ADDITIONAL INSTRUCTION AND SPECIFICATIONS

Design, Supply and Installation of 240 kW Grid-Integrated and 25 kW Off-Grid Solar Power Plant (Optional) at JNEC, Dewathang

1 Instruction to Bidders

- The bidder shall be responsible for the design, supply, installation, testing, and commissioning of the complete Solar PV system, including all necessary civil and electrical works for proper functioning.
- The bidder must conduct a site inspection prior to bid submission and present their technical and financial proposal, including system design and equipment selection, to the client on a notified date with at least five days' advance notice.
- All technical documentation, such as design calculations, drawings (including overall dimensions and sectional views), and technical literature necessary for installation, operation, and maintenance of the system and accessories, must be provided. Operation and maintenance manuals, including repair instructions and any other relevant technical data for efficient system operation, shall be submitted before project completion.
- The bidder shall perform system simulation using recognized software (e.g., PVSyst or SAM) to estimate annual energy generation. **Bids without the simulation results shall be considered non-responsive.**
- Civil and electrical works include all installations associated with the SPV system, ensuring alignment with existing structures without compromising structural integrity.
- The bidder is solely responsible for any material shortages during contract execution.
- Upon completion, the site must be cleared of all temporary works and debris, maintaining cleanliness and aesthetics during all phases.
- Warranties shall include a minimum one (1.5) years defect liability period covering manufacturing, design, and installation defects from the date of system handover. The main components, such as modules and inverters, shall carry warranties as specified in the technical requirements.
- During the one and half years defect liability period, the bidder must ensure satisfactory performance, operation, and regular maintenance, including prompt rectification of defects within fourteen (14) days of notification.
- All components and spare parts must comply with applicable BIS, IEC, BEE, or other recognized national/international standards and certifications.
- All proposed items shall be “**Made in Bhutan**” OR “**Made in India**”.

2 Scope of work

The scope of work shall include designing, planning, engineering, procurement (manufacturing/supply), site development, construction/erection, testing, and commissioning of 240 grid integrated and 25 kW off-grid solar PV power plant (Optional), and training operational staff at Jigme Namgyel Engineering College (JNEC), Dewathang, Samdrup Jongkhar. The Solar PV power plant shall comprise the following:

- Main Electrical System including solar PV modules, inverters, cables, transformers, battery, and protection equipment.
- Solar PV Module Mounting Structures
- Approach Road with Parking Space
- Office Building with Toilet
- Drainage System
- Water Supply System.
- Wire mesh Fencing
- Lightning Protection System.
- External Lighting System.
- Earthing System.
- Fire Fighting and Detection System.
- Data Acquisition System.

3 Site Location

JNEC campus is located on 56.2 acres, and it is 18 kms from Samdrup Jongkhar town towards Trashigang with a total of 5155 m^2 land area available for Solar PV Plant. Site coordinates are 26°51'25″ N, 91°27'41″ E and 860 m amsl. The minimum temperature recorded in 2023 is 8.11°C, maximum of 32.81°C with average annual temperature of 20.42°C. The total annual irradiance is 1680 kWh/m^2 measured in 2023.

