Exhibit B

Project Description and Schedule

Sunstone Solar Project
June 2023

Prepared for

PINE GATE RENEWABLES | GETTING SOLAR DONE.

Sunstone Solar, LLC

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Acronyms and Abbreviations

AC	alternating current
Applicant	Sunstone Solar, LLC, a subsidiary of Pine Gate Renewables, LLC
ASC	Application for Site Certificate
BESS	battery energy storage system
BLA	Big Lead Assembly
CFR	Code of Federal Regulations
DC	direct current
Council	Energy Facility Siting Council
EPA	U.S. Environmental Protection Agency
Facility	Sunstone Solar Project
GSU	generator step-up
HVAC	heating, ventilation, and air conditioning
HV	high voltage
I	Interstate
ISU	inverter step-up
kV	kilovolt
Li-ion	lithium-ion
MW	megawatt
MWh	megawatt-hour
O&M	operations and maintenance
OAR	Oregon Administrative Rule
ODFW	Oregon Department of Fish and Wildlife
ODOE	Oregon Department of Energy
ORS	Oregon Revised Statutes
PCB	polychlorinated biphenyl
SCADA	supervisory control and data acquisition
SPCC Plan	Spill Prevention, Control, and Countermeasure Plan
UEC	Umatilla Electric Cooperative
UL	Underwriters Laboratories

1.0 Introduction

Sunstone Solar, LLC, a subsidiary of Pine Gate Renewables, LLC (Applicant), proposes to construct and operate the Sunstone Solar Project (Facility), a photovoltaic solar energy generation facility and related or supporting facilities in Morrow County, Oregon. This Exhibit B was prepared to meet the submittal requirements in Oregon Administrative Rule (OAR) 345-021-0010(1)(b).

The Applicant proposes to permit a range of photovoltaic and related or associated technology within a site boundary that allows for micrositing flexibility in consideration of the perpetual evolution of technology and maximization of space efficiency, thereby allowing developmental flexibility to address varying market requirements. Therefore, this Exhibit B provides a representative description of Facility components and accompanying analysis for the maximum buildable footprint (for the solar arrays) within the site boundary, to address the greatest potential impact. The information summarized in this exhibit and described in this Application for Site Certificate (ASC) demonstrates that the proposed Facility can be designed, constructed, operated, and decommissioned in compliance with the applicable Energy Facility Siting Council (Council) standards.

2.0 Description of the Proposed Facility

> *OAR 345-021-0010(1)(b) Exhibit B. Information about the proposed facility, construction schedule and temporary disturbances of the site, including:*
>
> *(A) A description of the proposed energy facility, including as applicable:*
>
> *(i) For electric power generating plants, the nominal electric generating capacity and the average electrical generating capacity, as defined in ORS 469.300;*

The proposed Facility will be a photovoltaic solar energy generation facility with up to 1,200 megawatts (MW) alternating current (AC) of nominal and average generating capacity as defined in Oregon Revised Statute (ORS) 469.300(4)(c). The Facility will generate electricity using solar panels wired in series and in parallel to form arrays, which in turn are connected to electrical infrastructure. Additionally, the Facility may also include a distributed battery energy storage system capable of storing up to 1,200 MW/6 hours (7,200 megawatt-hours [MWh]) for the purpose of stabilizing the solar resource.

This ASC demonstrates that the proposed Facility will be designed, constructed, and operated consistent with the relevant Council siting criteria and standards. In addition to meeting the minimum required Council criteria, the Applicant proposes to design and construct the Facility utilizing measures to minimize agricultural impacts and improve existing vegetation and soil health conditions.

2.1 Construction Phasing

The Facility is expected to be constructed in six phases of approximately 200 MW each, with each phase of construction lasting approximately 21 months. Options for construction phasing for the Facility will include six sequential and/or overlapping phases, or fewer phases based on concurrent construction of multiple blocks. It is anticipated that construction would start in April 2026 and would continue in phases. As currently envisioned, two phases would start each year, with one phase beginning in April and one phase beginning in June. Construction of the first two phases would extend into the second year and would overlap with the construction start of phases 3 and 4. Under this approach, construction could extend through February 2030. Figure B-1 provides a visual depiction of this approach. Note that the workforce numbers in Figure B-1 represent the maximum anticipated number of workers assuming the battery energy storage system (BESS) is installed. If the BESS is not included in the final design, the number of workers would decrease by an average of 140 and a maximum of 280 workers; see Attachment U-1 in Exhibit U for details.

As part of the Project phasing, two primary interconnection switchyards will be built, either sequentially or concurrently. In addition, each approximately 200-MW block will have an associated collector substation that will be constructed as part of that block's phasing. The distributed battery energy storage system may be built in phases with the associated blocks, or may be built concurrently along with or following the solar array construction. Up to four operations and maintenance (O&M) buildings will be constructed, associated with the relevant block phases.

To the maximum extent practicable, temporary impacts such as laydown yards will be shared between phases to avoid duplicating temporary impacts. Constructing the Facility in phases will help to reduce the maximum number of workers on-site and minimize the amount of land that may be unvegetated at a given time, allowing revegetation to progress during the construction process to provide vegetative filters and reduce stormwater and dust management concerns. See Section 7.0 for further details on the Facility construction schedule.

2.2 Vegetation Management and Soil Health Improvement

To the maximum extent practicable, existing vegetation root systems (e.g., crop stubble, fallow vegetation) will be left intact during construction, although construction vehicles driving across the site may affect these existing root systems. Areas where the slope and gradient are within the panel and racking tolerances will receive minimal grading, with grading in those areas limited to the roads, inverter, and energy storage footprints only. This preservation of existing root systems will minimize soil erosion, providing both improved compliance with stormwater and dust management requirements, and preserving soil productivity for future agricultural use. Construction will be coordinated and sequenced with landowners to maintain land in current production and weed control or plant a cover crop until just prior to construction. This will avoid land being left unmanaged and minimize weed issues that can complicate revegetation.

All areas will be revegetated with a site-appropriate seed mixes (see Exhibit P, Attachment P-4, Draft Revegetation Plan for further details). These seed mixes may include species selected to enhance soil health, such as nitrogen-fixing species, if determined to be appropriate based on coordination with the Oregon Department of Energy (ODOE) and the Oregon Department of Fish and Wildlife (ODFW). Including these species in the seed mixes would help the other plant species thrive and increase long-term survival of desired species. Additionally, the seed mixes may include species intended to provide broader ecosystem benefits, such as pollinator species, that will benefit the surrounding landscape. The seed mix for temporarily disturbed areas outside of the solar array fence line area may include taller native species of grasses and pollinator-friendly forbs to increase overall site biodiversity and increase benefits to wildlife and pollinators, while the seed mix for areas within the solar array fence line area may include lower growing grasses and pollinator-friendly forbs compatible with desired vegetation conditions under the solar arrays (i.e., species whose mature height would not interfere with or shade the solar array).

2.3 Water Use Minimization and Fugitive Dust Control

Water is a scarce resource in Eastern Oregon, and the Facility is intended to utilize the least amount of water feasible during construction and operations. Specifically, in the extended dry season fugitive dust control is a major concern for both regulatory compliance and public safety reasons, and traditionally application of water has been the primary dust control measure used on construction sites. Instead, the proposed Facility will develop and implement a Fugitive Dust Control Plan that will identify fugitive dust sources; federal, state, and local regulatory compliance requirements; and responsibility, monitoring, and training required (see Exhibit I for further details). Reasonable available control measures will be outlined and will be designed to prioritize measures other than water application such as maintaining existing vegetative root systems, application of non-water palliatives, and restriction of traffic speeds. The Fugitive Dust Control Plan will be performance-based, requiring the implementation of adaptive management actions and reporting if federal, state, or local fugitive dust criteria are exceeded. This plan will be provided prior to construction of the Facility.

2.4 Major Components, Structures, and Systems

> *(ii) Major components, structures and systems, including a description of the size, type and configuration of equipment used to generate, store, transmit, or transport electricity, useful thermal energy, or fuels;*

The solar energy will be generated by using multiple arrays of solar panels connected to electrical infrastructure. The term “array” refers to solar panels wired in series and in parallel. Solar panels generate electricity by means of a photoelectric effect, whereby the materials in the panels absorb the sun’s energy in the form of photons and release electrons. The capture of these free electrons produces an electrical current that can be collected and supplied to the electrical power grid. The solar panels, known in the industry as modules, will be installed to form module blocks.

The major components of the proposed solar energy generation system are solar modules, racking systems, posts, and related electrical equipment (i.e., inverters and transformers). These components are combined to form a solar array. The layout of the solar array can vary depending on project size, technology, topography, and other constraints. Therefore, the Applicant seeks to permit a range of technology to preserve design flexibility. The solar modules and associated equipment, as well as the precise layout of the solar array and related or supporting facilities, have not yet been finalized. Because technology is changing rapidly, this ASC analyzes impacts associated with the largest anticipated footprint, or approximately 9,442 acres, 20 solar array fence line areas, within a 10,960-acre site boundary (see Exhibit C). The areas would be enclosed by a 7- to 8-foot-tall security fence. For the purposes of analysis, the maximum solar array fence line area depicted encompasses the all solar components (i.e., modules, inverters, transformers, tracking systems, posts, underground collector lines, and other associated equipment), the distributed battery energy storage system, portions of the transmission lines, the substations, the O&M buildings, the temporary construction areas, and new access roads in addition to the solar array (see Figure C-2 in Exhibit C). However, within the overall footprint, actual fencing of individual components (i.e., substations, etc.) may be different than shown.

The solar array fence line area is considered all permanent impact (see Exhibit C for an impact analysis). However, the vegetation within the solar array fence line area, where not occupied by permanent facilities, will be retained and/or planted. As a result, there will be residual (and in some cases improved) wildlife and ecological value, and these areas would be reclaimed upon retirement.

