



Telangana State Renewable Energy Development Corporation Ltd

Tender Notice. No. TSREDCO/SE/SPV/Hybrid –Rurban /2020-21

(e-Procurement Tender Notice)

Tender Schedule

For

DESIGN, SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF VARIOUS CAPACITIES FOR AGGREGATED CAPACITY OF 36 KWP ROOF TOP SOLAR PHOTO VOLTAIC HYBRID POWER PLANTS WITH FIVE YEARS OF COMPREHENSIVE MAINTENANCE CONTRACT AT VARIOUS RURBAN CLUSTERS UNDER R-URBAN SCHEME IN TELANGANA STATE

Tender Notice No:- TSREDCO/SE/SPV/Hybrid -Rurban /2020-21, Dated. 18.12.2020

CLOSING DATE: 28.12.2020 AT 3.00 PM



**TELANGANA STATE RENEWABLE ENERGY DEVELOPMENT CORPORATION LTD
(TSREDCO)**

Corporate Office: D. No. 6-2-910, Visvesvaraya Bhavan,
The Institution of Engineers Building, Khairatabad, Hyderabad - 500 004.
Telangana State, India

PHONE: 040-23201502, 23201503, FAX : 040-23201504

E-mail : info@tsredco.telangana.gov.in, se@tsredco.telangana.gov.in

Web site: tsredco.telangana.gov.in



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Website advertisement



TELANGANA STATE RENEWABLE ENERGY DEVELOPMENT CORPORATION LTD - (TSREDCO)

Corporate Office: D. No. 6-2-910, Visvesvaraya Bhavan, The Institution of Engineers Building,
Khairatabad, Hyderabad, 500 004. Telangana State PHONE: 040-23201502, 23201503, FAX :
040-23201504

Online tenders are hereby invited from interested and eligible bidders for “Design, Supply, Installation, Testing And Commissioning of various capacities for aggregated capacity of 36KWP roof top solar photo voltaic Hybrid power plants with five years of comprehensive maintenance contract at various Rurban Clusters under R-URBAN scheme in Telangana State”. Interested bidders can download the bids online from 18.12.2020 and submit the same, from 18.12.2020 to 28.12.2020 till 03:00PM through www.tender.telangana.gov.in. For further details please visit our website: <https://tsredco.telangana.gov.in>

Date: 18.12.2020

**VC & MD,
TS REDCO**



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SECTION - I

INVITATION FOR BIDS (IFB)



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SECTION - I

INVITATION FOR BIDS (IFB)

1. **Name of Work:** Design, Supply, Installation, Testing And Commissioning of various capacities for aggregated capacity of 36KWP roof top solar photo voltaic Hybrid power plants with five years of comprehensive maintenance contract at various Rurban Clusters under R-URBAN scheme in Telangana State.

Bid Document No: TSREDCO/SE/SPV/Hybrid -Rurban /2020-21 Date. 18.12.2020

2. **Background:** Government of Telangana through G.O.MS.No.25, Dated. 03.09.2015 nominated Telangana State Renewable Energy Development Corporation Limited as Nodal Agency for implementation of New & Renewable Energy Programmes in the state of Telangana.

On behalf of consumers under this scheme therein, TSREDCO is inviting e-bids from interested bidders for Design, Supply, Installation, Testing And Commissioning of various capacities for aggregated capacity of 36KWP roof top solar photo voltaic Hybrid power plants with five years of comprehensive maintenance contract at various Rurban Clusters under R-URBAN scheme in Telangana State. Any amendment(s)/ corrigendum/clarification(s) with respect to this Tender shall be uploaded on the e-Procurement website only. The bidders should keep themselves updated by regularly visiting the Telangana E-Procurement website and TSREDCO website for any amendment/ corrigendum/ clarification in regard to this Tender.

3. **OVERVIEW OF THE TENDER BID:-**

The successful Bidders selected by TSREDCO based on this tender bid shall set up of Design, Supply, Installation, Testing And Commissioning of various capacities for aggregated capacity of 36KWP roof top solar photo voltaic Hybrid power plants with five years of comprehensive maintenance contract at various Rurban Clusters under R-URBAN scheme in Telangana State.

4. **SELECTION TECHNOLOGY & ELIGIBLE PROJECTS UNDER THIS TENDER BID**

The Projects to be selected under this bid are of 1-10kWp Solar PV Projects Installed at Various Locations of Rurban clusters in Telangana State under Rurban Scheme. The Projects provide for deployment of Solar PV Technology. However, the selection of projects would be technology agnostic within the technology mentioned above.



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Crystalline Silicon, with or without Trackers can be installed. Only commercially established and operational technologies can be used, to minimize the technology risk and to achieve the timely commissioning of the Projects.

5. TSREDCO shall conduct negotiations separately for the projects, if required or as per provisions of tender bid document.
6. TSREDCO reserves the right to cancel/withdraw this invitation for bids without assigning any reason and shall bear no liability whatsoever consequent upon such a decision.

DISCLAIMER:

1. Telangana State Renewable Energy Development Corporation Limited (TSREDCO) reserves the right to modify, amend or supplement this document including all formats and Annexures.
2. While this document has been prepared in good faith, neither TSREDCO nor their employees or advisors make any representation or warranty, express or implied, or accept any responsibility or liability, whatsoever, in respect of any statements or omissions herein, or the accuracy, completeness or reliability of information, and shall incur no liability under any law, statute, rules or regulations as to the accuracy, reliability or completeness of this tender document, even if any loss or damage is caused by any act or omission on their part.

Definitions:

In the “Bid / Tender / Contract Document” as herein defined where the context so admits, the following words and expression will have the following meaning:

1. “Affiliate” shall mean a company that either directly or indirectly
 - a. controls or
 - b. is controlled by or
 - c. is under common control witha Bidding Company (in the case of a single company) and “control” means ownership by one company
2. “MNRE” shall mean Ministry of New & Renewable Energy
3. “B.I.S” shall mean specifications of Bureau of Indian Standards (BIS);
4. “Bid/Tender” shall mean the Techno Commercial and the Price/Financial Bid submitted by the Bidder along with all documents/credentials/attachments, formats, etc., in response to this Bid Document, in accordance with the terms and conditions hereof.



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5. “Bidder / Tenderer” shall mean Bidding Company submitting the Bid. Any reference to the Bidder includes Bidding Company including its successors, executors and permitted assigns jointly and severally, as the context may require”;
6. “Bidding Company” shall refer to such single/consortium company that has submitted the Bid in accordance with the provisions of this Bid;
7. “Bid Deadline” shall mean the last date and time for submission of Bid in response to this Bid as specified in Bid Information Sheet and as specified in ITB of this Bid document including all amendments thereto;
8. “Bid Document” shall mean all Definitions, Sections, Layouts, Drawings, Photographs, Formats & Annexure etc. as provided in this bid including all the terms and conditions hereof.
9. “CAPEX” shall means Capital Expenditure
10. “Chartered Accountant” shall mean a person practicing in India or a firm whereof all the partners practicing in India as a Chartered Accountant(s) within the meaning of the Chartered Accountants Act, 1949
11. “Competent Authority” shall mean Vice Chairman & Managing Director (VC&MD) of TSREDCO himself and/or a person or group of persons nominated by VC&MD for the mentioned purpose herein;
12. “Company” shall mean a body incorporated in India under the Companies Act, 2013;
13. "Contract" means the agreement entered into between the Employer and the Contractor/successful bidder, as recorded in the Contract Form signed by the parties, including all the attachments and appendices thereto and all documents incorporated by reference therein;
14. "Contract Price / Contract Value" shall mean the sum accepted or the sum calculated in accordance with the prices accepted in Bid and/or the Contract rates as payable to the Contractor for the entire execution and full completion of the Work (Price for Supply, Transportation, installation & Commissioning (including loading, unloading and transfer to Site), Insurance.
15. “Completion of Work” means that the Project/Works have been completed operationally and structurally has been attained as per Technical Specifications.
16. “Contract Document” shall mean collectively the Bid Document, Design, Drawings, and Specifications, Annexures, agreed variations, if any, and such other documents consisting the bid and acceptance thereof;
17. “CMC” means Comprehensive Maintenance Contract (CMC)
18. “Day” means calendar day;



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19. “Defect Liability Period” means the period of validity of the warranties given by the Contractor (commencing at Completion of the Project/Works, during which the Contractor is responsible for defects with respect to the Project/Works.
20. “BID SECURITY DEPOSIT” shall mean the unconditional and irrevocable online payment, the copy of acknowledgement to be submitted along with the Bid by the Bidder under ITB Clause of this Bid;
21. “Employer” or “TSREDCO” shall mean Telangana State Renewable Energy Development Corporation Limited, Hyderabad.
22. “Eligibility Criteria” shall mean the Eligibility Criteria as set forth in Section III: Technical & Special Conditions of Contract of this BID;
23. “Effective Date” means the date from which the Time for Completion shall be determined;
24. “GCC” means the General Conditions of Contract contained in this Tender Document;
25. “Goods” means permanent plant, equipment, machinery, apparatus, articles and things of all kinds to be provided and incorporated in the Works by the Contractor under the Contract but does not include Contractor’s Equipment;.
26. “Guarantee Test(s)” means the test(s) specified in the Technical Specification to be carried out to ascertain whether the Project/Works is able to attain the functional requirements specified in the Technical Specifications.
27. “IEC” shall mean specifications of International Electro-Technical Commission;
28. “IFB” Shall mean Information for Bidder
29. “ITB” shall mean Instructions to Bidder
30. “NIT” Shall means Notice Inviting Tender
31. “PGD” Shall means Performance guarantee deposit
32. “Parent Company” shall mean a company that holds paid-up equity capital directly or indirectly in the Bidding Company, as the case may be;
33. “Price/Financial Bid” shall mean separate Envelope, containing the Bidder’s Quoted Price as per the format prescribed in Section-III (Technical & Special Conditions of Contract) of this BID.
34. “Qualified Bidder” shall mean the Bidder(s) who, after evaluation of their Techno Commercial Bid as per Eligibility Criteria set forth in Section III: Technical & Special Conditions of Contract of this BID stand qualified for opening and evaluation of their Price/Financial Bid;
35. “RC” shall mean Rate Contract
36. “SNA” shall mean State Nodal Agency



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37. “Statutory Auditor” shall mean the auditor of a Company appointed under the provisions of the Companies Act, 2013 or under the provisions of any other applicable governing law;
38. “Services” means those entire services ancillary to the supply of the products, to be provided by the Contractor under the Contract; e.g. transportation (including loading, unloading and transfer to Site) and provision of marine or other similar insurance, inspection, expediting, carrying out guarantee tests, operations, maintenance etc.
39. SUCCESSFUL BIDDER shall means “Solar Power Developer”
40. “Successful Bidder(s) / Contractor(s)” shall mean the Bidder(s) selected by Employer pursuant to this Bid i.e. on whom award is made.
41. “Standards” shall mean the standards mentioned in the technical specification of the goods and equipment utilized for the Work or such other standard which ensure equal or higher quality and such standards shall be latest issued by the MNRE.
42. “Time for Completion” means the time within which Completion of the Project/Works is to be attained as per the respective PO/ LOI/LOA or the relevant provisions of the contract;
43. “TSREDCO” means Telangana State Renewable Energy Corporation Limited
44. “Work” means the “Goods” to be supplied, as well as all the “Services” to be carried out under the Contract;

INTERPRETATIONS:

1. Words comprising the singular shall include the plural & vice versa
2. An applicable law shall be construed as reference to such applicable law including its amendments or re-enactments from time to time.
3. A time of day shall save as otherwise provided in any agreement or document be construed as a reference to Indian Standard Time.
4. Different parts of this contract are to be taken as mutually explanatory and supplementary to each other and if there is any differentiation between or among the parts of this contract, they shall be interpreted in a harmonious manner so as to give effect to each part.
5. The table of contents and any headings or sub headings in the contract has been inserted for case of reference only & shall not affect the interpretation of this agreement.



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SECTION - II

**INSTRUCTIONS TO THE
BIDDER (ITB) AND GENERAL
CONDITIONS**



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SECTION - II

Instructions to the Bidder (ITB) and General Conditions

2.0 INTRODUCTION:

- The Work will be allotted to L1 Bidder.

2.1 BID INFORMATION SHEET

The brief details of the tender bid are as under:

Bid Document No.	TSREDCO/SE/SPV/Hybrid -Rurban/2020-21, Dt: 18.12.2020.
Bid Document fee (Non refundable)	Rs.11,800/- incl. 18% GST (to be paid Online from any Scheduled Bank to M/s TSREDCO, Account no: 30242010095314, Canara Bank, Mukramjahi Raod, Hyderabad). The copy of acknowledgement is to be submitted to TSREDCO.
Bid Security Deposit	Bid Bond (BID SECURITY DEPOSIT) for Rs.75,000.00 (Seventy Five thousand) to be paid Online from any Scheduled Bank to M/s TSREDCO, Account no: 30242010095314, Canara Bank, Mukramjahi Raod, Hyderabad). The copy of acknowledgement is to be submitted to TSREDCO (or) BG in favor of TSREDCO. Firms claiming Exemptions for BID SECURITY DEPOSIT shall submit Certificate from NSIC/ MSME.
Performance security value	At the time of allocation of projects, the bidder shall submit Performance Guarantee @ 10% on the total project cost with quoted price. This Performance Guarantee amount shall be paid Online from any Scheduled Bank to M/s TSREDCO, Account no: 30242010095314, Canara Bank, Mukramjahi Road, Hyderabad). The copy of acknowledgement is to be submitted to TSREDCO. Performance Guarantee amount shall be retained for a period of sixty six months (5.5Years). No interest shall be paid by TSREDCO on the amount of Performance Guarantee deposit.



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Minimum Eligibility Criteria	Valid Registered Suppliers with TSREDCO with requisite experience of at least minimum 30KWp cumulative capacity in field of OFF grid and Grid Connected Solar PV systems installed at government buildings in any one (1) FY from the last 3 Years (i.e. FY 2017-18, 2018-19 and 2019-20)
Minimum Eligibility Financial Criteria	The firms are having the Turnover not less than 1Cr, in any one financial year during the last 3 financial years.
Bid Documents Downloading Start date	18.12.2020
Bid Document Downloading End Date	28.12.2020 till 02.00 PM
Last date for uploading of online documents	28.12.2020 till 03.00 PM
Last date for submission of Hard copies of documents uploaded online	28.12.2020 till 05.00 PM at D. No. 6-2-910, Visvesvaraya Bhavan, The Institution of Engineers Building, Khairatabad, Hyderabad, 500 004. Telangana State, India
Pre-qualification & Technical Bid opening date/time	29.12.2020 at 11:00 AM.
Price Bid opening date/time	31.12.2020 at 03:00 PM
Tender Bid Validity	90 days from the date of Opening
Contact person	General Manager (OR) Project Director (Solar), TSREDCO, Hyderabad
Tender to be addressed to	Vice Chairman & Managing Director Telangana State Renewable Energy Development Corporation Ltd (TSREDCO), D. No. 6-2-910, Visvesvaraya Bhavan, 2 nd floor, The Institution of Engineers Building, Khairatabad, Hyderabad - 500 004. Telangana State, India Ph: 040 - 23201502, 23201503./ Fax: 040 - 23201504 Email: se@tsredco.telangana.gov.in

Important Note:

Bidder shall submit bid proposal along with Bid Document fee and BID SECURITY DEPOSIT, complete in all respect as per the Bid Information Sheet. Technical bids will be opened in presence of authorized representatives of bidders who wish to be present.



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TSREDCO have right to reject the bidding process at any stage or right to cancel the tender without mentioning any reason. In the event of any date indicated above is a declared Holiday, the next working day shall become operative for the respective purpose mentioned herein.

Bid documents which include Eligibility criteria, “Technical Specifications”, various conditions of contract, formats, etc. can be downloaded from Telangana e-procurement website <https://tender.telangana.gov.in/>.

Any amendment(s)/corrigendum/clarifications with respect to this Bid will be uploaded on <https://tender.telangana.gov.in/> website and TSREDCO website tsredco.telangana.gov.in only. The Bidder should regularly follow up for any Amendment/Corrigendum/Clarification on the above website. No separate notifications will be issued for such notices/ amendments/ clarification etc. in the print media or individually.

