

6.7 In case of termination of agreement (premature or after completion of 25 years), the SPD will remove the assets from beneficiary premises /land within 90 days, failing which, the infrastructure will be the property of Beneficiary Dept.

6.8 The Levellized Tariff of 25 years shall include all the costs related to above Scope of Work. Bidder shall quote for the entire facilities on a “single responsibility” basis such that the total Bid Price covers all the obligations mentioned in the Bidding Documents in respect of Design, Supply, Erection, Testing and Commissioning including Warranty, Operation & Maintenance (for a period of 25 years for RESCO), goods and services including spares required if any during O&M period. The Bidder has to take all permits like CEIG and other approvals and licenses, Insurance etc., provide training and such other items and services required to complete the scope of work mentioned above.

- The Levellized tariff is on lump sum turnkey basis and the bidder is responsible for the total Scope of work described above.
- The Levellized tariff shall remain firm and fixed and shall be binding on the Successful Bidder till completion of work for payment of Incentive amount irrespective of his actual cost of execution of the project. No escalation will be granted on any reason whatsoever. The bidder shall not be entitled to claim any additional charges, even though it may be necessary to extend the completion period for any reasons whatsoever.
- The Levellized tariff shall be inclusive of all duties and taxes, insurance etc. The prices quoted by the firm shall be complete in all respect and no price variation /adjustment shall be payable by TSREDCO.
- The Operation & Maintenance of Solar Photovoltaic Power Plant would include wear, tear, overhauling, machine breakdown, insurance, and replacement of defective modules, invertors / Power Conditioning Unit (PCU), spares, consumables & other parts for a period of 25 years.
- The Levellized tariff shall be in accordance with all terms, conditions, specifications and other conditions of the Contract as accepted by the TSREDCO and incorporated in the agreement.

## 7 FINANCIAL CLOSURE OR PROJECT FINANCING ARRANGEMENTS

(i) The Project shall achieve Financial Closure within 03 (Three) months from the Effective Date of the Power Purchase Agreement (PPA) (for e.g. if Effective Date of the PPA is 07.08.2020, then scheduled Financial Closure date shall be 07.11.2020).

(ii) At this stage, the SPD shall report 100% tie-up of Financing Arrangements for the Projects. In this regard the SPD shall submit a certificate from all financing agencies regarding the 100% tie-up of total cost indicated for the Project. Additionally, the SPD shall furnish official Permission from beneficiary Dept. to demonstrate/right to use that required roof/land/ plot for project development under possession of the SPD. In this regard the SPD shall be required to furnish the official permission documentary evidences to establish the possession of the required roof/land/lease/sub lease for project development (for 25 years) in the name of the SPD.

(a) Official permission letter to SPD from beneficiary Dept. for allotment/right to use of land as per beneficiary Dept. Terms & Conditions and possession of the roof/Land as mentioned in the LOI.

(b) All agreements and approvals, clearances from beneficiary Dept. related to the project along with all necessary supporting documents.

(iii) In case of delay in achieving above condition as may be applicable, beneficiary Dept. / TSREDCO shall encash Performance Bank Guarantees and shall remove the bidder from the list of the selected bidders, unless the delay is on account of delay in permission granted for roof/land/plot for project development from beneficiary Dept., or due to Force Majeure as per PPA. An extension maximum of One Month from scheduled Financial Closure date can however be considered, on the sole request of SPD, on advance payment of extension charges of INR 2000/- per day +18% GST. This extension will not have an impact on the Scheduled Commissioning Date of the Projects. Subsequent to the completion of deadline for achieving financial closure, TSREDCO shall issue notices to the SPDs who are not meeting the requirements of Financial Closure as per the bid deadlines. The notice shall provide a period of 7 business days to the respective SPDs to either furnish the necessary documents or make the above mentioned payment of INR 2000/ day+18% GST. In case of non-submission of either the requisite documents or the necessary amount upon expiry of the above-mentioned notice period of 7 days, beneficiary Dept. shall encash the PBG of the corresponding SPD and terminates the PPA for the corresponding Project. The amount of INR 2000/ day+18% GST shall be paid by the SPD in advance prior to the commencement of the said delay period and shall be calculated based on the period of delay as estimated by the SPD. In case of the SPD meeting the requirements of Financial Closure before the last date of such proposed delay period, the