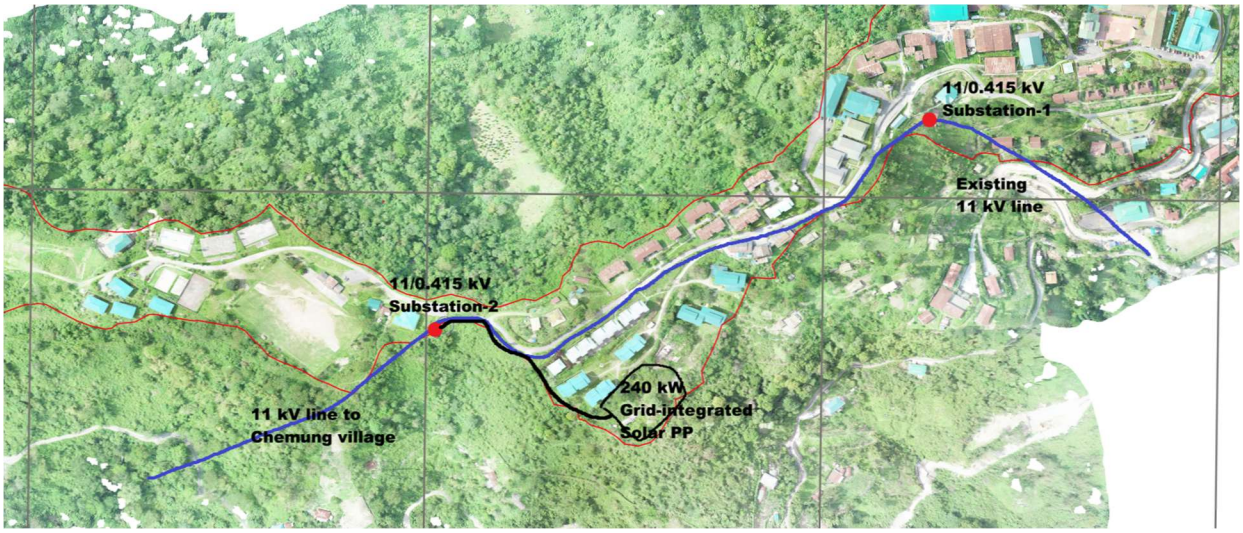

Figure-1: Location Map

4 Solar PV Plant Overview

The solar PV power plant shall comprise of two systems.

The power generated by the solar PV power plant will be fed to 11 kV line approximately 220 m from the control room. The equipment up to point of interconnection, including the switchyard and metering, shall be in the scope of the contractor. The contractor will construct the necessary terminal arrangements for connecting the power plant till the gantry (grid connection point).

