RFP Document

No. GSECL/ PP/ RE & BD/ 110 MW Solar PV/

24.08.2020

Issued by

Gujarat State Electricity Corporation Limited (GSECL)

PLANNING&PROJECT DEPARTMENT, VIDYUT BHAVAN, RACE COURSE, VADODARA 390 007

Ph. No: 0265 – 6612131 / 6612132/***6612139***

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sere.gsecl@gebmail.com

BID FOR DESIGN, ENGINEERING, SUPPLY & PROCUREMENT, CONSTRUCTION, OPERATION AND MAINTENANCE OF 110 MW SOLAR PHOTOVOLTAIC GRID CONNECTED POWER PLANT RANGING FROM 10 MW TO 55 MW AT VARIOUS SUBSTATIONS OF GETCO IN THE STATE OF GUJARAT.

Gujarat State Electricity Corporation Limited (GSECL)

(Regd. Office: Vidyut Bhavan, Race Course, Vadodara-390007, Gujarat)
Website: - www.gsecl.in

BID FOR DESIGN, ENGINEERING, SUPPLY & PROCUREMENT, CONSTRUCTION, OPERATION AND MAINTENANCE OF 110 MW SOLAR PHOTOVOLTAIC GRID-CONNECTED POWER PLANT RANGING FROM 10-55 MW AT VARIOUS SUBSTATIONS OF GETCO IN THE STATE OF GUJARAT.

ISSUED BY:

CHIEF ENGINEER (PLANNING AND PROJECT)
CORPORATE OFFICE
GUJARATSTATEELECTRICITY CORPORATION LIMITED (GSECL)

ON

24.08.2020

SECTION-1: NOTICE INVITING TENDER (NIT)

GUJARAT STATE ELECTRICITY CORPORATION LIMITED
Vidyut Bhavan, Race Course, Vadodara, Gujarat, India – 390007
E-mail: cepnp.gsecl@gebmail.com; acepnp.gsecl.@gebmail.com ; sere.gsecl@gebmail.com
Phone: 91-265-6612131 Website: www.gsecl.in

SECTION-1

NOTICE INVITING TENDER (NIT)

"Bid For Design, Engineering, Supply & Procurement, Construction, Operation And Maintenance Of 110 MW Solar Photovoltaic Grid-Connected Power Plant Ranging From 10-55 Mw At Various Substations Of GETCO In The State Of Gujarat".

Gujarat State Corporation Limited (GESCL) invites interested parties to participate in this Request for Proposal (this **"RFP or the "Tender Documents" or the "Tender")** for bidding and selection process for the appointment of Contractor for Design, Engineering, Supply & Procurement, Construction, Operation And Maintenance Of 110 MW Solar Photovoltaic Grid-Connected Power Plant Ranging From 10 MW To 55 M At Various Substations Of Getco In The State Of Gujarat**(the "Project")**.

Tender Documents may be downloaded from Web sitehttp://gsecl.nprocure.com(For view, down load and on-line submission) and GUVNL / GSECL websites www.guvnl.com / www.gsecl.in (For view & download only.) Tender fee & EMD shall be paid along with submission of Tender Documents. All the relevant documents of Tender shall be submitted physically by **Registered Post A.D. or Speed Post or by Hand Delivery** addressed to: **The Chief Engineer (P&P), Gujarat State Electricity Corporation Ltd, Corporate Office, Planning & Project Department, Vidyut Bhavan, Race Course, VADODARA- 390007**, **Gujarat** super scribing the envelope with Tender No. and Description. "NO COURIER SERVICE" shall be considered for submission of Tender.

TABLE A: IMPORTANT DATES

Sr.	Event		Date (and Time)
i.	Date of upload of orignal tender (Document No. GSECL/ PP/ RE&BD/ 110MW Solar PV)	:	24.08.2020
ii.	Last date and time for receipt of questions/ queries/ clarifications	:	07.09.2020 Note: after due date no any queries will be consider in pre-bid meeting.
iii.	Pre-bid Meeting	:	09.09.2020, 11.00 Hrs at Corporate Office, GSECL, Vadodara
iv.	Online (e-tendering) Tender/Offer submission last date **{This is mandatory}**	:	16.09.2020, 14.00 Hrs.
v.	Physical receipt of Bid with all the relevant documents last date (By RPAD or Speed Post or By Personal Messenger) **{This is mandatory}**	:	16.09.2020, 16.00 Hrs.
vi.	Bid Validity	:	One Hundred and twenty (120) days from the date of opening of the Technical Bid of this Tender
vii.	Date of opening of Tender Fee, EMD Cover, Vendor Registration and Technical Bid Physical as well as Online opening	:	16.09.2020, 17.00 Hrs
viii.	a) Opening of Financial Bid b) Reverse Auction starts from	:	Will be intimated separately to technically qualified bidders.

ix.	Target date for Commissioning of Project	:	**Capacity wise target date of commissioning is as under** Nikava 15 MW : 10 months from the date of NTP Pachham 40 MW : 12 months from the date of NTP Sanesh 55 MW : 15 months from the date of NTP
x.	Tentative Date for completion of Operational Acceptance Test	:	1 Month from the date of commissioning as per clause no (ix) above for respective site.
xi.	Performance Guarantee (PG) Test Period	:	Performance Guarantee (PG) Test Period shall start as under: A) If the Contractor successfully completes Operational Acceptance Test (OAT) in first attempt then PG Test Period and O&M Period will start from the date when the OAT was started. (OR) B) In case the Contractor fails the OAT in the first attempt, the Contractor shall be allowed maximum 60 days for corrective actions and further next OAT shall start on completion of 60 days period or earlier as desired by the Contractor. The PG Test and the O&M period shall start from the date when of second OAT period is started. In case the Contractor fails in the second attempt as well, a penalty will be imposed at 1% of EPC Contract Price. In this case, irrespective of the result (whether pass or fail) of the OAT, the PG Test and O&M Period shall start at the beginning of the second OAT.

			(OR) C) However, in case of failure of the second OAT, if the Contractor needs more time to further take corrective action at its own discretion, then the same may be allowed by GSECL without imposing any further penalty on the Contractor towards such subsequent OATs. However, if the Contractor is successful in third attempt then the penalty deducted at the time of unsuccessful 2nd attempt of OAT shall be returned but if the Contractor fails in third attempt of OAT then penalty charged at the time of second unsuccessful attempt of OAT shall not be returned to the Contractor. In such cases the PG Test and O&M Period shall start upon the completion of the on-going OAT, if any, upon the written intimation of the Contractor to GSECL. If OAT is passed successfully, the deducted LD (1%) shall be released.
xii.	Operation and Maintenance (O&M) Period	:	Upon start of PG Test Period as perClause No. xi above for a period of ten (10) years.
xiii.	EMD Validity	:	One Hundred and Twenty (120) days from the date of opening of the Technical Bid of this Tender
xiv.	Bank Guarantee Against PV Module Waranty (if applicable) as per Clause no. 6.39.10.		90 days beyond the 25 Years from the date of Commissioning of the entire Project.
xv.	Bank Guarantee for shortfall at the time of PG test (if applicable)		9 Years from the competition of PG Test.
xvi.	Site visit of the locations		Pachham & Sanesh on 02.09.2020 Nikava on 03.09.2020 Please refer Page no 222

Note: The abovementioned dates are subject to amendment, in which case the amendments shall be publically intimated.

TABLE B: IMPORTANT AMOUNTS

Sr.	Head		Amount (and Validity)
i.	**Tender Fees (non-refundable)**	:	Rs.25,000/- (Rupees Twenty Five Thousand Only + GST as applicable
ii.	**Estimated Cost of Tender**	:	Rs. 440 Cr-/- (Rupees Four Hundred Eighty Crore Only)
iii.	**Earnest Money Deposit (EMD) in the form of Bank Guarantee** **(Refundable/adjustable)**	:	Rs 4 Lakh per MW Separate EMD for each location. xiii of Table A (Important Dates) above.
iv.	**Security Deposit cum Performance Bank Guarantee (PBG)**	:	10% of the EPC Contract Price, to be submitted within seven (7) days, along with the acceptance of LoI, initially valid for a period as defined as per following from the date of issue of LoI; if required, the PBG shall have to be extended for further 3 months beyond the due date of successful completion of PG test. Validity of PBG : Nikava 15 MW : 25 months from the date of LoI Pachham 40 MW : 28 months from the date of LoI Sanesh 55 MW : 31 months from the date of LoI
v.	**O&M Bank Guarantee (O&M BG)**	:	5% of EPC Contract Price, to be submitted upon completion and acceptance of Performance Guarantee Test as per Clause No. xii of Table A (Important Dates) above for a period of Five (5) years, and and 2.5% of EPC Contract price from the start of the sixth (6th) year of O&M period to the **90 days beyond** completion of the O&M Period mentioned in Clause No. xii of Table A (Important Dates) above. This O&M BG shall cover the risk against extended warrantee for equipment up to O&M Period and recovery towards shortfall in NEEGG during O&M

			Period. The O&M Bank Guarantee shall be valid 90 days beyond the O&M Period. Bidder shall have to submit separate BG as per above for each SS project in case bidder wins more than one project vide this tender.
vi.	**Bank Guarantee Against PV Module Waranty (if applicable)**		This Bank Guarantee is to be submitted from the start date of O&M. Refer Payment Terms.
vii.	**Bank Guarantee for shortfall at the time of PG test (To whomsoever it is applicable)**		Rs. 25.80 per kWh
viii.	**Tender Fees (non-refundable)**	:	Rs. 25000/- (Rupees Twenty Five Thousand Only + GST

IMPORTANT NOTE TO BIDDERS:

Timely submission of offer to GSECL: In addition to bid submitted online, all the relevant documents as per requirement of the Tender shall also be submitted physically along with the proof of Tender Fee and EMD in sealed cover so that the same is received in this office on or before the due date and time. All such documents should be strictly submitted by **RPAD / speed post/ in person in sealed cover** only. Otherwise the offer will not be considered and no any further communication in the matter will be entertained. **Please note that Price Bid is not to be submitted in physical form .**Single stage two envelope bidding.

No Tender shall be accepted in any case after due date and time of receipt of the Tender, irrespective of delay due to postal services or any other reasons and GSECL does not assume any responsibility for late receipt of the Tender.

1. All interested parties are requested to understand this Tender in detail in order to comply with GSECL's requirements including but not limited to the fees and deadlines, selection criteria, selection methodology, scope of work, and minimum technical standards. They shall strictly abide by ALL terms prescribed in this Tender and provide accurate information to the best of their knowledge without misleading the Company to be considered for participation in this Project.
2. It is **mandatory** for all the Bidders to submit their Financial Bid ONLINE only via e-tendering portal.
3. **Technical Bid (Techno-commercial Bid)** to be submitted both in physical as well as soft copy (online). It is **mandatory** for all the bidders to submit their Technical Bid (Techno-commercial Bid) documents in both forms i.e. online (e-tendering) as well as in hard copy in scheduled time. Technical bid in any one form i.e. either in soft copy (online) or in hard copy (physical form), shall not be considered. Technical Bid (Techno-commercial Bid) in **TWO(**2) copies (1 Original+ 1 Copies) shall be sent in Sealed Envelopes containing copies of Technical bid (Techno-commercial bid).
4. Technical Bid (Techno-commercial Bid) envelope shall be super scribed as: "**GSECL/ PP/ RE&BD/ 110 MW Solar PV/ ; Technical Bid for Design, Engineering, Supply & Procurement, Construction, Operation and Maintenance of 110 MW Solar**

Photovoltaic Grid-Connected ranging from 10 to 55 MW at various substations of GETCO in the State of Gujarat.".

5. All the envelopes shall be addressed to: The Chief Engineer (P&P), Gujarat State Electricity Corporation Limited (GSECL), Corporate Office, Vidyut Bhavan, Race Course, Vadodara – 390 007, Gujarat. Complete postal address of the Bidder shall appear on all the envelopes so that it is possible to find out whose Bid it is without opening the envelope.
6. Tender Fee and EMD shall be submitted in two separate envelopes.
7. Tender fee (non-refundable) will be accepted by DD drawn in favour of the Gujarat State Electricity Corporation Ltd. payable at Vadodara. Tenders submitted without Tender Fee shall not be accepted. The envelope for Tender Fee should be super scribed as "Tender Fee". Cheques are not acceptable.
8. Bidder(s) have to pay total EMD of as per Clause No. iii of Table B (Important Amounts) above. EMD shall be in the form of Bank Guarantee/DD in favour of "Gujarat State Electricity Corporation Limited" payable at Vadodara. The envelope for EMD should be super scribed as "EMD". Cheques are not acceptable.
9. It is mandatory for all Bidders to submit their Price Bid (Appendix 15) only through on-line (e-tendering) mode. Price Bids submitted in physical form shall not be considered for its opening and only on-line submitted price bid will be considered for evaluation. Bidders to note that Price Bid (Appendix 15) of only those Bidders shall be opened (On-line e-tendering) who are found technically qualified and are found reasonably responsive to GSECL's Tender terms and conditions and Scope of Work.
10. Any technical/commercial query pertaining to this Tender should be referred to:

THE CHIEF ENGINEER (P&P)
Gujarat State Electricity Corporation Limited (GSECL)
Corporate Office, Vidyut Bhavan
Race Course, Vadodara – 390 007, Gujarat.
Contact No.: 0265-6612131; Email: cepnp.gsecl@gebmail.com

11. For submitting their Bids, Bidders need to have the Digital Signature Certificates from either of the following agencies. **(DSC as per Category- III).**

Sr. No.	Name of Certifying Agencies	Web Site Address.
1	Safe scrypt	www.safescrypt.com
2	TCS	www.tcs-ca.tcs.co.in
3	MTNL	www.mtnltrustline.com
4	nCode Solutions	www.nprocure.com

In case of any further information regarding online bidding or if a Bidder needs any assistance in accessing/ submission of online bid/ clarification or if training is required for participating in online e-reverse bidding, then the Bidder can contact the following office for assistance or training:

(n) Procure Cell, (n)code solutions-A division of GNFC Ltd.,
403, GNFC Info tower, S.G. Road,
Bodakdev Ahmedabad – 380054 (Gujarat)
Toll Free: 1-800-419-4632 / 1-800-233-1010,
Phone No. 079-26857315 / 316 / 317,
Fax: 079-26857321 / 40007533, Email: nprocure@gnvfc.net

12. **Tender Documents (PDF Format) can be downloaded from Web site http://gsecl.nprocure.com , www.guvnl.comorwww.gsecl.in .**

13. GSECL reserve the rights to accept/reject any or all Tenders without assigning any reasons thereof. Bidders are requested to be in touch with above-mentioned websites till opening of the Price Bid to know the latest status.

14. Project wise/location wise, Separate orders shall be issued. Likewise, Project wise/location wise, contract agreements shall be made.

Yours faithfully,

For and behalf of Gujarat State Electricity Corporation Ltd.

(Y.D.Brahmbhatt)
Chief Engineer (P&P)
GSECL, CO, Vadodara

--- End of Section ---

Document Checklist

[Note: Document Checklist shall be attached with Appendix 1 of the Technical Bid]

Sr.	Document	Attached? (Yes/ No)	For Official Use
1.	Complete sets of Bids (original and copies)		
2.	Signed Tender Documents in Cover-I		
3.	Demand Draft of Tender Fees		
4.	Enclosures of the Bid including the Covering Letter as per the format prescribed in Appendix 1: Format for Covering Letter Cover-II.		
5.	Details of Bidder as specified in Annexure 2		
6.	EMD in the form of Demand Draft or/and Bank Guarantee as per format prescribed in Appendix18 (a): Format of Bank Guarantee for EMD.		
7.	Attested copy of GST Registration Certificate of Bidder.		
8.	Attested copy of Provident Fund Code of Bidder.		
9.	Attested copy of PAN Card for Bidder.		
10.	Certificate of Commencement of Business issued by the Registrar of Companies for Bidder.		
11.	Power of Attorney by the Bidder in favour of Bidder as per format prescribed in Appendix		
12.	Document as per Clause No. 3.2		

13.	Details of qualified technical staff as per the format in Appendix– 8		
14.	Project Plan as mentioned in Appendix5: Format for Project Execution Plan.		
15.	Bill of Quantities with Specifications / Make etc. as per Tender/RFP		
16.	Copy of this RFP with sign and official seal on every page.		
17.	A comprehensive project management schedule in the form of Gantt Chart for execution plan		
18.	Visited the site locations		

Disclaimer

A. The information contained in this Request for Proposal ("RFP") or subsequently provided to Bidder(s), in documentary or in any other form, by or on behalf of GSECL, any of their employees or advisors, is provided to Bidder(s) on the terms and conditions set out in this RFP and such other terms and conditions subject to which such information is provided.

B. This RFP is not an agreement and is neither an offer nor invitation by GSECL to the prospective Bidders or any other person. The purpose of this RFP is to provide interested parties with information that may be useful to them in the formulation of their Bid for qualification pursuant to this RFP. This RFP includes statements, which reflect various assumptions and assessments arrived at by GSECL or their advisors or employees or agents, in relation to the Project. Such assumptions, assessments and statements do not purport to contain all the information that each Bidder may require. This RFP may not be appropriate for all persons, and it is not possible for GSECL, their employees or advisors to consider the investment objectives, financial situation and particular needs of each party who reads or uses this RFP.

C. The assumptions, assessments, statements and information contained in this RFP may not be complete, accurate, adequate or correct. Each Bidder should therefore, conduct its own investigations and analysis and should check the accuracy, adequacy, correctness, reliability and completeness of the assumptions, assessments, statements and information contained in this RFP and obtain independent advice from appropriate sources.

D. Information provided in this RFP to the Bidder(s) is on a wide range of matters, some of which depends upon interpretation of law. The information given is not an exhaustive account of statutory requirements and should not be regarded as a complete or authoritative statement of law. GSECL would not have any responsibility for the accuracy or otherwise for any interpretation or opinion on law expressed herein.

E. GSECL, their employees and advisors make no representation or warranty and shall have no liability to any person, including any Bidder or Bidder(s), under any law, statute, rules or regulations or tort, principles of restitution or unjust enrichment or otherwise for any loss, damages, cost or expense which may arise from or be incurred or suffered on account of anything contained in this Bid or otherwise, including the accuracy, adequacy,

correctness, completeness or reliability of the RFP and any assessment, assumption, statement or information contained therein or deemed to form part of this RFP or arising in any way with prequalification of Bidders for participation in the Bidding process.

F. GSECL also accept no liability of any nature whether resulting from negligence or otherwise howsoever caused arising from reliance of any Bidder upon the statements contained in this RFP. GSECL may, in their respective absolute discretion but without being under any obligation to do so, update, amend or supplement the information, assessment or assumptions contained in this RFP.

G. The issuance of this RFP does not imply that GSECL is bound to select and short-list prequalified Bids for Bid Stage (the "Bid Stage") or to appoint the selected Bidder, as the case may be, for the Project[s] and GSECL reserves the right to reject all or any of the Bid or Bids without assigning any reasons whatsoever.

H. The Bidder shall bear all its costs associated with or relating to the preparation and submission of its Bid including but not limited to preparation, copying, postage, delivery fees, expenses associated with any demonstrations or presentations which may be required by the GSECL or any other costs incurred in connection with or relating to its Bid proposal. All such costs and expenses will remain with the Bidder and the GSECL shall not be liable in any manner whatsoever for the same or for any other costs or other expenses incurred by a Bidder in preparation or submission of the Bid proposal regardless of the conduct or outcome of the Bidding process.

Table of Contents

1 Definition& Interpretation

1.1 Definitions

The following words and expressions shall have the meanings hereby assigned to them:

1.1.1 **"Actual Energy Delivered"** means the net energy in kilo-watt hour (kWh) from solar PV plant as measured at the Metering Point.

1.1.2 **"Adjudicator"** means the person, who shall be an engineer or a firm of engineers who is appointed by the Company to act as the adjudicator to make a decision on or to settle any dispute or difference between the Company and the Contractor referred to it or her by the parties pursuant to RFP (Adjudicator) hereof.

1.1.3 **"Applicable Law"** means any statute, law, regulation, ordinance, notification, rule, regulation, judgment, order, decree, bye-law, approval, directive, guideline, policy, requirement or other governmental restriction or any similar form of decision of, or determination by, or any interpretation or administration having the force of law in the Republic of India and the State Government, by any Government Authority or instrumentality thereof, whether in effect as of the date of this Contract or thereafter.

1.1.4 **"Base NEEGG"** for a year is calculated by using the Net Electrical Energy Generation Guarantee (NEEGG) quoted in the Bid 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.

1.1.5 **"Bid"** shall mean the bid submitted by the Bidder in response to the RFP/Tender Document No. "GSECL/ PP/ RE&BD/ 110 MW Solar PV" issued by the Company**.**

1.1.6 **"Bidder"** shall mean Bidding Company or a Bidding Individual submitting the Bid. Any reference to the Bidder includes Bidding Company / Bidding Individual including its successors, executors and permitted assigns severally, as the context may require;

1.1.7 **"Commissioning"** means the satisfactory, continuous and uninterrupted operation of the equipment/system as specified after all necessary statutory approvals, initial tests, checks and adjustments for a period of at least 3 days to the satisfaction of the Company and necessary certificates are issued by the all concerned/ nodal agencies appointed by appropriate authority/Government.

1.1.8 **"Completion"** means that the Facilities (or a specific part thereof where specific parts are specified in the Scope of Work) have been completed operationally and structurally and put in a tight and clean condition and that all work in respect of Commissioning of the Facilities or such specific part thereof has been completed as per the Scope of Work.

1.1.9 **"Company"** means Gujarat State Electricity Corporation Limited includes the legal successors or permitted assigns of the Company.

1.1.10 **"Contract"** or **"Contract Agreement"** means the Contract signed between the Company and the Contractor to execute the entire Scope of Work as given in Appendix 19: Contract Agreement.

1.1.11 **"Contract Documents"** means the documents listed in Appendix 19: Contract Agreement.

1.1.12 **"Contractor"** means the person(s) whose bid to perform the Contract has been accepted by the Company and is named as such the Contract Agreement, and includes the legal successors or permitted assigns of the Contractor.

1.1.13 **"Contractor's Equipment"** means all plant, facilities, equipment, machinery, tools, apparatus, appliances or things of every kind required in or for installation, completion and maintenance of Facilities that are to be provided by the Contractor, but does not include Plant and Equipment, or other things intended to form or forming part of the Facilities.

1.1.14 "**Capacity Utilization Factor (CUF)"** shall have the same meaning as provided in CERC (Terms and Conditions for Tariff determination from Renewable Energy Sources) Regulations, 2009 as amended from time to time.

1.1.15 **"Chartered Accountant**" shall mean a person practicing in India or a firm whereof all the partners practicing in India as a Chartered Accountant(s) within the meaning of the Chartered Accountants Act, 1949.

1.1.16 **"Day"** means calendar day of the Gregorian calendar.

1.1.17 "**Delivery Point**" shall be the interconnection point at which solar power developer (SPD), GSECL, shall deliver the power to the Gujarat State Transmission Unit substation. The metering shall be done at this point of interconnection.

1.1.18 **"Defect Liability Period"** means the period of validity of the warranties given by the Contractor, during which the Contractor is responsible for defects with respect to the Facilities (or the relevant part thereof) as provided in Clause No. 6.13 (Defect Liability) hereof.

1.1.19 **"Effective Date"** for this Contract shall mean the date of issuance of Letter of Intent by the Company.

1.1.20 **"Facilities"** means the Plant and Equipment to be supplied and installed, as well as all the Installation Services to be carried out by the Contractor under the Contract for enabling the installation, construction, testing and commissioning of the Solar Power System(s).

1.1.21 **"Government Authority"** means Government of India, any state government or any governmental department, commission, board, body, bureau, agency, authority, undertaking, court or other judicial or administrative body or any sub-division or instrumentality thereof, central, state, or local, having jurisdiction over the Contractor, the Facility, or the performance of all or any of the services, obligations or covenants of Contractor under or pursuant to this Contract or any portion thereof.

1.1.22 **"Guarantee Test(s)"** means the Performance & Guarantee test(s) specified in the (Guarantee Test) to be carried out to ascertain whether the Facilities or a specified part thereof is able to attain the Functional Guarantees.

1.1.23 **"Installation Services"** means all those services ancillary to the supply of the Plant and Equipment for the Facilities, to be provided by the Contractor under the Contract; e.g., transportation and provision of marine or other similar insurance, inspection, expediting, Site preparation works (including the provision and use of Contractor's Equipment and the supply of all civil, structural and construction materials required), installation, Commissioning, carrying out guarantee tests, operations, maintenance, the provision of operations and maintenance manuals, training of Company's personnel etc.

1.1.24 **"Month"** means calendar month of the Gregorian calendar.

1.1.25 **"MNRE"** means Ministry of New and Renewable Energy, Government of India.

1.1.26 **"O&M"** means Operations and Maintenance.

1.1.27 **"Owner"** means Gujarat State Electricity Corporation Limited (GSECL) for _____ MW (AC) project.

1.1.28 **"Plant Capacity"** is defined as capacity of respective site, Grid-Connected Solar Photovoltaic Power Plant, Gujarat as per the provisions in this Tender including but not limited to its design, engineering, procurement & supply, construction, commissioning, compressive operation and maintenance.

1.1.29 **"Project Manager"** means the person appointed by the Company in the manner provided in the RFP (Project Manager) hereof and named to perform the duties delegated by the Company.

1.1.30 **"Prudent Utility Practices"** means those practices, methods, techniques and standards, that are generally accepted for use in electric utility industries taking into account conditions in India, and commonly used in prudent electric utility engineering and operations to design, engineer, construct, test, operate and maintain equipment lawfully, safely, efficiently and economically as applicable to power stations of the size, service and type of the Project, and that generally conform to the manufacturer's operation and maintenance guidelines.

1.1.31 **"RFP document**" shall mean the bidding document issued by the Company including all attachments vide RFP No. **GSECL/ PP/ RE&BD/ 110 MW Solar PV**

1.1.32 **"SECI"** means Solar Energy Corporation of India.

1.1.33 **"Site"** means the land and other places upon which the Facilities are to be installed, and such other land or places as may be specified in the Contract as forming part of the Site.

1.1.34 **"Solar Power System(s)"** means the solar photovoltaic grid interactive power system(s) to be established at the site specified in the RFP.

1.1.35 **"Subcontractor"**, including vendors, means any person to whom execution of any part of the Facilities, including preparation of any design or supply of any Plant and Equipment, is sub-contracted directly or indirectly by the Contractor, and includes its legal successors or permitted assigns.

1.1.36 **"Successful Bidder"** means the bidder who has been awarded the Contract and described as Contractor for the "Project".

1.1.37 **"Time for Completion"** shall be the date on or before which Commissioning of the Facility has to be achieved to the satisfaction of the Company and such date is specified in NIT.

1.1.38 "**Metering Point**" means Metering Point for each plot shall be at GETCO substation 66 kV terminal point.

1.2 Interpretations

1.2.1 Language: Unless otherwise agreed by the parties in writing, the parties shall use the English language and the Contract and the other Bid documents, all correspondence and communications to be given, and all other documentation to be prepared and supplied under the Contract shall be written in English, and the Contract shall be construed and interpreted in accordance with that language. If any of the Contract Documents, correspondence or communications are prepared in any language other than English, the English translation of such documents, correspondence or communications shall prevail in matters of interpretation.

1.2.2 Singular and Plural: The singular shall include the plural and the plural the singular, except where the context otherwise requires.

1.2.3 Headings: The headings and marginal notes in the General Conditions of Contract are included for ease of reference, and shall neither constitute a part of the Contract nor affect its interpretation.

1.2.4 Persons: Words importing persons or parties shall include firms, corporations and government entities.

1.2.5 Men: The word 'Men' in this RFP shall mean all genders i.e. male, female and others.

1.2.6 Entire Agreement: The Contract constitutes the entire agreement between the Company and Contractor with respect to the subject matter of Contract and supersedes all communications, negotiations and agreements (whether written or oral) of parties with respect thereto made prior to the date of Contract. The various documents forming the Contract are to be taken as mutually explanatory. Should there be any discrepancy, inconsistency, error or omission in the Contract documents, the matter may be referred to the Adjudicator and the Contractor shall carry out work in accordance with the decision of the Adjudicator.

1.2.7 Amendment: No amendment or other variation of the Contract shall be effective unless it is in writing, is dated, expressly refers to the Contract, and is signed by a duly authorized representative of each party hereto.

1.2.8 Independent Contractor: Subject to the provisions of the Contract, the Contractor shall be solely responsible for the manner in which the Contract is performed.

i. All employees, representatives or Subcontractors engaged by the Contractor in connection with the performance of the Contract shall be under the complete control of the Contractor and shall not be deemed to be employees of the Company and nothing contained in the Contract or in any subcontract awarded by the Contractor shall be construed to create any contractual relationship between any such employees, representatives or Subcontractors and the Company.

ii. Not in any case the sub-contractor shall claim or shall put any binding to the Company and the sub-contractor must be handled by the Contractor and the Company shall not be responsible for any claims at any time by the Contractor in relation to the sub-contractor.

1.2.9 Non-Waiver

i. Subject to Clause1.2.9(i) below, no relaxation, forbearance, delay or indulgence by either party in enforcing any of the terms and conditions of the Contract or the granting of time by either party to the other shall prejudice, affect or restrict the rights of that party under the Contract, nor shall any waiver by either party of any breach of Contract operate as waiver of any subsequent or continuing breach of Contract.

(ii) Any waiver of a party's rights, powers or remedies under the Contract must be in writing, must be dated and signed by an authorized representative of the party granting such waiver, and must specify the right and the extent to which it is being waived.

1.2.10 Severability: If any provision or condition of the Contract is prohibited or rendered invalid or unenforceable, such prohibition, invalidity or unenforceability shall not affect the validity or enforceability of any other provisions and conditions of the Contract.

1.2.11 Country of Origin: "Origin" means the place where the materials, equipment and other supplies for the Facilities are mined, grown, produced or manufactured, as the case may be, and from which the services are provided. This shall be according to MNRE guidelines.

1.3.13 Bidder will have to bid for the name plate capacity of respective site. No partial bid will be accepted.

2 Introduction

2.1 About the Company

2.1.1 About GSECL

Gujarat State Electricity Corporation Limited (GSECL) was incorporated in August 1993 and is registered under the Companies Act, 1956 with the objectives to initiate a process of restructuring of Power Sector and to mobilize resources from the market for adding to the generating capacity of the State and improving the quality and cost of existing generation. The Company was promoted by erstwhile Gujarat Electricity Board (GEB) as it's wholly owned subsidiary in the context of liberalization and as a part of efforts towards restructuring of the Power Sector. The Memorandum and Articles of Association of GSECL envisage a wide spectrum of activities to improve the electricity infrastructure of Gujarat. GSECL has initiated its activities in the field of Generation of Power.

The Government of Gujarat (GoG) has also given to the GSECL the status of Independent Power Producer (IPP) with approval to undertake new power projects. The Company commenced it is commercial operation in the year 1998. However, the operations of GSECL were limited to Power Stations units Gandhinagar #5, Wanakbori #7, Utran GBPS & Dhuvaran CCPP till the complete unbundling of erstwhile GEB was undertaken, i.e. up to 31st March 2005.

As a part of the reform process, the Government of Gujarat has unbundled the various functions of GEB. As a result of this unbundling, Gujarat State Electricity Corporation Limited (GSECL) has taken up the responsibility of electricity generation. Electricity Transmission has been entrusted to the already existing company - GETCO. Distribution network in the state has been split up among four distribution companies, which cater to the northern, central, southern, and western parts of the state respectively. All these companies have been structured as subsidiaries of a holding company, Gujarat Urja Vikas Nigam Limited (GUVNL). GUVNL is also the single bulk buyer in the state as well as the bulk supplier to distribution companies. It will also carry out the trading function in the state.

2.2 About the Project

2.2.1 2.2.1 The Gujarat State Electricity Corporation Limited (GSECL) based at Vadodara proposes to implement a 110 MW (AC) project of Crystalline silicon solar

photovoltaic grid interactive power station to harness green energy. It is under Government of India (GoI) initiative to promote renewable energy. GSECL proposes to establish 110 MW (AC) capacity (Solar Power System(s) including development of land, buildings, plant, machinery, ancillary equipment, material, switch-gear, transformers, protection equipment and the development, design, construction, operation and maintenance for ten (10) year of the Power Plant is hereinafter referred to as the (the "Project") at various substations of GETCO in the State of Gujarat. The Company has now decided to undertake a competitive Bidding process for selection of the EPC Contractor to implement the Project (the "Contractor").

2.2.2 The details of the facilities which the Company requires to be set up in the present instance and for which Bids are hereby invited are described in this Request for Proposal (RFP). The overall responsibility of complete Scope of Work rests with the Bidder.

--- End of Section---

3 Instruction to Bidders

3.1 General Instructions

3.1.1 The current document is the request for proposal, which is issued to all the potential Bidders, requesting a proposal for implementation of the Project on a fixed price basis. A Contractor would be selected through competitive bidding process for execution of the Project.

3.1.2 The Company expects Bidders to confirm compliance to RFP terms, conditions and specifications at the time of submission of Bids, failing which the Bids are liable to be rejected. Hence, the Bidders in their own interest are advised to submit their Bids complete in all respects conforming to all terms and conditions of this RFP.

3.1.3 Before submitting the Tender, the instructions may be read carefully regarding submission of Tender. If any bidder finds discrepancies or omissions in the Tender documents or is in doubt as to the true meaning of any part, he shall clarify same from the Tender issuing office in writing before the due date of submission of the queries.

3.1.4 Bids shall be evaluated based on the information/documents available in the Bid. Hence, Bidders are advised to ensure that they submit appropriate and relevant supporting documentation along with their proposal in the first instance itself. Bids not complying with the requirements of this RFP are liable to be rejected without any further opportunity.

3.1.5 Bidders need to ensure that in the event the Project is awarded to it, and during execution of the Project, it shall not seek to alter any agreed contractual terms, conditions and specifications.

3.1.6 All Bids must be accompanied by a Tender fee and EMD of value as specified in the NIT in the form and manner as specified in the RFP document and must be delivered along with Bids.

3.1.7 The specification provided with this RFP outlines the functional requirement. The Bidder must submit a Proposal based upon their own design, meeting the functional requirements.

3.1.8 Bidders shall deploy the latest state-of-the-art technology and must ensure that the goods supplied are new, unused and of most recent or current models and incorporate all recent improvements in design and materials for the implementation of the Project.

3.1.9 This 'Instructions to Bidders', in original, issued along with RFP document, shall be submitted by the Bidder along with Bid duly signed by the Bidder as the token of acceptance. Bid sent without having the prescribed RFP document and without complying with the terms and conditions of RFP shall be ignored.

3.1.10 Issuance of this RFP does not construe that the Bidder has been short-listed or qualified.

3.1.11 The Company reserves the right, to accept or reject any Bid and to annul the bidding process and reject all Bids at any time prior to award of the Agreement, without assigning any reason thereof and without thereby incurring any liability to the affected Bidder(s).

3.1.12 The Company reserves the right to reject any Bid submitted with deviations beyond the one that is specified and mentioned in the RFP and no time shall be given in any circumstance after opening of Financial Proposal for submission of documents which are missing with Bid.

3.1.13 In case of change in ownership of the Project, all the Agreements and Contracts signed with the Company will stand true and valid with the new Owner of the Project.

3.1.14 Tender Issuing Authority reserves the right to cancel the NIT or to change qualifying requirement or to reject any or all the tenders so received without assigning any reason.

3.1.15 The entire Site for the work shall be made available along with NTP.

3.1.16 Canvassing in connection with Tender is strictly prohibited and the Tender submitted by the Bidders who resort to canvassing will be liable to rejection straight way.

3.1.17 All rates shall be quoted on the proper form i.e. price bid supplied as part of the Tender documents on e-tender portal by the Department.

3.1.18 The Gujarat State Electricity Corporation Limited does not bind itself to accept the lowest Bid and reserves to itself the right to accept the whole or any part of the Tender and the Bidder shall be bound to perform the same at the rate quoted in this Tender.

3.2 Pre-Qualifying Requirements (PQRs)/ Eligibility Conditions

3.2.1 GENERAL

(i) The Bidder shall be a body incorporated in India under the Companies Act, 1956 or 2013 including any amendment thereto. A copy of certificate of incorporation shall be furnished along with the bid in support of above.

3.2.2 TECHNICAL

For the capacity bided by Contractor (on or after 1st April 2014, only ground mounted solar projects):

(i) The Bidder shall have an experience of design, supply, installation, commissioning and operation or plant installation under progress of cumulative installed capacity of 66 % of total bided capacity or above in or outside India on or after 1 April 2014 as on the Deadline for Submission of Bid, with a minimum one megawatt scale of plant.

i.e. if bidder is bidding for total of 100 MW of capacity at various locations, then The Bidder shall have an experience of design, supply, installation, commissioning and operation or plant installation under progress of cumulative installed capacity of 66 MW of capacity or above in or outside India on or after 1 April 2014 as on the Deadline for Submission of Bid, with a minimum megawatt scale of plant.

(ii) Out of the above-mentioned required installed plant as per 3.2.2 (i) in accordance with bidding size, cumulative 90 % of 3.2.2 (i) solar PV power plants shall have been commissioned and in operation in India.

i.e. Out of the 66 MW of installed plant, cumulative 60 MW of required installed capacity solar PV power plants shall have been commissioned and in operation in India.

(iii) Out of the above-mentioned installed plant as per 3.2.2 (ii), there must atleast one solar PV power plant of 66 % of 3.2.2 (ii) capacity.

i.e. Out of the 60 MW of plant, there must atleast one solar PV power plant of 39.6 MW.

(iv) The Bidder shall also submit documentary proof of achievement of performance generation guarantee and performance of at least one solar PV power plant of 10 MW capacity at least one year, which shall be certified from the Developer of that particular solar PV power plant.Bidder shall submit, in support to the above, the list of projects commissioned along with their work order/ LOI and the commissioning certificates along with the certificate of plant being in operation. In case the bidder wants to meet the eligibility criterion through its own power plant, then a certificate from Chartered Accountant to that effect will be required to be submitted.

If bidder is bidding only for Nikava project the technical criteria at clause (i), (ii), (iii) shall remain same. However, in such Case, Clause no (iv) shall be as per following.

(iv) The Bidder shall also submit documentary proof of achievement of performance generation guarantee and performance of at least one solar PV power plant of 5 MW capacity at least one year, which shall be certified from the Developer of that particular solar PV power plant.Bidder shall submit, in support to the above, the list of projects commissioned along with their work order/ LOI and the commissioning certificates along with the certificate of plant being in operation. In case the bidder wants to meet the eligibility criterion through its own power plant, then a certificate from Chartered Accountant to that effect will be required to be submitted.

3.2.3 FINANCIAL

i. Cumulative Turnover of the Bidder for last three (3) financial years shall be at least as per below.

4 Cr. X Capacity in MW bidder is bidding X 0.9.

ii. The Net Worth of the Bidder during the last Financial Year shall be positive, wherein the Net Worth shall be calculated as follows:

Net Worth = (Equity + Reserves) – (Revaluation reserves+ intangible assets + Miscellaneous expenses to the extent not written off + carried forward Losses).

The Bidder shall provide a copy each of audited annual report to ascertain their turnover & net- worth. CA certified Net worth of previous three financial year shall be submitted.

iii. The Bidder shall submit audited annual report of FYs 2016-17, 2017-18, 2018-19 (if not audited then certification from Chartered Accountant shall be required).

Iv In case a Bidder is a 100 % subsidiary company & does not satisfy the annual turnover criteria, stipulated above on its own, its Holding Company would be required

to meet the stipulated turnover requirements as above, provided that the Net Worth of such Holding Company as on the last day of the preceding financial year is at least equal to or more than the paid-up share capital of the subsidiary Company. In such an event, the Bidder would be required to furnish along with its Techno- Commercial Bid, a Letter of Undertaking from the Holding Company, supported by the Holding Company's Board Resolution, as per the format enclosed in the bid documents, pledging unconditional and irrevocable financial support for the execution of the Contract by the Bidder in case of award. Over and above bidder shall submit unconditional Bank Guarantee equivalent but not less than 5 % of EPC price from holding company which shall be furnished within ten (10) days after Notification of Award.

v. Also, out of 10% PBG, the Technical Partner shall submit a Bank Guarantee of 7.5% and Financial/Other Partner shall furnish Bank Guarantee of 2.5%.