During final design, the Applicant will consider all micrositing factors and solar technology available at that time to design the most efficient and effective solar array layout. At this time, the Applicant will specify the precise details of the energy generation and related or supporting facilities equipment and layout in accordance with reporting requirements to ODOE. However, the actual solar array equipment and layout selected will not exceed the impacts analyzed. Therefore, the following description of major components is based on the best available design information at this time and largest anticipated footprint, but may not reflect the final design.

The Applicant proposes to construct the Facility in phases with each phase being constructed over the course of approximately 21 months (see Sections 2.1 and 7.0). The impact analysis presented in this ASC represents the fully built-out scenario of 1,200 MWAC.

2.4.1 Solar Modules and Racking

Solar modules use mono- or poly-crystalline cells to generate electricity by converting sunlight into direct current (DC) electrical energy. The electrical generation from a single module varies by module size and the number of cells per module. As technology continues to evolve, final module specification is usually in-flux until late in the development process. The solar industry as a whole is moving away from poly-crystalline silicon and it is likely that the Facility will use mono-crystalline silicon modules. The modules used in current preliminary site design each have a nameplate rating of 610 watts and measure 7.4 feet by 3.7 feet by 1.4 inches (see Figures B-2A and B-2B for a representative solar module and associated characteristics). Solar modules consist of a crystalline cellglass with an antireflective coating, a metal frame, and factory installed “quick connect” wire connectors. The crystalline cells are contained within antireflective glass panels and a metal frame and linked together with factory-installed wire connectors. The modules will be connected in series to form long rows. The rows of modules are then connected via combiners, cables, and switchboards. The configuration of multiple rows (the array) can vary depending on the module technology, spacing, mounting equipment, topography, and other design criteria, which are subject to change during final design. Each row of panels will be separated by approximately 10 feet of open space that will be either vegetated or graveled (e.g., for access roads).

Exhibit C, Figure C-2 depicts the solar layout developed for purposes of analyzing impacts, using approximately 3,937,536 modules in strings of 32 modules per string for 123,048 strings (see Figure B-3 for an illustration of installed solar strings). The actual number of modules will vary depending on the module technology, energy output, spacing, mounting equipment, phase of the Facility, and other design criteria, which are subject to change during final design. Impact assumptions are based on this use of 3,937,536 modules for the 1,200-MW solar array and that all areas within the solar array fence line area will be permanently impacted by construction of the Facility. See Exhibit C for temporary and permanent impact calculations.

2.4.2 Tracker Systems

Strings of solar modules will be mounted on either fixed-tilt systems or single-axis tracker systems that optimize electricity production by rotating the solar modules to follow the path of the sun throughout the day. Because tracker systems are more likely and because they would require more materials and land than fixed-tilt systems, all analysis presented in the ASC focuses on tracker systems. If fixed-tilt systems are selected for construction, the amount of materials, height of panels, length of roads, length of collector and transmission lines, and characteristics of other related or supporting facilities would be equal to or less than would be required for tracker systems. Therefore, fixed-tilt systems are not discussed further in this ASC.

The length of each tracker row may vary by topography and the number of modules that the tracker can hold. The actual number of tracker systems and modules will depend on the system selected. The depicted layout in Figure C-2 assumes 64 modules per 2-string rack and 96 modules per 3-string rack. The drive unit for the tracking system can control a single row or multiple rows of modules through a series of mechanical linkages and gearboxes. As the solar modules tilt throughout the day, the height of their top edges will shift accordingly, up to 15 feet high. Each set of approximately 64 racked modules will be mounted approximately 5 feet off the ground on a single-axis tracker that rotates 52 degrees to the east and west. The tracker system, and associated posts, will be specifically designed to withstand wind, snow, and seismic loads anticipated at the site.

2.4.3 Posts

Each tracker will be supported by multiple steel posts, which could be round hollow posts, screw piles, or pile-type posts (i.e., H-pile, C-pile, S-pile). Post depth may vary depending on soil conditions, but the posts are typically installed 6 to 8 feet below the surface and extend approximately 5 feet above grade. Posts at the end of tracker rows are usually installed to greater depth to withstand wind uplift. In some soil conditions, concrete backfill may be required. For the purposes of this ASC, the Applicant assumes that approximately 535,056 posts will be installed and that all of the posts may use concrete foundations. The actual number of posts and foundation method may vary depending on the final tracker system, ground coverage ratio, topography, height of the solar modules, and site-specific geological conditions. Post locations will be determined by the final layout of the tracker system and geotechnical investigations of the site boundary.

2.4.4 Cabling

The solar modules produce DC electrical current. Cables collect and aggregate the DC before it is converted to AC and sent to the Facility substations. Cables will connect to inverters via either a combiner box or a Big Lead Assembly (BLA) harness technology.

Using the combiner box technology, low-voltage cabling will connect the solar modules of each tracker string in series and likely combine at two strings to a single combiner box. Cabling from multiple combiner boxes will connect to a single inverter, which will convert the DC to AC and connect to the buried collection system. For example, the cabling system for the site plan shown on Exhibit C, Figure C-2 connects 32 modules in series per string, 64 modules (two strings) or 96 modules (three strings) per tracker rack, with a single pad-mounted combiner box per rack, for a maximum of 61,524 combiner boxes. A larger DC cable will run between each combiner box and then to the module block inverter. This cable will hang underneath the modules. Cabling can be mounted to the tracker system, placed in cable trays, or buried. The buried cable associated with the solar array will be located within the solar array fence line area and included in the estimated total permanent impact associated with the solar array (i.e., no temporary impacts are calculated for buried cable inside the solar array fence line area).

The BLA harness is an aboveground aluminum trunk system that combines the functionality of cable assemblies, combiner boxes, and fusing into one system (see Figure B-4 for an illustration of the BLA harness). If BLA harnesses are used, the amount of cabling would be similar to or less than the amount of cabling used in the combiner box approach, but all cables would be above ground, attached in series to the panel racking assemblies.

2.4.5 Inverters

The solar modules will be arranged into blocks, with each block connecting via collector lines to a modular inverter enclosure (see Figure B-5 for an illustration of an inverter station). In order to be sent to the electrical grid, the DC collected from the solar modules via combiner boxes must be converted into AC before connecting to the collector substations. Inverters serve the function of converting DC power supply to an AC power supply in accordance with electrical regulatory requirements. The conversion is accomplished by rapidly switching the DC power supply; by varying the length of time that the switch is on, as well as the polarity, the inverter creates the positive and negative swells of an AC wave. This waveform is then smoothed with an output filter. Inverters employ several advanced control systems, switching algorithms, and ancillary services for both the input and output stages. For the input stage, the inverters can manipulate the DC voltage to ensure maximum power harvest of input, and on the output various sensors ensure that AC power production is in accordance with regulatory requirements. Low-voltage cabling will link each solar module to inverters. Inverters will generally convert panel output ranging from 900 volts to 1,500 volts DC (varies by string length, temperature, and irradiance) to typical inverter output of 660 volts AC. For example, Figure C-2 in Exhibit C depicts a solar site plan with 319 inverter/transformer stations to convert the DC from the modules to AC. The final number of inverters will vary depending on the actual generation output of the solar array. While Figure C-2 depicts inverters co-located with transformers on the same concrete slab, string inverters may also be used. The inverter specification will comply with the applicable requirements and standards of the National Electric Code and Institute of Electrical and Electronics Engineers standards.

2.4.6 Inverter Step-Up Transformers

The AC from the inverters will be routed to transformers that will increase the output voltage from the inverter (typically 660 volts) to the desired substation feed voltage (34.5 kilovolts [kV] AC). For the purposes of analysis, the site plan on Figure C-2 shows 319 inverters/transformer stations. Each inverter step-up (ISU) transformer will contain up to 800 gallons of biodegradable oil. From the ISU transformers, the AC electricity is aggregated via underground 34.5-kV cables to the underground collector lines (see Section 4.4 below).

Generator step-up (GSU) transformers will be located at the collector substations to step up power from 34.5 kV to 230 kV. See Section 3.2.1 for additional information on collector substations.

2.5 Site Plan and General Arrangement

(iii) A site plan and general arrangement of buildings, equipment and structures;

A site plan is included in Exhibit C, Figure C-2.

2.6 Fuel and Chemical Storage

(iv) Fuel and chemical storage facilities, including structures and systems for spill containment;

The Facility does not require fuel or chemicals for the generation of electricity. During construction of the Facility, small quantities of chemical materials may be utilized in the temporary construction yards, and stored at the O&M buildings. Such materials may include cleaners, insecticides or herbicides, paint, or solvents. None will be present in substantial, reportable quantities and all materials will be handled in accordance with state and federal standards.

The primary chemical storage will be GSU transformers that use oil for cooling. GSU transformers will be ground-mounted units constructed on concrete pads with secondary spill containment traps designed to minimize the possibility of accidental leakage. The concrete catchment system is sized to contain approximately 1.25 times the amount of oil inside the transformer. Transformers typically use mineral oil or seed oil that is considered nontoxic. Transformer coolant does not contain PCBs or compounds listed as extremely hazardous by the U.S. Environmental Protection Agency (EPA). The small quantity and nontoxic nature of the oils combined with the fact that the transformers will be included in secondary containment on concrete pads will minimize risk effects of potential spills on soils. In the unlikely event of a spill, the Applicant will follow response measures outlined in its construction or operations Spill Prevention, Control, and Countermeasure Plan (SPCC Plan) as required under 40 Code of Federal Regulations (CFR) 112. As part of this plan, equipment containing oil or hazardous materials will be regularly monitored for leaks, and measures will be put in place if any are found to quickly control and remove spills. ISU transformers will use smaller quantities of biodegradable oil and will not require secondary containment.

