NIeT No: WBSEDCL/SPGD/10 MW SPVPP/Sankrail/2019-20/NIT-16

Date: 28/01/2020

TENDER DOCUMENT

for

Design & Engineering, Manufacture / Procurement, Supply, Installation, Testing and Commissioning including warrantee obligation with 05 (Five) years Comprehensive Operation and Maintenance

of

10 MW (AC)[minimum 12MWp DC] capacity of Solar Photovoltaic Power Plant

at

Chuasole & Kasturia Mouza, Block- Sankrail, Jhargram District,

West Bengal.

WEST BENGAL STATE ELECTRICITY DISTRIBUTION COMPANY LIMITED
(A Govt. of West Bengal Enterprise)
VIDYUT BHAVAN, BLOCK – DJ, SECTOR – II
SALT LAKE, KOLKATA – 700 091

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BID DETAILS

Sl. No.	ITEM	DETAILS
1	NIeT No.	NIeT No: WBSEDCL/SPGD/10 MW SPVPP (Sankrail)/2019-20/NIT-16 Dated : 28.01.2020
2	Name of work	Design & Engineering, Manufacture/ Procurement, Supply, Packing and Forwarding, Transportation, Unloading, Storage at site, Site development, Construction, Erection , Installation, Testing and Commissioning including warrantee obligation with 05 (Five) years Comprehensive Operation and Maintenance of 10 MW (AC) [minimum 12 MWp DC Capacity] Solar Photovoltaic Power Plant at Chuasole & Kasturia Mouza, Block- Sankrail, Jhargram District, West Bengal.
3	Tender Fee (Non-refundable) [In the form of Demand Draft/Banker's Cheque]	Rs. 24,000.00 + Rs. 4,320.00 (GST) = **Rs. 28,320.00** (Rupees Twenty Eight Thousand Three Hundred Twenty only)
4	Estimated Cost of the Project	Rs. 49.42 Crore
5	Earnest Money (In the form of Bank Guarantee/ Demand Draft/Banker's Cheque)	**₹ 98,84,000 /-** (Rupees Ninty Eight Lakh Eighty Four Thousand Only)
6	Validity of Earnest Money (in case of Bank Guarantee)	06 (six) months from the date of opening of Technical Bid and with a claim period of another 03 (three) months.
7	Date of uploading of NIeT Documents (Online)	**28/01/2020**
8	Document download start date (Online)	**29/01/2020**
9	Last Date of submission of queries, if any, for the pre-bid meeting (Only through email)	**05/02/2020**

Sl. No.	ITEM	DETAILS
10	Pre Bid Meeting (Date & Venue)	**07/02/2020 at 15:00 hrs** at the Office of the Chief Engineer, Solar Power Generation Department (SPGD) 5th Floor, B Block, Vidyut Bhavan, WBSEDCL Block – DJ, Sector-II, Salt Lake, Kolkata – 700091
11	Bid proposal submission start date (Online)	**12/02/2020 from 14:00 hrs.**
13	Last date & time for submission of bid (Online)	**26/02/2020 upto 16:00 hrs.**
14	Date of physical submission of Tender Fee and EMD	**27/02/2020 to 28/02/2020 ; 11:00 -16:00 hrs** (Except Holidays). Solar Power Generation Department (SPGD), B - Block, 5th Floor, Vidyut Bhavan, WBSEDCL Block – DJ, Sector-II, Salt Lake, Kolkata – 700091
15	Date and time of opening of Technical Bid / Part – A (online)	**02/03/2020** at 12:00 hrs.
16	Date and time of opening of Price Bid / Part - B	To be notified later.
17	Time of completion of work	270 (Two Hundred and Seventy) days.
18	Validity of offer	180 (One Hundred and Eighty) days (or within such extended period as may be, if required) from the date of opening of Price Bid.

PROJECT DETAILS

Sl. No.	ITEM	DETAILS
Details of Location:		
1	Location	Chuasole & Kasturia Mouza, Block-Sankrail, Jhargram District, West Bengal.
2	District	Jhargram
3	State	West Bengal
4	Site Latitude	22.1599˚ N
5	Site longitude	87.0648˚ E
6	Nearest Railway Station	Kharagpur Railway Station
7	Nearest state highway	SH 05
Details of Plant:		
9	Capacity of the power plant	10 MW (AC) [Minimum 12MWp DC]
10	Grid interfacing voltage	33 kV
11	Nearby Substation	Sankrail 33/11 KV Substation
12	Project Completion period	270 (Two Hundred and Seventy) days

West Bengal State Electricity Distribution Company Limited

(A Government of West Bengal Enterprise)
CIN : U40109WB2007SGC113473

Solar Power Generation Department

Vidyut Bhavan (5th Floor, Block-B), Bidhannagar, Block DJ, Sector-II,Kolkata-700091
Phone: +913323197784 / +913323197484, Fax : 033-2321 2584
Website *: www.wbsedcl.in*, e-mail : *solarwbsedcl2018@gmail.com*

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NIeT No: WBSEDCL/SPGD/10 MW SPVPP(Sankrail)/2019-20/NIT-16 Dated:28/01/2020

NOTICE INVITING e-TENDER

West Bengal State Electricity Distribution Company Limited (WBSEDCL) intends to develop Grid Connected Solar PV Power Plant of 10 MW (AC) capacity at Chuasole & Kasturia Mouza, Block- Sankrail, Jhargram District, West Bengal. In this connection, the Chief Engineer, Solar Power Generation Department (SPGD), WBSEDCL invites e-tender in two parts for the work of "***Design & Engineering, Manufacture / Procurement, Supply, Packing and Forwarding, Transportation, Unloading, Storage at site, Site development, Construction, Erection, Installation, Testing and Commissioning including warrantee obligation with 05 (Five) years Comprehensive Operation and Maintenance of 10 MW (AC) with minimum installing 12MW DC capacity of Solar Photovoltaic Power Plant at Chuasole & Kasturia Mouza, Block- Sankrail, Jhargram District, West Bengal*** " (on EPC mode) from bona-fide, resourceful and technically eligible developers having experience in execution of similar nature of work as per eligibility criteria as mentioned below in the form of technical and financial proposals containing as mentioned in the tender document.

Schedule of Dates for e-Tendering:

Sl. No.	Activity	Date & Time
1	Publishing of e-NIT	28/01/2020
2	Document Download start date	29/01/2020
3	Date of Pre-bid Meeting	07/02/2020
4	Start date of Bid submission	12/02/2020 from 14:00 hrs.
5	End date of Bid submission	26/02/2020 upto 16:00 hrs.
6	Date of physical submission of Tender Fee and EMD	27/02/2020 to 28/02/2020. 11:00 -16:00 hrs (Except Holidays)
7	Technical Bid opening date	02/03/2020 at 12:00 hrs.
8	Financial Bid opening date	To be notified after evaluation of Technical Proposal

Terms & Conditions of the Tender Notice:

1. **Registration of Bidder:** Intending eligible bidders desirous of participating in the tender will have to be enrolled and registered with the Government e-Procurement

System and may like to log on to the website https://wbtenders.gov.in for the above tender.

2. **Digital Signature Certificate (DSC):** Bidders willing to take part in the process of e-tendering are required to obtain Class 2 or Class 3 Digital Signature Certificate (DSC) in the name of person who will sign the tender, from any authorized Certifying Authority (CA) under the Controller of Certification Agencies (CCA), Govt of India. The bidders are required to register the fact of possessing the Digital Signature Certificates through the Registration System available in the website. Tenders shall be submitted online and intending bidders should download the tender documents from the website stated above, directly with the help of the DSC. This is the only mode of collection of tender documents. Details of submission procedure are given in "Instructions to Bidders (ITB)".

3. **Tender Fee:** The cost of the tender document as per clause no. 4 of ITB shall be submitted in the form of CTS 2010 compliant Demand Draft (DD) / Banker's Cheque (BC) on any Scheduled Bank approved by Reserve Bank of India with validity of 3 (three) months drawn in favour of ***"West Bengal State Electricity Distribution Company Limited"*** payable in Kolkata. The cost of tender documents is 'Non-refundable' and payment for the same in any other form will not be accepted.

4. **Earnest Money Deposit:** The Earnest Money as per clause no. 17 of ITB shall be submitted by CTS 2010 complaint Demand Draft (DD) / Banker's Cheque (BC) on any Scheduled Bank approved by Reserve Bank of India with validity of 03 (three) months drawn in favour of "West Bengal State Electricity Distribution Company Limited" payable at Kolkata or in the form of Bank Guarantee (BG) on any Scheduled Bank as per Annexed Pro-forma 8 & 12 initially valid for 06 (six) months from the bid submission start date with a claim period of another 03 (three) months and subject to further extension if required. The bidder shall not claim any interest on Earnest Money Deposit. Earnest Money in any other form or amount will not be accepted. Tender Fee and EMD shall have to be submitted as stipulated in ITB. If the offer is submitted without or inadequate Earnest Money, the bid will not be opened. Incomplete offer will be liable for rejection and Tender Fee Deposits will be forfeited.

5. **Bid Validity:** The Tender and Offer shall remain valid for a minimum period of 180 days from the date of opening of the Technical Bid. However, WBSEDCL, on the merit of the case, may request extension of validity of the offer for a further suitable period without any change in terms & conditions of the original offer.

6. All other information as well as terms and conditions, which are not covered above, will be available in Instructions to Bidders, General Conditions of Contract, Special Conditions of Contract, Technical Specification and specimen Proforma of this tender.

7. The bidder or their duly authorized representative should attend the Pre-bid Meeting at the stipulated date and time as mentioned in the Key date's schedule.

8. WBSEDCL is not bound to accept the lowest tender and reserves the right to cancel any or all the tenders unilaterally without assigning any reason what-so-ever. The decision of the Tender Inviting Authority will be final and binding on all concerned and no challenge against such decision will be entertained. In any circumstance, cost of the bidding will not be reimbursed/ returned by the Tender Inviting Authority.

9. **Disqualification of Bidders:** Any evidence of unfair Trade Practices including over charging, price fixing, cartelisation etc. as defined in various statutes, will automatically disqualify the bidders.

10. **Amendment of the Bid Documents:** The Tender Inviting Authority reserves the right to modify, amend or supplement the Tender Document. Any corrigendum, notification concerned to this tender will be published in the e-tender portal https://wbtenders.gov.in and it will be treated as part and parcel of the tender. The bidders are, therefore, advised to follow the website for such corrigendum, notification etc.

11. All the important correspondence must be done through declared authorised email id with original scanned copy of documents/letter in company's letter head/pad. However hard copies should reach our office through post/ by hand from your end.

12. Any further information related to this tender may be had from the following office:

Office of the Chief Engineer
Solar Power Generation Department,
West Bengal State Electricity Distribution Company Limited (WBSEDCL)
Vidyut Bhavan, 5th Floor, B – Block,
Block – DJ, Sector – II, Salt Lake,
Kolkata – 700091, West Bengal.

Website	:	www.wbsedcl.in
Contact Tel. Nos.	:	+91 33 2319 7784/484
Fax No.	:	03323595554
Alternate Tel. No.	:	+91 33 2321 2584
Email *id*	:	*solarwbsedcl2018@gmail.com*

INSTRUCTION TO BIDDERS (ITB)
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1. NAME OF THE WORK

Design & Engineering, Manufacture / Procurement, Supply, Packing and Forwarding, Transportation, Unloading, Storage at site, Site development, Construction, Erection, Installation, Testing and Commissioning including warrantee obligation with 05 (Five) years Comprehensive Operation and Maintenance of 10 MW (AC) with minimum 12 MWp installing DC capacity Solar Photovoltaic Power Plant at Chuasole & Kasturia Mouza, Block- Sankrail, Jhargram District, West Bengal.

2. REGISTRATION OF CONTRACTOR

Any contractor willing to take part in the process of e-tendering will have to be enrolled and registered with the Government e-Procurement System. Through logging in to https://wbtenders.gov.in, the contractor has to go for the e-Tendering link as given on the web portal.

3. DIGITAL SIGNATURE CERTIFICATE (DSC)

Each contractor is required to obtain Digital Signature Certificate (DSC) for submission of bids from the approved service provider of the National Information's Centre (NIC) on payment of requisite amount. Details are available at the website.

4. TENDER FEE

The cost of the tender document will be **Rs. 28,320.00** (Rupees Twenty Eight Thousand Three Hundred and Twenty only) payable in the form of Banker's Cheque / CTS 2010 complaint Demand Draft to be drawn in favour of "WEST BENGAL STATE ELECTRICITY DISTRIBUTION COMPANY LIMITED" payable at Kolkata. The cost of tender document submitted by the bidder is 'NON-REFUNDABLE'. The bidder should deposit the tender fee physically at the office of the Chief Engineer, Solar Power Generation Department (SPGD), WBSEDCL as per stipulated scheduled date and time noted in NIeT.

5. SITE VISIT

The bidders are advised to visit the proposed site of installation and get themselves conversant with the actual site conditions prior to submission of the bids. The bidder may visit the proposed site during the presence of the officials of WBSEDCL on 03.02.2020, 11.00 hrs to 16.00 hrs giving prior information in writing or through e-mail to this office.

6. PROCESS TO BE CONFIDENTIAL

6.1 After the public opening of bids information relating to the examination, clarification, evaluation of comparison of Bids and recommendations concerning the award of contract shall not be disclosed to bidders or other person not officially concerned with such process until the Award of the Contract to the successful bidder has been announced.

6.2 Any effort by a bidder to influence WBSEDCL in the process of examination, clarification evaluation and comparison of Bids, and in decisions concerning the Award of contract may result in the rejection of his Bid.

7. ELIGIBILITY CRITERIA FOR PARTICIPATION IN THE BIDDING:

7.1 General

This Invitation for Bids, issued by WBSEDCL is open to sole proprietorship farm/Partnership farm/ LLP and Company (ies) incorporated in India as per Company Act, 1956/2013 (with amendment from time to time) barring Government department as well as foreign bidders/MNCs not registered and incorporated in India and those bidders, which have been placed under Holiday Listing and the term/ duration of such listing has not yet expired.

A Bidder shall not have a conflict of interest. Any Bidders found to be having a conflict of interest shall be disqualified. The bidder may be considered to have conflict of interest with one or more parties in this bidding process, if:

i. They have a controlling partner in common,
ii. They receive or have received any direct or indirect subsidy from any of them; or
iii. They have the same legal representative for purpose of this bid; or
iv. They have a relationship with each other, directly or through common third parties, that puts them in position to have access to information about or influence on the bid of another Bidder, or influence the decisions of the Employer regarding this bidding process; or
v. A bidder submits more than one bid in the bidding process, either individually [including bid submitted as agent /authorised representative on behalf of one or more manufacturer(s) or through Licensee – Licensor route, wherever permitted as per the provision of Qualification requirement for Bidders] or as partner in a joint venture, except for alternative offers permitted under Invitation to Bid. This results in disqualification of all such bids. However, this does not limit the participation of a Bidder as a sub-contractor in another Bid, or of a firm as a sub-contractor in more than one bid; or
vi. A Bidder or any of its affiliates participated as a consultant in the preparation of the design or technical specification of the materials and services/works that are subject of the bid, or
vii. The Bidder, directly or indirectly shall not be a dependent agency of the WBSEDCL.

This bidding is open to any manufacturer or erector who provides satisfactory evidence concerning the following that he:

i. is a qualified manufacturer or erector who supply, erect, testing and commission of the type specified and has adequate technical knowledge and practical experience;
ii. does not anticipate change in the ownership during the proposed period of work (if such a change is anticipated, the scope and effect thereof shall be defined);
iii. has adequate financial stability and status to meet the financial obligation pursuant to the scope of the works;
iv. has adequate field services organisation to provide the necessary field erection and management services required to successfully erect, test and commission the equipment as required by the Specifications and Documents; and
v. has established quality assurance systems and organisation designed to achieve high levels of equipment reliability, both during his manufacturing and field installation activities.

The bidder must submit Certificate of Incorporation/ Registration of Company/Trade license, GST Registration (GSTIN), PAN Card, Labour License, Electrical Contractor License, PF Registration, Employees' State Insurance Registration and Professional Tax Registration as per the applicability. Submission of audit report for companies registered under companies Act and Tax audit report for partnership firm for the last 03 (three) **Financial Years** (2016-17, 2017-18, 2018-19), Income Tax Return for the last 03(three) **Assessment Years** (2017-18, 2018-19, 2019-20) and latest Income Tax Clearance Certificate from the appropriate authority would be necessary.

A power of attorney, duly notarized, indicating that the person(s) signing the bid has (ve) the authority to sign the bid and thus that the bid is binding upon the Bidder during full period of its validity.

The above stated requirements are a minimum and WBSEDCL reserves the right to request for any additional information and also reserves the right to reject the Proposal of any Bidder, if in the opinion of Employer, the qualification data is incomplete or the Bidder is found not qualified to satisfactorily perform the Contract.

7.2**Technical Eligibility Criteria**

7.2.(a) The bidder shall have the credential of satisfactory execution of contract(s) in planning, design and engineering, manufacture/ procurement, supply, installation, testing and commissioning with comprehensive operation and maintenance of at least 01 (one) no. 50% or 02 (two) nos. 40% or 03 nos. 30% of proposed plant capacity Grid Connected Solar PV Project or higher capacity of similar project in each case during preceding 05(Five) years from the Bid submission start date.

In case of bidders applying for more than one bid (package) shall have to satisfy the original technical credentials for cumulative capacity of the plants actually applied for as above.

(b) The plant(s) should have been operating successfully for minimum 01 (one) year from the Bid submission start date.

The bidder should furnish documentary evidences of satisfactory performances of the said solar power plant(s) by way of submission of monthly generation data on annual basis along with completion and performance certificates issued by the purchaser (Plant Owner) for minimum 01 (one) year from the Bid submission start date. Documentary evidence of Grid connectivity of said solar power plant(s) as well as actual energy injected to grid is also be furnished from the licensee of the grid.

The certification by the bidder for his own Solar PV power plant shall not be acceptable.

(c) Bids may also be submitted by joint venture farms/consortium (having not more than three partners with one partner as lead partner) with requisite technical qualification of the Members of the JV as mentioned below:

i. At least one of the partner(s) of the joint venture/consortium should fulfil the requirements set forth in Para 7.2 (a) and 7.2 (b) above.

Or

ii. All the partners should jointly meet qualification requirements set forth in Para 7.2 (a) and 7.2 (b) above.

(d) Bidder should 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 Successful Operation/ satisfaction from the Solar Power plant owner as per the format given under "Pro-forma 7: Satisfactory operation of Solar PV Plants".

(e) The bidder should submit a list of contracts of similar nature presently under execution giving details of client, completion time, scope and value of work.

(f) The bidder may have either in-house facility for structural design and civil design, the array structure and foundation design and the design drawings should be signed by competent engineers having minimum LBS/ESE/EBA license or, otherwise design should be prepared and or vetted by reputed civil engineering design firm having structural engineer with minimum LBS / ESE / EBA License.

(g) A list of key professionals is to be furnished by the bidder as the Project Team Structure for the proposed work mentioning their experience and qualification.

(h) The bidder shall have to possess Electrical Contractors License issued by statutory Authority in Central/State Level. In case of JV/Consortium Bidders, any of the constituent members should have the said licence for participating in the Tender. A copy of the License shall have to be uploaded in the specified folder of the e-tender and also to be furnished along with the Bid hard copy.

(i) The bidder shall submit Project Proposal mentioning necessary schedule of work(s)/ equipment(s) with BOQ and Single Line Diagram.

(j) Bid submitted by a joint venture/consortium having not more than 3 (three) partners with one partner as lead partner, as per stipulated Qualification Requirements in Clause no. 7 of ITB shall comply with the following requirements:

- One of the partners shall be authorised by the other members of the JV/Consortium, for performing key role in execution of the contract and shall be designated as Lead Member; this authorization shall be evidenced by submitting with the bid a Power of Attorney signed by legally authorized signatories as perProforma-15.
- The bid shall be signed by the authorised representative of the Lead Member.
- The leader shall be authorized to incur liabilities and receive instructions for and on behalf of any and all partners of the joint venture, and the entire execution of the contract, including payment, shall be done exclusively with the leader, provided otherwise requested by the joint venture and agreed between the Employer and the leader.
- All partners of the joint venture/Consortium shall be liable jointly and severally for the execution of the contract in accordance with the contract terms.

- A Joint Venture/Consortium Agreement entered into by the partners shall be submitted with the bid as perProforma-14, including inter-alia delineation of responsibilities and obligations of each partner appended thereto, notwithstanding the joint and several liabilities.
- The Joint Venture/Consortium Agreement should indicate precisely the responsibility of all members of JV/Consortium in respect of planning, design, manufacturing, supply, installation, commissioning and training.
- All members of JV/ Consortium should have active participation in execution during the currency of the contract. This should not be varied/modified subsequently without prior approval of WBSEDCL; and
- In order for a joint venture / Consortium to qualify, each of its partners or combination of partners must meet the minimum criteria listed in the Qualification Requirement for the Bidder in Clause no.7 of ITB for an individual Bidder for the component of the contract they are designated to perform. Failure to comply with those requirements will result in rejection of the joint venture bid.
- A farm can be a partner in only one joint venture/Consortium; bids submitted by joint ventures/Consortium including the same farm as partner will be rejected.

  The bidder shall have at least three years' experience in executing similar nature of contracts in India as detailed above to be reckoned from the Technical Bid publishing date.

7.3 **Financial Eligibility Criteria**

(a) The bidder should be a registered company incorporated in India under the Companies Act, 1956 or 2013 (with amendment from time to time) or Partnership Firm registered as per Partnership Act 1932 or Statutory Body or LLP Act 2008 and must submit Trade license, Certificate of Company Incorporation / Registration Certificate, PAN Card, PF Registration, Employees' State Insurance Registration, Profession Tax Enrolment Certificate, GST Registration (GSTIN), Labour License, Electrical Contractor License as per the applicability.

(b) The bidder shall submit reports on the financial standing i.r.o. solvency of bidder company/ firm as certified by bankers, Audit report for companies registered under Companies Act and Tax Audit report for partnership farms for last 03 (three) Financial Years (2016-17, 2017-18, 2018-19).

(c) The bidder shall submit Income Tax Return for the last 03 (three) Assessment Years (2017-18, 2018-19, 2019-20) and latest Income Tax Clearance Certificate from the appropriate authority.

(d) The bidder should have a Minimum Average Annual Turnover @ 30% of the estimated cost of package(s) during last 03 (three) consecutive financial years (2016-17, 2017-18, 2018-19) for actual participation in the bidding process.

(e) Bidder shall have Liquid Assets (LA) and/ or evidence of access to or availability of fund based credit facilities of not less than 10% of the estimated cost of the project and the Banker should confirm that the Credit facility is earmarked for the Work specified under Bid. Liquid assets would include cash (and equivalents), bank deposits, securities that can be freely traded and receivables which has general certainty of getting received. In

case a bidder is quoting for more than one project, Pre-Qualification requirement shall be examined on the basis of sum of project wise requirements of LA of all quoted projects.

(f) Net Worth for the each of the last three Financial Years should be positive. Net worth means the sum total of the paid up capital and free reserves (excluding reserves created out of revaluation) reduced by aggregate value of accumulated losses (including debit balance in profit and loss account for current year) and intangible assets.

(g) The bidder should submit letter of undertakings, evidence of access to or availability of credit/facilities, financial proposal containing Price Bid and Price Break-up as per the Pro-forma given in the tender document.

(h) For the purpose of this particular bid, bidder shall meet the following minimum commercial criteria in past 5 (Five) years (up to 31.03.2019):

i) Experience in **single completed work** of project execution in On-Grid Solar PV Power Projects sector or any other job costing not less than the amount equal to **50%** of the estimated amount of the project(s) actually applied for in the bidding process.

Or

ii) Experience in **two completed work** of project execution in each On-Grid Solar PV Power Projects sector or any other job costing not less than the amount equal to individually **40%** of the estimated amount of the project(s) actually applied for in the bidding process.

Or

iii) Experience in **three completed work** of project execution in each On-Grid Solar PV Power Projects sector or any other job costing not less than the amount equal to individually **30%** of the estimated amount of the project(s) actually applied for in the bidding process.

In case a bidder is quoting for more than one package, Pre-Qualification requirement shall be examined on the basis of cumulative capacity of requirements of experience for all quoted packages.

(i) In case a bid is submitted by a Joint Venture (JV)/Consortium, all the partners of the JV/Consortium shall meet, individually, the qualification set forth at Para 7.3(a), 7.3(b), 7.3(c) and 7.3(f) above and collectively the requirement of Para 7.3(d) and 7.3(e) above. The figures for each of the partner of the joint venture shall be added together to determine the bidder's compliance with the minimum qualifying criteria set out in Para 7.3(d) and 7.3(e) above; however for a joint venture to qualify, the partner(s) of joint venture must meet the following minimum criteria:

- At least one partner shall meet, not less than 40% of the minimum criteria given at Para 7.3(d) and 7.3(e) above.

And

- Each of the other partner(s) shall meet not less than 25% of the criteria given at Para 7.3(d) and 7.3(e) above.

8. CLARIFICATION OF BIDDING DOCUMENTS & PRE-BID MEETING

8.1 The bidder shall be deemed to have carefully examined the Bidding Document and also to have been satisfied him as to the nature and character of the system to be supplied and installed against the contract, and all relevant matters & details should there be any discrepancy or, obscurity in the meaning of any of these clauses of the e-Tender documents or if there be any query of the intending Bidder, the Bidder shall set forth such discrepancies, doubt, obscurity or queries and submit the same through our email-id :solarwbsedcl2018@gmail.comor physically at Solar Power Generation Department (SPGD), WBSEDCL at 5th Floor, B–Block, Vidyut Bhavan on or before 05/02/2020 (through e-mail) for necessary clarification by WBSEDCL & further action in this regard.

8.2 To assist in the examination evaluation and comparison of Bids, WBSEDCL may ask the bidder individually for a clarification of his Bid including break up of unit rates. The request for clarification and the responses shall be in writing or by cable but no change in the price or substance of the Bid shall be sought, offered or permitted except as required to conform the correction of arithmetical errors discovered by WBSEDCL during the evaluation of the Bids in accordance with clause no. 23 of ITB.

8.3 The Pre-bid meeting will be held on scheduled date and time as prescribed NIeT at the office of the Chief Engineer, Solar Power Generation Department (SPGD), 5th Floor, B Block, Vidyut Bhavan.

8.4 Non attendance at Pre-Bid discussion will not be a cause for disqualification of bidders. The clarification given in the Pre-Bid discussion shall be final and binding on the bidder, being a part the original Bid Documents.

9. DEVIATION

This tender is a 'No Deviation' tender. However, request for any deviation by the bidder (s) vides their queries prior to pre-bid meeting, if tenable, will be informed in the Pre Bid meeting. Proforma-16 shall be filled and submitted by the bidder.

10. AMENDMENT OF BIDDING DOCUMENTS

The Tender Inviting Authority reserves the right to modify, amend or supplement this Tender Document. Any corrigendum, notification concerned to this NIeT will be published in the e-tender portal https://wbtenders.gov.in . The bidders are advised to follow the website regularly for such corrigendum, notification etc.

11. NET MINIMUM GUARANTEED GENERATION (NMGG)

Bidders shall have to ensure Net Minimum Guaranteed Generation @1.7 MU/MW for the first year after final commissioning and at a reducing rate of 0.8% per year for subsequent years of plant life. Initially, the above Guarantee shall be required for the 05 years O&M period. The same guarantee shall continue for extended O & M period, if agreed on mutual terms & conditions. The bidder shall design their plant to achieve the Net Minimum Guaranteed Generation.

The Generated energy will be measured at the Outgoing feeder of the switchyard of the Solar PV Power Plant i.e. the Net Minimum Guaranteed Generation will be calculated after considering the Auxiliary Load. As the solar PV power plant will be

grid connected type grid outage will be considered as 12 hours as (6 am to 6 pm) for calculating NMGG. No relaxation in NMGG will be considered for any other losses occurred in the system.

The bidder shall submit a declaration for the Net Minimum Guaranteed Generation with their bid. Non-submission of the said document will entail for disqualification of the bidder.

12. LANGUAGE OF THE BID

The offer prepared by the bidder and all correspondence and documents relating to the bid exchanged by the bidder and WBSEDCL shall be written in English. The desired documents and any other document submitted by the bidder shall be written in English.

13. PROCEDURE OF SUBMISSION OF BIDS

Bids are to be submitted online through the website https://wbtenders.gov.in. All the documents uploaded by the Tender Inviting Authority form an integral part of the tender document. Bidders are required to upload the entire tender document along with the other required documents through the above website within the stipulated date and time as given in the NIT.

The bid shall comprise of two parts and to be submitted simultaneously – One is Technical Proposal and other is Financial Proposal.

The bidders need to download the documents, fill up the particulars in the designated cell and upload the same in PDF in the designated location of the Technical Bid.

The bidders need to download the Price Bid & Price Break up Proforma as attached with this document, fill up the same and upload that document in the designated location of the Financial Bid.

All The documents uploaded should be digitally signed using Digital Signature Certificate (DSC). Bidders should take note of all the addendum/corrigendum related to the bid and upload the latest documents as part of the bid.

In addition, a complete set of hard copy except Price Bid maintaining the sequence as per Form-I (Check List) in spiral binding of all the documentary evidences qualifying for their bid, duly stamped and signed by the authorized person of the bidder as uploaded in the website https://wbtenders.gov.in shall have to be submitted along with the hard copy of EMD and tender Fee with super-scribing of the NIT no., name of the bidder, name of the work etc. on the sealed envelope.

TECHNICAL PROPOSAL

(A.1) Statutory Cover:

a) To be submitted in "Drafts" folder

i. Tender Fee:
Scanned copy of CTS 2010 complaint Demand Draft (DD)/Banker's Cheque (BC) towards tender fee as prescribed in the NIT, in favour of "WEST BENGAL STATE ELECTRICITY DISTRIBUTION COMPANY LIMITED" payable at Kolkata as per clause no. 4 of ITB.

ii. Earnest Money (EMD):
Scanned copy of the Demand Draft/Banker's Cheque/Bank Guarantee against Earnest Money Deposit (EMD), in favour of 'WEST BENGAL STATE ELECTRICITY DISTRIBUTION COMPANY LIMITED' payable at Kolkata as prescribed in clause no. 17 of ITB.

b) To be submitted in "Annexure" folder

i. Application for Tender *(Vide Proforma – 1)*

c) To be submitted in "NIT" folder

i. Notice Inviting Tender (NIT)
ii. Addenda /Corrigenda/Pre-Bid response (if published) duly signed with stamp.

Note: Bidders are to keep track of all the Addendum / Corrigendum issued with a particular tender and upload all the above digitally signed along with the NIT. Tenders submitted without the Addendum / Corrigendum will be treated as informal and liable to be rejected.

d) To be submitted in "Forms" folder

i. Check List *(Vide Form – I)*
ii. Summary statement of average annual turnover / yearly audit report *(Vide Form – II)* for a period of the last three financial years, certified by the Auditor appointed under Companies Act, 2013. In case the bidder is not a company, certificate of Tax Auditor may be submitted.
iii. Statement of orders executed during last five years *(Vide Form -III)*
iv. Pro-forma for undertaking to be submitted by the Bidders *(Vide Form – IV)*
v. Format of Letter of Bid *(Vide Form – V)*

(Only downloaded copies of the above documents are to be uploaded, virus scanned and digitally signed by the bidder)

Note: Tenders will be summarily rejected if any item in the statutory cover is missing.

(A.2) Non-Statutory Cover (My Document)

i. Company Details:

- Proof of Company Incorporation / Trade Licence
- Power of Attorney, duly notarized, indicating that the person(s) signing the bid has (ve) the authority to sign.

ii. Certificates:

1) PAN Card details.
2) Professional Tax (PT) Registration.
3) GST Registration Certificate (GSTIN).
4) PF registration certificate.
5) ESI Certificate.
6) Labour License Certificate.
7) Electrical Contractors License.

iii. Financial Information:

1) Income Tax Return for the last 03 (three) AY (2017-18, 2018-19 & 2019-20)
2) Proforma for Evidence of Access to or Availability of Credit / Facilities (*Vide Proforma - 4*)

iv. Credential:

Copy of the Order(s)/LOA (s)/Contract Agreement(s) issued by the purchaser (plant owner), Completion Certificates, Commissioning Reports, Monthly Generation data for minimum one year from the bid submission start date signed by the purchaser (plant owner) and Grid Connectivity Certificate or Evidence of Grid synchronization/ Connectivity (Joint Monthly Meter reading data) from Licensee to substantiate timely completion and satisfactory performance of the plant shall be submitted in support of minimum eligibility criteria as per Clause no. 7 of ITB.

v. Declaration:

1) List of Orders in hand

   (The bidder shall submit the list of orders in hand mentioning the order value to be executed within one year from the date of submission of bid)
2) Declaration for Net Minimum Guaranteed Generation *(Vide Proforma - 5)*
3) Bill of Material *(Vide Proforma - 6)*
4) List of key personnel available and proposed to be engaged for the project mentioning their experience and qualification
5) Others: Any other documents (Proforma- 14 & 15 regarding JV eligibility and any other document if found necessary).

Note:

- Failure of submission of any of the above mentioned document(s) as stated in (A.1) & (A.2) above and as per applicability will render the bid liable to be summarily rejected for both statutory and non-statutory cover.
- The execution of work shall be treated as complete execution of contract, not partial execution of contract.
- The documents uploaded should be digitally signed using the Digital Signature Certificate (DSC).

FINANCIAL PROPOSAL

The financial proposal should contain the following documents in one cover (folder).

Bill of Quantities (BOQ)

The financial proposal will contain Price Bid and Price Break-up as given in Pro-forma: 2, Pro-forma: 3 A, Pro-forma: 3 B & Pro-forma: 3 C (minimum 8% of Total amount of Pro-forma 3A and Pro-forma 3B) respectively in the tender document. The bidder should fill up the documents by their respective cell and upload that same in the designated location of the Financial Bid.

Note:

- The bidder must furnish information in the specified Pro-forma with their offer. If information are not furnished in desired format or in stipulated copies, the offer of respective bidder may be treated as non responsive and may be considered as ineligible and the bidder shall have no claim whatsoever, on this account.

- The documents uploaded should be digitally signed using the Digital Signature Certificate (DSC).

14. SUBMISSION OF ORIGINAL COPIES OF DOCUMENTS OF TENDER FEE EARNEST MONEY DEPOSIT AND HARD COPIES OF UPLOADED DOCUMENTS:

i. **Mode of Payment***:* Tender Fee must be submitted in the form of CTS 2010 complaint Bank Draft (DD) / Bankers Cheque (BC) of any scheduled Bank of India. EMD must be submitted in the form of Bank Draft (DD) / Bankers Cheque (BC) / Bank Guarantee (BG) of any scheduled Bank of India. Payment in any other form will not be accepted.

ii. **Procedure of Submission:** All the documents shall be submitted to the place of submission mentioned below as per following instruction:

- ❖ **Envelope 1:** Shall contain Original copies of Tender Fee & Earnest Money Deposit (EMD) i.e., Sl. No. 1 & 2 of Form-I (Checklist).
- ❖ **Envelope 2:** Shall contain rest of the documents except Price Bid mentioned in the Form-I (Checklist) maintaining proper sequence.
- ❖ **Envelope 3:** Shall contain both the above envelopes mentioning the title on the envelope.

iii. **Place of submission**: The original copies of the DD/BC/BG, towards Tender Fee and Earnest Money shall be submitted in the following office:

Office of the Chief Engineer,
Solar Power Generation Department (SPGD),
West Bengal State Electricity Distribution Company Limited,
Vidyut Bhavan, 5th Floor, B-Block,
Bidhannagar, Kolkata – 700091.

Time of submission: The original Bank Guarantee/Demand Draft/Banker's Cheque against Tender Fees and Earnest Money Deposit (EMD) must be submitted physically at the office of the The Chief Engineer, Solar Power Generation Department (SPGD), WBSEDCL, under sealed cover super-scribing the name of the work with NIeT no., name of the bidder etc. within the scheduled date & time as specified in the NIT.

If the bidder fails to submit the original copies within the due date and time his tender will not be opened and his bid will be rejected.

15. DISQUALIFICATION / INELIGIBILITY OF BIDDERS

Even though the bidders meet the qualifying criteria, they shall be disqualified if they

- have been involved in the corrupt / fraudulent / collusive / coercive practices and/or,
- have made misleading or false representation(s) in the forms, statements and attachments submitted in proof of the qualification requirements and/or,
- have found to be guilty in formation of cartel for submitting their bids and/or,
- have any Record of poor performance such as abandoning the works, serious litigation history, or financial failures etc. (basis of assessment of suitability shall be decided by WBSEDCL based on the parameters laid down by him on these issues) and/or,

- Have been declared ineligible for poor performance/failure issued by the Govt. of India/State Govt. Dept./PSUs/SNAs and other Statutory Organizations etc.

16. TIME SCHEDULE

The basic consideration and the essence of the Contract shall be the strict adherence to the time schedule specified in the bidding document and incorporated in the contract for the proposed services.

17. EARNEST MONEY

The Earnest Money shall have to be submitted in the form of, Banker's Cheque/Bank Guarantee (as per Pro-forma: 8) / Demand Draft to be drawn in favour of "WEST BENGAL STATE ELECTRICITY DISTRIBUTION COMPANY LIMITED" payable at Kolkata and shall be valid for a period of 6 (six) months with a claim period of 03 (three) months from the Bid submission start date.

The amount of EMD against the project shall be Rs. 98,84,000/- (Rupees Ninety Eight Lakh Eighty Four Thousand Only).

The EMD amount shall be released to the successful bidder after receiving Performance Security/Contract Performance from the contractor within the stipulated date mentioned in the Letter of Award (LOA). But the EMD of the unsuccessful bidders will be returned within Forty Five (45) days after finalization of this contract for which a request letter has to be initiated by the concerned unsuccessful bidders to the Chief Engineer, Solar Power Generation Department (SPGD), WBSEDCL, 5th floor, B Block, Vidyut Bhavan, Block-DJ, Sector-II, Salt Lake, Kolkata-700091.

