



# **Telangana Renewable Energy Development Corporation Ltd**

Tender Ref. No. TGREDCO/PBDS/Solar/IMSS/2024/ Dated: 25.11.2024

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## **(E-Procurement Tender Notice)**

**Empanelment of Engineering Procurement & Construction (EPC) Vendors for “Design, Supply, Installation, Testing, commissioning with Remote Monitoring System with Comprehensive Warranty, guarantee for 5 Years and Operation and Maintenance of the Complete Plant for 1 Year from Commissioning Date for the Grid Connected Solar Power Plant Capacity of 1 MW each for a cumulative capacity of 1000 MW at Various Locations in Telangana State Through Rate Contract CAPEX Mode**

**UNDER**

**INDIRA MAHILA SHAKTHI SCHEME**

**Tender Ref: TGREDCO/PBDS/SOLAR/IMSS/2024 DATED 25.11.2024**

**CLOSING DATE: 10.12.2024 UP TO 5.00 PM**

**ISSUED BY**



**TELANGANA RENEWABLE ENERGY DEVELOPMENT CORPORATION LTD  
(TGREDCO)**

Corporate Office: D. No. 6-2-910, Visvesvaraya Bhavan,  
The Institution of Engineers Building, Khairatabad, Hyderabad - 500 004, Telangana  
Phone: 040-23201502, 23201503, Fax: 040-23201504  
e-mail: [pdprojects@tgredco.telangana.gov.in](mailto:pdprojects@tgredco.telangana.gov.in)  
website: <https://tgredco.telangana.gov.in>



# **Telangana Renewable Energy Development Corporation Ltd**

Tender Ref. No. TGREDCO/PBDS/Solar/IMSS/2024/ Dated: 25.11.2024

## **Contents**

<b>TABLE OF CONTENTS</b>	
<b>TOPIC</b>	<b>PAGE-NO.</b>
<b>PART-1</b>	04
Disclaimer	05
e-tender Notice	06
Definitions	07-10
Covering Letter	11-12
Checklist of Annexure	13
Detailed Tender Schedule	14
Bid Information Sheet	15-17
Declaration by Bidder	18
<b>PART-2 (Instructions to Bidders)</b>	19
Section -1 The e-tender document	20-22
Section-2 Introduction	23
Section-3 Preparation of e-tender	24-25
Section-4 Uploading of e-tender	26-27
Section -5 e-tender opening	28
Section -6 Evaluation Procedure	29-30
Section -7 Eligibility Conditions	31-34
Section -8 Procedure for Finalizations of BID	35-37
<b>PART-3</b>	38
General conditions of contract	38-44
<b>PART-4</b>	45
Scope of work	45-55
Technical specification	56-96
<b>PART-5</b>	97
Warranty And Maintenance	97
Bidder Information details	98-100
<b>PART-6</b>	101
Price Bid format	102
<b>PART-7</b>	103
<b>Annexures (B to H)</b>	104- 115



# **Telangana Renewable Energy Development Corporation Ltd**

Tender Ref. No. TGREDCO/PBDS/Solar/IMSS/2024/ Dated: 25.11.2024

## **WEBSITE ADVERTISEMENT**



### **TELANGANA RENEWABLE ENERGY DEVELOPMENT CORPORATION LTD** **- (TGREDCO)**

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 Empanelment of Engineering Procurement & Construction (EPC) Vendors for "Design, Supply, Installation, Testing, commissioning with Remote Monitoring System with Comprehensive Warranty, Guarantee or 5 Years and Operation and Maintenance of the Complete Plant for 1 Year for the Grid Connected Solar Power Plant Capacity of 1 MW each for a cumulative capacity of 1000 MW at Various Locations in Telangana State Through Rate Contract CAPEX Mode ". Interested bidders can download the bids online from 25.11.2024 and submit the same, from 25.11.2024 to 10.12.2024 till 05:00PM through <https://www.tender.telangana.gov.in> For further details, please visit our website: <https://tgredco.telangana.gov.in>

Date: 25.11.2024

**VC & MD,  
TGREDCO**



# **Telangana Renewable Energy Development Corporation Ltd**

Tender Ref. No. TGREDCO/PBDS/Solar/IMSS/2024/ Dated: 25.11.2024

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## **PART-1**



# **Telangana Renewable Energy Development Corporation Ltd**

Tender Ref. No. TGREDCO/PBDS/Solar/IMSS/2024/ Dated: 25.11.2024

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## **1. DISCLAIMER**

- 1.1 Though adequate care has been taken while preparing the tender document, the bidder(s) shall satisfy themselves that the document is complete in all respect. Intimation regarding any discrepancy shall be given by the prospective bidders to the office of TGREDCO immediately. If no intimation is received from any bidder within 10 (Ten) days from the date of issuance of tender documents, it shall be considered that the document is complete in all respect and has been received/ acknowledged by the bidder(s).
- 1.2 TGREDCO reserves the right reserves the right to modify, amend or supplement this document. It also reserves the right to reject any or all bids or cancel/withdraw the empanelment process without assigning any reason whatsoever and in such case no Bidders / intending bidder shall have any claim arising out of such action. It also reserves the right to decline to discuss further with any Bidders applying for Empanelment.
- 1.3 The proposed empanelment of EPC vendors for the construction of solar power plants under the Indira Mahila Shakti Scheme in the state of Telangana is intended solely to facilitate eligible beneficiaries under the Indira Mahila Shakti Scheme. This empanelment is a process that enables vendors to be considered for potential future work in alignment with the scheme's objectives.
- 1.4 However, please note that inclusion in this list does not guarantee the award of any business, contract, or project. The enlistment is purely for eligibility purposes, and the actual allocation of work will be subject to further criteria, demand, and requirements under the Indira Mahila Shakti Scheme.
- 1.5 Telangana Renewable Energy Development Corporation Limited (TGREDCO) reserves the right to modify, amend or supplement this document including all formats and Annexure.
- 1.6 While this document has been prepared in good faith, neither TGREDCO 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.



# **Telangana Renewable Energy Development Corporation Ltd**

Tender Ref. No. TGREDCO/PBDS/Solar/IMSS/2024/ Dated: 25.11.2024

## **E-tender Notice**

TGREDCO invites Online Bids from Prospective Bidders through e-tendering for Empanelment of Engineering Procurement & Construction (EPC) Vendors for "Design, Supply, Installation, Testing, commissioning with Remote Monitoring System with Comprehensive Warranty, Guarantee for 5 Years and Operation and Maintenance of the Complete Plant for 1 Year from Commissioning date for the Grid Connected Solar Power Plant Capacity of 1 MW each for a cumulative capacity of 1000 MW at Various Locations in Telangana State Through Rate Contract CAPEX Mode. The rates will be applicable to all the firms empanelled under this Tender who wish to provide their services on the lowest quoted prices which are received under this offer. The selected firms will have to execute the projects in accordance with technical specification of this tender Condition. The tender document is available at e-Procurement website <https://tender.telangana.gov.in> from 25.11.2024. Interested bidders may view, download the e-Bid document, seek clarification and submit their e-Bid online up to the date and time mentioned in the table below:

(a)	Availability of tender document on website	25-11-2024 after 5:00 PM At e-Procurement web site
(b)	Pre-Bid conference	29-11-2024 at 02:30 PM
(b)	e-Bid submission end date & Time	10-12-2024 up to 05:00 PM
(c)	Online technical e-Bid Opening date & time	11-12-2024 at 11:00 AM
(d)	Online financial e-Bid Opening date & time (Only of technically qualified bidders)	16-12-2024 at 02:00 PM
(e)	Venue of opening of technical & financial e-Bids	TGREDCO Head Office at the following address #D. No. 6-2-910, Visvesvaraya Bhavan, The Institution of Engineers Building, Khairatabad, Hyderabad, 500 004. Telangana State, India

The companies/firms who wish to participate in the e-tender has to registered at e-Procurement portal of Telangana and would only be eligible for participating in this e-tender. All companies/firms who have not registered themselves e-Procurement portal of Telangana for e-tendering till date can get their registration done. The companies/firms may contact visit <https://tender.telangana.gov.in> for their Registration details. The bidders need to submit the proof/cost of e-Bid document fees and Empanelment Deposit as stated in the above tender schedule through online Payment to TGREDCO bank Account as bid documents fees and bank guarantee or demand draft or online payment to TGREDCO bank account as empanelment deposit in favour of TGREDCO payable at Hyderabad. The scanned copy of the Demand Draft, Online Transfer and Bank guarantee must be enclosed along with the e-Bids. The original Demand Draft and bank guarantee along with the hard copy of the Demand Draft or Bank guarantee must reach the office of TGREDCO at the following address #D. No. 6-2-910, Visvesvaraya Bhavan, The Institution of Engineers Building, Khairthabad, Hyderabad, 500 004. Telangana State, India before opening date and time of technical e-Bid failing which, tender shall not be considered. Cumulative capacity mentioned as above, may increase or decrease. Vice Chairman & Managing Director, TGREDCO reserves the right to reject any or all tenders without assigning any reason thereof. The decision of Vice Chairman & Managing Director, TGREDCO will be final and binding.

Vice Chairman & Managing Director  
TGREDCO



# **Telangana Renewable Energy Development Corporation Ltd**

Tender Ref. No. TGREDCO/PBDS/Solar/IMSS/2024/ Dated: 25.11.2024

## **DEFINITIONS:**

The words and expressions beginning with capital letters and defined in the E-BID DOCUMENT shall, unless repugnant to the context, have the meaning ascribed thereto herein. In absence of availability of definitions in the foregoing references, the capitalized terms shall be interpreted in accordance with the Electricity Act 2003, the CERC (Terms and Conditions of Tariff) Regulations 2012 or any other relevant electricity law, rule or regulation prevalent in India, as amended or re-enacted from time to time, in that order. The following terms are defined for use in the E-BID DOCUMENT:

1. "Affiliate" shall mean a company that either directly or indirectly
  - a. controls or
  - b. is controlled by or
  - c. is under common control with a Bidding Company (in the case of a single company) and "control" means ownership by one company.
2. "Appropriate Commission" shall mean the Telangana Electricity Regulatory Commission set up under the Electricity Act 2003;
3. "B.I.S" shall mean specifications of Bureau of Indian Standards (BIS);
4. "Bids" shall mean the Technical Bid and the Financial Bid submitted by the Bidder electronically at the prescribed web portal, in response to the e-bid document, in accordance with the terms and conditions hereof;
5. "Bid Deadline" shall mean the last date and time for submission of Bid in response to the e-bid document, and as may have been extended in accordance with the e-bid document;
6. "Bidder" shall mean a Bidding Company complying with the provisions of Companies Act, 1956;
7. "Bidding Company" shall refer to such single company or consortium that has submitted the Bid in accordance with the provisions of the e-bid document;
8. "Bid Validity" shall have the meaning ascribed to it in the bid information sheet, Sl.no:7
9. "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.
10. "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";
11. "Bidding Company" shall refer to such single/consortium company that has submitted the Bid in accordance with the provisions of this Bid;
12. "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;



## **Telangana Renewable Energy Development Corporation Ltd**

Tender Ref. No. TGREDCO/PBDS/Solar/IMSS/2024/ Dated: 25.11.2024

13. "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.
14. "Beneficiary" shall mean the owner of the project who is awarding the contract.
15. "CAPEX" shall mean Capital Expenditure
16. "CEA" shall mean Central Electricity Authority
17. "Commissioning" means Successful operation of the Project / Works by the Contractor, for the purpose of carrying out Performance Test(s) as defined in RFS.
18. "Capacity Utilization Factor" (CUF) shall mean the ratio of actual energy generated by SPV project over the year to the equivalent energy output at its rated capacity over the yearly period.
19.  $CUF = \text{actual annual energy generated from the plant in kWh} / (\text{installed plant capacity in kW} * 365 * 24).$
20. "Consents, Clearances and Permits" shall mean all authorizations, licenses, approvals, registrations, permits, waivers, privileges, acknowledgements, agreements, or concessions required to be obtained from or provided by any concerned authority for the purpose of installation of the generation plant or captive consumption of such generation;
21. "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
22. "Competent Authority" shall mean Vice Chairman & Managing Director (VC&MD) of TGREDCO himself and/or a person or group of persons nominated by VC&MD for the mentioned purpose herein;
23. "Company" shall mean a body incorporated in India under the Companies Act, 1956;
24. "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;
25. "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.
26. "Completion of Work" means that the Project/Works have been completed operationally and structurally has been attained as per Technical Specifications.
27. "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;





## **Telangana Renewable Energy Development Corporation Ltd**

Tender Ref. No. TGREDCO/PBDS/Solar/IMSS/2024/ Dated: 25.11.2024

28. "Day" means calendar day;
29. "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.
30. "DISCOMS" shall mean Distribution utilities/companies i.e. TGSPDCL & TGNPDCL
31. "Electricity Act 2003" shall mean the Electricity Act, 2003 and any rules, amendments, regulation, notifications, guidelines or policies issued there under from time to time;
32. "EPC" shall mean engineering, procurement and construction of a plant or facility with obligation to meet minimum performance standards along with requisite warranties for the plant or facility;
33. "EMPANELMENT DEPOSIT" shall mean the unconditional and irrevocable online payment/ Bank Guarantee/ demand draft to be submitted along with the Bid by the Bidder;
34. "Employer" or "TGREDCO" shall mean Telangana Renewable Energy Development Corporation Limited, Hyderabad.
35. "Effective Date" means the date from which the Time for Completion shall be determined;
36. "Eligibility Conditions" shall mean the qualification requirements set forth in Section 7 of part - A
37. "Financial Bid" shall mean the e-Bid, containing the Bidder's Quoted Capital Cost for different Category in the Part -B of the e-bid document;
38. "GCC" means the General Conditions of Contract contained in this section;
39. "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.
40. "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.
41. "IEC" shall mean specifications of International Electro-Technical Commission;
42. "kWp" shall mean kilo-Watt Peak;
43. "kWh" shall mean kilo-Watt-hour;
44. "LEAD MEMBER OF THE BIDDING CONSORTIUM" or "LEAD MEMBER": There shall be only one Lead Member, having the required financial eligibility and has to submit the bid as lead member of the Bidding Consortium;
45. "MEMBER IN A BIDDING CONSORTIUM" or "MEMBER" shall mean each Company in a Bidding Consortium. In case of a Technology Partner being a member in the Consortium, it has to be a Company;
46. "O&M" shall mean Operation & Maintenance of Rooftop Solar PV system for 5 years;



## **Telangana Renewable Energy Development Corporation Ltd**

Tender Ref. No. TGREDCO/PBDS/Solar/IMSS/2024/ Dated: 25.11.2024

47. "Owner of the project" shall mean anyone who has ownership (including lease ownership also) of the roof and is the legal owner of all equipments of the project.
48. "Parent Company" shall mean a company that holds paid-up equity capital directly or indirectly in the Bidding Company, as the case may be;
49. "Price/Financial Bid" shall mean separate Envelope, containing the Bidder's Quoted Price as per the format prescribed (Technical & Special Conditions of Contract) of this BID.
50. "Plant" shall mean rooftop solar photovoltaic power generation plants implemented on the individual site;
51. "PV" shall mean photovoltaic;
52. "Performance Ratio" (PR) means
53. "Performance Ratio" (PR) means the ratio of plant output versus installed plant capacity at any instance with respect to the radiation measured.  $PR = (\text{Measured output in kW} / \text{Installed Plant capacity in kW} * (1000 \text{ W/m}^2 / \text{Measured radiation intensity in W/m}^2))$ .
54. "Qualified Bidder" shall mean the Bidder(s) who, after evaluation of their Techno Commercial Bid as per Eligibility Criteria set forth in Section: Technical & Special Conditions of Contract of this BID stand qualified for opening and evaluation of their Price/Financial Bid;
55. "RC" shall mean Rate Contract
56. "SNA" shall mean State Nodal Agency
57. "Statutory Auditor" shall mean the auditor of a Company appointed under the provisions of the Companies Act, 1956 or under the provisions of any other applicable governing law;
58. "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.
59. "Successful Bidder(s) / Contractor(s)" shall mean the Bidder(s) selected by Employer pursuant to this Bid i.e. on whom award is made.
60. "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.
61. "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;
62. "TGNPDCL" means Northern Power Distribution Company of Telangana.
63. "TGREDCO" means Telangana Renewable Energy Corporation Limited.
64. "TGSPDCL" means Southern Power Distribution Company of Telangana.
65. "Work" means the "Goods" to be supplied, as well as all the "Services" to be carried out under the Contract;



# **Telangana Renewable Energy Development Corporation Ltd**

Tender Ref. No. TGREDCO/PBDS/Solar/IMSS/2024/ Dated: 25.11.2024

**Annexure- A**

## **BIDDERS UNDERTAKING COVERING LETTER**

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

Ref No:

Date:

To

The V.C & Managing Director

Telangana Renewable Energy Development Corporation Limited (TGREDCO)

D.No. 6-2-910, Visvesvaraya Bhavan,

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

Telangana State, India

Dear Sir/Madam,

**Sub:** Empanelment of Engineering Procurement & Construction (EPC) Vendors for "Design, Supply, Installation, Testing, commissioning with Remote Monitoring System with Comprehensive Warranty, Guarantee for 5 Years and Operation and Maintenance of the Complete Plant for 1 Year from Commissioning date for the Grid Connected Solar Power Plant Capacity of 1 MW each for a cumulative capacity of 1000 MW at Various Locations in Telangana State through Rate Contract CAPEX Mode - reg.

**Tender Reference:** TGREDCO/PBDS/SOLAR/IMSS/2024/Dated:25.11.2024

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1. We have examined the Tender for Empanelment of Engineering Procurement & Construction (EPC) Vendors for "Design, Supply, Installation, Testing, commissioning with Remote Monitoring System with Comprehensive Warranty, Guarantee) for 5 Years and Operation and Maintenance of the Complete Plant for 1 Year from Commissioning date for the Grid Connected Solar Power Plant Capacity of 1 MW each for a cumulative capacity of 1000 MW at Various Locations in Telangana State Through Rate Contract CAPEX Mode 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 hereby submit our offer in full compliance with terms & conditions of the above e-tender. A blank copy of the e-tender, duly signed on each page is also uploaded in the technical bid as proof of our acceptance of all specifications as well as terms/ Conditions.
3. We confirm that we have the required Technical & Financial Eligibilities as mentioned in this tender document
4. Accordingly, we are depositing the Empanelment Deposit of Rs.5,00,000/- (Rupees Five Lakhs only) in the form of Demand Draft drawn in favour of TGREDCO. Hyderabad or Online Bank Transfer to TGREDCO Account or Bank Guarantee in favour of TGREDCO, Hyderabad which is valid for 15 months.
5. We understand that TGREDCO will not pay any interest on the empanelment deposit amount.
6. The e-tender is to be uploaded in online mode separately i.e., technical bid & Financial Bid.
7. 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.
8. 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.



## **Telangana Renewable Energy Development Corporation Ltd**

Tender Ref. No. TGREDCO/PBDS/Solar/IMSS/2024/ Dated: 25.11.2024

9. 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 Empanelment is carried, this Bid response, together with your written acceptance thereof in your notification of empanelment, shall constitute a binding contract between us and TGREDCO.
10. 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 TGREDCO 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 TGREDCO as to any material fact.
11. 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.
12. 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.
13. We also declare that our Company/Organisation is not blacklisted by any of the State or Central Government and organisations of the State or Central Government.
14. We undertake to use the BOS components other than PV Modules and Solar grid tie Inverters as per the standards stipulated.

Signature of the authorised person:

Name of the authorised 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 Organisation.

Date:

Signature:

Seal:



# **Telangana Renewable Energy Development Corporation Ltd**

Tender Ref. No. TGREDCO/PBDS/Solar/IMSS/2024/ Dated: 25.11.2024

## **CHECKLIST TO ACOMPANY THE TENDER**

<b>S. No</b>	<b>Description</b>	<b>Submitted</b>	<b>Page No. (see Note below)</b>
1	Online Payment of Bid Fee	Yes /No	
2	Empanelment Deposit (Submitted in the Form of (DD/BG/Online Transfer).	Yes /No	
3	Copy of Certificate of incorporation/Partnership Deed/LLP/ preoperatory firm	Yes /No	
4	If , the company, a copy of Memorandum of Association (MoA) & Article of Association (AoA).	Yes /No	
5	Copy of PAN card	Yes /No	
6	Copies of GST Registration Certificate.	Yes /No	
7	Self-Attested Copies in support of the Technical Qualification Criteria	Yes /No	
8	IT Returns or CA Certified Turn Over Certificate with UDIN in support of the Financial Qualification Criteria	Yes /No	
9	Consortium Agreement ( If applicable)	Yes /No	
10	Availability of local service centres/ technical personnel	Yes /No	
11	Information on litigation history in which Bidder is involved.	Yes/No	
12	Any other documents/certificate as specified in tender conditions in support of the Eligibility conditions	Yes /No	
13	Experience Certificate	Yes /No	
14	Declarations as per the formats	Yes /No	
15	Declaration on bidder's Letterhead for Non blacklisting from any Government Departments/ Public Sector Units (PSUs) / Distribution Companies etc.	Yes /No	

### **Notes:**

1. All the statements copies of the certificates, documents etc., enclosed to the Technical bid shall be given page numbers on the right corner of each certificate, which will be indicated in column (4) against each item. The statements furnished shall be in the formats appended to the tender document.

2) The information shall be filled-in by the Tenderer in the check list, as applicable and shall be enclosed to the Technical bid for the purposes of verification as well as evaluation of the Tenderer's Compliance to the qualification criteria as provided in the Tender document.

3) The bidder should submit this tender document duly signed and stamp on every page.

The bidder shall on all the statements, documents, certificates by him, owning responsibility for their correctness/authenticity.



## **Telangana Renewable Energy Development Corporation Ltd**

Tender Ref. No. TGREDCO/PBDS/Solar/IMSS/2024/ Dated: 25.11.2024

### **DETAIL TENDER SCHEDULE**

Bid calling date	25.11.2024
Bid Document fee (Non refundable)	Rs. 29,500/- (Including 18% GST) to be paid only through online payment to TGREDCO bank account details given Bid information sheet at SI.No. 9 (provide acknowledgment & UTR No. details to TGREDCO at the time of Bid submission)
Bid Documents Downloading Start date & Online bids submission start date	25.11.2024 at 05:00 PM
Pre-Bid meeting	29.11.2024 at 02:30 PM at TGREDCO, D. No. 6-2-910, Visvesvaraya Bhavan, The Institution of Engineers Building, Khairatabad, Hyderabad, 500 004. Telangana State, India
Bid Document Downloading End Date	10.12.2024 till 05:00 PM
Last date for uploading of online bids	10.12.2024 till 05:00 PM
Last date for submission of required Hard copies mentioned in the Bid.	10.12.2024 till 05:00 PM at TGREDCO Head Office at the following address #D. No. 6-2-910, Visvesvaraya Bhavan, The Institution of Engineers Building, Khairatabad, Hyderabad, 500 004. Telangana State, India
Technical Bid opening date/time	11.12.2024 at 11:00 AM.
Price Bid opening date/time	16.12.2024 at 02:00 PM
Contact person	General Manager, TGREDCO, Hyderabad
Tender Reference No	TGREDCO/PBDS/solar/IMSS/2024 Dated:25.11.2024

VC & MD  
TGREDCO





# Telangana Renewable Energy Development Corporation Ltd

Tender Ref. No. TGREDCO/PBDS/Solar/IMSS/2024/ Dated: 25.11.2024

## BID INFORMATION SHEET

Sl.	Particulars	Details	
1.	Bid Document fee (Non refundable)	Rs. 29,500/- (Including 18% GST) to be paid only through online payment to TGREDCO bank account as per the details given in Sl.No. 9 of the bid information sheet. (Upload the scanned copy of the acknowledgment & UTR No. details in the online technical bid during the bid submission on or before bid closing date.	
2.	Name of the Work	Empanelment of Engineering Procurement & Construction (EPC) Vendors for “Design, Supply, Installation, Testing, commissioning with Remote Monitoring System with Comprehensive Warranty, Guarantee for 5 Years and Operation and Maintenance of the Complete Plant for 1 Year for the Grid Connected Solar Power Plant Capacity of 1 MW each for a cumulative capacity of 1000 MW at Various Locations in Telangana State Through Rate Contract CAPEX Mode	
3.	Technical and Financial Eligibility Criteria:	As mentioned in Section 6 & Section 7	
4.	Period of Empanelment	1 year	
5.	Refundable Empanelment Deposit	5 Lakhs	
6.	Period for furnishing the Letter of acceptance for the Empanelment issued by TGREDCO	Within 7 days from date of finalization of L1 Price.	
7.	Bid Validity Period	90 days from the date of opening of commercial bid	
8.	Security Deposit (SD)	10 % of the total work order value to be paid by the vendor by the way of Demand Draft drawn in favour of beneficiary, payable at respective location of the concerned beneficiary. (OR) in the form of Bank Guarantee from any Nationalized/scheduled Bank in favour of beneficiary valid for 6 years plus 3 months period at the time of placing the purchase order as desired. The SD amount / BG to be refunded after successful completion of the warranty period.	
9	Bank Details of TGREDCO	Name of Bank	CANARA BANK
		Branch Name	Mukramjahi Road, Hyderabad
		Account No.	30242010095314
		Name of Account Holder	TGREDCO
		IFSC Code	CNRB0013024 (fifth, sixth & ninth characters are 0 ‘zero’)
		TYPE OF ACCOUNT	CURRENT ACCOUNTS
		Address	Mukramjahi Road, Hyderabad, Telangana



# **Telangana Renewable Energy Development Corporation Ltd**

Tender Ref. No. TGREDCO/PBDS/Solar/IMSS/2024/ Dated: 25.11.2024

## **Note:**

1. The Tender document can be downloaded from <https://tender.telangana.gov.in> and also can be viewed /downloaded from <https://tgredco.telangana.gov.in>, <https://www.serp.telangana.gov.in>, <https://tgsouthernpower.org> and <https://tgnpdcl.com>.
2. The online bids are to be submitted only through online bidding portal of Telangana state i.e. <https://tender.telangana.gov.in>
3. In respect of Minimum eligibility criteria, relevant attested copies of eligible documents shall be submitted in the online technical bid only.
4. All relevant required eligible documents along with evidences are to be uploaded in online technical bid only, and only rates has to be quoted (as per Format enclosed) in the online financial bid.
5. Financial bid will be opened of those bidders who would duly qualify in the technical bid.
6. No exemption for payment of Empanelment Deposit will be given to any bidder in any case.
7. All bidders are requested to frequently visit the e-procurement portal of Telangana and TGREDCO website till the schedule date of opening of bids.
8. If the bidder submits the Empanelment Deposit in the form of Bank Guarantee (BG) or Demand Draft (DD), the copy of the BG or DD has to be uploaded in the online technical bid and the physical copies of the same is required to be submitted at the following address, on or before the bid submission closing date and time.

The VC & Managing Director,  
Telangana Renewable Energy Development Corporation (TGREDCO)  
D. No. 6-2-910, Visvesvaraya Bhavan,  
The Institution of Engineers Building,  
Khairatabad, Hyderabad - 500 004, Telangana  
Phone: 040-23201502, Mobile: +91 6304903942  
email: [pdprojects@tgredco.telangana.gov.in](mailto:pdprojects@tgredco.telangana.gov.in)

9. Bids without Payment of the Tender Fee, Empanelment Deposit shall be treated as non-responsive and such bids shall be out rightly rejected.
10. The bids of the bidders, who have not submitted the above Empanelment Deposit (Bank Guarantee or DD) within the due date and time, their bids will be treated as non-responsive and treated as disqualified and will not be opened.
11. In case if the bidder is not selected, TGREDCO will return the Empanelment Deposit to the unsuccessful bidders within 30 days from the date of issue of Empanelment to the selected bidders and no interest will be paid on the Empanelment Deposit amount.
12. **The Empanelment Deposit shall be encashed /forfeited by TGREDCO in following cases:**
  - a) If the bidder upon found to be L1 bidder and does not accept the Empanelment with in the due date.





## **Telangana Renewable Energy Development Corporation Ltd**

Tender Ref. No. TGREDCO/PBDS/Solar/IMSS/2024/ Dated: 25.11.2024

- b) If the bidder fails to submit unconditional acceptance within 07 days from the date of issue of Empanelment.
- c) If the bidder fails to submit the 10 % security deposit on the contract value after placing the LOA by the SHGs with in the due date.