3.2.4 OTHER

1. The Bidders to have valid Proof of Permanent EPF account no., ESI registration no. and GST no.
2. The agency should have valid license under contract labour regulation and abolition of the Gujarat state or should give an undertaking that he will get himself registered within one month if work is allotted to him.
3. A self-attested certificate from the Bidder to the effect that the Bidder is not blacklisted from any Public Sector undertakings of Central Govt. / State Govt. /SEBs / Corporations/GIPCL/GSECL/GUVNL/GERMI/ DISCOMs/ GETCO etc.
4. The experience list shall include only projects executed by Bidder himself as a turnkey contractor which shall include entire Engineering, Procurement, and Supply& Installation and not as a sub-contractor. The list of project executed shall clearly mention name of the technology partner / licensee Agreement Company and whether the same is valid as on date with date of expiry.
5. The Bidder shall ensure that all the information, facts & figures, data provided in the bid are accurate and correct. GSECL reserves the right to confirm / verify any data or information through their own sources. GSECL also may contact directly the references given for the project executed and may also visit the site, manufacturing facilities & sub-vendors works etc., physically to ascertain capabilities of the applicant, if so desire at their own cost. Bidder may have to facilitate GSECL for any such visit.
6. The Bidder shall furnish documentary evidence by way of copies of Contract / Purchas Order, Completion Certificate, performance certificate or any other equivalent document, Audited Balance Sheet and Profit & Loss Account etc., along with the Bid to establish experience / track record and financial capabilities meeting Bid Evaluation Criteria.
7. The Bidder or its Proprietor / Partner(s) / Director(s) of the Firm should not have been convicted by a Court of Law for an offence involving moral turpitude in relation to business dealings during the past seven (7) years. GSECL shall also take into account past experience of Project execution by Bidder for GSECL or other reputed developers while carrying out overall due diligence of the proposal and evaluating Bidder in totality to take final call on his selection on his selection

on following criteria. GSECL decision regarding the same shall be binding to the bidder.

8. Bidder should not have executed any project(s) making in ordinate delay beyond 3 (three) months from the scheduled completion period for the single project as per technical qualification lause no 3.2.2(iii). Bidder shall submit undertaking for the same as part of Bid submission document.
9. GSECL also reserves right to reject or disqualify any bidder at any stage considering its overall performance in past project (s) executed for GSECL based on reasonable grounds/ reasons for such rejection/disqualification.

3.3 **Local Conditions**

3.3.1 The Bidder is advised to visit and examine the site conditions, traffic, location, surroundings, climate, availability of power, water and other utilities for construction, access to site, handling and storage of materials, weather data, applicable laws and regulations, and obtain for itself on its own responsibility all information that may be necessary for preparing the Bid and entering into the Contract Agreement. The costs of visiting the Site shall be at Bidder's own expense.

3.3.2 The Bidder and any of its personnel or agents shall be granted permission by the Company to enter upon its premises and lands for the purpose of such inspection, but only upon the express condition that the Bidder, its personnel or agents, shall release and indemnify the Company and its personnel and agents from and against all liability in respect thereof and shall be responsible for personal injury (whether fatal or otherwise), loss of or damage to property and any other loss, damage, costs and expenses however caused, which, but for the exercise of such permission would not have arisen.

3.3.3 Failure to visit the Site or failure to study the RFP document shall in no way relieve the successful Bidder from furnishing any material or performing any work in accordance with the RFP document.

3.3.4 In no case the date of Time for Completion of the project shall be extended, due to the failure of the Bidder to visit the site and it shall be in line with the timeline of Gujarat State Electricity Corporation Limited under the Scheme.

3.3.5 The Bidder must conduct its own inspection of the Project Site, access to the Project Site and surroundings at its own cost in order to make a proper estimate of the works to be performed under consideration of site-specific constraints. This applies in particular to the transportation of equipment to the Project site and the scope of site works. The Bidder shall also inspect the site and the access to site from the point of manufacture to make sure that its equipment is suitable for the available access and the site terrain.

3.3.6 It shall be deemed that by submitting a Bid, the Bidder has:

a) made a complete and careful examination of the RFP document;
b) received all relevant information requested from the Company;
c) Acknowledged and accepted the risk of inadequacy, error or mistake in the information provided in the RFP documents or furnished by or on behalf of the Company relating to any of the matters referred to in NIT.
d) satisfied itself about all matters, things and information including matters referred to in the Bid Info at a glance, necessary and required for submitting an informed Bid, execution of the Project in accordance with the RFP document and performance of all of its obligations there under;

e) acknowledged and agreed that inadequacy, lack of completeness or incorrectness of information provided in the RFP document or ignorance of any of the matters referred to in the RFP herein shall not be a basis for any claim for compensation, damages, extension of time for performance of its obligations, loss of profits etc. from the Company, or a ground for termination of the Contract Agreement; and

f) agreed to be bound by the undertakings provided by it under and in terms hereof.

3.3.7 The Company shall not be liable for any omission, mistake or error on the part of the Bidder in respect of any of the above or on account of any matter or thing arising out of or concerning or relating to the RFP document or the Bidding Process, including any error or mistake therein or in any information or data given by the Company.

3.4 Local Regulatory Frame Work

3.4.1 It shall be imperative for each Bidder to fully inform itself of all local conditions, laws and factors which may have any effect on the execution of the Contract as described in the Bidding Documents. The Company shall not entertain any request for clarification from the Bidder, regarding such local conditions.

3.4.2 It is the responsibility of the Bidder that such factors have properly been investigated and considered while submitting the Bid proposals and that no claim whatsoever including those for financial adjustment to the Contract awarded under the RFP document shall be entertained by the Company and that neither any change in the time schedule of the Contract nor any financial adjustments arising thereof shall be permitted by the Company.

3.5 Clarifications to Tender Document

3.5.1 A Bidder requiring any clarification of the Tender documents may notify

3.5.2 GSECL in writing or by facsimile or by e-mail to GSECL's contact as mentioned in Table A of NIT:

The Chief Engineer (Planning & Project)
Corporate Office, Gujarat State Electricity Corporation Limited (GSECL)
Vidyut Bhavan, Race Course
Vadodara -390 007, Gujarat
Email: cepnp.gsecl@gebmail.com;
acepnp.gsecl@gebmail.com;
sere.gsecl@gebmail.com
Website: www.gsecl.in

3.6 Amendments to Tender Document

3.6.1 GSECL may, for any reason, whether at his own initiative or in response to a clarification requested by a prospective Bidder, modify the Tender Documents.

3.6.2 The amendments will be notified on website as mentioned in Notice Inviting e-Tender of this Tender.

3.6.3 In order to allow the prospective Bidder(s), reasonable time in which to take the amendment into account in preparing their Bids, GSECL at its discretion, may extend the deadline for the submission of Bids.

3.7 Acceptance of Bids

3.7.1 GSECL neither bind itself to accept the lowest nor to assign any reasonfor the rejection of any Bid. It is also not binding on GSECL to disclose any analysis report.

3.8 **Withdrawal of Invitation to Bid**

3.8.1 While GSECL has floated this Tender and has requested Bidders to submit their proposals, GSECL shall always be at the liberty to withdraw this invitation to bid at any time before the acceptance of bid offer.

3.8.2 The sites/locations as mentioned in this tender are subject to availability of government wasteland. If Government Wasteland is not been provided/available/allotted to GSECL than GSECL shall be at the liberty to decide accordingly. Bidder shall bid accordingly. It is responsibility of bidder to visit the site prior to submission of bids.

3.9 **Representative/ Agent of Bidder**

3.9.1 All the Bidders are requested to mention the name of their authorized representative/ agent, if any, with full address in the Bid. In case the representative is changed during the bidding process such changes shall be notified by the Bidder, failing which, GSECL shall not accept any responsibility.

3.10 **Financial Proposal and Currencies**

3.10.1 The Bidders shall quote the prices inclusive of all the taxes, while also providing the breakup of taxes as mentioned in Appendix-15 the similar format will be present in the e-tender for online submission. The Bidder shall indicate the price in Financial Proposal in Indian National Rupee only.

3.11 **Bank Guarantees & EMD**

3.11.1 EMD shall be in the form of Bank Guarantee / Demand Draft.

3.11.2 The validity of EMD shall be as mentioned in NIT.

3.11.3 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 GSECL desiring to award the work to the said Bidder. GSECL 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.

3.11.4 The Company shall, however, arrange to release the EMD in respect of unsuccessful Bidders, without any interest, after the acceptance of LOI along with the submission of Security Deposit by successful Bidder.

- The EMD shall be released to bidders in the following manner. The EMD of the Successful Bidder shall be refunded only after the submission of SD cum PBG & after award of order.

- EMD of the unsuccessful bidders shall be released after releasing the EMD of the Successful Bidder.

3.11.5 The EMD shall be forfeited and appropriated by GSECL as per the discretion of GSECL as genuine, pre-estimated compensation and damages payable to GSECL for,

inter alia, time, cost and effort of GSECL without prejudice to any other right or remedy that may be available to GSECL 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 LoI – (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.

3.11.6 The Successful Bidder shall furnish the following Bank Guarantees:

i) **Security Deposit cum Performance Bank Guarantee (SD/PBG)** as per the format given in Appendix 18 (b): Format of Bank Guarantee for Security Deposit/ Performance Bank Guarantee, shall be furnished in favour of Chief Engineer (P&P), Gujarat State Electricity Corporation Limited. The Successful Bidder shall submit Security Deposit cum Performance Bank Guarantee of–10% of the EPC Contract Price, to be submitted within seven (7) days, along with the acceptance of LoI, initially valid for a period as defined as per following from the date of issue of LoI; if required, the PBG shall have to be extended for further 3 months beyond the due date of successful completion of PG test.

Sr no	Name of Project /Site	Validity of SD cum PBG
1	Nikava 15 MW	25 months from the date of LoI
2	Pachham 40 MW	28 months from the date of LoI
3	Sanesh 55 MW	31 months from the date of LoI

However, in case of delay in demonstration of the PG test, the same will have to be extended up to 3 months beyond the due date for successful completion of PG test. The period for Performance Guarantee Test shall begin from the date mentioned in NIT of this Tender and shall continue till next one (1) year. SD/PBG shall be returned only after successful Performance Guarantee Test/ Final Acceptance Test.

ii) **O&M Bank Guarantee:** 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. The Contractor shall submit the O&M Bank Guaranteeas mentioned in the NIT, to GSECL within 30 days from the date of start of O&M period as specified in the NIT of this Tender in favour of Chief Engineer (P&P), Gujarat State Electricty Corporation Limited, Vadodara. The format of the O&M Bank Guarantee is given in Appendix 18 (c): Format of Bank Guarantee for Performance for O&M.

iii) **Bank Guarantee against PV Module Warranty:** The Successful Bidder who is not able to provide insurance of PV modules as specified in the Tender Clause No. 6.40.10 (A) shall submit a Bank Gurantee of Rs. 10 Lakh per each megawatt of PV modules (i.e. DC capacity), which shall be valid for a period of twenty five (25) years and 90 days . The minimum validity of the Bank guarantee shall be five (5) years and shall be renewed subsequently every five (5) years prior to thrity (30) days of its expiry. In case the PV module fails to provide power output as per its performance warranty, and if the Contractor fails to rectify, replace or repair the PV module, then the Company shall carry out the necessary rectification, repair or replacement at its own discretion at the risk and cost of the Contractor. The cost of such rectificaiton, repair or replacement shall be encashed from the Bank Guarantee against PV Module Warranty. The same shall be replenished by the Contractor within thirty (30) day, failing which the entire Bank Guarantee amount shall be encashed and all pending payment shall be witheld by the Company till such amount is replenished by the Contractor. In another instance, if the Contractor becomes bankrupt or insolvent, then the Company shall immediately encash the entire amount of the Bank Guarantee against PV Module Warranty.

iv) **Bank Guarantee for shortfall at the time of PG Test:** In case the Contractor fails to achieve the NEEGG at the PG test then the Contractor shall, within a period of thirty (30) days, provide a Bank Guarantee of the amount equal to "**Rs 25.80 x No. of shortfall units**" valid for a period of 9 (nine) years. In case the Contractor achieves the NEEGG in the 10^{th} year then then Bank Guarantee shall be returned to the Contractor at the end of 10th year of O&M Period. However, if the Contractor fails to achieve theNEEGG during the 10^{th} year then Rs. 25.80/ KWh shall be charged for the shortfall that has occured in the 10^{th} year with a maximum amount

limited to the Bank Guarantee value. *For example,during the PG Test, if the Contractor has a shortfall of 100 kWh, then the Contractor shall submit a Bank Guarantee of Rs. 2580/- valid for 9 (nine) years.* Further at the end of 10thyear, if the short fall is of **100** kWh then maximum penalty of Rs **2580** shall beencashed from the BankGuarantee.However, if the shortfall is of 80 kWh then Rs. 2064 (i.e. Rs.25.80 x 80kWh) shall be encashed from the Bank Guarantee and the remaining amount of the Bank Guaranteeshallbe released to the Contractor.It is further clarified that the year-on-year shortfalls in achieving the NEEGG during the 1st to 10th year of O&M Period shall be charged as per Clause No 6.12.6 of this Tender Document, which shall be over and abve the provision of this current Clause.

3.11.7 Due to an extended nature of the O&M Bank Guarantee, the Contractor is allowed to provide O&M Bank Guarantees of not less than two (2) year and renew the same each year. However, the Contractor shall renew the O&M Bank Guarantee at least one month before the expiry of the validity failing which GSECL will be at liberty to encash the same. In case the O&M Bank Guarantee is encashed due to any penalty then the Contractor has to replenish within 20 days the O&M Bank Guarantee for the remaining period.

3.11.8 Any lapse in the timely renewal of the O&M Bank Guarantee shall entitle GSECL to encash it without assigning any further reason thereof.

3.11.9 The O&M Bank Guarantee should be valid up to **90 days** beyond the due date of completion of O&M year. For subsequent O&M years, the Bank Guarantee should be extended/renewed in such a manner that the same remains valid up to 45 days beyond the date of completion of each subsequent O&M year.

3.12 **Project Management Consultant and Third Party Inspection Agency**

3.12.1 A Project Management Consultancy (PMC) or Third Party Inspection agency (TPI) may be appointed by GSECL, at its sole discretion, to conduct any kind of inspection regarding procurement, fabrication, installation, hook-up, quality, execution, commissioning, operation and maintenance during the span of the Project. The Contractor shall provide necessary access and coordination to conduct such inspections. The Contractor shall provide all necessary access and cooperation for inspection by National or State agency.

3.13 **Right to Accept or Reject any or all Bids**

3.13.1 Notwithstanding anything contained in this Tender, GSECL reserves the right to accept or reject any Bid and to annul the bidding process and reject all Bids at any time without any liability or any obligation for such acceptance, rejection or annulment, and without assigning any reasons thereof.

3.13.2 GSECL reserves the right to reject any Bid and appropriate the EMD if:

a. after reviewing the Bid there is doubt that the offered works, materials or equipment are not state of the art and/ or not suitable for the site operating conditions;

b. at any time, a material misrepresentation is made or uncovered, or

c. the Bidder does not provide, within the time specified by the GSECL, the supplemental information sought by GSECL for evaluation of the Bid.

3.13.3 Such misrepresentation/ improper response shall lead to the disqualification of the Bidder. If such disqualification / rejection occur after the Bids have been opened and the Successful Bidder gets disqualified / rejected, then GSECL reserves the right to:

a. select the next Bidder with the Lowest Evaluated Bid Value as the Successful Bidder; <or>

b. take any such measure as may be deemed fit in the sole discretion of GSECL, including annulment of the bidding process.

3.13.4 In case it is found during the evaluation or at any time before signing of the Contract or after its execution and during the period of subsistence thereof, that one or more of the pre-qualification conditions have not been met by the Bidder or the Bidder has made material misrepresentation or has given any materially incorrect or false information, the Bidder shall be disqualified forthwith, if not yet appointed as the Contractor either by issue of the LoI or entering into of the Contract Agreement, and if the Successful Bidder has already been issued the LoI or has entered into the Contract Agreement, as the case may be, the same shall, notwithstanding anything to the contrary contained therein or in this Tender, be liable to be terminated, by a communication in writing by GSECL to the Contractor, without GSECL being liable in any manner whatsoever to the Bidder or Contractor, as the case may be. In such an event, GSECL shall forfeit and appropriate the bank guarantees without prejudice to any other right or remedy that may be available to GSECL.

3.13.5 GSECL reserves the right to verify all statements, information and documents submitted by the Bidder in response to the Tender Documents. Failure of GSECL to undertake such verification shall not relieve the Bidder of its obligations or liabilities hereunder nor will it affect any rights of GSECL there under.

3.14 Net Electrical Energy Generation Guarantee (NEEGG)

3.14.1 The Bidder shall be required to quote the Net Electrical Energy Generation Guarantee (NEEGG) for ten (10) 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.

3.14.2 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.

3.14.3 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. 6.12.2. The Contractor shall maintain the Plant equipment including its repair, replacement, overhauling, etc., so as to ensure guaranteed NEEGG per year, for which GSECL 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.

3.14.4 The Bids with NEEGG of less than or equal to 23 % of **CUF (AC)** at any site (Considering 365 days a year) for the first year shall be summarily rejected.

Hence for CUF :
Lower limit: 23%
Upper limit: No Limit

3.14.5 The deration in NEEGG quoted for any year shall not be more than 1% of the NEEGG quoted for the previous year. If the Bidder anticipates any degradation of the modules during the first year, it shall be taken care of to provide additional capacity of solar PV modules to meet guaranteed generation at the end of first year to avoid liquidated damages/compensation on account of Performance Guaranteed Generation. The NEEGG of consecutive year should not be more than the previous year's NEEGG. Bids not following these conditions shall be summarily rejected.

3.14.6This NEEGG shall be used for the evaluation of the Bids as Appendix 6: Bid Evaluation Criteria (BEC).

4 Submission of Bid

General Terms

4.1 General Terms

4.1.1 **A Bidder is eligible to submit only one technical Bid for the multiple locations. A Bidder shall not be entitled to submit another Bid either individually or in a Consortium, as the case may be. (Consortium is not allowed)**

4.1.2 Notwithstanding anything to the contrary contained in this RFP, the detailed terms specified in the draft Contract Agreement shall have overriding effect; provided, however, that any conditions or obligations imposed on the Bidder hereunder shall continue to have effect in addition to its obligations under the Contract Agreement.

4.1.3 The Bid should be furnished in the formats mentioned in the RFP document which shall be duly signed by the Bidder's authorized signatory, provided that the Financial Proposal will be submitted in separate envelop.

4.1.4 The Bidder shall submit a power of attorney as per the format at "Appendix 12: Format of Power of Attorney as Authorized Signatory" authorizing the signatory of the Bidder to commit to the Bid or as per their Company's format.

4.1.5 Any condition or qualification or any other stipulation contained in the Bid shall render the Bid liable to rejection as a non-responsive Bid. The complete Bid shall be without alterations, interlineations or erasures, except those to accord with instructions issued by the Company, or as necessary to correct errors made by the Bidder, in which case such corrections shall be initialled by the person or persons signing the Bid.

4.1.6 The RFP documents and all attached documents are and shall remain the property of the Company and are transmitted to the Bidders solely for the purpose of preparation and the submission of a Bid in accordance herewith. Bidders are to treat all information as strictly confidential and shall not use it for any purpose other than for preparation and submission of their Bid. The Company will not return any Bid or any information provided along therewith.

4.1.7 The Bidder shall submit PF code number allotted by Regional PF Commissioner. Failure to do so is likely to result in the offer being rejected.

4.1.8 Bidder shall note that the Price Bid of only those Bidders shall be opened who are found technically qualified and responsive to GSECL's Tender terms and conditions including but not limited to Scope of Works.

4.2 Format and Signing of Bid

4.2.1 The Bidder shall provide all the information sought under this RFP. The Company will evaluate only those Bids that are received in the required formats and complete in all respects.

4.2.2 The Bid shall be typed or written in indelible ink and signed by the authorized signatory of the Bidder who shall also initial each page, in blue ink. All the alterations, omissions, additions or any other amendments made to the Bid shall be initialled by the person(s) signing the Bid.

4.3 Sealing and Marking Of Bid

4.3.1 The Bid of the Bidder shall be contained in one (1) single "Main" Envelope.

4.3.2 The Main Envelope shall contain two (2) Envelopes as follows:

1. "Original" Envelope;
2. "CD" Envelope.

4.3.3 The "Original," Envelopes shall contain the following Envelopes:

a. Cover-I: Signed Copy of the Tender Document(s)
b. Cover-II: Enclosures of the Bid
c. Cover-III: Proof of EMD; and Tender Fee
d. Cover-IV: Financial Proposal unpriced and duly signed and stamped

4.3.4 The "CD" Envelope shall contain one (1) no. of CD containing the following folders with the same information submitted in the Original Envelope:

a. Cover-I: Signed Copy of the Tender Document(s)
b. Cover-II: Enclosures of the Bid
c. Cover-III: Proof of EMD and Tender Fee
d. Cover-IV: Financial Proposal unpriced and duly signed and stamped

4.3.5 All original attested Tender Documents, Bid Enclosures, EMD and Tender Fee, and Financial Proposal (unpriced) shall be contained in the "Original" Envelope.

4.3.6 All soft/ scanned copies of the original attested Tender Documents, Bid Enclosures, EMD and Tender Fee shall be contained in the CD in an appropriately organized manner as in the physical copies, and enclosed in the "CD" Envelope.

4.3.7 IMPORTANT: THE COPY OF THE FINANCIAL BID SHALL NOT BE INCLUDED IN THE CDS.

4.3.8 Envelopes shall be clearly marked as "Original," and "CD".

4.3.9 The content of documents uploaded on e-Procurement portal and hard copies submitted should be same and in case of any discrepancy all documents uploaded on e-Procurement portal shall stay valid.

4.4 Enclosures of the Bid

4.4.1 Cover-I shall be duly marked as "Signed copy of the Tender Document(s)" and shall include the duly signed and sealed Tender Document including its annexure, appendices, attachments, amendments and any other documents as added or modified by GSECL as per the provisions in this Tender.

4.4.2 The documents accompanying the Bid other than the attested Tender Document(s), and Proof of Tender Fee and EMD shall be placed in Cover-II and marked as "Enclosures of the Bid". These documents shall include:

a. The Covering Letter as per the format prescribed in Appendix 1: Format for Covering Letter.
b. Details of the Bidder as per format prescribed in Appendix 2: Details of Bidder. Attested copy of Service Tax Registration Certificate of Bidder.
c. Attested copy of PAN Card for Bidder.
d. Attested Certificate of Commencement of Business issued by the Registrar of Companies for the Bidder.
e. Attested copy of Provident Fund Code of Bidder.
f. Details of similar technical experience of the Bidder as per format prescribed in Appendix 3: Format of Details of Similar Technical Experience.
g. List of proposed PV technologies as per format prescribed in Annexure 4: Format of Disclosure of PV Technology

h. Project execution plan as mentioned in Appendix5: Format for Project Execution Plan.
i. Declaration of Compliance as per format prescribed in Appendix 9.
j. Declaration of Bidder's relation to Directors of GSECL as per format prescribed in Tender
k. Details of qualified technical staff as per format prescribed in Appendix 8: Details of qualified technical staff.
l. No Deviation Certificate as per format prescribed in Appendix 10: No Deviation Certificate.
m. Format of Summary of audited financial statements as per format prescribed in Appendix 12: Format of Power ofAttorney as Authorized Signatory.
n. (If applicable) Authorization of use of financial capability by Parent as per format prescribed in Appendix 14: Format of Authorization by Parent Company with the necessary financial statements and summary required from the Bidder.
o. Project Operation & Maintenance (O&M) Schedule with resource planning in the form of Gantt/ Pert Charts
p. Technical specifications and standard warranty document of PV modules.
q. Design, specifications and document of Solar Tracking solutions (if proposed by Bidder).
r. Specifications / Drawings / Designs and datasheets for all electrical work / components as prescribed in Clause No. 5
s. Technical specifications and warranty document of Inverters
t. Transformers, associated switchgear and others: Bidder shall furnish in detail its warranties/guarantees for these items.

4.4.3 Cover–III shall be duly marked as "copy of Proof of EMD and Tender Fee" and shall contain the copy of proof of Tender Fee and EMD.

4.4.4 Cover-IV shall be duly marked as "Financial Proposal unpriced duly signed and stamped" and shall contain the Financial Proposal (unpriced duly signed and stamped) as per the format prescribed in Appendix 15: Format of Financial Proposal.

4.4.5 All Bid documents shall be placed in hard binding and the pages shall be numbered serially. Each page thereof shall be initialled in blue ink by the authorized signatory.

4.4.6 All envelopes in the Bid Documents shall be sealed. The outer envelope shall clearly bear the following identification:

Outer Envelope

4.4.7 "Tender Bid Document' for setting up of 110 MW Solar Photovoltaic Grid-Connected Power Plant ranging from 10 MW to 55 MW at various substations of GETCO in the State of Gujarat on EPC basis".

Cover-I shall bear the following identification:

4.4.8 "Cover-I: Signed RFP Document for Engineering, Procurement, Construction, and Operation and Maintenance of 110 MW Solar Photovoltaic Grid-Connected Power Plant using Photovoltaic Technology ranging from 10 MW to 55 MW at various substations of GETCO in the State of Gujarat".

Cover -II shall bear the following identification:

4.4.9 "Cover-II: Enclosures of the Bid for Design, Engineering, Supply & Procurement, Construction, Operation and Maintenance of 110 MW Solar Photovoltaic Grid-Connected Power Plant using Photovoltaic Technology ranging from 10 MW to 55 MW at various substations of GETCO in the State of Gujarat".

4.4.10 Cover -III shall bear the following identification:

4.4.11 "Cover-III: EMD and Tender fees of the Bid for Design, Engineering, Supply & Procurement, Construction, Operation and Maintenance of 110 MW Solar Photovoltaic Grid-Connected Power Plant using Photovoltaic Technology ranging from 10 MW to 55 MW at various substations of GETCO in the State of Gujarat".

4.4.12 Cover -IV shall bear the following identification:

4.4.13 "Cover-IV: Financial Proposal (unpriced but duly signed and stamped) for the Bid for Design, Engineering, Supply & Procurement, Construction, Operation and Maintenance of 110 MW Solar Photovoltaic Grid-Connected Power Plant using Photovoltaic ranging from 10 MW to 55 MW at various substations of GETCO in the State of Gujarat".

4.4.14 Each of the envelopes shall clearly indicate the name and address of the Bidder. In addition, the Bid Due Date should be indicated on the right hand top corner of each envelope.

Each of the envelopes shall be addressed to:
ATTN:
The Chief Engineer (P&P)
Gujarat State Electricity Corporation Limited (GSECL)
Vidyut Bhavan, Race Course,
Vadodara–390 007, Gujarat
Tel.No.: +91 265 6612131, Fax No.: +91 265 2341588
Email:cepnp.gsecl@gebmail.com

4.4.15 If the envelopes are not sealed and marked as instructed above, the Company assumes no responsibility for the misplacement or premature opening of the contents of the Bid submitted.

4.4.16 Bids submitted by fax, telex, telegram, courier or e-mail shall not be entertained and shall be rejected.

4.5 **Bid Due Date**

4.5.1 Bids should be submitted before the Deadline for Submission of Bid as specified in NIT.

4.5.2 GSECL may, in its sole discretion, extend the Bid due date by issuing an Amendment/ Addendum in accordance with Clause No. 3.6 uniformly for all Bidders.

4.6 **Late Bids**

4.6.1 Bids received by the Company after the specified time on the bid due date shall not be eligible for consideration and shall be summarily rejected. In case of the unscheduled holiday being declared on the prescribed closing/opening day of the Bid, the next working day shall be treated as the scheduled prescribed day of closing/opening of the Bid.

4.7 **Confidentiality**

4.7.1 Information relating to the examination, clarification, evaluation and recommendation for the Bidders shall not be disclosed to any person who is not officially concerned with the process or is not a retained professional advisor advising the Company in relation to or matters arising out of, or concerning the bidding process. The Company will treat all information, submitted as part of the Bid, in confidence and will require all those who have access to such material to treat the same in confidence. The Company may not divulge any such information unless it is directed to do so by any

statutory entity that has the power under law to require its disclosure or is to enforce or assert any right or privilege of the statutory entity and/ or the Company.

4.8 **Correspondence with the Bidder**

4.8.1 The Company shall not entertain any correspondence with any Bidder in relation to acceptance or rejection of any Bid.

4.9 **Bid Opening and Evaluation**

4.9.1 The Company shall open, examine and evaluate the Bids in accordance with the provisions set out in this RFP document.

4.9.2 To facilitate evaluation of Bids, the Company may, at its sole discretion, seek clarifications in writing from any Bidder regarding its Bid.

4.9.3 After the receipt of Bids the Company may at its discretion send a team of engineers if necessary to inspect the engineering facilities, to ensure suitability and satisfactory working conditions at the Bidder's works/yards(s) and equipment listed to be used by the Bidder for the work. The Bidder shall ensure that the aforesaid team shall at all the times have access to visit and inspect works, equipment etc

4.9.4 This tender is single Stage Two envelope bidding. Price bid shall be submitted at the time of submission of tender bid. Price Bid is required to be submitted online on N procure portal only.

4.9.5 GSECL will hold separate E Reverse auction for each locations separately. Bidders who are bidding for more than one location will have to submit the separate price bids of those locations.

4.10 **Tests of Responsiveness**

4.10.1 Prior to evaluation of Bids, the Company shall determine whether each Bid is responsive to the requirements of the RFP. A Bid shall be considered responsive only if:

i. The minimum Performance Guaranteed of the Power Plant for one year is provided by the Bidder.
ii. it is received in the manner prescribed in this RFP
iii. it is accompanied by the requisite Tender Fee and EMD;
iv. it is received with all the Enclosures of the Bid as prescribed in the Clause 4.4
v. its Enclosures are received as per the formats specified in Appendices as well as the Tender;
vi. it contains all the information (complete in all respects) as requested in this Tender (in the same formats as specified);
vii. it complies will all the terms, conditions and provisions specified in this Tender; and
viii. it does not contain any conditions or deviations

4.10.2 The Company reserves the right to reject any Bid which is non-responsive and no request for alteration, modification, substitution or withdrawal shall be entertained by the Company in respect of such Bid.

4.11 **Modification and Withdrawal of Bids**

4.11.1 In case any clarifications are sought by the Company after opening of Bids then the replies of the Bidder should be restricted to the clarifications sought. Any Bidder who modifies its Bid (including a modification which has the effect of altering the value of its Financial Proposal) after opening of Bid without specific reference by the Company, shall render the Bid liable to be rejected without notice and without further reference to the Bidder and its EMD shall be forfeited.

4.11.2 No Bid may be withdrawn in the interval between the bid due date and the expiration of the validity period of the Bid. Withdrawal or unsolicited modification of a Bid during this interval shall result in the Bidder's forfeiture of its Bid Security.

4.12 **Evaluation of Bid and selection of Bidder**

4.12.1 GSECL will examine the Bid to determine whether they are complete, whether any computational errors have been made, whether required sureties have been furnished, whether the documents have been properly signed, and whether the Bid is generally in order.

4.12.2 Prior to the detailed evaluation, GSECL will determine the substantial responsiveness of each Bid. A substantially responsive Bid is one which conforms to all the terms and conditions of the Tender Documents without material deviations. Deviations from or objections or reservations to critical provisions such as those concerning EMD, Applicable Law and Taxes and Duties will be deemed to be a material deviation. GSECL's determination of a Bid's responsiveness is to be based on the contents of the Bid itself without recourse to extrinsic evidence.

4.12.3 If the Bid is not substantially responsive, it will be rejected by GSECL and may not subsequently be made responsive by the Bidder by correction of the nonconformity.

4.12.4 GSECL will evaluate and compare Bids which have been determined to be substantially responsive.

4.12.5 A Bidder shall have to quote for at least for one location in line with name plate capacity of that location of Solar PV power project.

4.12.6 Following factors shall be required for evaluation of Bid:

a. The Evaluated Bid Value (EBV) shall be calculated using the following parameters:

   i. Engineering Procurement Commissioning (EPC) Contract Price;
   ii. Net Present Value (NPV) of O&M Price of ten (10) years;
   iii. Net Electrical Energy Generation Guarantee; and
   iv. Constant parameters as indicated in the Tender if any.

b. The Bid with the Lowest Evaluated Bid Value shall be considered as L-1 and the Successful Bidder. The Bid with next highest value shall be considered as L-2 and so on for more understanding please refer Appendix 6. An example has also been done for Bidder's comprehension.

4.12.7 In no case, a Bidder shall have the right to claim to be the Successful Bidder for its Bid.

4.12.8 Evaluation of both Techno-Commercial (un-priced) bids and priced bids shall be done separately.

4.12.9 Price Bids of only techno-commercial acceptable bids shall be considered for further evaluation.

4.12.10 **Lowest eight (6) eligible bidders or 50% out of total eligible Bidders** (rounded to the next higher whole number), whichever is higher, shall be invited for participation in e-Reverse Auction.

4.12.11 Decrement value and duration for the e-Reverse Auction shall be informed to the qualified bidders before start of e-Reverse Auction. The L1 EBV shall be put up for starting e-Reverse Auction. e-Reverse auction shall be for reducing the EBV and the bidders have to reduce their EBV in decrement of value as decided before start of e-Reverse Auction.

4.12.12 The reduction offered by the Bidder during e-Reverse Auction Process on the EBV shall be considered for as an equivalent reduction in Total EPC Contract Price only, based on formula of EBV indicated in Appendix-6. Accordingly, final EPC Contract Price will be arrived for all contractual purposes based Quoted O&M cost for 10 years and NEEGG for 10 years shall remain fixed and no change will be allowed in these parameters during e-Reverse Auction.

4.12.13 After e-Reverse Auction process, L1 bidder for the location shall be decided on lowest EBV. The L1 bidder after e-Reverse Auction shall have to submit break-up in line with their quoted price bid within three (3) **working** days.

4.12.14 O&M period will be 10 years after COD with GEDA / GUVNL & completion of all works as per RFP, whichever is later.

4.13 Contacts during Bid Evaluation

4.13.1 Bids shall be deemed to be under consideration immediately after they are opened and until such time the Company makes official intimation of award/ rejection to the Bidders. While the Bids are under consideration, Bidders and/ or their representatives or other interested parties are advised to refrain from contacting by any means, the Company and/ or their employees/ representatives on matters related to the Bids under consideration.

4.14 Employment of Officials/ Ex-Official of the Company

4.14.1 Bidders are advised not to employ serving the Company. It is also advised not to employ ex-personnel of the Company within the initial two years period after their retirement/ resignation/severance from the service without specific permission of the Company. The Company may decide not to deal with such firms who fail to comply with the above advice.

4.15 Declaration on Bidder's Relation to Directors

4.15.1 The Bidders are required to certify in prescribed format Appendix 9: Declaration of Compliance, whether he/they is/are related to any of the Directors/Senior Personnel of the Company in any of the ways mentioned in the Certificate. It is clarified that any such affirmative certificate shall not, by itself, prejudice consideration of the Bid. This certificate must accompany the Bid.

4.16 Letter of Intent ("LOI") and Notification to Proceed

4.16.1 After selection of the Successful Bidder, a Letter of Intent (the "LoI") shall be issued, in duplicate, to the Successful Bidder. The Successful Bidder shall not be entitled to

seek any deviation from the Contract, as may have been amended by GSECL prior to the bid submission date.

4.16.2 On issue of the LoI by the Company, Authorised representative of the Successful Bidder shall sign the Contract Agreement within 7 (seven) days and submit the Bank Guarantee within the stipulated time.

4.16.3 GSECL will issue Notice to Proceed separately for each project unless it is mentioned in LOI. Time line of the project shall be from Notice to Proceed.

4.17 **Performance Guarantee**

4.17.1 Security Deposit cum Performance Bank Guarantee (SD/PBG) as per the format given in Appendix 18 (b): Format of Bank Guarantee for Security Deposit/ Performance Bank Guarantee shall be furnished in favour of Chief Engineer (P&P), Gujarat State Electricity Corporation Limited. The Successful Bidder shall submit Security Deposit cum Performance Bank Guarantee of 10% of the EPC Contract Price, within seven (7) days along with the acceptance of LOI, initially valid for a **period as mentioned in table (B) clause (v)**, and shall be valid for further 90 days..However, in case of delay in demonstration of the PG test, the same will have to be extended up to 3 months beyond the due date for successful completion of PG test. The period for Performance Guarantee Test shall begin from the date mentioned in NIT of this Tender and shall continue till next one (1) year. SD/PBG shall be returned only after successful Performance Guarantee Test/ Final Acceptance Test.

4.17.2 The bank guarantee by the Contractor will be given from bank specified in Appendix 17: List of Banks (for Bank Guarantee) only. BG of any other Bank will not be treated as valid BG.

4.18 **Fraudulent Practices**

4.18.1 The Bidders may please note that the Company shall not entertain any correspondence or queries on the status of the Bids received against this RFP. Bidders are advised not to depute any of their personnel or agents to visit the Company's office for making such inquiries.

4.18.2 Any effort by a Bidder to influence the Company on the Bid evaluation, Bid comparison or Contract award decision may result in the rejection of the Bidder's Bid.

--- End of Section ---

5 Scope of Work

5.1 GENERAL SCOPE OF WORK

The Tender is invited for setting up of grid connected solar PV power plants ranging from 20 MW to 40MW at govt waste land around substations of GETCO in the Gujarat. The cumulative maximum DC installation capacity under Standard Test Conditions (STC) asper IEC61215 and IEC:61730.

The Contractor shall comply that the maximum AC capacity shall not exceed 5% higer than the capacity mentioned for respective substation.

The general scope of work involves Design, Engineering, Procurement & Supply and Construction (EPC) of the grid-connected solar photovoltaic power plant commissioning and evacuation of power into the GETCO's 66 kV substation through construction, erection, testing and commissioning of complete 66 KV bay along with bus bar extension in respective substations, as per GETCO guidelines, with the guaranteed plant performance in the form of guaranteed energy output. Generation from solar PV plant shall be terminated 66 KV GETCO S/s., through 66 KV U/g cable or **single circuit** overhead line, which must be GETCO approved Cable or AL conductor of suitable rating as per current carrying capacity, fault level and voltage drop selection criteria.

The project site location are as under:

Sr No	District	Locations	Power evacuation feasibility (MW)	Land in possession of GSECL (Ha)
1	Bhavnagar	Sanesh	55	100
2	Ahmedabad	Pachchham	40	92
3	Jamnagar	Nikava	15	25

5.1.1

5.1.2 Evacuation of Power & Metering Point:

For the purpose of this project, the evacuation voltage shall be at 66 KV AC (three phase) wherein evacuating point cum metering point shall be installed at 66 KV substation. Scope of work shall also include 66 KV Under Ground cable work from solar plant to GETCO 66 KV substation as well as construction, erection, testing and commissioning of complete 66 KV

bay along with bus bar extension in respective substations as per GETCO guidelines. ABT Meter to measure net power evacuation shall be installed at 66 KV GETCO substations **only**. For each solar PV plant, 4 cables (three-phase plus one spare) are required.

Operation and Maintenance (O&M):

The scope of work includes Operation and Maintenance (O&M) of the plant for ten (10) years, where in 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, Bar chart, PERT 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 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 also shall be included.

b. Breakdown/ Corrective Maintenance: Whenever a fault has occurred, the Contractor has to rectify the fault, the fault must be rectified within 48 hrs 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 the NIT of this Tender. Detailed scope of comprehensive Operation & Maintenance has been described in Chapter 5 and Annexure 6 of this document. 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.

c. Scheduling and forecasting activity/appointment of Qualified coordinating agency for scheduling and forecasting activity shall be in bidder's scope. All required SCADA/System for each site shall be in bidder's scope.

5.1.3 Tracking Structures:

The Company encourages Bidders to employ proven and reliable seasonal tracking system, however the Bidder should note that total land available is approximately as mentioned above in for the Project. The Bidder shall submit in the Bid, the details / specifications / designs / guarantees and warrantees / and any other claims on performance / output of the solar tracking solutions in the Bid document. **Bidder may consider fixed or tilt or tracking system.**

5.1.4 Electrical Work:

Consisting of installation of solar PV modules, junction boxes, grid-tied inverters, isolation transformers, meters, relay & control panel, 11 or 33 KV switchgear, 66 KV switchyard for evacuation at solar plant peripheri , 66 KV UG cable/transmission line , 66 KV bay and bus bar extension in GETCO substation ,interconnection through wires, cables, bus bars, **system fault level study** etc.; plant lighting system, automatic weather station, SCADA and remote web-based communication & monitoring hardware, software etc.; plant and human safety and protection equipment including danger signs etc. Anything not mentioned in the list but still required to finish the EPC contract of Solar Plant capacity to be considered for the BID.

5.1.5 Civil and Other Non-Electrical Work:

Module Mounting Structures (MMS): The Contractor shall design, fabricate, supply and install module mounting structures with all required accessories like clamps, nuts, bolts, cable ties etc., The structures can be of fixed/ seasonal tracker are accepted.

Modules shall be mounted on a non-corrosive support structures (EPDM rubber gasket /Stainless Steel Star Washer). The frames and leg assemblies of the array structures shall be made of hot dip Galvanized steel per ASTM A123.All nuts and bolts (fasteners) shall be made very good quality stainless steel of grade SS 304required for module fixing and for other components of MMS, superstructure or switchyard, inverter room, control room, etc. in the plant premises nuts and bolts (fasteners) shall be of MS material with minimum Grade HDG: 5.6.

Foundations: The Contractor shall design and construct appropriate civil foundations for MMS, prefabricated structures/RCC, transformers, switchyard equipment, feeder bay etc.

Prefabricated Structures: The following prefabricated /RCC structures are to be planned and constructed by the Contractor for the Solar PV project:

- Prefabricated Inverter rooms **for indoor inverters**
- Prefabricated Watchman's cabin (At Main Gate) - 01 Nos.

- Security : **Security cabin shall be provided at the entry of each pocket (i.e. if utilized for installing Solar PV Project) of project site.**

Storm Water Drainage System: The Contractor shall provide storm water drainage system for entire plant.