In case, WBSEDCL cancel the Tender on his own for any reason, the EMD submitted by the bidders will be returned without any interest subsequently, for which a request letter has to be initiated by the authorised tender applicant.

18. FORFEITURE OF EMD

EMD shall be forfeited, if

a) The Bidder modifies/withdraws the Bid after Bid opening and during the period of Bid Validity and/or,
b) The bidder has been found practicing corrupt or fraudulent or collusive or coercive practices during bidding process and/or,
c) The bidder has been found guilty of Formation of Cartel.
d) The successful bidder fails within the specified time limit to Sign the Contract Agreement and/or,
e) The successful bidder fails within the specified time limit to submit the Contract performance/Performance security.
f) The successful bidder fails to submit unconditional Acceptance of LOA within the specified time limit.

19. PERFORMANCE SECURITY/CONTRACT PERFORMANCE

The Successful bidder shall submit a Performance Guarantee within 30 (thirty) days from the date of issuance of LOA in the form of Bank Guarantee (PBG) for an amount not less than 10% (ten per cent) of the total value of the contracts valid initially for a period of 1 (one) year with a claim period of 03 (three) months. The PBG shall be extendable up to total 05 (Five) years of O & M period from the date of final commissioning of the plant.

The above mentioned PBG shall also cover the guarantee against offered minimum annual generation of the plant upto initial O & M period of 05 (Five) years from the final date of commissioning of the entire plant.

In case of failure of requisite performance in terms of generation on part of the bidder, in either year the relevant penalty clause shall be imposed and the bidder will have to submit full amount of Bank Guarantee covering 10% of the total value of the contracts accordingly.

20. FORFEITURE OF PERFORMANCE SECURITY

Performance Security/Contract Performance shall be forfeited if,

a) The successful bidder do not execute the work after placement of Letter of Award (LOA) and/or,
b) The successful bidder discontinue the work without prior permission of the Chief Engineer, Solar Power Generation Department (SPGD), WBSEDCL and/or,
c) The successful bidder fails to install/procure the total capacity of the plant as mentioned in the tender document and/or,
d) The contractor fails to submit a fresh BG 30 (thirty) days prior to expiration of the previous BG against performance security of appropriate amount as per the terms and conditions and/or,
e) The successful bidder fails to rectify/replace of the defective/damaged equipment(s)/work(s) within the Defect Liability Period.
f) The contractor fails to perform/neglect the operation and maintenance activity of the plant as per contract.
g) In case of non-fulfillment of Net Minimum Guaranteed Generation in successive two years during O & M period of initial five years and no action on part of the contractor towards mitigating the said short fall in power generation.

21. PRICE REVISION

Revision/withdrawal of price bid after opening of Techno–commercial bid will not be entertained, under any circumstances until and unless it is sought for. In case it is asked by the tendering authority, the mode of communication too should strictly be followed by the bidder as specified in Writing by WBSEDCL.

22. VALIDITY OF OFFER

The offer against tender should remain valid for a minimum period of 180 days from the next day of opening of Price Bid. However, WBSEDCL may, on the merit of case, request extension of validity of the offer for a further suitable period without any change in terms & conditions of the offer.

23. DETERMINATION OF RESPONSIVENESS

23.1 Prior to be detailed evaluation of Bids, WBSEDCL will determine whether each Bid is substantially responsive to the requirements of the bidding documents.

23.2 For the purposes of this Clause a substantially responsive Bid is one which conforms to all the Terms, Conditions and Specifications of the bidding documents without immaterial deviation or reservation. A material deviation or reservation is one which affected in any substantial way the scope quality or performance of the works, or which limits in any way the responsibilities or liabilities of the Bidders or any right of the Owner as required in the

Bidding documents and the rectification of which deviation or reservation would affect unfairly the competitive position of other bidders presenting substantially responsive Bids.

23.3 If a Bids is not substantially responsive to the requirements of the bidding documents it will be rejected by WBSEDCL and may not subsequently be made responsive by the bidder having corrected or withdrawn the nonconforming deviation or reservation.

23.4 Although details presented in this NIeT have been compiled with all reasonable care, it is Bidder's responsibility to satisfy itself that the information / documents are adequate and that there is no conflict between various documents / stipulations. No dispute or claims shall be entertained on this account. Bid proposal preparation is the responsibility of the bidder and no relief or consideration can be given for errors and omissions.

24. CORRECTION OF ERRORS

24.1 Bids determined to be subsequently responsive will be checked by WBSEDCL for any arithmetic errors in computation and summation. Errors will be corrected by WBSEDCL as follows:

(a) Where there is discrepancy between amount in figures and in words, the amount in words will govern.

(b) Where there is discrepancy between the unit rate and the total amount derived from the multiplication of the unit rate and the quantity, the unit rate as quoted will govern unless in the opinion of WBSEDCL there is an obviously gross misplacement of the decimal point in the unit rate in which event the total amount as quoted will govern and the unit rate will be corrected.

24.2 The Bidder should ensure that the prices furnished in various price schedules are consistent with each other. In the case of any inconsistency in the prices furnished in the price schedules WBSEDCL shall be entitled to consider the highest price for the purpose of evaluation and use the lowest of the prices in this schedule for the purpose of Letter of Award (LOA).

24.3 The amount stated in the Bid form will be adjusted by WBSEDCL in accordance with the above procedure for the correction of errors and shall be considered as binding upon the Bidder, if the bidder does not accept the corrected amount of Bid, his Bid will be rejected and the Bid Guarantee forfeited.

24.4 In case of any discrepancies between the rate or price as quoted in Proforma 2 and corresponding rate or price in Proforma 3 A, 3 B and 3 C, then rate or price as quoted or arrived in Proforma 3 A, 3 B and 3 C shall prevail and evaluation shall be done accordingly.

25. OPENING AND EVALUATION OF TENDER

25.1 Opening of Technical Proposal

i. Technical proposals will be opened by the Tender Inviting Authority or his authorised representative electronically from the website stated above, using their Digital Signature Certificate.

ii. Technical proposals for those tenders, whose original copies of DD/BC/BG towards tender fee & EMD have been received, will only be

opened. Proposals corresponding to which original copy of DD/BC/BG towards tender fee & EMD has not been received, will not be opened and will stand rejected.

iii. Statutory Cover (vide Clause 13.A.1) will be opened first and if found in order, Non-statutory Cover (vide Clause 13.A.2) will be opened. If there is any deficiency in the Statutory Documents, the tender will summarily be rejected.

iv. Decrypted (transformed into readable formats) documents of the Statutory and Non-statutory Covers will be downloaded for the purpose of evaluation.

v. If the information furnished by the bidder in objective manner is not confirmed by the uploaded documents then the bidder will be out rightly rejected for Price Bid opening. The documents related to the furnished online information based on which the evaluation takes place will only be considered. If the bidder uploads any other document, it will be given no cognizance.

25.2 Technical Evaluation of Tender

i. While evaluation, the Tender Inviting Authority or his authorised representative may summon the bidders and seek clarification / information or additional documents or original hardcopy of any of the documents already submitted and if the same cannot be produced within the stipulated time frame, their proposals will be liable for rejection.

ii. The summary list of bidders, whose bids will be found techno-commercially eligible, will be uploaded in the web portals. Date of opening of financial bid will be intimated to the techno-commercially qualified bidders.

25.3 Opening and Evaluation of Financial Proposal

i. Financial proposals of the bidders declared techno-commercially eligible, will be opened electronically by the Tender Inviting Authority from the web portal stated above on the prescribed date.

ii. After opening of the financial proposal the preliminary summary result containing inter-alia, name of bidders and the rates quoted by them will be uploaded.

iii. The Tender Accepting Authority may ask any of the bidders to submit analysis to justify the rate quoted by that bidder.

iv. Bids determined to be subsequently responsive will be checked by WBSEDCL for any arithmetic errors in computation and summation. Errors will be corrected by WBSEDCL as follows:

(a) Where there is discrepancy between amount in figures and in words, the amount in words shall be considered.

(b) Where there is discrepancy between the unit rate and the total amount derived from the multiplication of the unit rate and the quantity, the unit rate as quoted shall be considered.

v. Conditional discounts/ rebates, if any, offered by the bidders shall not be taken in to consideration for evaluation.

vi. The discounted price in Price bid-3C shall be considered for evaluation

purpose only and shall have no relation with the contract price. The contract price shall be finalised based on actual rate quoted subject to bid responsiveness and bid correction.

25.4 Revision/withdrawal of Financial Proposal by the bidder after opening of Technical Proposal of the tender will not be allowed if it is not sought by the Tender Inviting Authority.

26. APPLICATION FOR TENDER

The bidder should submit the Application for Tender as per Proforma: 1 attached with this tender document. Not submitting the Proforma will cause for rejection of the respective bid.

27. AWARD CRITERIA

WBSEDCL will accept the lowest valid tender, evaluated based on the Financial Proposals, for awarding of the Contract. However the Tender Accepting Authority does not bind himself to do so and reserves the right to reject any or all the tenders for valid reasons.

28. LETTER OF AWARD

Solar Power Generation Department (SPGD), WBSEDCL will place Letter of Award (LOA) to the successful bidder to convey the decision of the tender inviting authority before the expiration of the period of validity of the offer, if the whole tender is not cancelled/ postponed by the Chief Engineer, Solar Power Generation Department (SPGD), WBSEDCL.

The contractor should submit the contract agreement, Bank Guarantee for Performance Security and any other document as desired within the stipulated date as mentioned in the said LOA, failing which the job may subject to be cancelled and EMD of the successful bidder will be forfeited.

Notwithstanding anything stated elsewhere in the bid documents, the Contract to be entered into will be treated as a divisible Supply, Civil construction, Erection & Commissioning Contract and Comprehensive O & M Contract initially for 5 (five) years.

Award shall be placed on the successful Bidder as follows:

i) **First (1st) Contract:** For Ex-works supply of all equipment and materials including all other services like inland transportation, insurance for delivery at site, unloading, safe storage, handling at site and any other services specified in the Bid Document.

ii) **Second (2nd) Contract:** For installation, testing and commissioning including performance testing in respect of all the equipment supplied under the "First Contract" and necessary Civil work including any other services specified in the Bid Document.

Both these Contracts will contain interlinking cross-fall breach clause specifying that breach of one Contract will constitute breach of the other Contract.

iii) **Third (3rd) Contract:** For comprehensive Operation & Maintenance Services initially for 5 (five) years as specified in the Bid document.

29. CURRENCIES OF BID

The unit rate and the price of each item given as per the Proforma shall be quoted by bidder only in Indian Rupees.

30. CONTRACT AGREEMENT

The contractor (successful bidder) shall have to be entered into a Contract Agreement within stipulated time as mentioned in the Letter of Award (LOA) with West Bengal State Electricity Distribution Company Limited (WBSEDCL) for the proper fulfillment of the contract as per Proforma: 10. All Documents/ Correspondences relevant to this tender evolved during the tendering process and firming up of the Contract and during execution of the work will form part of the agreement. The successful bidder shall have to submit a copy of the whole tender document duly signed and stamped by the authorized representative of the successful bidder.

31. INDEMNITY BOND

The contractor (successful bidder) shall have to produce Indemnity Bond as per Proforma: 11 within stipulated time as mentioned in the Letter of Award (LOA) to the Chief Engineer, Solar Power Generation Department (SPGD), WBSEDCL.

32. RIGHT TO ACCEPT OR REJECT ANY OR ALL OFFERS

The Chief Engineer, Solar Power Generation Department (SPGD), WBSEDCL reserves the right to reject any or all the offers without assigning any reason whatsoever.

If the successful bidder does not enter into Contract Agreement and/or submit the performance security/contract performance and/or Indemnity Bond within stipulated time as mentioned in the Letter of Intimation, his EMD will be forfeited and the job may subject to be cancelled.

GENERAL CONDITIONS OF CONTRACT (GCC)
Table of Contents

DEFINITION OF TERMS:

Unless the context otherwise requires, the following terms whenever used in this document have the respective meaning:

i. The **'Company'/'Employer'/'Department'** shall mean the WEST BENGAL STATE ELECTRICITY DISTRIBUTION COMPANY LTD. (WBSEDCL), having its Office at Vidyut Bhavan, Block-DJ, Sector-II, Kolkata – 700091 and shall include its successors and assigns.

ii. The **'Engineer-in-Charge'** shall mean the Engineer designated by the Company for the purpose of this contract. He will authorize the Controlling Officer and Supervising Officer for carrying out the work.

iii. **'Company's representative'** shall mean any person or persons of consulting firm appointed and remunerated by the Company to supervise, inspect, test and examine workmanship and materials of the work under this scope.

iv. The **'Contractor'** shall mean the Bidder who will be awarded with the contract by the Company and shall include the contractor's executor's administrators, successors and permitted assignees.

v. The **'Sub-Contractor'** shall mean the person named in the Contract for any part of the works or any person to whom any part of the contract has been sublet by the contractor with the consent in writing of the Engineer and will include the legal representatives, successors and permitted assigns of such persons.

vi. **'Equipment/materials'** shall mean and include all type of construction equipment & materials etc. required for true and satisfactory completion of the work under this contract.

vii. **'Workmanship'** shall mean the method/manner in which the jobs of the different items, whether included in the schedule or not but are required for true & satisfactory completion of the work under this contract, are executed.

viii. **'General conditions'** shall mean all the clauses of General conditions of the proposed contract stated hereinafter. The specification shall mean the specification annexed to or issued with the General Conditions and shall include the schedule and drawings attached thereto.

ix. The term **'Services'** shall mean all works to be undertaken by the contractor as laid down under the head "scope of work" or elsewhere in the specification enclosed. When the words "approved", "subject to Approval". "As directed", "Accepted", "Permitted" etc. are used, the approval, judgment, direction etc. are understood to be a function of Company.

x. **'Day'** means a calendar day beginning and ending midnight.

xi. **'Month'/'Calendar month'** means not only the period from the first of a particular month, but also any period between a date in a particular month, and the date previous to the corresponding date in subsequent month unless specifically stated otherwise.

xii. **'Week'** means seven consecutive calendar days.

xiii. **'Writing'** shall include any manuscript, type written, printed or other statement reproduced in any visible form.

xiv. The work **'Site'** shall mean the site of proposed work as detailed in the specification or any other place where the work is to be executed under the contract.

xv. **'Date of Commencement'** shall mean the date of actual handing over of site whichever is later.

xvi. **'Date of Completion'** shall mean the date of final completion of the project in all respect.

xvii. **'Specifications'** shall mean collectively all the terms and stipulations contained in this document including the conditions of contract, technical provisions and attachments thereto and list of corrections and amendments.

xviii. **'Drawings'** means collectively all the accompanying general drawings as well as all detailed drawings, which may be used from time to time or desired by WBSEDCL.

xix. **'Approval'** shall mean the written approval of WBSEDCL and/the statutory authorities, wherever such authorities are specified by any codes or otherwise.

xx. **'Manufacturer'** shall refer to the party proposing to design/engineering and construct in complete or in part a particular job/work at their works/premises.

xxi. **'Labourer'** shall mean all categories of labour engaged by the Contractor, his sub-contractors and his piece workers for work in connection with the execution of the worked covered by the specifications. All these labourers will be deemed to be employed primarily by the Contractor.

xxii. **'Plant'/'Equipment'/'Stores'** means and include plant and machineries to be provided under the contract.

xxiii. **'Delivery of Plant'/'Delivery of Equipment'** shall be deemed to take place on delivery of the plant/equipment in accordance with the terms of the contract complete in all respect after approval by WBSEDCL.

xxiv. **'Tests on Completion'** shall mean all such tests as are prescribed by the specification to be made by the Contractor to the satisfaction of WBSEDCL before the plant and equipment are taken over by WBSEDCL and this also includes those tests not specifically mentioned in the specification but required under various BIS codes and relevant Electricity Acts and Rules.

xxv. **'Commissioning'** shall mean the satisfactory, continuous and uninterrupted operation of the equipment/work as specified after all necessary initial tests, checks and adjustments required at site for a period of at least 30 (thirty) days to the satisfaction of WBSEDCL. Commissioning may be done Phase-wise or as a whole for complete 10 MW (AC).

xxvi. **'Urgent Works'** shall mean any urgent measures, which in opinion of the Engineer–in-Charge, become necessary at the time of execution and/or during the progress of work to obviate any risk of damage to the structure, or required to accelerate the progress of work or which become necessary for security or for any other/reason WBSEDCL may deem expedient.

xxvii. **"Joint Venture (JV)/Consortium**" shall refer to a group of Entities that has collectively submitted the Bid in accordance with the provisions of this Tender.

xxviii. **"Lead Entity of the JV/Consortium" or "Lead Entity**" or "**Parent Company**" shall mean an entity which represents the JV, with relation to the project.

1. NAME OF THE WORK

Design & Engineering, Manufacture / Procurement, Supply, Packing and Forwarding, Transportation, Unloading, Storage at site, Site development, Construction, Erection , Installation, Testing and Commissioning including warrantee obligation with 05 (Five) years Comprehensive Operation and Maintenance of 10 MW (AC)[Minimum12MWp DC] Solar Photovoltaic Power Plant Project at Chuasole & Kasturia Mouza, Block- Sankrail, Jhargram District, West Bengal.

The proposed location is adjacent to Kharagpur Railway Station and NH 49. The location of the project is at 22.159937° N Latitude and 87.064838° E Longitude.

SCOPE OF WORK

Scope of work Includes Design, Engineering, Manufacture/ Procurement, Supply of equipment and materials; testing at manufacturers works, inspection, packing and forwarding, unloading and safe storage at site, associated civil works including site development, services, permits, installation and incidentals, erection, testing and commissioning with Warrantee obligation of 10 MW (AC) with minimum 12 MWp DC Capacity of Grid connected Solar PV Power Plant with associated equipments and materials at Project site. The equipment and materials the Solar PV Power Plant with associated system shall include but not be limited to the following equipments and sub-systems:

a) Contractor shall at his own cost carry out site survey, soil investigation, measurement of soil resistivity, and other relevant parameters required for design of the system.

b) Contractor shall prepare and submit the Detailed Design Report along with Project Master Plan to WBSEDCL which must contain site meteorological data considered with necessary supporting documents, calculations for annual energy generation, schedule of site works, detailed specifications of each equipments and works (*as mentioned in the technical specification chapter of the tender document)*, all necessary drawings and associated calculations for selection of different equipments for the plant based on the site location and relevant code of practice.

   The Detailed Design Report shall also contain necessary test certificates and approvals as per relevant standard and practice for all the equipments, catalogues, quality assurance etc.

   Bill of Quantity (BOQ) for each job including tools and spares, quality control procedures on materials & works and other conditions of contract prior to the execution of the work shall also be a part of the Detailed Design Report.

   The contractor needs to submit their Detailed Design Report to WBSEDCL within the time specified in the 'Time Schedule' of the Letter of Award (LOA) and the design of the plant shall be verified with the PVSYST Software of premium version and Solar GIS Software which will be provided by the contractor.

   The contractor shall submit 03 (three) sets of the Draft Detailed Design/Drawing Report along with editable soft copy in a compact disk for approval.

   After finalization of the same by WBSEDCL, the contractor shall submit 12 (twelve) sets of the finalized Detailed Design Report along with editable soft copy in a compact disk to carry out further course of action.

c) The contractor should develop the land profile as per the approved land development drawings.

d) The contractor shall supply all materials and equipment required for erection, testing & commissioning of the plant. The supply of materials shall also include transportation, loading and unloading at work site.

e) Timely procurement and transportation to site in properly packed condition of all equipment, materials and miscellaneous item required to complete the project.

f) Contractor shall arrange proper storage at site for the equipments and materials at his own cost and risk. The complete system shall be under the custody of the contractor till successful commissioning and handing over the plant to WBSEDCL. WBSEDCL in no case shall be held responsible for any loss/damage/theft of materials/equipment; so long those shall continue to remain under the custody of the contractor.

g) The contractor shall carry out all necessary civil works for the power plant which include but not limited to the installation of PV array mounting structure & foundations, fencing & gates, construction of internal inspection path ways, access road (if required), electrical control room and a small office block, switch yard foundations and other details, watch tower, security room, utility services as required, cable trench, Deep Tube Well and drinking water system, water supply & drainage system required for utility services and cleaning of PV modules etc.

h) The equipments and materials for Solar PV Power Plant shall include but not limited to the following:

i. Solar PV Modules;
ii. Array Junction Box;
iii. Solar Inverters;
iv. Three winding transformer;
v. Ring Main Unit (RMU);
vi. Cables and conductor;
vii. Station Auxiliary Transformer;
viii. LT switchgear;
ix. DC Battery, Battery charging equipment & DCDB;
x. Protection system;
xi. Earthing system;
xii. Control, monitoring and data acquisition system;
xiii. Illumination system;
xiv. Fire protection system;
xv. Ventilation system;
xvi. Air Conditioning system;
xvii. Module cleaning arrangement;
xviii. Drinking water system;
xix. Weather station;
xx. Communication system;
xxi. Recommended spares;
xxii. Required Tools and Tackles;
xxiii. Approach Road, Internal Road & Inspection pathways
xxiv. Control rooms and 33 KV Switchyard
xxv. 33 KV HT Distribution Line up to nearest 33 KV Sub-station of WBSEDCL. 33 KV Transmission Line from 33 KV switchyard of Solar PV Power Plant to 33KV substation will be arranged by WBSEDCL. However, the contractor shall arrange the outgoing bay with necessary

equipments/ protection system and metering system for Net Minimum Guaranteed Generation and others as required.

xxvi. 33 KV Indoor C & R Panel and Outdoor VCB.

xxvii. Drainage system

xxviii. Boundary Wall & Fencing

xxix. Cable Trench

xxx. Required number of signage (Project Name Plate and caution as per IS);

xxxi. Project Documents (required no. of sets) etc.

xxxii. Any other items required.

i) Installation, testing and commissioning of 10 MW (AC) with minimum 12MWp DC capacity Solar PV Power Plant at Chuasole & Kasturia Mouza, Block-Sankrail, Jhargram District, West Bengal as per the approved time schedule.

05 (Five) years comprehensive operation & maintenance of the plant shall also be in the scope of work. Deployment of adequate skilled personnel with appropriate voltage grade electrical workmanship license for round the clock plant operation shall be a scope of the operation and maintenance.

Deployment of adequate security personnel (minimum 1 no. of armed security guard and 3 nos. of security personnel in each of the three shifts) shall be a scope of the operation and maintenance.

j) The contractor needs to submit 03 (three) sets of comprehensive user's manual and 02 (two) sets of Operation and Maintenance format book suitably useable for 60 months.

The scope of maintenance shall include supply of spare parts, replacement of all damaged equipment and accessories with new one within the price of yearly maintenance charge. The down time of PV system should not be more than 72 hours (03 days).

PTZ (Pan-Tilt Zoom) outdoor camera as per requirement shall be deployed to cover the whole plant with night vision and central monitoring through 40" LED monitor/TV for surveillance during construction as well as after commissioning of the plant. PTZ cameras & 40" LED monitor shall be provided for monitoring the plant prior to the final commissioning of the plant.

The contractor shall arrange sufficient transportation arrangement (24X7) for the operation and maintenance purpose.

k) Provision of Safety items like hand gloves, shock treatment charts, rubber mats, danger/caution boards etc. shall be a part of scope of works. The contractor shall adhere to safety practices during erection, commissioning and subsequent operation and maintenance of the system including fire prevention.

l) The contractor needs to clean all the debris from the site before final commissioning of the plant.

m) Any other items not specifically mentioned in the technical specification and/ scope of work but which are required for successful completion and satisfactory operation of the solar power plant are deemed to be included in the scope of work/specification.

n) The contractor should submit the total system warranty as per clause no. 23 of GCC in a 100 Rs. Non-judicial Stamp Paper (Proforma for the same should be approved by WBSEDCL) duly indemnified at the time of submission of completion report.

3. CONTROLLING OFFICER'S DECISION

Controlling Officer's decision is final in respect of all matters which are left to the decision of the Controlling Officer including the granting or with-holding of certificates.

If, in the opinion of the contractor, a decision made by the Controlling Officer is not in accordance with the meaning and intent of the contract, the contractor may file with the Controlling Officer, within 07 (seven) days after receipt of the decision, a written objection to the decision. Failure to file an objection within the allotted time will be considered as an acceptance of the Controlling Officer's decision and the decision shall become final and binding.

4. COMMENCEMENT & COMPLETION TIME

Date of commencement should be reckoned from the date of issuance of LOA/ date of actual handing over of site whichever is later.

The whole work (including finalization of Detailed Design Drawings & Reports and Site execution work) must be completed within 365 (Three Hundred and Sixty Five) days from the date of commencement.

A detailed time schedule for the site work has to be prepared and submitted by the contractor with the Detailed Design Report.

All works under the contract must be completed by period of completion mentioned in NIT while portions of work as per programme settled in consultation with the Controlling Officer shall be completed by the date stipulated in the said programme. It is to be noted that time is the essence of the contract and any default on the part of the contractor to complete the work within the stipulated date/dates aforesaid or within the time as may be extended in writing by the Controlling Officer subject to the payment of liquidated damages, the Company shall have the right, without prejudice to any other clauses, to terminate contract forthwith and to take possession of the balance work/materials and have the same allotted to any other agency and the contractor shall be liable to compensate the loss that may be occasioned to the Company on that account. Any letter in writing by the Controlling Officer shall be treated as conclusive on behalf of the Company.

5. SUBMISSION OF DETAILED DESIGN REPORT

The contractor shall submit 03 (three) sets of the Draft Detailed Design Drawings & Reports including master plan along with editable soft copy in a compact disk for approval.

Draft Detailed design report shall contain all requisite documents as mentioned in the 'Scope of Work'. The contractor should submit the same within 21 (twenty one) days from the date of issuance of 'Letter of Award'.

The contractor shall submit 6 (six) sets of the finalized Detailed Design Drawings & Reports along with editable soft copy in a compact disk to the Chief Engineer, Solar Power Generation Department (SPGD), WBSEDCL.

The contractor shall submit 6 (six) sets as built drawing after final completion of the project.

6. SCHEDULE OF WORK

Before actual commencement of the work, the contractor shall submit a time bound schedule for approval of the Controlling Officer who have the authority to make additional alteration, and substitution of such programme including modification and time to time as decided by the department and contractor shall strictly follow such modified schedule for timely completion of the work.

7. VARIATION, ADDITIONS AND OMISSIONS

The Contractor shall not modify the work except under direction in writing by the WBSEDCL. The quantities provided in the schedule of works are provisional only which may vary up to any extent or may be deleted altogether. The quoted rate of each item shall remain firm. The WBSEDCL reserves the right to alter, amend, omit or otherwise vary the quantities as may be necessary but such variation will be limited to +/- 25% (Plus or minus twenty five percent) of the contract price. Payment shall be made as per actual execution.

However, any item(s) not included in the schedule or specification but required for completion of the work shall have to be carried out/supplied without any extra price. While submitting the offer the bidder shall consider price of those items and may indicate separately as additional deliverable items.

8. CONFIDENTIALITY

The Contractor, or any entity affiliated with the Contractor, shall not disclose to any unauthorized person any information and/or data that may be supplied to him/her by the WBSEDCL or by any other organization, under the directions of the WBSEDCL. All such documents shall be the property of the WBSEDCL or any information that may have come to his/her knowledge directly or indirectly by virtue of the assignment.

9. DEPARTMENTAL MATERIAL

Departmental material shall not be issued to the contractor for the work except under special circumstances. For Import- Export metering system, the contractor shall communicate with the Testing Department (Distribution) for necessary approval.

10. FORCE MAJEURE

Force Majeure means any circumstances beyond the control of the parties, including but not limited to:

a. War and other hostilities, (whether war be declared or not), invasion, act of foreign enemies, requisition or embargo.
b. Rebellion, revolution, insurrection, military power and civil war.
c. Riot, commotion or disorder, except where solely restricted to employees of the Contractor or of his sub-contractors.
d. Earthquake, flood, cyclone and such other natural disaster affecting Contractor's work.

WBSEDCL shall neither be responsible nor be liable to bear any compensation for any interruption of work in the site, except, due to the above force majeure condition.

Upon the occurrence of any situation of Force Majeure, the Contractor shall endeavor to continue to perform his obligations under the Contract so far as reasonably practicable. The Contractor shall notify within a week in written to the controlling officer of the steps he proposes to take including any reasonable

alternative means for performance which is not prevented by Force Majeure. The Contractor shall not take any such steps unless directed to do so by the controlling officer.

11. EXTENSION OF TIME

An extension of time without imposition of Liquidated Damage (LD), may be granted for delay in execution of work provided there is no fault whatsoever on the part of the contractor. Such extension may only be granted on the basis of application to be submitted within the schedule date of completion by the contractor who has to establish that the extension of time required by him is not due to his fault.

The Contractor may claim an extension of the Time for Completion if he is or will be delayed in completing the Works by any of the following causes:

a. Extra or additional work ordered in writing by WBSEDCL.
b. Suspension of work ordered in writing.
c. Delay by any other Contractor engaged by WBSEDCL, affecting this Contract.
d. Delay in handover of site by WBSEDCL
e. Force Majeure.

The Contractor shall give notice to WBSEDCL of his intention to make a claim for an extension of time within 15 days of the occurrence of any of the above cause(s). The notice shall be followed as soon as possible by the claim with full supporting details. WBSEDCL shall after verification allow the Contractor for updating of the programme chart as facts may justify.

12. LIQUIDATED DAMAGE

If the Contractor shall fail to complete the total works within the time prescribed herein or extended time for completion, then the Contractor shall pay to the Company a sum amounting to half percent (0.50%) of the "Contract value of work" as liquidated damages for such delay for every week or part thereof which shall elapse between the time prescribed or extended time as the case may be and the date of completion of the work in each phase, subject to a maximum of ten percent (10%) of the contract price.

The Company may, without prejudice to any, all other method of recovery deduct the amount of such damages from any money in their hand due or which may become due to the contractor. The payment or deduction of such damages shall not relieve the contractor from this obligation to complete the works or from any other of his obligations and liabilities under the contract.

If there is a valid acceptable reason for delay of execution, the Controlling Officer may at his discretion consider lower down of the liquidated damage or even waive the liquidated damage on having written prayer from the contractor along with valid reason.

13. DEFECTIVE MATERIAL

If in the opinion of the Engineer, any of the machineries/equipment/materials etc. brought to the site for use are not of the quality or kind specified in the contract and/or are unfit for the work, he shall be at liberty to order the removal of the said items and the contractor shall remove the same within twenty four (24) hours after notice has been given to him and if he fails to remove them within the time the engineer may cause them to be removed anywhere at the risk of the Contractor and any cost incurred in so doing shall be deducted from the dues to the contractor under the contract. In such case, items as prescribed by the Controlling Officer or his representative are to be substituted immediately.

14. RISK PURCHASE

If the contractor fail, on receipt of the order, to take up the work within reasonable period or leave the work site after partial execution of the work WBSEDCL shall have the liberty to get the work done through other agency at his own risk and additional amount if any. If the situation so warranted to compel WBSEDCL to cancel the order placed on the Contractor, he shall be liable to compensate the loss or damage, which WBSEDCL may sustain due to reasons of failure on his part to execute the work in time.

15. DEFECT LIABILITY PERIOD

The term 'Defect Liability Period' shall mean the period of 365 (three hundred and sixty five) days from the Date of final completion and handing over of the entire project work. If any defect is found within the defect liability period the contractor shall be liable to rectify/replace the materials at their own cost and responsibility.

Defects/rectification work so notified shall have to be attended and completed satisfactorily within the specified date or as deemed justified by the Controlling Officer. For faithful & due fulfillment of all obligations, this defect liability period shall be covered by the performance security/contract performance, already submitted by the contractor.

After completion of defect liability period, and on completion of satisfactory rectification of defects, if any, reported within the defect liability period and on receipt of the application from the contractor and considering other factors as per clause no. 25 of GCC, the Controlling Officer of the work shall recommend for amount of the performance security/contract performance to be submitted by the contractor for the next year.

16. SUBLETTING OF CONTRACT

The contractor shall not, without the written consent of the Company, assign or sublet any part thereof, other than for raw materials, or for any part of the work provided that any such consent shall not relieve the contractor form any obligation, duty or responsibility under the contract. In the event of sub-letting of contract or any part thereof is permitted, the fact that such permission has been accorded shall not establish any contractual relationship between the approved Sub-vendor and WBSEDCL of any of his liabilities and obligations under the contract.

17. NOTICES

Unless otherwise stated in the Contract, all notices to be given under the Contract shall be in writing, and shall be sent by personal delivery, Registered post, special courier, cable, telegraph, telex, facsimile (fax) or Electronic Data Interchange (EDI), e-mail to the address of the relevant party.

Any notice sent by cable, telegraph, facsimile or EDI shall be confirmed within two (2) days after dispatch by notice sent by airmail post or special courier, except as otherwise specified in the Contract.

Any notice sent by airmail post or special courier shall be deemed (in the absence of evidence of earlier receipt) to have been delivered ten (10) days after dispatch. In proving the fact of dispatch, it shall be sufficient to show that the envelope containing such notice was properly addressed, stamped and conveyed to the postal authorities or courier service for transmission by airmail or special courier.

Either party may change its postal, cable, telex, facsimile or EDI address or addressee for receipt of such notices by ten (10) days' notice to the other party in writing.

Notices shall be deemed to include any approvals, consents, instructions, orders and certificates to be given under the Contract.

18. WBSEDCL'S RIGHT TO TERMINATE CONTRACT & HOLIDAY LISTING

- If the contractor fails to start the work within a month from the date of issue of the work order, the West Bengal State Electricity Distribution Company Limited shall have the right to cancel the work order with forfeiture of earnest money (Converted into initial security) without giving any notice to the contractor. The contractor may be subjected to holiday listing as per company's policy.

- If the contractor neglects, or fails to proceed with the work proportionate to the scheduled time of completion of the work or fails to complete the work within scheduled time for completion or within the extended time approved by West Bengal State Electricity Distribution Company Limited, the West Bengal State Electricity Distribution Company Limited shall have right to terminate the work order after giving notice in writing to the contractor. If the contractor fails after 14 (fourteen) days of such notice, to proceed with the work in the manner notified, West Bengal State Electricity Distribution Company Limited shall terminate the contract and call the contractor to take joint measurement along with the Engineer for the finished portion of work. If the contractor does not appear for joint measurement, ex-party measurement by West Bengal State Electricity Distribution Company Limited will be taken as final.

In that case, WBSEDCL shall take possession of the work, site and engage other agency to complete the work. Extra cost, if incurred, to get the unfinished work done through other agency, will be realized from him from his pending bills and security money. In the contract terminated as above, the contractor shall have no claim for compensation against West Bengal State Electricity Distribution Company Limited for any loss or deterioration of any materials that he may have collected or he may have entered into account of the work.

The contractor may be subject to holiday listing as per company's policy.

19. APPROVAL

Design and Drawing: The contractor shall have to prepare and submit the designs and drawings associated with civil, mechanical and electrical work which includes design of foundation, structure cable sizing, fabrication work, layout design, wiring diagram etc. and obtain approval prior to the execution of work and for this purpose the contractor shall submit Detailed Design Report for obtaining approval from WBSEDCL. The contents of the Detailed Design Report shall be as mentioned in the scope of work (Clause no. 2 of GCC).

Testing and Inspection: Any authorized representative of WBSEDCL shall, at all times, have full access to all parts of the site, places from which natural materials are being obtained, during production, manufacture and construction and be entitled to examine, inspect, measure and test materials and workmanship, and check the progress of manufacture of plant and production of materials/equipments at manufacturer's workshop. No such activity shall relieve the Contractor from any obligation or responsibility.

Material Inspection will be carried out after submission of all test reports/certificates and after completion of the manufacturing work, against formal intimation from the contractor. The contractor shall give notice of any material being ready for testing to SPGD, WBSEDCL.

The contractor shall arrange for all the necessary tests required for the project in the premises of the contractor or Sub-contractor and provide assistance, labour, materials, electricity, fuel, stores, calibrated apparatus and instruments as may be necessary to carry out the tests efficiently without any extra charges. If the facilities are inadequate to carry out tests as per standard, the contractor shall have to arrange suitable testing place having all such required facilities and the cost towards this will be on contractor's account.

The contractor shall also bear all charges towards travelling expenses of the Inspecting Team of the Purchaser or the authorized representatives of the Outside Inspecting agency consisting of at least two (2) persons for to and fro journey by Air from purchaser's Headquarter, including boarding and lodging at the place of inspection and transit, if any for the purpose of Inspection and Testing.

WBSEDCL, if desired, will visit the contractor's premises/manufacturer's workshop and may proceed with the routine tests. Arrangements for such program shall be done by the contractor. The inspection setup and instruments must be provided by the contractor within the contract value.

The material shall have to be dispatched at site after inspection and clearance from the purchaser.

WBSEDCL, if desired, may test the delivered product (especially solar module) at site from any accredited laboratory of Govt. of India. The result of that test and subsequent decisions taken by the controlling officer will be bound to the contractor.

Rejection: If, as a result of an examination/testing, any plant, materials, design or workmanship is found defective and/or not in accordance with the Contract, WBSEDCL may reject the plant, materials, design or workmanship by giving notice with reasons. The Contractor shall then promptly make good the defect and/or ensure that the rejected/replaced item complies with the Contract.

Materials: Contractor shall obtain prior approval for the materials deliverable under the project from WBSEDCL as mentioned in the technical specification.

20. MODE OF EXECUTION

The PV power plant shall be procured as a complete package. The entire work shall have to be executed on TURNKEY BASIS.

21. SUBMISSION OF PROGRESS REPORT

The contractor shall submit the field progress report weekly to the controlling officer for the work. The contractor needs to get approval of the format of the progress report prior to the execution of the work.

22. INSURANCE

Freight Insurance: The Contractor shall arrange for insurance coverage for the equipment, accessories, materials etc. during transportation & delivery at site till successful handover of the plant.

Execution Insurance: It is desired that the contractor shall arrange for insurance coverage for the equipment, accessories, materials etc. to be delivered at site till successful commissioning of the plant. As such the bidder shall include the price of such insurance in their price bid as part of the price of work.