remaining amount deposited by the SPD shall be returned by TSREDCO. Interest on account of delay in deposition of the above-mentioned charges or on any subsequent extension sought, shall be levied @ one year SBI MCLR rate/annum +18% GST on pro-rata basis. Any extension charges paid so, shall be returned to the SPD without any interest on achievement of successful commissioning within the Scheduled Commissioning Date, on pro-rata basis, based on the project capacity commissioned as on Scheduled Commissioned Date.

(iv) The SPD will have to submit the required documents to TSREDCO at least 14 days prior to the scheduled Financial Closure date. In case of delay in submission of documents mentioned above, TSREDCO shall not be liable for delay in verification of documents and subsequent delay in Financial Closure.

### **8 COMMISSIONING:**

The Commissioning of the Project shall be carried out by the SPD in line with the procedure elaborated in draft PPA document.

**8.1. PART COMMISSIONING:** There shall be no Part Commissioning allowed for the Project. Relaxation subjected to site conditions and with prior approval of beneficiary.

### **8.2 PENALTY FOR DELAY IN PROJECT IMPLEMENTATION**

If the bidder fails to commission the allocated capacity within 90 to 180days from date of issue of allocation letter, Penalty on per day basis calculated for the Performance Security on a 90 to 180days period would be levied. After above project duration period allocated capacity will get cancelled and the PBG amount pro-rata to non-commissioned capacity would be forfeited.

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

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

### **8.3 EARLY COMMISSIONING**

The SPD shall be permitted for full commissioning of the Project even prior to the Scheduled Commissioning Date. In case the entire capacity is commissioned prior to the Scheduled Commissioning Date, Beneficiary Dept. may purchase the generation at PPA Tariff. However, early commissioning of the Project and subsequent energy procurement from the same shall be subject to the approval of the Beneficiary Dept.

## **9. COMMERCIAL OPERATION DATE (COD)**

Commercial Operation Date (COD) shall be the date on which the commissioning certificate is issued upon successful commissioning of the full capacity of the Project. The 25-year tenure of PPA shall be as per the provisions of PPA.

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

## **10. STRUCTURING OF THE BID SELECTION PROCESS**

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

## **11. INSTRUCTIONS TO BIDDERS FOR STRUCTURING OF BID PROPOSALS IN RESPONSE TO BID**

The bidder including its Parent, Affiliate or Ultimate Parent or any Group Company shall submit single response to bid.

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

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

- i. Covering Letter
- ii. 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.

In the event any Member of the Bidding Consortium (other than Lead Member) is a foreign entity, it may submit Board Resolutions in place of Power of Attorney for the purpose of fulfilling the requirements under this clause. Provided that such Board Resolutions shall be supported by 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.

- iii. Earnest Money Deposit (EMD) in the form
- iv. Board Resolutions, as per prescribed formats certified by the Company Secretary or the Director of the relevant Bidder, as applicable to the Bidder and mentioned hereunder:

- a. 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 tender and in the event of selection of the Projects and to sign the PPA through TSREDCO. Board Resolution from each of the Consortium Members in favour of the person signing Consortium Agreement.
- b. Board Resolution from the Bidding Company committing 100% (One Hundred Percent) of the equity requirement for the Project/ Board Resolutions from each of the Consortium Members together in aggregate committing to 100% (One Hundred Percent) of equity requirement for the Project (in case of Bidding Consortium); and
- c. Board Resolutions from each of the Consortium Members and Lead member contributing such additional amount over and above the percentage limit (specified for the Lead Member and other 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 in the Consortium Agreement.
- v. In case of a Consortium, the Consortium Agreement between the Members in the Consortium along with Board resolution from each Member of the Consortium for participating in Consortium.
- vi. Format for Financial Requirements along with the certificate from practicing Chartered Accountant/ Statutory Auditors showing details of computation of the financial credentials of the Bidder.
- vii. A disclosure statement regarding participation of any related companies in the bidding process.
- viii. Format for Technical Criteria (to be filled out separately) in line with Clause, Section-II, Instructions to Bidders (ITB) of tender.
- ix. Declaration by the Bidding Company/ Lead Member of Bidding Consortium for the Proposed Technology Tie Up as per Format (to be filled out separately).
- x. Details of all types of securities/instruments which are pending conversion into equity whether optionally or mandatorily.
- xi. No Deviation Certificate as per mentioned in Format
- xii. **Attachments:**
  - a. Memorandum of Association, Article of Association needs to be attached along with the bid. The bidder should also highlight the relevant provision which highlights the objects relating to Power/ Energy/ Renewable Energy/ Solar Power plant development.
    - In case, there is no mention of the above provisions in the MoA/ AoA of the bidding company, the same has to be amended and submitted prior to signing of PPA, if the bidder is selected as Successful bidder.