Small quantities of lubricants, degreasers, herbicides, or other chemicals may be stored in the O&M buildings. Storage of these chemicals will follow label instructions. No underground storage tanks will be installed at the O&M buildings. No extremely hazardous materials (as defined by 40 CFR 355) are anticipated to be produced, used, stored, transported, or disposed of at this Facility during operations.

Fuels will be the only hazardous material that may be stored in substantial quantities on-site during construction. During construction, on-site fuel storage may be placed in designated areas within the temporary construction areas (up to five aboveground 1,000-gallon diesel tanks and one aboveground 1,000-gallon gasoline tank per phase of construction anticipated). Secondary containment and refueling procedures for on-site fuel storage will follow the SPCC Plan. Secondary containment will be compliant with requirements in 40 CFR §112.7(c), which requires secondary containment for all above ground, buried, and partially buried containers. It is anticipated that the majority of fuel containers will have self-contained secondary containment (e.g., double-walled containers) that provide capacity for the entire container plus precipitation, but in some cases smaller containers (e.g., drums) will be placed in a constructed secondary containment area that is impervious and is diked or otherwise contained to provide the required fuel and precipitation capacity.

Most fuel will be delivered to the temporary construction areas by a licensed specialized tanker vehicle on an as-needed basis. A 1,000-gallon gasoline tank and up to five 1,000-gallon diesel tanks will be on-site during construction. The gasoline tanks are expected to be filled once per month. There will be no substantial quantities of lubricating oils, hydraulic fluid for construction equipment, or other hazardous materials maintained on-site during construction. Lubricating oil and hydraulic fluids for construction equipment will be either stored in small quantities on-site or brought in on an as-needed basis for equipment maintenance by a licensed contractor using a specialized vehicle, and waste oils removed by the same maintenance contractor. Dielectric oils for the transformers will similarly be stored in small quantities on-site or will arrive on an as-needed basis and be transferred into the receiving components. Potentially hazardous substances will not be permanently present within the construction areas in quantities that exceed Oregon State Fire Marshal Reportable Quantities (see Exhibit G).[1]

During operations, qualified oil-filled equipment, including the substation GSU transformers, will contain oil. ISU transformers will contain biodegradable oil. In addition, each O&M building may have an aboveground fuel storage tank sized to contain up to 500 gallons of diesel fuel or gasoline. Secondary containment and refueling procedures during operations will continue to follow the SPCC Plan and will be compliant with requirements in 40 CFR §112.7(c)

While not considered an extremely hazardous material, electrolyte solution would be contained within the battery energy storage system if lithium-ion (Li-ion) batteries are selected. Li-ion battery systems are modular systems that contain multiple smaller battery cells. The cells are the primary containment for the gel or liquid electrolyte materials. The module containing the cells is relatively small, generally about the size of a desktop computer processer, and serves as leak-proof secondary containment. Modules are placed in anchored racks within the steel containers. The risk of leaking is very low because battery cells are hermetically sealed. Electrolyte can only escape (as vapor) in the unlikely case that a battery cell ruptures, though it would be contained in the battery energy storage system steel container. Note that used Li-ion batteries can sometimes be considered hazardous waste by the EPA and will be disposed of according to the most current guidelines at end of life. See Section 3.1 for additional description and discussion of the battery energy storage system.

As further described in Exhibit G, the Applicant will prepare and maintain an SPCC Plan to outline preventative measures and practices to reduce the likelihood of an accidental spill, and to expedite the response to and remediation of a spill should one occur.

2.7 Fire Prevention and Control

(v) Equipment and systems for fire prevention and control;

Exhibit V provides detailed information on wildfire risks and prevention. This section provides a summary of these topics.

Solar facilities do not pose a significant fire risk. A risk of fire can occur during construction of the Facility, when welding and metal cutting for foundation rebar frames will take place, and vehicles and construction equipment may be used in areas of tall, dry grass. To prevent fires from occurring, the construction contractor will implement a number of systems and procedures. These will include requirements to conduct welding or metal cutting only in areas cleared of vegetation, and to keep emergency firefighting equipment on-site when potentially hazardous operations are taking place. Employees will keep vehicles on roads and off dry grassland when feasible during the dry months

[1] "Reportable quantity" refers to the amount of hazardous substance that has to be released into the environment before the U.S. Environmental Protection Agency requires notification of the release to the National Response Center pursuant to the Comprehensive Environmental Release, Compensation, and Liability Act, also known as Superfund. These numerical designations are listed under 49 Code of Federal Regulations 172.101 Appendix A, Table 1 and Table 2.

of the year, unless such activities are required for emergency purposes, in which case fire precautions will be observed. Fire extinguishers and shovels will be kept in all vehicles. On-site employees will also receive training on fire prevention and response and have on-site fire extinguishers to respond to small fires. In the event of a large fire, emergency responders will be dispatched.

Fire prevention specific to solar arrays is dependent on proper installation and maintenance of electrical equipment to prevent short-circuits and consequent sparking, and reduction in fuel to reduce the chance of fire spreading. The Applicant will employ well-qualified employees to install and maintain electrical equipment. The solar array will have shielded electrical cabling, as required by applicable code, to prevent electrical fires. Vegetation within the solar array fence line area will be managed as needed to reduce fuels for fire. All electrical equipment will meet National Electrical Code and Institute of Electrical and Electronics Engineers standards and will not pose a significant fire risk. With proper maintenance and safety checks, the electrical collection system and 230-kV transmission line are unlikely to cause a fire. Vegetation near and under solar panels may be mowed periodically. Weeds will be managed in accordance with the weed management procedures described in the project Draft Noxious Weed Control Plan (see Exhibit P, Attachment P-3). Additional fire prevention and response measures for the Facility as a whole, including best management practices related to worker activities, maintenance of fire suppression equipment, and coordination with the local fire district, are described in Exhibit U.

Facility roads will be sufficiently sized for emergency vehicle access in accordance with 2019 Oregon Fire Code requirements, including Section 503 and Appendix D - Fire Apparatus Access Roads. Specifically, roads will primarily be 10 feet wide in the array area, with roads up to 20 feet wide near the substation, having an internal turning radius of 28 feet and less than 10 percent grade, or a similar profile depending on siting, to provide access to emergency vehicles. The areas immediately around the O&M buildings, substations, and battery energy storage system will be graveled, with no vegetation present. See Exhibit U for additional discussion of Project fire prevention measures and coordination with local emergency responders.

Smoke/fire detectors will be placed around the site that will be tied to the supervisory control and data acquisition (SCADA) system (see Section 3.6) and will contact local firefighting services. The O&M buildings will have basic firefighting equipment for use on-site during maintenance activities, such as shovels, beaters, portable water for hand sprayers, fire extinguishers, and other equipment.

2.7.1 Battery Energy Storage System

The zinc-based batteries under consideration for this Facility are non-flammable and tolerate wide temperature ranges. As a result, the manufacturer affirms that they are not anticipated to present a fire hazard and do not require on-site fire suppression systems. Therefore, the following paragraphs summarize the information pertinent to fire prevention and control for a Li-ion battery energy storage system, if selected.

The chemicals used in Li-ion batteries are generally nontoxic but do present a flammability hazard. Li-ion batteries are susceptible to overheating and typically require cooling systems dedicated to each battery energy storage system enclosure, especially at the utility scale (LAZARD 2021). The gas released by an overheating Li-ion cell is mainly carbon dioxide. The electrolyte solution, usually consisting of ethylene or propylene, may also vaporize and vent if the cell overheats (Battery University 2022).

The Applicant will implement the following fire prevention and control methods to minimize fire and safety risks for the Li-ion batteries proposed for the battery energy storage system:

- The batteries will be stored in completely contained, leak-proof modules.
- Ample working space will be provided around the battery energy storage system for maintenance and safety purposes.
- Off-site, 24-hour monitoring of the battery energy storage system will be implemented and will include shutdown capabilities.
- Transportation of Li-ion batteries is subject to 49 CFR 173.185 – Department of Transportation Pipeline and Hazardous Material Administration. This regulation contains requirements for prevention of a dangerous evolution of heat; prevention of short circuits; prevention of damage to the terminals; and prevention of batteries coming into contact with other batteries or conductive materials. Adherence to the requirements and regulations, personnel training, safe interim storage, and segregation from other potential waste streams will minimize any public hazard related to transport, use, or disposal of batteries.
- Design of the battery energy storage system will be in accordance with applicable Underwriters Laboratories (UL; specifically, 1642, 1741, 1973, 9540A), National Electric Code, and National Fire Protection Association (specifically 855) standards, which require rigorous industry testing and certification related to fire safety and/or other regulatory requirements applicable to battery storage at the time of construction.
- Additionally, the Applicant will employ the following design practices, as applicable to the available technology and design at time of construction:
    - Use of heating, ventilation, and air conditioning (HVAC) systems for Li-ion phosphate systems to maintain battery temperatures within the optimal range, which reduces the risk of battery malfunction that could lead to fire;
    - Use of Li-ion phosphate battery chemistry, which is a more thermally stable Li-ion cathode chemistry;
    - Employment of an advanced and proven battery management system;
    - Qualification testing of battery systems in accordance with UL 9540A (UL Solutions 2023);
    - Employment of fire control panels with 24-hour battery backup;

- Installation of fire sensors, smoke and hydrogen detectors, alarms, emergency ventilation systems, cooling systems, and aerosol fire suppression/extinguishing systems in every battery container;
- Installation of doors that are equipped with a contact that will shut down the battery container if opened;
- Installation of fire extinguishing and thermal insulation sheets between each individual battery cell;
- Implementation of locks and fencing to prevent entry of unauthorized personnel;
- Installation of remote power disconnect switches; and
- Clear and visible signs to identify remote power disconnect switches.