1. Bids not accompanying the Bidding Document Cost and BID SECURITY DEPOSIT, or those accompanied by these instruments of inadequate value, shall not be entertained and in such cases, the bids shall not be opened. The Bidding Document Cost has to be paid through online mode necessarily, and submit the copy of acknowledgement along with Bid Document.

The BID SECURITY DEPOSIT should be in the form of online mode to TSREDCO account with Account no: 30242010095314, Canara Bank, Hyderabad. The validity of the BID SECURITY DEPOSIT shall be as per the Bid information sheet.

The details of the instruments of Bidding Document Cost and the BID SECURITY DEPOSIT (to be paid Online) have to be entered online in relevant fields/columns of the module while submitting the e-bid. It must be ensured by the bidder that the original instruments towards Bidding Document Cost and BID SECURITY DEPOSIT are received by TSREDCO before opening time of the Technical bids for verification of the details of the same as given online by the bidder. Failure to comply with this would render the bid liable for rejection and the bid will not be opened online. TSREDCO will not be responsible for any delay, loss or non-receipt of Bidding Document Cost or BID SECURITY DEPOSIT sent by post/courier.

Any relaxation/exemption sought by bidders shall only be considered in accordance with relevant clauses Section-II (ITB) regarding submission/payment of BID SECURITY DEPOSIT and Bidding Document Cost and shall be subject to fulfillment of conditions defined in the said clauses. Since all the conditions explained in the said clauses for seeking exemption from submission of Bidding Document Cost and BID SECURITY DEPOSIT are self-explanatory, bidders should ascertain about their fulfillment of all conditions and submit their bid accordingly. If at any stage, it is found that false information is furnished or non-compliance of any of the



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conditions defined at the said clauses, the bid/offer shall be considered as non-responsive and would not be considered for further evaluation. Bidder seeking exemption from submission of the Bidding Document Cost and the BID SECURITY DEPOSIT has to mandatorily submit/upload the scanned copy of their valid original registration certificate(s) as asked for in the relevant, clause along with other relevant documents as part of their online bid.

2. TSREDCO reserves the right to cancel / withdraw the tender without assigning any reason whatsoever and in such a case, no bidder / intending bidder shall have any claim arising out of such action.

3. The subject procurement will be done through e-tendering. The Bid document is available on Telangana e-tender website <https://tender.telangana.gov.in/> or on TSREDCO website's Home Page <https://tsredco.telangana.gov.in>. The Tender submission, Tender closing and opening will be done electronically and online.

*****Note:** The payment to be made to TSREDCO in respect of Bid Document fee, Bid Security deposit and Performance Security Value must be made through Online mode and the copy of payment receipt or acknowledgement is to be submitted along with Bid Document. The Bank Account details of TSREDCO are as follows:

Name of the Beneficiary	M/s. Telangana State Renewable Energy Development Corporation Ltd.(TSREDCO)
Account Number	30242010095314
IFSC Code	SYNB0003024
Bank Name	Canara Bank
Branch	Mukramjahi Road, Hyderabad.

2.2 PROJECT LOCATION:

2.2.1 The Design, Supply, Installation, Testing And Commissioning of various capacities for aggregated capacity of 36KWP roof top solar photo voltaic Hybrid power plants with five years of comprehensive maintenance contract at various Rurban Clusters under R-URBAN scheme in Telangana State. The locations details as follows:



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Sl.No	Name of the District	Location	Plant capacity in KWp	Quantity in Nos	Total Capacity in KWp
1	2	3			4
1	Rangareddy	Tahasildar Office Shankerpally	5	1	5
		MPDO Office Shakarpally	5	1	5
		Primary Health Center Shankarpally	5	1	5
		MGNREGS (Velugu) Office Shankarpally	3	1	3
		KGVB School Sharkarpally	3	1	3
2	Jayashankar Bhupalapally	Nagaram Cluster	1	15	15
				Total	36

2.3 PROJECT SCOPE & TECHNOLOGY SELECTION

Following conditions shall be applicable to the Bidders for submission of bids against this bid.

- (i) A Bidder Company shall submit a single bid for the above work in the prescribed format.
- (ii) The evaluation of bids shall be carried out as described in Section-IV of bid.

2.4 CONNECTIVITY WITH THE EXISTING 230V/440V/11KV LINE

2.4.1 Refer Clause 25 of Section-V of the bid.

2.5 POWER GENERATION BY SUCCESSFUL BIDDER

2.5.1 CRITERIA FOR GENERATION

The declared annual CUF shall in no case be less than 15%. Successful Bidder shall maintain generation so as to achieve annual CUF of minimum 15% value till the end of duration of 25 years. The lower limit will, however, be relaxable by TSREDCO to the extent of non-availability of grid for evacuation which is beyond the control of the successful bidder.

3. BID SECURITY DEPOSIT

3.1 BID SECURITY DEPOSIT of **INR 75,000 (Rupees Seventy Five Thousand only)** as mentioned in Bid Information sheet for this Project is to be paid online to TSREDCO account or Bank Guarantee according to Format in favour of Telangana State Renewable Energy Development Corporation Ltd, (TSREDCO) and valid for **09 months** from the last date of bid



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submission, shall be submitted by the Bidder along with their bid, failing which the bid shall be summarily rejected. The Bank Guarantees towards BID SECURITY DEPOSIT have to be issued in the name of the Bidding Company.

3.2 The Bidder shall make payment through online mode or furnish the Bank Guarantee towards BID SECURITY DEPOSIT from any of the any Nationalized Banks/Schedule Banks.

Please note that:

I. Vendors registered with NSIC/MSME under single point registration scheme certificate may be given exemption from BID SECURITY DEPOSIT for all tenders of TSREDCO subject to following condition:

a. NSIC /MSME Certificate must be valid for 9 months from the date of Bid-Opening, However tender fee is not exempted.

The BID SECURITY DEPOSIT may be forfeited if:

- a. If the bidder withdraws its bid during the period of bid validity as specified in the bid.
- b. If the bidder does not accept computational/arithmetical error correction made by TSREDCO and as explained in “Financial Evaluation” section of the Bid document.
- c. If the bidder does not accept assumptions, estimations etc. used for evaluation of bids as specified by TSREDCO in tender documents and revision of his bid accordingly, in case other assumptions are used. If the bidder does not accept the sharing as specified in the bid.
- d. In the case of successful bidder, if the bidder fails within the specified time limit:

- To sign the contract agreement within 15 days of placement of Lol/Award letter.
- To furnish the required performance guarantee, in accordance with the tender document.

4 PERFORMANCE GUARANTEE DEPOSIT (PGD)

4.1 Bidders selected by TSREDCO based on the tender shall submit Performance Guarantee @ 10% on the total project cost with quoted price. This Performance Guarantee amount shall be paid through online and submit the copy of acknowledgement to TSREDCO, which will be retained with TSREDCO for a period of sixty six months (5.5Years). No interest shall be paid by TSREDCO on the amount of Performance Guarantee deposit. On receipt of the Performance Guarantee amount, paid towards BID SECURITY DEPOSIT shall be returned by TSREDCO to the successful Bidder.



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In case of delays in submission of PGD, the issue of work agreement shall be extended until the submission of the PGD by the successful bidder. In such cases, the Effective Date of work completion shall remain unchanged. Further, the validity of the Bank Guarantee(s) against BID SECURITY DEPOSIT submitted by the Bidder shall have to be maintained by the successful bidder, until the submission of PGD. In the event of non-submission of PGD by the date of expiry of the BID SECURITY DEPOSIT, the BID SECURITY DEPOSIT submitted for the Project shall be encashed/revoked by the TSREDCO, and the Project shall stand terminated.

4.2 All Performance Guarantee Deposit (PGD) shall be paid through online to M/s. TSREDCO, Account no: 30242010095314, Canara Bank, Hyderabad.

4.3 The format of the Bank Guarantee prescribed in the Formats (BID SECURITY DEPOSIT) shall be strictly adhered to and any major deviation from the above Formats shall result in rejection of the BID SECURITY DEPOSIT and consequently, the bid. In case of deviations in the formats of the Bank Guarantees.

4.4 The successful Bidder for the Project selected based on this tender bid is to be submitted PGD within 15days after the issue of Lol. If the Selected Bidder does not submit the requisite documents as per Clause, Section-II, Instructions to Bidders (ITB) of tender document or does not meet eligibility criteria upon submission of documents or does not submit the PGD within the stipulated time period, then the Bank Guarantee equivalent to the amount of the BID SECURITY DEPOSIT shall be encashed/revoked by TSREDCO from the Bank Guarantee available with TSREDCO (i.e. BID SECURITY DEPOSIT) as liquidated damages not amounting to penalty, the selected Project shall stand cancelled and the selected Bidder expressly waives off its rights and objections, if any, in that respect.

4.5 The Bank Guarantees have to be executed on non-judicial stamp paper of appropriate value as per Stamp Act relevant to the place of execution.

4.6 All expenditure towards execution of Bank Guarantees such as stamp duty etc. shall be borne by the Bidders.

4.7 In order to facilitate the Bidders to submit the Bank Guarantee as per the prescribed format and in line with the requirements, checklist at Annexure has been attached. Bidders are advised to take note of the above checklist while submitting the Bank Guarantees.



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4.8 After the bidding process is over, TSREDCO shall release the Bank Guarantees towards BID SECURITY DEPOSIT of the unsuccessful Bidders within 15 days after the completion of the bidding process. The PGD of successful bidder shall be returned to them, Only after successful completion of CMC period of their project, after taking into account any liquidated damages due to delays in commissioning as per Clause, Section-II, Instructions to Bidders (ITB) of tender bid.

5 TSREDCO ADMINISTRATIVE CHARGES:

5.1 TSREDCO ADMINISTRATIVE CHARGES @ 5% plus GST as applicable on the actual project completion cost shall be deducted at the time of release of first payment.

5.2 TSREDCO Administrative charges are charged towards site visits, inspection, liaison, monitoring etc.

6. PAYMENT TERMS:

Payment will be settled on receipt of funds from beneficiary dept. as stated below:

- a) 70% of purchase order value will be settled on installation, commissioning and synchronization of systems and handing over of the systems to Concerned Beneficiary Department officials after joint inspection of TSREDCO, Beneficiary Dept. officials and supplier.
- b) Contractor shall submit the performance and Warranty Certificates for a period of 5 Years for Inverter & other components and performance guaranty, warranty of SPV modules as per MNRE guidelines.
- c) 30% will be paid after 90 days of Successful performance and satisfactory of the System, joint inspection will be conducted with of TSREDCO officials , Beneficiary Dept. officials and supplier, before releasing of amount.
- d) The Contractor shall raise an invoice in an acceptable proforma and in accordance with the rates quoted in Price Bid.
- e) Income tax will be deducted by the TSREDCO from all payment made to the Contractor. This will be as per the Rules and Regulations in force and in accordance with the Income Tax Act prevailing from time to during the contract period.
- f) **TSREDCO ADMINISTRATIVE CHARGES @ 5% plus GST as applicable on the actual project completion cost shall be deducted at the time of release of first payment.**

7) COMMISSIONING: The Commissioning of the Project shall be carried out by the successful bidder in line with the procedure elaborated in work agreement.



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7.1. PART COMMISSIONING: There shall be no Part Commissioning allowed for the Project. Subjected to site conditions and with prior approval of beneficiary.

7.2 PENALTY FOR DELAY IN PROJECT IMPLEMENTATION

If the bidder fails to commission the allocated capacity within 60 to 180days from date of issue of allocation letter, Penalty on per day basis calculated for the Performance Security on a 60 to 180days period would be levied. After above project duration period allocated capacity will get cancelled and the PGD amount pro-rata to non-commissioned capacity would be forfeited.

Example: If a project of 500 kW is delayed by 36 days then the LD will be levied as given below.

Eg. PENALTY = ((Performance Security)/180 days)*delayed days = (15,00,000 /180)*36

8. COMMERCIAL OPERATION DATE (COD)

Commercial Operation Date (COD) shall be the date on which the commissioning certificate is issued upon successful commissioning of the full capacity of the Project.

(a) **Commissioning of the Project:** This will be on a date, when the project meets the criteria defined for project commissioning. TSREDCO to declare the project commissioned on site.

9. STRUCTURING OF THE BID SELECTION PROCESS

9.1 Single stage, Double Envelope bidding followed by negotiations has been envisaged under this bid. Bidders have to submit both Techno-Commercial Bid and Financial Bid (Rate) together in response to this bid online. The preparation of bid proposal has to be in the manner described in Clause, Section-II, Instructions to Bidders (ITB) of bid.

10. INSTRUCTIONS TO BIDDERS FOR STRUCTURING OF BID PROPOSALS IN RESPONSE TO BID:

The bidder shall submit single response to bid.

Detailed Instructions to be followed by the bidders for online submission of response to tender are stated at Annexures

Submission of bid proposals by Bidders in response to tender shall be in the manner described below:

- i. Covering Letter
- ii. Earnest Money Deposit (BID SECURITY DEPOSIT) in the form
- iii. Format for Financial Requirements along with the certificate from practicing Chartered Accountant/ Statutory Auditors showing details of computation of the financial credentials of the Bidder.



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- iv. A disclosure statement regarding participation of any related companies in the bidding process.
- v. Format for Technical Criteria in line with Clause, Section-II, Instructions to Bidders (ITB) of tender.
- vi. Details of all types of securities/instruments which are pending conversion into equity whether optionally or mandatorily.
- vii. No Deviation Certificate as per mentioned in Format.
- viii. Certified copies of annual audited accounts for the last financial year, i.e. FY 2019-20.

11. IMPORTANT NOTES AND INSTRUCTIONS TO BIDDERS

11.1 Wherever information has been sought in specified formats, the Bidders shall fill in the details as per the prescribed formats and shall refrain from any deviations and referring to any other document for providing any information required in the prescribed format.

11.2 The Bidders shall be shortlisted based on the declarations made by them in relevant schedules of tender. The documents submitted online will be verified before issuing of Lol in terms of Clause, Section-II, Instructions to Bidders, ITB of tender.

11.3 If the Bidder conceals any material information or makes a wrong statement or misrepresents facts or makes a misleading statement in its response to tender, in any manner whatsoever, TSREDCO reserves the right to reject such response to tender and/ or cancel the Letter of Award, if issued, and the Bank Guarantee provided up to that stage shall be enashed/revoked. Bidder shall be solely responsible for disqualification based on their declaration in the submission of response to tender bid.

11.4 Response submitted by the Bidder shall become the property of the TSREDCO and TSREDCO shall have no obligation to return the same to the Bidder. However, the BID SECURITY DEPOSIT s submitted by unsuccessful Bidders shall be returned as specified in Clause, Section-II, Instructions to Bidders (ITB) of bid.

11.5 All documents of the response to bid (including bid and subsequent Amendments/ Clarifications) submitted online must be digitally signed by the person authorized by the Board as per Format.

11.6 The response to bid shall be submitted as mentioned in Clause, Section-II, Instructions to Bidders (ITB) of bid. No change or supplemental information to a response to bid will be accepted after the scheduled date and time of submission of response to bid. However, TSREDCO reserves the right to seek additional information from the Bidders, if found necessary, during the course of evaluation of the response to bid.



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11.7 The bidder shall make sure that the correct, valid and operative Pass-Phrase to decrypt the relevant Bid-part is submitted into the 'Time Locked Electronic Key Box (EKB)' after the deadline of Bid submission, and before the commencement of the Online Tender Opening Event (TOE) of Technical bid.

11.8 All the information should be submitted in English language only. In case of foreign bidders having documents in other than English language, then the documents shall be translated in English language by certified translator and submitted.

11.9 Bidders shall mention the name of the contact person and complete address and contact details of the Bidder in the covering letter.

11.10 Response to tender that is incomplete, which do not substantially meet the requirements prescribed in this tender, will be liable for rejection by TSREDCO.