Solar PV Module Cleaning System:Cleaning frequency shall be decided by the Bidder to meet the guaranteed generation. For this, the Contractor shall construct and operate 10,000 litre /MW capacity RCC/Sintex or underground water storage tank. The Contractor also has to drill a bore and construct pipeline for carrying water to storage tank, provide electric panel and pump for bore and total water cleaning system. For module cleaning, the contractor can provide new tanker with pump; water jet and hose pipe or establish a pipeline network with valves**. Bidder may also consider Robotic/dry/ tractor mounted jet cleaning.**

RCC Precast Boundary Wall: The Contractor shall provide RCC preacst boundary wall for the entire plant boundary of solar plant site. (as per drawing attached herewith).

Approach / Internal Roads and Pathways: The Contractor shall provide internal roads and approach roads / pathways of WBM type. If plant is being installed in more than one pockets. Each pocket shall have internal connectivity by WBM road. Peripheral roads & road connected to inverter transformer shall be of WBM. Carriage way Width of WBM/ Asphalt shall be 4 mtr. and Shoulders width of0.50 mtr. On both side of road.

Cable Trenches: 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.**

Main Gate: The Contractor shall provide main gate of structural steel material of appropriate design. Also, necessary arrangement has to be made by Contractor to erect the main gate on pylon stone.

5.1.5 Site levelling: The Contractor shall level the site, as required, so as to compact the plant in minimum possible area and also minimize shading losses because of solar PV module structures. Removal of debris and bush-cutting is mandatory. Levelling of the site is to be done if required**. Bidder shall design Array of Solar PV as per the natural contour of site. However, water accumulation (rain +plant) shall not be occurred in Solar PV plant area.**

5.1.6 Communication: The Contractor shall provide complete plant SCADA (Software based) with SCADA server having **string level** monitoring capabilities over remote server. Contractor shall lay the cable in appropriate cable trench, connect with suitable connectors and terminate to the SCADA server inside control room. The Contractor shall also provide necessary internet connection through GPRS enabled modem along with LAN connectivity for data communication over remote server and shall bear the cost of the same during the Contract period including O&M. The Contractor shall provide 3 nos. of Web Client License

for remote monitoring per plot. The Contractor shall provide necessary provision of RTU for communication with SLDC. The Contractor shall submit the below mentioned Technical Data Sheet for String RTU, TCP String, Central RTU in the prescribed format.The necessary hardware and softwatre required for SLDC communication from the plant as well as up to evacuation point shall be in the bidder's scope. It is the responsibility of the contractor to obtain ALDC and SLDC connectivity .Necessary charges if any regarding SLDC connectivity shall be in the bidder's scope.

Type Code
Power Entry Characteristics
AC input voltage range ($V_{ac,\,min}$ $V_{ac,\,max}$)
Nominal AC input voltage ($V_{ac,n}$)
Rated frequency (f_r)
DC Input Voltage Range ($V_{dc,min}$..$V_{dc,max}$)
Nominal DC input voltage ($V_{dc,n}$)
RS485 Section
Serial interface type
Baud rate
Protocol
Number of devices
Line biasing resistor (wherever necessary)
Termination resistor
RS485 MODBUS section
Serial interface type
Baud rate
Protocol
Number of devices
Line biasing resistor (wherever necessary)
Termination resistor
Physical and Environmental
Environmental protection rating

Ambien temperature range
Relative humidity
Compliance
Isolation
Marking
Safety and EMC standard

Essential list of I/O and equipment is given herewith, but scope is not limited to the Essential List, contractor is fully responsible to provide complete SCADA System which can be extensible / communicable with additional / future solar plant. 10 % or 20 % spare I/o modules and equipments shall be provided.

Sr.	Equipment to be monitored	Data to Be Monitor (Real Time)	Type of IO
1	String Monitoring / Array Monitoring	String/Inverter level monitoring required	Through Communication with SJB PLC/Card
2	String Junction Box / Array Junction Box (SJB = AJB)	SJB internal temperature and SJB Bus Voltage and Current	Through Communication with SJB PLC/Card
3	Inverter	All Electrical Parameters of Inverter along with Scanning, Records & Error communication	Through Communication with SJB PLC/Card
4	Inverter Transformer	Oil and Winding Temp Monitoring	Analog Input
5	11/33 KV / VCB	ON/OFF and Trip position of VCB and Energy Meter RS-485 communication	DI and Communication
6	66 KV Switchyard	All Equipment details including Power Transformer, Breakers, C&R Panels, Isolators, Earth Break Switches, Metering & Protection Devices etc.	DI and Communication

7	Weather Monitoring Station	Two no. of Class I Pyranometer (one for GHI, one at PV plane collector angle), Two numbers of contact type temperature sensors at backside of the module. Ambient temperature sensor, Wind velocity and speed sensor.	Through Communication
8	Aux. Equipment's	Aux. Transformers, UPS, Fire Alarm Panel, Water & Utility Pumps & Panels,	AI / DI / Communication for Information / Records / Logging
9	Main and Check Meter	All electrical parameters recorded by energy meter	Through RS-485/MODDBUS communication

5.1.7 Plant Safety Equipments:

The Contractor shall provide appropriate numbers of foam type fire extinguishers / CO_2 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. Transformers shall be provided with appropriate Fire protection/ NIFPS fire prevention system.

5.1.8 Statutory Requirements:

All construction, operation and maintenance procedures shall be carried out as stipulated to appropriate relevant standards, regulations laid by CEA/GETCO / DISCOM / GEDA / GSECL / GoI / MNRE and / or any other agency as and when applicable. Further, this shall comply with the applicable labor laws. The Bidder shall make himself aware of such requirements and shall not solely depend on the Company to make available full information.

Bidders should follow GETCO norms, regulations, T & C, specifications and guidelines prevailing at present & amended time to time in all 66 KV and GETCO connected/related works. The GETCO norms, regulations, T & C, specifications and guidelines etc is available at GETCO site or will be provided at the time of LoI or as per requirement during the execution of the projects which is to be implemented in supply erection & commissioning and testing of GETCO items/related works. Following drawing/documents are attached for ready reference only.

1) Standard primary drawings for 66 KV GETCO substation (i.e. SLD, layout plan and section) – Attached as Annexure A6

2) Typical arrangement for GSECL solar feeder in 66KV s/s. (Attached as Annexure A7)

3) CEA regulation related to solar developers.(Attached as Annexure A8)

4) SCADA data/system requirement of GETCO with typical system architecture-Amendment(Attached as Annexure A9)

5.1.9 Planning and Designing:

i. 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.

ii. 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. shall be carried out considering appropriate seismic zone of the area. All appropriate loads, wind velocity, seismic factors etc. shall 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 shall be taken while designing the structures. RCC structures shall be adopted considering surrounding weather and soil conditions of site and as per the relevant IS codes. The concrete mix design test of minimum M20 grade with 380 kilograms of cement shall be carried out in Govt. certified laboratory or NABL accredited laboratory.

iii. 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 of design and construction of civil foundations for all civil work as per relevant IS codes.

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

v. All designs & drawings have to be developed based on the governing standards and requirements of the project and also keeping in mind basic design specifications. Company may approve minor deviations or suggest required modifications in the same which are meant for increasing plant performance without sacrificing quality / workmanship norms.

vi. All designs, specifications, reports, etc. submitted or used by the Contractor at any point in time shall first be approved by the Company /Consultant and revised by Company /Consultant, if required, prior to execution.

vii. The technology offered shall be commercially established technology and at least one Project based on this technology shall be satisfactorily operational for at least one

year in India. Details of the Project with location and the successful operational period of the Project utilizing this technology shall also be mentioned before the submission of first set of drawings for approvals.

viii The Contractor shall have to arrange the facility for testing bulk material at site such as elcometer for testing the galvanization, cube-testing machine for testing the strength of cube samples etc.

ix The Contractor shall have to send samples for testing of the material to Govt. accredited / NABL Accredited laboratory as when required by the Company.

5.1.10 Approval of Design/Drawings

The following procedure has to be followed for assessment and approval of designs, specifications and drawings during the course of the project: The Contractor shall submit to the Company/Consultant the documents in hard copy and soft copy both with proper reference and drawing numbers. The respective documents for selection, supply, installation, erection, commissioning of equipment/ structures have to be submitted at least 15 days in advance to the planned start of the activity as per the Contractor's project schedule. The Contractor shall submit documents as required for this project according to his design and specifications. The Company / Consultant (on behalf of the Company) will assess, review and approve the documents within 10 to 15 days of submission of documents; and only after the approval the Contractor shall release the documents on site for execution. The documents shall be revised by the Contractor as per instructions /comments given by the Company / Consultant (on behalf of the Company) if required, prior to execution. Subsequent revisions and the final version of the documents shall also be submitted in hard and soft copy to the Company and the Consultant. The Contractor has to take into account the above mentioned process of revisions (if required) and adjust the preparation and delivery of the documents such that the overall planned project schedule is not affected.

ii. 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 Company.

iii. The Contractor shall submit a comprehensive project management schedule in the form of a Gantt chart CPM/PERT chart and shall be liable for abiding by the schedule. **The submitted copy shall be compatible to open in either MS project or Primavera**

iv. The Contractor shall submit a comprehensive maintenance schedule for operation and maintenance of the photovoltaic power plant along with checklists before commencement of work on site 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 labor laws.

5.1.11 Final Commissioning

The commissioning procedure shall be as per GEDA/ GETCO / GSECL / DISCOM / Chief Electrical Inspector to Government (CEIG) requirements. The Contractor shall also ensure the following:

i. Obtaining written certificate of commissioning of the facility and permission to connect to the grid from the office of the Chief Electrical Inspector of the state and any other authorized representative from Government of India (GoI) / GoG / GETCO / GSECL / DISCOM/GEDA.

ii. Inspection and successful electrical commissioning certificate from the Company.

iii. Obtaining all certificates required by DisCom from agency appointed by them.

iv. Satisfactory completion certificate towards completion of all other contractual obligations by the Contractor as stipulated from the Company.

5.1.12 Comprehensive Operation and Maintenance Contract

The Bidder shall separately quote in Appendix 15.3 for Operation and Maintenance of the power plant for Ten (5 + 5) Years where in the plant should perform at a minimum annual NEEGG derated every year by not more than 1% referring to the installed DC capacity of the plant indicated by the Bidder. Any damage to CIVIL/ELECTRICAL/MECHANICAL components of the plant is to be reworked/replaced/supplied without any extra cost and time by the Contractor during maintenance period. This means after completion of O & M period every component of the plant should be in good and working condition.

Disclaimer: 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 PV plant around GETCO substations 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 Solar PV Power Plant around GETCO substations as if such work and / or items and materials were expressly mention in the Contract without any extra cost implication and liability to GSECL. 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 Company's discretion.

GENERAL SCOPE OF WORK

- The proposed location of solar project may be flat/uneven/hilly/submerged during monsoon. Bidder has to visit the site before pre bid meeting and accordingly discussed with the GSECL official for any query.

- Bidder shall have to execute the work of proposed solar project i.e. @ 20 MW to 40 MW in one/two/three/four pocket for proposed location as per the acquired government clear land, accordingly precast boundary wall of each pocket shall be provided for security point of view.

- Bidder shall have to construct Storm water drain for each pocket of proposed location. The storm water drain shall be designed by the bidder in such a way that rainy water

shall not be accumulated in pocket area and discharge of the same smoothly to nearest village nalla /palika drain etc.

- If huge quantity of rainy water entered into the proposed solar project site area than bidder has to construct bund/protection wall and necessary storm water drain shall be provided for each pocket of proposed solar project site and divert the same smoothly into nearest village nalla /palika drain to avoid the damage the solar project site etc. during monsoon.
- Bidder shall have to construct road as per site requirement of proposed solar project capacity i.e. @ 20 MW to 40 MW shall be executed in one/two/three/four pocket of each location, then as per site availability for internal connectivity with each pocket necessary WBM road, culvert with site slope rubble pitching, laying NP-3 pipe of sufficient diameter wherever required etc. shall be executed as per site requirement.
- Bidder shall have to make its own arrangement for construction water as well as water required during O & M period.
- The fresh OPC **53**/PPC cement and TMT steel reinforcement bars Fe 500 CRS shall be used confirming to relevant I.S. Specifications of the approved manufacturers of GSECL.
- The all material, installations, fixtures, accessories etc. to be provided shall be as per the relevant I.S. specifications and of best quality and of standard manufacturer as approved by the EIC.
- Bidder shall have to keep the full proof records of purchase and consumption along with original purchase bills of Cement and Steel as per the GSECL procedures and rules.
- Bidder shall have to provide best workmanship with skilled manpower for all the civil items as per the standard specifications/ best practice as approved by the EIC. If there is dispute in the items of civil works/no standard specifications of civil work items, in that case CPWD/ PWD/ booklet of Standard specification shall be applicable. GSECL will not supply any material for this work.
- To obtain necessary approval from Govt. / semi Govt. body etc. as a statutory requirement bidder has to approach the government organization, GSECL will provide required supporting documents for the purpose.
- All such items and materials not specifically mentioned in the Contract/ Tender Document but required as per site condition during execution for completion of proposed solar project / during O & M period of Solar PV Power Plant, bidder has to execute the same without any extra cost.
- For all the civil work of proposed solar project bidder has to submit the drawing for approval of GSECL.
- Civil foundation design for Module Mounting Structures (MMS) as well as control room, invertor room, switch yard transformer / equipment shall be made in accordance with the Indian Standard Codes and soil conditions, with the help of

Chartered Structural Designer having substantial experience in similar work. The Successful Bidder shall submit the detailed structural design analysis along with calculations and bases / standards.

- Module Mounting Structures Design is to be certified by Chartered Structure Engineer and certificate to be produced along with the design details for approval by GSECL. Switchyard structures / transmission line structure designs shall be strictly as per GETCO design.

The scope of work includes Operation and Maintenance (O & M) of the plant for ten (5+5) years, where in the plant shall generate the guaranteed Performance. 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, Bar chart, CPM, PERT 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 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 also shall be included.

b. Breakdown/ Corrective Maintenance: Whenever a fault has occurred, the Contractor has to attend or to rectify the fault, the fault must be rectified within **48 hrs** time from the time of occurrence of fault failing which the Contractor will be penalized as per terms and conditions of this Tender.

5.2: Civil work:

5.2:1 Civil work:

- The proposed location of solar project may be flat/uneven/hilly/submerged during monsoon. Bidder has to visit the site before pre bid meeting and accordingly discussed with the GSECL official for any query.

- Bidder shall have to execute the work of proposed solar project i.e. @ 10 MW to 50 MW in one/two/three/four pocket for proposed location as per the acquired government clear land, accordingly precast boundary wall of each pocket shall be provided for security point of view.
- Bidder shall have to make its own arrangement for construction water as well as water required during O & M period.
- The fresh OPC/PPC 53 grade cement and TMT steel reinforcement bars Fe 500 CRS shall be used confirming to relevant I.S. Specifications of the approved manufacturers of GSECL.
- The concrete mix design test shall be carried out in Govt. certified laboratory or NABL accredited laboratory for minimum M20 grade with 400 kilograms of cement.
- The all material, installations, fixtures, accessories etc. to be provided shall be as per the relevant I.S. specifications and of best quality and of standard manufacturer as approved by the EIC.
- Bidder shall have to keep the full proof records of purchase and consumption along with original purchase bills of Cement and Steel as per the GSECL procedures and rules.
- Bidder shall have to provide best workmanship with skilled manpower for all the civil items as per the standard specifications/ best practice as approved by the EIC. If there is dispute in the items of civil works/no standard specifications of civil work items, in that case CPWD/ PWD/ booklet of Standard specification shall be applicable. GSECL will not supply any material for this work.
- To obtain necessary approval from Govt. / semi Govt. body etc. as a statutory requirement bidder has to approach the government organization, GSECL will provide required supporting documents for the purpose.
- Bidder has to obtain BOCW certificate & labour license for the proposed solar site from concern government department.
- All such items and materials not specifically mentioned in the Contract/ Tender Document but required as per site condition during execution for completion of proposed solar project / during O & M period of Solar PV Power Plant, bidder has to execute the same without any extra cost.
- For all the civil work of proposed solar project bidder has to submit the drawing for approval of GSECL.

5.2.2 Topographical Survey:

GSECL will show the proposed project site physically to bidder , necessary required survey work for co-ordinate of site will be carried out by bidder and accordingly final plot layout (As per JMS sheet) drawing shall be submitted to GSECL for further approval. Topographical survey shall have to be done by the Bidder for the proposed site at 5 mt. interval with the help of Total Station or any other suitable standard method of survey. All necessary Reduced Levels (RL) as entered in the Field Book/Soft Copy have to be submitted along with pre

contour layout of the total site. The formation levels of the proposed solar power plant have to be fixed with reference to High Flood Level of the proposed site. The ground level and plinth level of structures shall be fixed taking into consideration on the highest flood level and surrounding ground profiles.

5.2.3 Soil Test:

The soil testing of proposed project site shall be carried out by the agency. Contractor is solely responsible to carry out detailed Geotechnical investigation to ascertain soil parameters of the proposed site for the use of planning / designing / construction / providing guarantee / warranty of all civil works including but not limited to foundations / piling for module mounting structures, HT lines, 66 kV switchyard equipment etc. The Contractor shall carryout soil investigation through NABL accredited labs. These reports shall be furnished to the Company prior to commencing work. All RCC works shall be provided of required grade of concrete as per relevant IS specifications as well as soil data considering appropriate earthquake seismic zone, wind velocity, whether effect ,soil characteristics etc. The minimum Bore hole for soil investigation report should be done as per IS Code.

5.2.4

The scope of soil investigation covers execution of complete soil exploration including boring, drilling, collection of disturbed & undisturbed soil sample 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.

5.2.5

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

5.2.6

The foundations should be designed considering the weight and distribution of the structure and assembly, and wind speed **as per IS 875 for calculations of Vz. Bidder shall take basic wind speed value for respective sites as per following.**

Site wise wind speed to be mentioned here as **per IS875**

Success full Bidder shall also plan for transport and storage of materials at site and shall arrange for its own construction power and water. However, the Contractor can avail construction power connection from Discom by applying for temporary connection and necessary charges will be borne by the bidder. Client will help for supporting documents.

5.2.8 Land Development and Cleaning:

Site leveling:

The bidder shall have to level the site, as required, so as to compact the plant in minimum possible area and also to minimize shading losses because of solar PV module structures. Removal of debris and bush-cutting is mandatory. Leveling & area grading of the site is to be done if required for easy drain of surface water naturally to avoid the accumulation of rainy water in plant area. During execution of work if any hidden masonry / concrete foundation / pipe line etc. found then agency has to execute / remove / reroute the same without any financial implication. The bidder shall visit the site to ensure the land development work if any and shall carry out the topographical survey to ensure land development work such that land is perfectly flat. The Contractor has to clean the site from small trees and shrubs, removal of debris, 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. Bidder shall have to Level the uneven area of each pocket of the proposed location as per site requirement.

5.2.9 Storm Water Drainage System:

The Contractor shall provide storm water drainage system for entire plant.

The drain is to be designed as per actual site requirement and to avoid accumulation of water in solar Plant area. The peripheral drain and all other internal drains to inverter room, control room, switchyard of solar project shall be of brick lining which is backed up by PCC (75 mm thick C.C. 1:4:8) on side slope and at bottom of drain with brick lining and all joints of Brick lining are to be filled up with cement mortar in C.M. 1:4. Also, the bidder shall provide RCC Hume pipe (NP3 grade) at the crossing of road and drains and at required locations. And also necessary arrangement for disposing / lifting of accumulated surface water is to be made by providing pump and RCC sump of required capacity shall be provided by bidder as per site requirement or naturally as per site conditions.

Storm water drain for each pocket of proposed location shall be designed by the bidder in such a way that rainy water will not be accumulated in pocket area and discharge the same smoothly to nearest village nalla /palika drain etc.

If huge quantity of rainy water entered into the proposed solar project site area than bidder shall have to construct bund/protection wall with necessary storm water drain shall be provided for each pocket of proposed solar project site and divert the same smoothly into nearest village nalla /palika drain to avoid the damage the solar project site etc. during monsoon.

5.2.10 Foundations:

The Contractor shall design and construct appropriate civil foundations for MMS RCC Pile Foundation, prefabricated structures / **RCC frame structure of control room**, transformers, switchyard equipment, feeder bay etc. During execution of work if any hidden masonry /

concrete foundation / any structure /pipe line etc. found then agency has to execute / remove / reroute the same without any financial implication. Site is found to be more or less flat.

Civil foundation design for Module Mounting Structures (MMS) as well as control room, inverter room, switch yard transformer / equipment shall be made in accordance with the Indian Standard Codes and soil conditions, with the help of Chartered Structural Designer having substantial experience in similar work. The Successful Bidder shall submit the detailed structural design analysis along with calculations and bases / standards.

Module Mounting Structures Design is to be certified by Chartered Structure Engineer and certificate to be produced along with the design details for approval by GSECL. Switchyard structures / transmission line structure designs shall be strictly as per GETCO design. The Contractor shall design, fabricate, supply and install module mounting structures with all required accessories like clamps, nuts, bolts, cable ties etc., The structures can be of fixed/ seasonal tracker are accepted.

Pile intrigrit test shoul be carried out for minimum 20% of total pile to be casted for MMS Structure.

5.2.11 Solar PV Module Cleaning System (RCC/ PVC water Tank):

Cleaning frequency shall be decided by the Bidder to meet the guaranteed generation. For this the Contractor has to design as per relevant IS codes, submit and take approval from GSECL, construct and operate 10,000 litter /MW capacity RCC / PVC water storage tank, the PVC water storage shall be of first quality and shall be approved EIC. The Contractor also has to drill a bore and construct pipeline for carrying water to storage tank, provide electric panel and pump for bore and total water. Silting chamber for filtration of the water before the inlet and which shall 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.

Cleaning system. For module cleaning, the contractor can provide new tanker with pump, water jet and hose pipe or establish a pipeline network with valves.

5.2.12 Approach / Internal Roads and Pathway & Peripheral Road:

Main road connecting to Government palika/village road to proposed site for each location for construction purpose as per site requirement shall be WBM 4.00 mtr.wide plus side shoulders both side.

The road connecting from the main gate to control room and switch yard shall be accessed by Asphalt road having 4.00 mtr.wide plus side shoulders both side.

Peripheral roads & road connected to inverter transformer shall be of WBM. Width of WBM/ Asphalt road shall be 4.00mtr.wide plus side shoulders both side.

The Contractor shall provide internal roads and approach roads / pathways of WBM type. If plant is being installed in more than one pockets, each pocket shall have internal connectivity by WBM road. Peripheral roads & road connected to inverter transformer shall be of WBM. Width of WBM/ Asphalt road shall be 4mtr.

Bidder shall have to construct road as per site requirement of proposed solar project capacity i.e. @ 10 MW to 55 MW shall be executed in one/two/three/four pocket of each location, as per site availability for internal connectivity with each pocket necessary WBM road, culvert with side slope rubble pitching, laying NP-3 pipe of sufficient diameter wherever required etc. shall be executed as per site requirement for road crossing.

5.2.13 Cable Trenches:

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.

5.2.14 Watchman's Cabin and Main Entrance Gate

The Contractor shall provide main gate of structural steel material of appropriate design. Also, necessary arrangement shall have to be made by Contractor to erect the main gate on pylon stone.

An all-weather main gate with width of at least 6 meter shall be erected at the entrance of the plant site and another gate (4 mt. width) for each pocket shall be provided for internal connectivity with of proposed location.

The Prefabricated Security Cabin of size 3.5 meter x 3.5 meter at the main entrance gate shall be designed & constructed by the Successful Bidder keeping in view the safety and security of the power plant. The Bidder shall provide detailed civil, electrical, plumbing, etc. drawings and equipment specifications for the security cabin in "(B) Technical Offer" of the Bid document.

5.2.15 Security Cabin:

Security Cabin – (at 4 corners of each pocket of proposed Plant.)

The Contractor shall provide 4 (four) numbers of prefabricated Watchman' portable cabin at minimum 4 (four) corners of the boundary of each pocket of proposed Plant such that safety of the plant is ensured along with one Watchman's cabin at the boundary of each pocket of proposed location. The minimum size of watchmen's (Security Cabin) cabin shall be 1.2 meter x 1.8 meter size and height of 2.10 mt. with appropriate roof at the top, considering minimum height of 6 mt above ground level. Location of the watch Cabin (Security Cabin) shall be as directed by GSECL. Bidder shall have to submit the design of supporting structure with ladder & railing for safety point of view. Security cabin of galvanized steel with roof will be submitted for the approval of EIC.

5.2.16 Fencing:

The bidder shall provide RCC precast boundary wall with barbed wire for entire plant area .**Internal fencing for PCU, X'mer, HT SWGR -Aux. Chain link fencing of 2.0 mtr. Height With provision of gate shall be considered.**

A. **Precast compound wall column**

Supply and installation of smooth finish and uniform shape & size precast compound wall column of concrete grade M30 with use of OPC 53 Grade of GSECL approved brand cement, including shuttering, reinforced with 3mm wiron (phosphorous carbon steel) of TATA make using pre stressed technology, 1.8m high from finished ground level, vertical post size 150mmX150mmX2700mm, reinforced of 7 nos-3mm dia PC steel of TATA make with a provision of 300 mm long (12")having 12mm dia MS bolt (9" length) grouted at the time of casting with 3" outside for fixing of angle on top of each column for barbed wire fence as per drg. Precast compound wall columns shall be provided with groove for wall panel slab fixing and grouted below ground level by Augur piling or excavation of 300mm dia, 900mm depth and grouted with PCC of M20 (1:1.5:3 proportion of cement concrete)

B. Precast compound wall panel slab

Supply and installation of smooth finish and uniform shape & size precast compound wall panel slab of concrete grade M30 with use of OPC 53 Grade of GSECL approved brand cement, including shuttering, reinforced with 3mm wiron (phosphorous carbon steel) of TATA make using pre stressed technology, wall panel slab size 1800mmX300mmX50mm thick, reinforced of 3 nos-3mm dia PC steel of TATA make, fixed in groove of vertical posts as per drg. Wall panel slab shall be fixed in groove of vertical column/posts with engraved precast logo in each section with text of GSECL on each one panel of each span and with provision of excess water flow weep holes having reinforced of 4 nos-3mm dia (phosphorous carbon steel of TATA make, fixed in groove of vertical posts as per drg.

C. Angle Post

Angle size of 40x40x5, 90cm. Long with Galvanize coating of minimum 80 micron & 8mm Plate to be provided for angle fixing100x100mmsize.

D. Barbed GI wires

Providing and fixing barbed GI wires four nos 12x14 SWG GI barbed wire (IS 278-2009) heavy coated 230/240 GSM zinc on wire of TATA make shall be provided on top of precast compound wall and fixed over 450 mm high MS HDG 'L' angle (40mmx40mmx5mm).The barbed wire has to be fitted in direction longitudinally between two posts fitted & fixed with GI staples, turn buckles, with all hardware etc, complete as per direction of Engineer-in –charge.

5.2.17 Water supply:

All necessary arrangement for wet cleaning of the solar panels shall be in the scope of the bidders and accordingly bidder shall have to provide all the necessary equipment, accessories, tool & tackles, pumps, tankers, tractors and piping arrangement which is required for the same. Bidder shall have to make its own arrangement for construction water as well as water required during O & M period.

5.2.18 Pre-fabricated Invertor Room (for indoor inverters only) & R.C.C./ PEB Control Room

Bidder has to submit the design drawing for approval of Pre-fabricated Inverter Room & R.C.C./PEB Control Room. Civil work for Pre-fab Inverter Room & R.C.C. Control cum Conference room shall be of adequate size and of be of standard manufacturer with sufficient lighting points and RCC cable trenches with oil painted edge angle of 65mm x 65mm x 6mm and checker plate covers of 8 mm thickness and shall have exhaust chimney and also sufficient ventilation. All prefab inverter room and Control Room shall be laid on RCC plinth with sufficient foundation and reinforced grade slab with finished Kotah of 25mm thickness /Vitrified of 8-10 mm thickness tile flooring and 100 mms skirting of same tiles. The plinth shall be minimum 500 mm high from formation level of the plant. Plinth protection shall be given throughout perimeter of width 1.2m with rough kotah of 25mm thickness on its top for Inverter rooms and Control Rooms. Sufficient steps at the entry of the room with rough Kotah on its top and RCC ramp of sufficient angle shall be provided for shifting the equipment in the rooms for all Inverter rooms and Control Room. Rain water pipe at various locations with gutter at the top shall be provided to discharge rain water. The bidder shall provide to GSECL the detailed civil, electrical, plumbing, etc. drawings and equipment specifications for the inverter room & control room and shall obtain approval of the same. The drawings of Panels with the make of components should be approved from GSECL.

For invertor transformer Chain link fencing of 2.0 mtr. height With provision of gate shall be provided

i. **RCC frame structure below plinth**

Inverter Rooms/Control cum Conference Room shall have adequate size of footing, pedestal columns, plinth beam, grade slab with reinforcement as per relevant IS specifications considering seismic zone, wind & soil detail etc. Back filling material shall be of Laboratory tested Murrum or Sand. Grade slab shall be laid on 100 mm thick PCC. Also, Termite proofing is required before preparation of grade slab and plinth protection. The Control cum Conference Room shall have a rolling shutter at the front side.

ii. **Control room**

It shall be of adequate size (minimum height 3.6 mtr) for fixing the panels, battery banks etc. With; a) SCADA Room with Work station, Desktop and Chairs; b) Store Room with almirah; c) Pantry unit of sufficient size with sandwich type of platform with plumbing fixture and exhaust fan; d) Toilet unit for Gents with urinals and Ladies having wash basins in each; e) RCC cable trenches with covers and cable trays and all openings of cable entry shall have vermin proofing using spray foam or mortar; f) Furniture like conference table, chair and sofa etc.; g) Lighting points and fixtures; and h) Plumbing fixtures.

iii. Facilities required for Control cum Conference Room:

It shall also have adequate size SCADA cabin with necessary 2 numbers of work station with drawers of Godrej/ Durian/ Zuari make, 2 numbers Computer and 1 number of LED TV of 48 inch of Sony/ Phillips / Samsung make, 4 numbers of chairs for workstation, 2 Nos. of almirah and split A.C of 1.5 Ton of Voltas/ Hitachi/ Samsung/LG make for operating staff for work station. Conference Room shall also be equipped with conference table of 10 persons with Power Sockets with 10 chairs of Godrej/ Durian/ Zuari/ Usha/ Lexus and sofas. In Control cum Conference room, except control room (where panels are fixed) all other rooms

like SCADA cabin, conference room, store, pantry and passage shall have False ceiling that shall consist of 600 x 600 x 20 mm gypsum board with one coat of primer and two or more coat of Acrylic emulsion paint. The suspension system shall consist of 6 mm diameter galvanised steel rods suspended from ceiling supporting by aluminium grid of 38 x 25 x 1.5 mm and cross tie of 25 x 25 x 1.5 mm and aluminium angle of 25 x 25 x 1.5 mm. Conference room shall be equipped with an all-in-one printer cum scanner, landline phone, refrigerator (150 litre) of Voltas/Godrej/Whirlpool make, projector and screen of 2m x 2m. All material, installations, accessories to be provided shall be of best quality and of standard manufacturer as approved by the EIC/ GSECL. All units of the Control cum Conference Room shall have marked signage of SS sheet of 1mm along with engraving words and filled with black color at all facilities within Control cum Conference room and on all equipment. The lighting points and fixtures shall be of Anchor/Philips make. The fans shall be of Khaitan/Usha/Bajaj make and lights (only LED shall be used) shall be of Philips/Syska/Havells make.

iv. Structural Steel, Insulated Walls and Roof for Super structure (prefabricated invertor room:

Design of Super-Structure i.e. Steel Structure like purlin, rafter, columns, truss etc. for fixing the Pre-Fabricated Panels conforming to relevant IS codes and of Jindal/Tata/ RINL make. It shall include all necessary fitting like nuts, bolts, washers etc. of good quality. All structural steel shall be treated with two coats of red oxide and three coats of Oil paint (Asian Paints, Berger, Durex). 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. The Insulated panels should be of required size for roof and walls. The insulated wall and roof panels shall be sandwich type. The panels shall be made out with 0.35 mm thick pre coated steel sheet on both side of Poly Urethane Foam (PUF) for both wall and roof. The density of PUF shall be 40±2 kg/m3 and thermal conductivity shall be within range of 0.019-0.021 W/m˚K at 10°C. The total thickness of the panels for walls shall be 60mm and for roof is 40mm. The panels shall be joined together by tongue and groove method. The joints of the panels shall be filled with silicon or equivalent filling material. Panels shall be cuts such that the exposure of PUF and patch work is avoided. The fixing of the panels shall be such that there should not be any gaps at joints like wall and roof, wall to wall, etc. from which air and water particle can pass (Air and Water tight). Roof panel shall be extended 300 mm from the eaves wall and 150 mm from Gable walls. Rain water gutter shall be provided throughout the periphery with rain water pipes (CPVC pipes) with proper clamping at regular interval. Provision of future installation of Solar panels on the top of the roof shall be done by I or C section with Small base plate assembly.

v. Landscaping:

Landscaping in surrounding area of 2 meter of Main Control Room is to be done using aesthetically pleasing and suitable varieties of flora.

vi. Flooring:

Best quality Vitrified tile flooring having min size of 600 mm x 600 mm x 8-10 mm thickness of standard manufacturers as approved by EIC.

vii. Toilet:

Toilet shall be designed for 10 persons; and constructed with following finish
- Floor: Vitrified tiles
- Door and window: made out of aluminum brown anodized sections, 6mm float glass
- Ventilators: Mechanical exhaust facility
- Plumbing fixtures: Jaquar and Kohler make
- Sanitary ware: Hindware, Cera or equivalent make
- EWC: 390 mm high with health facet, toilet paper roll holder and all fittings
- Urinal (430 x 260 x 350 mm size) with all fittings.
- Wash basin (550 x 400 mm) with all fittings.
- Bathroom mirror (600 x 450 x 6 mm thick) hard board backing
- CP brass towel rail (600 x 20 mm) with C.P. brass brackets
- Soap holder and liquid soap dispenser.

vii. Doors and Windows:

Doors and windows shall be made of aluminum sections. All sections shall be 20 microns anodized. Sections of door frame and window frame shall be adopted as per industrial standards. Door shutters shall be made of aluminum sections and combination of compact sheet and clear float/wired glass. All windows of Control cum conference room shall be protected by Sun film protection sheet. The control room shall require a number of windows/louvers to be provided for ventilation/ fresh air circulations. All fixtures for doors and windows shall be of Dorma, Godrej and Kich make.

viii. Water Supply for Toilets:

GI pipes (B class) Tata or equivalent make. Separate Overhead water tank Sintex or equivalent of 2,000 liter capacity.

ix. Drainage for Toilets:

Drainage pipes shall be of CPVC (6 kg/cm2) Supreme, Prince or equivalent make. Gully trap, inspection chambers, septic tank for 10person and soak well to be constructed for abovementioned requirement.

x. Air Conditioner for Control Room:

The control room shall be equipped with appropriate numbers of fans for effective heat dissipation. The SCADA cabin and Conference room shall have split type air conditioning units.

xi. Fire Extinguishers:

Liquefied CO2 fire extinguisher shall be up right type of capacity 10 kg having IS: 2171. 7 IS: 10658 marked. The fire extinguisher shall be suitable for fighting fire of Oils, Solvents, Gases, Paints, Varnishes, Electrical Wiring, Live Machinery Fires, and All Flammable Liquid & Gas. Bidder shall provide at least 10 no. of portable fire extinguisher.

xii. Sand Bucket:

Sand buckets should be wall mounted, made from at least 24 SWG sheet with bracket fixing on wall conforming to IS 2546. Bucket stands with four buckets on each stand shall be provided in the Transformer Yard – 4 Nos.

xiii. Sign Boards:

The sign board containing brief description of various components of the power plant as well as the complete power plant in general shall be installed at appropriate locations of the power plant.

- For Switchyard and Transformer Yard:

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

- All Inverter Rooms and Control and Conference Room:

The name boards shall be made of acrylic sheet of 300mm height and fixed at the entry of the all facilities.

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

5.2.19 Module Mounting Structures (MMS):

The Contractor shall design and construct appropriate civil foundations for MMS.

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 **as per IS 875 for calculations of Vz. Bidder shall take basic wind speed value for respective sites as per following.**

Site wise wind speed to be mentioned here as per IS875
Pile casting for testing shall be as per IS before approval of drawing &design. Testing of pile by NABL acrecrtited laboratory

It shall support Solar PV modules at a given orientation, 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.

Seismic factors for the site to be considered while making the design of the foundation/ramming etc. or any technology. The design of array structure shall be based on soil test report of the site and shall be approved from GSECL/Consultant.

The Contractor has to plan for pilot test like pull out; lateral and compression of minimum 10,10,3 are required to be conducted for each floor at strategic location, immediately. Based on the results of above-mentioned tests, final approval for design of pile shall be provided.

The material of construction, structural design and workmanship shall be appropriate with a factor of safety of not less than 1.5.

For multiple module mounting structures located in a single row, the alignment of all modules shall be within an error limit of 5 mm in vertical / horizontal line.

The Contractor shall provide to GSECL the detailed design, specifications and calculations of the MMS and take approval from GSECL.

The Contractor shall specify installation details of the Solar PV modules and the support structures with appropriate diagrams and drawings.

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

The Contractor should design the structure height considering highest flood level at the site. The minimum clearance between the lower edge of the module and the ground shall be the higher of (i) above highest flood level at the site and (ii) minimum 500 mm.

The Contractor shall provide to the Company the detailed design, specifications and calculations of the MMS during **detailed engineering**.

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

The Contractor has to ensure sufficient lighting arrangement for all concreting activities during night time. Sufficient illumination should be ensured in and around areas wherever civil and construction activities take place during night time.

The Contractor shall specify installation details of the Solar PV modules and the support structures with appropriate diagrams and drawings.

The Bidder shall be permitted ramming of the module mounting structure provided that they obtain consent of EIC. EIC shall provide such consent once it is convinced that such ramming shall not in any way deteriorate the strength of the structure and shall not reduce the structure's strength to enjoy a working life of more than 25 years.

Civil foundation design for Module Mounting Structures (MMS) as well as control room, inverters room shall be made in accordance with the Indian Standard Codes and soil conditions, with the help of Chartered Structural Designer having substantial experience in similar work. The Successful Bidder shall submit the detailed structural design analysis along with calculations and bases/ standards in the Bid.

Module Mounting Structures Design is to be certified by Chartered Structure Engineer and certificate to be produced along with the design details for approval by GSECL. Switchyard structures / transmission line structure designs shall be strictly as per GETCO design.

All the civil defects, rectification, repairing, replacement related to civil works shall be in the scope of contractor during the O&M period, the Contactor shall be responsible for rectification of any defect in the civil work and maintain the structure/buildings in good

condition with proper maintenance. The Contractor shall be responsible for the maintenance of each civil works carried out as mentioned below.

1. Buildings Control room premises, Underground water tank includes:

I. Water tightness/ leak proof of roof and walls.

II. Painting to the structure either PEB/ RCC Framed structure at regular interval (not more than five years).

III. Plumbing & Sanitation related defects/replacement.

IV. Chalking / overflow of septic tank and soak pit.

V. Replacement / repairing of water tank if major/minor leakage observed.

VI. Leakage of water to be attended by suitable crack filler.

VII. Repairing/replacement of doors, windows, ventilators & rolling shutter.

2. Road WBM or Bitumen:

I. Crack repairing of the road surface.

II. Pot-holes over the top road surface to be rectify.

III. Maintenance of shoulders for the rain cuts or damage due to some external reasons.

IV. Re-carpeting of the road surface at every five years interval.

3. Storm water Drainage:

I. Before and after the monsoon season the storm water drainage shall be maintained & cleaned for smoother flow of storm water.

4. Main Entry gate & Fencing:

I. Maintain the elegance of entry gate with painting as & when required.

II. Repairing & painting of precast boundary wall as & when required.

The above list is not exhaustive but indicative only. Although most of the structures are covered here in, any other system (Civil, Structural and Architectural) required for successful operation and maintenance of the works shall form a part of this contract and shall be deemed to be included in the scope of works. The scope of Bidder/EPC Contractor shall include supply of all required materials, mobilization of labour, and arrangement of required tools tackles and equipment to carry out all above civil maintenance works.

