Appendix H

Decommissioning Plan

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Decommissioning Plan
Iron Pine Solar Project
Pine County, Minnesota

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1.0 INTRODUCTION

Iron Pine Solar LLC (Iron Pine Solar) is proposing to construct and operate the Iron Pine Solar Project (Project) immediately south of the City of Willow River, Pine County, Minnesota. The Project footprint encompasses approximately 1,526 acres within perimeter fencing. The maximum generating capacity of the Project photovoltaic system will be up to 360 megawatts (MW), alternating current (AC) with 325 $MW_{[AC]}$ at the point of interconnection (POI).

This Decommissioning Plan (Plan) provides a description of the decommissioning and restoration phase of the Project. Start-of-construction is planned for the third quarter of 2025, with a projected Commercial Operation Date anticipated in first quarter 2027. Major components of the Project include solar modules and associated trackers and steel piles; inverter stations; access roads; perimeter fencing; electrical collection system and substations (Figure 1).

This Plan is applicable to the decommissioning/deconstruction and restoration phases of the Project and has been prepared as a summary of the activities and financial commitments required by the Minnesota Public Utilities Commission (MPUC). Iron Pine Solar is committed to completing the decommissioning of the Project according to the conditions described within the Minnesota Department of Commerce Energy Environmental Review and Analysis (EERA) Application Guidance for Site Permitting of Solar Farms (Guidance).

A summary of the components to be removed is provided in Section 1.1. Summaries of the estimated costs and potential salvage value associated with decommissioning the Project are provided in Section 4.

1.1 FACILITY COMPONENTS

The main components of the Project include:

- Solar modules and associated electrical cabling
- Tracking system and steel piles
- Inverter and transformer stations
- Electrical cabling and conduits (above and below ground)
- Perimeter fencing
- Site access and internal roads
- Operations and maintenance structure
- Project substation and overhead transmission generation tie-in line

1.2 TRIGGERING EVENTS AND EXPECTED LIFETIME OF PROJECT

Project decommissioning may be triggered by events such as the expiration of lease agreement(s), abandonment, or when the Project reaches the end of its operational life. Abandonment of a solar facility is typically defined as when a facility ceases to transfer energy on a continuous basis for 12 months.

The anticipated lifetime of the Project is approximately 30 years. At the end of the Project's useful life, the modules and associated components will be decommissioned and removed from the Project site. Iron Pine Solar will be the party responsible for decommissioning and restoring the site.

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 (landfill). Decommissioning activities will include removal of the solar arrays, and associated components as listed in Section 1.1 and described in Section 2 and restoration activities as described in Section 3.

1.3 DECOMMISSIONING SEQUENCE

Decommissioning activities are anticipated to begin within twelve (12) months of the Project ceasing operation and be completed within 12 months from start of decommissioning. Notice to landowners and applicable units of government will be sent at least 90 days prior to the start of decommissioning. Monitoring and site restoration may extend beyond the 12-month decommissioning period to achieve successful revegetation and rehabilitation. The anticipated sequence of decommissioning and removal is described below; however, overlap of activities is expected.

- Obtain required permits prior to the start of any onsite activities.
- Reinforce access roads, if needed, and prepare site for component removal.
- Install erosion control materials and other best management practices (BMPs) to protect sensitive resources and control erosion during decommissioning activities.
- De-energize solar arrays.
- Dismantle and remove panels and above-ground wiring.
- Remove tracking equipment and piles.
- Remove inverter/transformer stations along with support system and foundation pads.
- Remove above ground electrical cables
- Remove solar array and substation perimeter fence.
- Remove access roads and grade site (as required).
- De-energize and make the substation safe for removal.
- Coordinate with transmission owner to disconnect from grid at the POI.
- Remove substation and associated overhead transmission tie-in line.
- De-compact subsoils as needed, restore, and revegetate disturbed land to allow for pre-construction land use.

