Appendix B-2
Scope Book

for

2020 Request for Proposals
for
Build-Own-Transfer
Solar Photovoltaic Resources

Entergy Louisiana, LLC

April 16, 2020

CONFIDENTIAL

APPENDIX B-2

FORM OF SCOPE BOOK

(Exhibit A to BOT Agreement)

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1 GENERAL DATA[1]

This Exhibit A, including its attachments, is the Scope Book. This Scope Book describes certain requirements with respect to the Work. It is not intended to be, and shall not be construed to be, a comprehensive list of each and every element or other requirement applicable to the Work, and shall in no way limit Seller's obligations under the Agreement or any Ancillary Agreement. In performing the Work, Seller shall comply with the requirements specified in this Scope Book, all Laws and applicable Permits, and the other elements of the Performance Standard.

This Scope Book provides the minimum functional specification (MFS) for the Project, including scope and design requirements. In addition to the requirements set forth in the Agreement (including this Scope Book), the high voltage (HV) substations and the HV transmission lines shall comply with all requirements specified in the GIA or any other Required Deliverability Arrangement.

This Scope Book is part of the B-O-T Acquisition Agreement between Seller and Buyer and is subject to the rules of interpretation set forth therein. Terms with initial capital letters used but not defined in this Scope Book shall have the meanings ascribed to such terms in the Agreement, unless the context otherwise requires. For the avoidance of doubt, the rules of interpretation set forth in the main body of the Agreement shall apply to this Scope Book.

1.1 Project Description

The Project will include the following main systems and equipment:

- PV Modules
- Trackers
- Inverters
- Battery Energy Storage System (BESS)
- Transformers
- Switchgear
- High Voltage (HV) Substation
- Control System (including charge controllers and battery energy management system)
- Balance of System (BOS) and Auxiliary Equipment

[1] The Scope Book remains subject in all respects to Buyer's continued due diligence and internal review (including by Buyer's subject matter experts). On occasion, this draft includes certain provisions on the basis that the drafters were unaware of information that might cause those provisions to be drafted in a materially different way or eliminated altogether. This draft may need to be revised to reflect certain matters included or not addressed in the Agreement or the RFP or that have been reconsidered. ELL reserves the right to issue an updated version of the Scope Book at a later date.

- Backup Power Supply/Emergency Generator, if required for equipment protection or personnel safety (i.e., Container/Enclosure HVAC and emergency lighting)
- Access and internal roads
- Water, fuel, power and all other utilities.

Seller shall provide all other ancillary equipment, systems, materials, and components necessary to deliver to Buyer a fully functional and operational Project meeting the Performance Standard. Among other things, the Project will be designed to comply with at least the following principles: allow safe, reliable, long-term operations; provide maintenance access for all equipment according to the Performance Standard (including OSHA); achieve at least a thirty (30)-year life (recognizing that the theoretical design life of the PV modules and inverters used in the Project will be twenty-five (25) years; minimize operator surveillance (the intent being that the Project will be designed to operate autonomously with minimal interaction by operators such that a limited O&M staff is required); provide reliable power to the interconnected electric grid; minimize adverse local community impacts; minimize impact of fire and natural hazards on site equipment and otherwise adhere to the Performance Standard.

1.2 Site Description

1.2.1 General

The Project Site is located in _____ Parish, Louisiana, as further identified on Appendix 6.

1.2.2 Climatic Conditions

The Project shall be designed taking into account, in accordance with the Performance Standard, the climatic conditions set forth in Appendix 3 and any other climactic or environmental conditions that would reasonably be expected to be encountered or occur at the Project Site during the expected Project life. The Project equipment, materials, and components incorporated into the Project shall be suitable and, to the extent applicable, rated for such climatic conditions. The Project shall be capable of sustaining minimal damage and operating properly at such conditions.

Performance modeling for the Project shall utilize the Typical Meteorological Year (TMY) file set forth in Appendix 5, which is based on the solar resource assessment report provided to Buyer by Seller.

1.3 Codes and Standards

Without limiting the other requirements applicable thereto, Seller shall design, procure, construct, commission, and test the Project, including all equipment, materials, components, and auxiliary facilities and systems, in accordance with the most recently established codes and standards. In the event of a conflict between the requirements of the different applicable codes and standards, the most stringent requirement(s) shall prevail. In the event a code or standard (or other Law) applicable to the Project (including any code or

standard (or Law) expressly referenced in this Scope Book or other provision of the Agreement) is superseded by another code or standard (or Law), the more stringent standard or code (or Law) shall apply and be complied with.

Despite language in NFPA 850 suggesting that compliance with NFPA 850 is "advised, but not required," for the purposes of this Agreement and the Project, compliance with the recommendations in NFPA 850 is required except to the extent a deviation from a recommendation (i) is supported and documented in writing by an engineering justification prepared by a qualified individual with direct knowledge of the matter and (ii) has been accepted by the Authority Having Jurisdiction. For purposes of the Project and NFPA 850, Entergy Risk Engineering is the Authority Having Jurisdiction on behalf of Entergy's multiple insurance underwriters.

Seller shall perform the Work and otherwise cause the Project to comply with the applicable standards set forth in Table 1 below.

Table 1. Applicable Standards	
AASHTO	American Association of State Highway and Transportation Officials
ACI	American Concrete Institute
AISC	American Institute of Steel Construction
AISI	American Iron and Steel Institute
ANSI	American National Standards Institute
ASCE	American Society of Civil Engineers
ASHRAE	American Society of Heating Refrigerating and Air Conditioning Engineers
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing Materials
AWS	American Welding Society
IBC	International Building Code
ICE	Institution of Civil Engineers
IEC	International Electrotechnical Commission
IEEE	Institute of Electrical and Electronics Engineers
ISO	International Standardization Organization
NEC	National Electrical Code
NEMA	National Electrical Manufacturers Association
NERC	North America Electric Reliability Corporation
NESC	National Electrical Safety Code
NFPA	National Fire Protection Association
OSHA	Occupational Health & Safety Administration
UL	Underwriters Laboratories

The PV Modules included in the Project must be certified to UL 1703, IEC 61215, and IEC 61730 by a nationally recognized testing laboratory (NRTL). UL, CSA, Intertek, MET Laboratories, TUV America, and TUV Rheinland of North America are recognized NRTLs.

The PCUs included in the Project must be certified to UL 1741 SA and IEEE 1547 by an NRTL.

The BESS used in the Project must be certified to UL 9540, UL 1741 SA and IEEE 1547 by an NRTL.

1.4 Project Sequence and Milestones

The Project Execution Plan shall include a Project Schedule for the construction of the Project in accordance with the milestones set forth in Table 2 below.

Table 2. Project Milestones

Milestone	Date
Notice to Proceed	
Begin Construction	
Mechanical Completion	
Performance Testing Completed	
Substantial Completion	

1.5 Project Controls

1.5.1 Project Execution Plan

Seller shall submit a Project Execution Plan (PEP), which will include:

- Health, Safety, and Environmental Plan
- Quality Assurance/Quality Control Plan
- Project Site Security Plan
- Project Organization Plan
- Engineering Plan
- Contracting Plan
- Procurement Plan
- Construction Plan
- Document Control Plan
- Project Risk Register
- Schedule Management Plan
- Preliminary Baseline Level I and Level II Project Schedules and WBS
- Performance Measure Baseline
- Site-Specific Fire Protection Design Basis Document.

1.5.2 Project Schedule and Schedule Management

Seller shall develop a Project Schedule in accordance with the requirements of this Scope Book. The Project Schedule shall be a linked network of time-phased, project-planned discrete activities keyed to the Project's scope of Work and the requirements of the Agreement and any applicable Ancillary Agreement. The Project Schedule shall contain critical target dates, project milestones, contractual events, deadlines, Project decision points, deliverables, and related activities to plan, coordinate, check the status of, and monitor the progress of the Project. The Project Schedule shall be developed in a version compatible with Primavera Version 6.2 or Microsoft Project in native format.

Seller shall provide three (3) levels of the Project Schedule as follows:

- The Level I Schedule shall be an integrated Project summary schedule showing major activities and milestones in a Gantt chart format with network features to show major constraints and shall be provided within the first (1st) monthly report. Level I Schedule activities will be work breakdown structure (WBS) summary tasks that are driven by the Level II WBS summary tasks. The Level I Schedule shall be an executive management tool used to monitor overall Project status and shall align with the Project's WBS.

- Like the Level I Schedule, the Level II Schedule shall be deliverable-based and aligns with the Project's WBS. When summarized, the Level II Schedule shall also be used to validate the Level I Schedule. A key objective of the Level II Schedule is to bring all Project functions together to identify critical activity sequences and risks and resolve conflicts and restraints. Level II Schedule activities will be WBS summary tasks that are driven by the Level III activities falling under the associated WBS. The Level II Project Schedule shall be developed with activities tied logically throughout using the critical path method (CPM) precedence diagram form. Seller shall clearly identify and define the critical path of the Work and the Project in the Level II Project Schedule. The preliminary baseline Level II Schedule will be provided by Seller within forty-five (45) days after the Effective Date. Seller shall provide to Buyer the final Project baseline Level II Schedule with the first (1st) monthly report.

- The Level III Schedule shall consist of a CPM network that clearly defines the sequences and restraints between activities at a detailed level. The Level III Project Schedule will be a fully integrated schedule with activities initially developed based on the Level I and Level II Project Schedules. Like the Level I and Level II Project Schedules, each activity in the Level III Schedule shall be of sufficient detail to assure adequate planning and execution of the Work throughout its duration. In addition, each Level III Schedule shall include a basis of schedule. Within sixty (60) days after the FNTP Date, Seller shall provide to Buyer the baseline Level III Schedule including the associated basis of schedule. The initial Level III Schedule will be frequently updated during Project execution utilizing the rolling wave planning methodology.

Seller shall provide a Schedule Management Plan, as part of the PEP, which sets forth the required schedule development approach, schedule content, update process, baseline management practices, and change management procedures. Seller shall prepare, maintain,

and update the Project Schedule according to the Schedule Management Plan and the Performance Standard.

Each of the following requirements shall apply to each level of the Project Schedule (including any updates thereto):

- The logical network thereof shall be constructed primarily using the finish-to-start relationship type
- Seller shall prepare each level of the Project Schedule submitted to Buyer such that it describes a complete, realistic Work plan demonstrating completion of the Work in advance of the Guaranteed Substantial Completion Date
- Seller shall use CPM scheduling techniques in scheduling software
- The schedule option for retained logic must be used
- All calendars and activity codes assigned within the schedule must be assigned at the "Project" level and not at the "global" level
- Excluding procurement activities, Seller shall schedule Work activities in days with any Work activity requiring more than fourteen (14) days to complete being broken down further into shorter duration activities, unless Owner otherwise approves a single Work activity including a duration of more than fourteen (14) days. Each activity included in the Project Schedule shall be of sufficient detail to assure adequate planning and execution of the Work.

The Project Schedule shall not include any open-ended schedule logic, unless otherwise agreed by Buyer, except that the Final Completion milestone shall not have a successor.

1.5.3 Project Controls Reporting

Without limiting Seller's obligation to provide other documents required to be delivered under this Scope Book or the Agreement, Seller shall submit monthly reports in accordance with Section 6.2 of the main body of the Agreement (in PDF and in native file), which shall include:

- Updated Project Schedule
- Updated schedule narrative including descriptions of the following:
    - Progress narrative
    - Monthly planned activity adherence (planned vs. actual)
    - Milestone comparisons from previous updates
    - Description of critical/near critical path
    - Narrative of any duration change
    - Narrative of any schedule variance
- Updated commodity reporting matrix breaking down key scopes of work

- Updated cumulative and monthly planned vs. actual physical progress s-curve (physical percent complete).

1.6 Units and Language

1.6.1 Units for Calculations

Unless otherwise indicated, English units will be used in all calculations, as specified in Table 3 below.

Table 3. Units for Calculation

Measurement	Units
Area	Acre
Dimensions	Ft
Electrical Energy	kWh or MWh
Electrical Power	kW or MW
Mass	lb or ton
Temperature	^{o}F
Velocity	Mph
Voltage	V or kV
Volume	ft^3

1.6.2 Language

Seller shall provide all information in the English language.

2 SCOPE OF WORK

2.1 General

Without limiting the definition thereof or the other terms of the Agreement, the Work shall include:

- The survey and assessment of the Site
- The development, design, engineering, permitting, procurement, manufacturing, factory acceptance testing (FAT), equipment and materials delivery, unloading, handling and storage at the Project Site, erection, construction, equipment and system integration, onsite quality control assurance and control, commissioning, and testing of the Project including the PV Plant, the BESS, the HV substation and the HV transmission line(s)
- Onsite quality control assurance and control programs, which shall include torqueing of electrical connections and mechanical mounting fasteners
- The works and services related to preparation, civil, mechanical, electrical, I&C, and communication

- The security of the Project Site
- The utilities and interconnections needed for construction, commissioning and testing such as potable/non-potable water, temporary power, telecommunications and internet, and fuel.

2.2 Design and Engineering

Seller shall be responsible for all design and engineering of the Project and Project Site in accordance with this Scope Book and the remainder of the Performance Standard. Seller shall cause all design and engineering Work to be performed in accordance with all Laws (including codes and standards), applicable Permits, and the other elements of the Performance Standard. The design shall meet the interface requirements of the ELL Transmission System, including communications and battery limits.

The energy and other products delivered to the grid shall comply with the requirements of the GIA and all other elements of the Performance Standard.

All equipment incorporated into the Project or otherwise sold to Buyer under the Agreement shall be of proven design for the intended use of such equipment. As a general principle, the latest/most modern, commercially proven, and up-to-date technologies shall be utilized, with the objective of maximizing value to Buyer.

The Project shall include a well-established classification and identification ("tagging") system in all phases. Seller shall use a consistent tagging system across the Project and obtain Buyer approval prior to implementation of the tagging system.

Appendix 7 sets forth the list of Approved Vendors for the equipment specified therein. Pursuant to Section 5.8 of the Agreement, Seller may only procure the equipment specified in Appendix 7 from an Approved Vendor.

Seller shall provide documentation, as further detailed in Section 9.1 of this Scope Book, to Buyer for Buyer's design review of the Project at the following milestones:

- Completion of basic design
- 60% completion of detailed design
- 100% completion of detailed design prior to issue for construction release.

Seller may deliver documents for a given system as they reach each of the above milestones instead of delivering all documents in a single package. Buyer shall have ten (10) Business Days to review and provide comments to each set of design documents provided by Seller. Seller shall consider in good faith comments from Buyer on each such set of documents. Continuation to the next phase of the Project without first obtaining Buyer approval of preliminary designs will be at the sole risk of Seller and no scope change will be awarded for any rework required due to such continuation of work.

2.3 Civil and Structural

The civil and structural Work includes:

2.3.1 Infrastructure and Outdoor Works

Civil works, structures, and foundations for the Project Site, such as:

- Rerouting of existing underground services, such as piping, cabling, and ducts, if appropriate
- Civil works for discharging rainwater
- General site filling, leveling, and grading to the necessary lines and levels, and all other earthworks where required, including access areas
- Construction of new roads, parking areas, and pavement as a part of the required infrastructure. Roads shall be designed of sufficient bearing capacity and in accordance with the Performance Standard. The following shall be included as a minimum:
    - Main access road(s)
    - Internal and perimeter roads
    - HV Substation access road(s)
    - Transmission line maintenance road(s)
- Security fence and surveillance system and lighting system
- Access gate
- All civil works for the solar arrays, including:
    - Complete civil works for the solar field, including foundations for the Tracker structure and equipment
    - Trenches
    - Service roads
    - Onsite infrastructure
- All civil works for the HV Substation
- All civil works for routing and installation of the transmission line
- Any other outdoor civil works required inside the Project Site or as needed for interconnection of the Project to the ELL Transmission System.

2.3.2 Electrical and Instrumentation & Control (I&C) Systems

Civil works, structures, and foundations for the electrical and I&C systems, including:

- Construction of ducts, culverts, underground cable ducts, trenches, manholes, and other routing methods and access points for MV and LV system cables, perimeter lighting, surveillance, I&C system, etc.

- Civil works for equipment such as PCUs, transformers, switchgear, and enclosures, including their corresponding foundations
- Civil works for power evacuation lines from the Project's solar arrays to the HV Substation
- Civil works within the HV Substation area for power evacuation
- Civil works for the power transmission line from the HV Substation to the Electrical Interconnection Point, including tower foundations, if required
- Civil works for the Electrical Interconnection Point, if required
- Underground cable for MV and data connections inside of the PV array
- Connecting MV and I&C cables to the agreed interface points
- Power and control cabling
- Transformer foundation(s)
- PCU foundations
- Switchgear foundation(s)
- Enclosure foundation(s)
- Metering (operational meters [not the revenue meter, see Section 3.6.2 below])
- Any other outdoor civil works related to the electrical and I&C systems.

2.3.3 Buildings

Buildings, including all civil works, structures, and foundations, including:

- Control building
- Gatehouse.

The control building shall include a central control room, a kitchen area, adequate lockers and toilets, a warehouse, and any necessary cranes and hoists. Seller may include the control building within the substation building in lieu of a separate control building as long as both the control building and the substation building satisfy the requirements of the GIA and the other elements of the Performance Standard.

Seller shall provide a gatehouse at the main access gate to the Project Site for onsite security personnel.

2.3.4 Storage

A storage area on the Project Site that will be located, sized, and secured in accordance with the Performance Standard for the unloading, storing, accessing, handling, removal, and delivering of supplies, equipment, materials, consumables, and spare parts during all phases of the Project, including construction, commissioning, testing, and operation and maintenance.

2.4 Mechanical

Each Tracker shall include the following systems and components:

- Supply and assembly of a suitable main racking/tracking structure and anchor to structure foundations for the specified site conditions
- Supply and assembly of suitable substructure (racking system and/or tracking system) and attachment to PV Modules for the specified conditions
- Corrosion protection.

2.5 Electrical

2.5.1 Solar Array and DC Distribution

The Work includes the supply, assembly, and installation of the following components:

- PV Modules
- PV Module string connectors
- PV Module mounting clamps
- Solar cabling
- Grounding system and connection
- Fused DC combiner boxes
- DC disconnect switches
- Surge arrestors and lightning protection

2.5.2 Power Conversion Stations and PV Collection System

The Work includes the supply, assembly, and installation of the following components:

- Power conversion system(s)
    - PV DC to AC power inverter(s)
    - AC disconnect switches
    - Transformer(s)
    - Switchgear
    - Auxiliary equipment and systems (including HVAC or other cooling systems)
- Backup power supply and uninterruptible power supply (UPS), if applicable
- Grounding
- Lightning protection system, if applicable

- Conduits and cable trays
- Cables
- Relay protection
- Lighting systems (including emergency lighting)

2.5.3 MV Distribution and HV Substation

The Work includes the supply, assembly, and installation of the following components:

- HV switchgear, if applicable
- MV switchgear
- MV/HV transformer(s)
- Switchyard buses
- Revenue metering
- Circuit breakers
- Disconnect switches
- Overhead line
- Backup power supply/emergency generator
- UPS
- HVAC
- Grounding
- Lightning protection system, if applicable
- Conduits and cable trays
- Cables
- Relay Protection
- Lighting systems (including emergency lighting)
- I&C system (including fire alarm system).

2.5.4 Auxiliary Supply System

The Work includes the supply, assembly, and installation of the following components:

- Auxiliary transformer(s)
- LV switchgear
- LV panelboard
- Busducts and cables

- Conduits and cable trays
- Protective devices for inverters, transformers, MV and main LV switchgears
- Required protection systems
- Lighting System (including emergency lighting)
- Grounding
- Electrical workshop equipment
- Backup power supply/emergency generator (including UPS)
- Lightning protection system, where applicable
- Fire suppression for high value or potentially dangerous equipment and other items stored on the Project Site (e.g., spares in the storage warehouse), unless the exclusion of fire suppression for such equipment and items is approved in writing in advance by the Entergy Risk Engineering group.

2.5.5 Instrumentation and Control

The Work with respect to the local control system (LCS)[2] includes the supply, assembly, and installation of the following components:

- Primary sensors, transmitters, actuators
- Plant control and monitoring system for the Plant including all necessary software licenses
- Human Machine Interface (HMI) to operate and monitor the Project from the control room
- Meteorological, or "met", weather stations as described in Section 3.5.3 below
- Revenue metering systems at the HV Substation
- Plant monitoring system
- Communication systems (telephone, LAN/WAN system, etc.)
- GPS-based clock systems
- Data transfer to Buyer remote control center (e.g., via the internet)
- All works required for integration of the Project into the HV Substation control system

[2] A distribution control system (DCS) providing equivalent or better controls or equipment is also acceptable. The term "LDC" shall be deemed to include such a DCS for purposes of this Scope Book.

