



- Environment and Social Impact Assessment (ESIA) survey & study of the Transmission Line route and implementation of the Environment and Social Management Plan (ESMP) as per Annexure M.
 - Quality assurance plans for manufacturing (MQP), Standard Operating procedure (SOP) and field activities (FQP)
 - Detailed site EHS plan, fire safety & evacuation plan and disaster management plan.
 - Detailed risk assessment and mitigation plan.
 - O&M Instruction's and maintenance manuals for major equipment
 - As-built drawings / documents and deviation list from good for construction (GFC) drawings/documents
- 3.4 Estimation of the plant generation based on Solar Radiation and other climatic conditions prevailing at site.
- 3.5 Design of associated civil, structural, electrical & mechanical auxiliary and plumbing systems includes preparation of single line diagrams and installation drawings, manuals, electrical layouts, erection key diagrams, electrical and physical clearance diagrams, design calculations for civil, structural, RCC and plumbing & sanitary works, roads and drainage etc. including analysis & design input file, Earth- mat, Bus Bar & Spacers indoor and outdoor lighting/ illumination etc., GTP and GA drawings for the major equipment including transmission line. Design basis & calculation sheets, and other relevant drawings and documents not covered above but required for engineering of all facilities within the periphery shall be provided under this contract.
- 3.6 All drawings shall be fully corrected to match with the actual "As – Built" site conditions and submitted to Employer after commissioning of the project for record purpose. All as-built drawings must include the Good for Construction deviation list.

4 Procurement and Supply

The equipment and materials for Grid Interactive Floating Solar PV Power Plant with associated system shall include but not limited to the transit insurance, receipt, unloading, storage, erection, testing and commissioning of all supplied material for the following:

- 4.1 Adequate capacity of solar PV modules with minimum DC capacity as mentioned in Clause 1 of Scope of Works.
- 4.2 PV Module Floating Platform – Floating system along with anchoring and mooring



system for mounting PV modules, inverters, cable trays and other associated equipment.

- 4.3 Power Conditioning Units (string inverters) of appropriate rating along with mounting structure suitable for installation on PV Module floating platform.
- 4.4 Transformer Floating Platform – Floating system along with anchoring and mooring system for mounting of LT Switchgear panels, inverter duty transformers, Gas Insulated Switchgears and other associated equipment.
- 4.5 AC Combiner Box / LT Switchgear panels of appropriate rating with adequate number of inputs for pooling of power from inverter to inverter duty transformer suitable for installation on transformer floating platform.
- 4.6 DC Cables of appropriate size and rating along with straight/Y-connectors, ferrules, conduits, cable trays, cable ties and other materials required for cable laying and termination at both the ends.
- 4.7 AC Cables (LT & HT) of appropriate size and rating along with cable termination kits, ferrules / tags, conduits, cable floats, cable trays, cable ties and other materials required for cable laying and termination at both the ends.
- 4.8 Inverter transformers of appropriate rating suitable for installation on transformer floating platform.
- 4.9 33 kV Gas Insulated Switchgears including Vacuum Circuit Breakers, Current Transformers, Voltage Transformers, Relays and other accessories for complete protection of inverter transformer feeders suitable for installation on transformer floating platform.
- 4.10 33 kV Switchgear panels (with one spare) including Vacuum Circuit Breakers, Current Transformers, Voltage Transformers, Relays and other accessories for complete protection of GIS feeders suitable for installation in Main Control Room.
- 4.11 Two nos. of 132/33 kV 50 MVA Power Transformers and associated equipment.
- 4.12 Nitrogen Injection Fire Protection System for power transformers.
- 4.13 132 kV Switchyard including Circuit Breakers, Disconnectors, Instrument Transformers, Surge Arrestors, Control & Relay Panels other associated equipment for complete protection. Over Current Earth Fault Protection alongwith Distance Protection and other required protection schemes shall be provided at the 132/33kV Power Evacuation Switchyard at Getalsud Dam Site.
- 4.14 ABT meters with all necessary metering rated CTs and PTs at 132 kV side of Plant Substation as per CEA Metering Regulations 2006 as amended time to time and state



metering code.