Insurance after commissioning of PV Power Plant: After commissioning of the PV plant, insurance will be made by WBSEDCL.

23. WARRANTEE

The contractor must 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.

The warrantee period of the complete systems of the Solar PV Power Plant will be 60 (sixty) calendar months from the date of successful handover of the plant. However the performance guarantee of the PV Module shall be 25 years as per guideline of Ministry of New and Renewable Energy (MNRE), Government of India. The contractor shall remain liable to replace any defective parts that may develop in the plant of his own manufacture or that of his sub-contractors under the conditions provided for by the contract under proper use, and arising solely from faulty design, materials or workmanship, provided always that such defective parts as are not, repairable at site and are not essential in the meantime to the maintenance in commercial use of the plant are promptly returned to the contractor's works at the expense of the contractor unless otherwise arranged.

The contractor will submit Warrantee Certificates of the work & spare parts and materials in a 100 Rs. Non-judicial Stamp Paper (Proforma for the same should be approved by WBSEDCL) duly indemnified at the time of submission of completion report. If any defect is found within the warrantee period, contractor will be liable to repair or replace the same at his own cost and risk, within three (72 hours) days from the date of complaint lodged by WBSEDCL.

The contractor shall submit recommended spares and quote the price of the same for extended warranty for next 60 (sixty) calendar months from the date of expiration of the first 60 (sixty) month's warranty period. The contractor shall submit the same before 30 (thirty) days prior to the said expiration of the first warranty period.

24. COMPREHENSIVE OPERATION AND MAINTENANCE

Maintenance contract shall be commence after successful handing over of the plant.

05 (Five) years comprehensive operation & maintenance of the plant shall be in the scope of work. Deployment of adequate skilled personnel with appropriate voltage grade electrical workmanship license for round the clock plant operation shall be a scope of the operation and maintenance. The contractor needs to submit 03 (three) sets of comprehensive user's manual and 02 (two) sets of Operation and Maintenance format book suitably useable for 60 months.

The scope of maintenance shall include supply of spare parts, replacement of all damaged equipment and accessories with new one within the price of yearly maintenance charge.

Time for repair/ replacement of equipment or any works in case of any major failure will be granted by the Controlling Officer considering the type of failure and receiving written prayer from the contractor for the same. But in general the downtime will be 72 hours.

The period of unavailability of grid & Force Majeure Conditions will not be considered as downtime.

After final commissioning of the plant, arrangement of security (minimum 1 no. of armed security guard and 3 nos. of security personnel in each of the three shifts) shall be a scope of the operation and maintenance.

The contractor shall arrange sufficient transportation arrangement (24X7) for the operation and maintenance purpose.

The maintenance includes Routine and preventive, Breakdown and Capital Maintenance which shall be but not limited to the following:

Routine and preventive maintenance:

This shall include:

i. Regular cleaning of PV modules.
ii. Checking & tightening of all electrical connections and mechanical fittings.
iii. Checking and restoring of earthing system.
iv. Cleaning of Inverter and other electrical equipments.
v. Routine maintenance as recommended by the original equipment manufacturer.

The contractor shall be responsible to carry out routine and preventive maintenance and replacement of each and every damaged/faulty component/ equipment of the power plant and he shall provide all labour, material, consumables etc. for routine and preventive maintenance at his own cost.

Breakdown maintenance:

Breakdown maintenance shall mean the maintenance activity including repairs and replacement of any component or equipment of the power plant which is not covered by routine and preventive maintenance and which is required to be carried out as a result of sudden failure/breakdown of that particular component or equipment while the plant is running. The supplier shall be responsible to carry out breakdown maintenance of each and every component of the power plant and he shall provide the required manpower, materials, consumables, components or equipment etc. for breakdown maintenance at his own cost irrespective of the reasons of the breakdown/failure.

Capital maintenance:

Capital Maintenance shall mean the major overhaul of any component or equipment of the power plant which is not covered by routine, preventive and breakdown maintenance which may become necessary on account of excessive wear & tear, aging, which needs repair/replacement. The capital maintenance of power plant and all civil structures shall normally be planned to be carried out on an annual basis. For this purpose a joint inspection by the supplier and WBSEDCL shall be carried out of all the major components of the power plant, about two months in advance of the annual maintenance period, in order to ascertain as to which components of the power plant require capital maintenance. In this regard the decision of WBSEDCL will be final and binding.

However, if the condition of any plant component warrants its capital maintenance at any other time, a joint inspection of WBSEDCL and supplier shall be carried out immediately on occurrence of such situation and capital maintenance shall be carried out by arranging the shutdown of the plant/part of the plant, if required, in consultation with concerned authorities. The decision of WBSEDCL shall be final and binding to the contractor.

The capital maintenance also includes painting of mechanical & civil structures etc.

The contractor shall undertake necessary maintenance/troubleshooting work of the Solar PV Power Systems. Down time shall not be more than 72 hours from time of occurrence of such faults. Adequate measures should be taken for prevention of wear and tear of the machines. Solar PV Power System is to be designed to operate with a minimum of maintenance.

The scope of support service provides preventive maintenance as & when necessary within the contract period and break down maintenance in the event of malfunctions, which prevent the operation of the power system or part of it within the stipulated time period & free replacement of spares required for maintenance.

The contractor will provide Spare parts & measuring instruments.

The contractor shall submit the detailed schedule for routine and preventive maintenance before final commissioning of the plant. The contractor shall also submit Detailed Report to WBSEDCL for any capital or breakdown maintenance mentioning the cause of breakdown, actions taken to resolve that issue and preventive measures taken to avoid failure/damage/loss of generation due to similar incidents/accidents in future etc. within 07 (seven) days from the date of recovery.

The contractor shall engage at least 02 (two) operator having necessary technical knowledge and experience at the plant.

Maintenance Report: Maintenance register / log book must be maintained at site. However, quarterly maintenance and monthly generation report of each location as per format duly approved by WBSEDCL must be submitted by the contractor to WBSEDCL on quarterly basis.

The contractor shall mention the annual operation and maintenance charge as a distinct part in their financial proposal (Proforma: 3 C – Price Break Up). Annual operation and maintenance charge shall be inclusive of security and transportation arrangement. The contractor shall submit detailed price break up for operation and maintenance work to WBSEDCL before final commissioning of the plant.

The payment shall be made on quarterly basis and the Eligible amount will be due for payment after the certification by the Controlling Officer within 45 (forty five) days from the end of each quarter subject to satisfactory performance and submission of maintenance report in regular basis as mentioned in Clause no. 28 of GCC. The quarterly amount shall be worked out by the Controlling Officer or his authorized representative by dividing the total quoted Annual Operation and Maintenance Cost for that particular year by 04 (four) i.e. the no. of quarters in a year. Further this quarterly amount payable shall be subject to clause no. 28 of GCC as per discretion of the Controlling Officer.

25. PENALTY & REWARD

25.1 PENALTY :

Penalty may be imposed to the contractor for any of the following reasons:

a. If the contractor fails to repair/replace any defective material/equipment and/or run the whole plant satisfactorily for any equipment failure/ operator's fault within the downtime mentioned in clause no. 24 of GCC or the time period granted by the controlling officer after receiving such prayer from the contractor in writing, a sum amounting to two percent (2.00%) of annual operation and maintenance charge for every week or part thereof subject to maximum 10% (ten percent) will be deducted from the annual operation and maintenance charge of that particular year.

b. If the plant fails to generate the Net Minimum Guaranteed Generation (NMGG) as per clause no. 11 of ITB for that particular year and the plant fails to perform satisfactorily, WBSEDCL will realize the cost of Generation short fall at the average rate of power purchase of WBSEDCL as per the Tariff Order issued by West Bengal Electricity Regulatory Commission (WBERC) for that particular year from the Performance Security and/ or

outstanding dues of the contractor. In such case, the PBG for next year shall be of exact amount of previous years PBG and submitted in accordance to the Cl. 19 of ITB as modified.

c. If the contractor fails to perform operation and maintenance activity of the plant, WBSEDCL shall have right to terminate the work order after giving notice in writing to the contractor for a period of fourteen days, if not satisfied. In that case WBSEDCL shall take possession of the work, plant and engage other agency to continue the operation and maintenance work. The performance bank guarantee shall be revoked in full for this purpose.

25.2 **REWARD :**

If the plant performs satisfactorily and generate specified quantity of power during each year of 05 (five) years O&M period, a relaxation @ 01% of the PBG will be allowed during next year.

In case of failure of requisite performance in terms of generation on part of the bidder, in either year the relevant penalty clause shall be imposed and the bidder will have to submit full amount of PBG i.e. 10% of the total value of the contracts during next year.

26. LABOUR LICENSE

Contractor will have to obtain Labour License in respect of the above work as per Contract Labour (Regulation & Abolition) Act, 1970 as early as possible.

27. PRICE

Price shall be fixed/firm. No escalation shall be paid due to any reason what-so-ever. Price as quoted at column (III) of Proforma 2: Price Bid against Sl. No. 1, 2 & 3 should be equal to amount arrived by aggregating the quoted prices for the respective items in Proforma 3 A – Price Break up for supply of equipments & materials, Proforma 3 B – Price Break Up for Construction, Erection, Testing And Commissioning and Proforma 3 C – Price Break Up for Comprehensive Operation & Maintenance respectively. In case of any discrepancies between the rate or price as quoted in Proforma 2 and corresponding rates or price in Proforma 3 A, 3 B and 3 C, then rate or price as quoted or arrived in Proforma 3 A, 3 B and 3 C shall prevail and evaluation shall be done accordingly.

Amount of Freight Insurance & Execution Insurance shall be quoted in the Proforma: 3 A – Price Break Up For Supply of Equipments & Materials & Proforma: 3 B - Price Break Up for Construction, Erection, Testing and Commissioning, respectively considering the clause of Insurance under Clause No: 22 of GCC.

Any action on the part of the bidder to revise the price and/or change the structure of price at his own after the opening of the bid may result in rejection of the bid and forfeiture of the earnest money.

Total Comprehensive Annual Operation & Maintenance charge inclusive of security and transportation arrangement for 05 (Five) years i.e., Price of Proforma 3 C shall not be less than 08 % (eight percent) of the total quoted price in Proforma 3 A – Price Break up for supply of equipments & materials and Proforma 3 B – Price Break Up For Construction, Erection, Testing And Commissioning.

Prices shall be quoted and payable in Indian Rupees only

28. PAYMENT

Payment will be made as per following schedule:

<table>
<tr><th>Sl. No.</th><th>Work Head</th><th>Pattern of Release of Billing Amount</th></tr>
<tr><td>Part A</td><td>Mobilisation Advance:
Interest Bearing Mobilization advance will be paid to the contractor against submission of BG equivalent to 110% of the Mobilisation Advance, subject to the conditions mentioned below. The interest will be at the Base Rate of State Bank of India at the time of recovery of the advance. The mobilisation advance will be recovered along with interests from the progressive bills to be processed against Sl. No. Part-B below. However, WBSEDCL may recover the amount in maximum two installments according to Bill value.</td><td>10% of Schedule of Prices of Proforma- 3 A.</td></tr>
<tr><td rowspan="4">Part B</td><td colspan="2">• After Verification of site, Submission of Detail Design Report (DDR) & Project Implementation Schedule.
• Approval of
➢ Engineering & design of plant complete.
➢ Manufacturing drawings of equipments e.g. Modules, Inverters, transformers, modules structures, HT equipments and all other accessories along with makes.
➢ QAP of inverters, modules, solar transformers, modules structures and all other equipments.</td></tr>
<tr><td>i. After mandatory delivery of the following major materials and safe storage at site:
a) Solar Module
b) Module Mounting Structure (MMS)</td><td>60% of total amount of materials supplied including mandatory deliverables as per the Schedule of Prices of Proforma- 3A shall be paid on pro-rata basis.
Mobilisation Advance with interest will be recovered from progressive bills under this payment head.</td></tr>
<tr><td>ii. After installation, necessary testing and commissioning with successful Trial Run (PR test for at least 30 days) of the plant.</td><td>30% of total amount of the Schedule of Prices of Pro-forma- 3A shall be paid on pro-rata basis of plant capacity.</td></tr>
<tr><td>iii. After Final completion as well as closure of the project except O&M.</td><td>Balance 10% of total amount of the Schedule of Prices of Proforma- 3A shall be paid.</td></tr>
</table>

Sl. No.	Work Head	Pattern of Release of Billing Amount
Part C	i. After successful: • Completion of contour survey, Soil Testing, Land development (Site grading, levelling, clearing of vegetation etc.) • 20% of structural works for boundary wall. • Installation of 20 % of Solar PV modules. • And allied works as maybe desired by project authority.	25% of total amount of the Schedule of Prices of Proforma- 3 B shall be paid.
	ii. After successful: • Installation of total 50 % of SPV modules. • Completion of works for all the buildings including all finishing work. • Completion of sub base work for all the roads. • Total 50% structural and Brick work for boundary wall • Completion of road works in full for 50% of total length of the road. • Completion of foundation work for all the equipments and structures. • RCC Cable trench completion at both array and switch yard. • Erection of substation structure complete. • And allied works as required.	40% of total amount of the Schedule of Prices of Proforma- 3 B shall be paid.
	iii. After successful: • Installation of total 100 % of SPV modules. • Cable tray / cable supports for all the cables as required. • Completion of boundary wall in all respect. • Installation all the equipments e.g. Inverters /PCUs, Transformers, all panels, Battery system. • Completion of installation works for all the cables (Power, control & communication). • Completion of road work in all respect for 100% of total length of the road. • Installation of solar plant lighting system complete. • Installation of SCADA system and Plant • monitoring desk complete. • Installation of Weather station complete. • Carrying out of any other job necessary/relevant for commissioning of the plant as per NIT.	25% of the total amount of the schedule of prices of Proforma 3B shall be paid.

Sl. No.	Work Head	Pattern of Release of Billing Amount
Part C	iv. After Final completion as well as closure of the project except O&M.	**Balance 10%** of total amount of the Schedule of Prices of Proforma- 3 B shall be paid
Part D	Comprehensive Annual operation and maintenance.	The payment shall be made on quarterly basis and the Eligible amount will be due for payment after the certification by the controlling officer within 45 (forty five) days from the end of each quarter subject to satisfactory performance and submission of maintenance report in regular basis as mentioned in Clause no. 24 of GCC. The quarterly amount will be worked out by the controlling officer or his authorized representative by dividing the total quoted Annual Operation and Maintenance Cost for that particular year by 04 (four) i.e. the no. of quarters in a year. Further this quarterly amount payable shall be subject to clause no. 25 of GCC document of the tender.

All payments will be made to the Contractor under the contract in Indian rupees only.

The contractor shall submit Invoice in triplicate for release of payment to them.

Gross Value of the invoice (excluding the work of comprehensive O & M) should not be less than Rs. 3,00,00,000/-(Rupees Three Crore Only) except for the final bill.

Payment against delivery of materials, as mentioned above in Sl. No-Part B (i), will be released to the contractor for the materials for which delivery instructions would be issued by the authorized officer of WBSEDCL after successful inspection and testing of the materials carried out at the works of the manufacturer. The materials shall be according to the approved bill of materials.

WBSEDCL shall arrange joint inspection and measurement of work by the representatives of WBSEDCL and the contractor, for releasing payments.

Mobilization Advance & Recovery:

10% of Total Schedule of Prices of Proforma- 3 A will be paid to the contractor as mobilization advance after submission of the Bank Guarantee (BG) of 110% of the mobilization advance amount in the prescribed format of WBSEDCL and fulfillment of the following criteria:

- Unconditional acceptance of the LOA
- Taking over of site from WBSEDCL
- Execution of Contract Agreement

- Submission of Performance Bank Guarantee
- Submission of duly authenticated 'Activity Schedule' showing the entire execution of work

The Bank Guarantee shall be valid for a total period of 12 (twelve) months plus a claim period of 3 (three) months.

Mobilization advance, so paid shall be recovered in maximum two installments from Part B of Payment Terms as mentioned in the payment schedule with interest.

Bank Guarantee submitted for mobilization advance will be released after full recovery of the mobilization advance (with interest) and on receipt of written request of the contractor for release of the same.

29. TAXES, DUTIES, LEVIES

- Basic Customs duty and entry tax (wherever applicable) shall be included in the basic bid price by the bidder.
- GST as applicable will be paid extra as per GST Act, 2017.

Tax invoices need to be issued by the bidder for raising claim under the contract showing separately the tax component (CGST, SGST, IGST, Cess as applicable) in accordance with the provisions of the GST Act, 2017.

30. STATUTORY DEDUCTIONS

All statutory deductions will be made from each RA/Final Bill as per applicability of different laws of the land.

31. HANDING OVER

The work will be taken over by WBSEDCL after final completion of the plant in all respect. In case of phase-wise commissioning of the plant, the contractor shall have to maintain the same at his risk & cost until handing over of the plant. During handing over the plant, the contractor shall submit the following documents.

i. Completion Certificate including Warrantee Certificates of the work & spare parts and materials in a 100 Rs. Non-judicial Stamp Paper (Proforma for the same should be approved by WBSEDCL) duly indemnified.
ii. All as-built drawings, design and manual of the power plant in 06 (six) sets.
iii. Operation, Maintenance & Safety Instruction Manual and other information about the project.
iv. Detailed Bill of Materials for operation & maintenance, inventory of spares at project site.
v. Completion certificate as per prescribed format provided by WBSEDCL.

After submitting all the requisite documents as mentioned above, WBSEDCL will hand over the plant to the contractor for comprehensive operation and maintenance for 5 (Five) years as per clause no. 24 of GCC.

32. CERTIFICATE OF COMPLETION OF WORKS

Before taking over the works into commercial use, WBSEDCL will issue a certificate of completion based on the following certifications by the Controlling Officer:

i. Acceptable quality and workmanship of works.
ii. Acceptance of field tests by the Controlling Officer or his authorized representative after final commissioning the plant.

33. FINAL ACCEPTANCE CERTIFICATES (FAC)

The Controlling Officer will issue Final Acceptance Certificate (FAC) within 30 (Thirty) days from the date of expiration of 5 (Five) years comprehensive operation & maintenance or the date of rectification of deficiencies/damages/ defects, if any, whichever is later.

SPECIAL CONDITIONS OF CONTRACT (SCC)

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1. CODES AND STANDARDS

All equipment and materials to be furnished under this specification shall be designed, manufactured and tested in accordance with the latest editions of the relevant IS/IEC/MNRE guidelines or as applicable.

The electrical installation shall meet the requirement of Indian Electricity Act, and Indian Electricity Rules as amended up-to-date and also the applicable section of the latest revision of the relevant IS Code of Practice.

The work shall be done in compliance with the IS Specifications, International Electro-technical Commission Codes, Indian Electricity Act 2003 and all applicable laws in India.

2. RULES AND REGULATIONS

The contractor shall comply with all the statutory provisions of the following prevailing Labour Laws in respect of employees engaged by them:

- Contract Labour (Regulation and Abolition) Act 1970,
- Payment of Wages Act 1936,
- Minimum Wages Act 1948,
- Payment of Bonus Act 1965 and amended in 2015,
- Employees' Provident Fund and Miscellaneous Provisions Act 1952,
- Employees Compensation Act 1923,
- Employees State Insurance Act 1948.

3. SAFETY

All units with respect to their location, layout, general arrangement and design and equipment, structural design, etc. shall be safe to the personnel and conform to the relevant safety rules and regulations/statutory requirement issued by the State Government and the Central Government as well as to:

i. Indian Electricity Rules 2005
ii. Indian Electricity Act 2003
iii. Indian Explosives Manual and
iv. Fire Protection Manual

The bidder shall also provide necessary fencing and lights to protect the public from accident.

Fire extinguishers shall be kept by the bidder at the site of works where there is risk of fire hazard.

Adequate washing facilities shall be provided near the place of work.

When the work is done near any place where there is risk of drowning, all necessary equipments shall be provided and kept ready for use and all necessary steps taken for prompt rescue of any person in danger and adequate provisions shall be made for prompt first aid treatment of all injuries likely to be sustained during the course of work.

These safety provisions shall be brought to the notice of all concerned by displaying on a notice board at a prominent place at the work spot. The persons responsible for compliance of code shall be named by the bidder.

To ensure effective enforcement of the rules & regulations relating to safety precautions, the arrangement made by the bidder shall be open to inspection by the employer and WBSEDCL.

Notwithstanding the above clauses there is nothing in those to exempt the bidder from the operations of any other Act or Rule in force in the Republic of India.

All storage, handling & use of flammable liquids shall be under the supervision of qualified persons.

First aid arrangements with the degree of hazard and with no. of workers employed shall be maintained in a readily accessible place throughout the whole of working hours.

Reporting of Accident:

All accidents, major or minor, must be reported immediately to WBSEDCL and the contractor will provide first aid to the injured person immediately. The injured person shall report to the First Aid Station along with the 'Injured on work' form as per appropriate Proforma, duly filled in quintuplicate and submit to the Medical Officer of the First Aid Station.

Serious Injuries:

In case of serious injuries, the following procedure shall be adopted by the contractor.

- To provide first aid at his own First Aid Station.
- To take the injured person to the hospital along with the 'Injured on work' form duly filled in.
- To report the accident to WBSEDCL.

Fatal Accident:

Fatal accidents must be reported immediately to WBSEDCL as well as to the Police.

Penalty:

Failure to observe the Safety Rules will make the contractor liable to penalty by way of suspension of work/termination of contract.

Adequate arrangement for proper lighting & guarding shall be made at the work site.

4. CONSTRUCTION POWER

Contractor has to make his own arrangement of power connections/supply for utilization during construction stage of the project.

5. WATER FOR CONTRACTOR'S USE

The contractor can use the water available at the site for construction purposes and maintaining the plant. However, drinking water has to be arranged by the contractor boring a Tube well of adequate depth and size based on locally available data of the respective department.

6. PACKING

The Contractor shall make separate package for each consignment and mark all containers with the implementing document number pertinent to the shipment. Each shipping container shall also be clearly marked on at least two sides as follows:

a. Consignee
b. Contract No.
c. Package No.
d. Description
e. Item No.
f. Net and gross weight
g. Volume.

7. TRANSPORTATION

The Contractor shall at its own risk and expense transport all the Materials, Plant and Equipment and the Contractor's Equipment to the Site by the mode of transport that the Contractor judges most suitable under all the circumstances.

Unless otherwise provided in the Contract, the Contractor shall be entitled to select any safe mode of transport operated by any person to carry the Materials, Plant and Equipment and the Contractor's Equipment.

The Contractor shall be responsible for obtaining, if necessary, approvals from the authorities for transportation of the Plant and Equipment and the Contractor's Equipment to the Site. The Owner shall use its best endeavors in a timely and expeditious manner to assist the Contractor in obtaining such approvals, if requested by the Contractor. The Contractor shall indemnify and hold harmless the Owner from and against any claim for damage to roads, bridges or any other traffic facilities that may be caused by the transport of the Plant and Equipment and the Contractor's Equipment to the Site.

Issuance & Submission of Way Bill:

Regarding issuance and submission of e-way bill form, you have to follow the procedure given below:

a) E-way bill has to be generated from your end as per GST Act, 2017.
b) A copy of the same is to be sent to the Senior Manager (F&A), Indirect Tax Cell, WBSEDCL, Vidyut Bhavan, 6th Floor, 'C' Block, through e-mail id: manageridtwbsedcl@gmail.com on the same day of generation of e-way bill.

The utilization report is to be submitted to the Senior Manager (F&A), Indirect Tax Cell, WBSEDCL, Vidyut Bhavan, 6th Floor, 'C' Block within 72 hours from generation of e-way bill.

8. TOOLS & TACKLES

The contractor shall provide all reliable tools & tackles for proper execution of work. WBSEDCL, shall in no way, responsible for supply of any tools & tackles for implementation of the work.

9. ACCIDENT RISK

WBSEDCL shall not be responsible in connection with any sort of accident either fatal or non-fatal which may occur during transportation of materials/equipment, execution/maintenance of works of the PV Power Plant. The Contractor shall have to provide safety precautionary arrangement for his workmen in order to avoid any such incident/accident as per prevalent safety rules and regulations.

10. ROAD PERMITS

In case of procurement of materials for this project outside the state of West Bengal, issuance of Way Bill and Form-C will be taken care by WBSEDCL as per norms.

11. STORAGE AT SITE

The contractor shall provide all necessary storage at the site in specified areas for all materials which are likely to deteriorate by the action of sun, winds, rain or other natural cause due to exposure in the open in such manner that all such materials shall be duly protected from damage by weather or any other cause.

All such stores shall be cleared after completion of the work and the entire site shall be clean and free from debris. All materials shall be stacked in such a manner as to facilitate rapid and easy checking of such materials.

12. REPLACEMENT OF DEFECTIVE PLANT OR MATERIALS

If during the progress of the work the Purchaser's Representative shall decide and notify in writing to the Contractor that the Contractor has executed any unsound or imperfect work or has supplied any plant inferior in quality to that specified, the contractor, on receiving details of such defects or deficiency shall, at his own expense, within such time as may be reasonably necessary for making it good, proceed to alter, reconstruct or remove such work, or supply fresh materials up to the standard of the specification, and in case the Contractor shall fail so to do, the purchaser may, on giving the Contractor 10 (Ten) days' notice in writing of his intention so to do, proceed to remove the work complained of, and at the cost of the Contractor, perform all such works or supply all such materials, provided that nothing in this clause shall be deemed to deprive the purchaser of or affect any rights under the Contract which he may otherwise have in respect of such defects or deficiencies.

13. EQUIPMENT AND MATERIAL

Equipment and material shall comply with description, rating, type and size as detailed in the technical specification. Equipment and materials furnished shall be complete and operative in all respect.

All accessories which are necessary for safe and satisfactory installation and operation of the equipment shall be furnished in the BOQ.

All parts shall be made accurately to standard gauges so as to facilitate replacement and repair.

All corresponding parts of similar equipment shall be interchangeable.

Contractor shall carefully check the available space and the environmental conditions for installation of all equipments available at site and shall design the system accordingly.

Materials brought to the site shall not be removed from the site without the written consent of the WBSEDCL. The contractor shall submit well in advance for approval of samples, specimens as the WBSEDCL may demand from time to time. Any material brought to the site and rejected by the WBSEDCL shall be removed by the contractor from the site of work immediately.

All materials including reinforcing steel, cement for concrete work, sanitary, plumbing & carpentry fittings etc. shall be procured after approval of brand and make by WBSEDCL.

14. MATERIALS AND WORKMANSHIP

Qualified, experienced people should be deployed to install the PV Power Plant. All materials shall be of the best quality and capable of satisfactory operation under the operating and prevailing climatic conditions. Unless otherwise specified, they shall conform in all respect to the latest edition of the relevant code and standards. The project must be supervised by a qualified Structural Engineer/Engineering firm and Electrical/ Electronics Engineer so that the work shall be as per drawing and related IS/IEC Code.

The work shall be performed confirming safety precaution of all level of worker execute the project. The name and the qualification of the project engineers must be submitted to WBSEDCL after placement of order. The qualification of the supervising engineers must have degree in respective stream.

15. TESTING AND INSPECTION

Any authorized representative of WBSEDCL shall, at all times, have full access to all parts of the site, places from which natural materials are being obtained, during production, manufacture and construction and be entitled to examine, inspect, measure and test materials and workmanship, and check the progress of manufacture of plant and production of materials/equipments at manufacturer's workshop. No such activity shall relieve the Contractor from any obligation or responsibility.

Material Inspection will be carried out after submission of all test reports/certificates and after completion of the manufacturing work, against formal intimation from the contractor. The contractor shall give notice of any material being ready for testing to Solar Power Generation Department, WBSEDCL.

The contractor shall arrange for all the necessary tests required for the project in the premises of the contractor or Sub-contractor and provide assistance, labour, materials, electricity, fuel, stores, apparatus and instruments as may be necessary to carry out the tests efficiently without any extra charges. If the facilities are inadequate to carry out tests as per standard, the contractor shall have to arrange suitable testing place having all such required facilities and the cost towards this will be on contractor's account.

The contractor shall also bear all charges towards travelling expenses of the Inspecting Team of the Purchaser or the authorized representatives of the Outside Inspecting agency consisting of at least two (2) persons for to and fro journey by Air from purchaser's Headquarter, including boarding and lodging at the place of inspection and transit, if any for the purpose of Inspection and Testing.

WBSEDCL, if desired, will visit the contractor's premises/manufacturer's workshop and may proceed with the routine tests. Arrangements for such program shall be done by the contractor. The inspection setup and instruments must be provided by the contractor within the contract value.

The material shall have to be dispatched at site after inspection and clearance from the purchaser.

WBSEDCL, if desired, may test the delivered product (especially solar module) at site from any accredited laboratory of Govt. of India. The result of that test and subsequent decisions taken by the controlling officer will be bound to the contractor.

16. REJECTION

If, as a result of an examination/testing, any plant, materials, design or workmanship is found defective and/or not in accordance with the Contract, WBSEDCL may reject the plant, materials, design or workmanship by giving notice with reasons. The Contractor shall then promptly make good the defect and/or ensure that the rejected/replaced item complies with the Contract.

If WBSEDCL requires this plant, materials, design or workmanship to be retested, the tests shall be repeated under the same terms and conditions. If the rejection and retesting cause WBSEDCL to incur additional costs, the Contractor shall subject to pay these costs to WBSEDCL.

17. ROYALTIES

The Contractor shall pay all royalties, rents and other payments for: i. Natural Materials obtained from outside the Site and ii. The disposal of material from demolitions and excavations and of other surplus material (natural or man-made), except to the extent that disposal areas within the Site are specified in the Contract.

18. SUPPLEMENTARY/EXTRA WORKS

Whenever supplementary/extra items of work become unavoidable for completion of the work in all respect, the Contractor shall bring the matter to the notice of the Controlling Officer and submit their proposal. However, the controlling officers shall have the right to advise the contractor to proceed with such item (s) of work. Rates for supplementary items shall be arrived at as given hereunder:

19.1 The rates of all supplementary items shall be decided on pro-rata basis from the existing items in the contract.

19.2 When above clause no 19.1 shall not be applicable the rates shall be taken from P.W.D. (WB) schedule of rates for building works, sanitary & plumbing works effective from 01.07.2014 including addenda and corrigenda published up to date of bid opening subject to plus/minus the contractual rate of quotation.

19.3 When clause no 19.1 & 19.2 above shall not be applicable, the rates should be analyzed, to the mutual acceptance from present market rates of different elements involved in the item, against documentary evidence, with 5% overhead, contractor's profit as 10% and 1% cess towards BOCWWC Act,1996. In that case contractual rate of quotation will not be applicable.

Controlling Officer's decision regarding finalization of rate of non-scheduled item(s) shall be final and binding upon the contractors.

19. COMMISSIONING

After the erection and testing of the equipment/works as per above, commissioning of the plant and works shall be carried out and here the term "Commissioning" shall mean the activities of functional testing of the complete system after erection and testing, including tuning or adjustment of the equipment for optimum performance and demonstrating to the owner that the equipment performance meets the requirements of the specifications.

The contractor needs to submit the time schedule for the site work with their detailed design report considering the above factors.

20. DISPUTES

Dispute(s), if any, shall be settled by mutual agreement through Amicable Settlement and in case of failure the dispute(s) shall be settled through Arbitration.

The parties shall take necessary steps to settle any dispute through mutual discussion with issuing prior notice in writing to other side at least 14 (fourteen) days in advance. If the issue is remained unresolved to the satisfaction of the parties, then the matter may be referred to Arbitration.

The provisions of Arbitration and Conciliation Act 1996 will apply with respect to Arbitration proceedings between the parties.

21. ARBITRATION

The provisions of Arbitration and Conciliation Act 1996 will apply with respect to Arbitration proceedings between the parties.

Each party shall appoint one Arbitrator and third Arbitrator shall be nominated by the said two Arbitrators who shall act as presiding Arbitrator.

The venue of the Arbitration proceedings shall be in the state of West Bengal

The decision of the majority of the Arbitrators shall be final and binding upon both the parties.

The cost of the Arbitration shall be borne equally by the parties.

Any dispute submitted by a party to arbitration shall be heard by an arbitration panel composed of three arbitrators, in accordance with the provisions set forth below.

The Owner and the Contractor shall each appoint one arbitrator, and these two arbitrators shall jointly appoint a third arbitrator, who shall chair the arbitration panel. If the two arbitrators do not succeed in appointing a third arbitrator within 28 (twenty eight) days after the latter of the two arbitrators has been appointed, the third arbitrator shall, at the request of either party, be appointed by the Appointing Authority for arbitrator.

If for any reason an arbitrator is unable to perform its function, the mandate of the Arbitrator shall terminate in accordance with the provisions of applicable laws and a substitute shall be appointed in the same manner as the original arbitrator.

The decision of a majority of the arbitrators (or of the third arbitrator chairing the arbitration, if there is no such majority) shall be final and binding and shall be enforceable in any court of competent jurisdiction as decree of the court. The parties thereby waive any objections to or claims of immunity from such enforcement.

The arbitrator(s) shall give reasoned award.

Notwithstanding any reference to the arbitration herein

i. The parties shall continue to perform their respective obligations under the Contract unless they otherwise agree.

ii. The Owner shall pay the Contractor any monies due to the Contractor except for the woks referred to the Arbitrator.

22. JURISDICTIONAL MATTER

Either party may approach Court of law if any of them is aggrieved by the award of the Arbitration proceedings.

All litigation matters between the parties if any shall be held in any Court in Kolkata under the superintendence of High Court Calcutta.

23. ACCOMMODATION

The accommodation of the contractor's Engineers and workers at the site is to be arranged by the contractor. WBSEDCL may arrange the same upon availability of at the nearest field hostel in chargeable basis after receiving request letter from the contractor.

24. NIGHT AND HOLIDAY WORK

None of the permanent work related to contract shall be carried out during the night or Sunday or on other holiday of WBSEDCL without permission in writing of the Controlling Officer of WBSEDCL.

25. SURVEILLANCE

The contractor shall in connection with the works provide and maintain at his own cost all lights, guards, fencing and watching when and where necessary or required by the WBSEDCL or by any competent authority or statutory or other authority for the protection of the works or for the safety and convenience of the public or others.

After final commissioning of the plant, arrangement of security (minimum 1 no. of armed security guard and 3 nos. of security personnel in each of the three shifts) shall be a scope of the operation and maintenance.

PTZ (Pan-Tilt Zoom) outdoor camera as per requirement shall be deployed to cover the whole plant with night vision and central monitoring through 40" LED monitor/TV for surveillance during construction as well as after commissioning of the plant.

26. CLEARING SITE ON COMPLETION

On completion of the works the contractor shall clear away any and remove from the site all constructional plant, surplus materials, rubbish, debris and temporary works of every kind and leave the whole of the site and works clean and in a good and tidy condition to the satisfaction of the Controlling Officer of WBSEDCL.

The contractor shall dismantle and remove the staging and other temporary structures like stores, offices, labour camps etc. on completion of work, clear and clean the site where such temporary facilities were built and restore the same to original condition.

27. TRAINING FOR WBSEDCL PERSONNEL

The Contractor shall arrange training program at site for WBSEDCL personnel. The duration of the training program shall be minimum 07 (seven) days. The contractor shall provide training materials at least 07 (seven) days before commencement of training programme. The training shall be the part of contract and no extra amount shall be provided for organizing the training programme.

TECHNICAL SPECIFICATION (CIVIL WORKS)

Table of Contents

All civil works shall conform to the latest Indian standards, codes etc as where applicable or to equivalent applicable international standards approved by the engineer-in-charge. Civil works include but not limited to the following items whichever necessary for implementation of the Solar PV Project. All civil works should be carried out as per the relevant standards and guidelines /WB PWD Schedule of Works.

1. MODULE MOUNTING STRUCTURE

1.1 SCOPE

This section covers activities related to design, manufacturing, testing, supply, insurance, transportation, delivery at project site, storage, erection, testing of module mounting structure as detailed hereunder.

Adequate number of mounting structure shall be provided for installation of the required number of PV module. The contractor shall provide the details of this item in the detailed design report**.**

1.2 TECHNICAL REQUIREMENTS

- The Module mounting structure design shall be appropriate and innovative. It must follow the existing land profile.
- The structure shall be designed to allow easy replacement of any module and shall be in line with the site requirement.
- Design drawings with material selected and their standards shall be submitted for prior approval.
- The bidder shall 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) 800 mm.
- There must be sufficient gaps between the rows of the panels and all precautions to be taken to avoid any shading on the panels.
- The module alignment and fixed tilt angle shall be calculated to provide the maximum annual energy output. This shall be decided based on the location of array installation.
- The mounting structure for fixed tilt angle shall be designed for simple mechanical and electrical installation. It shall support SPV modules at a given orientation, absorb and transfer the mechanical loads to the base properly. Welding of structure at site shall not be allowed.
- The array structure shall be so designed that it will occupy minimum space without sacrificing the output from SPV panels at the same time.
- All fasteners shall be of stainless steel of grade SS 316 and must sustain the adverse climatic conditions. Two numbers of anti-theft fasteners of stainless steel on two diagonally opposite corners for each module shall be provided. However if stainless steel (SS 304) fasteners are used they must have protective coating to ensure the life of 25 years. Clamps/bolts shall use EPDM rubber and shall be designed in such a way so as not to cast any shadow on the active part of the module.
- Nut & bolt, supporting structures including module mounting structures shall have to be adequately protected from atmosphere and weather prevailing in the area.