□ If the selected bidder wishes to execute the project through a Special Purpose Vehicle (SPV), the MoA/ AoA of the SPV highlighting the relevant provision which highlights the objects relating to Power/ Energy/ Renewable Energy/ Solar Power plant development has to be submitted prior to signing of PPA.

b. Certificate of Incorporation of Bidding Company/ all member companies of Bidding Consortium.

c. A certificate of shareholding of the bidding company, its parent and Ultimate Parent (if any) duly certified by a practicing Chartered Accountant/ Company Secretary as on a date within 30 days prior to the last date of bid submission, along with documents containing information about the promoters, and their shareholding in the Company (as on a date within 30 days prior to the last date of bid submission) indicating the controlling shareholding at the stage of submission of response to tender to TSREDCO as per Clause, Section-II, Instructions to Bidders (ITB) of tender. TSREDCO reserves the right to seek additional information relating to shareholding in promoter companies, their parents/ ultimate parents and other group companies to satisfy themselves that tender conditions have been complied with and the bidder will ensure submission of the same within the required time lines.

d. Certified copies of annual audited accounts for the last financial year, i.e. FY 2019-20.

## **12. IMPORTANT NOTES AND INSTRUCTIONS TO BIDDERS:**

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

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

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

12.4 After the Effective Date of PPA, consequences specified in PPA shall apply.

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

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

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

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

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

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

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

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

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

12.14 Non-submission and/ or submission of incomplete data/ information required under the provisions of bid shall not be construed as waiver on the part of TSREDCO of the

obligation of the Bidder to furnish the said data/ information unless the waiver is in writing.

12.15 Only the State of Telangana Courts shall have exclusive jurisdiction in all matters pertaining to this tender bid.

### **13. NON-RESPONSIVE BID**

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

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

- (a) Non-submission of Cost of bid and/ or Processing Fee as mentioned in the Bid Information Sheet;
- (b) Non-submission of EMD in acceptable form along with bid document.
- (c) Response to bid not received by the due date and time of bid submission;
- (d) Non-submission of correct, valid and operative Pass-Phrase to decrypt either the Technical Bid Part or Financial Bid Part offline before due date and time of submission of bid;
- (e) Non-submission of the original documents mentioned at Clause, Section- II, Instructions to Bidders (ITB) of tender bid by due date and time of bid submission;
- (f) Any indication of tariff in any part of response to the bid, other than in the financial bid;
- (g) Data filled in the Electronic Form of Financial Bid (Second Envelope), not in line with the instructions mentioned in the same electronic form;
- (h) In case it is found that the Bidding Company including Ultimate Parent Company/ Parent Company/ Affiliate/ Group Companies have submitted more than one response to this Tender bid, then all these bids submitted shall be treated as non-responsive and rejected.

### **14. METHOD OF SUBMISSION OF RESPONSE TO TENDER BY THE BIDDER**

#### **A. DOCUMENTS TO BE SUBMITTED OFFLINE (IN ORIGINAL):**

The bidder has to submit the documents in original as part of Response to Tender bid to the address mentioned in Bid Information Sheet before the due date and time of bid submission.

