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August 5, 2022

Via Electronic Filing

Ms. Tanowa Troupe
Administration/Docketing
Public Utilities Commission of Ohio
180 East Broad Street, 11th Floor
Columbus, OH 43215-3793

Re: Arche Energy Project, LLC, Case No 20-979-EL-BGN

Dear Ms. Troupe:

On April 15, 2021, the Ohio Power Siting Board ("OPSB" or "Board") issued a certificate of environmental compatibility and public need to Arche Energy Project, LLC ("Arche") for the constructions, operation, and maintenance of a 107 MW solar generation facility located in Fulton County, Ohio.

As part of the Certificate, Arche must comply with various conditions related to the construction and operation of the facility. Certificate Condition No. 17 requires:

> **Arche shall submit an updated decommissioning plan 30 days prior to the preconstruction conference. The plan shall include a total cost estimate without regard for salvage value and a provision that the decommissioning financial assurance mechanism include a performance bond naming the company as principal, the insurance company as surety, and the Board as obligee.**

In compliance with Condition No. 17, attached is a copy of the updated decommissioning plan.

Please do not hesitate to contact me if you have any questions.

Sincerely,

Dylan F. Borchers

Attachment

Cc: Jim O'Dell (w/Attachment)

Decommissioning Plan
Arche Solar Project
Fulton County, Ohio

now

Prepared for:
Arche Energy Project, LLC
400 Montgomery Street, Eighth Floor
San Francisco, CA 94104

Prepared by:
Cardno, now Stantec
76 San Marcos Street
Austin, Texas 78702

Project No: E321201511
Revision July 27, 2022

This document entitled Decommissioning Plan – Arche Solar Project, Fulton County, Ohio, was prepared by Cardno, now Stantec ("Cardno") for the use of Arche Energy Project, LLC, a Texas limited liability company (the "Client"). The material in this document reflects Cardno's professional judgment in light of the scope, schedule and other limitations stated in the document and in the contract between Cardno and the Client. The opinions in this document are based on conditions and information existing at the time this document was published and do not take into account any subsequent changes.

(signature)

JoAnne Blank
Senior Associate, Senior Scientist

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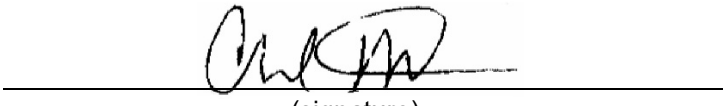
Matthew A Clementi, PE
Senior Engineer



(signature)

Chad Martin
Senior Principal

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1.0 INTRODUCTION

Arche Energy Project, LLC (Arche), is proposing to construct the Arche Solar Project in Fulton County, Ohio. The proposed Arche Solar Project (the Project) is to be located within Gorham Township in Fulton County, Ohio. Major components of the Project include solar modules, a tracking system, inverter/transformer stations, and a Project substation. The Project will occupy approximately 675 acres of land (520 acres within perimeter fencing) and will have a maximum nameplate generating capacity of up to 107 megawatts (MW) alternating current (AC).

This Decommissioning Plan (Plan) provides a description of the decommissioning and restoration phase of the Project. Start-of-construction is planned for March 2023, with a projected Commercial Operation Date of August 2023. The decommissioning phase is assumed to include the removal of Project facilities as listed in Section 1.1 and shown in Figure 1.

This Plan includes an overview of the primary decommissioning Project activities, including the dismantling and removal of facilities, and subsequent restoration of land. A summary of estimated costs and revenues associated with decommissioning the Project are included in Section 4.0. The summary statistics and estimates provided are based on a 107-$MW_{[AC]}$ Project array design.