- All works required for implementation and integration of the Project into MISO's systems, including all required equipment and software as well as testing, auditing, and all necessary documentation as required by MISO

2.5.6 Battery Energy Storage System[3]

The Work includes the supply, assembly, and installation of the following components:

- Battery container(s)/enclosure(s)
- BESS power conversion system(s)
    - BESS bidirectional power inverter(s)/converter(s);
    - Transformer(s)
    - Switchgear
    - Auxiliary equipment and systems
- Grounding
- Conduits and cable trays
- Cables
- Relay Protection
- Metering System
- HVAC System, fully redundant
- UPS System
- Instrumentation and Control System (including firefighting system)
- Explosion/deflagration (thermal runaway) mitigation equipment.

2.6 Environmental Requirements

Seller shall design, build, operate, and maintain the Project to meet all applicable Environmental Laws. Seller shall demonstrate during the design and construction phase and during the Performance Tests that the Project is able to (design) or does (construction) comply with all applicable Environmental Laws and standards. Applicable standards for Environmental protection must be fulfilled without any restriction.

Without limiting the terms of the main body of the Agreement or the other elements of the Performance Standard, Seller shall cause the Environmental Consultant to conduct Environmental Assessments (EA) on behalf of Seller and Buyer in compliance with Good Industry Practices and the then-current requirements and Laws reasonably in advance of the FNTP Date and within 180 days prior to the Closing. Seller shall provide to Buyer reasonable advance notice of any Environmental Assessment conducted by the

[3] To be included for Projects with a battery component.

Environmental Consultant. Buyer shall have to the right to witness the performance of the Environmental Assessment and to communicate directly and in real time with the Environmental Consultant regarding any Environmental Assessment.

2.7 Site Fire Protection

Seller shall provide to Buyer a complete set of the fire protection design basis documentation for the Project Site for Buyer's review and approval and shall not release equipment and material purchase orders for the Project prior to obtaining such Buyer's approval. NFPA 850, Chapter 4 is the current standard by which Buyer and Buyer's insurers measure property and asset protection and actions taken to mitigate fire risks to Buyer's insured assets. Buyer intends to utilize Chapter 4 and NFPA 850 as a basis for Buyer's review of the fire protection design basis documentation provided by Seller. This set of documentation will be updated from time to time to include and record all fire protection design decisions as the Project progresses.

2.8 Site Security

The Project Site Security Plan to be developed in accordance with Section 12.1(b) of the main body of the Agreement shall include the following:

- Surveillance equipment to detect unauthorized access to the Project Site
- Perimeter security fence
- Project Site access gate with interface for manual key entry
- Locks on any building on the Project Site that contains microprocessor-based relays
- Necessary cables (e.g., for power supply and sensors) and a fiber line that will permit Buyer to install (as, when, and if Buyer elects to do so) a PAC System (Physical Access Control System) for card reader access to all protected areas on the Project Site that contain cyber assets
- Pre-wiring of the main plant control room/enclosure entrance for, and procurement and installation of, professional grade security cameras that satisfy Buyer's NERC compliance requirements and the other elements of the Performance Standard
- Door alarms on all electrical hardware enclosures/panels.

Seller shall ensure that the security systems comply with all requirements of Law, applicable Permits, and the other requirements of the Performance Standard.

2.9 Temporary Site Installations and Laydown Areas

Seller shall obtain all necessary approvals and/or Permits for the installation of the temporary site installations and laydown areas.

Seller shall provide safe, secure, weatherproof, and functional offices on the Project Site, complete with electrical, telephone, water supply, air conditioning/heating, drainage, and sewage disposal services for Buyer's use during the construction of the Project.

Seller shall maintain site cleanliness and perform housekeeping in accordance with Good Industry Practices.

Seller is responsible for the mobilization of field forces and all necessary construction facilities at the Project Site, including temporary office trailers as necessary or advisable for completion of the Work.

Promptly after the Substantial Completion Payment Date, and as a condition to Final Completion, Seller shall remove all temporary installations and demobilize, leaving the Project Site clean and orderly, and clear of debris or pollution.

2.10 Tools, Spare Parts, and Consumables

Seller shall provide all equipment and tools, including cranes, lifting equipment, and Special Tools, necessary for operation and maintenance of the plant through the Substantial Completion Payment Date.

In addition to the Transferred Closing Inventory and any Transferred Post-Closing Inventory required to be supplied by Seller hereunder, Seller shall provide a list of recommended spare parts and Consumables, including the list price of each item. The recommended spare parts and Consumables should be classified as follows:

- Maintenance Spares and Consumables: Items that Seller reasonably anticipates may be required or appropriate for Buyer to have in stock during the first two (2) years of normal operation of the Project.
- Overhaul Spares and Consumables: Items that Seller reasonably anticipates may be required or appropriate for Buyer to have in stock during the programmed minor and major overhauls.
- Strategic/Breakdown Spares: Items that Seller reasonably anticipates may be required or appropriate for Buyer to have in stock after commissioning before extensive testing to refurbish the equipment.

Seller shall be responsible for supplying and fitting any spare parts required during construction, commissioning, and testing without charge to Buyer.

All spare parts and Consumables shall be commercially available for the operational lifetime of the installation. For all categories of spare parts and Consumables, Seller shall recommend in accordance with Good Industry Practices proper storage procedures for all items.

2.11 Project Utilities

In accordance with Section 5.4 of the main body of the Agreement, Seller shall procure, and provide the necessary means of transportation and delivery to the Project Site of, each commodity, utility, utility product, and service necessary or desirable for the performance of the Work.

2.12 Redundancy Concepts

Seller shall cause the Project to satisfy the following general redundancy requirements:

- Any system that can cause a complete outage or material reduction in generation or functionality of the Project if one (1) component fails shall include redundant equipment, ease of access to any component of the system, and ease of maintenance and replacement of the system and components
- If a failure in an instrument or in a control component can directly or indirectly cause the failure of the whole system, redundant instrumentation shall be provided
- The trip or outage of any single equipment or any single piece of auxiliary equipment shall not affect the operation of the Project.

Elements that shall be provided with full redundancy include:

- Communication links between LCS and the remote-control facilities
- Battery Container(s)/Enclosure(s) HVAC systems.

3 TECHNICAL REQUIREMENTS

3.1 General System Requirements

The Project and all equipment, systems, materials, and components included as part of the Project shall be designed for at least a thirty (30)-year useful life expectancy.

The rated power of the Project, as included in Appendix 1 of this Scope Book, shall be as measured at the Electrical Interconnection Point.

The Project shall be designed and installed to operate as a complete, fully integrated system.

The Project shall be designed and constructed with sufficient redundancy such that the availability required as per Appendix 1 of this Scope Book is sustained throughout the Project and the redundancy requirements in Section 2.12 of this Scope Book are satisfied.

Seller shall perform and complete the Work in a thorough, professional manner utilizing personnel skilled, competent, and appropriately licensed in their various trades, notwithstanding any omission from this Scope Book or the Agreement. All parts shall be made accurately to standard gauge when possible so that renewals and repairs may be made when necessary with the least possible expense.

The Project design shall be effective in engineering characteristics and comply with the requirements stated herein. All equipment, materials, and components shall comply with the requirements of this Scope Book.

Seller shall take necessary precautionary measures to ensure that there will be no interruption, damage, or danger to any equipment or system due to broadband, radiofrequency, or comparable interference. Seller shall ensure that there are no discharge sources from the Project that could cause interference with radio and television reception, wireless communication, telecommunication, or microwave communication systems. The Work shall include any mitigation necessary to ensure that such communication systems are not adversely affected.

Without limiting the foregoing, no aspect of the operation of the Project shall produce electromagnetic interference (EMI) that will cause faulty operation of instrumentation, communication, or similar electronic equipment within the Project or elsewhere on the ELL Transmission System. The Project shall be designed to suppress EMI effects and must meet the specifications of the latest revision of IEEE 519.

Seller shall take necessary precautions to ensure that the panels installed at the Project or included in Inventory do not degrade or experience diminished performance as a result of micro-cracking, micro-fracturing, or similar damage to the panels.

3.2 Civil and Structural Requirements

3.2.1 General

The Project shall be designed, constructed, and installed with sufficient access aisles, equipment separation, and clearance to ensure the safe operation, maintenance, inspection, and repair, removal, and replacement of equipment and systems. The Project design shall include and allow for appropriate walkways, forklift/vehicle runs, access routes, means of access, and related safety protections, including doors, stairs, landings, ladders, and other access means.

Control building, PCU, and other high-profile electrical equipment shall be placed on the Project Site in a manner to prevent or, if not possible, minimize shading on the PV Modules.

3.2.2 Accessibility

3.2.2.1 Vertical Clearances

Without limiting the requirements of the Performance Standard, the following minimum vertical clearances shall be used in the design and construction of the Project:

- Walkways and platforms: 7 feet, 6 inches
- Work areas and aisles for forklifts: 10 feet
- Work areas and access routes at grade: 10 feet.

3.2.2.2 Platform Access

Access shall be provided for systems components and equipment that require regular or anticipated maintenance activities or operator access for normal operations of the Project. All platforms shall provide space for maintenance of equipment and pull-space.

3.2.2.3 Row Spacing

Row spacing must provide a minimum of 10 feet clear space between Trackers to allow access for vegetation control or other plant maintenance. Distance shall be measured as the minimum distance at any time during operation.

Special consideration shall be given to minimize vegetation control efforts (e.g., grass mowing, trimming) at the Project Site, including providing ample row spacing for maneuvering of equipment and sufficient elevation to permit ease of vegetation removal below the PV Modules.

3.2.3 Geotechnical Investigation

Seller shall conduct geotechnical investigations on the Project Site in accordance with the Performance Standard. Without limiting Section 2.3 of the main body of the Agreement or the other requirements of the Performance Standard, the results of the investigation shall serve as a basis for the Project's civil, structural, and architectural design, including identifying the required foundations and earthworks, selection of materials and corrosion protection methods, trench and cable sizes, erosion potential, or any other aspect in which soil characteristics are relevant.

3.2.4 Site Clearing, Grading, and Soil Improvement

Seller shall design the general grading of the Project Site taking into account the requirements of the selected Trackers and the needs of the general drainage system. Soft, shifting, or unstable subsoil areas may be excavated down to firm subsoil and replaced with well-compacted suitable selected or imported fill material as determined by the engineer of record. Compaction levels shall be to an acceptable standard in accordance with the Performance Standard. Seller shall ensure that all Project grading and drainage and access roads are designed to the requirements of all Laws and applicable Permits.

Without limiting Section 2.3 of the main body of the Agreement or the other requirements of the Performance Standard, earthwork (excavation, fill, backfill, slopes, etc.) associated with grading and drainage, including materials and installation, shall be conducted in accordance with the final geotechnical data and as reasonably determined by Seller's geotechnical engineer(s) for the Project. Testing and monitoring of soils for earthwork shall be performed by a qualified, experienced, properly licensed independent quality control inspection and testing firm hired by Seller.

Seller shall provide for the inspection and testing of all load-bearing surfaces (foundations, slabs, roadways, trench bottom, etc.) by qualified, experienced, properly licensed independent inspectors.

Backfill for trenches shall be selected to prevent physical damage to raceways or cables. If existing soils contain large rocks, paving materials, cinders, large or sharply angular substances, or corrosive materials, then protection shall be provided in the form of granular or selected material.

Any debris or unsuitable material shall be removed from the site and properly disposed of in accordance with local Laws, applicable Permits, and the Performance Standard. If necessary, any surplus soil shall be transported to another suitable area inside or outside the Project Site.

Seller shall obtain all required Project Work Permits and Project Operational Permits from applicable Governmental Authorities. Seller shall locate the Work from horizontal and vertical control monuments. Seller shall locate, identify, protect, and flag as necessary or appropriate all utilities, structures, facilities, sidewalk, curbs, fences, paving, vegetation, and other features that exist on the Project Site. If the removal or relocation of utilities is required, Seller shall notify utility companies.

Seller shall protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations, soil conditions, or Environmental conditions. Seller shall provide erosion-control measures in accordance with the approved Project Storm Water Pollution Prevention Plan (SWPPP) for the Project to prevent or mitigate erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties, including roads, walkways, waterways, and wetlands.

3.2.5 Construction Materials

All materials shall be of good quality and capable of withstanding the environmental and subsoil conditions they will be exposed to during the life span of the Project without any significant decrease in serviceability or strength. All construction materials shall be in accordance with the latest version of the codes and standards, as per Section 1.3 of this Scope Book, and the other requirements of the Performance Standard.

3.2.6 Drainage and Stormwater Management

Without limiting the Performance Standard, the Project shall have, and Seller shall be responsible for developing, constructing, and maintaining through the Substantial Completion Date a Project Site stormwater management plan that meets all Laws and applicable Permits. Seller shall conduct a topographical survey to define the general drainage for the Project Site and shall use the survey as a basis for the design of the Project Site stormwater management plan. Seller shall complete and submit all necessary permitting applications, including stormwater discharge NPDES Permit applications, to the appropriate Governmental Authorities. The stormwater management plan, the Work, and the Project shall comply with all such Permits.

Seller shall develop, design, engineer, and construct an adequate drainage system, including any necessary inlets, pipes, channels, manholes, stormwater swales, surface flow, outlets, or other components for collecting, directing, and disposing of storm water from the Project Site. A clear path for the collected stormwater out of the Project Site shall be

provided, without flooding, while complying with all Laws (including codes and standards) and Permits.

Stormwater runoff shall replicate existing pre-development stormwater runoff to the greatest extent possible. Any contaminated runoff shall be segregated and detained separately in strict accordance with all Laws and applicable Permits. Permanent stormwater drainage systems shall be designed to carry the storm return period as required by all Laws.

Underground piping and culverts shall be reinforced concrete pipe (RCP) or corrugated, dual wall, high density polyethylene pipe (HDPE). The hydraulic grade line for the storm water pipeline system shall be as required by all Laws and applicable Permits. Ditches shall be lined with vegetation, rip-rap, and/or concrete, as applicable, based on the water velocity.

All areas not drained via a stormwater drainage system shall be drained via an open ditch system consisting of trapezoidal ditches with culverts or grating at road crossings or, where slope can be achieved, sheet flow.

When culverts are utilized, the culvert inlets and outlets shall be provided with end sections and permanent erosion protection.

Areas of the Project Site not included in or affected by the Project shall be left in their existing condition.

The Parties acknowledge that an offsite fire department response to a fire at or threatening the Project Site likely will include the spraying or use of significant quantities of water or fire retardant material to protect the Project and reduce the risk of property damage, personal injury, or other harm or casualty. Seller shall design, engineer, and construct the Project to direct water introduced to the Project Site to suppress fire or mitigate fire risk to an approved safe location and contain such water within such location in accordance with the Performance Standard.

- Spill containment for Project transformers shall be as addressed in the SPCC Plan. Where applicable, the equipment, systems, structures, and other means for containment of firefighting water used for transformer fires or incidents shall be designed, engineered, and sized to accommodate, provide, or include, at a minimum, each of the following without uncontrolled flooding on the Project Site or off-site discharge:The spill of the largest single container of any flammable or combustible liquid in the area
- The maximum expected manual hose streams (below) for ten minutes
- Where open pits are used for transformer containment, a 12-inch layer of rock between steel gratings should be provided at the top of the pit.

The Project's equipment and systems affecting fire hose flow from the local fire department response for containment and runoff considerations shall provide at least the following capacity flow volumes:

- 500 GPM for all lube oil and liquid fuel hazards on the Project Site regardless of quantity
- 500 GPM for all outdoor transformers on the Project Site containing > 1,000 gallons mineral oil
- 250 GPM for all outdoor transformers on the Project Site containing < 1,000 gallons mineral oil.

3.2.7 Erosion Control

An erosion and sediment control plan shall be developed by Seller's professional engineer licensed in conjunction with the SWPPP for the construction phase of the Project. During Project construction, erosion and sediment control measures shall be implemented to prevent sediment-laden runoff from leaving the Project Site. Construction runoff shall be directed to the erosion and sediment control systems prior to leaving the Project Site. The plan shall include, at minimum, the incorporation of silt fencing, silt bags, straw bale dikes, storm inlet protection, sediment basins, swales, piping, stream crossings, and other measures as required or appropriate to promote sediment and erosion control as prescribed in the approved plan and/or by periodic inspection by the local soil conservation district. Silt bags or reasonable equivalent shall be included as necessary when dewatering excavations to prevent sediment from collecting in the storm water system (e.g., Seller shall not pump silt laden water through the storm water system without proper filtration).

3.2.8 Foundations

Foundations shall be designed, constructed, and completed in accordance with the applicable codes and standards listed in Section 1.3 of this Scope Book and the other elements of the Performance Standard.

Foundations shall be designed, constructed, and completed to take into account the site climatic conditions (including, heat, cold, rain, wind (including maximum wind speeds recorded in the region)), soil conditions, and seismic loads, and thermal loads caused by expected fluctuations of materials and ambient temperatures.

Foundations for outdoor electrical equipment shall be elevated from the ground to prevent any equipment or systems from coming in contact with surface water or runoff. The amount of the elevation shall be based upon the results of the hydrological study and the Performance Standard, and in any event shall be at least three inches above the top of the ground.

3.2.9 Corrosion Protection

Seller shall be aware of and take into account the corrosion problems to be encountered on the Project Site, especially with outdoor equipment. Seller shall provide corrosion protection for concrete and steel structures in accordance with the Performance Standard.

3.2.10 Roads

Roads and bridges shall be designed in accordance with the requirements of Law, applicable Permits, and the other elements of the Performance Standard. The design conditions stated herein are minimums and any roadways that are planned to, or would reasonably be expected to, carry equipment and vehicle loads or traffic repetitions in excess of these minimum design conditions shall be designed to meet such planned or reasonably expected use.

Without limiting the Performance Standard, new roadway lanes shall have widths of no less than twelve (12) feet. Where a new road meets an existing road, the width of the new road shall smoothly transition back to the width of the existing road.

Access roads to each PCU shall have a minimum width of sixteen (16) feet with a minimum shoulder width of two (2) feet on each side of the road (at least twenty (20) feet in total).

Perimeter roads shall have a minimum width of twenty (20) feet with a minimum shoulder width of two (2) feet on each side of the road (at least twenty-four (24) feet in total).

At road intersections within the Project Site, the minimum turn radius shall be twenty-five (25) feet.

Vertical clearances above roadways for transmission lines shall be at least twenty (20) feet unless additional clearances are required for special equipment access or other design requirements.

The existing grade of any road shall be compacted to an acceptable level meeting the Performance Standard or replaced and compacted with suitable material, if necessary, and the sub-base, base, and pavement layers selected so as to provide sufficient bearing capacity to withstand the intended traffic and use. Roads shall comply with AASHTO requirements. Road surfaces for the Project Site shall be designed based on the recommendations from the final geotechnical report and the engineer of record.

Seller shall be responsible for checking any possible limitations on the transportation of sensitive material, heavy equipment, or other items to be delivered to the Project Site or use of vehicles or other modes of transportation due to the loading capacities and clearances of existing bridges and roads linking the roads, waterways, or other places to the Project Site.

3.2.11 Fencing and Gates

Seller shall ensure that the perimeter of the Project Site is completely fenced, utilizing chain link fencing topped with barbed wire, and secure.

All fence posts shall be anchored using concrete. All posts, rails, fabric, wire, and gates shall be galvanized. Road gates shall be sliding gates of the same design as the fence and have a width at least four (4) feet wider than the paved width of the ingress and egress road.

Safe step and touch potential of the perimeter fence shall be verified by an IEEE 80 compliant grounding study.

Seller may consider the possibility of installing a wind fence around the solar field (in whole or in part), if necessary and beneficial for the Tracker and the Project. In the event determines to install such a wind fence, Seller shall demonstrate to Buyer's satisfaction that the installation of such wind fence is necessary and beneficial for the Tracker and the Project reasonably prior to installation, including providing to Buyer the documents considered in Seller's determination and any information reasonably requested by Buyer.

If the Project or a portion thereof (including any ancillary structure) is exposed to known or reasonably foreseeable woodland, forest, or grassland fire hazards, Seller shall maintain sufficient separation to prevent the spread of offsite fire to onsite structures or of onsite structures to adjacent woodland or forest areas. For woodland and forest hazards, the separation between the nearest row of solar panels and the wood line shall be evaluated based on the typical maximum growth of neighboring trees but shall never be less than 150 ft. For grassland fire hazards, the separation from the nearest row of solar panels to the closest edge of the fire hazard shall be a minimum of 100 ft.

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3.2.12 Parking and Access

Seller shall be responsible for assuring that parking areas are included next to all buildings and enclosures required for the Project based on Seller's final design. The quantity of parking spaces shall be sufficient for the Project's operation and maintenance staff, with five (5) or more additional parking spaces for Buyer's staff and visitors.

Seller shall be responsible for ensuring that adequate parking is available for Project construction and commissioning staff and parking and access areas are sufficient for all construction and commissioning activities, including lifting of heavy loads. Surfacing requirements for parking areas shall conform to the requirements for roads.