Fihure-2: 240 kW Grid-integrated Solar Power Plant Layout

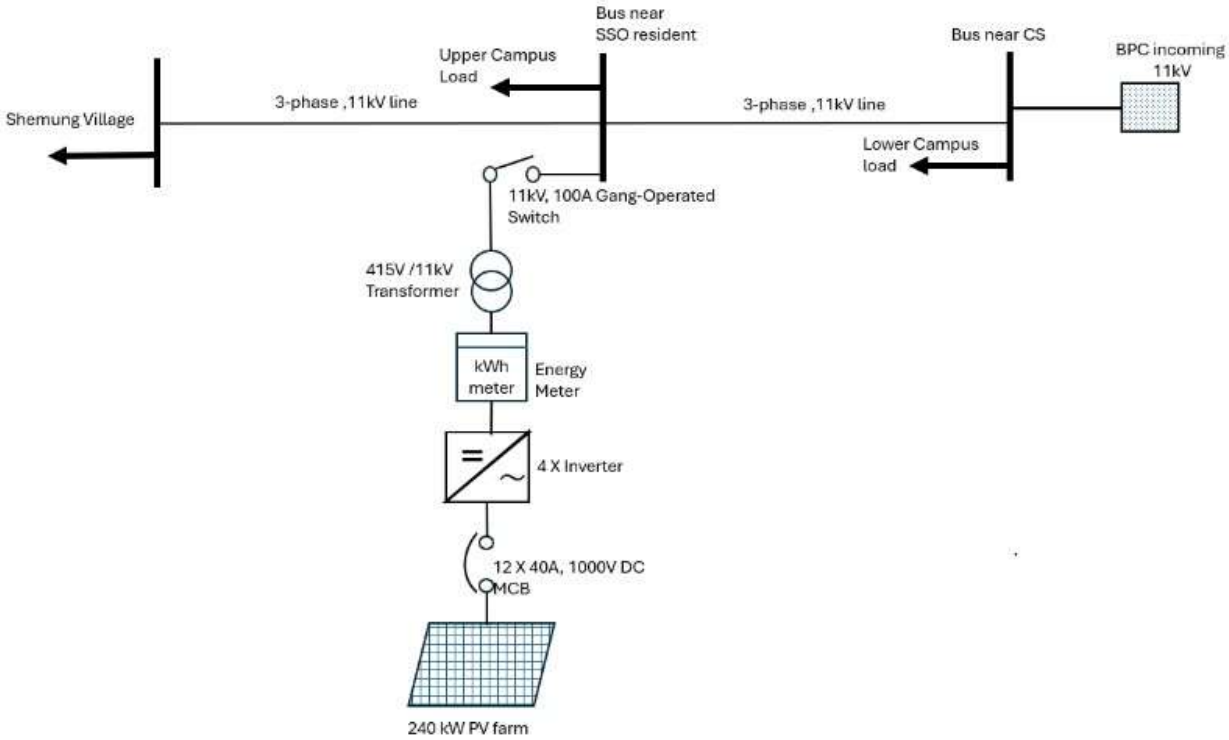

Figure-3: Single Line Diagram of 240 kW Grid-Integrated Solar PV Plant

25 kW roof mounted off-grid system (Optional)

This system shall be supported with Lithium ion batteries, hybrid inverter and grind connection.

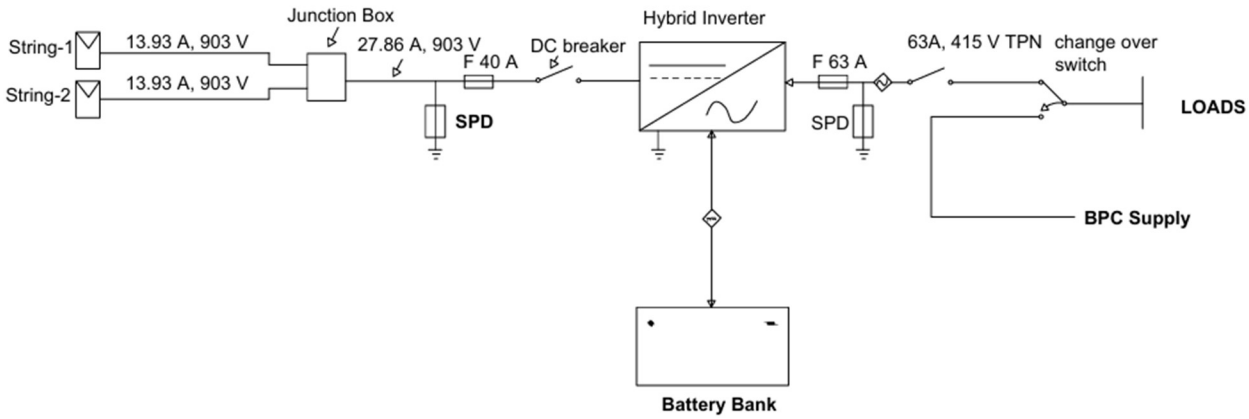

Figure-4: 25 kW Off-grid Solar PV System (Optional)

5 Site Clearing

The bidder shall visit the site prior to bidding and estimate the volume of the earthworks. The scope of work is as required for installation of panels / equipment etc. during construction, erection and commissioning activities. It includes cutting, clearing, transporting and disposal of trees, bushes, other vegetation, roots, stubs etc.

Site grading including slope protection if any, ground preparation/ filling/levelling (if required). Timber and non-timber products shall be made available to the client and shall be stored within 300 m of the site as instructed by the Site Engineer.

6 Evaluation of Bids

The evaluation criteria listed below are critical and prerequisite to fulfilling this contract. Therefore, non-fulfillment of any of these requirements may lead to rejection of the bids.

i. The Bidder should have executed design, procurement, supply, installation, testing and commissioning of solar power plant.
ii. At least one key personnel should have experience in installation of solar power plants.
iii. Work plan and time schedule with clear indication of weeks/months and achievable milestones.
iv. Other required documents:

- Valid Trade License and Tax Clearance Certificate.
- Proof of the firm's experience in executing SPV projects.

The successful bidder shall provide a warranty period for each piece of equipment listed in the Bill of Quantity (BoQ) and conduct hands on training for the basic O&M training for the beneficiaries during the project execution.

7 Technical Specification

7.1 240 kW Solar Grid-Integrated System

The Solar PV project shall be executed on a turnkey basis, which includes design, construction, installation, testing and commission. All the materials and equipment supplied under this tender shall conform to the latest editions of the International Electrotechnical Commission (IEC) Specifications or any other international standards. If equipment is not covered by IEC then other national standards are accepted if it confers equal or superior quality and performance than IEC or other international standards.