1.1 SOLAR FARM COMPONENTS

The main components of the Project include:

- Solar modules and associated above ground cabling
- Tracking system and steel piles
- Inverter/transformer stations
- Site access and internal roads
- Perimeter fencing
- Below ground electrical cabling and conduits
- Project substation
- Above ground transmission line

1.2 TRIGGERING EVENTS AND EXPECTED LIFETIME OF PROJECT

Project decommissioning may be triggered by events such as the end of a power purchase agreement or when the Project reaches the end of its operational life. Decommissioning will begin within 12 months of the Facility ceasing operation and decommissioning activities are anticipated to be completed within six to nine months.

If properly maintained, the expected lifetime of a utility-scale solar panel is approximately 30 to 35 years with an opportunity for a project lifetime of 50 years or more with equipment replacement and repowering. The Project's anticipated lifespan is 40 years. Depending on market conditions and project viability, solar arrays may be retrofitted with updated components (e.g., panels, frame, tracking system, etc.) to extend the life of a project. In the event that the modules are not retrofitted, or at the end of the Project's useful life, the panels 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 life of the Project, components such as the solar panels could be sold in the wholesale market for reuse or refurbishment. As efficiency and power production of the panels 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.

1.3 DECOMMISSIONING SEQUENCE

Decommissioning activities will begin within 12 months of the Project ceasing operation and will be completed within six to nine months from the start of decommissioning. 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.

- Reinforce access roads, if needed, and prepare site for component removal
- Install temporary fencing and best management practices (BMPs) to protect sensitive resources
- De-energize solar arrays
- Dismantle panels and above ground wiring
- Remove trackers and piles
- Remove inverter/transformer stations, along with support piers and piles
- Remove electrical cables and conduits buried at a depth of three feet or less

- Remove access and internal roads and grade site to restore original contours, as necessary
- Remove substation, if decommissioned
- Remove above-ground generation tie-in transmission line and poles
- De-compact subsoils (if required), restore and revegetate disturbed land to allow pre-construction land use to the extent practicable

2.0 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

Arche anticipates utilizing approximately 292,797 solar modules, with a total nameplate generating capacity of approximately 134 MW direct current (DC) converting to approximately 107 $MW_{[AC]}$ on the entire 675-acre site. Statistics and cost estimates provided in this Plan are based on First Solar and Jinko modules.

Foundations, steel piles, and electrical cabling and conduit (if any) located three feet or less below the surface will be removed. Access roads may be left in place if requested and/or agreed to by the landowner. Arche will communicate with the appropriate local agency to coordinate the repair of public roads damaged or modified during the decommissioning and reclamation process.

Estimated quantities of materials to be removed and salvaged or disposed of are included in this section. Most of the materials described have salvage value, although there are some components that will likely have none at the time of decommissioning. All recyclable materials, salvaged and non-salvage, will be recycled to the extent possible. All other non-recyclable waste materials will be disposed of in accordance with state and federal law in a licensed solid waste facility. Table 1 presents a summary of the primary components of the Project included in this decommissioning plan.

Table 1 Primary Components of Solar Farm to be Decommissioned

Component	Quantity	Unit of Measure
Solar Modules (approximate)	292,797	Each
Tracking System (full equivalent trackers)	4,067	Tracker
Steel Piles	45,133	Each
Inverters/Transformer Stations	33	Each
Electrical Cables and Conduits (greater than three feet below-ground to be abandoned in place)	245,000	Lineal Foot (estimated)
Perimeter Fencing	72,210	Lineal Foot (estimated)
Internal Access Roads (approximate)	23,260	Lineal Foot (estimated)
Transmission Line and Associated Structures	0.04	Lineal Miles (estimated)
Substation	1	Each

2.2 SOLAR MODULES

Arche is utilizing the Jinko Eagle Bifacial HC 72M G2 (395 watts) module and the First Solar Series 6 Plus (460 watts) module for the Project. The Jinko module assembly (with frame) has a total weight of approximately 51.3 pounds, is approximately 80.0 inches long and 40.0 inches in width and is mainly comprised of non-metallic materials such as silicon, tempered glass, composite film, plastic, and epoxies, with an anodized aluminum alloy frame. The First Solar module assembly (with frame) has a total weight of approximately 76.9 pounds, are approximately 80.0 inches long and 49.0 inches in width and are mainly comprised of non-metallic materials such as silicone, monocrystalline glass, composite film, laminate, and epoxies, with an anodized aluminum alloy 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.