### **Care to be taken for submission of bid:**

As per the tender document, the bid is invited through online e-procurement system, for which the following conditions are mandatory:

1. All required documents are to be submitted in online mode only except documents required against payment of Empanelment Deposit in the form of Bank Guarantee as specifically mentioned in this tender document.
2. The documents mentioned in this tender document are required to be uploaded in technical stage of online submission.
3. In case of not uploading of required document in online bid or uploading of wrong document, the bid may not be considered for technical evaluation and treated as non-responsive and the bid will be rejected.
4. Bidders are requested to submit price bid through e-procurement portal only and not to submit the price offer in physical form.
5. It is mandatory for all the bidders to confirm and agree to all the terms and condition of tender. By confirming this, bidder will also confirm all the amendments thereafter issued from time to time and will be automatically binding on the bidder.
6. TGREDCO at its sole discretion may ask additional clarification or information or documents from the bidder who is found to be eligible in pre-qualification criteria.

Any technical query, information and clarifications that may be required pertaining to this tender should be referred to:

General Manager  
Telangana Renewable Energy Development Corporation (TGREDCO)  
D. No. 6-2-910, Visvesvaraya Bhavan,  
The Institution of Engineers Building,  
Khairtabad, Hyderabad - 500 004, Telangana  
Phone: 040-23201502, Mobile: +91 6304903942  
email: pdprojects@tgredco.telangana.gov.in

1) Bidder should be familiar with websites <https://tender.telangana.gov.in> and <https://tgredco.telangana.gov.in> for information regarding revision/corrigendum/Amendment in tender Document till due date of online submission and thereafter. No separate / individual communications shall be sent in this regard and no public notice shall be issued in newspaper.

2) TGREDCO reserves the right to reject any OR all tender Documents/offers without assigning any reasons thereof during the process of tender.



# **Telangana Renewable Energy Development Corporation Ltd**

Tender Ref. No. TGREDCO/PBDS/Solar/IMSS/2024/ Dated: 25.11.2024

## **DECLARATION BY THE BIDDER**

**(Regarding E-Tender Ref No. TGREDCO/PBDS/Solar/IMSS/2024/ Dated: 25.11.2024)**

We\_\_\_\_\_ (hereinafter referred to as the bidder) being desirous of e-tendering for the work under the above mentioned e-tender and having fully understood the nature of the work and having carefully noted all the terms and conditions, specifications etc. As mentioned in the e-tender document,

### **DO HEREBY DECLARE THAT**

1. The bidder is fully aware of all the requirements of the e-tender document and agrees with all provisions of the e-tender document.
2. The bidder is capable of executing and completing the work as required in the e-tender.
3. The bidder accepts all risks and responsibilities directly or indirectly connected with the performance of the e-tender.
4. The bidder has no collusion with other bidders, any employee of TGREDCO or with any other person or firm in the preparation of the bid.
5. The bidder has not been influenced by any statement or promises of TGREDCO or any of its employees, but only by the e-tender document.
6. The bidder is financially solvent and sound to execute the work.
7. The bidder is sufficiently experienced and competent to perform the contract to the satisfaction of TGREDCO.
8. The information and the statements submitted with the e-tender are true.
9. The bidder is familiar with all general and special laws, acts, ordinances, rules and regulations of the municipal, district, state and central government that may affect the work, its performance or personnel employed therein.
10. The bidder has not been debarred from similar type of work by TGREDCO and or government undertaking/ department.
11. This offer shall remain valid for acceptance for 12 months from the date of opening of financial bid of e-tender.
12. The bidder gives the assurance to execute the e-tendered work as per specifications terms and conditions.
13. The bidder confirms the capability to Empanelment of Engineering Procurement & Construction (EPC) Vendors for "Design, Supply, Installation, Testing, commissioning with Remote Monitoring System with Comprehensive Warranty, Guarantee for 5 Years and Operation and Maintenance of the Complete Plant for 1 Year for the Grid Connected Solar Power Plant Capacity of 1 MW each for a cumulative capacity of 1000 MW at Various Locations in Telangana State Through Rate Contract CAPEX Mode including meters and other necessary infrastructures.



# **Telangana Renewable Energy Development Corporation Ltd**

Tender Ref. No. TGREDCO/PBDS/Solar/IMSS/2024/ Dated: 25.11.2024

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## **PART-II INSTRUCTIONS TO BIDDERS**



# **Telangana Renewable Energy Development Corporation Ltd**

Tender Ref. No. TGREDCO/PBDS/Solar/IMSS/2024/ Dated: 25.11.2024

## **SECTION 1: THE TENDER DOCUMENT**

### **1. CONTENT OF E-TENDER DOCUMENT**

The e-tender procedure and contract terms are prescribed in the e-tender Documents. In addition to the e-tender Notice the Bidding documents include.

### **PART A**

#### **Part - 1**

- 1 e-tender Notice
- 2 Covering Letter
- 3 Checklist of Annexures
- 4 Particulars of e-tender
- 5 General Particulars of Bidder
- 6 Declaration by Bidder

#### **Part – 2: Instruction to Bidders**

- |            |                                   |
|------------|-----------------------------------|
| Section -1 | Contents of e-tender document     |
| Section-2  | Bidder to inform fully            |
| Section -3 | Eligibility condition             |
| Section-4  | Preparation of e-tender           |
| Section-5  | Submission of e-tender            |
| Section -6 | e-tender opening and evaluation   |
| Section-7  | Procedure for Finalization of Bid |

#### **Part – 3: General Condition of Contract**

#### **Part – 4: Scope of Work & Technical specifications**

### **PART B**

#### **Financial Bid**

The Bidder is expected to examine all instructions, forms, terms and specifications as mentioned in the e-tender document. Failure to furnish all information required by the e-tender documents or submission of a bid not substantially responsive to the Bid Document in every respect will be at the Bidder's risk and is likely to result in out-right rejection of the e-tender.

### **2. LOCAL CONDITIONS**

It shall be imperative on each bidder to fully inform him of all local conditions and factors, which may have any effect on the execution of the works covered under these documents and specifications. TGREDCO shall not entertain any request for clarifications from the Bidder, regarding such local conditions.

### **3. CLARIFICATION:**

- i. A prospective Bidder requiring any clarification of the e-tender Documents may contact TGREDCO in writing through mail at the TGREDCO's mailing address indicated in the Invitation for e-tender by TGREDCO.



## **Telangana Renewable Energy Development Corporation Ltd**

Tender Ref. No. TGREDCO/PBDS/Solar/IMSS/2024/ Dated: 25.11.2024

- ii. All are requested to remain updated with the website. No separate reply/ intimation will be given elsewhere. Verbal clarifications and information's given by the TGREDCO or its employees or its representatives shall not be in any way entertained
- iii. The TGREDCO is not under any obligation to entertain or respond to suggestions made or to incorporate modifications sought for.

### **CLARIFICATION AND PRE BID CONFERENCE:**

A prospective Bidder requiring any clarification of the e-tender Documents may contact TGREDCO in writing at the TGREDCO 's mailing address indicated in the Invitation for e-tender. The Bidder(s) or their authorized representative(s) is/are invited to attend pre-bid meeting(s), TGREDCO will make all efforts to respond to the queries during the Pre Bid Meeting to be held on 29-11-2024 at 02.30 PM at TGREDCO Head Office, Hyderabad.

The purpose of the pre-bid meeting will be to clarify any issues regarding the Bid. Bidders are requested to submit such issues latest by 05.12.2024 up to 5:00 PM through e-mail ([pdprojects@tgredco.telangana.gov.in](mailto:pdprojects@tgredco.telangana.gov.in)) only. After that any other issue may not be considered. TGREDCO 's response will be uploaded on the website <https://tgredco.telangana.gov.in>

All are requested to remain updated with the website. No separate reply/ intimation will be given elsewhere. Verbal clarifications and information given by the TGREDCO or its employees or its representatives shall not be in any way entertained

Enquiries/clarifications may be sought by the Bidder from:

<p>General Manager Telangana Renewable Energy Development Corporation (TGREDCO) D. No. 6-2-910, Visvesvaraya Bhavan, The Institution of Engineers Building, Khairtabad, Hyderabad - 500 004, Telangana Phone: 040-23201502 email: <a href="mailto:pdprojects@tgredco.telangana.gov.in">pdprojects@tgredco.telangana.gov.in</a></p>
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Queries received via any mode other than e-mail id mentioned above will not be entertained. The queries should only be sent in following format on the official letter head of the company.

S.No.	Page No. (Tender Ref.)	Clause (Tender Ref.)	Description (Tender Ref.)	Query

The Bidders are requested to submit the bids after issue of clarifications duly considering the changes made if any. Bidders are totally responsible for incorporating/complying the changes/ amendments issued if any in their bid.

### **4. AMENDMENT OF e-tender DOCUMENTS**

At any time prior to the submission of the e-tender the TGREDCO may for any reason, whether at its own initiative or in response to a clarification requested by the Bidder, modify the e-tender documents by amendments. Such document shall be made available on websites: <https://tender.telangana.gov.in> and <http://tgredco.telangana.gov.in>. All are



## **Telangana Renewable Energy Development Corporation Ltd**

Tender Ref. No. TGREDCO/PBDS/Solar/IMSS/2024/ Dated: 25.11.2024

requested to remain updated with the website. No separate reply/ intimation will be given elsewhere.

The Bidder shall make independent enquiry and satisfy itself with respect to all the required information, inputs, conditions, including site conditions and circumstances and factors that may have any effect on its Bid. Once the Bidder has submitted the Bids, the Bidder shall be deemed to have examined the laws and regulations in force in India, the grid conditions, and prepare the Financial Bid and other sections taking into account all such relevant conditions and also the risks, contingencies and other circumstances which may influence or affect the implementation of power plants. Accordingly, the Bidder acknowledges that, on being selected as the Selected/Empanelled vendor, it shall not be relieved from any of its obligations foreseen under this Document nor shall be entitled to any extension of time for commissioning of the plants or financial compensation for any reason whatsoever.

The Bidders should particularly acquaint themselves with the technical requirements of integrating the power plant with the distribution system of the respective distribution licensee of the State, the regulations specified by Central Electricity Authority, grid operation as specified in the, the Telangana Distribution Code.

In their own interest, the Bidders are requested to familiarize themselves with the Electricity Act, 2003, Regulatory Framework specified by the Telangana Electricity Regulatory Commission, Ground Mounted Solar Photovoltaic Power Plant and any other local laws affecting the implementation of grid connected Ground Mounted solar photovoltaic power plants and all other related acts, laws, rules and regulations prevalent in India, as amended from time to time. The TGREDCO shall not entertain any request for clarifications from the Bidders regarding the same. Non-awareness of these laws or such information shall not be a reason for the Bidder to request for extension in the Bid Deadline. The Bidder undertakes and agrees that, before submission of its Bid; all such factors as generally stated above, have been fully investigated and considered while submitting the Bid.

The Bidder shall familiarize itself with the procedures and time frames required to obtain all the Consents, Clearances and Permits required for the supply of power to the Procurer. The Bidder shall arrange all the Consents, Clearances and Permits required for setting up of the generation facilities for Primary Beneficiary. It should also arrange for the grid interconnection of the plant as well as commissioning certificate from respective Government department.



# **Telangana Renewable Energy Development Corporation Ltd**

Tender Ref. No. TGREDCO/PBDS/Solar/IMSS/2024/ Dated: 25.11.2024

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## **SECTION 2: INTRODUCTION**

- a) Telangana Renewable Energy Development Corporation Limited. (TGREDCO), is the State Nodal Agency for promotion and implementation of Renewable Energy Schemes in the state of Telangana.
- b) Government of Telangana is committed for women Empowerment. In order to enable this, it has launched a scheme called Indira Mahila Shakti Scheme under which Government has decided to include in the scheme for installation of solar Power Plants of 1 MW capacity by women Self Help Groups (SHGs) for a cumulative capacity of 1000 MW across the Telangana State in the Government lands leased to them.
- c) As per G.O MS No.24, Dated: 13-11-2024 and as per the Memorandum of Understanding (MOU) entered between TGREDCO, TGDISCOMS & SERP, TGREDCO dated: 19.11.2024 is carrying out this Empanelment tender.
- d) TGREDCO plans to empanel EPC vendors, meeting the specified Eligibility Criteria and willing to be associated with Indira Mahila Shakti Scheme for the successful implementation in the state. This Empanelment tender is purely for identifying the competitive rate mechanism only. The actual allocation will be based on the further negotiation between the SHGs & empanelled vendor.
- E) TGREDCO invites online bids through E-procurement Portal from the eligible bidders for Empanelment of Engineering Procurement & Construction (EPC) Vendors for "Design, Supply, Installation, Testing, commissioning with Remote Monitoring System with Comprehensive Warranty, Guarantee for 5 Years and Operation and Maintenance of the Complete Plant for 1 Year for the Grid Connected Solar Power Plant Capacity of 1 MW each for a cumulative capacity of 1000 MW at Various Locations in Telangana State Through Rate Contract CAPEX Mode.





## **SECTION 3: PREPARATION OF E-TENDER**

### **1. LANGUAGE OF BID AND MEASURE**

The e-tender prepared by the Bidder and all correspondence and documents relating to the bid exchanged by the Bidder and TGREDCO shall be written in the English provided that any printed literature furnished by the Bidder may be written in another language so long as accompanied by an English translation of its pertinent passages in which case, for purpose of interpretation units of measurement shall be metric in accordance with International System.

### **2. DOCUMENTS COMPRISING THE BID**

- a) The e-tender prepared by the Bidder shall comprise the following components
- b) Covering letter as provided in e-tender document.
- c) General particulars of bidder, as provided in e-tender document.
- d) Declaration by The Bidder, as provided in e-tender document
- e) Details for Past Experience meeting Qualification Requirement With Documentary evidence establishing that the bidder is eligible to Tender and is qualified to perform the contract if its tender is accepted.
- f) Check list of Annexure as provided in e-tender document
- g) Minimum Guaranteed Generation in the prescribed in Section 9
- h) A blank copy of the in e-tender document signed on each page, as a confirmation by the Bidder to accept all technical specifications / commercial conditions along with all necessary enclosures.
- i) Authorization letter of the Bidder, for the person representing his Company/Firm/ Corporation, that he is authorized to discuss and with specific mention of this e-tender

### **3. BID PRICE**

The Bidder shall indicate prices on the appropriate Financial Bid schedule.

### **4. DUTIES AND TAXES**

The price quoted should include all taxes what so ever as applicable. A Bidder shall be entirely responsible for all taxes, duties, license fees, etc. All taxes payable as per Government income tax & GST norms will be payable by the Bidder. TDS of income Tax and GST as applicable will be deducted from the payment of the Bidder as per the prevalent laws and rules of Government of India and Government of Telangana in this regard.

### **5. BID CURRENCIES**

Prices shall be quoted in Indian Rupees (INR) only

### **6. SECURITY DEPOSIT/ PERFORMANCE GUARANTEE:**

- a) The successful Bidders, who empanels with TGREDCO for the work, shall have to furnish a security Deposit to the beneficiary as mentioned in the tender document in the form of Bank Guarantee valid for a period of 75 months from the date of execution of agreement. The bank guarantee may be issued by a nationalized bank or Scheduled bank.





## **Telangana Renewable Energy Development Corporation Ltd**

Tender Ref. No. TGREDCO/PBDS/Solar/IMSS/2024/ Dated: 25.11.2024

- b) Bank Guarantee shall be in favour of "the beneficiary ". The aforesaid Bank Guarantee shall be furnished prior to the placing of work order in format enclosed.

### **7. PERIOD OF VALIDITY OF e-tender**

- a) Validity of the offer should be 90 Days from the date of opening of the financial bid of the e-tenders. Without this validity the e-tenders will be rejected.
- b) In exceptional circumstances; the TGREDCO will solicit the Bidder's consent to an extension of the period of validity.

### **8. EMPANELMENT DEPOSIT**

- a) The bidder shall furnish, as part of its bid, bid security of Rs 5,00,000/- in the form of Bank guarantee issued by a nationalized bank, or scheduled bank or DD. The bank guarantee shall be valid for a period of 15 (Fifteen) months from the opening of technical bid.(Format enclosed).
- b) Any bid not secured with the tender fee and empanelment deposit will be rejected by the TGREDCO as non responsive.
- c) No Interest shall be payable on the amount of empanelment deposit. The same will be released after the e-tenders have been decided, to those Bidders who fail to get the contract.
- d) The Empanelment Deposit shall be encashed /forfeited by TGREDCO in following cases:
- If the bidder upon found to be L1 bidder and does not accept the Empanelment within the due date.
  - If the bidder fails to submit unconditional acceptance within 07 days from the date of issue of Empanelment.
  - If the bidder fails to submit the 10 % security deposit on the contract value after placing the LOA by the SHGs within the due date.

### **9. FORMAT AND SIGNING OF e-TENDER**

- a) The bid must contain the name, address and places of business of the persons making the e-tender and must be signed and sealed by the Bidder with his usual signature. The name and designations of all persons signing should be typed or printed below the signature.
- b) e-tender by corporation/ company must be signed with the legal name of the corporation/ company/firm by the „President“, Managing director or by the „Secretary“ or other designation or a person duly authorized
- c) The original copy of the e-tender shall be typed or written in indelible ink and shall be signed by the Bidder or a person duly authorized to bid and bidder to the contract. The letter of authorization shall be submitted along with power-of-attorney. All the pages of the bid shall be initialed by the person or persons signing the e-tender.
- d) The bid shall contain no interlineations, erasures or overwriting except as necessary to correct errors made by the Bidder in which case such corrections shall be initialed by the person or persons signing the e-tender.



# **Telangana Renewable Energy Development Corporation Ltd**

Tender Ref. No. TGREDCO/PBDS/Solar/IMSS/2024/ Dated: 25.11.2024

## **SECTION 4: UPLOADING OF THE E-TENDER**

1. Bids shall be submitted online on Telangana E-Tender portal <https://tender.telangana.gov.in> Platform only. The participating bidders in the tender should register themselves on e-procurement platform in the website <https://tender.telangana.gov.in>
2. Bidders can log-in to e-tender platform in secure mode by signing with the Digital certificates.
3. The tender must be complete in all technical and commercial respect and should contain requisite certificate, drawings, informative literature etc. as required in the specification.
4. The bidders shall sign on all the statements, documents certificates uploaded by them, owning responsibility for their correctness/authenticity.
5. The bidders should scan and upload the respective documents in Technical Documentation as per the check list.
6. After uploading the documents, the copies of the uploaded technical bid documents only the original Demand Drafts/BGs in respect of Bid Security and is to be submitted by the bidder to the "*The Vice Chairman and Managing Director, TGREDCO, Hyderabad, Telangana*", on or before 05:00PM on 10.12.2024.
7. Failure to furnish any of the uploaded documents, certificates, will entitled in rejection of the bid. *The Vice Chairman and Managing Director, TGREDCO, Hyderabad* shall not hold any risk on account of postal delay. Similarly, if any of the certificates, documents, etc., furnished by the Bidder are found to be false / fabricated / bogus, the bidder will be disqualified, blacklisted, action will be initiated as deemed fit and the Bid Security will be forfeited.
8. The Vice Chairman and Managing Director, TGREDCO, Hyderabad will not hold any risk and responsibility regulating non-visibility of the scanned and uploaded documents.
9. The Documents that are uploaded online on e-market place will only be considered for Bid Evaluation.
10. In case of consortium, Lead bidder has to purchase the bid document and submit the BID. The bid will be filled with user ID of Lead bidder only.
11. The rates should be quoted online only. The Bidder shall have to submit their rates in Indian Rupees only including all latest bid fee, taxes & duties of Govt. of Telangana as well as Govt. of India.
12. The Technical Bid should contain technical specification, brochure literature etc. All parts of tender documents except financial bid should be uploaded as per e-procurement mode in due date and time. Scanned copy of Requisite Empanelment Deposit in the form of Bank Guarantee/DD should be enclosed.



## **Telangana Renewable Energy Development Corporation Ltd**

Tender Ref. No. TGREDCO/PBDS/Solar/IMSS/2024/ Dated: 25.11.2024

13. The Bidder should submit price bid in the financial bid only. Financial bid only should be uploaded as per e-procurement mode in due date and time. Anything in regard of financial condition, payment terms, rebate etc. mentioned in financial bid may make the tender invalid. Therefore, it is in the interest of the Bidder not to write anything extra in price/financial bid except price.
14. **EXPENSES OF AGREEMENT:** A formal agreement for a period of 01 (one) year shall be entered between TGREDCO and the contractor/ bidder for the proper fulfillment of the contract. The expenses of completing and stamping of the agreement shall be paid by the successful bidder.
15. **DEADLINE FOR SUBMISSION OF BIDS:** Bids must be uploaded by the bidder in the date; time and address specified in the e-tender notice/ tender documents.
16. TGREDCO may, at its discretion, extend this deadline for submission of bids by amending the Empanelment documents in accordance, in which case all rights and obligations of TGREDCO and Bidders will thereafter be subject to the deadline as extended.
17. Tender documents can be downloaded from e-procurement portal of Telangana portal for the detailed Empanelment Documents please visit at e -procurement portal i.e., <https://tender.telangana.gov.in/>
18. All costs incurred by Bidders for preparing and submitting the Bid for Empanelment, in providing clarification or any other expenses whatsoever shall be borne by Bidders themselves, regardless of the conduct or outcome of the Empanelment process.
19. This Bid for Empanelment is not transferable.

All the notices related to this tender which are required to be publicized shall be uploaded only on <https://tgredco.telangana.gov.in> & <https://tender.telangana.gov.in>



## **SECTION 5: E-TENDER OPENING**

### **1. OPENING OF E-TENDER**

The procedure of opening of the e-tender shall be as under:

- 1.1 "Technical bid" shall be opened at the time and date mentioned in the e-tender notice by TGREDCO's representatives in the presence of Bidders, who choose to be present.
- 1.2 Financial Bids of the bidders who found to be technically qualified shall be opened (after obtaining clarifications and establishing technical suitability of the offer) as per schedule.

### **2. CLARIFICATION OF E-TENDER**

- 2.1 For the purpose of evaluation and comparison of bids, TGREDCO may at its discretion ask the bidder for a clarification of its bid. The request for clarification and the response shall be in writing.
- 2.2 TGREDCO reserves the right to interpret the Bid submitted by the Bidder in accordance with the provisions of this document and make its own judgment regarding the interpretation of the same. In this regard TGREDCO shall have no liability towards any Bidder and no Bidder shall have any recourse to TGREDCO with respect to the selection process. TGREDCO shall evaluate the Bids using the evaluation process specified in this document or as amended, at its sole discretion. TGREDCO's decision in this regard shall be final and binding on the Bidders.



## **SECTION 6: EVALUATION PROCEDURE**

### **EVALUATION CRITERIA UNDER THIS TENDER:**

For short listing of vendors, the following criteria shall be applied. For this purpose, bidders shall submit proof of documents for eligibility criteria along with the e-tender and the agency not confirming to any of these parameters will not qualify for short listing.

- 1) All bids will be evaluated by the TGREDCO Tender committee. The decision of VC&MD, TGREDCO will be final.
- 2) The online bids submitted by the bidders in the Telangana e-Procurement Portal only be evaluated.
- 3) The e-Tenders will be opened as per the Tender schedule in the presence of the bidders or their authorized representative who may wish to be present at that time.
- 4) The Technical Bids consisting of the documents related to Eligibility criteria will be opened first. The tenders will be evaluated so as to ascertain the capability of the bidders to provide the services for the period mentioned above and also to assess whether the bidder satisfies the eligibility criteria.
- 5) The Financial/Price Bids of only those bidders, who have fulfilled the technical eligibility criteria above, will be opened online and the Price Bid of the bidders who do not fulfil the technical eligibility criteria will not be opened and their Tender shall stand rejected.
- 6) TGREDCO 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.
- 7) Any claims or disputes raised by the unsuccessful bidders in respect of selection process and non-allotment of award will have no legal validity and will not be enforceable against The Vice Chairman and Managing Director, TGREDCO, Hyderabad. No further correspondence will be entertained regarding the disqualification.
- 8) Tenders will be finalized by the TGREDCO, for the works along with technical bid evaluation for consideration and in accordance with the conditions stipulated in the tender document and in case of any discrepancy or non-adherence to the conditions, the same shall be communicated which will be binding both on the TGREDCO and bidder. In case of any ambiguity the decision taken by the VC & Managing Director, TGREDCO on tenders shall be final.
- 9) The bids received with abnormal price under collusion due to unethical practices adopted during the tendering process shall be rejected.
- 10) The VC&MD, TGREDCO, reserves the right to accept or reject any / or all the tenders without assigning any reasons whatsoever. The VC&MD, TGREDCO also reserves the right to cancel the selection process for Empanelment at any time. The decision of The VC&MD, TGREDCO is final and binding.
- 11) The Lowest (L1) Price discovered shall be communicated to the qualified Bidders and the bidders willing to match the L1 price will be given One Week time for acceptance from the date of notifying for empanelment.



## **Telangana Renewable Energy Development Corporation Ltd**

Tender Ref. No. TGREDCO/PBDS/Solar/IMSS/2024/ Dated: 25.11.2024

- 12) The bidder who have quoted the Lowest Price shall have to mandatorily accept the Price or else forfeit their empanelment deposit. Other Bidders who accept to abide by the Lowest Price shall be considered as Successful Bidders, and the empanelment deposit of Other Bidders who do not wish to accept the discovered price shall be returned.
- 13) The Successful bidders have to sign an agreement as mentioned in this tender at Annexure E with in a period of 10 days from the date of receipt of communication of acceptance of his tender. On failure to do so, his bid will be cancelled, duly forfeiting the empanelment deposit paid by him without issuing any further notice and action will be taken by TGREDCO accordingly.
- 14) The whole work shall be on Turnkey basis. The empanelment of bidder shall be finalized on the basis of total cost of Solar Power Plant system as per the scope of work mentioned at Part -4 of this tender offered by the bidder in his Financial Bid.



# Telangana Renewable Energy Development Corporation Ltd

Tender Ref. No. TGREDCO/PBDS/Solar/IMSS/2024/ Dated: 25.11.2024

## SECTION 7: ELIGIBILITY CONDITIONS

Firm Type	General Eligibility	Technical Eligibility	Financial Eligibility
Manufacturers of Solar modules/System Integrators of Solar Systems/Engineering Procurement Construction Companies of Solar Plants	<p>The Bidder should be either a body incorporated in India under the Companies Act,1956 or Companies Act, 2013 including any amendment there to and engaged in the business of Solar Power</p> <p>OR</p> <p>Limited Liability partnership firm registered under the companies' act, 2013</p> <p>OR</p> <p>Partnership Firm</p> <p>OR</p> <p>Proprietorship firm</p>	<ol style="list-style-type: none"> <li>The bidder should have minimum one-year experience in successful installation of Grid connected Ground Mounted solar power plants.</li> <li>The bidder should have constructed and commissioned at least 1MW (single location or cumulative capacity) Grid connected Ground Mounted solar power plant with 33/11KV evacuation experience during last three Financial years.</li> <li>The details of projects executed should be listed. A certificate issued by the owner of the plant towards the satisfactory installation and functioning of the power plants to be furnished by the bidder.</li> </ol>	<ol style="list-style-type: none"> <li>The bidder should have financial turnover of Minimum Rs 3 Crores in any one year during the last 3 Financial Years.</li> <li>The audited balance Sheets / Turnover Certificates issued by CA with UDIN is to be submitted for the last 3 Financial Years.</li> <li>However for getting award of the capacity the Empaneled vendor has to meet the Rs 3Crores /MW or equivalent work order value criteria as turn over for the total cumulative capacity offered.</li> </ol>
In case of Consortium , the bidder should qualify the financial eligibility criteria and submit the BID.	<p>The Bidders should be either a body incorporated in India under the Companies Act,1956 or Companies Act, 2013 including any amendment there to and engaged in the business of Solar Power</p> <p>OR</p> <p>Limited Liability partnership firm registered under the</p>	<ol style="list-style-type: none"> <li>The technical consortium member should have minimum one year experience of successful installation of Grid connected Ground Mounted solar power plants.</li> <li>The Technical member of the consortium should have constructed and commissioned at</li> </ol>	<ol style="list-style-type: none"> <li>The bidder should have financial turnover of Minimum Rs 3 Crores in any one year during the last 3 Financial Years.</li> <li>The audited balance Sheets /Turnover Certificates issued by CA with UDIN is to be submitted for the last 3 Financial Years.</li> <li>However for getting award of the capacity the Empaneled vendor</li> </ol>





# **Telangana Renewable Energy Development Corporation Ltd**

Tender Ref. No. TGREDCO/PBDS/Solar/IMSS/2024/ Dated: 25.11.2024

	<p>companies' act, 2013</p> <p>OR</p> <p>Partnership Firm</p> <p>OR</p> <p>Proprietorship firm</p> <p>Note: The technical member of the consortium is restricted to the consortium for one bidder only</p>	<p>least 1MW (single location or cumulative capacity) Grid connected Ground Mounted solar power plant with 33/11KV evacuation experience during last three Financial years.</p> <p>3. The details of projects executed should be listed. A certificate issued by the owner of the plant towards the satisfactory installation and functioning of the power plants to be furnished by the bidder.</p>	<p>has to meet the Rs 3 Crores /MW or equivalent work order value criteria as turn over for the total cumulative capacity offered</p>
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- All the bidders, who are required to submit the details of the past experiences, shall submit all the documents, in support of Technical Qualification Requirements (such as copy of Purchase Orders/ Work Orders/ Contract Agreements/ Client Certificates etc.), duly certified and verified for authenticity from the Director(s) of the company along with the company seal.
- Further, wherever information can be drawn from books of accounts, records and other relevant documents, TGREDCO reserves the right to ask for further information in support of the submitted documents during the evaluation process.
- Financial data should be given in Indian Rupees only. The Audited Balance sheets/CA Certificate with UDIN in support of turnover during the last three (03) Financial years to be submitted.
- The information furnished with the Bid for Empanelment must be sufficient for processing and assessment.
- The online submitted attachments shall be filled in completely and wherever not applicable it should be written as "Not Applicable".
- All the pages of the tender document for Empanelment along with the annexures should be signed and uploaded in the technical bid only in proof of acceptance of the terms and condition mentioned in the tender document.
- Any information / data furnished by the Bidders found to be incorrect or false or misleading at any point of time would render him liable to be debarred from the Empanelment and can be subjected for blacklisting for 5 years in TGREDCO.





