HINDUSTAN PETROLEUM CORPORATION LIMITED (HPCL)

Domestic Competitive Public Bidding

Invitation to Bid Document

For

Selection of EPC Contractor for

DESIGN, ENGINEERING, PROCUREMENT, CONSTRUCTION, TESTING, COMMISSIONING, AND OPERATION & MAINTENANCE OF A SOLAR PHOTOVOLTAIC (PV) POWER PLANT, INCLUDING THE OFFER OF SUITABLE LAND ON LEASE IN MAHARASHTRA

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Abbreviations used in this Tender

Sr. No.	Abbreviation	Meaning
1	PO	Purchase Order
2	PQC	Pre-qualification Criteria
3	PAN	Permanent Account Number
4	EMD	Earnest Money Deposit
5	BG	Bank Guarantee
6	CPBG	Composite Performance Bank Guarantee
7	SD	Security Deposit
8	MSE	Micro & Small Enterprises
9	GST	Goods and Service Tax
10	PLR	Prime Lending Rate
11	DD	Demand Draft
12	GTC	General Terms and Conditions
13	SBI	State Bank Of India
14	SOR	Schedule of Rates
15	GST	Goods and Service Tax
16	CGST	Central Goods and Service Tax
17	SGST	State Goods and Service Tax
18	IGST	Integrated Goods and Service Tax

1. INSTRUCTION TO BIDDERS

1. This is only an e-Tender Enquiry and not an order. HPCL reserves the right to cancel it at any stage without assigning a reason.

2. The tender should be submitted online only, by the stipulated due date and time, as specified in the tender. Late / delayed tenders submitted online after the due date and time, for whatsoever reasons will not be considered. Offers sent through post, telegram, fax, telex, e-mail, courier will not be considered.

3. All communication regarding the tender including queries, if any, and submission of offers shall be done online.

4. Two Bid System: Bidders are required to submit offer in two parts, namely "Unpriced (Technical Bid)" & "Priced Bid".

5. Bidders shall be required to arrange all resources, including Digital Certificate and Internet connections at their own cost, for participating in online tenders.

6. HPCL shall not be responsible for any delays reasons whatsoever in receiving as well as submitting offers, including connectivity issues. HPCL shall not be responsible for any postalor other delays in submitting EMD / tender cost wherever applicable.

7. HPCL will not be responsible for the cost incurred in preparation and submission of bids including the cost of digital certificate, regardless of the conduct of outcome of the biding process.

8. Bidders are requested to quote unit rates (per unit quantity) in the on-line price bid only.

9. Please do not quote / mention rates anywhere else in the tender other than online price bid.In case bidders quote rates at any other place (other than online price bid), **THE OFFER OF PARTY SHALL BE REJECTED.**

10. Bidders should quote rate inclusive of all taxes and duties.

11. Request for extension of tender submission due date, if any, shall be considered at the sole discretion of HPCL however, request for extension received within two (2) days for limited tenders / three (3) days for public tender of tender submission due date /time shall not be considered.

12. HPCL may, at its discretion, on giving reasonable notice online to extend the bid due date, inwhich case all rights and obligations of the HPCL and the Bidders, previously subject to the bid due date, shall thereafter be subject to the new bid due date as extended.

13. Please note that queries related to scope of job, tender specifications, terms & conditions etc. should be submitted on line only (by logging in at https://etender.hpcl.co.in) OR by e-Mail in case tender enquiry is floated on GeM Portal by the query end date / time specified in the online tender. The reply of queries sent by bidders/ messagesissued by HPCL pertaining to tender shall be available on tender message board. HPCL, at itssole discretion, may not entertain the queries sent by through any othermode of communication.

14. **BID CLARIFICATIONS/AMENDMENTS BY HPCL :** HPCL may issue clarifications / amendments in the form of online addendum / corrigendum and on Message Board at https://etender.hpcl.co.in (on GeM Portal in case tender floated on GeM portal) during the bidding period and may also issue amendments subsequent to receiving the bids. Bidders shall consider the addendum/ corrigendum/ Messages on Message Board while quoting for the tender. Bidders shall examine the Bidding Document thoroughly and submit to HPCL / HPCL any apparent conflict, discrepancy or error. HPCL / HPCL shall issue appropriate clarifications or amendments, if required. Any failure by Bidder to comply with the aforesaid shall not excuse the Bidder from performing the Services in accordance with the contract if subsequently awarded.

15. In case any deviation sought by bidder is accepted by HPCL, HPCL reserves the right to suitably load the bidder for evaluation purpose only.

16. **DEVIATIONS TO TENDER TERMS:** Bidders are requested to accept tender terms/conditions in totality and should avoid deviations.

i.) In case deviations to tender terms/conditions are unavoidable, the same should be mentioned in ONLINE DEVIATION SHEET. Deviations mentioned elsewhere shall not be considered by HPCL.

ii.) In case, bidder is evaluated L1 bidder and has mentioned deviation to tender terms not in online deviation sheet , but elsewhere and is not withdrawing those deviations, HPCL mayforfeit the EMD (IF APPLICABLE) of the bidder in such cases.

iii.) No new deviation will be received/ accepted from bidder after bid due date. Incase biddersubmits new deviation, his bid will be rejected. At the sole discretion of the

HPCL bidder may be given opportunity to withdraw the deviation and in case the same is not withdrawn by the bidder, the offer of the bidder shall be rejected & EMD/ bid security (ifapplicable) submitted by the bidder shall be forfeited.

17. Break up of Purchase:

HPCL Shall Place two Separate Purchase orders (PO) as mentioned below;

First Purchase Order shall be placed for EPC services of for Design, Engineering, Procurement, Construction, testing, commissioning, and Operation & Maintenance of a Solar Photovoltaic (PV) Power plant of capacity 7MW/9.8MWp Including offer of suitable land on lease along with Transmission Line laying for power evacuation IN MAHARASHTRA state.

Second Purchase Order shall be placed for Comprehensive Maintenance Contract (COMC) for Operation & Maintenance of Solar PV power plant for 10 years including arrangement of spares, consumables, tools, tackles, testing equipment & instruments, manpower for maintenance of solar PV plant on turnkey basis.

Vendor to give extended validity as per declaration provided in the tender document to enable HPCL place separate contract for COMC on GeM Portal also post defect liability period as per tender terms and conditions.

18. Order of Precedence

In case of an irreconcilable conflict amongst General Conditions of Contract (GCC) and other conditions mentioned in Scope of Work, SCC, Specifications or Price Schedule / Schedule of Rates, the following shall prevail to the extent of such irreconcilable conflict in order of precedence:

a. Final Contract Agreement

b. Letter of Acceptance (LoA) / Work Order

c. Special Conditions of Contract (SCC)

d. Scope of Work

e. Instruction to Bidders

f. General Conditions of Contract (GCC)

HPCL GTC shall prevail for any clause which is not available in GeM GTC.

In case of any issue in placing PO on GeM, bidder shall agree to accept HPCL SAP PO. All terms and conditions as applicable in this GeM Tender shall apply to order placed in HPCL SAP also.

19. Contact Details:

CONTACT PERSONS FOR TECHNICAL/COMMERCIAL CLARIFICATIONS			
	CONTACT PERSONS NAME/ DESIGNATION/LOCATION	**LAND LINE NO /MOBILE NO**	**EMAIL ID**
Technical Query	**Mr. Gagandeep Singh Sodhi** GM-Renewable Energy, HQO	022-22759508	gssodhi@hpcl.in
	Mr. Kiran Kumar Marada Sr. Engineer-Renewable Energy, HQO	8449905551	kiran.marada@hpcl.in
Commercial Query	**Ms. Pallavi Jhingran** DGM-CPO	022 – 23030303	pallavijhingran@hpcl.in
	Ms. Radhika Mahto Sr. Manager- Category Management	022 – 23030081	radhikamahto@hpcl.in

Introduction and Scope of Work

The Tender is invited for Design, Engineering, Procurement, Construction, testing, commissioning, and Operation & Maintenance of a Solar Photovoltaic (PV) Power plant of capacity 7MW/9.8MWp Including offer of suitable land on lease along with Transmission Line laying for power evacuation IN MAHARASHTRA state. The evacuated power shall be utilized at HPCL marketing locations under captive consumption through open access. There will be 15-20 HPCL consumer locations. Exact location details shall be shared with successful Bidder.

Brief Scope of work :

Scope of Supply & Work includes offer of suitable land on lease basis, Design, Engineering, Supply, Procurement, Construction, Testing, Operation and Maintenance, laying of suitable 33KV Transmission line for Power evacuation, Installation of required Metering installations at plant level & load consumption locations, multi – level inspections, packing and forwarding, supply, receipt, unloading and storage at site, associated civil works, services, permits, licenses, installation and incidentals, insurance at all stages, erection, testing, commissioning, default liability period, operation and maintenance of 7MW/9.8MWp Solar PV Power Project at Maharashtra state and performance demonstration with associated equipment and materials on turnkey basis along with 10 (5+5 Year extendable based on the performance of the quality of first 5 Years) years comprehensive operation and maintenance from the date of Completion of Defect Liability Period. Defect Liability period shall be 12 months from the date of commissioning of project. All works shall be executed as per Technical Specifications given in this Tender Document. Bidder also has to provide 2 no's PVsyst subscriptions to HPCL valid for 1 year to the monitor performance of solar plant under various conditions.

1. Land Procurement

1.1 The bidder shall identify and offer suitable land on lease to HPCL (either on direct lease from landlord or on sub-lease from the bidder), for the solar PV project. Successful bidder should conduct preliminary feasibility studies to ensure that the land meets technical requirements such as solar irradiance, accessibility, terrain suitability and optimum distance from the suitable substation for power injection.

1.2 The bidder will also provide a 30 years Title search report (TSR) and other necessary documents (viz., title documents, revenue record, encumbrance certificate etc.,) required for carrying out land due diligence which would be carried out by HPCL.

1.3 On being selected, the selected bidder will obtain environmental clearances and necessary permits for establishing and maintaining the solar PV project on the offered land. The bidder

shall undertake the development of the land, including necessary levelling, grading, and site preparation to accommodate the solar PV installation at bidder's costs.

1.4 Infrastructure development, such as access roads including right of way, fencing, and security measures, shall also be the bidder's responsibility at bidder's costs.

Site Topography Details and Site Assessment:

1.5 On selection, Bidder shall carry out the detailed site survey including Topographic Survey, Contour mapping, Soil Investigations, geo-technical investigations etc. and shall get acquainted with information such as Soil Properties, availability of water, availability of evacuation facility, climatic conditions, requirement of statutory approvals etc., The bidder should take care of these during design and engineering of the project.

1.6 Claims and objections due to ignorance of site condition will not be considered after submission of the bid. Bidder shall fully acquaint himself to all conditions and matters, which may in any way affect the project or the cost thereof. The bidder shall be deemed to have independently obtained all necessary information for the purpose of preparing the bid and his bid as accepted shall be deemed to have taken in to account all contingencies as may arise due to such information or lack of the same

Arrangement of Land for Project:

1.7 Land required for setting up of solar power Project & its evacuation arrangement up to inter connection points of state grid Substation shall be identified and offered by the bidder on either direct lease or sub-lease to HPCL. All bidders are required to plan the execution of project in their identified locations only. A bidder shall have to quote 7MW/9.8MWp at one location. The land area arranged shall not be less than @ 3 Acre /MWp of quoted capacity.

1.8 Additional Approaches, strengthening and maintenance, widening of Roads wherever required for Project execution from main/connecting road shall be developed by Bidder at his own cost.

1.9 Land required for setting up of project and other related activities will be arranged by the Bidder only. No land for any purpose will be provided by HPCL

1.10 Land shall be offered on lease basis. On selection of a bidder, HPCL shall execute lease deed with the owner(s) of the offered land or with the selected bidder, if the offered land is owned by or taken on lease by the selected bidder from the landowners. The tenure of land lease will be 27 years. Cost pertaining to lease deed registration executed between HPCL and landowners/bidder who have leasehold rights will be borne by HPCL

1.11 The details/proof of ownership of land along with nil-encumbrance certificate from the concerned authorities is required to be submitted at the time of bidding. The Bidder may offer encumbered land, provided he undertakes that the encumbrance will be released within 60 days of LOA/PO. If the encumbrance is not released within 60 days of PO or within an extended

date as agreed by HPCL in writing, HPCL reserve the right to forfeit the EMD/SD and cancel the PO.

1.12 The land should be contiguous in nature and must be accessible by road (suitable for movement of heavy vehicles for transportation of equipment/ machineries like transformers, inverters etc.)

1.13 The land should not be in or within the prohibited range of any wildlife-protected area or forest area, or defense establishment. There should be no government restriction in setting up of renewable power projects on the offered land.

1.14 Construction of boundary fencing around the solar plant shall be within the scope of selected bidder.

1.15 Widening, strengthening and maintenance of internal roads/access roads/temporary roads for transportation of goods shall be carried out by the Bidder at his own cost during project execution. Permissions as required from the concerned local authorities shall be obtained by the Bidder. Further, Land development & maintenance for smooth functioning of Project will be responsibility of Bidder. Bidder is also required to liaise with Authorities for permissions/Right of Ways for the Transmission line execution. Any costs for the aforesaid activities including, payment of supervision charges, if any, for execution of the substation & transmission line shall be responsibility of Bidder and borne by him.

Land Documents submission:

1.16 Documents required to be submitted for transfer of land on Lease basis shall be as provided in the list below:

a. 30 years title search report from Advocate along with copies of supporting documents of title.
b. No Dues Certificate from the revenue authorities regarding any pending land revenue on the offered land etc.
c. No land related proceedings/litigation is pending on the offered land before any authority/court;
d. There is no restriction under any local law for transfer of offered land on lease for the required purpose.
e. There is no acquisition proceedings with respect to the offered land.

1.17 Bidder shall be responsible for provision of any statutory clearances and/or land conversion (Urban Land Ceiling, Non-Agricultural Permission, etc.) as required for successful commissioning of Solar Project and evacuation of power

Schedule of Land Transfer:

1.18 The Bidder will facilitate transfer/lease of the land in name of HPCL as per following schedule:

Submission of land documents as mentioned in Article 1.16 (a) to (e)	Within 14 days of PO
Submission of nil encumbrance certificate along with statutory clearances and/or change of land use as mentioned in Article 1.17 and feasibility approval from MSEDCL/DISCOM for Captive usage under Open access regulations	Within 60 days of PO
Land Lease agreement post Title Search Report and Due Diligence	Within 120 days of PO

In the event of any failure to meet the above-mentioned timelines by the selected Bidder, HPCL shall be entitled to cancel the Purchase Order and forfeit the SD/EMD.

Location of Land:

1.19 The details of project shall be proposed by the bidder as per the attached format with tender document [Form 1(a): Solar Plant Technical Details] and for proof of arrangement of land [Form 1(b): Undertaking by Bidder for Land] at the time of bid submission.

1.20 The successful bidder at his own risk and cost, can change the location of land and connectivity once, if any difficulties faced in obtaining statutory approval, land legal clearance issues etc. with consent of HPCL within one month of issue of PO. However, the cost, time of completion, generation etc. quoted by the bidder/ mentioned in PO shall remain firm and no change is allowed due to change in details filled in above format.

1.21 Any financial implications arising due to change in location land / connectivity shall be borne by the Bidder

1.22 Bidder is also required to liaise with Authorities and make appropriate payments for permissions/Right of Ways for the Transmission line execution. Payment of Supervision charges if any for execution of the substation & transmission line shall be responsibility of Bidder and borne by him. All statutory fees shall be paid by HPCL.

1.23 At any stage during project designing, Engineering or execution, if it is found that the extent of land, annual recurring cost of the land, length of the transmission line, Nos. of switchyard bays at State Grid sub-station increases beyond the Contract Price, the additional financial impact if any shall be on the Bidder.

2. ***Transmission Line laying:***

i. Laying of 33 kV Over Head Transmission Line / Under Ground Cable to Interconnecting Substation as per DISCOM / STU specifications / requirements including Right of Way, permits and approvals, DISCOM supervision and maintenance charges are in Bidder's scope.

ii. Installation of required Metering installations at plant and consumer locations shall be in the scope of Bidder

2.1 ***Open Access feasibility study, report submission and Liasoning:***

i. Bidder should conduct open access feasibility study at proposed land for power evacuation and at Consumer locations (15-20 no's) of HPCL for metering arrangement suitable for open access consumption.

ii. Liaison with appropriate Government authorities for Grid Connectivity/Open Access Permission including preparation of application and supporting document required by Discom, Liosion with State Discom/Transco for grant of connectivity at the nearest possible substation from our generation site needed for construction, commissioning and transmission of the power.

iii. Identify requisite statuary approvals towards Grid Connectivity, transmission line laying, Energy Evacuation thru Captive arrangement and to utilize this energy at identified locations.

iv. Finalizing various formalities, registration, documentations etc. to be submitted to Govt. Departments/ Agencies in each scheme

v. Liaising and obtaining clearance/ confirmation from MSEDCL/ TATA DISCOM/ ADANI DISCOM/ Other DSICOMs/CEA/ PESO/ NHAI/any other statutory agency for evacuation of power from proposed solar plant and at consumption points.

vi. Preparation of all open access permission documents (both at generation end and consumption) as required for using the generated solar power under open access for captive use in our own multiple operation locations in Maharashtra.

vii. Prepare initial application and shall coordinate/ submit all necessary supporting documents for registration and obtaining NOC/ In- Principal Approval from Statutory Nodal Agencies/ Clearance from ELECTRICITY DISTRIBUTION COMPANIES (DISCOM - MSEDCL/TATA POWER/ADANI/Any other DISCOMs etc. as listed below but not limited to following:

A. Registration of Project with MSEDCL for captive power under as per Maharashtra Electricity Regulatory Commission open access Regulation 2016.

B. Arranging survey by Electricity Distribution Company (DISCOM), if required for Connectivity Approvals.

C. Arranging approval of Technical & Commercial Feasibility Report by Electricity Distribution Company (DISCOM), if required for

Connectivity Approvals

D. Submission of necessary application to Maharashtra Electricity Regulatory Commission (MERC) and Discoms for ascertaining Captive status of the Project
E. Submission of Application for obtaining In-principal Connectivity Approvals and Open access approval from Nodal Agency (MSEDCL/MERC).
F. Arranging any other approval or clearance required from MERC/MSEDCL/DISCOMs for initiating the project implementation.
G. Submission of Application and required Technical Data/Information for obtaining Final Connectivity Approvals from Nodal Agency.
H. Execution of interconnection agreement between HPCL and concerned Electricity Distribution Company (DISCOM).
I. Additional Approvals, Consent to Establish & Consent to Operate from Pollution Control Board, as applicable.
J. Approval from Electrical Inspector
K. Any other statutory approval required for the installation and commissioning of the Solar Plant under open access.

3. Design and Engineering:

3.1. The Contractor shall plan and design for the electrical / mechanical / civil requirements including but not limited to plant configuration, space optimization, distance between rows of modules, sufficient passage for vehicle and man-power movement in the plant, mounting structures, location of inverter room, cable routing, selection of equipment and items, procurement plan etc. to enhance plant output.

3.2. The Contractor has to carry out the complete soil investigation of the site, through Government approved laboratory before designing various civil structures. The design of all civil foundations, R.C.C structures, buildings etc. will be carried out considering appropriate seismic zone of the area. All appropriate loads, wind velocity, seismic factors etc. will be considered as per the relevant IS Specifications while designing any civil structure. Also, the environmental conditions, soil characteristics, atmospheric effect, ground water table level, rain water data, land profile, etc. must be considered as per site actual condition and accordingly appropriate precautions and preventive measures will be taken while designing the structures. RCC structures will be adopted considering surrounding weather and soil conditions of site and as per the relevant IS codes. The concrete mix design test of minimum M25 grade with minimum 350 kilograms of cement content per M3 concrete shall be carried out in Govt. certified laboratory or NABL accredited laboratory.

3.3. The Contractor shall take into consideration all parameters like wind speed, seismic zone, safety factor and safe Soil Bearing Capacity (SBC) etc. for the purpose design and construction of civil foundations for all civil work as per relevant IS codes.

3.4. The Contractor shall carryout Shadow Analysis at the site and accordingly design strings and arrays layout considering optimal usage of space, material and labor.

3.5. The Contractor shall prepare the detailed design basis report (DBR) along with relevant standards (with respective clause description) and PERT Chart. The Contractor shall submit a copy to client for review and approval prior to detail engineering. The Contractor shall follow the timeline provided below for submission and approval of documents/drawings.

3.6. The Contractor shall follow the timeline provided for submission and approval of documents/drawings/project implementation.

3.7. All documents, basic design data, design documents, as built drawings and engineering information, shall be submitted to both (PMC deployed at site by HPCL & HPCL Project Incharge at HQO) in soft as well as hard copies for review and approval. Every drawing shall also be submitted in '*.dwg' (AutoCAD) format. In case of design calculations done in spread sheet, editable (working) soft copy of the spread sheet shall also be submitted along with 'pdf' copies during every submission.

3.8. All designs, specifications, reports, etc. submitted or used by the Successful Bidder at any point in time shall first be approved by client and shall be revised by Successful Bidder as per instructions given by client if required prior to execution.

3.9. The successful Bidder shall submit a comprehensive project management schedule in the form of a Gantt chart CPM/PERT chart within 15 days from the date of placement of PO and shall be liable for abiding by the schedule.

3.10. The successful Bidder shall submit general engineering drawings of all civil work, including but not limited to, layout of the power plant at different buildings indicating rows of photovoltaic modules, SLD, location of control panels, DC and AC Distribution Boxes, MMS design, civil foundations and anchoring design / details, shading analysis and generation estimation report etc.

3.11. The successful bidder shall submit technical specifications / Drawings / Designs and datasheets for all electrical work including but not limited to electrical component of the power plant including photovoltaic modules, cables, connectors, junction boxes, inverters, transformers, monitoring and auxiliary systems, etc.

3.12. The successful Bidder shall submit a comprehensive maintenance schedule for operation and maintenance of the photovoltaic power plant along with checklists and shall be liable for abiding by the schedule. All construction, operation and maintenance procedures shall be carried out through appropriate relevant standards, regulations and labour laws.

3.13. The Bidder/EPC Contractor shall submit the drawing as per Tender specifications. Any revision in drawing based on Owner's Comments/observations, in case not confirming to tender specification, then revised document shall be submitted within 03 days. In normal circumstances approval of final drawings will be given by Owner within 10 days from date of submission of revised drawings by Bidder. In case of multiple revision of documents/drawings then complete time taken by Bidder for revision of documents/drawings will be attributed to Contractor's account and no claim will be entertained by Owner on account of delay in approval of drawing/documents.

3.14. The Successful Bidder shall submit to the Owner the documents in hard copy (3 Set) and soft copy to both with proper reference and drawing numbers.

3.15. The Successful Bidder shall submit all drawings in AutoCAD format in addition to PDF.

3.16. The Successful Bidder shall also be submitted a structural Design Basis Report (DBR) for each design, Input / source file of STAAD/STRAP/STRUD/ETABS/ etc for the particular structure to the Owner in hard copy and soft copy for review and approval.

3.17. The Successful Bidder has to provide Input/Source file of STAAD / STRAP / STRUD / ETABS /etc and AutoCAD drawings for the patented designs also. The Bidder Shall submit detailed design calculations of foundation, columns, walls, stairs, beams & slabs – all the structural elements in hard as well as soft copy.

3.18. No revisions are entertained once the drawing is approved. If client is allowing for revision in approved drawing due to valid reason, then time required for approval process shall not be accounted for any extension.

3.19. The Contractor has to submit all drawings, which are related to plant for approval and the Contractor, shall not claim any drawing as their intellectual property. Drawing which is developed for project will be the intellectual property of the Owner

4. Procurement & Supply

The scope of procurement and supply for individual sites including testing at manufacturer's works, packing, transit insurance, receipt, unloading, storage at site of equipment and materials for Grid Interactive Solar PV Power Plant with associated system shall include but not limited to the following

4.1. Adequate capacity of Solar PV Modules.

4.2. Module Mounting Structure (MMS) with necessary hardware suitable for mounting PV Modules.

4.3. String Combiner Box (SCB) along with mounting structure in case of central inverter / string inverter configuration as per design approved by client.

4.4. Solar Cables of min 4 Sq mm size and rating from PV Modules to SCB / String Inverter along with straight/Y-connectors, ferrules, conduits, cable ties and other materials required for cable laying and termination at both the ends.

4.5. Power Conditioning Units (Central / String Inverter) of appropriate rating. DC Cables from of appropriate size and rating from SCB to Central Inverter along with cable termination kits, ferrules / tags, conduits, cable ties and other materials required for cable laying and termination at both the ends.

4.6. AC Combiner Box / LT Switchgear panel of appropriate rating with adequate number of inputs for pooling of power from Central/String Inverter to Inverter transformer.

4.7. AC Cables (LT & HT) of appropriate size and rating along with cable termination kits, ferrules / tags, conduits, cable ties and other materials required for cable laying and termination at both the ends.

4.8. Inverter transformers of appropriate rating. The MVA rating shall be considered the Maximum AC power available at metering point of power evacuation.

4.9. 33 kV Indoor Panels including Vacuum Circuit Breakers, Current Transformers, Potential Transformers, Relays and other accessories for complete protection. Outgoing feeder of the panel shall be rated as per rated capacity / design of the plant.

4.10. ABT/SEM meters with all necessary metering rated CTs and PTs at the plant take-off point as well as at the interconnecting substation as per Appropriate Authority / CEA Metering Regulations 2006 as amended time to time and state metering code to meet open access captive consumption guidelines. No separate payment shall be paid for Metering set up at plant and interconnecting substation. Bidder should quote accordingly.

4.11. ABT/SEM meters with all necessary metering rated CTs and PTs and other installations at Consumer locations as per Appropriate Authority / CEA Metering Regulations 2006 as amended time to time and state metering code to meet open access captive consumption guidelines. Payment for metering set up at consumer locations shall be paid on actual quantity installed. For each location, ABT/SEM metering set up with all installations including testing and commissioning considered as one quantity.

4.12. 33 kV Over Head Transmission Line / Under Ground Cable (rated for the AC power available at metering point of power evacuation) including Poles / Towers, Conductors, Insulators, Cable Termination Kits and associated accessories from Plant take-off point to Interconnecting Substation as per DISCOM / STU specifications / requirements including Right of Way, permits and approvals, DISCOM supervision and maintenance charges

4.13. 33 kV Indoor / Outdoor Switchgear panel / bay and other associated accessories (rated capacity of the plant) for integration of Solar PV Power Plant at the interconnecting substation as per DISCOM / STU specifications / requirements including replacement of substation equipment / materials, permits and approvals, DISCOM supervision and maintenance charges.

4.14. Auxiliary supply system including auxiliary transformers, distribution panels, cables and related accessories for plant internal consumption.

4.15. Uninterrupted Power Supply (UPS) including Batteries, Distribution Boards, Cables and associated equipment.

4.16. Battery Bank, Battery Charger, Distribution Boards, Cables and associated equipment

4.17. LT Power and Control Cables including end terminations and other required accessories

4.18. Communication cables including end terminations and other required accessories.

4.19. Supervisory Control and Data Acquisition (SCADA) for remote monitoring/control of plant facilities

4.20. Data Acquisition System and communication infrastructure (RTU) to transfer real time data to SLDC / RLDC as per DISCOM / STU specifications

4.21. Earthing system including earth strip/cables, earth electrodes, earth enhancing compound and all other associated materials for complete earthing of the plant

4.22. Lightning Protection System for entire plant area.

4.23. PEB buildings for Office, Control Room, Panels Room etc.

4.24. LED luminaries with diffuser for illumination, lighting poles, distribution boxes and power supply cables along with required conduits, fittings, etc

4.25. Weather monitoring station shall include but not be limited to the following:

(i) Pyranometers – One in Horizontal Plane for GHI and two in inclined plane for GHI – Minimum 2 (Two) Nos.

(ii) Ultrasonic Anemometer (wind speed and direction) – 1 (one) no.

(iii) Temperature Sensor (ambient and module surface) – 3 (three) nos.

(iv) Power source to the all sensors wherever required

(v) Data Logger with option to connected SCADA system / EMS etc

LED luminaries with diffuser for illumination, lighting poles, distribution boxes and power supply cables along with required conduits, fittings, etc

4.26. CCTV cameras with monitoring station along with mounting poles, power supply cables, communication cables, network switches, conduits, fittings, etc

4.27. Fire detection and fire protection system in buildings/containers, inverter / transformer yard and switchyard.

4.28. Testing instruments as specified

4.29. Water cleaning of panels with piping network all around the plant

4.30. Any other equipment / material, not mentioned but required to complete the Solar Power Plant facilities in all respect.

4.31. The material supplied shall be as per the ALMM (Approved List of Module Manufacturer) List published by MNRE (Ministry of New & Renewable Energy).

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 Module Mounting Structure and interconnection of PV Modules.

5.2. Installation, Testing and Commissioning of String Combiner Box in case of String/Central Inverter configuration.

5.3. Installation, Testing and Commissioning of Power Conditioning Units (Central / String Inverter). Central Inverter, if provided, shall be installed inside or outside as per manufacturer instructions.

5.4. Laying of Solar cables through HDPE conduits with proper sealing in the cable trench from PV Modules to SCB / String inverters along with termination at both the ends

5.5. Installation, Testing and Commissioning of AC Combiner Box / LT Switchgear panel in case of String Inverter configuration. AC Combiner Box / LT Switchgear panel, if provided, shall be installed inside existing Main Control Room

5.6. Laying of DC cables from SCB to Central inverter along with termination at both the ends in case of Central / String Inverter configuration

5.7. Laying of AC LT cables from AC Combiner Box / LT Switchgear panel to Inverter transformer along with termination at both the ends in case of String Inverter configuration

5.8. Laying of AC LT cables along cable trays from Power Conditioning Unit to Inverter transformer along with termination at both the ends

5.9. Installation, Testing and Commissioning of Inverter transformers

5.10. Installation, Testing and Commissioning of ABT meters with all necessary metering rated CTs and PTs at Plant take-off point as well as at Interconnecting Substation as per CEA Metering Regulations 2006 as amended time to time and state metering code. ABT Meters at plant take-off point shall be installed inside existing Main Control Room.

5.11. Installation, Testing and Commissioning of ABT meters with all necessary metering rated CTs and PTs and other installations at consumer locations as per CEA Metering Regulations 2006 as amended time to time and state metering code to meet open access captive consumption guidelines.

5.12. Laying of AC cables from Inverter transformer to Plant take-off point along with termination at both the ends

5.13. Installation, Testing and Commissioning of 33 kV Over Head Transmission Line / Underground Cable from Plant take-off point to Interconnecting Substation.

5.14. Installation, Testing and Commissioning of 33 kV Switchgear panels / bay and associated accessories for integration of Solar PV Power Plant at the interconnecting substation including rearrangement of substation equipment / materials

5.15. Installation, Testing and Commissioning of auxiliary power supply system consisting of auxiliary transformers, AC distribution boards, AC LT cables and related accessories.

5.16. Installation, Testing and Commissioning of Uninterrupted Power Supply (UPS), Distribution boards, Cables and related accessories inside existing Main Control Room

5.17. Installation, Testing and Commissioning of Battery Bank, Battery Charger, Distribution boards, Cables and related accessories inside existing Main Control Room

5.18. Laying of LT Power and Control Cables along with termination at both the ends

5.19. Installation, Testing and Commissioning of SCADA inside existing Main Control Room along with suitable communication system for interfacing PCU, Transformer, 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

5.20. Installation, Testing and Commissioning of Telemetry System inside existing Main Control Room 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.

5.21. Earthing of PV Modules, Module Mounting Structures, PCU, Switchgear panels, Transformers, and all other electrical equipment

5.22. Installation of lightning protection system (LPS) for entire plant facilities

5.23. Installation of illumination system including all required accessories and laying of power supply cables.

5.24. Installation, Testing and Commissioning of Weather Monitoring Station along with laying of required power supply and communication cables.

5.25. Installation of CCTV cameras on strategic locations including all required accessories, laying of power/communication cables and installation of monitoring station

5.26. Installation, Testing and Commissioning of robotic/ semi-robotic type cleaning system

5.27. Installation of fire detection and fire protection system for buildings/containers, transformer yard and switchyard.

5.28. Pre-commissioning checks and tests for all equipment.

5.29. Synchronization and Commissioning of plant.

5.30. 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 work and other non-electrical work the scope of civil works for the plant facilities shall include, but not limited and its specification mentioned in **Technical specification for Civil, Mechanical and plumbing** work given in this tender document.

6.1. Conducting geotechnical investigation and topographical survey of the plant area. Clearing plant site and transmission line corridor by cutting of trees, bushes and shrubs including disposal of waste material.

6.2. Earthwork for site grading, cutting, filling, levelling and compaction of land. Construction of boundary fencing around the entire plant area (wherever not available already).

6.3. Construction of foundation for Module Mounting Structure (MMS) and erection of MMS.

6.4. Construction of foundation and / or mounting structure for String Combiner Box, AC Combiner Box / LT Switchgear panel, Inverter, Inverter Transformer, Auxiliary Transformer, 33 kV Switchgear panel, Metering panel and other electrical equipment. Construction of cable trenches inside existing Main Control Room.

6.5. Construction of fence for transformer yard and switchyard.

6.6. Construction of foundation and / or mounting structure for Weather Monitoring Station and associated civil works.

6.7. Construction of foundation for Lighting poles, CCTV poles and other equipment. Construction of foundation for 33 kV Overhead Transmission Line from Plant take-off point to Interconnecting Substation and associated civil works.

6.8. Construction of foundation and / or mounting structure for 33 kV Switchgear panels / bay and associated accessories for integration of Solar PV Power Plant at the Interconnecting Substation.

6.9. Construction of approach roads, access roads, internal roads and peripheral roads, as applicable.

6.10. Construction of underground water tank for the cleaning of Solar PV Modules and for auxiliary water supply.

6.11. Construction of storm water drainage network for smooth disposal of storm water from the plant to the nearest available drainage outlet.

6.12. 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 HPCL from various Government Departments, not limited to, the following:

(i) Pollution control board clearance, if required
(ii) Mining Department, if required
(iii) Forest Department, if required
(iv) All other approval as and when, as necessary for setting up of the solar power plant including CEIG/ CEA, power evacuation, etc. as per the suggested guidelines.

7.2. All statutory approvals/permissions and/or No Objection Certificates (NoC) etc. from DISCOM / STU for obtaining connectivity at the substation as per Project Particulars provided above.

7.3. All other statutory approvals and permissions and their respective compliances, not mentioned specifically but are required to carry out hassle free Construction, Commissioning and O&M of the plant.

7.4. 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 HPCL.

7.5. 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, HPCL'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. Plant Safety Equipment:

The Contractor shall provide appropriate numbers of foam type fire extinguishers / CO2 extinguishers, sand buckets and transformer discharge rod at Invertor Rooms, Control Room, Security Cabin and Switchyard/Substation. Further, all high voltage places to be provided with danger sign boards with appropriate size and material to last for 25 years.

The contractor shall provide fire protection system in building(s)& transformer yards(as per NFPA& NBC norms)

9. Comprehensive Operation and Maintenance Contract (COMC):

Comprehensive O&M contract shall begin after the completion of Defect Liability period of 12 months from the date of successful commissioning of project. The O&M during the Defect Liability Period shall be in the scope of vendor and no extra payment shall be done by HPCL.

HPCL will issue separate order Comprehensive O&M post completion of Defect Liability period at the rates quoted by successful bidder with respect to this tender enquiry. The scope of work includes Operation and Maintenance (O&M) of the plant for ten (10) years (i.e. initially for 5 years and extendable for further period of 5 years subject to satisfactory performance during the initial 5 years of O&M), wherein the plant shall generate at least equivalent to the guaranteed Performance of the plant. The Bidder shall submit in the Bid a comprehensive project execution schedule as well as Operation and Maintenance (O&M) schedule with resource planning in the form of Gantt chart and shall be liable for abiding by the schedule. It is the responsibility of the Contractor to perform the necessary maintenance/ timely replacement of all Civil /Mechanical or Electrical components of the project during this O&M period such that the guaranteed performance of the plant is not compromised. Any damage to CIVIL/ ELECTRICAL/ MECHANICAL/Communication components of the plant is to be reworked/ replaced/ supplied without any extra cost and time by the Contractor during complete O&M period. The Operation and Maintenance shall be comprehensive. The maintenance service provided shall ensure project functioning of the Solar PV system as a whole and Power Evacuation System to the extent covered in the Contract. All preventive/ routine maintenance and breakdown/ corrective maintenance required for ensuring maximum uptime shall have to be provided. Accordingly, the Comprehensive Operation and Maintenance shall have two distinct components as described below:

a. Preventive / Routine Maintenance: This shall be done by the Contractor regularly and shall include activities such as cleaning and checking the health of the Plant, cleaning of module surface, tightening of all electrical connections, and any other activity that may be required for proper functioning of the Plant as a whole. Necessary maintenance activities, preventive and routine for Transformers and associated switchgears, 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 also shall be included.
b. Breakdown/ Corrective Maintenance: Whenever a fault has occurred, the Contractor has to attend to rectify the fault, the fault must be rectified within 48 hours time from the time of occurrence of fault failing which the Contractor will be penalized as per terms and conditions of this Tender.

The date of Comprehensive Operation and Maintenance Contract period of the Plant shall begin on the date as defined in this Tender. Detailed scope of comprehensive Operation & Maintenance has been described in the below. However, operation of the Power Plant means operation of system as per bidding schedule and workmanship in order to keep the project trouble free covering the guarantee period.

9.1. 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 HPCL in electronic form, compatible in CSV format. The right to use the data shall remain with the client.

9.2. 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.

9.3. To upkeep all administrative offices, roads, tool room, stores room, equipment in clean, green and workable conditions.

9.4. 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.

9.5. 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 and mean time to restore at the culmination of penultimate year under O&M period.

9.6. 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:

(i) Deputation of qualified and experienced engineers and technicians at the facility.

(ii) Deputation of Security personnel for the complete security of plant.

(iii) Successful running of Solar Power Plant for committed energy generation.

(iv) Co-ordination with Discom/STU/CTU/other statutory organizations as per the requirement on behalf of HPCL for Joint Metering Report (JMR), furnishing generations schedules as per requirement, revising schedules as necessary and complying with grid requirements.

(v) Monitoring, controlling, troubleshooting maintaining of logs & records, registers.

(vi) Furnishing monthly generation data to HPCL/Owner by 1st week of every month for the previous month to enable HPCL raise commercial bills..

(vii) Periodic cleaning of solar modules as approved by the HPCL and water quality as per the recommendations of OEM.

(viii) Replacement of Modules, Invertors/PCU's and other equipment used for the plant construction, generation, evacuation, monitoring and metering as and when required during the O&M period without additional cost to HPCL

(ix) Continuous monitoring 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

(x) All the equipment required for Testing, Commissioning and O&M for the healthy operation of the Plant must be calibrated, time to time, from the NABL Accredited laboratory and the certificate of calibration must be provided prior to its deployment.

(xi) The Contractor shall ensure that all safety measures are taken at the site to avoid accidents to his or his sub-contractor or HPCL's Representative. This will include procurement of all safety gadgets during Construction and O&M period including but not limited to, rubber mats of appropriate grade, PPE, rubber gloves and suitable shoes etc

(xii) The EPC Contractor should not misuse the area and/or assign responsibility for the safety of machinery within the premises.

(xiii) Quality Water arrangement for module cleaning should be solely in the scope of the EPC Contractor. EPC Contractor shall ensure that good quality of water available for the cleaning of module, If the quality of water not as per module OEM requirement then EPC contractor shall arrange Water softener / RO system for module cleaning.

(xiv) Electricity arrangement for running the installed pump for cleaning of modules shall be in the scope of EPC Contractor

10. Operation and Performance Monitoring

10.1. Operation part consists of deputing necessary manpower necessary to operate the Solar Photovoltaic Power Plant at the full capacity. Operation procedures such as preparation to starting, running, routine operations with safety precautions, monitoring etc., shall be carried out as per the manufacturer's instructions to have trouble free operation of the complete system.

10.2. Daily work of the operation and maintenance in the Solar Photovoltaic Power Plant involves periodic cleaning of Modules including periodic tilt angle change as and when required, logging the voltage, current, power factor, power and energy output of the Plant at different levels. The operator shall also note down time/ failures, interruption in supply and tripping of different relays, reason for such tripping, duration of such interruption etc. The other task of the operators is to check battery voltage-specific gravity and temperature. The operator shall record monthly energy output, down time, etc

10.3. Earth resistance of Plant as well as individual earth pit is to be measured and recorded every month. If the earth resistance is high (compared to standards) suitable action is to be taken to bring down the same.

10.4. A maintenance record is to be maintained by the operator/ O&M-in-charge to record the regular maintenance work carried out as well as any breakdown maintenance along with the reasons for the breakdowns and steps taken to attend the breakdown, duration of the breakdown etc.

10.5. The Preventive Maintenance Schedules will be drawn such that some of the jobs other than breakdown, which may require comparatively long stoppage of the Power Plant, shall be carried out preferably during the non-sunny days or evenings. Prior information shall be provided to the HPCLHPCL for such preventive maintenance prior to start.

10.6. The Contractor will attend to any breakdown jobs immediately for repair/ replacement/ adjustments and complete at the earliest working round the clock. During breakdowns (not attributable to normal wear and tear) in O&M period, the Contractor shall immediately report the accidents, if any, to the HPCL showing the circumstances under which it happened and the extent of damage and/or injury caused.

10.7. The contractor shall at his own expense provide all amenities to his workmen as per applicable laws and rules.

If negligence / mal operation of the contractor's operator results in failure of equipment, such equipment should be repaired/replaced by the contractor free of cost.

10.8. Below mentioned guidelines, shall be followed for each solar plant:

1. O&M of Solar Power Plant shall be compliant with grid requirements to achieve committed energy generation.
2. Deputation of qualified and experienced engineer/ technicians for the entire O&M period at project site(s).

3. Periodic cleaning of solar modules. The modules shall be cleaned with a periodic interval of 10 days or as and when required additionally as per actual site conditions. It's the responsibility of the contractor to get the modules cleaned during O & M Period.
4. The parameters of the cleaning water shall be as per OEM guidelines.
5. Periodic checks of the Modules, PCUs and BoS shall be carried out as a part of routine Preventive and breakdown maintenance.
   Contractor is required to visit the site at least 4 times/Year. In addition to these 3 visits may be scheduled by HPCL as and when required in a year. In every visit Contractor needs to check the whole system and report of maintenance and performance shall be submitted to HPCL.
6. Immediate replacement of defective Modules, Invertors/PCUs and other equipment as and when required.
7. Supply of all spares, consumables and fixtures as required. Such stock shall be maintained for all associated equipment and materials as per manufacturer's / supplier's recommendations.
8. All the testing instruments required for Testing, Commissioning and O&M for the healthy operation of the Plant shall be maintained/ arranged timely by the Bidder. The testing equipment must be calibrated once in a year from NABL accredited labs and the certificate of calibration must be kept for reference as required.
9. If negligence/ mal-operation on part of the Bidder's operator results in failure of equipment, such equipment should be repaired/ replaced by the Bidder free of cost.
10. Co-ordination with Owner / DISCOM as per the requirement for Joint Metering Report (JMR). The person in charge present at site from bidder's side shall take a joint meter reading in the presence of rooftop owner/lessee on a daily basis. Furnishing generation data (JMR) each month to HPCL positively by 1st week of every month for the previous month. Failure to adhere may result in non-disbursal O&M charges
11. Online Performance Monitoring, controlling, troubleshooting, maintaining of logs & records. A maintenance record register is to be maintained by the operator with effect from Commissioning to record the daily generation, regular maintenance work carried out as well as any preventive and breakdown maintenance along with the date of maintenance, reasons for the breakdown, duration of the breakdown, steps taken to attend the breakdown, etc. Performance reports to be submitted to HPCL.
12. For any issues related to operation & maintenance, a Nominated contact persons contact details shall be made available to the rooftop owner/ plant owner to resolve the issues within 72 hours. If not attended within such stipulated time, a penalty of Rs. 10,000 shall be imposed for the respective plant in which the issue has been highlighted. Further, if the outage of the plant is more than 30 days continuously, then the 50% O&M Performance Bank Guarantee amount shall be encashed by HPCL and if the outage exceeds more than 60 days due to any reason except failure in Grid or fault from DISCOM end then complete O&M Performance Bank Guarantee amount shall be encashed by HPCL. This CPBG will be applicable till the end of defect liability period as per the attached General terms and condition of this contract.
13. If any jobs covered in O&M Scope are not carried out by the contractor/ Bidders during the O&M period, HPCL shall take appropriate action as deemed fit. HPCL reserves the right to make surprise checks/ inspection at its own or through authorized representative to verify the O&M activities being carried out by the contractor.

11. Security Services

11.1. The contractor has to arrange proper security system including deputation of security personnel at his own cost for the check vigil for the Solar Power Plant for the complete scope of works including comprehensive O&M period.

11.2. The security staff may be organized to work on suitable shift system; proper checking & recording of all incoming & outgoing materials vehicles shall be maintained. Any occurrence of unlawful activities shall be informed to HPCL immediately. A monthly report shall be sent to HPCL on the security aspects.

11.3. Any other activities required for completion of project, but not specified in the above shall be in the scope of contractor. The Contractor must provide the BOM of the plant as per the design during the time of submission of design basis report. The detailed technical specifications of major equipment to be followed strictly and are described in the technical specification section.

2. TECHNICAL SPECIFICATIONS AND QUALITY ASSUARANCE

A. DISCLAMIER:

1. Though adequate care has been taken while preparing the Bidding documents, the Bidders/Applicants shall satisfy themselves that the document is complete in all respects. Intimation of any discrepancy shall be given to this office immediately.
2. The specifications mentioned for all the equipment which include Solar modules, PCU, combiner boxes, DC cables, module mounting structures, transformer, CT, PT, LT/ HT cables, interfacing panels, switch gears & other associated equipment etc., to complete the power generation and evacuation to the designated substation, in the present bidding documents are for the reference only. It is subject to revise/ alter as per the design/ planning/ good engineering practices etc., to be carried out by the selected bidder, to the satisfaction of the client or its authorized representatives. It is advised that the bidders must satisfy himself with the prevailing site conditions before design/ plan. The design must be optimized as per the site conditions and directed to achieve the maximum output from the installed capacity at all times. Moreover, the components not separately mentioned, but are required to complete the plant for operation is also included in the scope of bidder and shall be vetted by the client or its authorized representatives.
3. Any civil / electrical / other work, which is not mentioned or included in this Tender document but necessary for the construction and O&M of Solar Power Plant shall be borne by the Contractor. The Contractor shall, unless specifically excluded in the Contract, perform all such works and /or supply all such items and materials not specifically mentioned in the Contract/ Tender Document but can be reasonably inferred from the Contract as being required for attaining completion, commissioning and performance of the facilities, delivering NEEGG and maintaining the plant & achieving NEEGG during O&M period of 10 Solar PV Power Plant as if such work and / or items and materials were expressly mention in the Contract without any extra cost implication and liability to client. All specifications mentioned in this Tender indicates minimum technical requirement. The Contractor may propose alternate specifications or design though the final acceptance of the same is subject to the Owner's discretion.

B. Electrical System: -

A grid connected solar consists of all the equipment which include Solar modules, PCU, combiner boxes, DC cables, module mounting structures, transformer, CT, PT, LT/ HT cables, interfacing panels, switch gears & other associated equipment etc., to complete the power generation and evacuation to the designated substation. The comp should conform to the BIS or IEC or international specifications, wherever such specifications are available and applicable. The specifications mentioned for all the equipment in the present bidding documents are for the reference only. It is subject to revise/ alter as per the design/ planning/ good engineering practices etc., to be carried out by the selected bidder, to the satisfaction of the Client or its authorized representatives. It is advised that the bidders must satisfy himself with the prevailing site conditions before design/ plan. The design must be

optimized as per the site conditions and directed to achieve the maximum output from the installed capacity at all times. Moreover, the components not separately mentioned, but are required to complete the plant for operation is also included in the scope of bidder and shall be vetted by the Client or its authorized representatives.

12. Photovoltaic Modules: -

12.1. Standards and Code: - Photovoltaic Modules shall comply with the specified edition of the following standards and codes (IEC) or equivalent Indian Standards, wherever applicable

Standards	**Description**
IEC 61215/ IS 14286	Design Qualification and Type Approval for Crystalline Silicon Terrestrial Photovoltaic (PV) Modules
IEC 61701- As applicable	Salt Mist Corrosion Testing of Photovoltaic (PV) Modules
IEC 61853- Part 1/ IS 16170: Part 1	Photovoltaic (PV) module performance testing and energy rating –: Irradiance and temperature performance measurements, and power rating
IEC 62716	Photovoltaic (PV) Modules – Ammonia (NH3) Corrosion Testing (**Advisory - As per the site condition like dairies, toilets)**
IEC/IS 61730-1,2	Photovoltaic (PV) Module Safety Qualification – Part 1: Requirements for Construction, Part 2: Requirements for Testing
IEC TS 62804-1	Photovoltaic (PV) modules - Test methods for the detection of potential-induced degradation (PID). IEC TS 62804-1: Part 1: Crystalline silicon (Mandatory for system voltage is more than 600 VDC and advisory for system voltage is less than 600 VDC)
IEC 62759-1	Photovoltaic (PV) modules – Transportation testing, Part 1: Transportation and shipping of module package units

12.2. Technical Requirements: - The total solar PV array capacity (kWp) should not be less than allocated capacity (kW)

Parameter	Specification
Cell/ Module Technology	Mono-crystalline (mono perc half-cut cell panel ≥ 540Wp configuration)
Module Efficiency	≥ **20.0**%
Rated power at STC	No negative tolerance is allowed
Temperature co-efficient of power	better than -0.3%/°C
Application Class as per IEC 61730	Class A

12.3. Component Specifications

12.3.1. The PV Modules glass panel shall be:

(i) For PV Modules with back sheet, toughened low iron glass with minimum thickness of 3.2 mm for mono-crystalline modules incase of monofacial modules.

(ii) In case of glass-glass PV Modules, glass thickness shall be minimum of 2 mm on each side. It shall be laminated using a laminator with symmetrical structure, i.e., heating plates on both sides. PV modules must be warranted with linear degradation rate of power output.

(iii) The glass used shall have transmittance of above 90%.

12.3.2. The back sheet used in the PV modules shall be three-layered structure with outer (air side) layer having fluoropolymer or a material with superior UV stability properties. The back sheet shall have the following properties:

Parameter	Specification
Material thickness	≥ 300 micron
Water vapour transmission rate	< 2 g/m2 /day
Partial discharge test voltage	≥ 1500 V
Elongation at break	> 100%
Adhesion strength with encapsulant	> 40 N/cm
Interlayer adhesion strength	> 4 N/cm

The Client reserves the right to conduct Pressure Cooker (PC) test/ Highly Accelerated Stress Test (HAST) to confirm the durability of the back sheet in accelerated conditions.

12.3.3. The encapsulant used for the PV modules should be UV resistant and PID resistant in nature. No yellowing of the encapsulant with prolonged exposure shall occur.