3.0 Related or Supporting Facilities

OAR 345-021-0010(1)(b)(B) A description of major components, structures and systems of each related or supporting facility;

Related or supporting facilities consist of the battery energy storage system, collector substations, 34.5-kV electrical collector lines, 230-kV transmission line, O&M buildings, temporary constructions area, access roads and security infrastructure, and a communication and SCADA system. As noted earlier, the Applicant is requesting micrositing flexibility for the solar modules and associated equipment, as well as the layout of the solar arrays and related or supporting facilities. Therefore, the following descriptions are based on the best available information at this time and consider the potential for various phases of development.

3.1 Battery Energy Storage System

A BESS may be included with the Facility. The precise scope of the BESS will be determined prior to start of construction of the Facility and is dependent on several factors, including preference of the power purchaser(s), availability and cost-effectiveness of suitable systems, and ability to mitigate potential noise impacts (see Exhibit Y). As will be demonstrated in the relevant technical analyses (specifically Exhibits K, U, and Y), if a BESS is constructed it may contribute significantly to the number of workers needed for construction and operation (and associated economic and housing impacts), and noise mitigation may be required based on currently available technology. Because there is a range of possible outcomes for the BESS, the maximum impact analysis associated with the BESS is described separately to avoid overstating impacts in the event something less than the maximum proposed BESS scope is included in the final design of the Facility.

For the purpose of describing the maximum proposed BESS scope in this application, the BESS is assumed to be capable of discharging up to 1,200 MW continuously over a period of 6 hours, using either Li-ion or zinc-based technology (see subsections below for a detailed description of the proposed BESS equipment). This sizing assumption aligns with the maximum ratings considered in the ongoing interconnection studies with the Umatilla Electric Cooperative (UEC) and Bonneville Power Administration. The batteries and associated equipment would be oversized or periodically augmented in accordance with the manufacturer's recommendations to ensure a minimum of 7,200 MWh (1,200 MW x 6 hours) of energy storage capability over the life of the BESS, taking into account natural degradation of the batteries over time.

The Applicant proposes to construct either a DC-coupled distributed battery energy storage system (located throughout the solar array fence line area at the inverter and transformer sites) or AC-coupled battery energy storage system (concentrated in a single location within the solar array fence line area). Regardless of the arrangement or battery technology selected, the system as a whole will use a series of self-contained containers located within the solar array fence line area. The containers may have their own additional fencing, to be determined prior to construction. Each container will be placed on a concrete foundation. Regardless of the battery technology selected, the containers are estimated to require up to 0.2 to 0.4 acre each. Each container is rated for outdoor environments and holds the batteries and a battery management system. Li-ion systems would also include a fire prevention system and cooling units placed either on top of the containers or along the side. Zinc batteries will have fans and a heating unit for climate control. See Section 2.7.1 and Exhibit V for fire prevention and control methods as they relate to the battery energy storage system.

3.1.1 Battery Types

3.1.1.1 Lithium-ion Batteries

Li-ion batteries are the most common type of utility-scale battery energy storage system technologies at this time, although other technologies are used and are being developed. Li-ion batteries are a type of rechargeable battery where lithium ions, suspended in an electrolyte, move from negative to positive electrodes and back when recharging. A variety of chemistries fall under the "Li-ion" term, each with varying performance, cost, and safety characteristics (Energy Storage Association 2022). Li-ion batteries experience degradation of performance over their useful lifespan, which depends on several factors including battery technology, temperature, and rate/number of charge and discharge cycles. The Li-ion battery technology under consideration for this Facility has an expected useful life of 20 years. Li-ion batteries are generally used in utility-scale applications when rapid, short-term (minute) deployments of power are needed. For example, Li-ion batteries can smooth the fluctuating generation from solar arrays, which can vary based on time of day and cloud cover, to deliver consistent and predictable power to the grid.

Li-ion battery systems are modular systems in which each module contains multiple smaller battery pouch cells. The cells are the primary containment for the gel or liquid electrolyte materials. The module containing the cells is relatively small, generally about the size of a desktop computer processer, and serves as leak-proof secondary containment. The cells are contained within a module (approximately 10 cells/module), which are collected in a pack (approximately 3 modules/pack), and then wired into a string (approximately 14 packs/string) and finally into the full modular unit (approximately 840 cells, 84 modules, 28 packs, and 2 strings). The quantities per modular unit could change based on the most current model procured for the Facility, but the general framework is typical for utility-scale Li-ion systems. Each modular battery system is capable of 120-kilowatt AC and 740 kilowatt-hour AC and this Facility would require 12,000 modular Li-ion battery systems to meet the nameplate energy requirement.

3.1.1.2 Zinc Batteries

Zinc batteries are powered by a zinc hybrid cathode and allow for a full 3- to 12-hour discharge period. Compared to Li-ion batteries, zinc battery systems do not require HVAC or fire suppression systems, because they are able to operate across a higher range of temperatures and have a lower fire risk. Zinc batteries are estimated to have a lifespan of at least 20 years with a milder degradation rate than is typical for Li-ion batteries. Similar to Li-ion, zinc batteries can also smooth fluctuations in energy generation to better match daily power consumption patterns.

Zinc-based energy storage systems are also provided in outdoor rated, modular, metal container-based units (see Figure B-6 for an illustration of a zinc battery storage system). The smallest indivisible unit of the system is a battery module, typically with 12 modules per string, and 12 strings per container (144 battery modules/container). A modular container can discharge 116 kilowatts of power, and 700-kilowatt-hour in energy. For this Facility, a quantity of 14,946 zinc battery containers would be installed to meet the nameplate capacity. In the layout shown on Figure C-2 in Exhibit C, the battery energy storage system is depicted with 14,946 containers total, which is considered the maximum scenario for purposes of the impact analysis presented in this ASC.

3.1.2 Battery Energy Storage System Equipment

The battery storage design will include, but not be limited to, the following elements:

- Battery storage equipment, including batteries and racks or containers, inverters, isolation transformers, and switchboards;
- Balance of plant equipment, which may include medium-voltage and low-voltage electrical systems, fire suppression, HVAC systems (fire suppression systems are only required for Li-ion technology, if selected), building auxiliary electrical systems, and network/SCADA systems;
- Cooling system, which may include a separate chiller plant located outside the battery racks with chillers, pumps, and heat exchangers (Li-ion only, if selected); zinc batteries will have fans and a heating unit for climate control; and
- High-voltage (HV) equipment, including a step-up transformer, HV circuit breaker, HV current transformers and voltage transformers, a packaged control building for the HV breaker and transformer equipment, HV towers, structures, and HV cabling.

The battery containers will be placed on concrete slabs. Each container holds the batteries, a battery management system, and a fire prevention system (Li-ion only, if selected). Cooling units will be placed either on top of the concrete containers or along the side (Li-ion only, if selected); zinc batteries will have fans and a heating unit for climate control. By connecting multiple containers, the battery energy storage system can be scaled to the desired capacity.

3.1.3 Battery Energy Storage System Operations and Maintenance

The batteries and other materials for the battery energy storage system will be manufactured off-site and transported to the Facility by truck. As applicable, defective or decommissioned parts will be disposed of or recycled in compliance with 49 CFR 173 Subpart E, which regulates the transportation of batteries.

The O&M activities will mainly consist of minimal procedures that do not require tampering with the battery cell components. For the purposes of analysis, it is assumed that both the Li-ion or zinc battery system could require replacement of the batteries on average every 20 years.

The battery energy storage system will be stored in completely contained, leak-proof modules. The modules will be stored on a concrete pad. Battery energy storage systems will be inspected according to the manufacturer's recommendations, which are assumed to be monthly inspections.

As described in Section 2.6, an SPCC Plan will be developed to manage, prevent, contain, and control potential releases, with provisions for quick and safe cleanup of hazardous materials. Fire prevention and control measures specific to the battery energy storage system are discussed in Section 2.7 and Exhibit V.

3.2 Electrical Collection System

3.2.1 Collector Substations

The Facility will connect with the existing UEC 230-kV Blue Ridge Line via two new primary interconnection switchyards in the northwestern corner of the Facility site boundary, within the solar array fence line area (Exhibit C, Figure C-2). Additionally, six supporting substations will be dispersed throughout the site boundary that will interconnect to each other and in turn interconnect to the two primary interconnection switchyards. Each supporting substation will occupy approximately 1.6 acres and the switchyards will occupy a total of 3 acres. The six supporting substations will each have a generator step-up transformer that will step up from 34.5 kV to 230 kV. Transmission lines will then transport power to the two primary interconnection switchyards located at the point of interconnection.

Prior to construction, substation sites will be cleared and graded, with a bed of crushed rock applied for a durable surface. All substations will be enclosed by a locked 8-foot-tall chain-link fence with three strands of barbed wire one foot above the top, within the solar array fence line area (Exhibit C, Figure C-2). Additional substation equipment may include circuit-breakers and fuses, transmission line termination structures, power transformer(s), bus bar and insulators, disconnect switches, relaying, battery and charger, surge arresters, AC and DC supplies, control systems, metering equipment, grounding, and associated control wiring. Any additional equipment will be located within the fenced substation areas. Transformers will be non-PCB oil–filled types and will be up to approximately 10 feet tall. The lightning protection system will be 40 to 45 feet tall.

3.2.2 34.5-kV Collector Line

The transformers will connect the generation output of the solar array to the 34.5-kV collector lines, which will be both aboveground and underground. Electrical connections will be made at the switchgear inside the solar array before connecting to the transformer, then from the transformer to the collector lines. The 34.5-kV collector lines will consist of three wires, or phases; each cable will be an insulated, stranded metal conductor in a size range of 1/0 – 1000 kcmil wire gauge, ranging between 1.25 and 2.5 inches in diameter.