2.3 TRACKING SYSTEM AND SUPPORT

The solar modules will be mounted on a single axis, one in portrait tracking system, such as the Horizon tracker manufactured by NEXTracker or a similar manufacturer. An equivalent full tracker length of approximately 91 meters (298 feet) in length has been used to calculate removal costs. Smaller trackers may be employed at the edges of the layout, to efficiently utilize available space. The tracking systems are mainly comprised of galvanized and stainless steel; steel piles that support the system are comprised of structural steel.

The solar arrays will be deactivated from the surrounding electrical system and made safe for disassembly. Tracker lubricants 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 completely removed.

The supports, tracking system, and piles contain salvageable materials which will be sold to provide revenue to offset decommissioning costs.

2.4 INVERTER/TRANSFORMER STATIONS

Inverters and transformers are located within the array and will sit on skids with steel piles. Piles may be reinforced with concrete. The inverters and transformers will be deactivated, disassembled, and removed. 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. All oils and lubricants will be collected and disposed of at a licensed facility.

2.5 ELECTRICAL CABLING AND CONDUITS

The Project's underground electrical collection system will be placed at a minimum depth of approximately three feet (36 inches) unless a greater depth is required by a landowner. Cabling installed below three feet will not interfere with future land use and can be abandoned in place. For purposes of this Plan, it is assumed that all cabling and conduit located at a depth greater than three feet below the surface will be abandoned in place.

2.6 PROJECT SUBSTATION AND ABOVE GROUND TRANSMISSION LINE

The Project will include a project-specific substation as shown on the attached figure. The substation footprint will be approximately 129 feet by 87 feet and will contain within its perimeter a gravel pad, one power transformer and footings, electrical control house and concrete foundations, as needed. An approximately 200-foot-long dedicated overhead transmission line connects the Project substation to a larger regional substation. Unless an alternate use for the substation and transmission line are determined, the facilities will be removed, and the land restored to pre-construction conditions to the extent practicable.

The substation transformers 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. Foundations and footings will be demolished and removed to a minimum depth of four feet. The transmission line and associated structures will be removed. The substation and transmission line will service the Project and although they may be retained at the end of the Project life, an estimated decommissioning cost has been included in this Plan.

2.7 OPERATIONS AND MAINTENANCE BUILDING

One project-specific O&M structure will be utilized for the Project. The structure will be a self-contained modular office of steel container-type construction. It will be installed on a gravel pad with connections to electrical and other necessary services. The structure will be completely removed from the site during the decommissioning process.

2.8 PERIMETER FENCING, SITE ACCESS AND INTERNAL ROADS

The Project site will include an approximately seven-foot-high wildlife/deer fence surrounding the perimeter of each array site.

A network of access roads will allow access to solar facility equipment. The internal access roads will be composed of gravel over compacted soil approximately 12 feet wide and total approximately 23,260 feet (4.41 miles) in length. The internal access road lengths may change with the final Project design. To be conservative, the

decommissioning estimate assumes that all internal access roads will be completely removed.

During installation of the Project site access roads, subgrade conditions will be stabilized using cement stabilization or geotextile fabric. This Plan assumes the installation of up to nine inches of aggregate base materials over compacted native soil. Geotextile fabric will be placed beneath the gravel for the length of each access road. The estimated quantity of these materials is provided in Table 2.