2.0 PROJECT COMPONENTS AND DECOMMISSIONING ACTIVITIES

The solar facility components and decommissioning activities necessary to restore the Project area to allow for land use similar to the use prior to Project construction.

2.1 OVERVIEW OF FACILITIES

Iron Pine Solar anticipates utilizing approximately 570,622 bifacial solar modules, with a total generating capacity of approximately 395.88 MW direct current (DC) with a maximum of 325 $MW_{[AC]}$ at the POI. The Project footprint encompasses approximately 1,526 acres of predominantly agricultural land within perimeter fencing as shown on Figure 1.

All foundations and steel piles will be removed. Electric cabling and conduit installed below the soil surface will be abandoned in place. Access roads and fence may be left in place if requested and/or agreed to by the landowner; however, for purposes of this assessment, all access roads are assumed to be removed. Iron Pine Solar will communicate with the appropriate local agency to coordinate the repair of damaged or modified public roads during the decommissioning and reclamation process, and will coordinate with appropriate federal, state and/or local agencies for necessary permit approvals prior to decommissioning activities.

Estimated quantities of materials to be removed and sold, 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 that cannot be sold on the resale market 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.

Solar panels 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-year timeframe, the component's resale value will be substantially higher than at the end of the projected Project. 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)	570,622	Each
Tracking System (equivalent full trackers)	7,316	Tracker
Steel Piles	88,776	Each
Inverter Stations with Piers or Foundations	82	Each
Perimeter Fencing	83,805	Linear Foot
Access Roads (approximate)	86,197	Linear Foot
Overhead Tie-in Transmission Line	1.0	Linear Mile
O&M Building (prefabricated)	1	Each
Project Substation	1	Each

2.2 SOLAR MODULES

Statistics and estimates provided in this Plan are based on a Canadian Solar 690-watt bifacial module. The module assembly (with frame) will have a total weight of approximately 83.33 pounds and will be

approximately 93.90 inches by 51.30 inches in size. The modules are mainly comprised of non-metallic materials such as silicon, glass, 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. The estimates in this report have been calculated using a conservative approach, considering revenue from salvage only, rather than resale of Project components.

2.3 TRACKING SYSTEM AND SUPPORT

The solar modules are planned to be mounted on a single-axis, one-in-portrait tracking system. Each full, three-string tracker will be approximately 318 feet in length and will support 78 modules. Smaller trackers will be employed at the edges of the layout to efficiently utilize available space. 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 completely removed from the ground.

The supports, tracking system, and posts contain salvageable materials which can be sold to provide revenue to offset the decommissioning costs.

2.4 INVERTER/TRANSFORMER STATIONS

The inverter and transformer stations are located within the arrays and will sit on platforms supported by small concrete footings. The inverters and transformers will be deactivated, disassembled, and removed. Depending on the condition of the unit at decommissioning, 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.

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 below the ground surface. This Plan assumes that all underground cabling will be abandoned in place.

2.6 PROJECT SUBSTATION

A Project substation will be constructed as part of the Project development. The substation will contain within its perimeter, a gravel pad, power transformer and footings, an electrical control house, and concrete pads, 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. Although the Project substation may remain at the end of the Project life, an estimated decommissioning cost has been included in this Plan.

2.7 OVERHEAD GENERATION TIE-IN TRANSMISSION LINE

An overhead electrical generation tie-in transmission line, approximately one mile in length, will be constructed between the Project substation and a proposed utility switchyard (the POI). Removal of the overhead generation tie-in transmission lines is included in this Plan.

2.8 OPERATIONS AND MAINTENANCE BUILDING

Iron Pine Solar will include one operations and maintenance (O&M) building as part of the Project. The structure will be a prefabricated building with connections to electrical or other services, as needed. The placement of the structure on the site will be in conformance with local and state building codes and will be removed during the decommissioning process.

2.9 PERIMETER FENCING AND ACCESS ROADS

The Project will include a 10-foot-high wildlife-permeable security fence around the perimeter of each solar array site. The total length of fence will be approximately 83,805 feet (15.87 miles).