Underground AC electrical cables will be buried to a minimum of 3 feet, with junction splice boxes positioned intermittently along the lines for maintenance access. These cables will be located underground in trenches[2] to the extent practicable. In this maximum footprint layout for analysis, approximately 86 miles of collector line will be installed. Approximately 81.7 miles of 34.5-kV collector line will be installed underground (Exhibit C, Figure C-2).

Some collector line may need to be installed on aboveground overhead structures in situations where a buried cable would be infeasible, such as for long “home run” stretches, and at stream or canyon crossings. In such instances, overhead collector lines will be supported by a wooden structure. Each support pole will be buried up to approximately 12 feet in the ground and will extend to a height of up to approximately 35 to 40 feet above ground, depending on the terrain. The structures will be spaced approximately 150 to 300 feet apart, depending on specific site conditions. Approximately 4.3 miles (5 percent of the total 86 miles) of aboveground collector line is estimated to be required (Exhibit C, Figure C-2).

The majority of the collector lines will be installed inside the solar array fence line area permanent footprint (see Exhibit C, Figure C-2). For the purposes of calculating impacts, for collector line segments that are outside of the solar array fence line area, the Applicant assumes a temporary impact corridor approximately 50 feet wide for both the buried and overhead collector lines. There will be permanent impacts only in the locations of the support poles for the overhead collector lines. Aside from the pole footprints, there will be no permanent impacts associated with the collector line corridor for aboveground segments. Temporary impacts from collector line construction will be restored and revegetated following construction in accordance with the Facility Revegetation Plan (Attachment P-4 to Exhibit P). Exhibit C presents the temporary and permanent impacts of the collector lines where they are outside of the solar array fence line area.

[2] As multiple lines are laid together, the total length of trenches is less than the length of underground 34.5-kV conductor cable buried.

3.2.3 230-kV Transmission Line

The Facility will require construction of associated transmission lines that will connect the collection substations to the switchyard and from there to the point of interconnection/regional grid. The associated transmission lines are not transmission lines within the meaning of Council jurisdiction (see Section 5.0 below). The 230-kV overhead transmission lines will transport power from the six supporting substations to the primary interconnection substation/switchyard located at the point of interconnection. Approximately 9.5 miles of line is anticipated, supported either by H-frame structures with two galvanized steel or wood poles, or by galvanized steel or wood monopole structures. This 9.5 miles of transmission line includes a southern transmission line (6.3 miles) and a northern transmission line (3.2 miles), with an approximately 1-mile stretch where these two lines run in parallel. The structures will rise to a height of approximately 70 to 180 feet above grade depending on design and terrain. The transmission line corridor is approximately 1,000 feet in width to allow flexibility for final design. The 230-kV lines will generally have 1,000-foot-long spans between structures; however, spans may be shorter or longer depending on the terrain. The transmission line will be within the solar array fence line area as well as outside where the lines span between the 20 solar array fenced areas/substations and ultimately interconnect to the UEC 230-kV Blue Ridge Line (Exhibit C, Figure C-2).

3.3 Operations and Maintenance Building

There will be four O&M buildings, each located on up to approximately 2.8 acres. The O&M buildings will include a utility room, covered vehicle parking, storage for maintenance supplies and equipment, and a SCADA system. Permanent graveled parking and a storage area for employees, visitors, and equipment will be located adjacent to each O&M building. The buildings will each have an on-site well and septic system and power will be supplied by a local service provider using overhead and/or underground lines. The O&M buildings will be within the solar array fence line area (Exhibit C, Figure C-2).

3.4 Replacement Solar Panel Storage

For ease of access, spare solar panels and associated equipment will be stored at either the O&M buildings or within approximately 50 locked Conex storage containers (each a standard 40 feet long, 8 feet wide) distributed evenly throughout the site boundary, within the solar array fence line area.

3.5 Temporary Construction Areas

During construction, up to 54 temporary construction areas (laydown areas) will be used to support construction, store supplies and equipment, and facilitate the delivery and assembly of materials and equipment. The construction areas will be up to 5 acres each and may contain one temporary aboveground 1,000-gallon diesel tank and one temporary aboveground 1,000-gallon gasoline tank (per phase of construction) located within designated secondary containment areas as described in Section 2.6. The construction areas will consist of a crushed gravel surface that will be removed following construction. The temporary construction areas will be within the solar array fence line area (Exhibit C, Figure C-2).

3.6 Site Access, Service Roads, Perimeter Fencing, and Gates

The Facility will utilize existing access roads to the extent practicable. Primary transportation corridors to the Facility include Interstate (I) 84 and Oregon Route 207 (Lexington-Echo Highway). Other county and state roads in the immediate vicinity include Bombing Range Road, Doherty Road, Sand Hollow Road, Melville Road, and Grieb Lane. Once constructed, the bulk of the solar arrays will be accessible via grass corridors or new roads. Approximately 55 miles of new roads will be constructed to access Facility infrastructure. Exhibit C, Figure C-2 depicts the Facility layout. Existing roads are not anticipated to require improvements or alterations.

Corridors between module racking will be at least 10 feet wide and racking will be no closer than 15 feet from perimeter fencing. Some new road construction will be required to access site features. All newly constructed roads will be graded and graveled to meet load requirements for all equipment. Roads will be 10 to 20 feet in width, with some exceptions, including access to the substations and main travel corridors where two-way traffic is required. In these cases, roads will be 20 feet wide. Vegetation will be cleared and maintained along service roads to provide a vegetation clearance area for fire safety. This will include mowing to a height no more than 24 inches. Use of the roads may continue after construction, or new roads may be removed and the land reclaimed to pre-construction conditions.

The locations of specific access points and gates will depend on the final configuration of the solar arrays and related infrastructure. Fixed-knot (wildlife friendly) or chain-link perimeter fencing, up to 7 to 8 feet in height, will enclose the solar arrays, for a total of approximately 58 miles of fence. Fixed-knot fencing will have 6-inch mesh spacing and be supported by brace rails spaced no more than 20 feet apart. Substations and switchyards will be enclosed by either chain-link or fixed-knot fencing. The perimeter fencing will have lockable vehicle and pedestrian access gates, approximately 52 access gates total.

3.7 Communication and SCADA System

A communication system consisting of fiber optic and copper communication lines will connect the solar array, battery energy storage system, and substations to the SCADA control rooms (within the substations) and to the internet service provider. These communication lines as well as the onsite sensors will either be buried or overhead within a cable management system, depending on site-specific conditions. Where buried, the communication lines are placed above the collector lines in the same trench and, where overhead, run alongside the collector lines/conductors. This communication system allows each solar string, battery energy storage system, and substation to be monitored by a SCADA system, accessed through both the SCADA control room in the substations or remotely. This system monitors these components for variables such as meteorological conditions, critical operating parameters, and power output. The solar array is controlled and monitored via the SCADA system, and can be controlled remotely. SCADA software is tuned specifically to the needs of each project by the solar module manufacturer or a third-party SCADA vendor. This system will be monitored 24/7 by a remote operations center.

4.0 Approximate Dimensions of Major Structures and Features

OAR 345-021-0010(1)(b)(C) The approximate dimensions of major facility structures and visible features;

4.1 Solar Array Dimensions

The solar array will comprise linear rows (strings) of modules within the perimeter solar array fence line area, 20 fenced areas total, as depicted in Exhibit C, Figure C-2. Each solar module will measure approximately 3.4 feet wide by 7.4 feet long by 1.4 inches high; this will be a targeted standard dimension, with variations pending final technology selection and design considerations. Racks of modules will range in length from approximately 200 feet to 400 feet. The maximum height of the solar array will be 15 feet when the modules are tilted on the tracking system. Fixed-knot (wildlife friendly) or chain link perimeter fencing, up to 8 feet in height, will enclose the solar arrays, and will have lockable vehicle and pedestrian access gates. The exact number and size of modules, layout, and associated equipment specifications will be determined during final design; however, as noted earlier, the actual solar array equipment and layout selected will not exceed the impacts analyzed.

4.2 Battery Energy Storage System Dimensions

The Li-ion or zinc battery energy storage system will be placed in shipping containers on concrete slabs, to either be distributed throughout or localized within the solar array (both options located within the solar array fence line area; see Exhibit C, Figure C-2). Each container holds the batteries, a supervisory and power management system, and a fire prevention system (Li-ion only, if selected). Cooling units will be placed either on top of the containers or along the side (Li-ion only, if selected); zinc batteries will have fans and a heating unit for climate control. By connecting multiple containers, the battery energy storage system can be scaled to the desired capacity. A total of 14,946 containers are anticipated if zinc batteries are selected and approximately 12,000 containers will be required if Li-ion batteries are selected. If Li-ion is selected, the containers (segments) will be approximately 8.1 feet in depth, 5.2 feet in length, and 11.25 feet in height, and will be placed together in “centipedes,” each containing 20 segments. Each centipede is typically approximately 115 feet long by 8 feet wide. Zinc battery containers, on the other hand, will be 8 feet in depth, 20 feet in length, and 9.5 feet in height. Regardless of the battery technology selected, the containers are estimated to require up to 0.2 to 0.4 acre at each location. The battery storage areas will be within the permanent solar array fence line area. As stated earlier, all technology described is preliminary and, while final design may differ, impacts will not exceed those analyzed in this ASC.

4.3 Substation and Switchyard Dimensions

The six Facility collector supporting substations will each be situated on approximately 1.6-acre sites, locked and fenced individually either inside or outside of the solar array fence line (see Exhibit C, Figure C-2). Substations located at the edge of the array may be fenced separately to provide easier maintenance access and reduce total fence length. The two primary interconnection switchyards will be located on a 3-acre locked, separately fenced site either within or adjacent to the solar array fence line area. The substation components will be up to approximately 30 feet tall with the exception of the lightning protection system, which will be 40 to 45 feet tall.

