

**Nottingham Solar LLC**

OHIO POWER SITING BOARD  
CASE NUMBER: 21-0270-EL-BGN  
JULY 2021 - VERSION 1

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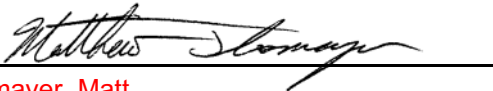
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# 1 PROJECT INTRODUCTION

The decommissioning plan (Plan) provides a description of the decommissioning and restoration phase of the Nottingham Solar Project (Project), as required per Ohio Administrative Code 4906-4-01 through 4906-4-08. The Plan identifies all areas proposed for decommissioning/deconstruction and restoration phases, in addition to describing the extent of the removal and restoration of the Project components. Additionally, the plan includes an anticipated method of disposal for the Project components.

The Project will be owned and operated by Nottingham Solar LLC, a wholly owned subsidiary of BQ Energy Development, LLC (BQ Energy). The Project is a proposed 100 megawatt (MW) solar project in Athens Township, Harrison County, Ohio. The Facility Site is approximately 580 acres. Major components of the Project include solar modules, racking systems and inverters/transformers (inverter stations). Project is currently considering bifacial monocrystalline solar panels sourced from several manufacturers. Start-of-construction is planned for fourth quarter in 2022, with a projected Commercial Operation Date in the fourth quarter of 2023. The Project will consist of the installation of the security fencing; solar arrays and associated racking system, foundations, steel piles or screws; inverter stations; access and internal roads; electrical collection system; substation; and an overhead transmission tie-in line (Exhibit A within the OPSB Application).

This Plan is applicable to the decommissioning/deconstruction and restoration phases of the Project. A summary of the components to be removed is provided in Section 1.1. A summary of estimated costs associated with decommissioning the Project is also provided in Section 4.0.

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## 1.1 MAIN SOLAR FARM COMPONENTS

The main components of the Project include:

- PV solar modules and racking system
- Foundations and steel piles or screws
- Inverters/transformers (equipment pads)
- Electrical cabling and conduits
- Site access roads
- Security fencing
- Post construction stormwater management practices
- Approximately 0.8-mile overhead transmission line (filed under separate OPSB application)
- Project substation (filed under separate OPSB application)

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## 1.2 TRIGGERING EVENTS AND EXPECTED LIFETIME OF PROJECT

Project decommissioning may be triggered by an event such as the end of the power purchase agreement or when the Project reaches the end of its operational life. The Project will be considered to be abandoned if the Project is non-operational and not working towards operational status for a period of 12 consecutive months.

If properly maintained, the expected lifetime of a utility-scale solar facility is approximately 30 to 40 years with an opportunity for a project lifetime of 50 years or more with equipment replacement and repowering. Depending on market conditions and project viability, the solar arrays may be retrofitted with updated components (e.g., PV solar modules, inverters, frame, racking system, etc.) to extend the life of the project. In the event that the modules are not retrofitted, or at the end of the Project's useful life, the solar arrays and associated components will be decommissioned and removed from the Project site. The value of the individual components of the solar facility

will vary with time. In general, the highest component value would be expected at the time of construction with declining value over the life of the Project. Over most of the Project life, components such as the PV solar modules could be sold in the wholesale market for reuse or refurbishment. As efficiency and power production of the PV solar modules decrease due to aging and/or weathering, the resale value will decline accordingly. Secondary markets for used solar components include other utility scale solar facilities with similar designs that may require replacement equipment due to damage or normal wear over time; or other buyers (e.g., developers, consumers) that are willing to accept a slightly lower power output in return for a significantly lower price point when compared to new equipment.

Components of the solar facility that have resale value may be sold in the wholesale market. Components with no wholesale value will be salvaged and sold as scrap for recycling or disposed of at an approved offsite licensed solid waste disposal facility (landfill). Decommissioning activities will include removal of the arrays and associated components as listed in Section 1.1 and described in Section 2.

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## 1.3 DECOMMISSIONING SEQUENCE

Decommissioning activities will begin within 12 months of the Project ceasing operation and are anticipated to be completed in six to 12 months. Nottingham Solar will be the responsible party for the decommissioning activities. Monitoring and site restoration may extend beyond this period to ensure successful revegetation and rehabilitation. The anticipated sequence of decommissioning and removal is described below; however, overlap of activities is expected.