12.3.4. The sealant used for edge sealing of PV modules shall have excellent moisture ingress protection with good electrical insulation (Break down voltage >15 kV/mm) and with good adhesion strength. Edge tapes for sealing are not allowed

12.3.5. The module frame shall be made of anodized Aluminium, which shall be electrically & chemically compatible with the structural material used for mounting the modules. It is required to have provision for earthing to connect it to the earthing grid. The anodization thickness shall not be less than 15 microns.

12.3.6. 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 IEC 62852/EN 50521 certified MC4 compatible connectors with appropriate length

of IEC 62930/EN 50618 certified 4 sq.mm copper cable shall be provided. The cable length shall be in accordance with the PV Module wiring strategy and adequate to ensure that the cable bending radius standard is not exceeded.

12.3.7. Protective devices against surges at the PV module shall be provided. Low voltage drop bypass diodes shall be provided.

12.3.8. All materials used for manufacturing solar PV module shall have a proven history of reliability and stable operation in external applications. It shall perform satisfactorily in relative humidity up to 85% with temperature between -40°C to +85°C and shall withstand adverse climatic conditions, such as high-speed wind, blow with dust, sand particles etc for wind speed of 180 km/hr on the surface of the panel as per IEC 61730.

12.3.9. Each PV Module shall be provided a RFID tag which is embedded inside the module lamination and must be able to withstand harsh environmental conditions. The RFID data base shall contain the following information. RFID scanner and database of all the modules containing the following information shall also be provided.

- **(i)** Name of the manufacturer of PV Module
- **(ii)** Name of the Manufacturer of Solar cells
- **(iii)** Month and year of the manufacture (separately for solar cells and module)
- **(iv)** Country of origin (separately for solar cells and module)
- **(v)** I-V curve for the module
- **(vi)** Peak Wattage, Im, Vm and FF for the module
- **(vii)** Unique Serial No. and Model No. of the module.
- **(viii)** Date and year of obtaining IEC PV module qualification certificate
- **(ix)** Name of the test lab issuing IEC certificate
- **(x)** Other relevant information on traceability of solar cells and modules as per ISO 9000 series.

12.3.10. Warranty

1. PV modules must be warranted with linear degradation rate of power output except for first year (maximum 2% including LID) and shall guarantee 80% of the initial rated power output at the end of 25 years from the date of supply.
2. The modules shall be warranted for minimum of 10 years against all material/ manufacturing defects and workmanship from the date of supply.
3. The above warranties shall be backed by OEM of the module. OEM shall issue the above warrantee certificate directly in the name of HPCL
4. The manufacturer should warrant the output of Solar Module(s) If, Module(s) fail(s) to exhibit such power output in prescribed time span, the Contractor will either deliver additional PV Module(s) to replace the missing power output with no change in area used or repair or replace the PV Module(s)

12.3.11. Manufacturing and Inspection

1. The Contractor shall inform the module manufacturing schedule to the client at least 7 (seven) working days before the start of proposed schedule.
2. The client or their representative shall perform material inspection at the Manufacturer's factory before the start of proposed manufacturing schedule. Proof of procurement of components as per the approved BOM

mentioning manufacturer name, manufacturing date and relevant test certificate shall be submitted during material inspection for verification.

3. The Manufacturing shall start only after the clearance by the HPCL or their representative after the material inspection.
4. The cells used for module making shall be free from all defects like edge chipping, breakages, printing defects, discoloration of top surface etc. Only Class A solar cell shall be used.
5. The modules shall be uniformly laminated without any lamination defects.
6. Current binning of modules shall be employed to limit current mismatch of modules. Different colour codes shall be provided on the modules as well as pallet for identification of different bins. Maximum three nos. of bins will be allowed for each module rating.

12.3.12. Pre-dispatch Inspection of PV Modules at Manufacturing Facility:

The Contractor shall provide a pre-dispatch inspection call to HPCL/ authorise 3rd party agency for inspection at manufacturer works for PV Modules, as per HPCL-approved drawings. Prior to inviting HPCL /authorise 3rd party agency for pre-dispatch inspection, the vendor shall submit a detailed quality assurance plan (QAP) for HPCL approval. QAP shall include type tests, routine tests, factory acceptance tests, sampling plans, applicable standards, etc. For all bought-out items, test certificates as per relevant standards shall be submitted along with factory acceptance test reports. The bidder shall bear the lodging, boarding, accommodation and traveling charges of HPCL/ authorise 3rd party agency for PDI. After the inspection, a complete set of test reports shall be submitted for dispatch clearance.

13. Power Conditioning Unit: -

13.1. Standards and Code: - Power Conditioning Unit (PCU) shall comply with the specified edition of the following standards and codes.

Standard/Code	Description
IEC 61683 Ed. 1	Photovoltaic systems - Power conditioners - Procedure for measuring efficiency
IEC 62109-1 Ed. 1	Safety of power converters for use in photovoltaic power systems - Part 1: General requirements
IEC 62109-2 Ed. 1	Safety of power converters for use in photovoltaic power systems - Part 2: Particular requirements for inverters
IEC 61000-6-2 Ed. 2	Electromagnetic compatibility (EMC) - Part 6-4: Generic standards - Emission standard for industrial environments
IEC 62116 Ed. 2	Utility-interconnected photovoltaic inverters - Test procedure of islanding prevention measures

IEC 60068-2-1:2007	Environmental testing - Part 2-1: Tests - Test A: Cold
IEC 60068-2-2:2007	Environmental testing - Part 2-2: Tests - Test B: Dry heat
IEC 60068-2-14:2009	Environmental testing - Part 2-14: Tests - Test N: Change of temperature
IEC 60068-2-30:2005	Environmental testing - Part 2-30: Tests - Test Db: Damp heat, cyclic (12 h + 12 h cycle)
IEC 61727/ VDE 0126	Photovoltaic (PV) systems Characteristics of the utility interface Testing includes Flicker, DC injection, Harmonics and waveform distortion, Power factor, Loss of utility voltage, Over/under voltage and frequency, Islanding protection and Response to utility recovery.
IEEE 519	Defines the voltage and current harmonics distortion criteria for the design of electrical systems
CEA Technical Standards for Connectivity to the Grid Regulations 2007 with 2013and 2019 Amendment	
Inverters used in the grid connected solar power projects shall be registered with BIS and bear the Standard Mark as notified by the Bureau of Indian Standards	

13.2. Technical Requirements:

Parameter	**Specification**
Rated AC power	As per design
Maximum input voltage	1500 V
Rated AC output voltage	As per design
Tolerance on rated AC output voltage	+/-10%
Rated frequency	50 Hz
Operating frequency range	47.5 Hz to 52 Hz
Power factor control range	0.9 lag to 0.9 lead
European efficiency	Minimum 98%
Maximum loss in Sleep Mode	0.05% of rated AC power

Total Harmonic Distortion	Less than 3% at rated capacity IEEE 519
Degree of protection	Central Inverter – IP 21 (Indoor), String Inverter – IP 65

13.2.1. The rated/ name plate AC capacity of the PCU shall be AC power output of the PCU at 50°C.

13.2.2. Maximum power point tracker (MPPT) shall be integrated in the PCU to maximize energy drawn from the Solar PV array. The MPPT voltage window shall be sufficient enough to accommodate the output voltage of the PV array at extreme temperatures prevailing at site.

13.2.3. The PCU output shall always follow the grid in terms of voltage and frequency. The operating voltage and frequency range of the PCU shall be sufficient enough to accommodate the allowable grid voltage and frequency variations

13.3. Construction

13.3.1. Power Conditioning Unit (PCU) shall consist of an electronic three phase inverter along with associated control, protection, filtering, measurement and data logging devices.

13.3.2. Every DC input terminal of PCU shall be provided with fuse / MCB / MCCB of appropriate rating. The combined DC feeder shall have suitably rated isolators for safe start up and shut down of the system. One spare DC input terminal shall be provided for each PCU. String inverters without DC fuse may be acceptable in case not more than two strings are connected to the same MPPT.

13.3.3. Type-II surge protective device (SPD) conforming to IEC 61643-11 / IEC 61643-31 / EN 50539-11 shall be connected between positive/ negative bus and earth.

13.3.4. In case external auxiliary power supply is required, UPS shall be used to meet auxiliary power requirement of PCU. It shall have a backup storage capacity of 2 hours

13.3.5. Circuit Breaker or Relay of appropriate voltage and current rating shall be provided at the output to isolate the PCU from grid in case of faults

13.3.6. The PCU shall be tropicalized and the design shall be compatible with conditions prevailing at site. Suitable number of exhaust fan with proper ducting shall be provided for cooling keeping in mind the extreme climatic condition of the site as per the recommendations of OEM to achieve desired performance and life expectancy

13.3.7. All the conducting parts of the PCU that are not intended to carry current shall be bonded together and connected to dedicated earth pits through protective conductor of appropriate size. DC negative terminal shall be grounded. In case DC negative grounding is not possible, appropriate anti-PID device shall be provided.

13.3.8. Dedicated communication interface shall be provided to monitor the PCU from SCADA

13.3.9. PCU front panel shall be provided with LCD/ LED to display all the relevant parameters related to PCU operation and fault conditions. It shall include, but not limited to, the following parameters.

(i) DC input power

(ii) DC input voltage
(iii) DC input current (for each terminal)
(iv) AC output power
(v) AC output voltage (all the 3 phases and line)
(vi) AC output current (all the 3 phases and line)
(vii) Frequency
(viii) Power Factor

In case of outdoor PCU, PCU without LCD display with provision for Data access over Bluetooth / WiFi shall be acceptable.

13.3.10. String inverter, if installed in open, shall be placed inside a canopy shed with at least 15 cm in all directions. Alternatively, the Contractor may install the inverter on the column post of the Module Mounting Structure, below the modules. In such case, the canopy is not required, and the column and foundation shall be designed accordingly.

13.3.11. AC combiner box for string inverter configuration shall comply with Technical Specifications with exception of the following.

(i) Rated System Voltage – Inverter Output Voltage
(ii) IP Rating – IP 5X (Indoor)
(iii) Metering System – Not required

13.4. Operating Modes:-

Operating modes of PCU shall include, but not limited to, the following modes. These operating modes and conditions for transition are indicative only. The Contractor shall provide the detailed flow chart indicating the various operating modes and conditions for transition during detailed engineering

13.4.1. Standby Mode Operating :-

The PCU shall continuously monitor the input DC voltage and remain on Standby Mode until it reaches the pre-set value

13.4.2. MPPT Mode

When the input DC voltage is above the pre-set value and AC grid connection conditions are fulfilled, the PCU shall enter into MPPT mode.

13.4.3. Sleep Mode :-

When the AC output power/DC input voltage decreases below the pre-set value for pre-set time delay, the PCU shall switch into Sleep Mode

13.5. Protection Features

The PCU shall include appropriate self-protective and self-diagnostic feature to protect itself and the PV array from damage in the event of PCU component failure or from parameters beyond the PCU's safe operating range due to internal or external causes. The self-protective features shall not allow signals from the PCU

front panel to cause the PCU to be operated in a manner which may be unsafe or damaging. Faults due to malfunctioning within the PCU, including commutation failure, shall be cleared by the PCU protective devices.

The PCU shall provide protection against the following type of faults, among others.

(i) DC/AC over current
(ii) DC/AC over voltage
(iii) DC reverse polarity
(iv) DC earth fault
(v) AC under voltage
(vi) AC under frequency/over frequency
(vii) Islanding
(viii) Over temperature
(ix) Lightning surges

13.6. Grid Support Functions

13.6.1. Active power regulation

The PCU shall be able to limit the active power exported to the grid based on the set point provided through PCU front control panel. The PCU shall also be able to automatically the limit the active power after an increase in grid frequency above a pre-set value. The ramp rate shall be adjustable during operation and start-up after fault. The applicability of the requirement shall be as per CEA regulation and compliance

13.6.2. Reactive power control

The PCU shall be able to inject /absorb reactive power to/ from the grid based on the set point provided through PCU front control panel. The same shall be performed automatically with adjustable ramp rate based on dynamic changes in grid voltage or reactive power reference

13.6.3. Voltage Ride Through

The PCU shall remain connected to the grid during temporary dip or rise in grid voltage as per the LVRT and HVRT requirements of CEA Technical Standards for Connectivity to the Grid Regulations. The PCU shall also be able to inject reactive power during the period of voltage dip.

13.7. Warranty

The complete Power Conditioning Unit shall be warranted against all material/ manufacturing defects and workmanship for minimum of 5 (five) years from the date of supply. Warrantee certificate shall be issued by OEM directly in the name of HPCL.

14. String Combiner Box:-

14.1. Standards and Code: -

Standard/Code	Description
IEC 60529	Enclosure Ingress Protection
IEC 62262	Enclosure Impact Protection
IEC 60269	Fuse
IEC 61643-11	Surge Protection Device
IEC 62852 or EN 50521	Solar cable connector
IEC 60695-2-11	Fire hazard testing

14.2. Construction

14.2.1. SCB enclosure shall be made of UV resistant, fire retardant, thermoplastic material. Enclosure degree of protection shall be at least IP 65 and mechanical impact resistance shall be at least IK08.

14.2.2. Not more than two strings can be connected in parallel to a single input of SCB. One spare input terminal along with connector shall be provided for each SCB.

14.2.3. Every SCB input shall be provided with fuses on both positive and negative side. In case of negative grounded system, fuse at positive side only is acceptable. The rating of the fuses shall be selected such that it protects the modules from reverse current overload. The fuses shall be 'gPV' type conforming to IEC 60269-6

14.2.4. DC switch disconnector of suitable rating shall be provided at SCB output to disconnect both positive and negative side simultaneously

14.2.5. Type-II surge protective device (SPD) conforming to IEC 61643-11/IEC 61643-31/ EN 50539-11 shall be connected between positive/negative bus and earth

14.2.6. MC4 connector conforming to IEC 62852 or EN 50521 shall be provided at each SCB input. Cable gland (double compression metallic) of suitable size for DC cables shall be provided at the SCB output.

14.2.7. UV resistant printed cable ferrules for solar cables & communication cables and punched/ embossed aluminum tags for DC cables shall be provided at cable termination points for identification.

14.3. Warranty :-

The SCB unit shall be warranted against all material/ manufacturing defects and workmanship for minimum of 2 (two) years from the date of supply. Warrantee certificate shall be issued by OEM directly in the name of HPCL.

15. Solar and DC Cables:-

15.1. Standards and Code: -

Cable	From	To	Conductor/ Insulation	Voltage Rating	Applicable Standard
Solar Cable*	Module	SCB	Copper/ XLPO	1.9 kV DC	IEC 62930 / IS 17293/ EN 50618
DC Cable	SCB	PCU	Copper or Aluminium/ XLPE	1.5 kV DC	IS 7098 Part I-II
*Cable used for module interconnection shall also be referred as solar cable.					

15.1.1. Solar cable outer sheath shall be flame retardant, UV resistant and black in colour. Solar cable with positive polarity should have marking of red line on black outer sheath

15.1.2. Solar DC cables shall be single core, tinned copper, Flame Retardant Low smoke (FRLS),) DC cable with positive polarity should have marking of red line on black outer sheath. PVC outer sheath conforming to IS 7098-II. DC cable with positive polarity should have marking of red line on black outer sheath.

15.1.3. In addition to manufacturer's identification on cables as per relevant standard, following marking shall also be provided over outer sheath.

(i) Cable size and voltage grade

(ii) Word 'FRNC/ FRLS' (as applicable) at every metre

(iii) Sequential marking of length of the cable in metres at every metre

(iv) Cables shall be sized based on the following considerations:

(v) Rated current of module

15.1.4. In case of central inverters, average voltage drop in the cables (from PV Modules to PCU) shall be limited to 1.5 % of the rated voltage. In case of string Inverters, average voltage drop (from PV module to string inverter) shall be limited to 0.5% of the rated voltage drop. The Contractor shall provide voltage drop calculations in excel sheet.

15.1.5. Short circuit withstand capability

15.1.6. De-rating factors according to laying pattern

15.2. Warranty:-

The cables (Solar and DC) shall be warranted against all material/ manufacturing defects and workmanship for minimum of 1 (one) year from the date of supply. Warrantee certificate shall be issued by OEM directly in the name of HPCL.

16. AC Cables :

16.1. Standards and Code

Sr.	Item	Relevant IS	Relevant IEC
1	Conductors of Insulated Cables	IS: 8130 - 1984	**IEC: 228**
2	Impulse tests on cables and their accessories		**IEC: 230**
3	Extruded solid dielectric-insulated power cables for rated voltage from 1 KV upto 30 KV.		**IEC: 502**
4	Test methods for insulations and sheaths of electric cables and chords.		**IEC: 540**
5	Test on cable over a sheath which has special protective functions and are applied by extrusion.		**IEC: 229**
6	Calculations of continuous current rating of cables (100% load factor).		**IEC: 287**
7	Cross-linked polyethylene insulated PVC sheathed cable for voltage from 3.3 KV upto 33 KV.	IS: 7098 (Part II& III)	
8	PVC insulation & sheath of electrical cables.	IS: 5831 - 1984	
9	Mild steel wires, formed wires and tapes for armouring of cables.	IS: 3975	
10	Electrical test methods for electric cables partial discharge test.		**IEC: 885(2) - 1987 (Part II)**
11	Methods of test for cables.	IS: 10810	
12	Common test methods for insulating and sheathing materials of electric cables.		**IEC: 811**
13	Impulse test on cables & other accessories		**IEC: 230**
14	Cable termination for gas insulated switchgear.		**IEC: 859**

16.1.1. All AC cables shall be flame retardant, low smoke (FRLS) type designed to withstand all mechanical, electrical and thermal stresses develop under steady state and transient operating conditions

16.1.2. Only terminal cable joints shall be accepted. No cable joint to join two cable ends shall be accepted. However, cable joints may be allowed if the route length is more than maximum available drum length subject to Client approval.

16.1.3. In addition to manufacturer's identification on cables as per relevant standard, following marking shall also be provided over outer sheath.

1. Cable size and voltage grade
2. Word 'FRLS' at every metre
3. Sequential marking of length of the cable in metres at every metre
4. Cables shall be sized based on the following considerations:
5. Rated current the equipment

16.1.4. In case of Central inverters, maximum voltage drop in LT cable (from PCU to inverter transformer) shall be limited to 0.5% of the rated voltage. In case of String inverters, maximum voltage drop (from string inverter to LT combiner panel and from LT combiner panel to Inverter duty transformer) shall be limited to 1.5%. For HT cables (from inverter transformer to plant take off point), maximum voltage drop shall be limited to 0.5 % of the rated voltage. The Contactor shall provide voltage drop calculations in excel sheet.

16.1.5. Short circuit withstand capability as per design for 1s.

16.1.6. De-rating factors according to laying pattern

16.1.7. Core Identification:

Two core	:	Red and Black
Three core	:	Red, Yellow and Blue
Four core	:	Red, Yellow, Blue and Black
Single core	:	Green cable with Yellow strips for earthing

16.2. Warranty

All cables shall be warranted for minimum of 1 (one) year against all material/ manufacturing defects and workmanship from the date of supply. Warrantee certificate shall be issued by OEM directly in the name of HPCL.

16.3. Testing

Type, routine and acceptance tests requirements shall be as per relevant standards for all cable sizes

16.4. Cable installation

Type, routine and acceptance tests requirements shall be as per relevant standards for all cable sizes

16.4.1. Cable installation shall be as per IS 1255.

16.4.2. Cables within transformer yard and switchyard shall be laid through RCC cable trench with supports.

16.4.3. Cable terminations shall be made with properly crimped lugs and passed through cable glands at the entry & exit point of the cubicles. Bimetallic lugs shall be used for connecting Cu bus bar and Al cables or vice-versa.

16.4.4. All AC cables shall be provided with punched/embossed aluminium tags. The marking shall be done with good quality letter and numbers of proper size so that the cables can be identified easily

16.4.5. All the earthen excavated cable trench with alternate layers of sand and brick as per relevant IS from PV arrays to inverter/Inverter room to control room to switchyard shall be provided by the Contractor. Cable trench warning tape to be laid in the cable trench.

17. Inverter Transformer and Auxiliary Transformer: -

17.1. Standards and Code: -Inverter transformer and auxiliary transformer, wherever applicable, shall comply with the latest edition of the following standards and codes including amendments.

Standard/Code	Description
IS 2026, IEC 60076	Specification of Power Transformers
IS 11171, IEC 60076	Dry-Type Power Transformers
IS 2099, IEC 60137	Bushings for alternate voltage above 1000 V
IS 335, IEC 60296	Insulating oil
IS 3639	Fittings and Accessories for Power Transformers
IS 12063	Degree of protection provided by enclosures
Indian Electricity rules and other statutory regulations	

17.2. Technical Requirements: -

Parameter	**Inverter Transformer**	**Auxiliary Transformer**
Continuous MVA Rating	As per system design requirement	
Voltage Ratio	33 kV / Inverter output voltage	As per system design
Duty, Service & Application	Continuous Solar Inverter application and converter Duty (Outdoor)	Continuous application (Outdoor/Indoor)
Winding	As per system design requirement	2
Frequency	50 Hz	50Hz
Nos. of Phase	3	3
Vector Group & Neutral earthing	As per system/inverter manufacturer requirement	Dyn11
Cooling	ONAN	ONAN
Rated power-frequency withstand voltage	70 kV	As per design
Rated lightning impulse withstand voltage	170 kV	As per design
Tap Changer	OCTC, No. of steps shall be +/- 10 % (in steps of 2.5%)	
Impedance at 75°C	As per Inverter Manufacturer requirement	As per system requirement
Permissible Temperature rise over an ambient of 50°C (irrespective of tap)		
Top Oil	As per IS/IEC	As per IS/IEC
Winding	As per IS/IEC	As per IS/IEC
SC withstand time (thermal)	2 second	2 second
Short Circuit Apparent power	As per system requirement	
Termination	As per system requirement	

Bushing rating, Insulation class (Winding & bushing)	36 kV – porcelain bushings 1.1 kV – epoxy bushings	As per the system requirement
Noise level	As per NEMA TR-1	
Loading Capability	Continuous operation at rated MVA on any tap with voltage variation of +/-3%, also transformer shall be capable of being loaded in accordance with IEC 60076-7	
Flux density	Not to exceed 1.9 Wb/sq.m. at any tap position with combined frequency and voltage variation from rated V/f ratio by 10% corresponding to the tap. Transformer shall also withstand following over fluxing conditions due to combined voltage and frequency fluctuations: a) 110% for continuous rating b) 125% for at least one minute c) 140% for at least five seconds. Bidder shall furnish over fluxing characteristic up to 150%	
Current Density	3 A/mm2	
Air Clearance	As per IS/IEC	

17.3. Construction: -

17.3.1. The transformer shall be provided with conventional single compartment conservator with prismatic toughened glass oil gauge. The top of the conservator shall be connected to the atmosphere through indicating type cobalt free silica gel breather with transparent enclosure. Silica gel shall be isolated from atmosphere by an oil seal. Aircel to be provided in the conservator tank. Inverter transformers shall be provided with Magnetic Oil Gauge (MOG) with low oil level alarm contact

17.3.2. It is the responsibility of the Contractor to ensure that the inverter transformer comply with all the requirements of inverter provided by the inverter manufacturer.

17.3.3. Inverter Transformer shall be designed for at least 5% total harmonic distortion (THD) to withstand distortion generated by the inverter as well as possible outside harmonics from the network.

17.3.4. The transformer shall be suitable for continuous operation with a frequency variation of ± 2.5% from nominal frequency of 50 Hz without exceeding the specified temperature rise.

17.3.5. Inverter Transformer shall have shield winding between LV & HV windings. Each LV winding must be capable of handling non-sinusoidal voltage with voltage gradient as specified by the inverter manufacturer. Also, shield winding shall be taken out from tank through shield bushing and the same shall be brought down to the bottom of the tank using copper flat and support insulator for independent grounding

17.3.6. Neutral bushing of Inverter duty transformer shall be brought outside the tank for the testing purpose. It shall be covered with MS sheet and a sticker "For testing purpose only. Do not earth". Neutral bushing of auxiliary transformer shall be brought outside the tank for earthing.

17.3.7. Transformer shall have 150 mm dial type Oil Temperature Indicator (OTI) and Winding Temperature Indicator (WTI) with alarm and trip contacts. All indicators shall have accuracy of 1.5%. For inverter transformers, WTI shall be provided for all the windings.

17.3.8. The radiators shall be detachable type, mounted on the tank with shut off valve at each point of connection to the tank, lifts, along with drain plug/ valve at the bottom and air release plug at the top.

17.3.9. Marshalling Box shall be of sheet steel, dust and vermin proof provided with proper lighting and thermostatically controlled space heaters. The degree of protection shall be IP 55. Marshalling Box of all transformers shall be preferably Tank Mounted. One dummy terminal block in between each trip wire terminal shall be provided. At least 10% spare terminals shall be provided on each panel. The gasket used shall be of neoprene rubber. Wiring scheme (TB details) shall be engraved in a stainless-steel plate with viewable font size and the same shall be fixed inside the Marshalling Box door

17.3.10. Inverter transformer shall be provided with spring operated Pressure Relief Device (with trip contacts) with suitable discharge arrangement for oil. For Auxiliary transformers, diaphragm type explosion vent shall be provided.

17.3.11. Filter valve at top the tank and drain cum sampling valve at bottom of the tank shall be provided.

17.3.12. All external surface of the transformer shall be painted with two coats of epoxy-based paint of colour shade RAL 7035. Internal surface of cable boxes and marshalling box shall be painted with epoxy enamel white paint. The minimum dry film thickness (DFT) shall be 100 microns.

17.3.13. LV and HV cable box shall be provided with disconnecting chamber to facilitate the movement of transformer without disturbing cable box and termination.

17.3.14. Air release plug, bi-directional wheel/skids, cover lifting eyes, transformer lifting lugs, jacking pads, towing holes, core and winding lifting lugs, inspection cover, rating plate, valve schedule plate, accessories and terminal marking plates, two nos. of earthing terminals shall be provided.

17.3.15. The accessories listed above are indicative only. Accessories which are not mentioned above but required for satisfactory operation of the transformers are deemed to be included in the contract without extra charges.

17.3.16. Fire-protection for inverter transformer shall be provided in accordance with relevant CEA regulations as amended time to time.

17.4. Dry Type Auxiliary Transformer: -

17.4.1. Transformer shall be cast resin encapsulated dry type transformer, made of cold rolled grain-oriented silicon steel laminations of M4 grade or better. Winding conductor shall be electrolytic grade Copper/Aluminium and insulation shall be Class F or better.

17.4.2. The transformers shall be housed in a metal protective housing, having a degree of protection of IP 23 suitable for indoor installation. The enclosure shall be

provided with suitable hardware and accessories required for satisfactory operation of the transformer per the relevant standard.

17.5. Warranty: - The transformer shall be warranted against all material/ manufacturing defects and workmanship for minimum of 5 (five) years from the date of supply. Warrantee certificate shall be issued by OEM directly in the name of HPCL.

17.6. Testing and Inspection

Type Tests and Special Tests The following type test and special test reports shall be submitted during detailed engineering. The tests should have been conducted on the similar transformer by NABL accredited laboratory within last five years from the last date of bid submission.

17.6.1. Type Tests

(i) Lightning impulse (Full & Chopped Wave) test on windings as per IEC 60076-3

(ii) Temperature Rise test at a tap corresponding to maximum losses as per IEC 60076-2

17.6.2. Special Tests

(i) Measurement of zero-sequence impedance as per IEC 60076-1

(ii) Measurement of harmonics of no-load current as per IEC 60076-1

(iii) Measurement of acoustic noise level as per NEMA TR-1

(iv) Short-circuit withstand test as per IEC 60076-5

In case the contractor is not able to submit the test reports during detailed engineering, the contractor shall submit the reports of type/special tests either conducted by NABL accredited laboratory or witnessed by Client.

18. 33 kV Switchgear Panel:

18.1. Standards and Code: -All equipment provided under 33 kV Switchgear outdoor shall comply with latest edition and amendments of the relevant IEC standards and IS codes. In particular, the shall comply with the following standards and code,

Standard/Code	Description
IS/IEC 62271-1	High Voltage Switchgear and Control gear - Part 1: Common Specifications
IS/IEC 62271-100	High Voltage Switchgear and Control gear - Part 100: AC Circuit Breakers
IS/IEC 62271-102	High Voltage Switchgear and Control gear - Part 102: AC Disconnectors and Earthing Switches
IS/IEC 62271-200	High Voltage Switchgear and Control gear - Part 200: AC Metal Enclosed Switchgear and Control gear for Rated Voltages Above 1 kV and up to and Including 52 kV

IEC 62271-206 Hig	High-voltage Switchgear and Control gear - Part 206: Voltage presence indicating systems for rated voltages above 1 kV and up to and including 52 kV
IEC 61869	Instrument Transformers
IS 3231	Electrical relays for power systems protection
IEC 60255	Measuring relays and protection equipment
IEC 61850	Communication networks and systems for power utility automation
IEC 61131-3	Programmable controllers - Part 3: Programming languages
IS 9385	High voltage fuses
IS 9431	Indoor post insulators of organic material for systems with nominal voltages greater than 1000 V up to and including 300 kV
IEC 60099-4	Surge arresters - Part 4: Metal-oxide surge arresters without gaps for A.C. systems
IS 3070-3	Lightning Arresters for Alternating Current Systems - Part 3: Metal Oxide Lightning Arresters Without Gaps
IEC 62052-11	Electricity metering equipment (A.C.) - General requirements, tests and test conditions - Part 11: Metering equipment
IS 14697	AC Static Transformer Operated Watthour and Var-hour Meters, Class 0.2S and 0.5S

18.2. Technical Requirements: -

Parameter	**Specification**
Nominal system voltage	33 KV
Highest system voltage	34 KV
Rated frequency	50 Hz
Number of phases	3 Phases
Rated power-frequency withstand voltage	70 kV (r.m.s.)
Rated lightning impulse withstand voltage	170 kV (peak)

Rated short-time withstand current	As per system requirement
Rated peak withstand current	2.5 times the rated short-time withstand current
Rated duration of short-circuit	As per system requirement
Internal Arc Classification	IAC-A, FLR, System Fault Current for 1 s
Circuit Breaker	
Type	Vacuum type
Operating duty cycle	O – 3min – CO – 3min – CO
Rated power-frequency withstand voltage	70 kV (r.m.s.)
Rated lightning impulse withstand voltage	170 kV (peak)
Rated short-circuit breaking current	As per system requirement
Rated short-circuit making current	2.5 times the rated short-circuit breaking current
Rated duration of short-circuit	As per system requirement
Re-strike performance class	C1
Mechanical endurance class	M1
Operation	Motorized & Manual
Disconnector	
Rated power-frequency withstand voltage across the isolating distance	80 kV (r.m.s.)
Lightning impulse withstand voltage across the isolating distance	195 kV (peak)
Mechanical endurance class	M1
Operation	Motorized & Manual
Current Transformer	
Accuracy class	0.2 for metering, 5P20 for protection
Ratio	As per system design

Rated VA burden	As per system requirement
Insulation class	Class E or better
Voltage Transformer	
Accuracy class	0.2 for metering, 3P for protection
Ratio	As per system design
Rated VA burden	As per system requirement
Insulation class	Class E or better

18.3. Construction: -

18.3.1. The switchgear panel shall be free standing, floor mounted, fully compartmentalized, metal enclosed construction. Each circuit shall have a separate vertical panel with required compartments for circuit breaker, cable termination, busbar and auxiliary control devices. Outgoing feeder of the GIS panel shall be rated for 5/6 MW

18.3.2. The outer enclosure shall be made up of CRCA steel sheet of minimum 2 mm thickness. The outer enclosure shall have degree of protection not less than IP 4X (Indoor). The enclosure shall be painted with two coats of epoxy-based paint of colour shade RAL 7035. The minimum dry film thickness (DFT) shall be 100 micron

18.3.3. The interconnection of individual panels shall not require any gas work neither for installation at site nor for extension of the panel board. It shall be possible to extend the panels on either side

1. Suitable interlock and indications shall be provided to prevent opening of any HT compartment doors in case the HT supply is ON

2. Thermostatically controlled space heater with common MCB shall be provided for various compartments.

18.3.4. Circuit Breaker

1. Circuit breakers shall be of vacuum type. It shall comprise of three separate identical single pole units operated through the common shaft and shall be fully interchangeable both electrically and mechanically.
2. The circuit breaker operating mechanism shall be based on motor operated spring charging and it shall be re-strike free, trip free both electrically and mechanically, with anti-pumping feature.
3. The rated control voltage of the spring charging motor shall be 110 V / 220 V DC. Closing coil shall operate at all values of voltages between 85% and 110% of rated voltage. Opening coil shall operate correctly under all operating conditions of the circuit breaker up to the rated breaking capacity and at all values of supply voltage between 70% and 110% of rated voltage.

4. Each circuit breaker shall be provided with two tripping coils operated through two independent DC supplies. Each trip coil shall have its own actuating contacts.
5. The spring charging motor shall have adequate thermal rating such that continuous sequence of the closing and opening operations is possible as long as power supply is available to the motor. It shall also be possible to charge the spring manually and close the breaker in the event of failure of motor / control supply to motor. Operating handle shall be provided for charging the operating mechanism. After failure of control supply to the motor, one open-close-open operation shall be possible with the energy contained in the operating mechanism.
6. The motor rating shall be such that it requires not more than 30 seconds for full charging of the closing spring. Closing action of the circuit breaker shall compress the opening spring ready for tripping. When closing springs are discharged after closing the breaker, they shall be automatically charged for the next operation
7. Suitable indicators shall be provided to indicate OPEN/CLOSED positions of the circuit breaker and CHARGED/ DISCHARGED positions of the closing spring. An operation counter shall also be provided.

18.3.5. Disconnector

1. Each switchgear panel shall be provided with three-position disconnector (Open, Close & Earth).
2. Mechanical indicators shall be provided to indicate OPEN / CLOSE / EARTH positions of the three-position disconnector.

18.3.6. Relays

1. All relays shall be microprocessor based numerical type. The relays shall be flush mounted on panel front with connections from the inside.
2. The relays shall be capable of operating continuously between 80 – 120% of the rated voltage.
3. All numerical relays shall have adequate number of freely configurable, optically isolated, Binary Inputs (BI) and potential free Binary Outputs (BO).
4. All numerical relays shall have minimum four no. of current inputs, three for phase current and one for earth current, suitable for CT secondary current of 1A. The current inputs shall be compatible with both residual connected CT and Core Balance CT (CBCT). In addition, numerical relay in main outgoing feeder shall have three no. of voltage inputs for Under Voltage/Over Voltage protection.
5. All I/O's shall have galvanic isolation. Analog inputs shall be protected against switching surges and harmonics.
6. All numerical relays shall have provision for measurement and storage of electrical parameters such as voltage, current, frequency, active power, reactive power etc. Measurement accuracy shall be 1% for RMS voltage and current.
7. The numerical relay shall be able to record faults and events in non-volatile memory. Sequence of events shall have 1 ms resolution at device level.
   (i) Fault record – At least 5 recent faults including the protection function operated, operating phase(s), voltages and currents along with date and time stamp.

(ii) Event record – At least 200 events with date and time stamp.
(iii) The numerical relay shall have feature for time synchronization through the SCADA System / networking.
(iv) The numerical relay shall be provided with backlit alphanumeric LCD to access protection settings, measurement parameters, fault and event records. Read and write access to protection settings shall be password protected.

18.3.7. Instrument Transformers

1. Instrument transformers shall be completely encapsulated cast resin type, suitable for continuous operation at the ambient temperature prevailing inside the switchgear enclosure, when the switchgear is operating at its rated load and the outside ambient temperature is 40°C.
2. All instrument transformers shall withstand the power frequency and impulse test voltage specified for the switchgear assembly. The current transformer shall further have the dynamic and short time ratings at least equal to those specified for the associated switchgear and shall safely withstand the thermal and mechanical stress produced by maximum fault currents specified when mounted inside the switchgear for circuit breaker modules
3. Polarity marks shall indelibly be marked on each instrument transformer and at the lead terminals at the associated terminal block.
4. HRC fuses of suitable rating shall be provided on primary side of voltage transformers. For secondary side, four pole Miniature Circuit Breakers (MCB) shall be provided with its supervision facility

18.3.8. Busbar

1. Bus bar shall be made of Copper with uniform cross section throughout their length. They shall be adequately supported on insulators to withstand electrical and mechanical stresses due to specified short circuit current.
2. Busbar shall be supported on the insulators such that the conductor expansion and contraction are allowed without straining the insulators.
3. Bus bar support insulators shall be made of non-hygroscopic, arc and track resistant, high strength, non-combustible material and shall be suitable to withstand stresses due to over voltage and short circuit current.
4. All busbars shall have suitable phase identification.
5. The Contractor shall submit busbar sizing calculation for specified continuous and short time current ratings during detailed engineering

18.3.9. Earthing

1. An earth bus made of Copper shall be provided at the bottom throughout the length of the panel. It shall be bolted / welded to the framework of each panel and each breaker earthing contact bar.
2. The earth bus shall have sufficient cross section to carry maximum fault current without exceeding the allowable temperature rise
3. All non-current carrying conductors of the panel shall be connected to the earth bus. All joints to the earth bus shall be made through at least two bolts. Hinged doors shall be earthed through flexible earthing braid of adequate cross section. Suitable provision shall be provided at each end of the earth bus for connection to Earth grid.

4. All metallic cases of relays, instruments and other panel mounted equipment shall be connected to earth bus by independent copper wires of size not less than 2.5 sq. mm with green colour insulation
5. Instrument transformer secondary neutral point shall be earthed at one place only on the terminal block. Such earthing shall be made through links so that earthing of one circuit may be removed without disturbing the earthing of other circuits.

18.3.10. Measuring Instruments

1. All the measuring instruments shall be digital, flush mounting type with communication facility
2. All feeders except main outgoing feeder shall be provided with digital Multi-Function Meter (MFM). Tri Vector Meter (TVM) shall be provided for the main outgoing feeder (in the HT Panel). Accuracy class of MFM shall be 0.2 and that of TVM shall be 0.2S.
3. Measuring instruments shall have provision to display the following parameters.
   (i) Line and phase voltages
   (ii) Line and phase currents
   (iii) Active power, Reactive power, Apparent power
   (iv) Frequency
   (v) Power factor
   (vi) Total Harmonic Distortion (THD)

18.3.11. Voltage Presence Indicating System

Each switchgear panel shall be equipped with Voltage Presence Indicating System (VPIS) to indicate whether or not there is voltage on the cables. The VPIS shall consist of capacitive voltage divider and indicator lamp on the front door according to IEC 62271-206.

18.3.12. Wiring and Terminal blocks

1. All internal wiring shall be done with 650 V grade, 1.5 sq.mm. PVC insulated stranded flexible copper wire. For CT secondary circuits, 2.5 sq.mm copper wire shall be used.
2. Wire terminations shall be made with solderless crimping type tinned copper lugs, which shall firmly grip the conductor. Insulation sleeves shall be provided at all the wire terminations.
3. Printed identification ferrules, marked to correspond with panel wiring diagram shall be provided at both ends of each wire. The ferrules shall be firmly located on each wire so that they cannot move or turn freely on the wire. Wire identification shall be done in accordance with IS 11353.
4. The Contractor shall be solely responsible for the completeness and correctness of the internal wiring and for the proper functioning of the connected equipment.
5. All internal wiring to be connected to the external equipment shall terminate on terminal blocks. Terminal blocks shall be rated for 650 V, 10 A and made of non-inflammable material.
6. CT and VT secondary circuits shall be terminated on stud type, disconnecting terminal blocks.
7. At least 10% spare terminals shall be provided on each panel and these spare terminals shall be distributed on all terminal blocks.

18.4. Warranty

The panel shall be warranted against all material/ manufacturing defects and workmanship for minimum of 2 (Two) years from the date of supply. Warrantee certificate shall be issued by OEM directly in the name of HPCL.

18.5. Testing and Inspection

18.5.1. Type Tests

The switchgear panel shall be of type tested design. Type test reports of switchgear panel as per IS/IEC 62271-200 shall be submitted during detailed engineering. The tests should have been conducted on the similar equipment by NABL accredited laboratory.

In case the contractor is not able to submit the test reports during detailed engineering, the contractor shall submit the reports of type/special tests either conducted by NABL accredited laboratory or witnessed by Client

18.5.2. Routine Tests Routine tests and acceptance tests shall be as per the Quality Assurance Plan (QAP) approved by the Client.

19. AC Distribution Panel Board and LT Switchgear

19.1. AC Distribution Panel Board

19.1.1. AC Distribution Panel Board (DPB) shall control the AC power from PCU/ inverter, and should have necessary surge arrestors. Interconnection from ACDB to mains at LT Bus bar while in grid-tied mode, the bus bars are made of copper of the desired size.

19.1.2. All switches and circuit breakers, and connectors should conform to IEC 60947, part I, II and III/ IS60947 part I, II and III.

19.1.3. ACDB shall be provided with MCCB, Instrument transformers, Multifunction meters, indication lamps, 5/15A Socket, spare terminal and Disconnectors adequate quantity has to be maintained by EPC contactor to use during O&M period, if required.

19.1.4. The changeover switches, cabling work should be undertaken by the bidder as part of the project.

19.1.5. All the Panel shall be metal clad, totally enclosed, rigid, wall mounted/floor mounted, air-insulated, cubical type suitable for operation on three phase / single phase, 415 or 230 volts, 50 Hz

19.1.6. The panels shall be designed for a minimum expected ambient temperature of 50 degrees Celsius, 85 present humidity and dusty weather.

19.1.7. All indoor panels will have the protection of IP 54 or better All outdoor panels will have the protection of IP 67.

19.1.8. Shall be of Metal Sheet with powder Coating

19.1.9. Should conform to Indian Electricity Act and rules (till last amendment).

19.1.10. All the 415 AC or 230 volts devices/equipment like bus support insulators, circuit breakers, SPDs, VTs etc., multifunction meters, mounted inside the switchgear shall be suitable for continuous operation and satisfactory performance under the following supply conditions;

1	Variation in supply voltage	+/- 10 %
2	Variation in supply frequency	+/- 3 Hz

19.1.11. Panel shall be totally enclosed dust and vermin-proof, the best quality synthetic / neoprene rubber gasket shall be provided around door covers and other cut-outs.

19.1.12. All Cable Entry Shall be from the Bottom Only. A Gland plate shall be provided on the ACDB compartment with required holes and spare holes. Party shall supply best quality grommet to plug the holes.

(i) Panel shall have an excellent aesthetic look and finish.

(ii) Two numbers of earthing bolts shall be provided on each side of the panel.

(iii) Holes on Gland plate shall be provided with proper grommets.

(iv) Finish and Surface Preparation:

a. Surface is to be prepared with Sand / Shot Blasting.

b. Epoxy Power coating (Exterior and interior) after seven tank process with a minimum thickness of 70 microns.

c. Exterior – RAL 7035

d. Interior – White (Preferred) or RAL 7035

19.1.13. All doors shall be provided with an adequate number of best-quality cam-type locking knobs. Concealed Hinges of good quality shall be provided. The location of the Hinges (right or left side) shall be as per GA drawing. Doors shall be removal type.

19.1.14. Labels -All labels shall comprise white letters engraved on Black background.

(i) Labels shall be made of 3 ply limacoid or Anodized Aluminium.

(ii) Size of lettering shall be a minimum 50 mm for panel description and designation. (As shown in GA Drawing)

(iii) Size of lettering shall be a minimum 5 mm for component designation.

(iv) Live terminal shall be protected with a proper insulating front barrier.

(v) CAUTION, Nameplate “CAUTION LIVE TERMINAL “Shall be provided at all points where the terminals are likely to remain live and isolation is required before opening

(vi) 415 V Hazard Board shall be provided on the panel appropriately.

Sr.	Item	Relevant IS	Relevant IEC
1	Conductors of Insulated Cables	IS: 8130 - 1984	**IEC: 228**
2	Impulse tests on cables and their accessories		**IEC: 230**

3	Extruded solid dielectric-insulated power cables for rated voltage from 1 KV upto 30 KV.		**IEC: 502**
4	Test methods for insulations and sheaths of electric cables and chords.		**IEC: 540**
5	Test on cable over a sheath which has special protective functions and are applied by extrusion.		**IEC: 229**
6	Calculations of continuous current rating of cables (100% load factor).		**IEC: 287**
7	Cross-linked polyethylene insulated PVC sheathed cable for voltage from 3.3 KV upto 33 KV.	IS: 7098 (Part II& III)	
8	PVC insulation & sheath of electrical cables.	IS: 5831 - 1984	
9	Mild steel wires, formed wires and tapes for armouring of cables.	IS: 3975	
10	Electrical test methods for electric cables partial discharge test.		**IEC: 885(2) - 1987 (Part II)**
11	Methods of test for cables.	IS: 10810	
12	Common test methods for insulating and sheathing materials of electric cables.		**IEC: 811**
13	Impulse test on cables & other accessories		**IEC: 230**
14	Cable termination for gas insulated switchgear.		**IEC: 859**

19.1.15. All AC cables shall be flame retardant, low smoke (FRLS) type designed to withstand all mechanical, electrical and thermal stresses develop under steady state and transient operating conditions

19.1.16. Only terminal cable joints shall be accepted. No cable joint to join two cable ends shall be accepted. However, cable joints may be allowed if the route length is more than maximum available drum length subject to Client approval.

19.1.17. In addition to manufacturer's identification on cables as per relevant standard, following marking shall also be provided over outer sheath. Cable size and voltage grade

(i) Word 'FRLS' at every metre

(ii) Sequential marking of length of the cable in metres at every metre

(iii) Cables shall be sized based on the following considerations:

(iv) Rated current the equipment

(v) In case of Central inverters, maximum voltage drop in LT cable (from PCU to inverter transformer) shall be limited to 0.5% of the rated voltage. In case of String inverters, maximum voltage drop (from string inverter to LT combiner panel and from LT combiner panel to Inverter duty transformer) shall be limited to 1.5%. For HT cables (from inverter transformer to plant take off point), maximum voltage drop shall be limited to 0.5 % of the rated voltage. The Contactor shall provide voltage drop calculations in excel sheet.

(vi) Short circuit withstand capability as per design for 1s.

(vii) De-rating factors according to laying pattern

(viii) **Core Identification:**

Two core	:	Red and Black
Three core	:	Red, Yellow and Blue
Four core	:	Red, Yellow, Blue and Black
Single core	:	Green cable with Yellow strips for earthing

19.2. Warranty All cables shall be warranted for minimum of 1 (one) year against all material/ manufacturing defects and workmanship from the date of supply. Warrantee certificate shall be issued by OEM directly in the name of HPCL.

19.3. Testing

Type, routine and acceptance tests requirements shall be as per relevant standards for all cable sizes

19.4. Cable installation

Type, routine and acceptance tests requirements shall be as per relevant standards for all cable sizes

(i) Cable installation shall be as per IS 1255.

(ii) Cables within transformer yard and switchyard shall be laid through RCC cable trench with supports.

(iii) Cable terminations shall be made with properly crimped lugs and passed through cable glands at the entry & exit point of the cubicles. Bimetallic lugs shall be used for connecting Cu bus bar and Al cables or vice-versa.

(iv) All AC cables shall be provided with punched/embossed aluminium tags. The marking shall be done with good quality letter and numbers of proper size so that the cables can be identified easily

20. LT Switchgear

20.1. Standards and Codes

All equipment provided under LT switchgear shall comply with latest revisions and amendments of the relevant IEC standards and IS codes. In particular, the switchgear shall comply with the following standards and codes.

Standard/Code	Description
IEC 61439-1	Low-voltage switchgear and control gear assemblies - Part 1: General rules
IEC 61439-2	Low-voltage switchgear and control gear assemblies - Part 2: Power switchgear and control gear assemblies
IEC 60947-1	Low-voltage switchgear and control gear - Part 1: General rules
IEC 60947-2	Low-Voltage Switchgear and Control gear: Circuit Breakers
IEC 60947-3	Low voltage switchgear and control gear: Part 3 Switches, disconnectors, switch-disconnectors and fuse combination units
IEC 60947-4-1	Low-voltage switchgear and control gear - Part 4-1: Contactors and motor-starters - Electromechanical contactors and motorstarters
IEC 60947-5-1	Low-voltage switchgear and control gear - Part 5-1: Control circuit devices and switching elements - Electromechanical control circuit devices
IEC 62052-11	Electricity metering equipment (a.c.) - General requirements, tests and test conditions - Part 11: Metering equipment
IS 694	Polyvinyl chloride insulated unsheathed-and sheathed cables/ cords with rigid and flexible conductor for rated voltages - up to and including 450/750V
IEC 61869	Instrument Transformers
IS 3043	Code of practice for earthing
IEC 60255	Measuring relays and protection equipment - Part 1: Common requirements

20.2. Technical Parameters

Parameter	Specification
System detail	

Rated system voltage	As per system requirement ± 10%, 3 Phase, 50Hz, 4 wire, Neutral Solidly Earthed
Digital Multifunctional Meter (MFM)	
Accuracy class	0.5 class for main distribution board at main control room and 0.5 class for DB at inverter room(s)
Communication with SCADA	RS485 communication with Modbus RTU
Current transformer (CT)	
Type	Cast Resin Bar Primary
Voltage class and frequency	As per system requirement, 50 Hz
CT Secondary Current	1 or 5 A
Class of insulation	Class F
Accuracy class & burden	
a) For Protection	5P20, 5VA PS Class for REF and core balance CT (CBCT)
b) For Metering	Class 0.5, 5VA (min)
Minimum primary earth fault current to be detected by CBCT	1 A
Instrument Security Factor for metering CT	5
Voltage transformer (VT)	
Type	Cast Resin
Accuracy class	0.5
Rated Voltage factor	1.1 continuous, 1.5 for 30 seconds
Class of insulation	E or better
Moulded case circuit breaker (MCCB)	
Rated voltage	As per system requirement
Release	Thermal-Magnetic/Microprocessor

Rated current	
Poles	4 poles
Rated insulation level	As per system requirement
Rated ultimate and service short circuit breaking Capacity	As per system requirement
Rated Making capacity (as per system requirement)	2.1 × Short circuit breaking Capacity
Utilization category	A

20.3. Constructional Details

20.3.1.1. The panel shall be metal enclosed, free standing, floor mounted, modular type with compartmentalized construction having degree of protection of IP 5X (Indoor) and IP 55 (Outdoor) as per IS/IEC 60529. All doors and covers shall be provided with neoprene gaskets to prevent entry of vermin and dust.

20.3.1.2. All switches, push buttons etc. shall be operated front and shall be flush/semi-flush mounted.

20.3.1.3. The panel shall be fabricated from 2 mm CRCA sheet steel for frame & load bearing surfaces. Partitions may be fabricated from 1.6 mm CRCA if no components are mounted on them.

20.3.1.4. Cable entries shall be from bottom. The opening of cable entry shall be covered by 3mm thick gland plates with proper sealing to avoid water and rodent entry.

20.3.1.5. Earthing bus bar of suitable cross section shall be provided throughout the length of panel.

20.3.1.6. The panel shall be duly wired with suitable size of 1.1kV, PVC insulated cable and terminals shall be brought out for cable connections. 10% spare terminals subjected to minimum one of each rating shall be provided on each distribution switchgear. All wire shall have ferrules as per wiring diagram.