4.4 34.5-kV Underground Collector Line Dimensions

The medium-voltage conductors will run underground for improved reliability. The approximately 81.7 miles of underground collector lines will be directly buried at a depth of approximately 3 feet. The underground collector lines will generally be within the solar array fence line area except at road crossings (see Exhibit C, Figure C-2).

4.5 34.5-kV Overhead Collector Line Dimensions

Any 34.5-kV overhead collector lines needed for the Facility will be constructed with single- or double-circuit wood monopole structures. The structures will be up to 35 to 40 feet tall, depending on the terrain, with poles measuring approximately 14 inches in diameter and spaced approximately 150 to 300 feet apart. An estimated 4.3 miles of overhead collector lines may be required for the Facility, located within the solar array fence line area (see Exhibit C, Figure C-2).

4.6 230-kV Transmission Line Dimensions

The 230-kV lines will be supported either by H-frame structures with two galvanized steel or wood poles or by a galvanized steel or wood monopole structure. The structures will rise to a height of approximately 70 to 180 feet above grade, depending on the terrain. The corridor within which the transmission line will be placed is approximately 1,000 feet in width. The 230-kV lines will generally have 1,000-foot-long spans between support structures; however, spans may be shorter or longer depending on the terrain. Each H-frame support structure will have two poles, with a total permanent disturbance for each structure of 3.1 square feet. Approximately 9.5 miles of overhead transmission line will be used and will be both within and outside of the solar array fence line area (see Exhibit C, Figure C-2).

4.7 O&M Building Dimensions

The four O&M buildings will be one-story structures each located on up to 2.8 acres. A permanent, graveled parking and storage area for employees, visitors, and equipment will be located adjacent to the O&M buildings. The O&M buildings will be approximately 20 feet high and within the solar array fence line area (see Exhibit C, Figure C-2).

4.8 Replacement Solar Panel Storage

Each of the 50 locked Conex storage containers will measure 40 feet long and 8 feet wide, to be distributed evenly throughout the site boundary.

4.9 Temporary Construction Areas Dimensions

The 54 temporary construction areas will occupy up to 5 acres each. The temporary construction areas will be within the solar array fence line area (see Exhibit C, Figure C-2). Five temporary aboveground 1,000-gallon diesel tanks and one temporary aboveground 500-gallon gasoline tank (per phase of construction) will be sited within temporary construction areas associated with each phase. Fuel tanks will be placed within designated secondary containment areas as described in Section 2.6.

5.0 Transmission Line Corridor

> *OAR 345-021-0010(1)(b)(D) If the proposed energy facility is a pipeline or a transmission line or has, as a related or supporting facility, a transmission line or pipeline that, by itself, is an energy facility under the definition in ORS 469.300, a corridor selection assessment explaining how the applicant selected the corridor(s) for analysis in the application. […]*

As previously noted, the transmission lines are not an energy facility as defined in ORS 469.300 because they do not cross more than one city or county. The associated transmission lines will be approximately 9.5 miles total of 230-kV overhead transmission line to connect the collector substations to the switchyard and then to the existing UEC 230-kV Blue Ridge Line, all entirely within the unincorporated areas of Morrow County. Therefore, a corridor selection assessment is not required.

6.0 Description of Transmission Line

> *OAR 345-021-0010(1)(b)(E) If the proposed energy facility is a pipeline or a transmission line or has, as a related or supporting facility, a transmission line or pipeline of any size:*
>
> > *(i) The length of the pipeline or transmission line;*

The proposed energy facility includes approximately 9.5 miles total of 230-kV overhead transmission line to connect the collector substations to the switchyard and then to the existing UEC 230-kV Blue Ridge Line, all entirely within the unincorporated areas of Morrow County.

> > *(ii) The proposed right-of-way width of the pipeline or transmission line, including to what extent new right-of-way will be required or existing right-of-way will be widened;*

The transmission line will be sited within the Facility lease boundary. No new right-of-way will be required and no existing right-of-way will be widened.

(iii) If the proposed transmission line or pipeline corridor follows or includes public right-of-way, a description of where the transmission line or pipeline would be located within the public right-of-way, to the extent known. If the applicant proposes to locate all or part of a transmission line or pipeline adjacent to but not within the public right-of-way, describe the reasons for locating the transmission line or pipeline outside the public right-of-way. The applicant must include a set of clear and objective criteria and a description of the type of evidence that would support locating the transmission line or pipeline outside the public right-of-way, based on those criteria;

A majority of the proposed transmission line does not follow or include public right-of-way because no public right-of-way is available between or near the proposed collector substations. The proposed transmission line will provide the most direct connection between collector substations, regardless of whether it is located within a public right-of-way. This will limit the amount of transmission line required and in turn decrease visual impacts and impacts to other resources. A portion of the proposed transmission line that runs along the western boundary of solar array fence line areas 7 and 8 is within the public right-of-way of Bombing Range Road (transmission line runs to the east of the road). Additionally, a portion of the proposed transmission line that interconnects solar array fence line areas 8 and 16 will cross Doherty Road and the Lexington-Echo Highway.

(iv) For pipelines, the operating pressure and delivery capacity in thousand cubic feet per day and the diameter and location, above or below ground, of each pipeline;

The Facility does not include a pipeline; therefore, this requirement is not applicable.

(v) For transmission lines, the rated voltage, load carrying capacity, and type of current and a description of transmission line structures and their dimensions; and

The Applicant proposes to construct six on-site Facility substations to increase the rated voltage from the 34.5-kV collection system to 230 kV, for transmission along the existing UEC Blue Ridge Line into the existing Bonneville Power Administration transmission network. The type of current will be alternating current. Section 4.6 provides additional detail on transmission line structures and dimensions.

7.0 Construction Schedule

OAR 345-021-0010(1)(b)(F) A construction schedule including the date by which the applicant proposes to begin construction and the date by which the applicant proposes to complete construction. Construction is defined in OAR 345-001-0010. The applicant must describe in this exhibit all work on the site that the applicant intends to begin before the Council issues a site certificate. The applicant must include an estimate of the cost of that work. For the purpose of this exhibit, "work on the site" means any work within a site or corridor, other than surveying, exploration or other activities to define or characterize the site or corridor, that the applicant anticipates or has performed as of the time of submitting the application.

Facility construction is anticipated to commence in April 2026, pending issuance of a site certificate from EFSC. The completion of commissioning and start of commercial operation is targeted for February 2030, though the Applicant will try to bring the facility online earlier if achievable. However, given that construction could conceivably be delayed by weather or other unforeseen circumstances such as market changes, the Applicant would like the flexibility to build the Facility in phases, and requests a deadline for construction completion of 3 years later than the deadline for beginning construction, or 6 years from issuance of the site certificate. The Facility will be constructed in phases based on six blocks of approximately 200 MW each, with each phase lasting approximately 21 months. Additional engineering and geotechnical investigations may occur prior to issuance of the site certificate. As defined in ORS 469.300(6), surveying and exploration activities (such as geotechnical investigations) are excluded from the definition of construction work, and preconstruction conditions may be satisfied for the applicable Facility component, as applicable, based on final design and configuration. No other construction work is anticipated to begin prior to issuance of the site certificate.

8.0 Submittal Requirements and Approval Standards

8.1 Submittal Requirements

Table B-1. Submittal Requirements Matrix

Requirement	Location
OAR 345-021-0010(1)(b) Exhibit B. Information about the proposed facility, construction schedule and temporary disturbances of the site, including:	–
(A) A description of the proposed energy facility, including as applicable:	Section 2.0
(i) For electric power generating plants, the nominal electric generating capacity and the average electrical generating capacity, as defined in ORS 469.300;	Section 2.0
(ii) Major components, structures and systems, including a description of the size, type and configuration of equipment used to generate electricity and useful thermal energy;	Section 2.4
(iii) A site plan and general arrangement of buildings, equipment and structures;	Section 2.5
(iv) Fuel and chemical storage faculties, including structures and systems for spill containment;	Section 2.6
(v) Equipment and systems for fire prevention and control; .	Section 2.7

Requirement	Location
(vi) For thermal power plants, combustion turbine power plants, or other facilities designed to generate electricity from gas, liquid, or solid fuels: (i) A discussion of the source, quantity and availability of all fuels proposed to be used in the facility to generate electricity or useful thermal energy; (ii) If the facility will generate electric power from natural gas, petroleum, coal or any form of solid, liquid or gaseous fuel derived from such material, a discussion of methods the facility will use to ensure that the facility does not emit greenhouse gasses into the atmosphere, and a description of any equipment the facility will use to capture, sequester, or store greenhouse gases; (iii) A description of energy flows within the facility, including power cycle and steam cycle diagrams, as appropriate; (iv) A description of equipment and systems for disposal of waste heat generated by the facility; (v) the fuel chargeable to power heat rate of the energy facility.	N/A
(vii) For surface facilities related to underground gas storage, estimated daily injection and withdrawal rates, horsepower compression required to operate at design injection or withdrawal rates, operating pressure range and fuel type of compressors.	N/A
(viii) For facilities to store liquefied natural gas, the volume, maximum pressure, liquefaction and gasification capacity in thousand cubic feet per hour.	N/A
(B) A description of major components, structures and systems of each related or supporting facility;	Section 3.0
(C) The approximate dimensions of major facility structures and visible features;	Section 4.0
(D) If the proposed energy facility is a pipeline or a transmission line or has, as a related or supporting facility, a transmission line or pipeline that, by itself, is an energy facility under the definition in ORS 469.300, a corridor selection assessment explaining how the applicant selected the corridor(s) for analysis in the application. In the assessment, the applicant must evaluate the corridor adjustments the Department has described in the project order, if any. The applicant may select any corridor for analysis in the application and may select more than one corridor. However, if the applicant selects a new corridor, then the applicant must explain why the applicant did not present the new corridor for comment at an information meeting under OAR 345-015-0130. In the assessment, the applicant must discuss the reasons for selecting the corridor(s), based upon evaluation of the following factors:	Section 5.0
(i) Least disturbance to streams, rivers and wetland during construction;	N/A
(ii) Least percentage of the total length of the pipeline or transmission line that would be located within areas of Habitat Category 1, as described by the Oregon Department of Fish and Wildlife;	N/A
(iii) Greatest percentage of the total length of the pipeline or transmission line that would be located within or adjacent to public roads, and existing pipeline or transmission line rights-of-way;	N/A
(iv) Least percentage of the total length of the pipeline or transmission line that would be located within lands that require zone changes, variances or exceptions.	N/A
(v) Least percentage of the total length of the pipeline or transmission line that would be located in a protected area as described in OAR 345-022-0040;	N/A
(vi) Least disturbance to areas where historical, cultural or archaeological resources are likely to exist;	N/A