5.2 DETAILED ELECTRICAL WORK (For each S/s)

5.3.1 Photovoltaic modules

The Contractor shall employ solar PV module of Crystalline-Si (Poly / Multi or Mono / Single) solar technology only. The Contractor shall provide detail Technical Data Sheets, Certifications of Standard Testing Conditions (STC: defined as Standard Testing Condition with air mass AM1.5, irradiance 1000W/m2, and cell temperature 25°C) as per the latest edition of IEC 61215 and IEC 61730 and as tested by IEC / MNRE recognized test laboratory. The Bidder shall also specify the minimum guaranteed energy output of solar PV module as per the site condition in the RFP. PV module must be registered with BIS.

i. The PV modules to be employed shall be of minimum 72 cell configuration with rated power of module ≥300 Wp as certified for solar PV module power performance test as prescribed by latest edition of IEC 61215 and IEC 61730 and as tested by IEC / MNRE recognized test laboratory. The maximum tolerance in the rated power of solar PV module shall have maximum tolerance up to +3%. No negative tolerance in the rated capacity of solar PV module is allowed.

ii. PV module must be registered with BIS.

iii. All modules shall be certified IEC 61215 2nd Edition (Design qualification and type approval for Crystalline Si modules), IEC 61730 (PV module safety qualification testing @ 1000 V DC or higher). IEC 62804 Certified PV modules should be PID free, documents for the same should be submitted with conditions of the PID test should be for a humidity of 85 % and a cell temperature of 85^0 C at 1000Volts , IEC 62716 , IEC 61701.

iv. The certified Bill of Material (BOM) to be used in the PV Modules should be the same as used during the IEC certification of reference PV Module certified by renowned agency like TUV, UL, etc.

v. Minimum certified module efficiency shall be 15% for crystalline with minimun fill factor of 0.75.The permissible maximum temperature coefficient of power (Pmpp) shall be -0.43%/ ^{0}C or better.

vi. All photovoltaic modules should carry a performance warranty of >90% during the first 10 years, and >80% during the next 15 years.

vii. Further, module shall have performance warranty during the first year of installation as under.

- Mono > 97%
- Poly > 97.5%

viii. The module mismatch losses for modules connected to an inverter should be less than **1%.(Maximum)**

ix. SPV module shall have module safety class-II and should be highly reliable, light weight and must have a service life of more than 25 years.

x. The PV modules shall be equipped with IP67 or higher protection level junction box with min. 3 by pass diodes of appropriate rating and appropriately sized output power cable of symmetric length with twist locking connectors.

xi. The SPV module shall be made up of high transmitivity glass & front surface shall give high encapsulation gain and the module shall consists of impact resistance, low iron and high transmission toughened glass. The module frame shall be made of corrosion resistant material, which shall be electrically compatible with the structural material used for mounting the modules.

xii. The SPV modules shall have suitable encapsulation and sealing arrangements to protect the silicon cells from environment. The encapsulation arrangement shall ensure complete moisture proofing for the entire life of solar modules.

xiii. The module frame should have been made of Aluminium or corrosion resistant material, which shall be electrolytically compatible with the structural material used for mounting the modules with sufficient no. of grounding/installation.

xiv. All materials used for manufacturing solar PV module shall have a proven history of reliability and stable operation in external applications. It shall perform in relevance as per IEC standards.

xv. Modules only with the same rating and manufacturer shall be connected to any single inverter. Modules shall compulsorily bear following information in the form of ID encapsulated with solar cell in the manner so as not to cast shadow on the active area and to be clearly visible from the top.

xvi. The Bidder shall provide to GSECL in the Bid, power performance test data sheets of all modules. The exact power of the module shall be indicated if the data sheet consists of a range of modules with varying output power.

xvii. Only those crystalline modules (above 300Wp) of the same module manufacturer which has supplied for a capacity more than 0.75MW x *awarded project capacity, in other projects in India with minimum 1 project size of 0.075MW x*awarded project capacity. On this account, the Contractor shall provide full information, to the satisfaction of GSECL, before placing final order for the modules. The Contractor shall also submit the proof of original purchase.

* this is to be noted that , cumulative capacity of awarded project shall be considered in case of single bidder are awarded project for more than one Site.

xviii. GSECL or its authorized representative reserves the right to inspect the modules at the manufacturer's site prior to dispatch.

xix. The Bidder is advised to check and ensure the availability of modules prior to submitting the Tender Document.

xx. The Contractor would be required to maintain accessibility to the list of module IDs along with the above parametric data for each module.

Table 5-1 Information to be displayed on solar PV module

Sr.	Particulars

1	Name of the manufacturer of the PV module and RFID code
2	Name of the manufacturer of solar cells
3	Month & year of the manufacture (separate for solar cells and modules)
4	Country of origin (separately for solar cells and module)
5	I-V curve for the module at standard test condition (1000 w/m^2 , AM 1.5, 25^{o}C
6	Wattage, Imp, Vmp, Isc, Voc, temperature co-efficient of power and FF for the module
7	Unique Serial No. and Model No. of the module
8	Date and year of obtaining IEC PV module qualification certificate
9	Name of the test lab issuing IEC certificate
10	Other relevant information on traceability of solar cells and module as per ISO 9001 and ISO 14001

5.1.6 Junction Box/ Combiner Box

i. The Contractor shall provide sufficient no. of Array Junction Boxes / PV combiner boxes / DCDBs.

ii. All switch boards shall be provided with adequately rated copper bus-bar, incoming control, outgoing control etc. as a separate compartment inside the panel to meet the requirements of the Chief Electrical Inspector of Government (CEIG). All live terminals and bus bars shall be shrouded. The outgoing terminals shall be suitable for connection to suitable runs and size of cables required for the Inverter/Transformer rating.

iii. The degree of protection for following equipment shall be:

- Indoor Junction box : IP 21
- Outdoor Junction Box : IP 65

iv. All junction/ combiner boxes including the module junction box, string junction box, array junction box and main junction box should be equipped with appropriate functionality, safety (including fuses, grounding, etc.), string monitoring capabilities, and protection.

v. The terminals will be connected to copper bus-bar arrangement of proper sizes to be provided. The junction boxes will have suitable cable entry points fitted with cable glands of appropriate sizes for both incoming and outgoing cables. Suitable markings

shall be provided on the bus-bars for easy identification and cable ferrules will be fitted at the cable termination points for identification.

Each Array Junction Box shall have suitable Reverse Blocking Diodes / Fuses of maximum DC blocking voltage of 1000 V with suitable arrangement for its connecting. The Array Junction Box shall also have suitable surge protection device. In addition, over voltage protection shall be provided between positive and negative conductor and earth ground such as Surge Protection Device (SPD) or on-load DC dis-connectors with shoes. All incoming & outgoing cables must be terminated with Brass Gland for Cu Cables & Steel Gland for Al Cables. Bidder can also provide polyamide glands and MC4 connector. All Glands must be of Double Compression type for Outdoor duty & Single Compression type for Indoor duty. The rating of the Junction Boxes shall be suitable with adequate safety factor to inter connect the Solar PV array.

vi. The Junction Boxes shall have suitable arrangement for the followings

vii. Combine groups of modules into independent charging sub-arrays that will be wired into the controller.

viii. Provide arrangement for disconnection for each of the groups.

ix. Provide a test point for each sub-group for quick fault location.

x. To provide group array isolation

xi. The rating of the Junction Boxes shall be suitable with adequate safety factor to inter connect the Solar PV array.

xii. The junction boxes shall be dust, vermin, and water proof and made of thermoplastic/ metallic in compliance with IEC 62208, which should be sunlight/ UV resistive as well as fire retardant & must have minimum protection to IP 65(Outdoor)/ IP 21(indoor) and Protection Class II or higher.

xiii. The terminals shall be connected to copper bus-bar arrangement of proper sizes. The junction boxes shall have suitable cable entry points fitted with cable glands of appropriate sizes for both incoming and outgoing cables.

xiv. The current carrying rating of the Junction Boxes shall be rated with standard safety factor to interconnect the Solar PV array.

xv. Suitable markings shall be provided on the bus-bars for easy identification and cable ferrules will be fitted at the cable termination points for identification.

xvi. Adequate capacity solar DC fuses & isolating miniature circuit breakers / MCCB should be provided if required. Fuses for string and outgoing DC dis-connector for SMB are allowed. The Junction Box must have space for the maintenance and 10% Spare Install Capacity for future integration.

xvii. Detailed junction box specifications and data sheet shall be provided in the Technical Bid document.

xviii. Other Sub systems and components used in the SPV power plants (Cables, connectors, Junction Boxes, Surge Protection devices, etc.) must also confirm to the relevant international /national standards for electrical safety besides that for quality required for ensuring expected service life and weather resistance. It is recommended that the cables of 600-1800 Volts Dc for outdoor installations should comply with the draft EN 50618 for service life expectancy of 25 years.

5.1.7 Inverter and Power Conditioning Unit (PCU)

Bidder shall consider Central or String Inverters as per specifications mentioned in NIT

(A) Central Inverters

i. Only those PCUs/ Inverters which are commissioned for more than **0.75 MW[1]x awarded project capacity, capacity in other solar PV projects till date shall be considered for this project. The Contractor has to provide sufficient information to the satisfaction of GSECL before placing the final order for PCUs/Inverters. Power Conditioning Unit (PCU) shall consist of an electronic inverter with latest technology available in the market along with associated control, protection and data logging devices and must be fully communicable to SCADA with OPEN Communication Protocol. If any software required for the communication & SCADA, the same to be made available within the EPC package by the Contractor.

ii. All PCUs should consist of associated control, protection and data logging devices and remote monitoring hardware, software for string level monitoring.

iii. Dimension and weight of the PCU shall be indicated by the Bidder in the Bid.

iv. Capacity of single unit of inverter shall be min. 1,000 kW. This plant shall be divided into 40-50 identical Solar PV arrays "sections", wherein the capacity of each section varies depending upon supplier's product capacity.

v. No. of inverters to be supplied shall be worked out by the Contractor based on DC rating of inverter, Pnom ratio, limit on overloading capacity.

vi. The Bidder shall guarantee average annual power loss due to non-threshold condition to be less than 0.1% and shall support the claim with necessary document / data / graphs in the Bid.

[**]This is to be noted that 0.75 MWx awarded project capacity is for the Inverter manufacturer to test their strength and capability for supplying for this Project. Also, cumulative capacity of awarded project shall be considered in case of single bidder awarded project for more than one site.

vii. DC Injection into the grid: This shall be avoided by using a step-up transformer at the output of the inverter. DC injection shall be limited to 1% of the rated current of the inverter as per IEC 61727.

viii. Inverters shall be capable of operating at varying power factor preferably between 0.85 lag to 0.85 lead and shall be able to inject or absorb reactive power.

ix. Inverters shall operate at ambient temperature of 50°C without deration.

x. The up-time of Inverters should be of 99% in a year, in case of failing to achieve this due to failure of any component of inverter the Contractor shall either replace the inverter or the component at his own cost.

xi. All inverters shall be tested for IEEE 519 &IEC 62116 standard.

xii. DC input terminals must be in enough numbers so as each terminal is connected to dedicated single input. Two DC inputs can not be connected on the single input DC terminal of the inverter. If adequate number of input are not available in the selected inverter by the Contractor then a DC junction box with protection devices such as fuse, DC disconnects may be incorporated in to design. The Bidder has to indicate the selected parameters in the Bid.

xiii. The minimum European efficiency of the inverter shall not be less than 98% measured at 100% load as per IEC 61683 standards for measuring efficiency. The Bidder shall specify the conversion efficiency at different loads i.e. 25%, 50%, 75% and 100% in the Bid. The Bidder should specify the overload inverter capacity in the Bid.

xiv. The PCU shall be tropicalized and design shall be compatible with conditions prevailing at site. Provision of exhaust fan with proper ducting for cooling of PCU's should be incorporated in the PCU's, keeping in mind the extreme climatic condition of the site.

xv. The inverters shall have Protection Class II or higher and minimum protection of IP as under:
Outdoor : IP 65(Electronics)/ IP 54 (Magnetic)
Indoor : IP 21

xvi. Nuts & bolts and the PCU enclosure shall have to be adequately protected taking into consideration the atmosphere and weather prevailing in the area.

xvii. (Grid Connectivity) Relevant CERC/GERC regulations and grid code as amended and revised from time to time shall be complied. The system shall incorporate a uni-directional inverter and should be designed to supply the AC power to the grid at load end. The power-conditioning unit shall adjust the voltage & frequency levels to suit the Grid.

xviii. All three phases shall be supervised with respect to rise/fall in programmable threshold values of frequency.

xix. The inverter output shall always follow the grid in terms of voltage and frequency. This shall be achieved by sensing the grid voltage and phase and feeding this information to the feedback loop of the inverter. Thus control variable then controls the output voltage and frequency of the inverter, so that inverter is always synchronized with the grid. The inverter shall be self-commutated with Pulse width modulation technology.

xx. This should be capable to synchronize maximum within 1 Minutes.

xxi. The PCU shall be capable of controlling power factor dynamically.

xxii. Maximum power point tracker (MPPT) shall be integrated in the power conditioner unit to maximize energy drawn from the Solar PV array. The MPPT should be microprocessor based to minimize power losses. The details of working mechanism and make of MPPT shall be mentioned by the Bidder in the Bid. The MPPT must have provision for constant voltage operation. The MPPT unit shall confirm to IEC 62093 or **EN50330** for design qualification.

xxiii. The system shall automatically "wake up" in the morning and begin to export power provided there is sufficient solar energy and the grid voltage and frequency is in range.

xxiv. Sleep Mode: Automatic sleep mode shall be provided so that unnecessary losses are minimized at night. The power conditioner must also automatically re-enter standby mode when threshold of standby mode reached.

xxv. Stand – By Mode: The control system shall continuously monitor the output of the solar power plant until pre-set value is exceeded & that value to be indicated.

xxvi. Basic System Operation (Full Auto Mode): The control system shall continuously monitor the output of the solar power plant until pre-set value is exceeded & that value to be indicated.

xxvii. 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. In addition, it shall have following minimum protection against various possible faults.

a. Earth Leakage Faults: The PCU shall have the required protection arrangements against earth leakage faults and –Ve DC directional protection.

b. Over Voltage & Current: In addition, over voltage protection shall be provided between positive and negative conductor and earth ground such as Surge Protection Devices (SPD).

c. PCU shall have arrangement for adjusting DC input current and should trip against sustainable fault downstream and shall not start till the fault is rectified.

d. Galvanic Isolation: The PCU inverter shall have provision for galvanic isolation. Each solid state electronic device shall have to be protected to ensure long life of the inverter as well as smooth functioning of the inverter.

e. Anti-islanding (Protection against Islanding of grid): The PCU shall have anti islanding protection. (IEEE 1547/UL 1741/ equivalent BIS standard).

f. Unequal Phases: The system shall tend to balance unequal phase voltage.

g. Heat Transfer / Cooling / Built in Ventilation Systems must be provided with 20% Spare capacity. Bidders to Submit Heat Rejection / Transfer calculation for Air Conditioning of Inverter Room.

h. Inverter must be provided with –Ve earthing for protection of PV modules against possible "Potential Induced Degradation".

xxviii. Reactive Power: The output power factor of the PCU should be of suitable range to supply or sink reactive power. The PCU shall have internal protection arrangement against any sustained fault in the feeder line and against lightning in the feeder line.

xxix. Isolation: The PCU shall have provision for input & output isolation. Each solid-state electronic device shall have to be protected to ensure long life as well as smooth functioning of the PCU.

xxx. All inverters/ PCUs shall be three phase using static solid state components. DC lines shall have suitably rated isolators to allow safe start up and shut down of the system. Circuit breakers used in the DC lines must be rated suitably.

a. Sinusoidal current modulation with excellent dynamic response.

b. Compact and weather proof housing.

c. Direct use in the outdoors with outdoor housing.

d. Comprehensive network management functions (including the LVRT and capability to inject reactive power to the grid).

e. No load loss < 1% of rated power and maximum loss in sleep mode shall be less than 0.05%.

f. Unit wise & integrated Data logging

a. Bidder shall consider as per standard design of vendor for Ethernet networking.

b. PCU shall have protection against over current, sync loss, over temperature, DC bus over voltage, cooling fan failure (if provided), short circuit, lightening, earth fault, surge voltage induced at output due to external source, power regulation in the event of thermal overloading,

xxxi. It shall have bus communication via interface for integration, remote control via telephone model or mini web server, integrated protection in the DC and three phase

system, insulation monitoring of PV array with sequential fault location. Alternatively, the same can be provided through SCADA.

xxxii. Ground fault detector which is essential for large PV generators in view of appreciable discharge current with respect to ground.

xxxiii. The power conditioner must be entirely self-managing and stable in operation. A self-diagnostic system check should occur on start up. Functions should include a test of key parameters on start up.

xxxiv. Over voltage protection against atmospheric lightning discharge to the PV array is required.

xxxv. The power conditioner must be entirely self-managing and stable in operation. A self-diagnostic system check should occur on start up. Functions should include a test of key parameters on start up.

xxxvi. <u>Standards and Compliances:</u>

The Bidder also has to confirm the PCU specifications in the Bid.

Table 5-2 Detailed Specifications of PCU

Sr.	Particulars	Details
1	PCU Mounting	As per the design
2	Nominal AC Output Power	≥ 1000 kW
3	Nominal AC Output Voltage	415 Volts +15%/-10% AC / 270 V / As per design
4	Maximum Input Voltage	1500 V DC
5	Wave Form	Pure Sine wave
6	DC voltage range, MPPT	450 to 1000 volts DC / As per design
7	Minimum Efficiency at 100% load The rated European efficiency (Euro Eta Efficiency) and peak efficiency	≥ 98%, measured as per IEC 61683 standard for measuring efficiency. * Inverter No Load / Full Load Loss Calculation must be submitted by the Bidder.
8	Output frequency	50 Hz +3% to - 5% Hz
9	Power Factor	0.85 lag- 0.85 lead

10	Max. THD at rated power	Less than 3 %
11	Ambient dry bulb temperature range	0 to 50˚ deg C
12	Humidity	15% to 95 % non- condensing
13	Enclosure	IP 20/ IP 65 (Indoor/ Outdoor rated) IEC-60068-2 (environmental)
14	Protection rating (as per IEC-60721-3-3)	Classification of chemically active substances: 3C2
15	Grid Specifications	IEC 61727, VDE 0126
16	Nominal Voltage & Frequency	415 Volts & 50 Hz
17	Voltage Tolerance	+ 10% and -10% or better than that

a. PCU shall confirm to IEC 60068-2 standards for Environmental Testing.

b. All inverters shall be IEC 61000 compliant for electromagnetic compatibility, harmonics, etc.

c. All inverters shall be safety rated as per IEC 62109 (1 &2), EN 50178 or equivalent DIN or UL standard.

d. Each PCU shall be compliant with IEEE standard 929 – 200 or equivalent. The Bidder should select the inverter (Central / String) as per its own system design so as to optimize the power output.

xxxvii Display

a. The PCU shall have local LCD (Liquid crystal display) and keypad for system control, monitoring instantaneous system data, event logs, data logs and changing set points. Control and read-out should be provided on an indicating panel integral to the Inverter. Display should be simple and self-explanatory. Display to show all the relevant parameter relating to PCU operational data and fault condition in form of front panel meters/ LEDs or two line LCD Display.

b. PCU front panel shall be provided with display (LCD or equivalent) to monitor the following

- Instantaneous DC power input
- DC input voltage
- DC Current
- Instantaneous active AC power output
- Instantaneous reactive AC power output
- AC voltage (all the 3 phases and line)
- AC current (all the 3 phases and line)

- Power Factor
- kWh Produced during entire day
- Total kWh produced during its life time
- Thermal loading (percentage)

PCU must be provided with display and also the same has to be made available at the SCADA monitoring & controlling desk installed in Main Control Room through Universal Open Protocol of Communication.

xxxviii Documentary Requirements & Inspection.

a. The bill of materials associated with PCUs should be clearly indicated while delivering the equipment.

b. The Contractor shall provide to GSECL data sheet containing detailed technical specifications of all the inverters and PCUs. Operation & Maintenance manual should be furnished by the Bidder before dispatch of PCUs.

Note:The Company or its authorized representative reserves the right to inspect the PCUs/ Inverters at the manufacturer's site prior to dispatch.

(B) String Inverters

Technical specifications for string Inverter

(1) CODES AND STANDARDS

The PCU shall conform to all applicable IEC standards. Where an applicable IEC standard is not available, IS/ any applicable international standard shall be referred to as best practice.

IEC-61683	Energy efficiency requirements
IEC 61000	Emission/ Immunity requirement
IEEE 519	Recommended Practices and Requirements for Harmonic Control in Electrical Power Systems.
IEC 60068-2-1, 2, 6, 14, 27 & 30	Environmental Testing
IEC 62116	Testing procedure—Islanding prevention measures for power conditioners used in grid-connected photovoltaic (PV) power generation systems
IEC 62109-1 & 2	Safety of power converters for use in photovoltaic power systems
EN 50530	Overall efficiency of grid connected photovoltaic inverters
BDEW 2008	Technical Guidelines for Generating plant connected to Medium voltage network
IEEE 1547	Standard for interconnecting distributed resources with electrical power systems.
IEC 60529	Ingress protection test
Grid Connectivity	Relevant CEA Regulations (including LVRT/HVRT compliance) and Grid Code as amended and revised from time to time.

(2) GENERAL REQUIREMENTS OF PCU

- The minimum euro efficiency of the PCU as per IEC 61683 shall be 97%. The bidder shall specify the conversion efficiency at following load conditions i.e. 25%, 50%, 75% and 100% during detail engineering, which shall be confirmed by type test reports.
- The PCU shall remain connected to the grid as per Central Electricity Authority Technical (standards for connectivity to the grid) regulation 2007 with all latest amendments and its components shall be designed accordingly.
- In case auxiliary supply of PCU is met internally, then it should have sufficient power backup to meet the LVRT requirement. Bidder needs to submit the detail auxiliary supply arrangement for PCU during detail engineering stage.
- The PCU shall be capable of operating in the frequency range of 47.5 Hz to 52 Hz and shall be able to deliver rated output in the frequency range of 49.5 Hz to 50.5 Hz.
- The monitoring/measurement of DC inputs and AC output shall be done using transducers/instruments having sensor accuracy of 0.5 class or better.
- Internal Surge Protection Device (SPD) shall be provided in the PCU on DC and AC side. It shall consist of Metal Oxide Varister (MOV) type arrestors. The discharge capability of the SPD shall be at least 12.5kA at 8/20 micro second wave as per IEC 61643-12.
- The PCU shall be capable of supplying reactive power as per grid requirement (manual intervention through SCADA) during solar generation hours. However, reactive power support, below 0.95 power factor, might be as the behest of active power.
- The PCU shall have protection against any sustained fault in the feeder line and against lightning discharge in the feeder line.
- The Contractor shall ensure by carrying out all necessary studies that the PCU will not excite any resonant conditions in the system that may result in the islanded operation of PV plant and loss of generation. In case there is excitation of any resonant condition in the system during PV plant operation that may result in the islanding/tripping of the PV plant and affect the power transfer, it shall be the responsibility of contractor to rectify the design and carryout required modification in the equipment of his supply.
- The PCU must be self-managing and stable in operation.
- In case of grid failure, the PCU shall be re-synchronized with grid after revival of power supply. Bidder to furnish the time taken by PCU to be re-synchronized after restoration of grid supply during detailed engineering.
- 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.
- PCU shall have active power limit control, reactive power and power factor control feature. Plant operator shall be able to provide (manual intervention) Active power,

reactive power and power factor control/limit set point through SCADA HMI and local control display unit (or Laptop computer). PCU shall be provided with remote start and stop facility from SCADA HMI. All required hardware and software required for this purpose shall be provided by Bidder.

- PCU shall have necessary limiters in build in the controller so as to ensure safe operation of the PCU within the designed operational parameters.
- PCU shall have thermal overloading protection to prevent failure of switching devices (i.e. IGBT) and other components of Inverter. PCU controller shall automatically regulate/limit the power output in order to reduce the PCU cabinet and switching devices temperature. Bidder to submit the PCU power vs ambient temperature curve during details engineering stage. PCU shall be able to provide inverter inside cabinet and IGBT's (switching device) temperature (in soft analog value) to SCADA system for remote monitoring, storing and report generation purpose.
- PCU shall have the following feature,
  a) AC & DC overcurrent protection.
  b) Synchronization loss protection.
  c) Over temperature protection.
  d) DC & AC under and over voltage protection.
  e) Under & over frequency protection.
  f) Cooling system failure protection
  g) PV array ground fault monitoring & detection
  h) PV array insulation monitoring
  i) LVRT
  j) Anti-islanding protection
  k) Grid monitoring
- One number of laptop PC shall be supplied for PCU configuration and troubleshooting purpose. Laptop shall be supplied with complete set of hardware & software accessories. Laptop detailed configuration must ensure suitability for the required applications. Supplied Laptop shall be protected with the latest anti-virus software and shall be provided 3 Years onsite warranty including its battery. At least two sets of communication cable for Laptop to PCU communication shall be provided.
- PCU shall be provided with Mobile user interface facility for monitoring of inverter by plant O&M personal for better O&M and highest yield from PV plant. In case PCU does not have this facility, then bidder can provide the same facility through plant SCADA system.
- PCU shall have AC and DC side monitoring capability and reporting to SCADA system (measured analog and digital value measured within PCU). Any special software if required for this purposes shall be provided for local and remote monitoring and report generation.
- DC Overloading: Maximum PCU DC overloading shall be limited to its design PV Array power to PCU nominal AC power ratio. Bidder needs to submit all the relevant technical documents/test report from PCU manufacturer (OEM) during detailed engineering stage in support of declared PCU design DC overloading capacity.

(3) EARTHING OF INVERTERS:-

The PCU shall be earthed as per manufacturer recommendation. During detail engineering the Bidder needs to submit the details earthing arrangement of PCU and system earth pit requirement during detail engineering stage. The detail specification for panel earthing for safety has been mentioned elsewhere in this specification

(4) OPERATING MODES OF PCU

a) Low Power Mode: - The PCU shall be able to wake-up automatically when PV array open circuit voltage value is equal/more than preset value in the PCU program. Once it starts generation the PCU shall automatically enter maximum power mode.

b) Maximum Power Point Tracking (MPPT):- In order to maximized the energy collection from solar PV array, the PCU shall have inbuilt maximum power point tracker (MPPT) controller and MPPT shall be able operate the PV array at its maximum power point by adjusting output voltage of PV array system according to atmospheric condition. PCU MPPT controller shall ensure that it operates the PV array system at its global maximum power point and it shall not trap into PV array local maximum power point during cloudy atmospheric condition. The PCU shall operate within its MPPT operating input DC voltage range (window). The PCU MPPT operating DC voltage range shall be large enough so that it shall be able to satisfactorily operate the PV modules exposed to the maximum ambient temperature of 500C or any other condition. In case the solar PV array operating maximum power point voltage fall below (or above) the PCU MPPT operating voltage range, then the PCU controller shall automatically adjust the PCU input voltage so that PCU shall not enter into sleep mode. If the PV array output power fall below the PCU minimum preset power value then PCU shall automatically switched to sleep mode. In case, PV modules connected to Inverter are in Flickering shading zone of Wind turbines, Suitable MPPT algorithm shall be adopted for those Inverters to optimize Energy Yield.

c) **Sleep Mode: -** PCU shall automatically go into sleep mode when the output voltage of PV array and/or output power of the inverter falls below a specified limit. During sleep mode the inverter shall disconnect from grid. Inverter shall continuously monitor the output of the PV array and automatically start when the DC voltage rises above a pre-defined level. During evening and night (non solar generation hours) the PCU shall be in sleep mode in order to minimize the internal power loss. Maximum loss in sleep mode shall be less than 0.05% of PCU rated power.

d) **Standby Mode: -** In standby mode the PCU DC & AC contactor are open, inverter is powered on condition and waiting for start command.

(5) PCU shall meet the following technical parameter

Nominal output voltage frequency	50Hz
Continuous operating frequency range	47.5 Hz to 52 Hz
Continuous operating AC voltage range	± 10% rated AC voltage
Operating power factor range	Operating power factor (adjustable) shall be 0.9 Lead to 0.9 Lag.
Maximum input DC voltage	1000V or 1500V as per application

Current THD value	< 4% at nominal load
Operating ambient temperature	0 to 50 ° C
Humidity	95 % non-condensing
Maximum Noise level (at 1 meter distance)	75 dBA for indoor type PCU
DC Injection	<0.5 % at rated current
Flicker	As per IEC61000

(6) Inverter Details

- The string inverter enclosure protection class shall be IP 65 or better protection.
- The string inverter should be placed inside a canopy shed with atleast 15 cm in all direction, if installed in open. Alternatively, the Bidder can also 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.
- String inverter shall have suitable communication port (RS485/TCP-IP/PLC) for SCADA integration. All necessary hardware, software and accessories used for communication with SCADA (including Data logger if supplied) at both the ends shall be provided by the bidder.
- String inverter shall have string monitoring capability and reporting to SCADA system. Any special software if required for this purposes shall be provided for remote monitoring and report generation.
- Anti-PID device along with all hardware and communication cable/device shall be provided in case negative grounding of PV string provision is not available in string inverter. Data logger used in Anti-PID device shall be integrated with SCADA system.
- DC fuse requirement for PV string at string inverter end shall be as per string manufacturer/system requirement and same shall be finalized during detail engineering stage.
- Provision for AC electrical isolation device (such as MCB/MCCB/Isolator) inside string shall be as per string inverter manufacturer practice.
- Local Display unit for viewing important parameters, configuration and troubleshooting purpose shall be provided as per string inverter manufacture practice.

(7) TYPE TESTING

During detailed engineering, the contractor shall submit all the type test reports including temperature rise test and surge withstand test carried out within last ten years from the date of techno-commercial bid opening for Owner's approval. These reports should be for the test conducted on the equipment similar to those proposed to be supplied under this contract and the test(s) should have been either conducted at an independent laboratory or should have been witnessed by a client.

However if the contractor is not able to submit report of the type test(s) conducted within last ten years from the date of techno-commercial bid opening, or in the case of type test report(s) are not found to be meeting the specification requirements, the contractor shall conduct all such tests under this contract at no additional cost to the owner either at third party lab or in presence of client/owners representative and submit the reports for approval.

5.3.4 Cables and Wires

i. All cables and connectors for use for installation of solar field must be of solar grade which can withstand harsh environment conditions for 25 years and voltages as per latest IEC standards.(Note: IEC standards for DC cables for PV systems is under development, the cables of 600- 1800 volts DC for outdoor installations should comply with the draft EN 50618 for service life expectancy of 25 years)

ii. Wires with sufficient ampacity and parameters shall be designed and used so that average voltage-drop at full power from the PV modules to inverter should be 2% (including diode voltage drop). PV Modules should be connected with USE-2/RHW-2 cables array to junction box conductors and junction box to photovoltaic disconnector with the THHN/THWN-2 sunlight resistant with 90ºC wet rated insulation cable.Due consideration shall be made for the de-rating of the cables with respect to the laying pattern in buried trenches / on cable trays, while sizing the cables. The Contractor shall provide voltage drop calculations in excel sheet **during detail engineering. Bidder shall also allow following EN 50618, IEC 60228 and IS7098 (Part-2).**

iii. All cables shall be supplied in the single largest length to restrict the straight-through joints to the minimum number. Only terminal cable joints shall be accepted. No cable joint to join two cable ends shall be accepted. All wires used on the LT side shall conform to IS and should be of appropriate voltage grade. Copper conductor wires of reputed make shall be used. Armoured Aluminium cable connecting SMB and Inverter and also for LT applications are allowed.

iv. All wires used for connecting the modules and array should conform to the NEC standards. Modules should be connected with USE-2/RHW-2 cables array to junction box conductors and junction box to photovoltaic dis-connector with the THHN/THWN-2 sunlight resistant with 90ºC wet rated insulation cable.

v. All high voltage cables connecting the main junction box/string inverters to the transformers should be PVC insulated grade conforming to IS 1554 and cables shall also conform to IEC 60189 for test and measuring the methods.

vi. Irrespective of utilization voltage and current rating all type of power cables shall be minimum of 1100 V grade PVC insulated conforming to IS 1554 / IS 694 for working voltage less than 150 V control cable shall be of minimum 500 V grade, the control and power cable shall have to be laid separately. All LT XLPE cables shall confirm to IS: 7098 Part I & II. All HT XLPE Cables (up to 33kV) Shall confirm IS: 7098 **PART-2** & IEC -60287, IEC-60332 and the Contractor to submit technical data sheet,

Voltage drop calculation, Power Loss Calculation and type test report for the approval of client / consultants

vii. The cables shall be adequately insulated for the voltage required and shall be suitably color coded for the required service. Bending radious for cables shall be as per manufacturer's recommendations and IS: 1255.

viii. **Bidder shall also allowed for cable testing and measurement as per IS 7098 (Pt-2) 2011, IS 8130 (2013) and IS 3975 (1999).**

Table 5-3 Relevant Codes & Standards for Cable

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 up to 33 KV.	IS: 7098 (Part II)	
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.	
13	Impulse test on cables & other accessories	
14	Cable termination for gas insulated switchgear.	

5.3.5 Technical Specification for LT XLPE Cable

General Constructional Features

The medium voltage cables shall be supplied, laid, connected, tested and commissioned in accordance with the drawings, specifications, relevant Indian Standards specifications, manufacturer's instructions. The cables shall be delivered at site in original drums with manufacturer's name, size, and type, clearly written on the drums.

A. Material:

Medium voltage cable shall be XLPE insulated. PVC sheathed, aluminium or copper conductor, armoured conforming to IS: 7098 Part I.

B. Type:

The cables shall be circular, multi core, annealed copper or aluminium conductor, XLPE insulated and PVC sheathed, armoured.

C. Conductor:

Uncoated, annealed copper, of high conductivity up to 4 mm^2 size, the conductor shall be solid and above 4 mm^2, conductors shall be concentrically stranded as per IEC:228.

D. Insulation:

XLPE rated 70° c. extruded insulation.

E. 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

Black shall always be used for neutral.

F. Assembly:

Two, three or four insulated conductors shall be laid up, filled with non-hygroscopic material and covered with an additional layer of thermoplastic material.

G. Armour:

Galvanised steel flat strip / round wires applied helically in single layers complete with covering the assembly of cores.

- For cable size up to 25 Sq. mm. : Armour of 1.4 mm dia G.I. round wire
- For cable size above 25 Sq. mm. Armour of 4 mm wide 0.8 mm thick G.I strip

H. Sheath:

The cable shall be rated extruded for XLPE 90 deg.C. Inner sheath shall be extruded type and shall be compatible with the insulation provided for the cables.

Outer sheath shall be of an extruded type layer of suitable PVC material compatible with the specified ambient temp 50 deg. C and operating temperature of cables. The sheath shall be resistant to water, ultraviolet radiation, fungus, termite and rodent attacks. The colour of outer sheath shall be black. Sequential length marking required at every 1.0 meter interval on outer sheath shall be available. The contractor has to furnish resistance / reactance / capacitances of the cable in the technical datasheet.

I. Rating:

Rating shall be as per IS 7098 (part-II).

5.3.6 Technical Specification for HT XLPE Cable

General Constructional Features

A. Conductors:

The conductor shall be of circular stranded Aluminium confirming to IS: 8130 & IEC: 228. It shall be clean, reasonably uniform in size & shape smooth & free from harmful defects. Any other form of conductor may also be accepted if in line with modern trends.

B. Semi-Conductor Barrier Tape/Tapes:

The semi-conducting barrier tape/tapes shall be provided over the conductors.

C. Conductor Screen:

The conductor screen shall consist of an extruded layer of thermosetting semi-conducting compound which shall be extruded simultaneously with the core insulation.

D. Insulation:

The insulation shall be super clean XLPE compound applied by extrusion and vulcanized to form a compact homogenous body.

E. Insulation Screen:

a. Each insulation have an insulation screen in two parts consisting of:

b. A water barrier tape/Non-metallic semi-conducting swellable tape part and a metallic screen part.

c. The non-metallic part shall be directly applied upon the insulation of each core and may consist of an impregnated but nylon/PVC tape or a similar approved material or, an extruded semi-conducting material extruded simultaneously with the conductor screen and insulation (triple extrusion).

d. The semi-conductor shall be readily strippable and must not be bonded in such a manner that it has to be shaved or scraped to remove.

e. The metallic part shall consist of a copper tape helical applied with a 30% overlap over the water barrier tape/blocking tape. A binder tape of copper shall be applied over the copper wire metallic screen.

F. Laying Up:

a. The cores shall be identified on the non-metallic part of the insulation screen by legible printing on the length of each conductor or, by the inclusion of a marker tape.

b. The cores shall be laid up with a right hand direction of lay.

c. Binder tape/Moisture barrier:

During layup, a suitable open spiral binder may be applied, at the manufacturer's discretion, before the application of an extruded inner covering.

G. Fillers:

Fillers shall be polypropylene.

H. Inner Covering/Sheath:

The inner covering shall be extruded over the laid up cores to form compact and circular bedding for the metallic layer.

I. Metallic Layer:

The metallic layer shall be galvanised steel wire.

J. Outer Sheath:

The tough outer sheath, black coloured best resisting PVC polyethylene compound type ST-2 as per IS: 5831 for the operating temperature of the cable shall be provided over the armour as specified in relevant standards by extrusion process.

K. Cable Marking:

a. Embossing on outer sheath:

The following particulars shall be properly legible embossed on the cable sheath at the intervals of not exceeding one meter throughout the length of the cable. The cables with poor and illegible embossing shall be liable for rejection.

- GSECL SPVPP
- Voltage grade
- Year of manufacture
- Manufactures name
- Successive Length
- Size of cable
- ISI mark

i. Packing and marking shall be as per clause No. 18 of IS 7098 (part I)/1988 amended up to date.

ii. Cables inside the control room and in the switchyard shall be laid in Galvanized Cable Trays mounted on mild steel supports duly painted, in constructed trenches with RCC raft and brick sidewalls and provided with removable RCC covers.

iii. Cable terminations shall be made with suitable cable lugs & sockets etc, crimped properly and passed through brass compression type cable glands at the entry & exit point of the cubicles.

iv. All cable/wires shall be provided with Punched Aluminium tags only. The marking on tags shall be done with good quality letter and number ferrules of proper sizes so that the cables can be identified easily.

v. The wiring for modules interconnection shall be in the GI pipe /HD Pipe of approved make.

vi. Data sheets of individual cable sizes (HT & LT) shall be submitted for approval by the Company. Drum numbers and drum length details shall be submitted with each consignment.

vii. Cable end terminations and joint kits shall comply with the latest version of the relevant IS standard.

viii. The cable ends shall be terminated with adequate size copper lugs and sockets etc, single/double compression cable glands. Cable glands shall be of robust construction capable of clamping cable and cable armor (for armored cables) firmly without injury to insulation. The metallic glands shall be earthed at two locations. Suitable lock type crimping lugs shall be used for cable end terminations. Where cables are raising from ground, suitable PVC pipe guarding shall be provided for cable raising with sealing of the guarding PVC pipe including a suitable clamp.

ix. HT cable termination kits and straight through joints shall be selected as per the cable specifications. Installation shall be as per the instructions given in the manufacturer's manual. Heat shrinkable type kits only shall be used for HT and LT cables.

x. Data sheets of the joints and kits shall be submitted for approval by GSECL.

5.3.7 **Clamps and Connectors**

i. 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 the Table 5-4.

ii. 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 Aluminium/Aluminium Alloy, shall be 12 mm, unless otherwise indicated in the specifications.

iii. 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.

Table 5-4 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

iv. 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 Aluminium/Aluminium Alloy, the bolts shall be of 12 mm diameter, and for copper connectors the bolts shall be of 10 mm diameter.

v. 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.

vi. 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.

vii. 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.

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

ix. 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

i. 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.

ii. 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.

iii. 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 with GSECL

5.3.8 **Structural Steel Work**

i. The structural steelwork required for termination incoming 66 KV line/ Cable, equipment supports, lighting masts and for shielding towers together with all foundation bolts shall be included by the Bidder in its scope of work. The steel work shall be fabricated from galvanized structural sections. The height of structures for incoming line shall be as per the design developed by the Bidder and drawings submitted.

ii. The incoming line gantry shall be designed on the basis of ACSR conductor/Cable considered in the design and also considering that GETCO terminal tower will be located at a distance of not more than 100 meters from the incoming gantry at SPV power station switchyard. The Bidder shall take into account wind load, temperature

variation etc. while designing the gantry structure. The column shall be provided with step bolts and anti-climbing devices.

iii. The entire structural steel work shall conform to IS: 802. The Bidder shall furnish design calculations for approval by Owner before procuring the material.

iv. The design of the switchyard towers, gantries and equipment structures shall also be designed in conformity with the standards followed by the Company. Approval from the Company also shall be obtained by the Bidder if required.

5.3.9 Hardware

i. 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.

ii. 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.

iii. 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.

iv. 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.

v. 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.

vi. 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.

a. Danger Plates

vii. 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 Gujarati and English.

viii. Fire Extinguishing System

ix. The installation shall meet all applicable statutory requirements, safety regulations in terms of fire protection

x. Liquefied CO2 fire extinguisher shall be upright type of capacity 10 kg having IS: 2171. 7 IS: 10658 marked. The fire extinguisher shall be suitable for fighting fire of Oils, Solvents, Gases, Paints, Varnishes, Electrical Wiring, Live Machinery Fires, and All Flammable Liquid & Gas. Bidder shall provide portable fire extinguisher as given below:

DCP Type(ABC type)(10 kg Cap)	CO_2 Type Hand 9 kg	Foam Type Hand 9 kg
1	1	1

xi. The minimum 1 no. of fire extinguishers shall be required for every installations / building.

xii. Sand bucket should be wall mounted made from at least 24 SWG sheet with bracket fixing on wall conforming to IS 2546.