Table 2 Typical Access Road Construction Materials

Item	Quantity	Unit
Gravel or granular fill; nine-inch thick	7,753	Cubic Yards
Geotextile fabric	31,013	Square Yards

Decommissioning activities include the removal and stockpiling of aggregate materials on site for salvage preparation. It is conservatively assumed that all aggregate materials will be removed from the Project site and hauled up to five miles from the Project area. The underlying geotextile fabric will be removed during the access road decommissioning. Fabric that is easily separated from the aggregate during excavation will be disposed of in an approved solid waste disposal facility. Fabric that remains with the aggregate will be sorted out at the processing site and properly disposed of. Following removal of aggregate and geotextile fabric, the access road areas will be graded, de-compacted with deep ripper or chisel plow (ripped to 18 inches), backfilled with native subsoil and topsoil, as needed, and land contours restored as near as practicable to preconstruction conditions.

3.0 LAND USE AND ENVIRONMENT

3.1 AGRICULTURAL LAND USE

The areas of the Project that were previously utilized for agricultural purposes will be restored, as near as practicable, to their preconstruction condition. Topsoil reserved during construction and stored in long-term berms will be used if available and supplemented with comparable soils. Restored areas will be revegetated in compliance with regulations in place at the time of decommissioning. The proposed solar facility is predominantly located on land currently utilized for agricultural purposes. The Project site is relatively flat with natural and man-made drainage waterways located in low-lying areas.

3.2 RESTORATION AND REVEGETATION

Portions of the Project site that have been excavated and backfilled will be restored, as near as practicable, to preconstruction conditions. Soils compacted during de-construction activities will be de-compacted, as necessary, to restore the land to pre-construction land use. County drains and ditches will be avoided. If present, private drain tiles that affect drainage of multiple parcels that were not avoided, rerouted, or repaired during construction and have been damaged will be repaired or replaced, as needed, in order to maintain appropriate drainage. Topsoil will be placed on disturbed areas, as needed, and seeded with appropriate vegetation in coordination with landowners.

3.3 SURFACE WATER DRAINAGE AND CONTROL

As previously described, the proposed Project area is predominantly located in actively drained agricultural land. The terrain is relatively flat with several man-made and natural drainages. The Project facilities are sited to avoid wetlands, waterways, and drainage ditches to the extent practicable.

Surface water conditions at the Project site will be reassessed prior to the decommissioning phase. Arche will obtain the required water quality permits from the Ohio Environmental Protection Agency (OEPA) and the U.S. Army Corps of Engineers (USACE), as needed, prior to decommissioning the Project. Required construction stormwater permits will also be obtained, and a Stormwater Pollution Prevention Plan (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 (in non-agricultural areas), erosion control matting, silt fence, filter berms, and filter socks.

3.4 MAJOR EQUIPMENT REQUIRED FOR DECOMMISSIONING

The activities involved in decommissioning the Project include removal of the Project components: solar modules, racking, tracking system, foundations and piles, inverters, transformers, access roads, and electrical cabling and conduits. Restoration activities include back-filling of pile and foundation sites; de-compaction of subsoils; grading of surfaces to pre-construction land contours and revegetation of the disturbed areas.

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, low ground pressure (LGP) tracked excavators, backhoes, LGP tracked bulldozers, LGP off-road end-dump trucks, front-end loaders, deep rippers, water trucks, disc plows and tractors to restore subgrade conditions, and ancillary equipment. Standard dump trucks will be used to transport material removed from the site to disposal facilities.

4.0 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, 2022 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

During decommissioning, the Project 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

Activity	Unit	Number	Cost per Unit	Total
Overhead and management (includes estimated permitting required)	Lump Sum	1	$537,000	$537,000
Solar modules; disassembly and removal	Each	292,797	$4.60	$1,346,866
Tracking System disassembly and removal	Each	4,067	$625	$2,541,875
Steel pile/post removal (includes trackers and inverter station)	Each	45,133	$9.70	$437,790
Inverter/transformers stations	Each	33	$1,820	$60,060
Access road excavation and removal	Lump Sum	1	$92,650	$92,650
Perimeter fence removal	Linear Feet	72,210	$2.80	$202,188
Topsoil replacement and rehabilitation of site	Lump Sum	1	$373,350	$373,350
O&M Building (Conex)	Lump Sum	1	$5,000	$5,000
Removed above ground transmission lines and poles	Lump Sum	1	$8,000	$8,000
Project Substation	Lump Sum	1	$300,000	$300,000
Total estimated decommissioning cost				**$5,904,779**