20.3.1.7. The panel shall be painted with 2 coats of primer after pre-treatment and 2 coats of Polyurethane / epoxy paint with shade as decided by the Owner

20.3.1.8. The panel shall be of dead front construction suitable for front operated and back maintained functioning.

20.3.1.9. 240 V, 5 A, 3 pin industrial socket-outlet with ON/OFF switch shall be provided in each panel.

20.3.1.10. Each panel shall be provided with LED lamp rated for 240 V, 50 Hz, single phase AC supply for interior illumination controlled by door switch.

20.3.1.11. Suitable lifting hooks shall be provided for each panel.

20.3.1.12. Each switchgear panel shall be provided with thermostatically controlled space heaters to prevent condensation within the enclosure. The space heater shall be connected to 240 V, 50 Hz, single phase AC supply through suitable switch and fuse.

20.4. Warranty

Distribution panels (ACDB and DCDB) shall be warranted against all material/ manufacturing defects and workmanship for minimum of 1 (one) year from the date of supply. Warrantee certificate shall be issued by OEM directly in the name of HPCL.

20.5. Testing

Routine test and acceptance tests requirements shall be as per relevant standards for all cable size

21. Clamps and Connectors

21.1. The bus-support clamps, spacers, T-connectors and various equipment connectors shall be supplied as per the enclosed drawings. The material to be used for these items shall be generally as per below detail

21.1.1. The materials shall be of the best workmanship, and all the sharp edges and corners shall be rounded off. The thickness of tinning, wherever applicable, shall be not less than 10 microns. The minimum thickness of pads made of copper shall be 10 mm and those made out of Aluminum/Aluminium Alloy, shall be 12 mm, unless otherwise indicated in the specifications.

21.1.2. All the clamps and connectors shall be designed to carry a continuous current not less than 125% of the rated current of the conductor (twin/single as the case may be)/equipment terminal to which these are to be connected. Temperature rise of the connector under the above condition shall not be more than 50% of the temperature of the main conductor/equipment terminal.

Clamps & Connectors

Sr.	Application	Material
1.	Bolted type connection	
2.	For connection to ACSR/AAAC/ Aluminum terminal	Aluminum Alloy conforming to designate A6 as per IS 617
3.	For connection to copper terminals, with crimping facility to connect ACSR/AAAC jumper	Electrolytic grade copper, forged and tinned
4.	Crimping type connection	
5.	For connection to ACSR/AAAC jumper	Electrolytic grade aluminum

21.1.3. All the fasteners (i.e. nut-bolts, washers, check-nuts, etc.) used in the clamps and connectors shall be of non-magnetic stainless steel. The straight bolts shall be fully threaded, and the U-bolts shall be threaded up to 30 mm from the ends.

For connectors made out of Aluminum/Aluminum Alloy, the bolts shall be of 12 mm diameter, and for copper connectors the bolts shall be of 10 mm diameter.

21.1.4. All the fasteners (i.e. nut-bolts, washers, check-nuts, etc.) used in the clamps and connectors shall be of non-magnetic stainless steel. The straight bolts shall be fully threaded, and the U-bolts shall be threaded up to 30 mm from the ends. For connectors made out of Aluminum/Aluminum Alloy, the bolts shall be of 12 mm diameter, and for copper connectors the bolts shall be of 10 mm diameter.

21.1.5. The clamps and connectors meant for ACSR and AAAC shall have the same crimping dimensions. It shall be possible to use the same clamp/connector for ACSR or AAAC, as would be required, without any modification/change at site.

21.1.6. The length of bolt shall be chosen such that after fully tightening the nut and check-nut, minimum 5 (five) threads of the bolt shall project outside the nut/check-nut.

21.1.7. As an alternative to the various types of clamps and connectors detailed under 2.0 above, the Contractors may offer connectors of Power Fired Wedge Pressure Technology (PFWPT). However, the same needs to be specified in the Bid.

21.1.8. Connectors of PFWPT type shall meet the general requirements for various connections/joints as indicated in the relevant drawings.

21.1.9. PFWPT type connectors shall comprise of:

a. **Tapered `C' - shaped spring member**

b. **Wedge for connecting solid/stranded conductor along with handle, suitable for connection between:**

- Aluminium & Aluminium
- Copper & Copper
- Aluminium & Copper
- Aluminium & Al. Alloy
- Copper & Al. Alloy
- Al. Alloy & Al. Alloy

21.1.10. Components of the PFWPT type connectors shall be made of Aluminium Alloy suitably heat-treated to ensure that the required Mechanical & Electrical parameters are in line with ANS 1 specification no. C 119.4-1991. The connectors shall have `self-cleaning' capability during application. The connector shall ensure stable and low contact resistance under varying load conditions and the thermal cycling effects.

21.1.11. The special tools and tackles required for installation of the PFWPT type connectors shall be identified in the offer. One set of these bolts and tackles shall be included in the scope of supply.

21.1.12. The Contractor shall furnish the following information in their bill of material:

a. Availability of the PGWT connectors indigenously.
b. Unit rate of each item
c. Not-withstanding anything stated above, the final decision regarding acceptance of the type of clamps and connectors (conventional/PFWPT type) shall rest.

22. Uninterrupted Power Supply

22.1. Standards and Codes

Standard/Code	Description
IEC 62040-1	Uninterruptible power systems (UPS) - Part 1: General and safety requirements for UPS
IEC 62040-2	Uninterruptible power systems (UPS) - Part 2: Electromagnetic compatibility (EMC) requirements
IEC 62040-3	Uninterruptible power systems (UPS) - Part 3: Method of specifying the performance and test requirements

22.2. General Requirements

22.2.1. The Uninterrupted Power Supply (UPS) system shall be designed to supply power to following loads (but not limited to). Data logger / SCADA, Fire Detection/ Alarm Panel HMI of SCADA.\, Emergency Lighting, Inverter's Auxiliary supply (if applicable) ,HT panel auxiliary CCTV

22.2.2. Sizing of UPS shall be done considering the above-mentioned load at power factor of 0.8 lagging inclusive of 10% design margin at 50 ˚C. 10.3 System Description

22.2.3. The UPS shall automatically provide continuous, regulated AC power to critical loads under normal and abnormal conditions, including loss of input AC power. The UPS system shall consist of the following major equipment.

(i) UPS Module Insulated Gate Bipolar Transistor (IGBT) Converter Insulated Gate Bipolar Transistor (IGBT) Inverter Digital Signal Processor (DSP) using Pulse Width Modulation (PWM) for Direct Digital Control (DDC) of all UPS control and monitoring functions Static bypass switch

(ii) Battery system for 2 hours

(iii) Battery protective and disconnect device

(iv) Maintenance bypass switch

(v) LCD display panel and LED indications

(vi) Integrated UPS Communications Protocols capable of communicating with SCADA system

22.2.4. The UPS shall meet the following minimum specifications

Parameter	Specification
Topology	Online double conversion UPS

Input	
Voltage	230 V ± 10% AC
Frequency	50 ± 5 Hz
Power factor	0.95
Output	
Voltage	230V ± 1% AC
Frequency	50 Hz
Power factor	0.8
Battery	
Type	Sealed, Maintenance-Free (AGM) battery
Capacity	100% UPS load for 2 hours
Monitoring and communication	
LED Indicators	Load on Inverter, Battery operation, Load on Bypass, Overload, LCD Fault, UPS Fault
Electrical contacts	Closing contacts for each of the following conditions: 1. Unit on Battery 2. Low Battery 3. Summary Alarm 4. UPS On 5. Input Fail
Local Display	LCD/ LED
SCADA communications	RS-485 Interface Port
Overall efficiency	>90%

Electrical Protection	Input/ output under voltage, over temperature, overload, Short circuit, battery low trip

22.2.5. The UPS shall be forced air cooled by internally mounted fans. The fans shall be redundant in nature to ensure maximum reliability. The fans shall be easily replaceable without the use of special tools.

22.2.6. Contractor shall provide the Operation & Maintenance Manual and mandatory spare parts list along with the equipment

22.3. Warranty

UPS shall be warranted for minimum of 5 (five) years and batteries shall be warranted for a minimum of 2 (two) years against all material/ manufacturing defects and workmanship from the date of supply. Warrantee certificate shall be issued by OEM directly in the name of HPCL.

22.4. Tests

22.4.1. Routine tests and acceptance tests on final product shall be done as per QAP approved by the HPCL.

22.4.2. On completion of installation and commissioning of the equipment on site tests shall be carried out with the max. available load, which does not exceed the rated continuous load. An on-site test procedure shall be submitted by contractor include a check of controls and indicators after installation of the equipment.

23. Battery and Battery Charger

23.1. Standards and Codes

Standard/Code	Description
IEC 60896-22:2004	Stationary lead-acid batteries - Part 22: Valve regulated types – Requirements
IEC 60896-21:2004	Stationary lead-acid batteries - Part 21: Valve regulated types - Methods of test
IS 1652	Specification for stationary cells and batteries, lead acid type (with plante positive plates)
IS 8320	General requirements and methods of tests for lead acid storage batteries.
IS 15549	Stationary Regulated Lead Acid Batteries

23.2. General

110 V / 220 V DC system (Battery, Battery Charger & DCDB) in accordance with this specification and standards stated herein, shall comprise of the following.

(i) Sealed Maintenance Free (VRLA) Battery complete with racks & accessories.

(ii) One No. Float charger.

(iii) One No. Float cum Boost charger.

(iv) DC Distribution Board (DCDB)

23.3. Battery

Battery shall be used to supply the following loads with back up of two hours in case of complete power failure:

(i) Trip and closing coil of HT circuit breaker

(ii) Spring charging motors for HT circuit breaker

(iii) Annunciator and Indication circuit of HT panel

(iv) Auxiliary supply to protection relays

The battery sizing shall account for suitable temperature correction factors, ageing factors of 1.25, design margin of 1.25 & depth of discharge of 80%.

The design of the battery bank and sizing calculation along with the data sheet for the battery and battery charger shall be submitted for approval. Battery voltage – 220V dc or 110V dc

23.4. Battery Charger

23.4.1. The Float Charger shall be used to supply normal DC loads and float charging current of charged battery. The Float cum Boost charger shall be designed to supply boost charging current requirement of the associated battery as well as to supply normal DC load. After full discharge of battery bank, the Float Cum boost charger shall be capable of charging the battery to its full capacity in 8 hours duration while supplying normal DC load.

23.4.2. The float charger shall have both auto and manual voltage regulation arrangements with provision of selector switch.

23.4.3. Suitable filter circuits shall be provided in all the chargers to limit the ripple content (peak to peak) in the output voltage and current to 2% and 5% respectively.

23.4.4. Digital Outputs shall be configured for connection to the SCADA to monitor the outputs like charger output current, output voltage, float/boost mode, etc.

23.4.5. The charging equipment shall be housed in a free standing, floor mounted compartmentalized panels. Panel shall have provision for bottom cable entry with removable undrilled cable gland plate of 3.0 mm thickness.

23.4.6. The panel shall be of CRCA sheet steel construction having thickness of at least 2.0 mm. Degree of protection provided by the enclosure to the internals of charger shall be IP 42.

23.4.7. The instruments, switches and indicating lamps shall be flush mounted on the front panel.

24. Earthing

24.1. Standards and Codes

Earthing system shall comply with latest revisions and amendments of the relevant IEC standards and IS codes. In particular, earthing system shall comply with the following standards and codes.

Standard/Code	Description
IS 3043	Code of Practice for Earthing
IEC 62561-2	Requirements for conductors and earth electrodes
IEC 62561-7	Requirements for earthing enhancing compounds
IEEE 80	IEEE Guide for Safety in AC Substation Grounding
IEEE 142	IEEE Recommended Practice for Grounding of Industrial and Commercial Power Systems
Indian Electricity Rules	

24.2. General Requirements

24.2.1. Earthing system shall be designed based on system fault current and soil resistivity value obtained from geo-technical investigation report. Earth grid shall be formed consisting of number of earth electrodes sufficient enough to dissipate the system fault current interconnected by earthing conductors.

24.2.2. The earth electrode shall be made of high tensile low carbon steel rod, molecularly bonded by high conductivity copper on outer surface with coating thickness not less than 250 microns as per relevant standards. Suitable earth enhancing material shall be filled around the electrode to lower the resistance to earth. Inspection chamber and lid shall be provided as per IS 3043.

24.2.3. Earth conductors shall be made of copper bonded steel or galvanized steel of sufficient cross section to carry the fault current and withstand corrosion.

24.2.4. Earth conductors buried in ground shall be laid minimum 600 mm below ground level unless otherwise indicated in the drawing. Back filling material to be placed over buried conductors shall be free from stones and harmful mixtures.

24.2.5. Earth electrodes shall not be situated within 1.5m from any building whose installation system is being earthed. Minimum distance between earth electrodes shall be two times the driven depth of the electrode.

(i) Transformer yard and switchyard fence shall be connected to the earth grid by one GS flat and gates by flexible lead to the earthed post.

(ii) All welded connections shall be made by electric arc welding. For rust

protection, the welds should be treated with red lead compound and afterwards thickly coated with bitumen compound.

24.3. Earthing of PV array field

24.3.1. All PV Modules, Module Mounting Structures (MMS) and String Combiner Box (SCB) structures in the PV array field shall be bonded to the earthing system by two distinct connections.

24.3.2. Each PV Module frame shall be earthed using copper wire of sufficient cross section. The copper wire shall be connected to the earth hole provided in the module frame using suitable arrangement in line with the manufacturer recommendation. The earthing arrangement shall use stainless washers to prevent galvanic corrosion between aluminium frame and copper wire. In order to achieve effective earthing, serrated washers shall be employed to penetrate the anodization layer of the module frame.

24.3.3. Continuous copper earthing wire shall be run to connect a group of modules and both ends of the loop shall be bolted to the DC earth grid using bimetallic lugs and stainless-steel fasteners. The copper earthing wire shall be routed in such a way to avoid physical contact with the module aluminium frame.

24.3.4. The connection between MMS and DC earth grid shall be bolted or welded. Portion of the MMS which undergoes welding at site shall be coated with two coats of cold galvanising and anti-corrosion paint afterwards.

24.3.5. Earth electrodes of the DC earth grid shall be uniformly distributed throughout the PV array field so that optimum earth resistance is offered to leakage current flowing from any module frame or MMS.

24.4. SCB equipment earthing point shall be connected to the DC earth grid using flexible copper cable of sufficient cross section as recommended by the manufacturer. The connection with the DC earth grid shall be done using suitable bimetallic lugs and stainless-steel fasteners.

24.5. PCU Earthing -DC negative bus bar of the PCU shall be earthed to avoid Potential Induced Degradation (PID). DC negative bus bar and PCU equipment earth shall be bonded to the PCU earth bus and connected to earth electrodes through flexible copper cable of sufficient cross section as mentioned by the manufacturer. The interconnection of PCU earth electrodes with DC earth grid shall be as per PCU manufacturer recommendation. In case DC negative grounding is not possible, appropriate anti-PID device shall be provided.

24.6. Transformer Earthing

24.6.1. Inverter transformer neutral shall be floating, not to be earthed. However, recommendation of inverter manufacturer shall also be taken into account.

24.6.2. Transformer tank, cable box, marshalling box and all other body earth points shall be earthed.

24.6.3. Inverter transformer shield shall be earthed separately using minimum two no. of earth electrodes. Earthing conductor between shield bushing and earth electrodes shall be copper flat of suitable size not less than 25 x 6 mm.

24.6.4. Neutral and body of the auxiliary transformer shall be earthed.

24.6.5. Inverter Room and Main Control Room Earthing

a. Metallic enclosure of all electrical equipment inside the inverter room and main control room shall be connected to the earth grid by two separate and

distinct connections.

b. Cable racks and trays shall be connected to the earth grid at minimum two places using galvanized steel flat.

c. SCADA and other related electronic devices shall be earthed separately using minimum two no. of earth electrodes.

24.7. Switchyard Earthing

The metallic frame work of all switchyard equipment and support structures shall be connected to the earth grid by means of two separate and distinct connections. Switchyard shall be shielded against direct lightning stroke by provision of overhead shield wire or earth wire or spikes(masts) or a combination there of as per CEA regulations 2010

24.8. Tests

Type test reports for earthing electrode, earth enhancing compound and its associated accessories shall be submitted during detailed engineering for approval. On completion of installation, continuity of earth conductors and efficiency of all bonds and joints shall be checked. Earth resistance at earth terminations shall be measured and recorded. The earth plate shall be provided to facilitate its identification and for carrying out periodical inspection

25. Lightning Protection System

25.1. Lightning Protection System (LPS) for entire plant against direct and indirect lighting strokes shall be provided as per IS/IEC 62305:2010.

25.2. Protection level for the entire plant shall be Level-III.

25.3. Air terminals, down conductors and earth termination system shall be designed as per relevant parts of IS/IEC 62305:2010.

25.4. Necessary foundation/anchoring for holding the air terminal in position to be made after giving due consideration to shadow on PV array, maximum wind speed and maintenance requirement at site in future.

25.5. The product shall be warranted for minimum of 2 (two) years against all material/ manufacturing defects and workmanship.

25.6. Type test reports as per IS/IEC 62305:2010 shall be submitted during detailed engineering for approval.

25.7. Necessary foundation / anchoring for holding the lightning conductor in position to be made after giving due consideration to shadow on PV array, maximum wind speed and maintenance requirement at site in future. Lightning arresters shall be equipped with lightning counters.

25.8. The lightning conductor shall be earthed through flats and connected to the earth mats as per applicable Indian Standards with earth pits. Minimum two earth pits shall be provided for each lightening arrestor. Each lightning conductor shall be fitted with individual earth pit as per required Standards including accessories, and providing masonry enclosure with cast iron cover plate having locking arrangement, watering pipe using charcoal or coke and salt as required as per provisions of IS & Earth Resistance of Lightening System must be less than one (1) Ohm.

25.9. If necessary, more numbers of lightning conductors may be provided. The Contractor is also free to provide franklin rod / Early Streamer type of lightning arrestors

on the MMS structure designed in such a way not to cast shadow on the next raw of solar PV modules. The Contractor to submit necessary calculations based upon rolling sphere method for the Lightening protection system.

26. Communication Cable

- **Optical Cables**

26.1. Optic Fibre cable shall be 4/8/12 core, galvanized corrugated steel taped armoured, fully water blocked with dielectric central member for outdoor/ indoor application so as to prevent any physical damage.

26.2. The cable shall have multiple single-mode or multimode fibres on as required basis so as to avoid the usage of any repeaters.

26.3. The outer sheath shall have Flame Retardant, UV resistant properties and are to be identified with the manufacturer's name, year of manufacturing, progressive automatic sequential on-line marking of length in meters at every meter on outer sheath. The cable core shall have suitable characteristics and strengthening for prevention of damage during pulling.

26.4. All testing of the optic fibre cable being supplied shall be as per the relevant IEC, EIA and other international standards.

26.5. The Contractor shall ensure that minimum 100% cores are kept as spare in all types of optical fibre cables.

26.6. Cables shall be suitable for laying in conduits, ducts, trenches, racks and underground buried installation.

26.7. Spliced/ Repaired cables are not acceptable. Penetration of water resistance and impact resistance shall be as per IEC standard.

- **Communication Cable (Modbus)**

26.8. Data (Modbus) Cable to be used shall be shielded type with stranded copper conductor. Cable shall have minimum 2 pair each with conductor size of 0.5 Sq.mm. Cable shall be flame retardant according to IEC 60332-1-2.

26.9. Cable shall be tested for Peak working voltage of not less than 300 V and shall be suitable for serial interfaces (RS 422 and RS 485).

26.10. Communication cable shall be laid through underground with suitable HDPE ducts.

27. SCADA and Remote Monitoring System

27.1. General Requirements

27.1.1. The Contractor shall provide complete SCADA system with all accessories, auxiliaries and associated equipment and cables for the safe, efficient and reliable operation and monitoring of entire solar plant and its auxiliary systems.

27.1.2. All data shall be recorded chronologically date wise. The data file should be MS Excel compatible. The data logger shall have internal reliable battery backup and data storage capacity to record all sorts of data simultaneously round the clock. All data shall be stored in a common work sheet chronologically and representation of monitored data shall be in graphics mode or in tabulation form. All instantaneous data can be shown in the Computer Screen. Provision should be available for Remote Monitoring.

27.1.3. The Bill of Materials associated with the equipment must clearly indicate especially the details about the PC and Printers, etc.

27.1.4. The Contractor shall provide all the components including, but not limited to, Hardware, Software, Panels, Power Supply, HMI, Laser Printer, Gateway, Networking equipment and associated Cables, firewall etc. needed for the completeness.

SCADA System shall have the provision to perform the following features and/or functions

(i) Web enabled Operator Dashboards: Showing key information on Generation, Performance and Current Status of various equipment in Single Line Diagram (SLD) format with capability to monitor PV array Zone level (i.e. SCB level) parameters.

(ii) Real time Data Logging with Integrated Analytics & Reporting: Logging of all parameters - AC, DC, Weather, System Run Hours, Equipment Status and Alarms as well as derived/ calculated/ integrated values. The SCADA User interface shall be customizable and enable Report Generation and Graphical Analysis.

(iii) Fault and System Diagnostics with time stamped event logging.

(iv) Support for O&M Activities: The interface shall allow integration with Module Cleaning System and various other O&M support systems to provide a Data Analysis and Decision Support System for smooth and efficient Plant Operations.

(v) AI based Distributed Analytics for Predictive Maintenance, trend analysis and Alerts.

(vi) Generate, store and retrieve user configurable Sequence of Event (SOE) Reports.

(vii) Interface with different field equipment in the plant and work seamlessly with field equipment supplied by different companies.

(viii) Transfer of plant data reliably, to a Cloud server on any kind of remote network including low bandwidth and wireless links such as 4G/5G/VSAT

(Note: Telecom Lease line connection, if required for transferring data from Plant over internet shall be taken by Contractor in the name of client for O&M period)

27.1.5. The Control system shall be designed to operate in non-air-conditioned area. However, the Contractor shall provide a Package/ Split AC of suitable capacity decided by heat load requirement in SCADA room at Main Control Room.

27.2. Architecture

27.2.1. The SCADA System shall be built over Industrial IoT architecture with integrated Analytics, secure web access, enterprise software and Database.

27.2.2. Data acquisition shall be distributed across MCR and LCRs while plant level data aggregation shall be done in both local and remote server (as specified by Owner).

27.2.3. Analog and Digital IO modules shall have integrated processor for distributed IO processing and control.

27.2.4. Data communication system shall be built over fibre optic cables/ wireless network with high bandwidth TCP/IP communication (Fast Ethernet or 802.11a/b/g/n) across all Inverter and Control Rooms with Internet/Intranet access at Main Control Room. Firewall shall be provided for network security.

27.2.5. Plant SCADA Server shall have Industrial Grade server hardware running SCADA & Monitoring Software with data storage (complete plant data) space for 2 years.

27.2.6. Plant data for monitoring and control operations should be accessible without dependence on external network.

27.2.7. A virtual/cloud server running SCADA & Monitoring Software shall be configured in parallel with Plant Server to enable easy access to plant data from outside the plant without having to login to plant server. Effectively, the plant data shall be replicated in both places i.e. between systems at the Plant Server and Remote Server to provide data redundancy for complete plant data.

27.2.8. Note: Configuration of Cloud server and procurement of associated subscription services shall be in the scope of the EPC Contractor.

27.2.9. Connectivity shall be provided to Owner's Data Monitoring Centre. Data collected by Plant SCADA shall be replicated in real-time, using industry standard interfaces such as Web Services, OPC-UA, data files, as required – with Owner's Central Monitoring System. The data recording intervals for different parameters from different devices in the solar plant shall be considered when creating schedules to "push" the data from Plant SCADA to data receivers stationed at Owner's Data Monitoring Centre.

27.2.10. Operator Workstation/PC shall be of Industrial Grade for browser-based access to plant data from Plant or remote server. Plant control & SLDC/Utility related operations shall only be initiated through browser-based interface requiring no client software or database to be installed on the Workstation. All critical software and Plant Data shall be installed/stored on local and remote servers only with user access control for protecting the software and data assets from accidental deletion or corruption.

27.2.11. Internet/Intranet at Plant: Public or private network access shall be provided at the plant through any broadband/VSAT connectivity of 2Mbps or higher bandwidth. In case no broadband/VSAT connectivity can be provided at the plant, a 3G/4G data card from any Internet Service Provider (ISP) may be provided. SCADA system shall be capable of sending all plant data in real time to the Remote Server.

27.2.12. GPS based Time Synchronization System: The SCADA system shall have a Master/Slave Clock system along with antenna, receiver, cabinet and internal interconnection cables. All SCADA controllers, servers, OWS and communicating equipment shall be synchronized to the GPS clock.

27.3. Industrial IoT Controllers & Data Acquisition

The Plant SCADA and Monitoring System may use one or more IoT Controllers at each Inverter Control Room and MCR for the purpose of data acquisition and data forwarding to the Local and Remote SCADA Servers. The IoT Controllers shall meet the following minimum requirements:

27.3.1. The IoT Controllers shall be distributed in nature and work independently of other IIoT Controllers or any central controller in the system.

27.3.2. Shall be capable of supporting wide range of field protocols to communicate with different field equipment (Modbus over RS485/Ethernet, etc.)

27.3.3. Shall have local storage for a minimum of 2 weeks (in case of network failure).

27.3.4. Provide web-based interface to configure the controller for various equipment

in the field.

27.3.5. IO Functionality: Shall support status monitoring of VCBs & Trip relays on RMU/HT & Transformer panels through distributed DI/AI modules.

27.3.6. Controls: Shall be capable of Controlling breakers (ON/OFF). Both ON/OFF and Parameter control of inverters shall be supported.

27.3.7. Data Communication with Servers: Shall send the data collected, from all the equipment at Inverter Control Room and/or Main Control Room, to the Monitoring & Control Server.

27.3.8. Controllers shall be capable of sending data over Internet connections, USB data cards.

27.4. Functionalities

27.4.1. SCADA system shall enable PV array Zone monitoring i.e. the total current from each String Combiner Box shall be monitored on the DC side of the inverter (Central).

27.4.2. The SCADA system shall monitor instantaneous and cumulative electrical parameters from all DC& AC Equipment including inverters, weather station, MFM, Transformer and Switchgear (LT & HT Panels) at regular intervals not greater than one minute.

27.4.3. The SCADA system shall monitor Instantaneous and cumulative environment parameters from weather sensors or data loggers at same interval as electrical parameters and provide PR, CUF on the fly.

27.4.4. The SCADA system shall provide Alarms and Alerts on equipment faults and failure in less than 5 seconds. Alarms on status change of hardwired DI shall also be provided.

27.4.5. The SCADA system shall provide configurable alerts on any parameter crossing settable thresholds. The list of such parameters shall be finalized in consultation with the Owner

27.4.6. The SCADA system shall enable integration with other sub-systems at the plant for supporting O&M activities.

27.4.7. The SCADA system shall have user-friendly browser-based User Interface for secure access from anywhere, for minimum ten concurrent connections from the Operator PC or other securely connected laptop/mobile, for plant monitoring, O&M, daily reporting, and analysis. A dashboard providing summary details of total plant generation, day's export, irradiance, Inverter Control Room level generation and performance indicators like PR and CUF.

27.4.8. Reporting: The SCADA system shall provide downloadable reports in Excel/PDF, configurable for equipment parameters across the plant.

27.4.9. The system shall have Configurable Analysis page for self-configured as well as on demand Analytics charts.

27.4.10. The SCADA system shall be extensible to include maintenance of O&M schedules and related activities for plant equipment as per the O&M Manual.

27.4.11. Mobile User Interface: summary of plant performance and issues should be accessible in a mobile Native UI or browser UI.

27.4.12. Data Communication to SLDC: SCADA system shall provide required interface to integrate with TRANSCO-SLDC, in compliance with grid code, to send any parameters specified by SLDC.

27.4.13. Note: The methodology and specification of SLDC interface will be provided

separately by SLDC/TRANSCO and it shall be the responsibility of the Contractor to determine the same.

27.4.14. Power Plant Control: SCADA system shall provide required interface to the local SCADA operator to set various power control modes (active/reactive power/frequency/PF) through the inverters over industry standard communication protocols like Modbus over TCP/IP.

27.4.15. Forecasting and Scheduling: SCADA shall provide day ahead and week ahead forecasting and scheduling for power generation at the plant as per SLDC/Utility stipulations.

27.4.16. Predictive Maintenance: SCADA system shall have in-built or pluggable frameworks to support AI based Predictive Maintenance for all key equipment including inverters, transformers and switchgear at the plant

27.4.17. All programming functionalities shall be password protected to avoid unauthorized modification.

27.4.18. The Contractor shall provide software locks and passwords to HPCLHPCL for all operating & application software. Also, the Contractor shall provide sufficient documentation and program listing so that it is possible for the HPCLHPCL to carry out modification at a later date.

27.5. Earthing

27.5.1. Two isolated electronic earth pits near to SCADA panel at every Inverter and Control Room with < 1 Ohm resistance shall be provided. One earth pit shall be used for protective/body earth and the other to be used for Signal Earth.

27.5.2. Apart from providing separate earth pits, manufacturer specified earthing recommendations shall be followed for all communicating equipment connected to SCADA. This includes but is not limited to SMBs, Inverters, WMS and Switchgear panels.

27.6. Communication Cable Laying

27.6.1. All RS485, IO and CAT6 cables shall be laid in separate conduits with a minimum separation of 1.5ft from AC/DC power cables all along.

27.6.2. Power cables shall be laid deep in the trenches first. Data cables shall be laid in separate conduits after partially filling the trenches to ensure minimum 1.5 ft separation between power and communication cables all along the trench.

27.6.3. IO Cables between switch gear panels and SCADA panel shall be laid on separate cable trays, with a minimum of 1.5ft separation from trays carrying AC Power cables.

27.6.4. RS485 & CAT6 cables between switch gear panels or Inverters and SCADA panel shall be laid on separate cable trays, with a minimum of 1.5ft separation from trays carrying AC Power cables.

27.7. Control Cabinets / Panels / Desks at Main Control Room

27.7.1. The cabinets shall be IP 22 protection class. The Contractor shall ensure that the temperature rise is well within the safe limits for system components even under the worst condition and specification requirements for remote I/O cabinets.

27.7.2. The cabinets shall be totally enclosed, free standing type and shall be constructed with minimum 2 mm thick steel plate frame and 1.6 mm thick CRCA steel sheet or as per supplier's standard practice for similar applications.

27.8. Software Licences

The Contractor shall provide software license for all software being used in Contractor's System. The software licenses shall be provided for the project and shall not be hardware/ machine-specific.

27.9. Hardware at Main Control Room

27.9.1. The Hardware as specified shall be based on latest state of the art Workstations and Servers and technology suitable for industrial application & power plant environment.

27.9.2. The Local Monitoring & Control Server and the Operating Work station, to be deployed in the Plant Control Room, shall have the following server hardware and operating system along with accessories:

a. Plant Server

(i) Server Hardware- Hex/Octal Core Xeon, 32GB RAM (expandable to 64 GB RAM), 4 X 2TB SATA hard discs in RAID 5 configuration, 2TB external USB hard disc (for backup), dual power supplies, 2 LAN ports, LCD console, keyboard & mouse. The Server hardware shall be housed in a rugged fan-cooled, and rodent-proof Server rack

(ii) Operating System- Operating System and Database shall be of enterprise scale (prefarably RedHat Linux or equivalent Linux OS, Oracle/MySQL or equivalent DB), with required AMC for 5 years

(iii) Accessories

1. Monitor: Min 22" LED Flat Monitor with non-interfaced refresh rate min. 75 Hz.
2. Keyboard: ASCII type
3. Pointing Device: Mouse
4. Intelligent UPS (on line): Minimum 2 hour battery backup.

b. Operator workstation

(i) Hardware - i7 CPU running at 3.0 GHz or faster with 1GB RAM, 500GB hard disk, 25" LED monitor

(ii) Operating System- Windows operating system with necessary tools, anti-virus software.

(iii) Accessories

1. Screen Display Unit: Min 50" LED Flat Monitor with wall mounted arrangement for the display of SCADA screen

2. A4 size monochrome laser printer.

3. UPS of required capacity with 2 hour battery back up

4. All network components of LAN and Workstations shall be compatible to the LAN, without degrading its performance.

27.10. Factory Acceptance Test (FAT)

FAT procedure shall be submitted by bidder for approval. SCADA shall communicate with all third party devices which are part of solar plant and same shall be demonstrated during the FAT.

Minimum Requirements of SCADA System for I/O

Sr. No.	Equipment Details	Location	SCADA Requirements			
			Monitoring / Status	Control / Operation	Data Logging	Specific Remarks
1	ABT Meter	33kV Switchyard	Yes		Yes	
2	Isolators	33kV Switchyard	Yes			
3	C & R	33kV Switchyard	Yes		Yes	Relay Log
4	Power Transformer	33kV Switchyard	Yes		Yes	Marshalling Box
5	Breakers	33kV Switchyard	Yes	Yes		
6	133 kV VCB Panel	MCR	Yes	Yes	Yes	MFM Meters with RS485
7	DC Battery Charger	MCR	Yes			Battery Back Up Status
8	UPS	MCR / LCR	Yes			UPS Data Log

9	Aux. Transformer	33kv Switchyard	Yes			Marshalling Box
10	Fire Alarm Panel	MCR / LCR	Yes			
11	Inverter	LCR	Yes	Yes	Yes	Inverter Data Log
12	11kV /33 kV RMU	LCR	Yes	Yes	Yes	MFM Meters with RS485
13	Weather Monitoring Status	MCR	Yes		Yes	
15	CCTV	LCR / MCR / Plant / Switchyard	Yes		Yes	NVR based recording & data transmission
16	String Junction Box	Plant	Yes		Yes	Each String / Input Monitoring

28. Illumination

28.1. Standards and Codes LED luminaires shall be tested at independent laboratory as per the following test standards.

Standard/Code	**Description**
LM79-08	Electrical and Photometric Measurements of Solid-State Lighting Products
LM 80-15	Measuring Luminous Flux and Color Maintenance of LED Packages, Arrays and Modules

28.2. General Specification

28.2.1. This specification covers design, supply and installation of uniformly Illumination system along the peripheral corridor, access & internal roads (as applicable), switchyard and other facilities including entry points/gate(s) inside the plant area.

28.2.2. The Contractor shall furnish Guaranteed Technical Particulars of the LED luminaires, from renowned brands available in the market for approval of HPCLHPCL.

28.2.3. Lighting system shall work on the auxiliary supply and same shall be incorporated in auxiliary loads. The Contractor shall provide minimum 20% of total lighting

points as emergency lighting points, fed from UPS DB or DCDB as per scheme adopted by the Contractor.

28.3. Lighting Levels

28.3.1. The average LUX level of 10 lumen is to be maintained in switchyard. However, a lux level of 20 lumen ((10+10) additional switchable on requirement only) is to be maintained in switchyard on transformer.

28.3.2. The lighting system of solar power plant shall be designed in such a way that uniform illumination is achieved. Average LUX level to be maintained in different areas shall be as under

Area	**LUX**
Internal / Access Roads & Peripheral Corridor	4
Transformer yard/Switchyard	20

28.3.3. The lighting level shall take into account appropriate light output ratio of luminaires, coefficient of utilization maintenance factor (of 0.7 or less) to take into account deterioration with time and dust deposition and illuminance uniformity [Uo] shall be min 0.3.

28.4. LED Luminaire for Outdoor Applications

28.4.1. LED luminaires shall meet the following parameters

Parameter	**Specified Value**
Input voltage	170 - 260 V
Input Frequency	50 Hz +/-1 Hz
Power Factor	0.90 (Minimum)
Luminaire efficacy	> 90 lumens per watt
Beam Angle	Minimum 120°
Total Harmonic Distortion	< 10 %
Working Humidity	10% - 90% RH (Preferably Hermetically sealed unit)
Degree of Protection	Minimum IP 65 (for Outdoor fixtures)
Luminaire Casing	Powder coated metal / Aluminium.
Colour Temperature	5700 K (cool day light)

Colour Rendering Index	> 65
Moisture protection in case of casing damage	IP 65 (driver unit shall preferably be totally encapsulated)

28.4.2. The LED luminaire (outdoor) housing, heat sink, pole mounting bracket, individual LED reflectors and front heat resistant tempered glass should be provided. The LED luminaire (outdoor) housing should be made of non-corrosive, high- pressure, die-cast aluminium and the housing should be power coated grey, so as to ensure good weatherability. Each individual LED source should be provided with an asymmetrical distribution high reflectance aluminized reflector, which should ensure that the light distribution of the luminaire is suitable for road lighting applications (wide beam distribution) and should ensure high pole to pole spacing.

28.4.3. The luminaire should be provided with in-built power unit and electronic driver.

28.4.4. The luminaire should be suitable for standard street light poles and should be suitable for side entry and bottom entry (post top).

28.4.5. GI Lighting pole of suitable diameter capable of withstanding system and wind load, shall be provided with average Zn coating thickness of 80micron. The street light poles shall have loop in loop out arrangement for cable entry and light fixture / wiring protected with suitably rated MCB.

28.4.6. All outdoor lighting system shall be automatically controlled by synchronous timer or photocell. Provision to bypass the timer or photocell shall be provided in the panel.

28.4.7. Lighting panels shall be earthed by two separate and distinct connections with earthing system. Switch boxes, junction boxes, lighting fixtures, etc. shall be earthed by means of separate earth continuity conductor. Cable armour shall be connected to earthing system at both the ends. Proper earthing of street light poles shall be ensured.

28.4.8. Junction box for lighting shall be made of fire-retardant material. The degree of protection shall be IP 55 for outdoor JB.

28.4.9. Lighting cables, wherever exposed to direct sunlight, shall be laid through Double Wall Corrugated (DWC) HDPE conduits.

28.5. Warranty

All luminaires shall be warranted against all material/manufacturing defects and workmanship for minimum of 2 (two) years from the date of supply.

29. Weather Monitoring System

As a part of weather monitoring system, the Contractor shall provide the following measuring instruments with all necessary software and hardware required to integrate with SCADA.

29.1. Pyranometer

29.1.1. The Contractor shall provide Class-A pyranometers (ISO 9060:2018 classification) along with necessary accessories for measuring incidental solar radiation at horizontal and inclined plane of array.

29.1.2. Specification of the pyranometer shall be as follows

Parameter	**Specified Value**
Spectral Response (50% points)	0.31 to 2.8 micron
Input Frequency	50 Hz +/-1 Hz
Operating temperature range	0°C to +80°C
Ingress Protection	IP 67
Resolution	Minimum +/- 1W/m^2
Output	Analog output: 4 – 20 mA Serial output: RS485

29.1.3. Each instrument shall be supplied with necessary cables. Calibration certificate with calibration traceability to World Radiation Reference (WRR) or World Radiation Centre (WRC) shall be furnished along with the equipment. The signal cable length shall not exceed 20m. The Contractor shall provide instrument manual in hard and soft form.

29.2. Temperature Sensor

The Contractor shall provide minimum 3 (three) temperature sensors (1 (one) for ambient temperature measurement with shielding case and 2 (two) for module temperature measurement) at each site. The temperature sensor shall be Resistance Temperature Detector (RTD)/ Semiconductor type with measurement range of 0°C to 80°C. The instrument shall have valid calibration certificate.

29.3. Anemometer

Contractor shall provide minimum one no. ultrasonic wind sensor (no moving parts) for wind speed and direction monitoring.

Parameter	**Specification**
Velocity range with accuracy limit	0-60m/s with +/-2% accuracy @12 m/s; Resolution: 0.01m/s
Wind direction range with accuracy limit	0 to 360o (No dead band) with +/-2o accuracy @12 m/s; Resolution: 1o

Mounting Bracket	Anodized Aluminium bracket to reduce corrosion, all mounting bolts of SS
Protection Class	IP 66
Output	RS 485

29.4. Data logger and Data Acquisition System

Data logger for the weather monitoring station should have the following features:

29.4.1. Provision for analog, digital and counter type inputs for interfacing with various type of sensors
- (i) Analog Input
- (ii) Adequate nos. for all analog sensors with redundancy
- (iii) Provision for operation in different current and voltage ranges as per connected sensors
- (iv) Accuracy of +/-0.1% of FS
- (v) Digital Inputs- Adequate no. of Digital inputs and outputs for the application
- (vi) Provision for RS232 and RS485 serial outputs
- (vii) Built-in battery backup
- (viii) Connectivity and Data transmission:
  - RS485 MODBUS interface for data collection and storage on SCADA
  - Communication protocol should support fast data transmission rates,
  - enable operation in different Frequency bands and have an encryption-based data security layer for secure data transmission

29.4.2. Display Settings: Graphic LCD screen which should be easily accessible and should display relevant details like all sensor values, battery strength, network strength etc.

29.4.3. Provision of Time synchronization from telecom time or server time

29.4.4. Data Storage: Provision for at least 2 MB internal Flash Memory and at least 8 GB Micro SD card (expandable)

29.4.5. Protection level: IP 65

30. CCTV Camera

30.1. CCTV Cameras along with monitoring stations (sufficient numbers) and all other accessories required for its proper operation must be installed to have complete coverage of following areas for 24 hours.
- **(i)** Main entry: Covering all the entry/exit
- **(ii)** Along the Plant Perimeter: Covering complete perimeter of Plant Area to capture all possible intrusion
- **(iii)** Control Rooms: Covering Entry/Exit and Equipment Rooms
- **(iv)** Switchyard

30.2. Monitoring stations of the CCTV Network shall be installed in Main Control Room

30.3. The CCTV system shall be designed as a standalone IP based network architecture. System shall use video signals from different cameras at defined locations, process the video signals for viewing on monitors at control room and simultaneously record all video streams using latest compression techniques.

30.4. Camera shall be colour, suitable for day and night surveillance (even under complete darkness) and network compatible.

30.5. It shall be possible to control all cameras i.e., PTZ auto/ manual focus, selection of pre- sets, video tour selection etc. The software shall support flexible 1/2/4 windows split screen display mode or scroll mode on the display monitor for live video.

30.6. The system shall support video analytics in respect of the following:

(i) Video motion detection

(ii) Object tracking

(iii) Object classification

(iv) Camera server shall be provided with sufficient storage space to storage recordings of all cameras at HD mode for a period of 45 days. All recordings shall have camera ID, location, date and time of recording

31. Fire Alarm System

31.1. Standards and Codes

Standard/Code	Description
IS 2189	Selection, Installation and Maintenance of Automatic Fire Detection and Alarm System Code of Practice
IS 2171	Portable Fire Extinguishers, Dry Powder (Cartridge Type)
IS 8149	Functional requirements for twin CO2 fire extinguishers (trolley mounted)
IS 2546	Galvanized mild steel fire bucket
National Building code 2016	

31.1.1. Contractor shall ensure the compliance of fire detection and alarm system as per relevant standards and regulations. The installation shall meet all applicable statutory requirements and safety regulations of state/central fire department/body or any other competent authority in terms of fire protection.

31.1.2. Firefighting system for the proposed power plant for fire protection shall be consisting of but not limited to:

(i) Sand buckets

(ii) Portable fire extinguishers (CO_2 and dry powder type)

(iii) Microprocessor based fire alarm panel

(iv) Multi sensor smoke detectors

(v) Hooter cum strobe

(vi) Manual call points

(vii) Cables from sensor to fire Panel

31.1.3. Minimum two numbers of fire extinguishers (CO_2 and Foam type each, of capacity 9 kg having BIS certification marking as per IS: 2171) shall be provided at every building/ enclosure, transformer yard and switchyard. However, contractor must comply with existing building code for fire protection and relevant IS codes.

31.1.4. Four numbers of stand with four sand buckets on each stand shall be provided in the Transformer Yard. Sand buckets inside the building shall be provided at strategic locations as decided during detailed engineering.

31.1.5. Digital output from the fire detection system shall be integrated with SCADA

31.1.6. Contractor shall submit the plan for fire and smoke detection system for the HPCL's approval

32. Testing Instruments

The Contractor shall provide the following set of instruments for on-site testing.

32.1. Earth resistance tester

Parameter	Specification
Display	Backlit LCD or LED display
Range	Earth Resistance: up to 2000 Ω Earth Voltage: 200 V
Accuracy	± (2% + 5)
Safety Ratings	IP 56
Programmable Limits setting	Enabled
Accessories	
Earth Ground Stakes – 4 Nos.	
Cable Reels – 3 Nos.	
Battery – 2 set	
Carry Case with sufficient space for accommodating accessories	

32.2. Array tester

Parameter	Specification

Display	Backlit LCD or LED display
Functionality	All electrical tests required by IEC 62446- 1:2016
Memory	Up to 200 records & USB downloadable to Computer
Accessories	
A set of two, 4mm fused leads for extra protection during installation tests.	
Leads which enable the array tester to connect directly to PV arrays	
Battery – 2 set	
Carry Case with sufficient space for accommodating accessories	

32.3. Insulation tester

Parameter	**Specification**
Display	Backlit LCD or LED display
Insulation Test Range	0.1 MΩ to 10 GΩ
Test Voltage	250V, 500V, 1000V, 5000V
Test Voltage accuracy	+20% on positive side only no negative variation is allowed
Accessories	
Heavy duty Test Leads with Alligator Clips – 1 set	
Battery – 2 set	
Carry Case with sufficient space for accommodating accessories	

32.4. Digital Multimeter

Parameter	**Specification**
Voltage Range	1500 V DC / 1000 V AC (True RMS)
Display	4 ½ digits, Backlit LCD or LED
Measuring Category	1000 V CAT III as per IEC Standard 61010-1
Additional Functions	Resistance, Temperature, Continuity, Diode, Capacitance, Frequency, Duty cycle measurement

Accessories
Temperature Probe – 1
Test Leads with Alligator Clips – 1 set
Battery – 2 set
Carry Case with sufficient space for accommodating accessories

32.5. Clamp meter

Parameter	**Specification**
Current Range	400 A DC / 1000 A AC (True RMS)
Display	Backlit LCD or LED display
Measuring Category	1000V CAT III as per IEC 61010-1
Additional Functions	Active, Reactive and Apparent Power, THD, PF
Accessories	
Test Leads – 1 set	
Battery – 2 set	
Carry Case with sufficient space for accommodating accessories.	

32.6. Clamp meter

Parameter	**Specification**
Spectral response	8 µm to 14 µm (LW)
Temperature-sensitivity and calibration range	–20 °C to +120 °C
Atmospheric air temperature	-10 °C to +40 °C
Thermal sensitivity	NETD ≤ 0.1 K at 30 °C
Geometric resolution	640 x 480 pixels
Absolute error of measurement	< ± 2 K

Adjustable parameters	Emissivity, Reflected temperature
Adjustable functions	Focus, temperature level and span
Measurement functions	Measuring spot, measuring area with average and maximum temperature
Calibration	The measuring system (Camera, lens, aperture and filter): The thermographic camera has to be traceably calibrated at least every two years. The calibration has to be documented. If the camera is not compliant (absolute temperature and/or temperature differences), it has to be readjusted by the manufacturer.
Documentation	Storing of the infrared picture with the radiometric data to be able to determine absolute temperature2

32.7. Digital lux meter

Parameter	Specification
Range	0 – 1000 lux
Accuracy	± (2% + 5)
Resolution	1 lux
Display	3½ digits, Backlit LCD/LED
Accessories	
Battery – 2 set	
Carry Case with sufficient space for accommodating accessories.	

32.7.1. All testing equipment shall possess valid calibration certificate issued from approved NABL labs.

32.7.2. Instruments of superior rating is allowed after seeking consent of the HPCL. Maintenance, calibration, up keeping, repair & replacement of these tools will be in the scope of the Contractor during O&M.

32.7.3. It is Contractor's responsibility to arrange for tools, tackles, logistics, test kits, manpower, experts etc. required for trouble free operation of Plant.

33. Power Evacuation System

33.1. The Contractor has to do the power evacuation and integration to and with the designated substation via either overhead transmission line or underground cables at specified grid voltage with all necessary infrastructure such as protection switchgears and metering systems as per the requirement of the DISCOM / STU.

33.2. The Contractor shall get the route approval from the HPCL prior to start of the construction. Any changes in the route or scheme due to ROW issues at any point of the time prior to commissioning shall be complied without any additional cost to the HPCL.

33.3. The ROW for the TL/UG cable shall be obtained prior to the construction of the line from the concerned authorities.

33.4. The power evacuation system shall be rated plant configuration and local grid code.

(i) Overhead Transmission Line

In case the power evacuation is planned with overhead transmission line for plant external evacuation, the design of tower/pole and its accessories shall be as per the DISCOM / STU's requirement and the design shall be submitted to HPCL for approval/ accord.

(ii) Underground cable

In case the power evacuation is planned with underground cable for plant internal evacuation, the cable shall be approved by the HPCL. However, in case of external power evacuation, the evacuation plan shall be as per DISCOM / STU's requirement and the same shall be submitted to HPCL for approval/ accord.

34. Metering & Grid Connectivity

34.1. EPC Contractor shall provide an energy meter for accurate periodical readings of AC energy generated and fed to the grid along with all metering arrangements such as instrument transformers and structure. EPC Contractor shall be responsible for inspection, testing, and calibration of ABT or Bidirectional Meter at the time of installation and also during operation lifetime of Facility

34.2. This specification covers the design, engineering, manufacturing, assembly, and testing before supply and delivery at site supply, installation, testing at site and successful commissioning CT and VT operated microprocessor based 3-phase 4-wire metering system with 0.2s accuracy class energy meters , associated essential equipment, along with accessories, and associated Base Computer Software (as detailed in this specification) One static type composite meter along with one check meter shall be installed for each circuit, as a self-contained device for measurement of power transmittals, as described herein, in each successive 15 / 5 minute block, and certain other functions, detailed in the following paragraphs.

34.3. The meters shall conform (for testing, performance and accuracy) in all respects the relevant Indian/International standards with latest amendments thereof unless otherwise specified. IEC: 687-1992 - Alternating Current Static watt-hour meters for measurement of active energy, class 0.2.

34.4. The Bi-Directional electronic energy meter/ ABT Meter (0.2S class) shall be installed for the measurement of the Import/Export of energy. EPC Contractor has to follow regulations of GERC's (Net Metering Solar PV Grid Interactive Systems) regulations-2016 and its amendments & orders on solar metering and conform to the CEA (Installation

and Operation Meters) Regulations, 2006. An energy meter shall be of approved make of the DISCOM and shall conform to the requirements laid down by the CEA's (Installation and Operation of Meters) Regulation, 2010. This shall be inspected, tested, and calibrated at the time of installation and also during the operation lifetime of a power plant.

34.5. For an accounting of solar generation after inverter/ ACDB from individual feeder solar meter shall be installed. A Minimum of two no. of the solar meter shall be considered for the plant. Solar meters shall be installed near the ground floor of the building.

34.6. The bidder must take approval/NOC from the Concerned DISCOM for the connectivity, technical feasibility, and synchronization of SPV plant with the distribution network and submit the same to HPCL/ TPE AGENCY before commissioning of SPV plant.

34.7. The Parties agree that the installation, sealing, inspection, calibration, maintenance and testing of Main Meters and the Back-Up Meters shall be as per TENDER and shall also conform to the Central Electricity Authority (Installation and Operation Meters) Regulation, 2006 as amended from time to time.

