Song Sparrow Solar LLC Decommissioning Plan



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1.0 INTRODUCTION

Song Sparrow Solar LLC (Song Sparrow) is proposing to construct the Song Sparrow Solar Project (the "Project") located near the intersection of Gage and Davis Roads approximately four miles south of Kevil in Ballard County, Kentucky. Arrays of photovoltaic modules will be mounted on single access trackers arranged in rows. Power conversion systems will be distributed throughout the Project area, comprised of one distribution transformer and a series of power inverters. The equipment will connect via underground electrical wiring to a Project substation and switchyard proposing to interconnect to the existing Grahamville-to-Wickliffe 161kV transmission line located in the southwest corner of the Project area north of Mosstown Road. The Project will occupy approximately 655 acres of land encompassed with perimeter fencing and will have a generating capacity of up to 104 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 July 2026, with a projected Commercial Operation Date of October 2027, but are subject to change. 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 104-MW_[AC] Project array design. This Plan complies with requirements stated within Sections 2.F. and 2.G. of the Ballard County Resolution Number 2023-04-18 "A Resolution Relating to the Policies and Procedures Concerning Commercial Solar Energy Systems" ("County CSES Resolution") dated April 18, 2023, and Kentucky Revised Statutes (KRS) 278.706(2)(m) (referred to as "2023 KRS HB4"). To the extent applicable laws and regulations in the future conflict with this Decommissioning Plan, such laws and regulations may apply in lieu of the applicable portion of this Plan.

1.1 SOLAR PROJECT 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 and associated transmission tie-in 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. The decommissioning phase will comply with requirements of the County CSES Resolution and 2023 KRS HB4, or applicable law at time of decommissioning. Where the provisions of the County CSES Resolution and 2023 KRS HB4 (or applicable law at the time of decommissioning) conflict, the more conservative provision will be complied with.

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 more than 40 years with equipment replacement and repowering. Depending on market conditions and project viability, solar arrays may be retrofitted with updated components (e.g., modules, tracking system, etc.) to extend the life of a project. In the event that the facility is 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. During the Project's useful life solar panels that are replaced or discarded will be removed from the site within 90 days, unless an extension has been granted by the secretary of the Kentucky Energy and Environment Cabinet ("Secretary").

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 modules 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 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. Decommissioning activities will include removal of the solar arrays and associated components as listed in Section 1.1 and described in Section 2.

1.3 DECOMMISSIONING SEQUENCE

The County CSES Resolution states that decommissioning is to occur within 12 months of the cessation of energy generation. 2023 KRS HB4 states that decommissioning activities will be completed within 18 months of the Project ceasing to produce electricity for sale unless the deadline has been extended by the Secretary. 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 erosion control 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 above and below-ground electrical cables to a depth of 36 inches
- Remove perimeter fencing
- Remove access and internal roads and grade site to restore original contours, as necessary
- Remove Project substation and above ground transmission line if decommissioned per request by landowner; otherwise left in place for future use in accordance with 2023 KRS HB4.
- De-compact subsoils (if required), restore and revegetate disturbed land to a substantially similar state as it was prior to commencement of Project construction



2.0 PROJECT COMPONENTS AND DECOMMISSIONING ACTIVITIES

The solar facility components and decommissioning activities necessary to restore the Project to a substantially similar state as it was prior to commencement of construction of the Project, are described within this section.

2.1 OVERVIEW OF SOLAR FACILITY SYSTEM

Song Sparrow anticipates utilizing approximately 246,116 solar modules, with a generating capacity of approximately 104 MW_[AC]. Statistics and cost estimates provided in this Plan are based on JA Solar bifacial modules, although the final panel selection may vary prior to construction. A different panel selection is not anticipated to materially alter the conclusions of this Plan.

Unless otherwise requested by a landowner, all above ground Project facilities and foundations, steel piles, and electrical cabling and conduit (if any) below the surface to a depth of 36 inches will be removed.