The following provides a general summary of the equipment dismantling process:

- Reinforce access roads, if needed, and prepare site for component removal
- Install erosion and sediment control fencing and other best management practices (BMPs) to protect sensitive resources and control sediment transport during decommissioning activities
- Disconnect the Facility from the electric grid at the Facility Substation in accordance with Utility requirements
- Disconnect all DC systems, PV modules, then lock disconnects in the “open” position
- Identify and flag environmentally sensitive areas on-site
- Implement temporary site security and erosion & sediment control practices
- Decommission electrical equipment in accordance with manufacturer’s guidelines, which may include removal of hazardous materials, such as SF6 gas, or draining of liquids, such as transformer cooling oil, before removal and transport
- Remove energized equipment, including PV modules
- Remove above-grade Facility components, including but not limited to PV modules, racking structures, inverters, transformers, permanent fencing, collection lines and support systems, signage, the Facility substation
- Remove Facility components buried more than 3ft, including but not limited to collection lines, grounding rods, and foundations
- Decompact subsoils as needed, restore and revegetate disturbed land to pre-construction conditions to the extent practicable

Some below-grade stormwater management structures, such as culverts or stormwater retention pond outfalls, may not be removed in order to limit soil disturbance during restoration activities.

## 2 PROJECT COMPONENTS AND DECOMMISSIONING ACTIVITIES

The solar facility components and decommissioning activities necessary to restore the Project area, as near as practicable, to pre-construction conditions are described within this section.

### 2.1 OVERVIEW OF SOLAR FACILITY SYSTEM

Project anticipates utilizing approximately 266,675 solar modules, with a total nameplate generating capacity of approximately 100-megawatts (MW) alternating current (AC), (hereinafter referred to as MW). The Facility Site encompasses approximately 580 acres. The solar modules will be placed within approximately 580 acres of land bounded by perimeter fencing as shown in Exhibit A of the OPSB Application (preliminary design; subject to modification). The land within the perimeter fencing is predominantly reclaimed mine grassland. Statistics and estimates provided in this Plan are based on a Hanwha Qcells G9.3 450-watt bifacial module (or similar) although the final panel manufacturer has not been selected at the time of this report.

Collection cabling will be installed below the surface at a depth of approximately two to four feet). Foundations, steel piles or screws, and electric cabling and conduit less than three feet (36 inches) below the soil surface will be removed. Components and cabling deeper than 36 inches below the surface will be abandoned in place. Access roads will be left in place. Public roads damaged or modified during the decommissioning and reclamation process will be repaired upon completion of the decommissioning phase.

Estimated quantities of materials to be removed and salvaged or disposed of are included in this section. Many of the materials described have salvage value; although, there are some components that will likely have none at the time of decommissioning. Removed materials will be salvaged or recycled to the extent possible. Other waste materials will be disposed of in accordance with state and federal law in an approved licensed solid waste facility. PV solar modules may have value in a resale market, depending on their condition at the end of the Project life. If the Project is decommissioned prior to the anticipated 30 to 40-year timeframe, the resale value of components may be substantially higher than at the end of the projected Project.

**Table 1. Summary of the Primary Project Components of the Decommissioning Plan**

Component	Quantity	Unit of Measure
Solar Modules (approximate)	266,675	Each
Tracking System (combined 2 and 3-string trackers)	3,600	Tracker
Steel Piles	58,000+	Each
Inverter Stations with Foundations	32	Each
Electrical Cables and Conduits (above and below ground cabling)	5,440,100	Linear Foot (estimated)
Security Fencing	73,500	Linear Foot
Access Roads (approximate)	40,000+	Linear Foot

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### 2.1.1 PV SOLAR MODULES

The Project is considering a bifacial monocrystalline panel (450 watts) from Hanwha or a similar module from other manufacturers for the Project. Each module assembly (with frame) has a total weight of approximately 65 pounds (29.5kg). The modules will be approximately 85 inches by 41 inches (2.16m x 1.03m) in size and are mainly comprised of silicon, copper, silver, glass, composite film, plastic, and epoxies, with an anodized aluminum frame.

At the time of decommissioning, module components in working condition may be refurbished and sold in a secondary market yielding greater revenue than selling as salvage material.

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### 2.1.2 RACKING SYSTEM AND SUPPORT

The solar modules will be mounted on a single-axis tracker racking system, such as the Terrasart or Game Change racking systems provided in Exhibit A, or similar system. The tracking system is mainly comprised of high-strength galvanized steel and anodized aluminum; steel piles that support the system are assumed to be comprised of galvanized steel.

The solar arrays will be deactivated from the surrounding electrical system and made safe for disassembly. Liquid wastes, including oils and hydraulic fluids will be removed and properly disposed of or recycled according to regulations current at the time of decommissioning. Electronic components, and internal electrical wiring will be removed and salvaged. The steel piles will be either cut and removed to a depth of three feet (36 inches) below the ground surface or completely removed. This will be determined at the time of decommissioning. The supports, racking system, and posts contain salvageable materials which can be sold to provide revenue to offset the decommissioning costs.