4.2 DECOMMISSIONING REVENUES

Although not taken into account for this plan, revenue from decommissioning the Project will be realized through the sale of the solar facility components and construction materials. As previously described, the value of the decommissioned components will be

higher in the early stages of the Project and decline over time. Resale of components such as solar panels is expected to be greater than salvage (i.e., scrap) value for most of the life of the Project, as described below. For the purposes of this report, only potential estimated salvage values were considered.

Modules and other solar plant components can be sold within a secondary market for re-use. A current sampling of reused solar panels indicates a wide range of pricing depending on age and condition ($0.10 to $0.30 per watt). Future pricing of solar panels is difficult to predict at this time, due to the relatively young age of the market, changes to solar panel technology, and the ever-increasing product demand. A conservative estimation of the value of solar panels at $0.10 per watt would yield approximately $13,400,000. Increased costs of removal, for resale versus salvage, would be expected in order to preserve the integrity of the panels; however, the net revenue would be substantially higher than the estimated salvage value.

The resale value of components such as trackers may decline more quickly; however, the salvage value of the steel that makes up a large portion of the tracker is expected to stay at or above the value used in this report.

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 $241 per metric ton; aluminum at $0.40 per pound; silicon at $0.40 per pound and glass at $0.05 per pound.

The main material of the tracking system and piles is assumed to be salvageable steel. The main components of the solar modules are glass and silicon with aluminum framing. A 50 percent recovery rate was assumed for all panel components, due to the processing required to separate the panel 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 Potential 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	Average Pounds per Panel	1.9	$0.40	$0.760	292,797	$222,526
Panels - Aluminum	Average Pounds per Panel	3.0	$0.40	$1.200	292,797	$351,356
Panels - Glass	Average Pounds per Panel	28.4	$0.05	$1.420	292,797	$415,772
Tracking System and Posts	Tons per $MW_{[DC]}$	32.0	$241	$7,712.0	134.00	$1,033,408
Substation	Each	1.00	$50,000	$50,000	1	$50,000
Total Potential Revenue						$2,073,062

* Revenue based on salvage value only. Revenue from used panels at $0.10 per watt could raise $13,400,000 as resale versus the estimated salvage revenue.

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 2022 prices, with no market fluctuations or inflation considered.

The following table represents the total estimated net decommissioning cost.