34.8. The meters will be sealed in the presence of representatives of the EPC Contractor and DISCOM. Any seal(s) of Main Meter or Backup Meter will be broken only by DISCOM's representative in the presence of the EPC Contractor's representative whenever such Meter is to be inspected, tested, adjusted, repaired or replaced.

34.9. In case of any change in the Delivery Point as mutually agreed between HPCL/Concern ULB /DISCOM and the EPC Contractor will automatically apply to this Agreement without any further action.

34.10. Metering System including CTs (Wherever applicable) shall be as approved by DISCOM and STU. All approval, testing, and required Liaison work shall be in the scope of Bidder. Testing Charges of the Solar Generation Energy Meter, Net Energy Meter, and Current Transformer shall be carried out and borne by the Bidder. The meter Box shall be as per DISCOM/STU requirements.

C. Civil, Mechanical and Plumbing work

35. General Requirement

- This section of Technical Specifications describes detailed technical and functional requirements of all civil, structural, mechanical & plumbing works included in the scope.
- This excludes design, supply and installation of Galvanized 33 kV Transmission Line towers /poles, Tower extensions/pole & accessories and which shall be designed following latest guidelines of respective SEB (State electricity board) and got approved from SEB/STU before execution. In absence of SEB/ STU guidelines REC (Rural electrification corporation) standards shall be followed. Poles at corner with angle > 100 shall be provided with 4- pole structure or lattice tower. Use of Pre-stressed cement concrete spun poles is not acceptable. Approved copies of these designs & drawings shall be submitted to the HPCL for reference and record.

36. Standards & Codes

36.1. All design and construction of civil works shall conform to relevant Indian standards such as BIS, IRC, MORTH, NBC etc.

36.2. Design of steel structures shall conform to IS: 800, 801 or 802 as applicable. Design of concrete structures shall conform to IS: 456. For design of liquid retaining structure IS: 3370 shall be followed. Only in case of non-availability of Indian standard, equivalent American or British standard may be used for design with prior approval of the Engineer and the contractor shall submit proper justification for the same along with his request to the Engineer for review and approval, and the decision of the Engineer shall be final and binding

36.3. All the design/ drawings shall be prepared/ approved either by in-house Engineering Team of the contractor (or by his Engineering Consultant) with qualified engineering staff with relevant experience in successful design of solar SPV plants

36.4. The design calculations for MMS, RCC structure, Steel structure, Foundation system including piling, Road work, Drainage work, etc. shall be submitted for prior approval of Engineer before commencement of construction.

36.5. As per project requirements, the HPCL may ask for approval of all civil designs and drawings by a Chartered Civil/ Structural Engineer.

36.6. The design calculations shall be supplemented with a neat sketch showing the structure geometry, node and member nos., lengths of various typical members, support points and type of supports, types of materials & type of sections with properties considered in analysis & design. The report shall also include back-up calculations for various loads adopted in design, brief write-up on primary load cases and design load combinations considered and conclusions on design results (with supporting sketches) for easy reference and clarity. Where a computer program (other than STAAD) is used for analysis and design, the contractor shall include a write-up on the computer program used along with examples for validation check. Design Input (format suitable to the programmed used and also in STAAD format) and output file shall also be given in the design report and in soft copy to facilitate its review and approval by the Engineer.

36.7. The methodology for construction of MMS and its foundations, Road & drainage works and Procedure for pile load test shall also be submitted for prior approval of Engineer before start of these works.

37. Topographical Survey

37.1. The contractor shall be responsible for detailed Topographical Survey of the proposed project site. The work shall be carried out through an agency with relevant experience and qualified survey team.

37.2. The Topographical survey shall be conducted at 20m x 20m grid, or as directed by the Engineer, only with the help of digital surveying instruments like Total Station/ Auto level. The Contractor shall carry the Bench Mark from nearest GTS Bench mark or any other established source like Railway station, Permanent PWD/ WRD structure etc. as approved by the Engineer, by fly-levelling and establish two permanent bench marks (PBM) at site. All subsequent transfer of levels shall be carried out with respect to these PBMs. The work shall also include constructing permanent reference pillars (RP) at suitable locations as directed by the Engineer. These reference pillars shall be labelled permanently with their respective coordinates and reduced levels for future use. The Permanent Bench Marks (PBM) and reference pillars (RP) shall be shown on the survey drawings.

37.3. While carrying bench mark to the project site, levels shall also be established on the permanent objects like culverts etc. at least on one object in every 1 (one) km if available

along with route with adequate description about the objects. These levels shall be maintained at site & also mentioned in the survey report to facilitate locating these objects later on.

37.4. The survey work shall be carried out in UTM grid system. The contractor shall also establish the latitudes and longitudes and UTM coordinates of all the corners of the project site. At least 50m width of the adjoining plots and surrounding areas shall also be covered in the survey for correlation with adjoining plots and facilities. The grids for the survey work shall be established in N-S & E-W direction (corresponding to Geographical North or Plant North) as directed by the Engineer.

37.5. Positions, both in plan and elevation, of all natural and artificial features in the area like waterways, railway tracks, trees, cultivation, houses, fences, pucca and kutcha roads including culverts and crossings, foot tracks, other permanent objects like telephone posts and transmission towers etc. are to be established and subsequently shown on survey maps by means of conventional symbols (preferably symbols of survey of India Maps). All hills and valleys within the area/areas are to be surveyed and plotted on maps by contours. Any unusual condition or formation on the ground, locations of rock outcrops (if visible on the surface) and springs/falls, sand heap/dune, possible aggregate deposits etc. shall also be noted and plotted on contour maps. The C/L coordinates of existing road & cross drainage (CD) works (culverts etc.) at intermediate points & at corners/ intersections and width of carriage way of the road shall be recorded with their position on the contour maps.The record of measurement of all Reduced Levels (RL) shall be submitted in digital format, (in x, y z coordinate system) along with preliminary contour plan of the site, for Engineer's review before submission of final contour map. The contour interval shall be as required for proper representation of the topography however it shall not be more than 0.5m. The Contractor shall submit survey maps of the site in 1:10,000 scale indicating grid lines and contour lines, demarcating all permanent features like roads railways, waterways, buildings, power lines, natural streams, trees, sand dunes etc. Present use of the site i.e. mining, quarrying, agriculture etc., existing drainage pattern of the site, possibility of water logging and high flood level of the area shall also be captured in the document. The project plot boundary with coordinates of all corner points along with coordinate grid of 50m x 50m interval shall be marked on the contour map.

38. Geotechnical Investigations

38.1. The contractor shall be responsible for detailed Geotechnical investigations at the proposed project site for the purpose of foundation design for various buildings, structures, HT lines, MMS etc. and other design/ planning requirements. The investigation work shall be carried out through any Govt. approved/ NABL accredited agency. The contractor shall submit the credentials of the proposed agency along with relevant certificates in support thereof for verification/ approval of the Investigation Agency by the Engineer.

38.2. The scope of work includes execution of complete soil exploration including boring and drilling with rotary drilling rig, standard penetration test (SPT), collecting disturbed (DS) and undisturbed samples (UDS), collecting ground water samples, trial pits, electrical resistivity tests (ERT), field & laboratory CBR tests, conducting laboratory tests on collected samples of soil & ground water and preparation and submission of report. SPT shall be carried out in all types of soil deposits and in all rock formations with core

recovery up to 20% met within a borehole (BH). SPT test shall be conducted at every 1.5m interval or at change of strata.

38.3. Laboratory tests shall be conducted on DS & UDS samples and ground water samples in sufficient no. & shall include, Soil classification, Grain size analysis including Hydrometer analysis, determination of Bulk and dry density, Specific gravity, Natural moisture content, Atterberg limits, Tri-axial shear tests (Unconsolidated Undrained – UU) on UDS, Undrained shear test, Consolidation tests, Unconfined compression tests (UCS), Free swell index, chemical analysis of soil and water samples to determine the carbonates, sulphates, chlorides, nitrates, pH, Organic matter and any other chemicals harmful to concrete and reinforcement/ steel. Laboratory tests on rock samples shall be carried out for Hardness, Specific Gravity, Unit Weight, Uniaxial Compressive Strength (in-situ & saturated), permeability test (in-situ, to be conducted at a depth of 750 mm), Slake Durability etc. Laboratory CBR test on soaked samples shall also be conducted on min. 5 no. of soil samples to ascertain the suitability of soil for sub-grade and requirement of any treatment of subgrade soil in case of CBR <2% as per IRC requirements

38.4. After completion of field and laboratory work, the contractor shall submit a Geotechnical Investigation Report for Engineer's approval. All bore log details and lab test results shall be presented in the report as per provisions of relevant BIS standards indicating BH coordinates, Existing GL, Depth of water table, Method of drilling etc. The report shall include a Map showing the locations of various field tests including coordinates, calculations and recommendations for foundation type and safe bearing capacity (SBC) for various Plant buildings & Open installations (as applicable), Switch Yard structures & Sub-Station (as applicable), Transformer foundation, HT lines (as applicable), MMS foundation etc. corresponding to settlement of 25mm.

38.5. The proposed Geotechnical investigation plan indicating proposed locations of TPs, BHs, water sample collection points, CBR test & ERT shall be submitted to the Client for review and approval before start of work.

38.6. After completion of field and laboratory work, the contractor shall submit a Geotechnical Investigation Report for Engineer's approval. All bore log details and lab test results shall be presented in the report as per provisions of relevant BIS standards indicating BH coordinates, Existing GL, Depth of water table, Method of drilling etc. The report shall include a Map showing the locations of various field tests including coordinates, calculations and recommendations for foundation type and safe bearing capacity (SBC) for various Plant buildings & Open installations (as applicable), Switch Yard structures & Sub-Station (as applicable), Transformer foundation, HT lines (as applicable), MMS foundation etc. corresponding to settlement of 25mm.

38.7. The report shall include the study for "Liquefaction potential assessment of the ground and suggestions for any ground improvement measures" as required.

38.8. The report shall also include ground water analysis (water sample collected from bore well) to ascertain its suitability for construction purposes, recommendations for type of cement, grade of concrete & minimum cement content as per prevalent soil characteristics with respect to presence of aggressive chemicals and environment exposure conditions as per relevant BIS specifications. However, minimum grade of concrete shall be as specified under 'Concrete Works'.

38.9. The Contractor shall carry out Shadow Analysis at the site and accordingly design strings and arrays layout considering optimal use of space, material and man-power and submit all the details / design to Company for its review / suggestions / approval.

38.10. The Contractor shall obtain and study earthquake and wind velocity data for design of module mounting structure, and considering all parameters related to the weathers conditions like Temperature, humidity, flood, rainfall, ambient air etc.

39. Other Investigations

39.1. In case the contractor wishes to adopt concrete pile foundation for MMS supports the Geo-tech. report shall also include the calculations, based on soil properties, for safe pile capacity under direct compression, lateral load and pull out as per IS:2911. For single pile, Lateral load capacity shall be min. of the values obtained as per IS:2911 & Brom's method corresponding to free pile head. The report shall also include recommendations about type of pile, its depth and dia. to be used.

39.2. All buildings and Plinth for Open installations (as applicable), Transformer yard, Switchyard and Sub-station area shall have levelled ground as per specification defined and approved by client

39.3. The scope of soil investigation covers execution of complete soil exploration including boring, drilling, collection of undisturbed soil sample where possible, otherwise disturbed soil samples, conducting laboratory test of samples to find out the various parameters mainly related to load bearing capacity, ground water level, settlement, and soil condition and submission of detail reports along with recommendation regarding suitable type of foundations for each bore hole along with recommendation for soil improvement where necessary. The design will done based on considering the worst result among the bore holes. Contractor has to carry out also Electrical Resistivity Test

39.4. The contractor shall carry out Shadow Analysis at proposed site and accordingly design strings and array layout with optimum use of space, material and man power. In case of large variations in topography. The study shall also include the effect of topographical variations on array layout and MMS structure design adequacy and stability. The contractor shall submit all the details/ design to the Engineer for review/ approval.

39.5. The contractor shall also obtain and study other input data at proposed project site for design of the project from metrological department/ local govt. authorities. This shall include data related to Rainfall, Maximum & Minimum ambient Temperature, Humidity, HFL, maximum depth of undisturbed aggregate cumulative snowfall, etc.

39.6. The Bidder shall estimate the water requirements for cleaning the photovoltaic modules at least once in every week in order to operate the plant at its guaranteed plant performance.

39.7. The contractor shall also identify potential quarry areas for coarse and fine aggregates to be used for concrete and shall carry out the concrete mix design for concrete grades to be used in construction of all concrete works (M25 and above) before start of construction. However, for piling M25 concrete with nominal mix of (1:1:2) may be used. For grades of concrete less than M25 to be used in PPC works, nominal mix as specified in IS:456 may be used. The concrete mix shall be designed for each source of cement and aggregates as per provisions of IS:10262 Standard. The concrete mix design shall be carried out through NABL accredited Laboratory or any Govt. agency approved by the Engineer.

40. Area Grading and Land Development

40.1. The Finished Grade Level (FGL) of the proposed plant shall be fixed with reference to the highest flood level (HFL) and surrounding ground profile at proposed site to avoid flooding of plant site. The data regarding HFL at proposed site shall be obtained from the metrological department by the contractor. In case of absence of this data, the contractor shall assess the required information through local site reconnaissance. The area at and around (up to 25m beyond external wall/ area including access road & parking whichever is minimum) all buildings/ plinth for open installations (as applicable), transformer yard and switch-yard shall be uniformly levelled at suitable RL (i.e. FGL) to be finalized considering topography and HFL at site. The minimum plinth level of all buildings/ open installations shall be 450mm above FGL. Module mounting structure foundation/ Pile cap or any other pedestal shall be min. 200mm above FGL. Top of transformer foundation pedestal shall be min, 500mm above the FGL.

40.2. A detailed drawing for site levelling and grading (if necessary) shall be submitted by the contractor before commencement of construction of all buildings, plinth for open installation and transformer/switchyard works. The estimated volume of cutting and filling shall also be marked on the Grading drawings for reference. The final grade levels to be adopted for different blocks shall be clearly marked on the Plant Layout/ Array Layout drawing.

40.3. It is envisaged that the MMS are installed on natural/ existing ground without any levelling or grading of the area. Contractor shall accordingly consider the effect of the existing ground slope on the design of MMS structure as specified elsewhere in the specifications. If any ground undulations at column locations are observed the same shall be filled up with PCC (1:3:6) up to surrounding ground level immediately after pile installation before start of erection of other MMS members. In case of pile, the PCC fill shall extend min. 500mm outside pile cap all around and remaining area may be filled up with local soil properly compacted.

40.4. The contractor is responsible for making the site ready and easily approachable by clearing bushes, felling of trees (mandatory permissions/ licenses/ statutory clearances from competent authorities if required for cutting of trees, blasting or mining operations, disposal of waste material etc. shall be obtained by the contractor), cutting, filling with selected excavated earth or borrowed earth including identifying borrow areas. Except in exceptional cases (with approval of the Engineer), filling shall be made up of cohesive non-swelling material.

40.5. The Contractor shall ensure the land development work and do the topographical survey to ensure land development work such that land is perfectly flat. Any overburden or the deposited waste soil stuff of any mass shall be removed from the site and dispose of outside the plant premises at the location shown by HPCL. The Contractor has to clean the site from wild vegetations, small trees and shrubs, uprooting of all vegetations, removal of all debris or soil, if any; filled the depression area and excavates and level the high-level areas wherever required even though contractor follows the natural ground level for entire plant execution. The Contractor can also use the natural contour of the land, if shadow is not affecting the generation. However, the Contractor shall take reasonable care to ensure that the plant is aesthetically designed.

40.6. It shall be ensured that the land grading and levelling is done properly to ensure for free flow of surface run-off and the grade levels shall be fixed with respect to high flood level at site, drainage pattern and system requirements. It shall be ensured that the land is used optimally to have maximum solar power generation considering full utilization

of the plot areas. It is advisable to follow the natural flow of water at the ground as far as possible for drainage design.

40.7. In case the filled-up earth is brought from outside the plant or borrow areas (when the material inside plant area is not found suitable for grading work or if directed by the Engineer), the contractor shall carry out all required soil investigations to ascertain the suitability of the borrowed soil for land development and filling purposes. Contractor's scope shall also include arranging land lease, getting all necessary statutory approvals for mining, payment of necessary challan etc. Excess earth, if any, shall be disposed of properly at location as directed by the Engineer.

41. Security Cabin

41.1. The Contractor shall provide 4 (four) numbers of prefabricated Watchman's portable cabin at minimum 4 (four) corners of the boundary of each plant such that safety of the plant is ensured along with one Watchman's cabin at the Main Gate. The minimum size of watchmen's (Security Cabin) cabin is 1.2 metre x 1.8 metre size and height of 2.4m with appropriate roof at the top. Location of the watch Cabin (Security Cabin) will be as directed by HPCL.

42. Office, Control & Monitoring and Panel Room Building

42.1. The contractor shall provide the Office building, Control & Monitoring Room building and Panel Room of appropriate sizes using the PEB Structures.

43. Road

43.1. Suitable approach road (as applicable) from nearest public road upto plant Main gate, Access Road from Main gate to Main control cum office room (MCR), Internal roads connecting MCR and other facilities/ buildings/ open installations like Local control room(s) (LCR)/ Inverter control room(s) (ICR), Sub-station & Switch yard (as applicable) etc. shall be provided for safe and easy transportation of men, material and equipment during construction and maintenance.

43.2. The Approach Road (as applicable) connecting nearest public road and the Main gate shall be of 4.0m wide carriage way with 0.5m wide shoulders on either side. The access road (as applicable) connecting Main gate and MCR and internal access road(s) connecting MCR to various facilities/ buildings/ open Installations shall be of 3.0m wide carriage way with 0.5m wide shoulders on either side. The top of road (TOR) elevation shall be minimum 200 mm above FGL to avoid flooding of roads during rains. The roads shall be provided with alongside drains as per design requirements of drainage system for effective disposal of storm water and to avoid cross flow of storm water over the road.

43.3. All the roads connecting the main gate to control room, switch yard shall be accessed by Asphalt Road with sufficient base courses like Sub grade, GSB, WBM layer, Wet Mix Macadam layer, DBM layer and at top Seal Coat etc. All remaining road for approaching to inverter room, peripheral roads shall be of WBM

44. Storm Water Drainage System

The Contractor has to design, submit and take approval from the Client/Consultant for storm water of the plant. It shall be designed considering rain fall, catchment area, natural gradient of the plot, outlet of the plot and in a such way that it can be easily drain off rain water and water required for module cleaning by providing sufficient

slope. Storm water drain shall be of Trapezoidal section. All the internal storm water drains i.e. on both side of main central road, approach road to all inverter rooms, control room, switchyard shall be of brick/ stone pitching which is backed up by cement mortar bed which is backed by PCC on side slope and at bottom of drain and all joints of Brick/Stone masonry are to be filled up with cement mortar in C.M. 1:4, further, plaster is to be applied in case of brick masonry surface. The Contractor shall provide RCC hume pipe (NP3 grade), RCC culvert at the crossing of road, cable corridor/network, other cross drains at required locations as cross drainage work. All along the peripheral drainage shall be constructed by simply excavating and by carrying out dressing & compacting and maintaining the side slope of the drains of required size and with required trapezoidal section in which no brick pitching is required. Also, the Contractor shall provide RCC hume pipe (NP3 grade) at the crossing of road and drains and at required locations.

45. Underground RCC water Tank:

45.1. The contractor shall construct underground RCC Tank with minimum capacity of 5 KL or of the capacity required for one time cleaning of all the panels whichever is higher. Successful bidder shall submit the detailed calculation for the same and take approval from HPCL.

45.2. The Contractor has to design as per relevant IS codes, submit and take approval from client / consultant with silting chamber for filtration of the water before the inlet which will match with invert level of Storm Water drain. Design of RCC water tank shall be such that it shall resist Earth pressure and Water pressure and satisfy all IS codes. Design of water tank shall be done strictly based on Soil Investigation Report with complying all latest IS codes.

45.3. The walls and floor slab shall be of reinforced concrete construction. The design and construction of these water retaining structures shall be in accordance with IS: 3370 with provision of construction/contraction and expansion joints. Minimum thickness of structural concrete elements shall be 230mm. underground water tank walls shall also be designed for condition of external surcharge load along with ground water table and basin being empty.

45.4. Concrete for the underground water tank shall have plasticizer cum waterproofing cement additives conforming to IS: 9103. In addition, limits on permeability as given in IS: 2545 shall also be met with. The concrete surface of these structures in contact with soil shall be provided with minimum two coats of bituminous painting of grade 85/25 conforming to IS: 702 @ 1.7 kg/sq.m (minimum) for water / damp proofing. Also provision shall be made on the inner surface of walls and base slab, so that water proofing grouting can be injected later in case of leakage.

45.5. Any loose pockets of soil below the basin floor shall be removed and filled back with plain cement concrete of mix 1:4:8.

45.6. External pressure due to earth and ground water shall not be relied upon to reduce the effect of the internal water pressure, but account shall be taken of the ground water pressure when considering buoyancy or stresses in the empty water retaining structure.

45.7. Floor slab of water tank shall be designed with due consideration to prevent any possibility of flotation due to upward thrust caused by underground water. Pressure release valves conforming to IS 4558 may be permitted with the specific approval by Owner/consultant. Special care will also be taken to prevent floatation during

construction period. The minimum thickness of the basin slab shall be 300 mm. Below PCC & rubble soling 1000mm thick CNS material shall be provided and compacted to 95% proctor density.

45.8. Construction of the water tank base raft & walls shall be watertight with the provision of 225mm wide approved quality PVC ribbed water stops at all construction joints and expansion joints. For Basin and channel base, kicker type of PVC water stops is preferred, whereas in walls water stops with Central Bulb and End Grip will be preferred. It shall be ensured that 225mm wide water stops are also provided all along the edges of common outlet channel at the terminal point and left projecting by half its width, to facilitate later construction by others.

45.9. The water retaining structures shall be tested for water-tightness in accordance with IS: 3370, without the backfill, if any, placed in position. For open structures, the test head shall correspond to the maximum design water level. Any rectification measures required to satisfy the test criteria shall be executed by the CONTRACTOR at his own cost all as per the directions of the OWNER.

45.10. In case of underground water tank C I rungs for descending & ascending in to the tank shall be provided. Inside the water tank, 500x500x500 mm size pit shall be provided to facilitate pumping arrangement provision at suitable location to collect and pump out water collection to nearest drains.

45.11. The water tank shall be so designed that it can be used during construction phase of solar plant and can also meet all other water requirements of the solar plant during O&M Stage The extension of existing pipe line from terminal point by SPIA/HPCL to underground water tank including supply and laying of pipeline shall be in the scope of contractor.

45.12. The bidder shall carryout necessary Electrifications works for connection of electrical pumps etc. Bidder shall provide 02 Nos. of minimum submersible pump with suitable head and capacity at water tank with necessary valve, NRVs, Piping etc.

45.13. Water supply: All necessary arrangement for wet cleaning of the solar panels shall be in the scope of the bidders and accordingly the agency has to provide all the necessary equipment, accessories, tool & tackles, pumps, tankers, tractors and piping arrangement which are required for the same.

46. Plant Layout

46.1. The contractor shall submit drawing showing proposed Project Plant and SPV module Layout.

46.2. The Plant and SPV module layout shall be a comprehensive drawing showing various requirements of the project like, Reference coordinate grid, Geographical and Plant North, Layout of boundary fence including coordinates of all corner points, Location of main entrance gate and any other access gates as per project needs, Block wise FGL, Layout of main approach road to the plant, Internal and peripheral roads, Security Room/ cabin (s), all Buildings and Open installations with coordinates, Temporary Storage yard/ facility to be used by the contractor during construction, Proposed Array layout, Lightening arrester, UG/Over ground water Tank(s), Storm water drains, Corridor for buried cables etc.

46.3. The cable corridor shall be laid through clear gap between arrays and shall not be laid below modules for easy maintenance.

46.4. All the facilities and buildings shall be presented with suitable Legend.

46.5. The drawing shall be in suitable scale to have proper representation of the information.

46.6. The Plant & SPV module layout drawing shall be submitted by the contractor for review/ approval by the Engineer.

47. Design Loads

Unless otherwise specified elsewhere, Dead load, Live load, Wind load and Seismic load for buildings and structures shall be considered as per provisions of relevant BIS standards.

47.1. F**oundations (General)**

47.1.1. Contractor shall design all foundations for buildings, equipment, HT line Towers, Switch yard structures, Transformer, MMS & other structures as per relevant BIS standards and recommendations of Geotechnical investigation report.

47.1.2. No foundation for MMS, buildings, switchyard equipment and structures, sub-stations, HT line towers, transformers, etc. shall rest on filled-up ground. However, minor structures like cable trench, cable rack, pipe pedestal, etc. may rest on filled-up soil with max. safe bearing capacity for design considerations not more than 3 T/Sqm.

47.1.3. Min. depth of foundation for all buildings and plinth for open installations shall be 1.5 m below NGL. For all other structures, min. depth of foundation shall be 1.0 m unless specified otherwise.

47.1.4. All foundations of a building shall be founded at same RL (Reduced level) with respect to foundation depth below lowest NGL (Natural ground level) in the building area. The Levels shall be obtained with reference to the already established TBM using digital survey instrument such as Total Station/ Auto Level.

47.1.5. All design & drawings shall be submitted to the Engineer for approval before execution

48. Module Mounting Structure (Array Structure): -

Scope of work under this section covers the provision of labour, tools, materials and performance of work necessary for the design, manufacture, quality assurance, quality control, shop assembly, shop testing, delivery at site, and preservation, installation, commissioning, performance and acceptance testing of Module Mounting Structures as per the specifications here under, complete with all auxiliaries, accessories, spare parts and warranting a trouble-free safe operation of the installation. The Module Mounting Structure (MMS) should be designed for an optimum seasonal/fixed tilt angle, so as to meet the offered NEEGG. The angle should be systematically optimized for maximum energy generation throughout the year based on location and local weather variables for each module technology. Bidder has to carry out proper shadow analysis of proposed area to meet offered NEEGG. MMS structure design is a combination of two elements named Substructure (Foundation) and Super structure. Bidder must submit the all the quality test documents and test certificates complying with the requirement of the structure. Suitable provision for mounting

DWC pipes for routing DC cable from Array to Inverter must be provided (Separate DWC Pipe for Positive and Negative DC Cables as mentioned elsewhere in this tender document).

48.1. Considerations for Ground-Mounted Structure Installation

Below mentioned consideration are to be kept in mind by contractor for design of concrete foundations for MMS.

48.1.1. Excavation/Auguring shall be done such that it shall not damage existing structures. If during the course of time if it is damaged, then the contractor has to repair it at their own cost.

48.1.2. Soil investigation shall be carried for finalizing the foundation requirements.

48.1.3. Depth of Pile or Open Foundation shall be done as per the Soil Investigation report. Any treatment required to the foundation shall be done as per soil investigation report.

48.1.4. Loose material shall be disposed of out of the plant premises.

48.1.5. Mix design of concrete shall be carried out with minimum cement content of 350 Kg/Cum.

48.1.6. Reinforcement shall be provided as per code provision.

48.1.7. Height of the Pile or Open foundation shall be a minimum of 150 mm above the ground

48.1.8. Due to space constraints if installation is proposed on a lawn area, in that case the foundation may take below natural ground level. Also, after completion of installation pits shall be backfilled and maintained such that it shall match with the surrounding lawn area.

48.1.9. Whitewash on the exposed concrete surface shall be matched with the existing structure within the premises to maintain the aesthetic appearance of the plant.

48.1.10. All required test like Cube test to be carried out as per IS code IS 456-2001. The numbers of the cube have to be tested as per the concrete M-cube.

48.1.11. Curing of all piles or open foundations shall be done thrice a day and be maintained for a period of seven days from the date of casting

48.1.12. All designs and drawings are to be submitted for approval in Editable, AutoCAD, STAAD file, PDF format to Company or its designated agency before starting the work. The submitted drawing and design shall be certified and stamped by a licensed structure designer.

48.1.13. Design of the foundation shall be done for 25 years life such that structure strength shall not reduce for the designed life.

48.1.14. The Contractor has to ensure and arrange the necessary/ essential requirement for all activities during nigh-time.

48.2. Below mentioned considerations are to be kept in mind by the contractor for design of Superstructure for MMS:

48.2.1. The MMS should be safe, and designed to allow easy replacement of any module and easy access to the O&M staff. It should be designed for simple mechanical and electrical installation, should support Solar PV modules at a given orientation, absorb and transfer the mechanical loads to the ground properly and there should be no requirement of welding or complex machinery at site.

48.2.2. Irrespective of design, none of the components shall be less than 1 mm in thickness and Column Post shall not be less than 1.8 mm in thickness.

48.2.3. The array structure shall be so designed that it will occupy minimum space without sacrificing the output from Solar PV panels at the same time it will withstand design wind speed as per the wind zone of the plant location.

48.2.4. It shall support Solar PV modules at a given orientation, and absorb and transfer the mechanical loads to the ground properly. There shall be no requirement of welding or complex machinery at site and is strictly not allowed.

48.2.5. The frames and leg assemblies of the array structures shall be made of hot dip galvanized steel per ASTM A123.

48.2.6. All design and drawing are required to be submitted in Editable, AutoCAD, STAAD file & PDF format for approval to Company or its designated agency before starting of work. The submitted drawing and design shall be certified and stamped by licensed structure designer.

48.2.7. Design of the super structure (Mounting steel structure) shall be done for 25 years life such that structure strength shall not reduce for designed life.

48.2.8. The array structure shall be so designed that it will occupy minimum space without sacrificing the output from Solar PV panels at the same time it will withstand severe cyclonic storm with wind speed.

48.2.9. Module Mounting Structure (MMS) shall be designed considering IS 875 and the maximum wind speed as per the wind zone of the area.In case of hot dip galvanization of structures, specific requirement for thickness of galvanization should be at least minimum 80 microns at any point of the galvanized structure. No averaging is allowed for measuring the thickness of galvanization. Inner side galvanization with same specification of any hollow components of module mounting structure is mandatory Galvanised structure is required to be sent to third-party laboratory test for confirmation of the mass of zinc applied on structure.

48.2.10. All nuts and bolts (fasteners) shall be made up of very good quality stainless steel of grade SS 304 required for module fixing. Other fasteners shall be of HDG of 8.8 grade.

48.2.11. Modules shall be clamped/bolted with the structure properly. The material of construction of clamps/bolts shall be Al / Steel. Clamps/bolts shall be designed in such a way so as not to cast any shadow on the active part of a module

48.2.12. Module mounting structures shall also be earthed through proper separate earthing

48.2.13. Factor of safety shall not be taken less than 1.5 for all design calculations.

48.2.14. For multiple modules mounting structures located in a single row, the alignment of all modules shall be within an error limit of 10 mm in vertical/horizontal line.

48.2.15. The Module Mounting Structure design shall be certified by a structural engineer and it is mandatory.

48.2.16. Minimum clearance between finished ground level and lowest edge of module shall be 450 mm for Ground mounted System.

48.2.17. All the cables were aesthetically tied to module mounting structure.

48.2.18. String Cables should be passes from Pipes and Cable-ties shall be used to hold and guide the Pipes (cables/wires) from the modules to inverters or junction boxes.

48.2.19. AC cables shall be laid in Underground cables with sand and brick layer and then backfilled with excavated material or it is to be laid in UPVC flexible pipe

and the same pipe is covered with HDG cable tray. For laying the cable wherever required to dismantle and repair the structure is to be done by contractor at their own cost.

48.2.20. The Contractor has to ensure and arrange sufficient lighting arrangement for all activities during night time.

48.3. Pre-dispatch Inspection of MMS:

The Contractor shall provide a pre-dispatch inspection call to HPCL for inspection at manufacturer works, as per HPCL approved drawings, for all fabricated items such as steel structure members, galvanization process etc. Prior to inviting HPCL for pre-dispatch inspection, the vendor shall submit a detailed quality assurance plan (QAP) before manufacturing for HPCL approval. QAP shall include type tests, routine tests, factory acceptance tests, sampling plans, applicable standards etc., The bidder shall bear the lodging, boarding, accommodation and traveling charges of HPCL for PDI. After the inspection, a complete set of test reports shall be submitted. Bought-out terms, test certificates as per relevant standards shall be submitted.

49. Concrete Works

49.1. Construction of all RCC works shall be done with approved design mix as per IS 456 and the materials used viz. Cement, coarse & fine aggregate, Reinforcement steel etc. shall conform to relevant BIS standards.

49.2. Cement higher than 43 Grade shall not be used in construction.

49.3. Unless otherwise specified elsewhere, PCC shall be of min. grade M10 (nominal mix 1:3:6) except for mud mat, back filling of ground pockets or leveling course which shall be of grade M7.5 (nominal mix 1:4:8).

49.4. Reinforcement steel shall be of high strength TMT bars of grade Fe500S conforming to IS: 1786.

49.5. Unless specified otherwise for grouting works anti shrink ready mix grout of approved make or cement mortar (CM) grout with non-shrink compound shall be used. The grout shall be high strength grout having min. characteristic strength of 35 N/mm^2 at 28 days.

50. Miscellaneous Steel Work

50.1. Unless otherwise specified elsewhere, all structural steel work shall be designed as per provisions of IS: 800 with working stress method of design (WSD).

50.2. Structural steel hot rolled sections, flats and plates shall conform IS: 2062, structural Pipes shall be medium (M)/ high (H) grade conforming to IS: 1161, chequered plate shall conform to IS: 3502 and Hollow steel sections for structural purposes shall conform to

IS: 4923.

51. Sand buckets

51.1. Sand buckets shall be wall mounted made from at least 24SWG sheet with bracket fixing on wall conforming to IS: 2546.

51.2. All buildings shall be provided with required no. of sand buckets as per relevant BIS standard and NBC. 4 No. of Bucket stands with four buckets on each stand shall be provided in the Transformer Yard.

52. Sign Boards and Danger Boards

52.1. The sign board containing brief description of major components of the power plant as well as the complete power plant in general shall be installed at appropriate locations of the power plant as approved by Engineer

52.2. The Signboard shall be made of steel plate of not less than 3 mm. Letters on the board shall be with appropriate illumination arrangements.

52.3. Safety signs, building evacuation plan and direction signs, assembly points shall also be placed at strategic locations.

52.4. The Contractor shall provide to the Engineer, detailed specifications of the sign boards.

53. Masonry work

53.1. The masonry work shall be of bricks, laterite blocks (as per site conditions) or concrete blocks.

53.2. All concrete block masonry walls shall be min. 200mm thick.

53.3. Brick work shall be in cement mortar (CM) 1:6 & 1:4 for 230 mm and 115 mm thick brick wall respectively unless specified.

53.4. Unless otherwise specified elsewhere, Bricks shall be of class designation 7.5 conforming to IS: 1077, IS: 2212 & IS: 3495.

53.5. All concrete blocks shall be of min. compressive strength of 7.5 N/mm2 and shall be of Grade-A conforming to IS: 2185.

53.6. The laterite blocks shall conform to IS: 3620.

53.7. The construction of brick masonry shall conform to IS: 2212. Construction of Concrete block masonry shall conform to IS: 2572.

54. Plastering, Pointing & Coping Works

54.1. All brick masonry work shall be provided with plaster.

54.2. All joints in stone masonry shall be raked and pointed in cement mortar (CM) 1:3 except specified otherwise.

54.3. Exposed top surface of brick or stone masonry shall be provided with 25 mm thick plain cement concrete (PCC) coping (1:2:4) with trawl finish. All exposed coping shall be provided with suitable slope and projection for easy drainage of water.

55. Pipe & Cable Trenches

55.1. Construction of RCC cable trenches with cable trays and covers for inverter and control rooms, earthen excavated cable trench with alternate layers of sand and brick as per relevant IS from PV arrays to inverter room to control room to switchyard shall be provided by the Contractor. However, during detail engineering cable laying philosophy will be decided and bidder shall have to follow respective philosophy as per standard.

55.2. All trenches inside the building and transformer area shall be of RCC. The min. wall and base slab thickness shall be 100mm for depth ≤ 850mm and 150mm for depths > 850mm.

55.3. The trench shall be designed for loads as specified under 'Design Loads'. External trenches shall be kept min. 100mm above FGL to avoid entry of rain water. In case of straight length of the trench being more than 40m, suitable expansion joints with PVC water stop shall be provided.

55.4. Internal trenches (inside buildings) shall be provided with chequred plate (min. 8mm thick with stiffening angle ISA 50x50x6 @ 750 mm c/c for trench width greater than 800 mm) covers while external trench shall have precast concrete covers.

55.5. Min. thickness of precast cover shall be 50mm. Both bearing edges of the cable trench and all edges of pre-cast concrete covers shall be provided with min. 50x50x6 mm edge protection angle with lugs

55.6. The trench cover (chequered or pre – cast both) shall be provided with suitable lifting hooks.

55.7. As required suitable MS insert plates shall be provided on trench wall to support the cable rack/ pipe.

55.8. The trench bed shall have a slope of approx. 1(V):250(H) along and 1(V):50(H) across the length of the trench. The cable trench shall have a dewatering sump (s) of size

450x450x450 mm depth at suitable location to facilitate collection & pumping out of rain water from the trench.

55.9. The external buried cables shall be laid in excavated trench as specified under specifications for Electrical works. The sand for filling shall be of Grade – IV conforming to IS: 383.

56. Transformer Yard Civil Works

56.1. Transformer and equipment foundations shall be founded on piles/isolated spread footings or block foundation depending on the final geotechnical investigation report and functional requirements.

56.2. In case of transformer oil tank capacity ≥ 2000 litres, the transformer foundation shall have its own soak pit which would cover the area of the transformer and cooler banks, so as to collect any spillage of oil in case of emergency. The retention capacity of the soak pit shall be equal to volume of the transformer oil (excluding free space above gravel) and it shall be filled with granite stone gravel of size 40mm, uniformly graded, with 200 mm free space above gravel fill.

56.3. In case of transformer oil tank capacity more ≥ 20000 litres, the soak pit shall be connected to a separate burnt oil pit through discharge pipe (300 mm dia) and shall be suitably sized to accommodate full oil volume (excluding free board above inlet pipe) of the transformer connected to it, without backflow. In this case the capacity of the soak pit may be reduced to min. 1/3rd of the total transformer oil volume. The burnt oil pit shall be further connected to oily water drainage system. The water shall be discharged into the nearest drain by gravity flow or pumping after suitable treatment as per statutory and code provisions.

56.4. Both, the transformer soak including side walls and the burnt oil pit shall be of RCC and shall be provided with sump (min. 500 mm x 500 mm x 400mm deep) and slope of 1:50 in concrete screed of 1:1 – ½:3 to the floor slab towards the sump pit. The oil collection pit shall be provided with 20mm dia. MS rung ladder with 2 coats of epoxy paint over 2 coats of primer, a manhole & removable RCC cover. The inside of oil collection pit shall be plastered with 6 mm thick CM 1:6 and painted with 2 coats of epoxy paint over 2 coats of primer.

56.5. The area around the transformer and equipment shall be covered with uniformly graded granite stone gravel of size 40mm.

56.6. The area shall be provided with galvanized chain link fence of height min 1.8m with 3.5m wide gate.

56.7. The fencing shall be of galvanized iron chain link mesh fabric with internal, corner and stay posts of hot dipped GI angle (min. ISA 65x65x6 mm) with 100mm thick M15 PCC foundation (min. width 450mm and min. depth 450 mm below GL).

56.8. Intermediate, corner and stay posts shall be supported with min. 300 mm dia. and 850 mm deep (below GL) piles in cement concrete (nominal mix 1:1:2). The column posts

shall be extended in to the pile up to 800mm with 50mm cover at the bottom. The pile shall project 150mm above GL. The intermediate, corner and stay posts shall be supported by angle struts that shall have the same foundation as that of the main posts.

56.9. Spacing of intermediate posts shall not be more than 2.5m. Every 10th intermediate post shall be provided with a stay post while every corner post shall be provided with two stay posts on either side.

56.10. Joints in RR masonry shall be properly raked and pointed with CM (1:3).

56.11. The GI chain link mesh fabric (40x40 mm with min. wire gauge 3.15mm, both ends twisted) and fencing shall conform to IS: 2721.

56.12. Each fence panel, in lieu of tie wire, shall be provided with 35x35x3mm GI edge angle at top and bottom with mesh fabric firmly secured to them and to intermediate support angles.

56.13. All MS sections shall be painted with 2 coats of epoxy paint of approved make and shade over 2 coats of suitable primer.

56.14. The Gate of size 3.5m shall be of MS pipe (medium class conforming to IS: 1161) frame with hard drawn steel wire fabric mesh (50x50mmx3mm thick conforming to IS: 1566) including all accessories and fittings. MS angle posts shall conform to IS 2062.

56.15. In addition to main gate, a wicket gate of MS pipe (medium class conforming to IS: 1161) frame with 1.0 m width with hard drawn steel wire fabric (50x50x3mm thick conforming to IS: 1566) shall be provided for man entry for maintenance purpose.

56.16. The transformer yard fencing work shall conform to CEIG requirements.

56.17. The requirement of fire barrier wall between transformers shall be as per Electricity Rules and IS: 1646 recommendations. Minimum wall thickness shall be 230mm for RCC wall and 300mm for masonry wall

57. Transmission Line Structures

57.1. Galvanized 33 kV Transmission Line towers(pole), Tower (pole) extensions & accessories shall be designed following latest guidelines of respective SEB (State electricity board)/ STU (State transmission utility) and approved from them before execution. In absence of SEB/ STU guidelines REC (Rural Electrification Corporation) standards may be followed. Support at corner with angle > 100 shall be provided with a 4-pole structure or a lattice tower structure. Use of PCC spun pole and RCC pole is not acceptable.

57.2. Approved copies of these designs & drawings shall be submitted to the HPCL for reference and record.

58. Miscellaneous structures

58.1. Support structure for weather monitoring device

58.1.1. Weather monitoring device shall be mounted on tubular steel pole of required height. The pole shall conform to IS: 2713.

58.1.2. The pole shall be secured to an independent RCC foundation structure through Base plate and Anchor bolt assembly.

58.1.3. 200 long 20 dia. rods shall be welded to the pole at 300 mm C/c for access to the device for maintenance purpose.

58.1.4. The support structure shall be hot dip galvanized.

58.2. Support structures for SCB

58.2.1. When supported independently, the SCB shall be mounted on a structural steel supporting frame of galvanized ISMC 75.

58.2.2. Column post and bracings shall be supported with 300 mm (min.) diameter and 850 mm (min.) deep below GL piles in cement concrete (nominal mix 1:1:2). The column post and bracings shall be extended into the piles upto 800 mm with 50mm cover at the bottom.

58.2.3. The pile shall project 200 mm above GL.

58.2.4. The support structure shall hot-dip galvanized and of adequate height to ensure min. ground clearance of 800 mm to SCB unit

59. Cable laying

59.1. Scope

The intent of this standard specification gives recommendation & Board Guideline for selection, transportation, laying, jointing, termination, testing and commissioning of the cabling system. up to **33kV**.

59.2. Standards

59.2.1. The intent of this standard specification gives recommendation & Board Guideline for selection, transportation, laying, jointing, termination, testing and commissioning of the cabling system. up to **33kV**.The work shall be carried out in the best workman like manner in conformity with this specification, the relevant specifications, codes of practice of Indian Standards Institution, approved drawings and instructions of Engineer-in-Charge or his authorized representative issued from time to time. The latest applicable standards of

a. Bureau of Indian Standards
b. British Standard Institution
c. American Standard Institution
d. International Electro Technical Commission

59.2.2. Wherever the requirements in this specification are in conflict with any of the above Standards, the requirements under this specification shall be binding.

59.3. General Requirements

59.3.1. Environmental Conditions: The cables shall be laid for continuous operation at full load under the climatic and environmental conditions as described in the specification "Design Basis Electrical".

59.3.2. Components And Equipment: The Contractor has to take care that all components, equipment & cable routes are selected considering easy maintenance, simple and quick diagnosis and long maintenance intervals. All components and equipment shall be designed for continuous duty at rated load and under the given climatic conditions. Standard industrial high-performance systems and components shall be used as far as possible. Components and equipment of same kind and type shall be selected for equivalent functions. The interchangeability must be guaranteed.

59.3.3. Tagging: All components, equipment, cable route and installations shall receive the respective tagging plates, labels, etc which have to be of extremely durable material resistant against the environmental conditions.

59.3.4. Cable Specifications Refer Specification for LV & MV Cable- Specification defined in the cable section

59.4. Miscellaneous Materials Specifications

59.4.1. Connectors Cable terminations shall be made with Aluminium/tinned copper crimped type solder less lugs of approved make for all Aluminium/Cu conductors cables and stud type terminals and shall be as per IS: 8309.

59.4.2. Cable Identification Cable tags shall be of 2 mm thick, 20 mm wide aluminium strap of suitable length to contain cable number, equipment no etc.

59.4.3. Ferrules: Ferrules shall be of approved type size to suit core size mentioned and shall be employed to designate the various cores of control cable by the terminal numbers to which the cores are connected for case in identification and maintenance. Ferruling shall be done at both end of cables.

59.4.4. Cable Glands: Cable glands shall be nickel-plated Brass double compression type of approved/ reputed make. Glands for classified hazardous areas shall be certified by approved agency

59.4.5. Cable trays: This shall be either prefabricated hot dip galvanized sheet steel trays or site fabricated angle iron trays as specified elsewhere. Prefabricated hot dip galvanized sheet steel cable trays shall be used for maximum support span of 2000 mm unless design is approved for larger span. For requirements of larger than 750 mm width two trays shall be run side by side. Cable trays shall be suitable for a cable weight of 50 kg/meter running length of tray. Minimum thickness of sheet steel/galvanizing shall be 2mm/86 microns respectively.

Cable trays fabricated from standard rolled sections shall use 50x50x6 /ISMC 100 Sections for runners for supporting spans limited to 2000 mm/more than 2000 mm respectively. Cross support shall be 30 x 6 mm flat/ 25x25x6 angle for width upto 500 mm/ more than 500 mm respectively. Vertical supports for both the above type of trays shall be fabricated out of ISMC 100 and horizontal supports with 75 x 50 x 6 angle iron/ ISMC 75 as approved by Engineer-in-Charge.

59.5. Cable Laying

59.5.1. Cable network shall include power, control, lighting and communication/signal cables, which shall be laid in trenches, cable trays or conduits as detailed in the relevant drawings and cable schedules. Erection of cable trays as required shall be checked after erection and marked in as built drawings. Cable routing given on the layout drawings shall be checked in the field to avoid interference with structures, heat sources, drains, piping, air-conditioning duct etc and minor adjustments shall be done to suit the field conditions wherever deemed necessary without any extra cost.

59.5.2. High voltage, medium voltage and other control cables shall be separated from each other by adequate spacing or running through independent pipes, trenches or cables trays, as applicable as per IS 1255.

59.5.3. All communication/signal cables (telephones, P.A.S, Instrument) .Wherever these are not available, cables shall be taken in a separate trench with a minimum clearance of 300 mm away from electrical trench as per IS 1255 & direction of Engineer-in-Charge. Communication cables shall cross power cables at right angles. Clearance-The desired Minimum clearance are as follows

Power Cable to Power Cable - Clearance is not necessary. However, there would be some clearance so that, the current carrying capacity become better.

a. Power cable to control cable - 0.2m
b. Power cable to communication/ - 0.3m
c. Signal cable Power cable to Gas/Water Main - 0.3m
d. Inductive influence/interference on signal/control/communication cable should be checked.
e. The Power cable should not be laid above the Communication Cable. While laying of power cables the likely interference to existing communication/signal cable should be avoided by referring to and coordinating to appropriate authority.

59.5.4. All cable routes shall be carefully measured and cables cut to the required lengths, leaving sufficient lengths for the final connection of the cable to the terminal of the equipment. The various cable lengths cut from the cable reels shall be carefully selected to prevent undue wastage of cables. The quantity indicated in the cable schedule is only approximate. The contractor shall ascertain the exact requirement of cable for a particular feeder by measuring at site and avoiding interference with structure, foundation, pipelines or any other works Before the start of cable laying, cable drum schedule shall be prepared by contractor and get that approved by Engineer-in-Charge to minimize/avoid straight through joints required. Contractor shall work out the actual number of straight through joints required.

59.5.5. Cables as far as possible shall be laid in complete, uncut lengths from one termination to the other

59.5.6. Cables shall be neatly arranged in the trenches/trays in such a manner so that cross-crossing is avoided and final take off to the motor/switchgear is facilitated. Arrangement of cables within the trenches/trays shall be the responsibility of the Contractor. Cable routing between lined cable trench and equipment/motors shall be taken through GI pipe sleeves of adequate size. Pipe sleeves shall be laid at an angle of maximum 45˚ to the trench wall. In case of larger diameter cables, i.e., 50 mm and above, adequately sized pipe with larger bend radius shall be provided for ease of drawing of cable or for replacement. In

places where it is not possible, a smaller trench may be provided if approved by Engineer-in-Charge.

59.5.7. All cables shall be identified close to their termination point by cable numbers as per cable schedule. Cable numbers will be punched on aluminium straps (2 mm thick) securely fastened to the cable and wrapped around it. Alternatively, cable tags shall be circular in construction to which cable numbers can be conveniently punched. Each underground cable shall be provided with identity tags of lead securely fastened every 30 m of its underground length & at turning of power cable with at least one tag at each end before the cable enters or leave the ground. In unpaved areas, cable trenches shall be identified by means of markers as per standard drawing. These posts shall be placed at location of changes in the direction of cables (turnings & crossings) and at intervals of not more than 30 M and at cable joint locations.

59.5.8. All temporary ends of cables must be protected against dirt and moisture to prevent damage to the insulation. For this purpose, ends of all XLPE/PVC insulated cables shall be taped with an approved PVC or rubber insulating tape. Use of friction type or other fabric type tape is not permitted. Lead sheathed cables shall be plumbed with lead alloy.

59.5.9. RCC cable trenches with removable covers as shown on the drawings will be provided by the Owner. Cables shall be laid in 3 or 4 tiers in these trenches as indicated on the sectional drawings. Concrete cable trenches shall be filled with sand where specified to avoid accumulation of hazardous gases, RCC covers of trenches in process area shall be effectively sealed to avoid ingress of chemicals etc. Removal of concrete covers for purpose of cable laying and reinstalling them in their proper positions after the cables are laid shall be done by the electrical Contractor at no extra cost.

59.5.10. Cables shall be handled carefully during installation to prevent mechanical injury to the cables. Ends of cables leaving trenches shall be coiled and provided with a protective pipe or cover, until such times the final termination to the equipment is connected. Minimum bending radii of cable shall be as specified in IS: 1255.

59.5.11. Directly buried cables shall be laid underground in excavated cable trenches where specified in layout drawings. Trenches shall be of sufficient depth and width for accommodation of all cables correctly spaced and arranged with a view of heat dissipation and economy of design.