## **Telangana Renewable Energy Development Corporation Ltd**

Tender Ref. No. TGREDCO/PBDS/Solar/IMSS/2024/ Dated: 25.11.2024

- h) TGREDCO reserves the right to cross check and confirm the information / details furnished by the Bidders at any time during the period of empanelment.
- i) Bidders shall give an undertaking at the time of Empanelment that in case of award against any project specific enquiry, he shall execute the awarded work with all the required Safety conditions and obtain all the statutory approvals required to carry out this work. TGREDCO reserves the right to ensure the required the safety and statutory approvals obtained by the vendor before placing the Work order
- j) Both Technical & Financial Consortiums shall be allowed to apply for the Empanelment.
- k) Members of the Consortium shall enter into a binding Consortium Agreement (as per the Annexure-F), of this tender Document, for the purpose of submitting Bid. The Consortium Agreement, to be submitted along with the Bid, shall, inter alia: (a) convey the intent to comply with the terms and conditions of this tender conditions in the event selected to undertake the Project; and (b) clearly outline the proposed roles and responsibilities of each.
- l) The consortium members should specify the lead consortium member and Every Consortium Member shall provide consent to the Lead Consortium Member and make itself aware of all the proceedings of the bidding process and Project implementation through legally enforceable Consortium Agreement, power of attorneys, legal undertakings, etc. (if applicable) entered amongst all members of that Bidding Consortium including but not limited to those as prescribed in Annexure-G & Annexure-H. In the absence of duly executed formats, the Bid shall not be considered for evaluation and shall be rejected.
- m) The Bid shall be submitted by the lead member as per the Consortium Agreement.
- n) Bidder shall submit details along with documentary evidence of the experience details meeting the specified requirements as per Eligibility Criteria.
- o) Qualification Requirement / Eligibility Criteria

The bidders are required to submit the following documents in through Online Mode only during Technical Bid Submission in Telangana e-procurement Portal.

- a. Certificate of incorporation/Partnership Deed
- b. Memorandum of Association (MoA) & Article of Association (AoA).
- c. Copy of PAN card & GST Registration, however State GST Registration is mandatory.
- d. Technical Eligibility Criterion: scanned copy of the Commissioning certificate and Work order/ Contract/ Agreement/ from the Client/ Owner.
- e. Financial Eligibility Criterion: scanned copy Balance showing Average Annual Turnover or Net worth and certificate from CA with UDIN.
- f. Availability of local service centres/ technical personnel
- g. Information on litigation history in which Bidder is involved.
- h. Any other documents/certificate as specified in tender conditions in support of the Eligibility conditions
- i. Acceptance of NIT terms and conditions including amendments & clarification on letter head of the bidder.
- j. Consortium Agreement if applicable
- k. Declaration on bidder's Letterhead for Non blacklisting from any Government Departments/ Public Sector Units (PSUs) / Distribution Companies etc.



## **Telangana Renewable Energy Development Corporation Ltd**

Tender Ref. No. TGREDCO/PBDS/Solar/IMSS/2024/ Dated: 25.11.2024

- p) To meet the General Conditions of Eligibility Criteria, Bidders must have one of the following credentials:

Bidder should have one of the following:

The Bidder should be either a body incorporated in India under the Companies Act, 1956 or 2013 including any amendment thereto.

Or

The Bidders should be a Limited Liability Partnership firm or partnership Firm

Or

The Bidders should be a Proprietor firm.

The Bidder should have valid PAN & GST registration certificate for General Bidder, however State GST Registration is mandatory.

- q) The person signing the bid and submitting it on behalf of the Bidders shall enclose Power of Attorney duly authorized and notarized for the same. The Power of Attorney shall be backed by copy of the Board Resolution of Company.
- r) In case of a Bidding Consortium, a Power of Attorney in favour of the Lead Member issued by the other Members of the Consortium shall be provided in original as per format attached hereto as Annexure-G.
- s) Board Resolutions, as per prescribed formats enclosed as per Annexure-H duly certified by the Company Secretary or the Director of the relevant Bidder, as applicable to the Bidder and mentioned hereunder:
- i. Board Resolution from the Bidding Company or the Lead Member of the Consortium, as the case may be, in favour of the person signing the response to BID and in the event of selection of the Projects. Board Resolution from each of the Consortium Members in favour of the person signing Consortium Agreement.
- t) In case of a Consortium, the Consortium Agreement between the Members in the Consortium as per Annexure-F along with Board resolution from each Member of the Consortium for participating in Consortium



# **Telangana Renewable Energy Development Corporation Ltd**

Tender Ref. No. TGREDCO/PBDS/Solar/IMSS/2024/ Dated: 25.11.2024

## **SECTION-8: PROCEDURE FOR FINALIZATION OF BID**

The Procedure for Finalization of BID would be as follows:

### **I. Finalization of BID:**

- a) Technical bids shall be opened and evaluated.
- b) Then the price bid of technically qualified bidders shall be opened.
- c) The lowest rate (i.e. L-1) shall be identified.

### **II. Finalization of Empanelment:**

- a) The lowest rate (i.e. L-1) received (and in turn approved by the TGREDCO) would be the "Approved L1 Rate".
- b) "Approved Lowest L1 Rate" all the technically qualified bidders who wish to empanel will be empanelled if they accept the L1 rate .
- c) No firm will be awarded more capacity than the eligible capacity qualifying the financial criteria of Rs 3 Crores /MW or work order Value as minimum turnover.
- d) Beneficiary/SHGs will issue the work orders for the work.
- e) Required Training for the SHGs will be arranged by the contractor.
- f) VC&MD, TGREDCO reserves the right to negotiate with (lowest) L-1 bidder before finalization of the rate.
- g) SHGs reserves the right at the time of awarding the contract to increase or decrease the capacity and locations of the projects without any change in price or other terms and conditions.
- h) The discovered L1 price is for 1 MW, however the contract can be awarded for lesser capacity and the rate discovered will be reduced prorata.
- i) If 2 or more SHGs commonly setup the solar plants in a same location or adjacent to each other, the SHGs reserve the right to negotiate keeping in view of the common items to be executed.
- j) TGREDCO reserves the right to accept any bid and to reject any or all bids.

### **k) NOTIFICATION OF EMPANELMENT:**

List of successful Bidder(s) for empanelment shall be displayed on TGREDCO's website and shall be intimated in writing to the selected vendors.

### **l) CONTRACT:**

Before execution of the work, a contract agreement for execution of the work shall be signed by the vendor with Beneficiary/SHGs within 7 days of from the date of LOA. In case agreement is not executed within the stipulated time, the empanelment Deposit will be forfeited.

### **m) AWARD OF WORK CONTRACT:**

- Before empanelment as approved supplier, an agreement shall be signed between TGREDCO and the BIDDER. The denial of the lowest bidder to undertake the work shall be treated as breach of contract and TGREDCO may forfeit empanelment Deposit.
- The award of work can be throughout the state.



## **Telangana Renewable Energy Development Corporation Ltd**

Tender Ref. No. TGREDCO/PBDS/Solar/IMSS/2024/ Dated: 25.11.2024

### **n) RIGHT TO VARY QUANTITIES**

- The authority reserves the right of awarding the work in a phased manner. TGREDCO may increase or decrease the quantity mentioned in the tender notice at the time of award of contract. The Successful Bidder shall not assign or make over the empanelment, the benefit or burden thereof to any other person or persons or body corporate for the execution of the contract or any part thereof without the prior written consent of TGREDCO. TGREDCO reserves its right to cancel the empanelment either in part or full, if this condition is violated.

### **o) ISSUE OF LETTER OF EMPANELMENT:**

After execution of the Agreement, the name of successful bidder(s) with price will be displayed in website of TGREDCO and a letter of empanelment will be sent to the selected vendor.

- p) All the Solar plant installed will be inspected by the representative of beneficiary within 7 days of receipt of Installation & Commissioning report by firm for the systems installed in compliance to the technical specification. During the Inspection, if the system installed is found faulty (or) not in compliance to the technical specification, the cost for re-inspection by after rectification/replacement shall be borne by the bidder.
- q) Upon signing of agreement with TGREDCO by the successful bidders the empanelment deposit will be retained till the validity of the empanelment period and for other bidders who did not accept the discovered priced the Empanelment deposit shall be refunded within 30 days after the conclusion of Empanelment.
- r) **PROCEDURE FOR ISSUING OF LOAs/WORK ORDERS**
- i. The beneficiary/SHGs are at their liberty to select any vendor of their choice from the list of empanelled vendors empanelled by TGREDCO.
  - ii. The beneficiary/SHGs will place the LOA on the empanelled vendor of their choice and the vendor has to provide acceptance of LOA and pay a Performance Security Deposit valid for 75 Months within 10 working days from the date of issue of LOA.
  - iii. The District Level Execution Committee will be formed to facilitate the SHGs technically, and will oversee the construction phase to ensure compliance with the conditions outlined in the Empanelment Tender.

### **s) PERIOD OF VALIDITY OF EMPANELMENT**

The validity of the empanelment will be for 1 year from the date of empanelment unless terminated earlier. TGREDCO reserves the right to cancel the empanelment during its validity and carry out fresh empanelment. The decision of the TGREDCO in this regard will be final. Empanelment can be extended for one more year based on the requirement and market dynamics.

### **t) EXECUTION OF AGREEMENT OF EMPANELMENT**

- i. The Successful Bidder shall execute an agreement of empanelment in the INR 100 non-judicial stamp paper of Telangana Jurisdiction only in the name of the Bidder, within 15 days from the date of Letter of Intimation about qualification by TGREDCO.



## **Telangana Renewable Energy Development Corporation Ltd**

Tender Ref. No. TGREDCO/PBDS/Solar/IMSS/2024/ Dated: 25.11.2024

- ii. The Successful Bidder shall not assign or make over the empanelment, the benefit or burden thereof to any other person or persons or body corporate for the execution of the contract or any part thereof without the prior written consent of TGREDCO. TGREDCO reserves its right to cancel the empanelment either in part or full, if this condition is violated.
- iii. In case of the successful bidder fails to execute necessary agreements as prescribed, the stipulated period, then his empanelment deposit shall be forfeited and his tender held as non responsive.

### **u) INSTALLATION & COMPLETION SCHEDULE**

The entire work involving Supply, Installation and Commissioning of each Grid connected Solar Rooftop power plants shall be completed within 6 months from the date of issue of work order by the beneficiary.



### **PART 3: GENERAL CONDITIONS OF CONTRACT**

#### **1. DEFINITIONS**

- 1.1. "TGREDCO" shall mean The Vice Chairman & Managing Director of TGREDCO or his representative and shall also include its successors in interest and assignees. The "Contractor" shall mean (successful bidder) i.e. the person whose e-tender has been accepted by TGREDCO and shall include his legal representatives and successors in interest.
- 1.2. The Empanelment Agreement shall be rate contract on basis valid for 12 months. The work shall be completed on turkey basis within 6 months from the date of placement of work order by Beneficiaries/SHGs. However, "Beneficiaries/SHGs" may in case of urgency ask the bidder to complete the work earlier, with the mutual consent of the contractor/ bidder. In case the contractor/ bidder fails to execute the said work within stipulated time, "Beneficiaries/SHGs" will be at liberty to get the work executed from the other vendors without any notice to the contractor/ bidder. Any additional cost incurred by "Beneficiaries/SHGs" over and above the agreed execution price shall be recovered from the contractor/ bidder. If the cost of executing the work as aforesaid shall exceed the balance due to the contractor/ bidder, and the contractor/ bidder fails to make good the additional cost, "Beneficiaries/SHGs" may recover it from the contractor/ bidders security Deposit Amount.
- 1.3. The contractor/ bidder, (i.e. the successful bidder), may execute the works in the State of Telangana through himself or through sub-contractors for execution as per the scope of this Tender /work order. It will be the sole responsibility of the contractor/ bidder, to execute orders placed as per time schedule, and to ensure quality parameters, specifications and other requirements provided in the e-tender document and as per agreement.
- 1.4. The interest of the work and the programme, agreement executed between the contractor/bidder and the "Beneficiaries/SHGs" may be extended to a mutually agreed period, if the need so arises. It shall be sole responsibility of the contractor/ bidder to get verified the quality & quantity of the supplied material at the site of delivery.

#### **2. LIQUIDATED DAMAGES (For work order placed by Beneficiaries/SHGs)**

- 2.1. If the contractor/ bidder fails to perform the services within the time periods specified in the contract (In case of delay for any reason other than due to Force Majeure conditions or any extension thereof granted to him by Beneficiaries/SHGs) the "Beneficiaries/SHGs" shall without prejudice to its other remedies under the contract deduct from the contract price as liquidated damage, a sum equivalent to 1.0% of the price of the unperformed services for each week (For the purposes as calculation of delay, part of week shall be treated as week) of delay until actual performance up to a maximum deduction of 10% of the delayed services. Once the maximum is reached, Beneficiaries/SHGs may asses the progress of work and take decision where the work order is to be cancelled, forfeit the performance security and debar/blacklist the firm or to continue with time extension with further penalty. The "TGREDCO" may consider blacklisting for a period of maximum 5





## **Telangana Renewable Energy Development Corporation Ltd**

Tender Ref. No. TGREDCO/PBDS/Solar/IMSS/2024/ Dated: 25.11.2024

years such vendor. In the case of violation of contract, TGREDCO may confiscate pending payments/ dues of the contractor/ bidder assigning specific reasons and shall also have the power to debar/ blacklist the contractor/bidder in similar circumstances. Beneficiaries/SHGs may also invoke performance/ security bank guarantee of 10%.

- 2.2. The contractor/ bidder shall have to comply with all the rules, regulations, laws and by-laws for the time being in force and the instructions if any, of the organization, in whose premises the work has to be done. "TGREDCO or Beneficiaries/SHGs" shall have no liability in this regard.

### **3. FORCE MAJEURE**

- 3.1. Notwithstanding the provisions of clauses contained in this Tender; the contractor/ bidder shall not be liable for forfeiture of its performance security, liquidated damages, termination for default, if he is unable to fulfil his obligation under this deed due to event of force majeure circumstances.
- 3.2. For purpose of this clause, "Force majeure" means an event beyond the control of the contractor/ bidder and not involving the contractor/ bidder's fault or negligence and not foreseeable. Such events may include, but are not restricted to, acts of Government either in its sovereign or contractual capacity, wars or revolutions, fires, floods, epidemics, quarantine restrictions and fright embargoes
- 3.3. However, if a force majeure situation arises, the contractor/ bidder shall immediately notify the "Beneficiaries/SHGs" in writing. The decision of the competent authority of Beneficiaries/SHGs or the committee (i.e., TG DISCOM, TGREDCO & SERP) in above conditions shall be final.
- 3.4. The High court of Judicature at Hyderabad and Courts subordinate thereto, at Telangana, shall alone have jurisdictions to the exclusion of all other courts.
- 3.5. The contractor/ bidder shall not, without the consent in writing of "Beneficiaries/SHGs", transfer, assign or sublet the work under the contract or any substantial part thereof to any other party.
- 3.6. "Beneficiaries/SHGs" shall have at all reasonable time access to the works being carried out by the contractor/ bidder under the contract. All the work shall be carried out by the contractor/bidder to the satisfaction of "Beneficiaries/SHGs".
- 3.7. If any question, dispute or difference what so ever shall arises between "Beneficiaries/SHGs" and the contractor/ bidder, in the connection with the agreement except as to matters, the decisions for which have been specifically provided, either party may forthwith give to the other notice in writing of existence of such question, dispute or difference and the same shall be referred to the sole arbitration of the TGREDCO /District Execution Committee. This reference shall be governed by the Indian Arbitration and Conciliation Act 1996, and the rules made there under. The award in such arbitration shall be final and binding on both the parties. Work under the agreement shall be continuing during the arbitration proceedings unless the "Beneficiaries/SHGs" or the arbitrator directs otherwise
- 3.8. "Beneficiaries/SHGs" may at any time by notice in writing to the contractor/ bidder either stops the work all together or reduces or cut it down. If the work is stopped all together,

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TGREDCO

Bidder's Signature



## **Telangana Renewable Energy Development Corporation Ltd**

Tender Ref. No. TGREDCO/PBDS/Solar/IMSS/2024/ Dated: 25.11.2024

the contractor/bidder will only be paid for work done and expenses distinctly incurred by him as on preparation or the execution of the work up to the date on which such notice is received by him. Such expenses shall be assessed by "Beneficiaries/SHGs", whose decision shall be final and bidding on the contractor/ bidder. If the work is cut down the contractor/ bidder will not be paid any compensation what so ever for the loss or profit which he might have made if he had been allowed to complete all the work included in the contract.

#### **4. INSPECTION AND TESTS**

- 4.1. The following inspection procedures and tests are required by the "Beneficiaries/SHGs" in the presence of "Beneficiaries/SHGs authorised representative if so desired by "Beneficiaries/SHGs".
- 4.2. The "Beneficiaries/SHGs" or its representative shall have the right to inspect and / or to test the goods to confirm their conformity to the contract. The special conditions of contract and/ or the Technical specifications shall specify what inspections and test the "Beneficiaries/SHGs" required.

#### **5. INSPECTION AT WORKS.**

- 5.1. The "Beneficiaries/SHGs", his duly authorized representative shall have at all reasonable times access to the contractor/bidders premises or works and shall have the power at all reasonable time to inspect and examine the materials and workmanship of the works during its manufacture.
- 5.2. The contractor/ bidder shall give the "Beneficiaries/SHGs", 15 day's written notice of any material being ready for testing. It shall be mandatory that such notice should reach "Beneficiaries/SHGs" within 3 days of placement of work order. Such tests shall be on the contractor/ bidder's accounts/expenses except for the expenses of the inspector. "Beneficiaries/SHGs" reserves the full rights, to waive off inspection of material.
- 5.3. Contractor/ bidder will have to bear the inspector cost for Beneficiaries/SHGs or its authorised representatives.
- 5.4. The inspection by "Beneficiaries/SHGs or its authorised representatives" and issue of dispatch instruction there on shall in no way limit the liabilities and responsibilities of the contractor/ bidder in respect of the agreed quality assurance programme forming a part of the contract.

#### **6. WARRANTY**

- 6.1. The Contractor/ Bidder shall be solely responsible for commencement to completion of the work. It shall be responsible for any loss or damage happens at the work place or during the erection of the plant, not already approved by the Beneficiaries/SHGs, and shall, at its own cost, arrange for repair or compensation.
- 6.2. The Contractor/ Bidder shall warranty that the equipment used in installing the plant are new and unused.
- 6.3. The Contractor/ Bidder shall provide warranty & Guarantee, of the complete power plant towards any defect in design of the plant, equipment used including spare parts for a period of five (5) years from the date of Commissioning of the plant. The Warranty period shall be 25 Years for the PV modules.





## **Telangana Renewable Energy Development Corporation Ltd**

Tender Ref. No. TGREDCO/PBDS/Solar/IMSS/2024/ Dated: 25.11.2024

- 6.4. Any defect noticed in the power plant during the period of five (5) years from the date of Commissioning of the power plant shall be rectified/replaced by the Contractor/ Bidder on its own motion or on due intimation by the TGREDCO or by the Beneficiaries/SHGs of the plant, as the case may be, for free of charges.
- 6.5. The replacement of the defective component at the cost of Contractor/ Bidder shall be made with similar and/or equivalent make. The replaced component shall not, in any situation, reduce the performance of the plant.
- 6.6. The Contractor/ Bidder shall commence the replacement/rectification of the defect within seven (7) days from the date of identification of such defect and shall rectify the defect within mutually agreed time, failure in doing so shall enable the TGREDCO to rectify the defect at the expense of Contractor/ Bidder.
- 6.7. The Contractor/ Bidder shall provide warranty certificate along with the Commissioning report to the Beneficiaries/TGREDCO.
- 6.8. Since the maintenance of the system may also be taken up by the contractor/ bidder after expiry of 05 years of warranty period if the end user/" TGREDCO" so desires, the contractor/bidder shall take up annual maintenance of the installed system.
- 6.9. The contractor/ bidder shall maintain the system under annual maintenance contract with the end user.
- 6.10. The contractor/ bidder shall furnish to the Primary Beneficiary and TGREDCO, The instruction manuals at the time of submission of commissioning certificate for the plant at each site. The manual so prepared shall include the all diagrams and instructions to operate and maintain the whole plant.
- 6.11. Individual copies of the approval of the Electrical Inspectorate or concerned officer of the respective distribution licensee for interconnection of each plant with the distribution system.
- 6.12. Hand-Over Agreement: The Contractor/ bidder shall hand-over the respective plant to the user after its successful commissioning in excellent condition. At the time of handing over all the performance tests of the major equipment shall be demonstrated to the user and TGREDCO to ensure Generation from the solar photovoltaic power plant. While handing over the plant the Contractor/ bidder shall also hand over all technical documents, literature, instruction manuals, lists of spare part & tools & tackles. The Contractor/ bidder shall enter into an agreement for handing over the plant after the commissioning.
- 6.13. The Plant shall be deemed to be commissioned after 120 hours of continuous generation of electricity subject to weather conditions.
- 6.14. The contractor/ bidder shall not display the photographs of the work and not take advantage through publicity of the work without written permission of "Beneficiaries/SHGs".

### **7. PATENT RIGHT AND ROYALTIES.**

- 7.1. The Contractor/ bidder shall indemnify the "Beneficiaries/SHGs/TGREDCO" against all third party claims of Infringement of patent, royalty's trademark or industrial design rights arising from use to the goods or any part thereof.



# **Telangana Renewable Energy Development Corporation Ltd**

Tender Ref. No. TGREDCO/PBDS/Solar/IMSS/2024/ Dated: 25.11.2024

## **8. PACKING FORWARDING**

- 8.1. Contractor/ bidders, wherever applicable, shall after proper painting, pack and crate all the equipment in such manner as to protect them from deterioration and damage during rail and road transportation to the site and storage at the site till time of installation. Contractor/bidder shall be held responsible for all damage due to improper packing.
- 8.2. The contractor/ bidder shall inform the "Beneficiaries/SHGs or authorised representatives" of the date of each shipment from his works, and the expected date of arrival at the site for the information of the "Beneficiaries/SHGs" project offices at least 7 days in advance.

## **9. DEMURRAGE WHARF AGE, ETC**

All demurrage, wharf age and other expenses incurred due to delayed clearance of the material or any other reason shall be to the account of the contractor/ bidder.

## **10. INSURANCE**

The goods supplied under the contract shall be fully insured against loss or damage incidental to manufacture or acquisition, transportation, storage during transportation shall be included in the bid price.

## **11. TRANSPORTATION**

The contractor/ bidder is required under the contract to deliver the goods to the site. Transportation, storage, safety and security of the supplied material, issuance of road permit etc. shall be the sole responsibility of the contractor/bidder.

## **12. TERMINATION FOR INSOLVENCY**

"Beneficiaries/SHGs" may at any time terminate the work order/ contract by giving written notice to the contractor/bidder without compensation to the contractor/ bidder, if it becomes bankrupt or otherwise insolvent, provided that such termination will not prejudice or affect any right of action or remedy, which has accrued or will accrue thereafter to the "Beneficiaries/SHGs".

## **13. TERMINATION FOR CONVENIENCE**

The "Beneficiaries/SHGs", may by written notice sent to the contractor/ bidder, terminate the contract, in whole or in part at any time for its convenience. The notice of termination shall specify that termination is for the purchaser's convenience in the interest of "TGREDCO".

## **14. APPLICABLE LAW**

The contractor/ bidder shall be interpreted in accordance with the laws of the purchaser's country i.e. India. The station of "TGREDCO" Headquarter shall have exclusive jurisdiction in all matters arising under this contract.

## **15. NOTICE**

- 15.1. Any notice given by one party to the other pursuant to the contract shall be sent in writing or Email and confirmed in writing to the address specified for that purpose in the special condition of contract.



## **Telangana Renewable Energy Development Corporation Ltd**

Tender Ref. No. TGREDCO/PBDS/Solar/IMSS/2024/ Dated: 25.11.2024

15.2. A notice shall be effective when delivered or on the notice's effective date, whichever is later.

### **16. TAXES DUTIES AND INSURANCE**

The price quoted should include all taxes, duties and Insurance expenditure, all tax etc. if any. A contractor/ bidder shall be entirely responsible for all taxes, duties, license fees, etc. All taxes payable as per Government income tax & service tax norms will be payable by the contractor/ bidder. If any new tax/duty is levied during the contract period the same will be borne by the contractor exclusively. TDS and GST will be deducted from the payment of the contractor/ bidder as per the prevalent laws and rules of Government of India and Government of the Telangana in this regard.

### **17. OTHERS**

- 17.1. I-V curve of the each module technical details such as Voc, Isc, FF, cell efficiency and Pmax etc. shall be supplied along-with each consignment and copy should be handed over to Beneficiaries/SHGs.
- 17.2. The Contractor/ bidder in consultation with concerned authorised person of Beneficiaries/SHGs" will conduct training programme for users, focusing on main features, operation and maintenance of the systems.
- 17.3. The Contractor/ bidder shall continue to provide spare parts after the expiry of warranty period at the users cost. If the contractor/ bidder fail to continue to supply spare parts and services to users "Beneficiaries/SHGs" shall take appropriate action against the Contractor/ bidder.
- 17.4. It shall be the sole responsibility of the contractor/ bidder to get verified the quality & quantity of the supplied material at the site of delivery.

### **18. POST COMMISSIONING ACTIVITIES**

On completion of work, the contractor/ bidder shall submit all the documents related to the execution of contract and implementation of rooftop solar photovoltaic power plants including,

1. Detailed project report including layout and drawings of the plant
2. All the consent, clearance and approvals
3. Testing Certificate of solar module, PCU and battery
4. Plant charging/ Commissioning certificate
5. Agreement / memorandum signed with distribution licensee for Interconnection with the distribution system
6. Photograph of site before installation and after installation

### **19. PLANT PERFORMANCE EVALUATION**

Beneficiaries/SHGs or its authorised representative may monitor the performance of the installed SPV Power Plants, The successful bidder shall be required to meet minimum guaranteed generation with Performance Ratio (PR) at the time of commissioning and related Capacity Utilization Factor (CUF) as per the DNI level for the location during the O&M period. PR should be shown minimum of 78% at the time of inspection for initial commissioning acceptance to qualify for release of subsidy. Minimum CUF of 19% should be maintained for a period of 5 years for release of performance related security deposit. For CUF less than 19%, the penalty can be imposed for the loss of energy generation @ maximum tariff paid by the consumer for that year subject to force majeure conditions. The bidder should send the



## **Telangana Renewable Energy Development Corporation Ltd**

Tender Ref. No. TGREDCO/PBDS/Solar/IMSS/2024/ Dated: 25.11.2024

periodic plant output details to Beneficiaries/SHGs for ensuring the CUF. The PR will be measured at Inverter output level during peak radiation conditions. This can also be monitor remote monitoring facilities provided with the system; firm should provide the login and pass word to both TGREDCO/consumer.

### **20. PROJECT INSPECTION.**

- Beneficiaries/SHGs or its authorised representative reserves the right to do sample inspection checks for the projects commissioned by the Bidder.
- Beneficiaries/SHGs or its authorised representative may also depute a technical person(s) / experts for inspection, Third party verification, monitoring of system installed to oversee, the implementation as per required standards and also to visit the manufactures facilities to check the quality of products as well as to visit the system integrators to assess their technical capabilities as and when required.