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### 2.1.3 INVERTER/TRANSFORMER EQUIPMENT PADS

The combined inverters/transformers (equipment pads) generally sit on small concrete footings or piers on steel piles within the array. The inverters will be deactivated, disassembled and removed. For purposes of this report, it is assumed that piers with steel piles will be utilized, though the actual steel foundation shape could vary depending on the final design and could include designs such as H piles or ground screws. Depending on condition, the equipment may be sold for refurbishment and re-use. If not re-used, they will be salvaged or disposed of at an approved solid waste management facility.

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### 2.1.4 ELECTRICAL CABLING AND CONDUITS

The Project's underground electrical collection system will be placed at a depth of approximately two to four feet below the ground surface. Cabling that is at or above a depth of three feet will be removed and salvaged, while cable greater than three feet in depth will be abandoned in place. Approximate recovery cost has been assumed for the collection cabling and is subject to change based on final quantities. It is likely to have salvage value at the time of removal. If, at the time of decommissioning, the salvage value of any cable greater than three feet exceeds the cost of extraction and restoration, the cables may be removed and salvaged.

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### 2.1.5 PROJECT SUBSTATION

The substation will contain within its perimeter, a 150 foot by 150 foot gravel pad, power transformer and footings, electrical control house and concrete foundations, as needed. The substation transformer may be sold for re-use or salvage. Components of the substation that cannot be salvaged will be transported off-site for disposal at an approved waste management facility. The estimated decommissioning cost will be included in a separate application.

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### 2.1.6 OVERHEAD TRANSMISSION LINE

The Project includes a 138 kilovolt (kV) generation tie-in line approximately 0.8 miles in length. The point of interconnection will be at the existing American Electric Power's (AEP) Nottingham Station. Decommissioning of the AEP switchyard is not included. If the Project substation described in Section 2.1.5 is removed, and there is no planned alternate use of the transmission line, then the transmission line poles and cable, will also be removed. Transmission line poles can be re-purposed within their service life and

the  
resale

value would be much higher than scrap value. Pole sites will be backfilled with native soils. The estimated decommissioning cost, if any, will be included in a separate application.

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### **2.1.7 OPERATIONS AND MAINTENANCE BUILDINGS**

The Project doesn't include any operations or maintenance buildings.

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### **2.1.8 SECURITY FENCING AND ACCESS ROADS**

The Project site will include a security fence around the perimeter of the site and exclusionary area. The fence will be greater than 73,600 feet in length. Access drives will provide direct access to the solar facility from local roads and along the inner perimeter of the arrays. Internal roads will be located within the array to allow access to the equipment. The site access drives will be approximately 20 feet in width and total approximately 42,300 feet (8.0 miles) in length. The access road lengths may change with final Project design. The decommissioning estimate assumes that all access roads and improvements will remain in place.

# 3 LAND USE AND ENVIRONMENT

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## 3.1 SOILS AND AGRICULTURAL LAND USE (RECLAIMED MINE)

The proposed Project area is predominantly located in reclaimed mine established as grassland. No areas of the Project were previously utilized for agricultural purposes. Restored areas will be revegetated in consultation with the current landowner and in compliance with regulations in place at the time of decommissioning. Land disturbed by Project facilities will be restored in such a way to be used in a reasonably similar manner to its original intended use as it existed prior to Project construction.

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## 3.2 RESTORATION AND REVEGETATION

Project sites that have been excavated and backfilled will be graded as previously described. Soils compacted during deconstruction activities will be de-compacted, as necessary, to restore the land to pre-construction land use. Topsoil will be placed on disturbed areas and seeded with appropriate vegetation or in coordination with landowners within agricultural land. Work will be completed to comply with the conditions agreed upon by the applicant and the OPSB or as directed by regulations in affect at the time of decommissioning.

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## 3.3 SURFACE WATER DRAINAGE AND CONTROL

The proposed Project area is predominantly located in reclaimed mine established as grassland. The terrain is rolling hills with some level ground at the top of hills. The Project facilities are being sited to avoid wetlands, waterways, and drainage ditches to the extent practicable. The existing Project site conditions and proposed BMPs to protect surface water features will be detailed in a Project Stormwater Pollution Prevention Plan (SWPPP) for the Project prior to the commencement of construction activities.

Surface water conditions at the Project site will be reassessed prior to the decommissioning phase. The applicant will obtain the required water quality permits from the Ohio Environmental Protection Agency (OEPA) and the U.S. Army Corp of Engineers (USACE), if needed, before decommissioning of the Project. Construction storm water permits will also be obtained and a SWPPP prepared describing the protection needed to reflect conditions present at the time of decommissioning. BMPs may include construction entrances, temporary seeding, permanent seeding, mulching, erosion control matting, silt fence, filter berms, or filter socks.