- The Mounting structure shall be grounded properly using maintenance free earthing kit.
- The support structure & foundation shall be designed with reference to the existing soil condition in order to withstand wind speed of the location as given in relevant Indian code for wind (IS 875 Part III, latest edition) and seismic load (IS 1893, latest edition).
- The module mounting structure shall be designed as per prevailing IS 800 and IS 801 and Sections shall be as per IS 808 and IS 811 (Latest edition) and shall be safe against wind and seismic force. Detailed design including STAAD output file shall be submitted for final approval. The minimum thickness of the structural sections:
  - Stub/Column-3.15 mm
  - Rafter-2.5 mm
  - Bracing/Purlin & other members -2 mm,

  However, the final thickness of the structure shall be arrived by structural analysis, considering combination of all possible loads. The members are to be designed taking into consideration the hot & humid nature of the area.
- The array structure shall be made of hot dipped galvanized steel of suitable size. The specification of steel should be as per relevant IS 2062 (Latest Edition). The thickness of galvanization should be as per the relevant standards for galvanization, subject to, a minimum of 80 microns. It is to ensure that before galvanization the steel surface shall be thoroughly cleaned of any paint, grease, rust, scale, acid or alkali or such foreign material as are likely to interfere with the galvanization process. The bidder should ensure that inner side should also be galvanized. All galvanized materials shall withstand tests as per IS 2633.
- Foundation is to be provided with piling if necessary. Foundation should be of minimum M25 grade of concrete (with provision of cube test as per relevant IS code) and minimum Fe500 reinforcing steel (conforming to IS 1786, latest edition). Design should be such that the foundation should be safe against the Soil Load Bearing Capacity as obtained at site. The work includes necessary excavation, concreting, curing, back filling, shoring & shuttering etc.
- For multiple module mounting structures located in a single row, the alignment of all modules shall be within an error limit of maximum 10 mm.
- The bidder/manufacturer shall specify installation details of the PV modules and the support structures with appropriate diagram and drawings.
- Bidder must submit all the quality test documents and test certificates complying with the requirement of the structure.

1.3 APPROVAL

- Proposed layout of the Module mounting structure fitted with equipments & other ancillaries as required over the proposed developed land profile shall be submitted with Detailed Design Report ,and soft copy of STAAD file for approval.
- Design, drawings, specifications of all components with material selected & installation details shall also be included with Detailed Design Report.
- Approval of the Engineer in charge should be taken before execution of the work at site.

The contractor shall deliver the product to the site only after receipt of such approval of drawing, and inspection of materials, from WBSEDCL, against their prayer in writing.

2. OTHER CIVIL WORKS

2.1 DETAILED CONTOUR SURVEY & SOIL INVESTIGATION OF THE SITE

The turnkey contractor shall be responsible for detailed soil investigation and contour survey at required locations for the purposes of foundation design and other design/ planning required for the successful completion of the project. The contractor must submit the detailed soil investigation report, Soil Resistivity Report, bore log records, ERT reports and contour survey to WSEDCL.

2.2 TOPOGRAPHICAL SURVEY

Topographical survey shall have to be done by the Successful Bidder of the proposed site at 5 m 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 have to be submitted along with pre contour layout of the total site. The formation levels of the proposed power plant have to be fixed with reference to the High Flood Level of the proposed site. The ground level and plinth level of structures shall be fixed taking into consideration the highest flood level and surrounding ground profiles.

2.3 SOIL TEST

The Contractor is advised to and 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 work including but not limited to foundations / piling for module mounting structures, HT lines, etc. The Contractor shall carry out soil investigation through any Govt. approved / certified soil consultant. These reports shall be furnished to the Employer 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, weather effect, soil characteristics etc.

2.4 SOIL INVESTIGATIONS

The scope of soil investigation covers execution of complete soil exploration including boring, drilling, collection of undisturbed soil sample where possible, otherwise disturbed soil samples, conducting laboratory test of samples to find out the various parameters mainly related to load bearing capacity, ground water level, settlement, and soil condition and submission of detail reports along with recommendation regarding suitable type of foundations for each bore hole along with recommendation for soil improvement where necessary.

2.5 OTHER INVESTIGATIONS

Successful Bidder shall obtain and study earthquake and wind velocity data for design of module mounting structure, and consider all parameters related to the weathers conditions like Temperature, humidity, flood, rainfall, ambient air etc. The Successful Bidder shall carry out Shadow Analysis at the site and accordingly design strings and arrays layout considering optimal use of space, material and man-power and submit all the details / design to Employer for its review / suggestions / approval.

2.6 LAND DEVELOPMENT FOR SITE ACTIVITIES

The turnkey contractor is responsible for making the site ready and easily approachable by clearing of bushes, felling of trees (if required with appropriate approval from concerned authority), leveling of ground with cutting/filling ,wherever required etc. for commencing the project. It is to ensure that land must be graded with and leveled properly for the flow of water. It is advisable to follow the natural flow of water at the ground. The Finished Ground Level shall be determined considering High Flood Level of the site area and accordingly, land development has to be done within the scope of this tender. WBSEDCL will assist in getting the High Flood Level from local authority.
If the land pocket needs any filling of earth or sand, it is to be ensured that the filled earth is well compacted as per the relevant IS standards. In case the filled earth is brought out from outside the plant, the contractor shall provide the necessary challan. On the other hand, additional earth, if any, must be disposed of properly. Bidder shall take reasonable care to ensure that the plant is aesthetically designed with proper landscaping by covering open areas with grass turf. Site access from the local road is within the scope of tender. Site will be handed over with demarcation.

2.7 FOUNDATIONS

The contractor is responsible for the detailed soil investigation and subsequent foundation design of the structures in the plant. The foundation of the module mounting structures, buildings and other important structures must be approved by WBSEDCL prior to construction. The foundation of the Main Control Room Building, shall have the provision of accommodating one floor (extra), in addition to that required, in accommodating the equipments and personnel. The contractor must provide the detailed design calculations of the foundation, including the soft copy of the STAAD output file. The foundations should be designed considering the weight and distribution of the structure and assembly, and a wind speed as per IS:875 part-III. Seismic factors for the site have to be considered while making the design of the foundation. Successful Bidder shall also plan for transport and storage of materials at site.

2.8 SWITCH YARD CIVIL WORKS

Switchyard civil work includes step up transformer plinth, HT Switchgear kiosk plinth, double pole, 4 pole or lattice structure foundation, earth pits, gravel/metal spreading curb wall in and around switchyard and fencing. The transformer/ HT switchgear kiosk plinth shall be made of brickwork or Random Rubble masonry conforming to relevant standards. The height of transformer /HT Switchgear kiosk plinth shall be decided based on 33 kV ground clearances. Earth pit construction shall be of brickwork covered with RCC (1:2:4) slabs. Switchyard/ double pole area must be surrounded by chain link fencing with pre-cast RCC post/ galvanized MS angle of suitable size with double leaf gate. Area enclosed within this perimeter must be filled with approx. 100mm. thick layer of double washed gravels, of approved quality.

2.9 BUILDINGS

Local Control Room(L.C.R) building/s are required to be constructed for housing the electrical equipment/ panel and Main Control Room(M.C.R) building, is required to be constructed housing, Conference room, Office (for the operation & maintenance of Solar Photovoltaic Power Plant) & Store(for spares) . The Local Control Room Buildings, should be provided with spiral staircase, to provide access to roof of the building, from outside and the Main Control Room Building, should have staircase(within),in order to access the roof of the building .The building shall be constructed with conventional RCC framed structure with brick partition walls. Equipment room shall be designed as per the OEM recommendations to ensure desired life of equipment. Plinth level of all buildings shall generally be kept minimum 600 mm above the FGL/300 mm above H.F.L, of the area

under consideration-whichever is higher. Bidder shall furnish the drawing of the proposed buildings to the Employer for approval, prior to construction. The construction of the same shall be as under-

2.9.1 RCC WORKS

All RCC works shall be as per IS 456 and the materials used viz. Cement, reinforcement steel etc. shall be as per relevant standards.

2.9.2 BRICK WORKS

Brick works, shall be made in cement mortar (CM) (1:6) ,both for 10"(inch) thick and for 5" (inch) thick wall. All brick works shall be made, using 1st. class bricks, of approved quality, and conforming to IS:3102.

2.9.3 DOORS & WINDOWS

Doors, windows and ventilators shall be with necessary glass panels including all fixtures and painting, complete. Doors and windows shall be made of aluminum sections. Thickness of door frame shall be 2.5 mm, and remaining section of door shall be provided as 2.00mm thick (min.). 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 Particle board (Exterior Grade) and clear float/ wired glass. The control room shall require a number of windows/ louvers to provide ventilation/ fresh air circulations.

2.9.4 PLASTERING

All faces of brick works(both internal and external) should be plastered, with cement mortar(1:6) ,both for 10" thick and 5" thick wall and all ceilings should be plastered with cement mortar(1:4) as per IS 1542.

2.9.5 FLOORING

Flooring of store shall be of ASF / Artificial stone floor with concrete mix (1:2:4) using 10 mm aggregates as per IS 2571. Flooring for control room building, equipment room and other places shall be of vitrified tiles of thickness 8 mm. For toilet area, the floor shall be of Kota stone of 18mm thicknesses. The floor finishing must include skirting up to a suitable height / 200mm. The wall tiles, if proposed, shall be glazed tiles of 6 mm thickness and provided up to lintel level.

Battery Room should be provided with Acid-proof tiles, with skirting upto window-sill level.

2.9.6 ROOFING

The roof of the building shall be heat-insulated and water proof (skid concrete) and both heat insulation and waterproofing shall be done as per relevant IS standard.

2.9.7 PLINTH PROTECTION

Plinth protection 1000mm wide shall be provided around all the buildings.

2.9.8 PAINTING WORK

- Internal walls – Plastic Emulsion including two coats of cement primer.
- External walls – Two coats of weather proofing painting with two coats of primer.
- For painting of steel surface, synthetic enamel paints of super gloss variety should be used.

2.9.9 ROLLING SHUTTERS

Rolling shutters made of cold rolled strips shall conforming to IS 4030 with approved gauge thickness shall be provided with all fixtures, accessories, painting all etc. complete.

2.9.10 WATER SUPPLY

GI pipes of Medium quality with GI fittings to be used for all drinking water supply, sanitation and plumbing works.

2.9.11 PLUMBING AND SANITARY

Sanitary fittings, which include water closet, wash basins, sink, urinal fitting including flushing tank, and necessary plumbing lines shall be provided for office cum stores building and Security house. The specification of materials shall be Heavy quality as followed by WB PWD SOR and shall be approved by the Engineer-in-charge.

2.9.12 ELECTRIFICATION OF BUILDING

Electrification of buildings shall be carried out as per IS 732 and other relevant standards. The lighting design of the buildings shall be carried out as per IS 3646. The building shall be provided with adequate quantity of light fittings, 5A/ 15A 1 phase sockets; fans etc., controlled by required ratings of MCBs and MCB, DBs. Supervisor room must be fitted with suitably sized HVAC system. It is encouraged that bidder shall use the latest energy efficient equipment for the electrification and illumination.

2.9.13 TOILET

Toilet shall be designed for 20 persons; and constructed with following finish

- Floor: Vitrified tiles
- Door window: Made out of Anodized Aluminum Sections, with 6mm thick float glass
- Ventilators: Mechanical exhaust facility
- Plumbing fixtures: Approved make & heavy duty.
- Sanitary ware: Approved standard make & heavy duty.
- WC: 580X440 mm Orissa pattern with health facet, toilet paper roll holder and all fittings with approved make.
- Urinal (465 x3550 x 265 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.
- Overhead water tank equivalent of 2,000 litre capacity

2.9.14 DRAINAGE FOR TOILETS

Drainage pipes with all accessories shall be of UPVC (B Type) conforming to IS-13592-1992. Inspection chambers, septic tank for 20 users and soak well to be constructed for abovementioned requirement.

2.10 WATER SUPPLY FOR CLEANING OF MODULES

Suitable arrangement of water shall be ensured to cater the day-to-day requirement of cleaning of Solar Photovoltaic Plant during entire O&M period with HDPE pipes. The Bidder shall estimate the water requirements for cleaning the photovoltaic modules at least once in every week in order to operate the plant at its guaranteed plant performance. All necessary arrangement for wet cleaning of the solar panels shall be in the scope of the bidders and accordingly the agency has to provide suitable water source

along with all the necessary equipment, accessories, tool & tackles, pumps, tankers, tractors and water storage, piping arrangement which as may be required for the same..

2.11 ROADS WITHIN SOLAR POWER PLANT

Suitable approach road and internal Solar Photovoltaic roads to carry safe and easy transportation of equipment and material at the project site shall be made. The road should provide easy and fast approach to each location of the plant. These roads are to be designed optimally to carry the crane load with all necessary cambers, gradients, super elevation, and radius of curvatures for the easy movement of cranes, trucks and public transport. Roads are to be constructed with sufficient width (minimum 3.75m) followed by 0.5m well compacted shoulders on each side. The road must be well compacted as per the relevant IS standards and updated till date. All approach and internal roads shall be Concrete Road with proper base development. Pathways would be brick soling with PCC of 75 mm thickness. Also, all cable crossings and other crossings shall be provided with Hume pipes.

2.12 **PERIPHERAL BOUNDARY WALL WITH FENCING**:

The periphery of the project area shall be protected by means of G.I Chain link fencing, of mesh size 75x75 mm. with wire dia 4.0 mm. & conforming to IS:2721-2003 supported on GALVANISED Steel post, underlain with 0.6m high(above F.G.L) boundary wall, at the base with necessary foundation, finish and colour/paint of approved quality and overlain with G.I 600mm dia Helix Concertina along with 4nos. CONSEC runners, mounted on Y-angle duly approved by the department. Total height of fencing should not be less than, 2.4m to avoid any unauthorized access to the plant. The boundary wall must be provided with rugged main entry gate. The construction of peripheral wall and the main entry gate must confirm to relevant IS standard and practice.

Switch Yard fencing may be of GI 4.00mm dia Chain Link of height about 1.8 m fitted & fixed with G.I angle/flat with necessary G.I nuts & bolts, welding and out of the total height, 0.6 m from FGL with necessary foundations (Minimum 0.5 m below the original GL) shall be made with 1ST Class brick work (1:6).

Details of fencing, material details along with design report and drawings are to be submitted for approval.

2.13 DRAINAGE

The storm water drainage shall be planned for the plant to ensure no water stagnation in the plant. The drains must be constructed with brickwork masonry as suitable for the site conditions. The drains outfall must be connected to the nearest drain outside the plant premises. It is advised that the drainage for the plant must be designed keeping the natural flow of water to the nearest exit point. Bidder is to provide RCC hume pipe at the crossing of road and drains and at required locations. The peripheral drain shall be of brick pitching which is backed up by cement mortar bed and all joints are filled up with cement mortar in C.M. 1:4. No pointing and plastering is required. All other internal drains i.e. on both side of central road, pathways to inverter room, control room, switchyards are to be done by excavating the drain of required size and with required trapezoidal section, with brickwork as per suitability, with necessary plaster and neat cement finish

2.14 PAINTING & FINISH

All metal surfaces and support structures other than G I shall be thoroughly cleaned of rust, scale, oil, grease, dirt etc. Fabricated structures shall be pickled and then rinsed to remove any trace of acid. The under surface shall be made free from all imperfections

before undertaking the finishing coat. After Phosphate treatment, two (2) coats of yellow zinc chromate primer shall be applied followed by two (2) coats of epoxy based synthetic enameled paint. Shade shall be Siemens Grey RAL- 7032. Thickness of paint shall be not less than 75 micron. All unpainted steel parts shall be cadmium plated or suitably treated to prevent rust formation. If these parts are moving elements then they shall be greased.

2.15 WATCHMEN TOWER AND SECURITY CABIN

Contractor shall provide two numbers of Watchmen tower at strategic locations within of the plant. The Minimum size of watchmen tower is 2.0 meter x 2.0 meter size and height of 5.0 m with appropriate shed at the top. Location of the watch tower will be as directed by the owner. The Prefabricated Security Cabin of size 3 meter x 3 meter with a toilet of size 1.2m x 1.0m at the main entrance gate shall be designed and constructed by the Successful Bidder keeping in view the safety and security of the power plant.

2.16 CABLE TRENCH

For cabling purposes of the plant, cable trench shall be provided as per requirement. The trench shall be as straight as possible with a firm and smooth base. The trench should be made of RCC with adequate foundation and should be covered with chequered plate, inside the M.C.R and the L.C.Rs and by concrete slab, on the periphery of the Control Rooms and the inside the switchyard. Sufficient arrangement shall be provided to drain out accumulated water inside the cable trench.

Detailed design & layout of cable trench to be prepared as per project requirement.

TECHNICAL SPECIFICATION: ELECTRICAL

Table of Contents

1. SOLAR PV MODULE

1.1 SCOPE

This section covers activities related to design, manufacturing, testing at works, supply, insurance, transportation and delivery at Project site, storage, erection, testing, commissioning of solar modules as detailed hereunder.

a. Solar Mono-crystalline modules having capacity greater than 350 Wp may be used for the project for 10 MW (AC) Solar PV Power Plant. However, the make, capacity, technical specification and the model no. of each module for the whole project shall be the same.
b. The proposed solar PV plant shall be of capacity 10 MW (AC) along with their associated equipment. Total capacity of the Solar PV modules shall be designed to ensure 10 MW (AC) and the Net Minimum Guaranteed Generation (NMGG) mentioned in the clause no. 11 of ITB of the tender document with a stipulation of minimum 20% additional solar PV modules in aggregate i.e, minimum DC to AC ratio shall be 1.2:1.
c. The most accurate weather database available during plant design shall be selected in respect of climate data input for the site.
d. PVSYST software Premium version and Solar GIS software with minimum two (2) licenses shall be purchased and installed at SPGD office for checking of the PAN file as well as the PV plant design.

The scope of supply shall also include spare modules (at least 50 Nos.) required for any normal or breakdown maintenance and special tools & plants required for erection & maintenance. Corresponding parts of all the equipments & spares shall be of the same specification & workmanship and shall be interchangeable. All the material & workmanship shall be of reputed make as have proven successful in their respective uses in similar services & under similar condition.

1.2 STANDARDS

The PV modules must conform to the latest edition of any of the following IEC / equivalent BIS Standards for PV module design qualification and type approval:

Sl. No.	Standards	Description
1	IEC: 61215/IS: 14286	Crystalline silicon terrestrial photovoltaic modules – Design qualification and type approval.
2	IEC: 61730 – Part 1	Photovoltaic (PV) module safety qualification – Requirements for construction.
3	IEC: 61730 – Part 2	Photovoltaic (PV) module safety qualification – Requirements for testing.
4	IEC 62716 Ed.1	Photovoltaic (PV) modules - Ammonia corrosion testing
5	IEC: 61701/IS: 61701	Salt Mist Corrosion Testing of the module.
6	IEC: 62804	Test method for detection of Potential Induced Degradation of photovoltaic (PV) modules.

The proposed PV Module must have the Test Certificate issued from accredited test laboratories of Ministry of New and Renewable Energy, Government of India.

The test certificates issued from IEC accredited laboratories shall also be acceptable.

The manufacturers shall get their samples tested as per latest norms of MNRE, Govt. of India.

1.3 IDENTIFICATION AND TRACEABILITY

Each PV module must use a RF identification tag (RFID), which must contain the following information:

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

RFID for each solar module shall be provided inside or outside of the module and must be able to withstand environmental conditions and last the lifetime of the solar module as per latest MNRE norms.

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

i. Manufacturer's Name
ii. Model Number, Serial Number
iii. Overall Dimensions (W x L x D)
iv. Weight (kg)
v. Maximum Power (PMAX), Voltage (VMP), Current (IMP)
vi. Short Circuit Current (ISC), Open Circuit Voltage (VOC)
vii. Main System Voltage
viii. Relevant standards, Certification lab. name
ix. WBSEDCL Logo on the top corner of the each Module (Design shall be provided to successful bidder during detail engineering)
x. “Property of WBSEDCL”
xi. Warnings, if any

1.4 AUTHORIZED TESTING LABORATORIES/ CENTERS

PV modules must qualify (test reports/ certificate from IEC/NABL accredited laboratory should be enclosed) as per the relevant IEC standard. Additionally the performance of PV modules at STC conditions must be tested and approved by one of the IEC / NABL Accredited Testing Laboratories including Solar Energy Centre (SEC). However, qualification certificate from IEC/NABL accredited laboratory as

per relevant standard for any of the higher wattage (greater than 50 kWp) regular module should be accompanied with the SEC report/certificate.

1.5 PERFORMANCE WARRANTY

A. Material Warranty: 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 original customer (i.e. EPC Contractor).

i. Defects and/or failures due to manufacturing
ii. Defects and/or failures due to quality of materials
iii. 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 the Owner's sole option. The contractor shall be responsible to contact with the contractor if any of the above mentioned cases occurred.

B. Performance Warranty: The manufacturer should warrant the output of Solar Module(s) for at least 90% of its rated power after initial 10 years & 80% of its rated power after 25 years from the completion of trial run at site/date of final commissioning. The contractor shall collect the Warranty Certificate for performance of the modules from the manufacturer and submit the same to WBSEDCL prior to delivery of the products to the respective sites.

If, Module(s) fail(s) to exhibit such power output in prescribed time span, the Contractor will bound to either deliver additional PV Module(s) to replace the missing power output with no change in area of site used or replace the PV Module(s) with no extra cost claimed at Owner's sole option.

The manufacturer should warrant the output of Solar Module(s) for at least 90% of its rated power after initial 10 years & 80% of its rated power after 25 years from the completion of trial run at site/ date of final commissioning.

Manufacturer of proposed PV modules must have the ISO 9001:2008 or ISO 14001 Certification for their manufacturing unit for their said manufacturing item.

Note: Only indigenously manufactured PV modules should be used in Solar PV Power Plants under this scheme. However, other imported components can be used, subject to adequate disclosure and compliance to specified quality norms and standards.

1.6 PERFORMANCE RATIO OF THE PLANT

Performance Ratio of the plant calculated for any time period of measurement shall be minimum 80%.

PR - Provisional Acceptance Test Verification Procedure

The Performance ratio test aims at the comparison of the actual PV plant energy production with the guaranteed value for a limited operation time of the PV plant of 30 consecutive days.

After Commissioning of the Plant and after receiving all the satisfactory results regarding the correct operation of the plant, there will be continuous monitoring of the performance for 30 days. This monitoring will be performed on the site under the supervision of the Employer / Employer's engineer.

The final tests to prove the guaranteed performance parameters shall be conducted at site by the Contractor in presence of the Employer. The Contractor's commissioning / start-up Engineer shall make the plant ready to conduct such tests. The Performance Guarantee Tests (PG tests) shall be commenced, within a period of one (1) month after successful Commissioning. Any extension of time beyond the above one (1) month shall be mutually agreed upon.

Performance Ratio of the plant will be calculated as per IEC 61724: 1998 (Photovoltaic system performance monitoring - Guidelines for measurement, data exchange and analysis) and as per Technical Report NREL/TP-5200-57991.

Performance Ratio (PR) = $\mathbf{Y_A / Y_R [1 - \alpha * (T_{Cell\ avg.} - T_{Cell})]}$

Where;

$\mathbf{Y_A}$ = 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)

Or, $Y_A = E_{ac} / P_{Nom}$

$\mathbf{Y_R}$ = 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)

Or, $Y_R = I_{R\ Site} / I_{R\ STC}$

E_{ac}	=	AC Power generated at any point of time (kW)
P_{Nom}	=	Installed nominal peak power of modules (Flash test rating at STC) (kWp)
$I_{R\ Site}$	=	Irradiation on the module plane of array during a clearly specified amount of time (measured with a Pyranometer installed on the array plane) (kWh/sq. m)
$I_{R\ STC}$	=	Irradiance at STC (kW/ sq. m)
$T_{cell\ avg}$	=	Average cell/ module temperature (^{0}C)
T_{cell}	=	STC cell/ module temperature (^{0}C)
α	=	temperature coefficient of power (negative in sign) corresponds to the installed module (%/^{0}C)

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).

During the comprehensive O&M period after commissioning, PR shall be tested in yearly basis considering 100% grid availability. However, WBSEDCL may check the PR at any time of the year for a period of minimum 7 days.

1.7 TECHNICAL REQUIREMENTS

- Modules shall be Mono-crystalline type having capacity of minimum 350Wp.
- The module frame shall be made of anodized Aluminium or corrosion resistant material, which shall be electrically & chemically compatible with the structural material used for mounting the modules. In case of metal frames for modules, it is required to have provision for earthing to connect it to the earthing grid. Module frame thickness/Height should be minimum 35 mm, the anodization thickness shall not be less than 15 micron. Junction box of IP 67 rated with min 3 no. of bypass diode and MC4 connectors with 1 meter of TUV 2pfg 1169/09.07 certified Cu cable of 4 sq mm.
- Solar module shall be laminated using lamination technology using established polymer (EVA: Ethylene-vinyl acetate).
- The back sheet used in the crystalline silicon based modules shall be of 3 layered structures. Outer layer of fluoropolymer, middle layer of Polyester (PET) based and Inner layer of fluoropolymer or UV resistant polymer. Back sheet with additional layer of Aluminium also will be considered. The thickness of back sheet should be of minimum 300 microns with water vapour transmission rate less than 3g/m2/day. The Back sheet shall have voltage tolerance of more than 1000 V.
- The EVA used for the modules should be of UV resistant in nature. No yellowing of the back sheet with prolonged exposure shall occur.
- The sealant used for edge sealing of PV modules shall have excellent moisture ingress protection with good electrical insulation (Break down voltage >15 kV/mm) and with good adhesion strength.
- The solar modules shall have suitable encapsulation and sealing arrangements to protect the silicon cells from the environment. The arrangement and the material of encapsulation shall be compatible with the thermal expansion properties of the Silicon cells and the module framing arrangement/material. The encapsulation arrangement shall ensure complete moisture proofing during the whole life of the solar modules.
- The Module shall be made of high transmittance glass front surface giving high encapsulation gain. The glass used to make the crystalline silicon modules shall be toughened low iron glass with minimum thickness of 3.2/4 mm for 72 cell module. The solar cell shall have surface anti-reflective coating to help to absorb more sunlight in all weather conditions. The glass used shall have transmittance of above 90% and with bending less than 0.3% to meet the specifications.
- Module rating is considered under standard test conditions, however Solar Modules shall be designed to operate and perform as per installation site condition.
- All materials used shall be having a proven history of reliable, light weight and stable operation in external outdoor applications and shall have service life of 25 years.
- The modules should be 100% PID (Potential Induced Degradation) tolerant and should comply with IEC 62804.

- Solar PV Module design shall conform to following requirement:
  - Weather proof DC rated MC connector and a lead cable coming out as a part of the module, making connections easier and secure, not allowing for any loose connections.
  - Resistant of water, abrasion, hail impact, humidity & other environment factor for the worst situation at site.
  - The PV Junction Box shall confirm IP 67 and shall have sufficient bypass diodes to avoid shadowing effects.
- Modules shall perform satisfactorily in relative humidity up to 85% and temperature between -10^{0}C and 85^{0}C (module temperature).
- The PAN file of the solar module shall be validated by Third party. PVSYST software Premium version with minimum two (2) licenses shall be purchased and installed at SPGD office for checking of the PAN file as well as the PV plant design.
- The developer shall arrange for the details of the materials along with specifications sheets of from the manufacturers of the various components used in solar modules along with those used in the modules sent for certification. The Bill of materials (BOM) used for modules shall not differ in any case from the ones submitted for certification of modules.
- Proof of procurement of components like cell, back sheet, lamination material, frames, Glass, sealant etc), mentioning manufacturer name, manufacturing date and relevant test certificate shall be submitted at the time of pre-dispatch inspection and acceptance.
- No different quality/makes of back sheets shall be used in the single lot of supply of modules.
- The modules used in the Plant are to be freshly manufactured (not having manufactured before the last date of bid submission)
- The I-V characteristics of all modules as per specifications to be used in the systems are required to be submitted at the time of supply.
- 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.

1.8 SPECIFICATION OF THE PV MODULES

Desired specification of the PV Module shall be as mentioned hereunder:

SI. No.	Item	Description
1	Type	Mono-crystalline Silicon
2	Efficiency of module	Minimum 18 % at STC
4	Fill Factor	Minimum 76 %
5	No. of cells per module	72
6	Module Frame	Non-corrosive and electrolytically compatible with the structural material, preferably anodized Aluminium.
7	Termination box	Thermo-plastic, IP 65, UV resistant
8	Blocking & Bypass Diode	Schottky type

10	Power Rating	The nominal power of a single PV module shall be minimum 350Wp
11	Power tolerance	upto +5 %
12	Temperature co-efficient of power	Not more than - 0.4% / °C
13	Glass	High transmittance glass with Anti Reflective Coating (ARC)
14	RF Identification tag for each solar module	Shall be provided inside or outside the module and must be able to withstand environmental conditions and last the lifetime of the solar module as per MNRE Norms.

1.9 APPROVAL

- The Detailed Design Report Submitted by the contractor to WBSEDCL must contain but not limited to the following details of the solar modules:
  - Detailed specification
  - Necessary Drawings
  - Type Test Report and Necessary Certificates etc.
  - Satisfactory performance certificate not less than 1 year from the date of publication of Bid.
- Joint inspections and testing will be done by WBSEDCL and the authorized representatives of the contractor at the manufacturer's workshop on regular basis for quality assurance and testing. Acceptance Tests as per relevant Indian Standard shall be carried out at the module manufacturer's workshop. Following tests as per relevant Indian Standard shall be carried out on certain number of modules from a lot (decided by WBSEDCL) as acceptance tests of Solar PV Modules:
  - Visual Inspection
  - Performance Test of the modules at STC and NOCT with Sun Simulator of Class B or better as per Indian Standard
  - Performance Test of the modules at low irradiance (200 W/m^2) with Sun Simulator of Class B or better as per Indian Standard
  - Dielectric withstand test
  - Continuity and leakage current test
  - Insulation Resistant test
  - Wet leakage current test
  - Mechanical load test
  - PID Test report will be verified during the approval of the offered module and also during inspection one (1) sample for entire project will be selected randomly by WBSEDCL, which shall be tested at third party laboratory.
  - Any other test as desired by WBSEDCL

  Arrangements for the aforesaid testing and inspection at manufacturer's end are to be provided by the contractor.
- Prior to the delivery of the product, the contractor shall submit but not limited to the following documents:
  - Guarantees
  - Instructions manual for installation and operation.
  - Test reports for routine tests and acceptance tests etc.

- The contractor shall deliver the product to the site only after receiving such approval against their prayer in writing from WBSEDCL.
- WBSEDCL may select certain number of modules delivered at site by the contractor on random basis for conducting performance test of those modules from any accredited test laboratory of MNRE/NABL. If there are any discrepancy found in the test results and the values specified by the contractor, the contractor will be bound to accept the decision made by WBSEDCL in respect of taking further course of action.

2. PV ARRAY CONFIGURATIONS

2.1 SCOPE

This section covers activities related to PV array configurations and design, manufacturing, testing at works, supply, insurance, transportation and delivery at Project site, storage, erection, testing, commissioning of array junction box as detailed hereunder.

The Solar array shall be configured in multiple numbers of sub-arrays, providing optimum DC power to auditable number of sub arrays. The Contractor shall submit their own design indicating configuration of PCU and respective sub arrays and associated bill of material.

- UV resistant Cable-ties (suitable for outdoor application shall be used to hold and guide the cables/wires from the modules to junction boxes or inverters. All the cables were aesthetically tied to module mounting structure.
- In case the string monitoring unit (SMU) is mounted on the module mounting structure, Contractor to take into consideration of the load thus added on the MMS. Accordingly, suitable supporting members for mounting the SMU must be designed and supplied. Separate structure for mounting of SMU can also be proposed.
- Every major Component of the Plant should be suitably named/ numbered & marked for ease of traceability, identification and maintenance.

2.2 STRING COMBINER BOX (SCB)/ STRING MONITORING BOX (SMB)

a. Adequate number of SCBs shall be provided for termination of array string with inverter.

b. The number and specification of PV Array Junction Box will be as per plant configuration.

The SCBs shall be suitable for interfacing with SCADA system and all necessary transducers shall be included in the scope of supply.

2.3 STANDARDS

The SCBs shall conform to the latest edition of following Standards except where specified otherwise in this specification:

Sl. No.	Standards	Description
1	IEC60269/IS 13703	Low-voltage fuses
2	IEC 60529	Ingress Protection of Enclosure
3	IEC 62262	External Mechanical Impact Protection of

		Enclosure
4	IEC 61643-11	Surge Protection Device
5	IEC 62852 or EN 50521	Solar cable connector
6	IEC 60695-2-11	Fire hazard testing

Equipment meeting with other authoritative standards which ensure an equal or better quality is also acceptable. Where the equipment conforms to any other authoritative standard, the salient points of difference between the standard adopted and IS/IEC shall be clearly brought out in the tender. Complete set of documents and standards in English shall be supplied by the bidder without any extra charge. It shall, however, be ensured that equipment offered comply with one consistent set of standards except in so far as they are modified by the requirement of this specification.

2.4 TECHNICAL REQUIREMENTS

- The SCBs shall have suitable arrangement for the followings (typical):
  - Provide arrangement for disconnection for each of the groups.
  - Provide a test point for each sub-group for quick fault location and to provide group array isolation.
  - SCADA Communication device with all necessary equipment for communicating with main SCADA Server.
  - Suitable space for workability and natural cooling.
- All junction boxes should be equipped with appropriate functionality, safety (including fuses, grounding, contacts etc.) and protection.
- The junction boxes shall be dust, vermin, and waterproof 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) and Protection Class II.
- 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 weather resistant cable ferrules will be fitted at the cable termination points for identification.
- SCBs shall have adequate ratings of solar DC fuses at the terminals (+ve as well as –ve), provided in recommendation with the inverter manufacturer. The fuses should be so designed that it should protect the modules from the reverse current overload.
- At outgoing side DC Disconnector switches Switch of suitable capacity shall be provided.
- The SCBs shall also have suitable surge protection. In addition, over voltage protection shall be provided between positive and negative conductor and earth ground such as Surge Protection Device (SPD). The maintenance free earthing shall be done as per the relevant standards.

2.5 APPROVAL

The Detailed Design Report Submitted by the contractor to WBSEDCL must contain but not limited to the following details of the array junction boxes:

- Detailed specification
- Necessary drawings, BOM, Test & Performance certificates etc.

Prior to the delivery of the product, the contractor shall submit but not limited to the following documents:

- Guarantees
- Instruction manuals for installation and operation.
- Necessary test certificates

The contractor shall deliver the product to the site only after receiving such approval against their prayer in writing from WBSEDCL.

3. SOLAR CENTRAL INVERTER

3.1 SCOPE

This section covers the activities related to design, manufacturing, testing at works, supply, insurance, transportation and delivery at project site, storage, erection, testing, commissioning of Solar Inverters as detailed hereunder.

a. Adequate number of Solar Central Inverter of minimum capacity 1250 kW having high quality, high efficiency and reliable operation. Total inverter capacity of the plant shall be in accordance with the PV array capacity.

b. The rated power/name plate capacity of the inverters shall be the AC output of the inverter at 50°C.

c. The scope of supply shall also include necessary spares, if any, required for normal or any breakdown maintenance for at least 05 (five) years and special tools & plants required for erection & maintenance. Corresponding parts of all the equipments & spares shall be of the same specification & workmanship and shall be interchangeable.

All the material & workmanship shall be of reputed make as have proven successful in their respective uses in similar services & under similar condition.

The solar inverter/power conditioning unit shall be suitable for interfacing with SCADA system and all necessary transducers shall be included under the scope of supply.

3.2 STANDARDS

The equipments and materials covered by this specification shall conform to the latest edition of following Indian Standards or equivalent IEC standards except where specified otherwise in this specification:

Sl. No.	Standards	Description
1	IEC: 61683	Photovoltaic systems – Power Conditioners – Procedure for measuring efficiency
3	IEC 60068	Environmental Testing
4	IEC 62116 / IEEE 1547/UL 1741/ equivalent IS standard	Photovoltaic (PV) systems - Characteristics of the utility interface
5	IEC 61727 Relevant CEA/ CERC regulation and grid code (amended up to date)	Utility-interconnected photovoltaic inverters - Test procedure of islanding prevention measures
6	IEC 61000 series	EMC, harmonics, etc.
7	IEC 62109 (1&2), EN 50178 or equivalent	Electrical safety
8	Recommended practice for PV – Utility interconnections	IEEE standard 929 – 2000 or equivalent
9	IEEE 519	Recommended Practices and Requirements for Harmonic Control in Electrical Power Systems
10	IEC 62093	Balance-of-system components for photovoltaic systems Design qualification natural environments
11	CEA Technical Standards for Connectivity to the Grid Regulations 2007 with 2013 Amendment	

Solar Inverters shall have certificate and approval from VDE, IEC, UNE, RD, EDF, BDEW etc. The inverters should have CE conformity according to LVD (Low Voltage Directive) and EMC (Electro Magnetic Compatibility) Directive for safety purpose.

Type test certificate issuing authorities should be any NABL/IEC Accredited Testing Laboratories or MNRE approved test centres.

Equipment meeting with other authoritative standards which ensure an equal or better quality is also acceptable. Where the equipment conforms to any other authoritative standard, the salient points of difference between the standard adopted and IS/IEC shall be clearly brought out by the contractor.

3.3 TECHNICAL REQUIREMENTS

- The inverter should be 3-Φ static solid state type power conditioning unit.
- Inverter/PCU shall be centralized grid tied in nature; 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 of MPPT to be submitted with the detailed design report. The MPPT unit shall confirm to IEC 62093 for design qualification.
- The minimum euro efficiency of the PCU as per IEC 61683 shall be 98%. 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.
- Degree of protection of the indoor Inverters shall conform at least IP-21 for Indoor type and outdoor type shall conform IP-54 or higher.
- Nuts & bolts and the PCU enclosure shall have to be adequately protected taking into consideration the atmosphere and weather prevailing in the area.
- Only those PCUs/ Inverters which are commissioned for the design capacity till date in India shall be considered for this project with individual Inverter capacity not less than 1250 kW. Contractor has to provide sufficient information to the satisfaction of the plant owner before placing the final order for PCUs/Inverters. Service centre of the PCU manufacturer must be in India
- All PCUs shall consist of associated control, protection and data logging devices and remote monitoring hardware and compatible with software used for SMB level monitoring.
- The dimension, weight, foundation details etc. of the PCU shall be clearly indicated in the technical specification to be submitted with the detailed design report.
- The PCU shall be capable of complete automatic operation, including wake-up, synchronization & shut down independently & automatically. Inverters / PCU shall operate in sleeping mode when there will no power connected.
- The Inverter shall have internal protection arrangement against any sustained fault in output line and lightning in the grid. AC protection boxes shall be provided at the inverter output which shall include over current, under voltage protection etc.
- Both AC & DC lines shall have suitable fuses & surge arrestors and contactors to allow safe start up and shut down of the system.
- 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 (PWM) technology.