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

- I. Covering Envelope: Super scribed as “Covering Envelope Containing Cost of Tender bid Document, Processing Fee, Bank Guarantee towards EMD, Covering Letter, and Power



of Attorney (if applicable), Consortium Agreement (if applicable), Board Resolution” must contain the following

- DD/ Pay order towards Cost of Tender bid Document as mentioned in Bid Information Sheet.
  - Processing Fee in the form DD/ Pay Order as mentioned in the Bid Information Sheet.
  - Bank Guarantee towards EMD as mentioned in the Bid Information Sheet (as per Format). One EMD may be submitted for the cumulative capacity quoted by the Bidder.
  - Covering Letter as per Format
  - Power of Attorney as per Format (if applicable),
  - Board Resolution as per Format
  - Consortium Agreement as per Format (if applicable)
  - GSTN along with respective registered address of the Bidder on the letterhead of the Bidder (signed by the Authorized signatory)
- II. Pass-Phrase Envelope-1: Containing Pass Phrase for Technical Bid duly signed by the authorized signatory in sealed envelope.
- III. Pass-Phrase Envelope-2: Containing Pass Phrase for Financial Bid duly signed by the authorized signatory in sealed envelope.

The bidding envelope shall contain the following sticker

<b>Response to Tender for Selection of Solar Power Developers for Design, Supply, Installation, Testing and commissioning of 1200KWp Grid Connected Ground Mounted power plants at 8 locations of each 150KWp at Vijaya Dairy plants of TSDDCFL, Telangana under RESCO mode</b>	
<i>Cumulative Capacity of the projects applied for</i>	_____kWp
<i>Tender Reference No.</i>	TSREDCO/SE/SPV/Govt./VIJAYA DAIRY-1200kWp/RESCO/2020 date. <u>09</u> .11.2020
<i>Submitted by</i>	<i>(Enter Full name and address of the Bidder)</i>
<i>Authorized Signatory</i>	<i>(Signature of the Authorized Signatory) (Name of the Authorized Signatory) (Stamp of the Bidder)</i>
<i>Bid Submitted to</i>	<b>VC &amp; Managing Director</b> TELANGANA STATE RENEWABLE ENERGY DEVELOPMENT CORPORATION LTD (TSREDCO) Corporate Office: D. No. 6-2-910, Visvesvaraya Bhavan, The Institution of Engineers Building, Khairatabad, Hyderabad - 500 004. Telangana State, India PHONE: 040-23201502 / 03, FAX : 040-23201504 E-mail : <a href="mailto:info@tsredco.telangana.gov.in">info@tsredco.telangana.gov.in</a> , <a href="mailto:se@tsredco.telangana.gov.in">se@tsredco.telangana.gov.in</a>

**14.b DOCUMENTS TO BE SUBMITTED ONLINE**


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

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

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

**15. NOTICE BOARD FOR DISPLAY**

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

.....kW Grid Connected Solar PV Project Owned and operated by  
----- (insert name of the SPD/Supplier)  
Setting up of \_\_\_\_kW Solar PV Project at .....,  
.....  
Implemented by  
  
**TELANGANA STATE RENEWABLE ENERGY DEVELOPMENT CORPORATION LTD**

**16. VALIDITY OF THE RESPONSE TO TENDER BID**

The Bidder shall submit the response to Tender bid which shall remain valid up to 90 (Ninty) days from the last date of submission of response to Tender bid (“Bid Validity”). TSREDCO reserves the right to reject any response to Tender bid which does not meet the aforementioned validity requirement.

## 17 BID PREPARATION COST

The Bidder shall be responsible for all the costs associated with the preparation of the response to Tender bid and participation in discussions and attending pre-bid meeting(s) etc. TSREDCO shall not be responsible in any way for such costs, regardless of the conduct or outcome of the bid process.

## 18 CLARIFICATIONS/ ENQUIRIES/ AMENDMENTS

18.1 Clarifications/ Doubts, if any, on Tender bid document may be emailed and/ or through [www.tender.telangana.gov.in](http://www.tender.telangana.gov.in) portal.