Desired Minimum depth of laying from ground surface to top of cable is as follows

a. High voltage cables, 3.3kV to 11kV Rating : 0.9m
b. High voltage cables, 22kV to 33kV Rating: 1.05m
c. Low voltage & control cable : 0.75m
d. Cables at Road Crossing : 1.00m
e. Cables at railway crossing (Measured from : 1.00m Bottom of sleepers to top of pipe)
f. The depth and the width of the trench shall vary depending upon the number of layers of cables. Cables shall be laid in trenches at depth as shown in the drawing with protective GI earth conductor (runs along the cable). Before cables are placed, the trenches bottom shall be filled with a layer of sand. This sand shall be leveled and cables laid over it. These cables shall be

covered with 150 mm of sand on top of the largest diameter cable and sand shall be lightly pressed. A protective covering of 75 mm thick second-class red bricks shall then be laid flat. The remainder of the trench shall then be back-filled with soil, rammed and leveled.

As each row of cables is laid in place and before covering with sand every cable shall be given an insulation test in the presence of Engineer-in-Charge / Owner. Any cable, which proves defective, shall be replaced before the next groups of cables are laid. All wall openings/pipe sleeves shall be effectively sealed after installation of cables to avoid seepage of water inside building/ lined trench.

59.5.12. Where cables rise from trenches to motor, control station, lighting panels etc., they shall be taken in G.I. Pipes for mechanical protection upto a minimum of 300 mm above grade or as shown in the standard drawings. Cable ends shall be carefully pulled through the conduits, to prevent damage to the cable. Where required, approved cable lubricant shall be used for this purpose. Where cable enters conduit the cable should be bent in large radius. Radius shall not be less than the recommended bending radius of the cables specified by the manufacturer. Following grade of the pipe fill shall be used for sizing the pipe size:

a. cables in pipe - 31% full
b. 3 or more cables - 43% full
c. Multiple cables - 40% full

After the cables are installed and all testing is complete, conduit ends above grade shall be plugged with a suitable weatherproof plastic compound/ `PUTTI' for sealing purpose. The cost for the same shall be deemed to have been included in the installation of G.I. Pipe and no separate payment shall be allowed.

59.5.13. Where cables pass through foundation walls or other underground structures, the necessary ducts or openings will be provided in advance for the same. However, should it become necessary to cut holes in existing foundations or structures, the electrical contractor shall determine their location and obtain approval of the Engineer-in-Charge before cutting is done.

59.5.14. At road crossing and other places where cables enter pipe sleeves adequate bed of sand shall be given so that the cables do not slack and get damaged by pipe ends.

59.5.15. Drum number of each cable from which it is taken shall be recorded against the cable number in the cable schedule.

59.5.16. Cables installed above ground shall be run in trays, exposed on walls, ceilings or structures and shall be run parallel or at right angles to beams, walls or columns. Cables shall be so routed that they will not be subjected to heat from adjacent hot piping or vessels.

59.5.17. Individual cables or small groups which run along structures/walls etc. will be clamped by means of 10 SWG GI saddles on 25x6 mm saddle bars. The cost of saddle and saddle bars shall be deemed to have been included in the installation of cables and no separate payment shall be made on this account. Alternatively small group of cables can be taken through 100 mm slotted channel/ISMC 100. They shall be rightly supported on structural steel and masonary, individual or in groups as required, if drilling of steel must be resorted

to, approval must be secured and steel must be drilled where the minimum weakening of the structure will result. Cables shall be supported so as to prevent unsightly sagging. In general distance between supports shall be approximately 300 mm for cables upto 25 mm diameter and maximum 450 mm for cables larger than 25 mm diameter.

59.5.18. All G.I. Pipes shall be laid as per layout drawings and site requirements. Before fabrication of various profiles of pipe by hydraulically operated bending machine (which is to be arranged by the contractor), all the burrs from the pipes shall be removed. GI Pipes with bends shall be buried in soil/concrete in such way that the bends shall be totally concealed. For G.I. Pipes buried in soil, bitumen coating shall be applied on the buried lengths. Installation of G.I. Pipes shall be undertaken well before paving is completed and necessary co-ordination with paving agency shall be the responsibility of Electrical Contractor. The open ends of pipes shall be suitably plugged with G.I. Plugs after they are laid in final position. G.I. Plugs shall be supplied by the Contractor at no extra cost.

59.5.19. Cable laid on supporting angle in cable trenches, structures, columns and vertical run of cable trays shall be suitably clamped by means of G.I. Saddles/Clamps, whereas cable in horizontal run of cable trays shall be tied by means of nylon cords.

59.5.20. Supporting steel shall be painted before laying of cables. The painting shall be done with one coat of red lead paint and two coats of approved bituminous aluminium paint unless otherwise specified.

59.6. Termination

59.6.1. All PVC cables upto 1.1 KV grade shall be terminated at the equipments by means of double compression type cable glands. They shall have a screwed nipple with conduit electrical threads and check nut. All Cable entries shall be through bottom only and top entry terminations are made only after getting approval of Engineer-in-Charge.

59.6.2. Power cables wherever colour coding is not available shall be identified with red, yellow and blue PVC tapes. Where copper to aluminum connections are made, necessary bimetallic washers shall be used for trip circuit identification additional red ferrules shall be used only in the particular cores of control cables at the termination points in the Switchgear/Control panels and Control Switches.

59.6.3. In case of control cables, all cables shall be identified at both ends by their terminal numbers by means of PVC ferrules or self-sticking cable markers. Wire numbers shall be as per schematic/ wiring /inter- connection diagram. Bidders shall have the samples of PVC ferrules/cable markers approved before starting the work. All unused spare cores of control cables shall be neatly bunched and ferruled with cable tag at both ends.

59.6.4. Where threaded cable gland is screwed into threaded opening of different size, suitable galvanized threaded reducing bushing shall be used of approved type, at no extra cost. All switchgear and control panels shall have un-drilled gland plate. Contractor shall drill holes for fixing glands wherever necessary at no extra cost. Gland plate shall be of non-magnetic material/aluminium sheet in case of single core cables.

59.6.5. The cable shall be taken through glands inside the panels or any other electrical equipment such as motors. The individual cores shall then be dressed and taken along the cable ways (if provided) or shall be fixed to the panels with polyethylene straps. Only control cables of single strand and lighting cables may be directly terminated on to the terminals. In case of termination of cables at the bottom of a panel over a cable trench having no access from the bottom close fit hole should be drilled in the bottom plate for all the cables in one line, then bottom plate should be split in two parts along the center line of holes. After installation of bottom plate and cables it should be sealed with cold setting compound. Cables shall be clamped over the open armouring to connect it to earth bus.

59.6.6. Cable leads shall be terminated at the equipment terminals, by means of crimped type solderless connectors. Crimping shall be done by hand crimping hydraulically operated tool and conducting jelly shall be applied on the conductor. Insulation of the leads should be removed immediately before the crimping. Conductor surface shall be cleaned and shall not be left open.

59.7. Cable accessories for H.V. Systems

59.7.1. The 33, 11, 6.6 and 3.3 KV cables terminations joints shall be done by skilled and experienced jointers duly approved by the Engineer-in-Charge. Termination including supplying of jointing kit shall be in the scope of contractor unless specified otherwise.

59.7.2. The termination and straight through joint kit for use on high voltage system shall be suitable for the type of cables or the type of cables issued by owner for installation. Supply of termination kit shall be in the scope of contractor. The materials required for termination and straight through joints shall be supplied in kit form. The kit shall include all insulating and sealing materials apart from conductor fitting and consumables items. An installation instruction shall be included in each sheet.

59.7.3. The termination kits shall be suitable for termination of the cables to indoor switchgear/panels or outdoor weatherproof cable box or outdoor transformer & motors or Double/Four pole structure. The terminating kits shall preferably be of the following types: a) Heat-shrinkable power cable termination/joint kit of M/s. Raychem or equivalent. For outdoor installations, weather shields/sealing ends and any other accessories required shall also form part of the kit.

59.7.4. The straight through jointing kits shall be suitable for underground-buried installation with uncontrolled backfill and possibility of flooding by water. The jointing kit shall be one of the following types. a) Heat-shrinkable sleeve type of M/s. Raychem or equivalent.

59.7.5. Makes of kits other than those specified above may be considered, provided the Contractor furnishes type test certificates, along with the offer for approval of the same.

59.7.6. Type tests are to be carried out at manufacturer's works to prove the general qualities and design of a given type of termination/jointing system. The type tests shall include the following tests conforming to the latest IEC 502.2, 466 and VDE 0278 specifications. The type test certificates shall be submitted by the Contractor along with the offer for indicating the jointing system considered.

a. A.C. Voltage withstand dry test for 1 minute
b. Partial discharge test - Discharge magnitude shall be less than 20 p.c.
c. Impulse voltage withstand test with 10 impulses of each polarity.
d. A.C. high voltage test following load cycling test with conductor temperature at 95˚C.
e. Thermal short circuit test of 250˚C for 1 second
f. DC Voltage withstand test for 30 minutes.
g. Humidity test.
h. Dynamic short circuit test.
i. Salt log test Impact test

59.8. Testing

59.8.1. Before energizing, the insulation resistance of every circuit shall be measured from phase to phase and from phase to ground.

59.8.2. Where splices or termination are required in circuits rated above 600 volts, measure insulation resistance of each length of cable before splicing and or/ terminating. Repeat measurement after splices and/or terminations are completed.

59.8.3. Measure the insulation resistance of directly buried cable circuits before cable trenches are back-filled. Repeat measurement after back- filling. Rating of IR tester for cables of different voltage rating as follows-

Cable Voltage	**IR tester Voltage Rating**
1.1 KV	500 V
3.3 KV	1000 V
6.6 KV	1000 V
11 KV	1000 V

59.8.4. Cables after jointing & termination are subjected to DC high voltage test. The recommended values of test voltage are given below.

Uo/U	**Any conductor and metallic sheath/screen /armour**	**Conductor to Conductor (For Unscreened Cable)**	**Duration (Min)**
0.65/1/1	3	3	
1.9/3.3	5	9	

3.3/3.3	9	9	15
3.8/6.6	10.5	18	
6.6/6.6	18	18	
6.35/11	18	30	
11-Nov	30	30	

59.8.5. All cables shall be tested as per standard test Performa available with site engineer.

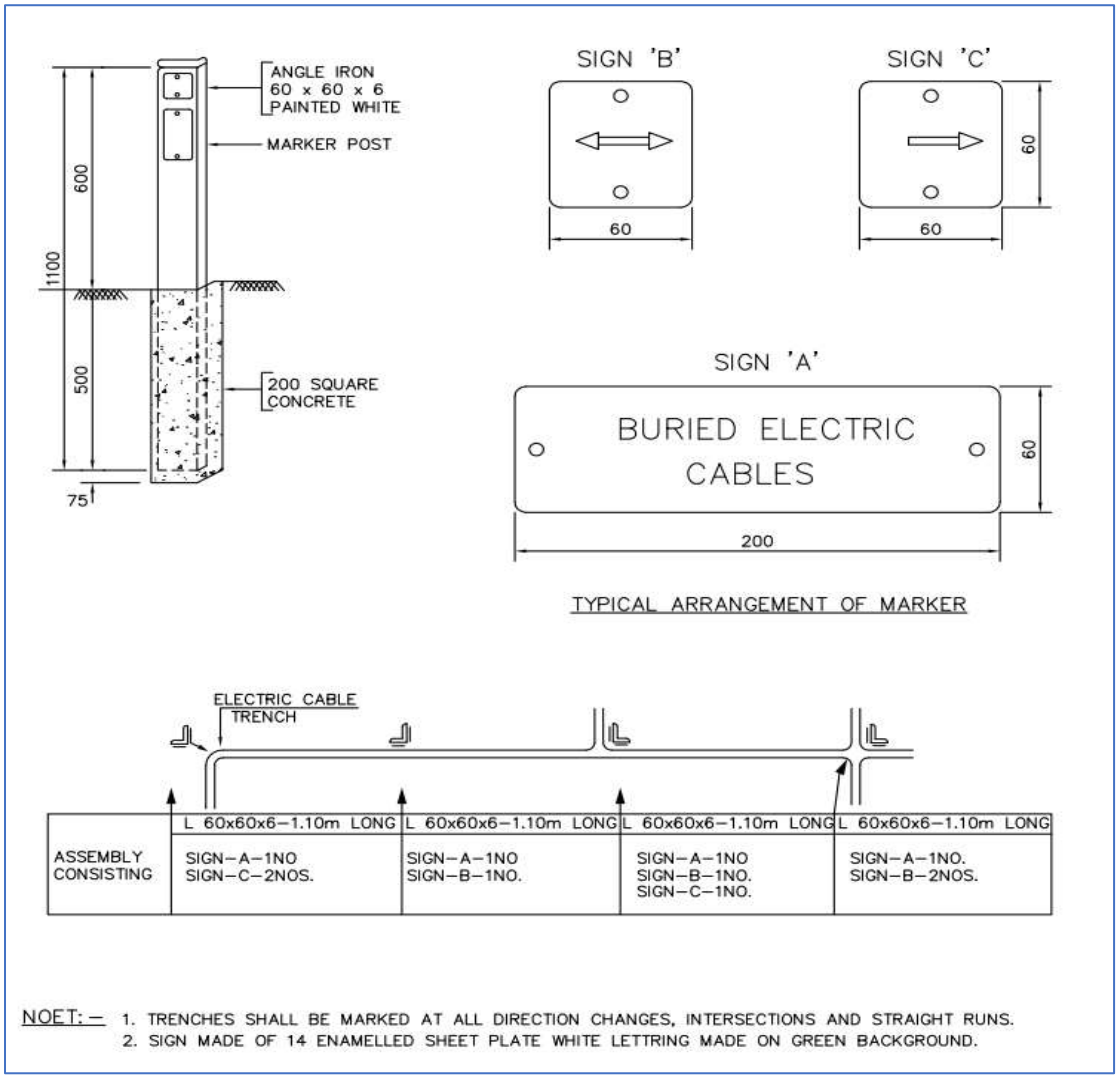
59.8.6. Cable schedule and layout drawings must be marked for AS BUILT conditions during the installation work and shall be approved by Site Engineer

59.9. Documentation

After commissioning & testing of all power & control cables, contractor shall submit the following document to Client/MECON for As-Built status in hard copy (5 set) plus one soft copy.

(i) Complete commissioning report of cables

(ii) Drawing showing Cable rout of all laid cables in trenches/trays including respective cable numbers



60. Hardware

60.1. Metal fittings of specified material for string hardware meant for power conductor and earth wire shall have excellent mechanical properties such as strength, toughness and high corrosion resistance. The suspension and tension clamps shall be made from aluminum alloy having high mechanical strength. Suspension and tension clamps offered shall be suitable for ACSR / AAAC conductor as per design.

60.2. All hooks, eyes, pins, bolts, suspension clamps and other fittings for attaching insulators to the tower or to the power conductor shall be so designed as to reduce (to a minimum) the damage to the conductor, insulator or the fitting arising from conductor vibration.

60.3. All drop-forged parts shall be free-from flaws, cracks, or other defects and shall be smooth, close-grained and of true forms and dimensions. all machined surfaces shall be true, smooth and well-finished. The thickness of all structural steel of Switchyard shall be minimum 80 microns measured at all points of the structure member when measured. No averaging is allowed. The gap between base plate of structural members and concrete top of foundation shall be filled with GP-2 grouting material of reputed make. The material of all J-bolts shall be of 8.8 Class.

60.4. All ferrous parts of hardware shall be galvanized in accordance with IS 2629. The galvanization shall withstand four dips of 1-minute duration each in copper-sulphate solution as per the test procedure laid down in the relevant ISS.

60.5. The threads in nuts and tapped holes shall be cut after galvanizing, and shall be well lubricated/greased. All other threads shall be cut before galvanizing.

60.6. Both the suspension and the tension hardware shall be of ball and socket type, and shall be with `R' and `W' type security clip of stainless steel or phosphor Bronze conforming to IS 2486. The tension clamps of both compression type and bolted type as shown in the relevant drawings shall be offered. Arcing horns shall be provided on the line side for both the suspension type and compression type hardware.

61. Danger Plates

Size of each Danger Notice plates shall be 200 mm x 150 mm made of mild steel sheet and at least 2 mm thick, and vitreous enameled white on both sides and with inscription in signal red colors on front side as required. The inscriptions shall be in Hindi and English.

3. BIDDER SELECTION PROCESS

Indian Bidders with sound technical and financial capabilities fulfilling the qualifying requirements stated herein may participate in this tender.

Evaluation of Bids

The bids submitted will be evaluated through **Evaluated Bid Value (EBV).** The detailed process for EBV based on the rates quoted by bidders & NEEGG is given in later pages of this tender document.

1. Financial Criteria (Details to be submitted as per Annexure – PQC-1)

Average Annual Financial Turn over during the last three years ending on ending 31st March, of the previous financial year should be Rs.1900 Lakhs. While computing the annual turnover, other income shall not be considered.

i. Average turnover shall be determined by summing up the annual turnover of each financial year and dividing the sum by three. In the event a bidder does not have turnover in any one or two of the years of the submitted financial years, the turnover for that/ those years shall be taken as Nil and the average turnover will be calculated by considering the denominator as 3 years to determine the conformity to the turnover criteria.

ii. For the bidders following financial year closing at the end of June or September or December, the last two financial years ending with June 2022 or September 2022 or December 2022 respectively will be considered.

iii. In case where audited results for the last financial year i.e. 31st March, 2023, as on the date of submission of the tender are not available bidders shall submit the audited results of three consecutive financial years preceding the last financial year, i.e. 2019-20, 2020-21 & 2021-22 and a Certificate signed by CEO/ CFO/ Partner/ Proprietor of the Bidder shall be submitted stating that the financial results of the last financial year of the Company / firm are under audit as on the date of submission of the bid.

iv. Bidder to ensure that any Attestation/Certification/Audited Financial Statement by Chartered Accountant submitted in Bid Document should bear Unique Document Identification Number (UDIN).

2. Technical Criteria (Details to be submitted as per Annexure – PQC-2):

Bidder shall have experience of having successfully carried out and completed similar works * in India in last 7 years ending last day of the month previous to the one in which applications are invited, which experience should be any of the following:

a) Three Similar Completed work(s), each costing not less than – Rs.2500 Lakhs

OR

b) Two Similar Completed work(s), each costing not less than - Rs.3100 Lakhs

OR

c) One Similar Completed work costing not less than - Rs.5000 Lakhs

#Similar Works:

The similar works mentioned in Clause Technical shall mean "Design, Engineering, Supply, Construction, Erection, Testing and Commissioning on turnkey basis of Ground Mounted Solar PV Power Project of minimum capacity of 5 MW (AC) with or without associated transmission line work and with Comprehensive Operation & Maintenance for at least (1) year period"

Work executed under Sub-contract without consent from Principle client/Owner will not be considered as similar completed work.

Note:

1. For Technical Criteria and Financial Criteria, PQC will be relaxed by 15% for Micro and Small Enterprises, subject to meeting the prescribed quality and technical specification of the tendered items/services.
2. The condition of prior turnover and prior experience is relaxed for Registered Start-ups (whether MSE or otherwise) subject to meeting similar work criteria mentioned in the Tender. For availing the relaxation, bidder is required to submit requisite certificate towards Start-up enterprise registration issued by Department of Industrial Policy and Promotion, Ministry of Commerce and the certificate should be notarized.

The bidders to note the following:

1) Submission of the Purchase Order / Work Order is mandatory and it should clearly mention the details of work executed/supplies made by the vendor so as to enable us to identify whether the vendor meets the technical criteria stipulated above or not.

2) The Completion Certificate for completed works should be certified by the owner/client (for whom the work order has been executed) in support of meeting

the technical criteria as stipulated above. If consultants are issuing certificates, then bidders shall provide documentary evidence of appointment of consultant by the client failing which the offer shall be rejected.

3) Value of similar work successfully carried out excluding land value and completed within last 7 years ending on last day of the month previous to the one in which applications are invited only would be considered for evaluation.

Successfully carried out & Completed Work referred under this Clause refers to the value of work executed & completed during the last 7 years on last day of the month previous to the one in which applications are invited.

4) Works of Maintenance and Works carried out under Sub-Contract without consent from Principal Client/Owner, will not be considered as Similar Completed Work.

5) Bidder can quote for any of the Schedules OR Both of the Schedules individually OR Combined for both Schedules in line with the Prequalification Criteria mentioned earlier.

Bidders are required to meet both the above criteria viz., Financial 1(a) & Technical 1(b) for qualifying. Bids not meeting any of the above criteria shall be rejected.

A. Information/Documents required along with the Bid Document:

1. Title, style and postal address of the firm.
2. Communication particulars including telephone numbers, fax numbers and e- mail address.

3. Following documents are required to be submitted as proof of meeting Bid Qualification Criteria (Financial):

Notarized copies of last three Audited Annual Reports/Balance sheet & Profit and Loss account for the financial year ending March'23. For the bidders following financial year closing at the end of June or September or December, the last three financial years ending with June 2022 or September 2022 or December 2022 respectively will be considered.

4. Following documents, duly notarized, are required to be submitted as proof of meeting bid qualification criteria (Technical):

i) Purchase Order or Work Order

ii) Certificate of Completion of Work order of relevant PO's (having cross reference to PO), clearly mentioning the scope of work and the final value along with name certified by owner/client for whom the purchase/work order had been executed.

5. In case of composite works executed (other items/works outside the similar work requirement), to arrive at value of similar works mentioned in the tender, the required break up shall be given by the party with notarization. In absence of work breakup from bidder, HPCL shall arrive at the break up on their own and such calculation shall be final and binding on the bidder.

6. HPCL reserves the right to seek original documents or any additional information from bidders, in addition to details furnished in original bid to complete the evaluation.

3. Parties who are affiliates of one another can decide which Affiliate will make a bid. Only one affiliate may submit a bid. Two or more affiliates are not permitted to make separate bids directly or indirectly. If 2 or more affiliates submit a bid, then any one or all of them are liable for disqualification.

"Affiliate" of a Party shall mean any company or legal entity which:

a) controls either directly or indirectly a Party, or
b) which is controlled directly or indirectly by a Party; or
c) is directly or indirectly controlled by a company, legal entity or partnership which directly or indirectly controls a Party. "Control" means actual control or ownership of at least a 50% voting or other controlling interest that gives the power to direct, or cause the direction of, the management and material business decisions of the controlled entity.

4. Bids may be submitted by:

a) A single person/ entity (called sole bidder);
b) A newly formed incorporated joint venture (JV) which has not completed 3 financial years from the date of commencement of business;
c) Subsidiaries / Affiliates of Indian / foreign companies

5. Fulfilment of Eligibility criteria and certain additional conditions in respect of each of the above types of bidders are stated below, respectively:

a) The bidders (including an incorporated JV which has completed 3 financial years after date of commencement of business) shall fulfil each eligibility criteria

b) In case the bidder is a newly formed and incorporated joint venture and which has not completed three financial years from the date of commencement of business, then either the said JV shall fulfil each eligibility criteria or any one constituent member/ promoter of such a JV shall fulfil each eligibility criteria. If the bid is received with the proposal that one constituent member/ promoter fulfils each eligibility criteria, then this member/promoter shall be clearly identified and he/it shall assume all obligations under the contract and provide such comfort letter/guarantees as may be required by Owner. The guarantees shall cover inter alia the commitment of the member/ promoter to complete the entire work in all respects and in a timely fashion, being bound by all the obligations under the contract, an undertaking to provide all necessary technical and financial support to the JV to ensure completion of the contract when awarded, an undertaking not to withdraw from the JV till completion of the work, etc. etc. See Annexure 14a.

c) Subsidiaries / Affiliates of Indian or foreign companies which are registered in India and having manufacturing facilities or establishment towards providing

services in India are allowed to participate in this tender, subject to meeting the local content provisions as per the MII clause enclosed with this tender. Such entities can participate either on the basis of their credentials (Technical & Financial) or on the basis of the credentials (Technical or Financial) of their parent / affiliate company, as per the PQC requirements applicable for this tender. If credentials of parent/ affiliate are sought to be relied upon, then the Indian subsidiary must meet the other PQC, either Technical or Financial. Moreover the parent/affiliate will also provide suitable Guarantees to ensure completion of the work in all respects. See Annexure 14b.

In case the parent / affiliate company is from a country which shares a land border with India, then the subsidiary / affiliate company will be eligible to bid in this tender only if the parent / affiliate company is registered with the Competent Authority constituted by the Department for Promotion of Industry and Internal Trade (DPIIT)."

Evaluation of Price Bids

1. Price bids of only qualified and techno-commercially acceptable bidders shall be opened.

2. EBV (Evaluated Bid Value) Per kWh will be worked out by annual energy production accepted by HPCL.

3. Price evaluation of the bids shall be carried out by Computation of Evaluated Bid Value (EBV) considering the following:

i. Total comprehensive Lease cost for 11 years (The leasing expense over 11 years is computed as the average of the leasing costs over a total period of 27 years, taking into account the 11-year duration), quoted by the EPC Contractor.

ii. Total Project Cost of EPC Contract quoted by bidder.

iii. Total Comprehensive O&M charges for 10 years quoted by the bidder. Cost equivalent to Minimum 0.5% of the total EPC Contract Cost OR Higher per year for COMC shall be quoted by bidder. If after opening of priced bids, it is observed that the vendor has quoted less than 0.5% of the total Capital Cost year wise towards COMC charges for 10 years for any schedule, then the unit rates quoted by the vendor towards EPC line item excluding COMC lines shall be proportionately reduced and the item wise unit rates quoted towards the COMC lines shall be proportionately increased in such a way as to ensure that the total bid value of a particular schedule remains constant. In case the vendor quotes higher amount of COMC, the quoted amount shall be retained.

iv. Summation of Quoted Annual Net Electrical Energy Generation Guarantee (NEEGG) at the metering point of the Plant for each year during the O&M period

(of 10 years) including defect liability period year (in kWh) as quoted by bidder in Annexure of unpriced bid and accepted by HPCL.

v. Annual Discount factor of 8.00% shall be considered for the calculating the NPV of O&M Cost.

The evaluation methodology for selection of L1 bidder shall be as follows:

The L1 bidder shall be selected based on lowest Evaluated Bid Value (EBV) per kWh, which shall be worked out using following formula:

EBV (Rs. per kWh)	(X1+X2+X3) / Y

Where:

Symbol	Details of parameters
X1	NPV of total land lease amount to be paid for 27 years agreement period, considering discount factor at 8% * (11/27)
X2	Quoted EPC Price by Bidder inclusive of all taxes / duties etc.
X3	NPV of Quoted Total Comprehensive O&M charges for 10 years considering discount factor at 8%
Y	Summation of NEEGG for 10 years as per quoted by bidder in Annexure during the O&M period as per stipulated evaluation criteria of tender

Sample Bid Evaluation for Evaluated Bid Value (EBV)

Bidder	A	B	C	Remarks
NPV of total land lease amount to be paid for 11 out of 27 years agreement period * (11/27) (X1) in Rs. lakhs	67.4	89.8	76.3	Derived
Total Project Cost including Design & Supply of Equipment, erection, commissioning & Testing (X2) in Rs lakhs	4105	4200	4272.5	As Quoted
Total O&M Cost per Year-in Rs lakhs				
1st Year O&M	82.1	63	42.725	As quoted for 10 years

2nd Year O&M	86	66	45	
3rd Year O&M	91	69	47	
4th Year O&M	95	73	49	
5th Year O&M	100	77	52	
6th Year O&M	105	80	55	
7th Year O&M	110	84	57	
8th Year O&M	116	89	60	
9th Year O&M	121	93	63	
10th Year O&M	127	98	66	
NPV Rate	8.00%	8.00%	8.00%	As per tender
NPV of O&M Price (X3) in Rs. lakhs	672.3	515.2	349.3	Derived
Annual Net Guaranteed Energy Production , Lakh kWh				
During Defect liability period	128.666	132.24	135.815	As Quoted
1st Year O&M	126.144	129.648	133.152	As Quoted
2nd Year O&M	125.387	128.870	132.353	As Quoted
3rd Year O&M	124.635	128.097	131.559	As Quoted
4th Year O&M	123.887	127.328	130.770	As Quoted
5th Year O&M	123.144	126.564	129.985	As Quoted
6th Year O&M	122.405	125.805	129.205	As Quoted
7th Year O&M	121.670	125.050	128.430	As Quoted
8th Year O&M	120.940	124.300	127.659	As Quoted
9th Year O&M	120.215	123.554	126.893	As Quoted
10^{th} Year O&M	119.493	122.813	126.132	As Quoted
Summation of AEP for 11 years For Bid Evaluation (Y) - Lakh kWh (LU)	1227.9	1262.0	1296.1	Considered by HPCL & Consultant

EBV - Rs / kWh	3.57	3.45	**3.27**	(X1+X2+X3) / Y

In the above sample calculations, Bidder C is having lowest EBV and is selected as L1 bidder

6. SPECIAL TERMS & CONDITIONS:

1. *Order of Precedence*

In case of an irreconcilable conflict amongst General Conditions of Contract (GCC) and other conditions mentioned in Scope of Work, SCC, Specifications or Price Schedule / Schedule of Rates, the following shall prevail to the extent of such irreconcilable conflict in order of precedence:

g. Final Contract Agreement

h. Letter of Acceptance (LoA) / Work Order

i. Special Terms & Conditions of Contract (SCC)

j. Scope of Work

k. Instruction to Bidders

l. General Conditions of Contract (GCC)

HPCL GTC shall prevail for any clause which is not available in GeM GTC.

In case of any issue in placing PO on GeM, bidder shall agree to accept HPCL SAP PO. All terms and conditions as applicable in this GeM Tender shall apply to order placed in HPCL SAP.

2. *Bank Guarantees & EMD*

2.1. EMD shall be in the form of Bank Guarantee.

2.2. The validity of EMD shall be as mentioned in Tender Instructions.

2.3. The EMD shall specifically bind the Bidder to keep its Bid valid for acceptance and to abide by all the conditions of the Tender Documents in the event of HPCL desiring to award the work to the said Bidder. HPCL shall have an unqualified discretion to forfeit the EMD in the event: (i) Bidder fails to keep the Bid valid up to the date specified/ required; or (ii) refuses to unconditionally accept Letter of Intent and carry out the work in accordance with the Bid in the event such Bidder is chosen as the Successful Bidder.

2.4. The HPCL shall, however, arrange to release the EMD in respect of unsuccessful Bidders, without any interest, after the acceptance of LOA/PO along with the submission of Security Deposit by successful Bidder.

2.5. The EMD shall be forfeited and appropriated by HPCL as per the discretion of HPCL as genuine, pre-estimated compensation and damages payable to HPCL for, inter alia, time, cost and effort of HPCL without prejudice to any other right or remedy that may be available to HPCL hereunder or otherwise, under the following conditions:

a. If a Bidder engages in a corrupt practice, fraudulent practice, coercive practice, or restrictive practice;

b. In the case of Successful Bidder, if it fails within 7 days from the issue of LOA/PO – (a) to sign the Contract Agreement and/ or (b) to furnish the Security Deposit cum Performance Bank Guarantee within the period prescribed.

c. In case the Successful Bidder, having signed the Contract Agreement, commits any breach thereof prior to furnishing the Security Deposit cum Performance Bank Guarantee.

2.6. The Successful Bidder shall furnish the following Bank Guarantees:

i) Security Deposit cum Performance Bank Guarantee (SD/PBG) as per the format given, shall be furnished in favor of Hindustan Petroleum Corporation Limited (HPCL). The Successful Bidder shall submit Security Deposit cum Performance Bank Guarantee of 10% EPC Contract Price (Excluding Land lease and O&M contract Value), within two weeks after issuance of LOA/PO. The validity period of PBG should be for a total period up to twenty three (23) months (Claim Validity of additional 3 months i.e. BG Validity + 3 Months i.e. 26 months) from the date of LOA/PO or till the date of successful completion of PG test after the completion of Defect Liability Period whichever is later; if required, the PBG shall have to be extended for further 3 months beyond the due date of successful completion of PG test. In case the successful bidder carry out the PGT and successfully completed it before the 21 months PBG validity period, the PBG will be returned to bidder after submission of the O&M Bank Guarantee. However, in case Bidder fails to submit PBG within two weeks after issue of date of LOA/PO, HPCL reserves the right to cancel LOA/PO and to recover all cost and liability thereof from Bidder. The period for Performance

Guarantee Test shall begin from the date of successful commissioning & operation of the project and shall continue till next one (1) year. SD/PBG shall be returned only after successful Performance Guarantee Test/ Final Acceptance Test and submission of O&M Bank Guarantee.

ii) O&M Bank Guarantee: The Contractor shall undertake comprehensive Operation and Maintenance (O&M) activities for a period of ten (10) (5+5 year extendable) years from the date mentioned in NIT of this Tender. The Contractor shall submit the O&M Bank Guarantee as mentioned in the NIT, to HPCL within 30 days from the date of start of O&M period as specified in the NIT of this Tender in favor of Hindustan Petroleum Corporation Limited (HPCL). PBG of Yearly average of 10 Years of O&M value shall be submitted with the BG validity of 10 Years from the date of commencement of O&M Contract. Claim period of the BG shall be 3 months more than the BG Validity period.

3. Net Electrical Energy Generation Guarantee (NEEGG)

3.1. The Bidder shall be required to quote the Net Electrical Energy Generation Guarantee (NEEGG) for Eleven (11) years period at the metering point. The Bidder shall give NEEGG per annum after considering proposed configuration and all local conditions, solar insolation, wind speed and direction, air temperature & relative humidity, barometric pressure, rainfall, sunshine duration, grid availability and grid related all other factors and losses due to near shading, incidence angle modifier, irradiance level, temperature loss, array loss, module quality loss, module array mismatch loss, soiling loss and various inverter losses etc. To assess/ verify feasibility of quoted NEEGG, Bidders are required to provide computation documents along with considered factors based on which NEEGG has been computed.

3.2. Bidders are expected to undertake their own study of solar profile and other related parameters of the area and make sound commercial judgment about power output i.e. Net Electrical Energy Guaranteed Generation. The Site information and solar data provided in this Tender except the reference radiation for the twelve months is only for preliminary information purpose. No claim or compensation shall be entertained on account of this information. It shall be the responsibility of the Bidder to access the corresponding solar insolation values and related factors of solar plant along with expected grid availability. The Bidder should access all related factors about the selected Site for the Project and then quote the NEEGG for the proposed Project.

3.3. The Contractor shall be responsible for achieving NEEGG. For any shortfall in NEEGG corresponding to the offer, the compensation shall be recovered from the Contractor as per Clause no. 6. The Contractor shall maintain the Plant equipment including its repair, replacement, overhauling, etc., so as to ensure guaranteed NEEGG per year, for which the HPCL shall pay the agreed O&M Contract Price and the applicable taxes. NEEGG guaranteed shall not be construed as limiting value of generation. The Contractor shall maintain such that maximum generation is achieved.

4. Timeline

4.1. Project shall be completed within 7 months from the date of land lease agreement. The Contractor shall provide full program of the supply in detail and delivery schedule along with work schedule thereto. Strict adherence and guaranteed delivery schedule mentioned in terms and conditions shall be the essence of the Contract and delivery schedule must be maintained.

4.2. The work must be completed as per the Timeline below from the date of handing over of site.

4.3. Detail Schedule

Sr.No	Stage	Reference from Zero Date ("D")
1	Date of Issuance of LOA/PO, whichever is earlier	D
2	Land lease agreement (within 4 months of LOA) along with feasibility approval from MSEDCL/Statutory bodies	D+120
3	Completion of site developmental work	D+150
4	Commencement of civil work	D+160
5	Approval of major drawings	D+160
6	Completion of supply of major balance of system	D+190
7	Completion of Civil work & erection of MMS	D+220
8	Completion of supply of PV modules, in phased manner, as per agreed schedule	D+220
9	Completion of Civil work for Inverter room and Control room, Transmission line, General Civil works	D+250
10	Completion of erection of control room, laying of transmission line	D + 270
11	Installation and interconnection of all DC & AC circuit	D+280
12	Interconnection and testing of entire plant and transmission line	D+290
13	Completion of entire plant and readiness for commencement of operations.	D+300
14	Commissioning & Operational Acceptance Test & Completion of Facilities.	D+330
15	Performance Guarantee Test-cum-Final Acceptance Test (Tentative) after completion of first year of operation after COD with appropriate State Authority.	D+695
16	Starting of O&M Period	D+696

4.4. The Contractor shall also provide a Bar/ PERT Chart indicating completion schedule for various items involved in the work within the stipulated completion period and the Contractor should strictly adhere to that schedule.

4.5. The issue of LOA/PO shall be considered as the Zero Date.

4.6. The Bar/ PERT Chart provided by the Contractor shall submitted to HPCL for approval prior to commencement of the execution of the Project. All comments and modifications provided by HPCL shall be incorporated and adhered to by the Contractor in the Timeline, Bar/ PERT Chart, detailed execution plan, etc. for execution of the Project.

4.7. Based on above timeline, Bidder/Contractor to submit detailed schedule/timeline for each Inverter/transformer Block.

4.8. The Commissioning of the Project shall be carried out inline with commissioning procedure of appropriate authority / Statutory Body applicable for the respective states. Their authorized representative will witness and validate the commissioning procedure at site. Commissioning certificate shall be issued by them after successful commissioning.

4.9. "Commissioning" word indicated in this tender shall mean commissioning certificate issued by relevant statutory authority after successful commissioning.

4.10. Partial commissioning shall not be allowed.

5. Price Reduction/ Liquidated Damages (LD):

i. In case of any delay in completion of the work beyond the CDD, the Owner shall be entitled to be paid Price Reduction by the Contractor. The price reduction shall be initially at the rate of 0.5% (half percent) of the total contract value for every week of the delay subject to a maximum of 10% of the total contract value. The price reduction shall be recovered by the Owner out of the amounts payable to the Contractor or from any Bank Guarantees or Deposits furnished by the Contractor or the Retention Money retained from the Bills of the Contractor, either under this contract or any other contract.

ii. The Contractor shall be entitled to give an acceptable unconditional Bank Guarantee in lieu of such a deduction if Contractor desires any decision on a request for time extension.

iii. Once a final decision is taken on the request of the Contractor or otherwise, the price reduction shall be applicable only on the basic cost of the contract and on each full completed week(s) of delay (and for part of the week, a pro-rata price reduction amount shall be applicable).

iv. This final calculation of price reduction shall be only on the value of the unexecuted portion/quantity of work as on the CDD.

v. Contractor agrees with the Owner, that the above represents a genuine pre-estimate of the damages which the Owner will suffer on account of delay in the performance of the work by Contractor. The Contractor further agrees that the price reduction amount is over and above any right which owner has to risk

purchase and any right to get the defects in the work rectified at the cost of the contractor

vi. Any delay in completion of the work shall attract liquidated damage/ penalty for late completion as per Liquidated Damage of this Tender.

a. If the Contractor fails to deliver the plant or fails to start the work within specified time frame after issue of LoA/PO or fails to carry out the work as per agreed schedule or leaves the work site after partial execution of the work, HPCL shall have the right to get the work done through any other agency at the risk and cost of the Contractor. Further to this, HPCL may, without prejudice to the right of the Contractor to recover damages for breach of trust of the Contract, may impose penalties.

b. Notwithstanding anything contained in this tender document, bidders to note that Completion time of Project activities as per the prescribed timeline/schedule is the essence of the Contract. It is envisaged that EPC Contractor shall plan and achieve progress of the Project on or before the prescribed timeline/schedule without fail.

c. If, at any time, the CONTRACTOR's actual progress falls behind or is likely to fall behind the agreed schedule of the break-up/detailed Project activities, the CONTRACTOR shall submit to the HPCL, a revised program with catch up schedule, taking into account the prevailing circumstances and delay in the respective activities / milestones. The CONTRACTOR shall, at the same time/forthwith notify promptly to HPCL of the steps being taken to expedite progress of the Project activities, so as to achieve completion of such activities within the agreed Time schedule for Completion. The Contractor shall in order to overcome the situation, forthwith mobilize required additional resources like manpower, materials, machineries etc. to achieve the prescribed timeline/schedule at his risk and cost.

d. In case further slippage is observed in the progress of Project activities, as per agreed time schedule or failure by EPC Contractor, at any stage of the Contract, to perform the Contract diligently to fulfill his obligations as per the EPC Contract, HPCL reserves the right to engage any other Contractor(s)/sub-contractor(s) at any time, at the risk and cost of the EPC Contractor to ensure completion of the Project activities in line with the agreed time schedule. Further, HPCL will also deduct Liquidated Damages (LD) arising out of any such delay, if any, as per the terms of this tender document or recover the costs, expenses, losses, damages incurred or suffered by HPCL as per the recourse available under this tender document or any other law for the time being in force.

e. The said right of the HPCL to levy damages on account of delay shall be without prejudice to and in addition to the right of the Company to get the concerned work done from a third party at the complete risk and cost of the Contractor.

f. The Contractor shall indicate duration of all the activities in activity chart in conformity with the overall schedule of the completion of project. The Contractor shall submit the activity chart in form of Bar Chart which shall be discussed and finalized and shall be a part of Contract.

g. Any strike / lockouts at works or site of the Contractor or his sub-supplier/sub-contractor shall not be considered as force majeure condition.

h. For calculation of penalty, date of issue of LOA/PO shall be the reference date.

6. Underperformance with respect to NEEGG

6.1. Penalty for less Generation during Operation & Maintenance (O&M)

6.2. For each Contract Year, the Contractor shall demonstrate "Actual Delivered Energy" at the Metering Point (HPCL Plant end) as compared to the 'NEEGG' for the particular year assured by contractor during bidding stage.

6.3. If for any Contract Year, it is found that the "Actual Delivered Energy" is less than 'NEEGG' for the particular year, the Contractor shall pay the compensation to HPCL equivalent to Rs. 10 per kWh of under-generation. The same shall be recovered from payment yet to be made by HPCL to the Contractor and/ or from the Bank Guarantees available with HPCL. In case the BG got fully exhausted because of this penalty, contractor has to replenish the BG within 30 days thereafter.

6.4. In case of any defect in the system after Commissioning, the Contractor shall repair it within forty eight (48) hours. After 48 hours, penalty shall be charged and the same shall be deducted / recovered from payments yet to be made by HPCL to the Contractor and / or from the Bank Guarantee submitted to HPCL. A penalty at the rate of Rs. 10 per kWh shall be charged by the HPCL for the loss of generation due to that effect post 48 hours. The loss of generation shall be calculated with respect to the NEEGG of that particular year. In case the BG got fully exhausted because of this penalty, contractor must replenish the BG within 30 days thereafter.

6.5. However, in case the Contractor fulfils the NEEGG at the end of the year then the amount deducted as a penalty for loss of generation as per this Clause shall be adjusted in the Contractor's bill or reimbursed. In case the Contractor fails to meet the NEEGG at the end of the year then above-mentioned penalty shall be adjusted from the penalty calculated at the end of the year for the shortfall in the generation so that there is no duplication of penalty for the same loss of generation. The first 48 hours shall not be considered for the penalty in case of any defect.

6.6. In case the Project fails to generate any power continuously for 6 months any time during the O&M period, it shall be considered as an "Event of Default".

6.7. Upon occurrence of any Event of Default mentioned in Clause herein above, HPCL shall have the right to encash the entire amount of O&M Bank Guarantee submitted by the Contractor and withhold any other pending payment.

6.8. The HPCL reserves the right to perform random audits of weather monitoring system of the plant anytime during the entire O&M period. If any discrepancy is found between the measured parameters, the difference between the measured parameters by HPCL from secondary sources and the weather monitoring system installed by the Contractor at the site will be factored in calculating the adjusted NEEGG during the entire year. However, HPCL will have the final authority to decide on this matter.

7. Plant Performance Guarantee

i. During O&M contract, the plant performance will be evaluated based on Minimum Generation Guarantee

ii. During the O&M period, the bidders need to maintain minimum 97% availability of the plant to achieve the proposed Min. Generation Guarantee at the end of each year. Every 1% fall in availability below the minimum availability requirement shall result in a penalty of 4% of the annual O&M charges. Recovery of such penalty shall be made in bill of the last quarter of that year. Any repair, replacement, overhauling, etc., are to be performed during night times so that no generation loss will be there in daytime.

iii. Contractor needs to submit month wise performance report to HPCL for verification of PR (Annual degradation may be considered as per PV module data sheet)

8. Defect Liability

8.1. The Contractor must warrant that the facilities or any part thereof shall be free from defects in the design, engineering, materials and workmanship of the Plant and Equipment supplied and of the work executed.

8.2. If it shall appear to the authorized representative of the Company that any supplies have been executed with unsound, imperfect or unskilled workmanship, or with materials of any inferior description, or that any materials or articles provided by the Contractor for the execution of Contract are unsound or otherwise not in accordance with the Contract, the Contractor shall on demand in writing inform the authorized representative of the Company specifying the item, materials or articles complained of, notwithstanding that the same may have been inadvertently or otherwise passed, certified and paid for. The Contractor shall forthwith rectify or remove and replace that item so specified and provide other proper and suitable materials or articles at its own charge and cost, and in the event of failure to do so within a period to be specified by the authorized representative of the Company in its demand aforesaid, the Project Manager may on expiry of notice period rectify or remove and re-execute the time or remove and replace with others, the materials or articles complained of as the case may be at the risk and cost in all respects of the Contractor. The decisions of the authorized representative of the Company as to any question arising under this Clause shall be final and conclusive.

8.3. If during the Defect Liability Period any defect found in the design, engineering, materials and workmanship of the Plant and Equipment supplied or of the work executed by the Contractor, the Contractor shall promptly, in consultation and agreement with HPCL regarding appropriate remedying of the defects, and at its cost, repair, replace or otherwise make good (as the Contractor shall, at its discretion, determine) such defect as well as any damage to the Facilities caused by such defect.

8.4. Furthermore, without prejudice to the generality of the foregoing, it is clarified that the Contractor shall also be responsible for the repair, replacement or making good of any defect or of any damage to the Facilities arising out of or resulting from any of the following causes:

a. Improper operation or maintenance of the Facilities by the Contractor during operation and maintenance of the Facility; or

b. Operation of the Facilities violating specifications of the Facilities.

8.5. HPCL shall give the Contractor a notice stating the nature of any such defect together with all available evidence thereof, promptly following the discovery thereof. HPCL shall afford all reasonable opportunity for the Contractor to inspect any such defect.

8.6. HPCL shall provide the Contractor all necessary access to the Facilities and the Site to enable the Contractor to perform its obligations.

8.7. The Contractor may, with the consent of the Company, remove from the Site any Plant and Equipment or any part of the Facilities that are defective, if the nature of the defect and/ or any damage to the Facilities caused by the defect is such that repairs cannot be expeditiously carried out at the Site.

8.8. If the repair, replacement or making good is of such a nature that it may affect the efficiency of the Facilities or any part thereof, the Company may give to the Contractor a notice requiring that tests of the defective part of the Facilities shall be made by the Contractor immediately upon completion of such remedial work, whereupon the Contractor shall carry out such tests.

8.9. If such part fails the tests, the Contractor shall carry out further repair, replacement or making good (as the case may be) until that part of the Facilities passes such tests. The tests, in character, shall in any case be not inferior to what has already been agreed upon by HPCL and the Contractor for the original equipment/part of the Facilities.

8.10. If the Contractor fails to commence the work necessary to remedy such defect or any damage to the Facilities caused by such defect within a reasonable time (which shall in no event be considered to be less than seven (7) days), the Company may, following notice to the Contractor, proceed to do such work, and the reasonable costs incurred by HPCL in connection therewith shall be paid to HPCL by the Contractor or may be deducted by the Company from any monies due to the Contractor or claimed under the Performance Guarantee, without prejudice to other rights, which HPCL may have against the Contractor in respect of such defects.

8.11. If the Facilities or any part thereof cannot be used by reason of such defect and/ or making good of such defect, the Defect Liability Period of the Facilities or such part, as the case may be, shall be extended by a period equal to the period during which the Facilities or such part cannot be used by the Company because of any of the aforesaid reasons. Upon correction of the defects in the Facilities or any part thereof by repair/ replacement, such repair/ replacement shall have the defect liability period of eighteen (18) months from such replacement.

8.12. In addition, the Contractor shall also provide an extended warranty for any such component of the Facilities and for the period of time. Such obligation shall be in addition to the Defect Liability Period specified under Clause 7.

9. Termination for Default

9.1. The HPCL may, without prejudice to any other remedy for breach of Contract, by written notice of default sent to the Contractor, terminate the Contract in whole or in part if the Contractor fails to deliver or execute any or all of the goods within the time period(s) under the Contract or any extension thereof granted by HPCL pursuant to the clause for Delay in Execution or Failure to Supply or, If the Contractor fails to perform any other obligations(s) under the Contract.

9.2. In the event the HPCL terminates the Contract in whole or in part, pursuant to above, the HPCL may procure, upon such terms and in such manner as it deems appropriate, goods similar to those undelivered, the Contractor shall be liable to the HPCL for any excess costs for such similar goods. However, the Contractor shall continue the performance of the Contract to the extent not terminated.

9.3. In case the Contractor is not able to demonstrate the “Actual Delivered Energy” as per the “Base NEEGG” during the Performance Guarantee Test and after the penalties levied as mentioned in Clause 6; HPCL reserves the right to terminate the Contract at its discretion if there are no efforts are made from the Contractor to correct the issues regarding plant performance.

9.4. In case termination of the Contract due to default, the Contractor may be blacklisted by HPCL and its associate companies, etc. for future work.

10. Breach and Cancellation of the Contract

10.1. In case of non-performance in any form or change of the covenant and conditions of the Contract by the Contractor, the HPCL shall have the power to annul, rescind, cancel or terminate the order and upon its notifying in writing to the Contractor that it has so done, this Contract shall absolutely determine. The decision of the HPCL in this regard shall be final and binding.

10.2. The HPCL may cancel the order or a portion thereof, and if so purchase or authorize purchase of the plant/equipment not so delivered or order Plant/ Equipment of similar description (opinion of the HPCL shall be final) at the risk and cost of the Contractor.

11. Progress Report of Work

11.1. The Contractor shall submit a weekly progress report on execution of works conforming to bar/ PERT Chart and format provided by HPCL. In case of any slippage(s) or delay in execution of work reasons for such delay along with details of hindrances will be submitted by the Contractor along with modified Bar/ PERT Chart mentioning the action plan being taken to keep the due date of completion of project unchanged. If required, the Contractor shall use additional manpower to keep the due date of completion of Project unchanged.

11.2. The authorized representative of the Contractor shall review the progress of the Project work every fortnight on a prefixed day at project site with HPCL or its representative as per the network and record the minutes.

12. Insurance

12.1. During the project period, i.e. till the Defect Liability Period of the Project, all insurance shall be taken by the contractor and related expenses shall be borne by the Contractor. The goods supplied under the Contract shall be fully insured against the loss or damage incidental to manufacture or acquisition, transportation, storage, delivery, theft, natural or other disaster, etc. in such a manner that the HPCL shall not incur any financial loss, as long as the construction of the Project continues to remain under the custody of the Contractor.

12.2. In case of any loss or damage or pilferage or theft or fire accident or combination of the said incidents etc. under the coverage of insurance, the Contractor shall lodge the claim as per rules of insurance. Any FIR required to be lodged to local Police Station shall be the responsibility of the Contractor.

12.3. The Contractor shall arrange to supply/ rectify/ recover the materials even if the claim is unsettled for timely completion of the Project. The final financial settlement with the insurance company shall be rested upon the Contractor.