- 4.15 132 kV Double Circuit Transmission Towers, Conductors, Insulators and associated accessories along with 24 fibre (24F) Optical Ground Wire (OPGW) cables from Plant Substation to Interconnection point as per STU specifications.

Note: *The Contractor shall construct the line after Joint Detailed Survey of Transmission Line Route Jointly Verified by the representatives of SECI and JUSNL. Supervision Charges payable to JUSNL shall be borne by SECI.*

- 4.16 Fibre Optic Terminal Equipment (FOTE) at the 132/33kV Power Evacuation Switchyard at Plant End as per specifications provided.
- 4.17 Auxiliary supply system including auxiliary transformers, distribution panels, cables and related accessories for plant internal consumption.
- 4.18 Uninterrupted Power Supply (UPS) including Batteries, Distribution Boards, Cables and associated equipment.
- 4.19 Battery Bank, Battery Charger, Distribution Boards, Cables and associated equipment.
- 4.20 LT Power and Control Cables including end terminations and other required accessories.
- 4.21 Communication cables including end terminations and other required accessories.
- 4.22 Supervisory Control and Data Acquisition (SCADA) and Energy Management system for remote monitoring/control of plant facilities.
- 4.23 Data Acquisition System and communication infrastructure to transfer real time data to SLDC, JUSNL as per the specifications of SLDC wing and as per grid connectivity approving authority.
- 4.24 Earthing system including earth strip/cables, earth electrodes, earth enhancing compound and all other associated materials for complete earthing of the plant.
- 4.25 Lightning Protection System for entire plant area including both off-shore and on-shore installations.
- 4.26 LED luminaries with diffuser for indoor and outdoor illumination (off-shore and on-shore), lighting poles, distribution boxes and power supply cables along with required conduits, fittings, etc.
- 4.27 Weather monitoring station shall include but not be limited to the following:
- Pyranometers – Two in Horizontal Plane for GHI and two in inclined plane for GTI – Minimum 4 (Four) Nos.
 - Ultrasonic Anemometer (wind speed and direction) – 2 (two) no.
 - Temperature Sensor (ambient and module surface) – 3 (three) nos.
 - Power source to the all sensors wherever required



- Data Logger
- 4.28 Water Quality Monitoring System (Two nos.) with all necessary hardware and software required for real-time monitoring of water temperature, pH, Electrical Conductivity and Dissolved Oxygen via SCADA.
- 4.29 Water Flow Monitoring System (one no.) for measurement of surface water current velocity and wave parameters with all necessary hardware and software for real-time monitoring via SCADA.
- 4.30 CCTV cameras with monitoring station along with mounting poles, power supply cables, communication cables, conduits, fittings, etc.
- 4.31 Fire detection and fire protection system in buildings/containers and switchyard.
- 4.32 Materials and accessories, which are required for satisfactory and trouble-free operation and maintenance of the above equipment like module cleaning system, supply of spares for all equipment, supply of tools and tackles etc.
- 4.33 Testing instruments as specified.
- 4.34 Mandatory spares as specified in Annexure – E.
- 4.35 Any other equipment / material, not mentioned but required to complete the Solar Power Plant facilities in all respect.

5 Installation, Testing and Commissioning

The scope of installation, testing and commissioning for the plant facilities shall include, but not limited, to the following.

- 5.1 Installation of PV Modules on Float Structure and interconnection of PV Modules.
- 5.2 Installation, Testing and Commissioning of solarinverters/Power conditioning Unit on PV Module floating platform.
- 5.3 Installation, Testing and Commissioning of AC Combiner Boxes / LT Switchgear Panels, Inverter Transformers and Gas Insulated Switchgears on Transformer floating platform.
- 5.4 Laying of AC cables from inverters to AC Combiner Boxes / LT Switchgear Panels along with termination at both the ends, as applicable.
- 5.5 Laying of AC cables from AC Combiner Boxes / LT Switchgear Panels to inverter transformers along with termination at both the ends, as applicable.
- 5.6 Laying of 33 kV AC cables from inverter transformer to Gas Insulated Switchgears along with termination at both the ends.
- 5.7 Laying of 33 kV AC cables from Gas Insulated Switchgears (Transformer Floating Platform) to 33 kV Switchgear Panels (Main Control Room) along with termination at



both the ends.