18.2 If necessary, amendments, clarifications, elaborations shall be issued by TSREDCO which will be notified on TSREDCO/ [www.tender.telangana.gov.in](http://www.tender.telangana.gov.in) web site. No separate reply/ intimation will be given for the above, elsewhere.

### 18.3 Enquiries/ Clarifications may be sought by the Bidder from

Sl.No	Designation	Contact Numbers	Email id
1.	General Manager	040 - 23201502/03	<a href="mailto:info@tsredco.telangana.gov.in">info@tsredco.telangana.gov.in</a>
2.	Project Director	040 - 23201502/03	<a href="mailto:se@tsredco.telangana.gov.in">se@tsredco.telangana.gov.in</a>

## 19 RIGHT OF TSREDCO TO REJECT A BID:

TSREDCO reserves the right to reject any or all of the responses to Tender bid or cancel the Tender bid or annul the bidding process for any project at any stage without assigning any reasons whatsoever and without thereby any liability. In the event of the tender being cancelled at any stage, the processing fee (excluding GST, if amount credited to TSREDCO's account), without any interests, and EMD submitted by the Bidders shall be returned to the respective Bidders.

## 20 POST AWARD COMPLIANCES

Timely completion of all the milestones i.e. signing of PPA, meeting Financial Closure Requirements/ Conditions Subsequent (PPA), Commissioning etc. will be the sole responsibility of SPD. TSREDCO/Beneficiary Dept. shall not be liable for issuing any intimations/ reminders to SPDs for timely completion of milestones and/ or submission of compliance documents.

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



**SECTION - III**

**TENDER SCHEDULE**

SECTION - III  
TENDER SCHEDULE

**1. PREAMBLE:**

The scope of work for the bidder include complete design, shadow analysis of Ground, engineering, manufacture, supply, storage, civil work, erection, testing & commissioning of **1200KWp Grid Connected Ground Mounted power plants at 8 locations of each 150KWp at Vijaya Dairy plants of TSDDCFL, Telangana under RESCO Mode** including operation and maintenance (O&M) of the project and cleaning of modules at regular intervals for a period of (25) Twenty Five years after commissioning through e-procurement platform (i.e. [www.tender.telangana.gov.in](http://www.tender.telangana.gov.in)).

The Govt. of Telangana has announced Telangana Solar Power Policy 2015 with provisions for promotion of Grid connected Solar Rooftop systems with net metering/gross metering option to the consumers. The following are the provisions for promotion of grid connected solar rooftop TS. Solar Power Policy 2015,

- The Government will promote solar rooftop systems on public buildings, domestic, commercial and industrial establishments.
- The consumers are free to choose either net or gross meter option for sale of power to DISCOM and the applicable tariff for either of the cases shall be equal to average Cost to Service of the DISCOM which will be determined by VIJAYA DAIRY every year.
- Permission will be given to the group of persons / society to set up solar power projects and will be treated as collective generation for supply of power to the households of each society / group member.
- Time bound clearance of proposals through online mode.
- The DISCOMs have issued the implementation guidelines based on the promotion policy announced by the GoTS.

On behalf of consumers under this scheme therein, TSREDCO inviting Bids for empanelment for Supply, Installation, Commissioning, maintenance and Operation of Solar Rooftop Power plants for 25 years in Telangana State, under Net Metering Policy to take up the projects under RESCO MODE.

**2. INCOME TAX:**

During the course of the contract period, deduction of income tax and surcharge as in force at source shall be made at the prevailing rate of income tax department issued from time to time of the gross amount of each bill.

**3. RATES , TAXES AND DUTIES:**

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

**4. PLACE OF WORK AND VISIT TO SITE:**

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

**5. BID DETAILS:**

The bid shall be on RESCO MODE for design, supply, installation and commissioning of grid connected solar rooftop systems and the levelised tariff quoted by the bidders for 25 years.