- The PCU shall be able to withstand an unbalanced load conforming to related IEC standard (+/- 5% voltage). The PCU shall include appropriate self-protective and self-diagnostic features 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 feature, shall be cleared by the PCU protective devices and not by the existing site utility grid service circuit breaker.
- Operation outside the limits of power quality as described in the technical data sheet should cause the power conditioner to disconnect the grid. Additional parameters requiring automatic disconnection are over voltage, over current, earth fault, short circuit and reverse power.
- The inverter itself shall consist of one circuit breaker for isolation from the circuit during any fault or maintenance purpose.
- All three phases shall be supervised with respect to rise/fall in programmable threshold values of frequency.
- The PCU shall be capable of controlling power factor dynamically.
- The inverters shall operate satisfactorily within the operating ambient temperature range of -15°C to +60°C. The contractor shall assure that the inverter shall not de-rate upto +50°C ambient temperature.
- To take care of PID (Potential Induced Degradation), the inverter shall have active negative grounding kit. [Only PID free Solar PV modules shall be used for the proposed plant and necessary test certificates shall be submitted.]
- The PCU shall have the following main features for convenience of operation:
    - Auto 'Wake up': 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.
    - 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.
    - 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.
    - 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.
- Following protections shall be provided with the inverter.
    - Over voltage both at input & output
    - Over current both at input & output
    - Over/under grid frequency
    - Synchronization loss
    - Anti-islanding Protection (IEEE 1547/UL 1741/ equivalent BIS standard)
    - Heat sink over temperature
    - Short circuit
    - Protection against lightening
    - Protection against unbalance phase voltage

- Power regulation in the event of thermal overloading
- Protection for each solid-state electronic device
- Surge arrestors to protect against Surge voltage induced at output due to external source
- Direct earth fault protection and body earthing
- Set point pre-selection for VAR control
- Insulation monitoring of the PV array with sequential fault location
- Any other protections required

- Inverters should have user friendly LED/LCD or touch display for programming and view on line parameters such as:
  - Inverter per phase Voltage, current, kW, kVA, frequency and power factor
  - Grid Voltage, frequency and power factor
  - DC voltage and current
  - Inverter Import export kWh summation
  - Solar kWh summation
  - Inverter ON/OFF
  - Grid ON/OFF
  - Inverter under voltage/over voltage
  - Inverter over load
  - Inverter over temperature
  - Any other if required

3.4 SPECIFICATION

Sl. No.	Operating Parameter	Desired specification
1	Input (DC)	
	PV array connectivity capacity	As per site requirement
	MPPT Voltage range	Compatible with the array voltage
	Number of MPPT Channel	As per design of the manufacturer.
2	Output (AC)	
	Nominal AC Power output	1250 kW (minimum)
	Number of Grid Phase	3
	Adjustable AC voltage range	+/- 10%
	Frequency range	+/- 5%
	AC wave form	Sine wave
	THD	Less than 3% at 100% load
	Switching	H.F. transformer/transformer less
3	General Electrical data	
	European Efficiency	98 % (minimum)
	No load loss	< 1% of rated power
	Maximum loss in sleep mode	< 0.05% of rated power
4	Protection	
	DC Side	As mentioned in the Technical Requirement
	AC side	As mentioned in the Technical Requirement
	Isolation Switch	PV array Isolation switch (DC)

SI. No.	Operating Parameter	Desired specification
	Ground fault detection device (RCD)	To be provided
5	Display	
	Display type	LED/LCD or touch display
	Display parameter	
	DC	As mentioned in the Technical Requirement
	On grid connected mode	As mentioned in the Technical Requirement
9	Interface (Communication protocol)	Suitable port must be provided in the inverter for i. On site upgrade of Software ii. On site dumping data from the memory iii. Plant based remote monitoring system
10	Storage of Data	At least for 1 year. Separate data logger may be provided to meet the criteria.
11	Monitoring	Matched with the monitoring and data logging system (SCADA)
12	Mechanical Data	
	Protection Class	As mentioned in the Technical Requirement
	DC Switch	Integrated
	Operating ambient temperature	-15° C to +60° C
	Relative Humidity	15 to 95 %
	Noise Emission	Less than 80 dB (A) @ 1 meter
	Cooling	Forced cooling

3.5 APPROVAL

The Detailed Design Report Submitted by the contractor to WBSEDCL must contain but not limited to the following details of the Solar Inverter/Power conditioning Unit:

- Detailed technical description of the complete unit including MPPT Algorithm.
- Necessary Schematic & Other Drawings.
- Type Test Reports, Performance certificate from plant owner etc.

Joint inspections and testing will be done by WBSEDCL and the authorized representatives of the contractor at the manufacturer's workshop on regular basis for quality assurance and testing. Acceptance Tests as per relevant Standard shall be carried out at the module manufacturer's workshop. Following tests shall be carried out on certain number of Inverters from a lot (decided by WBSEDCL) as acceptance tests of Solar Inverters:

- Visual Inspection
- Performance Test and measurement of AC & DC parameters

- DC reverse polarity protection
- Islanding Protection
- Over Voltage & Under Voltage withstand
- Over Frequency & Under Frequency withstand
- Night consumption
- Any other test as desired by WBSEDCL

Arrangements for the aforesaid testing and inspection at manufacturer's end are to be provided by the contractor.

Prior to the delivery of the product, the contractor shall submit but not limited to the following documents:

- Guarantees
- Instructions for installation and operation, manual
- Safety precautions
- Test reports for routine tests and acceptance tests etc.

The contractor can deliver the product to the site only after receiving such approval against their prayer in writing from WBSEDCL.

4. POWER TRANSFORMER

4.1 SCOPE

This section covers the activities related to design, manufacturing, testing at works, supply, insurance, transportation and delivery at Project site, storage, erection, testing, commissioning of step up transformers and associated equipments as detailed hereunder.

- Adequate number of 3-Φ, multiple winding, oil filled, ONAN type cooled transformers with suitable capacity considering 0.9 power factor shall be provided to step up voltage from 3-Φ, Grid tied Solar Inverter output to 33 kV voltage level for feeding the generated power to the 33 kV switchyard.
- LV winding of the transformer will be connected to the output of inverters and the HV sides will be connected to the 33 KV line through VCB, Isolator etc. Transformers shall be Oil Type and placed outside of each control room.
- All the transformers shall be suitable for outdoor installation with 3 phases,
- 50Hz and shall be suitable for service under fluctuations in supply voltage up to plus 10% to minus 15%.

The scope of supply shall also include necessary spares required for normal operation & maintenance of transformers for a period of 5 (five) years & special tools & plants required for erection & maintenance. Corresponding parts of all the equipments & spares shall be of the same material & dimensions, workmanship & finish and shall be interchangeable. All the material & workmanship shall be of suitable commercial quality as have proven successful in their respective uses in similar services & under similar condition.

The transformers and associated equipment shall be suitable for interfacing with SCADA system and all necessary transducers shall be included in the scope of supply.

4.2 STANDARDS

The equipments and materials covered by this specification shall conform to the latest edition of following Indian Standards or equivalent IEC standards except where specified otherwise in this specification:

Sl. No.	Standards	Description
1	IS: 2026 (Part I to IV)/ IEC 60076	Power Transformer
2	IS: 2099/IEC 137	Transformers bushings for alternating voltage above 1kV
3	IS: 335	Transformer oil
4	IS: 3637	Gas and oil operated relay
5	IS: 3639	Fittings and accessories for power transformers
6	IS: 6088	Dimensions for porcelain transformer bushings
7	IS: 3347	Loading guide for oil-immersed transformers
8	CBIP Manual No. 295 and latest publications	Transformer Design Manuals

Equipment meeting with other authoritative standards which ensure an equal or better quality is also acceptable. Where the equipment conforms to any other

authoritative standard, the salient points of difference between the standard adopted and IS/IEC shall be clearly brought out in the tender. Complete set of documents and standards in English shall be supplied by the contractor without any extra charge. It shall, however, be ensured that equipment offered comply with one consistent set of standards except in so far as they are modified by the requirement of this specification.

4.3 TECHNICAL REQUIREMENTS

The transformers shall be three winding, ONAN, oil filled, 3-Φ, Step Up transformers.

Sl. No.	Standards	Description
1	Type	Multi Winding (as per Plant Design)
2	No. of phases	~~Multiple~~ 3-Φ
3	Installation	Outdoor Foundation
4	Rated continuous MVA at maximum ambient temperature of 40^0C	As required according to Solar Inverter capacity
5	% Impedance at 75°C, rated current & frequency	As per relevant Indian Standard
6	Type of cooling	ONAN
7	Winding material	Copper
8	Connection	
	HV	Delta
	LV	Star/ Star-Star/as per design
9	Vector group	Dy11/ Dy11y11/as per design
10	Voltage	
	HV	33 kV
	LV	As per Solar Inverter Output Voltage
11	Rated Frequency	50 Hz
12	Type of Bushing	
	HV Winding	Porcelain/ XLPE bushing
	LV Winding	Porcelain bushing
13	Insulation level (impulse withstand)	
	HV	170kV (Peak)
	LV	NA
14	Insulation level (Power freq. withstand)	
	HV	70 kV (rms)
	LV	3 kV (rms)
15	Tapping	OCTC
	Range	+5% to -5% @ 2.5%
16	Temperature rise of oil/ winding over design ambient temperature of 50°C	50°C / 55°C

Sl. No.	Standards	Description
17	Hot spot temperature over a maximum yearly weighted average ambient temperature of 32 °C	105°C
18	Short circuit current on HV side	25 kA
19	Short circuit withstand time	3 sec
20	Insulation	
	HV winding	Class A (Winding insulation shall be able to withstand 33 kV continuously)
	LV winding	Class A (Uniformly insulated)
21	Voltage withstand capacity during sudden disconnection of load	1.4 times the rated voltage for 5 sec. 1.25 times the rated voltage for 1 min. 1.1 times the rated voltage for continuous operation.
22	Noise level	< 90 dB As per NEMA TR-1 standard
23	Cooling medium	Mineral oil (as per IS 335)
24	Earthing	LV neutrals solidly earthed through neutral CT, HV side should also be earthed.
25	Minimum efficiency	98%
26	Only Type –Tested transformers shall be used	

4.4 DESIGN CRITERIA

- The rating of the Transformers shall be sufficient to evacuate generated power from the Solar Inverter under full load conditions. The Transformers shall be able to evacuate generated power under all conditions of ambient temperature, frequency and voltage variations.
- The transformers will have Off Circuit Tap Changer (OCTC) with tap ranging +5% to -5% in steps of 2.5 % at HV side. The transformers will operate without injurious heating at the rated capacity at any voltage within +/-10% of the rated voltage of that particular tap. The transformer will be designed to deliver rated MVA continuously even at the lowest tap without exceeding specified temperature rise.
- HV line terminals shall be brought out through 33 kV class weather proof, shaded porcelain bushing.
- Ambient air temperature for the transformer
  - Maximum ambient air temperature: 50^0 C
  - Maximum daily average ambient air temperature: 40^0 C
  - Maximum yearly weighted average ambient air temperature: 32^0 C
  - Minimum ambient air temperature: - 5^0 C
- The transformers shall be designed to withstand short circuit current of 25 KA for 3 second without any damage. This capability shall be demonstrated by type test report.
- The transformers will be capable of being loaded in accordance with IS 3347 - loading guide for oil immersed power transformers. The transformers shall also be designed for operation at unbalanced loading conditions.

- The transformers shall be suitable for co-ordination and integration with SCADA System and necessary contacts and/or ports for the purpose shall be provided.
- Earthing arrangement of the transformers shall be provided as per the relevant Indian Standard and as per Inverter manufacturer recommendation.
- Necessary protection arrangement should be provided in the transformer.
- Marshaling Box shall be of sheet steel, dust and vermin proof provided with proper lighting and thermostatically controlled space heaters. The degree of protection shall be IP 55 or better. Marshalling Box of all transformers shall be preferably Tank Mounted. One dummy terminal block in between each trip wire terminal shall be provided. 20% spare terminals shall be provided on each panel. The gasket used shall be of neoprene rubber. Also Marshalling Box, shall be at least 450 mm above ground level. Wiring scheme (TB details) shall be engraved in a stainless steel plate with viewable font size and the same shall be fixed inside the Marshaling Box door.
- The radiators shall be detachable type, mounted on the tank with shut off valve at each point of connection to the tank, lifts, along with drain plug/valve at the bottom and air release plug at the top.
- Construction of different parts of the transformer shall conform to the latest edition of IS 2026.
- Fittings and accessories as per relevant Indian Standard shall be provided within the scope of the work.

4.5 TYPE TSET

All the transformers used for the plant must be type tested. The contractor must ensure the type tests are to be conducted separately at no extra cost for the transformers. These tests should be conducted on the equipment similar to those proposed to be supplied under this contract and test(s) should have been either conducted at CPRI/NABL accredited Laboratory/ Govt. Recognized test house. The type tests shall be performed are furnished below:

Sl.No.	TYPE TESTS
1.	Temperature Rise test at a tap corresponding to maximum losses as per IEC 60076. Gas Chromatography shall be conducted on oil sample taken before & immediately after temperature rise test. Gas analysis shall be as per IS: 9434 (based on IEC: 60567), results will be interpreted as per IS: 10593 (based on IEC: 60599)
2.	Measurement of harmonics of no load current (special test)
3.	Short Circuit Test as per IEC76/IS202
3.	Measurement of acoustic noise level as per NEMA TR-1 (special test)
5.	Tank Vacuum & Pressure Test (as per CBIP norms)

Sl.No.	TYPE TESTS
5.	Impulse Voltage Withstand Test, including Full Waves and Chopped Waves as listed below as per IEC76/IS2026: • One full wave at 50% BIL; • One full wave at100% BIL; • One chopped wave at 50% BIL • Two chopped waves at100%BIL and • Two full waves at100% BIL.

4.6 APPROVAL

The Detailed Design Report Submitted by the contractor to WBSEDCL must contain but not limited to the following details of the transformers:

- Detailed specification including Fittings and Accessories
- Necessary Drawings shall contain but not limited to the following:
  - Outline dimension/GA drawings of transformers, fittings/accessories and weight of main components.
  - Bushing Assembly drawings (for both HV & LV).
  - Marshalling Box GA & Connection Drawings.
  - Transport drawings, showing main dimensions and weight of each package.
  - Instruction plate for oil filling procedure for Aircell conservator as per Proforma provided by WBSEDCL during approval.
  - Foundation details
  - Tap-changing equipment
  - Rating & Property plate diagrams
- Necessary test certificates and type test reports.
- GTP shall be provided by the contractor as per Proforma provided by WBSEDCL during approval.

A joint inspection and testing will be done by WBSEDCL and the authorized representatives of the contractor at the manufacturer's workshop. Testing and inspection of the transformers will be carried out as per relevant Indian Standard. Arrangements for the aforesaid testing and inspection at manufacturer's end are to be provided by the contractor.

Prior to the delivery of the product, the contractor shall submit but not limited to the following documents:

- Guarantees
- Instructions for installation and operation, manual
- Safety precautions
- Test reports for routine tests and acceptance tests etc
- Detailed schematics of all power instrumentation and control equipment and subsystems along with their interconnection diagrams. Schematics shall indicate wiring diagrams, their numbers and quantities, type and ratings of all components and subsystems etc.

The contractor can deliver the product to the site only after receiving such approval against their prayer in writing from WBSEDCL.

5. 33 kV INDOOR C&R PANEL AND POWER EVACUATION

5.1 SCOPE

This specification covers the design, manufacture, testing at manufacturer's works before dispatch, supply, delivery at site, transit insurance, storage at site, erection, testing & commissioning of 33 kV Indoor C & R Panel & Power Evacuation System with all necessary equipments and accessories required for satisfactory operation of the Grid connected Solar Power Plant.

The scope of supply shall 33KV C&R Panel with all accessories, Vacuum Circuit Breaker (VCB), Current Transformer (CT), Potential Transformer (PT), Isolator, Lightning Arrestor (LA) and other materials & equipments for power evacuation in 33 KV system voltage grade and also include necessary spares required for normal operation & maintenance of C & R Panel equipments and Power Evacuation System for a period of 5 (five) years.

Corresponding parts of all the equipments & spares shall be of the same material & dimensions, workmanship & finish and shall be interchangeable. All the material & workmanship shall be of suitable commercial quality as have proven successful in their respective uses in similar services & under similar condition.

5.2 STANDARDS

The equipments covered under this chapter shall comply with the requirement of latest edition of following IS/BS/IEC specifications as amended up to date except where specified otherwise.

Sl. No.	Standards	Description
1	IS: 5	Colors for ready mixed paints & enamels
2	IEC: 60298/IS: 3427	AC metal enclosed switchgear & control gear for rated voltages above 1 kV & up to & including 52 kV.
3	IS: 13947	Degree of protection provided by enclosures for switchgear.
4	IS: 1901	Specification for visual indication lamps
5	IS: 13118/IEC-56	High Voltage Alternating current circuit breakers
6	IS: 2705 - (Part I-IV)	Current Transformers
7	IS: 3156 - (Part I-IV)	Voltage Transformers
8	IEC: 60694	Common clauses for high voltage switchgear & control gear
9	IS: 1248	Indicating Electrical measuring instruments
10	IS: 8084	Inter connecting Bus bars for AC voltage between above 1 kV up to and including 36 kV
11	IS-5578 & 11353	Making and arrangement for switchgear bus bar main connections and auxiliary wiring.
12	IEC: 62271-102	Alternating current disconnectors and earthing switches
13	IEC-99-4	Metal oxide surge arresters without gates for A.C. systems

Sl. No.	Standards	Description
15	IS: 3231	Electrical relays for Power Systems
16	IS-8686	Static Protection Relays
17	IEC-60255 & IEC- 61330	Numerical Relays
18	IEC-137	Bushing for AC Voltages
19	IS-3347	Porcelain Transformer Bushings.
20	IS-2099	High Voltage Porcelain Bushings.
21	IS-5561	Terminal Connectors
22	IS-13779	Static Energy Meters
23	IS 14697/1999	HT Static Tri-vector TOD Energy meter
24	IS-1248	Electrical measuring instruments
25	IS-10118	Minimum clearances for Outdoor Switchgear.
26	IEC-694	Common Clauses for High Voltage Switchgear and Control gear
27	IS 6875 amended upto date	Control switches

Equipment meeting with other authoritative standards which ensure an equal or better quality is also acceptable. Where the equipment conforms to any other authoritative standard, the salient points of difference between the standard adopted and IS/IEC shall be clearly brought out in the tender. Complete set of documents and standards in English shall be supplied by the contractor without any extra charge. It shall, however, be ensured that equipment offered comply with one consistent set of standards except in so far as they are modified by the requirement of this specification.

5.3 SPECIFIC TECHNICAL REQUIREMENTS/PARAMETERS:

All indoor C & R Panel panels shall have minimum technical parameters for design consideration as mentioned hereunder:

5.3.1 C & R PANEL:

- Each C & R Panel shall be completely metal enclosed and shall be dust, moisture and vermin proof for tropical use. The enclosure shall provide a degree of protection not less than IP-41 in accordance with IS-2147. Type test report in this respect shall be furnished with offer
- Separate C&R panel shall be provided for each VCB.
- Panels shall be free standing, floor mounting type and shall comprise structural frames enclosed completely with specially selected smooth finished, cold rolled sheet steel of thickness not less than 3 mm for weight bearing members of panels such as base frame, front sheets and door frames and not less than 2mm for sides, door, top & bottom portions. There shall be sufficient reinforcement to provide level surfaces, resistance to vibration and rigidity during transportation and installation.
- Control Cable entries to the panel shall be from the bottom. Bottom plates of the panels shall be fitted with detachable gland plates to allow cable entries from the bottom. Gland plates shall be suitable for fixing the cable glands at an elevated height of at least 100 mm above the ground level. Terminal Connectors and Test terminal blocks for cables shall be fixed at an elevated height of at least 200 mm above the Bottom plate. Side blocks cut out to be

arranged at the top of both sides of panel for inter panel bus wires. Dimensions of the cut out will be 300 mm X 50 mm, 255 mm from the top.

- The Control and Relay Panel shall be of Simplex type and the access door shall be provided at the back of each Panel where no instruments or relays shall be mounted. The indicating and signaling devices and relays etc. shall be mounted on the front side and the auxiliaries which shall be inside the Panel. The access door shall be at the back side and of double door type of height 1900 mm (with tolerance ± 1%).
- The individual panel shall be of 2250 mm (with tolerance ± 1%) in height with Channel base, 610 mm. in depth and of suitable width 1000mm to accommodate the equipment at a suitable height, suitable gaps to facilitate easy workability as specified hereafter. Individual piece of Channel base of C&R Panel is to be provided to obtain the flexibility of inter-changing the Panel, if any.
- The complete panel shall incorporate all necessary instruments, meters, relays, auxiliary relays, control switches, indicating lamps, mimic, annunciator, audible alarms, horizontal and vertical wiring trough, wiring supports, interior lighting system, terminal blocks , fuses and links etc.

0.415/33 KV individual control transformer panel having HV side control and protection shall consist of the following mentioned items meeting the IEC/IS mentioned above:

Sl. No.	**Items**
1	Circuit label engraved suitably at front and inner side
2	Section of painted and overlaid mimic diagram
3	Circuit breaker control switch.
4	Local/Remote switch
5	Indicating lamps for circuit breaker ON/OFF, spring charged, trip circuit 1 & 2 healthy and auto trip indication.
6	Trip circuit supervision relay to supervise the TC 1 & 2 both under pre-close and post-close condition.
7	PT supply Indicating lamps, red-yellow-blue for each PT.
8	96 mm x 96 mm ammeter scaled suitably.
9	Voltmeter of 96 mm x 96 mm
10	Voltmeter selector switch, 4-position, RY—YB—BR—OFF.
11	Suitable space and wiring for non-tariff TVM for energy management.
12	Three phase 4 wire test terminal block for above.

Sl. No.	Items
13	Auxiliary relay with test push button for panel DC supervision relay.
14	12 window type Fascia annunciator complete with accept reset and test PB but without audible bell.
15	Triple pole, IDMTL, non-directional over current relay with setting range 50%-200% for IDMTL units and 500% - 2000% for high set unit.
16	Restricted Earth Fault Relay current operated having setting range 10% to 40% both for HV & LV side of the Transformer.
17	High speed master tripping relay with contacts as required with lockout and coil supervision scheme complete.
18	PT selector switch, two position PT-1/PT-2 switch, stay put type(16A)
19	Space heater with On/OFF switch and thermostat.
20	Two element DC operated auxiliary relay having hand reset type contact with hand reset operating flag for transformer Buchholz trip and Buchholz alarm function. Each element
21	Two element DC operated auxiliary relay having hand reset type contact with hand reset operating flag for transformer winding temp. trip and alarm function. Each element with 4NO+2NC Contact.
22	Two elements DC operated auxiliary relay having hand reset type contact with hand reset operating flag for transformer Low Oil Level (Main Tank) and OSR (OLTC) alarm function.
23	Two element DC operated auxiliary relay having hand reset type contact with hand reset operating flag for transformer Oil Temp. trip and alarm function. Each element with 4NO+2NC Contact.
24	Two element DC operated auxiliary relay having hand reset type contact with hand reset operating flag for transformer Main tank PRV trip and OLTC PRV Trip function. Each element with 4NO+2NC Contact.
25	Two element DC operated auxiliary relay having hand reset type contact with hand reset operating flag for OLTC Buchholz trip and spare. Each element with 4NO+2NC Contact.
26	DC operated emergency lamp with switch.
27	Cubicle illumination lamp operated from door switch.
28	Audible bell and hooter for trip and non-trip fascia annunciation.
29	15A, 3 phase plug & socket with switch.
30	Other Panel accessories & equipment relays etc. as required to fulfil the scheme Requirement.

33KV Line Control C&R Panel with Directional O/C & E/F protection shall consist of the following mentioned items meeting the IEC/IS mentioned above:

Sl. No.	Items
1	Circuit label engraved suitably at front and inner side
2	Section of painted and overlaid mimic diagram
3	Circuit breaker control switch.
4	Local/Remote switch
5	Indicating lamps for circuit breaker ON/OFF, spring charged, trip circuit 1 & 2 healthy and auto trip indication.
6	Trip circuit supervision relay to supervise the TC 1 & 2 both under pre-close and post-close condition.
7	PT supply Indicating lamps, red-yellow-blue for each PT.
8	96 mm x 96 mm ammeter scaled suitably.
9	Voltmeter of 96 mm x 96 mm
10	Voltmeter selector switch, 4-position, RY—YB—BR—OFF.
11	Suitable space and wiring for non-tariff TVM for energy management.
12	Three phase 4 wire test terminal block for above.
13	Auxiliary relay with test push button for panel DC supervision relay.
14	12 window type Fascia annunciator complete with accept reset and test PB but without audible bell.
15	Triple pole, IDMTL, non-directional over current relay
16	Triple pole, IDMTL, directional over current relay with setting range 50% - 200% for IDMTL units and instantaneous high set unit -500% - 2000% applicable for parallel line feeder as per schedule
17	Single pole definite time sensitive E/F relay current operated having wide setting range for single circuit line.
18	Single pole directional definite time sensitive E/F relay current operated having wide setting range for single circuit line

Sl. No.	Items
19	High speed master tripping relay with contacts as required with lockout and coil supervision scheme complete.
20	PT selector switch, two position PT-1/PT-2 switch, stay put type(16A)
21	Space heater with On/OFF switch and thermostat.
22	AC operated single element, auxiliary relay having only self reset contacts and with reverse flag for incoming AC supply supervision with test push button.
23	DC operated, two element, auxiliary relay having only self reset contact and with reverse flag for incoming DC and alarm bus DC fail supervision with test push button.
24	Single element AC operated auxiliary relay having self reset contact only for incoming DC and alarm bus DC fail alarm cancellation.
25	Push button for incoming DC and alarm bus DC fail alarm accept.
26	Indicating lamp for incoming DC and Alarm bus DC fail indication.
27	AC operated buzzer for incoming DC and Alarm bus DC fail audible alarm.
28	DC operated emergency lamp with switch.
29	Cubicle illumination lamp operated from door switch.
30	Audible bell and hooter for trip and non-trip fascia annunciation.
31	15A, 3 phase plug & socket with switch.
32	Other Panel accessories & equipment relays etc. as required to fulfil the scheme Requirement.

5.3.2 CIRCUIT BREAKERS

SI. No.	Description	Requirement
1	Type	Vaccum
2	No. of Poles	3
3	Nominal/Highest System Voltage	33 kV/36 kV
4	Type of Installation	Outdoor
5	Duty Cycle	O- 0.3 sec-CO-3 min-CO
6	Operating cycles	Min. 10000
7	Control Voltage	110/220 V DC (10% to -15%)

SI. No.	Description	Requirement
8	Short Time Current Rating for 3 sec	25 kA
9	Continuous current rating	As per system design
10	Symmetrical Breaking Current Capacity	25 kA (rms)
11	Short Circuit Making Current	62.5 kA
12	Degree of protection	IP 65
13	Operating mechanism	Spring Charged
14	Auxiliary contacts	As required plus 6NO and 6NC contacts per pole as spare.
15	Noise level	Maximum 140dB at 50m distance from base of circuit breaker
16	Seismic acceleration	0.4 g horizontal

5.3.3 CURRENT TRANSFORMER

SI. No.	Description	Requirement
1	Type	Outdoor
2	Nominal/Highest System Voltage	33 kV/36 kV
3	Short Time Current Rating for 1 sec	25 kA
4	No. of Phases	Single
5	Insulation Class	Class A
6	Rated Power Frequency withstand voltage (Primary/secondary)	70 kV (rms)/3 kV (rms)
7	Rated Lightning Impulse Withstand Voltage	170 kV (peak)
8	Degree of protection	IP 65
9	Partial discharge level	10 Pico coulomb max.
10	Temperature rise	As per IEC 60044
11	Number of cores	Two (2) with One (1) protection core and one (1)metering core of accuracy 5P20 and 0.5 class respectively
12	CT secondary current	Protection cores – 1 Amp Metering Core – 1 Amp

5.3.4 POTENTIAL TRANSFORMER

SI. No.	Description	Requirement
1	Type	Outdoor
2	Nominal/Highest System Voltage	33 kV/36 kV
3	Short Time Current Rating for 1 sec	25 kA
4	No. of Phases	Single
5	Insulation Class	Class A
6	Rated Power Frequency withstand voltage (Primary/secondary)	70 kV (rms)/3 kV (rms)
7	Rated Lightning Impulse Withstand Voltage	170 kV (peak)
8	Rated voltage factor	1.2 continuous & 1.5 for 30 sec

SI. No.	Description	Requirement
9	Class of Accuracy	0.5/3P
10	Degree of protection	IP 65
11	Partial discharge level	10 Pico coulomb max.
12	Temperature rise	As per IEC 60044

5.3.5 ISOLATOR/DISCONNECTING SWITCH

The isolators and accessories shall conform in general to IEC 62271-102. Each isolating switch should have the following particulars under the site conditions for the system under design:

- Isolators shall comply with routine tests as per IEC 606181
- Isolator shall be gang operated for main blades and earth switches. The operation of the three poles shall be well synchronised and interlocked.
- The design of linkages and gears shall be such so as to allow one man to operate the handle with ease for isolator and earth switch.

SI. No.	Description	Requirement
1	Type	Outdoor
2	Nominal/Highest System Voltage	33 kV/36 kV
3	Short Time Current Rating for 1 sec	25 kA
4	No. of Poles	3
5	Continuous current rating	As per requirement
6	Short Time Current Rating for 3 sec	25 kA
7	Rated Power Frequency withstand voltage	
	a. To earth & between poles	70 kV (rms)
	b. Across isolating distance	80 kV (rms)
8	Rated Lightning Impulse Withstand Voltage	
	a. To earth & between poles	170 kV (peak)
	b. Across isolating distance	195 kV (peak)
9	Temperature rise	As per Table-IV of IS: 9921
10	Operating mechanism of Isolator and Earth Switch	Motor operated

5.3.6 SURGE ARRESTOR

SI. No.	Description	Requirement
1	Type	Metal Oxide Gapless
2	Rated Voltage	30 kV
3	Nominal Discharge Current	10 kA (8x20 micro impulse shape)
4	Installation	Indoor
5	Degree of protection	IP 67
6	Rated Power Frequency withstand voltage	70 kV (rms)
7	Rated Lightning Impulse Withstand Voltage	170 kV (peak)
8	RIV/Partial Discharge when energized at 1.05 times its continuous operating voltage shall not exceed b	250 microvolt/ less than 50 pico-coulomb

5.4 GENERAL REQUIREMENTS

The 33 kV Indoor C & R Panel shall be designed considering the minimum general requirements as mentioned hereunder:

- The C & R Panel shall confirm IP 41 or higher degree of protection.
- Each panel shall be equipped with space heaters to prevent moisture condensation within the enclosure and shall be complete with MCB, thermostats and auxiliary relay (if required).
- C&R Panel design shall comprise of fully compartmentalized execution having separate vertical sections for each circuit.
- Structure and control wiring shall be designed and arranged in such a manner so that future extension of the switchboard would readily be feasible.
- The circuit breaker shall be suitable for remote electrical and local electrical/manual operation. The closing coil shall operate correctly between 85% to 110% of its rated voltage and shunt trip shall operate correctly under all operating conditions of the circuit breaker between 70% to 110% of its rated voltage.
- The disconnecting switches shall be provided with local electrical/manual control from the panel. The disconnecting switches shall be fitted with earthing link wherever required. The disconnecting switch shall be connected between the transformer and circuit breaker for the power incoming from solar PV and for synchronization between the bus bar and transmission line through breaker, at 33 kV.
- The supplier shall ensure that the current transformers shall have adequate VA output for the type of protection & metering offered. The supplier shall also ensure that the current transformers quoted by him have adequate output for prescribed accuracy class and accuracy limit factor for the type of relays and instruments connected in their circuits. PS class CTs shall have low secondary resistance and high knee point voltage so as to avoid any possibility of CT saturation under through fault conditions.
- Three single phase voltage transformers shall be suitable for connecting in a bank of three phase voltage transformers for protection and measurement purpose for each incomer and outgoing feeders. Separate and dedicated voltage transformers shall be provided for synchronization.
- Each cubicle shall be equipped with space heaters, thermostats, illumination lamps & 240 V AC, 5A receptacle.
- Suitable single compression type, heavy duty brass cable glands with check nuts, rubber sealing ring and brass washers mounted on a removable gland plate shall be supplied with the C & R Panel to support all power and control cables entering the C&R Panel.
- Cables for each equipment must be tagged with permanent metal tag of impregnated cable number as per drawings at C&R Panel end and equipment terminal end as well as in the mid portion of the cables at certain distances as instructed by the owner or his authorized representative.
- The accuracy class of indicating instruments shall be 1 or better as per IS. The accuracy class of meters for commercial metering shall be 0.2 All instruments shall have means for calibration, testing and adjustment at site.
- Three phase watt hour meters conforming to latest issue of relevant Indian standard shall be provided with test link for CTs & PTs. Meters shall be compensated for temperature errors and factory calibrated to directly read the primary quantities.

- Following equipments at 33 kV C&R Panel shall be monitored from SCADA:
  1) Circuit breaker - On/Off status & Control
  2) Transformer - Winding temperature & Oil temperature Alarm status
  3) Energy meters
  4) Numerical Relays
  5) Voltmeters
  6) Ammeters
- Suitable earthing arrangement must be designed for the system.
- Finishing work like painting etc. for C&R Panel should be as per relevant IS.

5.5 APPROVAL

The Detailed Design Report submitted by the contractor to WBSEDCL must contain but not limited to the following details of the Ring Main Unit/C & R Panel:

- Detailed specification of all the items.
- Necessary Drawings (as per requirement during approval).
- All necessary test certificates and approvals etc.
- GTP and all other technical requirement/specification shall be in line with the specification available in; https://www.wbsedcl.in/irj/go/km/docs/internet/new_website/technicalSpecification.html.

The successful bidder required to produce all necessary test certificates and approvals of the product as per relevant standard with the Detailed Design Report.

Prior to the delivery of the product, the contractor shall submit but not limited to the following documents:

- Guarantees
- Instructions for installation and operation, manual
- Electrical diagrams
- Safety precautions
- Detailed schematics of all power instrumentation and control equipment and subsystems along with their interconnection diagrams. Schematics shall indicate wiring diagrams, their numbers and quantities, type and ratings of all components and subsystems etc.

The contractor can deliver the product to the site only after receiving such approval against their prayer in writing from WBSEDCL.

6. CABLES & CONDUCTOR

6.1 SCOPE

The scope of work under these specification covers the Design, Manufacture, Assembly, Shop Testing, Delivery at site, transit insurance, Storage, Erection, Testing & Commissioning of power, control and instrumentation cables (complete with cable terminals and all accessories for making the systems complete and for warranting a trouble free and safe operation).

The scope shall also include supply of all material, fabrication and erection of cable supporting structure, cable racks & trays as well as laying of cables on cable racks.

The scope of supply shall also include necessary spares required for a period of 5 (five) years & special tools & plants required for erection & maintenance.

The contractor shall assess the quantity of various sizes of the power, control, instrumentation and communication cables & its accessories along with cable racks & trays including the mandatory spares required for the project and shall furnish same in the bid. He shall also furnish the unit price for each item.

6.2 STANDARDS

The equipments covered under this chapter shall comply with the requirement of latest edition of following IS/BS/IEC specifications as amended up to date except where specified otherwise.

Sl. No.	Standards	Description
1	IS: 7098 – Part 1	Cross linked polyethylene insulated PVC sheathed cables for working voltage up to and including 1.1kV
2	IS: 7098 – Part 2	Cross linked polyethylene insulated PVC sheathed cables for working voltage from 3.3kV up to and including 33kV
3	IS 10418	Drums for cables
4	IS 8130	Conductors for insulated electric cables and flexible cords
5	IS 8308	Compression type tubular inline connectors for aluminium conductors
6	IS 8309	Compression type tubular terminals for aluminium conductors
7	IS 8438	Moulds of cast resin based straight joints of cable up to including 1.1kV
8	IS 11967	Specifications for co-axial cables
9	IS : 2062	Structural Steel (Standard Quality)
10	IS : 513	Cold rolled low carbon steel sheets & strips
11	IS : 277	Galvanized sheet steel
12	IS : 808	Rolled Steel Beam, Channels and Angle section
13	IS : 2629	Recommended practice for hot dip galvanizing of iron and steel.
14	IS : 2633	Method of testing uniformity of coating on zinc coated articles.
15	IS : 800	Specification for use of structural steel in general building construction.

Cables and other accessories complying with other internationally accepted standards such as IEC, IEEE, BS, etc. will also be accepted if they ensure performance and constructional features equivalent or superior to standards listed above. In such a case the Contractor shall clearly indicate the standard/standards adopted and furnish a copy of English version of the latest revision of the standard(s) along with the Bid and the salient features of comparison shall be brought out.

6.3 GENERAL REQUIREMENTS

Minimum requirements are mentioned hereunder.

- The cables shall be of type and design with proven record of similar power station installations.
- The colours of the cables (both AC & DC) should be so selected that there should not be any problem for identification of cables used for various circuits during inspection & testing.
- To facilitate easy identification of cores, multi-core control and instrumentation cables shall be colour coded by using PVC insulation of red, black, yellow, blue and grey colours in accordance with IS 1554 (Part I).
- Cable lengths shall be considered in such a way that straight through cable joint is avoided.
- 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.
- The contractor shall ensure that no bimetallic action takes place between the Aluminium conductor of the cable and the cable connecting lugs by filling the lugs with suitable compound.
- For the main cable ways, a system of cable racks and trays as well as cable ducts and trenches shall be provided. The power and the control cables will run on separate trays. The cables for emergency lighting, fire alarm systems, etc., shall run on separate trays. The power cables shall be laid on the uppermost rack to prevent spread of fire.
- In indoor installations, the cables must be laid through PVC conduit or GI pipe. In case of using metallic pipe as conduit proper grounding of the conduit must be done.
- Exposed cables, wherever, used, shall preferable have UV resistant jacket besides being water resistant.
- Cables for each equipment must be tagged with permanent metal tag of impregnated cable number as per drawings at MCC/C & R Panel end and equipment terminal end as well as in the mid portion of the cables at certain distances as instructed by the owner or his authorized representative.
- The loop length shall be provided for various cables as per the relevant Indian Standard.
- Cables shall be properly clamped at regular intervals with the help of non magnetic/molded fiber glass strip clamps/PVC sleeved clamps, of suitable size.
- When power cables are laid in the proximity of communication cables, the minimum horizontal and vertical separation between them may be 300 mm.