### **21. PAYMENT TERMS**

21.1. The beneficiary will directly make the payment in the following manner:

- 70 % after successful synchronization of the total capacity of the plant on submission of the synchronization/commissioning certificate issue by the DISCOM.
- 30 % after 90 days from the date of synchronization/commissioning on the satisfactory performance of the plant.



# Telangana Renewable Energy Development Corporation Ltd

Tender Ref. No. TGREDCO/PBDS/Solar/IMSS/2024/ Dated: 25.11.2024

## PART 4: SCOPE OF WORK & TECHNICAL SPECIFICATIONS

### I. PROJECT PARTICULARS

Particulars	Description
<b>i. Design and Engineering</b>	
Project AC Capacity	<b>1 MW</b>
Cumulative Inverter Duty Transformer Capacity	1 MVA or available next higher capacity
Cumulative Inverter AC Capacity	1 MW of cumulative (String or central Inverter) <b>Note:</b> Inverter shall be capable of delivering 1 MW AC Power with PF range -0.95 to +0.95 at POI
Module Technology	Mono-Crystalline PERC / TOP Con Non-DCR
Origin of Supply Items	As per MNRE Order on Public Procurement (Preference to Make in India) in respect of RE Sector and subsequent amendments
Module Mounting Structure Type	<b>Fixed Tilt</b>
Design life of power plant	<b>25 Years</b>
Warranty & Guarantee of total Plant	<b>5 Years</b>
Solar Modules	<b>25 Years</b>
O&M period	<b>1 Years</b>
<b>ii. Performance Ratio (at metering point)</b>	
For Operational Acceptance	<b>78%</b> <b>Note:</b> PR shall be estimated as per the standard procedure available.
<b>iii. Minimum Guaranteed CUF (at metering point)</b>	
During the first year O&M period	<b>19%</b>
<b>iv. Other Details</b>	
Water and Power for Construction	To be arranged by the Contractor

Note:

The specifications mentioned for all the equipment which include PCU, combiner boxes, DC cables, module mounting structures, transformer, CT, PT, LT/ HT cables, interfacing panels, switch gears & 11KV Switchyard at plant end along with metering and other associated equipment etc required for the power generation, in the present bidding documents are for the **reference** only. It is subject to revise/ alter as per the design/ planning/ good engineering practices etc., to be carried out by the selected bidder, to the satisfaction of the Beneficiary/SHGs or its authorized representatives. It is advised that the bidders must satisfy himself with the prevailing site conditions before design/ plan and the design approval obtained from CEIG under the Successful bidder Scope only. The design must be optimized as per the site conditions and directed to achieve the maximum output from the installed capacity at all times. Moreover, the components not separately mentioned, but are required to complete the plant for operation is also included in the scope of bidder and shall be vetted by the Beneficiary/SHGs or its authorized representatives.



# **Telangana Renewable Energy Development Corporation Ltd**

Tender Ref. No. TGREDCO/PBDS/Solar/IMSS/2024/ Dated: 25.11.2024

## **II. SCOPE OF WORK**

### **1. Detailed site survey.**

- 1.1. Design, supply and installation of solar power plant duly considering high efficiency and high-capacity modules to meet the required capacity to achieve 19% CUF along with the Remote Monitoring System with 5 years Comprehensive warrantee & Guarantee along with 1 (One) year comprehensive operation and maintenance from the date of commissioning.
- 1.2. All works shall be executed as per Technical Specifications provided along with this Tender.

### **2. Design and Engineering**

- 2.1. The Contractor shall prepare the detailed design basis report (DBR), and Master Drawing List (MDL). The Contractor shall submit a copy to Employer for review and approval prior to detail engineering.
- 2.2. The contractor shall estimate the Plant Generation/Energy Yield based on Solar Radiation and other climatic conditions prevailing at site using industry standard simulation software. Simulation report shall be submitted along with the design basis report.
- 2.3. All documents and drawings (soft copy) shall be submitted to the Employer for review and approval.
- 2.4. The contractor shall submit basic design data, design documents, drawings and engineering information including GTP and test reports to Employer or its authorized representative for review and approval from time to time as per project schedule. The documents typically include, but not limited to, the following:
  - 2.4.1. Detailed technical specifications (GTP) of all the equipment
  - 2.4.2. General arrangement and assembly drawings of all major equipment
  - 2.4.3. Schematic diagram for entire electrical system (DC, AC and auxiliary systems)
  - 2.4.4. GTP & G.A. drawings for all types of components 132 kV, 66 kV or 33 kV switchgears (as applicable) & other interfacing panels
  - 2.4.5. Test reports (for type, routine and acceptance tests)
  - 2.4.6. Relay setting charts
  - 2.4.7. Design calculations and sheets (civil, mechanical, structural and electrical designs)
  - 2.4.8. Geo technical investigation data and Topographical survey report including topographical survey data in digital format (Excel file) and Contour plan of the area.
  - 2.4.9. GA drawings of the entire project including equipment rooms/ inverter control rooms, roads, storm water drainage, sewage networks, security gate, fire protection system, perimeter fencing, transformer yard fencing etc.
  - 2.4.10. Quality assurance plans for manufacturing (MQP), Standard Operating procedure (SOP) and field activities (FQP)





## **Telangana Renewable Energy Development Corporation Ltd**

Tender Ref. No. TGREDCO/PBDS/Solar/IMSS/2024/ Dated: 25.11.2024

- 2.4.11. Detailed site EHS plan, fire safety & evacuation plan and disaster management plan.
- 2.4.12. Detailed risk assessment and mitigation plan.
- 2.4.13. O&M Instruction's and maintenance manuals for major equipment
- 2.4.14. As-built drawings / documents and deviation list from good for construction (GFC).
- 2.5. Design of associated civil, structural, electrical & mechanical auxiliary systems includes preparation of single line diagrams and installation drawings, manuals, electrical layouts, erection key diagrams, electrical and physical clearance diagrams, design calculations for Earth- mat, Bus Bar & Spacers indoor and outdoor lighting/ illumination etc., GTP and GA drawings for the major equipment including transmission line, design basis & calculation sheets, and other relevant drawings and documents required for engineering of all facilities within the periphery to be provided under this contract.
- 2.6. All drawings shall be fully corrected to match with the actual "As – Built" site conditions and submitted to Beneficiary/SHGs or its authorized representatives after commissioning of the project for record purpose. All as-built drawings must include the Good for Construction deviation list.
- 2.7. The contractor shall ensure that Generating Plant comply with "Central Electricity Authority (Technical Standards for Connectivity to the Grid) Regulations, 2007" & subsequent amendments. The plant shall be capable of reactive power support in line with regulations & its amendments/clarifications.
- 2.8. The contractor shall ensure that Generating Plant comply with "Central Electricity Authority (Grid Standards) Regulations, 2010" & subsequent amendments.

### **3. Procurement & Supply**

- 3.1. The scope of procurement and supply including testing at manufacturer's works, packing, transportation, transit insurance, receipt, unloading, storage at site of equipment and materials for Grid Interactive Solar PV Power Plant with associated system shall include but not limited to the following.
- 3.2. Solar PV modules with minimum DC capacity as required for CUF of 19%.
- 3.3. Module Mounting Structure (MMS) with necessary hardware suitable for mounting PV Modules.
- 3.4. String Combiner Box (SCB), along with mounting structure in case of central inverter configuration.
- 3.5. Solar Cables of appropriate size and rating from PV Modules to SCB / String Inverter along with straight/Y-connectors/branch connectors, ferrules, conduits, cable ties and other materials required for cable laying and termination at both the ends.
- 3.6. Power Conditioning Units (Central type/ String Inverter) of appropriate rating.
- 3.7. DC Cables of appropriate size and rating from SCB to Central Inverter (in case Central inverters are used) along with cable termination kits, ferrules / tags, conduits, cable ties and other materials required for cable laying and termination at both the ends.





## **Telangana Renewable Energy Development Corporation Ltd**

Tender Ref. No. TGREDCO/PBDS/Solar/IMSS/2024/ Dated: 25.11.2024

- 3.8. AC Combiner Box / LT Switchgear panel of appropriate rating with adequate number of inputs for pooling of power from String Inverter to Inverter transformer (in case String inverters are used).
- 3.9. AC Cables (LT & HT) of appropriate size and rating along with cable termination kits, ferrules / tags, conduits, cable ties and other materials required for cable laying and termination at both the ends.
- 3.10. Inverter duty transformers of appropriate rating and in accordance with inverter manufacturer requirements, including fire protection system.
- 3.11. 11 kV HT Switchgear Panels including Vacuum Circuit Breakers, Current Transformers, Voltage Transformers, Relays and other accessories for complete protection.
- Note: Electrical ratings of switchgear shall be in accordance with altitude correction factors above their standard designs, applicable as per IS/IEC 62271-1.
- 3.12. 11 kV Indoor / Outdoor Switchgear panel for plant side switchyard and other associated accessories (rated for 1 MW) for integration of Solar PV Power Plant as per DISCOM specifications, permits and approvals, DISCOM supervision.
- Note: Electrical ratings of switchgear shall be in accordance with altitude correction factors above their standard designs, applicable as per IS/IEC 62271-1.
- 3.13. ABT meters with all necessary metering rated CTs and PTs at the Metering Point as per CEA Metering Regulations 2006/TGERC regulations as amended time to time and state metering code.
- 3.14. Any other equipment / system required to comply with the relevant Procedures / Regulations issued by CEA/ CERC/TGERC any other statutory body for connectivity to the Grid.
- 3.15. Auxiliary supply system including auxiliary transformers, distribution panels, cables and related accessories for plant internal consumption.
- 3.16. Uninterrupted Power Supply (UPS) including Batteries, Distribution Boards, Cables and associated equipment.
- 3.17. Battery Bank, Battery Charger, Distribution Boards, Cables and associated equipment.
- 3.18. LT Power and Control Cables including end terminations and other required accessories.
- 3.19. Communication cables including end terminations and other required accessories.
- 3.20. Supervisory Control and Data Acquisition (SCADA) for remote monitoring/control of plant facilities.
- 3.21. Remote Monitoring System.
- 3.22. Earthing system including earth strip/cables, earth electrodes, earth enhancing compound and all other associated materials for complete earthing of the plant.
- 3.23. Lightning Protection System for entire plant area.
- 3.24. LED luminaries with diffuser for illumination, lighting poles, distribution boxes and power supply cables along with required conduits, fittings, etc.
- 3.25. CCTV cameras with monitoring station along with mounting poles, power supply cables, communication cables, network switches, conduits, fittings, etc.



## **Telangana Renewable Energy Development Corporation Ltd**

Tender Ref. No. TGREDCO/PBDS/Solar/IMSS/2024/ Dated: 25.11.2024

- 3.26. Fire detection and fire protection system in buildings/containers, inverter / transformer yard and switchyard.
- 3.27. Testing instruments as specified.
- 3.28. Dry cleaning system with micro-fibre based brushes. Mandatory spares as required for module cleaning.
- 3.29. Any other equipment / material not mentioned but required to complete the Solar Power Plant facilities in all respect in the plant side required for.

#### **4. Installation**

- 4.1. Installation, testing and commissioning of equipment procured and supplied should be as per the specifications mentioned and should be suitable for the solar plant.
- 4.2. Ownership of packing materials (except of mandatory spares) shall be of the Contractor. Responsibility of removal and disposal of the packing material shall be in the scope of the Contractor.

#### **5. Plant Testing and Commissioning**

- 5.1. Pre-commissioning checks and tests for all equipment Synchronization and Commissioning of plant.
- 5.2. Any other works related to installation, testing and commissioning not mentioned but required to complete the Solar Power Plant facilities in all respect.
- 5.3. All costs associated with the Plant Testing and Commissioning shall be borne by the Contractor.

#### **6. Civil Works**

- 6.1. The scope of civil works for the plant facilities shall include, but not limited, to the following:
- 6.2. Topographical survey of the plant area.
- 6.3. Clearing plant site and transmission line corridor by cutting of trees, bushes and shrubs, if any, including disposal of waste material.
- 6.4. Earthwork for site grading, cutting, filling, levelling and compaction of land.
- 6.5. Construction of 6 Feet Height chain link fence with entry gate along the boundary of the land required for 1MW solar plant.
- 6.6. Construction of foundation for Module Mounting Structure (MMS) and erection of MMS. (Note: Ground preparation shall be required for laying the MMS foundation in the areas where existing structures are being dismantled.)
- 6.7. Construction of foundation and / or mounting structure for String Combiner Box, AC Combiner Box / LT Switchgear panel, Power Conditioning Unit, Inverter Transformer, Auxiliary Transformer, 11 kV Switchgear panel, Power Transformer, Switchyard Equipment, lighting mast, lightening arrestor and other electrical equipment. Mounting structure of 11 kV switchyard equipment and gantry shall be as per DISCOM Specifications.
- 6.8. Construction of ICRs/LCRs and cable trenches inside existing Main Control Room, if required.



## **Telangana Renewable Energy Development Corporation Ltd**

Tender Ref. No. TGREDCO/PBDS/Solar/IMSS/2024/ Dated: 25.11.2024

- 6.9. Construction of fence for transformer yards at 11 kV Switchgear.
- 6.10. Construction of foundation for Lighting poles, CCTV poles and other equipment.
- 6.11. Construction of access roads, internal roads, switchyard roads(Murom).
- 6.12. Construction of cable trenches/over ground cable support structures
- 6.13. Construction of storm water drainage network for smooth disposal of storm water from the plant to the nearest available drainage outlet.
- 6.14. Construction of dry type module cleaning system
- 6.15. Suitable arrangement of water shall be ensured to cater to day-to-day requirement of cleaning water during entire O&M period.
- 6.16. Any other civil works not mentioned but required to complete the Solar Power Plant Facilities in all respect.

### **7. Statutory Approvals**

- 7.1. Obtaining all construction/Project approvals, statutory approvals /clearances/ compliances on behalf of the Beneficiaries/SHGs from various Government Departments will be in contractor scope.
- 7.2. All other statutory approvals and permissions and their respective compliances, not mentioned specifically but are required to carry out hassle free Construction and O&M of the plant.
- 7.3. Adequate and seamless insurance coverage during EPC and O&M period to mitigate all risks related to construction and O&M of the plant to indemnify the Employer.
- 7.4. The Contractor shall comply with the provision of all relevant acts of Central or State Governments including payment of Wages Act 1936, Minimum Wages Act 1948, Employer's Liability Act 1938, Workmen's Compensation Act 1923, Industrial Dispute Act 1947, Maturity Benefit Act 1961, Mines Act 1952, Employees State Insurance Act 1948, Contract Labour (Regulations & Abolishment) Act 1970, Electricity Act 2003, Grid Code, Metering Code, MNRE guidelines or any modification thereof or any other law relating thereto and rules made there under or amended from time to time.

### **8. Security Services**

- 8.1. The contractor shall arrange for proper security system including deputation of security personnel at his own cost for the check vigil for the Solar Power Plant for the construction & comprehensive O&M period.
- 8.2. The security staff may be organized to work on suitable shift system; proper checking & recording of all incoming & outgoing materials vehicles shall be maintained. Any occurrence of unlawful activities shall be informed to Beneficiary/SHGs immediately. A monthly report shall be sent to Beneficiary/SHGs on the security aspects.
- 8.3. Any other activities required for completion of project, but not specified in the above shall be in the scope of contractor. The Contractor must provide the BOM of the plant as per the design during the time of submission of design basis report. The detailed technical specifications of major equipment to be followed strictly and are described in the technical specification section.



## **Telangana Renewable Energy Development Corporation Ltd**

Tender Ref. No. TGREDCO/PBDS/Solar/IMSS/2024/ Dated: 25.11.2024

### **9. Operation and Maintenance**

- 9.1. The Scope of Works for Plant Operation shall include deputing necessary manpower necessary to operate the Solar Photovoltaic Power Plant. Operation procedures such as preparation to starting, running, routine operations with safety precautions, monitoring etc., shall be carried out as per the manufacturer's instructions to have trouble free operation of the complete system. The Contractor shall ensure continuous, un-uninterrupted Plant Operation and Monitoring, including Plant Operation and Maintenance activities, Scheduling of Power etc. for the interim period i.e. period commencing from Plant Commissioning to the signing of the O&M Agreement.
- 9.2. Total Operation & Maintenance of the SPV Plant of the Plant Facilities shall be with the Contractor for one-year period from the date of commissioning. After completion of One Year O&M period the Beneficiary/SHGs reserves to extend the O&M on mutual terms & conditions. The Contractor has to provide sufficient training for carrying out the O&M by the Beneficiary/SHGs.
- 9.3. To provide a detailed training plan for all O&M procedures to Beneficiary/SHGs nominated staff, which shall have prior approval from the Beneficiary/SHGs.
- 9.4. Supply and erection of associated 11kV transmission line & associated bay extension is not included in the scope of the bidder.
- 9.5. It will be mandatory to use (ALMM) approved Modules. To ensure the same submission of authorization from Indian module.
- 9.6. A pre dispatch inspection is mandatory before dispatch of the modules by TGREDCO/Beneficiary organization.
- 9.7. The bidder shall ensure minimum required CUF of 19 % from the date of COD of the project. The acceptance test will be carried after 2 months of COD. However after completion of 1 year the CUF will be calculated and if the minimum criteria of 19% is not attained the bidder with his own cost will have to increase the modules and carryout other required corrections to meet the CUF of 19% failing the bidders PBG will be encashed/deducted at the per unit rate of Rs 5/kWh till such rectification of CUF is done.
- 9.8. It shall be the responsibility of the bidder entirely at its cost and expense to install such number of solar panels and associated equipment as may be necessary to achieve the required to meet the CUF criteria mentioned above.
- 9.9. CUF shall be taken as per the solar insolation on site, however, annual CUF of minimum 19% shall be considered for calculation of plant capacity as plant acceptance criteria. No restrictions to be made on installing DC capacity to achieve prescribed CUF.
- 9.10. Bidder shall be responsible for all the works related to testing & commissioning, replacement of defective PV modules by same or equivalent make /model and RMS for 5 years of the CMC period of the project.
- 9.11. All components used for installation of solar power plants shall conform to applicable BIS/MNRE specifications and follow quality control guidelines issued by MNRE and ALMM order with its amendments issued by MNRE time to time.
- 9.12. The vendor will carry out the investigations regarding solar irradiation and implement the Solar PV Power Project keeping in view the quality control measures and the safety standards. The vendor will submit the monthly progress report of implementation of the project along with photographs to TGREDCO/TGDISCOM till it's commissioning before 7th day of each calendar month.



# **Telangana Renewable Energy Development Corporation Ltd**

Tender Ref. No. TGREDCO/PBDS/Solar/IMSS/2024/ Dated: 25.11.2024

- 9.13. The vendor shall ensure that the Technology being deployed is commercially established and solar PV modules, Power conditioning units, transformers and all other equipment adhere to the relevant and applicable quality and safety standards as per relevant IEC codes / BIS standards.
- 9.14. The work of installation and commissioning of solar plant, including Operation & maintenance of solar power project shall to be carried out by vendor by availing services of registered licensed electrical contractor of Govt. of Telangana.
- 9.15. The TGREDCO may inspect the ongoing installation or installed plants. In case the installed systems are not as per standard, non-functional on account of poor quality of installation, or non-compliance. TGREDCO reserves the right to debar the vendor and any of its successors up to a period of five years from the date of such decision of debarment.

## **10. METERING**

### **10.1 Meters**

- 10.1.1. For Installation of meters, meter testing, meter calibration and meter reading and all matters incidental thereto, the VENDOR and DISCOMs shall follow and be bound by the Appropriate Commission Regulations, Applicable Laws including Central Electricity Authority (Installation and Operation of Meters) Regulations, 2006, the Grid Code, as amended and revised from time to time.
- 10.1.2. The VENDOR shall bear all costs pertaining to installation, testing, calibration, maintenance, renewal and repair of meters at Substation Delivery Point.
- 10.1.3. In addition to ensuring compliance of the applicable codes, the VENDOR shall install Main, Check meters at the Delivery Point along with Standby meter as per applicable Regulations of the State of Telangana.
- 10.1.4. The VENDOR shall install Main meter and Check meter of static type 0.2s Class of Accuracy of ABT meters at the interconnection point. The VENDOR shall also install Stand-by meter of same accuracy as per the norms specified in the Metering Code by CEA/norms of TGERC. The Main meter, check meter and Stand-by meter shall consist of a pair of export and import parameters with facility for recording meter readings using Meter Recording Instrument (MRI). The VENDOR shall be responsible to enable Remote Monitoring System of generation by providing AMR modules to the billing meters.

### **10.2 Reporting of Metered Data and Parameters**

- 10.2.1 The VENDOR will have to install necessary equipment for regular monitoring of required data and simultaneously for monitoring of the electric power generated from the plant.
- 10.2.2 Online arrangement would have to be made by the VENDOR for submission of above data regularly for the entire period of this Power Purchase Agreement to DISCOM to Central Portal of MNRE and concerned agency as per applicable regulation/directions.
- 10.2.3 Reports on above parameters on monthly basis (or as required by regulation/guidelines) shall be submitted by the VENDOR to MNRE/National Institute of Solar Energy through DISCOM for entire period of this Agreement

### **10.3 Remote Monitoring System (RMS)**

- 10.3.1 As per the MNRE guidelines, it is mandatory for DISCOM's to monitor solar power generation and performance of the solar power plant through online system on State-



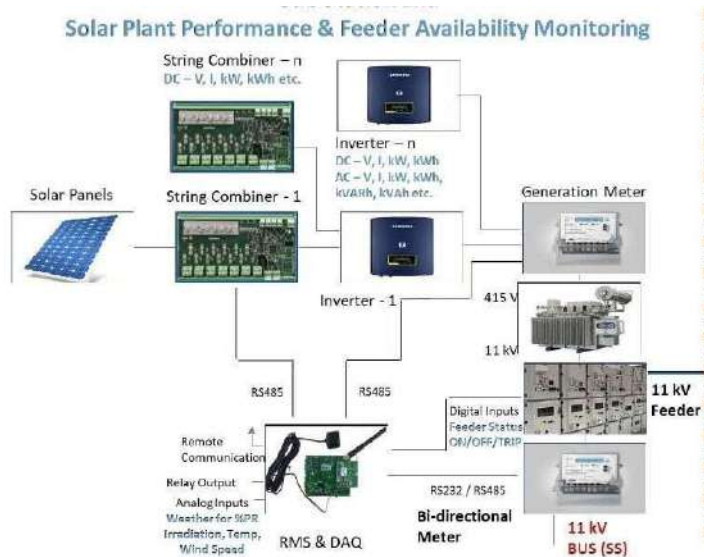


## **Telangana Renewable Energy Development Corporation Ltd**

Tender Ref. No. TGREDCO/PBDS/Solar/IMSS/2024/ Dated: 25.11.2024

Portal. The online data will also be integrated with the central monitoring portal of MNRE which will extract data from the State portals for monitoring of the scheme.

- 10.3.2 In line with MNRE guidelines for State Level SEDM Software Development issued in July 2020, TGREDCO/ TGDISCOM is in the process of development of State Level Solar Energy Data Management (SEDM) platform to integrate & monitor the performance of all systems installed under Indira Mahila Shakti Scheme.
- 10.3.3 Also, as per the Vendor under this Empanelment Tender shall be required to install required Remote Monitoring Systems for solar power plant to integrate with State SEDM platform directly which in turn will have interface with National Level Solar Energy Data Management Platform of MNRE.
- 10.3.4 MNRE and DISCOMs/SIAs will develop and host the National and State Level SEDM Platform which is excluded from the scope of the vendor but vendor needs to operate, integrate RMS, provide net services and do various data entries related to application processing, asset and workflow management.



- 10.3.5 As shown in the above diagram vendor needs to provide a Remote Monitoring System for:

### **10.4 Solar Power Plant Remote Monitoring System:**

To capture electrical parameters from multiple devices such as ABT Meter, Inverters, String Combiner boxes or String inverters including meters at Sub-station level. Remote monitoring system will capture important Electrical and Status parameters such as AC/DC voltage, control, power, energy as well as monitoring of Breaker etc. and will transmit data to State Level Solar Energy data management (SEDM) platform.

### **10.5 Communication Connectivity for Solar Plant RMS:**

- 10.5.1 Field Device Connectivity: RMS will connect to Inverter, String combiner boxes or string inverters using RS485 MODBUS communication protocol as well as meters using RS232 DLMS protocol. Both protocols are widely used by equipment manufacturers.
- 10.5.2 Remote Connectivity: The vendor will connect with the RMS the State Level SEDM Server using 4G/5G net or any other suitable cellular communication. RMS to Server



# **Telangana Renewable Energy Development Corporation Ltd**

Tender Ref. No. TGREDCO/PBDS/Solar/IMSS/2024/ Dated: 25.11.2024

Communication shall be established using MQTT protocol which is well accepted IoT protocol across the globe and supported by all leading IT as well as OT companies for Smart Grid, Smart RE and Smart City Applications.

- 10.5.3 Local Connectivity: Ethernet / Bluetooth / Wi-Fi connectivity to configure parameter, notifications, communication intervals, set points, operation mode configuration or to download locally stored data. All the required data shall be mapped with SCADA on real-time basis as per the guidelines of TGDSCOM /SLDC.
- 10.5.4 Once a bidder submits its technical bid by due date of submission, it shall be considered that the bidder is well versed with all the local conditions and has prepared its technical and financial bid accordingly. No claim or issue by the bidder(s) in this regard shall be accepted or entertained by TGREDCO after due date of bid submission.
- 10.5.5 It is the responsibility of vendor to provide SIM card, bear recurring communication charges and maintain communication connectivity of more than 98% and data availability of 99% for 1 year (unless extended by both the parties on mutual agreement) of operation & maintenance of solar power plant.

## **11. INSPECTION**

All the SPV systems installed will be inspected by the representative of TGREDCO within 10 days of receipt of Installation & Commissioning Certificate. The payments will be released only for the systems installed in compliance to the technical specification of MNRE /TGREDCO/DISCOMs. During the Inspection, if the system installed is found faulty (or) not in compliance to the technical specification, the payment will be kept on hold until such rectification of the fault is carried to the satisfaction of the TGREDCO/Beneficiary.

## **12. SERVICE CENTRES**

- Empanelled vendors shall have minimum of one service centre in each District of Telangana State. Additional service centres shall be opened in different locations in districts based on the installations carried out by them under this empanelment mechanism.
- The Vendor shall visit the site at least once in a quarter, to attend routine maintenance, during the 5 years warranty period. However, in case of malfunctioning of the system, the tenderer/bidder shall attend for rectification of defects within 2-3 working days from the date of lodging complaint.

## **13. WARRANTY**

- The empanelled supplier shall be used ALMM modules with Non-DCR.
  - The SPV panel shall carry a warranty of minimum 25 years.
  - The SPV panel must be warranted for their output peak watt capacity which shall not be less than 90% at the end of 10 years and 80% at the end of 25 years.
  - The PCU/Solar Grid tie Inverter shall carry a warranty of minimum 5 years.
- 13.1. The complete SPV systems installed and commissioned shall be under a warranty against any manufacturing or usage defect for a minimum period of 5 years from the date of Commissioning. The mechanical structures, electrical works including power conditioners/inverters/maximum power point tracker units/ distribution boards/digital meters/ switchgear etc. and overall workmanship of the SPV systems must be





## **Telangana Renewable Energy Development Corporation Ltd**

Tender Ref. No. TGREDCO/PBDS/Solar/IMSS/2024/ Dated: 25.11.2024

warranted against any manufacturing/ design/ installation defects for a minimum period of 5 years.

- 13.2. The warranty will be against breakages, malfunctions, non-fulfilment of guaranteed performance and breakdowns due to manufacturing defects or defects that may arise due to improper operation of electrical /electronic components of the system but do not include physical damages by the end users.
- 13.3. The above warranty shall take effect from the date on which the system is taken over by the purchaser after commissioning Synchronizing.
- 13.4. The successful bidder shall be liable to make good the loss by replacing the defective product during the warranty period for the entire system free of cost.
- 13.5. The warranty will cover all the materials and goods involved in the installation and commissioning of SPV systems by the successful Bidder.