11.11 Response to bid not submitted in the specified formats will be liable for rejection by TSREDCO.

11.12 Bidders delaying in submission of additional information or clarifications sought will be liable for rejection.

11.13 Non-submission and/ or submission of incomplete data/ information required under the provisions of bid shall not be construed as waiver on the part of TSREDCO of the obligation of the Bidder to furnish the said data/ information unless the waiver is in writing.

11.14 Only Telangana Courts shall have exclusive jurisdiction in all matters pertaining to this tender bid.

12. NON-RESPONSIVE BID

The electronic response to bid submitted by the bidder along with the documents submitted offline to TSREDCO shall be scrutinized to establish "Responsiveness of the bid". Each bidder's response to bid shall be checked for compliance with the submission requirements set forth in this bid.

Any of the following conditions shall cause the Bid to be "Non-responsive": -

- (a) Non-submission of Cost of bid as mentioned in the Bid Information Sheet;
- (b) Non-submission of BID SECURITY DEPOSIT in acceptable form along with bid document.
- (c) Response to bid not received by the due date and time of bid submission;
- (d) Non-submission of correct, valid and operative Pass-Phrase to decrypt either the Technical Bid Part or Financial Bid Part offline before due date and time of submission of bid;
- (e) Non-submission of the original documents mentioned at Clause, Section- II, Instructions to Bidders (ITB) of tender bid by due date and time of bid submission;



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- (f) Any indication of rate in any part of response to the bid, other than in the financial bid;
- (g) Data filled in the Electronic Form of Financial Bid (Second Envelope), not in line with the instructions mentioned in the same electronic form;
- (h) In case it is found that the Bidding Company have submitted more than one response to this Tender bid, then all these bids submitted shall be treated as non-responsive and rejected.

13. METHOD OF SUBMISSION OF RESPONSE TO TENDER BY THE BIDDER

A. DOCUMENTS TO BE SUBMITTED OFFLINE (IN ORIGINAL): The bidder has to submit the documents in original as part of Response to Tender bid to the address mentioned in Bid Information Sheet before the due date and time of bid submission.

Bidding Envelope: Super scribed as “Bidding Envelope containing i) Covering Envelope, ii) Pass Phrase Envelope -1 & iii) Pass Phrase Envelope -2” at the top of the Envelope and “Name & Address of the Bidder” on the left hand side bottom must contain the following

I. Covering Envelope: Super scribed as “Covering Envelope Containing Cost of Tender bid Document, Bank Guarantee towards BID SECURITY DEPOSIT, Covering Letter, and Power of Attorney (if applicable), Consortium Agreement (if applicable), Board Resolution” must contain the following

- Copy of payment receipt/acknowledgement towards Cost of Tender bid Document as mentioned in Bid Information Sheet.
- Bank Guarantee towards BID SECURITY DEPOSIT as mentioned in the Bid Information Sheet (as per Format). One BID SECURITY DEPOSIT may be submitted for the cumulative capacity quoted by the Bidder.
- Covering Letter as per Format
- Power of Attorney as per Format (if applicable),
- Board Resolution as per Format
- Consortium Agreement as per Format (if applicable)
- GSTN along with respective registered address of the Bidder on the letterhead of the Bidder (signed by the Authorized signatory)

II. Pass-Phrase Envelope-1: Containing Pass Phrase for Technical Bid duly signed by the authorized signatory in sealed envelope.

III. Pass-Phrase Envelope-2: Containing Pass Phrase for Financial Bid duly signed by the authorized signatory in sealed envelope.



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The bidding envelope shall contain the following sticker:

Response to Tender for Selection of Solar Power Developers for Setting up of various capacities for aggregated capacity of 36 KWP roof top solar photo voltaic Hybrid power plants with five years of comprehensive maintenance contract at various Rurban Clusters under R-URBAN scheme in Telangana State

Cumulative Capacity of the projects applied for	_____kWp
No. of Projects Bid for	
Tender Reference No.	TSREDCO/SE/SPV/Hybrid -Rurban /2020-21, Dt:18.12.2020
Submitted by	(Enter Full name and address of the Bidder)
Authorized Signatory	(Signature of the Authorized Signatory) (Name of the Authorized Signatory) (Stamp of the Bidder)
Bid Submitted to	VC & Managing Director TELANGANA STATE RENEWABLE ENERGY DEVELOPMENT CORPORATION LTD (TSREDCO) Corporate Office: D. No. 6-2-910, Visvesvaraya Bhavan, The Institution of Engineers Building, Khairatabad, Hyderabad - 500 004. Telangana State, India PHONE: 040-23201502 / 03, FAX : 040-23201504 E-mail : info@tsredco.telangana.gov.in, se@tsredco.telangana.gov.in

B. DOCUMENTS TO BE SUBMITTED ONLINE

Detail instructions to be followed by the bidders for online submission of response to Tender bid. The bidders shall strictly follow the instructions mentioned in the electronic form in respective technical bid and financial bid while filling the form

If the Bidder has submitted offline documents and fails to submit the online bid, then the same shall be treated as incomplete bid and Cost of Tender bid submitted shall be en-cashed and the BID SECURITY DEPOSIT (s) shall be returned. The bid shall not be processed further in such case.

All documents of the response to Tender bid submitted online must be digitally signed on www.tender.telangana.gov.in which should contain the following:

14. NOTICE BOARD FOR DISPLAY

The selected successful bidder will have to put a notice board (at least 180cm x 120cm) at its project site main entrance prominently displaying the following message before declaration of COD.



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.....kW Hybrid Solar PV Project Installed by
----- (insert name of the SUCCESSFUL BIDDER/SUPPLIER)
Setting up of ____kW Solar PV Project at,
.....

Implemented by



TELANGANA STATE RENEWABLE ENERGY DEVELOPMENT CORPORATION LTD
TSREDCO - HYDERABAD

15. VALIDITY OF THE RESPONSE TO TENDER BID

The Bidder shall submit the response to Tender bid which shall remain valid up to 4 (four) months from the last date of submission of response to Tender bid (“Bid Validity”). TSREDCO reserves the right to reject any response to Tender bid which does not meet the aforementioned validity requirement.

16 BID PREPARATION COST

The Bidder shall be responsible for all the costs associated with the preparation of the response to Tender bid. TSREDCO shall not be responsible in any way for such costs, regardless of the conduct or outcome of the bid process.

17 CLARIFICATIONS/ ENQUIRIES/ AMENDMENTS

17.1 Clarifications/ Doubts, if any, on Tender bid document may be emailed to se@tsredco.telangana.gov.in and/ or through www.tender.telangana.gov.in portal.

17.2 A compiled list of such questionnaire and TSREDCO’s response will be uploaded in the website TSREDCO or e-tender (www.tender.telangana.gov.in). If necessary, amendments, clarifications, elaborations shall be issued by TSREDCO which will be notified on TSREDCO/ www.tender.telangana.gov.in web site. No separate reply/ intimation will be given for the above, elsewhere.

17.3 Enquiries/ Clarifications may be sought by the Bidder from

Sl.No	Designation	Contact Numbers	Email id
1.	General Manager	040 - 23201502/03	gm@tsredco.telangana.gov.in
2.	Project Director	040 - 23201502/03	se@tsredco.telangana.gov.in



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18 RIGHT OF TSREDCO TO REJECT A BID:

TSREDCO reserves the right to reject any or all of the responses to Tender bid or cancel the Tender bid or annul the bidding process for any project at any stage without assigning any reasons whatsoever and without thereby any liability. In the event of the tender being cancelled at any stage, BID SECURITY DEPOSIT submitted by the Bidders shall be returned to the respective Bidders.

19. POST AWARD COMPLIANCES

Timely completion of all the milestones i.e. Commissioning, Synchronization etc. will be the sole responsibility of successful bidder. TSREDCO/Beneficiary Dept. shall not be liable for issuing any intimations/ reminders to successful bidders for timely completion of milestones and/ or submission of compliance documents.

Any checklist shared with successful bidder by TSREDCO for compliance of above mentioned milestones to be considered for the purpose of facilitation only. Any additional documents required as per the conditions of Tender bid and work agreement must be timely submitted by the successful bidder.



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SECTION - III

TENDER SCHEDULE



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SECTION - III

TENDER SCHEDULE

1. PREAMBLE:

The scope of work for the bidder include complete design, shadow analysis of roof top, engineering, manufacture, supply, Installation & Commissioning of Various Capacities for aggregated capacity of 36KWp roof top solar photo voltaic Hybrid power plants with five years of comprehensive maintenance contract under net-metering scheme at various RURBAN clusters under R-URBAN scheme in Telangana State through e-procurement platform (i.e. www.tender.telangana.gov.in).

On behalf of consumers therein, TSREDCO inviting Bids for Design, Supply, Installation, Testing And Commissioning of various capacities for aggregated capacity of 36 KWP roof top solar photo voltaic Hybrid power plants with five years of comprehensive maintenance contract at various Rurban Clusters under R-URBAN scheme in Telangana State. Bidders shall quote as per financial bid format.

The Successful Bidder(s) shall work closely with the State Government departments, Institutions, non-profit organizations institutions in implementing the above work and ensure success of the program. Installations will have to be generally done as follows from receipt of work orders/entering into agreements with the User Agency /TSREDCO.

2. INCOME TAX:

During the course of the contract period, deduction of income tax and surcharge at source shall be made at the prevailing rate issued by Income Tax Department from time to time on the gross amount of each bill.

3. RATES , TAXES AND DUTIES:

All the rates in the tender shall be **inclusive of all statutory compliances** like PF, ESI, Service Tax, GST, etc. However, any changes made to the tax structure by the government shall be duly considered and appropriate changes made.

4. PLACE OF WORK AND VISIT TO SITE:

Intending tenders shall visit the Site/ Campus to acquaint with local site conditions, nature and requirement of work, present conditions of premises/fittings/fixtures, etc., before start of the work.



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5. BID DETAILS:

The bid shall be on CAPEX MODE for design, supply, installation and commissioning of Hybrid solar rooftop systems and the rate quoted by the bidders for considering rate for the Rooftop project with module cleaning as per requirement of beneficiary dept.

6. ELIGIBILITY CRITERIA:

- a. Valid Registered SPV Suppliers/ Manufacturers/ System Integrators with TSREDCO.
- b. Bidder should have experience at least minimum **30KWp cumulative capacity in field OFF Grid and ON Grid** Solar PV systems installed at government buildings in any one (1) FY from the last 3 Years (i.e. FY 2017-18, 2018-19 and 2019-20)
- c. Experience certificate along with performance from beneficiary, should be before 6months from last date.

6.1. TECHNICAL ELIGIBILITY CRITERIA:

a. Under this tender, it is proposed to promote only commercially established and operational technologies to minimize the technology risk and to achieve timely commissioning of the Projects. The Bidder may indicate regarding the selection of technology and its details at the time of submission of bids in the prescribed Format. However, the Successful Bidder has to confirm the selection of technology in line with the above. The technology proposed at the time of submission of response to tender can be changed at the time of Financial Closure.

b. Detailed technical parameters for Solar PV Projects to be met by successful bidder are at Annexure. The Bidders shall strictly comply with the technical parameters detailed in the Annexure. Further, the cells and modules used in the Project shall be sourced only from the models and manufacturers included in the “Approved List of Models and Manufacturers” as published by MNRE and updated as on the date of commissioning of the Project.

- d. The Projects shall also comply with the criteria for power generation detailed in Clause in Section-II, Instructions to Bidders (ITB) of tender bid.

6.2 FINANCIAL ELIGIBILITY CRITERIA:

Bidder should have annual turnover of Rs.1.00 Cr. In any one (1) Financial Year during the last three financial years i.e. 2017-18, 2018-19 and 2019-2020(Certificate from CA is to be furnished).



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7. FORCE MAJEURE

a. Notwithstanding the provisions of clauses contained in this BID document; the contractor shall not be liable to forfeit

(a) Security deposit for delay and

(b) Termination of contract; if he is unable to fulfill his obligation under this contract due to force majeure conditions.

b. For purpose of this clause, "Force Majeure" means an event beyond the control of the contractor and not involving the contractor's fault or negligence and not foreseeable, either in its sovereign or contractual capacity. Such events may include but are not restricted to Acts of God, wars or revolutions, fires, floods, epidemics, quarantine restrictions and fright embargoes etc. Whether a "Force majeure" situation exists or not, shall be decided by TSREDCO and its decision shall be final and binding on the contractor and all other concerned.

c. In the event that the contractor is not able to perform his obligations under this contract on account of force majeure, he will be relieved of his obligations during the force majeure period. In the event that such force majeure extends beyond six months, TSREDCO has the right to terminate the contract in which case, the security deposit shall be refunded to him.

d. If a force majeure situation arises, the contractor shall notify TSREDCO in writing promptly, not later than 14 days from the date such situation arises. The contractor shall notify TSREDCO not later than 3 days of cessation of force majeure conditions. After examining the cases, TSREDCO shall decide and grant suitable additional time for the completion of the work, if required.

8. COMMISSIONING /COMPLETION CERTIFICATE

a. Application for completion/commissioning certificate:

When the Successful bidder fulfills his obligation under the Contract, he shall be eligible to apply for Completion Certificate. The Engineer-in-Charge of TSREDCO and beneficiary department officials shall normally issue to the Successful bidder the Completion Certificate within 15days after receiving any application therefore from the Successful bidder after verifying from the completion documents and satisfying themselves that the Work has been completed in accordance with and as set out in Contract

b. **DOCUMENT SUBMISSION FOR ISSUE COMMISSIONING/COMPLETION CERTIFICATE:**

For the purpose of above the following documents will be deemed to form the completion documents:



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- c. Checklist for inspection of Roof top SPV power plants as per TSREDCO format.
- d. Project completion report from successful bidder as per MNRE format
- e. Project completion/satisfaction certificate from concern beneficiary dept. officials.

TSREDCO



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SECTION - IV

**BID EVALUATION AND
SELECTION OF PROJECTS**



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SECTION - IV

BID EVALUATION AND SELECTION OF PROJECTS

1 BID EVALUATION

Bid evaluation will be carried out considering the information furnished by Bidders as per provisions specified in Section-II, Instructions to Bidders (ITB) of this tender. The detailed evaluation procedure and selection of bidders are described in subsequent clauses in this Section.

2 TECHNO-COMMERCIAL EVALUATION OF BIDDERS

2.a. FIRST ENVELOPE (TECHNICAL BID) EVALUATION (STEP - 1)

2.a.1 The first envelope (Technical Bid submitted online) of only those bidders will be opened by TSREDCO whose required documents as mentioned at Clause, Section-II, Instructions to Bidders (ITB) of this Tender are received at the office of TSREDCO on or before the due date and time of bid submission.

2.a.2 Documents (as mentioned in the previous clause) received after the bid submission deadline specified in the Bid Information Sheet shall be rejected and returned unopened, if super-scribed properly with address, to the bidder.

2.a.3 Subject to Clause, Section-II, Instructions to Bidders (ITB) of this Tender, TSREDCO will examine all the documents submitted by the Bidders and ascertain meeting of eligibility conditions prescribed in the Tender. During the examination of the bids, TSREDCO may seek clarifications/ additional documents to the documents submitted etc. from the Bidders if required to satisfy themselves for meeting the eligibility conditions by the Bidders. Bidders shall be required to respond to any clarifications/ additional documents sought by TSREDCO within 07 (seven) days from the date of such intimation from TSREDCO. All correspondence in this regard shall be made through email/ e-tender portal only. It shall be the responsibility of the Bidder to ensure that the email id of the authorized signatory of the Bidder is functional. The Bidder may provide an additional email id of the authorized signatory in the covering letter. No reminders in this case shall be sent. It shall be the sole responsibility of the Bidders to remove all the discrepancies and furnish additional documents as requested. TSREDCO shall not be responsible for rejection of any bid on account of the above.

2.a.4 The response to Tender submitted by the Bidder shall be scrutinized to establish Techno- Commercial eligibility as per Tender.



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2.b SECOND ENVELOPE (FINANCIAL BID) EVALUATION (STEP - 2)

2.b.1 Second Envelope of only those bidders shall be opened, whose technical bids are found to be qualified. After this step, the L1 bidder shall be invited for the negotiations.