**6. ELIGIBILITY CRITERIA:**

- a. Valid Registered SPV Suppliers/ Manufacturers/ System Integrators with TSREDCO.
- b. Bidder should have experience at least minimum **200KWp** capacity at single site under Net metering in field of Grid Connected Solar PV systems in any one (1) FY from the last 3 Years (i.e. FY 2017-18, 2018-19 and 2019-20). Experience certificate along with performance from beneficiary, should be before 6months from last date

**6.1. TECHNICAL ELIGIBILITY CRITERIA:**

- a. Under this Tender bid, it is proposed to promote only commercially established and operational technologies to minimize the technology risk and to achieve timely commissioning of the Projects. The Bidder may indicate regarding the selection of technology and its details at the time of submission of bids in the prescribed Format. However, the Successful Bidder has to confirm the selection of technology in line with the above at the time of Financial Closure. The technology proposed at the time of submission of response to Tender bid can be changed at the time of Financial Closure.
- b. Detailed technical parameters for Solar PV Projects to be met by SPDs are at Annexure. The Bidders shall strictly comply with the technical parameters detailed in the Annexure. Further, the cells and modules used in the Project shall be sourced only from the models and manufacturers included in the “Approved List of Models and Manufacturers” as published by MNRE and updated as on the date of commissioning of the Project.
- c. The Projects shall also comply with the criteria for power generation detailed in Clause in Section-II, Instructions to Bidders (ITB) of Tender bid.

**6.2 FINANCIAL ELIGIBILITY CRITERIA:**

- a. Bidder should have annual turnover of Rs.5.00 Cr. In any one (1) Financial Year during the last three financial years i.e. 2017-18 , 2018-19 and 2109-20 (Certificate from CA is to be furnished).

**7. FORCE MAJEURE**

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

(a) Security deposit for delay and

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

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

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

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

**8. COMMISSIONING /COMPLETION CERTIFICATE**

a. Application for completion/commissioning certificate:

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

- b. **DOCUMENT SUBMISSION FOR ISSUE COMMISSIONING/COMPLETION CERTIFICATE:**  
For the purpose of above the following documents will be deemed to form the completion documents:
- c. Checklist for inspection of Roof top SPV power plants as per TSREDCO format.
  - d. Project completion report from successful bidder as per MNRE format
  - e. Project completion/satisfaction certificate from concern beneficiary dept. officials.

TSREDCO





## SECTION - IV

# BID EVALUATION AND SELECTION OF PROJECTS

## SECTION - IV

### BID EVALUATION AND SELECTION OF PROJECTS

#### 1 BID EVALUATION

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

#### 2 TECHNO-COMMERCIAL EVALUATION OF BIDDERS

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

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

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

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

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

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

In this step evaluations of Techno-Commercially Qualified Bids for the projects shall be done based on the “First Round Tariff Bid” quoted separately for the projects by the bidders in the Electronic Form of Financial Bid. After this step, the shortlisted bidders shall be invited for the Reverse Auction separately for the projects.

2.b.1 Second Envelope (containing First Round Tariff) of only those bidders shall be opened for the projects whose technical bids are found to be qualified.

2.b.2 The Bidder including its Parent, Affiliate or Ultimate Parent or any Group Company will have to submit a single bid (single application) per project and quoting a single tariff per kWh per project applied for. The tariff has to be quoted up to two places of decimal only. If it is quoted with more than two digits after decimal, it shall be ignored after first two decimal places. (For e.g. if the quoted tariff is INR 4.337, then it shall be considered as INR 4.33).

2. b.3 In this step, evaluation will be carried out based on tariff quoted by Bidders.

2.b.4 On completion of Techno-Commercial bid evaluation, if it is found that only one or two Bidder(s) is/are eligible per project for the next stage, opening of the financial bid of the bidder will be at the discretion of TSREDCO. Thereafter, TSREDCO will take appropriate action as deemed fit.

2.b.5 If the first-round tariff quoted is same for two or more Bidders for a particular project, then all the Bidders with same tariff shall be considered of equal rank/ standing in the order.

2.b.6 All Bidders with same tariff shall be eligible for reverse auction round (provided their rank is equal to or less than nth Bidder as mentioned in Clause of this Section).