- 5.8 Installation, Testing and Commissioning of 33 kV Switchgear Panels inside Main Control Room.
- 5.9 Installation, Testing and Commissioning of 132/33 kV Power Transformers and 132 kV Switchyard Equipment.
- 5.10 Installation, Testing and Commissioning of Nitrogen Injection Fire Protection System for Power Transformers.
- 5.11 Installation, Testing and Commissioning of ABT meters with all necessary metering rated CTs and PTs at Plant Substation as per CEA Metering Regulations 2006 as amended time to time and state metering code.
- 5.12 Installation, Testing and Commissioning of 132 kV Double Circuit Transmission Line from Plant Substation to Interconnection point.
- 5.13 Installation, Testing and Commissioning of auxiliary power supply system consisting of auxiliary transformers, AC distribution boards, AC LT cables and related accessories.
- 5.14 Installation, Testing and Commissioning of Uninterrupted Power Supply (UPS), Distribution boards, Cables and related accessories.
- 5.15 Installation, Testing and Commissioning of Battery Bank, Battery Charger, Distribution boards, Cables and related accessories.
- 5.16 Laying of LT Power and Control Cables along with termination at both the ends.
- 5.17 Installation, Testing and Commissioning of SCADA and Energy Management System along with suitable communication system for interfacing PCU, Transformer, GIS, HT Panel, UPS, Fire alarm panel, WMS and other equipment with SCADA, remote monitoring capabilities and internet facility equipped with functionality as per Central Electricity Authority (Technical Standards for Connectivity to the Grid) (Amendment) Regulations, 2019.
- 5.18 Installation, Testing and Commissioning of Telemetry System for communication of Plant Data to the Transmission System Operator as per Central Electricity Authority (Technical Standards for Communication System in Power System Operations) Regulations, 2020.
- 5.19 Earthing of PV Modules, Module Mounting Structures, PCU, Switchgear panels, Transformers, and all other electrical equipments.
- 5.20 Installation of lightning protection system for entire plant facilities.
- 5.21 Installation of indoor & outdoor illumination (off-shore and on-shore) system including all required accessories and laying of power supply cables.



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- 5.22 Installation, Testing and Commissioning of Weather Monitoring Station along with laying of required power supply and communication cables.
- 5.23 Installation, Testing and Commissioning of Water Quality Monitoring System and Water Flow Monitoring System and associated equipment.
- 5.24 Installation of CCTV cameras on strategic locations including all required accessories, laying of power/communication cables and installation of monitoring station.
- 5.25 Installation of fire detection and fire protection system for buildings/containers and switchyard.
- 5.26 Pre-commissioning checks and tests for all equipment.
- 5.27 Synchronization and Commissioning of plant.
- 5.28 Any other works related to installation, testing and commissioning not mentioned but required to complete the Solar Power Plant facilities in all respect.

6 Civil Works

- 6.1 Conducting topographical survey of on-shore portion of the plant area including submission of contour drawings.
- 6.2 Conducting hydrographic survey of 'Maximum Permissible Plant Area' provided in 'Annexure-I: Available Reservoir Area with Contour Details' and submission of contour drawings and survey report.
- 6.3 Conducting geo-technical and geo-physical investigation of 'Maximum Permissible Plant Area' provided in 'Annexure-I: Available Reservoir Area with Contour Details' and submission of survey reports.
- 6.4 Conducting geo-technical investigation of on-shore portion of the plant area including submission of contour drawings and survey report.
- 6.5 Earthwork for site levelling & grading including dozing and rolling off the ground as required to make it fairly flat and well compacted for construction of Main Control Room and Substation, etc.
- 6.6 General clearing of plant site and TL corridor by cutting of any vegetation & shrubs including disposal of waste material.
- 6.7 Construction of Main Control Room.
- 6.8 Construction of outdoor storage shed of area sufficient enough to store spares.
- 6.9 Construction of one security room at Main Gate and one security cabin near water body approach path.
- 6.10 Construction of perimeter boundary wall and main gate for plant area on-shore (approximate dimensions – 133 m x 76 m).