3.2.13 Buildings

Buildings on the Project Site shall be designed in accordance with the requirements of all Laws, applicable Permits, and the other elements of the Performance Standard. Construction materials used in Project buildings and enclosures shall meet the definition of non-combustible or limited combustible, except roof coverings, which shall be Class A in accordance with standard methods of fire tests of roof coverings. Metal roof deck construction, where used, shall be "Class 1" or "fire classified." The local fire protection and NFPA rules and recommendations shall be followed for the fire safety design and fire protection systems.

Separate site support structures from solar collector panels and other site support structures shall be in accordance with NFPA 80A.

Particular attention shall be focused on sloping floors and roofs and adding drains around equipment to preclude any pooling of water and flashing to preclude water penetration inside the building.

Seller shall ensure that fire-rated seals in all openings and penetrations in all rated barriers for the Project are supplied and incorporated into the Project and that the fire-rating of such seals are commensurate with the fire rating of the barrier.

Seller shall provide and incorporate noncombustible or fire-rated sealing materials for all cable penetrations entering from below a raised electrical structure at the Project Site (BESS, Power Distribution Center, MCC Enclosure, etc.).

An adequately designed HVAC system that considers the specific needs of every room and the climatic conditions set forth in Section 1.2.2 shall be installed.

3.3 Electrical Requirements

3.3.1 General Requirements

Power shall be generated by the solar arrays through the solar inverters and stepped up through medium voltage, pad-mounted transformers to the Project medium voltage level. The medium voltage shall be stepped up through the GSU to the utility high voltage system. The following general criteria shall be used to design the electrical system.

Protective relaying, metering, and controls for all electrical equipment shall be according to industry standard metering and relaying, including NERC compliance, applicable codes and standards, and other requirements of the Performance Standard.

3.3.2 Cables

Cables shall be designed in accordance with the proposed voltage levels of the Project. All cables shall be halogen-free, fire-proof, and self-extinguishing, with XLPE isolation where required. For buried cable, anti-rodent and anti-termite additives shall be included for cable protection.

All cable (regardless of voltage level and use) shall have a fire retardant jacket and shall have successfully passed the appropriate (IEEE, ASTM, or UL) flame spread and smoke generated test for the class, voltage rating, and size of the specific cable.

3.3.2.1 DC Source Circuit Cable

All free air and conduit string source circuit cabling shall be minimum #12 AWG, multi strand, PV-Wire/RHH/RHW-2, 1000V-2000V rated, sunlight and UV resistant, with XLPE insulation.

All DC source circuit cabling shall be sized according to the operating and short-circuit current, multi strand, PV-Wire/RHH/RHW-2, 1000V-2000V rated.

All DC source circuit cabling shall be minimum 194°F temperature rated.

Conductors shall be sized to ensure that losses are below 2% and to avoid excessive voltage drop.

All DC source circuit cabling shall be listed and comply with UL 44 and UL 854.

3.3.2.2 AC Cables

AC cables shall be rated for the correct maximum voltage and sized according to the operating and short-circuit currents.

Conductors shall be sized to ensure that losses are below 2% and to avoid excessive voltage drop.

Insulation shall be adequate for the climactic and environmental conditions of the Project as listed in Section 1.2.

AC cables shall adhere to local AHJ and applicable standards, including IEEE and UL, for the voltage class.

3.3.2.3 Cable Management

Over-ground cables, such as module cables and string cables, shall be routed and secured to the Tracker, either using dedicated cable trays or weather-resistant Nylon 12 or better cable ties or zip ties. Cables shall be protected from direct sun exposure, standing water, and abrasion by any sharp edges of the Tracker.

All field-installed DC quick connectors shall be of the same manufacturer and type as the PV Module. Connectors shall be touch-proof.

3.3.2.4 DC and AC Circuit Conduit

All above-ground DC circuit conduit within the array shall be rigid PVC conduit, schedule 80, with screw adapters. Plastic bushings with locking nuts shall be used for all exposed threads. All sweeps and transitions from below ground to above ground shall be rigid PVC conduit, schedule 80. All sections of conduit shall have an inside chamfer at both ends.

Non-metallic liquid tight (NMLT) flexible conduit may be used to protect RHH/RHW-2 cable (or equivalent) from abrasion or damage. The conduit shall have an inside chamfer at both ends and may not exceed 3 feet. All NMLT fittings shall be metallic with locking nuts with plastic bushings on exposed threads.

Electrical Metallic Tubing (EMT) or compression type fittings shall not be used for any DC circuit.

AC conduit shall be rigid galvanized steel conforming to ANSI C80.1 & UL 6.

All below grade and concrete encased conduit (DC or AC) shall be rigid schedule 40 PVC.

Seller shall provide pull boxes and conduit bodies to facilitate wire pulls and maintain compliance with NFPA 70.

3.3.2.5 HV Cables

Seller shall comply with the requirements of the GIA for the design, manufacturing, installation, and testing of all HV cables.

3.3.3 Lighting

At a minimum, lighting shall be provided in the following areas:

- Building interior equipment (as applicable)
- Building exterior entrances (as applicable)
- Outdoor equipment within the high voltage area
- Entrance gate

Emergency lighting shall be provided by integral battery packs and shall automatically energize on loss of AC power to provide for safe egress and to light occupied control rooms and other critical areas. Illumination levels shall satisfy OSHA standards for their given service and location. Luminaires shall be standardized as much as practicable to reduce the number of components the Project must stock.

3.3.4 Grounding

A comprehensive soil resistivity measurement shall be performed in accordance with IEEE Standard 81 and the Performance Standard. All exposed equipment shall be fully grounded and bonded in accordance with Law, applicable Permits, the requirements of any Governmental Authority and the applicable standards listed in Section 1.3.

Solar arrays shall be installed in accordance with the original equipment manufacturer's recommendations for grounding and bonding.

Every PV Module within a string shall be bonded together (a) with a bonding procedure that is approved by the module manufacturer and complies with applicable codes and standards and (b) otherwise according to all manufacturer specifications.

Each PV Module string shall be bonded to the DC combiner box or harness assembly. Each combiner box output shall have an equipment grounding bond terminated at a ground ring or mat that is designed in accordance with the applicable standards listed in Section 1.3.

All low voltage and medium voltage electrical equipment bonding will be bonded to the grounding ring or mat and be designed in accordance with the applicable standards listed in Section 1.3.

3.3.5 Lightning Protection

Lightning protection for buildings shall be provided in accordance with NFPA 780, IEEE Std. 998-1996, and UL 96A. Lightning protection shall also be provided for major electrical equipment where applicable. Master labels shall be provided for structures that require lightning protection.

3.3.6 Interconnection Requirements

Without limiting Section 20.16 of the main body of the Agreement, Seller shall cause the Project to comply with the interconnection requirements set forth in the GIA.

3.4 Main Equipment Requirements

All equipment described in this Section shall be supplied by one of the Approved Vendors listed in Appendix 7, subject to the other terms of the Agreement. Appendix 4 of this Scope Book sets forth the complete datasheets for the Project's key equipment. The design, materials, manufacturing, construction, testing, cleaning, coating, and packaging of all equipment and components shall comply with the applicable standards listed in Section 1.3 and the other elements of the Performance Standard.

3.4.1 PV Modules

The PV Modules incorporated into the Project shall have a proven track-record in terms of technology performance, durability, and quality and shall comply with the Performance Standard.

PV Modules shall be suitable for installation at the Project Site with climatic conditions described Appendix 3.

PV Modules shall be UIL 1703 Type 1, Type 2, Type 3, Type 10, or Type 13. Use of any other UL 1703 Type will require the prior written approval of an authorized representative of Buyer prior to use.

The PV Module manufacturer shall provide a recommended procedure for disposal of the PV Modules at the end of their useful life.

PV Modules shall have a power tolerance of +5W/-0W or better.

PV Modules shall be designed to minimize the loosening of fasteners over time. Self tapping screws shall not be used unless designed and documented for a 30-year life. Nyloc or equivalent nut shall be used to prevent loosening.

PV Module frames shall be bolted and secured in accordance with the design windspeed using clamps that hold the modules individually or independently. Module "T" clamps or similar binders that depend on adjacent panels for tightness are permitted within a given module string only to minimize successive failure and each string must begin and end with an independent clamp design that isolates each string from the next. If such "T" clamps design is implemented, all strings must be capable of withstanding the Project Site climatic conditions as specified in Appendix 3 with an adjacent string or any string from a neighboring tracker/rack missing to ensure that the failure of a given string will not cause successive failures.

3.4.2 Tracker

Seller shall utilize a single axis tracking[4] system for the Trackers.[5]

[4] **NTD:** The defined term Tracker contemplates a single axis tracking system. Bidders may bid fixed tilt racking systems and corresponding changes will be made to the Agreement and Scope Book during the negotiation phase.

[5] **NTD:** Any limitation on the normal operation of the PV Plant arising out of wind speed, snow load, or other climatic or Environmental condition being above a certain threshold value applicable to the Tracker must be properly incorporated into the inputs to and reflected in the outputs of the Energy Model. The loss of power generation or performance arising out of such limitation shall be based on the meteorological data provided in Appendix 3 and determined in accordance with the Performance Standard.

Each Tracker shall be designed to resist all imposed loads in all possible working conditions as per the applicable standards and the conditions listed in Section 1.3. Each Tracker shall be installed in accordance with the Performance Standard.

Tracking systems (including Trackers, PV Modules, panel loading devices, and attachments) must be designed to withstand the Project Site climatic conditions described in Appendix 3. If any of such climatic conditions require or indicate a system or portion(s) thereof must be capable of moving to a stowed position, the system or portion(s) thereof, as applicable, must demonstrate that it can provide this functionality without external power and can~~within a short time frame to prevent damage to the system~~ withstand such climatic conditions without being damaged or damaging or impairing other Project systems, equipment, or items during the transition to the stowed position. Wind tunnel tests can be used to determine the design lateral and uplift loads. Any reduction in the loads stipulated in the codes due to such approach shall be kept within the limits established in the applicable standards. A written report describing the test(s), including the relevant conditions under which the test(s) were performed, and the test results shall be provided to Buyer promptly after the performance of the test(s). The conditions under which the test(s) were performed must be representative of the ones encountered at the Project Site. If wind tunnel tests are not performed as part of the Project, Seller shall provide Buyer recent wind tunnel test results previously conducted for the proposed Trackers. Such review shall not alleviate or diminish Seller's responsibility to provide Trackers that are suitable for the Project Site climatic conditions provided in Appendix 3.

Seller shall perform a load analysis and verify the foundation type and embedment depth for the Trackers based upon, without limitation, the geotechnical and climatic conditions specific to the Project Site. If bored or rammed pile foundations are selected for the structure, Seller shall carry out a sufficient number of load tests in order to refine and/or validate the preliminary design before the Construction Commencement Date.

Seller shall confirm that the PV Module attachment methods are approved by the PV Module manufacturer. The Trackers shall incorporate integrated NEC/UL required grounding. The integrated grounding method shall be approved for use by the PV Module manufacturer.

The leading front edge of the PV Module shall be a minimum of two (2) feet clear measured from the ground to the lower edge of the PV Module. The Tracker shall allow for any undulation of the ground and sloping as per the final proposed grade of the Project Site.

3.4.3 Power Conversion Unit (PCU)

The PCU will be the integration of inverters, LV/MV transformers, MV switchgear, and auxiliary components such as the LV auxiliary panel, the communication system, and LCS panel.

Where applicable, the PCU shall be provided with all necessary auxiliary equipment, including current transformers, voltage transformers, protective relays, grounding systems, breakers, and a fully integrated climate control system to ensure proper operation through

all possible operating conditions at the Project Site. A lockable and visible disconnect switch shall be provided between the batteries and the PCU.

PCU enclosures shall be rated for the prescribed site conditions in Section 1.2 of this Scope Book and for the intended PCU configuration (indoor or outdoor).

3.4.3.1 Inverters

Seller shall select a suitable technology to achieve the Guaranteed PV Plant Capacity (and associated energy) level for the Project. The inverters selected by Seller shall have proven track-records for performance, durability, and quality.

Inverters shall be selected and equipped to operate at rated capacity with respect to the local climatic and Environmental conditions in Appendix 3. The inverters shall be designed, among other things, for reliability and to avoid significant power loss in case of failure.

Each inverter shall meet the following requirements:

- Designed in accordance with UL 1741 SA
- Includes an output AC circuit breaker or load interrupting disconnect switch
- DC inputs rated for continuous duty, including overcurrent protection devices
- DC inputs with ground fault protection, isolation monitoring, and instrumentation to measure current to an accuracy of 1% or lower
- Self-consumption less than 0.4% of its own rated power
- Efficiency minimum of 97%
- Trip limits set per local Governmental Authority inverter protection settings
- Capable of operating at a power factor as required in the GIA
- Capable of providing full VAR support without the use of capacitors
- Meets the local electrical connection requirements
- Equipped with communication capabilities and able to control the main parameters (DC power, AC power, and auxiliary consumptions at a minimum) from the LCS
- Allows for remote operation utilizing read/write commands from the LCS and include interface protocol support, an alarm and command points list, remote connection, operation, and linkage
- Limits noise emissions to eighty-five (85) dB or less at three (3) feet from the source.

Grid forming capabilities shall be available at initial start-up of the inverters with the ability to activate this attribute provided to Buyer regardless of the need for this attribute at initial Project operation such that future costs are not incurred for such activation.

3.4.3.2 AC Disconnect Switches

AC disconnect switches shall be visual air-gap type designed to provide a manual means of electronically isolating inverters allowing for disconnection of all three phases of output wiring from the inverter(s). AC switches shall be rated for AC operation and capable of breaking under full load.

3.4.3.3 AC Panelboards

Where string inverters are utilized in the Project, an AC panelboard shall be mounted near the inverters. Each AC panelboard shall be equipped with circuit breakers for each inverter or aggregated output from another panelboard.

3.4.3.4 LV/MV Transformer

Transformers shall be either dry or liquid-filled. The MV transformers shall be three-phase, 60 hertz, 149°F temperature rise, self-cooled, pad mounted, dead-front, compartmentalized distribution transformers, loop feed with disconnectable elbows and +/- 5% de-energized tap.

Transformers shall be rated for inverter source operation of this type of generation and the Project Site climactic conditions listed in Appendix 3.

Transformers shall be supplied with a lockable and visible fused disconnect switch on the transformer high voltage side to isolate the transformer in case of an internal fault of an oil-filled transformer.

Transformers shall be equipped with dedicated relays for oil level, pressure, and temperature.

PCUs with oil-filled transformers shall be separated from other equipment and structures as outlined below in Section 3.4.6.

3.4.3.5 MV Switchgear

The mechanical protection class of all MV and LV switchgear, as well as of all control and protection panels, shall be NEMA 4X or greater for outdoor equipment.

The MV switchgear shall be designed in accordance with ANSI/IEEE standards, and shall be internal arc certified IAC=AFRL in accordance with ANSI/IEEE C37.20.7.

All MV switchgear for indoor and outdoor installation shall be metal-clad. The switching element connected to the MV transformer will be vacuum or SF6 type circuit breakers.

3.4.4 Auxiliary Equipment and Systems

3.4.4.1 AC Auxiliary System

The LV electrical panel for indoor applications shall be a fixed-mounted design in accordance with NEC standards. For outdoor applications, the panel shall be NEMA 4X or greater.

3.4.4.2 DC Auxiliary System

The DC auxiliary system shall consist of at least one (1) 100% capacity battery bank, two (2) 100% capacity battery chargers connected in a load sharing configuration, battery management system, a DC switchboard, and LV auxiliary panel board. The DC auxiliary system shall supply DC power for critical DC loads, including the UPS system, MV and LV switchgear, and HV equipment. The DC auxiliary system shall be sized to supply emergency loads for a minimum of two (2) hours or as necessary for safe equipment shutdown, whichever is longer.

The entire DC auxiliary system shall be designed in accordance with NEC requirements. For outdoor applications, the panel shall be NEMA 4X or greater.

3.4.5 Battery Energy Storage System (BESS)

3.4.5.1 General

The BESS shall be designed in accordance with the Project Site climactic conditions listed in Appendix 3.

The BESS shall meet the requirements of NFPA 855.

The BESS and all equipment, materials, and components incorporated therein shall be designed and installed to operate as a complete, fully integrated system. The system configuration must be DC coupled with the PV Plant. To assure compliance with investment tax credit (ITC) requirements, the BESS shall be designed and integrated with the PV Plant and the ELL Transmission System such that 100% of any energy used to charge the BESS is provided directly by the PV Plant (with no energy provided by the ELL Transmission System). The Project shall be designed, constructed, and completed in a manner to permit Buyer to change this control requirement at a later date to allow energy to be provided by the ELL Transmission System to charge the BESS once all of the ITC for the Project has vested.

The BESS shall be designed and constructed with sufficient redundancy such that the availability required as per Appendix 1 of this Scope Book is sustained throughout the Project and to comply with the redundancy requirements in Section 2.12 of this Scope Book.

3.4.5.1.1 Voltage

Reactive power capabilities for voltage control shall be 0.0 pF lead/lag to 1.0pF for full four quadrant operation. The BESS shall not cause excessive voltage flicker or introduce excessive distortion to the sinusoidal voltage or current waves as defined by ANSI (American National Standards Institute) Standard C84.1-1989, in accordance with IEEE Standard 519.

3.4.5.1.2 Frequency

The continuous and momentary low and high frequency ride-through capabilities shall meet the requirements of UL 1741 SA.

3.4.5.1.3 Electrical Losses

Without limiting the Guaranteed LD Performance Test Requirements, the estimated acceptable overall losses of the BESS system based on equipment specific data is set forth in Appendix 4.

3.4.5.2 Functionality and Use

The BESS shall be capable of performing all functions in accordance with this Scope Book.

3.4.5.2.1 Primary Function

The primary use of the BESS shall be demand response and load shifting. The BESS shall be able to perform daily peak shifting of the distribution network requiring a minimum of one deep full cycle per day, 365 full deep cycles per year, each consisting of the full energy capacity discharge and subsequent recharge to full capacity. The Project shall autonomously manage charging and discharging to follow for the distribution network demand curve.

3.4.5.2.2 Secondary Functions

Additionally, the Project shall be capable of providing the following secondary functions:

- Extended Solar Production: The BESS shall be capable of extending the hours of solar production by collecting energy during peak generation periods and discharging energy after end of day shutdown.
- Solar Smoothing: The BESS shall be capable of simulating, collecting, storing, and discharging as dynamic real power support when necessary to provide a stable energy profile.
- Grid Stability: The BESS shall be capable of providing at least the following functions to maintain grid stability:
    - Volt-VAR
    - Voltage Control
    - Frequency-Watt
    - Volt-Watt (standard and dynamic)
    - Power Factor
    - Dynamic Reactive Power Support
    - Connect/Disconnect

  The BESS's reactive power control functions shall be available independent of battery availability.

3.4.5.2.3 Available Functions

Appendix 4 sets forth the minimum available functions that the BESS shall be able to perform.

3.4.5.3 Battery

Seller shall take all necessary precautions to ensure that the BESS (and any component thereof) is protected from physical damage during transportation, unpacking, inspection, handling, storage, and installation. Battery cells shall be comprised of proven Lithium-Ion chemistry and shall utilize proven technology designed for the type of service described herein. The BESS may include only cells that are commercially available or for which suitable (though not necessarily identical) replacement cells can be supplied on short notice throughout the life of the BESS. Seller shall guarantee cell availability and replacement time to maintain the required availability as provided in Appendix 1.

Batteries shall be connected using string orientations and provided in modular, climate-controlled enclosures. Batteries shall be installed in a configuration that enables easy maintenance and replacement thereof and easy future battery expansion or additions.

Battery enclosures shall be stacked in a manner to ensure safe operation and shall not be stacked higher than recommended by the manufacturer or in a manner that would make maintenance and replacement difficult.

If changes to, or periodic replacements or overhauls of the components of, the BESS are necessary or contemplated throughout the life of the BESS to maintain the required functionality and proper operability of the BESS as required by this Scope Book and the Agreement, Seller shall provide a schedule for implementation of such changes and replacements over the life of the BESS as part of the documentation required to be delivered by Substantial Completion under the Agreement. The BESS design shall ensure that any such future changes to the BESS will require only installation of additional batteries and no other upgrades or modifications required.

The BESS, including the batteries, shall not release toxic gases or other emissions during normal charging, discharging, or use in excess of, or that create conditions that exceed, the permissible level(s) for such gas or gases (or combinations thereof) within the room or space in which the batteries are located or do not meet the Performance Standard.

The battery module manufacturer shall provide a recommended procedure for disposal of the battery modules at the end of their useful life and Seller shall provide such procedure and any related documentation to Buyer at the Closing.