2.b.7 Ranking of bidders after Financial Bid Evaluation: Following illustrates an example of ranking of bidders after financial bid opening and evaluation

<b>Bidder</b>	<b>Submitted Financial Bid</b>	<b>Ranking</b>
B1	₹ 4.10 (Tariff in ₹/ kWh)	L1
B2	₹ 4.20 (Tariff in ₹/ kWh)	L2
B3	₹ 4.30 (Tariff in ₹/ kWh)	L3
B4	₹ 4.30 (Tariff in ₹/ kWh)	L3
B5	₹ 4.43 (Tariff in ₹/ kWh)	L4
B6	₹ 4.60 (Tariff in ₹/ kWh)	L5
B7	₹ 4.70 (Tariff in ₹/ kWh)	L6

### **3.NEGOTIATIONS (STEP - 3)**

3.1 The negotiations for tender shall be conducted separately on the day as intimated by TSREDCO to the eligible bidders.

3.2 The Total eligible bidders for the Project for negotiations shall be decided as mentioned below:

i) After financial bid evaluation of the tender, the bidders shall be shortlisted in the ascending order of financial bids quoted.

3.3 At least one week prior to negotiations, advance intimation regarding the date and time of the negotiations will be sent by e-mail to all the bidders whose technical bids have been opened and found to be qualified for the tender. However, from this advance intimation it shall not be construed by the bidders that they have been shortlisted for negotiations.

3.4 The minimum decrement value for tariff shall be INR 0.01 per kWh. The Bidder can mention its revised discounted tariff which has to be at least 01 (One) Paise less than its current tariff.

3.4.1 Bidders can only quote any value lower than their previous quoted tariff taking into consideration the minimum decrement value mentioned in the previous clause. However, at any stage, increase in tariff will not be permissible. Bidders can improve their ranking by quoting the tariff lower than their last quoted tariff.

### **4. SELECTION OF SUCCESSFUL BIDDERS:**

4.1 The bidders shall be selected in the ascending order with lowest quoted tariff (being L1) project wise. In case of a tie among two or more bidders (i.e. their last quoted tariff being the same at the end), they will be considered in the chronological order of their last bid with preference to that bidder who has quoted his last bid earlier than others.

In the above case, if the time of quote also becomes exactly same among the bidders at a tie, then the ranking among these bidders shall be done as follows:

Lowest rank will be given to the bidder who has quoted the lowest in Financial Bid and so on.



## SECTION - V

# TECHNICAL SPECIFICATIONS

Section - V

Technical specifications

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

**DEFINITION:**

A Grid Tied Solar Rooftop Photo Voltaic (SPV) power plant consists of SPV array, Module Mounting Structure, Power Conditioning Unit (PCU) consisting of Maximum Power Point Tracker (MPPT), Inverter, and Controls & Protections, interconnect cables, Junction boxes, Distribution boxes and switches. PV Array is mounted on a suitable structure. Grid tied SPV system is without battery and should be designed with necessary features to supplement the grid power during day time. Components and parts used in the SPV power plants including the PV modules, metallic structures, cables, junction box, switches, PCUs etc., should conform to the BIS or IEC or international specifications, wherever such specifications are available and applicable. Solar PV system shall consist of following equipment/components.