Requirement	Location
(vii) Greatest percentage of the total length of the pipeline or transmission line that would be located to avoid seismic, geological and soils hazards;	N/A
(viii) Least percentage of the total length of the pipeline or transmission line that would be located within lands zoned for exclusive farm use.	N/A
(E) If the proposed energy facility is a pipeline or transmission line, or has, as a related or supporting facility, a transmission line or pipeline of any size:	Section 6.0
(i) The length of the pipeline or transmission line;	Section 6.0
(ii) The proposed right-of-way width of the pipeline or transmission line, including to what extent new right-of-way will be required or existing will be widened;	Section 6.0
(iii) If the proposed transmission line or pipeline corridor follows or includes public right-of-way, a description of where the transmission line or pipeline would be located within the public right-of-way, to the extent known. If the applicant proposes to locate all or part of a transmission line or pipeline adjacent to but not within the public right-of-way, describe the reasons for locating the transmission line or pipeline outside the public right-of-way. The applicant must include a set of clear and objective criteria and a description of the type of evidence that would support locating the transmission line or pipeline outside the public right-of-way, based on those criteria;	Section 6.0
(iv) For pipelines, the operating pressure and delivery capacity in thousand cubic feet per day and the diameter and location, above or below ground, of each pipeline;	N/A
(v) For transmission lines, the rated voltage, load carrying capacity, and type of current and a description of transmission line structures and their dimensions; and	Section 6.0
(F) A construction schedule including the date by which the applicant proposes to begin construction and the date by which the applicant proposes to complete construction. Construction is defined in OAR 345-001-0010. The applicant shall describe in this exhibit all work on the site that the applicant intends to begin before the Council issues a site certificate. The applicant shall include an estimate of the cost of that work. For the purpose of this exhibit, "work on the site" means any work within a site or corridor, other than surveying, exploration or other activities to define or characterize the site or corridor that the applicant anticipates or has performed as of the time of submitting the application.	Section 7.0

8.2 Approval Standards

OAR 345 Division 22 does not provide an approval standard specific to Exhibit B.

9.0 References

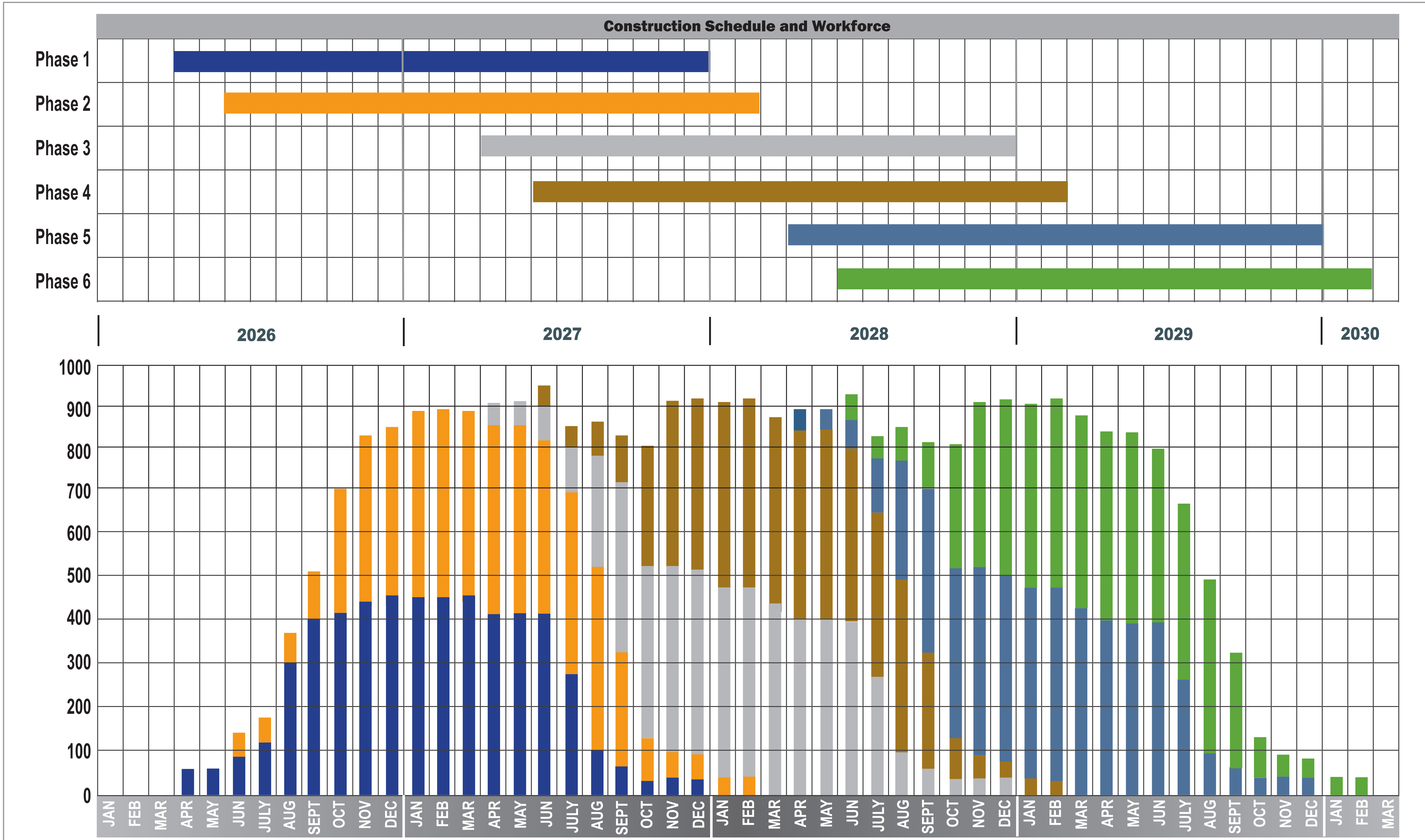
Battery University. 2022. BU-304a: Safety Concerns with Li-ion. February 2022. http://batteryuniversity.com/learn/article/safety_concerns_with_li_ion.

Energy Storage Association. 2022. *Lithium Ion (LI-ION) Batteries*. http://energystorage.org/energy-storage/technologies/lithium-ion-li-ion-batteries.

LAZARD. 2021. Lazard's Levelized Cost of Storage—Version 7.0. https://www.lazard.com/media/451882/lazards-levelized-cost-of-storage-version-70-vf.pdf.

UL Solutions. 2023. UL 9540A Test Method. Available online at: https://www.ul.com/services/ul-9540a-test-method

Figures



TETRA TECH

PINE GATE RENEWABLES GETTING SOLAR DONE.

Sunstone Solar Project

Figure B-1
Construction Schedule and Workforce

VSUN
Innovative & Smart

VSUN610-120BMH-DG

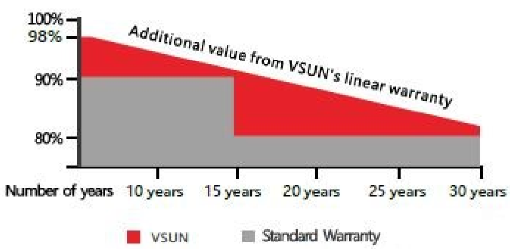
VSUN610-120BMH-DG VSUN605-120BMH-DG
VSUN600-120BMH-DG VSUN595-120BMH-DG

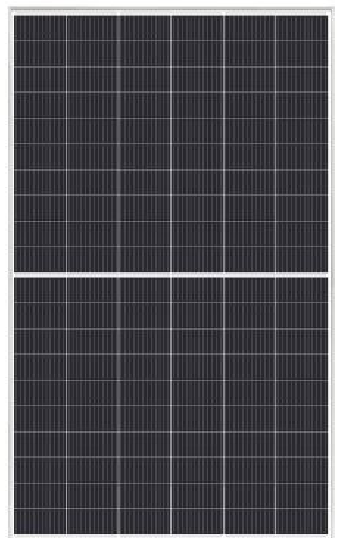
610W
Highest power output

21.55%
Module efficiency

12years
Material & Workmanship warranty

30years
Linear power output warranty





Material Characteristics

Dimensions	2172×1303×35mm (L×W×H)
Weight	36.4kg
Frame	Silver anodized aluminum profile
Front Glass	High transparency,Antireflection coated,Semi-toughened safety glass, 2.0mm
Cell Encapsulation	EVA (Ethylene-Vinyl-Acetate) or POE
Back Glass	Glazed & Semi-toughened safety glass, 2.0mm
Cells	12×10 pieces bifacial monocrystalline solar cells series strings
Junction Box	IP68, 3 diodes
Cable&Connector	Potrait: 500 mm (cable length can be customized) , 1×4 mm 2 , compatible with MC4

Sunstone Solar Project

Figure B-2A
Example Solar Module

PGR PINE GATE RENEWABLES | GETTING SOLAR DONE.