5.3.10 Lightening Protection for PV Array

i. The source of over voltage can be lightning or other atmospheric disturbance. Main aim of over voltage protection is to reduce the over voltage to a tolerable level before it reaches the PV or other sub-system components as per IS: 2309 – 1989 (Reaffirmed – 2005), Edition 3.1 (2006-01).

ii. 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.

iii. The lightning conductor shall be earthed through flats and connected to the earth mats as per applicable Indian Standards with earth pits. 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.

a. 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.

iv. The Contractor shall submit the drawings and detailed specifications of the PV array lightning protection equipment to GSECL for approval before installation of system.

5.3.11 AC Network

AC converted by the inverter is transmitted through the appropriate cables from the Inverter to appropriately sized Inverter transformer and from transformer to adequate rating of 11/33KV VCB breakers. VCB breakers should be equipped with adequate protection relays, fuses, annunciations and remote operating and controlling facility from the Main Control Room. Relevant national & international codes to be follows:-

Table 5-5 Relevant National & International Code

Sr.	Item	Relevant IS	Relevant IEC
1	Power transformer	IS 2026	**IEC 76**
2	Fittings & Accessories	IS 3639	
3	Climate Proofing	IS 3202	**IEC 354**
4	Loading of Transformer	IS 6600	**IEC 296**
5	Oil	IS 335	**IEC 137**
6	Bushings	IS 20650	**IEC 144**
7	Degree of Protection	IS 2147	**IEC 76**
8	Testing, Tolerances on guaranteed Particulars	IS 2026	**IEC 76**
9	Buchholz Relay	IS 3637	
10	Electrical Insulation	IS 1271	**IEC 85**

i. Radial scheme through VCB panel is acceptable. It shall have circuit breaker of suitable rating for connection and disconnection of PCU from grid. The bus bar shall connect the AC distribution board to the transformer. It shall have provision to measure bus voltage, current and power of the transformer. Outdoor inverter & **RMU** panel with IP65 or above are acceptable. In case of outdoor inverters, the inverter station should be properly provided with canopy structure and working platform.

ii. Bus-bars shall be of high conductivity Aluminium alloy or Copper of adequate size. The bus-bars shall be adequately supported by non-hygroscopic, non-combustible track resistant and high strength type polyester fibre glass moulded insulators. Separate supports shall be provided for each phase and neutral bus bar. The bus-bars joints shall be provided with high tensile steel bolts, Belleville washers and nuts, so as to ensure good contacts at the joints. The bus-bars shall be colour coded as per IS 375.

iii. The Bidder shall submit the detailed specifications of the AC bus and panel in the Bid.

iv. The VCB panel with thermal over current and earth fault releases. The incomer shall be selected one size higher than the required rating as per Type 2 selection chart **(For LV switchgear).**

v. Removable gland plates with gaskets shall be provided in the cable alleys for glanding the power and control cables. The distance between the gland plate and the incomer terminals shall not be less than 450 mm.

vi. The Contractor should submit theoretical design calculations and detailed explanations along with drawings shall be provided and approved by the Company.

11 or 33 kV SUBSTATION BLOCKS:

5.3.12 Step-Up Inverter Transformer

i. The Contractor shall provide the complete turnkey design, supply, erection, testing and commissioning of transformers and transformer substation to first step-up the output of the inverter to 11 or 33 kV at the location of the inverter. Inverter Transformer must be protected with 11 or 33 kV VCB/**RMU** Panel of each inverter block. **Bidder to consider LCR capacity as per their own design**. Hence, total capacity of the solar plant with provision of rated 11/33kV Vacuum Circuit Breaker panel with single outgoing connected. 3 phase, Oil Filled, 11Kv or 33 kV, 50 Hz, Inverter Transformers of the selected inverter rating and associated Switchgear of approved make should be utilized as per IS 6600. 1/33 kV Inverter transformers can be off-load tap change type. The transformers shall be suitable for outdoor installation with 3 phase 50 Hz 11/33 kV system in which the neutral is effectively earthed, the Contractor may consider the guidelines of inverter manufacturer for transformer neutral earthing. Transformer can be with floated neutral.

ii. Bidder shall have to consider transformer MVA rating asper AC capacity with adequate design margin.

iii. Cumulative loss shall be as per IGBC / CBIP guidelines. All electrical equipment and installation shall confirm to the latest Indian Electricity Rules as regards safety, earthing and other essential provisions specified for installation and operation of electrical plants. The Contractor may consider the timeline of guideline of inverter manufacturer for Transformer neutral earthing. The transformer can be floated neutral.

iv. Relevant national and international standards in this connection are mentioned in Table 5-6 General Standards for Transformers.

v. All working parts, insofar as possible, are to be arranged for convenience of operation, inspection, lubrication and ease of replacement with minimum downtime. All parts of equipment or of duplicate equipment offered shall be interchangeable.

vi. The quality of materials of construction and the workmanship of the finished products/ components shall be in accordance with the highest standard and practices adopted for the equipment covered by the specification.

vii. All items of equipment and materials shall be thoroughly cleaned and painted in accordance with relevant Indian Standards. The finish paint shall be done with two coats of epoxy based final paint of colour Shade RAL 7032 of IS:5 for indoor equipment

viii. Any fitting or accessories which may not have been specifically mentioned in the specification but which are usual or necessary in the equipment of similar plant or for efficient working of the plant shall be deemed to be included in the contract and shall be provided by the Contractor without extra charges. All plant and apparatus shall be complete in all details whether such details are mentioned in the specifications or not.

ix. All equipment shall be designed for operation in tropical humid climate at the required capacity in an ambient air temperature of 50°C. Equipment shall be suitable for an ambient temperature of 50°C. Maximum relative humidity of 100% shall also be taken into consideration for design of equipment.

x. The reference ambient temperatures for which the transformers are to be designed are as mentioned in Table 5-7.

xi. The rating and electrical characteristics of the MV / 11 kV Outdoor type transformer (typical) shall be as mentioned in Table 5-8

Table 5-6 General Standards for Transformers

IS: 2026 (Part 1 to 4)	**Specifications for Power Transformer**
IS: 2099	Bushings for alternating voltage above 1000 V
IS: 3639	Fittings and accessories for power transformer
IEC: 60076 (Part 1 to 5)	Specifications for Power Transformer
IS: 9921 Part 1 to 5	Alternating currents dis-connectors (isolators) and earthing switches rating, design, construction, tests etc.
IS: 2705 Part 1 to 4 & IEC: ———	Current transformer
IS: 3156 Part 1 to 4	Voltage Transformer
IS: 3070 part 1 to 3	Lightning arrestors
IS: 2544	Porcelain insulators for system above 1000 V
IS: 5350	Part III – post insulator units for systems greater than1000 V

IS: 5621	Hollow Insulators for use in electrical equipment
IS: 5556	Serrated lock washers – specification
IEC: 186	Voltage transformer

Table 5-7 Reference Weather Conditions for Transformer Design

Sr.	Particulars	Specifications
1.	Maximum ambient temperature	50 degree C
2.	Maximum daily average ambient temp	45 degree C
3.	Maximum yearly weighted average ambient temp	40 degree C
4.	Minimum ambient air temperature: (Cooling medium shall be Air)	Minus 5 degree C
5.	Climatic Conditions :	
5.1	Maximum relative humidity	100%
5.2	Yearly average number of thunder storms	Varies from 30 to 50
5.3	Average no. of rainy days per annum	60 days
5.4	Fog	The atmosphere is subject to fog for two month in winter
5.5	Number of months during which tropical monsoon conditions prevail	3 months
5.6	Dust storms	occur at frequent intervals
5.7	Average annual rainfall	60 cms
5.8	Maximum wind speed	180 kmph

CODES & STANDARDS

IS:13118/IEC56	Specification for High voltage Alternating Current Circuit Breakers.

IS9921	AC dis-connectors(isolators) and Earth switches for voltages above1000volts
IS-2705	Current transformers
IS-3156	Voltage transformers
IEC-60358	Coupling capacitors and capacitor dividers
IEC-60044	Instrument transformers
IEC-60481	Coupling devices for power line carrier systems
IS-3070	Lightning arresters 'for" alternating current systems: Metal oxide lightning arrestors without gaps.
IEC-60099	Metal oxide surge arrestors without gaps
IS-8792	Line traps for AC power system
IS-8997	Coupling devices for PLC systems
IEC-60353	Line traps for AC power systems
IEC-6_____0	Communication Network and Systems in Substations

5.3.13 Technical Data Sheet of 11/66 KV or 33/66 KV Step Up Power Transformer

Type of transformer: ONAN cooled, Three phase, 66/11KV or 66/33 KV Step Up Power Transformer, Double Limb wound, Core type for OUT DOOR application. Mounted on Rails with wheels. THREE Phase

Type of windings : HV: Interleaved type / Disc type with static end rings at both ends with uniformly insulated, LV: Continuous disc type / layer type with uniformly insulated. Winding connection for 3 phase HV winding – Delta, LV winding – Star or as per Design.

Vector Grouping : D-Y n 11 (as per IS: 2026 part-IV) or as per Design.
Type of insulation : Uniformly insulated as per IS: 2026 Part III
Winding Material : Electrolytic grade copper
Winding Insulation : Class-A
System frequency : 50Hz ± 3%
Rated Capacity : As per IS 6600 for Power Transformer
Rated Primary Voltage : 11 kV or 33 KV
Rated Secondary Voltage : 66 kV

i. Non-cumulative over load capacity after the transformer has reached steady temperature on continuous operation at rated load i.e. At rated power) 110% for

continuous, 125% for 15 minute, 140% for 5 min Tapings (On load Tap Changer) OLTC shall be of minimum 72 KV Voltage class and shall have maximum rated through current not less than 300 Amps at normal tap, short circuit withstand current not less than **10 KA** for 3 Seconds and shall be of High Speed Resistor type, housed in a separate tank outside the main tank.: Min. 17 Taps in step of 1.25%. **Bidder shall have to consider transformer MVA rating asper AC capacity with adequate design margin. Further,** losses shall be as per IS and ONAN is only acceptable.

Transformer Losses : As per IS

Insulating medium Transformer oil as per IS: 12463

i. Instrument Transformer (66 kV Switchyard)

i. The instrument transformers i.e. current and voltage transformers shall be single phase transformer units and shall be supplied with a common marshaling box for a set of three single phase units. The tank as well as top metallics shall be hot dip galvanized or painted Grey color as per RAL 9002.

ii. The instrument transformers shall be oil filled hermetically sealed units. The instrument transformers shall be provided with filling and drain plugs.

iii. Polarity marks shall indelibly be marked on each instrument transformer and at the lead terminals at the associated terminal block. The insulators shall have cantilever strength of more than 500 kg.

iv. Current Transformer, Voltage Transformer, Circuit Breaker and Relays should match –Local distribution GSECL requirements.

ii. Current Transformer (66 kV Switchyard)

Contractor shall provide CT for protection/Energy/metering purpose.CT & PT for ABT meter shall be as per GETCO guidelines and as approved by GETCO.

i. Current transformers may be either of the bushing type or wound type. The bushing types are normally accommodated within the transformer bushings and the wound types are invariably separately mounted. The location of the current transformer with respect to associated circuit breaker has an important bearing upon the protection scheme as well as layout of, substation. Current transformer class and ratio is determined by electrical protection, metering consideration.

ii. Technical specifications – Current ratings, design, Temperature rise and testing etc. should be in accordance with IS: 2705 (part I to IV).

Type and Rating

a. The current transformer should be of outdoor/ indoor type, single phase, oil immersed, self-cooled and suitable for operation in 3 phase solidly grounded system.

b. Each current transformer should have the following particulars under the site conditions for the system under design (typical values for 66 kV systems are given).

c. General Parameters: 66 kV CT.

d. Each current transformer should have the following particulars under the site conditions for the system under design (typical values for 66 kV system are given).

Table 5-8 General parameters for 66 kV CT

Sr.	Particulars	Details
1	Highest system Voltage (Um)	72 kV rms
2	Rated frequency	50 Hz
3	System Neutral Earthing	Effective earthed
4	Installation	Outdoor/indoor(IP 65)
5	Rated short time thermal current	25 kA for 3 sec or appropriate thermal current as per design calculations
6	Rated dynamic current	63 kA (Peak) appropriate dynamic current as per design calculations
7	Rated min power frequency withstand voltage (rms value)	140 kV & 150 Hz
8	Rated lightning impulse withstand voltage (peak value)	340 kV
10	Minimum Creepage distance **at 31 mm**/kV	900 phase to earth
11	Temperature rise	As per -IS 2705/1992
12	Type of insulation	Class A
13	Number of cores	For Transformer : Three (3) with One (1) protection core and One (1) metering core (1) Diff. Protection of Transformer For ABT Meter Line Side : Three (3) with One (1) protection core and One (2) ABT metering core Main & Check

14	CT secondary current	Protection cores – 1 Amp. Metering Core – 1 Amp (With Highest Accuracy Class)
15	Number of terminals in marshaling box	All terminals of control circuits wired up to marshaling box plus 20 terminals spare
16	CT ratio & Rated VA Burden, short time thermal rating ,class of accuracy	Minimum burden required : 1. Metering core – 30 VA min. 2. Protection core – 30 VA min.

5.3.16 Potential Transformer:

Potential transformer shall be provided for Metering/Energy/ protection purpose. Metering PT shall be as per GETCO/STU guidelines.

i. The instrument transformers i.e. current and voltage transformers shall be single phase

transformer units and shall be supplied with a common marshaling box for a set of three single phase units. The tank as well as top metallics shall be hot dip galvanized or painted Grey color as per RAL 9002.

ii. The instrument transformers shall be oil filled hermetically sealed units. The instrument

transformers shall be provided with filling and drain plugs.

iii. Polarity marks shall indelibly be marked on each instrument transformer and at the lead

terminals at the associated terminal block. The insulators shall have cantilever strength of more than 500 kg.

iv. Current Transformer, Voltage Transformer, Circuit Breaker and Relays should match –Local

distribution GSECL requirements.

5.3.17 General Parameters of 66 kV VT

The Bidder has to furnish the specifications of 66 KV VT with the Bid.

Table 5-9 General parameters for 66 kV VT

Sr.	Particulars	Details
1	Highest system voltage (Um)	72 kV

2	System neutral earthing	effective earthed
3	Installation	Outdoor (IP 65)
4	System fault level	Appropriate
5	Rated min power frequency withstand voltage (rms value)	140 kV & 150 Hz
6	Rated lightning impulse withstand voltage (peak value)	340 kV
7	Standard reference range of frequencies for which the accuracy are valid	96% to 102% for protection and 99% to 101% for measurement
8	Rated voltage factor	1.2 continuous & 1.9 for 30 sec
9	Class of Accuracy	0.5 / 3P, IS3156/1992
10	Minimum Creepage distance at **31 mm/kV**	900 phase to earth
11	Stray capacitance and stray conductance of LV terminal over entire carrier frequency range	As per IEC:358
12	One Minute Power frequency Withstand voltage for secondary winding	3 kV rms
13	Temp. Rise over an ambient temp. of 50 deg. C	As per IS 3156/1992
14	Number of terminals in control spare.	All terminals of control circuits wired Cabinet up to marshaling box plus 10 terminals
15	Rated total thermal burden	300 VA min.
16	Number of cores	2 (two) – 1 for protection and one for metering with 0.5 class accuracy.
17	Rated Output, insulation level, transformation ratio, rated voltage factor	Should be provided by the Contractor.

5.3.18 Circuit Breaker (66 KV)

i. The circuit breakers shall be capable of rapid and smooth interruption of currents under all conditions completely suppressing all undesirable phenomena even under the most severe and persistent short circuit conditions or when interrupting small currents or leading or lagging reactive currents. The circuit breakers shall be 'Restrike-Free' under all operating conditions. The details of any device incorporated to limit or control the rate of rise of restriking voltage across, the circuit breaker contacts shall be stated. The over voltage across, the circuit breaker contacts shall be stated. The over voltage caused by circuit breaker while switching inductive or capacitive loads shall not exceed 2.5 times the highest phase to neutral voltage. The actual make and break times for the circuit breakers throughout the ranges of their operating duties shall be stated in the offer and guaranteed.

ii. The arc quenching chambers shall have devices to ensure almost uniform distribution of voltage across the interrupters.

iii. Appropriate & adequate Capacity AC& DC power supply shall be provided as per the IEC 60898 / IEC 62271 – 100 or equivalent Indian Standards for control circuit and protection relay circuit, fuses, annunciations and remote operating and controlling facility from the Main Control Room.

iv. Circuit breaker shall be C2/Ml class under all duty conditions and shall be capable of performing their duties without opening resistor. The circuit breaker shall meet the duty requirement of any type of fault or fault location and shall be suitable for line charging and dropping when used on 6 kV effectively grounded or ungrounded systems and perform make and break operations as per the stipulated duty cycles satisfactorily.

v. The circuit breaker shall be capable for breaking the steady & transient magnetizing current corresponding to 66 kV transformers. It shall also be capable of breaking line charging currents as per IEC- 62271-100 with a voltage factor of 1.4.

vi. The rated transient recovery voltage for terminal fault and short line faults shall be as per IEC: 62271-100.

vii. The Bidder shall indicate in the Bid, the noise level of breaker at distance of 50 to 150 m from base of the breaker.

viii. The Bidder may note that total break time of the breaker shall not be exceeded under any duty conditions specified such as with the combined variation of the trip coil voltage, pneumatic pressure etc. While furnishing the proof of the total break time of complete circuit breaker, the Bidder may specifically bring out the effect of non-simultaneity between same pole and poles and show how it is covered in the guaranteed total break time.

ix. While furnishing particulars regarding the D.C. component of the circuit breaker, the Bidder shall note that IEC-62271-100 requires that this value should correspond to the guaranteed minimum opening time under any condition of operation.

x. The critical current which gives the longest arc duration at lock out pressure of extinguishing medium and the duration shall be indicated.

xi. All the duty requirements specified above shall be provided with the support of adequate test reports.

xii. Circuit breaker shall be SF6 with electrically spring charged mechanism. The operating mechanism shall be anti-pumping and trip free (as per IEC definition) electrically under every method of closing. The mechanism of the breaker shall be such that the position of the breaker is maintained even after the leakage of operating media and / or gas. The circuit breaker shall be able to perform the duty cycle without any interruption.

xiii. Electrical tripping shall be performed by shunt trip coil. Provision shall also be made for local electrical control. 'Local / remote' selector switch and close & trip push buttons shall be provided in the breaker central control cabinet. Remote located push buttons and indicating lamps shall also be provided. The SF6 coil DC supply through appropriately rated battery bank and charger to be supplied by the Contractor.

xiv. Operating mechanism and all accessories shall be in local control cabinet. A central control cabinet for the three poles of the breaker shall be provided along with supply of necessary tubing, cables, etc.

xv. Mounting and supporting structure for Circuit Breaker. The circuit breakers should be self-supporting type. However, if necessary for the purpose of minimum ground clearance the circuit breakers should be mounted on raised steel structures which should be included in the scope of supply of circuit breaker.

xvi. Following information and data for design of foundations from the supplier of the circuit breaker be obtained.

a. Dead weight per pole for complete circuit breaker

b. Static bending moments above the feet of each pole and for complete circuit breaker.

c. Static shear force at the foot of each pole and for complete circuit breaker

d. Maximum height of the steel supporting structure

e. Maximum diameter of the pole

f. Maximum horizontal force acting at upper terminal of each pole due to impact of closing/opening of the circuit breaker

g. Max. Impact loading in terms of equivalent static load both compression and upward due to opening/closing of the breakers. It shall be clearly stated whether these forces shall act simultaneously or at different timing.

h. No. of steel supporting columns provided for mounting the equipment.

i. The above data should represent static reactions for the worst windage or operation conditions. Circuit breakers whether of self-supporting type or on

raised steel structure should ensure minimum sectional clearance (say 3500 mm for 66 kV)

j. Necessary connecting materials such as clamps, bolts, nuts, washers etc. and fixing bolts for mounting the equipment on the supporting structures wherever required should be obtained from the circuit breaker supplier.

xvii. **Applicable Standards:** The materials shall conform in all respects to the relevant Indian Standard Specifications/ IEC Standards, with latest amendments indicated below in

xviii.

xix. Table **5-10**.

Table 5-10 Applicable Standards for Circuit Breakers

Indian Standard	Title	International & Internationally recognized standard
ISS-13118/1991	General requirements for Circuit breakers for voltage above 1000 V	IEC 62271-100-1/2001
ISS-2705/1992	Current Transformers	
ISS-2099/1986	Bushings for alternating voltages above 1000 V	
ISS-2633/1964	Methods of testing uniformity of coating of zinc coated articles	
ISS-3231/1986	Electrical relays for power system protection	
ISS-1248/1983	Specification for Ammeters & Voltmeters	
ISS-335/1983	New insulating oils Electrical Clearances	IEC 71 (For oils in CTs)
ISS-2147/1962	Degree of protection provided by enclosures for low voltage switchgear & control gear	

xx. **General Parameters of Circuit Breaker:**General parameters: Outdoor/ Indoor Vacuum type Circuit Breaker.

Table 5-11 General Parameters for 66 kV Circuit Breakers

Sr.	Particulars	Details
1	Type of circuit breaker	SF6 type
2	Highest System Voltage	72 kV
3	Rated operating voltage	66 kV
4	Rated frequency	50 Hz (+3% to -5%)
5	Number of poles	Three (3)
6	Rated/minimum power frequency Withstand voltage	140 kV
7	Rated lightning impulse Withstand voltage	340 kV
8	Minimum Creepage distance at 31mm/kV	900 phase to earth
9	Rated operating duty cycle	0 - 0.3 sec. - CO – 3 min. – CO
10	Rated line charging breaking	As per IEC
11	Reclosing	Single and three phase high speed auto reclosing
12	Maximum fault level	25 kA (rms) for 3 sec. **However, it should be supported with calculations and not limited to above value.**
13	Auxiliary contacts	As required plus 6NO and 6NC contacts per pole as spare.
14	Noise level	Maximum 140dB at 50m distance from base of circuit breaker
15	Seismic acceleration	g horizontal

xxi. Co-ordination of rated voltages, short circuit breaking current and rated normal current for guidance as per IS 13118 for rated voltage 11 kV and above as commonly used are as given in Table 5-13.

Table 5-12: parameters of Rated Voltage, Short Circuit current and Rated Normal Current

Rated Voltage (kV)	Rated Breaking	Short Current (kA)	Rated normal	Current (A)	Current (A)
12	8	630	630	630	
	18	800	800	1250	2000
	25	1250	1250	2000	2500

xxii. Circuit Breaker protection against

- Over Current
- Earth fault
- Under voltage & over voltage protection
- Under frequency & over frequency
- SF6 gas pressure low (where applicable)
- DC supply failure

5.3.19 Protective Relays

i. The Solar PV system and the associated power evacuation system interconnections should be protected as per IEC 61727 Ed.2, norms. Over current relays, differential protection relays and earth fault relays have to be essentially provided. All relay should be numerical type & should be remote operating and controlling facility from the control room.

ii. The numerical relays shall have RS 485 port for communication.

iii. The operating voltage of the relays shall be 110 V DC/220 V DC as per battery bank rating.

iv. Detailed Design calculations shall be provided on fault power computations and the philosophy of protective relaying with respect to short circuit kA calculations. Design, drawing and model of protection relay shall be approved by the Company/Electricity Authority (GETCO).

5.3.20 Earthing for PV Array

i. The photovoltaic modules, BOS and other components of power plant requires adequate earthing for protecting against any serious faults as guided by IEC 60364.

ii. The earthing system shall be designed with consideration of the earth resistivity of the project area. The earth resistivity values shall be measured prior to designing the earthing system. Unless otherwise specified, earthing system shall be in accordance with IS: 3043 and IEEE 80, Indian Electricity Rules, Codes of practice and regulations existing in the location where the system is being installed.

iii. The permissible system fault power level at all the voltage shall be kept in consideration while designing the earthing system. Each array structure of the PV yard, LT power system, earthing grid for switchyard ,all electrical equipment ,control room ,PCU, All junction boxes, ACDB& DCDB ,all motors and pumps etc .shall be grounded properly as per IS 3043 - 1987. All metal casing / shielding of the plant shall be thoroughly grounded in accordance with Indian electricity act / IE Rules.

iv. The earthing for array and LT power system shall be made of 3.0 m long 40 mm diameter perforated Cu/GI/ chemical compound filled, double walled earthing electrodes including accessories, and providing masonry enclosure with cast iron cover plate having pad-locking arrangement, chemical compound mix as required as per provisions of IS: 3043.

v. Necessary provision shall be made for bolted isolating joints of each earthing pit for periodic checking of earth resistance.

vi. Each string/ array and MMS of the plant shall be grounded properly. The array structures are to be connected to earth pits as per IS standards. Necessary provision shall be made for bolted isolating joints of each earthing pit for periodic checking of earth resistance.

vii. The complete earthing system shall be mechanically & electrically connected to provide independent return to earth.

viii. For each earth pit, a necessary test point shall be provided.

ix. In compliance to Rule 11 and 61 of Indian Electricity Rules, 1956 (as amended up to date), all non-current carrying metal parts shall be earthed with two separate and distinct earth continuity conductors to an efficient earth electrode.

x. The Contractor should submit the earthing system design calculations along with the system layout for the Company's approval prior to the installation of the system

xi. Unless otherwise specified, the earthing system primary and secondary grid conductors, equipment connections shall be constructed with galvanized iron flat. However the earthing of transformer neutrals, plc and inverter terminals and electronic earthing shall be provided using copper earthing conductor only.

xii. Earthing Mesh is to prepared and installed in entire power plant.

5.3.21 Lightening Protection for PV Plant and Earthing

i. The source of over voltage can be lightning or other atmospheric disturbance. Main aim of over voltage protection is to reduce the over voltage to a tolerable level before it reaches the PV or other sub-system components as per IEC 60099 / IS: 2309 – 1989 (Reaffirmed – 2005), Edition 3.1 (2006-01). Lightening Protection System required for Solar PV Plant, Inverter Room, and Substation Structure & Control Room within the EPC scope of work. The intent of specification can be conventional as per IS : 2309 or can be Early Streamer Emission Type depending upon Area, Protected Equipment & Technical feasibility.Necessary concrete foundation 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. We recommended going with Early Stream Emission Air Terminal Technology as per NFC 17-102 / IEC 62305-2. Level of Protection must be defining as per Rolling Sphere Method LPL-I, LPL-II, LPL-III & LPL-IV where the radius shall be of 20mtr, 30mtr, 45mtr & 60mtr respectively.

ii. Rp(h) : Protection radius at a given height (h) Rp(h) = √ 2rh - h2 + Δ(2r + Δ) (for h ≥ 5 m) For h < 5 m, refer to the table below h : Height of the OPR tip above the surface(s) to be protected r(m) : Standardized striking distance Δ(m) = 106 .ΔT (OPR efficiency)

OPR radius of protection

Protection level	I (r = 20 m)			II (r = 30 m)			III (r = 45 m)			IV (r = 60 m)		
OPR	OPR 30	OPR 45	OPR 60	OPR 30	OPR 45	OPR 60	OPR 30	OPR 45	OPR 60	OPR 30	OPR 45	OPR 60
h (m)	Radius of protection Rp (m)											
2	19	26	31	22	28	35	25	32	39	28	36	43
3	29	38	47	33	42	52	38	48	58	43	57	64
4	38	51	63	44	57	69	51	65	78	57	72	85
5	**48**	**63**	**79**	**55**	**71**	**86**	**63**	**81**	**97**	**71**	**89**	**107**
6	48	63	79	55	71	87	64	81	97	72	90	107
8	49	64	79	56	72	87	65	82	98	73	91	108
10	49	64	79	57	72	88	66	83	99	75	92	109
15	50	65	80	58	73	89	69	85	101	78	95	111
20	50	65	80	59	74	89	71	86	102	81	97	113
45	43	65	76	58	75	89	75	90	105	89	104	119
50	40	65	74	57	75	88	75	90	105	89	104	120
55	36	65	72	55	75	86	74	90	105	90	105	120
60	30	65	69	52	75	85	73	90	104	90	105	120

ii. The lightning conductor shall be earthed through flats and connected to the earth mats as per applicable Indian Standards with earth pits. 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, chemical compound as per provisions of IS.

iii. If necessary more numbers of lightning conductors may be provided as per design calculation

iv. The Contractor shall submit the drawings and detailed specifications of the PV array lightning protection equipment.

v. The design, manufacture, inspection, testing and performance of Lightning Arrester shall comply with all currently applicable statutes, safety codes, provision of latest Indian Electricity Act, Indian Electricity Rules and Regulations of Statutory Authorities.

vi. Contractor shall provide dedicated two earth pits for Lightening Arrestor as per relevant IS standard.

5.3.22 Isolators cum Earthing Switches, Contacts, Insulators, Busbars

i. This specification covers design, manufacture, testing and supply of. Manually operated 66 KV, 800 Amps Upright mounting type with manually operated with earth switch Isolators. The Isolators and Isolator-cum-Earthing Switched shall comply with the requirements of the IS: 9921 and IEC: 129 (latest edition) except specified herein. The Insulators shall comply with the requirements of IS : 2544 and IEC : 168-1988 (latest edition) for 66 kV pole mounted structure wherever required. 66 kV pole

mounted structure would be supplied, installed and commissioned by the Contractor wherever required.

ii. The isolator shall be of the **motor operated** type with earthing switches and shall complete with all parts and accessories including insulator operating rods, mounting attachments, necessary for their efficient operation. The equipment shall confirm in all respect to high standards of engineering Equipment shall capable of performing in continuous commercial operation up to the suppliers guarantee in a manner acceptable to the client, The equipment offered shall be complete with all components necessary for its effective and trouble free operation along with associated equipments, interlock, protection schemes, etc. Such components shall be deemed to be within the scope of the Contractor's supply irrespective of whether those are specifically brought out in this specification or not. All similar parts particularly removable ones shall be interchangeable.

iii. Each pole shall have three Pedestal type of Insulator's stacks. Necessary arrangements shall be provided for proper alignment of the contacts. Ganged operated links shall be so designed that all phases shall make and break simultaneously.The design of Isolators and Isolator-cum-Earthing Switches shall be provided for positive control of blades in all positions with minimum mechanical stress on the Insulators. Fixed guides shall be so provided that proper setting of contacts shall be obtained, when a blade is out of alignment even by 25mm in either direction. All movable parts which may be in current path shall be shunted by flexible copper conductor of adequate cross-section and capacity, which shall be furnished under bill of material.

Service Condition:

The 66 kV triple pole air break isolators are intended to be used primarily for sectionalizing 66 kV UG cable portion of the line with 66 kV overhead portion of the line.

Isolator shall confirm IS: 9921(Part 1 to 4) & IEC 600 - 129 "alternating current disconnects (Isolators) and earthing switches", and IS 9921 (Part-I to IV) "Specification for alternating current disconnects (isolators) and earthing switches for voltages above 1000V"

a. The moving & fixed contacts shall be made of hard drawn electrolytic grade copper strips and shall be heavy duty self- aligning & high pressure type preferably which applies pressure to the contact surfaces after the blades are fully closed and release the pressure before they start to open. High pressure type contacts shall wipe the contact surfaces, while opening and closing. The contacts shall be so designed that wiping, action shall not cause securing or abrasion on the contact surfaces. The wiping action shall be sufficient to remove oxide film, formed during the operation of the switches. The pressure shall be developed by rotation of the entire blade.

b. The temperature rise of contacts due to the flow of rated short circuit current for a period of 3 seconds shall not cause any annealing or welding of contacts.

c. The moving contacts, if provided, shall close first and open last so that no damage is caused due to arcing whatever to the main contacts. The Successful Bidder shall give full details of such contacts with necessary drawings.

d. The arcing contacts, if provided shall close first and open last so that no damage is caused due to arcing whatever to the main contacts. The Contractor shall give full details of such contacts with necessary drawings.

e. The female contact and its tensioning by spring shall be such that there will, always, be a positive contact with adequate pressure to give enough contact surface for the passing of current. The springs provided should not go out of alignment or get entangled with the male contact during operation. The details of springs shall be furnished on the G.A. drawing.

INSULATORS: The isolator shall be provided with solid core insulators.

i. These shall be of stacking type to be used. The dimensions and other parameters unless otherwise specified shall generally conform to IS - 5350-Part-11 & IEC 273.

ii. The cylindrical type post insulators shall be of solid core type. Insulators of similar type shall be interchangeable. The mechanical strength class for outdoor cylindrical post insulators shall be of strength class 6, corresponding mechanical strength in tension, compression and torsional shall be as per IS : 53550 Part - II. When operated at maximum system voltage, there shall be no electrical discharge. Shielding rings, if necessary shall be provided.

iii. The parameters of the insulators required shall conform to IS : 0350 - Part - II - 1973 or IEC 273.

iv. The cylindrical post insulators shall consist of single unit only.

v. The insulator shall be provided with a completely galvanized steel base designed for mounting on the support. The base and mounting arrangement shall be such that the insulator shall be rigid and self-supporting and no guying or cross bracing between phase shall be necessary.

vi. **Porcelain of the insulator**:

a. The porcelain used for the manufacture of the insulators shall be homogenous, free from laminations and other flaws or imperfections that might effect the mechanical or dielectric quality and shall be thorough vitrified, tough and impervious to moisture. The glazing of the porcelain shall be uniform brown colour, with a smooth surface arranged to shade away rain water and free from blisters, burns and other similar defects. Insulators shall be inter-changeable.

b. The porcelain and metal parts shall be assembled in such a manner and with such materials that any differential thermal expansion between the metal and porcelain parts throughout the operating temperature range will not loosen the parts or electrical strength or rigidity. The assembly shall not have excessive concentration of electrical stress in any section or across leakage surfaces. The cement used shall not give rise to chemical reaction with metal fittings. The insulator shall be suitable for water washing by rains or artificial means in service conditions. Further the insulators to be

supplied shall be of high- quality and should not result in mismatch and misalignment of stacks during erection and operation.

c. Each cap shall be of a high grade cast iron or malleable steel casting or steel forging. Cap and base insulators shall be interchangeable with each other. The insulator shall conform to the requirement of the latest edition of IS: 2544,or any other equivalent standard. The Bidder should furnish the characteristics of insulators in the Bid.

Bus bars

i. The outdoor bus-bars and equipment connections shall be with ACSR conductor (Panther /suitable size as per design).

ii. The bus-bars and the connection jumpers shall be supported on post insulators wherever required.

iii. The ACSR bus bars are an underground system of wires strung between two supporting structures and supported by strain type insulators. The stringing tension may be limited to 500-900 kg. depending upon the size of the conductor used. These types of bus bars are suitable for earthquake prone areas.

iv. Bus bar Material – The materials in common use for bus bars and connections of the strain type are ACSR conductor.

v. Since aluminum oxides rapidly great care is necessary in making connections. In the case of long spans expansion joints should be provided to avoid strain on the supporting insulators due to thermal expansion or contraction of pipe.

vi. The bus bar sizes should meet the electrical and mechanical requirements of the specific application for which they are chosen.

vii. The isolator shall be provided with padlocking device to permit locking of the isolator in both fully open and fully closed positions.

5.3.23 Control & Relay Panel Specification

i. The control & relay panel shall be free standing, simplex type, floor mounting type, fabricated from 2 mm thick MS sheet for main enclosure and 1.6 mm thick MS sheet for internals and partitions. The main enclosure shall be mounted on a base frame fabricated out of 100x50 ISMC mild steel section.

ii. The enclosure external finish color shade shall be decided by the GSECL, The internal surface shall have a glossy white finish all over.

iii. The control & relay panel shall contain the following metering and protection devices:

- Metering, Indications & Controls
- Ammeter – 0 – …….. A
- Ammeter selector switch
- Voltmeter – 0 – 12/36 kV
- Voltmeter selector switch

- Load manager to display the following parameters : MW, MVA, MVARh, MVAR Cos Ø, Hz,
- Indication lamps for R, Y, B phases, Breaker 'ON' (R), Breaker 'OFF' (G), Breaker 'TRIP' (A), Spring charged (W), Trip Circuit Healthy (B)
- TNC switch, spring return to neutral position shall be provided for circuit breaker operation.
- Local / Remote selection switch for circuit breaker operation
- Semaphore indicators (LED type) for CB and Isolator 'Open' & 'Close' positions
- Mimic diagram for the 66 KV systems with aluminum strips and 'ON' 'OFF' indications for isolators.

5.3.24 Low Voltage Switchgear

i. This specification is for the 415V TP&N Power Control Centre (PCC).

ii. The PCC shall be rated for the maximum output of the supply transformer feeding the system.

iii. The short circuit withstand rating (1 sec) at rated voltage of the switchgear shall be minimum of 20 kA (rms) and corresponding dynamic rating shall be 50 kA (peak). **However, this shall be supported by design calculations. Rating shown as above is indicative only.**

iv. The configuration of the PCCs shall be as per the Single Line Diagram of the system.

5.3.25 Execution

i. Single front / compartmentalized, modular design, degree of protection IP52 with provision of extension on both sides.

ii. Incomer feeders: mains incomer - Electrically operated draw out type Air Circuit Breakers (ACBs).

iii. Outgoing feeders : Electrically operated draw out type Air Circuit Breakers (ACBs) / Molded Case Circuit Breakers (MCCBs)

iv. The color finish shade of switchgear enclosure for interior shall be glossy white & for exterior it shall be light grey, semi glossy shade 631 of IS: 5. If a different exterior shade is desired by the PURCHASER, the same shall be intimated to the supplier.

v. The PCC shall be fabricated out of **CRCA** sheet steel; 2 mm thick for the outer shall all-round. The internal walls and separators shall be of 1.6 mm thick **CRCA** sheet steel.

vi. The gland plates shall be 3 mm thick.

5.3.26 Control & Relay Specification for 415V TP & N Power Control Centre(PCC)

i. This specification is for the 415V TP&N Power Control Centre (PCC).

v. The PCC shall be rated for the maximum output of the supply transformer feeding the system. The short circuit withstand rating (1 sec) at rated voltage of the switchgear shall be minimum of 20 kA (rms) and corresponding dynamic rating shall be 50 kA (peak). **However, Bidder shall have to carry out the short circuit current analysis and shall submit to GSECL for approval before selection of short circuit rating of equipments. Rating shown as above is indicative only.**

ii. The configuration of the PCCs shall be as per the Single Line Diagram of the system.

Execution

Power Control Centres (Construction)

a. Single front / compartmentalized, modular design, degree of protection IP52 with provision of extension on both sides.

b. Incomer feeders: mains incomer - Electrically operated draw out type Air Circuit Breakers (ACBs).

c. Outgoing feeders : Electrically operated draw out type Air Circuit Breakers (ACBs) / Moulded Case Circuit Breakers (MCCBs)

d. The colour finish shade of switchgear enclosure for interior shall be glossy white & for exterior it shall be light grey, RAL 7032 of IS: 5. If a different exterior shade is desired by the PURCHASER, the same shall be intimated to the supplier.

e. The PCC shall be fabricated out of CRGO sheet steel; 2 mm thick for the outer shall all-round. The internal walls and separators shall be of 1.6 mm thick CRGO sheet steel

f. The gland plates shall be 3 mm thick

Control Circuit

a. Control supply for breaker closing / tripping - 110V DC

b. Air Circuit Breaker spring charge motor – **240 /220 V AC/DC**

c. Molded Case Circuit Breakers – 240 V AC, 1 phase

d. Indications, annunciation – 110V DC

e. Space heater, sockets, etc. – 240 V AC, 1 phase

Bus bar and Cable Cavity

a. The material for main bus bars and tap off bus bars shall be electrolytic grade aluminum with HR PVC sleeved insulation

b. Bus bars shall be suitable for short circuit rating and current suitable for all connected load.

c. Bottom cable entry for incoming and outgoing cables

d. A suitable gland plate shall be supplied for termination of power, control and instrumentation cables.

e. Whenever feeders are housed in multi-tier configuration, these tiers shall be segregated by sheet metal barriers.

5.3.27 Control Room Electrical Wiring

i. Electrification of building shall be carried out as per IS 732-1989, IS 46481968 and other relevant standards. Suitable AC Distribution Board should be designed to Supply AC power in Control room.

ii. Control room AC distribution Board theoretical design, calculations and detailed explanations along with drawing shall be provided and approved by GSECL.

5.3.28 Auxiliary Power Supply

i. The Contractor shall install a separate 11 kV / 415 V or 33KV/415 V step down transformer to supply power for internal equipment such as power for control equipment, area lighting, water pumps, and conference room fixtures, control room lighting and air-condition, etc.

ii. This auxiliary power should be utilized directly from the grid through a separate meter and should not interfere with accounting of solar electricity fed into the grid.

5.3.29 DC Battery & Charger

i. Adequate capacity DC battery Bank should be provided for emergency control supply of inverters, control / protection system & emergency lighting. A appropriate capacity battery charger with relevant IS/IEC standards & protection and automatic change over system should be provided to charge the battery bank along with relay circuit, fuses, annunciations and remote operating and controlling facility from the Main Control Room.

ii. A DC power supply Distribution panel/board should be supplied along with the Charger as per relevant IS standards. Control room DC Battery Bank & DC supply system theoretical design, calculations and detailed explanations along with drawing shall be provided and approved by GSECL / GETCO.

iii. DC Batteries the batteries shall have the following specifications

a. Type : Nickel Cadmium Stationary/ VRLA, sealed type, storage battery

b. Rating : 110 V D.C., Minimum 80 Ah at 8 Hour rate of discharge

c. Standard : IS 1651 – 1979 ; performance as per IS 8702

d. Container : Plastic Resin, ABS or PP

e. Terminal Post : Designed suitably to accommodate external bolted connections

iv. The battery shall be provided with epoxy paint coated exhaust fan for removal of gasses released from the battery cells.

v. The data sheet for the battery shall be submitted along with the Bid for evaluation.