2.b.2 The Bidder will have to submit a single bid (single application) for this project and quoting a single rate per Wp for the total project applied for. The rate has to be quoted up to two places of decimal only. If it is quoted with more than two digits after decimal, it shall be ignored after first two decimal places. (For e.g. if the quoted rate is INR 40.337, then it shall be considered as INR 40.33).

2. b.3 In this step, evaluation will be carried out for this Project separately based on rate per Wp quoted by Bidders.

2.b.5 On completion of Techno-Commercial bid evaluation, if it is found that only one or two Bidder(s) is/are eligible per project for the next stage, opening of the financial bid of the bidder will be at the discretion of TSREDCO. Thereafter, TSREDCO will take appropriate action as deemed fit.

2.b.6 If the first-round rate quoted is same for two or more Bidders for this project, then all the Bidders with same rate shall be considered of equal rank/ standing in the order.

2.b.7 All Bidders with same (L1) rate shall be eligible for negotiations.

3. SELECTION OF SUCCESSFUL BIDDER:

3.1 The bidder shall be selected with lowest quoted rate (being L1) for this project. In case of a tie among two or more bidders (i.e. their quoted rate being the same at the end), they will be considered for further negotiations.

3.2 At the end of selection process, a Letter of Intent (LOI) will be issued to the successful Bidders for this Project.



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SECTION - V

TECHNICAL SPECIFICATIONS



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Section - V

Technical specifications

The proposed projects shall be commissioned as per the technical specifications given below. Competent Authority's decision will be final and binding on the bidder.

DEFINITION:

A Hybrid Grid Solar Rooftop Photo Voltaic (SPV) power plant consists of SPV array, Module Mounting Structure, Power Conditioning Unit (PCU) consisting of Maximum Power Point Tracker (MPPT), Inverter, and Controls & Protections, interconnect cables, Junction boxes, Distribution boxes and switches. PV Array is mounted on a suitable structure. Grid tied SPV system is with battery and should be designed with necessary features to supplement the grid power during day time. Components and parts used in the SPV power plants including the PV modules, metallic structures, cables, junction box, switches, PCUs etc., should conform to the BIS or IEC or international specifications, wherever such specifications are available and applicable. Solar PV system shall consist of following equipment/components.

Solar PV modules consisting of required number of Crystalline PV cells. Grid interactive Power Conditioning Unit with Remote Monitoring System Mounting structures, Junction Boxes, Earthing and lightning protections, IR/UV protected PVC Cables, pipes and accessories with net metering facility.

1. INTENT OF SPECIFICATION

Intent of the specification is to describe the requirement of the employer for procurement and installation of equipment, civil works and other auxiliary and support facilities and to provide inputs to Bidder to enable them to prepare and submit their techno-commercial proposal to meet this requirement. The specification intends to cover the design, engineering, manufacture, supply, transportation, un-loading, storage, in-plant transportation to site from stores, erection, testing & commissioning and performance guarantee and enabling work as encountered during execution of work

Relevant details necessary for preparation and submission of best offers are included in the subsequent sections of these specifications. However the Bidder are free to suggest any superior technology/ practices where ever required, with full details, as an alternative

The specification shall be read in totality and the bid shall be prepared accordingly.



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2. SCOPE OF WORKS AND SERVICES.

Scope of Supply & Work includes Design, Engineering, Manufacture, Procurement & Supply of equipment and materials; testing at manufacturers works, inspection, packing and forwarding, unloading at site, associated civil works, services, permits, installation and incidentals, erection, testing and commissioning of Hybrid Solar PV Power Plants with associated equipment and materials under Net-metering Scheme, on turnkey basis at various Govt. Buildings in Telangana State. The equipment and materials for Hybrid Solar PV Power Plants with associated system shall include but not be limited to the Design, Supply, Erection, and Testing & Commissioning of the following equipment and sub-systems:

- a. Solar PV modules including mounting frames, Mounting structures, foundation bolts and nuts for holding structures and module inter connection, Array Junction boxes / String combiner Box with surge protection and monitoring system.
- b. Power Control Unit/s including MPPT (Maximum Power Point Tracking) charge controller and synchronizing facility at 415V, 50Hz.
- c. AC Distribution Board/s
- d. Auxiliary AC & DC power system for control and protection system for the total plant complex including Battery and Battery charger for inverter and other such accessories that require a power backup.
- e. Plant Monitoring Desk
- f. Monitoring system for all electrical parameters of the solar PV plant
- g. Protection and Metering system for the complete installation including Meters, Relays and other associated devices
- h. Earthing and Lightning Protection system for the complete installation
- i. AC/DC Power and Control Cables and accessories
- j. Communication system with existing plant installations and control rooms
- k. Nomenclature, Danger Plates, Name Plate, Instructions etc.
- l. Civil works including, foundations, structures for safety of the plant and inverters as may be required.
- m. Contractor should obtain necessary permissions and approvals from the TSDISCOMs and Electrical Inspectorate for implementation of the project and net-metering and submit a copy of the same to Beneficiary Dept., and TSREDCO officials.
- n. The contractor/successful bidder has to prepare total project (design) documents related to this work as per MNRE formats on behalf of beneficiary dept. officials will sign on application forms, if any.



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Scope of Employer:

- a. Cleaning and clearing the roof top of any unwanted things and making it suitable for erection of the solar roof top power plant.
- b. Drinking water service in the power plant complex and suitable water supply for periodic cleaning of solar PV modules.

Scope of the successful Bidder shall also include:

- a. Site Survey, Measurement of solar isolation and other relevant parameters required for design of the each system.
- b. Complete Design, engineering, preparation and submission of drawings Equipment and material specification preparation.
- c. Procurement and expediting of all supplies and Delivery of equipment and material to each job site.
- d. Pre-commissioning & Commissioning of all supplied Equipment and Test running of Grid Connect Solar Power Plant.
- e. Any other items not specifically mentioned in the specification but which are required for erection, testing and commissioning and satisfactory operation of the solar power plant are deemed to be included in the scope of the specification unless specifically excluded on turnkey basis.
- f. Provision of Safety items like hand gloves, shock treatment charts, rubber mats, danger/caution boards.
- g. Supply of all commissioning spares and Supply of special tools and tackles
- h. Project management including project administration, project coordination, scheduling, progress reporting to employer and adhering to safety practices during erection, commissioning and subsequent operation and maintenance of the system including fire prevention.
- i. Power pack Capacity:

Sl.No	Power pack Capacity	SPV Modules Capacity	Batteries	Inverter Capacity
1	1KWp	1KWp	2Nos 12V, 150AH	1KWp
2	3KWp	3KWp	4No's 12V,150AH	3KWp
3	5KWp	5Kwp	8No's 12V,150AH	5Kwp



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3. SOLAR PV MODULES

SPV CRYSTALLINE MODULES

3.1. Only indigenously manufactured PV modules with RFID and the manufacturer should provide the following minimum information laminated inside the module:

- Made in India (to be subscribed in words)
- Company name / logo
- Module number (it should indicate the voltage and rated wattage of the module)
- Serial number
- Year of make

3.2 The PV modules used must qualify to the latest edition of IEC PV module qualification test or equivalent BIS standards Crystalline Silicon Solar Cell Modules IEC 61215/IS14286. In addition, the modules must conform to IEC 61730 Part-2- requirements for construction & Part 2 - requirements for testing, for safety qualification or equivalent IS.

a) For the PV modules to be used in a highly corrosive atmosphere throughout their lifetime, they must qualify to IEC 61701/IS 61701

b) The total solar PV array capacity should not be less than allocated capacity (kWp) and should comprise of solar crystalline modules of minimum 250Wp and above wattage. Module capacity less than minimum 250 watts should not be accepted.

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

d) PV modules must be tested and approved by one of the IEC authorized test centers.

e) The module frame shall be made of corrosion resistant materials, preferably having anodized aluminum.

f) The bidder shall carefully design & accommodate requisite numbers of the modules to achieve the rated power in his bid. TSREDCO/owners shall allow only minor changes at the time of execution.

g) Other general requirement for the PV modules and subsystems shall be the Following:

i. The rated output power of any supplied module shall have tolerance of +/- 3%.

ii. The peak-power point voltage and the peak-power point current of any supplied module and/or any module string (series connected modules) shall not vary by more than 2 (two) per cent from the respective arithmetic means for all modules and/or for all module strings, as the case may be.

iii. The module shall be provided with a junction box with either provision of external screw terminal connection or sealed type and with arrangement for provision of by-pass diode. The



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box shall have hinged, weather proof lid with captive screws and cable gland entry points or may be of sealed type and IP-65 rated.

iv. IV curves at STC should be provided by bidder.

3.3. Modules deployed RF identification tag. The following information to be mentioned in the RFID used on each modules. (This has to be inside the laminate, but must be able to withstand harsh environmental conditions).

- a. Name of the manufacturer of the PV module
- b. Name of the manufacturer of Solar Cells.
- c. Month & year of the manufacture (separate for solar cells and modules)
- d. Country of origin (separately for solar cells and module)
- e. I-V curve for the module Wattage, I_m , V_m and FF for the module
- f. Unique Serial No and Model No of the module
- g. Date and year of obtaining IEC PV module qualification certificate.
- h. Name of the test lab issuing IEC certificate.
- i. Other relevant information on traceability of solar cells and module as per ISO 9001 and ISO 14001

WARRANTIES:

a) **Material Warranty:**

i. Material Warranty is defined as: The manufacturer should warrant the Solar Module(s) to be free from the defects and/or failures specified below for a period not less than five (05) years from the date of sale to the original customer ("Customer")

ii. Defects and/or failures due to manufacturing

iii. Defects and/or failures due to quality of materials

iv. 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 Owners sole option

b) **Performance Warranty:**

The predicted electrical degradation of power generated not exceeding 20% of the minimum rated power over the 25 year period and not more than 10% after ten years period of the full rated original output.

4. MODULE MOUNTING STRUCTURE:

a. The module alignment and tilt angle shall be calculated to provide the maximum annual energy output. This shall be decided based on the location of array installation.



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- b. The structure shall be designed to allow easy replacement of any module and shall be in line with site requirement.
- c. The structures shall be fixed to the foundation in such a manner that, in future is required they can be easily relocated to a different foundation.
- d. The mounting structure 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.
- e. The mounting steel structure shall be as per latest BIS 2062 (amended up to date) and galvanization of mounting structure shall be in compliance of BIS 4759 (amended up to date).
- f. The array structure shall be so designed that it will occupy minimum space without sacrificing the output from SPV panels at the same time.
- g. The bidder shall be designed Module Mounting Structure as per MNRE norms for normal / plain RCC roofs.
- h. The bidder shall be designed Module Mounting Structure towards south direction and it is to be with stand 150KMPH wind speed and also maintain the alignment and tilt angle as per MNRE norms. The structure designs are to be approved by Govt. approved / empanelled structural Engineer for specific/ required locations.
- i. Nut & bolts, supporting structures including Module Mounting Structures shall have to be adequately protected from atmosphere and weather prevailing in the area.
- j. All fasteners shall be of stainless steel of grade SS 304.
- k. The Mounting structure shall be grounded properly using GI strips and maintenance free earthing kit.
- l. The Mounting structure shall be so designed to withstand the speed for the wind zone of the location where a PV system is proposed to be installed (wind speed of 150 km/ hour). It may be ensured that the design has been certified by a recognized Lab/ Institution in this regard and submit wind loading calculation sheet to TSREDCO. Suitable fastening arrangement such as grouting and calming should be provided to secure the installation against the specific wind speed.
- m. IS 800-2007 shall be followed for structural design.
- n. SPV module mounting structure shall be fixed type with provision of manual correction in tilt angle which shall be made after every 3 months to get maximum output. Azimuth shall be 0 degree True south.
- o. Hot dipped Galvanized Steel Structural with minimum 80 microns of galvanization must be considered for all type of structural steel proposed for the power plant



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- p. Design drawings with material selected shall be submitted for prior approval of the employer.
- q. The Bidder/Bidding Consortium shall specify installation details of the PV modules and the support structures with appropriate diagram and drawings.

5. STRING COMBINER BOX OR ARRAY JUNCTION BOXES

- a. The junction Boxes shall have suitable arrangement for the followings:-
- Combine groups of modules into independent charging sub-arrays that will be wired into the controller.
 - Provide arrangement for disconnection for each of the groups.
 - Provide a test point for each sub-group for quick fault location
 - To provide group array isolation
- b. The string combiner box/ junction box shall be dust proof, vermin proof, and waterproof and made of Polycarbonate Plastic
- c. The terminal will be connected to copper bus-bar arrangement of proper size to be provided. The junction boxes shall have suitable cable entry points fitted with cable glands of appropriate sizes for both incoming and outgoing cables
- d. Suitable markings shall be provided on the bus-bars for easy identification and cable ferrules will be fitted at the cable termination points for identification.
- e. The string combiner box/ junction box shall be with protection class IP 65 for mounting outside in Open weather condition.
- f. Each string combiner box/ junction box will have suitable Reverse Blocking Diodes of maximum DC blocking voltage of 600V / 1000V, whichever causes less power loss, with suitable arrangement for its connecting
- g. The string combiner box/ Array junction Box will also have suitable surge protection device.
- h. The current carrying ratings of the string combiner box/ junction box shall be suitable with adequate safety factor, to inter connect the Solar PV system corresponding to the project capacity, as designed by the Bidder
- i. Necessary sensors and transducers shall be provided in the string combiner boxes to facilitate monitoring of all string parameters in the data acquisition system.
- j. String level remote monitoring facility shall be incorporated to monitor generation and faults at string level.



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6. BATTERY:

A. BATTERY BANK:

The battery should be Lithium Ferro phosphate (Lifepo4) having capacity motioned in the chart at standard conditions. The battery Voltage & AH can be changed keeping the overall KWH same. The voltage selection should be close to Vm of combinations of modules having 72 cells. The configuration of battery assembly should be as per requirement of capacity. The cell should be prismatic type having capacity not less than 150 Ah The other feature of the battery should be:

Sr. No.	Description	Specification
1	Battery Configuration minimum cell capacity	12V- 150 AH; LiFePO4
2	Working Temperature Range (both for charging & discharging)	0-60 Deg C
3	Storage Temperature Range	@ 0-40 Deg- 6 months
4	Cycle Life (Full charge to full discharge @ 25 deg C before capacity of battery falls below 75%)	more than 3000 Cycles
5	Battery Warranty 5 years	Battery Warranty 5 years
6	Type of Cell Prismatic	Prismatic

- Depth of Discharge : up to 85%.
- Maximum Discharging rate : up to C rate of battery Capacity.
- Maximum Charging Rate : up to 0.5 C rate of battery capacity

The Lithium iron phosphate battery needs a very good “Battery Management Systems” BMS to ensure the proper charging and discharging of each cell of battery with temperature compensation. This battery also needs constant current and constant voltage charging methodology related to upper voltage limit of battery. BMS primary focus is therefore on the safety and the protection of the battery pack, to minimize the risk of sudden failure and to maximize the life cycle of the battery. The secondary function of the BMS is to perform battery diagnosis, such as state of charge (SOC) estimation, state of health (SOH) estimation and state of power (SOP) estimation. Hence a very good battery management system to be incorporated and got it tested with battery from MNRE/NABAL accredited lab as per IEC/BIS standard. The BMS of the LFP battery must also communicate with PCU in some standard protocol like RS485/232 or CAN so that PCU can adapt to requirements of battery and extend its life. Communication between PCU and BMS and the compatibility of 2 should be ensured.



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The cell and battery should be got tested as per IEC62133-2012 or BIS specifications with MNRE/NABAL accredited center. However, the Battery should conform to the latest BIS/ International standards and The Batteries makes should be empanelled with MNRE.

Battery Rack

A metallic cabinet of minimum 22 SWG thick made of pre-coated galvanized (60-micron thickness). MS sheet for housing the storage battery indoors should be provided with proper lock and key. The cabinet should be inscribed with TSREDCO written on front faces. The size of cabinet should be as per battery size. Danger logo as approved by TSREDCO shall be screen printed on it... The necessary switch gear, MCB etc to ensure the safety may be installed in cabinet. The cabinets have a modular design featuring uninterruptible maintenance and easy installation. The cabinet should be as per standard for safe storage of lifepo battery.