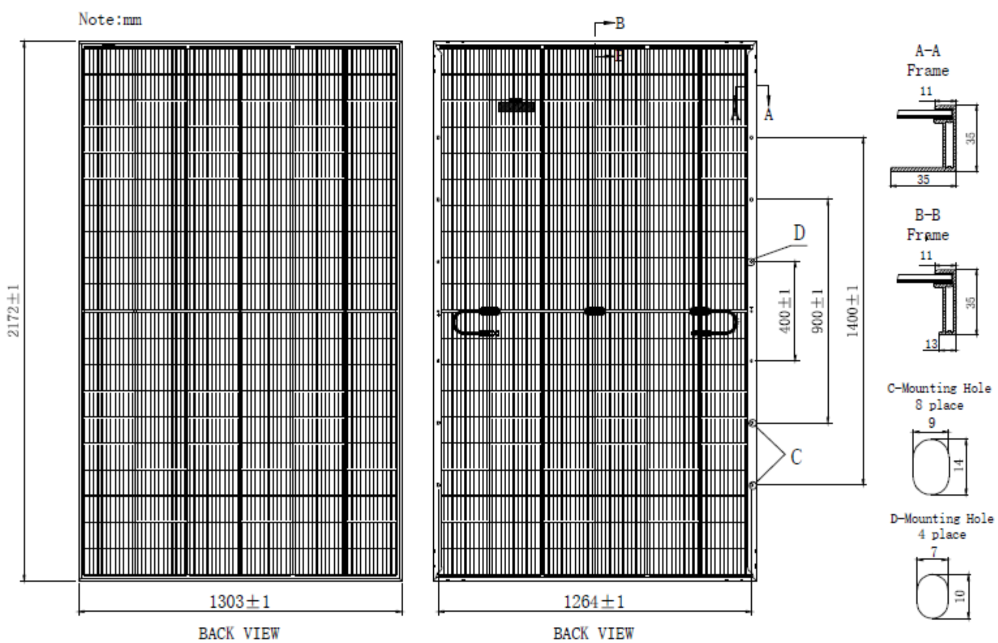
Packaging

Dimensions(L×W×H)	1325×1125×2400mm
Container 20'	/
Container 40'	/
Container 40'HC	540

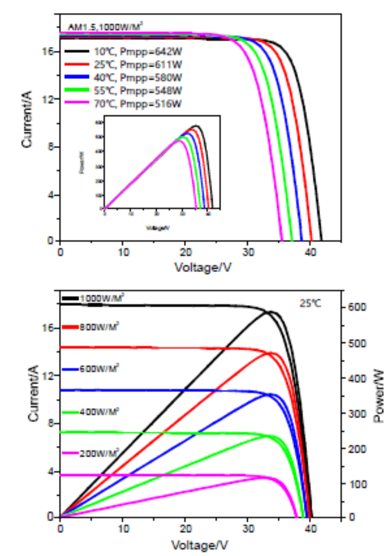
System Design

Temperature Range	-40 °C to + 85 °C
Withstanding Hail	Maximum diameter of 25 mm with impact speed of 23 m/s
Maximum Surface Load	5,400 Pa
Application class	class A

Dimensions



IV-Curves



Excellent performance under weak light condition.

Sunstone Solar Project

Figure B-2B
Example Solar Module

PINE GATE RENEWABLES | GETTING SOLAR DONE.

Sunstone Solar Project

Figure B-3
Illustration of Installed Solar Strings

PINE GATE RENEWABLES | GETTING SOLAR DONE.

shoals

BIG LEAD ASSEMBLY (BLA)

ABOUT

Shoals introduces the Big Lead Assembly, or BLA for short. The BLA is an aboveground aluminum trunk system that combines the functionality of cable assemblies, combiner boxes, and fusing all into one. This free air de-rated system eliminates the need for standard combiner boxes, messy multiple conductor string wires, cable trays, trenching, and field crimping. Factory manufactured and quality guaranteed.

FEATURES

- Up to (4) 8 AWG or (8) 10 AWG input leads per BLA mold drop
- Configurable for FSLR S4, FSLR S6, Crystalline, or Bi-Facial
- Plug and Play - eliminates field crimping and splicing
- Patented undermold/overmold process chemically bonds and hermetically seals joints
- Eliminates standard combiner boxes
- Utilizes free air ampacity table NEC 310.17
- Standard 5-year warranty on all models
- ETL certified to UL9703 for 600 VDC, 1000 VDC, and 1500 VDC systems
- ETL certified to CSA C22.2#182.5 for PV Connectors
- ETL certified to CSA C22.2#271 for PV Cables
- ETL certified to CSA C22.2#198.2 for Sealed Wire Connector

OPTIONS

- Customizable for up to 600 MCM wire gauges
- Messenger cable for mechanical attachment
- Cable available in standard colors
- BLM string monitoring

TECHNICAL SPECS	STG.BLA
Voltage Rating	600 VDC / 1000 VDC / 1500 VDC
Max. Isc (Trunk)	Up to 615A*
Max. OCPD Per String	50A
Max. Trunk Cable Size	600 MCM
Number of Input Circuits	Customer Specific
Max. Ambient Temp. Rating	50°C

*Max Isc shown is per NEC Code 2020, Table 310.17 for single-insulated conductors in free air at an ambient temperature of 30°C. Max Isc per BLA mold drop is determined by max allowable conductor ampacity per NEC 690.8(B) and any additional derating required at different ambient temperatures. Please refer to the Engineer of Record for calculations or use of different tables. Max OCPD per string is up to 50A.

Plastic over-mold material is suitable for outdoor use with respect to UV light, Water Exposure and Immersion in accordance with UL 746C. Product design and specification subject to change or modification without notice.

MADE IN TENNESSEE 5 year warranty c ETL us Intertek

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Sunstone Solar Project

Figure B-4
Example Big Lead Assembly

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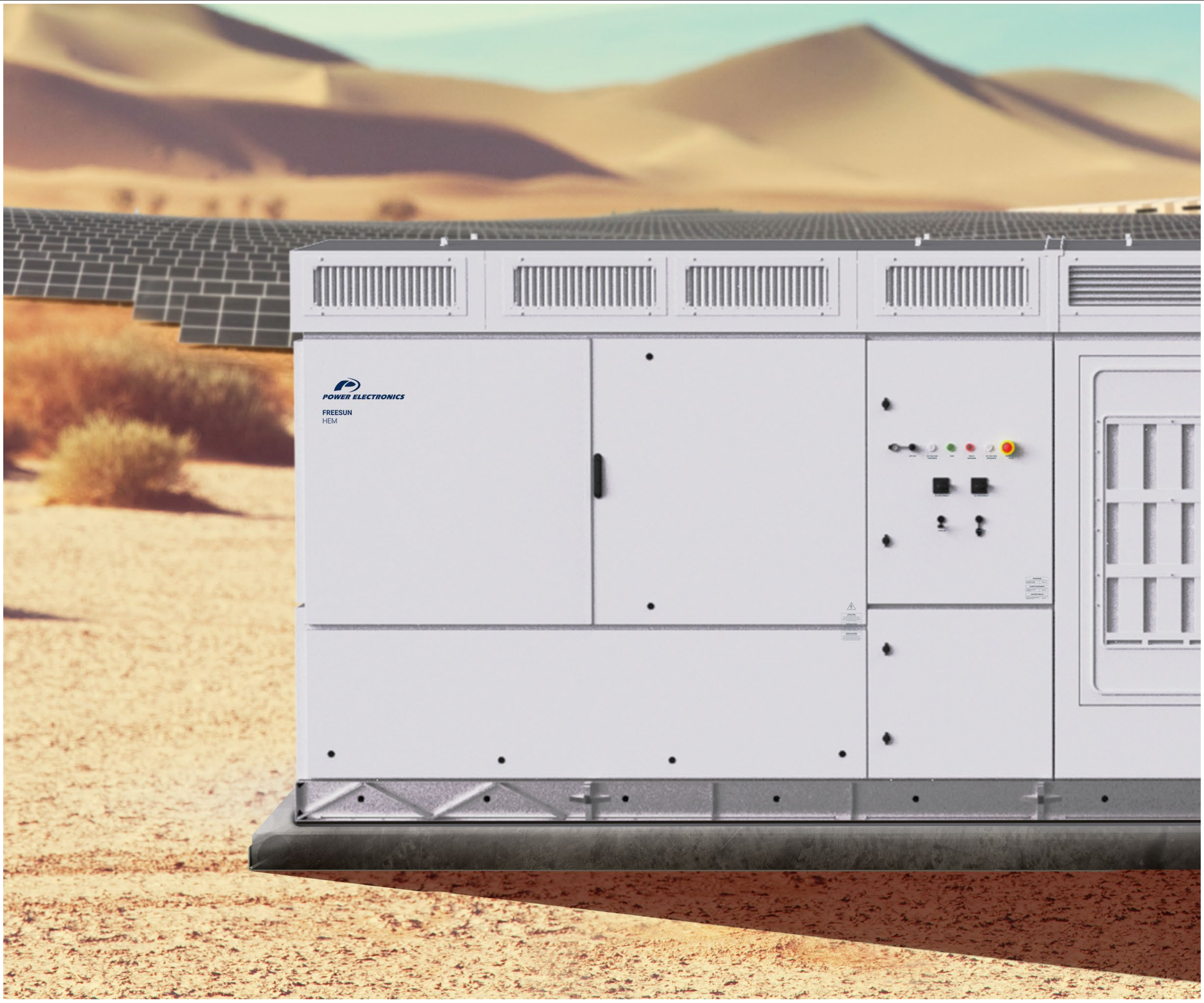

Sunstone Solar Project

Figure B-5
Illustration of Inverter Station

PINE GATE RENEWABLES
GETTING SOLAR DONE.

Sunstone Solar Project

Figure B-6
Illustration of Zinc Battery Storage System

PGR PINE GATE RENEWABLES | GETTING SOLAR DONE.