3.4.5.4 BESS Enclosures

The BESS enclosure(s) shall be in accordance with the International Building Code (IBC) and all Laws, applicable Permits, codes, and standards, including NFPA 855.

The edge of the BESS enclosure(s) shall be located at least 150 ft. from the closest perimeter property fence accessible to the public.

The enclosure(s) shall have the appropriate rating for the Project Site conditions specified in Appendix 3 of this Scope Book and shall be thermally insulated with a fully integrated

heating, ventilating and air conditioning (HVAC) system to satisfy the climate requirements of all equipment, materials, components, and occupants housed in the enclosure(s). The HVAC system shall be provided with full redundancy (2 x 100%) to prevent system outage and damage.

In order to prevent unacceptable hazards to adjacent BESS units or equipment, dedicated use buildings/containers housing battery assemblies shall meet one or more of the following separation criteria:

- The batteries in their installed configuration shall be listed in accordance with UL 9540, including size, capacity, and, if part of the listing, presence of required fire suppression, OR
- In order to demonstrate that a fire in a battery container will not affect other adjacent battery containers or equipment, full-scale fire tests are performed in accordance with UL 9540A and the Performance Standard and are installed taking into account the test conditions, OR
- Individual containers (e.g., Sealand container) are separated from other battery containers, inverters, transformers, or other site equipment by a minimum of 25 feet or a 3-hour fire wall.

Seller shall ensure that the OEM/battery integrator submits to Entergy Risk Engineering a hazard mitigation analysis for Buyer's review and approval at least 90 days prior to any implementation of the battery design work for the Project. Buyer shall approve or provide to Seller any comments on the proposed analysis within 30 days after receipt. Seller shall consider and cause the OEM/battery integrator to consider in good faith any such comments made by Buyer and to issue a new or revised hazard mitigation analysis promptly after receipt of Buyer's comments. Buyer shall approve or provide to Seller any comments on the new or revised proposed analysis within 10 days after receipt. The foregoing process shall continue until Buyer's approval has been obtained. The hazard mitigation analysis shall document the UL 9540 listing and compliance with the conditions of the listing or provide the test results of the full-scale fire tests performed in accordance with UL 9540A or evidence compliance with the required separation distance or fire wall, as applicable. If no UL 9540A testing was performed, provide separation of buildings/containers housing batteries in accordance with the paragraph above.

The following protection against thermal runaway shall be provided to preclude, detect, and minimize the impact of thermal runaway:

- Installed HVAC systems shall be designed to remove the required heat load from the batteries during normal use to prevent thermal stresses
- A Battery Management System (BMS) shall be supplied that, among other things, controls the charging and discharging of the batteries in the Project, monitors the condition of each battery, and isolates the Project's battery system from exterior connections in emergencies.
- Installation of pre-emptive technologies (e.g., the Li-Ion Tamer system by Nexceris) shall be included as part of the BESS and the Project. Other pre-

emptive technologies that act on signs of battery cell deterioration and are precursors to thermal runaway may be used with the prior written approval of Entergy Risk Engineering. E-Stop circuits shall be connected into the circuitry to automatically trip the BESS unit upon detection of thermal runaway precursors.

- E-Stop circuitry shall not prevent the operation of pre-emptive technology or other post-incident monitoring technologies.

Explosion controls shall be included in the BESS and the Project to preclude catastrophic deflagrations or explosions in the event of failures such as thermal runaway.

- The internal automatic suppression system may extinguish flames but does not remove the heat or generation of explosive gases typical of thermal runaway.
- Detection shall be provided for accumulated quantities of combustible and explosive gases and the BESS shall be designed, engineered, and installed to transmit interior concentrations of these gases to a remote safe location in accordance with the Performance Standard.
- Remote manually actuated emergency ventilation shall be provided with the BESS and the Project. Ventilation shall be sized in accordance with NFPA 68 and NFPA 69 as applicable and located to direct any potential deflagration or explosion energy in a safe direction without jeopardizing nearby personnel or the structural integrity of the container or other property.

Seller shall provide a fire suppression, smoke detection, and alarm (FASS) system for each enclosure. The FASS system shall include local and remote audible and visual alarms and a gaseous extinguishing system designed to prevent damage of or residue on the equipment housed in the enclosure(s). All FASS system alarms shall be relayed to the LCS. Protocols shall be included to extinguish fires inside the enclosure(s) without the need to open the enclosure doors.

Outdoor battery containers shall be protected internally with a self-contained automatic suppression system. The system may be Hybrid Water Mist (i.e. Victaulic Vortex) or clean agent gaseous (e.g. NOVEC-1230). Suppression system shall not utilize aerosol (Stat-X) agent or any other agent that leaves a residue.

The enclosure(s) shall be equipped with a minimum of two (2) grounding lugs per device within the container to enable proper grounding of the overall enclosure(s).

All wiring and cables shall be sized and selected per IEEE, NEC, and any other applicable code or standard as provided in Section 1.3 of this Scope Book. Internal wiring shall be pre-installed where possible. Any wiring that must be shipped separate for field installation shall be pre-terminated in the manufacturer's factory, labelled, and shipped with the enclosure for easy field installation.

3.4.5.5 BESS Power Conversion System

The BESS shall be provided with a PCU designed to match the DC voltage of the batteries and the transformers.

Appropriate metering must be applied to ensure that BESS RT Efficiency, BESS Availability, and BESS Storage Capacity Project Performance Tests are accurately implemented in accordance with the Agreement and this Scope Book.

3.4.5.6 MV Transformers

The MV transformers shall conform to the requirements set forth in Section 3.4.3.4 of this Scope Book.

3.4.6 Generator Step-Up (GSU) Transformer

The GSU connects the medium voltage collector system to the high voltage interconnecting transmission system and shall be built to ANSI/IEEE C57. The GSU shall be an outdoor, oil-filled power transformer, 65 degrees C temperature rise, and designed in accordance with the Project Site climactic conditions listed in Appendix 3.

Transformer design, including internal conductors and bushings, shall be suitable for the additional kVA allowed by the forced-air cooling fans and fan control.

Fans shall be three-phase and wired to an auxiliary cooling equipment control panel for power connection, individually fused or otherwise thermally protected, controlled by the winding hot spot temperature and bolted or welded on the transformer tanks.

The GSU shall be equipped with continuous online gas monitoring (8 gas plus moisture minimum) and include bushing monitors.

The transformer windings shall be copper.

The transformer tank shall be of welded steel construction and shall withstand full vacuum without leakage or distortion. The transformer tank cover shall be welded on with at least a 20-inch diameter manhole.

Copper grounding pads shall be provided at opposite corners of the tank base. A NEMA 4-hole compression type lug for connection of a 500 kcmil ground cable to the station ground grid shall be provided for each ground pad and for the transformer neutral bushing ground connection which shall be bussed to the tank base.

The oil preservation system shall be a sealed-tank system with a constant pressure inert gas-pressure or conservator/diaphragm system.

The transformer shall have a de-energized tap changer in the high-voltage winding with steps at +5%, +2.5%, 0%, -2.5%, and -5%. A high-speed motor operated load tap changer with vacuum or resistance switching shall be included with the transformer.

The manufacturer shall provide and include on the transformer(s) for the Project:

- Magnetic liquid level indicator with alarm contacts and threaded conduit hub, with two set points and two sets of alarm contacts per set point
- Liquid filling and filter press connection in the top and bottom of the tank
- Combination drain and bottom filter valve with sampler

- Dial-type liquid thermometer and temperature-indicating switch with alarm contacts, maximum read pointer, and threaded conduit hub, with two set points and two sets of alarm contacts per set point
- Vacuum pressure gauge with bleeder
- Lifting hooks on the tank, lifting eyes on the cover and provisions for jacking
- Stops shall be provided to prevent over-compression of gaskets; gaskets below oil level will be eliminated unless isolating valves are provided
- Pressure relief device with alarm contacts and threaded conduit hub
- A hot spot dial-type winding temperature indicator with alarm contacts shall be provided for each high voltage and low voltage winding, with a minimum of two (2) per transformer; each winding temperature indicator shall have two set points and two sets of alarm contacts per set point
- A sudden pressure or Bucholtz relay (Device 63) shall be provided, including seal-in contacts in an enclosure with a threaded conduit hub and "loss of DC indication"
- Stainless steel nameplates and tap changer warning/instruction plates; nameplates shall not be attached to the radiators
- The radiators shall be equipped with bolted flanges and valves to permit the removal of any radiator without draining the oil from the transformer or any other radiator; lifting eyes shall be provided on each radiator/cooler group
- Connection provisions shall be made in the cooling equipment controls circuit to allow external interlocking with the transformer protective relaying scheme, such that operation of normally closed contacts of the transformer protection lockout relay (86T) will shut down the cooling equipment in the event of an internal transformer fault
- Seller shall ensure the manufacturer fills the tank with oil and the transformer shall be provided with the necessary amount of high-grade insulating oil that contains no detectable PCBs; the oil shall be manufactured and tested in accordance with the requirements of ASTM D3487; identification of non-PCB liquid shall be placed on outside of tank
- Internal, multi-ratio, bushing-type current transformers (CT) shall be provided with all secondary terminals wired to shorting terminal blocks using ring type lugs
- Bushing mounted, station-type lightning arrestors shall be provided; arrestor ratings shall be coordinated with the transformer insulation level
- All control wiring shall be 600-volt, 90 degrees C, and XLPE insulation, with stranded copper wire, No. 12 AWG (minimum) for power, No. 14 AWG (minimum) for controls, and No. 10 AWG (minimum) for current transformers

- Terminal blocks shall be rated for 600 volts and accept conductors sized #18 through # 8 AWG; an additional 20% spare or extra terminal blocks shall be provided; heat shrink wire markers are required
- A core grounding strap shall be provided and accessible from a tank top man-way
- The auxiliary cooling equipment control shall have a loss of auxiliary cooling power alarm (fans not running)
- The auxiliary cooling equipment control cabinet shall meet the following requirements:
    - The control cabinet components shall be mounted in a weatherproof enclosure of NEMA 4X design or better
    - The control cabinet and terminal block enclosures will be provided with space heater(s) and internal illumination by standard lamps(s), 120-VAC, with a door-activated on-off switch and guard for the lamp(s).

Fire-rated walls may be used in conjunction with physical separation between transformers at the Project Site and other equipment as follows.

- For outdoor transformers with an oil capacity of less than 500 gallons, maintain clear separation of 5 ft. from other structures
- For outdoor transformers with an oil capacity of between 500 and 5,000 gallons, maintain clear separation of 25 ft. from other structures or provide a 2-hour fire rated barrier
- For outdoor transformers with an oil capacity of greater than 5,000 gallons, maintain clear separation of 50 feet from other structures or provide a 2-hour fire rated barrier
- For indoor transformers with an oil capacity of greater than 100 gallons, provide a 3-hour rated fire barrier.

Any transformer for the Project using a listed “less flammable” insulating oil (e.g., Envirotemp FR3) shall be installed with and maintain a separation distance and barriers as provided above. If Seller seeks a modification of a separation distance or a barrier requirement for a transformer on the basis that the transformer will use a listed less flammable insulating oil, Seller shall perform and provide to Buyer a detailed hazard evaluation of such transformer with the proposed less flammable insulating oil. Buyer will consider such evaluation in its review of the modification request.

3.4.7 For clarity, the requirements of this Section 3.4.6 apply to the plant GSU and do not apply to the individual inverter transformers, which are covered in Section 3.4.3.4. Air Insulated Switchyard

The switchyard will be located adjacent to the main step-up transformer(s) and will require either rigid tube or an overhead conductor for the connection. The switchyard design will

meet the requirements of the National Electrical Safety Code, ANSI C2 and all ELL Transmission System requirements.

The tubular bus used will be aluminum alloy 6063-T6. Cable connections between the tube bus and equipment will be ACSR (aluminum conductor steel reinforced), AAAC (all aluminum alloy cable) or AAC (all aluminum cable). Bus connectors will be aluminum alloy for aluminum-to-aluminum connections and tinned bronze for aluminum-to-copper connections. Hardware connectors will be welded onto the cable or tube. Aeolian cable will be installed in the switchyard tubing, as required, to limit bus vibration. All rigid bus designs will comply with IEEE Std. 605, *IEEE Guide for Design of Substation Rigid-Bus Structures*. The bus shall be supported by the project short circuit momentary rating.

Rated voltage according to ANSI and IEEE and equipment basic insulation levels per ANSI standard, as applicable.

Circuit breakers shall be three phase dead tank design with current transformers (CTs) on each bushing. A sufficient number of CTs will be supplied to support the system protection and metering requirements. Circuit breakers shall use SF6 or vacuum interrupters.

All disconnect switches whether motorized or not will have auxiliary contacts for system monitoring. Auxiliary contacts on motorized switches will not be actuated by the motor cam but will be triggered based on the physical switch position.

DC power for the circuit breaker operation and protection will be 125VDC.

Protective relaying will meet IEEE and ANSI requirements and will be coordinated with ELL Transmission (as the host utility).

Transmission line protective relay equipment at the switchyard end will be provided to meet the requirements of ELL Transmission (as the host utility). All circuit breakers will be provided with a and b auxiliary contacts on each pole. The exact number of contacts required will be determined by the protective scheme and plant control system requirements.

High voltage equipment and structures will be connected to a ground grid of standard copper or copper-clad steel cables. A grounding grid will be provided to control step and touch potentials in accordance with IEEE Standard 80, Safety in Substation Grounding Equipment. All metallic equipment, structures, and fencing will be conducted to the grounding grid of buried conductors and ground rods, as required for personnel safety.

The substation and plant grounding system designs will be based on soil resistivity measurements made at the Project Site. If necessary, ground rods or wells will be used to reduce the overall ground resistance to the calculated safe maximum permissible level. The substation ground grid will be tied to the plant ground grid at several widely spaced points.

The lightning protection system will be designed in accordance with IEEE 998 guidelines and will consist of either dedicated station lightning posts or overhead cable shielding.

The outside areas in the switchyard will be adequately illuminated per IES requirements.

3.5 Control System and Communication Requirements

Seller shall furnish a local control system (LCS). The LCS shall be an integrated system that interfaces with the Project to allow for monitoring and/or control of all Project equipment and systems from one common location at the Project Site. In addition, the LCS shall interface with met stations, field instrumentation, and other data acquisition sensors to perform complete data acquisition, storage, and transmission functions. Seller shall also provide a remote terminal unit (RTU) and the LCS to RTU interfaces to provide for remote (off the Project Site) monitoring and control of the Project (including as required by NERC and MISO requirements). The LCS control cabinet power shall be installed and configured to feed from the UPS.

The LCS shall perform all control and monitoring functions both automatically and manually. These functions shall include:

- Control of the site electrical output to the grid
- Centralized control of all inverter parameters
- Real-time performance metrics
- Coordination and communication for all site meteorological data
- Monitoring of the UPS, batteries, and other power generation equipment
- Monitoring of Project Site switching equipment
- Alarm generation for equipment failure or abnormal operation
- Equipment status (Trackers, including inverters)
- Sequence of event recording
- Historical storage, data retrieval, and report generation.

The LCS equipment shall include reasonable spare capacity for future expansion. Without limiting the foregoing, the installed system shall include at least 20% spare or extra discrete input/output points and at least 20% spare or extra cabinet space for future input/output points, and the capacity of the LCS controllers shall provide at least 20% more computing capacity than necessary for the LCS system as designed and transferred to Buyer.

The design, materials, manufacturing, construction, testing, cleaning, coating, and packaging of all equipment and components included in the scope of the LCS shall comply with the applicable standards listed in Section 1.3 and the other elements of the Performance Standard.

3.5.1 Operational Interface

The Project shall be operated using an LCS and will leverage DNP3 over IP communications protocols. As DNP3 is not inherently secure, Seller will provide to Buyer any security options offered or expected and will include these in the cyber security plan, as discussed in Section 3.5.4.1 of this Scope Book.

Seller shall provide information regarding support and any plans/roadmaps for transition of the LCS to a DER Management System (DERMS), including adoption of IEEE 2030.5. This information is for future planning purposes only; the implementation of DERMS and IEEE 2030.5 is not a requirement of this Scope Book.

3.5.2 Remote Access

For operation and maintenance activities, the Project shall include access to the control and monitoring system to enable remote access to monitor, manipulate, and control the setpoints, gains, and droop curves of these functionalities.

The control system shall:

- Include real-time data in no longer than one (1) minute intervals at a minimum
- Ensure time-stamped data will be obtained from a consistent time source using an internal time source synchronized to GPS time and provided by Seller with the Project
- Create alerts accessible to both internal and external operators when devices under its control are not performing as expected with the communications mechanism to be proposed by Seller for review and acceptance by Buyer
- Provide remote access to all IEEE 1547 settable parameters and any additional parameters required based on the following:
    - Access to controllable parameters may be provided via remote access over the network, but such access must be highly secure
    - The vendor will provide remote access security controls as a part of the cyber security plan, which will include user identity management, encryption standards, intrusion detection features, and any additional pertinent security controls
    - In addition to system security features, Buyer will provide transport level security for these functions as they traverse the network
- Provide a mechanism for updating system software for security patching.

Seller shall comply with the list of eligible protocols in Table 4 below:

Table 4. List of Eligible Protocols

Protocol	Transport	Physical Layer
IEEE Std 2030.55 (SEP2)	TCP/IP	Ethernet
IEEE Std 1815 (DNP3)	TCP/IP	Ethernet
SunSpec Modbus	TCP/IP	Ethernet
	N/A	RS-485

3.5.3 Meteorological Station

Subject to the other terms hereof, Seller shall provide a minimum of two (2) met stations for the Project. One (1) main met station shall be located near the Project Site control building. Additional met stations shall be distributed throughout the solar arrays of the Project such that there is one (1) additional met station per 50 MW of installed capacity. The stations shall be arranged to allow for the determination of, and provide an accurate weather profile for, the overall solar field and the Project.

Met stations shall be provided with NEMA 3R or greater enclosures. Instruments and sensors associated with the met stations shall be calibrated by a reputable, certified laboratory.

The main met station shall contain or meet, among other things, the following requirements:

- One (1) horizontal pyranometer with a minimum secondary standard according to ISO 9060
- One (1) plane of array pyranometer with a minimum secondary standard installed in the plane of the PV Modules
- One (1) unobstructed anemometer and vane at a minimum 3-meter height
- Six (6) thermal sensors (Pt 100 class B according to IEC 60751) installed as triple clusters at the center and edge of installed row to measure cell temperature with a measurement resolution up to ± 33.8°F
- One (1) shielded ventilated thermal sensor to measure ambient temperature with a measurement resolution of ± 33.8°F (Pt 100 class B according to IEC 60751)
- One (1) relative humidity (RH) sensor
- One (1) soiling monitoring system/sensor
- One (1) precipitation sensor
- A data logger for local saving of data and for remote data transfer through available telecommunication infrastructure; the data logger shall be capable of accommodating all sensors and be protected against direct sunlight; irradiation data should be collected every second and stored as ten (10)-min averages (in W/m2) and as the sum total for any defined time period (in Wh/m2)
- Minimum twelve (12)-hour backup battery.

The additional met stations located in the solar field shall meet the following requirements:

- One (1) horizontal pyranometer with a minimum secondary standard according to ISO 9060
- One (1) plane of array pyranometer with a minimum secondary standard installed in the plane of the PV Modules

- One (1) unobstructed anemometer and vane at a minimum height of three (3) meters
- Six (6) thermal sensors (Pt 100 class B according to IEC 60751) installed as triple clusters at the center and edge of each installed row to measure photovoltaic cell temperature with a measurement resolution up to ± 33.8°F
- One (1) shielded ventilated thermal sensor to measure ambient temperature with a measurement resolution of ±33.8°F (Pt 100 class B according to IEC 60751)
- Data logger for local saving of data and for remote data transfer through available telecommunication infrastructure and capable of accommodating all sensors. The data logger should be protected against direct sunlight. Data should be collected every second and stored as 10-min averages or as the sum in the case of irradiation.
- Minimum twelve (12)-hour backup battery.

The met stations shall be powered either by:

- PV Modules and batteries (sizing of the system shall ensure complete autonomy throughout the year and avoidance of power shortage); or
- Direct LV connection to the nearest building or inverter/transformer block. Seller shall design a backup system to ensure a minimum of three (3) days of autonomy to the Project in case of a grid failure.

Data can be directly transferred to the unit or block equipped with communication capacities and available in the monitoring system.

Batteries and all electronics shall be installed in a protected area away from direct heat and protected against the elements by a sunshade.

3.5.4 Control System Security

3.5.4.1 Cyber Security

Seller shall develop and provide to Buyer a cyber security plan that includes test planning. (Buyer may elect in its discretion to provide an example plan for Seller to complete.) The plan will cover:

- Steps taken in software development to detect and correct security flaws, including plans for code scanning
- Methods used to protect system user identities and logins, including methods of encryptions and use of certificates
- Methods to assure reliable and confidential communications of inbound commands and outbound data
- A description of software maintenance processes, including the process to patch security vulnerabilities in the vendor's product

- Test planning to assure compliance with the cyber security plan.