# **Telangana Renewable Energy Development Corporation Ltd**

Tender Ref. No. TGREDCO/PBDS/Solar/IMSS/2024/ Dated: 25.11.2024

## **III. TECHNICAL SPECIFICATIONS**

### **1 PHOTOVOLTAIC MODULES**

#### **1.1 General**

- 1.1.1 PV Modules shall be registered with Bureau of India Standards (BIS) and bear the Standard Mark as per Solar Photovoltaics, Systems, Devices and Components Goods (Requirements for Compulsory Registration) Order, 2017 and subsequent amendments.
- 1.1.2 The PV Module shall be enlisted in ALMM – List in accordance with extant provisions of Approved Models and Manufacturers of Solar Photovoltaic Modules (Requirements for Compulsory Registration, Order, 2019) and subsequent amendments.
- 1.1.3 PV Modules shall conform to MNRE Order on Public Procurement (Preference to Make in India) to provide for Purchase Preference (linked with local content) in respect of RE Sector dated 9th February, 2021 and subsequent amendments.

#### **1.2 Standards and Codes**

Photovoltaic Modules shall comply with the specified edition of the following standards and codes or equivalent IEC Standards, wherever applicable. Higher revision of standards specified are acceptable.

<b>Standard</b>	<b>Description</b>
IS 14286: Part 1: 2019	Terrestrial Photovoltaic (PV) Modules - Design Qualification and Type Approval, Part 1: Test Requirements (Second Revision)
IS 14286: Part 1: Sec 1:2019	Terrestrial Photovoltaic (PV) Modules - Design Qualification and Type Approval, Part 1: Test Requirements, Section 1: Special requirements for testing of crystalline silicon photovoltaic (PV) modules (Second Revision)
IS 14286 (Part 1/Sec 2): 2019	Terrestrial photovoltaic (PV) modules - Design qualification and type approval: Part 1 test requirements: Sec 2 special requirements for testing of thin - Film cadmium telluride (CdTe) based photovoltaic (PV) modules (Second Revision)
IS/IEC 61730-1: 2016	Photovoltaic (PV) module safety qualification - Part 1: Requirements for construction
IS/IEC 61730-2: 2016	Photovoltaic (PV) module safety qualification - Part 2: Requirements for testing
IS 17210: Part 1: 2019	Photovoltaic (PV) modules - Test methods for the detection of potential-induced degradation - Part 1: Crystalline silicon

Note: PV Module shall have been tested for design loads applicable at site (Refer TS- Civil, relevant clause on Design Load combinations) with minimum safety factor of 1.5 (as per IEC 61215-2)

#### **1.3 Technical Requirements**

<b>Parameter</b>	<b>Specification</b>
Cell type	(i) Mono-crystalline Si - PERC / TOPCon
Module Efficiency	(i) Mono-crystalline Si $\geq 20.9\%$
Rated power at STC	No negative tolerance is allowed
Temperature co-efficient of power	(i) Mono-crystalline Si: Not less than $-0.4\%/^{\circ}\text{C}$
Maximum System Voltage	1500 V
Application Class as per IS/IEC 61730	Class II



# **Telangana Renewable Energy Development Corporation Ltd**

Tender Ref. No. TGREDCO/PBDS/Solar/IMSS/2024/ Dated: 25.11.2024

## **1.4 Component Specifications**

### **1.4.1 Glass Panel:**

- Glass/Back-sheet Modules: The PV Modules glass panel shall have transmittance of above 90%. The minimum thickness of glass shall be 3.2 mm.
- Glass/Glass Modules: Glass shall have minimum 2 mm thickness on each side. Glass shall have transmittance above 90%.

1.4.2 The back sheet used in the PV modules (applicable in case of Glass/Back-sheet) shall be of three-layered structure with properties of moisture barrier, elongation retention and UV resistance. The back sheet shall have the following properties:

Parameter	Value
Material Thickness	≥ 300 microns
Water Vapor Transmission Rate	≤ 2 g/m <sup>2</sup> /day
Partial Discharge Test Voltage	≥ 1500V
Elongation at break	≥ 100%
Adhesion strength with encapsulant	≥ 40 N/cm
Interlayer adhesion strength	≥ 4 N/cm

1.4.3 The encapsulant used for the PV modules (applicable for Crystalline Si Modules) should be UV resistant and PID resistant in nature. No yellowing of the encapsulant with prolonged exposure shall occur. The encapsulant shall have the following properties:

Parameter	Value
Gel content	<ul style="list-style-type: none"><li>• ≥ 75% for EVA (applicable for glass/polymer modules)</li><li>• ≥ 70% for POE or EPE i.e. EVA co- extruded with POE (applicable for glass/glass modules and glass/polymer modules)</li></ul>
Volume resistivity	≥ 1×10 <sup>14</sup> Ω.cm
Peeling strength with glass	≥ 40 N/cm

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

1.4.5 The module frame shall be made of anodized Aluminium, which shall be electrically & chemically compatible with the structural material used for mounting the modules. It shall have provision for earthing to connect it to the earthing grid. The anodization thickness shall be 15 micron (12 micron in case of 6005 Grade Aluminium).

1.4.6 The material used for junction box shall be UV resistant to avoid degradation during module life. The degree of protection of the junction box shall be at least IP 67.

1.4.7 Minimum three number of bypass diodes and two number of IS 16781 / IEC 62852 certified MC4 compatible connectors with IS 17293 / IEC 62930 certified 4 sq.mm. copper cable shall be provided.

1.4.8 The following information must be mentioned in the RFID used on each module(This can be inside or outside the laminate, but must be able to withstand harsh environmental conditions).

- i. Name of the manufacturer of PV Module



# **Telangana Renewable Energy Development Corporation Ltd**

Tender Ref. No. TGREDCO/PBDS/Solar/IMSS/2024/ Dated: 25.11.2024

- ii. Name of the Manufacturer of Solar cells
- iii. Month and year of the manufacture (separately for solar cells and module)
- iv. Country of origin (separately for solar cells and module)
- v. I-V curve for the module at Standard Test Condition (1000 W/m<sup>2</sup>, AM 1.5, 250 C)
- vi. Wattage, Im, Vm and FF for the module
- vii. Unique Serial No. and Model No. of the module
- viii. Date and year of obtaining IEC PV module qualification certificate
- ix. Name of the test lab issuing IEC certificate
- x. Other relevant information on traceability of solar cells and module as per ISO 9000

Note: RFID scanner and database of all the modules supplied, containing the above information shall also be provided.

## **1.5 Warranty**

- Performance Warranty: PV modules must be warranted with linear degradation rate of power output except for first year (up to 3% including LID) and shall guarantee minimum 80% of the initial rated power output at the end of 25 years from the date of supply.
- Product Warranty: The modules shall be warranted for minimum of 10 years from the date of supply against all material/ manufacturing defects and workmanship.

## **1.6 Approval**

- 1.6.1 The Contractor shall provide Guaranteed Technical Particular (GTP) datasheet and Bill of Materials (BOM) of the module that is submitted for approval along with the datasheets of each component. The component datasheet shall contain all the information to substantiate the compliance for component specifications mentioned above.
- 1.6.2 The Contractor shall also provide test certificates corresponding to the standards mentioned above along with complete test reports for the proposed module. The tests should have been conducted at a test laboratory compliant with ISO 17025 for testing and calibration and accredited by an ILAC/IECEE member signatory. Laboratory accreditation certificate or weblink along with scope of accreditation shall also be submitted.
- 1.6.3 The BOM proposed shall be the subset of IEC 61215/61730 Constructional Data Form (CDF)s, subject to suitability of the proposed BOM for other type tests applicable as per Clause 1.2. The BOM extensions for PV Module BOM components shall be in accordance with IEC 62915 retest guidelines.
- 1.6.4 The Contractor shall submit a detailed Manufacturing Quality Plan (MQP) for the PV Module with list of checks/tests performed during incoming material inspection, production, pre-dispatch and package.
- 1.6.5 The Contractor shall obtain the approval of the proposed module make & model prior to manufacturing/ inspection call.

## **1.7 Manufacturing and Inspection**

- 1.7.1 The Contractor shall inform the module manufacturing schedule to the EMPLOYER at least 7 (seven) working days before the start of proposed schedule.



# **Telangana Renewable Energy Development Corporation Ltd**

Tender Ref. No. TGREDCO/PBDS/Solar/IMSS/2024/ Dated: 25.11.2024

- 1.7.2 The EMPLOYER shall perform material inspection at the Manufacturer's factory during manufacturing of Modules or during pre-dispatch Inspection. Proof of procurement of components as per the approved BOM mentioning manufacturer name, manufacturing date and relevant test certificate shall be submitted during material inspection for verification.
- 1.7.3 The cells used for module making shall be free from all defects like edge chipping, breakages, printing defects, discoloration of top surface etc. Only Class A solar cell shall be used.
- 1.7.4 The modules shall be uniformly laminated without any lamination defects.
- 1.7.5 Current binning of modules shall be employed (max. 3 no. of bins) so that current mismatch of modules in a bin does not exceed 150 mA. Different colour codes shall be provided on the modules as well as pallet for identification of different bins.
- 1.7.6 Pre-dispatch inspection of modules shall be performed as per the Standard Inspection Protocol.

## **1.8 Transportation, Handling, Storage and Installation**

- 1.8.1 Transportation, handling, storage and installation of modules shall be in accordance with the manufacturer manual so as not to breach warranty conditions. The Standard Operating Procedure (SOP) for the same shall be shared by the Contractor prior to dispatch for approval.
- 1.8.2 The module shall be kept in common storage area with proper arrangement.
- 1.8.3 Modules shall be dispatched in line with the Construction schedule. If Modules are dispatched ahead of schedule, following measures shall be undertaken:
- 1.8.4 Modules shall be covered with tarpaulin sheet. Alternatively, the Modules, properly stacked as per OEM recommendations.

## **2 STRING COMBINER BOX**

### **2.1 Standards and Codes**

<b>Standard/Code</b>	<b>Description</b>
IS/IEC 60529	Enclosure Ingress Protection
IEC 62262	Enclosure Impact Protection
IEC 60269-6	Fuse
IEC 61643-31 / EN 50539-11	Surge Protection Device
IS 17293 / IEC 62852	Solar cable connector
IEC 60947-3	Switch disconnector
IEC 60695-2-11	Fire hazard testing

### **2.2 Construction**

- 2.2.1 SCB enclosure shall be made of UV resistant, fire retardant, thermoplastic material. Enclosure degree of protection shall be at least IP 65 and mechanical impact resistance shall be at least IK 08.
- 2.2.2 Not more than two strings can be connected in parallel to a single input of SCB. One spare input terminal along with connector shall be provided for each SCB.
- 2.2.3 Every SCB input shall be provided with fuses on both positive and negative side. In case of negative grounded system, fuse at positive side only is acceptable. The rating



# **Telangana Renewable Energy Development Corporation Ltd**

Tender Ref. No. TGREDCO/PBDS/Solar/IMSS/2024/ Dated: 25.11.2024

of the fuses shall be selected such that it protects the modules from reverse current overload. The fuses shall be 'gPV' type conforming to IEC 60269-6.

2.2.4 DC switch disconnecter of suitable rating shall be provided at SCB output / SIB to disconnect both positive and negative side simultaneously.

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

2.2.6 Connector conforming to IS 17293 / IEC 62852 shall be provided at each SCB input. Cable gland (double compression metallic) of suitable size for DC cables shall be provided at the SCB output.

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

## **2.3 Warranty**

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

## **2.4 Tests**

Routine tests and acceptance tests for the assembled unit shall be as per the Quality Assurance Plan (QAP) approved by the Employer.

## **3 SOLAR AND DC CABLES**

### **3.1 Standards and Codes**

Cable	From	To	Conductor/ Insulation	Voltage Rating	Applicable Standard
Solar Cable*	Module	SCB	Copper/ XLPO	1.5 kV DC	IS 17293 / IEC 62930
DC Cable	SCB	PCU	Copper or Aluminium / XLPE	1.5 kV DC	IS 7098 Part II

\* Cable used for module interconnection shall also be referred as solar cable.

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

3.3 DC cables shall be single core, armoured, Flame Retardant Low smoke (FRLS), PVC outer sheath conforming to IS 7098-II. DC cable with positive polarity and negative polarity shall have red and black outer sheath respectively.

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

- Cable size and voltage grade
- Word 'HALOGEN FREE LOW SMOKE'
- Sequential marking of length of the cable

3.5 Cables shall be sized based on the following considerations:

- Rated current of module





# **Telangana Renewable Energy Development Corporation Ltd**

Tender Ref. No. TGREDCO/PBDS/Solar/IMSS/2024/ Dated: 25.11.2024

- ii. In case of central inverters, average voltage drop in the cables (from PV Modules to PCU) shall be limited to 1.5 % of the rated voltage. In case of string Inverters, average voltage drop (from PV module to string inverter) shall be limited to 0.5% of the rated voltage drop. The Contractor shall provide voltage drop calculations in excel sheet.
- iii. Short circuit withstand capability
- iv. De-rating factors according to laying pattern

## **3.6 Warranty**

The cables (Solar and DC) shall be warranted against all material/ manufacturing defects and workmanship for minimum of 1 (one) year from the date of supply.

## **3.7 Tests**

Type test, routine test and acceptance tests requirements shall be as per IS 17293 / IEC 62930 for solar cables and IS 7098-II for DC cables.

## **3.8 Installation**

3.8.1 Cable installation shall be as per IS 1255.

3.8.2 Only terminal cable joints shall be accepted. No cable joint to join two cable ends shall be accepted.

3.8.3 Solar cables shall be provided with UV resistant printed ferrules and DC cables shall be provided with punched/ embossed aluminium tags. The marking shall be done with good quality letter and numbers of proper size so that the cables can be identified easily.

3.8.4 Solar cables or group of solar cables combined through branch connector may be laid over ground on GI or FRP cable trays / underground through Double Wall Corrugated (DWC) HDPE conduits from PV String (Series connection of PV Modules) to SCB/String Inverter. The size of the conduit or pipe shall be selected on the basis of 40% fill criteria. Solar cable terminations shall be made with connectors complying IS 16781 / IEC 62852. The connectors shall have degree of protection of IP 68.

3.8.5 Solar cables shall be aesthetically tied to Module Mounting Structure using GI/SS cable-ties.

3.8.6 DC cables from SCB to PCU shall be laid directly buried underground as per IS 1255. DC cable terminations shall be made with properly crimped lugs and passed through cable glands at the entry & exit point of the cubicles. Bimetallic lugs shall be used for connecting Cu bus bar and Al cables or vice-versa.

## **4 POWER CONDITIONING UNIT**

### **4.1 Standards and Codes**

Power Conditioning Unit (PCU) shall comply with the specified edition of the following standards and codes.

Standard	Description
IEC 61683 Ed.1	Photovoltaic systems - Power conditioners - Procedure for measuring efficiency
IEC 62109-1 Ed.1	Safety of power converters for use in photovoltaic power systems - Part 1: General requirements
IEC 62109-2 Ed.1	Safety of power converters for use in photovoltaic power systems - Part 2: Particular requirements for inverters





# **Telangana Renewable Energy Development Corporation Ltd**

Tender Ref. No. TGREDCO/PBDS/Solar/IMSS/2024/ Dated: 25.11.2024

Standard	Description
IEC 61000-6-2 Ed.3	Electromagnetic compatibility (EMC) - Part 6-2: Generic standards - Immunity standard for industrial environments
IEC 61000-6-4 Ed.3	Electromagnetic compatibility (EMC) - Part 6-4: Generic standards - Emission standard for industrial environments
IEC 62116 Ed.2	Utility-interconnected photovoltaic inverters - Test procedure of islanding prevention measures
IEC 60068-2-1 Ed.6	Environmental testing - Part 2-1: Tests - Test A: Cold
IEC 60068-2-2 Ed.5	Environmental testing - Part 2-2: Tests - Test B: Dry heat
IEC 60068-2-14 Ed.6	Environmental testing - Part 2-14: Tests - Test N: Change of temperature
IEC 60068-2-30 Ed.3	Environmental testing - Part 2-30: Tests - Test Db: Damp heat, cyclic (12 h + 12 h cycle)
CEA Technical Standards for Connectivity to the Grid Regulations 2007 with 2013 and 2019 Amendment	
As per the Solar Photovoltaics, Systems, Devices and Components Goods (Requirements for Compulsory Registration) Order, 2017, Inverters used in the grid connected solar power projects shall be registered with BIS and bear the Standard Mark as notified by the Bureau of Indian Standards.	

## **4.2 Supplier Qualification Criteria**

The Inverter Supplier shall be Class-I local supplier as per MNRE Order on Public Procurement (Preference to Make in India) to provide for Purchase Preference (linked with local content) in respect of Renewable Energy (RE) Sector dated 9th February, 2021 and subsequent amendments.

## **4.3 Technical Requirements**

Parameter	Specification
Type	Central/String
Rated AC power	As per design
Maximum input voltage	1500 V
Rated AC output voltage	As per design
Tolerance on rated AC output voltage	+/-10%
Rated frequency	50 Hz
Operating frequency range	47.5 Hz to 52 Hz
Power factor control range	0.8 lag to 0.8 lead
European efficiency	Minimum 98%
Maximum loss in Sleep Mode	0.05% of rated AC power
Total Harmonic Distortion	Less than 3% at 100% load
Degree of protection	Central Inverter – IP 20 (Indoor) / IP 54 (Outdoor), String Inverter – IP 65

4.3.1 The rated/ name plate AC capacity of the PCU shall be AC power output of the PCU at 25°C.

Note: The equipment shall be suitably derated for the Altitude.

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

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



# **Telangana Renewable Energy Development Corporation Ltd**

Tender Ref. No. TGREDCO/PBDS/Solar/IMSS/2024/ Dated: 25.11.2024

accommodate the allowable grid voltage and frequency variations.

## **4.4 Construction**

- 4.4.1 Power Conditioning Unit (PCU) shall consist of an electronic three phase inverter along with associated control, protection, filtering, measurement and data logging devices.
- 4.4.2 Every DC input terminal of PCU shall be provided with fuse / MCB / MCCB of appropriate rating. The combined DC feeder shall have suitably rated isolators for safe start up and shut down of the system. One spare DC input terminal shall be provided for each PCU. String inverters without DC fuse may be acceptable in case not more than two strings are connected to the same MPPT.
- 4.4.3 DC input current monitoring shall be provided at each input of the PCU.
- 4.4.4 Type-I+II surge protective device (SPD) conforming to IEC 61643-31 shall be connected between positive/ negative bus and earth on the DC side. Type-II SPD conforming to IEC 61643-11 shall be provided on the AC side.
- 4.4.5 In case external auxiliary power supply is required, UPS shall be used to meet auxiliary power requirement of PCU. It shall have a backup storage capacity of 2 hours.
- 4.4.6 Circuit Breaker or Relay of appropriate voltage and current rating shall be provided at the output to isolate the PCU from grid in case of faults.
- 4.4.7 The PCU shall be tropicalized and the design shall be compatible with conditions prevailing at site. Suitable number of exhaust fan with proper ducting shall be provided for cooling keeping in mind the extreme climatic condition of the site as per the recommendations of OEM to achieve desired performance and life expectancy.
- 4.4.8 All the conducting parts of the PCU that are not intended to carry current shall be bonded together and connected to dedicated earth pits through protective conductor of appropriate size. Grounding on DC side of the PCU shall be as per the requirements of PV Module Manufacturer.
- 4.4.9 Dedicated communication interface shall be provided to monitor the PCU from SCADA.
- 4.4.10 PCU front panel shall be provided with LCD/ LED to display all the relevant parameters related to PCU operation and fault conditions. It shall include, but not limited to, the following parameters.
  - i. DC input power
  - ii. DC input voltage
  - iii. DC input current (for each terminal)
  - iv. AC output power
  - v. AC output voltage (all the 3 phases and line)
  - vi. AC output current (all the 3 phases and line)
  - vii. Frequency
  - viii. Power Factor

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

- 4.4.11 String inverter, if installed in open, shall be placed inside a canopy shed with at least



15 cm in all directions.

4.4.12 AC combiner box for string inverter configuration shall comply with Clause 9 of the Technical Specifications with exception of the following.

- i. Rated System Voltage – Inverter Output Voltage
- ii. IP Rating – IP 5X (Indoor)
- iii. Metering System – Not required
- iv. CBCT – Not applicable

## **4.5 Operating Modes**

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

### **4.5.1 Standby Mode**

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

### **4.5.2 MPPT Mode**

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

### **4.5.3 Sleep Mode**

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

The Contractor shall also provide the short-circuit characteristics of the PCU (Voltage and Time dependent) as per the CTU requirements for Connectivity.

## **4.6 Protection Features**

The PCU shall include appropriate self-protective and self-diagnostic feature to protect itself and the PV array from damage in the event of PCU component failure or from parameters beyond the PCU's safe operating range due to internal or external causes. The self-protective features shall not allow signals from the PCU front panel to cause the PCU to be operated in a manner which may be unsafe or damaging. Faults due to malfunctioning within the PCU, including commutation failure, shall be cleared by the PCU protective devices.

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

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



# **Telangana Renewable Energy Development Corporation Ltd**

Tender Ref. No. TGREDCO/PBDS/Solar/IMSS/2024/ Dated: 25.11.2024

## **4.7 Grid Support Functions**

### **4.7.1 Active power regulation**

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

### **4.7.2 Reactive power control**

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

### **4.7.3 Voltage Ride Through**

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

## **4.8 Warranty**

The complete Power Conditioning Unit shall be warranted against all material/manufacturing defects and workmanship for minimum of 5 (five) years from the date of supply.

## **4.9 Tests**

### **4.9.1 Type Tests**

The type test certificates as per the standards mentioned above should be from any of the ILAC/IECEE member signatory accredited test centers. Laboratory accreditation certificate or weblink along with scope of accreditation shall also be submitted. It is the responsibility of the Contractor to substantiate the compliance for CEA Regulations using test reports.

### **4.9.2 Routine Tests**

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

## **5 INVERTER TRANSFORMER AND AUXILIARY TRANSFORMER**

### **5.1 Standards and Codes**

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

<b>Standard</b>	<b>Description</b>
IS 2026, IEC 60076	Specification of Power Transformers
IS 11171, IEC 60076	Dry-Type Power Transformers
IS 2099, IEC 60137	Bushings for alternate voltage above 1000 V
IS 335, IEC 60296	Insulating oil
IS 3639	Fittings and Accessories for Power Transformers



# Telangana Renewable Energy Development Corporation Ltd

Tender Ref. No. TGREDCO/PBDS/Solar/IMSS/2024/ Dated: 25.11.2024

Standard	Description
IS 12063	Degree of protection provided by enclosures
CBIP publication no. 317	
CEA regulations and other statutory regulations	

## 5.2 Technical Requirements

Parameters	Inverter Transformer	Auxiliary Transformer
VA Rating	As per system design requirement	
Voltage Ratio	11 kV / Inverter output voltage	As per system design
Duty, Service & Application	Continuous Solar Inverter application and converter Duty (Outdoor)	Continuous application (Outdoor/Indoor)
Winding	As per system design requirement	2
Frequency	50 Hz	50Hz
Nos. of Phase	3	3
Vector Group & Neutral earthing	As per system/inverter manufacturer requirement	Dyn11
Cooling	ONAN	ONAN / AN
Tap Changer	OCTC, No. of steps shall be as per system requirement	
Impedance at 75°C	As per Inverter Manufacturer requirement	As per system requirement
Permissible Temperature rise over an ambient of 50°C (irrespective of tap)		
Top Oil	50°C	As per IS/IEC
Winding	55°C	As per IS/IEC
SC withstand time (thermal)	2 second	2 second
Short Circuit Apparent power	As per system requirement	
Termination	As per system requirement	
Bushing rating, Insulation class (Winding & bushing)	12 kV – porcelain bushings 1.1 kV – epoxy bushings	As per the system requirement
Noise level	As per NEMA TR-1	
Loading Capability	Continuous operation at rated MVA on any tap with voltage variation of +/-3%, also transformer shall be capable of being loaded in accordance with IEC 60076-7	
Flux density	Not to exceed 1.9 Wb/sq.m. at any tap position with combined frequency and voltage variation from rated V/f	



## **Telangana Renewable Energy Development Corporation Ltd**

Tender Ref. No. TGREDCO/PBDS/Solar/IMSS/2024/ Dated: 25.11.2024

Parameters	Inverter Transformer	Auxiliary Transformer
	ratio by 10% corresponding to the tap. Transformer shall also withstand following over fluxing conditions due to combined voltage and frequency fluctuations: a) 110% for continuous rating b) 125% for at least one minute c) 140% for at least five seconds. Bidder shall furnish over fluxing characteristic up to 150%	
Air Clearance	As per IS/IEC	

### **5.3 Construction**

- 5.3.1 The transformer shall be provided with conventional single compartment conservator with prismatic toughened glass oil gauge. The top of the conservator shall be connected to the atmosphere through indicating type cobalt free silica gel breather with transparent enclosure. Silica gel shall be isolated from atmosphere by an oil seal. Inverter transformers shall be provided with Magnetic Oil Gauge (MOG) with low oil level alarm contact.
- 5.3.2 It is the responsibility of the Contractor to ensure that the inverter transformer comply with all the requirements of inverter provided by the inverter manufacturer.
- 5.3.3 Inverter Transformer shall be designed for at least 5% total harmonic distortion (THD) to withstand distortion generated by the inverter as well as possible outside harmonics from the network.
- 5.3.4 The transformer shall be suitable for continuous operation with a frequency variation of  $\pm 2.5\%$  from nominal frequency of 50 Hz without exceeding the specified temperature rise.
- 5.3.5 Inverter Transformer shall have shield winding between LV & HV windings. Each LV winding must be capable of handling non-sinusoidal voltage with voltage gradient as specified by the inverter manufacturer. Also, shield winding shall be taken out from tank through shield bushing and the same shall be brought down to the bottom of the tank using copper flat and support insulator for independent grounding.
- 5.3.6 Neutral earthing of inverter transformer shall be as per the recommendations of inverter manufacturer. Even if neutral earthing is not required, neutral bushing shall be brought outside the tank for the testing purpose. It shall be covered with MS sheet and a sticker "For testing purpose only. Do not earth". Neutral bushing of auxiliary transformer shall be brought outside the tank for earthing.
- 5.3.7 Transformer shall have 150 mm dial type Oil Temperature Indicator (OTI) and Winding Temperature Indicator (WTI) with alarm and trip contacts. All indicators shall have accuracy of 1.5%. For inverter transformers, WTI shall be provided for all the windings.
- 5.3.8 The radiators shall be detachable type, mounted on the tank with shut off valve at each point of connection to the tank, lifts, along with drain plug/ valve at the bottom and air release plug at the top.





## **Telangana Renewable Energy Development Corporation Ltd**

Tender Ref. No. TGREDCO/PBDS/Solar/IMSS/2024/ Dated: 25.11.2024

- 5.3.9 Marshalling Box shall be of sheet steel, dust and vermin proof provided with proper lighting and thermostatically controlled space heaters. The degree of protection shall be IP 55. Marshalling Box of all transformers shall be preferably Tank Mounted. One dummy terminal block in between each trip wire terminal shall be provided. At least 10% spare terminals shall be provided on each panel. The gasket used shall be of neoprene rubber. Wiring scheme (TB details) shall be engraved in a stainless-steel plate with viewable font size and the same shall be fixed inside the Marshalling Box door.
- 5.3.10 Buchholz relay, double float type with alarm and trip contacts, along with suitable gas collecting arrangement shall be provided.
- 5.3.11 Inverter transformer shall be provided with spring operated Pressure Relief Device (with trip contacts) with suitable discharge arrangement for oil. For Auxiliary transformers, diaphragm type explosion vent shall be provided.
- 5.3.12 Filter valve at top the tank and drain cum sampling valve at bottom of the tank shall be provided.
- 5.3.13 All external surface of the transformer shall be painted with two coats of epoxy- based paint of colour shade RAL 7032. Internal surface of cable boxes and marshalling box shall be painted with epoxy enamel white paint. The minimum dry film thickness (DFT) shall be 100 microns.
- 5.3.14 LV and HV cable box shall be provided with disconnecting chamber to facilitate the movement of transformer without disturbing cable box and termination.
- 5.3.15 Air release plug, bi-directional wheel/skids, cover lifting eyes, transformer lifting lugs, jacking pads, towing holes, core and winding lifting lugs, inspection cover, rating plate, valve schedule plate, accessories and terminal marking plates, two nos. of earthing terminals shall be provided.
- 5.3.16 Rain hoods to be provided on Buchholz, MOG & PRD. Entry points of wires shall be suitably sealed.
- 5.3.17 The accessories listed above are indicative only. Accessories which are not mentioned above but required for satisfactory operation of the transformers are deemed to be included in the contract without extra charges.
- 5.3.18 Fire-protection for inverter transformer shall be provided in accordance with relevant CEA regulations as amended time to time.