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 Project to be Decommissioned

Component	Quantity	Unit of Measure
Solar Modules (approximate)	246,116	Each
Tracking System (full equivalent trackers)	3,156	Tracker
Steel Piles (tracker and inverter station)	41,352	Each
Inverters/Transformer Stations	27	Each
Electrical Cables and Conduits (below ground) (approximate)	105,185	Lineal Foot
Perimeter Fencing (approximate)	89,201	Lineal Foot
Access Roads (approximate)	39,363	Lineal Foot
Overhead Transmission Line (approximate)	200	Lineal Foot
Substation	1	Each

2.2 SOLAR MODULES

Song Sparrow is considering the JAM72D30 (585 watts) or similar bifacial module for the Project. The module assembly (with frame) has a total weight of approximately 68.6 pounds and is approximately 97



inches long and 44.6 inches in width. The module is mainly comprised of non-metallic materials such as silicon, tempered glass, plastic, 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 by Nextracker. An equivalent three-string, 78-module, tracker has been used to calculate removal costs. Each full equivalent tracker has an approximate length of 92 meters (302 feet). Smaller trackers may be employed at the edges of the layout, to efficiently utilize available space. The tracking systems are mainly comprised of galvanized 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 be mounted on skids supported by steel piles. Piles may be reinforced with concrete. The inverters and transformers will be deactivated, disassembled, and removed. Depending on its 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. 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 depth of three feet (36 inches) or greater. Underground cabling that is installed at a depth of three feet or less will be removed and salvaged, while cable located greater than three feet in depth will be abandoned in place.

2.6 PROJECT SUBSTATION AND ABOVE GROUND TRANSMISSION TIE-IN LINE

Song Sparrow will include a Project substation as shown on the attached figure. The substation footprint 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 tie-in line connects the Project substation to a larger regional utility switchyard. The Project substation and transmission line are considered "interconnection and other facilities" as described in 2023 KRS HB4, and thus, will remain in place unless otherwise requested by the landowner. If the landowner requests that the facilities will be removed, the land will be restored to a substantially similar state as it was prior to



commencement of construction of the Project. The utility interconnection switchyard will remain following decommissioning, as it will become part of the regional transmission grid, in compliance with the easement agreement with landowner.

If decommissioned, 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. Foundations and footings will be demolished and removed. Although the Project substation and transmission tie-in line 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

Song Sparrow may construct an operations and maintenance (O&M) building on a leased parcel of land. The building would have value at the end of the Project and will be reverted to the landowner; therefore, no O&M building removal cost is included in this Plan.

2.8 PERIMETER FENCING, SITE ACCESS AND INTERNAL ROADS

The Project site will include an approximately seven-foot-high wildlife fence surrounding the perimeter of each array site. The fencing will be removed and sold for salvage or recycled at the end of the decommissioning phase.

A network of access roads will allow access to solar facility equipment. The internal access roads will be composed of aggregate, approximately six inches in depth and 39,363 feet (7.5 miles) in length. The internal access road lengths may change with the final Project design. Access roads may be left in place if requested and/or agreed to by the landowner. To be conservative, the decommissioning estimate assumes that all internal access roads will be removed. The estimated quantity of aggregate is provided in Table 2.

Table 2 Typical Access Road Construction Materials

Item	Quantity	Unit
Gravel or granular fill; six-inch thick	11,663	Cubic 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. Following removal of aggregate, 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 to a substantially similar state as it was prior to the commencement of construction of the Project.



3.0 LAND USE AND ENVIRONMENT

3.1 AGRICULTURAL LAND USE

The Project site topography is gently rolling with natural and man-made drainageways located in low-lying areas. The proposed solar facility is predominantly located on land currently utilized for agricultural purposes. The Project area will be returned to a substantially similar state as it was prior to the commencement of construction.

3.2 RESTORATION AND REVEGETATION

Portions of the Project site that have been excavated and backfilled will be returned to a substantially similar state as it was prior to the commencement of construction. Soils compacted during de-construction activities will be de-compacted, as necessary. County drains 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. Restored areas will be revegetated in compliance with applicable laws and regulations in place at the time of decommissioning.

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 gently rolling with several man-made and natural drainages. The Project facilities are being 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. Song Sparrow will obtain the required water quality permits from the Kentucky Energy and Environment Cabinet (KEEC) 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. Best Management Practices (BMPs) may include enhancement of 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, including but not limited to solar modules, tracking system, foundations and piles, inverters, transformers, perimeter fence, access roads, and electrical cabling and conduits located at three feet or less below the surface grade of the land. 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) track mounted excavators, backhoes, LGP track bulldozers and dump trucks, front-end loaders, deep rippers, water trucks, disc plows and tractors to restore subgrade conditions, and ancillary equipment. Standard dump trucks may 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, 2023 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 3. Table 3 summarizes the estimates for decommissioning activities associated with the major components of the Project. Costs are based on an approximately 144 MW direct current (DC) site design, converting to 104 MW_[AC].