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## 3.4 MAJOR EQUIPMENT REQUIRED FOR DECOMMISSIONING

The activities involved in decommissioning the Project include removal of the components down to a depth of 36” and restoration as described in Sections 2 and 3.2.

Equipment required for the decommissioning activities is similar to what is needed to construct the solar facility and may include, but is not limited to: small cranes, track mounted excavators, backhoes, track bulldozers off-road end-dump trucks, front-end loaders, deep rippers, water trucks, disc plows and tractors to restore subgrade conditions, and ancillary equipment. Over-the-road dump trucks will be required to transport material removed from the site to disposal facilities.

# 4 DECOMMISSIONING COST ESTIMATE SUMMARY

Expenses associated with decommissioning the Project will be dependent on labor costs at the time of decommissioning. For the purposes of this report approximate 2020-2021 average market values were used to estimate labor expenses. Fluctuation and inflation of the labor costs were not factored into the estimates.

## 4.1 DECOMMISSIONING EXPENSES

Project decommissioning will incur costs associated with disposal of components not sold for salvage, including materials which will be disposed of at a licensed facility, as required. Decommissioning costs also include backfilling, grading and restoration of the proposed Project site as described in Section 2. Table 3 summarizes the estimates for activities associated with the major components of the Project.

**Table 3. Estimated Decommissioning Expenses – 100 MW Solar Array**

Activity	Unit	Quantity	Cost per Unit	Total
Overhead and management (includes estimated permitting required)	Each	1	\$500,000	\$500,000
Solar modules; disassembly and removal	Each	266,675	\$3.75	\$1,000,031
Racking disassembly and removal (equivalent 3- string trackers)	Each	3,600	\$620	\$2,232,000
Steel pile/post removal	Each	58,000	\$9.50	\$551,000
Inverter/transformers with foundations	Each	32	\$1,900	\$60,800
Electrical cables and conduits trenching removal	LF	125,300	\$2.76	\$345,828
Security fencing	LF	73,500	\$2.80	\$205,800
<b>Total Estimated Decommissioning Cost</b>				<b>\$4,895,459</b>

## 4.2 DECOMMISSIONING REVENUES

Project revenue will be realized through the sale of the solar facility components and construction materials. Modules and other components may be sold within a secondary market or as salvage. The market value of steel and other materials fluctuates daily and has varied widely over the past five years. Salvage value estimates were based on an approximate five-year-average price of steel and copper derived from sources including on-line recycling companies and United States Geological Survey (USGS) commodity summaries. The price used to value the steel used in this report is \$283 per metric ton; aluminum at \$0.403 per pound; silicon at \$0.43 per pound and glass at \$0.04 per pound. The main component of the tracking system and piles is assumed to be salvageable steel. PV solar modules are estimated to contain approximately 75 percent glass, 8 percent aluminum and 5 percent silicon. A 70 percent recovery

rate was assumed for aluminum and all module components, due to the processing required to separate the components. Alternative and more efficient methods of recycling solar panels are anticipated before this Project is decommissioned, given the large number of solar facilities that are currently being developed. Table 4 summarizes the potential salvage value for the solar array components and construction materials.

**Table 4. Estimated Decommissioning Revenues**

Item	Unit of Measurement	Quantity per Unit	Salvage Price per Unit	Total Salvage price per item	Number of items	Total
Panels-Silicon	Pounds per Panel	2.1	\$0.43	\$0.87	266,675	\$240,808
Panels-Aluminum	Pounds per Panel	3.4	\$0.43	\$1.57	266,675	\$389,879
Panels-Glass	Pounds per Panel	32.0	\$0.04	\$1.63	266,675	\$341,344
Steel pile/post	Pounds per Pile	10	\$0.25	\$25.70	58,000	\$145,000
Tracking System	Ton per MW	60	\$283	\$17,200	100	\$1,720,000
Aluminum Wiring	Ton (with insulation)	1	\$700	\$700	157.8	\$110,460
Copper Wiring	Ton (with insulation)	1	\$2,700	\$2,700	199.8	\$539,460
						<b>\$3,486,950</b>

## 4.3 DECOMMISSIONING COST SUMMARY AND FINANCIAL ASSURANCE

The following is a summary of the net estimated cost to decommission the Project, using the information detailed in Sections 4.1 and 4.2. Estimates are based on 2020-2021 prices, with no market fluctuations or inflation considered.

**Table 5. Net Decommissioning Summary**

Item	Cost/Revenue
Decommissioning Expenses	\$4,895,459
Potential Revenue – salvage value of panel components and recoverable materials	\$3,486,950
<b>Net Decommissioning Cost</b>	<b>\$1,408,509</b>