5.3.30 Earthing

i. Earthing bus bar shall be terminated at both ends of the switchgear to suit the connections to outside earthing conductor. All components inside the module are required to be earthed individually and are to be looped and connected to the horizontal earth bus.

Terminals

a. CT circuit - Isolating link type terminals with shorting facility

b. PT circuit – clip on type terminals

c. Spare contacts shall be wired up to terminal block. 10% spare terminals shall be provided for each module

Specific Requirements

1. All ACBs shall be 4 pole, electrically operated, draw-out type, with closing coil, spring charge motor, trip coil, TNC switch for close and trip, manual closing and tripping push buttons, door I/L, test and service position micro switches, emergency P.B., safety shutters, etc. The circuit breaker shall be provided with anti-pumping feature.

2. ACBs shall be complete with microprocessor release and shall be provided with over current, short circuit and earth fault protections.

3. Minimum10% spare feeders of each rating shall be provided in the switchgear. No spare feeder is required for 11kV VCB panel and SMB.

4. All current transformers shall have 5/1A secondary and all meters shall be suitable for 5/1A operation.

5. All indicating lamps shall be of LED cluster type. ACB feeders shall be provided with ON, OFF, AUTOTRIP, SPRING CHARGED, TEST, SERVICE, TRIP CIRCUIT HEALTHY indications

6. All indicating instruments shall be flush mounting, Digital, 96 sq.mm size.

7. Window annunciator with hooter and accept, test, reset button shall be provided. Necessary auxiliary relays for contact multiplication shall be provided in the panel.

8. The maximum temperature of the bus bars, droppers and contacts at continuous current rating under site reference ambient temperature of 50º C shall not exceed 105º C.

Instrumentation: Switchgear instrumentation shall be provided as follows:

a. Mains Incomer – Voltmeter with selector switch
b. Ammeter with selector switch
c. Power Factor meter
d. Frequency meter
e. TVM + MD meter
f. Potential indicating lamps
g. Outgoing Feeders
h. Ammeter with selector switch on all feeders.

5.3.31 General Technical Specifications of Control Panel

i. The panel shall be self-supporting, free standing, floor mounted, modular type with construction having degree of protection of IP 54 as per IS 2147.

ii. The panel shall be fabricated from 14 SWG CRCA sheet steel for frame & load bearing surfaces. Partitions may be fabricated from 16 SWG CRCA if no components are mounted on them.

iii. 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 Company.

iv. Stiffeners shall be provided at corners & between modules to make panel rugged. The stiffeners will necessarily be required for relay compartments or doors where heavy components are mounted.

v. The openable covers shall be provided with lift off type hinges, quarter turn door locks and flexible copper wire for earth connection.

vi. The panel shall be dust and vermin proof. Synthetic or neoprene gaskets shall be provided at all openings.

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

viii. Panel shall be provided with fl. lamp of 20 w capacity operated by door operated limit switch. Panel shall also have space heaters and thermostat arrangement.

ix. Panel shall be provided with 3 pin switch socket combined unit of 5 Amp capacity.

x. Lifting hooks shall be provided at the top of the panel.

xi. The hardware components used in the panel shall be hot dipped galvanized.

xii. The control components shall be fixed on mounting plate by drilling & tapping.

xiii. Aluminum anodized legend plates shall be provided for all the components. For components mounted on front face, legend plate from inside shall also be provided.

xiv. Pretreatment by 7 tank process shall be done before painting / powder coating the panel.

xv. Panel shall have provision of drawing pocket.

xvi. The panel shall be designed to ensure maximum safety during operation inspection, connection of cables and maintenance. Inside panel, checking and removal of components shall be possible without disturbing other units.

xvii. Cable entries will be from bottom. The opening of cable entry shall be covered by 3 mm thick gland plates.

xviii. The panel shall be provided with all necessary components / devices and instruments as per the enclosed schematic diagram and functional requirements.

xix. The components such as protective relays, auxiliary relays, push buttons, switches, instruments shall be flush mounted on the front side of a panel.

xx. The control wiring shall be done with PVC insulated flexible copper wire. For CT secondary circuits 2.5 sq.mm. wire shall be used. For control wiring 1.5 sq.mm. wire shall be used.

xxi. Earthing busbar of suitable cross section shall be provided throughout the length of panel.

xxii. The panel shall be fully wired all the terminals shall be brought out for cable connections. 10% spare terminals shall be provided on each terminal block. Separate terminal block shall be provided for different voltages. All wire shall have P.V.C. ferrules as per wiring diagram.

xxiii. Proper shrouding to incoming and outgoing terminals shall be provided to ensure safety during operation, inspection and maintenance.

xxiv. Indicating lamps shall be with multiple LEDs & shall be suitable for the voltage specified.

xxv. All the components in the panel shall be properly labeled. The labels shall be made of non-rusting metal or engraved PVC material properly fixed by screws.

xxvi. The panel layout shall be made in such a way that it will always facilitate easy removal and reconnection of control cables without disturbing other wiring.

xxvii. Centre lines of control switches, push buttons and indicating lamps shall be matched so as to give neat appearance. Similarly top lines of indicating instruments and relays shall also be matched.

xxviii. The panel shall be provided with electrolytic grade aluminum busbar of suitable cross section so as to maintain max current density of 0.8 AMP/ Sq.mm.

xxix. Bus bars shall be provided with color coded heat shrinkable sleeves.

xxx. Bus bars shall be supported by high quality epoxy insulators provided at specified distances so as to withstand to the given fault level.

xxxi. The busbar chambers shall be provided with suitable ventilation arrangements so as to limit the maximum temperature of 85°C while carrying rated current.

xxxii. Proper clearance of minimum 25 mm shall be maintained between phase bus bars and between bus bars.

xxxiii. The panel shall be inspected at manufactures works before dispatch to site at the discretion of GSECL.

xxxiv. All routine tests shall be carried out on the panel in presence of the Company / its representative. These tests shall include following:

a. Verification of components ratings and operation.

b. High voltage measurement test.

c. Insulation Resistance measurement.

xxxv. Control testing.

xxxvi. Approval on following drawings shall be obtained before manufacturing the panels

a. General arrangement drawing.

b. Wiring Diagram.

xxxvii. Detail bill of material.

66kV Under Ground Cable

The Contractor shall provide 66kV Under Ground Cable along with bay and metering on Turnkey basis as per client's requirementat at GETCO substation. The Bidder shall confirm the same in the Bid.The Underground cable shall also be approved registered supplier in GETCO.

Bidder can opt underground cable or Transmission line. However it shall be as per GETCO guidelines.

5.3.32 Metering System

i. ABT energy meter shall be provided as approved by GETCO to measure the delivered quantum of energy to the grid for sale. The responsibility of arranging for the meter, its inspection/calibration/testing charges etc. rests with the Contractor. All charges incurred on Meter testing, shall be borne by the Contractor. ABT energy metering system is to be approved by GETCO. Metering shall be at GETCO S/s end.

ii. Meter must be provided with the necessary data cables.

iii. Separate metering system has to be provided for L.T. (incoming) and H.T. (outgoing) supply.

iv. The Bidder shall provide ABT compliant meters at the interface points. Interface metering shall conform to the Central Electricity Authority (Installation and Operation Meters) Regulation 2006 and amendment thereof Commercial settlement of solar Photovoltaic Grid Interactive based power project shall be in accordance with the GERC relevant order. Meter shall be suitable for interfacing for synchronizing the built-in clock of the meter by GPS time synchronization equipment existing at the station either through a synchronization pulse received from the time synchronization equipment or through a remote PC synchronized to GPS clock shall also be in the scope of Bidder.

v. All charges for testing and passing of the meter with relevant government agency shall be borne by Bidder; GSECL will assist Bidder for necessary document as and when required.

vi. ABT compliant Energy Meters shall have technical specification as given below (not limited to specified requirement, Bidder can provide Meter with latest facilities):

vii. Shall be microprocessor-based conforming to IEC 60687 / IEC 6205211/ IEC 62053-22 / IS 14697

viii. Shall carry out measurement of active energy (both import and export) and reactive energy (import) by 3-phase, 4 wire principle suitable for balanced/ unbalanced 3 phase load.

ix. Shall have an accuracy of energy measurement of at least Class 0.2 for active energy and at least Class 0.5 for reactive energy according to IEC 60687, and shall be connected to Class 0.2 CT cores and Class 0.2 VT windings.

x. The active and reactive energy shall be directly computed in CT & VT primary ratings.

xi. Shall compute the net MWh and MVARh during each successive 15-minute block metering interval along with a plus/minus sign, instantaneous net MWh, instantaneous net MVARh, average frequency of each 15 minutes, net active energy at midnight, net reactive energy for voltage low and high conditions at each midnight.

xii. Each energy meter shall have a display unit with a seven digit display unit. It shall display the net MWh and MVARh with a plus/minus sign and average frequency during the previous metering interval; peak MW demand since the last demand reset; accumulated total (instantaneous) MWh and MVARh with a plus/minus sign, date and time; and instantaneous current and voltage on each phases.

xiii. All the registers shall be stored in a non-volatile memory. Meter registers for each metering interval, as well as accumulated totals, shall be downloadable. All the net active/reactive energy values displayed or stored shall be with a plus /minus sign for export/import.

xiv. At least the following data shall be stored before being over-written for the following parameters:

Table 5-13 Co-ordination Parameters

Sr.	Parameters	Details	Min No of Days.
1	Net MWh	15 min Block	90 days in meter
2	Average Frequency	15 min Block	90 days in meter
3	Net MVARh for > 103 %	15 min Block	90 days in meter
4	Cumulative Net MWh	At every Mid-night	30 days in meter / 90 days in PC
5	Cumulative Net MVARh for v > 103 %	At every Mid-night	30 days in meter / 90 days in PC
6	Date and time blocks of VT failure on any phase		

xxxviii. Shall have a built in clock and calendar with an accuracy of less than 15 seconds per month drift without assistance of external time synchronizing pulse.

xxxix. Date/time shall be displayed on demand. The clock shall be synchronized by GPS time synchronization equipment existing at the station provided by Bidder.

xl. The meter shall be suitable to operate with power drawn from the VT supplies. The burden of the meters shall be less than maximum 2 VA.

xli. The power supply to the meter shall be healthy even with a single-phase VT supply. An automatic backup, in the event of non-availability of voltage in all the phases, shall be provided by a built in long life battery and shall not need replacement for at least 10 years with a continuous VT interruption of at least 2 years. Date and time of VT interruption and restoration shall be automatically stored in a non-volatile memory.

xlii. Even under the absence of VT input, energy meter display shall be available and it shall be possible to download data from the energy meters.

xliii. Shall have an optical port on the front of the meter for data collection from either a hand held meter reading instrument (MRI) having a display for energy readings or from a notebook computer with suitable software.

xliv. The meter shall have means to test MWh and MVARh accuracy and calibration at site in-situ and test terminal blocks shall be provided for the same.

xlv. The meter shall have a unique identification code provided by the Company and shall be permanently marked on the front of the meter and stored in the non-volatile memory of the meter.

xlvi. The Company shall have the right to carry out surprise inspections of the Metering Systems from time to time to check their accuracy.

5.3.33 SCADA and Remote Monitoring System

i. The plant shall be automatically operated and shall be controlled by microprocessor based control system SCADA. There shall be simultaneous data logging, recording and display system for continuous monitoring of data for different parameters of different sub systems, power supply of the power plant at DC side and AC side.

ii. An integrated SCADA shall be supplied which should be capable of communicating with all inverters and provide information of the entire Solar PV Grid interactive power plant.

iii. Computer-aided data acquisition unit shall be a separate & individual system comprising of different transducers to read the different variable parameters, A/D converter, multiplexer, de multiplexer, interfacing hardware & software, which will be robust & rugged suitable to operate in the control room Environment.

iv. Reliable sensors for solar insolation, temperature, and other weather and electrical parameters are to be supplied with the data logger unit.

v. The data acquisition system shall measure and continuously record electrical parameters at inverter output,11KV terminal, 66 KV terminal, 66 kV ABT meter at evacuation point, ambient temperature near array field, control room temperature, AC and DC side electrical parameters of each inverter, power characteristics of the HT side.

vi. 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.

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

viii. The Data Acquisition System should be housed in a desk made of steel sheet.

ix. SCADA shall provide following data at a 5-15 minute interval.

a. Power at 66 kV ABT meter at switchyard
b. Ambient temperature near array field.
c. Wind Speed
d. AC and DC side Power of each inverter
e. Solar irradiation/isolation
f. Voltage of the HT Side
g. Any other parameter considered necessary by supplier based on current prudent practice.

x. Minimum I/O Consideration as per below table. Any other parameter not mentioned in the list but required as per current prudent practice to be considered& provided.

Minimum Requirements of SCADA System for I/O Consideration

Sr. No.	Equipment Details	Location	SCADA Requirements			
			Monitoring / Status	Control / Operation	Data Logging	Specific Remarks
1	ABT Meter	66kv Switchyard	Yes		Yes	
2	Isolators	66kv Switchyard	Yes			
3	C & R	66kv Switchyard	Yes	Yes	Yes	Relay Log
4	Power Transformer	66kv Switchyard	Yes		Yes	Marshalling Box
5	Breakers	66kv Switchyard	Yes	Yes		
6	11kV or 33 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	66kv Switchyard	Yes			Marshaling Box

10	Fire Alarm Panel	MCR / LCR	Yes	Yes		
11	Inverter	LCR	Yes	Yes	Yes	Inverter Data Log
12	11kV RMU	LCR	Yes	Yes	Yes	MFM Meters with RS485
13	Weather Monitoring Status	MCR	Yes		Yes	
14	Plant & Switchyard Lighting	Plant & 66kV Switchyard	Yes	Yes		Feedback through ACDB & Light ON/OFF Programming
15	CCTV	LCR / MCR / Plant / Switchyard	Yes		Yes	NVR based recording & data transmission **360 degree rotatable, night vision and state of the art Technology of reputed bidder shall be considered. Bidders to submit credentials and specification at the time of detail Engineering.**
16	String Junction Box	Plant	Yes		Yes	Each String Monitoring

xi. SCADA shall provide 15 minute daily, monthly and annual average of following parameters:

- Exported Energy to grid at 66 kV
- Energy of each inverter
- Solar Radiation

- Temperature

xii. The SCADA server PC shall be of Industrial type, rugged & robust in nature to operate in a hostile environment. The PC shall have minimum Intel Core i5 processor having 2 X 500 GB HDD with 8 GB RAM + 2GB RAM with Graphics Card. The PC shall also have 42" LED Color monitor, DVD Drive with Writer, USB drive, Scroll Mouse and UPS for 4 hours Power back up.

xiii. The printer shall be of industrial type, rugged & robust in nature and of reputed make. The printer shall be equipped for printing, scanning, copying and fax.

xiv. String Monitoring System: String Monitoring System designed exclusively for parallel connection of the photovoltaic field strings, allowing for protection in the case of breakdown & monitoring the entire photovoltaic field, by means of the following checks.

- Reading the string currents (10 channels available)
- Reading the total voltage of the field
- Checking the fuses positioned in the system, to protect the photovoltaic panels.
- Checking the state of the internal protection against over-voltages.
- Should be very low power consumption.

a. Monitoring of various parameters at string level should be made possible in the main control room at site by installing the suitable string monitoring system any fault at string level could be recogniz able by that system.

b. A provision should be present for remote monitoring of the power plant at string detail over the web.

c. The Contractor shall provide to GSECL the detailed specifications, and all administrative rights/ privileges/ passwords to the string monitoring system.

xv. Weather Station and Data logger

a. Contractor shall provide the data over remote web-server with rights to control or modify the same through appropriate arrangements.

b. Contractor shall provide necessary licensed software and hardware solution to offer monitoring of electrical parameters of grid and solar generator monitored at individual string level over remote web server. The Contractor shall provide all necessary accessories like power supply, connection cords, sensors, active SIM card with appropriate data plan etc. so as to make the system complete in all respect.

c. The cost of data plan during the project and O&M shall be borne by the Contractor. At the end of the O&M, the same shall be transferred to GSECL at no extra cost.

d. It shall also have local data logging and communication through Bluetooth / Wi Fi and Ethernet port.

e. The Remote Monitoring System shall be capable of sustaining maximum – minimum temperature, rainfall, wind gusts and UV radiation. The enclosure shall be IP65 for outdoor installation / IP21 for indoor installation.

f. The Remote Monitoring System shall have capability to log and send data from weather sensors.

g. The data shall be available for every minimum 15 minutes interval.

h. The system shall have sufficient internal memory storage to retain data for one complete year and shall have provision of expanding memory through external memory card / USB drive.

i. The system shall be able to communicate wirelessly in a close proximity

j. The Contractor shall provide to the Company the detailed specifications, and all administrative rights/ privileges / passwords to the string monitoring system.

k. The Contractor shall provide following measuring instruments with all necessary software & hardware compatible with the Data logging and web based monitoring system.

   i. **Pyrometer**: The Contractor shall provide two no. of pyranometers for measuring incident global solar radiation, one each on the horizontal surface and in the same orientation (inclination and azimuth) as the photovoltaic modules. The pyranometers shall have following specifications mentioned in Table 5-14.

Table 5-14 Specification of Pyranometers

Sr.	Particulars	Specification
1	Class	II
2	Spectral Response	0.31 to 2.8 micron
3	Sensitivity	Approx. 9 micro - volt/w/m2
4	Time response (95%)	Max 15 sec.
5	Non linearity	±0.5%
6	Temperature Response	±2%
7	Temperature Response	Max ±2%
8	Tilt error	±0.5%.
9	Zero offset thermal radiation	±7 w/m2
10	Zero offset temperature change	±2 w/m2

11	Operating temperature range	- 40 deg. to +80 deg.
12	Uncertainty(95% confidence Level)	Hourly- Max-3%
13	Daily-	Max -2%
14	Non stability	Max ±0.8%
15	Resolution	Min + / - 1 W/m2
16	Input Power for Instrument & Peripherals	230 VAC (If required)
17	Output Signal	Analogue form which is compatible with the data

ii. Temperature Sensor: The Contractor shall provide suitable nos. of RTD type temperature sensors with required weather shield as per Indian Standards, so as to individually and simultaneously measure both, ambient temperature, and module temperature. To measure module temperature, the temperature sensors shall be located on the back of representative modules and on front glass surface. Care must be taken to ensure that the temperature of the cell in front of the sensor is not substantially altered due to the presence of the sensor. Instrument shall have a range of -5°C to 60°C.

iii. Anemometer and Wind Vane: The Contractor shall provide double cup anemometer on tubular type made up of hot dipped Galvanized Iron. Velocity range upto 65 m/s, accuracy limit of 0.1 m/s. the anemometer shall have valid calibration certificates which should be produced during one month of the installation.

iv. 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. Bidder shall provide Instrument manual in hard and soft form.

v. The data acquisition system shall measure, continuously record power at PV module ambient temperature near array field, cell temperature, wind velocity, AC and DC (string level) side power of each inverter, power characteristics of the HT side, fault messages, alarms etc. in Indian Standard Time.

vi. Reliable sensers for solar insolation , tempetature & other weather & electrical parameters are to be supplied with data logger unit.

vii. 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. Representation of monitored data in graphics mode or in tabulation form. All instantaneous data can be shown in the Computer Screen.

viii. Provision should be available for Remote Monitoring and Data Retrieval over web server. Moreover, Successful Bidder shall also provide one no. of PC with required hardware and licensed copies of software to make it fully functional for normal operation and data logging through Bluetooth / Wi Fi / RS port from the site.

ix. The Bill of Materials associated with the equipment must clearly indicate especially the details about the PC and other accessories.

x. The Data Acquisition System should be housed in appropriate enclosure to sustain outdoor environment as per generation design guidelines laid for enclosures. The same shall have provision of locking the same to prevent unauthorized operation. Remote Monitoring System (RMS) shall provide following data at a 15 minute interval.

- Power, Current and Voltage at individual solar PV strings (Instantaneous)
- Ambient temperature near array field, cell temperature measured at module front and back surface
- Wind Speed
- Cumulative AC and DC side Power of each inverter
- Cumulative AC and DC energy of each inverter

a. Solar irradiation/isolation over horizontal and in-plane of the module

b. Voltage, frequency and other important electrical parameters etc. in the local grid.

c. Any other parameter considered necessary by supplier based on current prudent practice

d. RMS shall have feature to be integrated with the local system as well remotely via the web using either a standard modem or a GSM/WIFI modem. The Bidder shall provide compatible software and hardware so that data can be transmitted via Standard modem.

e. RMS shall be provided with independent solar PV based power supply along with maintenance free battery having 3 days autonomy.

f. The RMS shall be compatible to the requirements for measuring and reporting the performance-ratio of the power plant.

g. The contractor shall provide all administrative rights/ privileges/ passwords of the RMS system to GSECL.

h. The Bidder shall submit the data sheet with technical specifications of the RMS system in the Bid.

5.3.34 Testing Instruments For Electral and Electronics

The Contractor shall also provide required set of onsite testing instruments/equipment Whenever need arises for testing, instruments i.e. Rheostats, CRO, Function generator, inverter testing kit for commissioning, testing and O & M of plant bidder shall have to be arranged at their cost. The instruments /equipment's viz earth resistance tester, insulation tester, millimetres, clamp meters , transformer oil BDV kit, Relay testing kit, infra-red thermal imaging hand held temperature meter etc.. Shall have to be supplied

5.4 66 KV bay at GETCO S/s and Bus bar extension.

66 Kv construction, erection, testing and commissioning of 66 KV bay at GETCO S/s and Bus bar extention shall be carried out under supervison of GETCO and as per GETCO guidelines. Also Contractor has to select GETCO registered vendor for EPC work of 66 KV bay and Bus as well as 66 KV line(if U/G cable not selected) from solar plant to GETCO S/s.

5.5 Area Lighting

The system provides lighting and electric power supply for lighting to solar plant areas, boundary fencing, roads, Peripheral roads inside boundary wall etc. In addition, it also provides lighting to selected areas during plant emergency conditions.
The design shall be such as to provide minimum lighting levels as specified for different areas.

- General Outdoor Area : 10 Lux average
- Main Roads : 20 Lux
- Secondary Roads: 10 Lu
- Near Equipment : 50 Lux
- Main Control Room : 400 Lux
- Conference Room/ Staff Room : 300 Lux
- Other Room : 200 Lux

The lighting system shall comprise Normal A.C. Lighting, Emergency A.C. Lighting and Emergency D.C. Lighting

--- End of Section---

6 General Terms and Conditions

6.1 Use of Contract Documents & Information

6.1.1 The Contractor shall not, without GSECL's prior written consent, disclose the Contract or any provision thereof or any specification, plan, drawing, pattern therewith to any person other than person employed by the Contractor in performance of the Contract. Disclosure to any such employed person shall be made in confidence and shall extend strictly for purpose of performance only.

6.1.2 The Contractor shall not, without GSECL's prior written consent, make use of any document or information except for purpose of performing the Contract.

6.1.3 Any document other than the Contract itself shall remain the property of GSECL.

6.2 Patent Rights

6.2.1 The Contractor shall indemnify GSECL against third party claims of infringement of patent, trademark or industrial design rights arising from use of goods/design or any part thereof.

6.3 Materials and Workmanship

6.1.1 All materials shall be of the best quality and workmanship capable of satisfactory operation under the operating and climatic conditions as may be specified. Unless otherwise specified, they shall conform in all respect to the latest edition of the relevant Bureau of Indian Standard (BIS) specification wherever Indian specifications apply or British Standard (BS) or International Electro-technical Commission (IEC) or internationally accepted standard.

6.1.2 The Contractor shall supply and deliver all equipment and materials for installation at site. The Contractor shall arrange for transportation, loading and unloading and safe storage of materials at project site at his own cost and risk.

6.1.3 If the Contractor offers equipment manufactured in accordance with other international well recognized standards, he shall, in that case, supply a copy in English of the Standard Specification adopted and shall clearly mention in what respect such standard specification differs from Indian Standard Specifications. The plant, equipment, and materials offered by the Contractor should comply with one consistent set of Standards only as far as possible.

6.1.4 No deviation in foreign exchange rate shall be admissible at any point of time after submission of the Bid.

6.4 Inter-changeability

6.4.1 All the parts shall be made accurately to standard gauges and specifications so as to facilitate replacement and repairs. All corresponding parts of similar apparatus shall be inter-changeable.

6.5 Packing and Marking

6.5.1 The Contractor shall be responsible for securely protecting and packing the plant and equipment as per prescribed standards in force to withstand the journey and ensuring safety of materials and also arrival of materials at destination in original condition and good for contemplated use. Packing case size and weight shall take into consideration the remoteness of the goods' final destination and absence of heavy material handling facilities at all points in transit.

6.5.2 Packing lists of materials shall be provided in each package to facilitate checking up of the contents at the destination.

6.5.3 In order to import any items, associated with the Project, from abroad or from any other state in India, the Contractor shall have to arrange any clearance, permission, if required at his own risk, from any Government (Government of State and Government of India) or any Government (Government of State and Government of India) controlled organization for transportation of materials from manufacturing shop to delivery at any site. Necessary certificates if so required shall be issued by GSECL within reasonable time after getting written request from the Bidder along with the necessary documents substantiating necessity of such approvals. All packing material is the property of GSECL and shall be immediately deposited by the Contractor to GSECL's Store at Project Site.

6.6 Negligence

6.6.1 If the Contractor neglects to manufacture or supply the plant and equipment with due diligence and with expeditiousness or refuses or neglects to comply with any reasonable order given to it in writing by GSECL or contravenes any provisions of the Contract, GSECL may give seven (7) seven days' notice in writing to the Contractor, to make good the failure, neglect or contravention complained of. If the Contractor fails to comply with the notice within reasonable time from the date of serving thereof, in the event of failure, neglect or contravention capable of being made good within that time, then in such case, if GSECL thinks fit, it shall be lawful for it to take the manufacture or supply of plant wholly or in part, out of the Contractor's hand and give it to another person on Contract at a reasonable price and GSECL shall be entitled to retain any balance which may be otherwise due on the Contract by it to the Contractor or such part thereof as may be necessary, to the payment of the cost of manufacture or supply of such plant as aforesaid.

6.6.2 If the cost of executing the work as aforesaid shall exceed the balance due to the Contractor and the Contractor fails to make good such deficiency, GSECL shall take action in the manner it may consider deem fit in terms of the Contract.

6.7 Statutory Responsibility

6.7.1 The Contractor shall comply with all applicable laws, by laws, rules, and regulations and shall procure and maintain their validity all necessary Municipal, Panchayat and Government permits & licenses etc. at its own cost.

6.8 Insolvency and Breach of Contract

6.8.1 GSECL may at any time by notice in writing summarily terminate the Contract without compensation to the Contractor in any of the following events:

a. If the Contractor at any time, is adjudged insolvent or have a receiving order or order from administration of its state made against it or shall take any proceeding for compensation under any Insolvency Act for the time being in force or make any conveyance or assignment with its creditors or suspend payment. If the Contractor being a company is wound up voluntarily or by the order of a court or a Receiver, Liquidator or manager on behalf of the Debenture holder is appointed or circumstances have arisen which entitle the Court or debenture holder to appoint a Receiver, Liquidator or Manager.

6.9 Timeline

6.9.1 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.

6.1.5 The work must be completed as per the Timeline below from the date of handing over of site. Zero date is the date of issue of Notice to Proceed.

Sr no	Capacity of project.	Project completion period
1	Nikava 15 MW	10 months from the date of NTP
2	Pachham 40 MW	12 months from the date of NTP
3	Sanesh 55 MW	15 months from the date of NTP

6.9.2 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.

6.9.3 The issue of Notice to Proceed shall be considered as the Zero Date unless it is mentioned in LOI

6.9.5 The Bar/ PERT Chart provided by the Contractor shall submitted to GSECL for approval prior to commencement of the execution of the Project. All comments and modifications provided by GSECL shall be incorporated and adhered to by the Contractor in the Timeline, Bar/ PERT Chart, detailed execution plan, etc. for execution of the Project.

6.10 Delay in Execution or Failure to Supply

6.10.1 Any delay in completion of the work shall attract liquidated damage/ penalty for late completion as per Liquidated Damage (Clause 6.11) of this Tender.

6.10.2 If the Contractor fails to deliver the plant or fails to start the work within specified time frame after issue of LoI or leaves the work site after partial execution of the work, GSECL shall have the right to get the work done through any other agency at the risk and cost of the Contractor. Further to this, GSECL may, without prejudice to the right of the Contractor to recover damages for breach of trust of the Contract, may impose penalties.

6.11 Liquidated Damages for Delay and Underperformance

A. <u>Delay in Commissioning</u>

6.11.1 In case the Contractor fails to achieve successful Commissioning of plant by the due date indicated in Timeline Clause 6.1.5, then GSECL shall levy the Liquidated Damages on the Contractor. 50% of name plate capacity i.e. (AC) to be consider for partial commissioning, subject to confirmation from GUVNL for purchase of power. Operational Acceptance Test (OAT) shall start only when full capacity is commissioned by the Contractor.

6.11.2

a) Delay up to 30 days: Amount of Rs. 15,000/MW/Day shall be deducted as penalty for the first 30 days of delay calculated on per day basis and proportionate to the capacity not commissioned as COD with GUVNL.

b) Delay of more than 30 days and up to 60 days: Amount of Rs. 25,000 /MW/day shall be deducted on per day basis and proportionate to the capacity not commissioned as COD with GUVNL.

c) Delay of more than 60 days: Amount of Rs. 35,000 /MW/day shall be deducted on per day basis and proportionate to the capacity not commissioned as COD with GUVNL.

Maximum applicable Liquidated Damages: The upper ceiling for total liquidated damages for delay shall be maximum 10% of the EPC Contract Price. For calculation of penalty, date of Notice to Proceed shall be the reference date.

B. Underperformance

6.11.3 At the time of the Operational Acceptance Test, any shortfall in the Performance Ratio (PR) as determined through the Test Procedure in the Appendix 16: Procedure for Performance Testing will attract imposition of Liquidated Damages after one (1) unsuccessful chance. For any shortfall in PR below **0.78** by the Bidder for the second (2) time, a penalty of 1% of the EPC Contract Price (including taxes & duties) shall be levied. In case the first the Test is unsuccessful then penalty shall not be charged but the Contractor has to make the necessary corrections to conduct the test again within the stipulated maximum 30 days so as to demonstrate the PR equal to or more than 0.78. In the second (2^{nd}) time, a penalty at the rate specified above shall be levied on the Contractor. The penalty shall be deducted from the pending payment and Performance Bank Guarantee. However, if Contractor feels that NEEGG may not be achieved and want to carry out further correction, the same will be allowed for the one more time i.e. 3^{rd} time but PG Test and O&M period shall start from such later date as mentioned in Point no. A (xi) in NIT; Table Pg. 4.In case the Contractor is successful in 3^{rd} attempt then 1% of the EPC Contract Price (including taxes & duties) deducted after unsuccessful 2^{nd} attempt shall be returned. However, if the Contractor fails in the 3^{rd} attempt as well then the penalty deducted at the time of 2^{nd} unsuccessful attempt shall not be returned.

C. Performance Guarantee Test / Final Acceptance Test

6.11.4 If the "Actual Delivered Energy" at metering point is less than the Base NEEGG (corresponding to NEEGG quoted for 1^{st} year of O&M) based on the procedure mentioned in the Appendix 16, then the penalty at rate of Rs.(GUVNL PPA rate x 2) per kWh shall be charged for the shortfall.

6.12 Penalty for Loss of Generation during O&M

6.12.1 For each Contract Year, the Contractor shall demonstrate "Actual Delivered Energy" at the Metering Point as compared to the '*Base NEEGG'* for the particular year (calculated as per the methodology given in Appendix 16 Part C).

6.12.2 If for any Contract Year, it is found that the 'Actual Delivered Energy' is less than 'Base NEEGG for the particular year, the Contractor shall pay the compensation to GSECL equivalent to Rs.(GUVNL PPA rate x 2) per kWh of under-generation. The same shall be recovered from payments yet to be made by GSECL to the Contractor and/or from the Bank Guarantees available with GSECL.

6.12.3 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 GSECL to the Contractor and / or** from the Bank Guarantee submitted to GSECL.A penalty at the rate of Rs.(GUVNL PPA rate x 2) per kWh shall be charged by the company 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 based on the actual radiation.

6.12.4 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.

6.12.5 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".

6.12.6 Upon occurrence of any Event of Default mentioned in Clause 6.12.4 herein above, GSECL shall have the right to encash the entire amount of O&M Bank Guarantee submitted by the Contractor and withheld any other pending payment.

6.12.7 The Company 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 GSECL 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, GSECL will have the final authority to decide on this matter.

6.13 DSM charges

6.13.1 EPC/O&M contractor shall be responsible for carrying out scheduling & forecasting work.

6.13.2 All cost associated towards scheduling &forecasting activity like charges for Qualified Co-ordinating Agency (QCA), additional SCADA requirements if any for accurate scheduling & forecasting work, related to DSM regulation by GERC in existence and amended from time to time, shall be in the scope of EPC/O&M contractor.

6.13.3 GSECL shall bear 50% of DSM charges and EPC/O&M contractor shall have to bear remaining 50% DSM charges.

6.14 Defect Liability

6.14.1 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.

6.14.2 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.

6.14.3 The Contractor shall be liable for the operation and maintenance of the Facility and

6.14.4 Consequently shall be required to rectify any defects that emerge during the operation of the Facilities for the entire term of this Contract. Defect Liability Period shall be eighteen **(18)** months from the date of **Commissioning or twelve (12) months from the completion of last Operational Acceptance Test, whichever is later."**

6.14.5 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 GSECL 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.

6.14.6 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.

6.14.7 GSECL shall give the Contractor a notice stating the nature of any such defect together with all available evidence thereof, promptly following the discovery thereof. GSECL shall afford all reasonable opportunity for the Contractor to inspect any such defect.

6.14.8 GSECL shall provide the Contractor all necessary access to the Facilities and the Site to enable the Contractor to perform its obligations.

6.14.9 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.

6.14.10 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.

6.14.11 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 GSECL and the Contractor for the original equipment/part of the Facilities.

6.14.12 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 GSECL in connection therewith shall be paid to GSECL 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 GSECL may have against the Contractor in respect of such defects.

6.14.13 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.

6.14.14 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 6.14.

6.15 Termination for Default

6.15.1 The Company 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 GSECL 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.

6.15.2 In the event the Company terminates the Contract in whole or in part, pursuant to above, the Company 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 Company for any excess costs for such similar goods. However, the Contractor shall continue the performance of the Contract to the extent not terminated.

6.15.3 In case the Contractor is not able to demonstrate the "Actual Delivered Energy" as per the "Base NEEGG" based on the procedure mentioned in Appendix 16 during the Performance Guarantee Test and after the penalties levied as mentioned in Clause 6.12.; GSECL 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.

6.15.4 In case termination of the Contract due to default, the Contractor may be blacklisted by GSECL and its associate companies, etc. for future work.

6.16 Breach and Cancellation of the Contract

6.16.1 In case of non-performance in any form or change of the covenant and conditions of the Contract by the Contractor, the Company 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 Company in this regard shall be final and binding.

6.16.2 The Company 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 Company shall be final) at the risk and cost of the Contractor.

6.17 Force Majeure

6.17.1 In the event of either party being rendered unable by Force Majeure to perform any obligation required to be performed by them under this Contract, relative obligation of the party affected by such Force Majeure shall be treated as suspended during which the Force Majeure Clause lasts.

6.17.2 The term "Force Majeure" shall have herein mean riots (other than among the Contractor's employee), Civil commotion, War (whether declared or not), invasion, act of foreign enemies hostilities, civil war, rebellion, revolution, insurrection, military coup, damage from aircraft, nuclear fission, embargoes, quarantines, acts of god such as earthquake (above 7.0 magnitude on Richter scales), lightning, unprecedented floods, fires not caused by the Contractors negligence and other causes which the Contractor has no control and accepted as such by GSECL whose decision shall be final and binding. Normal rainy season and monsoons are not Force Majeure.

6.17.3 Upon occurrence of such causes and upon its termination, the party alleging that it has been rendered unable as aforesaid, thereby, shall notify the other party in writing by registered notice within 24 (twenty four) hours of the alleged beginning and ending thereof giving full particulars and satisfactory evidence in support of its claim.

6.17.4 Time for performance of the relative obligation suspended by the Force Majeure shall stand extended by the period for which such clause lasts.

6.17.5 If works are suspended by Force Majeure conditions lasting for more than two (2) months, GSECL shall have the option of cancelling this Contract in whole or part thereof, at its discretion.

6.17.6 The Contractor shall not claim any compensation for Force Majeure conditions and shall take appropriate steps to insure men and materials utilized by it under the Contract well in advance.

6.18 Progress Report of Work

6.18.1 The Contractor shall submit a weekly progress report on execution of works conforming to bar/ PERT Chart and format provided by GSECL. 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.

6.18.2 The authorized representative of the Contractor shall review the progress of the Project work every fortnight on a prefixed day at project site with GSECL or its representative as per the network and record the minutes.

6.19 Insurance

6.19.1 During the construction period, i.e. before the Commissioning of the Project, all insurance 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 Company shall not incur any financial loss, as long as the construction of the Project continues to remain under the custody of the Contractor.

6.19.2 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.

6.19.3 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.

6.19.4 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.

6.19.5 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 Company shall not be responsible for any such loss or mishap.

6.19.6 Comprehensive insurance is to be arranged by the Contractor during the O&M period of the Contract.

6.19.7 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.

6.20 Statutory Acts, Rules and Standards

6.20.1 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.

6.21 Tools and Tackles

6.21.1 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 Company, 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.

6.22 Safety Measures

6.22.1 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 Company shall not be responsible for any such accidents.

6.23 Hazardous Material

6.23.1 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.

6.24 Stoppage of Work

6.24.1 The Company 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.

6.25 Hindrance Register

6.25.1 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.

6.26 Responsibility of the Contractor

6.26.1 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.

6.27 Right of the Company to Make Change(s) in Design

6.27.1 All designs shall be approved by GSECL prior to the execution of such designs.

6.27.2 The Company shall have the right to make any change in the design, which may be necessary in the opinion of GSECL to make the plant and materials conform to the provisions and contents of the specification without extra cost to GSECL.

6.28 Manuals

6.28.1 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.

6.29 Governing Language

6.29.1 The Contract shall be written in English Language. All correspondence and documents pertaining to the Contract, which are exchanged by the Company and Contractor, shall be written in English.

6.30 Order Amendments

6.30.1 No variation in or modification of the terms of the contract shall be made except by written amendments issued by the Company.

6.31 Assignments or Subletting of Contract

6.31.1 The Contractor shall not, without the prior consent in writing of the Company, 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.

6.32 Subcontracts

6.32.1 The Contractor shall notify the Company 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.

6.32.2 Subcontracting a work shall not, under any circumstances, relieve the Contractor from its obligations towards the Project and the Company.

6.32.3 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.

6.33 Inspection and Testing

6.33.1 The Company 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 GSECL or its duly authorized representative.

6.33.2 GSECL 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 Company at his liberty may reject all or any component of plant or workmanship connected with such work.

6.33.3 The Contractor shall issue request letter to GSECL 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, GSECL shall issue a certificate to that effect. However, the Company 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 GSECL'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 GSECL, may dispatch the equipment for erection and installation.

6.33.4 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 GSECL or its authorized representative to accomplish such testing.

6.33.5 The Company 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.

6.33.6 If the Company desires, testing of any component(s) of the plant be carried out by an independent agency, the inspection fee, if any, shall be paid by the Company. However, the Contractor shall render all necessary help to GSECL whenever required free of charge.

6.33.7 The Contractor has to provide the necessary testing reports to GSECL as and when required.

6.33.8 Neither the waiving of inspection nor acceptance after inspection by GSECL shall, in anyway, absolve the Contractor of the responsibility of supplying the plant and equipment strictly in accordance with specification and drawings etc.

6.34 Authorized Test Centres

6.34.1 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.

6.35 Delivery of Equipment

6.35.1 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 Company from time to time regarding the transit of the plant and material.

6.35.2 Notification of delivery or dispatch in regard to each and every consignment shall be made to the Company 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.

6.35.3 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.

6.36 Liabilities during Transit

6.36.1 The Contractor shall be responsible for loss, damages, or depreciation to goods or of plant, equipment, and machineries up to delivery at the Site.

6.37 Deduction from Contract Price

6.37.1 All costs, claims, damages or expenses, which the Company may have paid for which the Contractor is liable, will be deducted by the Company 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 Company.

6.37.2 Any sum of money due and payable to the Contractor, as per the Contract Agreement, may be appropriated by the Company and set off against any claim of the Company, 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 Company 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.

6.38 Terms of Payment

(a) Supply and 10 years O&M: The Company shall pay the Contractor in the following manner for supply of material and at the following time for achieving the respective milestone for the Supply. The Tender is for a comprehensive EPC Contract of Supply, Works and O&M. There shall be 3 (three) different Contracts signed for Supply, Works and O&M. However, a single LoI shall be issued to the Successful Bidder. The payment terms for Supply, Works and O&M is given below.