Access drives from local roads and within the arrays will provide direct access to the solar facility and substation equipment. The access drives will be approximately 12 feet in width and total approximately 86,197 feet (16.3 miles) in length. The access drive lengths may change with final Project design. Landowners may choose to retain the access drives at completion of the Project; however, to be conservative, the decommissioning estimate assumes that all access drives will be removed. Access drives are planned to be gravel.

During installation of the Project, site access drives will be excavated to remove topsoil, the subgrade will be compacted, and aggregate fill will be placed as necessary. This plan is based on a design of twelve inches of gravel with geotextile fabric placed beneath the gravel for the length of each access drive. The estimated quantity of these materials is provided in Table 2.

Table 2 Typical Access Drive Construction Materials

Item	Quantity	Unit
Aggregate fill, 12-inch thick – to be removed	38,310	Cubic Yards
Geotextile	114,929	Square Yards

Decommissioning activities include the removal and stockpiling of aggregate materials onsite 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. Underlying geotextile fabric will also be removed during the decommissioning process. 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. Following removal of aggregate and geotextile fabric, the gravel and compacted soil access road areas will be de-compacted with deep ripper or chisel plow (ripped to 18 inches), backfilled with native subsoil and topsoil, as needed, and graded as necessary.

3.0 LAND USE AND ENVIRONMENT

3.1 SOILS AND LAND USE

The proposed Project is predominantly located on agricultural land. Areas of Project disturbance will be restored to substantially similar conditions that existed immediately prior to Project construction. Soils compacted during de-construction activities will be de-compacted, as necessary.

3.2 RESTORATION AND REVEGETATION

Areas of the Project that have been excavated and backfilled will be graded as previously described. If present, drain tiles that have been damaged will be restored to pre-construction condition. Restored areas will be revegetated in consultation with the current landowner and in compliance with regulations in place at the time of decommissioning. Work will be completed to comply with the conditions agreed upon by Iron Pine Solar, Project leaseholders, and the MPUC or other federal, state, and local regulations in affect at the time of decommissioning.

If permitted by the landowner who retains control of the land following decommissioning of the Project, Iron Pine Solar will monitor the site for successful revegetation.

3.3 SURFACE WATER DRAINAGE AND CONTROL

Project facilities are being sited to avoid impacts to wetlands and waterways. The existing Project site conditions and proposed BMPs to protect surface water features will be detailed in a Project Stormwater Pollution Prevention Plan (SWPPP) prior to the commencement of decommissioning construction activities.

Surface water conditions at the Project site will be reassessed prior to the decommissioning phase. Iron Pine Solar will obtain the required water quality permits from the Minnesota Department of Natural Resources (MNDNR) and the U.S. Army Corp of Engineers (USACE), as needed, before decommissioning of the Project. Decommissioning construction stormwater 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 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 above- and below-ground ground components of the Project and restoration as described in Sections 2, 3.1 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, low ground pressure (LGP) tracked excavators, backhoes, LGP tracked bulldozers and dump trucks, front-end loaders, deep rippers, water trucks, disc

plows and tractors to restore subgrade conditions, along with 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, approximate late-2023 market values were used to estimate labor expenses. Fluctuation and inflation of the labor costs or equipment were not factored into the estimates.

The value of the individual components of the Project 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. During the early life of the Project, components such as the solar modules and batteries could be sold in the wholesale market for reuse or refurbishment. 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. As efficiency and power production of the panels decrease due to aging and/or weathering, the resale value will decline accordingly.

4.1 DECOMMISSIONING RISK OVER THE LIFECYCLE OF A PROJECT

The probability of an event that would lead to abandonment or long-term interruption is extremely low during the first 15 to 20 years of the Project life. Accordingly, the risk of decommissioning the Project is extremely low during this time frame. The reasons why the risk to decommission the Project is extremely low in the early phases of the Project include, but are not limited to, the resale value of the facilities; power purchase agreements in place; manufacturer warranties on components; property damage and business interruption insurance coverage; and the value of renewable energy in general in the current market.