Seller shall use NISTR 7628 as a guide in the development of the cyber security plan for the Project. Buyer expects to provide additional guidance or input in the development of the plan to ensure the Project's cyber systems are compatible with and provide the protection required or appropriate for Buyer's cyber systems. The plan is subject to Buyer's review and approval in advance of the FNTP Date.

Buyer will contract for a third-party vulnerability assessment and penetration test during Project testing. Such testing shall be done, at Seller's expense, as a "type" test for the initial unit, with testing not required for subsequent units. Seller shall correct vulnerabilities identified in this testing and the completion of such corrections in accordance with the Performance Standard shall be a condition to Substantial Completion.

Seller shall:

- Undertake periodic reviews of emerging vulnerabilities that will potentially impact the Project
- Provide notice to Buyer of new vulnerabilities within a specified time frame from a new vulnerability becomes known
- Develop corrections (patches) to address identified vulnerabilities.

Seller shall assure the above software support, including operations and maintenance, is provided through Substantial Completion. Buyer reserves the right to perform periodically independent, recurring security audits to assure compliance with the security maintenance requirements of this Scope Book during the performance of the Work.

Once the Project's cyber security system is in operation, Seller shall not provide communications directly to the system and must access the system via Buyer security controls. If Seller reasonably requires monitoring (read-only) information to perform the Work, Buyer will use commercially reasonable efforts to provide such information via internet solutions to Seller or the applicable vendor after Seller's request therefor. Any remote access to the cyber security system shall be covered in the cyber security plan, and Buyer agrees to use commercially reasonable efforts to cooperate with Seller to provide mutually agreeable solutions for gaining access to the system once in operation.

3.5.4.2 Physical Security

Physical access to workstations or HMIs shall be controlled with locks and alarms.

3.6 Metering Requirements

3.6.1 General

Metering systems for the Project shall be designed and installed to monitor and record all energy traveling to and from the Project and to permit the evaluation of the functionality and efficiency of the overall Project.

Shorting-type terminal blocks shall be provided for all CT circuits to allow meters to be removed without disrupting current transformer circuits.

A set of metering CTs on the GSU secondary shall be provided. Potential transformers shall be provided on the medium voltage buses for input to the meters. Shorting-type terminal blocks shall be provided to allow meters to be removed without disturbing current transformer circuits.

All permanently installed electrical metering instrumentation, or a combination of temporary test and permanently installed instrumentation, that will be used for the Project Performance Tests shall comply with maximum allowable measurement uncertainties per ASME PTC 22.

Except where more restrictive requirements apply, relaying class accuracy voltage and current transformers are acceptable for panel indication meter applications.

ABB FT-1 type test switches shall be provided for the voltage and current inputs to each meter.

3.6.2 Revenue Metering

The revenue metering system shall be included in the Work except for installation of the revenue meters, which shall be performed by Buyer. Seller shall purchase the revenue meter(s) from ELL Transmission during the design phase of the Project. Notwithstanding anything herein to the contrary, all revenue meters, installation and purchases thereof, and revenue metering shall be in accordance with the GIA or other applicable Required Deliverability Arrangement (to the extent applicable) and the other elements of the Performance Standard.

Seller shall provide and install high accuracy 0.15B1.8 extended range CTs and 0.15Z accuracy PTs for GSU high-side revenue metering. Seller shall provide the revenue meter cabinet(s) to Buyer's specifications. Seller shall design and install all wiring needed for revenue metering. Buyer shall install the revenue meters and make the final connections to the meters. Seller's schedule for the Work shall allow a reasonable period of time for Buyer to undertake, complete, and test such installation and final connections, and Seller shall use commercially reasonable efforts to cooperate with Buyer in connection with such installation and final connections.

3.6.3 Metering Locations

Other than where included with standard equipment packages (*e.g.,* inverters), indication metering shall be provided in the following locations:

- High side of each GSU (voltage, current, kW, and kVAR)
- Each medium voltage main breaker (voltage, current, kW, and kVAR)
- Each LV main breaker (voltage, current, kW, and kVAR)
- 120 VAC UPS system, if applicable.

3.7 Interconnection of Utilities

Pursuant to Section 5.4 of the main body of the Agreement, Seller shall provide all utility interconnections needed for construction, commissioning, and testing of the Project or performance of the Work (in each case, or any portion thereof), e.g., potable and non-potable water, waste water, sanitation (including sewage), temporary power, telecommunications, internet, and fuel.

Seller shall provide adequate means for PV Module washing either via permanent water connection or on-site storage.

4 ENERGY MODEL

Seller's model for Project performance (Energy Model) shall model accurately the Project PV system's theoretical energy output based on measured ambient conditions (and with no deduction factors other than degradation) and otherwise be compliant with the Performance Standard. On the Effective Date, Seller shall have delivered to Buyer the Energy Model that has been approved and accepted by an authorized representative of Buyer and that will forecast expected energy production over a continuous twenty-five (25)-year period of the PV Plant taking into account production degradation and all internal losses. The datasheets included in Appendix 2 and Appendix 3 of this Scope Book set forth the inputs and results from the Energy Model and the detailed design requirements for the PV Plant.

The Energy Model shall be considered final as of the Effective Date, except for changes expressly permitted after the Effective Date under this Section 4. Seller may make changes to the Energy Model after the Effective Date to the extent required to match the final design of the Project, such as updating inputs to reflect supplier data obtained after final equipment selection and overall system refinements during the design phase as long as the overall generation and energy delivery estimate for the Project at the Electrical Interconnection Point provided in the Project Performance Model report included as Figure 5 in Appendix A is not reduced. Any modification to the Project Performance Model that causes a reduction in the overall generation or energy delivery estimate for the PV Plant at the Electrical Interconnection Point when compared to Section 4.1 of Appendix 2 shall be permitted only with the prior written approval of an authorized representative of Buyer. From and after the Effective Date through the Substantial Completion Payment Date, Seller shall maintain an up-to-date, accurate log providing the date and basis for, and a reasonable description of, each change, if any, to the Energy Model, including changes to all files, inputs, and parameters used in the Energy Model, and shall notify Buyer of each such change.

5 COMMISSIONING AND TESTING

Seller shall develop a commissioning plan and process (Commissioning Plan) that ensures all Project components meet the requirements of the Agreement, this Scope Book, and the other elements of the Performance Standard, including BESS Availability, BESS Power Rating, BESS RT Efficiency, BESS Storage Capacity, PV Plant Availability, and PV Plant Capacity. The Commissioning Plan shall outline the tasks, processes, procedures, and deliverables required to commission the Project, conduct the Performance Tests, and prove the function and performance of the Project, including its components. The Commissioning Plan shall designate the tests and processes required to be completed and

performed prior to Mechanical Completion and Substantial Completion in accordance with the Agreement, including completion of all quality assurance and quality control (QA/QC) tests prior to Mechanical Completion and completion of all Project Performance Tests prior to Substantial Completion.

Seller shall provide the Commissioning Plan to Buyer reasonably prior to the commencement of Seller's commissioning activities. Buyer shall provide comments, if any, in good faith on such Commissioning Plan to Seller within ten (10) Business Days after Buyer's receipt of such Commissioning Plan. If Buyer provides such comments, Seller, within five (5) Business Days after Seller's receipt of Buyer's comments, shall revise the Commissioning Plan to address Buyer's comments and resubmit the revised Commissioning Plan to Buyer for review and approval. This procedure shall be repeated until the Commissioning Plan, as modified, is approved by Buyer. Buyer shall promptly notify Seller in writing if and when it has approved the Commissioning Plan.

Buyer shall be given reasonable advance notice of and a reasonable opportunity to review, monitor, and witness all commissioning and testing activities performed as part of the Work. Seller shall provide Buyer a schedule of all factory and Project Site tests, inspections, and performance tests within thirty (30) days after the FNTP Date and any update to such schedule promptly after such update is made.

Buyer and its contractors and Representatives shall be permitted access to the Project Site at all times and shall be permitted to visit factories during the manufacturing of equipment, materials, and components for the Project and to witness factory tests and inspections. Buyer may contract with one or more third parties to conduct individual inspections and tests at any time to confirm test results and to verify that the Project has been installed and constructed in accordance with the requirements of the Agreement, this Scope Book, and the other elements of the Performance Standard.

Where manufacturing or finishing is performed at the Project Site, reviews, inspections, studies, and tests shall be conducted in accordance with the Performance Standard as a replacement for an appropriate workshop test. The preliminary check-out and test runs, the reliability test run, and the Project Performance Tests shall be carried out by Seller under the witnessing of and review by Buyer and its contractors and Representatives.

These tests shall demonstrate, among other things:

- Completeness of the mechanical and electrical construction works
- Correctness of the assembly and installation
- Safety and reliability of the Project under all operating conditions
- Proper functioning of the components and system under all operating conditions.

5.1 Commissioning Documentation

The minimum required information for commissioning shall be documented and checked, if appropriate, during the commissioning period, including as listed below:

- Basic system information

- Project location and installation date
- Rated system capacity (DC and AC)
- PV Modules and inverter – manufacturer, model, and quantity
- Commissioning date
- System designers' information
- System installer/contractor information
- Detailed single-line diagram of the Project
- Array general specifications
- PV Module type
- PV Module number
- Number of PV Modules per string
- Number of strings
- PV string information
- String cable type, size, and length
- Specification (current and voltage rating) of overvoltage protection device
- Array electrical characteristics
- Array junction box location
- Array main cable specification
- Location, type, and rating of over voltage protective devices
- Earthing and over voltage protections
- Single-line diagram(s) showing the details of all earthing, lightning protection, and surge protection systems
- A single-line diagram showing AC isolator location, type, and rating and similar information for AC over-current protection device
- Technical data sheet for all major components
- Warranty documentations for PV Modules and PCUs with the information of starting date of warranty and period of warranty
- Mechanical design information/data sheet of array mounting structure (static report)
- Documentation of all required Permits
- Documentation and stock of spare parts and Consumables

- Documentation of PV Module flash test data
- Commissioning test reports
- Equipment calibration certificates
- Operation and maintenance information, including:
    - Procedures for verifying correct system operation and minimum guaranteed performance parameters
    - Preventive and corrective maintenance procedures
    - Scheduling of routine maintenance
    - A checklist of what to do in case of system failure
    - Emergency shutdown/isolation procedures

In accordance with NERC reliability standards, Seller shall provide the following documentation to Buyer thirty (30) days prior to initial synchronization of the Project, along with any other documentation reasonably requested by Buyer or required by NERC or the Performance Standard:

- BAL-005 – One-line diagram that displays the Electrical Interconnection Point (and includes unique line identifiers/names ensuring that the Project Site and ELL Transmission use the same naming convention when referring to the PV Plant (e.g., breakers, lines, etc.) by Seller
- COM-002 – Network diagram of voice and data links by Seller
- FAC-008 – Identification of most limiting equipment factor based on application of Generator Buyers Facility Rating Methodology by Seller
- MOD-010 – Static Modeling Data of equipment, as applicable, by Seller
- MOD-012 – Dynamic Modeling Data of equipment, as applicable, by Seller
- VAR-002 - Transformer information, including the following, as applicable, by Seller and Buyer (or its Affiliate), and as obtained by Seller from the Approved Vendor of the GSU:
    - Tap Settings
    - Available fixed tap ranges
    - Impedance data
    - The + / - voltage range with step-change in % for load-tap changing transformers.

5.2 Factory Acceptance Tests

All equipment, materials, and components specified in Section 3.4 of this Scope Book shall be factory tested to ensure such items are suitable for use at the Project and will be able to

satisfy the requirements of the Agreement, including this Scope Book and the other elements of the Performance Standard. Quality check lists and test protocols for such equipment, materials, and individual components shall be submitted by Seller prior to and during the factory tests.

All equipment, materials, and components shall be "routine" or "type"-tested in the factory in accordance with the applicable standards set forth in Section 1.3 of this Scope Book. The frequency of testing shall be as agreed between Seller and Buyer prior to the FNTP Date. Type tests shall not be repeated if type test certificates of identical equipment designed and fabricated to a specification identical to that of the Project are available. Any proposed type test certificates must be submitted to Buyer for review and approval.

The following sequence shall be included in Seller's QA/QC Plan provided as part of the PEP:

1. Seller shall keep a "Three-Month Look Ahead Inspection Schedule," which shall be updated on a regular basis as part of the monthly report to be delivered under Section 6.2 of the main body of the Agreement.
2. Seller shall provide Buyer notice of its intent to inspect prior to any inspection as detailed in the Agreement.
3. Prior to notifying Buyer of its intent to inspect, Seller shall have issued and obtained Buyer's approval of the relevant inspection test plan (ITP) and all other technical documentation relevant to the inspection.
4. Buyer will notify Seller of Buyer's intent to attend the inspection. Buyer may contract with third party inspectors to attend the inspection with, or on behalf of, Buyer.
5. Upon completion of the inspection, Seller shall issue an inspection test report summarizing the results of the inspection, including any reports generated by the manufacturer, for review and approval by Buyer.

Seller should expect Buyer to attend the inspections of at least the following equipment:

- PV Modules
- Inverters
- Trackers
- Step-Up transformers
- Inverter power transformers
- HV switchgear, if applicable
- MV switchgear
- LCS
- Batteries

- BESS PCU
- BESS container(s)/enclosure(s).

5.3 Project Performance Tests

Seller shall conduct all Project Performance Tests after the Closing and synchronization of the Project to the interconnected electric grid. Project Performance Tests may be run simultaneously when possible.

Appendix 5 sets forth certain requirements, standards, and procedures for the performance of the Project Performance Tests, which shall be conducted in accordance with the Commissioning Plan under Section 5 of this Scope Book.

The Project Performance Test Report shall include the following information with respect to the Project Performance Test Results:

- Summary
- Test Protocols
- Instrument Calibration Certificates
- Test Data (manual and data acquisition)
- Field Notes
- Calculations
- Conclusions

5.3.1 PV Plant Capacity Test

Seller shall cause a Project Performance Test to be performed to determine PV Plant Capacity in accordance with the requirements, standards, and procedures set forth in Article 9 of the main body of the Agreement, Appendix 5, and the other elements of the Performance Standard. The PV Plant Capacity shall be measured at the Electrical Interconnection Point.

The Project Performance Test conducted to determine the PV Plant Capacity may not be interrupted or suspended and then resumed without Buyer's prior written approval. Among other things, and without limiting the other terms of the Agreement, the PV Plant must have operated and performed as designed (and must have achieved the Minimum PV Plant Availability) during such Project Performance Test in order for such Project Performance Test to be considered valid for purposes of determining the PV Plant Capacity.

5.3.2 PV Plant Availability Test

Seller shall cause a Project Performance Test to be performed to measure PV Plant Availability in accordance with the requirements, standards, and procedures set forth in Article 9 of the main body of the Agreement, Appendix 5 of this Scope Book, and the other elements of the Performance Standard.

The Project Performance Test conducted to determine the PV Plant Availability may not be interrupted or suspended and then resumed without Buyer's prior written approval. Among other things, and without limiting the other terms of the Agreement, the PV Plant must have operated and performed as designed (and must have achieved the Minimum PV Plant Capacity) during such Project Performance Test in order for such Project Performance Test to be considered valid for purposes of determining the PV Plant Availability.

5.3.3 Battery Energy Storage System Performance Tests

5.3.3.1 BESS Storage Capacity and BESS Power Rating Tests

Seller shall cause Project Performance Tests to be performed to determine the BESS Power Rating and the BESS Storage Capacity in accordance with the requirements, standards, and procedures set forth in Article 9 of the main body of the Agreement, Appendix 5, and the other elements of the Performance Standard. Such Project Performance Tests may be run simultaneously or separately. The BESS Power Rating and the BESS Storage Capacity shall be measured at the Electrical Interconnection Point. Among other things, and without limiting the other terms of the Agreement (including Section 9.2 of the main body of the Agreement), (i) the BESS and PV Plant must have operated and performed as designed (and must have achieved Minimum BESS Power Rating and the Minimum BESS RT Efficiency) during such Project Performance Test in order for such Project Performance Test to be considered valid for purposes of determining the BESS Storage Capacity, and (ii) the BESS and PV Plant must have operated and performed as designed (and must have achieved the Minimum BESS Storage Capacity and the Minimum BESS RT Efficiency) during such Project Performance Test in order for such Project Performance Test to be considered valid for purposes of determining the BESS Power Rating.

5.3.3.2 BESS Round Trip (RT) Efficiency Test

Seller shall cause a Project Performance Test to be performed to determine the BESS RT Efficiency in accordance with the requirements, standards, and procedures set forth in Article 9 of the main body of the Agreement, Appendix 5, and the other elements of the Performance Standard. The BESS RT Efficiency shall be measured at the input/output meter(s) to the BESS. Among other things, and without limiting the other terms of the Agreement (including Section 9.2 of the main body of the Agreement), (i) the BESS and PV Plant must have operated and performed as designed (and must have achieved the Minimum BESS Storage Capacity and Minimum BESS Power Rating) during such Project Performance Test in order for such Project Performance Test to be considered valid for purposes of determining the BESS Storage RT Efficiency, and (ii) the BESS and PV Plant must have operated and performed as designed (and must have achieved the Minimum BESS Storage Capacity and the Minimum BESS Power Rating) during such Project Performance Test in order for such Project Performance Test to be considered valid for purposes of determining the BESS RT Efficiency Test.

5.3.3.3 BESS Availability Test

Seller shall cause a Project Performance Test to be performed to measure BESS Availability in accordance with the requirements, standards, and procedures set forth in Article 9 of the main body of the Agreement, Appendix 5, and the other elements of the Performance Standard.

5.3.3.4 BESS Functional Tests

Seller shall conduct functional tests to confirm that the BESS is capable of operation of each primary and secondary function required per Sections 3.4.5.2.1 and 3.4.5.2.2 of this Scope Book, and for all available functions provided per Section 3.4.5.2.3 of this Scope Book.

6 WARRANTY

In addition to the Project Warranty set forth in Article 10 of the main body of the Agreement, and without limiting the requirements or obligations of Seller set forth in Section 5.2 or Article X of the main body of the Agreement or the other elements of the Performance Standard, Seller shall procure warranties from original equipment manufacturers that satisfy the requirements set forth in this Section 6 and the other elements of the Performance Standard. Seller shall notify Buyer of any procedure, activity, or other Work that may void a manufacturer warranty or violate any Law or applicable Permit reasonably in advance of the performance of such procedure, activity, or Work. Seller shall provide to Buyer all original equipment manufacturer warranty documents.

6.1 PV Module Warranty

The PV Modules shall be provided with original equipment manufacturer warranties, including the following (which may commence no sooner than the earlier of (i) the date of completion of installation of the PV Modules or (ii) ninety (90) days after delivery of the PV Modules to the Project Site):

- The product warranty for PV Modules shall warrant that the PV Modules are free from defects in materials, manufacture, workmanship, and design for at least ten (10) years from the warranty commencement date. The PV Module manufacturer shall be required to repair or replace any PV Module in breach of the PV Module product warranty.
- The power output warranty for PV Modules shall warrant the power output of the PV Modules relative to the labeled nameplate power output of the PV Modules, as adjusted only for degradation (with no additional exclusions or other conditionality on coverage), for at least twenty-five (25) years from the warranty commencement date. The annual linear degradation included in the power output warranty shall have a maximum power output degradation of 2.0% within the first year and 0.6% in each year thereafter when measured using Standard Test Conditions. In the event of a breach of the power output warranty, the PV Module manufacturer shall take corrective action at its cost to repair or replace and prevent in subsequent years breaches of the power output warranty.

6.2 Inverter Warranty

The Project inverters shall be provided with an original equipment manufacturer's warranty that the inverters are free from defects in material, manufacture, workmanship, and design, which warranty may commence no sooner than delivery of the inverters to the Project Site and continue for a minimum of five (5) years from the warranty commencement date. The inverter manufacturer shall be required to repair or replace at its cost any inverter (or any component thereof) in breach of such warranty. The inverter warranty shall cover, to the extent applicable, the cost of removal from the Project Site, transportation to and from the repair facility, reinstallation after repairs, and any and all other "in and out" work.

6.3 Transformer Warranty

Subject to Section 6.4, the Project transformers shall be provided with an original equipment manufacturer's warranty that the transformers are free from defects in material, manufacture, workmanship, and design, which warranty shall commence no sooner than the earlier of (i) energization thereof (in which case it shall continue through at least eighteen (18) months thereafter) or (ii) arrival at the Project Site (in which case it shall continue through at least thirty-six (36) months thereafter). The transformer manufacturer shall be required to repair or replace at its cost any transformer (or component thereof) in breach of such warranty. The transformer warranty shall cover the cost of removal from the Project Site, transportation to and from the repair facility, reinstallation after repairs, and any and all other "in and out" work.