Payment milestones for supply(For Sanesh & Pachham)

1.	Advance Payment (5% of Supply Price excluding taxes & duties) against : (i) Acceptance of LoI (ii) Submission of Advance Bank Guarantee of equivalent amount (iii) Submission of Performance Bank Guarantee (validity as per clause no 3.11.6 (1)) -10% of the total EPC Contract Price Interest free Advance shall be given	5% of Supply Contract value (Excluding Taxes and duties.)
2	Supply and receipt of PV modules at site on pro-rata basis for each 1MWp PV module consignment.	40% of Supply Contract value
3	Completion of Erection of MMS Column Post including civil Foundation of each 5MW (AC) on pro-rata basis.	10% of Supply Contract value
4	Erection of PV Modules on prorate basis, for each **5MW(AC)** pro-rata basis	10% of Supply Contract value
5	Supply of BOS on each 5 MW (AC) Block on Pro rata basis.	10 % of Supply Contract value

6	Completion of Erection & Installation of each 5MW(AC) block	10% of Supply Contract value
7	Upon Completion of Successful Performance and Operational Acceptance Test	10% of Supply Contract value
8	Upon Completion of the Facilities of the project.	5% of Supply Contract value

Payment milestones for supply(For Nikava 15MW)

1.	Advance Payment (5% of Supply Price excluding taxes & duties) against : (i) Acceptance of LoI (ii) Submission of Advance Bank Guarantee of equivalent amount (iii) Submission of Performance Bank Guarantee (validity as per clause no 3.11.6 (1)) -10% of the total EPC Contract Price Interest free Advance shall be given	5% of Supply Contract value (Excluding Taxes and duties.)
2	Supply and receipt of PV modules at site on pro-rata basis for each 1MWp PV module consignment.	40% of Supply Contract value
3	Completion of Erection of MMS Column Post including civil Foundation of each 3MW (AC) on pro-rata basis.	10% of Supply Contract value
4	Erection of PV Modules on prorata basis, for each 3**MW(AC)** pro-rata basis	10% of Supply Contract value
5	Supply of BOS on each 3 MW (AC) Block on Pro rata basis.	10 % Supply Contract value
6	Completion of Erection & Installation of each 3MW(AC) block	10% of Supply Contract value
7	Upon Completion of Successful Performance and Operational Acceptance Test	10% of Supply Contract value
8	Upon Completion of the Facilities of the project.	5% of Supply Contract value

6.38.1 (b) Payment Terms for the Works shall be as per the following table (For all three sites)

Sr.	Milestone for Works and O&M	Amount
1	Mobilization Advance Payment: Interest free 5 % of works price Against mobilization at site and submission of BG of equivalent amount.	5% of Work Contract Value
2	On completion of soil investigation and Topo survey & Finalization of MMS pile design.	5 % of Work Contract Value
3	Against monthly RA bills for the Works executed at site	60 % of Work Contract Value
5	Upon Successful Commissioning of the entire Project Against PV Module Bank Guarantee (if PV Module insurance is not available).	10 % of Work Contract Value
6	Upon Successful OAT	20 % of Work Contract Value
1.	On Successful Operation and Maintenance of the Solar PV Power Plant on quarterly basis for each year till 10 years	Year 1: OM-1 Year 2: OM-2 Year 3: OM-3 Year 4: OM-4 Year 5: OM-5 Year 6: OM-6 Year 7: OM-7 Year 8: OM-8 Year 9: OM-9 Year 10: OM-10

Note:

1. Bank Guarantee against mobilization **& supply** Advance shall be submitted for initial validity of 12 (Twelve) months and shall be extended till adjustment of the entire amount.
2. All works shall be considered for payment on pro-rata basis of payment milestones per approved billing break up to be approved after award of contract.

3. The Contractor shall submit all the invoices related Project and invoices of the O&M to notified officer (will be informed to successful bidder) with copy to Chief Engineer (P&P), Corporate Office, GSECL, Vadodara. All material shall be consigned to notified officer (will be informed to successful bidder)
4. The payment for works shall be released on monthly basis.
5. Mobilization Advance Payment shall be adjusted in monthly RA bills on pro-rata basis. Supply advance shall be adjusted from subsequent bills on pro rata basis.
6. For payment against milestone 2 of works, the joint recording of work done at site shall be attached with the invoice."
7. EPC Contract Price of Supply means the Supply part of the EPC Contract Price.
8. Contract Value of Works means the Contract value of the Works part of the EPC Contract Price.
9. Commercial Operation Date" (COD): with respect to the Project/Unit shall mean the date on which the project /unit is commissioned (certified by GEDA) and available for commercial operation and such date as specified in a written notice given at least 10 days in advance by the EPC Contractor to Owner /GUVNL.

6.39 Payments

6.39.1 Subject to any deduction which the Company may be authorized to make under this Contract, and or to any additions or deductions provided for in this Contract, the Contractor shall be entitled to payment as follows:

a. All payments shall be made in Indian Rupees, unless otherwise specified in the LoI/Contract Agreement. All payment shall be made on the basis of actual measurement for the quantified items as per schedule of works.

b. The Contractor shall submit the bill / invoice for the work executed showing separately GST and any other statutory levies in the bill / invoice.

- All taxes and deductions shall be applicable as per prevailing income tax and other statutory rules and provisions in force.

- Payment shall be released by the Sr. Accounts Officer/ Accounts Officer, GSECL, through RTGS/NEFT.

6.40 Warranty/ Guarantee

6.40.1 The Plant shall perform as per the Guaranteed Performance indicated by the Bidder in its Financial Proposal.

6.40.2 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**.5% for poly** and **3% for mono** of the PV Module capacity and in subsequent years it shall be 1% **maximum**.

6.40.3 The mechanical structures, electrical works, all plant equipment and components and overall workmanship of the grid solar power plants shall be warranted for a minimum of 5 years.

6.40.4 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.

6.40.5 The warranty / guarantee period shall be as follows:

a. 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.

b. Inverters: Inverters shall be warranted for the guarantee period provided by the original equipment manufacturer. Same shall be furnished with its Bid.

c. Transformers, associated switchgear and others: Bidder shall furnish in detail its warranties/ guarantees for these items.

6.40.6 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.

6.40.7 At the end of Guarantee period, the Contractor's liability shall cease. In respect of goods not covered above, GSECL shall be entitled to the benefit of such Guarantee given to the Contractor by the original Contractor or manufacturer of such goods.

6.40.8 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 GSECL within a reasonable time as may be considered from the date of receipt of such intimation from GSECL failing which GSECL shall take up rectification work at the risk and cost of the Contractor.

6.40.9 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 GSECL:

- 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 GSECL's sole option.

(a) 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 GSECL's sole option. Total land available from GSECL 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.

6.40.10 Insurance or Bank Guarantee

A) **Bank Guarantee against PV Modules Warranty**: The Successful Bidder shall provide security in form of Bank Guarantee of Rs 10 lac per MW (DC capacity) valid for 25 Yrs from the start date of O & M period.

<Or>

(B) Insurance: Successful Bidder shall provide the insurance for PV module power output warranty as per the technical specification backed up through an insurance policy by a reputed insurance company. This shall cover the PV module power output warranty in case of insolvency or bankruptcy of the PV module manufacturer. The Bidder shall submit a suitable insurance from Third Party.

However, Bidder shall provide notarised undertaking for followings.

(i) Bidder will be fully liable and responsible for the performance of supplied Solar PV Module for entire project life of 25 Years.

(ii) Failing to which Bidder will make all arrangement at their risk and cost to replace or make it good in order to keep Solar PV plant under smooth operation and meeting the obligation of Guarantee/warrantee.

(iii) in case of any failure of Solar PV Module or any spare part of it under guarantee Bidder will be liable to replace it and all relevant expenses shall be borne by them

(iv) Bidder will indemnify to GSECL for any loss and/or damage from time to time and will undertake all the relevant procedure of insurance claim for guarantee/warrantee at their own with the PV module supplier/ insurer at no cost to GSECL.

In case of failure to meet performance warrantee of Solar PV modules, Bidder will make all arrangement at their risk and cost to replace or make it good in order to keep Solar PV plant under smooth operation and meeting the obligation of warrantee.

6.41 Arbitration

6.41.1 All matters, questions, disputes, differences and / or claims arising out of and / or concerning, and /or in connection with, and /or in consequence of, and /or relating to this contract which may arise between the parties in connection with the Contract or any matter arising out of or in relation thereto shall be reported to Gujarat Public Work Contract Dispute Arbitration Tribunal and provision of Gujarat Public Work Contract Disputes Arbitration and Tribunal Act 1996 shall be applied as updates time to time.

6.41.2 The Contractor shall ensure that the work under this Contract shall continue during arbitration proceedings and dispute and no payments due from or payment by the Company shall be withheld on account of such proceedings except to the extent which may be in dispute.

6.40.3 The Arbitrator may, from time to time, with the consent of the parties to the contract enlarge the time for making the award. The venue of the arbitration shall be the place from which the acceptance of offer is issued or such other place as the Arbitrator, in his discretion, may determine.

6.42 Court of Competent Jurisdiction

6.42.1 The Courts of Vadodara for GSECL shall have exclusive jurisdiction in all matters arising under the Contract.

6.43 Law and Procedure

6.43.1 The law which is to apply to the Contract and under which the Contract is to be construed shall be Indian Law.

6.43.2 The law governing the procedure and administration of any arbitration instituted under the clause for arbitration shall be the Indian law.

6.44Construction of Contract

6.44.1 The Contract shall in all respect be construed and operated, as a Contract as defined in the Indian Contracts Act, 1872, and all the payments there under shall be made in Indian Rupees unless otherwise specified.

6.45Notices

6.45.1 For all purpose of the Contract, including arbitration there under, the address of the Contractor mentioned in the Bid shall be the address to which all communications addressed to the Contractor shall be sent, unless the Contractor has notified a change by a separate letter containing no other communication and sent by registered post with acknowledgement due to GSECL. The Contractor shall be solely responsible for the consequence of an omission to notify change of address in the manner aforesaid.

6.45.2 Any communication or notice on behalf of the Company in relation to the Contract Agreement may be issued to the Contractor by the Company and all such communication and notice may be served on the Contractor either by registered post or under certificate of posting or by ordinary post or by hand delivery at the option of the officer.

6.45.3 Instructions or notices to the Contractor and notices from the Contractor to GSECL recorded in a minute signed by the authorized representatives of both GSECL and the Contractor. Such notice or instruction shall be valid notice of instruction for the purpose of the Contract.

6.46Final Bill

6.46.1 The Final EPC Bill relating to the Contract shall be prepared only after the Performance Guaranteed Test of the plant has been observed as under Clause No. Appendix 16: Procedure for Performance Testing and it will include the adjustments of all claims against the Contractor by the Company and awarded in its favour by the arbitrator up to the date of preparation of the final bill.

6.47Degradation of Solar Modules

6.47.1 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.

6.47.2 The derating of module should not be more than 1% in any year except for the first year of operation, which should be limited to 2.5% **for poly** and **3% for mono.**

6.47.3 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 with no change in area of land used;

<or>

b. Repair or replace the existing PV Module(s) with no change in area of land used;

<or>

c. Compensate GSECL 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 GSECL's cost of capital.

6.47.4 The Company 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.6.47.3.

6.48Risk Purchase

6.48.1 If the Contractor fails, on receipt of the LoI, to take up the work within a reasonable period or leave the work Site after partial execution of the work, GSECL shall have the liberty to get the work done through other agency at the Contractor's own risk and additional cost if any. If the situation, so warrants, to compel GSECL to cancel the LoI placed on the Contractor, it shall be liable to compensate the loss or damage, which GSECL may sustain due to reasons of failure on Contractor's part to execute the work in time.

6.49Confidential Information

6.49.1 GSECL 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 GSECL 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.

6.49.2 Notwithstanding the generality of the foregoing Clause 6.48.1 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 of 6.48.

6.49.3 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.

6.49.4 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.

6.49.5 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.

6.49.6 The obligation of a party under this Clause 6.48, 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 otherwise lawfully becomes available to that Party from a third party that has no obligation of Confidentiality.

6.49.7 The above provisions of this Clause 6.48shall 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.

6.49.8 The provisions of this Clause 6.48 shall survive Termination, for whatever reason, of the Contract.

6.50Limitation of Liability (LLP)

6.50.1 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.

6.50.2 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.

--- End of Section ---

7 Special Terms and Condition

7.1 Definition

7.1.1 The General Terms and Conditions as well as the Special Terms and Conditions of the Tender are complementary to each other, and wherever there is a conflict, the Special Terms and Conditions shall prevail.

7.2 Objective of the Project

7.2.1 The main objective of this project is "Design, Engineering, Supply & Procurement, construction, operation and maintenance of 110 MW solar Photovoltaic grid connected power plant ranging from 10 MW to 55 MW at various substations of GETCO in the State of Gujarat.

7.2.2 Compliance with GUVNL/GETCO/GEDA Guidelines

7.2.3 The Bidders and Contractor shall make themselves fully aware of and comply with the norms and guidelines provided by GUVNL/GETCO/GEDA if any, towards the Project.

7.2.4 The Contractor shall ensure that the Project shall comply with all the norms and guidelines of GUVNL/GETCO/GEDA if any, and subsequent clarifications or amendments issued from time to time. The Contractor is required to refer the compliance documents of GUVNL/GETCO/GEDA if any, for necessary compliances of GUVNL/GETCO/GEDA requirements.

7.2.5 In case of any conflict between the compliance of GUVNL/GETCO/GEDA and this Tender or any aspect of the Project, the Contractor shall immediately notify GSECL for clarity.

7.3 Project Site

7.3.1 Details of the Project Site will be as per the Annexure 1.

7.4 Scope of Service

7.4.1 The item of work to be performed on all equipment and accessories shall include but not limited to the following:

a. Transportation, unloading, receiving and storage at site.

b. Arranging to repair and/or re-order all damaged or short-supply items.

c. Final check-up of equipment and commissioning and putting the system into successful operation, feeding power to the local internal grid.

7.5 Training of GSECL's Personnel

7.5.1 The Bidder shall provide training on Plant operations and maintenance to three (3) teams of 5-10 personnel each (Engineers and Technician/ Operators) of GSECL as and when requested by GSECL.

7.6 Mode of Execution

7.6.1 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.

7.7 Programme of Work

7.7.1 The Contractor shall submit the programme of work within 15 days from the date of receipt of Letter of Intent. The programme shall include a Bar Chart indicating there in the starting position and completion date of each of the major items of work.

7.8 Starting of Work

7.8.1 The Contractor shall be required to start the work within 15 (fifteen) days from the date of issue of Letter of Intent and shall thereof, report to GSECL accordingly.

7.9 Completion Schedule

7.9.1 The time of completion and commissioning of the Plant is from the date of **Notice to Proceed as per relevant clauses**. The O&M contract period is initially for **Five (5)** years, which can be extended for the remaining years i.e. **6th** Year onwards on sole discretion of GSECL at the mutually agreed rates.

6.1.6 The Contractor shall inform GSECL at least sixty five (65) days advanced preliminary written notice and at least thirty five (35) days advanced final written notice, of the date on which it intends to synchronize the Power Project to the Grid System.

6.1.7 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.

6.1.8 The Contractor shall provide the power evacuation schedule as and when required or asked by any Central or State Government agency(s).

7.10 Site Inspection & Basis of Bid

7.10.1 The volume and quantity of work indicated in schedule of works may vary. The Contractor should visit the Site before quoting rate for civil works. After taking in to consideration all aspects of the site, condition of soil etc., the Contractor should quote for civil works. 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 GSECL. In case of any defects arising in the building during guarantee period, the Contractor shall have to rectify the same at its own cost.

7.11 Price Escalation

7.11.1 The rate(s) quoted against the work shall remain firm during the entire Contract period.

7.12 Taxes and Duties

7.12.1 The price quoted shall be exclusive 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.

7.12.2 Bidders shall quote the rates as well as taxes and duties based on the concessional exemption in the same that can be availed by the Bidder.

7.12.3 It is mandatory to mention safe guard duty in column (c) of schedule of Price A for supply. If it is mentioned' "0" in column (c), no safe guard duty shall be payable for the PV modules procured till 29th July-2021.

7.12.4 Statutory variations in the tax shall be permitted as under:

(A) Statutory variations during original contractual completion period :

(i) If any increase takes place in taxes and duties due to statutory variation (including safeguard Duty for PV modules only), then GSECL shall admit the same on production of documentary evidences.

(ii) If any decrease takes place in taxes and duties due to statutory variation (including safeguard Duty for PV modules only), the same shall be passed on to GSECL or GSECL shall admit the decreased rate of taxes and duties while making the payment.

For any statutory variation in safe guard duty post 29-07-2021 the safe guard duty rates prevailing as notified by GoI on the date of submission of price bid will be considered as base rate.

(B) Statutory variations beyond original contractual completion period :

(i) If reasons for extension of contractual completion period is attributable solely to GSECL, the provisions of (A) (i) above shall apply.

(ii) If any decrease takes place in taxes and duties due to statutory variation, the same shall be passed on to GSECL or GSECL shall admit the decreased rate of taxes and duties while making the payment.

7.12.5 Variation on account of exchange rate will not be payable. No statutory variation shall be payable by GSECL on the input items. i.e. raw materials etc.

7.13 Procurement of Materials

7.13.1 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 GSECL for approval in respect of the materials procured by the Contractor.

7.14 Samples

7.14.1 Apart from adhering to special provision made in the specification regarding submission of samples, the Contractor shall within fifteen (15) days of its receipt of Letter of Intent, provide to GSECL samples along with detailed literature of all materials it proposes to use irrespective of the fact that specific make/ material might have been stipulated. If certain items proposed to be used are of such nature that samples cannot be presented or prepared at Site, detailed literature / test certificate of the same shall be provided instead. GSECL shall check the samples and give his comments and/or approval to the same.

7.15 Notice of Operation

7.15.1 The Contractor shall not carry out important operation without the consent in writing of GSECL or his representative. For carrying out such important activity, the Contractor shall intimate to GSECL at least seventy two (72) hours before starting of the job.

7.16 Rejection of Materials

7.16.1 GSECL'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.

7.17 Power and Water Supply during Construction

7.17.1 The Contractor shall arrange for the temporary Power Supply at the site for construction purpose at its own cost.

7.17.2 Cost of water shall be as per prevailing rate and to be borne by the Contractor.

7.17.3 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.

7.17.4 GSECL shall not provide facility for storage of material, and accommodation for labours at site. The Contractor shall make his own arrangement for the same.

7.18 Labour Engagement

7.18.1 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.

7.18.2 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 GSECL on account of default in this regard by the Contractor.

7.18.3 The contractor is encouraged to use local manpower as per the local statutory (labour) requirement, if any.

7.18.4 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.

7.19 Handing Over –Taking Over

7.19.1 project shall be taken over by GSECL 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. 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.

7.19.2 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.

7.19.3 Handing over will be done only after Completion of Facilities and successful Operational Acceptance Test

7.19.4 Prior to the handing over, GSECL shall conduct a plant audit by self or the third party as per GSECL'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.

7.20 Termination on the death of Contractor

7.20.1 Without prejudice to any of the rights or remedies under this contract, if the Contractor dies, the Engineer-in-Charge on behalf of GSECL shall have the option of terminating the Contract without compensation to the contractor.

7.21 Retired Government servants taking to Contract

7.21.1 No engineer of gazette rank or other gazette officer employed in engineering or administrative duties in the Engineering Department of the Company is allowed to work as contractor for a period of two years of his retirement from Company's service without the previous permission of the Company. This contract is liable to be cancelled if either the contractor or any of his employees is found at any time to be a person who had not obtained the permission of the Company as aforesaid before submission of the tender or engagement in the contractor's service as the case may be.

7.22 EPF

7.22.1 The contractor will deduct and deposit EPF of his labour staff/worker as applicable from time to time in his own EPF A/c code and then produce a photocopy of documentary evidence of EPF Challan with each R.A. Bill for the concerned period.

7.23 Miscellaneous

7.23.1 The project manager appointed by EPC contractor shall not be replaced without the prior written approval of GSECL.

7.23.2 Any project manager or member of the Contractor at Site shall be replaced within a period of forty eight (48) hours of intimation by GSECL without assigning any reason thereof.

7.23.3 The Contractor shall take care of all statutory, local clearance, approvals etc . GSECL will provide all documentary support if needed. Any approval in regard with Land of SPV site is in the scope of GSECL.

7.23.4 All warranties on the equipment shall be in the name of GSECL with reference to the Clause No. 6.40.

7.23.5 The Contractor shall be responsible for claiming and retaining any subsidy and shall quote only final price. Responsibility of Project registration/ applications, factory registration etc. shall lie with the Bidder only. In no case, GSECL is responsible to provide any additional amount other than the EPC Contract Price & O&M Contract Price.

7.23.6 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.

7.23.7 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 GSECL's approval of the new design or specification.

7.23.8 Based on reviewing the Project, if the progress is below expectation as judged based on GSECL's discretion, then GSECL 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.

7.23.9 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 GSECL at the time of hand over at no extra cost to GSECL for the rest of the life of the Plant.

7.23.10 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 GSECL's employees or authorized representatives at the time of construction of the Plant.

7.23.11 Provision for installing any additional monitoring equipment to facilitate on-line transfer of data shall be provided by the Contractor.

7.23.12 GSECL shall provide necessary support to the Contractor for the high-sea sales of the PV modules.

--- End of Section ---

Appendix 1: Format for Covering Letter

To,

The Chief Engineer (P&P)
Gujarat State Electricity Corporation Limited ("GSECL")
Vidyut Bhavan, Race Course
Vadodarar-390 007, Gujarat

Sub: Submission of the RFP Document No. GSECL/ PP/RE&BD/ 110 MW Solar PV/ Date:

Dear Sir,

We, the undersigned, have considered and complied with the "Instructions to Bidders" and have accepted the terms stipulated in the RFP documents. The scope of work to be offered by the Bidder shall include but not be limited to Engineering, Procurement, Manufacturing, Construction, Installation, Testing, Commissioning, Operation and Maintenance of 110 MW solar Photovoltaic grid connected power plant ranging from 10 MW to 55 MW at various substations of GETCO in the State of Gujarat.. The Successful Bidder shall be required to ensure the continuous running of plant without any interruption for a period of One year. All the above shall be as per RFP Document No. GSECL/ PP/RE&BD/ 110 MW Solar PV/ Date:

Also we have familiarized ourselves with the, land surface and subsurface, metrological, climatologically and environmental conditions which may exist in the installations area. In full cognizance and compliance with these aforesaid conditions and the regulations of local government authorities, we the undersigned do hereby offer for the Engineering, Procurement, Manufacturing, Construction, Installation, Testing, Commissioning, Operation and Maintenance of a 110 MW solar Photovoltaic grid connected power plant ranging from 10 MW to 55 MW at various substations of GETCO in the State of Gujarat for which we have Bid. The work covered under the Bid shall be completed to the entire satisfaction of yourselves or your representative in conformity with the RFP documents at the prices accompanying this Bid.

It is a term of our Bid that the Project shall be handed over installed, interconnected, tested, commissioned and modified and shall achieve commissioning not later than Six months from the date of Notice to Proceed. This shall be the essence of the Contract between us.

We further agree and stipulate as follows:

1. Until the final Contract Documents are prepared and executed the RFP documents with any modifications, additions, deletions agreed with the Company(s) and your written acceptance thereof, shall constitute a binding Contract between us, upon terms contained in aforesaid documents and the Financial Proposal accompanying the Bid.
2. That the Company will not supply any material. In all respects we shall be fully self-sufficient in the performance of the work.
3. I/ We understand that you are not bound to accept the lowest of the Bid you may receive.
4. I/ We shall make available to the Company any additional information it may find necessary or require to supplement or authenticate the qualification statement.
5. I/ We acknowledge the right of the Company to reject our Bid without assigning any reason or otherwise and hereby waive, to the fullest extent permitted by applicable law, our right to challenge the same on any account whatsoever.
6. I/ We understand that you may cancel the bidding process at any time and that you are neither bound to accept any Application that you may receive nor to invite the Applicants to Bid for the Project, without incurring any liability to the Applicants.
7. I/ We further certify that in regard to matters relating to security and integrity of the country, we or any of our Associates have not been charge-sheeted by any agency of the Government or convicted by a Court of Law.
8. I/ We further certify that no investigation by a regulatory authority is pending either against us or against our Associates or against our CEO or any of our directors/ managers/ employees.
9. I/ We undertake that in case due to any change in facts or circumstances during the bidding process, we are attracted by the provisions of disqualification in terms of the provisions of this RFP; we shall intimate the Company of the same immediately.
10. We understand that the selected Bidder shall either be an existing Company incorporated under the Indian Companies Act, 1956 or Companies Act 2013.

11. I/ We hereby irrevocably waive any right or remedy which we may have at any stage at law or howsoever otherwise arising to challenge or question any decision taken by the Company in connection with the selection of Applicants, selection of the Bidder, or in connection with the selection/ bidding process itself, in respect of the above mentioned Project and the terms and implementation thereof.
12. I/ We agree and undertake to abide by all the terms and conditions of the RFP document.
13. We agree to keep the bidding valid for acceptance for a period of 120 (One Hundred Twenty) days from the date of opening of the Technical Bid (hereinafter referred to as validity period) and the Bid shall not be withdrawn on or after the opening of bidding till the expiration of the validity period or any extension thereof.
14. We also undertake not to vary/modify the Bid during the validity period or any extension thereof.
15. We represent that we have fully satisfied ourselves as to the nature and location of the Project having in mind the general and local conditions and other factors incidental to the performance of the works and the costs thereof.
16. We further represent that from our own investigation of the Site of the Project we have fully satisfied ourselves as to the character, quality and quantity of surface and other conditions to be encountered in the performance of the works and we understand and represent that any failure to acquaint ourselves in respect of these matters and the other factors and conditions as set forth shall not relieve us from any responsibility for estimating properly the difficulty and cost of successfully performing the works.
17. We also acknowledge and accept that you shall not pay for any discontinuance or low performance rate resulting from malfunction of / or inadequacy of our equipment, instruments or personnel.
18. We agree to return to you all reports and technical data provided for our use in preparing this Bid and in the subsequent conduct of the works. We undertake that we will not use the same for any other work/purpose.
19. We further represent that we have familiarized ourselves with all the terms and provisions of the various parts of the bidding documents and that in making our Bid, we do not rely upon any representation made by any agent or employee of yourselves

in respect of the terms of the bidding documents or the nature of the performance of the works.

20. We submit this Bid with the full understanding that our Bid fully complies with all the terms and conditions of the RFP documents including Bid evaluation criteria and that no deviation/exception to the RFP documents have been taken by us. We also agree that in case we have taken any exceptions/ deviations to the RFP documents, the Company will be free to reject our offer on account of such exceptions/deviations.

21. **We are submitting** this Bid for following locations.

1) Name of Location: ……

(a) Name plate Capacity of Location: …… MW

I have visited the site: Yes/No

2) Name of Location: ……

(b) Name plate Capacity of Location: …… MW

I have visited the site: Yes/No

No Of location bid for: ……. Nos Total name plate capacity Bid for: …….. MW

Dated this _____ day of _____ 2020

Signature: _____

In the capacity of:_____

Duly authorized to sign Tenders for and on behalf of (Name & Address) _____
_____
_____
_____

Witness

_____

Appendix 2: Details of Bidder

1. (a) Name:

   (b) Country of incorporation:

   (c) Address of the corporate headquarters and its branch office(s), if any, in India:

   (d) Date of incorporation and/ or commencement of business:

2. Brief description of company including details of its main lines of business and proposed role and responsibilities in this Project:

3. Details of individual(s) who will serve as the point of contact/ communication for company:

   (a) Name:
   (b) Designation:
   (c) Company:
   (d) Address:
   (e) Telephone Number:
   (f) E-Mail Address:
   (g) Fax Number:
   (h) GST Number of Bidder (with proof) :

4. Particulars of the Authorised Signatory of the Bidder:

   (a) Name:
   (b) Designation:
   (c) Address:
   (d) Phone Number:
   (e) Fax Number:

Appendix 3: Format of Details of Similar Technical Experience

INSTRUCTIONS:

A. The Bidder shall indicate similar EPC experience of grid-connected solar photovoltaic projects herein.

B. The Bidder shall duly attach the Letter of Award (LOA) from the Client, Commissioning Certificate, and Certificate of Satisfactory Completion of Work from the Client.

C. Projects without sufficient documentary evidence of execution, commissioning and completion as per the discretion of GSECL shall not be considered towards technical evaluation of the Bidder.

D. The Bidder may indicate more than five (5) projects.

Sr.	Name of Client (with name and contact information of Contact Person)	PV Project AC/ DC Capacity (in MW)	For Official Use Only		
			LOA attached?	Commissioning Certificate attached?	Certificate of Satisfactory Completion attached?
1.			Yes/ No	Yes/ No	Yes/ No
2.			Yes/ No	Yes/ No	Yes/ No
3.			Yes/ No	Yes/ No	Yes/ No
4.			Yes/ No	Yes/ No	Yes/ No
5.			Yes/ No	Yes/ No	Yes/ No

Appendix 4: Format of Disclosure of PV Technology

PV MODULE		
Type	:	Select One: □ Poly-crystalline Silicon □ Mono-crystalline Silicon □ Other variant of the above. Please specify.....
Manufacturer	:	
Model Number	:	
Module Capacity	:	..... W
No. of Cells per Module	:	
No. of Modules	:	
PV INVERTER		
Type	:	Select One: □ Central Inverter
Configuration	:	Select One: □ Independent Operation □ Master-Slave Operation □ Other, Please specify.....
Manufacturer	:	
Model Number	:	
Inverter Capacity	:	..... kW
Number of Inverters	:	
MODULE TRACKING		

Type	:	Select One: □ Fixed □ 1-Axis Manual Seasonal □ 1-Axis, Fixed Tilt, Automatic, Daily Tracking □ 1-Axis, Azimuth, Automatic, Daily Tracking □ 2-Axis, Automatic, Tracking □ Other, Please specify.....

Appendix 5: Format for Project Execution Plan

I. Division of Scope of Work

Discipline/ Equipment	Basic Engineering	Design/ Detailed Engineering	Procurement	Supply	Project Management	Construction/ Fabrication/ Installation	Commissioning

NOTES: 1. Bidder shall clearly indicate the agency which will carry our each activity and the location of activity.

2. In case any activity is proposed with back-up consultant, Bidder shall clearly indicate role of back-up consultant

3. Bidder to identify major equipment / items and discipline

II. DETAILED PROJECT SCHEDULE

Sr.	Activity	Start Date	End Date
1.	Issue of LoI	NTP	
2.			
3.			

NOTES:

1. The Bidder shall ensure that the entire work is completed within Six months from issue of Notice to Proceed.
2. All Start Dates and End Dates to be indicated with respect to the Zero Date, e.g. +3 Days.
3. The Bidder may use as many lines as required to satisfactorily provide the detailed project schedule.

SIGNATURE OF BIDDER ----------
NAME ----------
DESIGNATION ----------
SEAL DATE ----------

Appendix 6: Bid Evaluation Criteria (BEC)

The Evaluated Bid Value (EBV) shall be calculated using the following parameters:

Parameters Quoted by the Bidder:

i. Quoted EPC Contract Price,
ii. 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),
iii. Quoted O&M Contract Price for each year during the O&M period (of 10 years),

Parameters assumed constant for evaluation of each Bidder:

iv. Discount Factor of 10.69% annually.
v. Fixed Land Cost: Rs. _____Cr.

The Evaluated Bid Value (EBV) shall be calculated using the abovementioned parameters as follows:

Step 1		:	Quoted EPC Contract Price at the zeroth (0^{th}) year
Step 2		:	Net Present Value (NPV) of 10 years of O&M Cost quoted by the Bidder
Step 3	ADD	:	Summation of EPC Contract Price and NPV of O&M for 10 years
Step 4		:	Summation of quoted NEEGG for 10 years
Step 5	DIVIDE		(Sum of EPC Contract Price and NPV of each year O&M Contract Price for 10 years and Fixed Land Cost) by (Summation of quoted NEEGG for 10 years) i.e. *(Step3/Step4)*

The Evaluated Bid Value (EBV) shall be the Net Present Value (NPV) as calculated above.

Evaluated Bid Value (EBV) =

$$\frac{\text{[(EPC Contract Price) + (NPV of each year O\&M Contract Price of 10 years at the rate of 10.69\%)]}}{\sum \text{NEEGG of 10 years}}$$

The Bidder with the lowest EBV in Rs./ kwh shall be the Successful Bidder.

EXAMPLE:

The following example will further clarify the methodology of comparison:

Note: Figures quoted by Bidder are in **Box**.

For 150 MW

Figures Quoted by Bidder 1				
EPC Price	:	Rs.	**465**	Crore
Year			NEEGG	O&M Cost
			(in kWh)	(Rs.)
0			NA	NA
1			**285,000,000**	**23,250,000**
2			**282,150,000**	**24,412,500**
3			**279,328,500**	**25,633,125**
4			**276,535,215**	**26,914,781**
5			**273,769,863**	**28,260,520**
6			**271,032,164**	**29,673,546**
7			**268,321,843**	**31,157,224**
8			**265,638,624**	**32,715,085**

Derived/ Evaluated Figures

9			262,982,238	34,350,839	**NPV of each year O&M Contract Price for the Project (in Rs.)**	**Rs. 16,75,54,566**
10			260,352,416	36,068,381		
Total			272,51,10,862	29,24,36,001	**EBV (in Rs/ kWh) without Land Cost**	**2.2345**

For 150 MW

Figures Quoted by Bidder 2					Derived/ Evaluated Figures	
EPC Price	:	Rs.	486.0	Crore		
Year			NEEGG	O&M Cost		
			(MU)	(Rs.)		
0			NA	NA		
1			315,000,000	19,440,000		
2			311,850,000	20,412,000		
3			308,731,500	21,432,600		
4			305,644,_____	22,504,230		
5			302,587,743	23,629,442		
6			299,561,866	24,810,914		
7			296,566,247	26,051,459		
8			293,600,585	27,354,032		
9			290,664,579	28,721,734	**NPV of each year O&M Contract Price for the Project (in Rs.)**	**140,09,72,373**

10			287,757,933	30,157,821		
Total			3,011,964,637	24,45,14,231	**EBV (in Rs/ kWh) without Land Cost**	**2.0823**

Result:

EBV of Bidder 1 = *[(465,00,00,000+167,55,45,662+ 150x 84,78,000] / 272,51,10,862*

= Rs/kWh 2.2345

EBV of Bidder 2 = *[(486,00,00,000+ 140,09,72,373+ 150x 84,78,000] / 301,19,64,637*

= Rs/kWh 2.0823

- EBV in Rs/kWh of Bidder 1 is Rs. 2.2345 per kWh.
- EBV in Rs/kWh of Bidder 2 is Rs 2.0823 per kWh.
- EBV of Bidder 1 is higher than Bidder 2.

Bidder with lower EBV in Rs.2.08 /kWh shall be L-1 and Bidder with higher EBV will be L-2.

Hence, in the above Bidder 2 would be preferred as the Successful Bidder (L-1) compared to Bidder 1.

NOTE: This is only example. Complete project of individual location will be given to one Bidder. There is an e-Reverse Auction after opening of the Financial Bid where the Bidder has to give discount as per the procedure of the e-Reverse Auction.

Appendix 8: Details of qualified technical staff

Sr. No.	***Name***	**Relevant Qualification**	**Additional Certifications**	**Total Years of Relevant Experience**	**Remarks**
1.					
2.					
3.					
4.					
5.					

6.					

Note:

Kindly submit copies of resumes and appropriate certifications with this sheet.

Additional sheets may be used to provide accurate information.

Appendix 9: Declaration of Compliance

Date:

To,

The Chief Engineer (P&P)

Gujarat State Electricity Corporation Limited ("GSECL")

Vidyut Bhawan , Race Course

Vadodarar-390 007, Gujarat

Sub: Declaration of Compliance for the Bid for Design, Engineering, Supply & Procurement, construction, operation and maintenance of 110 MW solar Photovoltaic grid connected power plant ranging from 10 MW to 55 MW at various substations of GETCO in the State of Gujarat on EPC basis

Dear Sir,

This is to certify that I, _____, am the duly authorized signatory appointed on behalf of my organization to submit this Bid. The authorization letter is attached herewith.

I agree to all the terms and conditions set forth in this RFP Document.

If awarded the job, the job work shall also conform to the terms and conditions, as well as specifications indicated in the RFP documents and as finally indicated by the Evaluation Committee.

I further certify that all the information provided in this document is accurate to the best of my knowledge.

Signature: _____ Designation:_____

Name: _____ Organization: _____

Address: _____ Phone: _____

Email: _____

Appendix 10: No Deviation Certificate

Date:

To

The Chief Engineer (P&P)

Gujarat State Electricity Corporation Limited ("GSECL")

Vidyut Bhavan, Race Course

Vadodarar-390 007, Gujarat

Sub: No Deviation Certificate regarding Bid for Bid for Design, Engineering, Supply & Procurement, construction, operation and maintenance of 110 MW solar Photovoltaic grid connected power plant ranging from 10 MW to 55 MW at various substations of GETCO in the State of Gujarat.

Dear Sir,

We, _____

(Bidder's name), confirm our acceptance to all terms and conditions mentioned in the RFP Document, and all subsequent clarifications, in totality and withdraw all deviations raised by us, if any.

_____

SEAL AND SIGNATURE OF BIDDER

Date: _____

Appendix 11: Declaration on Bidder's relation to Directors

Date:

To

The Chief Engineer (P&P)

Gujarat State Electricity Corporation Limited ("GSECL")

Vidyut Bhawan , Race Course

Vadodarar-390 007, Gujarat

Sub: Declaration of relationship with Directors/any other employee/associates.

Dear Sir,

This has reference to our proposed Contract regarding Bid for Design, Engineering, Supply & Procurement, construction, operation and maintenance of 110 MW solar Photovoltaic grid connected power plant ranging from 10 MW to 55MW at various substations of GETCO in the State of Gujarat to be entered into Agreement with Gujarat State Electricity Corporation (GSECL).

For the purpose of Section 297/299 of the Companies Act, 1956 we certify that to the best of my/our knowledge;

i) I am not a relative of any Director of GSECL;
ii) We are not a firm in which a Director of GSECL or its relative is a partner;
iii) I am not a partner in a firm in which a Director of GSECL or its relative is a partner;
iv) We are not a private company in which a Director of GSECL is a member or director;
v) We are not a company in which Directors of GSECL hold more than 2% of the paid-up share capital of our company or vice-versa.

_____

Authorised Signatory of the Contracting Party

Place:

Date:

Appendix 12: Format of Power ofAttorney as Authorized Signatory

(On a non-judicial stamp paper of appropriate value)

Know all men by these presents, We, …… (name of the firm and address of the registered office) do hereby irrevocably constitute, nominate, appoint and authorise Mr. / Ms (Name), son/daughter/wife of …… and presently residing at ……..., who is presently employed with us and holding the position of ……..., as our true and lawful attorney (hereinafter referred to as the "Attorney") to do in our name and on our behalf, all such acts, deeds and things as are necessary or required in connection with or incidental to submission of our Bid for the Bid for Design, Engineering, Supply & Procurement, construction, operation and maintenance of 110 MW solar Photovoltaic grid connected power plant ranging from 10 MW to 55 MW at various substations of GETCO in the State of Gujarat, pursuant to the RFP document no. _____ issued by Gujarat State Electricity Corporation Limited ("GSECL"),including but not limited to signing and submission of all applications, Bids and other documents and writings, participate in Bidders' and other conferences and providing information / responses to the Company, representing us in all matters before the Company, signing and execution of all contracts including the Contract Agreement and undertakings consequent to acceptance of our Bid, and generally dealing with the Company in all matters in connection with or relating to or arising out of our Bid for the said Project and/or upon award thereof to us and/or till the entering into of the Contract Agreement with GSECL.

AND we hereby agree to ratify and confirm and do hereby ratify and confirm all acts, deeds and things done or caused to be done by our said Attorney pursuant to and in exercise of the powers conferred by this Power of Attorney and that all acts, deeds and things done by our said Attorney in exercise of the powers hereby conferred shall and shall always be deemed to have been done by us.

IN WITNESS WHEREOF WE, ……., THE ABOVE NAMED PRINCIPAL HAVE EXECUTED THIS POWER OF ATTORNEY ON THIS …… DAY OF ….. 20…

For……..

(Signature, name, designation and address)

Witnesses:

1.

2.