12.4. In case of any delay of the Project attributable to the Contractor, the Contractor himself in consultation with the Company should take the extension of insurance. Any financial implications shall, however, be borne by the Contractor.

12.5. The Contractor shall arrange for providing insurance coverage to its workmen under Workmen's Compensation Act or similar Rules and Acts as applicable during execution of work for covering risk against any mishap to its workmen. The Contractor shall also undertake a Third Party Insurance. The HPCL shall not be responsible for any such loss or mishap.

12.6. Comprehensive insurance is to be arranged by the Contractor during the O&M period of the Contract.

12.7. At the end of the term of insurance undertaken by the Contractor, the Contractor shall provide all the necessary documents to the satisfaction of the Company in order to enable the Company to take up the insurance of the Plant.

13. Statutory Acts, Rules and Standards

13.1. The work shall be executed in conformity with the relevant standard of Bureau of Indian Specification (or equivalent International Standard), Electricity Rules, 2010 (as amended up to date), Indian Electricity Act, BARC/DAE rules, Explosive Act 1948, Petroleum Act 1934, National Building Code and relevant Rules in vogue at the time of execution including operation and maintenance period.

14. Tools and Tackles

14.1. The Contractor shall provide technically suitable tools and tackles for installation & erection of Plant and Machineries conforming to relevant BIS safety and technical standards for proper execution of work. The HPCL, in no way, shall be responsible for supply of any tools and tackles for implementation of the work and also to carry out operation and maintenance activities.

15. Safety Measures

15.1. The Contractor shall have to provide necessary and adequate safety measures including personal protective equipment and precautions to avoid any accident, which may cause damage to any equipment/ material or injury to workmen. The HPCL shall not be responsible for any such accidents.

16. Hazardous Material

16.1. Any hazardous material used during construction or used as part of the plant has to be taken back by the supplier for recycling or dumping purpose after its operating/ working life, so that it may not affect the environment or any living being. The Contractor shall comply with the State Pollution Board regulation.

17. Stoppage of Work

17.1. The HPCL shall not be responsible and not liable to pay any compensation due to stoppage of work as a reaction from local public due to any undue action on the part of the Contractor causing annoyance to local people.

18. Hindrance Register

18.1. The Contractor may also maintain a Hindrance Register where reasons for delay may be recorded from time to time and at the time of occurrence of the hindrance and get it duly certified by the Project Manager or his authorized representative.

19. Responsibility of the Contractor

19.1. The Contractor shall provide guarantee and be entirely responsible for the execution of the Contract in accordance with this tender including but not limited to its specification, schedules, and annexure. The Contractor shall further provide guarantee and be responsible for the quality and workmanship of all materials and completed works, correct designs and drawings, correct delivery of material, erection, testing and commissioning including operation and maintenance.

20. Right of the HPCL to Make Change(s) in Design

20.1. All designs shall be approved by HPCL prior to the execution of such designs.

20.2. The HPCL shall have the right to make any change in the design, which may be necessary in the opinion of HPCL to make the plant and materials conform to the provisions and contents of the specification without extra cost to HPCL.

21. Manuals

21.1. The Contractor shall supply all necessary erection and commissioning manuals, O&M manuals etc. as and when required. Six sets of test results, manuals etc. shall be submitted by the Contractor on completion of the work in hard and soft copies.

22. Governing Language

22.1. The Contract shall be written in English Language. All correspondence and documents pertaining to the Contract, which are exchanged by the HPCL and Contractor, shall be written in English.

23. Order Amendments

23.1. No variation in or modification of the terms of the contract shall be made except by written amendments issued by the HPCL.

24. Assignments or Subletting of Contract

24.1. The Contractor shall not, without the prior consent in writing of the HPCL, assign or sublet or transfer its Contract in whole or in part, its obligations to perform under the Contract or a substantial part thereof, other than raw materials, or for any part of the work of which makers are named in the Contract, provided that any such consent shall not relieve the Contractor from any obligation, duty or responsibility under the Contract.

25. Subcontracts

25.1. The Contractor shall notify the HPCL in writing of all subcontracts awarded under the Contract if not already specified in his Bid. Such notification in its original Bid or later shall not relieve the Contractor from any liability or obligation under the Contract.

25.2. Subcontracting a work shall not, under any circumstances, relieve the Contractor from its obligations towards the Project and the HPCL.

25.3. In case, the Contractor engages any Subcontractor to carry out a part of the work, the Subcontractor should have requisite Government License for carrying out such part of the work.

26. Inspection and Testing

26.1. The HPCL or its authorized representative including appointed Consultant for the project shall have, at all times, access to the Contractor's premises and also shall have the power to inspect and examine the materials and workmanship of project work during its manufacture, shop assembly and testing. If part of the plant is required to be manufactured in the premises other than the Contractor's, the necessary permission for inspection shall be obtained by the Contractor on behalf of HPCL or its duly authorized representative.

27. The Contractor shall offer following Test / Inspection to the HPCL.

27.1. The Contractor shall hire a Third Party Agency from below mentioned list to carry out Factory Acceptance Test of Major items like PV Modules, MMS, cables, SJBs, Inverters, Transformers, HT & LT switchgears, DC system, Switchyard equipments, earthing system, SCADA, RMU etc. for pre-dispatch inspection at the manufacturing facility of the Contractor all items under this RFP as per applicable standards, approved QAP and documents

a. TUV Nord
b. EL
c. Buereau Veritas
d. PRO QC International
e. Intertek
f. SGS or equivalent (Equivalent Agency has to be deployed post approval from HPCL)

27.2. HPCL may depute its Engineer or representative for pre-dispatch inspection at the manufacturing facility of the Contractor all items under this RFP as per applicable standards, approved QAP and documents. Samples for testing shall be drawn randomly in presence of HPCL/ inspecting agency from the lot offered for inspection. After Test/Inspection of the Items at factory, the Contractor is to submit the inspection & test reports to HPCL for review. After review of the inspection & test reports, HPCL will give dispatch clearance in writing. The Contractor shall not dispatch any item without dispatch clearance from HPCL, in writing.

27.3. HPCL may depute its Engineer or representative for inspection during manufacture and in assembled condition prior to dispatch in accordance with the standard practice/ QAP of the manufacturer and applicable Standards, at no additional cost to HPCL for demonstration and performing the test/inspection. The Contractor shall raise inspection call with internal test reports in advance for all items like PV Modules, MMS, cables, SJBs, Inverters, Transformers, HT & LT switchgears, DC system, Switchyard equipments, earthing system, SCADA, RMU etc.

27.4. HPCL shall have the right to serve notice in writing to the Contractor on any grounds of objections, which he may have in respect of the work. The Contractor has to satisfy the objection, otherwise, the HPCL at his liberty may reject all or any component of plant or workmanship connected with such work.

27.5. The Contractor shall issue request letter to HPCL or his authorized representative for testing of any component of the plant, which is ready for testing at least fifteen (15) days in advance from the date of actual date of testing at the premises of the Contractor or elsewhere. When the inspection and the tests have been satisfactorily completed at the Contractor's works, HPCL shall issue a certificate to that effect. However, the HPCL at its own discretion may waive the inspection and testing in writing under very special circumstances. In such case, the Contractor may proceed with the tests which shall be deemed to have been made in HPCL's presence, and it shall forthwith forward six (6) sets of duly certified copies of test results and certificates to the Company for approval of the Company. The Contractor, on receipt of written acceptance from HPCL, may dispatch the equipment for erection and installation.

27.6. For all tests to be carried out, whether in the premises of the Contractor or any Subcontractor or the supplier, the Contractor, shall provide labour, materials, electricity, fuel, water, stores, apparatus and instruments etc. free of charge as may reasonably be demanded to carry out such tests of the plant in accordance with the Contract. The Contractor shall provide all facilities to HPCL or its authorized representative to accomplish such testing.

27.7. The HPCL or his authorized representative shall have the right to carry out inward inspection of the items on delivery at the Site and if the items have been found to be not in line with the approved specifications, shall have the liberty to reject the same.

27.8. The Contractor has to provide the necessary testing reports to HPCL as and when required.

27.9. Neither the waiving of inspection nor acceptance after inspection by HPCL shall, in anyway, absolve the Contractor of the responsibility of supplying the plant and equipment strictly in accordance with specification and drawings etc.

27.10. If any item is not found conforming to standards during test / inspection, the same shall be replaced / rectified by Contractor without any cost to HPCL and shall be re-offered for inspection.

27.11. The work is subject to inspection at all times and at all places by HPCL. The Contractor shall carry out all instructions given during inspection and shall ensure that the work is carried out according to the relevant codes of practice

27.12. Decision of the HPCL in regard to the quality of work and materials and performance to the specifications and drawings shall be final.

28. Authorized Test Centres

28.1. The PV modules, inverters, transformers, panels, wires, etc. deployed in the power plants shall have valid test certificates for their qualification as per above specified IEC/ BIS Standards by one of the reputed labs of the respective equipment (preferably NABL Accredited Test Centres) in India. In case of module or other equipment for which such Test facilities may not exist in India, test certificates from reputed ILAC Member Labs abroad will be acceptable.

29. Delivery of Equipment

29.1. The Contractor shall deliver the equipment of the plant and machineries in accordance with the terms of the Contract at the time(s) to the place(s) and in the manner specified in the Contract. The Contractor shall comply with instructions that may be given by the HPCL from time to time regarding the transit of the plant and material.

29.2. Notification of delivery or dispatch in regard to each and every consignment shall be made to the HPCL immediately after dispatch or delivery from the manufacturing works. The Contractor shall supply to the consignee Invoice in triplicate and packing account of all stores delivered or dispatched by him.

29.3. In case of any occurrence of loss or damage in transit, it shall be the liability of the Contractor to initiate or pursue the claim with the Insurance Company. It should take immediate steps to repair the damaged apparatus or replacement there to.

30. Deduction from Contract Price

30.1. All costs, claims, damages or expenses, which the HPCL may have paid for which the Contractor is liable, will be deducted by the HPCL from deposited bank guarantees or from any money due or which become due to him under this Contract or any contract are being executed elsewhere with the HPCL.

30.2. Any sum of money due and payable to the Contractor, as per the Contract Agreement, may be appropriated by the HPCL and set off against any claim of the HPCL, for the payment of a sum of money arising out of or under any other contract made by the Contractor with the Company. It is an agreed term of the Contract that the sum of money, withheld or obtained under this clause by the Company, will be kept withhold or retained as such by the HPCL or till this claim arising out of in the same Contract is either mutually settled or determined by the arbitrator, or by competent court, as the case may be, and that the Contractor shall have no claim for interest or damages whatsoever on this account or any other account in respect of any sum of money withheld or retained under this clause and duly notified as such to the Contractor.

31. Terms of Payment

31.1. Supply, Works and 10 years O&M: The HPCL shall pay the Contractor in the following manner for supply of material and at the following time for achieving the respective milestones for the Supply. The Tender is a comprehensive EPC Contract of Land lease, Supply, Works and O&M. However a single LoA shall be provided to the Successful Bidder. The payment terms are given below.

Terms of Payment Solar Plant & Evacuation System

Sr.	Payment Milestone	Amount
A	**Supply, Installation, Testing & Commissioning of Solar Power Plant**	**90% of EPC Contract Value**
1	Signing of land lease agreement	4%
2	Open access feasibility study of proposed land, consumption locations and report submission	1%
3	Completion of Erection of MMS Column Post including civil Foundation	10%
4	Supply of Solar PV Modules	25%
5	Supply of Balance of System	10%
6	Completion of erection of MMS and Inverter	10%
7	Completion of erection of PV Module, Cables, Control Room etc.	20%

8	Upon Successful completion of the Plant and ready for connecting with the Transmission Line	10%
9	Upon successful commissioning of project including power generation evacuation from site.	10%
B	**Supply, Installation, Testing & Commissioning of Power Evacuation System**	**10% of EPC Contract Value**
1	Supply of Conductor/ Cable of Transmission line	20%
2	Supply of BoS of Transmission line	10%
3	Completion of TL erection	40%
4	Completion of interconnection with State Grid Substation	10%
5	Upon Successful Commissioning of Project	20%

Note:

1. Supply payment are subject to receipt of goods at site.
2. Payment against supply of PV modules shall be on sequential basis after readiness of module mounting structure as indicated in schedule

Terms of payment for Operation and Maintenance (O&M) of Solar Plant

Payment for O & M shall be released quarterly against submission of proportionate running bill.

Terms of payment for Land Lease Agreement

30.2 HPCL shall pay the Lessor the lease rental on yearly basis. The lease rental for a year shall be paid within 10th day of January of the relevant year, provided in case of the first year of lease, the prorated lease rental shall be paid within 30 days of execution of lease deed.

32. Warranty/ Guarantee

32.1. The Plant shall perform as per the Guaranteed Performance in terms of NEEGG indicated by the Bidder.

32.2. PV modules used in grid connected solar power plants must be warranted for peak output power at Standard Testing Condition (STC), which shall not be less than 90% at the end of ten (10) years and not less than 80% at the end of twenty five (25) years. The first year degradation shall not be more 2% of the PV Module capacity and in subsequent years it shall not be more than 0.55% per annum.

32.3. Defect Liability Period: All plant equipment and components and overall workmanship of the grid solar power plants shall be warranted for a minimum of 1 years except solar PV Modules which shall be warranted for 25 years.

32.4. The Contractor shall ensure that the goods supplied under the Contract are new, unused and of most recent or current models and incorporate all recent improvements in design and materials unless provided otherwise in the Contract.

32.5. The warranty / guarantee period shall be as follows:

32.6. Solar PV Modules: Modules shall be warranted for a minimum period of 25 years in the Bidder's detailed Warranty/ Guarantee certificate. Same shall be furnished with its Bid.

32.7. Inverters: Inverters shall be warranted for the guarantee period provided by the original equipment manufacturer. Same shall be furnished with its Bid.

32.8. Transformers, associated switchgear and others: Bidder shall furnish in detail its warranties/ guarantees for these items.

32.9. During the period of Warranty/ Guarantee the Contractor shall remain liable to replace/ repair any defective parts, that becomes defective in the Plant, of its own manufacture or that of its Subcontractors, under the conditions provided for by the Contract under and arising solely from faulty design, materials or workmanship, provided such defective parts are not repairable at Site. After replacement the defective parts shall be returned to the Contractors works at the expense of the Contractor unless otherwise arranged.

32.10. At the end of Warranty / Guarantee period, the Contractor's liability shall cease. In respect of goods not covered above, HPCL shall be entitled to the benefit of such Guarantee given to the Contractor by the original Contractor or manufacturer of such goods.

32.11. During the Operation and Maintenance and Guarantee period, the Contractor shall be responsible for any defects in the work due to faulty workmanship or due to use of sub-standard materials in the work. Any defects in the work during the guarantee period shall therefore, be rectified by the Contractor without any extra cost to HPCL within a reasonable time as may be considered from the date of receipt of such intimation from HPCL failing which HPCL shall take up rectification work at the risk and cost of the Contractor.

33. Material Warranty:

Material Warranty is defined as: The manufacturer should warrant the Solar Module(s) to be free from the defects and/or failures specified below for a period not less than ten (10) years from the date of sale to the HPCL:

- Defects and/or failures due to manufacturing defects and/or failures due to materials, including PID defect
- Non-conformity to specifications due to faulty manufacturing and/or inspection processes.

If the solar Module(s) fails to conform to this warranty, the manufacturer will repair or replace the solar module(s), at GIPCL's / GSECL's sole option.

33.1. Performance Warranty:

The manufacturer should warrant the output of Solar Module(s) If, Module(s) fail(s) to exhibit such power output in prescribed time span, the Contractor will either deliver additional PV Module(s) to replace the missing power output with no change in area of land used or repair or replace the PV Module(s) with no change in area of land used at HPCL's sole option. Total land available from HPCL is fixed and the bidder shall design the plant so that in this case he has enough space within this land to accommodate additional capacity.

34. Degradation of Solar Modules

34.1. The Contractor should warrant for the output of each Solar Module(s) for at least 90% of its actual rated capacity at Standard Testing Condition after initial 10 years and 80% of its rated capacity after 25 years upon commissioning of the Plant.

34.2. The derating of module should not be more than 0.55% in any year except for the first year of operation, which should be limited to 2%.

34.3. If, Module(s) fail(s) to exhibit such power output, the Contractor will either:

a. Deliver additional PV Module(s) to replace the loss of power output;

<Or>

b. Repair or replace the existing PV Module(s);

<or>

c. Compensate HPCL with an amount equivalent to the loss of revenue from the date of audit to 25th years which shall be calculated based on Net Present Value of amount of loss of revenues from the date of audit to 25th years discounted at the rate of HPCL's cost of capital.

34.4. HPCL will specifically do the audit of solar PV module by third-party at any point of the operation period and in case the Contractor fails to demonstrate the value as per the maximum deration allowed then, the Contractor shall compensate as per the Clause no. 33.3.

35. Confidential Information

35.1. HPCL and the Contractor shall keep confidential and shall not, without the written consent of the other Party hereto, divulge to any third party any documents, data or other information furnished directly or indirectly by the other Party hereto in connection with the Contract, whether such information has been furnished prior to, during or following termination of the Contract. Notwithstanding the above, the Contractor may furnish to its Subcontractor(s) such documents, data and other information it receives from HPCL to the extent required for the Subcontractor(s) to perform its work under the Contract, in which event the Contractor shall obtain from such Subcontractor(s) an undertaking of confidentiality similar to that imposed on the Contractor.

35.2. Notwithstanding the generality of the foregoing Clause 34.1 all maps, plans, drawings, specifications, schemes and the subject matter contained therein and all other information given to the Contractor, by the Company in connection with the performance of the Contract shall be held confidential by the Contractor and shall remain the property of the Company and shall not be used or disclosed to third parties by the Contractor for any purpose other than for which they have been supplied or prepared. The Contractor may disclose to third parties, upon execution of secrecy agreements satisfactory to the Company, such part of the drawings, specifications or information if such disclosure is necessary for the performance of the Contract under this Clause 34.

35.3. Maps, layouts and photographs of the unit/integrated plant including its surrounding region's showing vital installation for national security shall not be published or disclosed to the third parties or taken out of the country without prior written approval of the Company and upon execution of secrecy agreements satisfactory to the Company with such third parties prior to disclosure.

35.4. Title to secret processes, if any, developed by the Contractor on an exclusive basis and employed in the design of the unit shall remain with the Contractor. The Company shall hold in confidence such process and shall not disclose such processes to the third parties without prior approval of the Contractor and execution by such third parties of secrecy agreements satisfactory to the Contractor prior to disclosure.

35.5. Technical specifications, drawings, flow sheets, norms, calculations, diagrams, interpretations of the test results, schematics, layouts and such other information which the Contractor has supplied to the Company under the Contract shall be passed on to the Company. The Company shall have the right to use these for construction erection, start-up, commissioning, operation, maintenance, modifications and/ or expansion of the unit including for the manufacture of spare parts.

35.6. The obligation of a party under this Clause 34, however, shall not apply to that information which:

a. now or hereafter enters the public domain through no fault of that Party,

b. can be proven to have been possessed by that Party at the time of disclosure and which was not previously obtained, directly or indirectly, from the other Party hereto, or

c. Otherwise lawfully becomes available to that Party from a third party that has no obligation of Confidentiality.

35.7. The above provisions of this Clause 34 shall not in any way modify any undertaking of Confidentiality given by either of the Parties hereto prior to the date of the Contract in respect of the Facilities or any part thereof.

35.8. The provisions of this Clause 34 shall survive Termination, for whatever reason, of the Contract.

36. Limitation of Liability (LLP)

36.1. The total liability of the Contractor under or in connection with this Tender and the consequent Contract shall not exceed the full EPC Contract Price inclusive of taxes and duties.

36.2. This sub-Clause shall not limit the liability in case of fraud, deliberate default/ negligence, reckless misconduct or illegal or unlawful acts by the Contractor.

37. Training of HPCL's Personnel

37.1. The Bidder shall provide training on Plant operations and maintenance to three (3) teams of 2-5 personnel each (Engineers and Technician/ Operators) of HPCL as and when requested by HPCL.

38. Mode of Execution

38.1. All the work shall be executed on EPC basis in strict conformity with the provisions of the Contract documents explanatory detailed drawings, specifications and instructions by the Engineer-in-Charge whether mentioned in the contract or not. The contractor shall be responsible for ensuring that works are executed in the most substantial, proper and workman like manner using the quality materials and labour throughout the job Completion in strict accordance with the specifications and to the entire satisfaction of the Engineer-in-Charge. Any discrepancy/ambiguity found during erection and commissioning at site, decision of HPCL will be final.

38.2. The entire work shall be executed on turnkey basis. Any minor item(s) not included in the schedule but required for completion of the work shall have to be carried out/ supplied without any extra cost. Such works, not listed in the schedule of works but elaborately described to perform or to facilitate particular operation(s) required for completion of the project shall be deemed to have been included in the scope of this work and the Contractor shall supply, install the same without any extra cost.

39. Programme of Work

39.1. The Contractor shall submit the programme of work within 15 days from the date of receipt of Work Order. The programme shall include a Bar Chart indicating there in the starting position and completion date of each of the major items of work.

40. Starting of Work

40.1. The Contractor shall be required to start the work within 15 (fifteen) days from the date of issue of Work Order and shall thereof, report to HPCL accordingly.

41. Completion Schedule

41.1. The time of completion and Commissioning of the Plant is Three Hundred (300) the date of issue of Letter of Intent. The O&M Contract Period is initially for ten (10) years (five plus five extension), and can be extended for the remaining years on sole discretion of HPCL at the mutually agreed rates.

41.2. The Contractor shall inform HPCL at least thirty (30) days advanced preliminary written notice and at least fifteen (15) days advanced final written notice, of the date on which it intends to synchronize the Power Project to the Grid System.

41.3. The Contractor shall prepare the completion schedule accordingly and inconformity with provisions of technical specifications and carry out the work as per this schedule subject to “Force Majeure” conditions. The Contractor shall mobilize resources keeping in view, the above scheduled completion period.

41.4. The Contractor shall provide the power evacuation schedule as and when required or asked by any Central or State Government agency(s).

42. Site Inspection & Basis of Bid

42.1. After taking in to consideration all aspects of the site, condition of soil etc., the Contractor should quote. No extra claim will be entertained at post bidding stage. The foundation design of module structure and the building shall have to be approved by HPCL. In case of any defects arising in the building during guarantee period, the Contractor shall have to rectify the same at its own cost.

43. Price Escalation

43.1. The rate(s) quoted against the work shall remain firm during the entire Contract period.

44. Taxes and Duties

44.1. The price quoted shall be inclusive of all applicable taxes, duties, levies as applicable (as per the format of the Financial Proposal), which shall be paid on production of documentary evidences for the same.

44.2. Bidders shall quote the rates as well as all taxes and duties based on the concessional exemption that can be availed by the Bidder.

a.Statutory variations in the tax shall be permitted as under:

i. Statutory variations during original contractual completion period:

ii. If any increase takes place in taxes and duties due to statutory variation, then HPCL shall admit the same on production of documentary evidences.

iii. If any decrease takes place in taxes and duties due to statutory variation, the same shall be passed on to HPCL or HPCL shall admit the decreased rate of taxes and duties while making the payment.

b. Statutory variations beyond original contractual completion period:

i. If reasons for extension of contractual completion period is attributable solely to HPCL, the provisions of (A) (i) above shall apply.

ii. If reasons for extension of contractual completion period is attributable to Bidder, then:

a. If any increase takes place in taxes and duties due to statutory variation, then HPCL shall not admit the same; however HPCL shall admit the taxes and duties at the rate prevailing during payment of last invoice raised during original contract completion period.

b. If any decrease takes place in taxes and duties due to statutory variation, the same shall be passed on to HPCL or HPCL shall admit the decreased rate of taxes and duties while making the payment.

44.3. Variation on account of exchange rate will not be payable. No statutory variation shall be payable by HPCL on the input items. i.e. raw materials etc.

44.4. No statutory variation shall be admitted if the excise duty becomes payable because of exceeding of the prescribed limits for turnover of the Bidder.

45. Retention Money Clause:

44.1 For EPC Contract-

a) 10% of the total value of the Running Account and Final Bill will be deducted and retained by the Owner as retention money on account of any damage/defect liability that may arise for the period covered under the defect liability period clause of the Contract free of interest. Any damage or defect that may arise or lie undiscovered at the time of issue of completion certificate connected in any way with the equipment or materials supplied by contractor or in workmanship shall be rectified or replaced by the contractor at his own expense failing which the Owner shall be entitled to rectify the said damage/defect from the retention money. Any excess of expenditure incurred by the Owner on account of damage or defect shall be payable by the Contractor. The decision of the Owner in this behalf shall not be liable to be questioned but shall be final and binding on the Contractor.

b) The retention money is not applicable, if the contractor provides the Performance bank Guarantee for 10% of the EPC Contract Value. Security Deposit cum Performance Bank Guarantee (SD/PBG) as per the format given, shall be furnished in favour of Hindustan Petroleum Corporation Limited (HPCL). The Successful Bidder shall submit Security Deposit cum Performance Bank Guarantee of 10% EPC Contract Price (Excluding O&M contract Value), within two weeks after issuance of LOA/PO. The validity period of PBG should be for a total period up to twenty three (23) months (Claim Validity of additional 3 months i.e. BG Validity + 3 Months i.e. 26 months) from the date of LOA/PO or till the date of successful completion of PG test after the completion of Defect Liability Period whichever is later; if required, the PBG shall have to be extended for further 3 months beyond the due date of successful completion of PG test. In case the successful bidder carry out the PGT and successfully completed it before the 23 months PBG validity period, the PBG will be returned to bidder after submission of the O&M Bank Guarantee. However, in case Bidder fails to submit PBG within two weeks after issue of date of LOA/PO, HPCL reserves the right to cancel LOA/PO and to recover all cost and liability thereof from Bidder. The period for Performance Guarantee Test shall begin from the date of successful commissioning & operation of the project and shall continue till next one (1) year. SD/PBG shall be returned only after successful Performance Guarantee Test/ Final Acceptance Test and submission of O&M Bank Guarantee.

c) If the contractor failed to undertake the O&M contract post completion of PGT and its final acceptance, Retention Money held with HPCL will not be released / forfeited. In case the contractor had provided BG in lieu of Retention Money, then the BG will be encashed if the contractor does not provide the acceptance to undertake the O&M Contract and submit the O&M Bank Guarantee within 30 days of the completion & final acceptance of PGT.

44.2 For Operations & Maintenance Contract-

a) Separate PO will be placed for O&M contract post successful completion of PGT.
b) The Contractor shall undertake comprehensive Operation and Maintenance (O&M) activities for a period of ten (10) years from the date mentioned in NIT of this Tender.
c) Amount equivalent to Yearly average of 10 Years of O&M value will be deducted and retained by the Owner as retention money (free of interest) from O&M running bills on account of any damage/defect/underperformance that may be observed during the O&M period. Any damage or defect or underperformance that may arise or lie undiscovered at the time of issue of completion certificate connected in any way with the equipment or materials supplied by contractor or in workmanship shall be rectified or replaced by the contractor at his own expense failing which the Owner shall be entitled to rectify the said damage/defect/underperformance from the retention money. The Plant shall be able to produce energy equal to or more than the NEEGG specified by contractor during the bidding stage. Any excess of expenditure incurred by the Owner on account of damage or defect or underperformance shall be payable by the Contractor. The decision of the Owner in this behalf shall not be liable to be questioned but shall be final and binding on the Contractor.
d) The retention money is not applicable, if the contractor provides the O&M bank Guarantee. The Contractor shall submit the O&M Bank Guarantee as mentioned in the NIT, to HPCL within 30 days from the date of start of O&M period as specified in the NIT of this Tender in favor of Hindustan Petroleum Corporation Limited (HPCL). PBG of Yearly average of 10 Years of O&M value shall be submitted with the BG validity of 10 Years from the date of commencement of O&M Contract. Claim period of the BG shall be 3 months more than the BG Validity period.
e) If the contractor failed to provide the intended services anytime during the O&M period, then HPCL shall make alternative arrangements to carry out the O&M and the cost incurred towards the same plus administrative expenses shall be recovered from Retention Money / BG.

46. Procurement of Materials

46.1. The Contractor shall procure all necessary material required for the project work and arrange to store them properly. Test certificate in accordance with the specifications are to be furnished by the Contractor to HPCL for approval in respect of the materials procured by the Contractor.

47. Notice of Operation

47.1. The Contractor shall not carry out important operation without the consent in writing of HPCL or his representative. For carrying out such important activity, the Contractor shall intimate to HPCL at least seventy-two (72) hours before starting of the job.

48. Rejection of Materials

48.1. HPCL's decision in regard to the quality of the material and workmanship will be final. The Contractors at its own cost and risk without any compensation shall immediately remove any material rejected by the Project Manager or Engineer-in-Charge from the Site of work.

49. Power and Water Supply during Construction

49.1. The Contractor shall arrange for the temporary Power and water Supply at the site for construction purpose at its own cost.

49.2. Cost of electricity required during construction shall be payable by the Contractor. For construction, temporary connection from Distribution Company shall be arranged by the Contractor as per applicable tariff.

49.3. HPCL shall not provide facility for storage of material, and accommodation for labours at site. The Contractor shall make his own arrangement for the same.

50. Labour Engagement

50.1. The Contractor shall be responsible to provide all wages and allied benefits to its labours engaged for execution of the project work and also to carry out Operation and Maintenance service. The Contractor shall remain liable to the authorities concerned for compliance of the respective existing rules and regulations of the government for this purpose and shall remain liable for any contravention thereof.

50.2. Strict adherence of various applicable labour laws like the Factories Act, Minimum Wages Act, ESI Act, Payment of Wages Act, the Workman's Compensation Act, EPF Act, Contractor labour (Regulation & Abolition) Act,1970 and all other statutory requirements as amended from time to time to the entire satisfaction of Central/State Govt. Authorities, shall be the responsibility of the Contractor and he shall have to make good loss, if any, suffered by HPCL on account of default in this regard by the Contractor.

50.3. The contractor is encouraged to use local manpower as per the local statutory (labour) requirement, if any.

50.4. The successful Bidder shall obtain license under Contract Labour (Regulation &Abolition) Act 1970, read with rules framed there under and furnish the same to the Company within 15 days of the issue of Detailed order of Contract failing which the detailed order of contract shall be cancelled/terminated without any further notice and its EMD and/ or performance guarantee shall be forfeited.

51. Handing Over –Taking Over

51.1. Project shall be taken over by HPCL upon successful completion of all tasks to be performed at Site(s) on equipment supplied, installed, erected and Commissioned by the Contractor in accordance with provision of this Tender with completion of Defect Liability Period. During handing over complete Project work, the Contractor shall submit the following for considering final payment:

a. All as- Built Drawings;

b. Detailed Engineering Document with detailed specification, schematic drawing, circuit drawing and test results, manuals for all deliverable items, Operation, Maintenance & Safety Instruction Manual and other information about the project;

c. Bill of material; and

d. Inventory of spares at projects Site.

e. Copies of all warranties/guarantees in name of HPCL.

51.2. Immediately after taking over of complete Plant, the same will be handed over to the Contractor for Operation & Maintenance for a period as mentioned in the Tender.

51.3. Handing over will be done only after Completion of Facilities, successful Operational Acceptance Test, successful Performance Guarantee test and completion of defect liability period.

51.4. Prior to the handing over, HPCl shall conduct a plant audit by self or the third party as per HPCL's discretion, and any defects identified during such audits or inspection shall be rectified by the Contractor at its own cost prior to the completion of the O&M period.

52. Miscellaneous

52.1. The project manager appointed by EPC contractor shall not be replaced without the prior written approval of HPCL.

52.2. Any project manager or member of the Contractor at Site shall be replaced within a period of forty eight (48) hours of intimation by HPCL without assigning any reason thereof.

52.3. The Contractor shall take care of all statutory, local clearance, approvals, etc.

52.4. All warranties on the equipment shall be in the name of HPCL with reference to the Clause No. 33.

52.5. The Contractor shall be responsible for claiming and retaining any subsidy and shall quote only final price and responsibility of Project registration/ applications etc. shall lie with the Bidder only. In no case, HPCL is responsible to provide any additional amount other than the EPC Contract Price & O&M Contract Price.

52.6. The Contractor shall provide arrangement for water drainage, which shall be appropriately arranged for dispersion/ evacuation as per the local statutory norms without causing any local inconvenience or hindrance.

52.7. The design philosophy and related specifications mentioned in this Tender are to be treated as baseline specifications. The Contractor may further improve the design of the Plant through minor modifications and execute the same contingent on HPCL's approval of the new design or specification.

52.8. Based on reviewing the Project, if the progress is below expectation as judged based on HPCL's discretion, then HPCLL shall reduce the Scope of the Contractor in part or full and assign the same to other contractor(s) at the risk and cost of the existing Contractor.

52.9. The Contractor shall continue to provide all the monitoring services, licenses, software, access to all information (real-time or stored) that were been used during the O&M Contract period by the Contractor to HPCL at the time of hand over at no extra cost to HPCL for the rest of the life of the Plant.

52.10. The Contractor shall construct a dedicated site office including tables, chairs, functional power outlets, light, fan air conditioner, etc. for at least eight (8) people to host HPCL's employees or authorized representatives at the time of construction of the Plant.

52.11. Provision for installing any additional monitoring equipment to facilitate on-line transfer of data shall be provided by the Contractor.

7. SCHEDULE OF QUANTITIES

Sr. No.	SCHEDULE	Item Description	Qty	UoM
1		EPC services – 7MW/9.8MWp including defect liability period of 1 year	1	LS
2		Land Lease Agreement value – 1st YEAR	1	LS
3		Land Lease Agreement value – 2nd YEAR	1	LS
4		Land Lease Agreement value – 3rd YEAR	1	LS
5		LAND LEASE AGREEMENT VALUE – 4th YEAR	1	LS
6		Land Lease Agreement value – 5thYEAR	1	LS
7		Land Lease Agreement value – 6th YEAR	1	LS
8		Land Lease Agreement value – 7th YEAR	1	LS
9		Land Lease Agreement value – 8th YEAR	1	LS
10		Land Lease Agreement value – 9th YEAR	1	LS
11		Land Lease Agreement value – 10th YEAR	1	LS
12		Land Lease Agreement value – 11th YEAR	1	LS
13		Land Lease Agreement value – 12th YEAR	1	LS
14		Land Lease Agreement value – 13th YEAR	1	LS
15		Land Lease Agreement value – 14th YEAR	1	LS
16		Land Lease Agreement value – 15th YEAR	1	LS
17		Land Lease Agreement value – 16th YEAR	1	LS
18		Land Lease Agreement value – 17th YEAR	1	LS
19		Land Lease Agreement value – 18th YEAR	1	LS
20		Land Lease Agreement value – 19th YEAR	1	LS
21		Land Lease Agreement value – 20th YEAR	1	LS

22		Land Lease Agreement value – 21st YEAR	1	LS
23		Land Lease Agreement value – 22nd YEAR	1	LS
24		Land Lease Agreement value – 23rd YEAR	1	LS
25		Land Lease Agreement value – 24th YEAR	1	LS
26		Land Lease Agreement value – 25th YEAR	1	LS
27		Land Lease Agreement value – 26th YEAR	1	LS
28		Land Lease Agreement value – 27th YEAR	1	LS
29		COMC Solar Plant Post Defect Liability Period - 1st Year	1	LS
30		COMC Solar Plant Post Defect Liability Period - 2nd Year	1	LS
31		COMC Solar Plant Post Defect Liability Period - 3rd Year	1	LS
32		COMC Solar Plant Post Defect Liability Period - 4th Year	1	LS
33		COMC Solar Plant Post Defect Liability Period - 5th Year	1	LS
34		COMC Solar Plant Post Defect Liability Period - 6th Year	1	LS
35		COMC Solar Plant Post Defect Liability Period - 7th Year	1	LS
36		COMC Solar Plant Post Defect Liability Period - 8th Year	1	LS
37		COMC Solar Plant Post Defect Liability Period - 9th Year	1	LS
38		COMC Solar Plant Post Defect Liability Period - 10th Year	1	LS
39		SEM Metering setup for Open access at 20 Consumption locations	20	No

Annexures of PQC

Bidder is required to submit all the below mentioned annexures and forms duly signed by the CEO/ CFO. HPCL reserves the right to verify the authenticity of the documents submitted by the bidders and may ask for submission of additional documents / clarifications and bidders need to comply with that.

HINDUSTAN PETROLEUM CORPORATION LIMITED
BU GREENING- SOLAR POWER PLANT IN MAHARASHTRA

Annexure PQC-1

Certificate from Statutory Auditor – Financial (Stage 1: Bidder Qualification Criteria)

Name of the bidder:

S No.	Financial Year/Calendar Year	Annual Turnover (Rs. Crore)
1	2020-21	
2	2021-22	
3	2022-23	

(signature)

Name Authorized SignatoryName:

Designation:

S

Instruction to bidders:

i. This format is for ascertaining the Financial capacity of the consultant

ii. The total annual turnover of the Firm.

iii. In case accounting is on calendar year basis , then the years shall be 2018,2019 and 2020

Annexure PQC-2

Details of similar works for meeting pre-qualification criteria (PTR)

(Stage 1: Bidder Qualification Criteria)

Name of the bidder:

Unit : Rs. Lakhs

S.N	Brief of Work	Start Date of Assignment	Completion Date of Assignment	Work Order Reference	Value of Work Executed Rs. Crore	Client Name	Client Turnover In Rs. Crore	Comments bybidder in meeting the technical criteria with respect to similar works
1								
2								
3								

The 'Comments by bidder in meeting the Technical criteria' shall cover how the previous work executed by bidder meets the criteria of "Similar works".

(Signature)

Name of Authorized SignatoryName:

Designation

Instruction to bidders:

i. The details in the above format shall be same as per the work order / Completion certificate issued by the client to the bidder.

ii. The Comments by bidder in meeting the Technical Criteria shall cover how the previous work executed by bidder meets the criteria of similar works.

iii. HPCL has the rights to access and interpret the scope of works in meeting the Similar Work Criteria and the decision in this regard will be final and binding.

iv. In case of turnover/credentials in foreign currencies, the same shall be converted to INR for each year at the conversion rate prevailing on the last day of the financial year/calendar year as per Reserve Bank of India.

v. The onus to establish the undertaking of similar works in the past is the responsibility of the bidder to get qualified including all supplementary documents to prove the same.

NET ELECTRICAL ENERGY GENERATION GUARANTEE YEAR WISE

Year	NEEGG	Remarks
Performance Guarantee Test (PGT) for first 1 year from the date of Commissioning		
1st Year O&M		
2nd Year O&M		
3rd Year O&M		
4th Year O&M		
5th Year O&M		
6th Year O&M		
7th Year O&M		
8th Year O&M		
9th Year O&M		
10^{th} Year O&M		

(Signature)

Name of Authorized SignatoryName:

Designation

Form 1(a)
Solar Plant Details
The following details shall be furnished by the bidder

Sr. No.	Description		Project details
1	Land Details	Location	
		Total Area in Acres	
		Latitude & Longitude	
		Distance from National Highway	
		Land on ownership basis in Acre	
2	Type of Land	Cultivable (Yes/No)	
		Terrain (Plain / Hilly)	
		Land Soil (Rocky / Sandy/ Clay)	
		Water table depth	
		Agriculture Permission required (Yes/No)	
		If yes, scope of Agriculture Permission	
		Typical time frame involved	
		SC/ST land? (Yes/No) If yes, area in acres, number of	
		Forest land? (Yes/No) If yes, area in acres, number of surveys, and time frame	
		Ownership details	
		Name of Substation	
		Voltage Rating of Substation	
		Latitude & Longitude	

		No. of Switchyard Bay at each	
4	Details of Transmission System from Solar Plant to interconnecting substation	Voltage level of Transmission	
		Length of O/H Transmission Line (KM)	
		Transmission Circuit and Conductor Configuration (eg:	

Note:-

a. The bidder has to fill aforementioned details as per the provisions of bid documents.
b. In case of change of Land or connectivity substation or transmission voltage level, the contractor has to intimate the HPCL within one month of date of issue of PO. No change shall be allowed after one month of issue of PO.
c. The cost, time of completion, generation etc. quoted by the bidder/ mentioned in PO shall remain firm and no change is allowed due to change in details filled in above format.
d. Monthly Generation and Solar insolation shall be submitted separately in the format attached with Technical data sheet. The quoted Generation shall be demonstrated during PG test for each Project independently.
e. Bidder shall submit the Single Line Diagram & write up of proposed power evacuation system up to Transmission utility point of inter-connection.
f. During detailed engineering or project execution or during O&M of project, if it is found that the quantum of adjustment made above is not adequate due to change in transmission line length, number of bays or state specific charges, then the additional financial impact as per the respective NPV shall be recovered from the next payment of the contractor

.

(Name, Seal and Signature of bidder)

FORM 1(b)

FORM OF UNDERTAKING BY BIDDER FOR LAND

(to be submitted on Rs.500 value Non Judicial stamp paper and duly notarized)

We, M/s ..... a company incorporated under the..... having its registered office at ..... (The Bidder) undertake the following on .....day of..... for the work of **"DESIGN, ENGINEERING, PROCUREMENT, CONSTRUCTION, TESTING, COMMISSIONING, AND OPERATION & MAINTENANCE OF A SOLAR PHOTOVOLTAIC (PV) POWER PLANT, INCLUDING THE PROCUREMENT OF SUITABLE LAND**" to Hindustan Petroleum Corporation Limited (HPCL), a company incorporated under the Companies Act, 1956, having its Registered Office at Petroleum House, 17, Jamshedji Tata Road, Mumbai 400 020

HPCL has invited bids for "**DESIGN, ENGINEERING, PROCUREMENT, CONSTRUCTION, TESTING, COMMISSIONING, AND OPERATION & MAINTENANCE OF A SOLAR PHOTOVOLTAIC (PV) POWER PLANT, INCLUDING THE OFFER OF SUITABLE LAND ON LEASE**" vide its Tender ID No. [xx] for Arranging land for the solar plant & for transmission line up to State grid substation, evacuation arrangements, obtaining all required statutory approvals, Design, Engineering, Manufacturing, Supply, Packing and Forwarding, Transportation, Unloading, Storage, Installation and Commissioning of grid connected Solar PV projects.

We undertake that a land admeasuring …….sq.m. situated at …….(offered land) has been procured by us from the land owners/Firms/Agencies/Aggregators having right, title and interest thereof, for the work of Engineering, Procurement and Construction (EPC) contract for Development of 7MW/9.8MWp capacity State grid connected Solar Power Project at ……. location in India. The said land is free from all encumbrances. and shall be leased to HPCL, upon being successful in the above-mentioned tender, for a period of 27 years as per the terms of the tender. We undertake to indemnify and keep indemnified HPCL, its directors, employees and agents from and against any loss, cost, damage, injury, expense etc. arising out of or in relation to any claim either by the owners of the land or third party claiming right in the said land.

Signature of the Bidder
Full name of Bidder

Stamp & Date

Annexure-I : List of Approved Make

GENERAL BUILDING MATERIALS

Sr.	MATERIALS/ ITEMS	VENDOR / MANUFACTURERS
1.	CEMENT	ULTRATECH SANGHI SIDHHI ACC JAYPEE CEMENT Ambuja OPC JK Lakshmi Cement
2.	REINFORCEMENT STEEL HYSD/TMT BARS GRADE FE 500	SAIL TISCO RINL THERMAX ELECTROTHREM
3.	ALUMINIUM SHEETS	HINDALCO INDAL JINDAL,
4.	P.V.C PIPES/ CPVC pipes	FINOLEX SUPREME TRUEBORE
5.	VITRIFIED CERAMIC TILES	NITCO RAK BRAND OR AS SPECIFIED IN ITEM
6.	GLASS	FLOAT GLASS : SAINT GOBIN

		MODI GLASS
7.	ROLLING SHUTTERS	SURAJ ROLLING SHUTTERS BARODA OR APPROVED MAKE BY OWNER ,
8.	BRICKS	APPROVED MAKE BY OWNER
9.	FLUSH DOORS	GODREJ, FALCON PLYWOOD AND INDUS-GODHRA GREEN PLY KIT PLY
10.	STAINLESS STEEL	SS – 304 GRADE FROM SALEM STEEL PLANT
11.	WATER PROOFING	APP SHEET OF TIKIDAN, FOSROC or PIDILITE
12.	PAINTS	ONLY BRAND NAMES GIVEN : BERGER ASIAN ICI
13.	SEALANTS	FOSROC SICA
14.	R.C MANHOLE COVER	PRECONS PRECAST CONCRETE PRODUCT CO. OR EQUIVALENT
15.	HARDENERS	FOSROC SICA
16.	PLYWOOD PRODUCTS	IPM, NOVOPAN PARTICLE BOARDS BHUTAN BOARDS NUWOOD PARTICLE BOARDS
17.	ALUMINIUM DOORS, WINDOWS, PARTITIONS	GODREJ

		INDAL JINDAL
18.	WATER PROOFING COMPOUNDS/ADMIXTURES/ EPOXY FLOORING	MATERIAL OF CONSTRUCTION FOSROC SICA PIDILITE
19.	PAINTS AND ACRYLIC DISTEMPERS, WEATHER PROOF PAINTS AND EXTERIOR EMULSION PAINTS	ASIAN PAINTS ICI BERGER.
20.	DOOR CLOSERS	EVERITE MAKE
21.	METAL CLADDING SYSTEM, SANDWICH PANEL	TATA BLUE SCOPE, LLOYD INSULATIONS (INDIA) LIMITED, KING SPAN TURKEY SINTEX
22.	PUTTY	BIRLA ASIAN BERGER,
23.	PLASTICISER/ADMIXURE	FOSROC SIKA,
24.	ACID /ALKALI RESISTING PAINT	ASIAN BERGER
25.	NON SHRINK GROUT MATERIAL	FOSROC
26.	GYPSUM FALSE CEILING (gyp board)	ARMSTRONG

SANITARY AND WATER SUPPLY WORK

SR.	MATERIALS/ ITEMS	VENDOR / MANUFACTURERS

1.	RCC PIPES	APPROVED MANUFACTURER CONFORMING B.I.S. STANDARD
2.	G.I. PIPE	TATA MEDIUM CLASS.
3.	G.I. FITTINGS	"R" BRAND
4.	CPVC Pipes	FINOLEX,SUPREME AND ANY OTHER APPROVED BRAND
5.	SLUICE VALVES, CHECK VALVES ETC.	LEADER ENGINEERING WORKS, JALANDHAR; KIRLOSKAR BROS. LIMITED, PUNE;
6.	BRASS FITTINGS	LEADER ENGINEERING JALANDHAR; L & K MATHURA,
7.	C.P., FITTINGS	L & K make
8.	W.C. PAN WASH BASIN, URINALS SINK LOW DOWN FLUSHING CISTERN	EID, PARRYWARE, HINDUSTAN SANITARYWARE, CALCUTTA; KOHLER
9.	STAINLESS STEEL SINK WITH DRAIN BOARD	NIRALI
10.	MIRRORS	PHILCO, ATUL GLASS WORKS, VALLABH GLASS WORKS, GOLDENFISH
11.	WHITE GLAZED & COLOUR GLAZED CERAMIC TILES.	H&R JOHNSON TILES, SPARTEK, NITCO
12.	GLAZING GLASS.	MODI FLOAT SAINT GOBAIN.

STRUCTURAL STEEL

SR.	MATERIALS/ ITEMS	VENDOR / MANUFACTURERS
1.	WELDING ELECTRODES	**ADOR,D&H ,ESSAB**
2.	STRUCTURAL STEEL RAW MATERIALS	**TISCO, SAIL, JINDAL, RINL**
3.	ANCHOR BARS	**BRIGHT BARS**
4.	**SHEETING AND** **SANDWITCH PANELS FOR PRE_ENGINEERING WORK**	**TATA BLUE SCOPE, SINTEX** **JINDAL, KIRBY**

VENDOR LIST

The list of acceptable makes for equipment / system are as listed below:

Sr.	Description	Vendor Name
1	PCU / Inverter	M/s Sungrow
		M/s Fimer
		M/s Hitachi Hi-Rel Power Electronics Pvt Ltd.
		M/s TMEIC
		Bidder to propose other reputed make based on reference and credentials for approval of HPCL
2	PV Modules	As per ALMM approved List
3	HT Panel /HT Breaker	Siemens
		L & T
		ABB
		Schneider

		Jyoti
		CGL
4	Control and relay panel	ABB
		Siemens
		Schneider
		Alstom
5	LT Switchgear component (LT switchgear panel shall be CPRI approved vendor)	L & T
		Siemens
		ABB
		Schneider
6	Power Transformer	Voltamp
		Schneider
		CGL
		ABB
		BHEL
		ALSTOM
7	Inverter Duty Transformer	Schneider
		Electrotherm
		Voltamp
		ABB
		CGL
		T & R
8	Auxiliary Transformer (Dry Type)	Voltamp
		Kotson
		Danish
		Melcon
9	Solar Cable and DC Cable	M/s LAPP
		M/s Siechem

		M/s KEI Cables
		M/s UniFlex Cables
		M/s Cords Cables
		M/s Apar
		M/s Universal
		M/s KEC
10	AC Cable (Up to 33 kV)	M/s LAPP
		M/s KEI Cables
		M/s Havells
		M/s Universal
		M/s KEC
10	HT termination kits	Raychem
		3M
11	Optical Fiber Cable	Finolex
		D-Link
12	Earthing Pit Materials	Ashlok
		Powertrac
		ERICO
13	SJB	M/s Hensel Electric Pvt Ltd
		M/s Trinity Solar
		M/s Eaton
		M/s ABB
14	Lugs	Dowell
		Comet
		3D
15	Cable Glands	Comet / 3D
16	SCADA System	M/s Rockwell

		M/s Siemens
		M/s Schneider
17	Weather Sensors	a. Pyranometer : i) Keep & Zonen ii) Ingenieurbüro Mencke & Tegtmeyer GmbH b. Wind Sensor: ADOLF THIES Gmbh& Co c. Temperature Measurement: i) Met One Inc ii) Climatronics d. Wind Speed & direction : i) Met One Inc e. Tripod Stand : i) Met One Inc ii) Climatronics For other reputed make – HPCL in charge engineer's approval is required.
18	Batteries	Exide
19	UPS	Hitachi HI-REL
		Eaton
		Emerson
20	Battery Charger	M/s Chhabi Electrical
		M/s. Caldyne
		M/s. HBL Niap power system Ltd
		M/s Servilink
21	Lightning Arrestor (ESE type)	Erico
		Nimbus
		AT, Spain
		Ingesco
		Indelec
22	ABT Energy Meter (subject to approval of DISCOM / Local authority)	SEMS
		EDMI
23	HT Isolator (Upto 33 kV Outdoor Type)	Siemens
		ABB
		CGL
		GR Power switchgear

24	HT CT & PT (Upto 33 kV Oil Filled Type)	ABB
		CGL
		Pragati
		Jyoti
25	LA (Upto 33 kV Outdoor Type)	CGL
		Oblum
		Elpro
26	33kV Cable (subject to approval of DISCOM / Local authority)	M/s Universal (Satna, MP)
		M/s Torrent (Ahmedabad, Gujarat)
		M/s KEI (New Delhi)
		M/s Polycab (Daman, Gujarat)
27	Disc and post insulator	BHEL
		Birla
28	GI structure for the switchyard	Sujana Towers
		Kalpatru Power transmission
		OR Any other Approved vendors of DISCOM OR LOCAL AUTHORITY
29	Insulator hardware	3M
		ITIPL
		Approved vendors of DISCOM OR LOCAL AUTHORITY
30	Clamps and connectors	Klemenn engineering corporation
		Approved vendors of DISCOM OR LOCAL AUTHORITY
31	Numerical Relay	Siemens
		Areva
32	Switch fuse unit	Siemens
		L & T
33	PLCC equipments	ABB

34	Lighting fixture / system	Philips / CGL/Bajaj/Havells
35	CSS (Compact Sub-station)	ABB
		CGL
		Siemens
		Alstom
		Schneider
36	LED Lighting	CGL
		Wipro
		Bajaj
		Panasonic
		Philips
37	MCCB	SIEMENS
		ABB
		Schneider
		L & T
38	RMU (Ring Main Unit)	ABB
		Schneider
		Siemens
		CGL
		L & T
39	Steel Structure for MMS	TISCO
		SAIL
		JINDAL
		RINL
		ESSAR
40	Submersible/Sump Pump	Kirlosker
		KSB

		CGL
		CRI
		Jyoti
41	CCTV Camera & Monitoring System	Sony /Honeywell/Milestone

NOTES:

(1) The final make selected out of the recommended makes listed above shall be subject to the HPCL's approval during detailed Engineering.