7. INVERTERS / POWER CONDITIONING UNIT (PCU)

A. HYBRID SOLAR INVERTER:

The PCU / Grid Tied Inverter shall carry a warranty of minimum 5years

Feature	Minimum Specification
	The OEM should have service center in the state of Telangana and service centers address, engineers name and contact number should be furnished)
	Hybrid solar inverter should be a combined unit comprising of MPPT charge controller, visual display, necessary protections and provision to export excess power to Grid and with option of blocking the export.
	a) It should have Integrated MPPT Charge Controller/ In case of MPPT charge controller is not built-in inside the inverter, IEC 62093 test certificate should be provide separately for charge controller. IEC 62093 report should be enclosed along with bid b) It should not over charge the batteries once all the batteries are fully charged. c) It should sustain both the temperature during winter and summer season d) It should have protection from over voltage, under voltage, over current protection. e) It should have short circuit protection. f) It should be rated for continuous operation at full load. g) It should have solar priority grid charging.
Switching Elements	IGBT/MOSFET
Type of Charge Controller	MPPT Charge Controller
Nominal Inverter Capacity	1-Phase : 1kW, 2kW, 3kW, 4kW & 5kW
Nominal Array Capacity	Equivalent/More to the Inverter Capacity.



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Maximum DC Voltage	145 V DC to 180V DC for 1- Phase inverters is allowed
Mppt Voltage range	65V - 115 V DC for 1- Phase inverters
Battery Nominal Volt	Less than/ equal to 60V due to space constraint and as per MNRE guidelines in view of safety above 60V DC is not accepted
Inverter Surge Rating @ 40 deg C	105% > 10 sec
Inverter Output Voltage	230V+/- 1% for single phase (During Solar/Battery Mode)
Inverter Output Frequency (Synchronization range)	50+/-0.5Hz (Synchronized to Mains during grid export operation)
Grid synchronization Voltage range	170V-270V (Inverter should charge the battery & Inverter should able to work at this voltage range)
Grid Frequency range	50 Hz (48.5 to 51.5 Hz)
Inverter Efficiency @ 40 deg C Nominal Load	Above 80 % for 1kw & 2kw Above 90 % for 3kw, 4kw, 5kw
Operating Ambient Temperature	0 to 50 deg C
Humidity	95 % max. non condensing
Enclosure	IP 20, Powder Coated
Cooling	Forced air Cooling
Protection	Short Circuit, Overload Over Temperature Over Voltage
Output wave form	Pure Sine Ware
Mounting Type	Wall mounting only to save the floor space and also for easy visibility of inverter operation
Dimension	Upto 5kW (DXWXH) 200X310 x 500 in mm (preferred due to space constraint and 10kw (DXWXH) 175 X 500 X 650 in mm (Preferred Due to Space constraint) Inverters with upto 50% more than above dimensions are acceptable subject to space constraint at site.
Grid Charger Capacity	Suitable to charge the battery and feed to inverter simultaneously minimum 10% to the battery AH capacity to be provided to charge the battery.



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IEC Test Certificates from lab as per below standards should be enclosed along with bid.

Environmental Testing	IEC 60068-2 (1,214,30)
Efficiency Measurements	IEC 61683
Safety Measurements	IEC 62109-1 & IEC 62109-2
Anti-Islanding Protection and utility interface	IEC 62116:2014 and IEC 61727:2004
Electromagnetic compatibility and electromagnetic interference of inverter	IEC 61000-3, IEC 61000-4

In case of delay in installing the net meter there should be provision to block the export of power to grid

B. BALANCE OPERATING SYSTEM ITEMS/COMPONENTS:

The BoS items / components of the Solar PV Power Plants/ systems must conform to the latest edition of IEC/ equivalent BIS Standards as specified below:

BoS item/component	Applicable IEC/equivalent BIS Standard	
	Standard Description	Standard Number
Power Conditioners/ Inverters*	Efficiency Measurements	IEC 61683
	Environmental Testing	IEC 60068 2 (6,21,217,30,778)
Charge controller/ MPPT units*	Design Qualification	IEC 62093
	Environmental Testing	IEC 60068 2 (6,21,27,30,75,78)
Cables	General Test and Measuring Methods PVC insulated cables for working Voltages up to and including 1100 V-Do-, UV resistant for outdoor installation	IEC 60189 IS 694/ IS 1554 IS/IEC 69947



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Switches/Circuit Breakers/ Connectors	General Requirements Connectors- safety	IS/IEC 60947 part I,II,III EN 50521
Junction Boxes/ Enclosures	General Requirements	IP 65 IP 21 IEC 62208
SPV System Design	PV Stand-alone System design verification	IEC 62124
Installation Practices	Elect. installation of building requirements for SPV power supply systems	IEC 60364-7-712

** BoS Must additionally conform to the relevant national/international Electrical Safety Standards.

b. Inverter/PCU shall be non-transformer string inverters, grid tied in nature, shall consist of MPPT controller. Inverters shall be decided based on array design/suitable rating in case of string design, associated control and protection devices etc all integrated into PCU. It shall provide necessary protections for Grid Synchronization. The Inverters should convert DC power produced by SPV modules in to AC power and must synchronize automatically its AC output to the exact AC Voltage and frequency of Grid.

c. The DC energy produced has to be utilized to maximum and supplied to the bus for inverting to AC voltage to extract maximum energy from solar array and provides 3-ph, 400V AC/ (+10% to - 10%), 50+/- 1.5 Hz with total harmonic voltage distortion less than 3% to synchronize with local grid.

d. The Inverters shall be of very high quality having efficiency not less than 97% and shall be capable of running in integrated mode.

e. Degree of protection of the indoor Inverters shall be at least IP-42 and that of outdoor at least IP-65.

f. Built in with data logging to remotely monitor plant performance through external PC shall be provided (PC shall be provided along with SPV Plant).

g. The Inverters should be designed to be completely compatible with the SPV array voltage and Grid supply voltage.

h. The dimension, weight, foundation details etc. of the PCU shall be clearly indicated in the detailed technical specification.



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- i. The PCU shall be capable of complete automatic operation, including wake-up, synchronization & shut down independently & automatically.
- j. Both AC & DC lines shall have suitable fuses & surge arrestors and Bidder/Bidding Consortium/Bidding Consortium/ss to allow safe start up and shut down of the system. Fuses used in the DC circuit should be DC rated.
- k. Inverters/PCU shall operate in sleeping mode when there will no power connected.
- l. **Protections:**
- Over voltage both at input & output
 - Over current both at input & output
 - Over/under grid frequency
 - Heat sink over temperature
 - Short circuit
 - Protection against lightning
 - Surge arrestors to protect against Surge voltage induced at output due to external source
 - Anti- Islanding Protection
 - And other required protections
- It 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 and frequency,
 - Grid Voltage and frequency,
 - Inverter (Grid) on Line status,
 - PV panel voltage,
 - Solar charge current
 - Individual power stage heat sink and cabinet temperature,
 - Inverter Import export kWh summation
 - Solar kWh summation
 - Inverter on
 - Grid on
 - Inverter under voltage/over voltage
 - Inverter over load
 - Inverter over temperature
- m. PCU shall be capable to synchronize independently & automatically with grid power line frequency to attain synchronization and export power generated by solar plant to grid.



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- n. The PCU shall be capable of operating in parallel with the grid utility service and shall be capable of interrupting line fault currents and line to ground fault currents.
- o. The PCU shall be able to withstand an unbalanced load conforming to IEC standard (+/- 5% voltage) and relevant Indian electricity condition. 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.
- p. The Inverter shall go to shutdown/standby mode, with its contacts open, under the following conditions before attempting an automatic restart after an appropriate time delay.
- When the power available from the PV array is insufficient to supply the losses of the PCU, the PCU shall go to standby/shutdown mode.
 - The PCU control shall prevent excessive cycling of shut down during insufficient solar radiance.
- q. 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 current
 - Earth fault
 - And reverse power
 - In each of the above cases, tripping time should be less than a few seconds.
- r. Detailed technical description of the complete unit of offered Inverter should be furnished with bid document Following Technical documents of Inverter shall be supplied for approval after placement of order
- Detailed technical description of the complete unit
 - Instructions for installation and operation
 - Electrical diagrams of all internal cabling necessary for installation, maintenance and fault finding.
 - Description of electrical and mechanical characteristics of units
 - Maintenance and fault finding procedures.
 - Safety precautions
 - Software for data monitoring with detailed description.



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- Details of data acquisition
- Factory test reports in details on various parameters.
- Trouble shooting procedures
- All maintenance requirements and their schedules, including detailed instructions on how to perform each task.
- 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 alt components and subsystems.
- A detailed bill of materials which shall list components model numbers, quantities and manufacturer of each supplied item.
- All documents and write ups shall be in English. They shall be clean and legible, and must be checked, signed, approved and dated by a competent representative of the Bidder/Bidding Consortium.

s. The Bidder/Bidding Consortium should note that Inverters/PCU is going to be installed in an area which is prone to hot air of 48 to 50 degree centigrade. Thus the room shelters and air blower/ fan (auto operated as per requirement), if required, for Inverter will be in scope of supply. Integrated solutions into prefabricated structures or in standard metallic container may be accepted. The Bidder/Bidding Consortium shall provide data sheet for Inverter/ Power Conditioning Unit along with their offer.

t. The PCU/ inverters should be tested from the MNRE approved test centers / NABL /BIS /IEC accredited testing- calibration laboratories. In case of imported power conditioning units, these should be approved by international test houses.

u. MNRE latest additional guidelines for Inverters:

1. The inverters should be tested as per IEC standards. The following criteria should be followed:

- i. The benchmarking efficiency criteria for Grid Tied (string inverters) inverter
 - At nominal voltage and full load is $\geq 95\%$.
 - For load $\geq 25\%$ is $\geq 92\%$.
- ii. In case of hybrid grid interactive inverter the bench marking efficiency criteria
 - At full load is 85%
 - For the load $\geq 25\%$ is 80%
- iii. No load losses should not be more than 5%.

2. The following tests are to be conducted on the inverters:

- a) Efficiency measurement as per IS/IEC 61683 (for system with no MPPT)
- b) Overall efficiency for Grid Tied inverter as per EN50530



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- c) Islanding Prevention test as per IS 16169/IEC 62116
- d) PV system characteristics of utility interface as per IEC 61727 (the system should meet all the clauses as per the standard except the clause 5.2.2 of IEC 61727. In case of clause 5.2.2 it should withstand the over /under frequency in the range of 47 to 52Hz)
- e) Overall charge controller efficiency should be $\geq 85\%$ at $\geq 10\%$ load and $\geq 92\%$ at full load.
- f) System should have IP 65 certification for outdoor use IP 21 & 22 for indoor use.
- g) Environmental testing as per IEC 60068-2-(1,2,14&30)

All the test laboratories should provide a clear cut verdict in the end of the test report regarding conformity / non conformity of the system against the standard / specifications for which it has been tested. Any discrepancy in the specifications of sample submitted, the test labs should specify the same in the report.

From 1st July' 2017 all test laboratories should start the data logging of all the test parameters during testing and soft copy of the same will be maintained for a period of 5years.

8. ENERGY METERING (If Required)

Digital Communicable Energy Meters shall be provided for measuring power consumption by grid side loads on continuous basis and register the cumulative energy on 30-minute interval basis (Programmable/adjustable), daily, monthly and annually the energy generated. The Energy Meter shall have default display of Cumulative kWh. The following parameters to be displayed on-demand:

- a. The Energy Meter shall have 4-quadrant measurement method and shall be suitable for 3-wire as well as 4-wire connection.
- b. The meter shall also record Maximum Demand at set interval. TOD (Time of Day) measurement shall also be possible.
- c. The energy meter shall communicate with the Data Acquisition System / other plant network over MODBUS protocol.
- d. Separate Meters shall be provided for Solar Power Generation and Auxiliary load consumption.
- e. In case more than one inverter circuits are used for synchronizing with the grid then similar meters shall be provided for each inverter output circuit.
- f. Additionally one digital summator shall also be provided for calculation and display of total concurrent energy/ demand of all the feeders.
- g. Meters shall comply with the requirements of CEA Regulations on Installation & Operation of Meters.



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- h. The functional Specification of the energy meters shall be as follows:
- Applicable IS: IS 13779 or IS 14679 depending upon accuracy of meters.
 - Accuracy Class Index: 0.25
 - Power factor range: Zero lag-unity-zero lead
 - Display parameters : LCD test, KWH import, KWH export, MD in KW export, MD in KW import, Date & Time, AC(phase wise and line wise) current and voltages and power factor and frequency (Cumulative KWH will be indicated continuously by default & other parameters through push-button) .
 - Power Consumption: Less than 4VA in Voltage circuit and 2 VA for Current circuit.
 - Frequency: 50 Hz with + / -5% variation
 - Test Output Device: Flashing LED visible from the front
 - Billing data: Meter serial number, Date and time, KWH import, KWH export, MD in KW (both export and import), History of KWH import and export, & MD (both export & import).
 - All these data shall be accessible for reading, recording and spot billing by downloading through optical port/RS485 on MRI or Laptop computers at site.

9. INTEGRATION OF PV POWER WITH GRID:

The output power from SPV would be fed to the inverters which converts DC produced by SPV array to AC and feeds it into the main electricity grid after synchronization. In case of grid failure, or low or high voltage, solar PV system shall be out of synchronization and shall be disconnected from the grid. Once the DG set comes into service PV system shall again be synchronized with DG supply and load requirement would be met to the extent of availability of power. 4 pole isolation of inverter output with respect to the grid/ DG power connection need to be provided.

10. DATA ACQUISITION AND LOGGING

- i. Data Acquisition System shall be provided for each of the solar PV plant.
- ii. Data Logging Provision for plant control and monitoring, time and date stamped system data logs for analysis with the high quality, suitable PC. Metering and Instrumentation for display of systems parameters and status indication to be provided.
- iii. Solar Irradiance: An integrating Pyranometer / Solar cell based irradiation sensor (along with calibration certificate) provided, with the sensor mounted in the plane of the array. Readout integrated with data logging system.



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- iv. Temperature: Temperature probes for recording the Solar panel temperature and/or ambient temperature to be provided complete with readouts integrated with the data logging system
- v. The following parameters are accessible via the operating interface display in real time separately for solar power plant:
 - a. AC Voltage.
 - b. AC Output current.
 - c. Output Power
 - d. Power factor.
 - e. DC Input Voltage.
 - f. DC Input Current.
 - g. Time Active.
 - h. Time disabled.
 - i. Time Idle.
 - j. Power produced
 - k. Protective function limits (Viz-AC Over voltage, AC Under voltage, Over frequency, Under frequency ground fault, PV starting voltage, PV stopping voltage.
- vi. All major parameters available on the digital bus and logging facility for energy auditing through the internal microprocessor and read on the digital front panel at any time) and logging facility (the current values, previous values for up to a month and the average values) should be made available for energy auditing through the internal microprocessor and should be read on the digital front panel.
- vii. PV array energy production: Digital Energy Meters to log the actual value of AC/ DC voltage, Current & Energy generated by the PV system provided. Energy meter along with CT/PT should be of 0.5 accuracy class.
- viii. Computerized DC String/Array monitoring and AC output monitoring shall be provided as part of the inverter and/or string/array combiner box or separately.
- ix. String and array DC Voltage, Current and Power, Inverter AC output voltage and current (All 3 phases and lines), AC power (Active, Reactive and Apparent), Power Factor and AC energy (All 3 phases and cumulative) and frequency shall be monitored.
- x. Computerized AC energy monitoring shall be in addition to the digital AC energy meter.
- xi. The data shall be recorded in a common work sheet chronologically date wise. The data file shall be MS Excel compatible. The data shall be represented in both tabular and graphical form.