Accepted Notarised

(Signature, name, designation and address of the Attorney)

Notes:

1. *The mode of execution of the Power of Attorney should be in accordance with the procedure, if any, laid down by the applicable law and the charter documents of the executant(s) and when it is so required, the same should be under common seal affixed in accordance with the required procedure.*
2. *Wherever required, the Bidder should submit for verification the extract of the charter documents and documents such as a board or shareholders resolution/ power of attorney in favour of the person executing this Power of Attorney for the delegation of power hereunder on behalf of the Bidder.*

3. *For a Power of Attorney executed and issued overseas, the document will also haveto be legalised by the Indian Embassy and notarised in the jurisdiction where the Power of Attorney is being issued. However, the Power of Attorney provided by Bidders from countries that have signed the Hague Legislation Convention, 1961 are not required to be legalised by the Indian Embassy if it carries a conforming Apostle certificate.*
4. *This format for Power of Attorney is for reference and in case a Bidder has a different format approved by their management then the same can submitted.*

Appendix 13: Format of Summary of Audited Financial Statements

To

The Chief Engineer (P&P)

Gujarat State Electricity Corporation Limited ("GSECL")

Vidyut Bhavan, Race Course

Vadodarar-390 007, Gujarat

Sub: Summary of Financial Statement

Ref: Request for Proposal for Bid for Design, Engineering, Supply & Procurement, construction, operation and maintenance of 110MW solar Photovoltaic grid connected power plant ranging from 10 MW to 55 MW at various substations of GETCO in the State of Gujarat.

Dear Sir,

This is to certify that..... *[Insert name of Bidder]* (The "Bidder") having its Registered Office at..... *[Insert Registered Address of the Bidder]* with PAN No. ..... *[Insert PAN No. of the Bidder]* is in the business of..... *[Insert briefly the nature of the business]*, has recorded the following turnovers and net worth: 3u

A

Financial Year	Turnover (in INR)	Net Worth (in INR)	For Official Use Only
			Audited Statement Attached?
2019-20			Yes / / No
2018-19			Yes / / No
2017-18			Yes / / No
2016-17			Yes / / No
2015-16			Yes / / No
2014-15			Yes / / No

All figures indicated herein are arrived from the Audit Reports of the Bidder duly submitted to the Income Tax Department.

Sincerely yours,

.....

[Official seal of the Chartered Accountant]

[Insert Name of the Chartered Accountant]

Date: [Insert Date]

[Insert address and contact information of the Chartered Accountant]

Place: [Insert Place]

All figures indicated herein are calculated as per the guidelines mentioned in the Tender.

NOTES:

A. If the Bidder is seeking financial qualification based on the financial standing of the Parent Company, then a similar certificate summarizing the financial statement of the Parent Company shall be attached by the Bidder as a part of the Bid.
B. All audited statements to be attached by the Bidder as a part of the Bid.

Appendix 14: Format of Authorization by Parent Company

[On the Official Letterhead of the Parent Company]

[Reference No.]

From: [Name of Parent Company]

[Address of Parent Company]

[Date]

To

The Chief Engineer (P&P)

Gujarat State Electricity Corporation Limited ("GSECL")

Vidyut Bhavan, Race Course

Vadodarar-390 007, Gujarat

Sub: Authorization of use of financial capability by Parent Company

Ref: Request for Proposal for Bid for Design, Engineering, Supply & Procurement, construction, operation and maintenance of 110 MW solar Photovoltaic grid connected power plant ranging from 10 MW to 55 MW at various substations of GETCO in the State of Gujarat

Dear Sir,

A. With reference to RFP No……., we confirm that we hold ..... [Insert percentage of share held in words] percentage ([Insert percentage of share held in figures] %) share in M/s. ..... [Insert Name of the Bidder].

B. We confirm that M/s. ..... [Insert Name of the Bidder] is authorized by us to use our financial capability for meeting the financial criteria as specified in the Tender, meeting all the provisions including but not limited to terms and conditions of the Tender and undertaking the Scope of Work as defined in the Tender.

C. We further confirm that we shall by jointly and severely be held responsible for the performance of M/s. ..... [Insert Name of the Bidder] as per the various provisions including but not limited to the terms and conditions in undertaking the Scope of Work as defined in the Tender.

D. Our financial summary is attached as a part of the Bid submitted by ..... [Insert Name of the Bidder] as per the appropriate format indicated in the Tender.

For and on behalf of ..... [Insert Name of Parent Company]

[Signature and Stamp of any Whole-Time Director]

Name: [Insert name of the Whole-Time Director]

Place: [Insert Place]

Date: [Insert Date]

[NOTE:

A. The Authorization of use of financial capability by Parent Company shall be supported by a specific Board Resolution of the Parent Company satisfactorily conveying the same.]

Appendix 15: Format of Financial Proposal

To

The Chief Engineer (P&P)

Gujarat State Electricity Corporation Limited ("GSECL")

Vidyut Bhavan, Race Course

Vadodarar-390 007, Gujarat

Sub: Financial Proposal for Bid for Design, Engineering, Supply & Procurement, construction, operation and maintenance of 110 MW solar Photovoltaic grid connected power plant ranging from 10 MW to 55 MW at various substations of GETCO in the State of Gujarat

Dear Sir,

I,_____,

present the Financial Proposal for the **"Bid for Design, Engineering, Supply & Procurement, construction, operation and maintenance of 110 MW solar Photovoltaic grid connected power plant ranging from 10 MW to 55 MW at various substations of GETCO in the State of Gujarat"** on EPC basis through the Tender Document No. "Tender No. *GSECL/ PP/ RE&BD/ 110MW Solar PV/ "*confirming that:

i. I agree to all the terms and conditions set forth in this Tender Document. If awarded the Project, the implementation of the Project shall also conform to the terms and conditions, as well as specifications indicated in the Tender Document and as finally indicated by the Evaluation Committee.

ii. Rates quoted in this Bid is for destination prices inclusive of all taxes (unless stated otherwise), levies, duties, packing, forwarding, freight, insurance, loading, unloading, supply, installation, commissioning, and any/all charges for successful Engineering, Supply & Installation, Construction, Comprehensive Operation and Maintenance of "Project" at the Site. The break-up of taxes considered are also furnished in price bid.

iii. Rates quoted in this Bid are exclusive of taxes and duties. The statutory variation in taxes shall be admissible in accordance with the Clause no. 7.12.3 Taxes and duties of Tender Document. Under no circumstances shall escalation in the prices of this Tender Document shall be entertained.

iv. The details quoted herein stand valid for at least six months from the date of opening of the Price Bid.

Table 15.A: Price Quote for EPC Contract Location wise

Sr. No.	Item	Unit Rate INR	Qty (Wp)	Price (without taxes & duties)	Freight and Transportation	Safe Guard Duty	Other Taxes & Duties (if any)	GST	**Final Price SPV Plant**
		A1	A2	(A)= A1*A2	(B)	(C)	(D)	(E)	**(G)= (A+B+C+ D+E)**
				(Rs.)	(Rs.)	(Rs.)	(Rs.)	(Rs.)	**(Rs.)**
1	Supply of PV Modules								
2	Supply of Inverters								
3	Supply of MMS								
4	Supply of Civil items								

5	Supply of Balance of System includes all equipment, materials, accessories etc. (excluding Sr. no 1 to 4)								
6	General works including construction, erection, testing, commissioning, COD with GEDA / GUVNL etc. of entire plant as per details specified in the Tender documents, on EPC Basis.								
7	Works including supply ,construction, erection, testing , commissioning of transmission line to the GETCO S/s.								
8	Total Rs=(1+2+3+4+5+6)								
EPC price quoted by the Bidder.									

Note:

1. EPC cost with taxes and duties shall be considered for evaluation of bid. Thereafter e-Reverse Auction shall be done.
2. No variation due to change in forex rate shall be admissible.
3. Payment shall be made in Indian National Rupees (INR) only. Bidder(s) has to quote their rate in INR only.
4. Arithmetical errors will be rectified on the following basis: If there is a discrepancy between words and figures, the amount written in words will prevail.
5. GST on supply & Works shall be considered in confirmation with Govt. Of India Notification No. 24/2018-Central Tax (Rate) dtd 31.08.2018.
6. If EPC contractor has two GST registration out of which one is cancelled then EPC contractor has to provide NO DUE CERTIFICATE from GST Department for the cancelled GST registration.
7. It is mandatory to mention safe guard duty in column (c) of schedule of Price A for supply. If it is mentioned' "0" in column (c), no safe guard duty shall be payable for the PV modules procured till 29th July-2021. For any statutory variation in safe guard duty post 29-07-2021 the safe guard duty rates prevailing as notified by GoI on the date of submission of price bid will be considered as base rate.

Table 15B: Price Quote for O&M Contract

Sr. No.	Head	Annual rate for comprehensive O&M (A)	Taxes & Duties (B)	O&M charges including taxes (C= A+B)	NEEGG (D)	Discounting factor for NPV @10.69 (E)	NPV of O&M charges (F)= (Cx E)
		(In Rs.)					**(In kWh)**
1.	Operation and Maintenance of the Project for **First Year.**					**1**	
2.	Operation and Maintenance of the Project for **Second Year.**					0.9034	
3.	Operation and Maintenance of the Project for **Third Year.**					0.8162	
4.	Operation and Maintenance of the Project for **Fourth Year.**					0.7374	
5.	Operation and Maintenance of the Project for **Fifth Year.**					0.6661	
6.	Operation and Maintenance of the Project for **Sixth Year.**					0.6018	
7.	Operation and Maintenance of the Project for **Seventh Year.**					0.5437	

8.	Operation and Maintenance of the Project for **Eighth Year.**					0.4912	
9.	Operation and Maintenance of the Project for **Ninth Year.**					0.4437	
10.	Operation and Maintenance of the Project for **Tenth Year.**					0.4009	
	TOTAL (In Figures)						

	TOTAL Rate for Comprehensive O&M including all taxes " Total O&M Contract Price" (In Words)	
	TOTAL NEEGG (In Words)	

All applicable taxes including GST and any surcharge or cess thereon are included in the quoted number.

Signature:_____ Designation: _____

Name: _____

Address: _____ _____

_____ Seal of Company / Organization:

_____ Phone: _____

Email: _____

Note:

1. The Rate for Comprehensive O&M including all taxes for subsequent year shall not be more than 5% of the previous year. E.g. The Rate for Comprehensive O&M including all taxes of 3rd Year shall not be more than 5% of the 2nd Year.
2. O&M Contract after 10th year shall be mutually decided by the Contractor and GSECL.

Appendix 16: Procedure for Performance Testing

Part A: Solar PV power plant Net power generation

1. The Contractor shall quote the 'Net Electrical Energy Generation Guarantee" for annual basis considering the Reference Global Average Radiation indicated in this Tender.
2. The Contractor shall demonstrate "Actual Delivered Energy" at metering point as compared to the '*Base NEEGG'* for every year from the date of starting of O&M Period.
3. The quoted NEEGG as in Table no. 14 B in Appendix 14 for any year shall be permitted with maximum 1 % degradation factor in previous year generation.
4. **The quoted NEEGG will be used for calculating CUF for that particular year.**
5. The Bidder shall clearly mention the technology used i.e. fixed/tilt or seasonal tracker (please specify) as per Table given in Appendix 6.

Operational Acceptance Test Procedure

Performance Ratio (PR) - Test Procedure

1. Performance Ratio as determined through the PR Test Procedure specified here should not be less than **0.75** for Operational Acceptance Test.

2. 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.

3. 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.

4. PR shall be demonstrated against the installed DC Capacity.

5. The Efficiency or performance ratio (PR) of the PV Plant is calculated as follows (according to IEC 61724)

Performance Ratio (PR) = $\mathbf{Y_A / Y_R}$

$Y_A = E_{ac} / P_{Nom}$

$Y_R = IR_{Site} / IR_{STC}$

Where;

Y_A = Final PV system yield (representing the number of hours that the system would need to operate at its rated output power P_{Nom} to contribute the same energy to the grid as was monitored.

Y_R = 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.

Part C: The procedure for Performance Guarantee Test (PGT) - cum- Final Acceptance Test- shall be as follows:

1. A weather station with a calibrated pyranometer shall be installed by the Contractor at the location mutually agreed by the Contractor and GSECL. The test report for the calibration shall be submitted by the Contractor for approval by GSECL. 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 GSECL. However, for the dispute period for which such error has occurred and until the instrument is recalibrated to the satisfaction of GSECL, data from any one of the following list of sources as decided by GSECL 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 GSECL
    iii. Nearest MNRE weather station
3. "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.
4. **To judge the performance on monthly basis and accordingly to initiate measures to meet guaranteed NEEEG quoted for respective years, the measured value of**

energy at step (3) shall be compared with '*Base NEEGG*' and hence with '*Base 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 month. This shall be for intermittent performance monitoring only. However, correction in annual NEEGG offered will be only on annual GHI measured.

5. 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.
6. The Contractor shall share with GSECL all the radiation, generation, etc. parameters details and all other factors necessary for GSECL to corroborate the estimate. GSECL has the right to cross verify data submitted by the Contractor by all possible means/sources.

Following factors shall be considered for computing the Base NEEGG/ CUF and PR Test:

7. Effect due to variation in annual insolation shall only be considered for computing the Base NEEGG/ CUF.
8. Effect due to variation of meteorological parameters e.g. ambient temperature, wind speed, humidity etc. shall not be considered.
9. **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 GETCO S/s are tabulated below:

Month	GHI (kWh/m2/month)		
	Pachham	Sanesh	Nikava
January	144.2	144.5	143.8
February	147.8	149.5	149.5
March	190.3	191.6	191.3
April	198.3	196.5	201.0
May	205.5	202.7	206.8
June	171.0	163.5	174.0
July	140.1	137.0	147.9
August	137.0	135.8	142.0
September	153.3	152.1	156.0
October	161.5	162.1	161.8
November	140.4	140.7	139.8
December	131.8	132.1	133.6
Annual	**1921.2**	**1908.1**	**1947.5**

The above radiation data shall be used by the Bidder to calculate annual NEEGG. This radiation data is for evaluation purpose. However, for every year actual radiation shall be considered to calculate the annual NEEGG offered 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)

NEEGG guaranteed by Contractor = 71,832,000 KWh

Reference GHI= 1886 KWh/m^2 per annum

For Example:

Case A) for higher irradiation:

If Actual GHI = 1900 kWh/m^2 per annum then NEEGG will be:

NEEGG = (1900 x 71,832,000)/ 1886

NEEGG = 72,365,217 KWh/ Annum

Case B) for lower irradiation:

If Actual GHI = 1850 kWh/m^2 per annum then NEEGG will be:

NEEGG = (1850 x 71,832,000)/ 1886

NEEGG = 70,460,870 KWh/ Annum

Appendix 17: List of Banks (for Bank Guarantee)

Bank Guarantee from the following Banks will be acceptable.

Sr. No	Name of Banks		
(A)	Guarantees issued by following Banks will be accepted as SD/EMD on permanent basis		
	1	All Nationalized Banks	
(B)	Guarantees issued by following Banks will be accepted as SD/EMD.		
	1)	Commercial Banks	
		1	Kotak Mahindra Bank
		2	IndusInd Bank
		3	RBL Bank
		4	DCB Bank
		5	AXIS Bank
		6	ICICI Bank
		7	HDFC Bank
	2)	Co-operative Banks of Gujarat	
		1	The Kalupur Commercial Co-operative Bank Ltd.
		2	Rajkot Nagarik Shakari Bank Ltd.
		3	The Ahmedabad Mercantile Co-operative Bank Ltd.
		4	The Mehsana Urban Co-operative Bank Ltd.
		5	Nutan Nagrik Sahakari Bank Ltd.
		6	The Surat District Co. Operative Bank
		7	Saurastra Gramin Bank
		8	Baroda Gujarat Gramin Bank

- The Bank Guarantee submitted should have the clear one time validity in all respect and up to the completion period. If by any reason the Contract Period is extended, the Bidder shall undertake to renew the Bank Guarantee at least one month before the expiry of the validity failing which GSECL will be at liberty to encash the same.

Appendix18 (a): Format of Bank Guarantee for EMD

[To be on non-judicial stamp paper of Rupees One Hundred Only (INR 300/-) or appropriate value as per Stamp Act relevant to place of execution, duly signed on each page. Foreign entities submitting Bid are required to follow the applicable law in their country]

Reference No. ……. Bank Guarantee No. ……. Dated: …….

EMD BANK GUARANTEE FORMAT FOR TENDER /RFP No._____

(BANK GUARANTEE ON NON-JUDICIAL STAMP PAPER OF Rs.300)

WHEREAS M/s. _____
(Name and Address of the Firm) having their registered Office at _____ (Address of the Firm's registered Office) (hereinafter called the Tenderer) wish to participate in the Tender No._____ for _____ of (supply / Erection / Supply & Erection / Work) of _____ (Name of the material / equipment / work) for _____ Gujarat State Electricity Corporation Limited and WHEREAS a Bank Guarantee for (hereinafter called the "Beneficiary") Rs. _____ (Amount of EMD) valid till _____ (mention here date of validity of this Guarantee) which is required to be submitted by the Tenderer along with the Tender.

We, _____
(Name of the Bank and address of the Branch giving the Bank Guarantee) having our registered Office at _____ (Address of Bank's registered Office) hereby gives this Bank Guarantee No. _____
dated _____ and hereby agree unequivocally and unconditionally to pay immediately on demand in writing from the Gujarat State Electricity Corporation Limited or any Officer authorized by it in this behalf any amount not exceeding Rs._____ (amount of EMD) (Rupees _____ _____) (in words) to the said Gujarat State Electricity Corporation Limited on behalf of the Tenderer.

We, _____ (Name of the Bank) also agree that withdrawal of the Tender or part thereof by the Tenderer within its validity or non-submission of Security Deposit by the Tenderer within one month from the date of Tender or a part thereof has been accepted by the Gujarat State Electricity Corporation Limited would constitute a default on the part of the Tenderer and that this Bank Guarantee is liable to be invoked and encash within its validity by the Beneficiary in case of any occurrence of a default on the part of the Tenderer and that the encash amount is liable to be forfeited by the Beneficiary.

This agreement shall be valid and binding on this Bank up to and inclusive of _____ (mention here the date of validity of Bank Guarantee) and shall not be terminated by notice or by Guarantor change in the constitution of the Bank or the Firm of Tenderer or by any reason whatsoever and our liability hereunder shall not be impaired or discharged by any extension of time or variations or alterations made, given, conceded with or

without our knowledge or consent by or between the Tenderer and the Gujarat State Electricity Corporation Limited.

"Notwithstanding anything contrary contained in any law for the time being in force or banking practice, this Guarantee shall not be assignable, transferable by the beneficiary (i.e. GSECL). Notice or invocation by any person such as assignee, transferee or agent of beneficiary shall not be entertained by the Bank. Any invocation of the Guarantee can be made only by the beneficiary directly."

NOT WITHSTANDING anything contained hereinbefore our liability under this Guarantee is restricted to Rs. _____ (amount of EMD) (Rupees _____ (in words). Our Guarantee shall remain in force till _____ (date of validity of the Guarantee). Unless demands or claims under this Bank Guarantee are made to us in writing on or before _____ (date should be 1 month after the above validity period of BG), all rights of Beneficiary under this Bank Guarantee shall be forfeited and we shall be released and discharged from all liabilities there under.

Place:

Date:

(Please mention here complete Postal Address of Bank with Branch Code, Signature of the Bank's authorized Signatory Telephone and Fax Nos) with official seal.

INSTRUCTIONS FOR FURNISHING BANK GUARANTEE

1. The Bank Guarantee by Bidders will be given on non-judicial stamp paper as per stamp duty applicable at the place where the Tender has emanated. The non-judicial stamp paper should be in name of the issuing bank.
2. The Bank Guarantee by Bidder will be given from Nationalized/Scheduled bank as per Appendix 17 only.
3. This bank guarantee/ all further communication relating to the bank guarantee should be forwarded to The Chief Engineer (P&P), Gujarat State Electricity Corporation Limited, Vidyut Bhavan, Race Course, Vadodara, Gujarat only.
4. The full address along with the Telex/Fax No. and email address of the issuing bank to be mentioned.

Appendix 18 (b): Format of Bank Guarantee for Security Deposit/ Performance Bank Guarantee

As per attached circular Ref no LL/CS/Bank Guarantee Formats/106 Dtd 7.12.2019

Appendix18 (c): Format of Bank Guarantee for Performance for O&M

[To be on non-judicial stamp paper of Rupees One Hundred Only (INR 300/-) or appropriate value as per Stamp Act relevant to place of execution, duly signed on each page. Foreign entities submitting Bid are required to follow the applicable law in their country]

Reference No. ……. Bank Guarantee No. ……. Dated: …….

To:

The Chief Engineer (P&P)

Gujarat State Electricity Corporation Limited ("GSECL")

VidyutBhwan , Race Course

Vadodarar-390 007, Gujarat

Dear Sir,

WHEREAS ……. *[Insert name of the Contractor]* with address ……. *[Insert address of the Contractor]* having its registered office at ……. *[Insert address of the Contractor]* (hereinafter, the "Bidder") wishes to participate in RFP document No. GSECL/ PP/ RE&BD/ 110 MW Solar PVissued by Gujarat State Electricity Corporation Limited ("GSECL") (hereinafter, the "Beneficiary") for Operation and Management of Performance of Solar Power Project.

And WHEREAS a Bank Guarantee for Rupees *[……]* valid till ……. *[Insert date for 5 years from the date of commissioning]* is required to be submitted by the Contractor as per the terms and conditions of the RFP.

We, …….*[Insert name of the Bank and address of the Branch giving the Bank Guarantee]* having our registered office at ……. *[Insert address of the registered office of the Bank]* hereby give this Bank Guarantee No. ……. *[Insert Bank Guarantee number]* dated ……. *[Insert the date of the Bank Guarantee]*, and hereby agree unequivocally and unconditionally to pay immediately on demand in writing from the Beneficiary any officer authorized by it in this behalf any amount not exceeding Rupees *[……]* to the said Beneficiary on behalf of the Bidder.

We ……. *[Insert name of the Bank]* also agree that withdrawal of the Bid or part thereof by the Bidder within its validity or non-submission of further O&M Performance Bank Guarantee by the Bidder within the stipulated time of the Letter of Intent to the Bidder or any violation to the relevant terms stipulated in the RFP would constitute a default on the part of the Bidder and that this Bank Guarantee is liable to be invoked and encashed within its validity by the Beneficiary in case of any occurrence of a default on the part of the Bidder and that the encash amount is liable to be forfeited by the Beneficiary.

This agreement shall be valid and binding on this Bank up to and inclusive of ……. *[Insert the date of validity of the Bank]* and shall not be terminable by notice or by Guarantor change in the constitution of the Bank or the firm of the Bidder Or by any reason whatsoever and our liability hereunder shall not be impaired or discharged by any extension of time or variations or alternations made, given, conceded with or without our knowledge or consent by or between the Bidder and the Beneficiary.

NOTWITHSTANDING anything contained hereinbefore, our liability under this guarantee is restricted to Rupees ……..(*Insert the Amount*). Our Guarantee shall remain in force till ……. *[Insert date]*. Unless demands or claims under this Bank Guarantee are made to us in writing on or before ……. *[Insert date]*, all rights of the Beneficiary under this Bank Guarantee shall be forfeited and we shall be released and discharged from all liabilities there under.

[Insert the address of the Bank with complete postal branch code, telephone and fax numbers, and official round seal of the Bank]

[Insert signature of the Bank's Authorized Signatory]

Attested:

……. [Signature] (Notary Public)

Place: ……. Date: …….

INSTRUCTIONS FOR FURNISHING BANK GUARANTEE

- The Bank Guarantee by Bidders will be given on non-judicial stamp paper as per stamp duty applicable at the place where the Tender has emanated. The non-judicial stamp paper should be in name of the issuing bank.
- The Bank Guarantee by the Bidder shall be given from bank only given in Appendix 17.
- This Bank Guarantee/ all further communication relating to the bank guarantee should be forwarded to The Chief Engineer, (P&P), Vadodara
- The full address along with the Telex/Fax No. and email address of the issuing bank to be mentioned.

Appendix 19: Contract Agreement (to be entered separately with GSECL for their respective projects)

This agreement is made at VADODARA the ----------day of ----------in the Christian year Two thousand -------- between ----------(herein after referred to as "THE CONTRACTOR" which expression shall unless excluded by or repugnant to the contract include its successors or permitted assigns) of the one part and the Gujarat State Electricity Corporation Ltd. having their Head Office at Sardar Patel Vidyut Bhavan, Race Course, VADODARA – 390 007 (hereinafter called "The GSECL" which expression shall unless excluded by or repugnant to the context include its successors or assigns) of the other part.

WHEREAS the aforesaid GSECL has accepted the Tender of the aforesaid contractors for ---------- as per GSECL's Order No.----------hereinafter called "**the Works**" and more particularly described enumerated or referred to in the specification, terms and conditions prescribed in the Order letter, covering letter and other letters and schedule of price which for the purpose of identification have been signed by Shri ---------- on behalf of the Contractors and by ----------on behalf of the GSECL a list whereof is made out in the Schedule hereunder written and all of which said documents are deemed to form part of this contract and included in the expression " **the Works"** wherever herein used, upon the terms and subject to the conditions hereinafter mentioned.

AND WHEREAS THE GSECL has accepted the Tender of the contractors for the construction of the said works for the sum of Rs. ----------(Rupees:----------) upon the terms and subject to the conditions herein mentioned.

NOW THIS AGREEMENT WITNESSES AND IT IS HEREBY AGREED AND DECLARED THAT:

(a) The contractors shall do and perform all works and things in this contract mentioned and described or which are implied therein or therefrom respectively or are reasonably necessary for the completion of the works as mentioned and at the times, in the manner and subject to the terms, conditions and stipulations contained in this contract, and in consideration of the due provision, executions, construction and completion of the works agreed to by the contractors as aforesaid, the GSECL doth hereby covenant with the contractor to pay all the sums of money as and when they become due and payable to the contractors under the provisions of the contract. Such payments to be made at such times and in such manner as are provided by the contract.

(b) The conditions and covenants stipulated herein before in this contract are subject to and without prejudice to the rights of the GSECL to enforce penalty for delays and / or any other rights whatsoever including the right to reject and cancel on default or breach by the contractors of the conditions and the covenants as stipulated in the general conditions, specifications, forms, or Tender schedule, drawing, etc., attached with GSECL's Order No.----------.

The contract value, extent of supply delivery dates, specifications, and other relevant matters may be altered by mutual agreement and if so altered shall not be deemed or construed to mean or apply to affect or alter other terms and conditions of the contract and the general conditions and the contract so altered or revised shall be and shall always be deemed to have been subject to and without prejudice to said stipulation.

SCHEDULE

List of documents forming part of the contract:

1.
2.
3
4.
5.
6
7.
8.

In witness where of the parties hereto have set their hands and seals this day and month year first above written.

1. Signed, Sealed and delivered by:

(Signature with Name, Designation & official seal)

for and on behalf of M/s._____

In the presence of name, Full Address & Signatures. :
i).

ii).

2. Signed, Sealed and Delivered by:

(Signature with Name, Designation & official seal)

For and on behalf of Gujarat State Electricity Corporation Ltd.,
Vidyut Bhavan, Race Course, VADODARA – 390 007.

In the presence of Name, Full Address & Signature:

i)

---

ii) ---

Appendix 20: Format for Pre-Bid Queries

Sr.	Chapter No.	Clause No.	Page No.	Tender Term	Bidder's Query

Annexure-A1: Details of Site

Sr No	District	Locations	Power evacuation feasibility (MW)	Approx. land (Ha)
1	Bhavnagar	Sanesh	55	100
2	Ahmedabad	Pachchham	50	92
3	Jamnagar	Nikava	15	25

Note: GSECL reserves the right to modify locations/evacuation feasibility & land availability. GSECL reserves the right to exclude/include locations and respective power evacuation feasibility.

Annexure-A2: Advance Payment Guarantee

(To be submitted by Bidder on a Non-Judicial Stamp Paper of Appropriate Value)

Date:

To,

The Chief Engineer (P&P)
Gujarat State Electricity Corporation Limited
Vidyut Bhawan, Race Course
Vadodara-390 007, Gujarat

Subject: Bank Guarantee No. _____

Whereas _____, a incorporated under _____ having its registered office at _____ (hereinafter referred to as the "Contractor " which expression shall, unless repugnant to the context or meaning thereof, include its successors and permitted assigns) have entered into Agreement for Design, Engineering, Supply & Procurement, construction, operation and maintenance of 110 MW solar Photovoltaic grid connected power plant ranging from 10 MW to 55 MW at various substations of GETCO in the State of Gujarat. India, dated _____ with Gujarat State Electricity Corporation Limited/ Gujarat Power Corporation Limited (GSECL), having its registered office at (Insert address of respective company

Whereas, under the Agreement a payment of 10 % (ten percentage) of the EPC Contract Value is payable in advance to the Contractor, as a security for which the Contractor is required to furnish to GSECL an irrevocable, unconditional, first demand bank guarantee issued for a sum equal to 10% (ten percentage) of the EPC Contract Value.

And whereas, _____ (Insert Bank name) having its registered office at _____ and a branch office at _____, India, hereinafter referred to as the "Bank" (which expression shall, unless repugnant to context or meaning, be deemed to mean and include its successors), being a Nationalised bank of India and acceptable to GSECL, has at the request of the Contractor agreed to issue this advance re payment bank guarantee in favour of GSECL.

Now therefore this Bank Guarantee witnessed as follows:

1. The Bank hereby undertakes the pecuniary responsibility of the Contractor to GSECL for the repayment of the Work Advance by the Contractor to GSECL and hereby issues in favour of GSECL this irrevocable and unconditional work advance payment bank guarantee (hereinafter referred to as the "Guarantee") on behalf of the Contractor in the amount of

_____ Indian Rupees (insert an amount equal to ten percentage (10 %) of the EPC Contract Value).

2. The Bank for the purpose hereof unconditionally and irrevocably undertakes to pay to GSECL without any demur, reservation, cavil, protest or recourse, immediately on receipt of first written demand from GSECL, any sum or sums (by way of one or more claims) not exceeding in the aggregate the amount of _____ (insert an amount equal to ten percent (10 %) of the EPC Contract Value) without GSECL needing to prove or to show to the Bank grounds or reasons for such demand for the sum specified therein and notwithstanding any dispute or difference between GSECL and the Contractor in respect of the performance of the Agreement or moneys payable by Contractor to GSECL or any matter whatsoever related thereto.

3. The Bank acknowledges that any such demand by GSECL of the amounts payable by the Bank to GSECL shall be final, binding and conclusive evidence in respect of the amount payable by the Contractor to GSECL.

4. The Bank hereby waives the necessity for GSECL from demanding the aforesaid amount or any part thereof from the Contractor and also waives any right that the Bank may have of first requiring GSECL to pursue its legal remedies against the Contractor, before presenting any written demand to the Bank for payment under this Guarantee.

5. The Bank further unconditionally agrees with GSECL that GSECL shall be at liberty, without the Bank's consent and without affecting in any manner the Bank's obligation under this Guarantee, from time to time, to:

a. Vary and / or modify any of the terms and conditions of the Agreement.
b. Extend and / or postpone the time for performance of the obligations of the Contractor under the Agreement.
c. Forbear or enforce any of the rights exercisable by GSECL against the Contractor under the terms and conditions of the Agreement.

and the Bank shall not be relieved from its liability by reason of any such act or omission on the part of GSECL or any indulgence by GSECL to the Contractor or other thing whatsoever which under the law relating to sureties, but for this provision, would have the effect of relieving the Bank of its obligations under this Guarantee
6. The Bank's obligations under this Guarantee shall not be reduced by reason of any partial performance of the Agreement. The Bank's obligations shall not be reduced by any failure by GSECL to timely pay or perform any of its obligations under the Agreement.

7. Any payment made hereunder shall be made free and clear of and without for, or on account of, any present or future taxes, levies, imposts, duties, charges, fees, commissions, deductions or

withholdings of any nature whatsoever and by whomsoever imposed, and where any withholding on a payment is required by law, the Bank shall comply with such withholding obligations and shall pay such additional amount in respect of such payment such that GSECL receives the full amount due hereunder as if no such withholding had occurred.

8. This Guarantee shall be a continuing bank guarantee and shall not be discharged by the change in constitution of any member of the Contractor and the Guarantee shall not be affected or discharged by the liquidation, winding up, bankruptcy, re organisation, dissolution or insolvency of any member of the Contractor or any other circumstances whatsoever.

9. This guarantee shall be in addition to and not in substitution or in derogation of any other security held by GSECL to secure the performance of the obligations of the Contractor under the Agreement.

10. The Bank agrees that GSECL at its option shall be entitled to enforce this Guarantee against the surety, as a principal debtor in the first instance without proceeding at the first instance against the Contractor.

11. Without prejudice to any continuing liability to perform obligations under this Guarantee which have arisen prior thereto, the Bank shall be released from any further obligations arising hereunder after _____ (insert the scheduled date of completion) unless this Guarantee is otherwise extended on account of failure to recover the entire Work Advance from the Contractor by the said date.

12. GSECL may assign this Guarantee to any person and in such case GSECL shall inform the Bank in writing. This Guarantee shall not be assigned or transferred by the Bank.

13. This Guarantee shall be construed and interpreted in accordance with and governed by the laws of India, and subject to Clause 13 above, the courts at Ahmedabad, Gujarat, India shall have jurisdiction over all matters arising out of or relating to this Guarantee.

14. The Bank has the power to issue this Guarantee in favour of GSECL. The aggregate liability of the Bank under this Guarantee shall not under any circumstance exceed _____ Indian Rupees (insert an amount equal to ten percentage (10%) of the EPC Contract Value).

15. Notwithstanding anything contained herein, this Guarantee shall be valid up to __/__/____. A written claim or demand shall be served upon us on or before the said date, after which this Guarantee shall become null and void.

16. No action, event or condition, which by any Applicable Law should operate to discharge the Bank from liability hereunder, shall have any effect and the Bank hereby waives any right it

may have to apply such law, so that in all respects its liability hereunder shall be irrevocable and, except as stated herein, unconditional in all respects.

18. Capitalised terms not otherwise defined herein shall have their respective meanings given such terms set forth in the Agreement.

In witness where off, the bank, through its authorised officer, has set its hand and stamp on this _____ day of _____ 20__.

SEAL AND SIGNATURE OF BANK REPRESENTATIVE

Annexure-A3: Plot Details of locations

Refer Attachment

Annexure A5: Operation and Maintenance

Operation and Maintenance (O & M)

Operation & Maintenance period shall be as mentioned in NIT. The start of O&M and first year operation shall be considered after completion of all works and certification by GSECL.

Guideline for Operation and Maintenance (O&M):

O&M Contract shall cover complete Solar PV Power plant and power evacuation system up to inter connection point (66 kV GETCO end S/S) as specified elsewhere in the Contract. Contractor to achieve guaranteed Generation in respective O&M year.

Further, it is the responsibility of the Contractor to liaison with the following authorities:

(a) Liaison with State/Central Government.

(b) Liaison with State Power Utilities.

(c) Liaison with State Renewable Agency.

(d) Any other department / agency as may be required.

(e) GSECL shall provide required documents.

O&M OF PLANT

Comprehensive operation & maintenance of the Solar PV plant including supply of spare parts, consumables, repairs/replacement of any defective equipment etc. shall be performed by the Contractor for a period of 05 years (warranty period) + 05 Years. GSECL shall review the performance of Solar PV plant at the end of 5^{th} year of O & M.

During O&M period, employer personnel shall have unrestricted entry to the solar plant and Control Room any time. GSECL may depute its personals to associate with O&M activities. The Contractor shall assist them in developing expertise through their day to day O&M activities and all records of maintenance must be maintained by the contractor which can be accessed by employer on demand. These recordings are to be handed over to employer after the O&M period of contract.

During the O&M period, the Contactor shall be responsible for any defect in the work due to faulty workmanship or due to use of sub-standard material in the work. Any defects in the work during the warrantee period shall there be rectified/replaced by the contractor without any extra cost to the employer within a reasonable time as may be considered from the date of receipt of such intimation from employer failing which employer shall take up rectification work at the risk and cost of contractor.

The Contractor shall be responsible for supply of all spare parts, repairs / replacement of any defective equipment(s) including civil works at his own cost as required from time to time during the O&M period.

During O & M period the Contractor shall be responsible for all the activities required for the successful running, optimum energy generation etc. This shall include but not necessarily be limited to following:

1. Deputation of adequate number of O&M, engineering and supporting personal, security etc.
2. O&M Contractor shall have to fill at least 65% of post in supervisory and managerial cadres and 80% of posts in other cadres by the local persons. The expression "Local person " shall mean a person domiciled in Gujarat state for minimum 15 years shall be considered as local person.
3. Operation part consists of deputing necessary manpower necessary to operate the Solar Photovoltaic Power Plant at the optimum capacity. Operation procedures such as preparation to start, routine operations with safety precautions, monitoring of Solar Power Plant etc. shall be carried out as per the manufacturer's instructions to have trouble free operation of the complete system.
4. Daily work of the operators in the Solar Photovoltaic Power Plant involves cleaning of Modules, logging the voltage, current, power factor, power and energy output of the solar Power Plant. The operator shall also note down failures, interruption in supply and tripping of different relays, reason for such tripping, duration of such interruption etc.
5. The Contractor shall demonstrate guaranteed generation as quoted in respective O&M year. In case the contractor fails to achieve the guaranteed generation, then penalties shall be recovered as defined in this Tender.
6. Water cleaning of SPV modules. The Contractor shall wash the modules minimum twice in a month and maintain this schedule in its records for the cleaning cycle.
7. Housekeeping of complete power plant.
8. Reporting the energy generation data to GSECL.
9. Monitoring, controlling, troubleshooting, maintaining of records, registers etc.
10. Recording/logging of all the operational parameters (e.g. voltage, current, power factor, energy output, temperature etc.) and preparation of daily/weekly/monthly reports etc. including submission of periodical consolidate plant performance reports to the Owner / GSECL.
11. Conducting periodical checking, testing, over hauling and preventive action of all equipment in systematic method including regular cleaning of PV modules of the solar PV plant as per OEM guidelines.
12. The contractor shall carry out the periodical/plant maintenance as given in the manufacturer's service manual and requirement.
13. Cleaning including cutting/removing of bushes/vegetation etc. of the complete plant on regular basis and as and when required.
14. Particular care shall be taken for outdoor equipment to prevent corrosion. Cleaning of the junction boxes, cable joints, insulators etc. shall also be carried out at every month interval.

15. Resistance of the earthing system as well as individual earthing is to be measured and recorded every month. If the earth resistance is more than 3 ohm, suitable action is to be taken to bring down the same.
16. According to the recommendations stock of special tools and tackles shall be maintained for Modules, PCU's and other major electrical equipment.
17. Breakdown / Corrective Maintenance: Whenever a fault has occurred, the contractor has to attend to rectify the fault & the fault must be rectified at the earliest time from the time of occurrence of fault.
18. A maintenance record is to be maintained by the contractor to record the regular maintenance work carried out as well as any breakdown maintenance along with the date of maintenance reasons for the breakdowns steps have taken to attend the breakdown duration of the breakdown etc.
19. The 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-sun period.
20. The Contractor shall ensure that all safety measures are taken at the site to avoid accidents to his employees or his co-contractor's employees as per prevailing safety rules.
21. In order to ensure longevity, safety of the core equipment and optimum performance of the system the contractor should use only genuine spares of high quality standards.
22. Supply of all spares, consumables and fixing / installation of the same including proper storage of tool, tackles & spares.
23. The Contractor shall at his own expense provide all amenities to his workmen as per applicable laws and rules.
24. The Contractor shall immediately report the accidents, if any, to the Engineer In charge & to all the concerned authorities as per prevailing laws of the state.
25. The Contractor shall comply with the provision of all relevant Acts of Central or State Governments including payment of Wages Act 1936, Minimum Wages Act 1948, Employer's Liability Act 1938, Workmen's Compensation Act 1923, Industrial Dispute Act 1947, Maturity Benefit Act 1961, Employees State Insurance Act 1948, Contract Labour (Regulations & Abolishment) Act 1970 or any modification thereof or any other law relating whereto and rules made there under from time to time.
26. Coordinating, on behalf of GSECL, and obtaining renewal of statutory licenses, clearances and approvals from state departments such as State Electricity Supply & Transmission Boards/CEIG/GEDA etc.
27. Contractor shall keep updating the spares inventory at the site every time there is consumption of spare items towards replacement.
28. Coordinating with sub-station upon grid failures, line problems etc. and implementing the needful steps to restore the plant to normal operation
29. Theft incidents: immediate reporting to GSECL, filing FIRs with police stations on behalf of GSECL, coordination for site inspection by insurance companies and clearance of insurance claims, logging of events (date, time) and maintaining records
30. Proper housekeeping shall be maintained during O&M period by the Contractor.
31. Required security personnel shall be deployed for Plant security, round the clock.

HANDING OVER THE FACILITIES

After expiry of O&M period, the Contractor shall hand over the Facilities to Employer in good operating condition along with requisite tools & tackles and spares etc. The Contractor shall demonstrate functional operations of all the major & critical Plant & Equipment. The spare if consumed during O&M period then same shall be replenished at the time of handing over of facilities.

Annexure A6

Site visit for the locations.

Sr No	District	Locations	Power evacuation feasibility (MW)
1	Bhavnagar	Sanesh	55
2	Ahmedabad	Pachchham	40
3	Jamnagar	Nikava	15
4			
5			
6			

GSECL has organized site visit of locations as per above schedule. GSECL representative will accompany the representatives of bidders to locations. Bidders shall make sure to provide name along with mobile number of the representative visiting the site at least two days in advance of the date of site visit.

1) Sh. R H Kahar **9925210735** sere.gsecl@gebmail.com
2) Sh S N Kharod **9925210310** Eesolar.gsecl@gebmail.com
3) Sh Ujit Shukla **9687663082** dere3.gsecl@gebmail.com

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