### **5.4 Dry Type Auxiliary Transformer**

- 5.4.1 Transformer shall be cast resin encapsulated dry type transformer, made of cold rolled grain-oriented silicon steel laminations of M4 grade or better. Winding conductor shall be electrolytic grade Copper/Aluminium and insulation shall be Class F or better.
- 5.4.2 The transformers shall be housed in a metal protective housing, having a degree of protection of IP 23 suitable for indoor installation. The enclosure shall be provided with suitable hardware and accessories required for satisfactory operation of the transformer per the relevant standard.





# **Telangana Renewable Energy Development Corporation Ltd**

Tender Ref. No. TGREDCO/PBDS/Solar/IMSS/2024/ Dated: 25.11.2024

## **5.5 Warranty**

The transformer shall be warranted against all material/ manufacturing defects and workmanship for minimum of 5 (five) years from the date of supply.

## **5.6 Testing and Inspection**

### **5.6.1 Type Tests and Special Tests**

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

#### **5.6.1.1 Type Tests**

- i. Lightning impulse (Full & Chopped Wave) test on windings as per IEC 60076-3
- ii. Temperature Rise test at a tap corresponding to maximum losses as per IEC 60076-2
- iii. Tank vacuum test & pressure test as per CBIP manual

#### **5.6.1.2 Special Tests**

- i. Measurement of zero-sequence impedance as per IEC 60076-1
- ii. Measurement of harmonics of no-load current as per IEC 60076-1
- iii. Measurement of acoustic noise level as per NEMA TR-1
- iv. Short-circuit withstand test as per IEC 60076-5

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

5.6.1.3 Type tests mentioned in Clause 5.6.1.1(ii) & (iii) shall be performed for auxiliary transformers. Special tests are not required.

### **5.6.2 Routine Tests**

Each completed transformer shall be subjected to following routine tests as per the latest edition of IEC 60076 unless specified otherwise.

- i. Measurement of winding resistance at each tap
- ii. Measurement of voltage ratio between HV and LV windings at each tap
- iii. Check of vector group
- iv. Measurement of no-load loss and no-load current
- v. Measurement of short-circuit impedance and load loss
- vi. Magnetic balance test as per CBIP manual publication no. 295
- vii. Separate source voltage withstand test
- viii. Induced over voltage withstand test
- ix. Measurement of insulation resistance
- x. Marshalling box functional test
- xi. IR Measurement on wiring of marshalling box
- xii. Breakdown voltage test on transformer oil as per IS 335
- xiii. Oil leakage test on completely assembled transformer along with radiators

### **5.6.3 Tests at Site**

After erection at site all transformer(s) shall be subjected to the following tests.

- i. Measurement of voltage ratio
- ii. Check of vector group



# **Telangana Renewable Energy Development Corporation Ltd**

Tender Ref. No. TGREDCO/PBDS/Solar/IMSS/2024/ Dated: 25.11.2024

- iii. Magnetic balance test
- iv. Measurement of insulation resistance
- v. Breakdown voltage test on transformer oil

In case the equipment is not found as per the requirements of the Technical Specifications of NIT, all expenses incurred during site testing will be to the Contractor's account and the equipment shall be replaced by him at free of cost.

## **6 11 KV HT SWITCHGEAR PANEL**

### **6.1 Standards and Codes**

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

Standard/Code	Description
IS/IEC 62271-1	High Voltage Switchgear and Control gear - Part 1: Common Specifications
IS/IEC 62271-100	High Voltage Switchgear and Control gear - Part 100: AC Circuit Breakers
IS/IEC 62271-102	High Voltage Switchgear and Control gear - Part 102: AC Disconnectors and Earthing Switches
IS/IEC 62271-200	High Voltage Switchgear and Control gear - Part 200: AC Metal Enclosed Switchgear and Control gear for Rated Voltages Above 1 kV and Up to and Including 52 kV
IEC 62271-206	High-voltage Switchgear and Control gear - Part 206: Voltage presence indicating systems for rated voltages above 1 kV and up to and including 52 kV
IEC 61869	Instrument Transformers
IS 3231	Electrical relays for power systems protection
IEC 60255	Measuring relays and protection equipment
IEC 61850	Communication networks and systems for power utility automation
IEC 61131-3	Programmable controllers - Part 3: Programming languages
IS 9385	High voltage fuses
IS 9431	Indoor post insulators of organic material for systems with nominal voltages greater than 1000 V up to and including 300 kV
IEC 60099-4	Surge arresters - Part 4: Metal-oxide surge arresters without gaps for A.C. systems
IS 15086-4	Surge Arresters, Part 4: Metal-Oxide Surge Arresters Without Gaps for A.C. systems
IEC 62052-11	Electricity metering equipment (A.C.) - General requirements, tests and test conditions - Part 11: Metering equipment
IEC 62053	Electricity metering equipment (A.C.) – Particular requirements
IS 14697	AC Static Transformer Operated Watthour and Var-hour Meters, Class 0.2S and 0.5S



# **Telangana Renewable Energy Development Corporation Ltd**

Tender Ref. No. TGREDCO/PBDS/Solar/IMSS/2024/ Dated: 25.11.2024

## **6.2 Technical Parameters**

Parameter	Specification
<b>System Parameters</b>	
<b>Note:</b> Electrical ratings of switchgear shall be in accordance with <b>altitude correction factors above their standard designs</b> , applicable as per IS/IEC 62271-1	
Highest system voltage	13 kV
Rated system voltage	11 kV
Rated frequency	50 Hz
Number of phases	3
Power frequency withstand voltage	70 kV (r.m.s.)
Lightning impulse withstand voltage	170 kV (peak)
System fault current	25 kA / 1s
Internal Arc Classification	IAC-A, FLR, 25 kA for 1s
<b>Circuit Breaker</b>	
Type	Vacuum type
Operating duty cycle	O – 3min – CO – 3min – CO
Short circuit breaking current	As per system requirement
Short circuit making current	2.5 times S.C. breaking current
Re-strike performance class	C1
Mechanical endurance class	M1
<b>Current Transformer</b>	
Accuracy class	0.2 for metering (0.2S for metering at outgoing feeder), 5P20 for protection
Rated VA burden	As per requirement
Insulation class	Class E or better
<b>Voltage Transformer</b>	
Accuracy class	0.2 for metering, 3P for protection
Rated VA burden	As per requirement
Insulation class	Class E or better

## **6.3 Switchgear Panel**

- 6.3.1 The switchgear panel shall be free standing, floor mounted, single front, single tier fully compartmentalized, metal enclosed construction. Each panel shall have separate compartments for circuit breaker, bus bars, cable termination and auxiliary circuit.
- 6.3.2 The circuit breakers shall be mounted on horizontally withdrawable trucks with locking facility in SERVICE and TEST positions.
- 6.3.3 The panel enclosure shall be constructed with CRCA steel/Aluzinc sheet. The thickness of load bearing members shall be minimum 3 mm and that of non-load bearing members shall be minimum 2 mm.



## **Telangana Renewable Energy Development Corporation Ltd**

Tender Ref. No. TGREDCO/PBDS/Solar/IMSS/2024/ Dated: 25.11.2024

- 6.3.4 All surfaces shall be painted with two coats of epoxy-based paint of colour shade RAL 7032. The minimum dry film thickness (DFT) shall be 100 micron.
- 6.3.5 The circuit breaker and auxiliary circuit compartments provided on the front side shall have separate concealed hinged doors. Cable and bus bar compartments provided on the rear side shall have separate bolted covers. All doors and covers shall be provided with neoprene/synthetic rubber gaskets to prevent entry of vermin and dust.
- 6.3.6 Pressure relief device shall be provided in each high voltage compartment of a panel to safely vent the gases in the event of internal arc. Seal-off bushing arrangement shall be provided between the breaker compartment and bus bar/cable compartments to prevent transfer of arc from one compartment to other.
- 6.3.7 Automatic safety shutters shall be provided to cover up the fixed high voltage contacts on bus bar and cable sides when the truck is moved to TEST position.
- 6.3.8 Degree of protection shall not be less than IP 5X for auxiliary circuit compartment. However, for remaining compartments it shall not be less than IP 4X. For outdoor panels, degree of protection shall not be less than IP 55.
- 6.3.9 Mechanical /Electrical interlocks shall be provided to prevent mal-operation and in particular to ensure the following.
- The breaker shall be operated only if it is in SERVICE or TEST position.
  - Movement of the breaker truck between SERVICE and TEST positions shall be possible only if the breaker is OFF.
  - It shall be possible to open the door only when the breaker is in TEST position.
- 6.3.10 Each switchgear panel shall be provided with thermostatically controlled space heaters, separately for breaker, cable and bus bar compartments, to prevent condensation within the compartment. The space heater shall be connected to 240 V, 50 Hz, single phase AC supply through suitable switch and fuse.
- 6.3.11 240 V, 5 A, SPN industrial socket-outlet with ON/OFF switch shall be provided in each panel.
- 6.3.12 Each panel shall be provided with LED lamp rated for 240 V, 50 Hz, single phase AC supply for interior illumination controlled by door switch.
- 6.3.13 Gapless, metal-oxide surge arrestors shall be provided between line and earth in cable compartment of the switchgear panel.
- 6.3.14 Suitable lifting hooks shall be provided for each panel.
- 6.4 Circuit Breakers**
- 6.4.1 Circuit breakers shall be of vacuum type. It shall comprise of three separate identical single pole units operated through the common shaft and shall be fully interchangeable both electrically and mechanically.
- 6.4.2 The circuit breaker operating mechanism shall be based on motor operated spring charging and it shall be re-strike free, trip free both electrically and mechanically, with anti-pumping feature.
- 6.4.3 The rated control voltage shall be 110 VDC/220 VDC. The closing coil and spring charging motor shall operate at all values of control voltage between 85% and 110% of rated



## **Telangana Renewable Energy Development Corporation Ltd**

Tender Ref. No. TGREDCO/PBDS/Solar/IMSS/2024/ Dated: 25.11.2024

voltage. The shunt trip coil shall operate correctly under all operating conditions of the circuit breaker up to the rated short-circuit breaking capacity and at all values of control voltage between 70% and 110% of rated voltage.

6.4.4 Each circuit breaker shall be provided with two tripping coils. Each trip coil shall have its own actuating contacts.

6.4.5 The spring charging motor shall have adequate thermal rating such that continuous sequence of the closing and opening operations is possible as long as power supply is available to the motor. It shall also be possible to charge the spring manually and close the breaker in the event of failure of motor / control supply to motor. Operating handle shall be provided for charging the operating mechanism. After failure of control supply to the motor, one open-close-open operation shall be possible with the energy contained in the operating mechanism.

6.4.6 The motor rating shall be such that it requires not more than 30 seconds for full charging of the closing spring. Closing action of the circuit breaker shall compress the opening spring ready for tripping. When closing springs are discharged after closing the breaker, they shall be automatically charged for the next operation.

6.4.7 Mechanical indicators shall be provided to indicate OPEN/CLOSED positions of the circuit breaker and CHARGED/ DISCHARGED positions of the closing spring. An operation counter shall also be provided. These indicators and counter shall be visible from the panel front door without opening it.

### **6.5 Relays**

6.5.1 All relays shall be microprocessor based numerical type. However, auxiliary relays can be static or electromechanical type. The relays shall be flush mounted on panel front with connections from the inside.

6.5.2 Auxiliary voltage of the relays shall be 110 VDC / 220 VDC and the relays shall be capable of operating continuously between 80 – 120% of auxiliary voltage.

6.5.3 All numerical relays shall have adequate number of freely configurable, optically isolated, Binary Inputs (BI) and potential free Binary Outputs (BO).

6.5.4 All numerical relays shall have minimum four no. of current inputs, three for phase current and one for earth current, suitable for CT secondary current of 1A. The current inputs shall be compatible with both residual connected CT and Core Balance CT (CBCT). In addition, numerical relay in main outgoing feeder shall have three no. of voltage inputs for Under Voltage/Over Voltage protection.

6.5.5 All I/O's shall have galvanic isolation. Analog inputs shall be protected against switching surges and harmonics.

6.5.6 Making, breaking and continuous capacity of the relay contacts shall be adequate enough for the circuits in which they are used.

6.5.7 The numerical relay shall have the following protection functions with at least two independent protection setting groups. The protection functions shall be selectable from any of the IEC characteristic curves.

- i. Definite time (DT) phase over current protection
- ii. Inverse Definite Minimum Time (IDMT) phase over current protection



## **Telangana Renewable Energy Development Corporation Ltd**

Tender Ref. No. TGREDCO/PBDS/Solar/IMSS/2024/ Dated: 25.11.2024

- iii. Definite time (DT) earth fault current protection
- iv. Inverse Definite Minimum Time (IDMT) earth fault current protection
- v. Under Voltage protection
- vi. Over Voltage protection

6.5.8 Transformer feeder protection relay shall have provision for the following protection functions.

- i. Buchholz alarm & trip
- ii. Oil Temperature Indicator (OTI) alarm & trip
- iii. Winding Temperature Indicator (WTI) alarm & trip
- iv. Pressure Relief Valve (PRV) trip
- v. Magnetic Oil Gauge (MOG) alarm

6.5.9 All numerical relays shall have provision for measurement and storage of electrical parameters such as voltage, current, frequency, active power, reactive power etc.

6.5.10 The numerical relay shall be able to record faults and events in non-volatile memory.

- i. Fault record – At least 5 recent faults including the protection function operated, operating phase(s), voltages and currents along with date and time stamp.
- ii. Event record – At least 200 events with date and time stamp.

6.5.11 The numerical relay shall have trip circuit supervision facility to monitor the circuit breaker trip circuit both in pre-trip and post-trip conditions. The relay shall also be able to provide circuit breaker monitoring, CT and VT supervision.

6.5.12 The numerical relay shall have self-diagnostic feature with separate output contact for indication of any internal relay failure.

6.5.13 The numerical relay shall have feature for time synchronization through the SCADA System / networking.

6.5.14 The numerical relay shall be provided with backlit alphanumeric LCD to access protection settings, measurement parameters, fault and event records. Read and write access to protection settings shall be password protected.

### **6.6 Instrument Transformers**

6.6.1 Instrument transformers shall be completely encapsulated cast resin type, suitable for continuous operation at the ambient temperature prevailing inside the switchgear enclosure, when the switchgear is operating at its rated load and the outside ambient temperature is 50°C.

6.6.2 Polarity marks shall indelibly be marked on each instrument transformer and at the lead terminals at the associated terminal block.

6.6.3 Voltage transformers shall be single phase units. Bus voltage transformers shall be housed in a separate panel on withdrawable truck.

6.6.4 HRC fuses of suitable rating shall be provided on primary side of voltage transformers. For secondary side, four pole Miniature Circuit Breakers (MCB) shall be provided.

### **6.7 Earthing**

6.7.1 An earth bus made of copper shall be provided throughout the length of the panel. It shall be bolted to the framework of each panel and brazed to each breaker earthing contact bar.

6.7.2 The earth bus shall have sufficient cross section to carry maximum fault current without





## **Telangana Renewable Energy Development Corporation Ltd**

Tender Ref. No. TGREDCO/PBDS/Solar/IMSS/2024/ Dated: 25.11.2024

exceeding the allowable temperature rise.

- 6.7.3 All non-current carrying conductors of the panel shall be connected to the earth bus. All joints to the earth bus shall be made through at least two bolts. Hinged doors shall be earthed through flexible earthing braid of adequate cross section. Suitable provision shall be provided at each end of the earth bus for connection with Owner's Earth conductor.
- 6.7.4 Positive earthing of the breaker truck and frame shall be maintained when it is in the connected position and in all other positions whilst the auxiliary circuits are not totally disconnected.
- 6.7.5 All metallic cases of relays, instruments and other panel mounted equipment shall be connected to earth bus by independent copper wires of size not less than 2.5 sq. mm with green colour insulation.
- 6.7.6 Instrument transformer secondary neutral point shall be earthed at one place only on the terminal block. Such earthing shall be made through links so that earthing of one circuit may be removed without disturbing the earthing of other circuits.
- 6.7.7 Separate earthing trucks shall be provided for earthing of busbars and incoming/outgoing feeders. The trucks shall have voltage transformer to indicate presence of voltage prior to earthing. An audible alarm shall also be provided in case of voltage on the earthing terminal. Integral earth switches may also be considered instead of earthing trucks. The earthing truck/switch shall have short circuit withstand capability equal to that of the associated switchgear panel.
- 6.7.8 The interlocks shall be provided to ensure the following.
- (i) It is not possible to rack-in the earthing truck/close the earthing switch when the breaker truck is in SERVICE position.
  - (ii) It is not possible to rack-in the breaker truck into SERVICE position when earthing truck is connected/earthing switch is in closed position.

### **6.8 Bus bar**

- 6.8.1 Bus bar shall be made of copper or aluminium with uniform cross section throughout their length. They shall be adequately supported on insulators to withstand electrical and mechanical stresses due to specified short circuit current.
- 6.8.2 All bus bars joints shall be thoroughly cleaned and anti-oxide grease shall be applied. Plain and spring washers shall be provided to ensure good contacts at the joints and taps. Wherever aluminium to copper connections are required, suitable bimetallic connectors or clamps shall be used.
- 6.8.3 Bus bars shall be provided with heat shrinkable sleeves of suitable insulation class throughout their length with proper colour coding. All bus bar joints and taps shall be shrouded.
- 6.8.4 Bus bar support insulators shall be made of non-hygroscopic, arc and track resistant, high strength material suitable to withstand stresses due to over voltage and short circuit current.
- 6.8.5 The Contractor shall submit busbar sizing calculation for specified continuous and short time current ratings during detailed engineering.





## **Telangana Renewable Energy Development Corporation Ltd**

Tender Ref. No. TGREDCO/PBDS/Solar/IMSS/2024/ Dated: 25.11.2024

### **6.9 Measuring Instruments**

6.9.1 All the measuring instruments shall be digital, flush mounting type with communication facility.

6.9.2 All feeders except main outgoing feeder shall be provided with digital Multi-Function Meter (MFM). Tri Vector Meter (TVM) shall be provided for the main outgoing feeder (in the HT Panel). Accuracy class of MFM shall be 0.2 and that of TVM shall be 0.2S.

6.9.3 Measuring instruments shall have provision to display the following parameters.

- (i) Line and phase voltages
- (ii) Line and phase currents
- (iii) Active power, Reactive power, Apparent power
- (iv) Frequency
- (v) Power factor
- (vi) Total Harmonic Distortion (THD)

### **6.10 Wiring and Terminal blocks**

6.10.1 All internal wiring shall be done with 650 V grade, 1.5 sq.mm. PVC insulated stranded flexible copper wire. For CT secondary circuits, 2.5 sq.mm copper wire shall be used.

6.10.2 Wire terminations shall be made with solderless crimping type tinned copper lugs, which shall firmly grip the conductor. Insulation sleeves shall be provided at all the wire terminations.

6.10.3 Printed identification ferrules, marked to correspond with panel wiring diagram shall be provided at both ends of each wire. The ferrules shall be firmly located on each wire so that they cannot move or turn freely on the wire. Wire identification shall be done in accordance with IS 11353.

6.10.4 The Contractor shall be solely responsible for the completeness and correctness of the internal wiring and for the proper functioning of the connected equipment.

6.10.5 All internal wiring to be connected to the external equipment shall terminate on terminal blocks. Terminal blocks shall be rated for 650 V, 10 A and made of non- inflammable material.

6.10.6 CT and VT secondary circuits shall be terminated on stud type, disconnecting terminal blocks.

6.10.7 At least 10% spare terminals shall be provided on each panel and these spare terminals shall be distributed on all terminal blocks.

### **6.11 Warranty**

The HT panel unit shall be warranted against all material/ manufacturing defects and workmanship for minimum of 2 (Two) years from the date of supply.

### **6.12 Testing and Inspection**

#### **6.12.1 Type Tests**

The switchgear panel shall be of type tested design. The following type test reports shall be submitted during detailed engineering. The tests should have been conducted on the similar equipment by NABL accredited laboratory. Validity period of type tests conducted on



## **Telangana Renewable Energy Development Corporation Ltd**

Tender Ref. No. TGREDCO/PBDS/Solar/IMSS/2024/ Dated: 25.11.2024

the equipment shall be as per 'CEA Guidelines for the Validity Period of Type Test(s) conducted on Major Electrical Equipment in Power Transmission'.

Test	Standard	Relevant IEC Clause
<b>Switchgear Panel</b>		
Dielectric tests		
Power frequency voltage test	IEC 62271-200	6.2.6.1
Lightning impulse voltage test	IEC 62271-200	6.2.6.2
Dielectric tests on auxiliary and control circuits	IEC 62271-200	6.2.10
Measurement of the resistance of the main circuit	IEC 62271-200	6.4.1
Temperature-rise tests	IEC 62271-200	6.5
Short-time withstand current and peak withstand current tests	IEC 62271-200	6.6
Verification of the IP coding	IEC 62271-200	6.7.1
Verification of making and breaking capacities	IEC 62271-200	6.101
Mechanical operation test	IEC 62271-200	6.102
Internal arc test	IEC 62271-200	6.106
<b>Circuit Breaker</b>		
Mechanical operation test at ambient air temperature (M2 Class)	IEC 62271-100	6.101.2
Basic short-circuit test-duties	IEC 62271-100	6.106
<b>Relays</b>		
Vibration tests	IEC 60255-21-1	
Shock and bump tests	IEC 60255-21-2	
Seismic tests	IEC 60255-21-3	
Electromagnetic compatibility requirements	IEC 60255-26	
Product safety requirements	IEC 60255-27	
Common requirements	IEC 60255-1	
Functional Requirements	Relevant standards of IEC 60255-1xx series	
Communication requirements	IEC 61850	
<b>Current Transformers</b>		
Temperature-rise test	IEC 61869-2	7.2.2
Impulse voltage withstand test on primary terminals	IEC 61869-2	7.2.3
Tests for accuracy	IEC 61869-2	7.2.6
Short-time current tests	IEC 61869-2	7.2.201
<b>Voltage Transformer</b>		
Temperature-rise test	IEC 61869-3	7.2.2
Impulse voltage withstand test on primary terminals	IEC 61869-3	7.2.3
Test for accuracy	IEC 61869-3	7.2.6
Short-circuit withstand capability test	IEC 61869-3	7.2.301



# **Telangana Renewable Energy Development Corporation Ltd**

Tender Ref. No. TGREDCO/PBDS/Solar/IMSS/2024/ Dated: 25.11.2024

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

## **6.12.2 Routine Tests**

Routine tests and acceptance tests shall be as per the Quality Assurance Plan (QAP) approved by the Beneficiary/SHGs authorized representative.

## **7 AC CABLES**

### **7.1 Standards and Codes**

All AC Cables shall conform to the following standards and codes

IS 7098-I	Crosslinked Polyethylene Insulated Thermoplastic Sheathed Cables, Part 1: For Working Voltages up to and including 1100 V
IS 7098-II	Crosslinked Polyethylene Insulated Thermoplastics Sheathed Cables Part 2: For Working Voltages from 3.3 kV up to and including 33 kV

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

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

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

- i. Cable size and voltage grade
- ii. Word 'FRLS' at every meter

7.5 Sequential marking of length of the cable in meters at every meter Cables shall be sized based on the following considerations:

- Rated current the equipment
- In case of Central inverters, average voltage drop in LT cable (from PCU to inverter transformer) shall be limited to 0.5% of the rated voltage. In case of String inverters, average voltage drop (from string inverter to LT combiner panel and from LT combiner panel to Inverter duty transformer) shall be limited to 1.5%. For HT cables (from inverter transformer to Plant take-off point), average voltage drop shall be limited to 1% of the rated voltage. The Contactor shall provide voltage drop calculations in excel sheet.
- Short circuit withstand capability as per design
- De-rating factors according to laying pattern

### **7.6 Warranty**

All cables shall be warranted for minimum of 1 (one) year against all material/manufacturing defects and workmanship from the date of supply.

### **7.7 Testing**

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



# **Telangana Renewable Energy Development Corporation Ltd**

Tender Ref. No. TGREDCO/PBDS/Solar/IMSS/2024/ Dated: 25.11.2024

## **7.8 Installation**

- 7.8.1 Cable installation shall be as per IS 1255.
- 7.8.2 In case of central inverter configuration, AC cables from inverter to inverter transformer shall be laid above ground on horizontal GI cable trays of required width. The cable trays shall be supported on concrete foundations. Minimum clear height of the cable tray shall be 350 mm above FGL.
- 7.8.3 Cables within transformer yard/ switchyard shall be laid through RCC cable trench with supports. 11 kV Switchgear Panel in Local Control Room may be laid over ground on GI cable trays / directly buried underground. AC cables from 11 kV Switchgear Panel in Local Control Room to 11 kV Switchgear Panel in Plant Main Control Room may be laid over ground on GI cable trays / directly buried underground / on over ground transmission lines.
- 7.8.4 Cable terminations shall be made with properly crimped lugs and passed through cable glands at the entry & exit point of the cubicles. Bimetallic lugs shall be used for connecting Cu bus bar and Al cables or vice-versa.
- 7.8.5 AC cables shall be provided with punched/embossed aluminium tags. The marking shall be done with good quality letter and numbers of proper size so that the cables can be identified easily.

## **8 AUXILIARY SUPPLY SYSTEM**

- 8.1 Scheme for auxiliary supply system shall be submitted by contractor during detailed engineering for the approval by Employer.
- 8.2 It shall mainly comprise of auxiliary transformer, AC distribution board(s) (ACDB), Battery & battery charger system, emergency lighting network, Uninterrupted power supply (UPS), distribution cables and metering & protective devices.
- 8.3 Auxiliary system shall incorporate redundant source of power supply for increased reliability.
- 8.4 Following consideration shall be taken into account while sizing the auxiliary transformer:
  - (i) 20% future load margin
  - (ii) Total connected load at 0.8 power factor

## **9 LT SWITCHGEAR**

The LT switchgear specifications mentioned in this section are applicable for auxiliary supply distribution panel, AC combiner box and LT switchgear panel in case of string inverter configuration.

### **9.1 Standards and Codes**

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

Standard/Code	Description
IEC 61439-1	Low-voltage switchgear and control gear assemblies - Part 1: General rules



# **Telangana Renewable Energy Development Corporation Ltd**

Tender Ref. No. TGREDCO/PBDS/Solar/IMSS/2024/ Dated: 25.11.2024

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

## 9.2 Technical Parameters

System Details	
Rated system voltage	415 V $\pm$ 10%, 3 Phase, 50Hz, 4 wire, Neutral Solidly Earthed
Rated frequency	50 Hz $\pm$ 5%
System fault current	As per system requirement
Moulded case circuit breaker (MCCB)	
Rated voltage	415 V
Rated current	As per system requirement
Rated insulation level	690 V
Rated ultimate short-circuit breaking capacity and Rated service short-circuit breaking capacity	As per system fault current
Rated short-circuit making capacity	2.1 $\times$ Rated ultimate short-circuit breaking capacity
Rated short-time withstand current duration	1 s
Utilization category	A
Current transformer (CT)	
Type	Cast Resin Bar Primary
Voltage class and frequency	650 V, 50 Hz
CT Secondary Current	1:00 AM
Class of insulation	Class E or better
Accuracy class & burden	
a) For Protection	5P20, 5VA
b) For Metering	Class 0.5, 5VA (min)



## **Telangana Renewable Energy Development Corporation Ltd**

Tender Ref. No. TGREDCO/PBDS/Solar/IMSS/2024/ Dated: 25.11.2024

Instrument Security Factor for metering CT	5
<b>Voltage transformer (VT)</b>	
Type	Cast Resin
Accuracy class	0.5
Rated Voltage factor	1.1 continuous, 1.5 for 30 seconds
Class of insulation	E or better
<b>Digital Multifunctional Meter (MFM)</b>	
Accuracy class	0.5
Communication with SCADA	RS485 communication with Modbus RTU

### **9.3 Constructional Details**

- 9.3.1 The panel shall be metal enclosed, free standing, floor mounted, modular type with compartmentalized construction having degree of protection of IP 5X (Indoor) and IP 55 (Outdoor) as per IS/IEC 60529. All doors and covers shall be provided with neoprene gaskets to prevent entry of vermin and dust.
- 9.3.2 All switches, push buttons etc. shall be operated front and shall be flush/semi- flush mounted.
- 9.3.3 The panel shall be fabricated from 2 mm CRCA sheet steel for frame & load bearing surfaces. Partitions may be fabricated from 1.6 mm CRCA if no components are mounted on them.
- 9.3.4 Cable entries shall be from bottom. The opening of cable entry shall be covered by 3mm thick gland plates with proper sealing to avoid water and rodent entry.
- 9.3.5 Earthing bus bar of suitable cross section shall be provided throughout the length of panel.
- 9.3.6 The panel shall be duly wired with suitable size of 1.1kV, PVC insulated cable and terminals shall be brought out for cable connections. 10% spare terminals subjected to minimum one of each rating shall be provided on each distribution switchgear. All wire shall have ferrules as per wiring diagram.
- 9.3.7 The panel shall be painted with 2 coats of primer after pre-treatment and 2 coats of Polyurethane / epoxy paint with shade as decided by the Owner.
- 9.3.8 The panel shall be of dead front construction suitable for front operated and back maintained functioning.
- 9.3.9 240 V, 5 A, 3 pin industrial socket-outlet with ON/OFF switch shall be provided in each panel.
- 9.3.10 Each panel shall be provided with LED lamp rated for 240 V, 50 Hz, single phase AC supply for interior illumination controlled by door switch.
- 9.3.11 Suitable lifting hooks shall be provided for each panel.
- 9.3.12 Each switchgear panel shall be provided with thermostatically controlled space heaters to prevent condensation within the enclosure. The space heater shall be connected to 240 V, 50 Hz, single phase AC supply through suitable switch and fuse.
- 9.3.13 Earth leakage relay with Core balance CTs (CBCT) shall be provided on main incoming feeders having phase CT ratio more than 50/1A. CBCT's shall be circular window type





# **Telangana Renewable Energy Development Corporation Ltd**

Tender Ref. No. TGREDCO/PBDS/Solar/IMSS/2024/ Dated: 25.11.2024

with window size based on the overall diameter of the cables, to be finalized during detailed engineering.