7.2 25 kW Solar Off-Grid System (Optional)

This roof-mounted plant shall be used to power street lamps on the campus. The system should have a hybrid inverter, lithium ion battery to last two days, and manual change over switch. The bid shall be inclusive of rooftop mounting structure with a slope of 26°.

7.3 Solar PV Module

Monocrystalline PV modules shall be used. The individual modules shall be provided with Name Plate label at the back of module which shall provide the information given below for identification. They shall be clearly visible and shall not be hidden by equipment wiring. Type of labels and fixing of labels shall be such that they are not likely to peel off/ fall off during the life of the panel.

- Manufacturer's Name
- Model Number, Serial Number
- Overall Dimensions (W x L x D)
- Weight (kg)
- Maximum Power (PMAX), Voltage (VMP), Current (IMP)
- Short Circuit Current (ISC), Open Circuit Voltage (VOC)
- Main System Voltage
- Relevant tests and standards, Certification lab. name
- OWNER Logo on the top corner of each Module (Design shall be provided to successful Bidder during detail engineering)
- Warnings, if any

Each module should have two stranded UV resistant cables and terminated with DC plug-in connector (MC4) directly. The cable length of the modules shall be finalised by the Bidder based on the actual requirement. The positive (+) terminal has a male connector while the negative (-) terminal has a female connector. Any different design offered shall be reviewed during detailed engineering.

The module frame shall be made of anodized Aluminium. It shall have provision for earthing to connect it to the earthing grid. The anodization thickness shall not be less than 15 micron.

7.4 String Combiner Box (SCB)

SCB is used in multi-string photovoltaic systems to combine the individual strings electrically and connect them to the Inverters. It shall have protection devices to protect the PV modules from current/voltage surges. Input to each SCB shall be decided during detail engineering based on the approved Single Line Diagram (SLD) submitted by contractor. Vendor to note that DC system of 1000 V only is acceptable and hence all equipment ratings shall be finalised as per system requirement during detail engineering. Voltage rating of the selected component shall be 1000V. SCB offered shall have already been type tested and in satisfactory operation in Solar plant with 1000 V DC system

7.5 String Fuses

In order to provide protection to all cables and modules, string fuses shall be provided with strings. String fuses shall be of gPV category and dedicated to solar applications and conform to IEC 60269-6 or UL-2579 standards and fuse base shall comply to IEC 60269-

String fuses should be so designed that it should protect the modules from reverse current overload. Fuses or Isolation Link shall be mounted in pull out type fuse holders. Fuse holders shall be suitable for DIN rail mounting. PCB mounted fuses are not acceptable. Fuse rating for single and combined input (limited to two) shall be decided suitable for 1000 Volt for crystalline module, with minimum 1.56 times of Isc after accounting for about 10% additional gain by bi-facial modules. In case of negative grounded system, string fuse as well as inverter input fuses on negative side shall be provided, based on Inverter manufacturer’s recommendation.

7.6 Junction Boxes

The material used for junction box shall be UV resistant to avoid degradation during module life. The degree of protection of the junction box shall be at least IP 67. Minimum three number of bypass diodes and two number of IS 16781/ IEC 62852 certified MC4 compatible connectors with appropriate length of IS 17293 / IEC 62930 certified 2.5 sq.mm. or 4 sq.mm copper cable shall be provided. The cable length shall be finalized by the Bidder, based on the project requirements.

7.7 PV Module Mounting Structure

The module mounting structure shall be fixed axis ground and roof (Optional) mounted prefabricated and with no onsite fabrication work.

The mounting of the PV modules shall use standard or module manufacturer recommended installation accessories like mounting clips, rails, racks etc. All the structure members shall be factory fabricated and only assembled on site. No fabrication shall be permitted on site.

The sizing of the structure (pole span lengths, total longitudinal length of each desk etc), orientation and laying on the ground (stepped type or fitting on the ground type) shall depend on the topographical, geological/geotechnical conditions, stability/structural design conditions, minimum required installed capacity (in regard with the optimized land usage), minimized shading effects and best operational conditions.

Interconnections between modules must use high-quality, industry-standard male-female connectors (MC4 or TC4).