6.4 TECHNICAL REQUIREMENTS FOR CABLES AND CONDUCTOR

Minimum Technical requirements are mentioned below:

- All cables and connectors for use for installation of solar field must be of solar grade which can withstand harsh environment conditions including High temperatures, UV radiation, rain, humidity, dirt, burial and attack by moss and microbes 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/ TUV 2PfG 1169/09.07 for service life expectancy of 25 years)
- All cables shall be Fire Retardant Low Smoke (FRLS) type. The cables shall be sized based on the following considerations:
  - Rated current of the equipment
  - The voltage drop in the cable, during motor starting condition, shall be limited to 10% and during running condition, shall be limited to 3% of the rated Voltage
  - Short circuit withstand capability De-rating factor for various conditions of installations shall be considered while selecting the cable size
  - Variation in ambient temperature for cables laid in air
  - Grouping of cable
  - Variation in ground temperature and soil resistivity for buried cables
- HT cable shall be designed based on the short circuit conditions and LT cable shall be sized based on the voltage drop.
- Size of aluminium power cable shall in no case be less than 16 mm^2 and copper power cable shall not be less than 6 mm^2. Where there is requirement of cables less than the above mentioned values, copper cable of appropriate size but not less than 4 mm^2 may be used.
- Minimum size of the control cable for CT circuit shall be 4 mm^2 and that for potential circuit shall be 2.5 mm^2.
- The cables shall be capable of satisfactory operation under a power supply system voltage variation of ± 10% and frequency variation of ± 5% and a combined frequency voltage variation of 10% (absolute sum). The cables shall have heat and moisture resistant properties.
- Conductor size of cables and wires shall be selected based on efficient design criteria. The wiring size of shall be designed such that maximum voltage drop at full power from the PV Array to Inverter(s) should be less than 1.5%. From Inverter to AC Grid interfacing panel should be less than 2.5%.
- The continuous withstand temperature shall be 90^oC and 70^oC for XLPE and PVC cables respectively and the short circuit withstand temperature shall be 250^0C and 160^oC for XLPE and PVC cables respectively.
- The Jointing Boxes shall comply in all aspects with the provision of the latest issue of relevant standards.
- The control cables shall be multi-core, colour coded, annealed, stranded high conductivity copper, single conductor, insulated with HR-PVC insulation, PVC sheathed, unarmoured FRLS type conforming to IS 1554 (part I & II)/relevant IEC. The outer sheath is of specially formulated PVC compound.
- The instrumentation cables in addition to meeting the requirements of control cables shall be provided with electrostatic shielding by aluminium tape and screening by annealed tinned copper wire.
- For connecting solar modules with solar inverter via array junction box (1.1 kV), solar inverter output with three winding transformer input (1.1 kV), three

winding transformer output with 33 kV Indoor C & R Panel (33 kV) and 33 kV Indoor C & R Panel (33 kV) with the 33 kV Switchyard (33 kV), cables of suitable size shall be provided.

- Number of Local Control Rooms with 33 kV Indoor C & R Panel shall be as per plant design. One number Main Control Room shall be provided adjacent to the 33 kV Switchyard. Cable Trench of suitable size as per relevant standard shall be a part of the scope of work.

6.5 TECHNICAL REQUIREMENTS OF CABLE LAYING

Minimum technical requirements for cable racks and trays are mentioned below:

- The contractor shall fabricate and supply the mounting arrangement for the support and installation of all the cable trays on galvanized steel structure including channels, angles, rods etc at requisite spacing in the suspended cable trays, cable trenches. Supporting structures wherever necessary, shall be provided by the contractor.
- The contractor shall provide embedment/anchor fasteners for fixing the supporting structures.
- These supporting structures shall be fabricated from structural steel members (channels, angles and rods) of the required size.
- The vertical member of the support will be of ISRO12 threaded rod or ISMC100 channel. The horizontal member of the support will be of angle ISA 50X50X6. For the threaded rod support configuration the horizontal member shall be fixed by bolting whereas for channel configuration the horizontal member shall be fixed by welding to the channel.
- Trays shall be of ladder type. The trays shall be fabricated from Hot Rolled Carbon Mild Steel (conforming to IS 1079, Grade "O", of chemical composition (C, Si, Mn, S, Ph) sheet of proper thickness as per IS.
- Cable trays shall be fixed with support by hold-down clamps. The clamps shall be fabricated from MS sheet of appropriate thickness and Hot Dip Galvanized.
- The contractor shall supply various tray fittings and accessories like coupler plate with fasteners, horizontal tees, vertical and horizontal elbows, vertical and horizontal adjustable connectors required for the mentioned trays. All accessories, fittings, elbows and tees shall be Hot Dip Galvanized. The nuts, bolts and washers shall be cadmium plated or electrolytically galvanized.
- Proper earthing of the trays and continuity between tray components must be ensured by the contractor.
- The contractor shall install the cable trays in accordance with relevant standards.
- Cable drums shall be unloaded, handled and stored in an approved manner on hard and well drained surface so that they may not sink. In no case shall be drum be stored flat i.e. with flange horizontal. Rolling of drums shall be avoided as far as possible. For short distances, the drums may be rolled provided they are rolled slowly and in proper direction as marked on the drum. In absence of any indication, the drums may be rolled in the same direction as it was rolled during taking up the cables. For unreeling the cable, the drum shall be mounted on suitable jacks or on cable wheels and shall be rolled slowly so that cable comes out over the drum and not from below. All possible care shall be taken during unreeling and laying to avoid damage due to twist, kink or sharp bends. Cable ends shall be provided with sealed plastic caps to prevent damage and ingress of moisture.

- Cables shall be laid on cable trays strictly in line with cable schedule. Laying of cable shall be done stretch-wise as follows:

  a) PV array field to SCB/AJB: On cable tray. b) SCB/AJB to Inverter Room: Burried as per Technical Specification- Electrical. c) All AC power cables including control cables in Control Room and Switchyard shall be laid in RCC cable trench.

- Power and control cables shall be laid on separate tiers in RCC cable trench with slab cover in line with approved guidelines/drawings. The laying of different voltage grade cables shall be on different tiers according to the voltage grade of the cables. In horizontal tray stacks, H.T. cables shall be laid on topmost tier and cables of subsequent lower voltage grades on lower tiers of trays. Single core cable in trefoil formation shall be laid with a distance of four times the diameter of cable between trefoil center lines and clamped at every two meter. All multi core cables shall be laid in touching formation. Power and control cables shall be secured fixed to trays/support with self-locking type nylon cable straps with de-interlocking facilities. For horizontal trays arrangements, multi core power cables and control cables shall be secured at every five meter interval. For vertical tray arrangement, individual multi core power cables and control cables shall be secured at every one meter by nylon cable strap. After completion of cable laying work in the particular vertical tray, all the control cables shall be binded to trays/supports by aluminium strips at every five meter interval and at every bend.

- Bending radii for cables shall be as per manufacturer's recommendations and IS: 1255. Directly Buried Cables.

- Cable trenches shall be constructed for directly buried cables. Construction of cable trench for cables shall include excavation, preparation of sieved sand bedding, riddled soil cover, supply and installation of brick or concrete protective covers, back filling and compacting, supply and installation of route markers and joint markers. Laying of cables and providing protective covering shall be as per IS: 1255. Cable shall be laid in such a systematic manner, so that in case of occurrence of fault the faulty cable can be identified in shortest possible time.

- RCC cable route and RCC joint markers shall be provided wherever required. The voltage grade of the higher voltage cables in route shall be engraved on the marker. Location of underground cable joints shall be indicated with cable marker with an additional inscription "Cable Joint". The marker shall project 150 mm above ground and shall be spaced at an interval of 30 meters and at every change in direction. They shall be located on both sides of road crossings and drain crossings. Top of cable marker/joint marker shall be sloped to avoid accumulation of water/dust on marker.

- Cable tags shall be provided on all cables at each end (just before entering the equipment enclosure), on both sides of a wall or floor crossing, on each duct/conduit entry, and at every 20 meters in cable tray/trench runs. Cable tags shall also be provided inside the C & R Panel, motor control centers, control and relay panels etc. where a number of cables enter together through a gland plate. Cable tag shall be of rectangular shape for power cables and control cables. Cable tag shall be of 2 mm thick aluminum with number punched on it and securely attached to the cable by not less than two turns of 20 SWG GI wire conforming to IS:280. Alternatively, the Contractor may also provide cable tags made of nylon, cable marking ties with cable number heat stamped on the cable tags.

- Inspection pit at suitable places to be provided for the purpose of maintenance.
- Adequate no. of spare DC cables shall be laid for the purpose of better reliability and minimize interruption period.
- For each Transformer at both Incoming and outgoing side minimum one no. spare cable shall be laid for the purpose of better reliability and minimize interruption period.

6.6 APPROVAL

The Detailed Design Report Submitted by the contractor to WBSEDCL must contain but not limited to the following details of the Cables and conductor and the accessories for their installation:

- Detailed design and specification of all the items.
- All necessary drawings
- Calculations for choosing cable size
- Type test reports and necessary certificates etc.
- Performance certificate from the purchaser.

Before dispatch, sample pieces of the cable shall be subjected to type, routine, acceptance and FRLS tests at the manufacturer's works as stipulated in IS 1554 (Part I)/IEC in the presence of owner or his representative. Routine tests and acceptance tests as per relevant standards shall be carried out on each type of cable in presence of the owner or his representative.

Before commissioning of complete system all cabling system shall be checked as per cable schedule and complete report shall be prepared by Contractor and shall be submitted.

Prior to the delivery of the product, the contractor shall submit but not limited to the following documents:

- Guarantees
- Cable routing and layout drawings
- Detailed procedure adopted for the earthing of the trays
- Type test certificates for cable trays etc.

The contractor can deliver the product to the site only after receipt of such approval against their prayer in writing from WBSEDCL.

7. STATION AUXILIARY TRANSFORMER

7.1 SCOPE

This section covers the activities related to design, manufacturing, testing at works, supply, insurance, transportation and delivery at Project site, storage, erection, testing, commissioning of 33 / 0.415 kV oil fill type station auxiliary transformers and associated equipments as detailed hereunder.

The scope of supply shall also include necessary spares required for normal operation & maintenance of transformers for a period of 5 (five) years & special tools & plants required for erection & maintenance. Corresponding parts of all the equipments & spares shall be of the same material & dimensions, workmanship & finish and shall be interchangeable. All the material & workmanship shall be of suitable commercial quality as have proven successful in their respective uses in similar services & under similar condition.

The transformers and associated equipment shall be suitable for interfacing with SCADA system and all necessary transducers shall be included in the scope of supply.

7.2 STANDARDS

The equipments and materials covered by this specification shall conform to the latest edition of following Indian Standards or equivalent IEC standards except where specified otherwise in this specification:

Sl. No.	Standards	Description
1	IS: 2026 (Part I to IV) /IEC 76	Power Transformer
2	IS: 2099/IEC 137	Transformers bushings
3	IS: 2705/IEC 185	Current transformers
4	IS: 1180	Three phase distribution transformer
5	IS: 6088	Dimensions for porcelain transformer bushings
6	IS: 3347	Loading guide for oil-immersed transformers
7	IS: 335	Transformer oil
8	CBIP No. 295	CBIP Manual on Transformers Publication

Equipment meeting with other authoritative standards which ensure an equal or better quality is also acceptable. Where the equipment conforms to any other authoritative standard, the salient points of difference between the standard adopted and IS/IEC shall be clearly brought out in the tender. Complete set of documents and standards in English shall be supplied by the bidder without any extra charge. It shall, however, be ensured that equipment offered comply with one consistent set of standards except in so far as they are modified by the requirement of this specification.

7.3 TECHNICAL REQUIREMENTS

- Capacity of the Station Auxiliary Transformer (SAT) shall be calculated based on the total auxiliary load of the plant.
- HT side of the transformer shall be connected to the 33 kV Bus through Isolator with earth switch of required rating and LT side shall be terminated to the Station Service Board (SSB)/ 415 V LT Switchgear.
- SAT shall be installed at the switchyard of the plant.

- The transformer shall be able to perform satisfactorily under voltage variation limit of +/- 10 % and frequency variation limit of +/- 5 %.
- Vector group of the transformer shall be Dyn11
- Off Circuit Tap changer (-7.5% to +5% @ 2.5% steps) shall be provided with the transformer. Owner will take final decision regarding this based on the proposal submitted by the contractor.
- % Impedance, type of bushing, class of insulation, temperature rise etc. shall be as per relevant Indian Standard.
- The transformers shall be suitable for co-ordination and integration with SCADA System and necessary contacts and/or ports for the purpose shall be provided.
- Earthing arrangement of the transformers shall be provided as per the relevant Indian Standard.
- Necessary protection arrangement like should be provided in the transformer.
- Construction of different parts of the transformer shall conform to the latest edition of relevant Indian Standard.
- Fittings and accessories shall be provided as per relevant Indian Standard code.
- Transformer oil shall conform to latest edition of IS 335.

7.4 APPROVAL

The Detailed Design Report Submitted by the contractor to WBSEDCL must contain but not limited to the following details of the transformers:

- Detailed specification
- Fittings and Accessories
- Necessary Drawings and GTP as mentioned in case of Solar Transformer.
- Tools and spare parts etc.
- Type Test Reports and certificates etc.
- GTP and all other technical requirement/specification shall be in line with the specification available in; https://www.wbsedcl.in/irj/go/km/docs/internet/new_website/technicalSpecification.html.

A joint inspection and testing will be done by owner and the authorized representatives of the contractor at the manufacturer's workshop, if desired so by the owner. Testing will be done as per relevant IS Code.

Prior to the delivery of the product, the contractor shall submit but not limited to the following documents:

- Guarantees
- Instructions for installation and operation, manual
- Test Reports for routine and acceptance tests etc.

The contractor can deliver the product to the site only after receiving such approval against their prayer in writing from WBSEDCL.

8. LT ACDB

8.1 SCOPE

The scope of work under this specification covers the design, manufacture, assembly, testing at manufacturer's works, transportation, transit insurance, delivery at site, storage, installation, testing, and commissioning of indoor type following 415V LT ACDB complete with all accessories and spares. Design shall be finalised during detail designing of the plant.

8.2 STANDARDS

The equipments covered under this chapter shall comply with the requirement of latest edition of following IS/BS/IEC specifications as amended up to date except where specified otherwise.

Sl. No.	Standards	Description
1	IS: 13947 (Part 1 to 5)	Specification for Low-Voltage Switchgear and Control gear.
2	IS: 10118 (Part 1 to 4)	Code of practice for selection, installation and maintenance of switchgear & control gear.
3	IS: 1248	Specifications for Electrical Indicating Instruments
4	IS: 2633	Hot dip Galvanizing
5	IS: 2705	Current Transformers
6	IS: 3156	Voltage Transformers
7	IS: 3231	Electrical Relays for Power System Protection
8	IS: 5082	Wrought Aluminum and Aluminum Alloy bars, tubes and sections for electrical purposes.
9	IS: 8623	General requirement for factory built assemblies up to 1000V.
10	IS: 8828	Circuit breakers for over current protection for household and similar installations
11	IS: 13703	Low Voltage fuses for voltages not exceeding 1000V AC
12	IS: 11353	Guide for uniform system of marking and identification of conductors and apparatus terminals.

Equipment meeting any other authoritative national or international standards that ensure equal or better quality than the standards mentioned above are also acceptable. Where the equipment conforms to any other standards than those mentioned above, salient points of difference between the standards adopted and standards mentioned above shall be brought out in the tender.

The electrical installation shall meet the requirement of Indian Electricity rules and other statutory regulations as amended up to date and relevant BIS code of practice.

8.3 TECHNICAL REQUIREMENTS

- Main Incoming A.C. circuits on Station service Board shall be controlled circuit breaker. Type and capacity of the breakers shall be proposed by the bidders in their bid considering the total auxiliary load of the plant.
- The LT ACDB shall be suitable for indoor installation in the control room.

- LT ACDB shall be placed in each control room and shall be connected to each other by means of 415 V (3 phase, neutral) transmission line along the whole area. LT switchgear at main control room shall be connected with Station Auxiliary Transformer 1 (as mentioned in the chapter "Station Auxiliary Transformer") and LT switchgear of a local control room placed at a suitable distance away from the Main Control Room shall be connected with Station Auxiliary Transformer 1 (as mentioned in the chapter "Station Auxiliary Transformer").
- The Station Service Board (SSB) shall be sectionalized in two parts through sectionalizing breakers on the bus to ensure continuity of supply to the auxiliaries in case of failure/fault on one section.
- For interconnection with various boards and all outgoing feeder circuits, 25 kA, 3 pole draw-out type MCCBs with adjustable current setting shall be provided.
- The 415V switchboards shall be metal-enclosed fixed type, free standing, self-supporting, floor mounted, indoor type, totally enclosed and compartmentalized to house the switchgear. Circuit breakers and other switchgear components shall be arranged in compartments, vertically in a multi-tier formation. All metering and protection equipment associated with a particular circuit shall be housed in separate and independent compartment earmarked for particular circuit and in the fixed portion of the vertical panel in case of breaker panels.
- Construction of all the switchboards and equipments shall conform to the latest edition of relevant IS codes.
- All cable glands and aluminum crimping type cable lugs for all power and control cables shall be in the bidder's scope of supply. Panels shall be suitable for bottom entry of cable unless otherwise specified.
- The bidder shall indicate clearly the de-rating factors, if any, employed for each component and furnish the basis for arriving at these de-rating factors duly considering the specified current ratings, ambient temperature etc.
- The equipment shall comply with all safety requirements during erection and operation as per relevant standards.
- The neutral of the incoming transformer secondary shall be connected to the neutral bus of the auxiliary boards. The neutral shall be connected to the common earthing system of the switchyard/control room.
- All auxiliary devices for control, indication, measurement and protection such as push buttons, control and selector switches, indicating lamps, Power monitors, kWh meters and protective relays shall be mounted on the front side of the respective compartment. The design shall be such that unless required for maintenance / inspection purposes, all power ON/OFF or START / STOP and relay reset operations shall be performed without opening the panel door.
- The switchboard panels shall be provided with thermostatically controlled space heaters to prevent moisture condensation.
- LED lamp fittings along with necessary isolating switches shall be provided for illumination inside the panels. Each panel shall be provided with an industrial grade power socket as well.
- The 415V bus shall be of suitable cross-section so as to be able to carry the required continuous and short circuit currents within the limits of temperature rise for the site conditions.

- Control and selector switches shall be rotary type with escutcheon plates clearly marked to show the function and positions. The switches shall be of sturdy construction suitable for mounting on panel front.
- AC Distribution Board is to be provided in the main switchgear room and in the particular local control room having auxiliary transformer as per requirements.
- Instrument transformers shall be provided and shall conform to the relevant standard.
- All protective device shown in the drawing and others required for operation of the system as per the specification shall be included in the scope of supply.
- All instruments and meters shall be suitable for operation under the climatic conditions prevailing at site. The instrument cases shall be dust-proof, water tight, vermin proof, specially constructed to adequately protect the instruments against damage or deterioration due to high ambient temperature and humidity.
- Watt hour meter shall be suitable for 3-Phase, 4-wire unbalanced system and shall comply generally with the requirements of relevant IS code and shall be of first grade for the purpose of accuracy classification. Watt hour meters shall be provided in each LT ACDB.
- Panels shall be supplied completely wired internally to equipment and terminal blocks for connection to external cables entering the panel from the bottom. Terminal blocks shall be complete and provided with necessary terminal accessories for cable ends.
- Engraved PVC labels shall be provided on incoming and all outgoing breaker compartments, the exact details of legend to be engraved shall be furnished later to the contractor.
- All vertical cubicles shall be connected to earth bus bar running throughout the length of the switchboard. All doors and movable parts shall be connected to the earth-bus with flexible copper connections. Provision shall be made to connect the earthing bus bar to the main earthing grid at two ends. All non-current carrying metallic parts of the mounted equipment shall be earthed. Earthing bolts shall be provided to ground cable armours.
- Finishing work like painting etc. for ACDB should be as per relevant IS.

8.4 APPROVAL

The Detailed Design Report submitted by the contractor to WBSEDCL must contain but not limited to the following details of the LT Switchgear:

- Detailed specification of all the items.
- All necessary drawings
- All necessary test certificates and approvals etc.
- GTP and all other technical requirement/specification shall be in line with the specification available in; https://www.wbsedcl.in/irj/go/km/docs/internet/new_website/technicalSpecification.html.

Prior to the delivery of the product, the contractor shall submit but not limited to the following documents:

- Guarantees
- Instructions for installation and operation, manual
- Electrical diagrams

- Safety precautions
- Detailed schematics of all power instrumentation and control equipment and subsystems along with their interconnection diagrams. Schematics shall indicate wiring diagrams, their numbers and quantities, type and ratings of all components and subsystems etc

The contractor can deliver the product to the site only after receiving such approval against their prayer in writing from WBSEDCL.

9. DC BATTERY, BATTERY CHARGING EQUIPMENT & DCDB

9.1 SCOPE

The scope of work under this specification covers the design, manufacture, assembly, testing at manufacturer's works, transportation, transit insurance, delivery at site, storage, installation, testing, and commissioning of D.C equipment comprising of 110/220 V D.C Battery Bank of suitable designed capacity complete with battery charging equipment, D.C. Distribution Board and other auxiliary equipments.

The scope shall include all associated devices, components, relays, contactors, switches etc. required for satisfactory operation of the DC equipment as per the proposed logic control scheme.

The scope of supply shall also include necessary spares required for normal operation & maintenance of DC equipments for a period of 5 (five) years and special tools & plants required for erection & maintenance.

Corresponding parts of all the equipments & spares shall be of the same material & dimensions, workmanship & finish and shall be interchangeable. All the material & workmanship shall be of suitable commercial quality as have proven successful in their respective uses in similar services & under similar condition.

9.2 STANDARDS

The equipments covered under this chapter shall comply with the requirement of latest edition of following IS/BS/IEC specifications as amended up to date except where specified otherwise.

Sl. No.	Standards	Description
1	IS: 1651	Stationary cells & batteries, lead acid type (with tubular positive plates)
2	IS: 266	Battery grade Sulphuric Acid. (Battery electrolyte)
3	IS: 1069	Water for storage batteries
4	IS: 1146	Rubber & Plastic containers for lead Acid storage batteries
5	IS: 1248	Electrical Indicating Instruments
6	IS: 13947	Low voltage switchgear and control gear
7	IS: 3895	Mono-crystalline semi-conductor rectifier cells & stacks
8	IS: 8320	General requirement and methods of tests for lead acid storage batteries
9	IS : 6071	Synthetic separators for lead acid batteries
10	IS : 8623	Factory built assemblies of switchyard and control gear for voltage up to including 1000 V AC and 1200 V DC (Part 1 to 3)
11	IS : 4540	Non-crystalline semi-conductor rectifier assemblies & equipment

Equipment meeting any other authoritative national or international standards that ensure equal or better quality than the standards mentioned above are also acceptable. Where the equipment conforms to any other standards than those

mentioned above, salient points of difference between the standards adopted and standards mentioned above shall be brought out in the tender.

9.3 GENERAL REQUIREMENTS

Minimum general requirements for the DC Battery, Battery charger and DC Distribution Board are mentioned below.

- Lead acid tubular type battery of required rating shall be provided at Main Control Room and each Local Control room. Battery Bank at Main Control Room shall be 110/220 V and Battery Bank at Local Control Rooms shall be selected based on the Control Voltage required for closing and tripping of 33 kV Indoor type VCBs. 10 hours continuous discharge shall be considered for sizing the battery.
- One float charger and one float cum boost chargers shall be provided to maintain constant voltage at D.C. bus bars while supplying the continuous load in addition to keeping the battery on float charge.
- In case of sudden D.C. requirements due to failure of A.C. supply or charger itself, the battery shall be capable of meeting the system load demand. In case of failure of float charger supplying the continuous DC load, the affected battery charger shall get disconnected automatically from the DCDB and the complete D.C. load requirements shall be met by the float charger of float cum boost charger unit.
- The charger shall be protected against overloads by having suitable characteristics so that all loads in excess of the capacity of the charger would be transferred to the battery.
- In the event of failure of A.C. supply, the battery shall meet the complete D.C. requirements. After the discharge of battery to a considerable extent, the boost charger on restoration of A.C. supply shall recharge the battery in a short period. During the period of boost charging, the D.C. load requirements of power station shall also continue to be met.
- The distribution board with necessary switch and interlock, if any, shall be provided for distributing the D.C. power for the control & protection circuits, emergency D.C. supply for essential lighting etc.
- The bidder may give his recommendation on the scheme of operation of battery, battery chargers as described in the specifications. However, the decision of the owner in this regard shall be final and bound to the bidder/contractor.
- The battery shall be capable of delivering the rated output at the minimum temperature of -3°C and maximum temperature of +40°C.
- The battery shall be mounted on the two tier wooden racks supplied along with the battery. Each cell as well as its locations shall be numbered for proper record of maintenance operations. Battery should be placed on the porcelain base kept on the wooden rack.
- The battery shall be connected to D.C. distribution board by single core cables laid above ground. Suitable terminal arrangement with glands shall be provided for this purpose.
- Battery room shall be painted with acid proof paint. Exhaust fans should be provided in the battery room. Contractor shall submit the details of the same to the owner.
- The ripple content in the D.C. current shall be less than 1%.

- The float charger unit shall be capable of supplying continuous D.C. load and trickle charge the battery.
- Necessary alarm and indication shall be provided with the DC System and also in the annunciation window of the Battery Charger.
- Necessary terminals with lugs for earthing the charger panels with two distinct separate earthing for each panel shall be provided. In addition, separate terminals for earthing of equipment shall be provided. The charger panels shall have space heaters.
- Compression type cable glands of suitable rating for PVC unarmoured cable, suitably mounted in the panel for cable entry from the bottom for A.C. & D.C. supplies shall be provided.
- Type of cell, cell terminal, containers and installation of battery, chargers, inverter, DC Distribution Board, cables etc. should conform to the latest edition of relevant Indian Standard.
- During installation of battery, charging & discharging and charging is to be done proper installation procedure.

9.4 TECHNICAL REQUIREMENTS

Minimum technical requirements for the DC Battery, Battery charger and DC Distribution Board are as following.

- The battery shall be made of lead-acid cells with tubular type plates conforming to latest issue of IS 1651. The battery cells shall be high discharge performance (HDP) type.
- The capacity of 110/220 V D.C. batteries based on 10 hours discharge rate shall be selected to fulfill the plant's requirement. The contractor shall propose the same to the owner and decision of the owner will be final and bound to the contractor.
- The battery shall normally remain under floating condition with the charger supplying the normal continuous load. However, the battery shall be capable of supplying the load without fall of terminal voltage per cell below 1.85V (92.5% of rated voltage).
- The number of cells of the 110/220 volt battery bank at Main Control Room and required voltage at Local Control Room shall be chosen to suit the following conditions.
    - Nominal floating voltage per cell shall be between 2.15 and 2.21 V.
    - The voltage of each cell under floating conditions shall be of optimum value for its performance and maintenance in a healthy condition.
    - The voltage of the battery after meeting the D.C. load cycle shall not be less than 90% of the rated voltage. The manufacturer shall ensure safe operation of the battery after the aforementioned end voltage.
    - The voltage across the load shall not exceed 110% of rated value under charging conditions of the battery. To achieve this condition under quick charging, a blocking diode may be incorporated by the supplier in the charging equipment.
- The bidder shall clearly justify the choice of number of cells in the tender on the above lines and furnish any clarifications required by the owner.

- All cell terminals shall have adequate current carrying capacity and shall be of lead-alloy or lead-alloy reinforced with copper core inserts. Cell terminal posts shall be equipped with acid resisting connector bolts and nuts.
- The electrolyte shall be of battery grade sulphuric acid. The battery shall be transported dry.
- The charging equipment shall preferably employ solid state full wave rectifier in a 3 phase full wave bridge circuit with suitable filter circuit of AC ripples, suitable for operation in conjunction with static voltage regulator. A.C. and D.C. Circuit breakers with thermal overload and instantaneous short circuit releases shall be provided on input and output sides of chargers respectively.
- Capacity of the float charger and the boost charger in the float cum boost charger shall be sufficient to meet the system requirement. Contractor shall submit the details to the owner.
- The charger shall be capable of providing the floating voltage between 2.15 V to 2.21 V per cell with the variation of not more than +1% irrespective of input supply voltage fluctuations within +/-10%, frequency fluctuation within +/-5 % throughout its ampere rating with ambient air temperature range of -3^0C to 40^0C.
- The DC Distribution Board (DCDB) shall be free standing, self-supporting and floor mounting type. It shall be totally enclosed and compartmentalized. DCDB shall be made as per relevant Indian Standard.
- The Emergency Lighting Board supplying the emergency lighting requirement of the power house at A.C shall have an arrangement so that automatic changeover to emergency lighting in case of A.C. failure, is achieved through an inverter of suitable capacity. Normally, the inverter shall run on AC. supply. In the event of failure of AC, the inverter shall automatically switch-over to DC supply and feed the selected emergency loads (lighting loads) at 230 V AC. On restoration of AC supply, the inverters load will automatically return to AC.
- The DC system shall have necessary control & protection arrangement which include but not limited to the following.
    - Auto/Manual selector switch
    - Digital D.C. voltmeter, ammeter
    - A.C. failure alarm
    - Ground fault relay and its annunciation
    - Double pole D.C. contactor of suitable capacity for annunciation
    - Triple pole A.C. contactor of suitable capacity for ON/OFF operation
    - MCCB and DC contactor of suitable capacity in output circuit of each charger to suit the operation requirements.
    - Indicating lamps, as required
    - Triple pole, A.C. circuit breaker of sufficient capacity to meet system requirements & capacity with overload and short circuit release for incoming A.C. supply to charger panel
    - MCB/MCCBs for A.C. supply to individual chargers
    - A.C. under voltage relay
    - A.C. voltmeter, ammeter etc.
- Nearest local control room from the main control room should be connected with 110/220 V DC from Battery Bank DCDB.
- 110/220 V AC/DC converter is to be provided in each isolated C & R Panel for operation of circuit breaker/isolator as and where required. Power required in ACDB/DCDB for illumination, control system etc. for each control room should

be collected from 415 V (3phase+N) transmission line with necessary cables and protection.

9.5 APPROVAL

The Detailed Design Report submitted by the contractor to WBSEDCL must contain but not limited to the following details of the DC system:

- Detailed specification of all the items.
- Necessary Drawings
- Test Certificates etc.
- GTP and all other technical requirement/specification shall be in line with the specification available in; https://www.wbsedcl.in/irj/go/km/docs/internet/new_website/technicalSpecification.html.

Prior to the delivery of the product, the contractor shall submit but not limited to the following documents:

- Guarantees
- Instructions for installation and operation, manual
- Detailed schematic, connection and control wiring diagrams etc.

The contractor can deliver the product to the site only after receiving such approval against their prayer in writing from WBSEDCL.

10. PROTECTION SYSTEM

10.1 SCOPE

The scheme shall consist of design, engineering, quality surveillance, manufacture, tests at manufacturer's works before dispatch, transport, transit insurance, supply, delivery to site, storage at site, erection, testing, trial run and commissioning, handing over to the purchaser of protection system for

- PV Array yard
- Solar Inverter
- Three winding Step up Transformer
- Incomer feeder for 33 kV Switchyard
- Station Auxiliary Transformer
- 33 kV outgoing feeder

The protection system shall include protection relays, trip relays, relay contacts, trip & alarm circuits, Annunciation system, diagnostic system, other necessary equipment with all accessories, wiring and cubicles for making the protection system complete for 10 MW (AC) Solar PV Power Plant at Chuasole & Kasturia Mouza, Block- Sankrail, Jhargram District, West Bengal.

10.2 STANDARDS

All materials and equipments shall conform to latest edition of relevant Indian/IEC Standards unless otherwise specified. Equipment conforming to any other authoritative standard ensuring equal or better quality than the standards indicated below will also be acceptable. However, in such eventuality, the salient points of difference between the standards adopted and the standards mentioned below shall be brought out by the bidder. The list of reference standards is given below:

Sl. No.	Standards	Description
1	IS: 2705	Current Transformers
2	IS: 3156	Voltage Transformer s
3	IEC: 60255 (Part 1 to 23)	Electric Relays
4	IEC: 60337	Control switches and low voltage switching devices for control and auxiliary circuits
5	IS: 1885	Electro-technical vocabulary on Electrical relays, Electric Power System Protection and Switchgear & Control
6	IS:13947	Degree of protection provided by enclosures for low voltage switchgear and control gear
7	IS: 3231	Electric relays for Power System protection
8	IS: 5834	Electric Timer relays
9	IS: 8686	Static Protective relays

10.3 TECHNICAL REQUIREMENTS

The technical requirements of the protection system shall be but not limited to the following.

- Protection shall be designed to ensure reliability, sensitivity and stability under through fault conditions of the system.

- The protection system shall be fully integrated with SCADA system.
- The protection scheme shall be coordinated with control & protection of solar modules, solar inverters and generator transformers etc. All protection, though not specified but which are recommended for this capacity of the machine as per relevant IEC / other Standards shall be provided.
- The protective relays shall be of the numerical, fully tropicalised, plug in type, arranged in protection cubicles including all ancillary devices, such as interposing transformers, tripping matrix and relays, test facilities, power supply units, etc. with all circuits complying to latest editions of IEC 60255-4 recommendation or British Standard 142 and 5992, parts 1, 2 and 3 or relevant Indian Standard.
- The relays/protection system shall be of state of the art of technology and only latest proven versions of the relay series shall be offered. If the protection system mentioned in the awarded Contract become obsolete at the time of supply, the Supplier shall offer the latest model with the approval of Employer, without any extra cost.
- Protection system shall be provided to prevent operation of protective equipment due to, magnetizing current inrush during switching-in of the transformer from the high voltage side.
- Precaution shall also be taken so that the unavoidable inductive and capacitive couplings from the power circuits do not cause disturbances.
- Protection relay shall have features but not limited to the following:
    - Man machine communication interface with alarm and trip value setting, displaying of alarm/trip set values, alarmed/tripped values, fault current and disturbance values etc.
    - Self-supervision and indication of any failure.
    - Continuous monitoring of external and internal auxiliary voltages
    - Easiness of replacing a set in case of failure.
    - Communication interfaces or ports.
    - Indication of alarm and trip condition.
    - Test facilities etc.
- All devices shall be insensitive to mechanical shocks, vibration and external magnetic fields.
- The protection relays, shall be located in conventional panels and shall be flush mounted in dust and moisture proof cases with protection class IP 54 and of the draw out type with rear connections. The protection class of the cover for all relays or protection systems, in which the modules are mounted, shall not be inferior to IP 54.
- The protection systems shall be fed by the battery banks installed in the main control room and local control rooms. Relay shall be suitable for operation on DC systems without the use of voltage dropping resistors.
- The supplier has to supply the equipments for protection of best quality. The supplier has to maintain control and quality assurance during the manufacture, installation, testing and commissioning of equipments as per approved quality assurance plan.

10.4 APPROVAL

The Detailed Design Report submitted by the contractor to WBSEDCL must contain but not limited to the following details of the protection system:

- Detailed specification of all the items.
- All required drawing etc.
- GTP and all other technical requirement/specification shall be in line with the specification available in; https://www.wbsedcl.in/irj/go/km/docs/internet/new_website/technicalSpecification.html.

Prior to the delivery of the products, the contractor shall submit but not limited to the following documents:

- Guarantees
- Instructions for installation
- Instruction O&M manual Testing & commissioning manuals
- Detailed BOQ covering protection relays, CTs /PTs, DC Sources and all other devices.

The contractor can deliver the product to the site only after receiving such approval against their prayer in writing from WBSEDCL.

11. EARTHING SYSTEM

11.1 SCOPE

The scope of work under this specification covers the design, supply, transportation, delivery at project site, transit insurance, storage at site, erection, testing & commissioning of earthing system along with necessary materials

11.2 STANDARDS

The grounding system shall conform to the requirement of following standards.

Sl. No.	Standards	Description
1	ANSI/IEEE: 80 –2000	Guide for safety in AC Substation Grounding
2	CBIP Publication: 223	Design of Earthing Mat for High Voltage substation
3	IS: 3043	Code of Practice for Earthing Indian Electricity Rules

11.3 OBJECTIVE

The grounding system shall be designed with the following objectives:

- To provide low impedance path to fault currents, during ground faults, to ensure prompt and consistent operation of protective devices to effect isolation
- To keep the maximum voltage gradient during ground faults along the surface inside and around the switchyard, PV array yard, control rooms etc. within safe limits
- To protect the life and property from electrical shocks due to over voltage
- To stabilize circuit potentials with respect to ground and limit the overall potential rise

11.4 TECHNICAL REQUIREMENTS

Minimum technical requirement of the earthing system is mentioned below.

- The earth resistance should be less than 1 Ω.
- Suitable number of earthing pit shall be provided at the array field.
- Design and installation of the earth mat and other associated system shall confirm IS: 3043 and shall be followed by modern practice.
- The earthing for solar field and power distribution system shall be made with GI pipe of suitable size 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: 3043. The Mounting structure shall be grounded properly using GI strips and maintenance free earthing kit.
- Necessary provision shall be made for bolted isolating joints of each earthing pit for periodic checking of earth resistance.
- The earth conduction shall run through GI pipe partly buried and partly on the surface of the control room building.
- The complete earthing system shall be mechanically & electrically connected to provide independent return to earth.
- All three phase equipment shall have two distinct earth connections.