## **9.4 Warranty**

LT switchgear shall be warranted against all material/ manufacturing defects and workmanship for minimum of 5 year from the date of supply.

## **9.5 Testing**

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

## **10 LT SWITCHGEAR**

### **10.1 Standards and Codes**

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

### **10.2 General Requirements**

10.2.1 The Uninterrupted Power Supply (UPS) system shall be designed to supply power to following loads (but not limited to).

- (i) Data logger / SCADA
- (ii) Fire Detection/ Alarm Panel
- (iii) HMI of SCADA
- (iv) Emergency Lighting
- (v) Inverter's Auxiliary supply (if applicable)
- (vi) HT panel auxiliary
- (vii) CCTV

10.2.2 UPS system shall comprise of two nos. of UPS of 100% capacity, i.e., two inverters, batteries and UPSDB connected by bus coupler.

10.2.3 Sizing of UPS shall be done considering the above-mentioned load at power factor of 0.8 lagging inclusive of 10% design margin at 50 °C.

10.2.4 The battery sizing shall account for suitable temperature correction factors, ageing factors of 1.25, design margin of 1.1 & depth of discharge of 80%.

### **10.3 System Description**

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

- (i) UPS Module
  - a) Insulated Gate Bipolar Transistor (IGBT) Converter
  - b) Insulated Gate Bipolar Transistor (IGBT) Inverter





# **Telangana Renewable Energy Development Corporation Ltd**

Tender Ref. No. TGREDCO/PBDS/Solar/IMSS/2024/ Dated: 25.11.2024

- c) Digital Signal Processor (DSP) using Pulse Width Modulation (PWM) for Direct Digital Control (DDC) of all UPS control and monitoring functions
- d) Static bypass switch
- (ii) Battery system for 2 hours
- (iii) Battery protective and disconnect device
- (iv) Maintenance bypass switch
- (v) LCD display panel and LED indications
- (vi) Integrated UPS Communications Protocols capable of communicating with SCADA system

10.3.2 The UPS shall meet the following minimum specifications.

Parameter	Specification
Topology	Online double conversion UPS
Overall efficiency	> 90%
<b>Input</b>	
Voltage	230 V $\pm$ 10% AC for UPS rating of less than 5 kVA 415 V $\pm$ 10% AC for UPS rating of 5 kVA and above
Frequency	50 $\pm$ 5%
Power factor	0.95
<b>Output</b>	
Voltage	230V $\pm$ 1% AC
Frequency	50 Hz
Power factor	0.8
<b>Battery</b>	
Type	Sealed, Maintenance-Free (AGM) battery
Capacity	100% UPS load for 2 hours
<b>Monitoring and communication</b>	
LED Indication	Yes
Local Display	LCD / LED
SCADA communication	RS-485 Interface Port

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

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

## **10.4 Warranty**

10.4.1 UPS shall be warranted for minimum of 5 (five) years and batteries shall be warranted for a minimum of 2 (two) years against all material/ manufacturing defects and workmanship from the date of supply.

## **10.5 Tests**

- Routine tests and acceptance tests on final product shall be done as per QAP approved by the Employer.
- On completion of installation and commissioning of the equipment on site tests shall be carried out with the max. available load, which does not exceed the rated continuous load. An on-site test procedure shall be submitted by contractor include a check of



# **Telangana Renewable Energy Development Corporation Ltd**

Tender Ref. No. TGREDCO/PBDS/Solar/IMSS/2024/ Dated: 25.11.2024

controls and indicators after installation of the equipment.

## **11 BATTERY AND BATTERY CHARGER**

### **11.1 Standards and Codes**

Standard/Code	Description
IEC 60896-21:2004	Stationary lead-acid batteries - Part 21: Valve regulated types - Methods of test
IEC 60896-22:2004	Stationary lead-acid batteries - Part 22: Valve regulated types - Requirements
IS 15549	Stationary Regulated Lead Acid Batteries

### **11.2 General**

11.2.1 110 V / 220 V DC system (Battery, Battery Charger & DCDB) in accordance with this specification and standards stated herein, shall comprise of the following.

- Sealed Maintenance Free VRLA battery complete with racks & accessories.
- Float cum Boost Charger (FCBC)
- DC Distribution Board (DCDB)

11.2.2 DC system shall comprise of two nos. of battery, battery charger and DCDB connected by bus coupler.

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

- Trip and closing coil of HT circuit breaker
- Spring charging motors for HT circuit breaker
- Annunciator and Indication circuit of HT switchgear panel
- Auxiliary supply to protection relays

11.2.4 The battery sizing shall account for suitable temperature correction factors, ageing factors of 1.25, design margin of 1.1 & depth of discharge of 80%.

11.2.5 The design of the battery bank and sizing calculation along with the data sheet for the battery and battery charger shall be submitted for approval.

### **11.3 Battery**

The battery shall be VRLA type complying with IEC 60896-21 & IEC 60896-22 / IS 15549. The Contractor shall submit type test reports as per IEC 60896-21 & IEC 60896-22 / IS 15549.

### **11.4 Battery Charger**

11.4.1 The Battery Charger as well as its automatic regulator shall be of static type and shall be compatible with offered batteries. The Battery Charger shall be capable of continuous operation at the respective rated load in float charging mode. The charger shall also be capable of boost charging the associated battery at the desired rate.

11.4.2 The battery charger shall regulate the float/boost voltage in case of prescribed temperature rise of battery as per manufacturer's recommendation to avoid thermal runaway. Necessary temperature sensors shall be provided in mid location of battery



## **Telangana Renewable Energy Development Corporation Ltd**

Tender Ref. No. TGREDCO/PBDS/Solar/IMSS/2024/ Dated: 25.11.2024

banks and shall be wired up to the respective charger for feedback control.

- 11.4.3 The battery charger shall be provided with facility for both automatic and manual control of output voltage and current. A selector switch shall be provided for selecting the mode of output voltage/current control, whether automatic or manual. When on automatic control mode during float charging, the charger output voltage shall remain within  $\pm 1\%$  of the set value for AC input voltage variation of  $\pm 10\%$ , frequency variation of  $\pm 5\%$ , combined voltage and frequency variation of  $\pm 10\%$ , and DC load variation from zero to full load.
- 11.4.4 The battery charger shall have a constant voltage characteristics throughout the range (from zero to full load) at the floating value of the voltage so as to keep the battery fully charged but without harmful overcharge.
- 11.4.5 The battery charger shall have load limiters having drooping characteristic, which shall cause, when the voltage control is in automatic mode, a gradual lowering of the output voltage when the DC load current exceeds the load limiter setting of the charger. The load-limiter characteristics shall be such that any sustained overload or short circuit in DC system shall not damage the charger, nor shall it cause blowing of any of the charger fuses. The charger shall not trip on overload or external short circuit.
- 11.4.6 Uniform and step less adjustments of voltage setting (in both manual and automatic modes) shall be provided on the front of the charger panel covering the entire float charging output range specified. Step less adjustment of the load limiter setting shall also be possible from 80% to 100% of the rated output current for float charging mode.
- 11.4.7 During boost charging, the battery charger shall operate on constant current mode (when automatic regulator is in service). It shall be possible to adjust the boost charging current continuously over a range of 50 to 100% of the rated output current for boost charging mode. The charger output voltage shall automatically go on rising, when it is operating on boost mode, as the battery charges up. For limiting the output voltage of the charger, a potentiometer shall be provided on the front of the panel, whereby it shall be possible to set the upper limit of this voltage anywhere in the output range specified for boost charging mode.
- 11.4.8 Suitable filter circuits shall be provided in all the chargers to limit the ripple content (peak to peak) in the output voltage to 1%, irrespective of DC load level, even when they are not connected to battery.
- 11.4.9 Digital Outputs shall be configured for connection to the SCADA to monitor the outputs like charger output current, output voltage, float/boost mode, etc.
- 11.4.10 The battery charger shall have an AC contactor on the input side. It shall be of air break type and suitable for continuous duty. A thermal overload relay incorporating a distinct single phasing protection (using differential movement of bimetal strips) shall also be provided for the AC input. The relay shall trip the above contactor.
- 11.4.11 The rectifier assembly shall be full wave bridge type and designed to meet the duty as required by the respective charger.
- 11.4.12 Digital or analog indicating instruments to indicate DC current, DC voltage & AC voltage shall be provided.
- 11.4.13 The charging equipment shall be housed in a free standing, floor mounted



# **Telangana Renewable Energy Development Corporation Ltd**

Tender Ref. No. TGREDCO/PBDS/Solar/IMSS/2024/ Dated: 25.11.2024

compartmentalized panels. Panel shall have provision for bottom cable entry with removable undrilled cable gland plate of 3.0 mm thickness.

11.4.14 The panel shall be of CRCA sheet steel construction having thickness of at least

11.4.15 2.0 mm. Degree of protection provided by the enclosure to the internals of charger shall be IP 42 (Indoor) / IP 55 (Outdoor).

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

11.4.17 DCDB shall have adequate number of outgoing feeders with double pole, DC MCBs. At least 20% feeders shall be provided as spare.

## **11.5 Warranty**

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

## **11.6 Tests**

Routine tests and acceptance tests shall be as per the Quality Assurance Plan (QAP) approved by the Beneficiary/SHGs or its authorized representative.

## **12 EARTHING**

### **12.1 Standards and Codes**

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

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

### **12.2 General Requirements**

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

12.2.2 The earth electrode shall be made of high tensile low carbon steel rod, molecularly bonded by high conductivity copper on outer surface with coating thickness not less than 250 micron as per relevant standards. Suitable earth enhancing material shall be filled around the electrode to lower the resistance to earth. Inspection chamber and lid shall be provided as per IS 3043. For Transformer- yard/Switchyard earthing, mild steel rod may be used as earth electrode.

12.2.3 Earth conductors shall be made of copper bonded steel or galvanized steel of sufficient



## **Telangana Renewable Energy Development Corporation Ltd**

Tender Ref. No. TGREDCO/PBDS/Solar/IMSS/2024/ Dated: 25.11.2024

cross section to carry the fault current and withstand corrosion.

- 12.2.4 Earth conductors buried in ground shall be laid minimum 600 mm below ground level unless otherwise indicated in the drawing. Back filling material to be placed over buried conductors shall be free from stones and harmful mixtures.
- 12.2.5 Earth electrodes shall not be situated within 1.5m from any building whose installation system is being earthed. Minimum distance between earth electrodes shall be two times the driven depth of the electrode.
- 12.2.6 Transformer yard and switchyard fence shall be connected to the earth grid by one GS flat and gates by flexible lead to the earthed post.
- 12.2.7 All welded connections shall be made by electric arc welding. For rust protection, the welds should be treated with red lead compound and afterwards thickly coated with bitumen compound.

### **12.3 Earthing of PV array field**

- 12.3.1 All PV Modules, Module Mounting Structures (MMS) and String Combiner Box (SCB) structures in the PV array field shall be bonded to the earthing system by two distinct connections.
- 12.3.2 Earthing of PV Modules shall be as per the requirements of the PV Module Manufacturer.
- 12.3.3 The connection between MMS and DC earth grid shall be bolted or welded. Portion of the MMS which undergoes welding at site shall be coated with two coats of cold galvanising and anti-corrosion paint afterwards.
- 12.3.4 Earth electrodes of the DC earth grid shall be uniformly distributed throughout the PV array field so that optimum earth resistance is offered to leakage current flowing from any module frame or MMS.
- 12.3.5 SCB equipment earthing point shall be connected to the DC earth grid using flexible copper cable of sufficient cross section as recommended by the manufacturer. The connection with the DC earth grid shall be done using suitable bimetallic lugs and stainless-steel fasteners.

### **12.4 PCU Earthing**

- 12.4.1 Grounding on DC side of the PCU shall be as per the requirements of PV Module Manufacturer. PCU earth bus shall be connected to earth electrodes through flexible copper cable of sufficient cross section as mentioned by PCU manufacturer. The interconnection of PCU earth electrodes with DC earth grid shall be as per PCU manufacturer recommendation.

### **12.5 Transformer Earthing**

- 12.5.1 Inverter transformer neutral earthing shall be as per the recommendation of inverter manufacturer.
- 12.5.2 Transformer tank, cable box, marshalling box and all other body earth points shall be earthed.
- 12.5.3 Inverter transformer shield shall be earthed separately using minimum two no. of earth electrodes. Earthing conductor between shield bushing and earth electrodes shall be copper flat of suitable size not less than 25 x 6 mm.



## **Telangana Renewable Energy Development Corporation Ltd**

Tender Ref. No. TGREDCO/PBDS/Solar/IMSS/2024/ Dated: 25.11.2024

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

### **12.6 Inverter Room and Main Control Room Earthing**

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

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

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

### **12.7 Switchyard Earthing**

12.7.1 The metallic frame work of all switchyard equipment and support structures shall be connected to the earth grid by means of two separate and distinct connections.

12.7.2 Switchyard shall be shielded against direct lightning stroke by provision of over-head shield wire or earth wire or spikes(masts) or a combination thereof as per CEA regulations 2010 (Technical standards)- 42(2)(C).

### **12.8 Tests**

12.8.1 Type test reports for earthing electrode, earth enhancing compound and its associated accessories shall be submitted during detailed engineering for approval.

12.8.2 On completion of installation, continuity of earth conductors and efficiency of all bonds and joints shall be checked. Earth resistance at earth terminations shall be measured and recorded.

12.8.3 The earth plate shall be provided to facilitate its identification and for carrying out periodical inspection.

## **13 LIGHTNING PROTECTION SYSTEM**

13.1 Lightning Protection System (LPS) for the entire plant except buildings and transformer-yard/switchyard against direct lightning strokes shall be provided as per IS/IEC 62305:2010 or NF C 17-102. Lightning Protection System for buildings shall be provided as per IS/IEC 62305:2010.

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

13.3 Air terminals, down conductors and earth termination system shall be designed as per relevant parts of IS/IEC 62305:2010 or NF C 17-102.

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

13.5 Type test reports as per IS/IEC 62305:2010 or NF C 17-102 shall be submitted during detailed engineering for approval.

### **13.6 Lightning Protection System for Transformer Yard/Switchyard**

13.6.1 Direct Stroke Lightning Protection (DSLPL) for Transformer Yard/Switchyard shall be provided by Lightning Mast and Shield Wires.

13.6.2 The lightning protection system shall not be in direct contact with underground





# **Telangana Renewable Energy Development Corporation Ltd**

Tender Ref. No. TGREDCO/PBDS/Solar/IMSS/2024/ Dated: 25.11.2024

metallic service ducts and cables.

13.6.3 Down conductors shall not be connected to other conductors above ground level. Down conductors shall be cleated on the structures at 2000 mm interval.

13.6.4 Every down conductor shall be provided with a test joint at about 1000 mm above ground level. The test joint shall be directly connected to the earthing system.

## **14 COMMUNICATION CABLES**

### **14.1 Optical Fibre Cables**

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

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

14.1.3 The outer sheath shall have Flame Retardant, UV resistant properties and are to be identified with the manufacturer's name, year of manufacturing, progressive automatic sequential on-line marking of length in meters at every meter on outer sheath.

14.1.4 The cable core shall have suitable characteristics and strengthening for prevention of damage during pulling.

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

14.1.6 The Contractor shall ensure that minimum 50% cores (not less than 4) are kept as spare in all types of optical fiber cables.

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

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

### **14.2 RS-485 Cable**

RS-485 Cable to be used shall be shielded type with stranded copper conductor. Cable shall have minimum 2 pair each with conductor size of 0.5 sq.mm. Cable shall be flame retardant according to IEC 60332-1-2.

## **15 REMOTE MONITORING SYSTEM**

### **15.1 General Requirements**

15.1.1 Management platform for Remote monitoring of solar plants installed. Remote Monitoring System (RMS) should have following minimum features or modules

a) Solar System Performance: DC Voltage, DC current, AC output Current, Power, Energy, Status of Inverter & String Combiner Box etc.

b) Net Metering:





## **Telangana Renewable Energy Development Corporation Ltd**

Tender Ref. No. TGREDCO/PBDS/Solar/IMSS/2024/ Dated: 25.11.2024

- i. As per CEA guidelines, grid connected solar plant will require minimum Two energy meters mainly:
    - Bi-Directional Grid Interface Meter
    - Solar Generation Audit Meter.
  - ii. Remote Monitoring System should have provision to integrate both energy meters on DLMS communication protocol on RS232 ports
  - iii. Important electrical parameters of Bi-Directional Grid Interface Meter such as Imported Energy, Exported Energy, Net Energy, Solar Generation Energy, Voltage, Power (Import or Export).
  - iv. iv. Important electrical parameters of Solar Generation such as Voltage, Current, PF, Power, Energy etc.
  - c) Billing Data Management: Remote Monitoring System should provide Billing parameters from Bi-Directional Grid Interface meter required by DISCOMS
  - d) RMS Performance: %Device Connectivity, %Data Availability etc.
  - e) Events and Notifications: Faults related to solar generation, inverter fault/alarms, Breaker status change such as on/off/trip etc.
  - f) Asset Management: Ratings, Serial Number, Make, Model Number of Inverter, String combiner Box, IMEI number (of communication module) and ICCID (of SIM) etc.
  - g) Complaint and Ticket Management
- 15.1.2 Remote Monitoring System (RMS) provided by all bidders should connect to State Level Solar Energy Data Management platform.
- 15.1.3 Communication Architecture between SWPS and RMS should be as per following:
- a. Communication Connectivity:**
    - i. Field Device Connectivity: Communication between RMS and Inverter /String Combiner Box should be on RS485 MODBUS RTU protocol to ensure interoperability irrespective of make and manufacturer
    - ii. Remote Connectivity: RMS of SWPS should be using GSM/GPRS/2G/3G/4G cellular connectivity
    - iii. Local Connectivity: Ethernet/Bluetooth/Wi-Fi connectivity to configure parameters, notifications, communication interval, set points etc. or to retrieve locally stored data
    - iv. Sensor Connectivity: RMS should have provision for at least four Analog inputs with 0.1% accuracy for applications such as breaker & transformer health etc. and four digital inputs for breaker status
  - b. Communication Modes:**
    - i. Push Data on Event/Notification: Faults related to solar generation, inverter fault/alarms, Breaker status change



## **Telangana Renewable Energy Development Corporation Ltd**

Tender Ref. No. TGREDCO/PBDS/Solar/IMSS/2024/ Dated: 25.11.2024

- ii. Push Data Periodically: important parameters of inverter, string combiner box and energy meter should be pushed to central server on configurable interval. Interval should be configurable in multiple of 1 minute.
- iii. Command On Demand: It should be possible to send commands via GSM or GPRS to RMS either to update configuration

### **c. Communication Protocol:**

- i. RMS should provide data on MQTT Protocol to establish communication with thousands of systems.

### **d. Security:**

- i. Communication between RMS and Server should be secured and encrypted using TLS/SSL/X.509 certificate etc.
- ii. As a part of IoT protocol, Authentication and Authorization should be implemented using token/password mechanism

### **e. Message Format:**

- i. RMS should provide data in a JSON message format as required by respective DISCOM

### **f. Data Storage:**

- i. In case of unavailability of cellular network, RMS should store data locally and on availability of network it should push data to central server. Local data storage should be possible for at least one year in case of unavailability of cellular network.

- g. **Configuration Update Over-The-Air:** Configuration update over the air of multiple parameters such as IP, APN, Data Logging Interval, Set Points etc. is essential.

#### **15.1.4 EMI/EMC Certifications:**

Surge Immunity Test (IEC 61000-4-5)	A
Electrical Fast Transient (IEC 61000-4-4)	A
Electrostatic Discharge (IEC 61000-4-2)	A
Radiated Electromagnetic Field Test (IEC 61000-4-3)	A
Power Frequency Magnetic Field (IEC 61000-4-8)	A
Conducted Disturbances induced by radio frequency (IEC 61000-4-6)	A
Voltage Dips, short interruptions (IEC 61000-4-11)	A
Dry Heat test (IEC 60068-2-2), continuous operations @ 55 deg. C	O
Damped Heat Test (IEC 60068-2-78), @ 95% RH and 40 deg. C	O

#### **Note: Passing Criteria**

A: Temporary degradation or loss of function or performance which is self-recoverable

O: Normal performance within the specified limits O



# **Telangana Renewable Energy Development Corporation Ltd**

Tender Ref. No. TGREDCO/PBDS/Solar/IMSS/2024/ Dated: 25.11.2024

## **15.2 Hardware at Main Control Room**

- 15.2.1 The Hardware as specified shall be based on latest state of the art Workstations and Servers and technology suitable for industrial application & power plant environment.
- 15.2.2 The Local Monitoring & Control Server and the Operating Work station, to be deployed in the Plant Control Room, shall have the following server hardware and operating system along with accessories:

<b>Operator Workstation (OWS) – 1 Nos.</b>	
Hardware	i7 CPU running at 3.0 GHz or faster with 8GB RAM, 2TB SSD hard disk, 28" LED monitor, keyboard and mouse, 4 USB ports, LAN port
Operating System	Windows operating system with necessary tools, anti-virus software.
Accessories	1. UPS of required capacity with 2 hour battery backup. 2. Common for the Operator Workstations: 3. Screen Display Unit: Min 50" LED Flat Monitor with wall mounted arrangement for the display of SCADA screen 4. A4 size monochrome laser printer.

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

## **15.3 Factory Acceptance Test (FAT)**

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

## **16 ILLUMINATION**

### **16.1 Standards and Codes**

LED luminaries shall be tested at independent laboratory as per the following test standards.

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

### **16.2 General Specification**

- 16.2.1 This specification covers design, supply and installation of uniformly Illumination system along the peripheral corridor, access & internal roads, main control room & inverter rooms, switchyard and other facilities including entry points/gate(s) inside the plant area.
- 16.2.2 The Contractor shall furnish Guaranteed Technical Particulars of the LED luminaries, from renowned brands available in the market for approval of Employer.
- 16.2.3 Lighting system shall work on the auxiliary supply and same shall be incorporated in auxiliary loads. The Contractor shall provide minimum 20% of total lighting points as emergency lighting points, fed from UPS DB or DCDB as per scheme adopted by the Contractor.



## **Telangana Renewable Energy Development Corporation Ltd**

Tender Ref. No. TGREDCO/PBDS/Solar/IMSS/2024/ Dated: 25.11.2024

### **16.3 Lighting Levels**

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

Area	LUX
Control Room and equipment rooms	300
Office	300
Battery & other rooms	150
Internal / Access Roads	4
Transformer yard/Switchyard	20
H – pole and metering point	10

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

### **16.4 LED Luminaries for Outdoor Applications**

16.4.1 LED luminaries' shall meet the following parameters.

Parameter	Specified Value
Input voltage	170 - 260 V
Input Frequency	50 Hz +/-1 Hz
Power Factor	0.90 (Minimum)
Luminaire efficacy	> 90 lumens per watt
Beam Angle	Minimum 120°
Total Harmonic Distortion	< 10 %
Working Humidity	10% - 90% RH (Preferably Hermetically sealed unit)
Degree of Protection	Minimum IP 65 (for Outdoor fixtures)
Luminaire Casing	Powder coated metal / Aluminum.
Colour Temperature	5700 K (cool day light)
Colour Rendering Index	> 65
Moisture protection in case of casing damage	IP 65 (driver unit shall preferably be totally encapsulated)

16.4.2 LED luminaries of minimum 50 W mounted at a pole height of 4 m shall be provided at every 100 m interval for plant boundary.

16.4.3 The LED luminaries (outdoor) housing, heat sink, pole mounting bracket, individual LED reflectors and front heat resistant tempered glass should be provided.

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

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



## **Telangana Renewable Energy Development Corporation Ltd**

Tender Ref. No. TGREDCO/PBDS/Solar/IMSS/2024/ Dated: 25.11.2024

- 16.4.6 The luminaire should be suitable for standard street light poles and should be suitable for side entry and bottom entry (post top).
- 16.4.7 GI Lighting pole of suitable diameter capable of withstanding system and wind load, shall be provided with average Zn coating thickness of 80micron. The street light poles shall have loop in loop out arrangement for cable entry and light fixture/ wiring protected with suitably rated MCB.
- 16.4.8 All outdoor lighting system shall be automatically controlled by synchronous timer or photocell. Provision to bypass the timer or photocell shall be provided in the panel.
- 16.4.9 Lighting panels shall be earthed by two separate and distinct connections with earthing system. Switch boxes, junction boxes, lighting fixtures, etc. shall be earthed by means of separate earth continuity conductor. Cable armour shall be connected to earthing system at both the ends. Proper earthing of street light poles shall be ensured.
- 16.4.10 Junction box for lighting shall be made of fire-retardant material. The degree of protection shall be IP 55 for outdoor JB.
- 16.4.11 Lighting cables, wherever exposed to direct sunlight, shall be laid through Double Wall Corrugated (DWC) HDPE conduits.

### **16.5 LED Luminaire/Lamps for Indoor Applications**

All indoor LED luminaire/lamps shall be supplied with proper diffuser to avoid direct visibility of LED and suitable heat sink for longer life.

### **16.6 Warranty**

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

## **17 CCTV Camera**

17.1 CCTV Cameras along with monitoring stations (sufficient numbers) and all other accessories required for its proper operation must be installed to have complete coverage of following areas for 24 hours.

- (i) Each entry/exit gate.
- (ii) Any strategic location in the Plant Area required to be monitored.
- (iii) Main Control Room: Covering Entry/Exit and Equipment Rooms
- (iii) Inverter Station & Inverter Transformer Yard

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

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

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

17.5 It shall be possible to control all cameras i.e., PTZ auto/ manual focus, selection of pre-sets, video tour selection etc. The software shall support flexible 1/2/4 windows split screen display mode or scroll mode on the display monitor (minimum 32") for live video.



# **Telangana Renewable Energy Development Corporation Ltd**

Tender Ref. No. TGREDCO/PBDS/Solar/IMSS/2024/ Dated: 25.11.2024

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

- i. Video motion detection
- ii. Object tracking
- iii. Object classification
- iv. Camera server shall be provided with sufficient storage space to storage recordings of all cameras at HD mode for a period of 15 days. All recordings shall have camera ID, location, date and time of recording.

## **18 FIRE ALARM SYSTEM**

### **18.1 Standards and Codes**

Standard/Code	Description
IS 2189	Selection, Installation and Maintenance of Automatic Fire Detection and Alarm System - Code of Practice
IS 15683	Portable Fire Extinguishers - Performance and Construction - Specification
IS 2546	Specification for galvanized mild steel fire bucket
National Building code 2016	

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

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

- (i) Sand buckets
- (ii) Portable fire extinguishers (CO2 and dry powder type)
- (iii) Microprocessor based fire alarm panel
- (iv) Multi sensor smoke detectors
- (v) Hooter cum strobe
- (vi) Manual call points
- (vii) Cables from sensor to fire Panel.

18.4 Minimum two numbers of fire extinguishers (CO2 and Foam type each, of capacity 9 kg having BIS certification marking as per IS 15683) shall be provided at every building/ enclosure, transformer yard and switchyard. However, contractor must comply with existing building code for fire protection and relevant IS codes.