7.8 Earthing

The entire solar PV power plant area including any equipment, control & protection, support structure, weather station and control room & office building shall be appropriately earthed with adequate number of earth stations and shall run along the periphery of the plant.

The earthing system shall have complete earthing network comprising of wires, copper tapes, electrodes and earth bonding with relevant necessary non-current carrying metal parts to be connected with the equipment/ apparatus as required.

- **Plate type earthing stations:**

Earth leads to the electrode shall be laid in a heavy-duty GI pipe and connected to the plate electrode with brass bolts, nuts, and washers. A GI pipe of not less than 50 mm in diameter shall be clamped with bolts vertically to the plate and terminated in a wire meshed funnel. The funnel shall be enclosed in a masonry chamber

- **Pipe type earthing stations:**

Electrodes shall be made of G.I. Pipe of internal diameter of 100mm dia. The pipe electrode shall be as far as practicable embedded below permanent moisture level. The length of the pipe electrode shall not be less than 3 m. The pipe electrode shall be made of one piece. The soil around the earthing electrode shall be treated to reduce the resistivity of the soil by filling the complete depth of electrode with alternative layers of charcoal and salt. The funnel shall be enclosed in a masonry chamber. of 450 mm x 450 mm dimensions.

7.9 Lightning Protection

The entire power plant area including control room & office building shall be protected from lightning. The protection system shall be based on early streamer emission lightning conductor air terminals. The air terminals shall provide an umbrella protection against direct lightning strike covering a radial distance of maximum 60 m. Lighting protection systems shall be designed in accordance with IEC 62305-3, IEC 61173 and IEC 60099; The air terminal shall be capable of handling multiple strikes of lightning current and should be maintenance free after installation.

Protective equipment and its installation shall comply with IEC 60255.

The earthing stations for the lighting discharges shall be provided with test links of phosphorus bronze and located at least 150 mm above ground level in an easily accessible position for testing.

7.10 Inverters

The plant shall have four indoor inverters with a minimum of 60 kW each for 240 kW SPP. The inverter shall have a performance not lower than 99% and European efficiency or CEC efficiency of at least 98%.

The inverter shall be able to communicate with the power plant's SCADA system using Modbus protocol.

Inverters shall have provisions to isolate it from both DC and AC sides using DC isolators and AC circuit breakers respectively. These can be in-built or externally connected.

Necessary inverter protection shall include but not limited to the following:

- AC Overcurrent
- DC Overcurrent
- Loss of synchronism
- Over-temperature
- AC Over/Under Voltage
- DC Over/Under Voltage
- Under/Over frequency
- Cooling System Failure
- PV array ground fault
- Anti-islanding

The inverter shall automatically wake up. Automatic sleep mode shall be available so that unnecessary losses are minimized at night. In case of grid failure, the inverter shall be re-synchronized with the grid after the revival of the power supply. Inverters shall be earthed as per manufacturer recommendations.

In addition to this automatic grid disconnection, a manual disconnect isolation switch must be provided at the utility end, allowing utility personnel to isolate the grid connection for any maintenance; this manual switch shall be locked by the utility personnel.

7.11 Battery (Optional)

The bidders shall propose Lithium ion batteries to be used for Off-grid system. It shall include mounting structures, DC and AC control gears, and earthing.

7.12 Transformer

The bidders shall propose one 250 kVA transformer to step up the voltage to the grid voltage level at the site (11 kV).

7.13 Switchgear

The design, materials, and method of LT switchgear shall conform to the applicable IEC standard. All equipment shall be installed and all work shall be carried out in accordance with relevant IEC standards. Where an applicable IEC standard is not available, IS/ any applicable international standard shall be referred to as best practice. All standards, specifications and codes of practice shall be the latest editions including all applicable official amendments and revisions.

7.14 Data Acquisition System

The power plant shall have a data acquisition system for data monitoring, remote diagnosis, data storage and visualization with preinstalled software along with a 16GB RAM desktop. The Contractor is responsible for providing a web-based monitoring software capable of collecting data directly from the inverter at all times. The data collected must include, but is not limited to:

- Site information
- Generation metrics, specifically DC (before inverter) and AC (after inverter) generation in kWh, along with voltage and current.