6.4 Generator Step-Up Transformer Warranty

The GSU transformer(s) shall be provided with an original equipment manufacturer's warranty that the GSU transformer(s) shall be free from defects in material, manufacture, workmanship, and design for a minimum period of five (5) years from the date of such GSU transformer's energization; provided that, if such GSU transformer has not been energized within six (6) months after delivery thereof to the Project Site, the warranty period shall be at least five (5) years commencing six (6) months after the date of delivery to the Project Site. The GSU transformer manufacturer shall be required to repair or replace at its cost any GSU transformer (or component thereof) in breach of such warranty. The warranty shall cover the cost of removal from the Project Site, transportation to and from the repair facility, reinstallation after repairs, and any and all other "in and out" work.

6.5 Tracker Warranty

The Trackers shall be provided with an original equipment manufacturer's warranty that the Trackers are free from defects in material, manufacture, workmanship, and design for a period of (i) for structural components of the Trackers, at least twenty (20) years from the date of completion of the installation thereof and (ii) for motor, gear, battery, and controller components of the Trackers, at least five (5) years from the date of completion of the installation thereof. The Tracker manufacturer shall be required to repair or replace any Tracker (or component thereof) in breach of such warranty. The warranty shall cover the

cost of removal from the Project Site, transportation to and from the repair facility, reinstallation after repairs, and any and all other "in and out" work.

6.6 Balance of Plant Warranties

All combiner boxes shall be provided with an original equipment manufacturer's warranty that such combiner boxes are free from defects in material, manufacture, workmanship, and design for a period of at least five (5) years from the date of completion of the installation thereof. The combiner box manufacturer shall be required to repair or replace any combiner box (or component thereof) in breach of such warranty. The combiner box warranty shall cover the cost of removal from the Project Site, transportation to and from the repair facility, reinstallation after repairs, and any and all other "in and out" work.

Seller shall ensure that the provider of the LCS software commits to the following:

- Conduct reviews for emerging vulnerabilities that will potentially impact the LCS
- Notify Buyer of new vulnerabilities within a time frame acceptable to Buyer after those vulnerabilities become known
- Develop corrections (patches) to the product to address identified vulnerabilities.

6.7 Battery Energy Storage System Warranty

The BESS shall be provided with an original equipment manufacturer's or BESS contractor's, as applicable, warranty that all equipment, systems, and components included in the BESS are free from defects in material, manufacture, workmanship, and design for a period of at least ten (10) years from the date the Project achieves Substantial Completion. The original equipment manufacturer or BESS contractor, as applicable, shall repair or replace any equipment, system, or component of the BESS in breach of such warranty.

The BESS shall also be provided with an original equipment manufacturer's or the BESS contractor's, as applicable, warranty covering the BESS RT Efficiency, the BESS Power Rating, and the BESS Capacity for a period of ten (10) years from the date the Project achieves Substantial Completion with an option to extend such performance warranty for a twenty (20) years from Substantial Completion. The original equipment manufacturer or the BESS contractor, as applicable, shall repair or replace any equipment, system, or component of the BESS causing the BESS to not meet the requirements of such performance warranty.

The BESS warranty shall cover the cost of removal from the Project Site, transportation to and from the repair facility, reinstallation after repairs, and any and all other "in and out" work.

7 TRAINING

Buyer will identify a project team to be trained by Seller during the design, construction, commissioning, and testing of the Project.

Seller shall provide for Buyer's operation and maintenance staff a training program that includes training for all components and systems of the Project, including use of all related

equipment and software. The training program shall include a training plan, training materials, and presentation schedule designed to ensure a successful training program. The training program shall consist of on-the-job training during different stages of the Project and shall be supplemented by classroom instruction and computer-assisted training.

All training shall be conducted at the Project Site prior to initial operation of the Project or the generation of power therefrom. Each individual shall be assigned a qualification plan and schedule according to his or her designated position within the project team.

All costs of training shall be borne by Seller. Expenses incurred by Buyer's project team to attend training at the Project Site will be borne by Buyer. Seller shall be responsible for any expenses incurred by Buyer's project team for any training that occurs at any alternative locations.

Training shall be held only during normal working days and hours and shall not be held on holidays or weekends or require the need for overtime of Buyer's personnel.

The objective of the training program shall be to train Buyer's personnel to be qualified and self-sufficient in the overall operation, maintenance, and troubleshooting of each system and auxiliary equipment and systems included in the Project.

All presented lectures shall be conducted by personnel having extensive experience both in PV solar plant start-up, operations and maintenance, and training. All training shall include classroom and hands-on field instruction. Additional hard copies and one electronic equivalent of the training manual shall be provided to Buyer.

Scheduling of the training program shall be subject to mutual agreement between Seller and Buyer.

Training shall include:

- Solar resource basics
- Introduction to PV and solar
- Performance modeling basics and software operation
- BESS basics
- Introduction to Project equipment (PV Modules, PCUs, Trackers, the BESS, transformers, switchgear, etc.)
- Plant installation basics
- Inspection and testing basics
- Control system basics
- Interconnection basics.

Without limiting the other terms of this Section 7, training will be provided with respect to the following Project equipment/systems, at a minimum:

- PCUs

- Trackers
- BESS
- LCS
- Met stations
- HV/MV switchgear.

7.1 Training Goals

The goal of the training program is to ensure that Project personnel acquire and maintain the knowledge and skills required to fulfil their responsibilities such that the Project is operated safely, efficiently, and in accordance with the Performance Standard.

7.2 Program Description

Seller shall ensure that the instructors have the knowledge and qualifications to participate in the training program. All instructors must be fluent in both written and spoken English.

The training program shall make up the majority of all training at the Project Site. The routine training program consists of assigning each individual a qualification goal and schedule for accomplishment. Each individual will receive Position Qualification Requirements (PQRs) based on their specific qualification schedule, which shall outline the specific knowledge and demonstrated skill requirements for satisfactorily performing in the required position.

The training plan shall include the following minimum training:

- Overview of the Project and Technology
    - The training will be attended by trainees assigned by Buyer
    - The training will be delivered at the Project Site
    - The training shall cover, at a minimum, the following topics: introduction to PV and BESS, basics of electricity, PCU, rectifiers, transformers, switchgear, Project installation and testing, HSE, control system, measurement of input/output energy, transmission lines (underground and overhead as applicable), etc.
    - Training shall cover all normal and off-normal operating procedures, which Seller shall provide to Buyer
- O&M training during the construction, commissioning, and testing phases
    - The training will be attended by trainees assigned by Buyer
    - The training will be delivered at Project Site
    - The training shall include at least the following topics: Plant operation, O&M philosophy, preventive and corrective maintenance, HSE, quality assurance and control, spare parts philosophy, etc.

Seller shall be responsible for the attendance of all instructors needed to provide proper training for each piece of equipment and system.

8 HEALTH AND SAFETY REQUIREMENTS

8.1 General Requirements

Seller shall prepare and implement a comprehensive Project/Project Site-specific health, safety, and environment policy and associated procedures (HSE Plan) for the performance of the Work. The HSE Plan shall apply at all times during the design, preparation, construction, and operation of the Project and shall be prepared in accordance with, and require compliance with, all Laws (including codes and standards) and applicable Permits and the other elements of the Performance Standard.

Seller shall submit to Buyer at least one hundred twenty (120) days prior to the Construction Commencement Date an initial HSE Plan that demonstrates Seller's commitment to the highest standards of health and occupational hygiene of the construction workforce during the development, construction, operation, maintenance, and repair of the Project. Buyer shall provide its comments to the initial proposed HSE Plan, if any, to Seller within forty-five (45) days after Buyer's receipt of the initial proposed HSE Plan from Seller and within ten (10) Business Days after Buyer's receipt of any modification to a proposed HSE Plan from Seller, and Seller shall, in each case, consider in good faith timely comments from Buyer on the proposed HSE Plan. Without limiting Section 4.1(c) of the main body of the Agreement or the other elements of the Performance Standard, Seller shall be responsible for implementing, complying with, and enforcing, and performing the Work in accordance with, the approved HSE Plan. Seller shall not commence Work at the Project Site until the HSE Plan has been approved by Buyer. Buyer shall not unreasonably withhold, condition, or delay its approval of an HSE Plan.

The HSE Plan shall address and include pertinent information regarding any known or reasonably anticipated safety issues arising out of the Work on the Project Site, including the equipment to be incorporated into the Project (such as, for example, how to properly handle generated and stored energy in emergencies) and operation of the Project prior to Substantial Completion. Without limiting the foregoing, the HSE Plan also shall set forth Seller's detailed plan for addressing Environmental risks and challenges that may arise during the construction, commissioning, testing, operation, maintenance, and repair phases of the Project.

The Project shall be designed and HSE Plan (and Security Plan) developed to minimize the risk of injury to personnel and to the public during performance of the Work, including during the use, operation, maintenance, repair, and replacement of the Project or components thereof.

Seller shall ensure that guidelines and policies for maintaining hygienic conditions and appropriate shelter or shading at eating, resting, drinking, washing facilities, and restrooms are established and adhered to by individuals at the Project Site.

The Project shall be designed to cease to energize and trip off in the event of a grid power outage. In such circumstance, the Project shall cease to energize, trip off, and physically

isolate from the interconnected grid to prevent interaction with the grid (nominal auxiliary load contactors may continue to serve these loads). This shutdown/isolation mode includes both normal shutdown and system trips requiring reset.

Hazardous areas on or at the Project Site shall be identified and marked as such, and Seller shall select and install suitable equipment for use in such areas.

8.1.1 Fire Protection and Firefighting Systems

The fire alarm and detection systems and the fire protection and firefighting systems for the Project shall include the systems required to meet local and National Fire Protection Association (NFPA) Standards.

- All fire alarms shall be arranged to annunciate at a constantly attended location on a main fire alarm control panel. Local panels may be installed in addition to the main panel as required or appropriate.
- If the Project's local panels and main fire alarm panel are installed by multiple Contractors or Subcontractors, one of the Contractors or Subcontractors shall be designated in writing as responsible for the integration of all remote alarms to the main fire alarm panel and such record shall be transferred to Buyer at the Closing
- Each fire alarm shall be readily accessible for inspection, testing, maintenance, repair, and replacement and installed in accordance with the Performance Standard
- All communications (network) wiring shall be Class A; individual detection circuits may be Class B
- The main fire alarm control panel shall have the capability to serve a minimum of 500 fire alarms and to create and store an accurate, comprehensible, electronically retrievable historical record of the activation and performance of such alarms.

Smoke and/or heat detection systems at the Project shall be provided in accordance with NFPA 72 and where recommended by NFPA 850, specifically, but not limited to, the following areas as applicable:

- Air aspirating early warning smoke detection (e.g., VESDA) shall be provided in areas with critical electronic equipment (e.g., computer rooms/DCS servers, BESS)
- Control rooms shall have smoke detection installed throughout the control room in the spaces that may contain humans, below raised floor systems, and above suspended ceilings
- In control rooms that are or may be occupied 24/7, the detection in the operating spaces may be omitted
- Control room break areas
- In-duct detectors shall be used for ventilation systems in occupied buildings

- Switchgear rooms and relay rooms
- Battery rooms
- Warehouses and buildings.

The Project shall be designed and built with a safe operating environment for equipment and personnel. Seller shall select and install equipment and systems for the Project in accordance with such obligation and separate equipment and systems at the Project Site with sufficient distance, clearance, and other safeguards to mitigate hazards and risks, including fire. The Project shall comply with all fire protection, fire alarm, firefighting, and similar Laws (including codes and standards), applicable Permits, the NFPA (including NFPA 850 and NFPA 855), and the other elements of the Performance Standard.

Miscellaneous site support structures such as warehouses, oil storage buildings, vehicle maintenance facilities, bulk compressed gas storage, or other facilities not specifically mentioned above in this Section 8.1.1 shall be evaluated for the need for or appropriateness of automatic fire, smoke, and heat detection systems and equipment and for water-based fire suppression systems in accordance with applicable codes and standards and the other elements of the Performance Standard.

Miscellaneous site structures shall be separated from other important plant structures and equipment in accordance with NFPA 80A.

Different firefighting systems shall be adopted according to the operational characteristics of the particular areas and improvements on and near the Project Site to be protected.

Seller shall coordinate the firefighting plan, system, and solutions for the Project and the Project Site with the local fire department, and shall obtain approval of the same from Buyer.

Portable fire extinguishers shall be provided at strategic locations in accordance with NFPA 10 and the Performance Standard.

- Sensitive electronic equipment areas (BESS, control room/DCS servers/computer room, etc.) shall have an ABC-rated clean agent, Halotron, water mist, or other effective agent that does not leave a residue after use. Dry chemical extinguishers shall not be used in these areas.
- General electrical hazard areas shall utilize CO_2 or a clean agent extinguisher sized appropriately for the hazard. Dry chemical extinguishers shall not be used for general electrical hazards
- General areas and oil hazard areas may use any suitable ABC-rated extinguisher, including dry chemical
- Extinguishers shall be located as follows:
    - Near entrances and/or exits to an area
    - Extinguishers in occupied buildings (warehouse, control room, DCS server/computer room, electrical distribution, etc.), if applicable, shall be

located, at a minimum, at each exit door, with additional extinguishers in the interior spaces if required to meet NFPA 10 travel distances.

8.1.2 Safety Rules and Procedures

Without limiting the Performance Standard, the Work shall be performed and completed in accordance with the HSE Plan and Site Security Plan. Any safety rules and procedures required for any specific activities of the Work shall be included in the HSE Plan.

8.2 Arc Flash Hazard Analysis Study/Calculation

Seller shall perform in accordance with IEEE Standard 1584 an arc flash hazard analysis study/calculation for all equipment installed pursuant to the Agreement. Arc flash hazard incident energy levels shall be limited to 8 cal/sq.cm. Arc flash hazard reduction maintenance systems may be utilized to achieve the required levels. Where 8 cal/sq.cm levels cannot be achieved, site-specific operation and maintenance procedures shall be required to address Project equipment clearance requirements.

Labeling that lists arc flash incident energy exposure levels, including instructions on disconnecting devices required for the replacement of battery modules, shall be provided in accordance with the Performance Standard.

8.3 Signage

All necessary safety signs and warnings described in ANSI Z535-2002 (entire series from Z535.1 through Z535.6) shall be included on Project Site fencing and each enclosure and any other buildings at the Project Site. All necessary signs and warnings for identification of Hazardous Substances as described in NFPA 704 shall be included in accordance with the Performance Standard on the fencing, each building, and any other enclosure at the Project Site.

8.4 Community Relations

Seller shall manage for community relations with respect to the Project through Substantial Completion (except as otherwise directed by Buyer after the Closing). Seller shall use best efforts to undertake such works and other activities as necessary or advisable to engender and maintain, and shall perform the Work and its other obligations under the Agreement in a manner that is intended to engender and maintain, a positive perception of the Project within, and a harmonious relationship with, the surrounding community, such that Buyer could reasonably be expected to inherit that perception and relationship at the Closing and thereafter preserves the same through Substantial Completion and, to the extent based on Seller's or the Seller Service Providers' acts or omissions, thereafter.

9 DOCUMENTATION TO BE SUBMITTED PRIOR TO COMPLETION OF THE DESIGN AND ENGINEERING PHASE

9.1 Documentation to be Submitted During Project Design (Documents Issued for Construction)

Without limiting Seller's obligation to provide other documents required to be delivered under this Scope Book or the Agreement, Seller shall prepare and submit to Buyer the following documents during the design and engineering phase of the Project:

- Monthly progress reports in accordance with Section 6.2 of the main body of the Agreement
- Drawings and documents provided with Permit applications in accordance with Section 5.5(c) of the main body of the Agreement and copies of all correspondence exchanged prior to and after the Closing Date between or on behalf of Seller and any Governmental Authority with respect to the Project
- Subject to Section 4, the final Energy Model, including
    - All PVsyst project files, inputs, and parameters
    - 25-year estimates
    - P50-90 estimates
- Project documents, including:
    - General arrangement and layout drawings
    - Plans, sections, and details for each system
    - Underground arrangement drawings (mechanical, electrical, and civil)
    - Electrical Diagrams for each system (single line diagrams, three-line diagrams and elementary diagrams)
    - Cable layouts
    - Grading and drainage drawings
    - Foundation drawings
    - Specifications and datasheets
- Site studies (geotechnical, hydrological, etc.)
- The initial, baseline Environmental Assessment (subject to Section 7.1(a)(xv) of the main body of the Agreement)
- System description of the main systems for the Project
- Start-up and shut-down diagrams
- Project Schedule showing, among other things, design and engineering work, procurement, and delivery of major equipment, FAT of major equipment, site surveys and studies, site preparation, construction activities, commissioning activities, and performance tests
- Preliminary Commissioning Program with procedures for respective tests and activities

- The Project Performance Test procedures
- Preliminary O&M philosophy
- The site-specific fire protection design basis in accordance with NFPA 850, Chapter 4, including:
    1. Plant name/location information
    2. Plant location
    3. Responsible fire protection engineer
    4. Table of Contents
    5. Stakeholders
    6. General fire protection philosophies
    7. Assumptions
    8. Site-specific information
    9. Source documents
    10. Plant layout (description of fire areas)
    11. Water supply (fire protection water storage, fire pumps, mains, hydrants, etc.)
    12. Hazards
    13. Administrative controls.

9.2 Documentation to be Submitted During Project Construction

Without limiting any other documents required to be delivered under the Agreement or this Scope Book, Seller shall prepare and submit to Buyer the following documents from and after the Construction Commencement Date through Substantial Completion:

- Monthly progress reports in accordance with Section 6.2 of the main body of the Agreement, including:
    - Engineering, procurement and construction activities
    - HSE information (near misses, incidents, accidents, training, etc.)
    - Updated Project schedule including lookahead for coming month
    - Visual report of completed activities using layout drawings and photographs
- Copy of all Project Work Permits and Project Operational Permits when obtained
- Final Commissioning Program
- Final Performance Test Procedure
- Final O&M Philosophy.

9.3 Documentation to be Submitted at Substantial Completion Payment Date

Without limiting any other documents required to be delivered under the Agreement or this Scope Book, Seller shall prepare and submit to Buyer the following documents prior to Substantial Completion:

- Draft As-Builts for all drawings and documents submitted during the engineering and design phase and during Project construction as described above with final As-Builts to be delivered as a condition to Final Completion
- Test Results
    - Factory Acceptance Test Results and Certificates for key equipment, including those listed in Section 5.2 of this Scope Book
    - Arch/Flash Test Results and Certificates
    - Project Performance Test Results and Certificate
- A Project operation and maintenance manual, including all OEM manuals and related documentation
- Reports and Other Documents
    - All Permits
    - All signed and approved design change requests
    - All site study reports (geotechnical, hydrological, EIA, etc.)
    - Training manuals
    - Punchlist in accordance with Section 7.5(b) of the main body of the Agreement, including the agreed Punchlist Holdback Amount
    - Invoices
    - Records.