- 6.11 Foundation for 132/33 kV Plant Substation equipment.
- 6.12 Construction of fence for transformer yard and switchyard (on-shore).
- 6.13 Construction of PV Module floating platform including floating system, anchoring and mooring system.
- 6.14 Construction of Transformer floating platform including floating system, anchoring and mooring system.
- 6.15 Construction of floating fence around off-shore portion of the plant.
- 6.16 Suitable arrangement for water shall be ensured to cater day-to-day requirement of drinking water and permanent water supply for module cleaning and other needs of the power plant during entire O&M period.
- 6.17 Construction of approach roads, access roads, internal roads and peripheral roads, as applicable.
- 6.18 Construction of storm water drainage & sewage network including rain water harvesting mechanism (on-shore).
- 6.19 Construction of water tanks, plumbing network for drinking water and cleaning of PV Modules.
- 6.20 Construction of foundation and/or mounting structure for Weather Monitoring Station (on-shore) and associated civil works.
- 6.21 Foundation for Lighting poles, CCTV poles and other equipments.
- 6.22 Foundation for 132 kV double circuit transmission towers from Plant Substation to Interconnection point.
- 6.23 Construction of approach path (RCC/Steel framed structure) to facilitate movement of personnel and equipment from the reservoir bank to the floating platform provided for access to the boat/vessel. This floating platform shall be located where adequate water depth is met at MDDL for the movement of boat/vessel and shall be suitably anchored.
- 6.24 Any other civil works not mentioned but required to complete the Solar Power Plant facilities in all respect.

7 Statutory Approvals

- 7.1 Obtaining statutory approvals /clearances/ compliances on behalf of the Employer from various Government Departments, not limited to, the following: -
 - Pollution control board clearance, if required
 - Mining Department, if required
 - Forest Department, if required



- All other approvals as and when, as necessary for setting up of a solar power plant including CEIG/ CEA, connectivity, power evacuation, Railways, Port Trust authorities etc. (as applicable) as per the suggested guidelines.
- 7.1.1 All statutory approvals/permissions and/or No Objection Certificates (NoC) etc. from the DISCOM for obtaining connectivity at the substation as per Project Particulars provided above.
- 7.1.2 All other statutory approvals and permissions and their respective compliances, not mentioned specifically but are required to carry out hassle free Construction and O&M of the plant.
- 7.1.3 Adequate and seamless insurance coverage during EPC and O&M period to mitigate all risks related to construction and O&M of the plant to indemnify the Employer.
- 7.2 The Contractor shall comply with the provision of all relevant acts of Central or State Governments including payment of Wages Act 1936, Minimum Wages Act 1948, Employer's Liability Act 1938, Workmen's Compensation Act 1923, Industrial Dispute Act 1947, Maturity Benefit Act 1961, Mines Act 1952, Employees State Insurance Act 1948, Contract Labour (Regulations & Abolishment) Act 1970, Electricity Act 2003, Grid Code, Metering Code, MNRE guidelines or any modification thereof or any other law relating whereto and rules made there under or amended from time to time.

8 Operation and Maintenance

- 8.1 Total Operation & Maintenance of the SPV Plant shall be with the Contractor, after operational acceptance of the plant till final acceptance or culmination of the O&M period, shall include deployment of engineering personnel, technicians and security personnel.
- 8.2 To provide a detailed training plan for all O&M procedures to Employer's nominated staff, which shall have prior approval from the Employer.
- 8.3 Employ and coordinate the training of contractors' personnel who will be qualified and experienced to operate and monitor the facility and to coordinate operations of the facility with the grid system.
- 8.4 Discharge obligations relating to retirement/ Superannuating benefits to employees or any other benefit accruing to them in the nature of compensation, profit in lieu / in addition to salary, etc. for the period of service with the contractor, irrespective continuance of employees with the project as employees of Contractor, after conclusion of O&M period.