Table 3 Estimated Decommissioning Expenses

Activity	Unit	Number	Cost per Unit	Total
Overhead and management (includes estimated permitting required)	Lump Sum	1	\$504,000	\$504,000
Solar modules; disassembly and removal	Each	246,116	\$4.95	\$1,218,274
Tracking system disassembly and removal	Each	3,156	\$685	\$2,161,860
Steel pile/post removal (includes trackers and solar inverter stations)	Each	41,352	\$10.70	\$442,466
Inverter/transformers stations	Each	27	\$1,860	\$50,220
Access road excavation and removal	Lump Sum	1	\$74,300	\$74,300
Perimeter fence removal	Lineal Foot	89,201	\$3.10	\$276,523
Topsoil replacement and rehabilitation of site	Lump Sum	1	\$508,900	\$508,900
Substation removal	Lump Sum	1	\$300,000	\$300,000
Above ground transmission line	Lump Sum	1	\$9,500	\$9,500
Total Estimated Decommissioning Cost	\$5,546,043			

4.2 DECOMMISSIONING REVENUES

Revenue from decommissioning the Project will be realized through the sale of the 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 Plan, only estimated salvage values were considered in net revenue calculations, as this is the more conservative estimate strategy. Modules and other solar facility 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 \$14,398,000. Increased costs of removal, when preparing 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, thus offsetting higher removal cost.

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 \$262 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 Estimated Decommissioning Revenues

Item	Unit of Measure- ment	Quantity per Unit	Salvage Price per Unit	Total Salvage Price per Item	Number of Items	Total
Panels - Silicon	Pounds per Panel	1.7	\$0.40	\$0.680	246,116	\$167,359
Panels - Aluminum	Pounds per Panel	2.7	\$0.40	\$1.080	246,116	\$265,805
Panels - Glass	Pounds per Panel	25.7	\$0.05	\$1.285	246,116	\$316,259
Tracking System and Posts	Metric tons per MW _[DC]	32.0	\$262	\$8,384	143.98	\$1,207,128
Substation Components (steel and transformer)	Lump Sum	1	\$50,000	\$50,000	1	\$50,000
Total Potential Revenue					\$2,006,551	

^{*} Revenue based on salvage value only. Revenue from used panels at \$0.10 per watt could raise \$14,398,000 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 2023 prices, with no market fluctuations or inflation considered. Table 5 represents the total estimated net decommissioning cost.

Table 5 Net Decommissioning Cost Summary

Item	Cost/Revenue
Decommissioning Expenses	\$5,546,043
Potential Revenue – salvage value of panel components and recoverable materials	\$2,006,551
Net Decommissioning Cost	\$3,539,492

Song Sparrow has indicated that they will comply with 2023 KRS HB4 and the County CSES Resolution. Consistent with the Ballard County CSES Resolution, during the second year of Project operations, a surety bond or a decommissioning security will be issued to the Ballard County Fiscal Court for the net decommissioning cost provided within this Plan. Song Sparrow will update the decommissioning estimate every five years, and the financial security will be increased if the updated estimate yields a different net removal cost.

Song Sparrow has indicated they will comply with 2023 KRS HB4 requirements, including but not limited to the following:



- The bond or other similar security shall be provided by an insurance company or surety that shall at all times maintain at least an "Excellent" rating as measured by the AM Best rating agency or an investment grade credit rating by any national credit rating agency and, if available, shall be noncancelable by the provider or the customer until completion of the decommissioning plan or until a replacement bond is secured.
- The bond or other similar security shall provide that at least thirty (30) days prior to its cancellation or lapse, the surety shall notify the applicant, its successor or assign, each landowner, the Energy and Environment Cabinet, and the county or city in which the facility is located of the impending cancellation or lapse. The notice shall specify the reason for the cancellation or lapse and provide any of the parties, either jointly or separately, the opportunity to cure the cancellation or lapse prior to it becoming effective. The applicant, its successor, or its assign shall be responsible for all costs incurred by all parties to cure the cancellation or lapse of the bond. Each landowner, or the Energy and Environment Cabinet with the prior approval of each landowner, may make a demand on the bond and initiate and complete the decommissioning plan.
- Communicate with each affected landowner at the end of the merchant electric generating facility's
 useful life so that any requests of the landowner that are in addition to the minimum requirements
 set forth in this paragraph and in addition to any other requirements specified in the lease with the
 landowner may, in the sole discretion of the applicant or its successor or assign, be accommodated.

The Ballard County CSES Resolution states that the decommissioning shall be in accordance with the 2023 KRS HB4. Song Sparrow has indicated that the 2023 KRS HB4 requirements are covered in the Project's land leases and no amendments to leases are necessary. Song Sparrow will be responsible for decommissioning the Project facilities.



Figure 1 Project Layout