End of Scope Book Main Body

Appendix 1: Performance Guarantees

PERFORMANCE GUARANTEES				
Nº	**CHARACTERISTICS**	**UNITS**	**DATA**	**NOTES**
1	**MINIMUM CRITERIA**			
1.1	Guaranteed PV Plant Capacity (@ Electrical Interconnection Point (EIP))	MWac		
1.2	Minimum PV Plant Capacity (@ EIP)	MWac		95% of Guaranteed PV Plant Capacity
1.3	Minimum PV Plant Availability (Required / As Bid)	%	99% /	
1.5	Guaranteed BESS Power Rating (@ EIP)	MWac		
1.6	Minimum BESS Power Rating (@ EIP)	MWac		95% of Guaranteed BESS Power Rating
1.7	Guaranteed BESS Energy Storage Capacity (@ EIP)	MWh ac		
1.8	Minimum BESS Storage Capacity (@ EIP)	MWh ac		95% of Guaranteed BESS Storage Capacity
1.9	BESS RT Efficiency (@ BESS)	%		
1.10	Minimum BESS RT Efficiency (@ BESS)	%		95% of Guaranteed BESS RT Efficiency
1.11	Minimum BESS Availability (Required / As Bid)	%	99% /	
1.12	Long-Term BESS Availability (Required / As Bid)	%	97% /	

Appendix 2: Energy Model

The following table sets forth certain inputs to and results from the Energy Model (PVsyst):

PERFORMANCE MODEL				
Nº	**CHARACTERISTICS**	**UNITS**	**DATA**	**NOTES**
1	**REFERENCE SITE CONDITIONS**	-		
1.1	Global Horizontal Irradiation (GHI) @ ground level	kWh/m²		
1.2	Diffuse Horizontal Irradiation (DHI) @ ground level	kWh/m²		
1.3	Ambient temperature	°F		
1.4	Altitude (above sea level)	Ft		
2	**WEATHER DATA**	-		
2.1	Data source	-		
2.2	Period of data collection	Years		
2.3	Distance from site or spatial resolution	Km		
2.4	Uncertainty	%		
3	**MODEL PARAMETERS**	-		
3.1	Installed Capacity (DC)	kWp		Total peak DC power
3.2	Nominal Power (AC)	kW		Total nominal inverter output
3.3	Nominal Power at POI (AC)	kW		
3.4	DC/AC ratio	-		
3.5	**PV Modules**	-		
3.5.1	PV module manufacturer and model	-		
3.5.2	PV module power at STC	Wp		
3.5.3	Technology	-		
3.5.4	Number of PV Modules per string	-		
3.5.5	Total number of PV Modules installed	-		
3.5.6	Total number of strings	-		
3.6	**Inverters**	-		

PERFORMANCE MODEL				
Nº	**CHARACTERISTICS**	**UNITS**	**DATA**	**NOTES**
3.6.1	Inverter manufacturer and model	-		
3.6.2	Input voltage rating	VDC		
3.6.3	Number of strings per inverter	-		
3.6.4	Number of inverters	-		
3.7	**Mounting System**	-		
3.7.1	Tilt angle of fixed tilt system or rotation limits of tracking system	º		
3.7.2	Backtracking	Yes / No		
3.7.3	Orientation of PV Modules (azimuth)	º		
3.7.4	Installation type (portrait / landscape)	-		
3.7.5	Rows and columns per mounting structure	- x -		
3.7.6	Ground Coverage Ratio	%		
3.8	**Array losses**	-		
3.8.1	Module quality loss	%		
3.8.2	Module mismatch losses	%		
3.8.3	String mismatch losses	%		
3.8.4	Light induced degradation losses	%		
3.8.5	IAM losses defined by manufacturer	Yes / No		
3.8.6	Constant thermal loss factor	$W/m^2/k$		
3.8.7	Wind loss factor	$W/m^2/k/m/s$		
3.8.8	Soiling losses	%		
3.8.9	Spectral correction applied	Yes / No		
3.9	**Cabling**	-		
3.9.1	DC ohmic losses @STC (Max/Calculated)	%		
3.9.2	AC ohmic losses @STC (Max/Calculated)	%		
3.10	**Transformers**	-		
3.10.1	Transformer type	-		
3.10.2	Number of transformers	-		
3.10.3	Iron losses	%		
3.10.4	Resistive losses @ STC	%		

PERFORMANCE MODEL					
Nº	**CHARACTERISTICS**	**UNITS**	**DATA**		**NOTES**
3.11	**System losses**	-			
3.11.1	First year degradation	%			
3.11.2	Annual degradation	%			
3.11.3	Light soaking effect	%			
3.11.4	Inverter losses	%			
3.11.5	Auxiliary losses	%			
3.11.6	Unavailability	%			
3.12	Combined Uncertainty	%			
4	**ANNUAL PERFORMANCE RESULTS**	-	**PVsyst Results**	**Final Results**	Final Results include all post-processing
4.1	Net electricity production	-			
4.1.1	Year 1, P50	MWh/yr			
4.1.2	Year 1, P90	MWh/yr			
4.1.3	25-year average, P50	MWh/yr			
4.2	Specific Yield (first year, P50)	kWh/kWp/yr			
4.3	Performance Ratio (first year, P50)	%			
4.4	Document number of the attached calculation/report	-			

Appendix 3: Design and Operational Data

The following table sets forth certain design and operational requirements for the overall Project.

DESIGN AND OPERATIONAL DATA				
Nº	**CHARACTERISTICS**	**UNITS**	**DATA**	**NOTES**
1	**DESIGN CONDITIONS**	-		
1.1	Design lifetime of the plant (Required / As Bid)	years	25 /	
1.2	Average elevation	ft a.s.l		
1.3	Ambient Temperature Recorded (Minimum/Average/Maximum)	°F		
1.4	Design Temperature for Operation (Minimum/Maximum)	°F		
1.5	Design Relative Humidity	%		
1.6	Design wind speed (per ASCE 7, Risk Category III)	mph		If equipment selection is to be based on 10-minute mean wind velocity at 10 m above ground level, a correlation factor of 0.67 with 3 second gust may be used. Category C surface roughness as per ASCE shall be considered.
1.7	Rainfall (Annual Avg/Annual Max/1-day Max)	in		
1.8	Typical meteorological year (GHI)	W/m²		
1.9	Seismic Zone	-		Zone and ground acceleration values shall be confirmed by the geotechnical study.
1.10	Available Area required (approx.)	acres		
2	**GENERAL PLANT DATA**	-		
2.1	PV technology type	-		
2.2	Installed Capacity (total DC peak power)	MWp		
2.3	Nominal Power (AC) (total nominal inverter output)	MW		
2.4	Nominal Power at POI (AC)	MW		
2.5	DC/AC ratio	-		
2.6	Auxiliary Power (Average/Peak)	MW		

DESIGN AND OPERATIONAL DATA				
Nº	**CHARACTERISTICS**	**UNITS**	**DATA**	**NOTES**
2.7	Annual Auxiliary Power	MWh		Year 1 based on TMY
2.8	Total area covered by PV arrays	acres		
2.9	Total area of Project	acres		
2.10	Row to row spacing	ft		
2.11	Ground Coverage Ratio	%		
2.12	Shading losses due to internal row spacing	%		
2.13	Total number of PV panels	Qty		
2.14	Total number of strings	Qty		
2.15	Total number of racking system tables	Qty		
2.16	Total number of combiner boxes	Qty		
2.17	Total number of inverters	Qty		
2.18	Total number of batteries/enclosures	Qty		
2.19	Total number of LV/MV transformers	Qty		
2.20	Total number of MV/HV transformers	Qty		
3	**MONTHLY PERFORMANCE RATIOS**	-		
3.1	January	%		
3.2	February	%		
3.3	March	%		
3.4	April	%		
3.5	May	%		
3.6	June	%		
3.7	July	%		
3.8	August	%		
3.9	September	%		
3.10	October	%		
3.11	November	%		
3.12	December	%		
3.13	PR Base	%		
4	**YEARLY PERFORMANCE RATIOS**	-		
4.1	Year 1	%		
4.2	Year 2	%		
4.3	Year 3	%		
4.4	Year 4	%		

DESIGN AND OPERATIONAL DATA				
Nº	**CHARACTERISTICS**	**UNITS**	**DATA**	**NOTES**
4.5	Year 5	%		
4.6	Year 6	%		
4.7	Year 7	%		
4.8	Year 8	%		
4.9	Year 9	%		
4.10	Year 10	%		
4.11	Year 11	%		
4.12	Year 12	%		
4.13	Year 13	%		
4.14	Year 14	%		
4.15	Year 15	%		
4.16	Year 16	%		
4.17	Year 17	%		
4.18	Year 18	%		
4.19	Year 19	%		
4.20	Year 20	%		
4.21	Year 21	%		
4.22	Year 22	%		
4.23	Year 23	%		
4.24	Year 24	%		
4.25	Year 25	%		
5	**ANNUAL DEGRADATION FACTOR**	-		
5.1	Year 1	%		
5.2	Year 2	%		
5.3	Year 3	%		
5.4	Year 4	%		
5.5	Year 5	%		
5.6	Year 6	%		
5.7	Year 7	%		
5.8	Year 8	%		
5.9	Year 9	%		
5.10	Year 10	%		
5.11	Year 11	%		
5.12	Year 12	%		
5.13	Year 13	%		
5.14	Year 14	%		
5.15	Year 15	%		
5.16	Year 16	%		
5.17	Year 17	%		
5.18	Year 18	%		

DESIGN AND OPERATIONAL DATA				
Nº	**CHARACTERISTICS**	**UNITS**	**DATA**	**NOTES**
5.19	Year 19	%		
5.20	Year 20	%		
5.21	Year 21	%		
5.22	Year 22	%		
5.23	Year 23	%		
5.24	Year 24	%		
5.25	Year 25	%		
6	**YEARLY PRODUCTION**	**-**		
6.1	Year 1	MWh/yr		
6.2	Year 2	MWh/yr		
6.3	Year 3	MWh/yr		
6.4	Year 4	MWh/yr		
6.5	Year 5	MWh/yr		
6.6	Year 6	MWh/yr		
6.7	Year 7	MWh/yr		
6.8	Year 8	MWh/yr		
6.9	Year 9	MWh/yr		
6.10	Year 10	MWh/yr		
6.11	Year 11	MWh/yr		
6.12	Year 12	MWh/yr		
6.13	Year 13	MWh/yr		
6.14	Year 14	MWh/yr		
6.15	Year 15	MWh/yr		
6.16	Year 16	MWh/yr		
6.17	Year 17	MWh/yr		
6.18	Year 18	MWh/yr		
6.19	Year 19	MWh/yr		
6.20	Year 20	MWh/yr		
6.21	Year 21	MWh/yr		
6.22	Year 22	MWh/yr		
6.23	Year 23	MWh/yr		
6.24	Year 24	MWh/yr		
6.25	Year 25	MWh/yr		

Appendix 4: Key Equipment Datasheets

The following tables detail the design requirements for the designated Project equipment.

PV MODULE				
Nº	**CHARACTERISTICS**	**UNITS**	**DATA**	**NOTES**
1	**GENERAL**	-		
1.1	Manufacturer	-		
1.2	Type/Model	-		
1.3	Cell type	-		
1.4	Cell configuration	-		
1.5	Intellectual Properties	-		List any IPs
1.6	Design - manufacture standards	-		
1.7	Name of datasheet attached	-		
2	**ELECTRICAL DATA**	-		
2.1	Nominal maximum power	W		
2.2	Power tolerance	W		
2.3	Cell efficiency	%		
2.4	Module efficiency	%		
2.5	Rated voltage (Vmp)	V		
2.6	Rated current (Imp)	A		
2.7	Open-Circuit voltage	V		
2.8	Short-Circuit voltage	V		
2.9	Maximum system voltage	VDC		
2.10	Series fuse rating	A		
2.11	Annual degradation factor	%		
2.12	Grounding requirements	-		
3	**TEMPERATURE CHARACTERISTICS**	-		
3.1	Power	%/K		
3.2	Voltage	%/K		
3.3	Current	%/K		
3.4	NOCT	ºF		
4	**MECHANICAL DATA**			
4.1	Cell type	-		
4.2	Cell arrangement	-		
4.3	Dimensions	in		
4.4	Front cover	-		
4.5	Frame material, if applicable	-		
4.6	Junction box	-		
4.7	Cable	-		
4.8	Weight	lbs		
5	**TESTED OPERATION CONDITIONS**	-		

PV MODULE				
Nº	**CHARACTERISTICS**	**UNITS**	**DATA**	**NOTES**
5.1	Operating temperature	ºF		
5.2	Max load	-		
5.3	Impact resistance	-		
6	**WARRANTIES**	-		
6.1	Product warranty period (Required / As Bid)	yrs	10 /	
6.2	Power warranty (Required / As Bid)	yrs	25 /	
6.3	Certifications	-		
1 - Seller is allowed to add/include information considered important.				
2 - Electrical Data in Standard Test Conditions (STC)				

INVERTER				
Nº	**CHARACTERISTICS**	**UNITS**	**DATA**	**NOTES**
1	**GENERAL**	-		
1.1	Manufacturer	-		
1.2	Type/Model	-		
1.3	Nº machines	-		
1.4	Intellectual Properties	-		List any IPs
1.5	Design - manufacture standards	-		
1.6	Name of datasheet attached	-		
2	**INPUT RATING**	-		
2.1	Rated power	kW		
2.2	Max. DC Input voltage	V		
2.3	MPP voltage range	V		
2.4	Max. input current	A		
2.5	Nº DC inputs pairs	-		
2.6	Input fuse rating	A		
2.7	Nº of MPP trackers	-		
2.8	Input overvoltage protection	-		
3	**OUTPUT RATING**	-		
3.1	Rated output power	kW		
3.2	Rated grid voltage	V		
3.3	Voltage range	V		
3.4	Max. output current	A		
3.5	Contributory fault current	A		
3.6	Rated frequency	hz		
3.7	Nominal power factor and adjustable range	%		
3.8	THD (rated power)	%		
3.9	Output fuse rating	A		
3.10	Output overvoltage protection	-		
4	**OPERATING PERFORMANCE**	-		
4.1	Maximum efficiency	%		
4.2	European weighted efficiency	%		
4.3	CEC weighted efficiency	%		
4.4	Max. standby consumption	W		
4.5	Max. self-consumption (operation)	W		
5	**ENVIRONMENT**	-		
5.1	Operating temperature range	ºF		
5.2	Noise level	dBA		
5.3	Maximum installation altitude without derating	ft a.s.l		
5.4	Maximum acceptable temperature at Pn	ºF		
5.5	Installation type	indoor / outdoor		

INVERTER				
Nº	**CHARACTERISTICS**	**UNITS**	**DATA**	**NOTES**
5.6	Dimensions/machine (width/height/depth)	-		
5.7	Weight/machine	lbs		
5.8	Galvanic isolation	-		
6	**COOLING**	-		
6.1	Cooling method	-		
6.2	Cooling air requirement	cfm		
6.3	Heating system	-		
7	**OTHERS**	-		
7.1	Communication	-		
7.2	Emergency stop	-		
7.3	Positive earth soft connection	-		
7.4	External auxiliary power for inverter machine	-		
7.5	Additional circuits for tracker motors	-		
7.6	Disconnect parameter adjustable	-		
7.7	All pole sensitive RCB	-		
7.8	Isolation monitoring	-		
7.9	Overload behavior	-		
7.10	Internal DC switch	-		
8	**WARRANTIES**	-		
8.1	Product warranty period (Required / As Bid)	yrs	5 /	
8.2	Certifications	-		
1 - Seller is allowed to add/include information considered important.				
2 – Seller to complete for each type of inverter used on the Project, including PV inverter station and BESS converters/inverters.				

TRACKER				
Nº	**CHARACTERISTICS**	**UNITS**	**DATA**	**NOTES**
1	**GENERAL**	-		
1.1	Manufacturer	-		
1.2	Type	Fixed / Tracking		
1.3	Intellectual Properties	-		List any IPs
1.4	Design - manufacture standards	-		
1.5	Name of datasheet attached	-		
2	**BASIC DATA**	-		
2.1	Ground Coverage Ratio	%		
2.2	Type of foundations	-		
2.3	Type of supporting profiles	-		
2.4	Foundation solution drawing attached	Dwg file name		
2.5	Corrosion protection	Yes / No		
2.6	Type of corrosion protection	-		
2.7	Design wind speed (per ASCE 7, Risk Category III)	mph		See Design and Operational Data Sheet No. 1.6
2.8	Wind tunnel study results attached	name file		
2.9	Tilt	º		
2.10	Module positions	landscape / portrait		
2.11	Module arrangement	-		
2.12	kWp per table	kWp		
2.13	Number or tables	-		
2.14	Dimensions (length/width/height)	in		
2.15	Steel quality (yield strength / Tensile strength)	psi		
2.16	Concrete quality (compression strength)	psi		
2.17	Certifications and Standards	-		
3	**TRACKER SYSTEM**	-		
3.1	Maximum slope	-		
3.2	Type of tracking system	-		
3.3	Tracking range	º		
3.4	Backtracking	Yes / No		
3.5	Rows per tracker actuator	-		
3.6	Strings per row	-		
3.7	Power per tracker	kWp		
3.8	Drive type	-		
3.9	Power consumption	kWh/MWp/yr		

TRACKER				
Nº	**CHARACTERISTICS**	**UNITS**	**DATA**	**NOTES**
3.10	Stow Wind Speed	mph		
3.11	Motors per MWp	-		
4	**WARRANTIES**	-		
4.1	Manufacturer's material & workmanship (Required / As Bid)	yrs	20 /	
4.2	Motor, gear, battery, controller (Required / As Bid)	yrs	5 /	
4.3	Certifications	-		
1 - Seller is allowed to add/include information considered important.				

LV/MV TRANSFORMER				
Nº	**CHARACTERISTICS**	**UNITS**	**DATA**	**NOTES**
1	**GENERAL**	-		
1.1	Manufacturer	-		
1.2	Type/Model	-		
1.3	Nº of units	-		
1.4	Intellectual Properties	-		List any IPs
1.5	Design - manufacture standards	-		
1.6	Name of datasheet attached	-		
2	**TRANSFORMER CHARACTERISTICS**	-		
2.1	Type of Transformer	-		
2.2	3 x single phase or three-phase	-		
2.3	Core or shell	-		
2.4	Type of tank	-		
2.5	Type of cooling	-		
2.6	Vector group	-		
2.7	Winding material LV/HV	Al/Cu		
2.8	Rated frequency	hz		
2.9	Transformer life value at IEC conditions	-		
2.10	Rated power based @ 20ºC	kW		
2.11	Higher grid voltage	kV		
2.12	Insulation voltage level	kV		
2.13	Short duration withstand voltage	kV		
2.14	Test voltage (60 hz 1min)	kV		
2.15	Transformation ratio	-		
2.16	Primary rated current	A		
2.17	First Secondary rated current	A		
2.18	Second Secondary rated current	A		
2.19	Primary no load current	A		
2.20	Excitation current (rated V/110% rated V)	A		
2.21	Maximum inrush current HV	A		
2.22	Maximum withstand short-circuit current	kA		
2.23	Duration of short-circuit current	s		
2.24	Tappings	-		See Section 3.4.3.4 of Scope Book
2.25	Load losses at 75ºC	W		
2.26	No-load losses	W		
2.27	Short-circuit impedance	%		
2.28	Environmental class	-		
2.29	Climatic class	-		
2.30	Fire behavior class	-		

LV/MV TRANSFORMER				
Nº	**CHARACTERISTICS**	**UNITS**	**DATA**	**NOTES**
2.31	Thermal class	-		
2.32	Dimensions (width/height/depth)	in		
2.33	Weight of complete transformer	lbs		
3	**ACCESSORIES**	-		
3.1	Accessories oil type	-		
3.2	Shock tightness degree	-		
3.3	Salt-fogtight	-		
3.4	Tª resistance	-		
3.5	Max. Rated pressure	-		
3.6	Pressure range	-		
3.7	Oil level	-		
3.8	Tª range	-		
3.9	PT 100, Dry type	-		
3.10	Tª range	-		
3.11	Output signal	-		
3.12	Other technical characteristics	-		
4	**OTHERS**	-		
4.1	Temperature rising windings	ºF		
4.2	Terminals (location)	-		
4.3	LV	-		
4.4	MV	-		
4.8	Accessories	-		
5	**WARRANTIES**	-		
5.1	Product Warranty Period (Required / As Bid)	mo	18-36 /	See Section 6.3
1 - Seller is allowed to add/include information considered important.				
2 – Seller to complete for each type of LV/MV transformer used on the Project, including inverter station transformers and BESS transformers.				

GSU TRANSFORMER						
Nº	**CHARACTERISTICS**	**UNITS**	**DATA**			**NOTES**
1	**GENERAL**	-				
1.1	Manufacturer	-				
1.2	Place of manufacture	-				
1.3	Identification	-				
1.4	Type/Model	-				
1.5	Nº of units	-				
1.6	Design - manufacture standards	-				
1.7	Name of datasheet attached	-				
2	**TRANSFORMER CHARACTERISTICS**	-				
2.1	Type of transformer	-				
2.2	Installation	-				
2.3	Rated frequency	-				
2.4	Number of phases	-				
2.5	Number of windings	-				
2.6	Winding material	-				Must be Copper
2.7	Cooling class	-				
2.8	Sound level at 3 ft	dB				
2.9	Impedance at ONAN MVA and rated Volts	%				
2.10	Transformer connection group	-				
2.11	Unusual Service Conditions	-				
3	**CAPACITY**	-				
3.1	Base rating	MVA				
3.2	1st stage fans	MVA				
3.3	2nd stage fans	MVA				
4	**WINDING DATA**	-	Primary (H)	Secondary (X)	Tertiary (Y)	
4.1	Voltage rating	kV				
4.2	Transformer internal ANSI BIL	kV				
4.3	Transformer bushing ANSI BIL	kV				
4.4	Neutral BIL	kV				
4.5	Winding connection	-				
5	**TERMINAL FEATURES**	-	Primary (H)	Secondary (X)	Tertiary (Y)	
5.1	Bushing location	-				
5.2	Aerial conductor	-				

GSU TRANSFORMER						
Nº	**CHARACTERISTICS**	**UNITS**	**DATA**			**NOTES**
5.3	Cable	-				
5.4	Iso phase bus	-				
5.5	Non-Segregated phase bus	-				
5.6	Lightning arrestors	-				
5.7	Bushing CT 1 ratio	-				
5.8	Accuracy class CT 1	-				
5.9	Bushing CT 2 ratio	-				
5.10	Accuracy class CT2	-				
5.11	Bushing CT 3 ratio	-				
5.12	Accuracy class CT 3	-				
5.13	Bushing CT 4 ratio	-				
5.14	Accuracy class CT4	-				
5.15	Neutral CT ratio	-				
5.16	Accuracy class	-				
6	**INSTRUMENTS**	-	Alarm Set Points	Minimum Sets of Contacts per Set Point		
6.1	Oil Level	-				
6.2	Oil temperature	-				
6.3	Winding hot spot	-				
6.4	Sudden pressure	-				
6.5	Pressure relief device	-				
6.6	Hydran	-				
7	**SYSTEM DATA**	-				
7.1	Utility tie	MVA				
7.2	Utility tie	V				
7.3	MVA/HP	MVA				
7.4	MVA/HP	HP				
7.5	Inrush/Xd" of generator	%				
7.6	Inrush/Xd" of largest motor started	%				
8	**ACCESSORIES**	-	Primary (H)	Secondary (X)	Tertiary (Y)	
8.1	Neutral grounding transformer	Yes / No				
8.2	Liquid temperature indicator	Yes / No				
8.3	Winding temperature indicator	Yes / No				
8.4	Liquid level indicator	Yes / No				
8.5	Tap changer (de-energized)	Yes / No				

GSU TRANSFORMER						
Nº	**CHARACTERISTICS**	**UNITS**	**DATA**			**NOTES**
8.6	Pressure relief device	Yes / No				
8.7	Sudden pressure relay	Yes / No				
8.8	Upper fill valves	Yes / No				
8.9	Drain and filter valves	Yes / No				
8.10	Buckholtz relay	Yes / No				
8.11	Vacuum/pressure gauge	Yes / No				
8.12	Key interlock	Yes / No				
8.13	Impact recorder	Yes / No				
8.14	Oil preservation system	Yes / No				
9	**WARRANTIES**	-				
9.1	Product Warranty Period (Required / As Bid)	yrs	5 /			
1 - Seller is allowed to add/include information considered important.						