The program must be able to display both instantaneous and historical data. Furthermore, this system is required to provide information for each installation and offer the capability to add different installations. The monitoring information must be accessible on a single computer in the control room. The Contractor is responsible for providing data connection for each site. Communication methods must be the most effective way in each location.

The system must display data in real time and record and log performance data at regular intervals for a minimum of two years. This data must be downloadable at any moment in a format compatible with MS EXCEL.

Finally, the contract requires the Contractor to specify the system and demonstrate the features of the software as a DEMO to Purchaser for approval during the design stage.

7.15 Security and Surveillance System

The bidder shall propose 24-hour surveillance system that covers entire plant area including approach road, parking area and control & office building.

The following requirements shall apply:

- Outdoor closed-circuit cameras shall be provided to monitor the entire perimeter of the installation without blind spots. Camera images should be available on LCD / LED monitors installed in a control room;
- The camera enclosure used for indoor installations shall be IP 55 protection class while for outdoor installations shall be IP 66 class or higher. This equipment must be protected against lightning;
- The data should be transferred by optical fibres to the security building.

7.16 Plant Lighting

All the main and internal roads shall be lit with external lighting system for enhancing site security and maintenance requirements. Care should be taken to avoid any shading effect due to the poles. The light fittings shall be highly efficient LED-based system with a minimum of a 75 lux and longer life period. The lighting must be designed to operate using movement sensors set at person height so as not to be kept permanently on overnight. The lighting used shall be directional and shielded, so light does not fall outside the allocated land plots.

Flood lights shall be mounted at strategic locations along the boundary of the land parcels of PV plant. All the lighting shall be fed from power supply system available at the plant.

7.17 Panel Wiring

All external control cables/wires shall be brought to the panel from the bottom. Control cables/wires shall enter the panel through suitable cable glands to prevent contact with sharp metal edges. The gland-plate assembly shall be vermin proof.

- There shall be no wiring run as single cores through grommets. The AC wiring shall be bundled separately from DC wiring in the same raceway. Signalling cables shall be shielded type and run in a separate raceway and shall be separated as far as practical from all LV power cables and at right angle to such wiring when the spacing is less than 300 mm.
- All wires shall be adequately rated and sized for thermal withstand of short circuit currents, in accordance with backup tripping time.

- Wiring for lights, and convenience outlets may be run in the same raceway in individual panels and in rigid or PVC jacketed flexible conduits between panels. Wiring of meters/relays mounted on doors shall be mechanically protected.
- Labelling shall be provided with each panel and each circuit. Colour coding of panel wiring shall be used to differentiate AC vs DC.

All internal wiring terminations shall be made with solderless crimping type tinned copper lugs which shall firmly grip the conductor or an equally secure method. Similar lugs shall also be provided at both ends of component to component wiring. Insulating sleeves shall be provided over the exposed parts of lugs to the extent possible.

7.18 Fencing

GI Chain-link fence shall be constructed around the periphery of the plant with a height of 2.5 m. The fence shall provide lockable entry gate. All fences, gates, doors, and other similar metal components must be properly grounded.

7.19 Power Evacuation System

The PV Plant has been planned with 0.415/11 kV, single 250 kVA power transformer for stepping-up the power generated from PV plant and evacuating to the existing Thangzor Substation. The Complete PV system including 11kV UG cable and associated trench as per Bhutan Power Corporation standard shall be in scope of the bidder.

7.20 Control & Office Building

A Control & Office Building shall be constructed at the project site to house transformer, switchgear and other equipment. The building shall be designed in keeping with the traditional Bhutanese vernacular. The building should be dimensioned to provide adequate space for all these facilities. General layout, architectural aspects and design planning should be subject to the approval by the client prior to the detailed design.

A proper foundation sealing (waterproofing) system should be provided for the building depending on the environmental and climatic factors in the areas to prevent water from entering the basement from outside by considering the geological, topographical, soil/water table conditions and depth of foundations. A proper site drainage system should be provided around the building (also including the roofing and the basement) to address surface run-off of water to be directed away from the building. The surfaces around the building shall be shaped to provide drainage and prevent ponding.