(2) Wherever the make is not specified for any other items, the contractor shall submit credential for vendors for relevant items / equipments, out of which HPCL shall decide acceptance of vendor based on review of credentials. This shall have no price implication. HPCL reserves the right to reject the proposed vendor without assigning any reason.

(3) Bidder may suggest /request for approval of Additional vendor with credentials and details for review and approval of HPCL. HPCL may consider the request in case proposed additional vendor is reputed and meeting the tender specification requirements. HPCL reserves the right to reject the proposed vendor without assigning any reason.

(4) For SCADA system common make of PLC / SCADA system to be select entire plant of the project.

Annexure-II

PROCEDURE FOR PERFORMANCE TESTING

Operational Acceptance Test Procedure

Performance Ratio (PR) - Test Procedure

1. A weather station with a calibrated pyranometer shall be installed by the Contractor at the location mutually agreed by the Contractor and HPCL. The test report for the calibration shall be submitted by the Contractor for approval by HPCL. The calibration should be traceable to a national/international laboratory. The output of this pyranometer for shall be logged in the SCADA system.

2. In case the pyranometer is found to be working erratically then immediately the Contractor shall take necessary steps to rectify and/or recalibrate the instrument to the satisfaction of HPCL. However, for the dispute period for which such error has occurred and until the instrument is recalibrated to the satisfaction of HPCL, data from any one of the following list of sources as decided by HPCL will be used:

   i. A separate pyranometer installed by the Company near the site, if available
   ii. Average of two closest solar power projects, as identified by HPCL
   iii. Nearest NICE/MNRE weather station

3. Performance Ratio as determined through the PR Test Procedure specified here should not be less than 75% for Operational Acceptance Test.

4. The Performance Ratio Test to prove the guaranteed performance parameters of the power plant shall be conducted at site by the Contractor in presence of the Company. The Contractor's Engineer shall make the plant ready to conduct such tests. The Operational Acceptance Test shall be commenced, within a period of one (1) month after successful Commissioning and, there will be continuous monitoring of the performance for 30 days. Any extension of time beyond the above one (1) month shall be mutually agreed upon. These tests shall be binding on both the parties to the Contract to determine compliance of the equipment with the guaranteed performance parameters. This monitoring will be performed on the site under the supervision of the Company/ Company's engineer.

5. The test will consist of guaranteeing the correct operation of the plant over 30 days, by the way of the efficiency rate (performance ratio) based on the reading of the energy produced and delivered to the grid and the average incident solar radiation. During this period of 30 days, any 5 (five) instances of 15 (fifteen) minutes shall be taken to calculate the instantaneous Performance Ratio of 15 minutes block as per the formula given below in Point No. 5. If the PR of these fives instances is above 75%, then Operational Acceptance Test (OAT) shall be considered successful.

   - PR shall be demonstrated against the installed DC Capacity.

- The Efficiency or performance ratio (PR) of the PV Plant is calculated as follows (according to IEC 61724)

- On completion of successful test, O&M period shall be commenced from the date of start of the test.

- In event of non-satisfactory OAT results, the contractor shall be allowed for modifications to achieve to specified results

Performance Ratio (PR) = **YA / YR**
YA = Eac / PNom
YR = IR Site/ IR STC

Where;
YA = Final PV system yield (representing the number of hours that the system would need to operate at its rated output power PNom to contribute the same energy to the grid as was monitored.

YR = Reference yield (representing the number of hours during which the solar radiation would need to be at STC irradiance levels in order to contribute the same incident energy as was monitored).

Eac = AC energy injected into the grid during a clearly specified amount of time (kWh).

PNom = Installed nominal peak power of modules (Nameplate rating at STC) (kWp);

IRSite = Irradiation on the module plane of array during a clearly specified amount of time (measured with a pyranometer installed on the plane of array, POA) (kWh/sq. m).

IRSTC = Irradiance at STC (kW/ sq. m); 1000W/m2

Monitoring System for PR Verification

The following instrumentation will be used to determine the Solar Plant Performance:

- Power Meter at the delivery point.
- Power Meter for each inverter for reference only.
- One nos. calibrated pyranometer to determine irradiance on the plane of array (with a target measurement uncertainty of ± 2).
- One nos. calibrated pyranometer to determine irradiance on horizontal plane (with a target measurement uncertainty of ± 2)
- Two nos. thermocouples to measure module temperature with a measurement uncertainty of ±1 °C.
- Shielded ventilated thermocouple with a measurement accuracy of ±1°C.
- An anemometer mounted on a 10m mast to measure wind speed (without additional shadowing on modules).

- Data measurement shall be witnessed in the format mutually agreed before the start of PR test by the employer and the contractor jointly for the said period.
- The Contractor shall show the specified PR for Operational Acceptance.

The procedure for Performance Guarantee Test (PGT) - cum- Final Acceptance Test- shall be as follows:

6. "Actual Delivered Energy" from the plant supplied by the Contractor shall be noted for every month and summed up for entire year. For this purpose, the net delivered energy at the metering point shall be taken into account.

7. The measured value of energy at step (6) shall be compared with '*Base NEEGG'* and hence with 'B*ase CUF'* value. *"Base NEEGG/ CUF"* for a month is calculated by using the NEEGG quoted in the offer by the Contractor adjusted with a correction factor to take into account the actual average global solar radiation measured by the calibrated pyranometer for that year.

8. Further, if the plant is not able to achieve the calculated Base NEEGG/CUF during PGT and O&M period and there is a shortfall in energy generation, then the Contractor shall be penalized as per relevant Clause of the Tender.

9. The Contractor shall share with HPCL all the radiation, generation, etc. parameters details and all other factors necessary for HPCL to corroborate the estimate. HPCL has the right to cross verify data submitted by the Contractor by all possible means/sources.

Following factors may be noted for computing the Base NEEGG/ CUF and PR Test:

- Effect due to variation in annual insolation shall only be considered for computing the Base NEEGG/ CUF.
- Effect due to variation of meteorological parameters e.g. ambient temperature, wind speed, humidity etc. shall not be considered.
- Generation loss due to grid outage (or power evacuation system which is not in the scope of the Contractor): The measured global solar radiation of the period of the outage of the power evacuation system shall be excluded to calculate average global solar radiation for the period of PGT and O&M.

Solar Radiation:

Ideally, actual measurement of solar radiation at the site is desirable for estimating the projected power output since solar energy is the raw material for power generation. It may be noted that the annual average solar radiation measurement even for 1-2 years is not sufficient. World over, an average radiation value for at least 8-10 years is used for solar power project designing since climatic variations are quite wide year-to-year. Under such a situation, the prevailing practice world over is to develop software which uses

satellite measured solar radiation and matches it with the actual ground measured data for the particular site where actual data has been obtained for many years. The derived values for respective location are tabulated below:

Month	
January	
February	
March	
April	
May	
June	
July	
August	
September	
October	
November	
December	
Annual	

The above radiation data shall be used by the Bidder to calculate NEEGG. This radiation data is for evaluation purpose. However, for every year actual radiation shall be considered to calculate the revised NEEGG by the Bidder.

Illustration:

If the GHI of a year is more or less then the reference GHI then NEEGG will be calculated as follows:

NEEGG = (Actual GHI x NEEGG guaranteed by contractor on reference GHI)/ (Reference

GHI)

Example:

NEEGG guaranteed by Contractor = 93,78,000 KWh

Reference GHI= 1789 KWh/m2 per annum

For Example: Annual Variability @ 2 % GHI to be consider for general calculation purpose only

Case A) for higher irradiation:

If Actual GHI = 1824 kWh/m2 per annum then NEEGG will be:

NEEGG = (1824 x 93,78,000)/ 1789

NEEGG = 97,18,732 KWh/ Annum

Case B) for lower irradiation:

If Actual GHI = 1754kWh/m2 per annum then NEEGG will be:

NEEGG = (1754 x 93,78,000)/ 1789

NEEGG = 91,94,528 KWh/ Annum

ANNEXURE – III

MANDATORY SPARES

Sr.	Description	Quantity
	PV Module	
1	SPV Module	0.5% of total supply
2	MC-4 connector (Including Y - connector if used)	0.5% of total supply
	String Combiner Box	
1	String Combiner Box with its accessories such SPD,Fues and other components	0.5% of total supply
	PCU	
1	Complete IGBT stacks assembly with drivers for 1 inverter	1 Set
2	Surge protection devices for 1 inverter	4 Sets
3	Fuse (each type & rating) for 1 inverter	4 Sets
4	Fuse Holder (each type & rating) for 1 inverter	4 Sets
5	Power supply SMPS set for 1 inverter	1 Set
6	Control card – each type and rating for 1 inverter	2 Sets
7	Tripping and Closing coil of ACB of AC side, for 1 inverter	3 Sets
8	Cooling Fan (each Type and rating) for 1 inverter	2 Sets
9	Power Conditioning Unit	1 Sets
	INVERTER TRANSFORMER & POWER TRANSFORMER	
1	Buchholz relay	1 Set
2	OTI & WTI complete	1 Set.
3	MOG	1 Set.
4	Valve (each type)	1 No.

5	Silica gel breather	1 Set.
6	Bushing & Support insulator (each type)	1 No.
7	Pressure relief device	1 Set.
	Structure	
1	Complete Structure assembly for One Array / String	1 Set
	AC / DC Distribution Boards	
1	Indicating Lamps of each type used	04 Nos.
2	Contactor of each type used	02 Nos.
3	Relay of each type used	01 No.
4	Indicating instruments of each type used	01 No.
5	Circuit Breaker of each type used	01 No.
	Battery Charger	
1	Indicating instruments of each type used	02 Nos.
2	Shunt Resistor of each type used	02 Nos.
3	Complete Thyristor Bridge/Module of each type used	04 Nos.
4	Printed Circuit Cards of each type used	02 Nos.
5	Semi Conducting Type Fast Fuse of each type	06 Nos.
6	Auxiliary Fuse of each type used	05 Nos.
7	Auto Transformer of each type used	01 No.
8	Control transformer of each type and rating	01 No.
	DC Inverter /UPS	
1	Circuit Breaker of each type used	02 Nos.
2	Complete Thyristor Bridge/Module	02 Nos.

3	Printed Circuit Cards – Inverter Control Card and Data Logger Card	02 Nos.
4	Cooling Fan	02 Nos.
	HT Panel	
1	Protection relays of each type used	01 No.
2	Test plugs	01 No.
3	Auxiliary relays of each type used	05 Nos.
4	Circuit breaker trip and closing coils each type	02 Nos.
5	Breaker Position Switch each type and rating	02 Nos
	LT Panel / switchgear	
1	MCCB	01 No.
2	Current transformer each used type	01 No.
3	Coils for tripping and closing	02 Nos
4	Breaker Position Switch each type and rating	02 Nos
	33 kV Switchyard	
1	Surge arrester for 33 KV	2 Nos.
2	Disc Insulators string 33 kV (Each type)	2 Sets
3	Conductor of each type used each type	50 mtr
4	Stringing hardware	01 Set
5	Terminal Connectors on high voltage conductors and equipments each type	01 Set
6	Complete drive mechanism including motor for disconnector switches	01 No.
7	Trip coils for circuit breakers	01 No.
8	Closing coils for circuit breakers	01 No.
9	Complete set of rupture disc	1 Sets

10	33kV Current transformer of each rating	02 Nos.
11	33kV Voltage transformer of each rating	1 Nos.
12	33kV Post insulator	01 Set
13	33kV Isolator contacts set (Male+Female)	01 Set
14	Maintenance earthing rod for 33kV	01 Set
15	Breaker operating mechanism	01 Set
16	SF6 bottle (To fill SF6 in one complete Circuit breaker)	01 No.
17	Contactors and relays of each type and rating used in circuit breaker and isolator control cubicle / Mechanism box	01 set.
18	Limit switch for the isolator	01 Set
19	33kV Earth switch contact assy.	01 Set (For three pole)
	SCADA System	
1	Each type of electronic modules including CPU	1 No. each type
2	Any type of converter like RS 485 to Ethernet, Serial link converter, MODBUS converter etc	1 No. each type
3	Network Switch	1 No each type
4	Any other recommended spares by OEM List shall be submitted	
	Cable	
1	DC Cable	1% of total supply
2	AC Cable	1% of total supply
3	Coils for tripping and closing	1% of total supply
4	Communication Cable	1% of total supply
3	Control Cable	1% of total supply
	Fuse	
1	Fuse	10% of total supply

	33 kV line / pole accessories	
1	Line supports, MS Angle, Back Clamp, Top Clamp, Earthing Coil, Insulators	2 Sets
2	Conductor	1 KM
3	Jointing Sleeves, Stay set complete with turn buckles, stay wire, stay insulators, Anti-climbing Devices, Danger Boards	2 Sets

Spares, if used, during the O&M period shall be replenished by the Contractor. All the mandatory spares shall be handed over to the Employer in working condition at the end of O&M period.

Notes:

(1) The suggested spares are the minimum requirement of HPCL. The EPC Contractor shall ensure sufficient spares beyond the suggested spares list to maintain its contractual obligations.

(2) Bidder shall furnish recommended spare list as a part of design/drawing approval stage.

(3) Wherever % indicated in Mandatory spares list, Total installed quantity of each type shall be considered for calculation of % of spare of each type.

(4) For rounding of upper side number shall be considered for quantity of item.

- **TENDER INSTRUCTIONS:**

1. METHOD OF EVALUATION AND ORDER DISTRIBUTION:

- The bids submitted will be evaluated through Evaluated Bid Value (EBV). The detailed process for EBV based on the rates quoted by bidders & NEEGG is given in tender document.

- Vendor to quote door delivered price against each line items of the tender.

- Order will be placed on door delivered cost basis at HPCL Project site.

- Purchase Order for 100% of the tender quantity will be awarded to the lowest bidder. Purchase Preference shall be applicable as per Government Guidelines. Job under this tender is indivisible.

- Pls. note that only Class I and Class II local suppliers will be eligible to submit bids for this tender. However, preference as per MII Policy will be given only to Class-I local supplier. Class-II local supplier will not get any purchase preference.

- Undertaking as per Attachment 1 has to be mandatorily submitted by all the participating bidders.

- The undertaking as per Attachment 1 submitted by the bidder shall be supported by a certificate from statutory auditor or cost auditor of the company (in case of companies) or from a practicing cost accountant or practicing chartered accountant (in respect of other than companies) for tender value > or = Rs. 10 Crores. Bids may not be evaluated further in absence of this document.

- Traders and Agents shall not be allowed to avail the benefits extended under Purchase Preference Policy.

2. Please note the details of the currently serving IEMs as under:

Shri Ashwani Kumar : ashwani.ashwani282@gmail.com
Shri Rajesh Ranjan : rajeshranjan2@gmail.com

Address:
C/o The Company Secretary, HPCL, 6thFloor, Petroleum House, 17, Jamshedji Tata Road,
Churchgate, Mumbai 400020

The Integrity Pact is for compliance with relevant laws of the land, regulations, economic use of resources and of fairness /transparency in its relation between buyer and Bidder. The IEMs monitor the tender process and the execution of the contract for compliance with Integrity Pact.

Therefore only grievances related to the Tender process as detailed in the Integrity Pact may be addressed to the IEMs.

The details of Independent External Monitors (IEMs) are available on HPCL website (www.hindustanpetroleum.com) at Home -> Procurement (Under Quick Links) -> Integrity Pact.

This Tender and the Purchase orders / Contracts finalized against this tender shall be governed by Guidelines for Holiday Listing as displayed in the link "Guidelines for Holiday Listing (Banning of business dealing)" in HPCL Website: www.hindustanpetroleum.com. Guidelines on Holiday Listing/Banning of Business dealings are available on HPCL website (www.hindustanpetroleum.com) at Home -> Procurement (Under Quick Links) -> Guidelines on Holiday listing.

3. Usage of TReDS Platform by MSME Vendors

The Government has introduced Trade Receivable e-Discounting System (TReDS) which is a platform approved by the Reserve Bank of India specially for Micro, Small and Medium Enterprises (MSMEs) to ease and facilitate constraints faced by them in obtaining adequate working capital finance, particularly in terms of their ability to convert their trade receivables into liquid funds.

To facilitate the same, HPCL has been registered as Buyer with all three RBI recognized TReDS platform provider as below:

- Invoice Mart (A.TREDS Ltd)
- M1 Exchange (Mynd Solutions)
- RXIL (Receivables Exchange of India Ltd)
-

All MSME vendors with UDYAM REGISTRATION CERTIFICATE are encouraged to get themselves registered with any one or all of the aforesaid TReDS platforms to avail benefit of TReDS bill discounting facility. HPCL has also enabled TReDS discounting option in its Bill Tracking System (BTS) for ease of process during payments post PO placement.

4. EMD (Earnest Money Deposit): Rs 1,40,000 (Rupees One Crore Forty Lakhs only)

EMD is to be submitted in form of Bank Guarantee.

1(a). As per GeM Terms and conditions, Scanned copy of the EMD shall be uploaded by Seller in the online bid and hard copy of the same will have to be submitted directly to the Buyer within 5 days of bid opening.

1(b). Original EMD instrument (Bank guarantee) should be deposited in a sealed envelope in the tender box provided at the following address. Bidders are requested to super scribe the envelope with i) Tender No. ii) Item Description iii) Due date and time iv) Name of the Tenderer on the EMD envelope. The EMD exemption document can be uploaded in the appropriate place where the EMD details are sought in the GEM tender.

Ms Pallavi Jhingran
DGM - CATEGORY MANAGEMENT
EMD BOX NO. 3,
HINDUSTAN PETROLEUM CORPORATION LIMITED
CENTRAL PROCUREMENT-MARKETING
9TH FLOOR, A WING – MARATHON FUTUREX BUILDING,
LOWER PAREL NM JOSHI MARG, MUMBAI - 400 013 PHONE
022-23030076

1(c). EMD submitted in the form of Bank Guarantee shall be issued by any Scheduled bank (other than Cooperative banks). EMD submitted in the form of Bank Guarantee should be as per the exact format given along with this tender and shall be made on non-judicial stamp paper of appropriate value (denomination). BG should be issued through SFMS enabled Bank and a SFMS BG confirmation message is also to be issued through SFMS Enabled issuing Bank in prescribed message type.

1(d). Bidders who wishes to submit bank guarantee (BG) towards EMD/Security Deposit (SD)/Composite Performance Bank Guarantee (CPBG)/Advances/ towards any other requirement of the tender, is required to ensure that

(i) The issuing bank is on SFMS platform

(ii) SFMS Message type used is 760 COV and SMFS Delivery report/Message Copy is sent along with original BG

(iii) SFMS Message from issuing Bank is sent to following:

- Beneficiary's bank Name: ICICI Bank
- ISFC Code: ICIC0000393

(iv) Field no 7037 of SFMS Message is updated with HPCL CPO UIC as HPCL508902133CP

(v) BG advising message - 760COV via SFMS

Field No.	Particulars
7037	Sender to Receiver Information (HPCL508902133CP)
7039	Free Field (HPCL508902133CP)
7025	Amount of Guarantee
7029	End date for Lodgment of Claim
7033	Name of Applicant and his details
7034	Name of Beneficiary and his details
7035	Beneficiary IFSC (ICIC0000393)
7036	Beneficiary Branch name and address (ICICI Bank Limited, Mumbai)

All Bidders should submit Bank Guarantees drawn from SFMS enabled Scheduled Banks (other than Cooperative bank) in India.

EXEMPTION FROM EMD:

The bidder seeking EMD exemption, must submit the valid supporting document for the relevant category as per GeM GTC with the bid. Under MSE category, only manufacturers for goods and Service Providers for Services are eligible for exemption from EMD. Traders are excluded from the purview of this Policy.

EMD submitted by the bidder shall be forfeited, if the bidder:

1. Withdraws or modify or impairs or derogates from the bid in any respect within the period of validity of its bid; or
2. If it comes to notice that the information / documents furnished in its bid is false, misleading or forged; or
3. Fails to furnish requisite performance security / PBG within stipulated time required as per e-bid / RA conditions.

Earnest money of unsuccessful bidders shall be returned within 15 days after the award of contract or expiry of bid validity whichever is earlier. Earnest money of successful bidder shall be returned within 15 days after receipt of Performance Security / e-PBG.

5. FIRM RATES:

The rates shall remain unchanged till the expiry of Contract and no Revision of Rates shall be entertained from parties for any reason. No Escalation / De-escalation of rates are applicable.

6. VALIDITY OF OFFER:

The offer shall be valid for a period of 120 days from the due date/ extended due date of opening of the un-priced bid. Corporation reserves the right to take action as deemed fit, including putting the bidder under suspension / holiday, in case of withdrawal of Offer at any stage, non-acceptance of LOA/LOI/PO or any other breach of Tender terms and conditions.

7. BIDDER FROM A COUNTRY THAT SHARES LAND BORDER WITH INDIA

Orders issued by the Government of India restricting procurement from bidders of certain countries which shares a land border with India [Rule 144(xi) of the General Financial Rules (GFR) 2017] shall apply to this tender.

I. Any bidder from a country which shares a land border with India will be eligible to bid in any procurement whether of goods, services (including consultancy services and non-consultancy services) or works (including turnkey projects) only if the bidder is registered with the Competent Authority. *Further, any bidder (including bidder from India) having specified Transfer of Technology (ToT) arrangement with an entity from* a *country which shares* a *land border with India, shall also require to be registered with the same competent authority.*

II. "Bidder" (including the term 'tenderer', 'consultant' or 'service provider' in certain contexts) means any person or firm or company, including any member of a consortium or joint venture (that is an association of several persons, or firms or companies), every artificial juridical person not falling in any of the descriptions of bidders stated hereinbefore, including any agency branch or office controlled by such person, participating in a procurement process.

III. "Bidder (or entity) from a country which shares a land border with India" for the purpose of this Order means:-

a) An entity incorporated, established or registered in such a country; or
b) A subsidiary of an entity incorporated, established or registered in such a country; or
c) An entity substantially controlled through entities incorporated, established or registered in such a country; or
d) An entity whose beneficial owner is situated in such a country; or
e) An Indian (or other) agent of such an entity; or
f) A natural person who is a citizen of such a country; or
g) A consortium or joint venture where any member of the consortium

or joint venture falls under any of the above

IV. The beneficial owner for the purpose of (iii) above will be as under:

1. In case of a company or Limited Liability Partnership, the beneficial owner is the natural person(s), who, whether acting alone or together, or through one or more juridical person, has a controlling ownership interest or who exercises control through other means.
   Explanation-
   a. "Controlling ownership interest" means ownership of or entitlement to more than twenty-five per cent. of shares or capital or profits of the company;
   b. "Control" shall include the right to appoint majority of the directors or to control the management or policy decisions including by virtue of their shareholding or management rights or shareholders agreements or voting agreements;
2. In case of a partnership firm, the beneficial owner is the natural person(s) who, whether acting alone or together, or through one or more juridical person, has ownership of entitlement to more than fifteen percent of capital or profits of the partnership;
3. In case of an unincorporated association or body of individuals, the beneficial owner is the natural person(s), who, whether acting alone or together, or through one or more juridical person, has ownership of or entitlement to more than fifteen percent of the property or capital or profits of such association or body of individuals;
4. Where no natural person is identified under (1) or (2) or (3) above, the beneficial owner is the relevant natural person who holds the position of senior managing official;
5. In case of a trust, the identification of beneficial owner(s) shall include identification of the author of the trust, the trustee, the beneficiaries with fifteen percent or more interest in the trust and any other natural person exercising ultimate effective control over the trust through a chain of control or ownership.

V. An Agent is a person employed to do any act for another, or to represent another in dealings with third person.

VI. [To be inserted in tenders for Works contracts, including Turnkey contracts] The successful bidder shall not be allowed to sub-contract works to any contractor from a country which shares a land border with India unless such contractor is registered with the Competent Authority.

VII. The registration shall be valid at the time of submission of bid and at the time of acceptance of bid.

VIII. If the bidder was validly registered at the time of acceptance/ placement of

order, registration shall not be a relevant consideration during contract execution.

8. PLANNING AND DESIGNING IN PURVIEW OF VULNERABILITY ATLAS OF INDIA

Vulnerability Atlas of India (VAI) is a comprehensive document which provides existing hazard scenario for the entire country and presents the digitized State/UT - wise hazard, maps with respect to earthquakes, winds and floods for district-wise identification of vulnerable areas. It also includes additional digitized maps for thunderstorms, cyclones and landslides. The main purpose of this Atlas is its use for disaster preparedness and mitigation at policy planning and project formulation stage.

This Atlas is one of its kind single point source for the various stakeholders including policy makers, administrators, municipal commissioners, urban managers, engineers, architects, planners, public etc. to ascertain proneness of any city/location/site to multi-hazard which includes earthquakes, winds, floods thunderstorms, cyclones and landslides. While project formulation, approvals and implementation of various urban housing, buildings and infrastructures schemes, this Atlas provides necessary information for risk analysis and hazard assessment.
The Vulnerability Atlas of India has been prepared by Building Materials and Technology Promotion Council under Ministry of Housing and Urban Affairs, Government of India and available at their website **www.bmtpc.org.**
It is mandatory for the bidders to refer Vulnerability Atlas of India for multi-hazard risk assessment and include the relevant hazard proneness specific to project location while planning and designing the project in terms of:

i. Seismic zone (II to V) for earthquakes
ii. Wind velocity (Basic Wind Velocity: 55, 50, 47, 44, 39 & 33 m/s)
iii. Area liable to floods and Probable max. surge height
iv. Thunderstorms history
v. Number of cyclonic storms / severe cyclonic storms and max sustained wind specific to coastal region
vi. Landslides incidences with Annual rainfall normal
vii. District wise Probable Max. Precipitation

9. REVERSE AUCTION

Reverse Auction will not be conducted for this tender. Price bids of techno-commercially qualified vendors of this tender will be opened in normal mode and L1 bidder will be identified as per tender terms and conditions. Hence, vendors are requested to quote their most competitive price in the online price bid.

Verification of Original Documents:

All the participating bidders shall provide copies of all the necessary documents along with the bid. However, all the bidders or their authorized representatives are required to be present at HPCL Office on the informed dates along with the original documents submitted for Bid Qualification-Financial /Technical and other techno-commercial documents for the

verification/clarification by HPCL. Offers of Vendors who fail to submit the Original documents on demand shall be liable for rejection.

Grievance Redressal Mechanism: Details of this grievance redressal mechanism is available on the Corporation's Website- www.hindustanpetroleum.com.

10. The bidder should give a declaration, in the provided format indicating that they are not on holiday list/banned/blacklisted as on due date of this tender. Offers received from Vendors who are blacklisted or Holiday listed by any Government or Quasi Government Agencies or PSU as of due date of this tender may not be considered. The decision to consider / not to consider the offers of vendors who are blacklisted or Holiday listed by Government or Quasi Government Agencies or PSU will be at the sole discretion of HPCL. Bidders who submit declarations notifying their blacklisted/ holiday listed status are also required to submit the copy of the holiday listing letter that they have received from Government or Quasi Government Agencies or PSU.
11. Digital Signature – Authorized Signatory:
    a. All the tender documents and Annexures, Techno-commercial details and Price Bids shall be required to be digitally signed with a class IIB or above digital signature by the authorized signatory. The authorized signatory shall be:

i. Proprietor in case of proprietary concern.
ii. Authorized partner in case of partnership firm.
iii. Director, in case of a limited Company, duly authorized by its board of directors to sign.

    b. If for any reason, the proprietor or the authorized partner or director as the case may be, are unable to digitally sign the document, the said document should be digitally signed by the constituted attorney having full authority to sign the tender document and a scanned copy of such authority letter as also the power of attorney (duly signed in the presence of a Notary public) should be uploaded with the tender.
    c. Online submission of the tender under the digital signature of the authorized signatory through e procurement portal shall be considered as token of having read, understood and totally accepted all the terms and conditions.

12. Acceptance of Offer by the Corporation:
    a. Incomplete or conditional submissions, and those with deviations/ subjective or counter conditions/ quantity restrictions or those not accompanied by the requisite documents shall be liable to be rejected and no further correspondence/ enquiries on this issue by the tenderer shall be entertained.
    b. Any Terms and Conditions attached to the Tenderer's offer will not be binding on HPCL.

c. The Corporation is not bound to accept the lowest offer and reserves the right to reject any and / or every tender and / or place order on one or more tenderers in the manner considered appropriate by the Corporation. Corporation also reserves the right to reject any Un-workable offer.

13. All the terms and conditions of this tender are required to be accepted by bidders and no counter conditions will be entertained.
14. Any bid that does not meet the requirement in the Techno-commercial bid is liable for rejection without further notice.
15. HPCL reserves the right to accept/ reject any or all of the bids at their sole discretion.
16. HPCL is not responsible for any delay in submission of bids by the vendor.
17. Corrigenda/Addenda:
    a. At any time prior to the bid due date, HPCL may, for any reason, whether at its own initiative or in response to a clarification requested by a prospective Bidder, modify this tender Document.
    b. The modifications, amendments, clarifications, corrigenda, addenda, time extensions, etc. to this tender will be hosted only on GeM Portal. Bidders should regularly visit this website to keep themselves updated.
    c. All corrigenda published are deemed to have been accepted as part of tender terms and conditions irrespective of the date a bid is submitted on GeM.
    d. Bidder shall be responsible to ensure that the bid submitted has taken into consideration all the corrigenda published as above.
18. Extension of Due date: HPCL reserves the right to extend the tender due date in order to afford prospective Bidders reasonable time in which to take the amendments / corrigenda into account while preparing their bids.
19. HPCL reserves the right to make any changes in the terms and conditions.
20. HPCL reserves the right to reject incomplete bids.
21. The vendors should be in possession of all necessary approvals from statutory authorities as applicable.
22. HPCL reserves the right to reveal the contents of the bid documents submitted by the bidder / tenderer during the process of opening of bids as per prevailing policy of the corporation.
23. Order of Precedence:
    a. The Special Terms & Conditions and the Technical Specification of the tender shall supersede the General Terms & Conditions of the tender for the related terms/clauses.
    b. In case of contradictions between various sections of the tender document, the Work Description shall supersede Specification and Drawings and Special

Terms & Conditions shall supersede instructions to tenderers, particular clauses of General Terms & Conditions or clauses stated elsewhere.

24. Miscellaneous:

a. This Tender is not transferable. All enclosed tender documents along with the Annexures / Attachments will form part of the tender.

b. The prices quoted by the Tenderer shall be firm during the validity period of the bid and Tenderer agrees to keep the bid valid during the said period. In case the tenderer revokes or cancels the tender or varies any of terms of the tender without the Consent of the Owner, in writing, the Tenderer forfeits the right to the refund of the Earnest Money paid along with the tender.

c. Payment of bills shall be tendered to the contractor in electronic mode (e-payment) through any of the designated banks. The contractor will comply by furnishing full particulars of Bank Account (mandate) to which the payments will be routed. Corporation reserves the right to make payment in any alternate mode also.

d. Tenders received after the stipulated date and time for receipt of the tenders, due to any reason will not be considered.

e. Courts in the city of Mumbai alone shall have Jurisdiction to entertain any application or other proceedings in respect of anything arising under this tender either before or after or during the finalization of the tender.

f. Corporation reserves the right to take action as deemed fit which is inclusive of placing the tenderer under suspension / holiday for a period as decided by the Corporation, in case of withdrawal of offer at any stage, non - acceptance of LOA / PO or non-execution of order or any other breach of tender terms and conditions.

g. In case of any dispute in the interpretation of the terms and conditions of the tender, the decision of the Corporation shall be final and binding.

25. <u>Deviations:</u>

a. The bidders are required to submit offers strictly as per the terms and conditions/specifications given in the Bidding Document and not stipulate any deviations.

b. Offers received from bidders, stipulating deviations to any of the following clauses, will not be considered for priced bid evaluation:

i. Earnest Money Deposit, Security Deposit & Retention Money.
ii. Suspension & Termination
iii. Price Reduction Clause
iv. Force Majeure
v. Scope of work
vi. Arbitration

vii. Firm Prices
viii. Delivery Period

c. However, HPCL reserves the right to give opportunity to bidder for withdrawal of deviations to the above clauses. In case, bidders refuse to withdraw the deviation against above clauses, the offers shall be liable for rejection without any further correspondence with them.
d. Deviation sought if any, by the bidder should be submitted through the Deviation Form in the Technical Bid. Any deviation not mentioned in the Deviation Form shall not be considered and such tenders will be evaluated considering only the deviations, if any, mentioned in the Deviation Form.

26. Disclaimers and Rights of Procuring Entity

The issue of the Tender Document does not imply that the Procuring Entity is bound to select bid(s), and it reserves the right without assigning any reason to

- reject any or all of the Bids, or
- cancel the tender process; or
- abandon the procurement of the Goods; or
- issue another tender for identical or similar Goods

27. Procuring Entity - Rights and Disclaimers

The Procuring Entity

Bids are to be addressed to Head - Category Management, Central Procurement Organisation (headed by Head of the Central Procurement Organisation). The Tender Inviting Authority is the designated officer for uploading and clarifying this Tender Document. The contract may designate, as required, Inspection Agency/ Officer and interim/ ultimate Consignee(s) and Paying authority who shall discharge designated function during contract execution.

Right to Intellectual Property and confidentiality:

a. The Tender Document and associated correspondence are subject to copyright laws and shall always remain the property of the Procuring Entity and must not be shared with third parties or reproduced, whether in whole or part, without the Procuring Entity's prior written consent.
b. However, Bidders may share these to prepare and submit its bid with its employees, subcontractor(s), or holding Company. Bidders shall obtain from them an undertaking of confidentiality similar to that imposed on Bidder under this clause.
c. This condition shall also apply to bidders who do not submit a bid after downloading it or who are not awarded a contract in the process.

The obligation of the Bidders under sub-clauses above, however, shall not apply to information that:

- now or hereafter is or enters the public domain through no fault of Bidder;

- is legally possessed by Bidder at the relevant time and was not previously obtained, directly or indirectly, from the Procuring Entity; or
- otherwise lawfully becomes available to Bidder from a third party that has no obligation of confidentiality.

d. The provisions of this clause shall survive completion or termination for whatever reason of the Tender Process or the contract.

28. Right to Reject any or all Bids

The Procuring Entity reserves its right to accept or reject any or all Bids, abandon/ cancel the Tender process, and issue another tender for the same or similar Goods at any time before the award of the contract. It would have no liability to the affected Bidder or Bidders or any obligation to inform the affected Bidder or Bidders of the grounds for such action(s).

Disclaimers

29. Regarding Purpose of the Tender Document

The Tender Document is neither an agreement nor an offer to prospective Bidder(s) or any other party hereunder. The purpose of the Tender document is to provide the Bidder(s) with information to assist them in participation in this Tender Process.

30. Regarding Information Provided

Information contained in the Tender Document or subsequently provided to the Bidder(s) is on the terms and conditions set out in the Tender Document or subject to which that was provided. Similar terms apply to information provided verbally or in documentary or any other form, directly or indirectly, by the Procuring Entity or any of its employees or associated agencies.

31. Regarding Tender Document:

The Tender Document does not purport to contain all the information Bidder(s) may require. It may not address the needs of all Bidders. They should conduct due diligence, investigation, and analysis, check the information's accuracy, reliability, and completeness, and obtain independent advice from appropriate sources. Information provided in the Tender Document to the Bidder(s) is on a wide range of matters, some of which may depend upon interpreting the law. The information given is not intended to be an exhaustive account of statutory requirements and should not be regarded as a complete or authoritative statement of law. The Procuring Entity, its employees and other associated agencies accept no responsibility for the accuracy or otherwise for any interpretation or opinion on law expressed herein.

The Procuring Entity, its employees and other associated agencies make no representation or warranty for the accuracy, adequacy, correctness, completeness or reliability, assessment, assumption, statement, or information in the Tender Document. They have no legal liability, whether resulting from negligence or otherwise, for any loss, damages, cost, or expense that may arise from/ incurred/ suffered howsoever caused to any person, including any Bidder, on such account.

32. Reasonableness of Rates Received

Procuring Entity shall evaluate whether the rates received in the Bids in the zone of consideration are reasonable. If the rates received are considered abnormally low or unreasonably high, it reserves its right to take action as per the following sub-clauses, reject any or all Bids; abandon/ cancel the Tender process and issue another tender for the identical or similar Goods.

a. Consideration of Abnormally Low Bids

An Abnormally Low bid is one in which the bid price, in combination with other elements of the bid, appears so low that it raises substantive concerns as to the Bidder's capability to perform the contract at the offered price. Procuring Entity shall in such cases seek written clarifications from the Bidder, including detailed price analyses of its bid price concerning scope, schedule, allocation of risks and responsibilities, and any other requirements of the Tender Document.

b. Price Negotiation

Usually, there shall be no price negotiations. However, the Procuring Entity reserves its right to negotiate with the lowest acceptable bidder (L-1), who is techno-commercially suitable for supplying bulk quantity and on whom the contract would have been placed but for the decision to negotiate. This right shall also apply to post e-Reverse Auction process, if any.

Annexure I

PRE BID MEETING

Topic: PRE BID MEETING – TENDER FOR DESIGN, ENGINEERING, PROCUREMENT, CONSTRUCTION, TESTING, COMMISSIONING, AND OPERATION & MAINTENANCE OF A SOLAR PHOTOVOLTAIC (PV) POWER PLANT, INCLUDING THE OFFER OF SUITABLE LAND ON LEASE IN MAHARASHTRA

Time: Dec22, 2023 11:00 AM Mumbai, Kolkata, New Delhi

Join Zoom Meeting

https://hpcl-in.zoom.us/j/95015999315?pwd=ZEhWRWxRYlRCOG5pSEQ3eFZyNk9kdz09

More Ways to join:

Web Browser –

https://hpcl-in.zoom.us/j/95015999315?pwd=ZEhWRWxRYlRCOG5pSEQ3eFZyNk9kdz09

Meeting ID: 950 1599 9315

Passcode: 130042

DOCUMENTS TO UPLOAD:

Bidder & Organization Details		
Name of Bidder		
Vendor Code		
Type of Organisation & Entity Details	Status (Prop/HUF/Partnership/Ltd Co)	
	NAME OF Proprietor/Partners/Directors)	
	Office Address with Pin Code & Telephone Number	
	Factory Address with Pin Code & Telephone Number	
	E Mail ID and address	
	Name of Contact Person & Contact Number (Landline/Mobile)	
PAN NUMBER (copy to be uploaded)		
Whether registered under NSIC/MSME (certificates to be uploaded)	If NSIC - Certificate No. & validity	
	If MSE - Certificate No. & validity	
	Whether SC/ST under MSME (Certificate attached Yes/No)	
	GSTIN number/numbers	
GST Details	Whether Composition dealer under GST Act or not. If NO , provide following details: i,ii.	
	i. Month for which latest GSTR 1 has been filed. Attach acknowledgement thereof.	
	ii. Month for which latest GSTR 3B has been filed. Attach acknowledgement thereof	

Bidders shall fill up the above data and mandatorily upload along with technical bid.

(The following declarations should be typed on the letter head of the tenderer and should be duly signed by an authorized signatory clearly stating the name and designation of the signatory)

DECLARATION ON GST

Payment of GST and filing of GST Returns to enable Hindustan Petroleum Corporation Limited to avail Input Tax Credit (ITC) correctly

With reference to Payment of GST & filing GST Returns for availing Input Tax Credit (ITC) by HPCL as per GST provisions for the Invoices raised by us, we hereby declare as follows:

(1) We have disclosed all the facts relating to our Firm / Company to M/s Hindustan Petroleum Corporation Limited.

(2) We hereby declare that we have agreed to pay GST to the respective GST Authorities. In this connection, we hereby agree to furnish to you proof of payment of GST.

(3) We hereby declare that we will file GST Returns as per GST provisions. In this connection, we hereby agree and undertake to furnish you proof of electronically filed GST Returns.

(4) We hereby agree as under: -

i. We will be fully responsible for complying with the GST provisions to enable HPCL to take Input Tax Credit. In case, HPCL is not able to take Input Tax Credit due to any non-compliance/default/negligence of the seller of goods/service provider, the same shall be recovered from the pending bills/dues (including security deposit, BG etc.)

ii. In case of rejection of ITC by the concerned Tax Authority, for non- filing of GST or non-payment of GST amount by us or for any other reasons attributable to us, we hereby agree to indemnify Hindustan Petroleum Corporation Limited in full against all the loss including consequences, liabilities of any kind whatsoever, directly arising from denial of ITC including interest and penalty. We hereby agree and confirm that –

any breach of the above declaration shall be construed as breach of the terms and conditions w.r.t. GST and Hindustan Petroleum Corporation Limited shall be at liberty to take necessary action like

Holiday listing (banning of Business dealings) and/or recovering of amounts mentioned in para 4 (ii) above, from:

a) any of our Bank Guarantee executed in your favour, if any,
b) Retention / Security Deposit paid for any of your work, if any or
c) Other unpaid invoices, if any raised by us on Hindustan Petroleum Corporation Limited

Place:

Signature

Name:

Date:

Designation:

Seal:

DECLARATION FOR NON BLACK LISTING

(To be submitted along with un-priced bid)

We, M/s_____ hereby declare/clarify that we have not been banned by any Government or quasi Government agencies or Public sector Undertakings.

I / We confirm that we have read the holiday listing guideline available on HPCL website at the following link:

https://www.hindustanpetroleum.com/images/pdf/HPCL_Holiday_Listing.pdf

I / We agree and accept that the GUIDELINES FOR HOLIDAY LISTING (BANNING OF BUSINESS DEALING) will apply to my bid submitted for this tender.

NOTE: If a bidder has been banned by any Government or Quasi Government Agencies or Public Sector Undertakings, the fact must be clearly stated with details. If this declaration is not given along with un-priced bid, the tender will be rejected as non-responsive.

Signature of bidder & Seal

DECLARATION FOR RELATIVES

The tenderer is required to state whether he/she is a relative of any director of HPCL or the tenderer is a firm in which director of HPCL or his relative is a partner of is any other partner of such firm or alternatively the tenderer is a private company in which director of HPCL is a member or director (the list of relative(s) for this purpose is given below)

N.B: Strike off whichever is not applicable. If the tenderer employs any person subsequent to signing of the above declaration and the employee so appointed happens to be relative of the officer of HPCL/Central/State government, the tenderer should submit another declaration furnishing the names of such employees who is /are related to the officer/s of HPCL/Central/State Government.

Date: Signature----------

Name of person signing

Tenderer's Name & address with seal

List of Relatives: A person shall be deemed to be a relative of another, if any and only if, He/She/They are members of Hindu undivided family or He/ she/ they are husband and wife or **The one is related to the other in the manner indicated below:**

Father
Mother (including step mother)
Son (including step son)
Son's wife
Daughter (including step daughter)
Father's father
Mother's mother
Mother's mother
Mother's father
Son's son
Son's son's wife
Son's daughter
Son's daughter's husband
Daughter's husband
Daughter's son
Daughter's son's wife
Daughter's daughter
Daughter's daughter's husband
Brother (including step brother)

(To be submitted on Letter head / emblem)

BIDDER DECLARATION REGARDING LAND BORDER SHARING

I have read the clause regarding restrictions on procurement from a bidder of a country which shares a land border with India; I certify that M/s _____ is not from such a country or, if from such a country, has been registered with the Competent Authority. I hereby certify that M/s _____ fulfills all requirements in this regard and is eligible to be considered. [Where applicable, evidence of valid registration by the Competent Authority has been attached.]

Date Signature _____

Place Stamp / seal

To be submitted on Letter head / emblem)

DECLARATION REGARDING VALIDITY OF BID

We, M/s_____ hereby declare that we shall keep Bid No. _____ floated for DESIGN, ENGINEERING, PROCUREMENT, CONSTRUCTION, TESTING, COMMISSIONING, AND OPERATION & MAINTENANCE OF A SOLAR PHOTOVOLTAIC (PV) POWER PLANT, INCLUDING THE OFFER OF SUITABLE LAND ON LEASE IN MAHARASHTRA valid up to the last date of expiry of defect liability period for the above job undertaken by us which may me approximately Date of Issuance of LOA/PO, whichever is earlier plus 800 days.

Date Signature _____

Place Stamp / seal

Declaration for Applicable % GST:
(Pls. submit along with Technical Bid)

Sr No	Line Description	% GST Applicable
1	EPC services - 7MW/9.8MWp Solar Plant	
2	Land Lease Agreement value – 1st Year	
3	Land Lease Agreement value – 2nd Year	
4	Land Lease Agreement value – 3rd Year	
5	Land Lease Agreement value – 4th Year	
6	Land Lease Agreement value – 5thYear	
7	Land Lease Agreement value – 6th Year	
8	Land Lease Agreement value – 7th Year	
9	Land Lease Agreement value – 8th Year	
10	Land Lease Agreement value – 9th Year	
11	Land Lease Agreement value – 10th Year	
12	Land Lease Agreement value – 11th Year	
13	Land Lease Agreement value – 12th Year	
14	Land Lease Agreement value – 13th Year	
15	Land Lease Agreement value – 14th Year	
16	Land Lease Agreement value – 15th Year	
17	Land Lease Agreement value – 16th Year	
18	Land Lease Agreement value – 17th Year	
19	Land Lease Agreement value – 18th Year	
20	Land Lease Agreement value – 19th Year	
21	Land Lease Agreement value – 20th Year	
22	Land Lease Agreement value – 21st Year	
23	Land Lease Agreement value – 22nd Year	
24	Land Lease Agreement value – 23rd Year	
25	Land Lease Agreement value – 24th Year	
26	Land Lease Agreement value – 25th Year	
27	Land Lease Agreement value – 26th Year	
28	Land Lease Agreement value – 27th Year	
29	COMC Post Defect Liability Period - 1st	
30	COMC Post Defect Liability Period - 2nd	
31	COMC Post Defect Liability Period - 3rd	
32	COMC Post Defect Liability Period - 4th	
33	COMC Post Defect Liability Period - 5th	
34	COMC Post Defect Liability Period - 6th	
35	COMC Post Defect Liability Period - 7th	
36	COMC Post Defect Liability Period - 8th	
37	COMC Post Defect Liability Period - 9th	
38	COMC Post Defect Liability Period - 10th	
39	SEM Metering for Open Access-20 locations	

Pls. do not fill any rates. Only the applicable percentage GST is to be mentioned. Unpriced bid containing rates shall make the bid liable for rejection. For Eg. 5%, 18%, etc.

ANNEXURE – 14a

PROMOTER MEMBER GUARANTEE

This GUARANTEE ("Guarantee") is issued on the _____ day of _____, 20__ by _____, a Company organized and existing under the laws of ____(country), having its Registered Office at _____ (hereinafter referred to as "Guarantor"), at the request and/or behest of _____, a Joint Venture Company organized and existing under the laws of India, having its Registered Office at _____, of which the Guarantor is a promoter (hereinafter referred to as "Bidder"), in favour of Hindustan Petroleum Corporation Limited, a listed Public Limited Company organized under the laws of India having its registered office at Petroleum House, 17, Jamshedji Tata Road, Churchgate, Mumbai – 400 020 and its Marketing Headquarters Office at Hindustan Bhawan, 8 Shoorji Vallabhdas Marg, Ballard Estate, Mumbai – 400 001, (hereinafter referred to as "Beneficiary" or "HPCL").

WHEREAS:
The Beneficiary floated a tender dated _____ inviting offers from Vendors for _____(purpose). The Bidder (JV Company) has submitted its quotation and advised the Beneficiary that the Bidder is a Joint Venture Company in which the Guarantor is the promoter and a majority/ultimate shareholder and the Guarantor has effective control of the Bidder. Since the Bidder is a newly incorporated company, the Bidder seeks to take benefit of the experience and qualifications of the Guarantor, in order to qualify in the tender. In terms of the tender conditions, if the Bidder is to be given the benefit of the qualifications of the promoter member, then the said promoter member is supposed to provide adequate guarantees to the Beneficiary, in respect of technical, financial and other support to the Bidder, in order to complete the job, if the Bidder is successful and the contract is awarded to the Bidder. For this reason, the Guarantor is ready and willing to give a Promoter Member Guarantee inter alia for the performance of the obligations of the Bidder to the terms and conditions of the tender and on Bidder's failure, to assume the said obligations.

We, the Guarantor are hereby recording the terms and conditions governing our obligations under this Guarantee with the intent of being legally bound by the same and hereby agree, covenant and bind ourselves as follows:-

1. The Guarantor hereby irrevocably and unconditionally guarantees to HPCL that its joint venture company i.e., the Bidder will perform its obligations under the terms and conditions of the tender, if the contract is being awarded to them in future for _____ and agrees to provide further comfort letters/ guarantees, if so desired by Beneficiary, in terms of the tender.

2. The Guarantor unconditionally and irrevocably guarantees to the Beneficiary that it will make available or cause to be made available to the Bidder all financial, technical and other resources required to ensure that the Bidder can carry out its obligations as per the tender terms and conditions and that the Bidder at all times fully and effectively discharge its obligations under the terms and conditions of tender, including by discharging the obligations within the time and cost so stipulated. This Guarantee is an absolute, unconditional and continuing guarantee of the full and punctual payment and performance of obligations under this Guarantee and is in no way conditioned upon any requirement that the Beneficiary first attempt to enforce any of the obligations against the Bidder, any other guarantors of the Bidder or any other person or entity or resort to any other means of obtaining performance of any obligations of the Bidder.

3. The Guarantor hereby agrees that if the Bidder shall in any respect commit any breach or fails to fulfill any of the terms of the Contract/Tender or complete it in all respects or if there is a failure to make any supplies or if any material, equipment or machinery under the contract so supplied is not of the required specifications or does not perform as envisaged under the contract/tender, then the Guarantor will forthwith perform the same and fulfill all the obligations required under tender terms & conditions on behalf of their Bidder, without any extra cost and time implications and without any delay or demur.

4. The Guarantor further undertakes to indemnify all losses, damages, expenses, claims, costs and proceedings which may be suffered or incurred by Beneficiary due to the failure or breach on the part of its Bidder.