- Along the cable trays suitable size of GI Flat shall be provided inside the control room.
- For each earth pit, necessary Test Point shall have to be provided.
- The earthing system shall be connected to the following.
  - Solar modules with suitable number of earthing pit at the solar array field
  - The neutral point of each system/equipment
  - Equipment framework and other non-current carrying parts
  - Frames of panels & cubicles
  - Metallic structures of switchgear, cable racks, casing of cable boxes
  - Equipment supporting Steel structures
  - All extraneous metallic frame work not associated with equipment
  - The earth point of lightning arrestors; voltage transformers and lightning conductors through their permanent independent earth electrodes.
  - Fence
- For equipment connection to mat/riser, 50 mm x 6 mm or higher size GS flat shall be used.
- The conductor shall be of adequate cross-section to safely withstand the system fault current for time duration of fault clearance by the remotest/back up protective system.
- Sufficient allowance needs to be provided for corrosion of the embedded conductor on account of chemical properties of soil and also due to galvanic action with other embedded systems.
- For determination of the size of the conductor, the minimum value of earth fault current shall be taken as 25 kA, duration of fault current shall be considered as 1 second. The extra allowance of minimum 20% to take care of corrosion shall be added to arrive at final conductor size.
- For designing of the earth mat for 33kV switchyard, the material of ground mat conductor shall be MS Flat and that of risers emanating from ground mat shall be GS flats. Soil resistance of the site is available in the soil report.

11.5 APPROVAL

The successful bidder shall carry out the earth resistance measurement at the site and they need to submit the measurement report to WBSEDCL.

The Detailed Design Report submitted by the contractor to WBSEDCL must contain but not limited to the following details of the earthing system:

- Detailed specification of all the items.
- Soil resistivity measurement data
- Necessary calculations and drawings etc.

The successful bidder required to produce schematic diagram of the earthing system and the proposed locations for earth mat as per relevant standard with the Detailed Design Report.

All drawings and calculations submitted by the contractor will be subjected to approval of the WBSEDCL.

12. CONTROL, MONITORING AND DATA ACQUISITION SYSTEM

12.1 SCOPE

The scope of work under this specification covers the design, engineering, manufacture, testing at manufacturer's works, transportation, transit insurance, delivery at project site, storage at site, erection, testing at site and commissioning of Control, monitoring & Data Acquisition system comprising of computers, VDU, key board/mouse, PLC's, input and output relays, meters, fields sensors, panels/cubicles for housing above equipment/devices, power supplies, transducers, converters, wiring etc to make the system complete.

12.2 REQUIREMENTS

- The automatic control panels shall be located in each control room. The control panels shall be provided with local automatic selection. On local automatic selection, control will be transferred to control panels located in local control rooms from where unit can be started by single push button control.
- The SCADA work station and push button control panel shall be interlocked by means of hardwired and software (Logic) to ensure smooth and safe operation of the plant.
- All pre-synchronisation checks shall be made to ensure normal and safe operation of the machine. Detailed philosophy shall be submitted by the contractor.
- PTZ (Pan-Tilt-Zoom) outdoor camera covering the whole plant to be deployed with night vision and central monitoring through 50" LED monitor/TV of reputed make such as Sony, Samsung, LG etc.
- System shall acquire on continuous basis the parameters of PV array, like DC current of string, DC voltage of each combiner box etc., Parameters of Solar Inverter like Power at the input of each inverter, Power at the input of each inverter, phase current, voltage, PF, MVAR, MW, Frequency etc., similar parameters of Generator Step-up and auxiliary Transformers etc.
- The Monitoring system shall perform String level monitoring for trouble free operation and maintenance of the plant. System shall indicate these on VDU Mimic alongside relevant device.
- System shall monitor and indicate on VDU status of all electrical devices including 33 kV VCB.
- Shall provide mimics of main single line diagram, Auxiliary SLD and DC SLD in colour. The parameters as above shall be displayed by the side of respective device in proper units of measurement.
- The control & monitoring system for the generating units shall be microprocessor based digital control.
- The data logger shall have reliable battery backup and data storage capacity to record all sorts of data simultaneously round the clock.
- Inverters should be integrated with SCADA and provision of Data logging should be there. Logger should have the provision of recording the data of solar insolation, PV Module temperature and ambient temperature and associated electrical parameters at different stages to study performance of system as well

as to study status of the system at a particular instant. The data logger should have required transducer to monitor and record the required system data. The data logger should be provided with an insolation sensor and a module temperature sensor, ambient temperature sensor matched with the system.

- Plant based Remote Monitoring system must be compatible with data logger. The other required accessories, hardware and compatible software shall have to be provided as an integrated part of the system to monitor the real time data through the server. The Data logger shall continuously send data to the server. Plant based Data logging system may be provided with special software (minimum 10 users). Up gradation of the software, if any, shall be done by the contractor. The server shall not be provided by WBSEDCL or end-user.
- In case the data cable to be laid in the array field, SPD (surge protection device) suitable for communication network, as much number at suitable location are required must be provided with the system.
- The Plant based monitoring system should have the provision of graphical representation of the data shall include but not limited to the following:

SI. No.	Operating Parameter	Desired specification
1	Input data	• PV Power • PV Energy
2	Meteorological data	• Insolation (inclined on the plane of module as well as horizontal) • Module Temperature • Ambient Temperature • Wind Velocity
3	Output data	• Inverter Export Power • Inverter Export energy

- All data shall be recorded chronologically date wise. The data file should be MS Excel/XML/any readable form compatible and should have the facility of easy downloads.
- IT grade server may be installed including provision for back up data at least for 02 years.

12.3 APPROVAL

The Detailed Design Report submitted by the contractor to WBSEDCL must contain but not limited to the following details of the data acquisition and monitoring system:

- Detailed scheme
- Details of panels, metering system
- Necessary drawings for the scheme etc.

Drawings and scheme submitted by the contractor will be subjected to approval of the owner.

13. MISCELLANEOUS

13.1 GENERAL SCOPE

The scope of work under this specification covers the following systems.

- Illumination system
- Fire protection system
- Ventilation system
- Air conditioning system
- Drinking water
- Weather station
- Communication system
- Signage
- Surveillance System

13.2 ILLUMINATION SYSTEM

13.2.1 SCOPE

The scope of work under this specification covers design, manufacture, assembly, shop testing, delivery, site erection, testing & commissioning of Illumination system comprising of main Illumination switchboards, distribution boards, sub distribution boards, switchboards, lighting fixtures, convenience and power outlets, conduits & fittings, cabling, outdoor lighting including mounting structures & poles, LED etc. for control rooms, security cabin, watch tower, access road, across the fence (maximum 15 m between two adjacent lamps).

The illumination system shall be designed as per relevant Indian Standard / Guideline for different location of the plant. The lighting arrangement should be LED Based.

The scope of supply shall also include necessary spares required for normal operation & maintenance of illumination equipment for a period of 5 (five) years & special tools & plants required for erection & maintenance. Corresponding parts of all the equipments & spares shall be of the same material & dimensions, workmanship & finish and shall be interchangeable.

13.2.2 STANDARDS

The material, equipment and its installation under the scope shall comply with all applicable provisions of the latest Indian standards and codes of practice. Some of the relevant standards are given below:

Sl. No.	Standards	Description
1	IS: 3646	Code of practice for interior Illumination (Part I, II, III)
2	IS: 6665	Code of Practice for Industrial Lighting
3	IS: 732	Code of Practice for Electrical wiring installations
4	IS: 9537	Conduits for Electric installations
5	IS: 2418	Tubular fluorescent lamps for general lighting service
6	EN 61347-2-13	Particular requirements for D.C. or A.C. supplied electronic control gear for LED modules
7	EN 62384	D.C. or A.C. supplied electronic control gear for LED modules
8	EN 61000-3-2	Electromagnetic compatibility (EMC). Limits for harmonic current emissions (Equipment input current < 16 A per phase)

9	EN 61000-3-3	Limitation of voltage fluctuation and flicker in low voltage supply systems for equipment with rated current < = 16 A

The installation shall generally be carried out in conformity with the requirements of Indian Electricity Act 1910 (latest Amendment) & Indian Electricity Rules.

13.2.3 REQUIREMENT

The lighting system for outdoor and indoor areas of Solar Power Plant shall be designed in such a way that uniform illumination is achieved.

In outdoor yard equipment / bus bar areas and the peripheral wall are to be illuminated and luminaires shall be aimed for clear view.

13.2.4 LIGHTING LEVELS

The complete switchyard shall be lightened with an average illumination level of 100 lux.

Lighting in other areas such as control room, office rooms and battery room & other areas (i.e. street light) shall be such that the average LUX level to be maintained shall be as under:

Sl No.	Area	LUX
1	Control Room and equipment rooms	500
2	Office	300
3	Communication Room	300
4	Battery & other rooms	150
5	Other areas including periphery wall	20
6	H – pole and metering point	20
7	Outdoor switchyard including road	30
8	Road within campus including colony area	30
9	Auxiliary Buildings like Pump room and other houses	150
10	ACDB- DCDB room/Store / Store Office	150
11	Conference room	300
12	Dining room/Kitchen	150
13	Maintenance room	150
14	Stairs	100
15	Toilet	100
16	Corridor	100
17	Any other spot where high level of illumination required	150

13.2.5 EMERGENCY LIGHT POINTS

Light points using LED lamps of 15-20 W (at 240 V) shall also be provided as given below:

- Control room and equipment room – 4 Nos.
- Battery room – 1 No

- Office – 1 No
- Corridor – 1 No
- Local Control Room – 2 Nos.

These lights shall operate on AC/DC changeover supply from the DC distribution Board. Separate wiring and distribution board shall be provided from these lights.

13.2.6 APPROVAL

The Detailed Design Report submitted by the contractor to WBSEDCL must contain but not limited to the following details of the illumination system:

- Detailed scheme and specification
- Illumination calculations for arriving at the number of lighting fixtures for different areas & rooms considering the required lux level as per relevant IS Code.
- Necessary drawings etc.

Drawings and scheme submitted by the contractor will be subjected to approval of the owner.

The contractor can deliver the product to the site only after receipt of such approval against their prayer in writing from WBSEDCL.

13.3 FIRE PROTECTION SYSTEM

13.3.1 SCOPE

The scope of work under this specification covers design, engineering, quality assurance, manufacture, shop testing, transport, transit insurance, delivery to site, storage at site, site erection, testing & commissioning of fire protection system (fire extinguisher (type shall be selected as per requirement), fire buckets, fire alarms at all control rooms etc.) complete with all accessories.

The scope of supply shall also include necessary spares required for normal operation & maintenance of illumination equipment for a period of 5 (five) years & special tools & plants required for erection & maintenance. Corresponding parts of all the equipments & spares shall be of the same material & dimensions, workmanship & finish and shall be interchangeable.

13.3.2 STANDARDS

All equipment covered under this section will conform to the latest edition of following Indian Standards:

Sl. No.	Standards	Description
1	IS: 3034	Code of Practice for Fire Safety of Industrial buildings: Electrical generating and distributing stations.
2	IS: 3844	Code of Practice for installation of internal fire hydrants in multi-storied buildings
3	IS: 1646	Code of Practice for fire safety of buildings (General) Electrical Installations
4	IS: 2878	Specification for fire Extinguishers – Carbon dioxide type
5	IS: 2171	Specification for fire Extinguishers – Dry Powder type
6	IS: 933	Specification for fire Extinguishers – Foam type
7	IS: 2175	Specification for heat sensitive fire detectors for use in automatic electrical fire alarm system
8	IS: 2189	Code of Practice for installation of automatic fire alarm system using heat sensitive type fire detectors

13.3.3 APPROVAL

The Detailed Design Report submitted by the contractor to WBSEDCL must contain but not limited to the following details of the fire protection system:

- Detailed scheme and technical specification
- Placing and type of fire extinguisher with justification
- Necessary drawings related to the system etc.

Drawings and scheme submitted by the contractor will be subjected to approval of the owner.

The contractor can deliver the product to the site only after receiving such approval against their prayer in writing from WBSEDCL.

13.4 VENTILATION SYSTEM

13.4.1 SCOPE

The scope of work under this specification covers design, manufacture, shop testing, supply, transportation, delivery, storage at site, erection, testing and commissioning of ventilation system complete with all accessories at each control rooms, store room etc.

The Scope shall include supply of all blower fans, GS ducting, air plenum, exhaust fans air dampers etc as required to make the ventilation system complete in all respects for satisfactory operation.

The scope of supply shall also include necessary spares required for normal operation & maintenance of ventilating equipments for a period of 5 (five) years and special tools & plants required for erection & maintenance.

Corresponding parts of all the equipments & spares shall be of the same material & dimensions, workmanship & finish and shall be interchangeable. All the material & workmanship shall be of suitable commercial quality as have proven successful in their respective uses in similar services & under similar condition.

13.4.2 STANDARDS

The ventilating equipment shall comply with the requirement of the latest edition of relevant Indian standards or equivalent British Standards. Some of the relevant standards are given below:

Sl. No.	Standards	Description
1	IS : 3103	Code of Practice for industrial ventilation
2	IS : 2312	Specifications for propeller type A.C. Ventilating fans.
3	IS: 4894	Centrifugal fans

13.4.3 APPROVAL

The Detailed Design Report submitted by the contractor to WBSEDCL must contain but not limited to the following details of the fire protection system:

- Detailed scheme and technical specification
- Calculations showing air requirements at various locations
- Necessary drawings etc.

The successful bidder required to produce all necessary test certificates and approvals of the product as per relevant standard with the Detailed Design Report.

Drawings and scheme submitted by the contractor will be subjected to approval of the owner. The contractor can deliver the product to the site only after receiving such approval against their prayer in writing from WBSEDCL.

13.5 AIR CONDITIONING SYSTEM

13.5.1 SCOPE

The scope of work under this specification covers design, manufacture, testing, supply, transportation, transit insurance, delivery, storage at site, erection, testing and commissioning of Air conditioning system with control and accessories at the operator's work station, SCADA room and Conference/seminar room at main control room building.

13.5.2 STANDARDS

Equipment shall conform to the latest Indian standards or equivalent British Standards.

Sl. No.	Standards	Description
1	IS: 659	Safety code for Air conditioning
2	IS: 660	Safety code for Mechanical Refrigeration
3	IS: 655	Metal Air ducts

13.5.3 Specification

Five Star rated Inverter AC of reputed make and adequate capacity such as O-General/Mitsubishi etc. shall be supplied. Approval of AC capacity shall be accorded after submission of requisite documents.

13.6 DRINKING WATER

13.6.1 SCOPE

The scope of supply under this section shall cover the design, manufacture, shop testing, supply, transportation, delivery, storage at site, erection, testing and commissioning of deep tube well, pump, water purifier unit and other related plumbing arrangement and accessories etc. for drinking water supply for the personnel at the power house.

13.6.2 STANDARDS

The whole system shall conform to the latest edition of relevant Indian Standard.

13.6.3 APPROVAL

The Detailed Design Report submitted by the contractor to WBSEDCL must contain but not limited to the following details of the water purification unit:

- Detailed Technical specification
- Necessary drawings etc.

Specification submitted by the contractor will be subjected to approval of the owner. The contractor can deliver the product to the site only after receiving such approval against their prayer in writing from WBSEDCL.

13.7 WEATHER STATION

13.7.1 SCOPE

The scope of supply under this section shall cover the design, manufacture, shop testing, supply, transportation, delivery, storage at site, erection, testing and commissioning of weather station comprising of

- Temperature sensor with radiation protection
- Temperature sensor in the module
- Solar radiation sensor (Inclined on the plane of module as well as horizontal)

- Sensor which indicates the speed and direction of the wind etc.

The monitoring system shall be linked to the weather station by means of its digital/analogue inputs, allowing the datas collected by the sensors stored through software.

13.7.2 STANDARDS

The equipments shall conform to the latest edition of relevant Indian Standard.

13.7.3 APPROVAL

The Detailed Design Report submitted by the contractor to WBSEDCL must contain but not limited to the following details of the equipments of weather station:

- Detailed Technical specification
- Necessary drawings etc.

Specification submitted by the contractor will be subjected to approval of the owner. The contractor can deliver the product to the site only after receiving such approval against their prayer in writing from WBSEDCL.

13.8 COMMUNICATION SYSTEM

Communication system at the Main Control Room (telephone sets) and required number of walkie talkies for security personnel and main control room shall be provided by the contractor.

13.9 SIGNAGE

Project information Signage:

- The Signage shall be provided with details of the project as approved by WBSEDCL.
- The font size on the signage has to be big enough so that everyone can read it easily.
- This signage will be outdoor type.
- The Signage shall be installed two (02) prominent place of each project location.

Safety Signage:

Safety Signage must be provided mentioning the level and type of voltage and symbols as per IE Rule at different position as may be required.

13.10 SURVEILLANCE SYSTEM

The specification covers design, supply, erection, testing and commissioning of the complete surveillance system including cameras, Network Digital video recorder, computer with peripherals, mounting arrangement for cameras, cables etc. for effective visual monitoring of total power plant premises.

The number of cameras and their locations shall be decided to monitor at least:

- All the Transformers.
- The operation of each and every isolator of the complete yard.
- All other Major Equipments (such as CB, CT, PT, SA etc.)

- Key areas of control room cum administrative building, Indoor C&R panel room etc.
- All the Entrance doors of Control Room Building, Pump House, Sub-Station main gate, gates of switchyard, colony entrance gate etc.

The cameras can be mounted on structures, buildings or any other suitable arrangement to be provided by the contractor.

13.10.1 TECHNICAL REQUIREMENTS

The system shall use video signals from various types of indoor/outdoor CCD colour cameras installed at different locations, process them for viewing on workstations/monitors in the control Room and simultaneously record all the cameras after compression using MPEG 4 or better standard and streamed over the IP network. Mouse-Keyboard controllers shall be used for Pan, Tilt, Zoom, and other functions of desired cameras. The System shall provide sufficient storage of all the camera recordings for a period of 30 days or more @ 25 FPS, at 4 CIF or better quality using necessary compression techniques. It shall be ensured that data once recorded shall not be altered by any means. The recording resolution and frame rate for each camera shall be user programmable. The provision for transfer of recorded data to separate external media shall be ensured.

The surveillance CCTV System shall operate on 230 V, 50 Hz single-phase power supply.

13.10.2 SYSTEM REQUIREMENTS

- Camera with external encoder shall be used for image capture.
- Indoor cameras shall be either with fixed focal length lens or with Pan/Tilt & Zoom lens as per site requirement. All outdoor Cameras shall be Day/Night PTZ Dome type cameras.
- Housing of cameras meant for indoor use shall be of IP 42 rating whereas outdoor camera housing shall be of IP 66 or better rating.
- All camera recordings shall have Camera ID & location/area of recording as well as date/time stamp. Camera ID, Location/Area of recording & date/time shall be programmable by the system administrator with User ID & Password.
- System to have facility of additional camera installation beyond the originally planned capacity.
- System shall be triplex i.e. it should provide facility of simultaneous recording, playback & network operation.
- The offered system shall have facility to export the desired portion of clipping (from a desired date/time to another desired date/time) on CD or DVD. Viewing of this recording shall be possible on standard PC using standard software like windows media player etc.
- System shall have provision for remote monitoring.

The equipment should generally conform to Electromagnetic compatibility requirements for outdoor equipment in EHV switchyards. Type test reports to establish compliance with this requirement shall be submitted during detailed engineering.

13.10.3 VIDEO SURVEILLANCE APPLICATION SOFTWARE

- Digital video surveillance control software should be capable to display and manage the entire surveillance system. It should be capable of supporting variety of devices such as cameras, video encoder, Servers, NAS boxes/Raid backup device etc.
- Surveillance control software should be compatible with MS Windows operating system.
- The software should have inbuilt facility to store configuration of encoders and cameras.
- The software should Support flexible 1/2/4/8 Windows Split screen display mode or scroll mode on the PC monitor.
- The software should be able to control all cameras i.e. PTZ control, Iris control, auto / manual focus, and color balance of camera, Selection of presets, Video tour selection etc.
- There must be a single encoder for each camera.
- The software should have user access authority configurable on per device or per device group basis. The user shall have the facility to request the access and control of any camera for a pre determined time period. Control of camera shall be released automatically after expiry of the pre determined time period.
- The system shall provide user activity log with user ID, time stamp, action performed, etc.
- The users should be on a hierarchical basis as assigned by the administrator. The higher priority person can take control of cameras, which are already being controlled by a lower priority user.
- It should have recording modes viz. continuous, manual, or programmed modes on date, time and camera-wise. All modes should be disabled and enabled using scheduled configuration. It should also be possible to search and replay the recorded images on date, time and camera-wise. It should provide onscreen controls for remote operation of PTZ cameras. It should have the facility for scheduled recording. Different recording speeds (fps) and resolution for each recording mode for each camera should be possible.
- The software for clients should also be working on a browser based system for remote users. This will allow any authorized user to display the video of any desired camera on the monitor with full PTZ and associated controls.
- Retrieval: The VMS application should allow retrieval of data instantaneously or any date / time interval chosen through search functionality of the application software. In case data is older than 30 days and available, the retrieval should be possible. The system should also allow for backup of specific data on any drives like DVD's or any other device in a format which can be replayed through a standard PC based software. Log of any such activity should be maintained by the system.

13.10.4 DIGITAL VIDEO RECORDER

The Personal Computer based network digital Video recorder is to be provided. The Personal computer shall include the PC (min intel core i5 processor, 4GB DDR3 RAM, 1 TB hard disk) with latest configuration available in the market along with:

- Coloured LED monitor of minimum 40", coloured Laser printer, and External USB DVD writer.
- Windows operating system latest version with license.

Sl. No.	Items	Specifications Requirement
1	Recording & Display Frame Rate	Real time 240 frames per second total, 30 frames per second per camera
2	Recording Resolution	(NTSC): 704(H) x 480(V) / (PAL): 704(H) x 586(V) It should be possible to select lower resolutions
3	Operating System	MPEG4 Hardware RTOS (Real time operating system)
4	Compression Method	MPEG-4
5	Video Motion Detection Capable	Standard and built-in (selectable in menu)
6	Video Motion Detection Options	Masking, sensitivity adjustment
7	Monitoring Options	Split screen 1,2, 4 or 8 cameras
8	Playback Options	Search, still image capture
9	Network Operation Capable	To be provided by using WAN or LAN router
10	Ethernet/Modem Built-in	Ethernet standard and built-in
11	HDD Storage Consumption	80 ~ 350 MB per hour / channel variable based on frame speed and
12	HDD Speed	7200 R.P.M + 8 MB buffer
13	Operation	Triplex operation (simultaneous recording, playback, network operation)
14	Number of Video Inputs	Eight (8) video inputs for eight (8) cameras
15	Audio Recording Capable	Eight (8) audio inputs for eight (8) microphones
16	Number of Video Outputs	Two (2) A/V outputs, one (1) VGA output
17	Pan / Tilt / Zoom Protocol Drivers Built-in	Yes

13.10.5 CAMERA FOR VISUAL MONITORING SYSTEM (VMS)

The VMS camera shall be suitable for wall mounting, ceiling mounting and switchyard structure mounting. The VMS camera should be colour high resolution, super HAD (Hole-accumulation Diode) , Weatherproof, Dome type. The Camera shall have an internal amplifier that applies gain to the signal. The amplifier must operate when there is insufficient light in the scene to produce an acceptable video output level, and must only apply as much gain as is necessary. The camera shall

incorporate one level of automatic gain Compensation (AGC), allowing the user to achieve the optimal balance of noise and low light performance in demanding environments.

Sl. No.	Items	Specifications Requirement
1	Resolution(TV lines)	480 horizontal TV lines (Minimum)
2	Effective Pixels (minimum)	(PAL): 752(H) x 582(V) pixels (NTSC):768 (H) x 494 (V)
3	Low Light Sensitivity (lux)	0.1 lux
4	Signal to noise Ratio	More than 45 dB (AGC off)
5	White Balance Control (WBC)	Adjustable / Automatic (2,100° ~ 8,000°K)
6	Gamma Correction	d = 0.45

13.10.5.1 SPECIFICATION FOR FIXED DOME CAMERA

The High Resolution DSP Colour Dome Camera (Digital Signal Processing using a DSP chip) shall include, as a minimum, the following features/ functions/ specifications:

- The High Resolution DSP Colour Dome Camera shall incorporate a 1/3-inch Charge-coupled device (CCD).
- The Dome Camera shall support the use of Auto Iris/ Direct Drive lens connected to the camera via 4-pin molex socket located from the inside of the camera housing. The camera must provide power to the lens.
- The Camera shall support the use of fixed lens, focal length is 3.6mm, each.
- The power consumption of the High Resolution DSP Colour Mini Dome Camera shall be no more than 1 watt.

13.10.5.2 SPECIFICATION FOR PTZ CAMERA

The features of PTZ shall include:

- Fully functional dynamic keyboard controllers with joystick for smooth camera movements
- Controls all pan / tilt and zoom functions
- Many preset options for quick access to frequently monitored areas and advanced tour programming

Sl. No.	Items	Specifications Requirement
1	Electronic Shutter	1/60 ~ 1/100,000 sec. automatic
2	Back Light Compensation	Adjustable / Automatic and built-in
3	Automatic Gain Control (AGC)	Automatic ([0 ~ 30 dB] / 41) dB and built-in
Sl. No.	**Items**	**Specifications Requirement**
4	Lens	270x (27x optical /10x digital) IR-corrected aspherical power zoom lens
5	Lens Aperture	F1.6 ~ 3.7
6	Pan / Tilt / Zoom Protocol Languages Supported	Yes
7	Panning Range	Complete 360 degrees (horizontal)
8	Pan Speed	Adjustable
9	Tilting Range	180 degrees (vertical)

10	Tilt Speed	Adjustable

NOTE:

Any item/equipment not mentioned in the Technical Specification, but required for successful completion of the project shall be deemed to be a part of the scope of the work and the same shall be included by the bidder in their Bill of Quantity (BOQ).

PROFORMAS

Table of Contents

Form – I CHECK LIST

Sl. No.	Scanned Copy of Documents to be uploaded	Name of folder	To be submitted in cover	Submitted (Y/N)
1	Check List (Form – I)	Forms	Statutory cover (Technical proposal)	
2	Application for Tender (Proforma – 1)	Annexure	Statutory cover (Technical proposal)	
3	Power of Attorney i.r.o. the person authorised to sign	Company Details	Non-Statutory cover (Technical proposal)	
4	Tender Fee (Scanned copy)	Drafts	Statutory cover (Technical proposal)	
5	Earnest Money Deposit (Scanned copy)	Drafts	Statutory cover (Technical proposal)	
6	Deviation Sheet (Proforma – 16)	Annexure	Statutory cover (Technical proposal)	
7	Tender Document with Stamp & Signature by authorised person.	NIT	Statutory cover (Technical proposal)	
8	Addenda / corrigenda & Pre-Bid response/minutes , if published	NIT	Statutory cover (Technical proposal)	
9	Format of Letter of Bid (Form – V)	Forms	Statutory cover (Technical proposal)	
10	Pro-forma for undertaking to be submitted by the Bidders (Form – IV)	Forms	Statutory cover (Technical proposal)	
11	Statement of orders executed (Form – III)	Forms	Statutory cover (Technical proposal)	
12	**Technical Credential :** i) Order(s)/Contract Agreement(s) issued by the purchaser ii) Commissioning Report (s) and Completion Certificate(s) iii) Month wise power generation data from last one year from the bid submission start date, signed by the Purchaser/ Ordering authority on Plant Owner's Letter Head iv) Grid Synchronization/Connectivity Certificate/JMR data from License of the grid Substantiate timely completion of the work and Satisfactory operation of Solar PV Plant in support of minimum eligibility criteria as per Clause no. 7.2 of ITB	Credential	Non-Statutory cover (Technical proposal)	
13	Net Minimum Guaranteed Generation (Vide Proforma – 5)	Declaration	Non-Statutory cover (Technical proposal)	

Sl. No.	Scanned Copy of Documents to be uploaded	Name of folder	To be submitted in cover	Submitted (Y/N)
14	Bill of Material (Vide Proforma – 6)	Declaration	Non-Statutory cover (Technical proposal)	
15	List of Orders in hand with financial information	Declaration	Non-Statutory cover (Technical proposal)	
16	List of key personnel available and proposed to be engaged for the project mentioning their experience and qualification	Declaration	Non-Statutory cover (Technical proposal)	
17	Proof of Company Incorporation / Trade Licence	Company Details	Non-Statutory cover (Technical proposal)	
18	Electrical Contractor License	Certificates	Non-Statutory cover (Technical proposal)	
19	Labour License	Certificates	Non-Statutory cover (Technical proposal)	
20	PF registration certificate	Certificates	Non-Statutory cover (Technical proposal)	
21	ESI Certificate	Certificates	Non-Statutory cover (Technical proposal)	
22	JV/Consortium Agreement and power attorney for JV/Consortium.	Declaration	Non-Statutory cover (Technical proposal)	
23	PAN Card details	Certificates	Non-Statutory cover (Technical proposal)	
24	GST registration certificate	Certificates	Non-Statutory cover (Technical proposal)	
25	Professional Tax Registration certificate	Certificates	Non-Statutory cover (Technical proposal)	
26	Income Tax return for the last 03 (three) Assessment Years	Financial Information	Non-Statutory cover (Technical proposal)	
27	Summary statement of average annual turnover (Form – II)	Forms	Statutory cover (Technical proposal)	
28	Evidence of Access to or Availability of Credit/Facilities (Proforma – 4)	Financial Information	Non-Statutory cover (Technical proposal)	
29	Audited Report on Annual Accounts for last three Years.	Financial Information	Non-Statutory cover (Technical proposal)	
30	Order(s)/Contract Agreement(s) issued by the purchaser in support of financial eligibility criteria as per clause No.7.3 of ITB	Financial Information	Non-Statutory cover (Technical proposal)	
31	Project Proposal with Time Schedule	Declaration	Non-Statutory cover (Technical proposal)	
32	PRICE BID vide Proforma –2, 3A, 3B, 3C & 3D (Proforma: PRICE BID and PRICE BREAK UP)	Bill of Quantities (BOQ)	Financial Proposal	
33	Any other documents, if found necessary	Declaration	Non-Statutory cover (Technical proposal)	

SIGNATURE OF THE TENDERER WITH OFFICE SEAL

Form – II - CERTIFICATE REGARDING SUMMARY STATEMENT OF YEARLY TURNOVER

This is to certify that the following statement is the summary of the audited Balance Sheet arrived in favour of . . . . . for the three consecutive years or for such period since inception of the Firm, if it was set in less than such three year's period.

Sl. No.	Financial		Remarks
	Fin.-Year	Turnover rounded up to in Crore (two digit after decimal)	
1.	2016-17		
2.	2017-18		
3.	2018-19		
Total			

Average Turnover (In Crore):

Note: Average turnover is to be expressed in Crore of rupees, rounded up to two digits after decimal.

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SIGNATURE OF THE TENDERER WITH OFFICE SEAL

Form – III - STATEMENT OF SIMILAR TYPE OF ORDERS EXECUTED DURING LAST FIVE YEARS

Sl. No.	Name of the Installed Plants/ Project	Financial year	Order No. and date	Name of Owner/ order issuing authority	Plant Capacity (MW)	Ordered value (Rs.)	Completion Time	Completion Certificate	Performance Report	Grid Synchronization Certificate & Generation Data

Remarks, if any :

.....

SIGNATURE OF THE TENDERER WITH OFFICE SEAL

Form – IV - PROFORMA FOR UNDERTAKING TO BE SUBMITTED BY THE BIDDER

(To be executed on non-Judicial stamp paper of requisite value)

(For genuineness of the information furnished on-line and authenticity of the documents produced before Tender Committee for verification in support of his eligibility)

I _____, Partner/Legal Attorney/ Accredited Representative of M/s_____, solemnly declare that:

1. We are submitting Tender for the Work _____ _____against Tender NIeT. No. _____

2. None of the Partners of our firm is relative of employee of West Bengal State Electricity Distribution Company Limited (WBSEDCL).

3. All information furnished by us in respect of fulfilment of eligibility criteria and qualification information of this Tender is complete, correct and true.

4. All documents/ credentials submitted along with this Tender are genuine, authentic, true and valid.

5. If any information and document submitted is found to be false/ incorrect any time, department may cancel my Tender and action as deemed fit may be taken against us, including termination of the contract, forfeiture of all dues including Earnest Money and banning / delisting of our firm and all partners of the firm etc.

6. Should this Bid be accepted, I/We* also agree to abide by and fulfil all the terms and conditions of provisions of the above mentioned Bidding Documents.

Signature along with Seal of Company.....

(Duly authorized to sign the Tender on behalf of the Contractors)

Name.....

Designation.....

Name of Company.....

(IN BLOCK LETTERS)

WITNESS

Signature.....

Date.....

Name & Address.....

.....

Telegraphic Address.....

.....

.....

Telephone No.....

Fax No.....

E-mail.....

***Strike out whichever is not applicable**

Form – V - FORMAT OF LETTER OF BID

LETTER HEAD OF BIDDER (AS ENROLLED ONLINE ON e-Tendering PORTAL OF NIC)

To,

The Chief Engineer,

Sub: Letter of Bid for the work_____
_____
_____
_____

Ref: 1. NIeT No _____ dated _____

2. Tender Id No. _____

Dear Sir,

We offer to execute the whole work in Turnkey Basis in accordance with the conditions of the NIT document as available in the website. The details of the EMD being submitted by us has been furnished on-line.

This Bid and your subsequent Letter of Acceptance / Work Order shall constitute a binding contract between us.

We hereby confirm our acceptance of all terms and conditions of the NIT document unconditionally.

Dated---------- **SIGNATURE OF THE TENDERER WITH SEAL**

Proforma: 1 – APPLICATION FOR TENDER

(To be submitted on official letter head by the bidder)

Ref. No..... Dated: .....

To
The Chief Engineer,
Solar Power Generation Department,
West Bengal State Electricity Distribution Company Limited,
Vidyut Bhaban (5th Floor),
Bidhannagar, Block - DJ, Sector - II,
Kolkata-700 091

NIT No: - SPGD/WBSEDCL/

Amount put to tender (Tender Fee) : .....

Dear Sir,

Having examined the Statutory, Non-statutory & NIT documents, I/we hereby like to state that I/we wilfully accept all your conditions and offer to take up the work as per NIeT. No. stated above. I/We also agree to guarantee to replace or repair any defect, whenever it is detected, in the equipment/materials to the satisfaction of the owner in conformity with the conditions of contract, specifications, drawings, bill of quantities and addenda.

Dated this _____ day of _____ 201___

Full name of applicant: _____

Signature: _____

In the capacity of: _____

Duly authorized to sign bids

For & on behalf of (Name of Firm): _____

(In block capitals or typed)

Office address:

Telephone no(s) (office): _____

Mobile No: _____

Fax No: _____

E mail ID: _____

.....

SIGNATURE OF THE TENDERER WITH OFFICE SEAL

Proforma: 2 – PRICE BID

(To be completed & submitted with the Financial Proposal)

Name of the Work: Design & Engineering, Manufacture / Procurement, Supply, Packing and Forwarding, Transportation, Unloading, Storage at site, Site development, Construction, Erection, Installation, Testing and Commissioning including warrantee obligation with 05 (Five) years Comprehensive Operation and Maintenance of 10 MW (AC) [Minimum 12MWp DC] Solar PV Power Plant at Chuasole & Kasturia Mouza, Block- Sankrail, Jhargram District, West Bengal.

Sl. No.	Particulars (Fixed/Firm)	TOTAL AMOUNT Without GST	TOTAL AMOUNT In Words
(I)	**(II)**	**(III)**	**(IV)**
1	Design, engineering, manufacture, supply & delivery of all the equipments and materials including transit insurance to the site for 10 MW(AC) [Minimum 12MWp DC] Solar Power Plant consisting of SPV modules, MMS structures, SMB, PCUs / Inverters, DCDB / ACDB, Transformers, VCBs, CTs, PTs, Isolator(s), fuse unit(s) with protection system complete including control & relay panel, DC system with battery charger & battery bank, Central Monitoring & Control System comprising of SCADA & Plant Monitoring Desk, Solar Weather station, power & control cables with hardware, metering system, Lighting & Lightening protection system, earthing system, security system, Fire fighting & other safety systems etc., water supply system, auxiliaries as required for the completion of the entire Solar Power Project on turnkey basis as per Proforma-3A.		
2	Carrying out all civil works for Control room(s), sub-station(s), approach & internal roads, peripheral boundary wall, fencing, Construction of foundations for module mounting Structures, Inverters / PCUs, Transformers, ACDB, DCDB, HT & LT switchgears & switchgear panels, relay & control panels, cable trenches, Street lights, indoor lights, switchyard light etc. and all other allied equipment foundations as required; erection, testing, commissioning of all the supplied equipments including online data telemetry system, Solar observatory, obtaining all statutory clearances / permissions / certification, making all payments / security deposit to statutory & local authorities; storage & other auxiliaries for carrying out works at site till commissioning and hand over to O&M group / owner, and all other works enabling 10 MW (AC) solar power project work complete in all respects as per the scope of work on turnkey basis as per Proforma-3B		

No.	Particulars	TOTAL AMOUNT With Taxes	TOTAL AMOUNT In Words
(I)	**(II)**	**(III)**	**(IV)**
3	Operation and Maintenance (O & M) of the 10 MW (AC) solar power plant from date of commissioning for 5(five) years including arrangement & replacement of spares, consumables, tools, tackles, testing equipments & instruments, manpower, charges payable to all government agencies, liaison with all government agencies, insurances, all administrative work, maintaining records and submission of reports to all concerned authorities as per foregoing specification on turnkey basis as per Proforma 3 C		
Gross price for supply, installation, testing &commissioning of 10 MW (AC) Grid Interactive Solar Power Project including Comprehensive Operation & Maintenance for 5 (five) years **Note:** **The quoted price shall be inclusive of all types of taxes, duties, levies etc. except Goods and Service Tax (GST).**			

Total Price in Rupees.....

..... (In Words)

Company Seal:

Signature: .....

Name: .....

Designation: .....