4.2 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 Project site as described in Sections 2 and 3. Table 3 summarizes the estimates for activities associated with removal of the major components of the Project and site restoration.

Table 3 Estimated Decommissioning Expenses

Activity	Unit	Quantity	Cost per Unit	Total
Overhead and management (includes estimated permitting required and public road repairs)	Lump Sum	1	$1,103,000	$1,103,000
Solar modules; disassembly and removal	Each	570,622	$4.95	$2,824,579
Tracking System disassembly and removal (equivalent full trackers)	Each	7,316	$685	$5,011,460
Steel pile/post removal	Each	88,776	$10.70	$949,903
Inverter and transformer removal with foundation	Each	82	$1,860	$152,520
Access road excavation and removal	Lump Sum	1	$352,700	$352,700
Restoration of access roads and rehabilitation of site	Lump Sum	1	$662,350	$662,350
Perimeter fence removal (wildlife fence)	Linear Feet	83,805	$4.60	$385,503
O&M building (prefabricated)	Lump Sum	1	$12,000	$12,000
Project substation	Lump Sum	1	$400,000	$400,000
Removed above ground transmission line and poles	Linear Mile	1.00	$275,000	$275,000
Total Estimated Decommissioning Cost				**$12,129,015**

4.3 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 at least the first ten years of the Project.

Modules and other solar facility components may be sold within a secondary market or as salvage. A current sampling of used 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, 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 $39,588,000. To preserve the integrity of the modules, higher removal and handling costs would be expected for module resale versus salvage. However, although costs would be higher, the net revenue due to resale would still be substantially greater 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 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 component of the tracking system and piles is assumed to be salvageable steel. Solar panels are estimated to contain approximately 75 percent glass, 8 percent aluminum and 5 percent silicon. A 50 percent recovery rate was assumed for aluminum and 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 – Solar Facilities

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	$0.40	$0.840	570,622	$479,322
Panels - Aluminum	Pounds per Panel	3.3	$0.40	$1.320	570,622	$753,221
Panels - Glass	Pounds per Panel	31.3	$0.05	$1.565	570,622	$893,023
Tracking System and Posts	Metric tons per $MW_{[DC]}$	32.0	$262	$8,384	395.88	$3,319,058
Substation	Each	1	$50,000	$50,000	1	$50,000
Total Estimated Decommissioning Revenue – Solar Facilities						**$5,494,624***

* Revenue based on salvage value only. Revenue from used panels at $0.10 per watt could raise $39,588,000 as resale versus the estimated salvage revenue.

4.4 DECOMMISSIONING COST SUMMARY

Table 5 provides a summary of the estimated cost to decommission the Project, using the information detailed in Section 4.2. Estimates are based on late-2023 prices, with no market fluctuations or inflation considered.

Table 5 Net Decommissioning Cost Summary

Item	(Cost)/Revenue
Decommissioning Expenses (Solar Project)	**($12129,015)**
Potential Revenue – salvage value of panel components and recoverable materials	**$5,494,624**
Net Decommissioning Cost/Revenue	**($6,634,391)**

4.5 FINANCIAL ASSURANCE

Iron Pine Solar will be the financially responsible party for decommissioning the Project and restoring the site to a condition similar to that which existed prior to the Project construction. As recommended in the EERA Guidance, Iron Pine Solar proposes the following schedule of decommissioning cost re-assessment and financial assurance. The schedule is based on Year 0 being the Project date of commissioning.

- Year 5 – Re-assessment of the net decommissioning cost; update to be provided to Pine County Zoning Administrator or applicable Pine County officer (Pine County).
- Year 10 – Re-assessment of the net decommissioning cost and issuance of surety bond or other agreed upon method of financial assurance.
- Years 15 through end of Project life – Re-assessment of net decommissioning cost and update of financial assurance.

FIGURE

Figure 1 Proposed Project Layout