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

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

18.7 The Contractor shall submit the plan for fire and smoke detection system for the Employer's approval.





## **Telangana Renewable Energy Development Corporation Ltd**

Tender Ref. No. TGREDCO/PBDS/Solar/IMSS/2024/ Dated: 25.11.2024

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### **19 TESTING INSTRUMENTS**

- 19.1 The Contractor shall provide the following set of instruments for on-site testing.
- 19.2 All testing equipment shall possess valid calibration certificate issued from approved NABL labs.
- 19.3 Instruments of superior rating are allowed after seeking consent of the Employer.
- 19.4 Maintenance, calibration, up keeping, repair & replacement of these tools will be in the scope of the Contractor during O&M.
- 19.5 It is Contractor's responsibility to arrange for tools, tackles, logistics, test kits, manpower, experts etc. required for trouble free operation of Plant.



## **PART -5: WARRANTY AND MAINTENANCE**

1. The PV modules will be warranted for a minimum period of 25 years from the date of supply. (Output wattage should not be less than 90% at the end of 12 years and 80% at the end of 25 years).
2. The mechanical structures, electrical components including evacuation infrastructure and overall workmanship of the Solar PV Rooftop power plant system must be warranted for a minimum of 5years from the date of commissioning and handing over of the system.
3. The contractor/ bidder shall be responsible to replace free of cost (including transportation and insurance expenses) to the purchaser whole or any part of supply which under normal and proper use become dysfunctional within 72 hours of issue of any such complaint by the purchaser.
4. The service personnel of the Successful Bidder will make routine quarterly maintenance visits. The maintenance shall include thorough testing & replacement of any damaged parts Apart from this any complaint registered/ service calls received / faults notified in the report generated by the IVRS should be attended to and the system should be repaired/ restored/ replaced within 4 days.
5. During operation and maintenance period of the SPV Power Plant, if there is any loss or damage of any component due to miss management/miss handling or due to any other reasons pertaining to the deputed personnel, what-so- ever, the contractor shall be responsible for immediate replacement/rectification. The damaged component may be repaired or replaced by new component



# **Telangana Renewable Energy Development Corporation Ltd**

Tender Ref. No. TGREDCO/PBDS/Solar/IMSS/2024/ Dated: 25.11.2024

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## **Section - 3**

### **BIDDER INFORMATION**



# **Telangana Renewable Energy Development Corporation Ltd**

Tender Ref. No. TGREDCO/PBDS/Solar/IMSS/2024/ Dated: 25.11.2024

## **BIDDER INFORMATION DETAILS**

All pages of the Technical Bid shall be organised section-wise, annexed with proof documents, serially numbered and stitched/or spiral bound intact and submitted) Loose pages shall not be accepted.

### **1. GENERAL PARTICULARS OF TENDERER**

<b>SL.</b>	<b>PARTICULARS</b>	<b>TO BE FUNISHED BY THE TENDERER</b>
1	Name of Tenderer/Firm	
2	Postal Address	
3	E-mail address for communication	
4	Telephone/ Fax No.	
5	Name, designation, address, contact number and Email of the representative of the tenderer to whom all references shall be made.	
6	Nature of the firm (Individual/ Partnership/Consortium/ Pvt. Ltd /Public Ltd. Co. /Public Sector, etc.) Attach attested copy of Registration & Partnership deed/ Memorandum of Association	
7	Amount and particulars of the Empanelment deposit Deposited.	
8	Annual Turnover for last three years i.e 2021 to 2024 (Attach balance sheets from CA in this regard)	
9	Name and address of the Indian/foreign collaboration if any.	
10	PAN NO (Copy of certificate to be enclosed)	
11	GST /TIN/ GRN No. CST No. (copies of	



## **Telangana Renewable Energy Development Corporation Ltd**

Tender Ref. No. TGREDCO/PBDS/Solar/IMSS/2024/ Dated: 25.11.2024

SL.	PARTICULARS	TO BE FUNISHED BY THE TENDERER
	certificates to be attached)	
12	Has the Tenderer/firm ever been debarred by any institution for undertaking any work?	
13	Any other information attached by the Tenderer (Details of Annexure / page no. where its enclosed)	
14	Does Tenderer have any relative Working in TGREDCO? If yes state the Name and designation.	

### **2. DETAILS ABOUT THE BLACKLISTING, IF ANY**

Information on litigation history in which Bidder is involved.

- 1) Whether black listed/ Debarred/Suspended from execution of work.
- 2) Other litigations. If any including Court litigations Arbitrations etc.

Department and concerned officer	Other party (ies)	Case of dispute.	Amount involved.	Remarks showing present status.
1	2	3	4	5

Signature of the authorised person:

Name of the authorised person:

Designation:

Name and Address of Bidder

Stamp of bidder



# **Telangana Renewable Energy Development Corporation Ltd**

Tender Ref. No. TGREDCO/PBDS/Solar/IMSS/2024/ Dated: 25.11.2024

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## **PART - 6**

### **FINANCIAL BID**





## **Telangana Renewable Energy Development Corporation Ltd**

Tender Ref. No. TGREDCO/PBDS/Solar/IMSS/2024/ Dated: 25.11.2024

### **PRICE BID**

Tender Ref. No. TGREDCO/PBDS/Solar/IMSS/2024/ Dated: 25.11.2024

Name of the Firm: -----

**“Design, Supply, Installation, Testing, commissioning with Remote Monitoring System with Comprehensive Warranty, Guarantee for 5 Years and Operation and Maintenance of the Complete Plant for 1 Year from the date of commissioning of the Grid Connected Solar Power Plant of 1 MW Capacity at Various Locations in Telangana State through Rate Contract CAPEX Mode as per technical specifications, Terms and Conditions of the tender document.**

Sl. No	Description	Cost of SPV Power plant per 1MW Comprehensive Warranty, Guarantee, for 5 Years and Operation and Maintenance of the Complete Plant for 1 Year from the date of commissioning (Rs)
1	1MW ground mounted Solar PV Power plant with Comprehensive Warranty, Guarantee for 5 Years and Operation and Maintenance of the Complete Plant for 1 Year from the date of commissioning as per the Scope ,Terms and Conditions of the tender document	

### **NOTES:**

1. Certified that rates quoted above are as per the requirement, specification terms & condition mentioned in the e-tender document.
2. The rates are inclusive of all taxes & duties, storage, transportation up to site, insurance etc., and any other job required to properly execute the work.
3. The filled in Price Bid sheet duly signed and stamped has to be scanned and uploaded in the Price Bid Column of e-procurement portal of Telangana State only. If any Other document / condition, terms if enclosed will liable to be rejection of bid.

(Signature of Bidder)

Name of the authorised person:

Designation:

Stamp of bidder



# **Telangana Renewable Energy Development Corporation Ltd**

Tender Ref. No. TGREDCO/PBDS/Solar/IMSS/2024/ Dated: 25.11.2024

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## **PART - 7**

## **ANNEXURES**



## **Telangana Renewable Energy Development Corporation Ltd**

Tender Ref. No. TGREDCO/PBDS/Solar/IMSS/2024/ Dated: 25.11.2024

### **ANNEXURE -B**

#### **DECLARATION**

**(on Rs.100/- non-judicial stamp paper)**

I / WE ..... have gone through carefully all the Tender conditions and solemnly declare that I / we will abide by any penal action such as disqualification or black listing or determination of contract or any other action deemed fit, taken by, the Department against us, if it is found that the statements, documents, certificates produced by us are false / fabricated.

I / WE hereby declare that, I / WE have not been blacklisted / debarred / Suspended / demoted in any Government Department in any State due to any reasons.

**Signature of the Tenderer**



**ANNEXURE - C**

**DECLARATION BY THE TENDERER**

I/We

.....  
(Hereinafter referred to as Tenderer) being desirous of tendering for the work, under this tender and having fully understood the nature of the work and having carefully noted all the terms and conditions, specifications etc. as mentioned in the tender document do hereby declare that

1. The tenderer is fully aware of all the requirements of the tender document and agrees with all provisions of the tender document and accepts all risks, responsibilities and obligations directly or indirectly connected with the performance of the tender.
2. The Tenderer is fully aware of all the relevant information for proper execution of the proposed work, with respect to the proposed place of works/ site, its local environment, approach road and connectivity etc. and is well acquainted with actual and other prevailing working conditions, availability of required materials and labour etc. at site.
3. The Tenderer is capable of executing and completing the work as required in the tender and is financially solvent and sound to execute the tendered work. The tenderer is sufficiently experienced and competent to perform the contract to the satisfaction of TGREDCO. The Tenderer gives the assurance to execute the tendered work as per specifications, terms and conditions of the tender on award of work.
4. The Tenderer has no collusion with other Bidders, any employee of TGREDCO or with any other person or firm in the preparation of the tender.
5. The Tenderer has not been influenced by any statement or promises by TGREDCO or any of its employees but only by the tender document.
6. The Tenderer is familiar with all general and special laws, acts, ordinances, rules and regulations of the Municipal, District, State and Central Government that may affect the work, its performance or personnel employed therein.
7. The Tenderer has never been debarred from similar type of work by any Government Undertaking /Department. (An undertaking on Non-Judicial Stamp paper worth of Rs. 100/- in this regard shall be submitted)
8. The Tenderer accepts that the empanelment deposit/ security deposit may be absolutely forfeited by TGREDCO if the selected bidder fails to sign the contract or to undertake the work within stipulated time.
9. This offer shall remain valid for acceptance for 3 (Three) months from the proposed date of opening of Tender.
10. All the information and the statements submitted with the tender are true and correct to the best of my knowledge and belief.

**Signature of Tenderer**



# **Telangana Renewable Energy Development Corporation Ltd**

Tender Ref. No. TGREDCO/PBDS/Solar/IMSS/2024/ Dated: 25.11.2024

## **ANNEXURE - D**

### **Format For Bank Guarantee For - Empanelment Deposit**

This deed of Guarantee made on..... day of Month & Year by Name & Address of the bank (hereinafter called the „GUARANTOR“) on the one part, on behalf of M/s Name & address of the Firm (hereinafter called the “Firm”) ) in favour of VC& Managing Director, TGREDCO, Hyderabad on the following terms and conditions.

Whereas the FIRM is submitting its tender for (Name of the work) and this guarantee is being made for the purpose of submission of Empanelment deposit with the tender document.

Know all people by these presents that the GUARANTOR, hereby undertake to indemnify and keep TGREDCO indemnified up to the extent of Rs.....during the validity of this bank guarantee and authorize TGREDCO to recover the same directly from the GUARANTOR. This bank guarantee herein contained shall remain in full force and effect till the expiry of its validity or till any extended period (if extended by the bank on receiving instructions from FIRM.). The liability under the guarantee shall be binding on the GUARANTOR or its successors.

Whereas the GUARANTOR further agrees that their liability under this guarantee shall not be affected by any reason of any change in the offer or its terms and conditions between the FIRM and TGREDCO with or without the consent or knowledge of the GUARANTOR.

Whereas the GUARANTOR further agrees to pay guaranteed amount hereby under or part thereof, on receipt of first written demand whenever placed by TGREDCO during the currency period of this guarantee. The GUARANTOR shall pay TGREDCO immediately without any question, demure, reservation or correspondence.

Whereas the GUARANTOR hereby agrees not to revoke this guarantee bond during its currency period except with the previous consent of TGREDCO in writing.

Notwithstanding anything contained herein

1. Our liability under this bank guarantee shall not exceed Rs. ....
2. This Bank guarantee shall be valid up to .....
3. We are liable to pay the guaranteed amount or any part thereof under this bank guarantee only and only against the written claim or demand on or before ..... Sealed with the common seal of the bank on this ..... day of Month and Year

**Witness :**

- 1.
- 2

**(Signature and seal of Bank)**



# **Telangana Renewable Energy Development Corporation Ltd**

Tender Ref. No. TGREDCO/PBDS/Solar/IMSS/2024/ Dated: 25.11.2024

## **ANNEXURE - E**

### **MODEL FORM OF AGREEMENT**

**To be executed on a Rs.200- Non-judicial Stamp paper of Telangana jurisdiction by the Successful Bidder for EMPANELMENT OF ENGINEERING PROCUREMENT & CONSTRUCTION (EPC) VENDORS FOR “DESIGN, SUPPLY, INSTALLATION, TESTING, COMMISSIONING WITH REMOTE MONITORING SYSTEM WITH COMPREHENSIVE WARRANTY, GUARANTEE FOR 5 YEARS AND OPERATION AND MAINTENANCE OF THE COMPLETE PLANT FOR 1 YEAR FOR THE GRID CONNECTED SOLAR POWER PLANT CAPACITY OF 1 MW EACH FOR A CUMULATIVE CAPACITY OF 1000 MW AT VARIOUS LOCATIONS IN TELANGANA STATE THROUGH RATE CONTRACT CAPEX MODE (NO FIGURES IN NUMERALS OR WORDS SHALL BE FILLED UP IN THIS SAMPLE FORM AT THE TIME OF SUBMISSION OF TENDER)**

### **AGREEMENT**

This Agreement is entered into at Hyderabad on the ..... day of \_\_\_\_\_ 2024 between ***Telangana Renewable Energy Development Corporation Limited***, a state owned Corporation of Government of Telangana, and having its Corporate Office: D.No. 6-2-910, Visvesvaraya Bhavan, The Institution of Engineers Building, Khairatabad, Hyderabad - 500 004. Telangana State, India hereinafter referred to as "TGREDCO" (Which term shall mean and include its successors and permitted assigns) and ....., a Company registered under .....and having its Registered office at ..... hereinafter referred to as the "Vendor" (Which term shall mean and include its successors and permitted assigns)

Whereas TGREDCO invited a tender vide Tender Ref. No. TGREDCO/PBDS/Solar/IMSS/2024, Dt. 25.11.2024 for Empanelment of Engineering Procurement & Construction (EPC) Vendors for “Design, Supply, Installation, Testing, commissioning with Remote Monitoring System with Comprehensive Warranty, Guarantee for 5 Years and Operation and Maintenance of the Complete Plant for 1 Year for the Grid Connected Solar Power Plant Capacity of 1 MW each for a cumulative capacity of 1000 MW at Various Locations in Telangana State Through Rate Contract CAPEX Mode

This document on having been signed by both the parties shall constitute a binding contract between the parties and shall remain in force for a period of five years. But in the event of any breach of the Contract at any time on the part of the Vendor, the contract shall be terminated by TGREDCO without compensation to the Vendor. The contract may also be put to an end at any time by the TGREDCO upon giving seven days’ notice to the Vendor. The Vendor/Supplier agrees Empanelment of Engineering Procurement & Construction (EPC) Vendors for “Design, Supply, Installation, Testing, commissioning with Remote Monitoring System with Comprehensive Warranty, Guarantee for 5 Years and Operation and Maintenance of the Complete Plant for 1 Year for the Grid Connected Solar Power Plant Capacity of 1 MW each for a cumulative capacity of 1000 MW at Various Locations in Telangana State Through Rate Contract CAPEX Mode

#### **1. Installation & Completion Schedule**



## **Telangana Renewable Energy Development Corporation Ltd**

Tender Ref. No. TGREDCO/PBDS/Solar/IMSS/2024/ Dated: 25.11.2024

- a) The entire work involving Supply, Installation and Commissioning of Grid Connected Ground Mounted Solar Power Plant shall be completed within **6 months** from the date of issue of work order by the purchaser/sanction of In-Principle.

### 2. Service:

- b) Empanelled Vendor shall have service centre in the state. If required additional service centres shall be opened at different locations based on the installations carried out by them under this empanelment mechanism.
- c) The Vendor shall visit the site at least once in a quarter, to attend routine maintenance, during the 5 years warranty period. However, in case of malfunctioning of the system, the tenderer/bidder shall attend for rectification of defects within 3 working days from the date of lodging complaint.
- d) The vendor is required to carry out the Operations & Maintenance(O&M) during the first year after commissioning. Should maintain the LOG Books for tracking the O&M services.

### 3. Installation and Commissioning locations:

- a) The Grid Connected Solar Ground Mounted Power Plants shall be installed and commissioned anywhere in Telangana under this Tender.

4. The validity of Empanelment and the price accepted will be for 12 months.

5. The following documents shall be deemed to form and be read and constructed as part of this Contract.

- a) Technical Specifications
- b) Tender Terms and Conditions
- c) Amendments issued by TGREDCO for the Tender document
- d) Corrigendum/Clarifications issued by TGREDCO for the Tender document
- e) Detailed final offer of the Successful Bidder
- f) Correspondence made by TGREDCO to the successful Bidder from time to time during the period of the contract.

6. Waiver of any terms and conditions by TGREDCO / Purchaser in writing shall not have the effect of waiving or abandoning other terms and conditions of the contract.

7. (a) Unless otherwise provided in the Contract, any notice, request, consent or other communication given or required to be given hereunder shall be given by mailing the same by registered mail, postage prepaid to TGREDCO at its registered office.

(b) Any notice to the Vendor shall be deemed to be sufficiently served, if given or left in writing at their usual or last known place of abode or business. In case of failure by the Vendor to commission the solar Rooftop systems within the period specified as per the schedule or in case of installations made by them, not being of the stipulated quality and specifications, TGREDCO shall have the power to reject any such installations.

8. TGREDCO is no way responsible for any dispute arising between the Vendor & Purchaser.

Subject to the above, the Courts at Hyderabad alone only shall have jurisdiction in the matter of empanelment.

In Witness whereof the parties hereto have signed on the day, month and year above written in the presence of

---

TGREDCO

---

Bidder's Signature





# **Telangana Renewable Energy Development Corporation Ltd**

Tender Ref. No. TGREDCO/PBDS/Solar/IMSS/2024/ Dated: 25.11.2024

**For and on behalf of  
TGREDCO**

**For and on behalf of  
Vendor**

Name  
Designation  
Seal

Name  
Designation  
Seal

**Witnesses:**

- 1.
- 2.

**Witnesses:**



# **Telangana Renewable Energy Development Corporation Ltd**

Tender Ref. No. TGREDCO/PBDS/Solar/IMSS/2024/ Dated: 25.11.2024

**ANNEXURE - F**

## **CONSORTIUM AGREEMENT**

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

THIS Consortium Agreement ("Agreement") executed on this \_\_\_\_\_ day of \_\_\_\_\_ 2024 between M/s [insert name of Lead Member] \_\_\_\_\_ a Firm / Company incorporated under the laws of \_\_\_\_\_ and having its Registered Office at \_\_\_\_\_ (hereinafter called the "Lead Member", which expression shall include its successors, executors and permitted assigns)

and

M/s \_\_\_\_\_ a Firm / Company incorporated under the laws of \_\_\_\_\_ and having its Registered Office at \_\_\_\_\_ (hereinafter called the "Technical Member", which expression shall include its successors, executors and permitted assigns), which expression shall include its successors, executors and permitted assigns)

WHEREAS, each Member individually shall be referred to as the "Member" and both the Members shall be collectively referred to as the "Members" in this Agreement.

WHEREAS the Telangana Renewable Energy Development Corporation Limited (hereinafter called TGREDCO), a section -3 Company incorporated under the Company's Act, 2013 has invited empanelment Tenders.

WHEREAS the Tender documents stipulates that the Lead Member may enter into a Technical/Financial Consortium Agreement with another Company / Corporate entity to fulfill the Technical/Financial Eligibility Criteria as stipulated in the Tender document. The Members of the Bidding Consortium will have to submit a legally enforceable Consortium Agreement in a format enclosed with this Tender document.

NOW THEREFORE, THIS AGREEMENT WITNESSTH AS UNDER:

In consideration of the above premises and agreements all the Members in this Consortium do hereby mutually agree as follows:

1. We, the Members of the Consortium and Members to the Agreement do hereby unequivocally agree that (M/s \_\_\_\_\_), shall act as the Lead Member as defined in the Tender for self and agent for and on behalf of Technical/Financial Member \_\_\_\_\_.
2. The Lead Member is hereby authorized by the Technical/Financial Member of the Consortium to bind the Consortium and receive instructions for and on their behalf.
3. The Lead Member shall be liable and responsible for ensuring the individual and collective commitment of each of the Members of the Consortium in discharging all of their respective obligations. Each Member further undertakes to be individually liable for the performance of its part of the obligations without in any way limiting the scope of collective liability envisaged in this Agreement.
4. Subject to the terms of this Agreement, the Technical Member shall be responsible for providing technical knowledge for "Setting up of 1MW Solar Power plant as per the scope mentioned" if the lead member is Financial Member.
5. Subject to the terms of this Agreement, the Financial Member shall be responsible for providing required financial support for "Setting up of 1MW Solar Power plant as per the scope mentioned" if the lead member is Technical Member.
6. In case of any breach of any commitment by any of the Consortium Members, the lead Member shall be solely liable for the consequences thereof.
7. This Agreement shall be construed and interpreted in accordance with the Laws of India and courts at Hyderabad alone shall have the exclusive jurisdiction in all matters relating thereto and arising there under.

TGREDCO

Bidder's Signature



## **Telangana Renewable Energy Development Corporation Ltd**

Tender Ref. No. TGREDCO/PBDS/Solar/IMSS/2024/ Dated: 25.11.2024

8. It is hereby further agreed that in case of being shortlisted, the Members do hereby agree that they shall abide by the terms & conditions of the Tender document.
9. It is further expressly agreed that this Agreement shall be irrevocable and shall form an integral part of the Tender submitted to TGREDCO and shall remain valid till completion of the job assigned to the vendor.
10. The Lead Member is authorized and shall be fully responsible for the accuracy and veracity of the representations and information submitted by the Members respectively from time to time in the response to Tender.
11. It is hereby expressly understood between the Members that no Member at any given point of time, may assign or delegate its rights, duties or obligations under this agreement without the explicit permission of TGREDCO.
12. This Agreement
  - (a) Has been duly executed and delivered on behalf of each Member hereto and constitutes the legal, valid, binding and enforceable obligation of each such Member;
  - (b) Sets forth the entire understanding of the Members hereto with respect to the subject matter hereof; and
  - (c) May not be amended or modified except in writing signed by each of the Members and with prior written consent of TGREDCO.

IN WITNESS WHEREOF, the Members have, through their authorized representatives, executed these present on the Day, Month and Year first mentioned above.

For M/s----- [Lead Member]

-----  
(signature, Name & Designation of the person authorized vide Board Resolution Dated .....)

Witnesses:

1) Signature-----

Name:

Address:

2) Signature -----

Name:

Address:

For M/s----- [Technical/Financial Member]

-----  
(signature, Name & Designation of the person authorized vide Board Resolution Dated .....)

Witnesses:

Witnesses:

1) Signature-----

Name:

Address:

2) Signature -----

Name:

Address:



# **Telangana Renewable Energy Development Corporation Ltd**

Tender Ref. No. TGREDCO/PBDS/Solar/IMSS/2024/ Dated: 25.11.2024

**Annexure-G**

## **FORMAT FOR POWER OF ATTORNEY**

**(To be provided by each of the other members of the Consortium in favor of the Lead Member)**

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

KNOW ALL MEN BY THESE PRESENTS THAT M/s..... having its registered office at ....., .....and M/s ..... having its registered office at ....., (Insert names and registered offices of all Members of the Consortium) the Members of Consortium have formed a Bidding Consortium named ..... (insert name of the Consortium if finalized) (hereinafter called the 'Consortium') vide Consortium Agreement dated..... and having agreed to appoint M/s.....as the Lead Member of the said Consortium do hereby constitute, nominate and appoint M/s.....a company incorporated under the laws of .....and having its Registered /Head Office at .....as our duly constituted lawful Attorney (hereinafter called as Lead Member) to exercise all or any of the powers for and on behalf of the Consortium in regard to submission of the response to tender No..... . We also authorize the said Lead Member to undertake the following acts:

- i) To submit on behalf of Consortium Members response to tender.
- ii) To do any other act or submit any information and documents related to the above response to tender.

It is expressly understood that in the event of the Consortium being selected as Successful Bidder, this Power of Attorney shall remain valid, binding and irrevocable until the completion of the assigned work(s).

We as the Member of the Consortium agree and undertake to ratify and confirm all whatsoever the said Attorney/Lead Member has done on behalf of the Consortium Members pursuant to this Power of Attorney and the same shall bind us and deemed to have been done by us.

IN WITNESS WHEREOF M/s ....., as the Member of the Consortium have executed these presents on this..... day of .....under the Common Seal of our company.

For and on behalf of Consortium Member

M/s.....

(Signature of person authorized by the board)

(Name

Designation

Place:

Date:)

Accepted

TGREDCO

Bidder's Signature



## **Telangana Renewable Energy Development Corporation Ltd**

Tender Ref. No. TGREDCO/PBDS/Solar/IMSS/2024/ Dated: 25.11.2024

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-----  
(Signature, Name, Designation and Address  
of the person authorized by the board of the Lead Member)

Attested

-----  
(Signature of the executant)

-----  
(Signature & stamp of Notary of the place of execution)

Place: -----

Date: -----



# **Telangana Renewable Energy Development Corporation Ltd**

Tender Ref. No. TGREDCO/PBDS/Solar/IMSS/2024/ Dated: 25.11.2024

Annexure-H

## **FORMAT FOR BOARD RESOLUTIONS**

The Board, after discussion, at the duly convened Meeting on ..... (Insert date), with the consent of all the Directors present and in compliance of the provisions of the Companies Act, 1956, passed the following Resolution:

**1. RESOLVED THAT** Mr/Ms....., be and is hereby authorized to do on our behalf, all such acts, deeds and things necessary in connection with or incidental to our response to Tender vide Tender Ref. No. TGREDCO/PBDS/Solar/IMSS/2024/ Dated: 25.11.2024 for Empanelment of Engineering Procurement & Construction (EPC) Vendors for "Design, Supply, Installation, Testing, commissioning with Remote Monitoring System with Comprehensive Warranty, Guarantee for 5 Years and Operation and Maintenance of the Complete Plant for 1 Year for the Grid Connected Solar Power Plant Capacity of 1 MW each for a cumulative capacity of 1000 MW at Various Locations in Telangana State Through Rate Contract CAPEX Mode, representing us in all matters before TGREDCO, and generally dealing with TGREDCO in all matters in connection with our bid for the said Project. **(To be provided by the Bidding Company or the Lead Member of the Consortium)**

**2. FURTHER RESOLVED THAT** pursuant to the provisions of the Companies Act, 1956 and compliance thereof and as permitted under the Memorandum and Articles of Association of the Company, approval of the Board be and is hereby accorded to invest total equity in the Project. **(To be provided by the Bidding Company)**

**[Note: In the event the Bidder is a Bidding Consortium, in place of the above resolution at Sl. No. 2, the following resolutions are to be provided]**

**FURTHER RESOLVED THAT** pursuant to the provisions of the Companies Act, 1956 and compliance thereof and as permitted under the Memorandum and Articles of Association of the Company, approval of the Board be and is hereby accorded to participate as the consortium member in the Project. **(To be provided by each Member of the Bidding Consortium including Lead Member)**

**FURTHER RESOLVED THAT** approval of the Board be and is hereby accorded to participate in consortium with M/s -----[Insert the name of other Members in the Consortium] and Mr/Ms....., be and is hereby authorized to execute the Consortium Agreement. **(To be provided by each Member of the Bidding Consortium including Lead Member)**

And

**FURTHER RESOLVED THAT** approval of the Board be and is hereby accorded to contribute such additional amount over and above the percentage limit (specified for the Lead Member in the Consortium Agreement) to the extent becoming necessary towards the total equity share in the Project Company, obligatory on the part of the Consortium pursuant to the terms and conditions contained in the Consortium Agreement dated ..... executed by the Consortium as per the provisions of the Tender. **[To be passed by the Lead Member of the Bidding Consortium]**

**3. FURTHER RESOLVED THAT** approval of the Board be and is hereby accorded to M/s. .... (Insert name of Bidding Company/ Consortium Member(s)) to use our financial



## **Telangana Renewable Energy Development Corporation Ltd**

Tender Ref. No. TGREDCO/PBDS/Solar/IMSS/2024/ Dated: 25.11.2024

capability for meeting the Qualification Requirements for the Tender for 'Selection of Grid Connected Solar Photo Voltaic Project' and confirm that all the equity investment obligations of M/s..... (Insert Name of Bidding Company/ Consortium Member(s)), shall be deemed to be our equity investment obligations and in the event of any default the same shall be met by us. **[To be passed by the entity(s) whose financial credentials have been used]**

**Certified true copy**

-----

**(Signature, Name and stamp of Company Secretary / Director)**

**Notes:**

- 1) This certified true copy should be submitted on the letterhead of the Company, signed by the Company Secretary / Director.
- 2) The contents of the format may be suitably re-worded indicating the identity of the entity passing the resolution.
- 3) This format may be modified only to the limited extent required to comply with the local regulations and laws applicable to a foreign entity submitting this resolution. For example, reference to Companies Act 1956 may be suitably modified to refer to the law applicable to the entity submitting the resolution. However, in such case, the foreign entity shall submit an unqualified opinion issued by the legal counsel of such foreign entity, stating that the Board resolutions are in compliance with the applicable laws of the respective jurisdictions of the issuing Company and the authorizations granted therein are true and valid.