MEDIUM VOLTAGE SWITCHGEAR				
Nº	**CHARACTERISTICS**	**UNITS**	**DATA**	**NOTES**
1	**GENERAL**	-		
1.1	Manufacturer	-		
1.2	Type/Model	-		
1.3	Nº machines	-		
1.4	Design - manufacture standards	-		
1.5	Name of datasheet attached	-		
2	**RATINGS**	-		
2.1	Rated voltage	kV		
2.2	Insulated rated voltage	kV		
2.3	Rated frequency	hz		
2.4	Rated short-duration power-frequency withstand voltage	kV		
2.5	Rated lightning impulse withstand voltage	kV		
2.6	Rated short-circuit breaking current, max.	kA		
2.7	Rated short-time withstand current, 3s, max.	kA		
2.8	Rated short-circuit making current, max.	kA		
2.9	Rated peak withstand current, max.	kA		
2.10	Rated main busbar current	A		
2.11	Rated normal current of feeder, circuit-breaker, max.	A		
2.12	Rated normal current of feeder, switch-disconnector	A		
2.13	Rated normal current of feeder, switch-disconnector with fuses	A		
2.14	Degree of protection standard	-		
3	**GENERAL CHARACTERISTICS**	-		
3.1	Cubicle Type	-		
3.2	CB extinguishing agent	-		
3.3	Electric arc classification acc. to IEC 62271-200	-		
3.4	Cooling system	-		
3.5	Number of cubicles	-		
3.6	Double cable busbar riser cubicles	-		
3.7	Transformer protection cubicles	-		
3.8	Operation temperature	ºF		
3.9	Operation altitude	ft a.s.l		
3.10	Interlock system	-		

MEDIUM VOLTAGE SWITCHGEAR				
Nº	**CHARACTERISTICS**	**UNITS**	**DATA**	**NOTES**
3.11	Voltage induction light detectors	-		
3.12	Heat resistance	-		
3.13	Auxiliary contacts for monitoring	-		
3.14	Auxiliary contacts for remote control	-		
3.15	Lockers	-		
3.16	Busbar material	-		
4	**DOUBLE CABLE BUSBAR RISER CUBICLE**	-		
4.1	Components rated current	A		
4.2	Rated current	A		
4.2.1	Switch disconnectors	A		
4.2.2	Isolators	A		
4.3	VT	-		
4.4	CT	-		
4.5	Connection terminals	-		
5	**TRANSFORMER PROTECTION CUBICLE**	-		
5.1	Components rated current	A		
5.2	Rated current	A		
5.2.1	Circuit-breakers	A		
5.2.2	Switch disconnectors	A		
5.2.3	Isolators	A		
5.3	Relays	-		
5.3.1	50	-		
5.3.2	51	-		
5.3.3	50N	-		
5.3.4	51N	-		
5.4	Connection terminals	-		
5.5	VT	-		
5.6	CT	-		
1 - Seller is allowed to add/include information considered important.				

SWITCHYARD MAJOR EQUIPMENT				
1	**HV DEAD TANK CIRCUIT BREAKERS**	**UNITS**	**DATA**	**NOTES**
3.1	Description	-		
3.2	Manufacturer	-		
3.3	Place of manufacture	-		
3.4	Total weight of shipment	lbs		
3.5	Approximate number of man-days to assemble	Day		
3.6	Maximum Rated Voltage	kV		
3.7	Continuous Current	A		
3.8	BIL Voltage	kV		
3.9	Interrupting Rating	kA		
3.10	Maximum Opening Time (msec)	msec		
3.11	Number of stored Close-Open operations	-		
3.12	60Hz Impulse and Switching Surge withstand at 75 degrees F for rated SF6 pressure and one atmosphere SF6 pressure	Yes / No		
3.13	Shunt capacitors (if Applicable)	Yes / No		
3.14	Capacitor Switching Rating	-		
3.15	Number of Trip Coils	Qty		
3.16	DC Control Voltage	V		
3.17	AC Control Voltage	V		
3.18	Auxiliary Power Requirements	-		
3.19	Number of auxiliary switch contacts	Qty		
3.20	Operating Mechanism Type and Model No.	-		
3.21	Bushing Manufacturer, Type, and Catalog No.	-		
3.22	Manufacturer and Catalog No. of CTs being provided.	-		
2	**HV DISCONNECT SWITCHES**	-		
2.1	Manufacturer	-		
2.2	Place of manufacture	-		
2.3	Nº of units	Qty		
2.4	Type or Model	-		
2.5	Rated Voltage	kV		
2.6	Maximum Design Voltage	kV		
2.7	BIL Rating	kV		
2.8	Rated Frequency	Hz		

SWITCHYARD MAJOR EQUIPMENT				
1	**HV DEAD TANK CIRCUIT BREAKERS**	**UNITS**	**DATA**	**NOTES**
2.9	Rated Continuous Current	A		
2.10	Rated Momentary Current	kA rms		
2.11	Insulator Manufacturer and Type	-		
2.12	Mounting	-		
3	**BREAKER DISCONNECT SWITCHES**	-		
3.1	Manufacturer	-		
3.2	Place of manufacture	-		
3.3	Nº of units	Qty		
3.4	Type or Model	-		
3.5	Rated Voltage	kV		
3.6	Maximum Design Voltage	kV		
3.7	BIL Rating	kV		
3.8	Rated Frequency	Hz		
3.9	Rated Continuous Current	A		
3.10	Rated Momentary Current	kA rms		
3.11	Insulator Manufacturer and Type	-		
4	**CAPACITOR VOLTAGE TRANSFORMERS**	-		
4.1	Manufacturer	-		
4.2	Place of manufacture	-		
4.3	Type/Model	-		
4.4	Nº of units	Qty		
4.5	Connection	-		
4.6	Design - manufacture standards	-		
4.7	Name of datasheet attached	-		
4.8	Nominal Line-to-Line System Voltage	kV		
4.9	Maximum Line-to-Line System Voltage	kV		
4.10	Primary Voltage Rating (line-to-neutral)	kV		
4.11	Frequency	Hz		
4.12	Number of Secondary Windings	Qty		
4.13	CVT Winding 1 Ratio(s)	-		
4.14	CVT Winding 1 Accuracy/Burden Ratings	-		
4.14	CVT Winding 1 Thermal Burden Rating	-		
4.15	CVT Winding 2 Ratio(s)	-		

SWITCHYARD MAJOR EQUIPMENT				
1	**HV DEAD TANK CIRCUIT BREAKERS**	**UNITS**	**DATA**	**NOTES**
4.16	CVT Winding 2 Accuracy/Burden Ratings	-		
4.17	CVT Winding 2 Thermal Burden Rating	-		
4.18	CVT Winding 3 Ratio(s)	-		
4.19	CVT Winding 3 Accuracy/Burden Ratings	-		
4.20	CVT Winding 3 Thermal Burden Rating	-		
4.21	Capacitance	μF		
4.22	Capacitance Loss	W		
4.23	BIL Rating	kV		
4.24	Power Frequency Withstand	kV		Dry 1 Minute
		kV		Wet 10 Seconds
4.25	Average ambient temperature for which above ratings are based	^{o}C		
5	**SPARE PARTS**			
5.1	List all recommended initial spare parts for 25 years operation	-		

BATTERY				
Nº	**CHARACTERISTICS**	**UNITS**	**DATA**	**NOTES**
1	**GENERAL**	**-**		
1.1	Manufacturer	-		
1.2	Type/Model	-		
1.3	Quantity required	Qty		
1.4	Intellectual Properties	-		List any IPs
1.5	Design - manufacture standards	-		
1.6	Name of datasheet attached	-		
2	**RATINGS**	**-**		
2.1	Continuous Real Power - Discharge (Rated/Maximum)	MW		
2.2	Continuous Real Power - Charge (Rated/Maximum)	MW		
2.3	Continuous Apparent Power - Charge (leading and lagging) (Rated/Maximum)	MVA		
2.4	Continuous Apparent Power - Discharge (leading and lagging) (Rated/Maximum)	MVA		
2.5	Continuous Reactive Power (Rated/Maximum)	MVARs		
2.6	Rated Discharge Energy (BOL)	MWh		
2.7	Rated Continuous AC Current	A		
2.8	Output Voltage Range (AC grid voltage)	kV		
2.9	Output Frequency Range	hz		
2.10	Maximum Ramp Rate (charging/discharging)	MW/min		Specify any associated parameters such as SOC
2.11	Charge Time (Minimum/Typical/Maximum)	hr		From minimum to rated maximum SOC
2.12	Recommended Charge Power	MW		
2.13	Typical Charge Time (include any rest period between charge and discharge cycle)	hr		
2.14	Expected Availability of System	%		
2.15	Typical Start Up Time / Shut Down Time	s		
3	**EFFICIENCY AND CYCLE LIFE**	**-**		
3.1	Cycle Life @ Full rated power.	qty		
3.2	Total Round Trip Efficiency, 100% DOD Cycles, Full rated power (BOL and EOL)	%		

BATTERY				
Nº	**CHARACTERISTICS**	**UNITS**	**DATA**	**NOTES**
3.3	Total Round Trip Efficiency, 100% DOD Cycles, 50% rated power (BOL and EOL)	%		
3.4	Total Round Trip Efficiency, 50% DOD Cycles, Full rated power (BOL and EOL)	%		
3.5	Total Round Trip Efficiency, 50% DOD Cycles, 50% rated power (BOL and EOL)	%		
3.6	Total Round Trip Efficiency, 25% DOD Cycles, Full rated power (BOL and EOL)	%		
3.7	Total Round Trip Efficiency, 25% DOD Cycles, 50% rated power (BOL and EOL)	%		
4	**AUXILIARY POWER**	**-**		
4.1	Average Auxiliary Power Required (continuous/peak)	kW		
4.2	Auxiliary Nominal Voltage	VAC		
5	**ENVIRONMENT**	**-**		
5.1	Rate Operating Temperature Range (Minimum-Maximum)	ºF		
5.2	Noise Level (@ 3ft)	dBA		
5.3	Rated Operating Relative Humidity Range (Minimum-Maximum)	%		
5.4	Maximum Installation Altitude Without Derating	ft a.s.l		
5.5	Installation Type	indoor/ outdoor		
5.6	Battery Container/Enclosure Dimension (length/width/height)	in		
5.7	Weight per Battery Container/Enclosure	lbs		
5.8	Galvanic Isolation	-		
6	**BATTERY CONTAINER/ENCLOSURE THERMAL MANAGEMENT**	**-**		
6.1	Startup Time (Typical/Maximum)	s		
6.2	Shutdown Time (Typical/Maximum)	s		
6.3	Estimated Planned Outages	hr/yr		
7	**BATTERY CONTAINER/ENCLOSURE THERMAL MANAGEMENT**	**-**		

BATTERY				
Nº	**CHARACTERISTICS**	**UNITS**	**DATA**	**NOTES**
7.1	Cooling Method	-		
7.2	Configuration (i.e. 2 x 100%)	-		
7.3	Cooling Air Requirement	cfm		
7.4	Heating System	-		
8	**WARRANTIES**	**-**		
8.1	BESS Product Warranty Period (Required / As Bid)	yrs	10 /	
8.2	BESS Performance Warranty Period (Required / As Bid)	yrs	20 /	
1 – Seller is permitted to add/include information considered important.				
2 – Efficiency is generally the ratio of the net output energy delivered from the BESS [to the Electrical Interconnection Point] to the input energy collected to restore the BESS to the initial charge.				

BALANCE OF PLANT				
Nº	**CHARACTERISTICS**	**UNITS**	**DATA**	**NOTES**
1	**COMBINER BOXES**	**-**		
	Rated output current	A		
3.1	Number of strings	-		
3.2	Permissible DC voltage	Vdc		
3.3	Protection level, according to IS Codes	-		
3.4	UV proof	Yes / No		
3.5	String voltage, temperature and surge protection monitoring	Yes / No		
3.6	String current monitoring	Yes / No		
3.7	Output DC switch	Yes / No		
3.8	Surge protection on DC side	-		
3.9	Design Ambient Temperature (min/max)	°F		
3.10	Halogen-free and self-extinguishing housing	Yes / No		
3.11	Cooling system	Yes / No		
3.12	Earthing	Yes / No		
3.13	Warranties (Required / As Bid)	Yrs	**5 /**	
3.14	Certifications	-		
	Enclosure Rating	-		
2	**CABLES**	**-**		
2.1	Solar String Cable Voltage (rated/max)			
2.2	Solar String Cable Material (conductor/insulator)			
2.3	Solar String Cable Insulator Class			
2.4	LV Cable Voltage (rated/max)			
2.5	LV Cable Material (conductor/insulator)			
2.6	LV Cable Insulator Class			
2.7	MV Cable Voltage (rated/max)			
2.8	MV Cable Material (conductor/insulator)			
2.9	MV Cable Insulator Class			
2.10	HV Cable Voltage (rated/max)			
2.11	HV Cable Material (conductor/insulator)			
2.12	HV Cable Insulator Class			
3	**POWER CONVERSION AUXILIARY EQUIPMENT**	**-**		
3.1	**General**			
3.1.1	Total number of step-up transformers per station	-		

BALANCE OF PLANT				
Nº	**CHARACTERISTICS**	**UNITS**	**DATA**	**NOTES**
3.1.2	Total number of auxiliary transformers per station	-		
3.1.3	Temperature range	°F		
3.1.4	Cooling System	-		
3.1.5	Energy consumption	W		
3.1.6	Dimensions (length/width/height)	In		
3.2	**MV - Circuit Breaker Cubicle**			
3.2.1	Manufacturer	-		
3.2.2	Type/Model	-		
3.2.3	Type of circuit breaker (vacuum, SF6)	-		
3.2.4	Protection class			
3.2.5	System Voltage (rated/maximum)	kV		
3.2.6	Rated short-circuit breaking current	kA		
3.2.7	Rated busbar current	A		
3.2.8	Rated short time current (3 sec)	kA		
3.2.9	Certifications and Standards			
3.3	**LV - Switchgear**			
3.3.1	Manufacturer	-		
3.3.2	Type/Model	-		
3.3.3	Type of circuit breakers	-		
3.3.4	Protection class			
3.3.5	System Voltage (rated/maximum)	kV		
3.3.6	Rated current			
3.3.7	Buses current	A		
3.3.8	Rated short time current (1 sec) for main / sub-busbars	kA		
3.4	**UPS**			
3.4.1	Manufacturer	-		
3.4.2	Type/Model	-		
3.4.3	Rated Voltage	V		
3.4.4	Rated capacity	kVA		
3.4.5	Time Backup	Hr		
3.4.6	Inverters and by pass switch redundant (2 x 100%)	Yes / No		
3.4.7	Protection class			
4	**INSTRUMENTATION AND CONTROL**	**-**		
4.1	Number of operator stations	Qty		
4.2	**Meteorological Stations**	Qty		**Minimum 2**
4.2.1	GHI Pyranometer	Qty		per met station

BALANCE OF PLANT				
Nº	**CHARACTERISTICS**	**UNITS**	**DATA**	**NOTES**
4.2.2	POA Pyranometer	Qty		per met station
4.2.3	Ambient temperature	Qty		per met station
4.2.4	Module temperature	Qty		per met station
4.2.5	Wind speed (anemometer)	Qty		per met station
4.2.6	Relative Humidity Sensor	Qty		per met station
4.2.7	Soiling Monitoring System/Sensor	Qty		per met station
4.2.8	Data Logger	Qty		per met station
4.2.9	Battery Backup (required/as bid)	Hr	12 /	per met station
4.2.10	Cloud sensor	Qty		per met station
4.2.11	Other	-		List and provide quantity per met station
5	**SPARE PARTS**	**-**		
5.1	List all recommended initial spare parts for 25 years operation	-		

Appendix 5: Project Performance Test Procedures[6]

[6] To be provided by Seller and approved by Buyer prior to the Effective Date. The procedures are expected to include, among other things, pre-test meetings, checks, and other requirements, test procedures and protocols, notice and engineering, equipment, instrumentation, monitoring, control system and other document deliverables, and data collection and filtering.

Appendix 6: Project Site Map

Appendix 7: Approved Manufacturers and EPC Contractors List

A vendor appearing in the list below as an Approved Vendor for a particular type of equipment, system, or item shall not be an Approved Vendor for the manufacture of any other type of equipment, system, or item unless it is also identified therein as an Approved Vendor for such other type of equipment, system, or item. The inclusion of an entity on the list does not mean that such entity has been determined to satisfy or been pre-approved with respect to the requirements in, and other terms of, this Scope Book or the Agreement that apply, directly or indirectly, to EPC Contractors, vendors, manufacturers, or providers of equipment, systems, or items on (or not on) the list. Nothing in this Appendix 7 is intended to or shall limit the application of such requirements or terms, directly or indirectly, to any entity on the list.

Vendors or EPC Contractors not included in the list shall be considered and permitted upon Buyer's approval in its sole and absolute discretion. Vendors and EPC Contractors submitted for approval shall be evaluated based on a combination of installed capacity of largest facilities, total installed capacity of all facilities, bankability of product, company net worth, legal standing of the company, safety record and policies, quality assurance/quality control procedures, and other factors.

Approved Manufacturers List					
Major Equipment					
PV Modules	Jinko	Trina	LG	Hanwha Q CELLS	Canadian Solar
	FirstSolar	Astronergy	Talesun	LONGi	Phono Solar (SUMEC)
	Yingli	JA Solar	Suntech	SunPower	REC Solar
	Risen	HT Solar			
Inverters	GE	TMEIC	Schneider	Power Electronics	SMA
	Chint	Ingeteam	ABB		
Racking System	Array Technologies Inc.	NexTracker	Game Change	SunLink	Shoals
	RBI	Schletter	TerraSmart	Ideematec	Unirac
	SunPower	Soltec	Nclave		
Transformer	ABB	Waukesha	Siemens	Alstom	Hyundai

Approved Manufacturers List					
Major Equipment					
	Virginia Transformer	Pennsylvania Transformer	Cooper	PACS	
Switchgear	ABB	Cutler-Hammer	GE	Powell	
Balance of Plant					
Combiner / Recombiner Boxes	SolarBOS	Shoals	Bentek		
Disconnects	Square D	Siemens	Eaton	ABB	SMA
Data Logger	Campbell Scientific	Kipp and Zonen			
Pyranometer	Kipp and Zonen	Eppley Laboratory	EKO		
Temperature Sensor (cell)	Aros Solar Technology				
Anemometer	Gill Instruments				
Power Distribution Center	Powell	Zachry	PACS	Alstom	
HV Circuit Breakers	ABB	GE-Hitachi	Mitsubishi	Siemens	
HV Disconnect Switch	Pascor	Southern-States			
Battery Energy Storage System					
Batteries	Samsung	LG Chem	BYD	Panasonic	Tesla
Power Conversion System	SMA	TMEIC	Schneider	Power Electronics	Ingeteam
	ABB	Chint			

EPC Contractors: [Seller to provide a list of EPC Contractors for Buyer's approval]

***** END OF APPENDIX 7 *****