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- xii. All instantaneous data shall be shown on the computer screen.
- xiii. Software shall be provided for USB download and analysis of DC and AC parametric data for individual plant.
- xiv. Provision for Internet monitoring and download of data shall be also incorporated.
- xv. Remote Server and Software for centralized Internet monitoring system shall be also provided for download and analysis of cumulative data of all the plants and the data of the solar radiation and temperature monitoring system.
- xvi. Ambient / Solar PV module back surface temperature shall be also monitored on continuous basis.
- xvii. Simultaneous monitoring of DC and AC electrical voltage, current, power, energy and other data of the plant for correlation with solar and environment data shall be provided.
- xviii. Remote Monitoring and data acquisition from ranging of 1kWp through Remote Monitoring System software at the Beneficiary department/TSREDCO location with latest software/hardware configuration and service connectivity for online / real time data monitoring/control complete to be supplied and operation and maintenance/control to be ensured by the supplier. Provision for interfacing these data on TSREDCO server and portal in future shall be kept.

11. POWER & CONTROL CABLES

Cables of appropriate size to be used in the system shall have the following characteristics:

- i. Shall meet IEC 60227/IS 694, IEC 60502/IS1554 standards
- ii. Temp. Range: -10oC to +80oC.
- iii. Voltage rating 660/1100V
- iv. Excellent resistance to heat, cold, water, oil, abrasion, UV radiation
- v. Flexible
- vi. Sizes of cables between array interconnections, array to junction boxes, junction boxes to Inverter etc. shall be so selected to keep the voltage drop (power loss) of the entire solar system to the minimum. The cables (as per IS) should be insulated with a special grade PVC compound formulated for outdoor use.
- vii. Cable Routing/ Marking: All cable/wires are to be routed in a GI cable tray and suitably tagged and marked with proper manner by good quality ferule or by other means so that the cable easily identified.
- viii. The Cable should be so selected that it should be compatible up to the life of the solar PV panels i.e. 25years.



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- ix. The ratings given are approximate. Bidder to indicate size and length as per system design requirement. All the cables required for the plant provided by the bidder. Any change in cabling sizes if desired by the bidder/approved after citing appropriate reasons. All cable schedules/layout drawings approved prior to installation.
- x. Multi Strand, Annealed high conductivity copper conductor PVC type 'A' pressure extruded insulation or XLPE insulation. Overall PVC/XLPE insulation for UV protection Armoured cable for underground laying. All cable trays including covers to be provided. All cables conform to latest edition of IEC/ equivalent BIS Standards as specified below: BoS item / component Standard. Description Standard Number Cables General Test and Measuring Methods, PVC/XLPE insulated cables for working Voltage up to and including 1100 V ,UV resistant for outdoor installation IS /IEC 69947.
- xi. The size of each type of DC cable selected shall be based on minimum voltage drop however; the maximum drop shall be limited to 1%.
- xii. The size of each type of AC cable selected shall be based on minimum voltage drop however; the maximum drop shall be limited to 2 %.

12. DC DISTRIBUTION BOARD:

12.1 DC Distribution panel to receive the DC output from the array field.

12.2 DC DPBs shall have sheet from enclosure of dust & vermin proof conform to IP 65 protection. The bus bars are made of copper of desired size. Suitable capacity MCBs/MCCB shall be provided for controlling the DC power output to the PCU along with necessary surge arrestors.

13. AC DISTRIBUTION PANEL BOARD:

- a) AC Distribution Panel Board (DPB) shall control the AC power from PCU/ inverter, and should have necessary surge arrestors. Interconnection from ACDB to mains at LT Bus bar while in grid tied mode.
- b) All switches and the circuit breakers, connectors should conform to IEC 60947, part I, II and III/ IS60947 part I, II and III.
- c) The changeover switches, cabling work should be undertaken by the bidder as part of the project.
- d) All the Panel's shall be metal clad, totally enclosed, rigid, floor mounted, air - insulated, cubical type suitable for operation on three phase / single phase, 415 or 230 volts, 50 Hz



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- e) The panels shall be designed for minimum expected ambient temperature of 45 degree Celsius, 80 percent humidity and dusty weather.
- f) All indoor panels will have protection of IP54 or better. All outdoor panels will have protection of IP65 or better.
- g) Should conform to Indian Electricity Act and rules (till last amendment).
- h) All the 415 AC or 230 volts devices / equipment like bus support insulators, circuit breakers, SUCCESSFUL BIDDERS, VTs etc., mounted inside the switchgear shall be suitable for continuous operation and satisfactory performance under the following supply conditions

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

14. PCU/ARRAY SIZE RATIO:

- 14.1 The combined wattage of all inverters should not be less than rated capacity of power plant under STC.
- 14.2 Maximum power point tracker shall be integrated in the PCU/inverter to maximize energy drawn from the array.

15. EARTHING AND LIGHTNING PROTECTION SYSTEM

The system should be provided with all necessary protections like earthing, Lightning, and grid islanding as follows:

15.1. LIGHTNING PROTECTION: The SPV power plants shall be provided with lightning & overvoltage protection. The main aim in this protection shall be to reduce the over voltage to a tolerable value before it reaches the PV or other sub system components. The source of over voltage can be lightning, atmosphere disturbances etc. The entire space occupying the SPV array shall be suitably protected against Lightning by deploying required number of Lightning Arrestors. Lightning protection should be provided as per IEC 62305 standard. The protection against induced high-voltages shall be provided by the use of metal oxide varistors (MOVs) and suitable earthing such that induced transients find an alternate route to earth.

15.2. SURGE PROTECTION: Internal surge protection shall consist of three MOV type surge-arrestors connected from +ve and -ve terminals to earth (via Y arrangement)

15.3. EARTHING PROTECTION:

- i. Each array structure of the PV yard should be grounded/ earthed properly as per IS:3043-1987. In addition the lightning arrester/masts should also be earthed inside the array field. Earth Resistance shall be tested in presence of the representative of



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Department/TSREDCO as and when required after earthing by calibrated earth tester. PCU, ACDB and DCDB should also be earthed properly.

ii. Earth resistance shall not be more than 5 ohms. It shall be ensured that all the earthing points are bonded together to make them at the same potential.

15.4 GRID ISLANDING:

i. In the event of a power failure on the electric grid, it is required that any independent power-producing inverters attached to the grid turn off in a short period of time. This prevents the DC-to-AC inverters from continuing to feed power into small sections of the grid, known as “islands.” Powered islands present a risk to workers who may expect the area to be unpowered, and they may also damage grid-tied equipment. The Rooftop PV system shall be equipped with islanding protection. In addition to disconnection from the grid (due to islanding protection) disconnection due to under and over voltage conditions shall also be provided.

ii. A manual disconnect 4pole isolation switch beside automatic disconnection to grid would have to be provided at utility end to isolate the grid connection by the utility personnel to carry out any maintenance. This switch shall be locked by the utility personnel

16. POWER CONSUMPTION:

Regarding the generated power consumption, priority need to give for internal consumption first and thereafter any excess power can be exported to grid. Finalization of rate is not under the purview of TSREDCO or MNRE. Decisions of appropriate authority like DISCOM, state regulator may be followed.

17. CIVIL WORKS:

This section of the specification covers entire civil engineering work for technological structures, new equipment and facilities for all production, auxiliary and ancillary units, foundation for all structures and main equipment described elsewhere in this specification on a Turnkey basis for installation of the Solar PV power plant.

The scope shall cover complete civil engineering work for the proposed plant within its battery limit, on turnkey basis including design, supply of all materials and execution.

18. PROJECT SCHEDULE & PROGRESS MONITORING

Bidder shall submit Overall schedule along with the offer. The overall schedule should be planned in weeks. The heads to be covered in the schedules shall broadly be as follows:



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- i. Basic engineering and approval
- ii. Preparation and issue of ordering / technical specifications for sub vendors
- iii. Placement of orders on sub-vendors
- iv. Detailed design and engineering
- v. Submission and approval of drawings for civil & structural works
- vi. Manufacture and supply of all equipment/ piping/ cables, etc
- vii. Fabrication and supply of building and technological structures
- viii. Submission and approval of erection drawings and manuals
- ix. Erection of building and technological structures
- x. Erection of equipment, piping, cables, etc.
- xi. Testing and commissioning

The major milestones for the project are to be highlighted in the schedule. The Bidder shall submit an overall erection plan for the plant and equipment under his scope of supply along with the tender.

The successful Bidder shall have to submit the Level-II network schedule both in hard and editable soft copy (in MS Project/Primavera) covering further details of construction, fabrication and erection activities, area-wise, for approval and finalization of the Employer / Consultant. The format of progress report to be discussed and agreed.

The Bidder/Bidding Consortium has to clearly specify to complete the work as per terms and conditions of agreement.

19. DRAWINGS, DATA AND DOCUMENTS

The Bidder shall furnish following documents/ information along-with the offer.

- General description of equipment offered specifying the important features, make, technical parameters, materials of construction, etc. to enable the owner to have proper understanding of the equipment offered and its operation.
- Technical literature, catalogue and publications
- Layout of Complete Power Plant Installation showing location of all major sub-systems
- Single line diagrams of all systems and sub systems of the entire power plant including that of the MMS structures.
- Typical general arrangement and foundation details
- General lighting scheme



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- Type tests certificates of all major equipments like switchgear, Inverters, Solar Modules etc.
- Single line schematic diagram of electrical system for grid interfacing and grid interconnection from Solar plant.
- General arrangement drawings and circuit diagrams of Module, Inverters, Transformers, and overall solar plant arrangement
- The Bidder shall submit a list of all drawings and documents proposed to be submitted. The list will be approved by employer/ consultant and may be modified if necessary
- Each drawing/ documents in the list shall be identified with a serial number, description and scheduled date of submission.

For Approval:

- Equipment layout plan
- Single line diagram with rating of all equipment, cable sizes and details of protection and metering
- Front view, general arrangement of equipment with plan and sectional views; clearly showing the position of various components, and clearance between components. The make and type of components, together with vital technical parameters shall also be furnished along with GA drawings
- Control, alarm, indications, interlocking and other schematics
- Lighting layout drawings with illumination levels, type and make of fittings.
- Wiring terminal plan drawings with cable connections
- Earthing scheme and layout of earthing network with design calculations, for outdoor switch yard and other areas/premises, if applicable.
- Cable layout drawings, cable channels details
- Installation drawings of all equipment with layout of equipment, cables, lighting systems, (if applicable) and earthing network.
- Calculation for design of LT bus duct, sizing of bus bars, bus bar supports considering the temperature rise and fault current.
- Calculations for design of supporting structures for outdoor switchyard w.r.t. wind pressure, short circuit forces etc. (if applicable).

Instruction Manuals for Operation & Maintenance

- Complete and comprehensive instruction manuals for operation and maintenance of the equipment with drawings. This shall include the following:
- Preventive maintenance schedule for each equipment



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- Procedure for shut down and start-up of the entire power plant
- Safety procedures for safe operation of equipment and complete system
- Specification of equipments installed.
- Test procedure for site tests

Upon installation and commissioning supplier shall incorporate revisions/ modifications if any in the reproducible and submit 'as built' drawings for employer's record as per general condition of contract.

20. DELIVERY

The completion period of the project is limited to 4 months. No further extension shall be provided except under Force Majeure.

21. INSPECTION

Manufacturing progress review, inspection & testing of equipment covered under the technical specification shall be carried out by the Employer at the manufacturers' works/premises prior to dispatch, to ensure that their quality & workmanship are in conformity with the contract specifications and approved drawings.

The Bidder shall furnish the quality assurance plan for equipment separately with suggestive stages and hold points for undertaking inspection and testing by the Employer. Total list of plant & equipment of the order shall be submitted to the Employer prior to submission of QAP

The Employer reserves the right to visit at any stage of manufacture of plant and equipment and ask for additional inspection & tests beyond approved QAP, if it is found necessary after completion of detailed design & engineering and approval of drawings

22. TESTS AND INSPECTION

Following tests shall be conducted on equipment after erection and before energizing from point of view of completeness in the presence of employer:

- Visual inspection of total system
- Checking of continuity of power and control cables.
- Checking of insulation resistance for inter-connected links or cables.
- Calibration of meters by secondary injection or by primary injection
- Checking of protective schemes
- Setting of relays, and the checking of their operation with one lower and one higher setting.



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- Checking of control scheme of breakers, etc. as per approved drawings and as per actual requirement
- Checking of alarm scheme by simulation of faults.
- Checking of name plate data of complete system.
- Verification of earthing resistance.
- Checking of cable terminations and laying, dressing etc.
- Checking for safe accessibility of components.

23. INSTALLATION GUIDELINES

- All the electrical installations shall conform to the Indian Electricity Act, Indian Electricity Rules, and regulations.
- The mechanical and Civil installation shall conform to the applicable Acts and Rules of corresponding Inspectorate and other relevant authorities, if any.
- Provision of cable glands, ferrules, cable lugs, tags, sealing kits shall be arranged.
- Supply and installation of first aid boxes, shock treatment charts, rubber mats, and key board etc.
- Erection, testing and commissioning of various equipment shall be done strictly as per manufacturer's instructions.
- Cables shall be laid in conduits as per the electrical installation procedures
- The minimum bending radius of cables shall be 12D and 15D for LT and LT cable respectively.
- Interplant cable shall be laid to trenches, tunnel or overhead structure as per site condition. Digging and refilling of cable trenches, required erection accessories shall be in the scope of work of the Bidder/Bidding Consortium.
- Cable shall be fixed to cable racks or cable trays or run on cleats or in conduits, which shall be fixed to concrete brick work or steel structure as required for proper support of the cables, easy accessibility and neatness of appearance.
- Perforated trays shall be provided for control cables.
- Approved type of danger boards, boards inscribing 'ISOLATED', 'DO NOT CLOSE, MEN AT WORK' in English, Telugu, Hindi and Local languages shall be provided in sufficient numbers.
- Special care shall be taken to make the enclosed equipment protected against entry of rats, lizard, and creeping reptiles which may create electrical short circuits.
- Approved cable markers of reinforced concrete shall be provided and fixed to mark each and every diversion of all buried cable routes. A marker shall also be placed every



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50 meters along straight portions of each route. A concrete cable marker shall also be provided and fixed to mark the position of every buried joints.

- Distinguishing labels of non-corrodible material marked in accordance with the cable numbers of the cabling diagram shall be permanently attached to each end of every cable. The phase or polarity of each power cable core at the cable ends shall be identified.
- Mounting of Inverters, Electrical panels, Dc and Ac junction boxes, Monitoring systems shall be done with proper mounting procedures with neat look.

24. ERECTION, TESTING, COMMISSIONING

The scope of work of the Bidder shall be complete erection of the equipment, cables, auxiliary systems and sub systems under the scope of work. The Bidder shall make all arrangements to deliver the equipment at site by wagons/ trucks/ trailers, build his own stores (covered, uncovered, air-conditioned, if necessary) for the proper storage of equipment, maintain the stores and all related documents and records, transport the equipment to site for erection purpose. The Bidder also shall make all security arrangements.

- The Bidder shall be responsible for proper, quick retrievable and neat storage and also undertake the conservation of all consignments including damaged boxes. During storage of equipment, the Bidder shall take into account deterioration and carry out the re-conservation of the complete equipment/parts/supplies as may be necessary as per the storage instructions of the Manufacturer of equipment/ components. The Bidder shall also supply the consumables required for such re-conservation work and repair/ replace parts required thereof for the proper functioning of the equipment after erection and commissioning.
- The Bidder shall retrieve the equipment/ materials from stores and transport the same to erection site.
- The Bidder shall unpack and do visual checking against physical damages to the equipment/cases, clean equipment before start of erection. Damage/ shortage, if any, shall be reported to the Employer/ Consultant and shall be rectified/replaced expeditiously, so as not to upset the erection and commissioning schedule.
- The Bidder shall provide all necessary erection equipment and tools & tackles including material handling equipment, cranes, compressors and other equipment and instruments and consumables, all commissioning equipment and instruments, welding equipment, winches, alignment tools, precision levels, etc., which may be required for carrying out the erection and commissioning work efficiently.