Note on Proforma 2 – Price Bid:

1. Price shall be fixed/firm. No escalation shall be paid due to any reason what-so-ever. Price as quoted at column (III) of Proforma 2: Price Bid against Sl. No. 1, 2 & 3 should be equal to amount arrived by aggregating the quoted prices for the respective items in Proforma 3A – Price Break up for supply of equipments & materials, Proforma 3 B – Price Break Up for Construction, Erection, Testing And Commissioning and Proforma 3 C – Price Break Up for Operation & Maintenance respectively. In case of any discrepancies between the rate or price as quoted in Proforma 2 and corresponding rates or price in Proforma 3 A, 3 B and 3C, then rate or price as quoted or arrived in Proforma 3 A, 3 B and 3C shall prevail and evaluation shall be done accordingly.
2. The individual items shall at least meet the technical requirements mentioned in the "Technical Specifications: Civil" and "Technical Specifications: Electrical" section.

Proforma: 3A –PRICE BREAK UP FOR SUPPLY OF EQUIPMENTS & MATERIALS

Sl. No.	Item Description	Basic Price(Rs.)	Basic Custom Duty (Rs.)	Total Price of material (Rs)	TOTAL AMOUNT (In words)
(I)	(II)	(A)	(B)	(C=A+B)	
1	Supply of crystalline SPV modules complete with galvanized steel nuts & bolts				
2	Supply of hot dip galvanized module mounting structures complete on which the SPV Module will be installed.				
3	Supply of SCADA compatible String Combiner Boxes (SCBs) /Array Junction Boxes (AJBs) with String Monitoring Units (SMUs)				
4	Supply of grid interactive Inverters /PCUs				

Sl. No.	Item Description	Basic Price(Rs.)	Basic Custom Duty (Rs.)	Total Price of material (Rs)	TOTAL AMOUNT (In words)
(I)	(II)	(A)	(B)	(C=A+B)	
5	Supply of SCADA based Centralised Monitoring & control system along with associated materials for data acquisition remote monitoring facilities				
6	Supply of weather station equipments with associate system complete				
7	Supply of all equipments & associated materials for 33 kV outdoor switchyard LCR & MCR and indoor C&R Panel complete				
8	Supply of set of Energy meters				
9	Supply of DC Power Interfacing Panel(s) (DCDB) for Power distribution / accumulation at DC side required				

Sl. No.	Item Description	Basic Price(Rs.)	Basic Custom Duty (Rs.)	Total Price of material (Rs)	TOTAL AMOUNT (In words)
(I)	(II)	(A)	(B)	(C=A+B)	
10	Supply of AC Power Interfacing Panel(s) (ACDB) for Power distribution / accumulation at AC side required				
11	Supply of 3 phase Step Up Solar Transformers with all accessories				
12	Supply of 33kV / 415V Station Transformer				
13	Supply of Solar Copper Cable (4 sq. mm) and other DC Cables to be used				
14	Supply of 1.1 kV XLPE grade AC Cables from Solar Inverter to Three Winding Transformer				
15	Supply of 33 KV AC XLPE Cable from Three Winding Transformer to Switchyard or wherever required				
16	Supply of Battery bank & Battery Charger				

Sl. No.	Item Description	Basic Price(Rs.)	Basic Custom Duty (Rs.)	Total Price of material (Rs)	TOTAL AMOUNT (In words)
(I)	(II)	(A)	(B)	(C=A+B)	
17	Supply of Earthing system materials of complete power plant				
18	Supply of Fire fighting equipments, fire extinguishers, CO2 extinguishers, Rubber mats, Danger Plates, Name Plates and all other related equipments				
19	Supply of LED and fixtures for lighting of solar plant area				
20	Supply of Surveillance system equipments				
21	Supply of all the equipment & Materials related to water supply scheme				
22	Supply of furniture (table, chairs, shelves etc.) for office, Control room, Store etc.				
23	Supply of air-conditioning units with 5 star rating for control & office rooms				
24	Supply of Signage complete				

Sl. No.	Item Description	Basic Price(Rs.)	Basic Custom Duty (Rs.)	Total Price of material (Rs)	TOTAL AMOUNT (In words)
(I)	(II)	(A)	(B)	(C=A+B)	
25	Supply of Tool Kit & Measuring Instruments				
26	Supply of Spares equipments/materials				
27	Supply of any other equipment(s)/work(s) not mentioned above but required for the plant				

- **Instruction for filling up the Proforma 3A – BREAK UP OF PRICES FOR SUPPLY OF EQUIPMENTS & MATERIALS**

1. The Bidder shall quote the basic price of the equipment and materials only.
2. The basic price of the equipment and materials shall be quoted without any amount of GST.

Proforma: 3 B

PRICE BREAK UP FOR CONSTRUCTION, ERECTION, TESTING AND COMMISSIONING

Sl. No.	Item Description	Quantity	Unit Rate	Total Price without GST (INR)	TOTAL AMOUNT (In word)
		(A)	(B)	(C=AXB)	(D)
1	Carrying out contour survey, Soil Testing, Land development (Site grading, levelling, clearing of vegetation, Landscaping with grass turf etc.) and preparation of project Master Plan.				
2	Construction of buildings for Sub-Station, Office &Control Room, Security Hut, Watch Tower, Sewage system / Wash Rooms, Store etc.				
3	Foundations for MMS & all installation				
4	Foundations for Transformers, Inverters, CT, PT, C & R Panel& all other equipments·				

Sl. No.	Item Description	Quantity	Unit Rate	Total Price without GST (INR)	TOTAL AMOUNT (In word)
		(A)	(B)	(C=AXB)	(D)
5	Construction of Approach& Internal Road/Pathways.				
6	Construction of Drains and Cable Trenches (Buried & RCC)				
7	Construction of Peripheral Boundary Wall and Sub-station Fencing				
8	Providing all services like inland transportation, insurance for delivery at site, unloading, storage, handling etc. at site				
9	Installation of Solar PV modules, Inverters, SCBs / AJBs, Transformers, C&R panels complete with control cables, Cable trays & supports, Communication Cables, ACDB, DCDB, Water treatment plant/RO plant with bore well, water storage & water supply facility, Sub-station structure complete with CT, PT, Energy meters, LAs, Isolators, fuse unit, gravel spreading etc. Weather Station, Lighting, earthing, Water piping networks, surveillance system, watch tower, plant entry gate, project & safety signage etc.				

Sl. No.	Item Description	Quantity	Unit Rate	Total Price without GST (INR)	TOTAL AMOUNT (In word)
		(A)	(B)	(C=AXB)	(D)
10	Testing and commissioning of all supplied equipments & materials for 10 MW (AC) capacity Solar Power Plant and Synchronising with the DISCOM grid & delivery of power to the grid.				
11	Purchase of Execution Insurance.				
12	Any other item/job not mentioned above but required for the plant.				

Total Price in Rupees..... (In Words)

Note on Proforma 3 B – Price Break Up For Construction, Erection, Testing And Commissioning: Total Installation, Testing & Commissioning Charge for the materials of Proforma 3 A as arrived shall appear at column (III) against Sl. No. 2 in Proforma 2: Price

Proforma: 3C – PRICE BREAK UP FOR OPERATION & MAINTENANCE

Sl. No	Item Description	Year	Minimum Annual O & M Value (Rs.)	Discount Factor @ 10%	Basic Price without GST (Rs.)	Discounted Price (Rs.)
			(A)	(B)	(C)	(D=B X C)
1	Annual Operation and Maintenance Cost	1		0.9091		
2		2		0.8264		
3		3		0.7513		
4		4		0.6830		
5		5		0.6209		

Total Discounted O&M Price in Rupees..... (In Words)

Total actual O & M Price in Rupees..... (In Words)

Note on Proforma 3C – Price Break Up for Operation & Maintenance:

1. Total discounted price as arrived shall appear at column (III) against Sl. No. 3 in Proforma 2: Price Bid.
2. The discounted price shall be considered for evaluation purpose only and shall have no relation with the contract price. The contract price shall be finalised for this part based on rate quoted at Column C and subject to bid responsiveness and bid correction.
3. **The basic price in Column (C) for Operation & Maintenance shall be put always equal or greater than the Minimum Annual O&M Value as arrived in column (A) after filling up Proforma-3A & Proforma-3B.**

Proforma: 4 – EVIDENCE OF ACCESS TO OR AVAILABILITY OF CREDIT/FACILITIES

(To be given by banker of bidder)

BANK CERTIFICATE

This is to certify that M/s …… (FULL NAME AND ADDRESS) who are submitting their Bid to ……against their tender specification vide Ref. No…… and date…… is our customer for the past ……years.

Their financial transactions with our bank have been satisfactory. They enjoy the following fund based and non fund based limits including guarantees, L/C and other credit facilities with us against which the extent of utilization as on date is also indicated below:

Sl. No.	TYPE OF FACILITY	SANCTIONED LIMIT AS ON DATE	UTILIZATION AS ON DATE……

This letter is issued at the request of M/s……

Sd/-

Name of Bank ……

Name of authorized Signatory ……

Designation ……

Phone No ……

Address ……

SEAL OF THE BANK

Proforma – 5 - DECLARATION SHEET – FOR NETMINIMUM GUARANTEED GENERATION

(To be submitted on official letter head by the bidder)

We ..... declare that the 10 MW Solar PV Plant at Chuasole & Kasturia Mouza, Block-Sankrail, Jhargram District, West Bengal offered by us within the scope of this tender, will generate minimum 17.00MU/year measured in the Net Meter installed at the outgoing feeder of the 33 kV Switchyard of the Power Plant. The Net Minimum Guaranteed Generation shall be calculated after considering the Auxiliary Consumption for the plant.

The Net Minimum Guaranteed Generation shall be reduced @ 0.8% per year.

In case we fail to produce the Net Minimum Guaranteed Generation as stated above, the provisions of penalty according to Clause No. 25 of the General Conditions of Contract of this tender shall be applicable.

I hereby certify that I am duly authorized representative of the Bidder whose name appears above my signature.

Bidder's Name: .....

Authorised Representative's Signature.....

Proforma: 6 – BILL OF MATERIALS (BOM)

(To be completed & submitted with the Bid)

Name of the Work: Design & Engineering, Manufacture / Procurement, Supply, Packing and Forwarding, Transportation, Unloading, Storage at site, Site development, Construction, Erection, Installation, Testing and Commissioning including warrantee obligation with 05 (Five) years Comprehensive Operation and Maintenance of 10 MW (AC) [Minimum 12MWp DC] Solar Photovoltaic Power Plant at Chuasole & Kasturia Mouza, Block- Sankrail, Jhargram District, West Bengal.

Sl. No.	Items	Unit	Quantity	Description / Specification proposed
1	Survey & Land Development	L.S	1	
2	Solar Modules	LOT	1	
2	Copper Solar Cable (4 sq. mm.) of suitable voltage grade to lay Strings upto Combiner Boxes	LOT	1	
3	String Combiner/Monitoring Box as per design.	LOT	1	
4	Armoured Aluminium Cable buried in cable trench from Combiner Boxes to Inverters, calculated for a maximum voltage drop of 1.50 % in DC from photovoltaic modules to solar inverter	LOT	1	
5	Earthing system of the photovoltaic field with bare Cu conductor and earthing rods	LOT	1	
6	Solar Central Inverters with Data Logger (SCADA Cloud based configuration)	LOT	1	
7	AC protection Boxes in the Inverter exits, with switch for each O/P	LOT	1	
8	XLPE Cable of required voltage grade to be used from Solar Inverter to Three Winding Transformer	LOT	1	
9	Multi Winding Power Transformers with necessary protections	LOT	1	
10	33 kV XLPE Cable to be used from Three Winding Transformer to 33 kV Switchyard	LOT	1	

Sl. No.	Items	Unit	Quantity	Description / Specification proposed
11	Indoor C&R Panel	LOT	**1**	
12	Local Control Room (LCR) *(Consisting of Solar Inverter, UPS, Outdoor type three winding Transformer, set of HV protection means of Disconnect Switch or ACDB, forced axial ventilation etc.)*	LOT	1	
13	Main Control Room (MCR) *(Consisting of ACDB, annunciation, protection, metering, synchronization, DC Battery Bank with float & boost charger, DCDB, computer, Office Room, Conference Room, 2000 L water tank, security cabin, utility area etc.)*	LOT	1	
14	33 kV Switchyard *(Consisting of 33 kV Bus, VCB, Isolator, LA, CT, PT, Station Auxiliary Transformer etc.)*	LOT	1	
16	Earthing for Switchyard & Control Rooms	LOT	1	
17	Control Monitoring and Data Acquisition System (SCADA)	LOT	1	
18	Uninterrupted Power Supply (UPS) System of required capacity for MCR & each LCR	LOT	1	
19	Smoke detector for MCR & each LCR	LOT	1	
20	Foam type fire extinguisher for MCR & each LCR	LOT	1	
21	CO_2 type fire extinguisher for MCR & each LCR	LOT	1	
23	33 kV VCB, outdoor type	LOT	1	
24	33 kV Isolator without E/S	LOT	1	
25	33 kV Isolator with E/S	LOT	1	
26	30 kV Lightning Arrestor	LOT	1	
27	Auxiliary Transformer (33/0.433KV)	No.	1	

Sl. No.	Items	Unit	Quantity	Description / Specification proposed
28	LT Switchgear	LOT	1	
29	DC Battery, Battery Charger and DCDB	LOT	1	
30	Weather Station (anemometer, temperature & radiation sensors with data logger)	LOT	1	
31	Ventilation System	LOT	1	
32	Air Conditioning System	LOT	1	
33	Peripheral/Yard lighting System	LOT	1	
34	Module Mounting Structure	LOT	1	
35	Module Cleaning Arrangement	LOT	1	
36	Cable Tray & Trench	LOT	1	
37	Internal Road	LOT	1	
38	Drainage System	LOT	1	
39	Communication System	LOT	1	
40	Surveillance System	LOT	1	
41	Watch Tower	LOT	1	
40	Fencing across the perimeter	LOT	1	
41	Signage	LOT	1	
42	Tool Kit & Measuring Instruments (provide detailed list)	LOT	1	
43	Spares as required for maintenance works	LOT	1	

Proforma: 7 – SATISFACTORY OPERATION OF SOLAR PV PLANT

(On Plant Owner's Letter Head)

Date: __/__/____

TO WHOMSOEVER IT MAY CONCERN

This is to certify that the (plant detail and location) was commissioned on (Date of commissioning) by (Bidder Details) against the LOI/ WO No. (Details of LOI/ WO with complete scope).

The project is under operation since the date of commissioning and has been working satisfactorily as per the estimated output. The cumulative generation (Net) of the plant recorded for the previous year is (Number of units generated) and the Performance Ratio is_____.

The last 12 Months generation data is appended below:

Capacity(MW)	Month	Generated Unit	Remarks
	January 20……		
	February20……		
	……		

Regards,

Signature & SEAL of Authorized Person

SPECIMEN COPY

Proforma: 8 – BANK GUARANTEE FOR EARNEST MONEY DEPOSIT/BID SECURITY

(The non-Judicial stamp paper of Rs 100/- should be in the name of issuing bank)

Ref..... **Bank Guarantee No.....**

Date.....

To

The .....

.....

.....

West Bengal

Dear Sirs,

In accordance with Invitation to bid under your Bid No..... M/s....., having its Registered/Head Office at..... (Hereinafter called the `Bidder') wish to participate in the said Bid of.....and you, as a special favour have agreed to accept an irrevocable and unconditional Bank Guarantee for an amount of..... (.....in words.....) Valid upto.....on behalf of Bidder in lieu of the Bid deposit required to be made by the bidder, as a Condition precedent for participation in the said Bid.

We, the.....Bank (Name) at.....(Address) having our Head Office at..... Guarantee and undertake to pay immediately on demand by West Bengal State Electricity Distribution Company Ltd., the Amount of.....(.....In words.....)Without any reservation, protest, demur and recourse. Any such demand made by said `Owner' shall be conclusive and binding on us irrespective of any dispute or difference raised by the Bidder.

This Guarantee shall be irrevocable and shall remain valid upto 06(six) calendar months with a claim period of 3(three) months from the date of opening of Technical Bid.

If any further extension of this guarantee is required, the same shall be extended to such required period (not exceeding one year) on receiving instruction from M/s..... on whose behalf this guarantee is issued.

In witness where of the Bank, through its authorized office, has set its hand and stamp on this.....day of.....20.....at.....

WITNESS

.....	.....
(Signature)	(Signature)
.....	.....
(Name)	(Name)
.....	.....
(Official Address)	(Official Address)

Proforma: 9 –BANK GUARANTEE FOR CONTRACT PERFORMANCE

(To be executed in non-judicial stamp paper of Rs. 100/-)

Ref.....

Bank Guarantee No..... Date...

To

.....

.....

.....

West Bengal

Dear Sirs,

In consideration of West Bengal State Electricity Distribution Company Ltd., (herein after referred to as the "Owner" which expression shall unless repugnant to the context or meaning thereof include its successors, administrators and assigns) having awarded to M/s.....with registered/Head office at.....(Hereinafter referred to as "Contractor" which expression shall unless repugnant to the context or meaning thereof include its successors, administrators, executors and assigns), a Contract issued by Owner's Letter of Award No.....dated.....for..... .....(scope of work) and the same having been acknowledged by the Contractor, resulting in a Contract bearing No.....dated ..... Contractor having agreed to provide a Contract Performance Guarantee for the faithful performance of the entire Contract including net minimum guaranteed generation equivalent to Rs..... (.....in words.....) being (10%) (Ten percent) of the total contract value (aggregating first, second and third contract values) to the Owner.

We..... ..... (Name & Address) having its Head Office at.....(hereinafter referred to as the "Bank", which expression shall, unless repugnant to the context or meaning thereof, include its successors, administrators, executors and assigns) do hereby guarantee and undertake to pay the Owner, on demand any or all monies payable by the Contractor to the extent of Rs.....(.....in words.....) as aforesaid at any time up to.....* (day/month/year) without any demur, reservation, contest, recourse or protest and/or without any reference to this Contractor.

Any such demand made by the Owner on the bank shall be conclusive and binding notwithstanding any difference between the Owner and the Contractor or any

dispute pending before any Court, Tribunal, Arbitrator or any other authority. The Bank undertakes not to revoke this guarantee during its currency without previous consent of the Owner and further agrees that the guarantee herein contained shall continue to be enforceable till the Owner discharges this guarantee.

The Owner shall have the fullest liberty without affecting in any way the liability of the Bank under the guarantee from time to time to extend the time for performance or the Contract by the Contractor. The Owner shall have the fullest liberty, without affecting this guarantee, to postpone from time to time the exercise of any powers vested in them or of any right which they might have against the Contractor and to exercise the same at any time in any manner and either to enforce or to for bear to enforce any covenants, contained or implied in the Contract between the Owner and the Contractor or any other course or remedy or security available to the Owner. The Bank shall not be relieved of its obligations under these presents by any exercise by the Owner of its liberty with reference to the matters aforesaid or any of them or by reason of any other act of omission or commission on the part of the Owner or any other indulgences shown by the Owner or by any other matter or thing whatsoever which under law would, but for this provision have the effect of relieving the Bank.

The bank also agrees that the Owner at its option shall be entitled to enforce this guarantee against the Bank as a principal debtor, in the first instance without proceeding against the Contractor and not withstanding any security or other guarantee the Owner may have in relation to the Contractor's liabilities.

Notwithstanding anything contained herein above our liability under this guarantee is restricted to Rs..... (.....in words.....) and it shall remain in force upto and including .....**(day/month/year) and shall be extended from time to time for such period as may be desired M/s.....on whose behalf this guarantee has been given.

Unless a demand or claim is lodged on us within and including.....*(day/month/year) we shall be discharged from all liabilities thereafter.

Dated this.....day of.....20.....at.....

WITNESS

....

(Signature) (Signature)

....

(Name) (Name)

(Official Address) (Official Address)

Attorney as per Power

Of Attorney No.....

Date.....

* **Till 3 (three) months after the validity of the Bank Guarantee.**

** **Upto 3 (three) months after the expiry of warranty/guarantee period.**

Notes:

1. The stamp paper of appropriate value shall be purchased in the name of issuing bank.
2. The sum shall be 10% (ten percent) of the total contract value (aggregating first, second and third contract values).

   The performance Bank Guarantee/ Contract Performance Bank Guarantee shall be valid as per terms of contract. A period of three (3) months should be added as claimed period from the last date of validity of the Bank Guarantee.

Proforma: 10 – CONTRACT AGREEMENT

(To be executed on Non-Judicial Stamp Paper of Rs. 100/-)

Articles of agreement made on this..... day of ..... in the year ..... between West Bengal State Electricity Distribution Company Limited (A Government of West Bengal Enterprise) having its head office at Vidyut Bhavan, Block–DJ, Sector–II, Kolkata–700091 hereinafter referred as 'WBSEDCL' (which expression shall unless excluded by or repugnant to the context be deemed to include its successors and assigns) of the ONE PART,

AND

.....Hereinafter referred to as the 'CONTRACTOR' (Which expression shall unless excluded by or repugnant to the context be deemed to include his heirs, executors, administrators, representatives and assigns) of the OTHER PART.

WHEREAS the WBSEDCL invited tenders vide Tender Notice No .....dated..... (Annexed hereto) for Design & engineering, manufacturing &procurement, supply, installation, testing and commissioning including warrantee obligation with 5 (five) year'scomprehensive operation and maintenanceof..... ..... (Project name)

AND WHEREAS in pursuance of such invitation for tenders, the contractor submitted a tender vide no .....dated..... (Annexed hereto).The Techno-commercial part of which was opened on.....And the Price bid was opened on ..... (The tender offer is in custody of the Company at present).

AND WHEREAS AFTER consideration of the tender submitted by the contractor with clarification(s), if any, the WBSEDCL accepted the said tender submitted by the contractor and placed Letter of Award no ..... dated..... (Annexedhereto).

NOW, THEREFORE, the WBSEDCL and the contractor agree as follows:

1. The Contractor agrees to undertake the work of ".....” as per Letter of Award no .....dated ..... referred to above.

2. The WBSEDCL agrees to pay the Contractor as per order no ..... dated ..... referred to above.

3. Both the Contractor and the Company agree that for the purpose of jurisdiction of court in regard to any dispute arising out of this agreement, this agreement shall be deemed to have been executed within the jurisdiction of the original side of the High Court, Kolkata.

IN WITNESS WHEREOF the parties have hereunder affixed their signature on the day, month and year written as above.

SIGNED, SEALED AND DELIVERED

.....	.....
Contractor	WBSEDCL
1).....	1).....
Witness Witness	
2).....	2).....
Witness	Witness

Proforma: 11 – INDEMNITY BOND

(To be executed on Non-Judicial Stamp Paper of Rs. 100/-)

BY THE PRESENT INDEMNITY BOND EXECUTED by us on this ……Day of ……20……., We having Registered Office at …… (herein after called "OBLIGOR/OBLIGORS" which expression shall mean and includes my/our successors legal representatives, assigns) do hereby binds ourselves and also our entity…… after having the power to bind so with the promise and undertaking in favour of the West Bengal State Electricity Distribution Company Limited, a company incorporated under Companies Act 1956 having Registered Office at Vidyut Bhavan, Block-DJ, Sector-II, Salt Lake City, Kolkata-700091 (hereinafter called as OBLIGEE, which expression shall mean and include it's legal representative, administrators assigns.

WHEREAS OBLIGOR/OBLIGORS has/have been awarded the project under letter no…… dated …… issued by the OBLIGEE after having observing necessary formalities, the details of which is described in the schedule given here under as per letter mentioned herein-above.

AND WHEREAS according to the condition of the contract the OBLIGOR/OBLIGORS are under obligation to execute this Indemnity Bond before the commencement of actual execution and OBLIGOR/OBLIGORS is/are aware that unless this Indemnity Bond is executed in accordance with the condition of contract before the actual execution in accordance with law the OBLIGEE shall have the power to deem that actual work has been stated within the meaning of the contract before the execution of this Indemnity Bond.

Now this indenture witnesses that We the OBLIGOR/OBLIGORS do hereby undertake:

1. THAT the OBLIGEE shall not be held responsible for any type of accident which may take place during the course of work undertaken by the OBLIGOR/OBLIGORS.
2. THAT the OBLIGOR/OBLIGORS will take/adopt all safety norms in respect of each and every workmen labour personnel according to the rules and laws relating to welfare of workers to the satisfaction of the OBLIGEE IN ALL CASES.
3. That the OBLIGOR/OBLIGORS undertakes/undertake to engage only those labour worker or any other personnel whether skilled or unskilled or any other person whether in technical management or non-managerial or any other capacity in the area covered under Employee' State Insurance Act, 1948 who has/have insurance coverage within the meaning of Employees' State Insurance Act and further undertakes NOT to engage any person in the area covered under Employees State Insurance Act., who does/do not has/have insurance coverage within the meaning of Employees' State Insurance Act,1948.
4. THAT the OBLIGOR/OBLIGORS undertakes/undertake to indemnify and keep harmless the OBLIGEE from all claims, action, proceedings and of risk, damage, danger to any person whether belonging to/or not belonging to OBLIGOR/OBLIGORS.

5. THAT the OBLIGOR/OBLIGORS shall keep harmless the OBLIGEE from all claims, compensation, damages, any proceedings in respect of any of its employee/workmen under the Employee Compensation Act or any other laws for the time being in force.
6. THAT in case of Joint Venture OBLIGOR/ OBLIGORS shall undertake to Indemnify OBLIGEE from all losses or damages that OBLIGEE may sustain due to dispute/disputes that may arise between the Constituents of the JV.
7. THAT the OBLIGOR/OBLIGORS is/are aware and accept that for the persistent or repeated violation of any condition mentioned in this Indemnity Bond, the OBLIGEE shall have right to terminate the contract of work issued by the OBLIGEE to OBLIGOR/OBLIGORS as per relevant provisions of the Tender Document.

SIGNED AND DELIVERED

BY THE OBLIGOR/OBLIGORS .....

Signature .....

WITNESS:

1) Name & Designation .....

Signature .....

2) Name & Designation .....

Signature .....

Proforma: 12 – EXTENSION OF BANK GUARANTEE

Ref..... Date.....

To

.....

.....

.....

West Bengal

Sub: Extension of Bank Guarantee No.....for Rs..... favoring yourselves, expiring on.....on account of M/s.....in respect of Contract No.....dated..... (Hereinafter called original Bank Guarantee).

Dear Sirs,

At the request of M/s....., we.....Bank, branch office at.....and having its Head Office at.....do hereby extend our liability under the above mentioned Bank Guarantee No..... dated..... for a further period of..... (Years/Months) from.....to expire on..... Expect as provided above, all other terms and conditions of the original bank guarantee No.....dated.....shall remain unaltered and binding.

Please treat this as an integral part of the original bank guarantee to which it would be attached.

Yours Faithfully,

For.....

Manager/Agent/Accountant.....

Power of Attorney No.....

Dated.....

SEAL OF BANK

NOTE: The non-judicial stamp paper of appropriate value shall be purchased in the name of the bank who has issued the Bank Guarantee.

Proforma: 13 – FORMAT FOR PRE-BID QUERIES

To
The Chief Engineer,
Solar Power Generation Department,
West Bengal State Electricity Distribution Company Limited (WBSEDCL),
Vidyut Bhavan, 5th Floor, B – Block, Block – DJ, Sector – II,
Salt Lake, Kolkata – 700091, West Bengal, India

Sub: Pre-Bid queries

Ref. Tender No. : **----------**

Dear Sir,
Having examined the General and Special Conditions of Contract and the Terms of Reference including all attachments thereto, the receipt of which is hereby duly acknowledged, we have some queries and the same are submitted as per the format provided in the tender documents.

Sl. No.	**Clause No.**	**Existing provision**	**Clarification Required**	**Suggested text for the amendment**	**Rationale for the Clarification or amendment**

Authorised Signatory

(Seal and Designation)

SPECIMEN COPY

Proforma: 14 – JOINT VENTURE / CONSORTIUM AGREEMENT

(To be executed on Non-Judicial Stamp Paper of Rs.100/-)

THIS AGREEMENT executed on this……. day of…….. Two Thousand …….. BETWEEN …….. a company incorporated under the laws of INDIA and having its Registered Office at .....(hereinafter called the "Party No.1" which expression shall include its successors, executors and permitted assigns) and M/s……a company incorporated under the laws of ……..…… and having its Registered Office at ……..…… (hereinafter called the "Party No.2" which expression shall include its successors, executors and permitted assigns) and M/s.. .. .. a Company incorporated under the laws of …….. and having its Registered Office at ……. (hereinafter called the "Party No.3" which expression shall include its successors, executors and permitted assigns) for the purpose of making a bid and entering into a contract [hereinafter called the "Contract" {in case of award)] against the Specification No……..……. for …… *(insert name of the package along with project name)* ……of West Bengal State Electricity Distribution Company Limited, a Company incorporated under the Companies Act of1956 having its Registered Office at Vidyut Bhavan, Block-DJ, Sector – II, Bidhannagar, Kolkata – 700 091 (hereinafter called the "Employer").

WHEREAS the Party No.1, Party No.2 and Party No.3 have entered into an Agreement dated.....

AND WHEREAS the Employer invited bids as per the above mentioned Specification for the design, manufacture, supply, erection, testing and commissioning of Equipment/ Materials stipulated in the Bidding Documents under …… *(insert name of the package along with project name)* ……

AND WHEREAS Clause 3.2 & 3.3 (ITB) of NIT (documents establishing the eligibility of Bidder) forming part of the Bidding Documents, inter-alia stipulates that an Undertaking of two or more qualified manufacturers as partners, meeting the requirements of Qualification Criteria in Clause 3.2 (ITB) & 3.3 of NIT, as applicable may bid, provided, the Joint Venture/ Consortium fulfils all other requirements of NIT and Qualification Criteria in Clause 3.2 & 3.3 (ITB) of NIT and in such a case, the Bid Forms shall be signed by all the parties so as to legally bind them and severally liable to perform the Contract and all obligations hereunder.

The above clause further states that the Contract performance guarantee will be as per the format enclosed with the Bidding Documents without any restrictions or liability for either party.

AND WHEREAS the bid is being submitted to the Employer vide proposal No……..dated ……..... by Party/Parties in accordance with the requirements of Clause 3.2 & 3.3 (ITB) of NIT (documents establishing the Qualification of Bidder) has been signed by all the parties.

NOW THIS UNDERTAKING WITNESSETH AS UNDER:

In consideration of the above premises and agreements all the parties do hereby declare and undertake:

1. In requirement of the award of the Contract by the Employer to the Joint Venture/Consortium, the Parties do hereby undertake that M/s…… the Party No.1, shall act as Lead Partner and further declare and confirm that we the parties to the Joint Venture/Consortium shall jointly and severally be bound unto the Employer for the successful performance of the Contract and shall be fully responsible for the design, manufacture, supply and successful performance of the plant in accordance with the Contract.

2. In case of any breach or default of the said Contract by any of the party or parties to the Joint Venture/ Consortium, the party(s) does hereby undertake to be fully responsible for the successful performance of the Contract and to carry out all the obligations and responsibilities under the Contract in accordance with the requirements of the Contract.

3. Further, if the Employer suffers any loss or damage on account of any breach in the Contract or any shortfall in the performance of the equipment in meeting the performances guaranteed as per the specification in terms of the Contract, the Party(s) of THESE PRESENTS undertake to promptly make good such loss or damages caused to the Employer, on its demand without any demur. It shall not be necessary or obligatory for the Employer to proceed against Lead Partner to THESE PRESENTS before proceeding against or dealing with the other Party(s), the Employer can proceed against any of the parties who shall be jointly and severally liable for the performance and all other liabilities/obligations under the Contract to the Employer.

4. The financial liability of the Parties of this Deed of Undertaking to the Employer, with respect to any of the claims arising out of the performance or non-performance of the obligations set forth in this agreement, read in conjunction with the relevant conditions of the Contract shall, however not be limited in any way so as to restrict or limit the liabilities or obligations of any of the Parties of this agreement.

5. It is expressly understood and agreed between the Parties to this agreement that the responsibilities and obligations of each of the Parties shall be as delineated in **Clause no 27 & 28 of GCC** to this agreement. It is further undertaken by the parties that the above sharing of responsibilities and obligations shall not in any way be a limitation of joint and several responsibilities of the Parties under the Contract.

6. This agreement shall be construed and interpreted in accordance with the provisions of the Contract.

7. In case of an award of a Contract, the parties to this agreement do hereby agree that it shall be jointly and severally responsible for furnishing a Contract performance security in the form of Bank Guarantee from a nationalized bank in favour of the Employer in Indian currency.

8. It is further agreed that this Bank Guarantee shall be irrevocable and shall form an integral part of the bid and shall continue to be enforceable till the Employer discharges the same or upon the completion of the Contract in accordance with its provisions, whichever is earlier. It shall be effective from the date first mentioned above for all purposes and intents.

IN WITNESS WHEREOF, the Parties to this Deed of Undertaking have through their authorised representatives executed these presents and affixed Common Seals of their companies, on the day, month and year first mentioned above.

Common Seal of …….
has been affixed in my/ our
presence pursuant to Board of
Director's Resolution dated …….

Name ……..

Designation …….

Signature …….

WITNESS :

I. ……

II. ……

For Lead Company/Lead Partner (Party No.-1)

For and on behalf of M/s

……..

(Signature of the authorized representative)

Common Seal of …….
has been affixed in my/ our
presence pursuant to Board of
Director's Resolution dated …….

Name ……..

For Party No.-2

For and on behalf of M/s……..

(Signature of the authorized representative)

Designation …….

Signature …….

WITNESS :

I. ……

II. ……

Common Seal of ……. has been affixed in my/ our presence pursuant to Board of Director's Resolution dated …….

For Party No.-3
For and on behalf of M/s.
……..

Name ……..

Designation …….

Signature …….

(Signature of the authorized representative)

WITNESS :

I. ……

II. ……

Note:

1. For the purpose of executing this agreement, the non-judicial stamp papers of Rs.100/- shall be purchased on behalf of Joint Venture/Consortium.
2. The Undertaking shall be signed on all the pages by the authorised representatives of each of the parties.
3. The nomenclature of this agreement be treated as standardised format for parties being companies incorporated under Companies Act. 1956/2013.

   But other entities like partnership firm/ LLP may also eligible for participation in the bid as part of joint venture/ Consortium under relevant laws of India.

Proforma: 15 - POWER OF ATTORNEY FOR LEAD MEMBER OF JV/CONSORTIUM

(To be executed on Non-Judicial Stamp Paper)

KNOW ALL MEN BY THESE PRESENTS THAT WE, the Parties whose details are given hereunder ..... have formed a Joint Venture/Consortium under the laws of INDIA and having our Registered Office(s)/Head Office(s) at ..... (hereinafter called the 'Joint Venture' which expression shall unless repugnant to the context or meaning thereof, include its successors, administrators and assigns) acting through M/s ..... being the Lead Company or Lead Partner do hereby constitute, nominate and appoint M/s..... a Company incorporated under the laws of .....…….... and having its Registered/Head Office at ..... as our duly constituted lawful Attorney (hereinafter called "Attorney" or "Authorized Representative" or "Partner In-charge") duly represented by Shri/Ms to exercise all or any of the powers for and on behalf of the Joint Venture/consortium in regard to Specification No..... Package ..... the bids for which have been invited by West Bengal State Electricity Distribution Company Limited, having its Registered Office at Vidyut Bhavan, Block-DJ, Sector – II, Bidhannagar, Kolkata – 700 091 (hereinafter called the 'Employer') to undertake the following acts :

i) To submit proposal and participate in the aforesaid Bid Specification of the Employer on behalf of the "Joint Venture/Consortium".

ii) To negotiate with the Employer the terms and conditions for award of the Contract pursuant to the aforesaid Bid and to sign the Contract with the Employer for and on behalf of the "Joint Venture/Consortium".

iii) To do any other act or submit any document related to the above.

iv) To receive, accept and execute the Contract for and on behalf of the "Joint Venture/Consortium".

It is clearly understood that the Lead Company/Lead Partner shall ensure performance of the Contract(s) and if one or more Partner fail to perform their respective portions of the Contract(s), the same shall be deemed to be a default by all the Parties.

It is expressly understood that this Power of Attorney shall remain valid binding and irrevocable till completion of the Defect Liability Period in terms of the Contract.

The Joint Venture/Consortium hereby agrees and undertakes to ratify and confirm all the whatsoever the said Attorney/Authorized Representatives/Partner in-charge quotes in the bid, negotiates and signs the Contract with the Employer and/or proposes to act on behalf

of the Joint Venture/Consortium by virtue of this Power of Attorney and the same shall bind the Joint Venture/Consortium as if done by itself.

IN WITNESS THEREOF the Partners Constituting the Joint Venture as aforesaid have executed these presents on this..... day of ……..... under the Common Seal(s) of their Companies.

for and on behalf of the Parties of Joint Venture/Consortium

.....

.....

.....

The Common Seal of the above Partners of the Joint Venture:

The Common Seal has been affixed there unto in the presence of:

WITNESS

1. Signature.....

   Name .....….....

   Designation .....….....

   Occupation .....….....

2. Signature.....….…

   Name .....….....

   Designation .....….....

   Occupation .....….....

Note:

1. For the purpose of executing the Agreement, the non-judicial stamp papers of appropriate value shall be purchased on behalf of Joint Venture/Consortium.

2. The Agreement shall be signed on all the pages by the authorized representatives of each of the parties.

Proforma-16

SPECIMEN COPY

DEVIATION SHEET

(To be filled in and signed by the Bidder)

1. If the proposal has got any deviation from the Technical Specification, the Bidder shall tabulate those deviations here clause by clause.

Sl. No.	Clause No.	Description	Deviation Offered	Remarks

2. If the proposal has got any deviation from the Commercial terms specified, the Bidder shall tabulate those deviations here clause by clause.

Sl. No.	Clause No.	Description	Deviation Offered	Remarks

Dated----------

SIGNATURE OF THE TENDERER WITH SEAL

Note: 1. When there is no deviation, this sheet is to be submitted with the offer duly signed with an endorsement indicating "No Deviation".

2. Deviations not indicated here will not be taken into consideration.