5. The Guarantor assures and undertakes that during the term of the contract or of any guarantee for performance as per the contract, the Guarantor shall continue to be the promoter member of the Bidder and further, that the Guarantor's liability shall not be affected due to any incapacity or lack of power or legal personality or change in the status of the Bidder or the Guarantor.

6. The Guarantor's liabilities under this Guarantee shall not exceed the liability of the Bidder under the tender terms and conditions but this shall in any manner not affect the Guarantor's own responsibilities and liabilities under the Guarantee.

7. The obligation of the Guarantor shall take effect from the date of this Guarantee and shall remain in full force until all the obligations of the Bidder have been fully performed and discharged and/or all sums of money payable to Beneficiary have been fully paid under the contract being entered into by Beneficiary with the Bidder. The Guarantor further undertakes to perform forthwith under this Guarantee without insisting on any proof of breach of contract by the Bidder and purely relying on Beneficiary' s written demand.

8. The liabilities of the Guarantor shall not be discharged, diminished or otherwise affected by:-

    a. Any change in the Articles of Association or Bye-Laws or constitution of the Bidder or the Guarantor or the Beneficiary.

    b. Any time, indulgence, waiver or consent given to the Bidder by the Beneficiary.

    c. Any amendment to the Contract or any security or other guarantee or indemnity to which Bidder has agreed.

    d. The dissolution, amalgamation, reconstruction or reorganization of Bidder or Guarantor.

9. NOTICE:

    Any notice, demand, declaration or other communication to be given by the Beneficiary or the Guarantor to the other shall be in writing, in English language and delivered in person or by Air Mail or by Courier Services or by Facsimile or by E-Mail to the address given in the tender documents or in the beginning of this Guarantee.

10. GOVERNING LAW AND JURISDICTION:

    This Guarantee shall be exclusively governed by and construed in accordance with the laws of India without giving effect to the principles of conflict of laws therein. No party shall take a plea that any forum is inconvenient. It may be enforced in terms of the Indian laws.

11. DISPUTE RESOLUTION

    All and any disputes or differences arising out of or in relation to this Guarantee shall be finally settled and resolved in terms of the Disputes Resolution Clause contained in the tender documents and agreed to between the Bidder and the Beneficiary.

® If the disputes are **between the Beneficiary and the** Guarantor, then the same shall settled in terms of the Disputes Resolution Clause in the contract assuming that the Guarantor is the Bidder under the said clause.

12. This Guarantee may be executed in one or more counterparts, all of which shall be read and construed as one document and any fax copy or scanned copy or print of a scanned copy of a signed Guarantee shall be deemed to be an original signature.

13. No modification, alteration or amendment of this Guarantee or any of its terms or provisions shall be valid or legally binding unless the Beneficiary consents to the same in writing.

14. No failure to take any action with respect to a breach of this Guarantee or a default by any other party shall constitute a waiver of the Beneficiary's right to enforce any provision of this Guarantee or to take action with respect to such breach or default or any subsequent breach or default.

15. Waiver of any breach or failure to comply with any provisions of this Guarantee shall not be construed as, or constitute, a continuing waiver of such provision, or a waiver of any other breach of or failure to comply with any other provision of this Guarantee, unless any such waiver has been consented to by the concerned party in writing.

16. This document has been executed by a duly authorized signatory on behalf of the Guarantor having the requisite power to do so.

IN WITNESS WHEEOF the Guarantor has duly executed this Guarantee as at the date first above written.

For and on behalf of Guarantor,

_____ Witness

(Signature) Signature :
Name: Name :
Designation: Designation :

ANNEXURE – 14b

PARENT / AFFILIATE GUARANTEE

This GUARANTEE ("Guarantee") is issued on the _____ day of _____, 20xx by _____, a Company organized and existing under the laws of ____*(country)*, having its Registered Office at _____ (hereinafter referred to as "Guarantor"), at the request and/or behest of _____, a Subsidiary/Affiliate Company organized and existing under the laws of India, having its Registered Office at _____, of which the Guarantor is the Parent/Affiliate (hereinafter referred to as "Bidder"), in favour of Hindustan Petroleum Corporation Limited, a listed Public Limited Company organized under the laws of India having its Marketing Headquarters Office at Hindustan Bhawan, 8 Shoorji Vallabhdas Marg, Ballard Estate, Mumbai – 400 001, (hereinafter referred to as "Beneficiary" or "HPCL").

WHEREAS:
The Beneficiary floated a tender dated _____ inviting offers from Vendors for _____(purpose). The Bidder (Subsidiary/Affiliate) has submitted its bid/tender/quotation and advised the Beneficiary that the Bidder is a Subsidiary/Affiliate of _____ ,which is the Guarantor and the Parent/Affiliate , and the Guarantor has effective control of the Bidder, directly or through the Guarantor's Parent. Since the Bidder is a Subsidiary/Affiliate of the Guarantor, the Bidder seeks to take benefit of the experience and qualifications of the Guarantor, in order to qualify in the tender. In terms of the tender conditions, if the Bidder is to be given the benefit of the qualifications of the Parent/Affiliate, then the said Parent/Affiliate is supposed to provide adequate guarantees to the Beneficiary, in respect of technical, financial and other support to the Bidder, in order to complete the job, if the Bidder is successful and the contract is awarded to the Bidder. For this reason, the Guarantor is ready and willing to give a Parent / Affiliate Guarantee inter alia for the performance of the obligations of the Bidder to the terms and conditions of the tender and on Bidder's failure, to assume the said obligations.

We, the Guarantor are hereby recording the terms and conditions governing our obligations under this Guarantee with the intent of being legally bound by the same and hereby agree, covenant and bind ourselves as follows:-

1. The Guarantor hereby irrevocably and unconditionally guarantees to HPCL that its Subsidiary/Affiliate company i.e., the Bidder will perform its obligations under the terms and conditions of the tender, if the contract is being awarded to them in future for _____ and agrees to provide further comfort letters/ guarantees, if so desired by

Beneficiary, in terms of the tender.

2. The Guarantor unconditionally and irrevocably guarantees to the Beneficiary that it will make available or cause to be made available to the Bidder all financial, technical and other resources required to ensure that the Bidder can carry out its obligations as per the tender terms and conditions and that the Bidder at all times fully and effectively discharge its obligations under the terms and conditions of tender, including by discharging the obligations within the time and cost so stipulated. This Guarantee is an absolute, unconditional and continuing guarantee of the full and punctual payment and performance of obligations under this Guarantee and is in no way conditioned upon any requirement that the Beneficiary first attempt to enforce any of the obligations against the Bidder, any other guarantors of the Bidder or any other person or entity or resort to any other means of obtaining performance of any obligations of the Bidder.

3. The Guarantor hereby agrees that if the Bidder shall in any respect commit any breach or fails to fulfill any of the terms of the Contract/Tender or complete it in all respects or if there is a failure to make any supplies or if any material, equipment or machinery under the contract so supplied is not of the required specifications or does not perform as envisaged under the contract/tender, then the Guarantor will forthwith perform the same and fulfill all the obligations required under tender terms & conditions on behalf of their Bidder, without any extra cost and time implications and without any delay or demur.The Guarantor further undertakes to indemnify all losses, damages, expenses, claims, costs and proceedings which may be suffered or incurred by Beneficiary due to the failure or breach on the part of its Bidder.

4. The Guarantor assures and undertakes that during the term of the contract or of any guarantee for performance as per the contract, the Guarantor shall continue to be the Parent/Affiliate of the Bidder and further that the Guarantor's liability shall not be affected due to any incapacity or lack of power or legal personality or change in the status of the Bidder or the Guarantor.

5. The Guarantor's liabilities under this Guarantee shall not exceed the liability of the Bidder under the tender terms and conditions but this shall in any manner not affect the Guarantor's own responsibilities and liabilities under the Guarantee.

6. The obligation of the Guarantor shall take effect from the date of this Guarantee and shall remain in full force until all the obligations of the Bidder have been fully performed and discharged and/or all sums of money payable to Beneficiary have been fully paid under the contract being entered into by Beneficiary with the Bidder. The Guarantor further undertakes to perform forthwith under this Guarantee without insisting on any proof of breach of contract by the Bidder and purely relying on Beneficiary' s written demand.

7. The liabilities of the Guarantor shall not be discharged, diminished or otherwise affected by:-

    a. Any change in the Articles of Association or Bye-Laws or constitution of the Bidder or the Guarantor or the Beneficiary.

b. Any time, indulgence, waiver or consent given to the Bidder by the Beneficiary.

c. Any amendment to the Contract or any security or other guarantee or indemnity to which Bidder has agreed.

d. The dissolution, amalgamation, reconstruction or reorganization of Bidder Company or Guarantor.

8. NOTICE:

Any notice, demand, declaration or other communication to be given by the Beneficiary or the Guarantor to the other shall be in writing, in English language and delivered in person or by Air Mail or by Courier Services or by Facsimile or by E-Mail to the address given in the tender documents or in the beginning of this Guarantee.

9. GOVERNING LAW AND JURISDICTION:

This Guarantee shall be exclusively governed by and construed in accordance with the laws of India without giving effect to the principles of conflict of laws therein. No party shall take a plea that any forum is inconvenient. It may be enforced in terms of the Indian laws.

10. DISPUTE RESOLUTION

All and any disputes or differences arising out of or in relation to this Guarantee shall be finally settled and resolved in terms of the Disputes Resolution Clause contained in the tender documents and agreed to between the Bidder and the Beneficiary.

If the disputes are **between the Beneficiary and the** Guarantor, then the same shall settled in terms of the Disputes Resolution Clause in the contract assuming that the Guarantor is the Bidder under the said clause.

11. This Guarantee may be executed in one or more counterparts, all of which shall be read and construed as one document and any fax copy or scanned copy or print of a scanned copy of a signed Guarantee shall be deemed to be an original signature.

12. No modification, alteration or amendment of this Guarantee or any of its terms or provisions shall be valid or legally binding unless the Beneficiary consents to the same in writing.

13. No failure to take any action with respect to a breach of this Guarantee or a default by any other party shall constitute a waiver of the Beneficiary's right to enforce any provision of this Guarantee or to take action with respect to such breach or default or any subsequent breach or default.

14. Waiver of any breach or failure to comply with any provisions of this Guarantee shall not be construed as, or constitute, a continuing waiver of such provision, or a waiver of any other breach of or failure to comply with any other provision of this Guarantee, unless any such waiver has been consented to by the concerned party in writing.

15. This document has been executed by a duly authorized signatory on behalf of the Guarantor having the requisite power to do so.

IN WITNESS WHEEOF the Guarantor has duly executed this Guarantee as at the date first above written.

For and on behalf of Guarantor,

_____

(Signature)
Name:
Designation:

Witness

Signature :
Name :
Designation :

No. P-45021/2/2017-PP (BE-II)
Government of India
Ministry of Commerce and Industry
Department for Promotion of Industry and Internal Trade
(Public Procurement Section)

Udyog Bhawan, New Delhi
Dated: 16th September, 2020

To

All Central Ministries/Departments/CPSUs/All concerned

ORDER

Subject: Public Procurement (Preference to Make in India), Order 2017– Revision; regarding.

Department for Promotion of Industry and Internal Trade, in partial modification [Paras 2, 3, 5, 10 & 13] of Order No.P-45021/2/2017-B.E.-II dated 15.6.2017 as amended by Order No.P-45021/2/2017-B.E.-II dated 28.05.2018, Order No.P-45021/2/2017-B.E.-II dated 29.05.2019 and Order No.P-45021/2/2017-B.E.-II dated 04.06.2020, hereby issues the revised 'Public Procurement (Preference to Make in India), Order 2017" dated 16.09.2020 effective with immediate effect.

Whereas it is the policy of the Government of India to encourage 'Make in India' and promote manufacturing and production of goods and services in India with a view to enhancing income and employment, and

Whereas procurement by the Government is substantial in amount and can contribute towards this policy objective, and

Whereas local content can be increased through partnerships, cooperation with local companies, establishing production units in India or Joint Ventures (JV) with Indian suppliers, increasing the participation of local employees in services and training them,

Now therefore the following Order is issued:

1. This Order is issued pursuant to Rule 153 (iii) of the General Financial Rules 2017.

2. **Definitions**: For the purposes of this Order:

   'Local content' means the amount of value added in India which shall, unless otherwise prescribed by the Nodal Ministry, be the total value of the item procured (excluding net domestic indirect taxes) minus the value of imported content in the item (including all customs duties) as a proportion of the total value, in percent.

   'Class-I local supplier' means a supplier or service provider, whose goods, services or works offered for procurement, meets the minimum local content as prescribed for 'Class-I local supplier' under this Order.

.....Contd. p/2

'Class-II local supplier' means a supplier or service provider, whose goods, services or works offered for procurement, meets the minimum local content as prescribed for 'Class-II local supplier' but less than that prescribed for 'Class-I local supplier' under this Order.

'Non - Local supplier' means a supplier or service provider, whose goods, services or works offered for procurement, has local content less than that prescribed for 'Class-II local supplier' under this Order.

'L1' means the lowest tender or lowest bid or the lowest quotation received in a tender, bidding process or other procurement solicitation as adjudged in the evaluation process as per the tender or other procurement solicitation.

'Margin of purchase preference' means the maximum extent to which the price quoted by a "Class-I local supplier" may be above the L1 for the purpose of purchase preference.

'Nodal Ministry' means the Ministry or Department identified pursuant to this order in respect of a particular item of goods or services or works.

'Procuring entity' means a Ministry or department or attached or subordinate office of, or autonomous body controlled by, the Government of India and includes Government companies as defined in the Companies Act.

'Works' means all works as per Rule 130 of GFR- 2017, and will also include *'turnkey works'*.

3. Eligibility of 'Class-I local supplier'/ 'Class-II local supplier'/ 'Non-local suppliers' for different types of procurement

(a) In procurement of all goods, services or works in respect of which the Nodal Ministry / Department has communicated that there is sufficient local capacity and local competition, only 'Class-I local supplier', as defined under the Order, shall be eligible to bid irrespective of purchase value.

(b) Only 'Class-I local supplier' and 'Class-II local supplier', as defined under the Order, shall be eligible to bid in procurements undertaken by procuring entities, except when Global tender enquiry has been issued. In global tender enquiries, 'Non-local suppliers' shall also be eligible to bid along with 'Class-I local suppliers' and 'Class-II local suppliers'. In procurement of all goods, services or works, not covered by sub-para 3(a) above, and with estimated value of purchases less than Rs. 200 Crore, in accordance with Rule 161(iv) of GFR, 2017, Global tender enquiry shall not be issued except with the approval of competent authority as designated by Department of Expenditure.

(c) For the purpose of this Order, works includes Engineering, Procurement and Construction (EPC) contracts and services include System Integrator (SI) contracts.

.....Contd. p/3

3A. Purchase Preference

(a) Subject to the provisions of this Order and to any specific instructions issued by the Nodal Ministry or in pursuance of this Order, purchase preference shall be given to 'Class-I local supplier' in procurements undertaken by procuring entities in the manner specified here under.

(b) In the procurements of goods or works, which are covered by para 3(b) above and which are divisible in nature, the 'Class-I local supplier' shall get purchase preference over 'Class-II local supplier' as well as 'Non-local supplier', as per following procedure:

i. Among all qualified bids, the lowest bid will be termed as L1. If L1 is 'Class-I local supplier', the contract for full quantity will be awarded to L1.

ii. If L1 bid is not a 'Class-I local supplier', 50% of the order quantity shall be awarded to L1. Thereafter, the lowest bidder among the 'Class-I local supplier' will be invited to match the L1 price for the remaining 50% quantity subject to the Class-I local supplier's quoted price falling within the margin of purchase preference, and contract for that quantity shall be awarded to such 'Class-I local supplier' subject to matching the L1 price. In case such lowest eligible 'Class-I local supplier' fails to match the L1 price or accepts less than the offered quantity, the next higher 'Class-I local supplier' within the margin of purchase preference shall be invited to match the L1 price for remaining quantity and so on, and contract shall be awarded accordingly. In case some quantity is still left uncovered on Class-I local suppliers, then such balance quantity may also be ordered on the L1 bidder.

(c) In the procurements of goods or works, which are covered by para 3(b) above and which are not divisible in nature, and in procurement of services where the bid is evaluated on price alone, the 'Class-I local supplier' shall get purchase preference over 'Class-II local supplier' as well as 'Non-local supplier', as per following procedure:

i. Among all qualified bids, the lowest bid will be termed as L1. If L1 is 'Class-I local supplier', the contract will be awarded to L1.

ii. If L1 is not 'Class-I local supplier', the lowest bidder among the 'Class-I local supplier', will be invited to match the L1 price subject to Class-I local supplier's quoted price falling within the margin of purchase preference, and the contract shall be awarded to such 'Class-I local supplier' subject to matching the L1 price.

iii. In case such lowest eligible 'Class-I local supplier' fails to match the L1 price, the 'Class-I local supplier' with the next higher bid within the margin of purchase preference shall be invited to match the L1 price and so on and contract shall be awarded accordingly. In case none of the 'Class-I local supplier' within the margin of purchase preference matches the L1 price, the contract may be awarded to the L1 bidder.

.....Contd. p/4

(d) "Class-II local supplier" will not get purchase preference in any procurement, undertaken by procuring entities.

3B. Applicability in tenders where contract is to be awarded to multiple bidders - In tenders where contract is awarded to multiple bidders subject to matching of L1 rates or otherwise, the 'Class-I local supplier' shall get purchase preference over 'Class-II local supplier' as well as 'Non-local supplier', as per following procedure:

a) In case there is sufficient local capacity and competition for the item to be procured, as notified by the nodal Ministry, only Class I local suppliers shall be eligible to bid. As such, the multiple suppliers, who would be awarded the contract, should be all and only 'Class I Local suppliers'.

b) In other cases, 'Class II local suppliers' and 'Non local suppliers' may also participate in the bidding process along with 'Class I Local suppliers' as per provisions of this Order.

c) If 'Class I Local suppliers' qualify for award of contract for at least 50% of the tendered quantity in any tender, the contract may be awarded to all the qualified bidders as per award criteria stipulated in the bid documents. However, in case 'Class I Local suppliers' do not qualify for award of contract for at least 50% of the tendered quantity, purchase preference should be given to the 'Class I local supplier' over 'Class II local suppliers'/ 'Non local suppliers' provided that their quoted rate falls within 20% margin of purchase preference of the highest quoted bidder considered for award of contract so as to ensure that the 'Class I Local suppliers' taken in totality are considered for award of contract for at least 50% of the tendered quantity.

d) First purchase preference has to be given to the lowest quoting 'Class-I local supplier', whose quoted rates fall within 20% margin of purchase preference, subject to its meeting the prescribed criteria for award of contract as also the constraint of maximum quantity that can be sourced from any single supplier. If the lowest quoting 'Class-I local supplier', does not qualify for purchase preference because of aforesaid constraints or does not accept the offered quantity, an opportunity may be given to next higher 'Class-I local supplier', falling within 20% margin of purchase preference, and so on.

e) To avoid any ambiguity during bid evaluation process, the procuring entities may stipulate its own tender specific criteria for award of contract amongst different bidders including the procedure for purchase preference to 'Class-I local supplier' within the broad policy guidelines stipulated in sub-paras above.

4. **Exemption of small purchases**: Notwithstanding anything contained in paragraph 3, procurements where the estimated value to be procured is less than Rs. 5 lakhs shall be exempt from this Order. However, it shall be ensured by procuring entities that procurement is not split for the purpose of avoiding the provisions of this Order.

5. **Minimum local content**: The 'local content' requirement to categorize a supplier as 'Class-I local supplier' is minimum 50%. For 'Class-II local supplier', the 'local content' requirement is minimum 20%. Nodal Ministry/ Department may prescribe only a higher

.....Contd. p/5

percentage of minimum local content requirement to categorize a supplier as 'Class-I local supplier'/ 'Class-II local supplier'. For the items, for which Nodal Ministry/ Department has not prescribed higher minimum local content notification under the Order, it shall be 50% and 20% for 'Class-I local supplier'/ 'Class-II local supplier' respectively.

6. **Margin of Purchase Preference**: The margin of purchase preference shall be 20%.

7. **Requirement for specification in advance**: The minimum local content, the margin of purchase preference and the procedure for preference to Make in India shall be specified in the notice inviting tenders or other form of procurement solicitation and shall not be varied during a particular procurement transaction.

8. **Government E-marketplace**: In respect of procurement through the Government E-marketplace (GeM) shall, as far as possible, specifically mark the items which meet the minimum local content while registering the item for display, and shall, wherever feasible, make provision for automated comparison with purchase preference and without purchase preference and for obtaining consent of the local supplier in those cases where purchase preference is to be exercised.

9. **Verification of local content**:

   a. The 'Class-I local supplier'/ 'Class-II local supplier' at the time of tender, bidding or solicitation shall be required to indicate percentage of local content and provide self-certification that the item offered meets the local content requirement for 'Class-I local supplier'/ 'Class-II local supplier', as the case may be. They shall also give details of the location(s) at which the local value addition is made.

   b. In cases of procurement for a value in excess of Rs. 10 crores, the 'Class-I local supplier'/ 'Class-II local supplier' shall be required to provide a certificate from the statutory auditor or cost auditor of the company (in the case of companies) or from a practicing cost accountant or practicing chartered accountant (in respect of suppliers other than companies) giving the percentage of local content.

   c. Decisions on complaints relating to implementation of this Order shall be taken by the competent authority which is empowered to look into procurement-related complaints relating to the procuring entity.

   d. Nodal Ministries may constitute committees with internal and external experts for independent verification of self-declarations and auditor's/ accountant's certificates on random basis and in the case of complaints.

   e. Nodal Ministries and procuring entities may prescribe fees for such complaints.

   f. False declarations will be in breach of the Code of Integrity under Rule 175(1)(i)(h) of the General Financial Rules for which a bidder or its successors can be debarred for up to two years as per Rule 151 (iii) of the General Financial Rules along with such other actions as may be permissible under law.

.....Contd. p/6

g. A supplier who has been debarred by any procuring entity for violation of this Order shall not be eligible for preference under this Order for procurement by any other procuring entity for the duration of the debarment. The debarment for such other procuring entities shall take effect prospectively from the date on which it comes to the notice of other procurement entities, in the manner prescribed under paragraph 9h below.

h. The Department of Expenditure shall issue suitable instructions for the effective and smooth operation of this process, so that:

   i. The fact and duration of debarment for violation of this Order by any procuring entity are promptly brought to the notice of the Member-Convenor of the Standing Committee and the Department of Expenditure through the concerned Ministry /Department or in some other manner;

   ii. on a periodical basis such cases are consolidated and a centralized list or decentralized lists of such suppliers with the period of debarment is maintained and displayed on website(s);

   iii. in respect of procuring entities other than the one which has carried out the debarment, the debarment takes effect prospectively from the date of uploading on the website(s) in the such a manner that ongoing procurements are not disrupted.

10. **Specifications in Tenders and other procurement solicitations**:

a. Every procuring entity shall ensure that the eligibility conditions in respect of previous experience fixed in any tender or solicitation do not require proof of supply in other countries or proof of exports.

b. Procuring entities shall endeavour to see that eligibility conditions, including on matters like turnover, production capability and financial strength do not result in unreasonable exclusion of 'Class-I local supplier'/ 'Class-II local supplier' who would otherwise be eligible, beyond what is essential for ensuring quality or creditworthiness of the supplier.

c. Procuring entities shall, within 2 months of the issue of this Order review all existing eligibility norms and conditions with reference to sub-paragraphs 'a' and 'b' above.

d. Reciprocity Clause

   i. When a Nodal Ministry/Department identifies that Indian suppliers of an item are not allowed to participate and/ or compete in procurement by any foreign government, due to restrictive tender conditions which have direct or indirect effect of barring Indian companies such as registration in the procuring country, execution of projects of specific value in the procuring country etc., it shall provide such details to all its procuring entities including CMDs/CEOs of PSEs/PSUs, State Governments and other procurement agencies under their administrative control and GeM for appropriate reciprocal action.

.....Contd. p/7

ii. Entities of countries which have been identified by the nodal Ministry/Department as not allowing Indian companies to participate in their Government procurement for any item related to that nodal Ministry shall not be allowed to participate in Government procurement in India for all items related to that nodal Ministry/ Department, except for the list of items published by the Ministry/ Department permitting their participation.

iii. The stipulation in (ii) above shall be part of all tenders invited by the Central Government procuring entities stated in (i) above. All purchases on GeM shall also necessarily have the above provisions for items identified by nodal Ministry/ Department.

iv. State Governments should be encouraged to incorporate similar provisions in their respective tenders.

v. The term 'entity' of a country shall have the same meaning as under the FDI Policy of DPIIT as amended from time to time.

e. Specifying foreign certifications/ unreasonable technical specifications/ brands/ models in the bid document is restrictive and discriminatory practice against local suppliers. If foreign certification is required to be stipulated because of non-availability of Indian Standards and/or for any other reason, the same shall be done only after written approval of Secretary of the Department concerned or any other Authority having been designated such power by the Secretary of the Department concerned.

f. "All administrative Ministries/Departments whose procurement exceeds *Rs.* 1000 Crore per annum shall notify/ update their procurement projections every year, including those of the PSEs/PSUs, for the next 5 years on their respective website."

10A. Action for non-compliance of the Provisions of the Order: In case restrictive or discriminatory conditions against domestic suppliers are included in bid documents, an inquiry shall be conducted by the Administrative Department undertaking the procurement (including procurement by any entity under its administrative control) to fix responsibility for the same. Thereafter, appropriate action, administrative or otherwise, shall be taken against erring officials of procurement entities under relevant provisions. Intimation on all such actions shall be sent to the Standing Committee.

11. **Assessment of supply base by Nodal Ministries**: The Nodal Ministry shall keep in view the domestic manufacturing / supply base and assess the available capacity and the extent of local competition while identifying items and prescribing the higher minimum local content or the manner of its calculation, with a view to avoiding cost increase from the operation of this Order.

12. **Increase in minimum local content**: The Nodal Ministry may annually review the local content requirements with a view to increasing them, subject to availability of sufficient local competition with adequate quality.

.....Contd. p/8

13. **Manufacture under license/ technology collaboration agreements with phased indigenization**: While notifying the minimum local content, Nodal Ministries may make special provisions for exempting suppliers from meeting the stipulated local content if the product is being manufactured in India under a license from a foreign manufacturer who holds intellectual property rights and where there is a technology collaboration agreement / transfer of technology agreement for indigenous manufacture of a product developed abroad with clear phasing of increase in local content.

13A. In procurement of all goods, services or works in respect of which there is substantial quantity of public procurement and for which the nodal ministry has not notified that there is sufficient local capacity and local competition, the concerned nodal ministry shall notify an upper threshold value of procurement beyond which foreign companies shall enter into a joint venture with an Indian company to participate in the tender. Procuring entities, while procuring such items beyond the notified threshold value, shall prescribe in their respective tenders that foreign companies may enter into a joint venture with an Indian company to participate in the tender. The procuring Ministries/Departments shall also make special provisions for exempting such joint ventures from meeting the stipulated minimum local content requirement, which shall be increased in a phased manner.

14. **Powers to grant exemption and to reduce minimum local content**: The administrative Department undertaking the procurement (including procurement by any entity under its administrative control), with the approval of their Minister-in-charge, may by written order, for reasons to be recorded in writing,

    a. reduce the minimum local content below the prescribed level; or
    b. reduce the margin of purchase preference below 20%; or
    c. exempt any particular item or supplying entities from the operation of this Order or any part of the Order.

    A copy of every such order shall be provided to the Standing Committee and concerned Nodal Ministry / Department. The Nodal Ministry / Department concerned will continue to have the power to vary its notification on Minimum Local Content.

15. **Directions to Government companies**: In respect of Government companies and other procuring entities not governed by the General Financial Rules, the administrative Ministry or Department shall issue policy directions requiring compliance with this Order.

16. **Standing Committee**: A standing committee is hereby constituted with the following membership:

    Secretary, Department for Promotion of Industry and Internal Trade—Chairman
    Secretary, Commerce—Member
    Secretary, Ministry of Electronics and Information Technology—Member
    Joint Secretary (Public Procurement), Department of Expenditure—Member
    Joint Secretary (DPIIT)—Member-Convenor

.....Contd. p/9

The Secretary of the Department concerned with a particular item shall be a member in respect of issues relating to such item. The Chairman of the Committee may co-opt technical experts as relevant to any issue or class of issues under its consideration.

17. **Functions of the Standing Committee**: The Standing Committee shall meet as often as necessary, but not less than once in six months. The Committee

a. shall oversee the implementation of this order and issues arising therefrom, and make recommendations to Nodal Ministries and procuring entities.
b. shall annually assess and periodically monitor compliance with this Order
c. shall identify Nodal Ministries and the allocation of items among them for issue of notifications on minimum local content
d. may require furnishing of details or returns regarding compliance with this Order and related matters
e. may, during the annual review or otherwise, assess issues, if any, where it is felt that the manner of implementation of the order results in any restrictive practices, cartelization or increase in public expenditure and suggest remedial measures
f. may examine cases covered by paragraph 13 above relating to manufacture under license/ technology transfer agreements with a view to satisfying itself that adequate mechanisms exist for enforcement of such agreements and for attaining the underlying objective of progressive indigenization
g. may consider any other issue relating to this Order which may arise.

18. **Removal of difficulties**: Ministries /Departments and the Boards of Directors of Government companies may issue such clarifications and instructions as may be necessary for the removal of any difficulties arising in the implementation of this Order.

19. **Ministries having existing policies**: Where any Ministry or Department has its own policy for preference to local content approved by the Cabinet after 1st January 2015, such policies will prevail over the provisions of this Order. All other existing orders on preference to local content shall be reviewed by the Nodal Ministries and revised as needed to conform to this Order, within two months of the issue of this Order.

20. **Transitional provision**: This Order shall not apply to any tender or procurement for which notice inviting tender or other form of procurement solicitation has been issued before the issue of this Order.

(Rajesh Gupta)
Director
Tel: 23063211
rajesh.gupta66@gov.in

File No: FP-20013/2/2017-FP-PNG-Part (4) (E-41432)
Government of India
Ministry of Petroleum and Natural Gas
(Flagship Programme Cell)
****

Shastri Bhawan, New Delhi
Dated 26th April, 2022

To,

1. Chairman, IOCL
2. C&MD, BPCL/ HPCL/ ONGC/ OIL/ GAIL/ EIL/ Balmer Lawrie
3. Managing Director, MRPL/NRL/CPCL// BCPL/ OVL
4. DG, DGH
5. DG, PPAC
6. Secretary, OIDB
7. ED, PCRA
8. ED, OISD
9. ED, CHT
10. Director, RGIPT
11. Secretary, PNGRB
12. CEO & MD, ISPRL

Sub: Public Procurement (Preference to Make in India) (PPP-MII) Order, 2017-reg.

Sir/Madam,

I am directed to refer to this Ministry's letter of even number dated 23.02.2022 regarding Policy to Provide Purchase Preference (linked with local content) (PP-LC) in all Public Sector Undertakings under the Ministry of Petroleum and Natural Gas (MoP&NG) and to say that Public Procurement (Preference to Make in India) Order, 2017 issued by DPIIT and as amended time to time shall be applicable to all the Public Sector Undertakings and their wholly owned subsidiaries under MoP&NG; Joint Ventures that have 51% or more equity by one or more Public Sector Undertakings under MoP&NG; attached and subordinate offices of MoPNG w.e.f. 01.04.2022.

2. Moreover, as per para 14 of the PPP-MII Order, the following modifications in the order shall be applicable on the procuring entities under this Ministry:

a. Limit for exemption of small purchase under para 4 of the PPP-MII Order, 2017 shall be Rs. 1 crore.

b. Local value addition through services such as transportation, insurance, installation, commissioning, training and after sales services support like AMC/ CMC etc. shall continue to be considered in local content calculation.

c. HP-HT operations in upstream oil and gas business activities shall be exempted from applicability of the Order.

3. This issues with the approval of Hon'ble Minister, Petroleum and Natural Gas.

Yours faithfully

26/04/2022

(Santanu Dhar)
Under Secretary to the Govt. of India
Tel.: 011-23388652

Copy to:

a. PS to Minister, PNG
b. PPS/ PS to Secretary/ AS&FA/ Sr. Economic Advisor, MoPNG
c. PPS/ PS to AS (E)/ JS(R)/ JS (M& GP)/ OSD (IC)/ JS (G)/ JS (IFD)/ DDG (ED), MoPNG
d. PPS/PS to Dir.(BR)/Dir.(E-II)/Dir.(E-I)/DS(GP)/DS(Mkt.)/DS(LPG)/DS(Admn.)/DS(RTI)/ DS (Gen) MoPNG

Copy for information to:

Secretary, DPIIT

PURCHASE PREFERENCE - MSE

The MSE bidder shall be entitled for benefits under the Public Procurement Policy as per the details mentioned below :

i. Issue of Tender Documents free of cost.

ii. Exemption from payment of EMD.

iii. Micro and Small Enterprises quoting price within price band of L1 + 15% shall be allowed to supply a portion of requirement by matching the price of L1, if L1 is other than MSE, upto 25% of the total tendered value.

iv. Only Manufacturing Enterprises qualify as MSEs. Traders and Agents shall not be allowed to avail the benefits extended under PP Policy.

v. In case of availability of more than one Micro and Small Enterprises within the price band of L1 + 15%, 25% of the tender value shall be shared equally amongst the eligible MSEs, subject to matching the L1 price.

vi. Further, out of above 25%, 4% shall be from MSEs owned by SC/ST entrepreneurs and 3% from MSEs owned by Women Entrepreneurs. This quota is to be transferred to other MSEs in case of non-availability of MSEs owned by SC/ST entrepreneurs or Women Entrepreneurs.

Note :

An MSE bidder shall be defined to be owned by an SC/ST Entrepreneur as under:

i. In case of Proprietary MSE, Proprietor(s) shall be SC/ST,
ii. In case of partnership MSE, the SC/ST partners should be holding at least 51% shares in the Unit,
iii. In case of Private Limited Companies, at least 51% shares shall be held by SC/ST promoters.

An MSE bidder shall be defined to be owned by Women entrepreneur:

i. In case of Proprietary MSE, Proprietor(s) shall be Woman,
ii. In case of partnership MSE, the women partners should be holding at least 51% shares in the Unit,
iii. In case of Private Limited Companies, at least 51% shares shall be held by women promoters.

MSE bidder shall submit the following:

i. Documentary evidence that the bidder is a Micro or Small Enterprise.

ii. If the MSE is owned by SC/ST Entrepreneurs, the bidder shall furnish appropriate documentary evidence in this regard.

iii. The above documents submitted by the bidder shall be duly certified by the Statutory Auditor of the bidder or a practicing Chartered Accountant (not being an employee or a Director or not having any interest in the bidder's company/firm) where audited accounts are not mandatory as per law.

a. If the bidder does not provide the appropriate document or any evidence to substantiate the above, then it will be presumed that they do not qualify for any preference admissible in the Public Procurement Policy (PPP), 2012 along with amendments notified vide Government of India Gazette from time to time.

Distribution of Order – INDIVISIBLE GOODS & SERVICES

Status of L1 Bidder	% Order Distribution	
MSE + Class – I local Supplier	L1 Bidder : 100 %	
MSE + Class – II local Supplier	L1 Bidder : 100 %	
Non-MSE + Class – I local Supplier	Eligible MSE Bidder : 100 %	In case of non-availability of eligible MSE bidders L1 Bidder : 100 %
Non-MSE + Class – II local Supplier	Eligible MSE Bidder : 100 %	In case of non-availability of eligible MSE bidders Eligible Class-I local supplier : 100 % In case of non-availability of eligible MSE bidder/eligible Class-I local supplier L1 Bidder : 100 %

UNDERTAKING **ATTACHMENT -1**

Tender no. _____ dated _____

We, M/s _____ ***(Name of Bidder)*** hereby state and undertake that we meet all the requirements of the MII policy and hereby confirm that we are eligible for purchase preference under this policy.

In case our declaration is found to be incorrect at any point of time during the tender process or contract execution or thereafter, HPCL shall have the right to impose sanctions as stated in the subject MII policy.

We hereby declare that the local content of Goods / Services / EPC / Works Contract (retain whichever is applicable and remove the balance options) as per the scope of job to be executed under this tender is [ ] % at the time of bidding**.**

Place:
Date:

[Signature of Authorized Signatory of Bidder]
Name:
Designation:
Seal:

(In case quoted value **exceeds Rs. 10 Crores**, the undertaking should be supported by a certificate from Statutory Auditor engaged by the bidder certifying that the bidder meets the mandatory local content requirement.)

CMD
|
Adv to:D-M/ED-CPO
cc:D-F/D-R/D-HR

HPCL/CMD/GOVT/2023/723

F. No. DPE/3(3)/10-Fin.
Government of India
Ministry of Finance
Department of Public Enterprises
Block No. 14, CGO Complex,
Lodi Road, New Delhi-110003
Dated the 29th May, 2023

To,

Chief Executives of all CPSEs

Subject:- Concurrent application of Public Procurement Policy for Micro and Small Enterprises Order, 2012 and Public Procurement (Preference to Make in India) Order, 2017 - regarding

Sir/Madam,

The undersigned is directed to forward herewith a copy of Department of Expenditure O.M. dated 18th May, 2023 on the subject mentioned above for information and strict compliance.

Encl : As stated

(Kailash Bhandari)
Deputy Director
Tel : 2436-6247

Copy to :- Shri Kanwalpreet, Director, Department of Expenditure, Room No. 264-C, North Block, New Delhi.

No.F.1/4/2021-PPD
Government of India
Ministry of Finance
Department of Expenditure
Public Procurement Division
*****

264-C, North Block, New Delhi.
18.05.2023.

OFFICE MEMORANDUM

Subject: Concurrent application of Public Procurement Policy for Micro and Small Enterprises Order, 2012 and Public Procurement (Preference to Make in India) Order, 2017.

The undersigned is directed to refer two Preferential Procurement Orders mandated for the Public Procurement in India, namely:

i. Public Procurement Policy for Micro and Small Enterprises (MSEs) Order dated 23.03.2012 (PPP-MSE Order) issued by Ministry of Micro, Small and Medium Enterprises (MoMSME) in exercise of the powers conferred in Section 11 of the MSME Development Act, 2006. (Last revised on 09.11.2018)

ii. Public Procurement (Preference to Make in India) Order, 2017 (PPP-MII order), under Rule 153(iii) of the General Financial Rules (GFRs) 2017, approved by the Cabinet. Implementation of this PPP-MII order is monitored by Department for Promotion of Industry and Internal Trade (DPIIT). (Last revised on 16.09.2020.)

2. It has been brought to the notice of this Department that concurrent application of these two orders are creating confusion to the procuring entities and different procuring entities interpret them differently. In order to bring predictability both to the procuring entities as well as bidders, following guidelines are being issued.

Guidelines

3. The Class-I local suppliers, under PPP-MII Order, participating in any government tender, may or may not be MSEs, as defined under the MSME Act. Similarly, MSEs participating in any government tender, may or may not be Class-I local suppliers. Suppliers may be categorised in following four broad categories for consideration or applicability of purchase preference:

Category	**Terminology**
Supplier is both MSE & Class-I local supplier.	"MSE Class-I local supplier"
Supplier is MSE but not Class-I local supplier.	"MSE but non-Class-I local supplier"
Supplier is not MSE but is Class-I local supplier.	"Non-MSE but Class-I local supplier"
Supplier is neither MSE nor Class-I local.	"Non-MSE non-Class-I local supplier"

4. The applicability of PPP-MSE Order and PPP-MII Order in various scenarios, involving simultaneous purchase preference to MSEs and Class-I local suppliers under PPP-MSE Order and PPP-MII Order respectively, shall be as under:

a) *Items covered under Para 3(a) of PPP- MII Order, 2017 for which Nodal Ministry has notified sufficient local capacity and competition:* For these items, only Class-I local suppliers are eligible to bid irrespective of purchase value. Hence, Class-II local suppliers or Non-local suppliers, including MSEs which are Class-II local suppliers/ Non-local suppliers, are not eligible to bid. Possible scenarios can be as under:

(i) L-1 is "MSE Class-I local supplier" - 100% of the tendered quantity is to be awarded to L-1.

(ii) L-1 is "Non-MSE but Class-I local supplier" - Purchase preference is given to MSEs as per PPP-MSE Order. Balance quantity is to be awarded to the L-1 bidder.

b) *Items reserved exclusively for procurement from MSEs as per PPP-MSE Order:* These items are reserved exclusively for purchase from MSEs. Hence, non-MSEs are not eligible to bid for these items. Possible scenarios can be as under:

(i) L-1 is "MSE Class-I local supplier" - 100% of the tendered quantity is to be awarded to L-1.

(ii) L-1 is "MSE non-Class–I local supplier" - Purchase preference is to be given to Class-I local supplier as per PPP-MII Order. Balance quantity, is to be awarded to L-1 bidder.

c) *If items are neither notified for sufficient local capacity nor reserved for MSEs, then the process will be as follows:*

c (a) Items covered under Para 3A(b) of PPP-MII Order are divisible items and both MSEs as well as Class-I local suppliers are eligible for purchase preference. Possible scenarios can be as under:

(i) L-1 is "MSE Class-I local supplier" - 100% of the tendered quantity is to be awarded to L-1.

(ii) L-1 is "Non-MSE but Class-I local supplier" - Purchase preference is to be given to MSEs, if eligible, as per PPP-MSE Order. Balance quantity is to be awarded to L-1 bidder.

(iii) L-1 is "MSE but non-Class-I local supplier" - Purchase preference is to be given to Class-I local suppliers, if eligible, as per PPP-MII Order. Balance quantity is to be awarded to L-1 bidder.

(iv) L-1 is "Non-MSE non-Class-I local supplier" - Purchase preference is to be given to MSEs as per PPP-MSE Order. Thereafter, purchase preference is to be given to Class-I local suppliers for "50% of the tendered quantity minus quantity allotted to MSEs

above" as per PPP- MII Order. For the balance quantity, contract is to be awarded to L-1 bidder. *(Kindly refer to the illustrative example in the annexure).*

c (b) Items covered under Para 3A(c) of PPP-MII Order, 2017 are non-divisible items and both MSEs as well as Class-I local suppliers are eligible for purchase preference. Possible scenarios can be as under:

(i) L-1 is "MSE Class-I local supplier" - Contract is awarded to L-1.

(ii) L-1 is not "MSE Class-I local supplier" but the "MSE Class-I local supplier" falls within 15% margin of purchase preference - Purchase preference is to be given to lowest quoting "MSE Class-I local supplier". If lowest quoting "MSE Class-I local supplier" does not accept the L-1 rates, the next higher "MSE Class-I local supplier" falling within 15% margin of purchase preference is to be given purchase preference and so on.

(iii) If conditions mentioned in sub paras (i) and (ii) above are not met i.e. L-1 is neither "MSE Class-I local supplier" nor "MSE Class-I local supplier" is eligible to take benefit of purchase preference, the contract is to be awarded/ purchase preference to be given in different possible scenarios as under:

A. L1 is "MSE but non-Class-I local supplier" or "Non-MSE but Class-I local supplier" – Contract is be awarded to L1.

B. L1 is "Non-MSE non-Class-I local supplier" - First purchase preference to be given to MSE as per PPP-MSE Order. If MSE not eligible/ does not accept - purchase preference to be given to Class- I Local supplier as per PPP-MII Order. If Class-I Local supplier also not eligible/ does not accept – contract to be awarded to L-1.

d) *Items reserved for both MSEs and Class-I local suppliers*: These items are reserved exclusively for purchase from MSEs as well as Class-I local suppliers. Hence, only "MSE Class-I local supplier" are eligible to bid for these items. Non-MSEs/Class-II local suppliers/ Non-local suppliers cannot bid for these items. Hence the question of purchase preference does not arise.

e) Non-local suppliers, including MSEs falling in the category of Non-local suppliers, shall be eligible to bid only against Global Tender Enquiry.

18/5/2023

(Kanwalpreet)
Director
Tel.:-223093811; email: - kanwal.irss@gov.in

To

1. Secretaries of all Central Government Ministries/ Departments.
2. Secretary Department of Public Enterprises with a request for issuing suitable instructions to all Central Public Sector Enterprises in this regard.

Annexure

Example explaining applicability in scenario explained in para 4 c (a)(iv)

(Scenario: Divisible items, both MSEs as well as Class-I local suppliers eligible for purchase preference and L-1 is "Non-MSE non-Class-I local supplier")

Item – Desktop computer

Qty – 50 Nos.

Details of bids received

Sr. No.	Name of bidder	Rates quoted	Price Ranking	Status of bidder
1.	A	100	L1	"Non-MSE non- Class-I local supplier"
2.	B	110	L2	"Non-MSE but Class-I local supplier"
3.	C	112	L3	"MSE but non- Class-I local supplier"
4.	D	115	L4	"Non-MSE but Class-I local supplier"
5.	E	118	L5	"MSE but non- Class-I local supplier"
6.	F	120	L6	"MSE Class-I local supplier"

1. In this case, first purchase preference is to be given to MSEs as per PPP-MSE Order for 25% of tendered quantity of 50 Nos. i.e. 12.5 Nos. (rounded off to the next whole number say 13 Nos). Accordingly, invite L3 (bidder C), whose quoted rates falls within 15% margin of purchase preference to match L1 price i.e. Rs. 100/- for quantity of 13 Nos. Bidder "E" and "F", although MSEs, will not get purchase preference since their quoted rates don't fall within 15% margin of purchase preference. Bidder C will be considered for order of 13 Nos. on confirmation of reduction of price.

2. For 50% of balance quantity of 37 number (tendered quantity of 50 – 13 awarded to bidder C; assuming bidder C has confirmed to accept L1 rates), purchase preference will be given to lowest Class-I local supplier as per PPP-MII Order. Accordingly, bidder B will be invited to match L-1 price for 50% of 37 Nos i.e. 18.5 (say 19 Nos of computers). If bidder "B" does not accept the L1 price i.e. price of Rs. 100/- per unit, next higher Class-I local supplier falling within 20% margin of purchase preference, i.e. bidder "D", may be invited to match L-1 price for 19 Nos. of computers and so on.

3. For remaining quantity i.e. 18 Nos (50-13-19), the contract will be awarded to lowest quoting bidder i.e. Bidder "A", who is L-1 in the example.

***

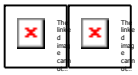
Chairman Managing Director HPCL

From: Mr Kailash Bhandari <kailash.bhandari@nic.in>
Sent: 29 May 2023 10:19
To: cmd-cpses
Subject: [Cmd-cpses] Concurrent application of Public Procurement Policy for Micro and Small Enterprises Order, 2012 and Public Procurement (Preference to Make in India) Order, 2017 -regarding
Attachments: DPE OM Dated 29.05.2023.pdf; ATT00001.txt

PFA letter on the subject mentioned above.

Regards

Kailash Bhandari
Deputy Director
Department of Public Enterprises
Tel : 011-24366247
Mobile : 9891239889



ANNEXURE - 12
(SPECIMEN)

12. BANK GUARANTEE IN LIEU OF EARNEST MONEY

(On Non-Judicial stamp paper of appropriate value)

TO : Hindustan Petroleum Corporation Limited

(Address as applicable)

IN CONSIDERATION OF MESSRS. HINDUSTAN PETROLEUM CORPORATION LIMITED a Government of India Company registered under the Companies Act, 1956, having its registered office at 17, Jamshedji Tata Road, Bombay-20 (hereinafter called "The Corporation" which expression shall include its successor in business and assigns) issued a tender on Messrs. ..... a partnership firm/sole proprietor business/a company registered under the Companies Act, 1956 having its office at (hereinafter called "the Tenderer" which expression shall include its executors, administrators and assigns) against Tender no..... dated ..... (hereinafter called "the tender" which expression shall include any amendments/ alterations to "the tender" issued by "the Corporation") for the supply of goods to/execution of services for "the Corporation" and "the Corporation" having agreed not to insist upon immediate payment of Earnest Money for the fulfilment of the said tender in terms thereof on production of an acceptable Bank Guarantee for an amount of ₹..... (Rupees ..... only).

We, ... Bank having office at ..... Bombay (hereinafter referred to as "the Bank" which expression shall include its successors and assigns) at the request and on behalf of "the Tenderer" hereby agree to pay to the Corporation without any demur on first demand an amount not exceeding ₹..... (Rupees ..... only) against any loss or damage, costs, charges and expenses caused to or suffered by "the Corporation" by reason of non performance and fulfilment or for any breach on the part of "the Tenderer" of any of the terms and conditions of the said "tender".

2. We, ... Bank further agree that "the Corporation" shall be sole Judge whether the said "Tenderer" has failed to perform or fulfill the said "tender" in terms thereof or committed breach of any of the terms and conditions of "the order" and the extent of loss, damage, cost, charges and expenses suffered or incurred or would be suffered or incurred by "the Corporation" on account thereof and we waive in favour of "the Corporation" all the rights and defences to which we as guarantors and/or "the Tenderer" may be entitled to.

® 3. We, ... Bank further agree that the amount demanded by "the Corporation" as such shall be final and binding on "the Bank" as to "the Bank" 's liability to pay and the amount demanded and "the Bank" to undertake to pay "the Corporation" the amount so demanded on first demand and without any demur notwithstanding any dispute raised by "the Tenderer" or any suit or other legal proceedings including arbitration **or conciliation** pending before any court, tribunal or arbitrator **or conciliator(s)** relating thereto, our liability under this guarantee being absolute and unconditional.

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4. We, ... Bank further agree with "the Corporation" that "the Corporation" shall have the fullest liberty without our consent and without affecting in any manner our obligations hereunder to vary any of the terms and conditions of the said "tender"/or to extend time of performance by "the Tenderer" from time to time or to postpone for any time to time any of the powers exercisable by "the Corporation" against "the Tenderer" and to forbear to enforce any of the terms and conditions relating to "the tender" and we shall not be relieved from our liability by reason of any such variation or extension being granted to "the Tenderer" or for any forbearance, act or omission on the part of "the Corporation" or any indulgence by "the Corporation" to "the tenderer" or by any such matter or things whatsoever which under the law relating to sureties would but for this provision have the effect of relieving us.

5. NOTWITHSTANDING anything hereinbefore contained, our liability under this Guarantee is restricted to r ..... (Rupees..... only). Our liability under this guarantee shall remain in force until expiration of six months from the due date of opening of the said "tender". Unless a demand or claim under this guarantee is made on us in writing within said period, that is, on or before ..... all rights of "the Corporation" under the said guarantee shall be forfeited and we shall be relieved and discharged from all liabilities thereunder.

6. We, ... Bank further undertake not to revoke this guarantee during its currency except with the previous consent of "the Corporation" in Writing.

7. We, ... Bank lastly agree that "the Bank's liability under this guarantee shall not be affected by any change in the constitution of "the Tenderer".

8. "The Bank" has power to issue this guarantee in favour of "the Corporation" in terms of the documents and/or the Agreement/Contract or MOU entered into between "the Tenderer" and "the Bank" in this regard.

IN WITNESS WHEREOF the Bank has executed this document on this ..... day of .....

For ..... Bank

(by its constituted attorney)

(Signature of a person authorised

to sign on behalf of "the Bank")