7.21 Occupational Health and Safety

In accordance with the Labour and Employment Act of Bhutan and related regulations, the Contractor shall provide all employees with appropriate Personal Protective

Equipment (PPE), including helmets, footwear, protective clothing, and other necessary items to be used at the workplace. The Contractor must ensure that employees wear the PPE at all times while performing work on site. All PPE shall be regularly inspected to verify proper use and condition, and any damaged equipment shall be replaced without delay.

The Contractor shall ensure the availability of trained first-aiders and adequately stocked first-aid boxes at the project work site. The names of designated first-aiders shall be displayed prominently. First-aid boxes must clearly indicate their contents along with the quantities of medical and medicinal supplies, which shall be maintained at all times. The Contractor is responsible for the prompt replenishment of any depleted items to ensure continuous readiness.

The Contractor shall designate an emergency response team at the work site tasked with coordinating all emergency actions in liaison with the Purchaser and local health authorities. The emergency telephone and mobile numbers of key contact persons, including police, ambulance, and other relevant services, shall be clearly displayed and accessible at all times.

8 Specification of Civil Items (to be read in conjunction with Section 6.1 to 6.20)

SL. No	Particular	Specifications
1	Ground preparation	• Prepare $7^o/8^o/9^o$ slope of the ground from the existing topography for mounting structures. • Prepare plane surface for control room, parking and approach road. • Topographic map of the site will be provided if needed.
2	Control Room	• Control Room size = 10 mx5m overall all dimension with room height =3.5 m. ✓ One office room (3mx2.5 m) ✓ One toilet (1.4mx2.5m) with complete toilet accessories (Vitreous China European One-Piece Toilet with seat cover and fixing of vitreous China wash basin, etc.,). ✓ Toilet wall and floor should be tiled. • Wall = 250/125 mm thick of 1^{st} class burnt red clay brick with 12 mm thick plastering works external and Internal respectively. • RCC column • RCC beam (Plinth, roof and lintels beam) • RCC roof slab • Plastering work for all RCC structures.

		• Gable Roofing = Pre-Painted Steel Corrugated Roofing sheets of 24g. • Truss =MS square/ rectangular sections with welded connections. • uPVC sliding window (plain white) with 5 mm thick clear glass for all windows and grills ✓ W1=2mx1.6 m of 4 eyes -3 nos. in control room. ✓ W2=1.5mx1.6 m of 3 eyes - 1 no. in office. ✓ W3=0.7mx0.5 m of 1 no. in toilet. ✓ Window grills = MS flat • Complete installation of Doors ✓ uPVC door (D1) = 0.9mx2.2 m -1 no for office. ✓ uPVC door (D2) = 0.7mx2.2 m -1 no for toilet ✓ Main Door = Aluminum Rolling shutters with all accessories of size 1.5x2.5 m - 2 nos. • Flooring = Compacted soil, stone soling and PCC • Painting work=Cement primer, and emulsion plastic paint both internal and external. • Plith protection=Stone soling and PCC of 1.3 m width. • Building side drain. • **Electrical items** ***Note:*** Control room should have duct provision for the electrical cables incoming and outgoing.
3	Parking before control room	• Parking to accommodate 2-3 vehicles • PCC parking • 2 nos. of RRM wall of 2.5 m height approximately of 20 m length each.
4	Approach road	• Road width = 5 m including V-shaped side drain. • PCC road (approx. 50 m).
5	Mounting structures	• Mild steel (angle/flat/tubular/ Hot Dip galvanized with minimum 80-micron coating/ aluminum painted) • Design wind speed 47m/s • Double post type mounting structures with 1.7 m height from the lowest module edge to the ground surface. • Solar module mounting angle = 25^{o} • All electrical running cables in the plant and line running to 11kV grid should be through underground cables (1ft x 1ft trench) embedded inside HDPE pipes/trenching size of 300x300mm.
6	Fencing	• Concrete Grouted MS angle Post/bracing structures @ 1.5 m C/C of the post. • Approximate Length of fencing = 320 m • Fencing = 4mm (8 SWG) x 50mm GI chain-link • Height =2.5m above ground level

		• Two leaf openable steel gate attached to RCC post on both sides -1 no.
7	Water supply	• HDPE pipes for water supply system to Solar plant • Two no. of water supply provision points in each long rows and one for short rows.