Table 5 Decommissioning Summary

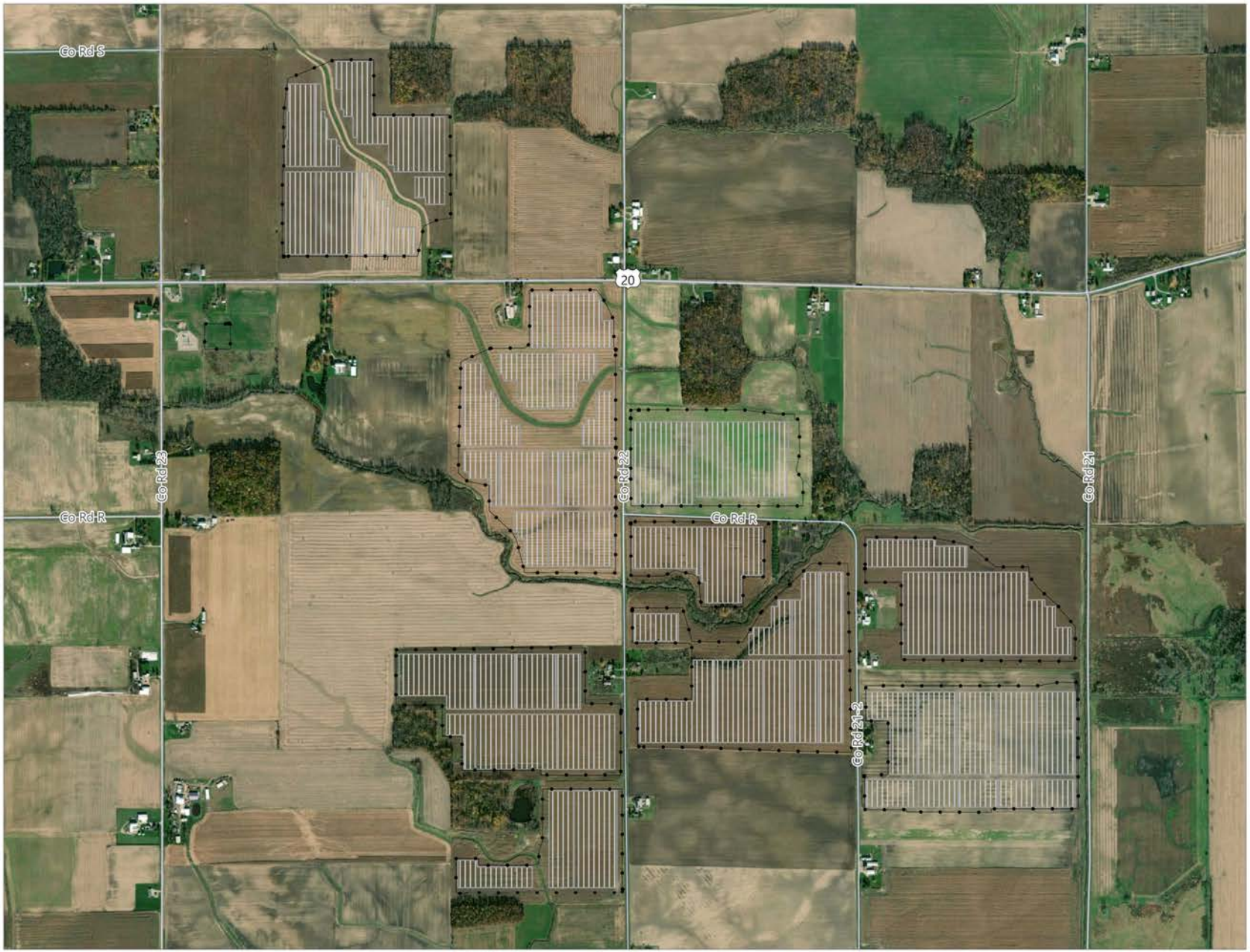
Item	Cost/Revenue
Decommissioning Expenses	**$5,904,779**
Potential Revenue – salvage value of panel components and recoverable materials (Arche acknowledges that salvage revenue may not be allowed by OPSB)	**$2,073,062**

Arche has indicated that, prior to the start of construction, they will retain an independent and registered professional engineer to calculate the net decommissioning costs for the Facility, to be recalculated every five years. Arche will post and maintain a surety bond

or similar financial assurance instrument in that amount for the removal of the Facility at least three years prior to the earlier of the termination of any Facility Power Purchase Agreement or the operational life of the Facility.

FIGURES

Figure 1 Project Layout



Arche Energy Project

Gorham Township,
Fulton County, Ohio

Updated Facility Layout

Public Road

Fenceline

PV Panel Area

www.archesolarfarm.com

0 500 1,000 2,000

Feet

Prepared June 30, 2022
Basemap: Esri "World Imagery" map service

EDR

Summary: Notice of Compliance with Condition No. 17 - Decommissioning Plan electronically filed by Teresa Orahood on behalf of Dylan F. Borchers