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- All instruments shall be properly calibrated before use. Unless otherwise specified, the above erection equipment/ materials shall be the property of the Bidder. However, Employer's prior permission shall be required for removal of these erection equipment/ materials from the site. The Bidder/ shall ensure that proper procedure and documentation is maintained at entry gate of Employer's premises for such items as might be carried back by the Bidder after completion of work.
- The Bidder shall provide erection consumables like oxygen and acetylene gas, welding rods, solder lugs, oil, grease, kerosene, cotton waste, etc. required for erection of equipment and steel structures.
- The Bidder shall construct and maintain his own site offices and stores as required for the work and arrange for maintaining in the area placed at the Bidder/Bidding Consortium's disposal in a neat manner.
- The Bidder shall provide his scheme for mobilization with Bar Chart indicating clearly the resources, manpower and machinery proposed to be deployed to ensure timely completion of work and quality of workmanship
- On request, the Employer may help the Bidder by providing any special handling/construction equipment needed in the interest of work subject to availability and on payment of hire charges and other conditions of Employer. The charges shall be recovered from any bill of the Bidder due immediately thereafter.
- o All safety, health and pollution control measures as required to be adopted as per the Statutory Regulations and the Safety conditions for Bidder/Bidding Consortia issued along with the tender or otherwise required or implied by statutory regulations or practices shall be strictly followed by the Bidder during the execution of the Contract. The Bidder shall set up a suitable safety organization of his own at site in this regard.
- Labor facilities such as shelter, food shall be arranged by the Bidder/Bidding Consortium. On request drinking water shall be provided by the employer.
- The Employer shall deploy/supply Supervising/operating & maintenance personnel and all raw materials, utilities & services required for commissioning.
- Auxiliary power supply facility for system testing & commissioning, Inverter auxiliary, luminaries, control room, Inverter room, site office and other power consuming areas shall be provided by the Employer
- The results of pre commissioning Test, start-up tests and commissioning report shall be recorded jointly by the Bidder and the TSREDCO. And a cumulative report shall be duly submitted by the Bidder to



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- The Bidder shall rectify the defects observed during the Commissioning period promptly.
- Successfully commissioning as be accepted if the complete system remains synchronized with the grid for a period of 48 hours without any disturbance or interruption. During this period the system shall generate power during sunshine hours and export power to the grid and during dark hours shall remain synchronized with the grid. If there is an outage isolation from the grid during this period due to defects in the system, then commissioning period shall start afresh after rectification of the said defect. However if the ambient or the grid parameter are beyond the specified limits if any shall not be considered as stoppage.
- The Commissioning and project completion certificate shall be issued by the Employer subject to relevant conditions.

25. CONNECTIVITY

The maximum capacity for interconnection with the grid at a specific voltage level shall be as specified in the Distribution Code/Supply Code of the State and amended from time to time. Following criteria have been suggested for selection of voltage level in the distribution system for ready reference of the solar suppliers.

Plant Capacity	Connecting voltage
Up to 10KW	230- Single Phase or 415V - three phase as per DISCOM rules

- The maximum permissible capacity for rooftop shall be 1 MW for a single net metering point.
- Utilities may have voltage levels other than above, DISCOMS may be consulted before finalization of the voltage level and specification be made accordingly.

26. TOOLS & TACKLES AND SPARES:

- After completion of installation & commissioning of the power plant, necessary tools & tackles are to be provided free of cost by the bidder for maintenance purpose. List of tools and tackles to be supplied by the bidder for approval of specifications and make from TSREDCO.
- A list of requisite spares in case of PCU/inverter comprising of a set of control logic cards, IGBT driver cards etc. Junction Boxes. Fuses, MOVs / arrestors, MCCBs etc., along with spare set of PV modules be indicated, which shall be supplied along with the equipment. A minimum set of spares shall be maintained in the plant itself for the entire period of warranty and Operation & Maintenance which upon its use shall be replenished



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27. DANGER BOARDS AND SIGNAGES:

Danger boards should be provided as and where necessary as per IE Act. /IE rules as amended up to date. Three signage shall be provided one each at battery -cum- control room, solar array area and main entry from concerned building/block. Text of the signage may be finalized in consultation with TSREDCO/ Beneficiary Department.

28. FIRE EXTINGUISHERS:

The firefighting system for the proposed power plant for fire protection shall be consisting of:

- a) Portable fire extinguishers in the control room for fire caused by electrical short circuits
- b) Sand buckets in the control room
- c) The installation of Fire Extinguishers should confirm to TAC regulations and BIS standards. The fire extinguishers shall be provided in the control room housing PCUs as well as on the Roof or site where the PV arrays have been installed.

29. Technical Specifications:

- 1) The Solar panels to be used in this project should be from Indian manufacturers certified by the Ministry of New & Renewable Energy (MNRE).
- 2) The SPV panels shall carry a warranty of minimum 25years.
- 3) The SPV panel must be warranted for their output peak watt capacity which shall not be less than 90% at the end of 10years and 80% at the end of 25years.
- 4) In addition any components those are to be used in the project should have the certification of MNRE.

30. PLANNING AND DESIGNING:

- i. The bidder should carry out Shadow Analysis at the site and accordingly design strings & arrays layout considering optimal usage of space, material and labor. The bidder should submit the array layout drawings along with Shadow Analysis Report to TSREDCO for approval.
- ii. TSREDCO reserves the right to modify the landscaping design, Layout and specification of sub-systems and components at any stage as per local site conditions/requirements.
- iii. The bidder shall submit preliminary drawing for approval & based on any modification or recommendation, if any. The bidder submits three sets and soft copy in CD of final drawing for formal approval to proceed with construction work.

31. TRANSFORMER “IF REQUIRED” & METERING:

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- i. Dry/oil type relevant kVA, 11kV/415V, 50 Hz Step up along with all protections, switchgears, Vacuum circuit breakers, cables etc. along with required civil work.
- ii. The bidirectional electronic energy meter as per the requirement shall be installed for the measurement of import/Export of energy.
- iii. The bidder must take approval/NOC from the Concerned DISCOM for the connectivity, technical feasibility, and synchronization of SPV plant with distribution network and submit the same to TSREDCO before commissioning of SPV plant.
- iv. Reverse power relay shall be provided by bidder (if necessary), as per the local DISCOM requirement.

TSREDCO



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SECTION - VI

OTHER PROVISIONS



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SECTION - VI

OTHER PROVISIONS

1 ROLE OF BENEFICIARY DEPT.

It is envisaged that the beneficiary Dept. shall appoint any officer which will provide necessary support to facilitate the required approvals and sanctions in a time bound manner so as to achieve commissioning of the Projects within the scheduled Timeline. This may include facilitation in the following areas:

The beneficiary Dept. shall undertake the following activities also to achieve the objectives of speedy establishment and implementation of Solar Power Plant in the Host Area

- a. Obtain statutory & non-statutory clearances and to make area development plan within project location.
- b. Frame out transparent project land allotment/right to use policy and specify procedures pursuant to the relevant State policies and their amendments thereof.
- c. Coordination among various State and Central agencies for speedy implementation of projects
- e. Support during commissioning of projects and issue of commissioning certificates.

While it will be the endeavor of the beneficiary Dept. as described above to facilitate support in their respective area of working but nevertheless, successful bidder shall be overall responsible to complete all the activities related to Project Development at its own risk and cost.

2 SCOPE MATRIX

The scope matrix indicating roles and responsibilities of beneficiary Dept. and successful bidder are indicated on the table below: -

S. N.	KEY FUNCTIONS	ROLE/ RESPONSIBILITY
1	Providing the shadow free Rooftop/ Land / Plot	Beneficiary Dept.
2	Internal Water Supply Arrangement	SPD
3	Illumination System (For Pathways)	SPD
4	Construction of Cable Tray and Drainage Systems	SPD
5	Construction of Office Complex (where ever required)	SPD
6	Construction of Boundary Wall/ Fencing (where ever required)	SPD
7	Land Leveling/Roof Clearing	Beneficiary Dept.
8	O & M Services	SPD
9	Construction Power Arrangement from plant to 230/440/11 KV existing Line	SPD



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3.1 LIGHTING

Lighting has been planned Path & walkways. Area lighting shall be provided for safety and operational needs.

3.2 WEATHER MONITORING STATION (WMS)

One No. of Weather Monitoring Station (WMS) shall be developed for monitoring rainfall, solar radiation, wind speed, atmospheric pressure, temperature and other necessary parameters on real-time basis. This Weather Monitoring System should be SCADA compatible & work in line with Sub-station SCADA System.

3.3 SECURITY (If Required)

Multilevel security arrangements to be provided, such as deployment of security personal at entry gate, patrolling boundary lines & other strategic location.

3.4 DRAINAGE SYSTEM (If required)

Keeping in view of the topography of the area necessary cutting, filling & leveling work shall be taken up to have different benches suitable to our plant requirement as well as compatible with the Road network.



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SECTION - VII

FINANCIAL BID



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SECTION-VII

FINANCIAL BID GUIDELINES

- Rates quoted by Bidder will be for destination prices inclusive of taxes, levies, duties, packing, forwarding, freight, insurance, loading unloading, supply, installation, commissioning, connectivity charges etc. and any/ all charges for successful Supply and Installation of the systems at any locations in the State of Telangana.
- The rates quoted by the Bidder will be inclusive of GST or any other taxes applicable to such work. Any escalation in such taxes/ levies during the tenure of the offer/ order will not be paid by the Purchaser. Bidders are advised to take in to consideration any such escalations in the prevailing taxes/levies/duties.
- In no circumstances, escalation in the prices will be entertained.
- Your rates are to be submitted as per the enclosed Performa of schedule of rates.



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FINANCIAL BID

(On the official Letterhead of the firm)

(To be submitted in a separate envelope)

“Design, Supply, Installation, Testing And Commissioning of various capacities for aggregated capacity of 36 KWP roof top solar photo voltaic Hybrid power plants with five years of comprehensive maintenance contract at various Rurban Clusters under R-URBAN scheme in Telangana State”

Sl.No	Project Category	Quoted price for in Rs./Wp	
		In Figures	In Words
1	Hybrid Solar PV Projects range from 1KWp to 5KWP system with 5 years CMC period		

Certified that:

1. The bidder shall be quoted rate in INR / Wp only up to two decimal places up to two decimal places, incl. 5years CMC period.
2. Above rates are in accordance with specifications & various terms & conditions mentioned in the tender document.
3. The rates are inclusive of all taxes and duties of Govt. of Telangana as well Govt. of India prevailing from time to time.
4. In the event of any discrepancy between the values entered in figures and in words, shall be considered whichever is less.

Authorized Signature:

Name:

Designation:



Telangana State Renewable Energy Development Corporation Ltd

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SECTION - VIII

**SAMPLE FORMS & FORMATS
FOR BID SUBMISSION**



Telangana State Renewable Energy Development Corporation Ltd

Tender Notice. No. TSREDCO/SE/SPV/Hybrid –Rurban /2020-21

Format-I

Covering Letter

(The covering letter should be on the Letter Head of the Bidding Company)

BIDDERS UNDERTAKING COVERING LETTER

(Letter shall be submitted on Bidder(s) Letter Head)

Ref No:

Date:

To

The V.C & Managing Director

Telangana State Renewable Energy Development Corporation Limited (TSREDCO)

Corporate Office: D.No. 6-2-910, Visvesvaraya Bhavan,

The Institution of Engineers Building, Khairatabad, Hyderabad - 500 004.

Telangana State, India

Dear Sir,

Sub: Design, Supply, Installation, Testing And Commissioning of various capacities for aggregated capacity of 36 KWP roof top solar photo voltaic Hybrid power plants with five years of comprehensive maintenance contract at various Rurban Clusters under R-URBAN scheme in Telangana State- reg.

Tender Reference: TSREDCO/SE/SPV/Hybrid-Rurban/2020-21, Dated: .11.2020

1. We have examined the Tender for Supply, Installation and Commissioning of Hybrid Solar Power plants as specified in the Tender. We undertake to meet the requirements and services as required and as set out in the Tender document.
2. We attach our Technical Bid and Financial Bid in separate sealed covers as required by the Tender both of which together constitute our proposal, in full conformity with the said Tender.
3. We have read the provisions of Tender and confirm that these are acceptable to us. We further declare that additional conditions, variations, deviations, if any, found in our response shall not be given effect to.
4. We undertake, if our Bid is accepted, to adhere to the requirements as specified in the Tender or such modified plan as may subsequently be agreed.
5. We agree to unconditionally accept all the terms and conditions set out in the Tender document and also agree to abide by this Bid response for a period as mentioned in the Tender from the date fixed for bid opening and it shall remain binding upon us with full force and virtue, until within this period a formal contract is prepared and executed, this Bid response, together with your written acceptance thereof in your notification of empanelment, shall constitute a binding contract between us and TSREDCO.
6. We affirm that the information contained in the Technical Bid or any part thereof, including its schedules, and other documents, etc., delivered or to be delivered to TSREDCO is true, accurate, and complete. This proposal includes all information necessary to ensure that the statements therein do not in whole or in part mislead TSREDCO as to any material fact.
7. We also agree that you reserve the right in absolute sense to reject all or any of the products/ service specified in the bid response without assigning any reason whatsoever.
8. It is hereby confirmed that I/We are entitled to act on behalf of our company/ organization and empowered to sign this document as well as such other documents, which may be required in this connection.
9. We agree to use only indigenous PV modules in this project.
10. We also declare that our Company/Organization is not blacklisted by any of the State or Central Government and organizations of the State or Central Government.

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11. We undertake to use the BOS components other than PV Modules and Solar grid tie Inverters as per the standards stipulated.

Signature of the authorized person:

Name of the authorized person:

Designation:

Name and Address of Bidder

Stamp of bidder

CERTIFICATE AS TO AUTHORISED SIGNATORIES

I, certify that I am (Name) (Designation), and that (Name)..... who signed the above Bid has been duly authorized to sign the same on behalf of our Organization.

Date:

Signature:

Seal:

TSREDCO



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FORMAT FOR BID SECURITY

(To be on non-judicial stamp paper of appropriate value as per Stamp Act relevant to place of execution.)

Ref. _____

Bank Guarantee No. _____

Date: _____

In consideration of the -----[Insert name of the Bidder] (hereinafter referred to as 'Bidder') submitting the response to Tender inter alia for selection of the Project under CAPEX route of the capacity of ____ MWp in the Telangana. State for the districts as indicated in Tender) in response to the Tender No. _____ dated ____ issued by Telangana State Renewable Energy Development Corporation Limited (hereinafter referred to as TSREDCO) and TSREDCO considering such response to the Tender of[insert the name of the Bidder] as per the terms of the Tender, the _____ [insert name & address of bank] hereby agrees unequivocally, irrevocably and unconditionally to pay to TSREDCO at [Insert Name of the Place from the address of TSREDCO] forthwith on demand in writing from TSREDCO or any Officer authorized by it in this behalf, any amount up to and not exceeding Rupees ----- only, on behalf of M/s. _____ [Insert name of the Bidder]

This guarantee shall be valid and binding on this Bank up to and including _____ [insert date of validity in accordance with condition of this Tender] and shall not be terminable by notice or any change in the constitution of the Bank or the term of contract or by any other reasons whatsoever and our liability hereunder shall not be impaired or discharged by any extension of time or variations or alternations made, given, or agreed with or without our knowledge or consent, by or between parties to the respective agreement.

Our liability under this Guarantee is restricted to Rs. _____ (Rs. _____ only). Our Guarantee shall remain in force until _____. TSREDCO shall be entitled to invoke this Guarantee till ____ [Insert date which is 30 days after the date in the preceding sentence].

The Guarantor Bank hereby agrees and acknowledges that the TSREDCO shall have a right to invoke this BANK GUARANTEE in part or in full, as it may deem fit.

The Guarantor Bank hereby expressly agrees that it shall not require any proof in addition to the written demand by TSREDCO, made in any format, raised at the above mentioned address of the Guarantor Bank, in order to make the said payment to TSREDCO.

The Guarantor Bank shall make payment hereunder on first demand without restriction or conditions and notwithstanding any objection by ----- [Insert name of the Bidder] and/or any other person. The Guarantor Bank shall not require TSREDCO to justify the invocation of this BANK GUARANTEE, nor shall the Guarantor Bank have any recourse against TSREDCO in respect of any payment made hereunder.

This BANK GUARANTEE shall be interpreted in accordance with the laws of India and the courts at Delhi shall have exclusive jurisdiction.