9 Specification of Electrical Items (to be read in conjunction with Section 7.1 to 7.21)

8.1 PV Module Panel

Electrical Data at STC			
Parameter	**Symbol**	**Unit**	**Value**
Power output Pmax	Pmax	W	670 to 750
Voltage at Pmax	Pmax	V	30 to 45
Current at Pmax	Pmax	A	15 to 20
Open-circuit voltage	Voc	V	45 to 52
Short-circuit current	Isc	A	15 to 20
Panel Efficiency	21 % to 25 %		
Construction Material			
Cell material	Monocrystalline silicon		

9.1 Inverter

Parameter	**Value**
Rated AC Power	60 kW ± 2kW
AC grid Connection type	Three-phase (3W+PE or 3W+N+PE), Grounded WYE system
Max DC Input Power	60 kW ± 2kW
Number of MPPTs	3 to 4, With connections upto 4 strings per MPPT
DC Input Voltage Range (MPPT)	685 V± 115V
Absolute Maximum DC Voltage	1000 V
Start-up Voltage	500 V ± 50 V
Max DC Current per MPPT	36 A
Max Short Circuit Current per MPPT	55 A
Max Efficiency	98.60%
Max output AC Current	80A

AC Nominal Voltage	384 - 571 V line to line voltage (3-phase, configurable)
AC Frequency	50 Hz ± 3Hz
With all necessary input and output protection included with anti-islanding protection	
With master-slave embedded data logging features and direct cloud transfer of data and remote monitoring	

9.2 Transformer

Parameter	**Value**
kVA rating	250 kVA
LV	400V
HV	11 kV
Cooling	Dry type, Air natural
Vector group	Dyn11
Frequency	50 Hz
Winding material	Copper
Manufecturer	Reputed and certified
Insulation Class	F

9.3 Pole Mounted Gang-Operated Switch

Voltage	11kV
Current	300 A per phase
Poles	3
Type	Outdoor, Air break, gang-operated
Mounting	Pole mounted
Operation	Ground-level handle with operating rod
Insulation	Complete

9.4 Hybrid Inverter

Max. PV input power	65 kW
Max. PV input Voltage	1000 V
Start-up voltage	250 V
Rated DC input voltage	600 V
Number of MPPT	1 to 2
Rated AC input/output power	50kW

Rated AC input/output voltage	400 V, 3L/N/PE
Communication	RS485,LAN,CAN
Protection	Anti-islanding protection
Accessories	Included

9.5 Battery

Battery Chemistry	Lithium-ion (LiFePo4)
Battery Nominal Voltage	576 V
kWh Capacity	28.8 kWh
Features	Remote Monitoring
Communication	CANBus
Extendable	Yes
Accessories (Support structure)	Included

9.6 String Combiner Box Type-1

Input to output	2 strings in 1 out
Protection	Surge Protector
	Fuse Disconnect Switch
	IP65 Waterproof
Voltage Rating	1000V
Isolator	Included
Current Rating	32 A
Accessories	Included

9.7 String Combiner Box Type-2

Input to output	3 strings in 1 out
Protection	Surge Protector
	Fuse Disconnect Switch
	IP65 Waterproof
Voltage Rating	1000V
Current Rating	32 A
Isolator	Included
Accessories	Included

9.8 Busbar Chamber/AC DB

Input to output terminals	min. 4 input, 1 output
Voltage Rating	400V
Current Rating	400A
MCCB included	400V, 400A
Dimension LxBxH	As per requirement

9.9 Energy Meter

Voltage Rating	400V
Current Rating	400 A
Current Transformer	Included
Communication	CAN Bus / RS485
Pole	Three phase
Type	AC

10 Documents to be submitted

The bidders shall submit the following documents.

- Product Data: Provide manufacturer's documents on products, data sheets, test certificates and installation instructions, and operation manuals after completion.
- Drawings & Layout: Physical and electrical layout and drawings (as built) including details (where applicable) for construction, installation and operation and maintenance.
- Design Data: System Design and Structural design calculations with signature of professional engineers.
- Manufacturer test certificates: Certify products exceeding specified specifications.
- Manufacturer's warranties: The supplier/manufacturer's warranty will have to be provided