- 8.5 To maintain accurate and up-to-date operating logs, records and monthly Operation & Maintenance reports at the facility. Contractor shall keep the measured daily data at regular intervals and provide the same to Employer in electronic form, compatible in CSV format. The right to use the data shall remain with the Employer.
- 8.6 The Contractor shall prepare and send Forecasting and Scheduling generation reports as per extant regulations (SERC/CERC) for Forecasting, Scheduling, Deviation Settlement Mechanism and related matters. The scope under this Clause shall also include establishing and maintaining forecasting tools and appointment of QCA/Aggregator, if required. % Error (Deviation) shall be calculated as per the said regulations and DSM Charges in case of deviation beyond the permissible limits shall be borne by the Contractor.
- 8.7 Procurement of spare parts, overhaul parts, tools & tackles, equipment, consumables, etc. required for smooth operation and maintenance of the plant as per prudent/standard utility practices, OEM recommendations and warranty clauses for the entire O&M period
- 8.8 To upkeep all administrative offices, equipment rooms, roads, vehicular parking, tool room, stores room, equipment, clean, green and in workable conditions.
- 8.9 To carry out periodic overhauls or maintenance required as per the recommendations of the original equipment manufacturer (OEM) and to furnish all such periodic maintenance schedules at the time of plant commissioning/ start of O&M contract.
- 8.10 Handover the system to maintain an inventory of spare parts, tools, equipment, consumables and supplies for the facility's operation along-with required details of recommended spares list with all associated information regarding replacement records, supplier details, tentative cost, storage details, specifications on the basis of replacement frequency and mean time between failures (MTBF) and mean time to restore (MTTR) at the culmination of penultimate year under O&M period.
- 8.11 Availability of vehicles for Employer/ his authorized representative staff during construction and O&M period as per requirement may be ensured, failing which Employer shall have full right for alternate arrangement at the risk & cost of the contractor.
- 8.12 The contractor shall be responsible for all the required activities for the successful running, committed energy generation & maintenance of the Solar Photovoltaic Power Plant covering:
- Deputation of qualified and experienced engineers and technicians at the facility.



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- Deputation of Security personnel for the complete security of plant.
- Successful running of Solar Power Plant for committed energy generation.
- Co-ordination with STU/SLDC/other statutory organizations as per the requirement on behalf of Employer for Joint Metering Report (JMR), furnishing generations schedules as per requirement, revising schedules as necessary and complying with grid requirements.
- Monitoring, controlling, troubleshooting maintaining of logs & records, registers.
- Furnishing generation data monthly to Employer by 1st week of every month for the previous month to enable Employer raise commercial bills on consumers.
- Periodic cleaning of solar modules as approved by the Employer and water quality as per the recommendations of OEM
- Quarterly visual inspection of floats, anchoring and mooring system and other off-shore installations using underwater drone videography & photography. The drone shall have low-light 4K UHD camera.
- Replacement of Modules, Invertors/PCU's and other equipment as and when required during the O&M period without additional cost to Employer

8.13 Continuous monitoring of the performance of the Solar Power Plant and regular maintenance of the whole system including Modules, PCU's, transformers, overhead line, outdoor/indoor panels/ kiosks etc. are necessary for extracting and maintaining the maximum energy output from the Solar Power Plant.

8.14 Preventive and corrective O&M of the Solar Photovoltaic Power Plant including supply of spares, consumables, wear and tear, overhauling, replacement of damaged modules, invertors, PCU's and insurance covering all risks (Fire & allied perils, earth quake, terrorists, burglary and others) as required.

8.15 The period of Operation and Maintenance will be deemed to commence from the date of completion of performance demonstration/Operational acceptance and successively the complete Solar Photovoltaic Power Plant to be handed over to the O&M contractor for operation and maintenance of the same. O&M contract shall further be extended on the mutually agreed terms and conditions for the mutually agreed period.

8.16 All the equipments required for Testing, Commissioning and O&M for the healthy operation of the Plant must be calibrated, time to time, from the NABL accredited labs and the certificate of calibration must be provided prior to its deployment.

8.17 The Contractor shall ensure that all safety measures are taken at the site to avoid accidents to his or his sub-contractor or Employer's Workmen. This will include