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The Guarantor Bank represents that this BANK GUARANTEE has been established in such form and with such content that it is fully enforceable in accordance with its terms as against the Guarantor Bank in the manner provided herein.

This BANK GUARANTEE shall not be affected in any manner by reason of merger, amalgamation, restructuring or any other change in the constitution of the Guarantor Bank.

This BANK GUARANTEE shall be a primary obligation of the Guarantor Bank and accordingly TSREDCO shall not be obliged before enforcing this BANK GUARANTEE to take any action in any court or arbitral proceedings against the Bidder, to make any claim against or any demand on the Bidder or to give any notice to the Bidder or to enforce any security held by TSREDCO or to exercise, levy or enforce any distress, diligence or other process against the Bidder.

Notwithstanding anything contained hereinabove, our liability under this Guarantee is restricted to Rs. _____ (Rs. _____ only) and it shall remain in force until _____ [Date to be inserted on the basis condition of this Tender] with an additional claim period of thirty (30) days thereafter. We are liable to pay the guaranteed amount or any part thereof under this Bank Guarantee only if TSREDCO serves upon us a written claim or demand.

Signature _____

Name _____

Power of Attorney No. _____

For _____ [Insert Name of the Bank] _____ Banker's Stamp and Full Address.

Dated this _____ day of _____, 20____



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POWER OF ATTORNEY

(To be on non-judicial stamp paper of appropriate value as per Stamp Act relevant to place of execution.)

(a) Power of Attorney to be provided by the Bidding Company in favour of its representative as evidence of authorized signatory’s authority.

Know all men by these presents, We

(name and address of the registered office of the Bidding Company as applicable) do hereby constitute, appoint and authorize Mr./Ms. (name& residential

address) who is presently employed with us and holding the position of as our true and lawful attorney, to do in our name and on

our behalf, all such acts, deeds and things necessary in connection with or incidental to submission of our Bid for implementation of Hybrid Roof top solar PV scheme in the State___ in response to the NIT No,dated issued by Telangana State Renewable Energy Development Corporation Ltd, (TSREDCO), including signing and submission of the Bid and all other documents related to the Bid, including but not limited to undertakings, letters, certificates, acceptances, clarifications, guarantees or any other document which the TSREDCO may require us to submit. The aforesaid Attorney is further authorized for making representations to the TSREDCO and providing information / responses to TSREDCO representing us in all matters before TSREDCO, and generally dealing with TSREDCO in all matters in connection with Bid till the completion of the bidding process as per the terms of the above mentioned NIT.

We hereby agree to ratify all acts, deeds and things done by our said attorney pursuant to this Power of Attorney and that all acts, deeds and things done by our aforesaid attorney shall be binding on us and shall always be deemed to have been done by us.

All the terms used herein but not defined shall have the meaning ascribed to such terms under the NIT.

Signed by the within named

..... (Insert the name of the executant company)

through the hand of

Mr.

duly authorized by the Board to issue such Power of Attorney

Dated this day of

Accepted

.....

Signature of Attorney
(Name, designation and address of the Attorney)



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Attested

.....

(Signature of the executant)
(Name, designation and address of the executant)

.....
Signature and stamp of Notary of the place of execution

Common seal of has been affixed in my/our presence pursuant to Board of Director’s Resolution dated.....

WITNESS

1.

(Signature)

Name.....

Designation

2.

(Signature)

Name.....

Designation

Notes:

The mode of execution of the power of attorney should be in accordance with the procedure, if any, laid down by the applicable law and the charter documents of the executant(s) and the same should be under common seal of the executant affixed in accordance with the applicable procedure. Further, the person whose signatures are to be provided on the power of attorney shall be duly authorized by the executant(s) in this regard.

The person authorized under this Power of Attorney, in the case of the Bidding Company / Lead Member being a public company, or a private company which is a subsidiary of a public company, in terms of the Companies Act, 1956, with a paid up share capital of more than Rupees Five crores, should be the Managing Director / whole time director/manager appointed under section 269 of the Companies Act, 1956. In all other cases the person authorized should be a director duly authorized by a board resolution duly passed by the Company.

Also, wherever required, the executant(s) should submit for verification the extract of the chartered documents and documents such as a Board resolution / power of attorney, in favour of the person executing this power of attorney for delegation of power hereunder on behalf of the executant(s).



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DOCUMENTS REQUIRED FOR PROJECT SANCTION

Following documents will be required to be submitted for project sanction:

1. Agreement between the bidder and the owner of the Project and Building/Roof top (Notarized original agreement on stamp paper of appropriate value should be enclosed).
2. All Agreement shall generally have reference to the TSREDCO's Tender No. and Letter of Allocation and provisions as per terms and conditions, technical specification and performance parameter in line with the TSREDCO's Tender Document against which Letter of Allocation has been issued. In addition, it shall indicate the price / rate payable by the roof top Owner to the developer, payment terms, completion period along with other conditions of contract like insurance, warranty, force majeure, arbitration, jurisdiction, governing law, site access for the developer, and, site access for TSREDCO officials for the entire plant life, obligation of the roof top owner regarding providing of data to TSREDCO as per the TENDER Document etc.
3. No Objection Certificate from the concerned DISCOM for grid connectivity or CEIG approval (In case CEIG approval is suffice for grid connectivity). Undertaking of Successful Bidder on stamp Paper for indemnification of TSREDCO shall be furnished in case approval of CEIG is only furnished for grid connectivity.

(Not mandatory during project identification, however mandatory for project commissioning/operation).
4. Summary Project Report as per Format at Annexure.

OPERATION AND MAINTENANCE GUIDELINES OF HYBRID SOLAR PV PLANTS

1. Periodic cleaning of solar modules, preferably once every fortnight.
2. O&M of Solar Power Plant shall be compliant with grid requirements to achieve committed energy generation.
3. Periodic checks of the Modules, PCUs and BoS shall be carried out as a part of routine preventive and breakdown maintenance.
4. Immediate replacement of defective Modules, Invertors/PCUs and other equipment as and when required.
5. Supply of all spares, consumables and fixtures as required. Such stock shall be maintained for all associated equipments and materials as per manufacturer/ supplier's recommendations.
6. All the equipment testing instrument required for Testing, Commissioning and O&M for the healthy operation of the Plant shall be maintained by the Bidder. The testing equipments must be calibrated once every 2 years from NABL accredited labs and the certificate of calibration must be kept for reference as required.



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- 7. If negligence/ mal-operation on part of the Bidder's operator results in failure of equipment, such equipment should be repaired/ replaced by the Bidder free of cost.
- 8. If any jobs covered in O&M Scope as per TENDER are not carried out by the contractor/ Bidders during the O&M period, the Engineer-In-Charge shall take appropriate action as deemed fit.
- 9. TSREDCO reserves the right to make surprise checks/ inspection visits at its own or through authorized representative to verify the O&M activities being carried out by the Bidder. Failure to adhere to above guidelines will result in penal action including debarring from participation in next tender.

Quality Certification, Standards and Testing for Grid-connected Rooftop Solar PV Systems/Power Plants

Quality certification and standards for grid-connected rooftop solar PV systems are essential for the successful mass-scale implementation of this technology. It is also imperative to put in place an efficient and rigorous monitoring mechanism, adherence to these standards. Hence, all components of grid-connected rooftop solar PV system/ plant must conform to the relevant standards and certifications given below:

Solar PV Modules/Panels

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

Solar PV Inverters

IEC 62109-1, IEC 62109-2	Safety of power converters for use in photovoltaic power systems - Part 1: General requirements, and Safety of power converters for use in photovoltaic power systems
	Part 2: Particular requirements for inverters. Safety compliance (Protection degree IP 65 for outdoor mounting, IP 54 for indoor mounting)
IEC/IS 61683 (as applicable)	Photovoltaic Systems - Power conditioners: Procedure for Measuring Efficiency (10%, 25%, 50%, 75% & 90-100% Loading Conditions)
BS EN 50530 (as applicable)	Overall efficiency of grid-connected photovoltaic inverters: This European Standard provides a procedure for the measurement of the accuracy of



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	the maximum power point tracking (MPPT) of inverters, which are used in grid-connected photovoltaic systems. In that case the inverter energizes a low voltage grid of stable AC voltage and constant frequency. Both the static and dynamic MPPT efficiency is considered.
IEC 62116/ UL 1741/ IEEE 1547 (as applicable)	Utility-interconnected Photovoltaic Inverters - Test Procedure of Islanding Prevention Measures
IEC 60255-27	Measuring relays and protection equipment - Part 27: Product safety requirements
IEC 60068-2 (1, 2, 14, 27, 30 & 64)	Environmental Testing of PV System - Power Conditioners and Inverters a) IEC 60068-2-1: Environmental testing - Part 2-1: Tests - Test A: Cold b) IEC 60068-2-2: Environmental testing - Part 2-2: Tests - Test B: Dry heat c) IEC 60068-2-14: Environmental testing - Part 2-14: Tests - Test N: Change of temperature d) IEC 60068-2-27: Environmental testing - Part 2-27: Tests - Test Ea and guidance: Shock e) IEC 60068-2-30: Environmental testing - Part 2-30: Tests - Test Db: Damp heat, cyclic (12 h + 12 h cycle) f) IEC 60068-2-64: Environmental testing - Part 2-64: Tests - Test Fh: Vibration, broadband random and guidance
IEC 61000 - 2,3,5 (as applicable)	Electromagnetic Interference (EMI) and Electromagnetic Compatibility (EMC) testing of PV Inverters

Fuses

IS/IEC 60947 (Part 1, 2 & 3), EN 50521	General safety requirements for connectors, switches, circuit breakers (AC/DC):
	a) Low-voltage Switchgear and Control-gear, Part 1: General Rules
	b) Low-Voltage Switchgear and Control-gear, Part 2: Circuit Breakers
	c) Low-voltage switchgear and Control-gear, Part 3: Switches, dis connectors, switch-dis connectors and fuse-combination units
	d) EN 50521: Connectors for photovoltaic systems - Safety requirements and tests
IEC 60269-6	Low-voltage fuses - Part 6: Supplementary requirements for fuse-links for the protection of solar photovoltaic energy systems
Surge Arrestors	
IEC 62305-4	Lightening Protection Standard
IEC 60364-5-53/ IS 15086-5 (SUCCESSFUL BIDDER)	Electrical installations of buildings - Part 5-53: Selection and erection of electrical equipment - Isolation, switching and control
IEC 61643- 11:2011	Low-voltage surge protective devices - Part 11: Surge protective devices connected to low-voltage power systems - Requirements and test methods
Cables	
IEC 60227/IS 694, IEC 60502/IS 1554 (Part 1 & 2)/IEC69947	General test and measuring method for PVC (Polyvinyl chloride) insulated cables (for working voltages up to and including 1100 V, and UV resistant for outdoor installation)
BS EN 50618	Electric cables for photovoltaic systems (BT(DE/NOT)258), mainly for DC Cables



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Earthing /Lightning:

IEC 62561 Series (Chemical earthing)	IEC 62561-1 Lightning protection system components (LPSC) - Part 1: Requirements for connection components IEC 62561-2 Lightning protection system components (LPSC) - Part 2: Requirements for conductors and earth electrodes IEC 62561-7 Lightning protection system components (LPSC) - Part 7: Requirements for earthing enhancing compounds
Junction Boxes	
IEC 60529	Junction boxes and solar panel terminal boxes shall be of the thermo-plastic type with IP 65 protection for outdoor use, and IP 54 protection for indoor use
Energy Meter	
IS 16444 or as specified by the DISCOMs	A.C. Static direct connected watt-hour Smart Meter Class 1 and 2 – Specification (with Import & Export/Net energy measurements)
Solar PV Roof Mounting	Structure
IS 2062/IS 4759	Material for the structure mounting

Note:-

- Equivalent standards may be used for different system components of the plants. In case of clarification following person/agencies may be contacted.
- Ministry of New and Renewable Energy (Govt. of India) National Institute of Solar Energy
- The Energy & Resources Institute TUV / Rheinland / UL



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PROJECT REPORT FORMAT

Format for Summary Project Report for Hybrid Rooftop and Small SPV Power Plants

1. Name of Bidder
2. Tender no.
3. Project details (Site location & Address)
4. Brief about the Rooftop Solar Power Generation System
5. Details of the beneficiary
6. Specifications of the Components and Bill of Material/ Quantities

Sl. no	Component	Specifications	Quantity	Make
A	Solar PV module			
A.1	Aggregate Solar PV capacity (kWp)			
B	Grid Tie inverter (Type and Capacity)			
B.1	Aggregate Inverter capacity (kVA)			
C	Module mounting structure (Certified by a Structural Engineer (Mandatory for 101 kWp to 1000 kWp))			
D	Array Junction Box			
E	AC Distribution Board			
F	Cable (All type)			
G	Earthing Kit (maintenance free)			
H	Meters			
I	Online monitoring system			
J	Any other component			
K	Transformer			

7. Unit cost of solar power generation
8. Cost benefit analysis, payback period
9. Expected output/annum.
10. Respective drawings for layout, electrical wiring connections, earthing, components etc.
11. Connectivity details with grid and metering arrangement (with sketch diagram)
12. Copy of electricity bill of the beneficiary and consumer number
13. Any other information
14. Documentary proof regarding beneficiary type



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BIDDER INFORMATION

(In technical bid)

1	Name of the organization	
2	Year of establishment	
3	Complete postal address	
4	Name & Designation of Authorized person	
5	Phone No.'s	
6	Fax No.	
7	Email	
8	Nature of the firm (Proprietary/partnership/etc...)	
9	Bank Details of the Agency:	
	Bank Name	
	Bank Address	
	Bank Account Number	
	IFSC Code	
10	PAN No.	
11	TIN No.	
12	Goods and Service Tax Registration No.	
13	Total No. of branch offices in Telangana	
14	Bid Document Fee (Non refundable)	Amount Rs. : UTR No. : UTR Date :
15	BID SECURITY DEPOSIT	Amount Rs. : UTR No. : UTR Date :
16	Details of certificates enclosed.	



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IN COVER 'A'

Forms

Turn over details of item/product - **2017- 18 to 2019-20**

S.No	Solution	Amount (Rs in Lakhs)

List of Major Customers - **2017- 18 to 2019-2020**

S. No	Customer Full Address	Details of Supplies made	Turn Over (Rs. In Lakhs)



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CHECK LIST

IMPORTANT:

The Bidder must ensure that the following details in the check list are furnished along with the bid document. The bidder must also carefully go through all the contents of the BID Document and any additional information/documents, required more than the items listed in the check list below, also shall have to be furnished. Non-furnishing of any required information/document as per the Tender Document will lead to rejection of the bid. **(in the following order only).**

S.No	Particulars	Yes / No	Pg. No.	Name of the File uploaded
1	Tender Document Fee of Rs.11,800/- through Online Mode to M/s TSREDCO, Account No: 30242010095314, Canara Bank, Hyderabad.			
2	Bid Security of Rs.75,000/-(on line mode/BG) drawn from any Nationalised/ Scheduled Bank			
3	Bidder Information Sheet			
4	Tender document, duly signed and stamped in token of accepted all the terms and conditions of the tender schedule.			
5	Registration Certificate (firm registration)			
6	Copy of PAN & GST			
7	Valid Registration with TSREDCO			
8	The firms are having the solar GCRT system experience of minimum 30KWp cumulative capacity in field of OFF grid and Grid Connected Solar PV systems installed at government buildings in any one (1) FY from the last 3 Years (i.e. FY 2017-18, 2018-19 and 2019-20)			
9	The firms are having the Turnover not less than 1Cr, in any one financial year during the last 3 financial years.			
10	Solar PV Module Efficiency has to be greater than 15% @STC. (proof to be submitted)			
11	List of present clients with contact address & telephone numbers along with work orders & latest performance certificates of each capacity/order			
12	Power of Attorney, wherever applicable			
13	The OEM should have service center in the state of Telangana and service centers address, engineers name and contact number should be furnished			
14	Any other information/documents that are required in the bid document			

NOTE: All pages of the bid documents must be serially numbered and signed.

*****End*****