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

**1. SOLAR PV MODULES**

**SPV CRYSTALLINE MODULES**

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

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

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

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

- b) The total solar PV array capacity should not be less than allocated capacity (kWp) and should comprise of solar crystalline modules of minimum 250Wp and above wattage. Module capacity less than minimum 250 watts should not be accepted.
  - c) Protective devices against surges at the PV module shall be provided. Low voltage drop bypass diodes shall be provided.
  - d) PV modules must be tested and approved by one of the IEC authorized test centers.
  - e) The module frame shall be made of corrosion resistant materials, preferably having anodized aluminum.
  - f) The bidder shall carefully design & accommodate requisite numbers of the modules to achieve the rated power in his bid. TSREDCO/owners shall allow only minor changes at the time of execution.
  - g) Other general requirement for the PV modules and subsystems shall be the Following:
    - i. The rated output power of any supplied module shall have tolerance of +/- 3%.
    - ii. The peak-power point voltage and the peak-power point current of any supplied module and/or any module string (series connected modules) shall not vary by more than 2 (two) per cent from the respective arithmetic means for all modules and/or for all module strings, as the case may be.
    - iii. The module shall be provided with a junction box with either provision of external screw terminal connection or sealed type and with arrangement for provision of by-pass diode. The box shall have hinged, weather proof lid with captive screws and cable gland entry points or may be of sealed type and IP-65 rated.
    - iv. IV curves at STC should be provided by bidder.
- 1.3. Modules deployed RF identification tag. The following information to be mentioned in the RFID used on each modules. (This has to be inside the laminate, but must be able to withstand harsh environmental conditions).
- a. Name of the manufacturer of the PV module
  - b. Name of the manufacturer of Solar Cells.
  - c. Month & year of the manufacture (separate for solar cells and modules)
  - d. Country of origin (separately for solar cells and module)
  - e. I-V curve for the module Wattage,  $I_m$ ,  $V_m$  and FF for the module
  - f. Unique Serial No and Model No of the module
  - g. Date and year of obtaining IEC PV module qualification certificate.
  - h. Name of the test lab issuing IEC certificate.
  - i. Other relevant information on traceability of solar cells and module as per ISO 9001 and ISO 14001.

**WARRANTIES:**

**a) Material Warranty:**

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

ii. Defects and/or failures due to manufacturing

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

iv. Non conformity to specifications due to faulty manufacturing and/or inspection processes. If the solar Module(s) fails to conform to this warranty, the manufacturer will repair or replace the solar module(s), at the Owners sole option

**b) Performance Warranty:**

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

**2. MODULE MOUNTING STRUCTURE:**

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

b. The structure shall be designed to allow easy replacement of any module and shall be in line with site requirement.

c. The structures shall be fixed to the foundation in such a manner that, in future is required they can be easily relocated to a different foundation.

d. The mounting structure shall be designed for simple mechanical and electrical installation. It shall support SPV modules at a given orientation, absorb and transfer the mechanical Loads to the base properly.

e. The mounting steel structure shall be as per latest BIS 2062 (amended up to date) and galvanization of mounting structure shall be in compliance of BIS 4759 (amended up to date).

f. The array structure shall be so designed that it will occupy minimum space without sacrificing the output from SPV panels at the same time.

g. The bidder shall be designed Module Mounting Structure as per MNRE norms for normal / plain VIJAYA DAIRYC roofs.

h. The bidder shall be designed Module Mounting Structure with towards south direction and it is to be with stand 150KMPH wind speed and also maintain the alignment and tilt angle as per MNRE norms. The structure designs are to be approved by Govt. approved / empanelled structural Engineer for specific/ required locations.



- i. Nut & bolts, supporting structures including Module Mounting Structures shall have to be adequately protected from atmosphere and weather prevailing in the area.
- j. All fasteners shall be of stainless steel of grade SS 304.
- k. The Mounting structure shall be grounded properly using GI strips and maintenance free earthing kit.
- l. The Mounting structure shall be so designed to withstand the speed for the wind zone of the location where a PV system is proposed to be installed (wind speed of 150 km/hour). It may be ensured that the design has been certified by a recognized Lab/Institution in this regard and submit wind Loading calculation sheet to TSREDCO. Suitable fastening arrangement such as grouting and calming should be provided to secure the installation against the specific wind speed.
- m. IS 800-2007 shall be followed for structural design.
- n. SPV module mounting structure shall be fixed type with provision of manual correction in tilt angle which shall be made after every 3 months to get maximum output. Azimuth shall be 0 degree True south
- o. Hot dipped Galvanized Steel Structural with minimum 80 microns of galvanization must be considered for all type of structural steel proposed for the power plant
- p. Design drawings with material selected shall be submitted for prior approval of the employer.
- q. The Bidder/Bidding Consortium/Bidding Consortium shall specify installation details of the PV modules and the support structures with appropriate diagram and drawings.

### **3. STRING COMBINER BOX OR ARRAY JUNCTION BOXES**

- a. The junction Boxes shall have suitable arrangement for the followings:-
  - Combine groups of modules into independent charging sub-arrays that will be wired into the controller.
  - Provide arrangement for disconnection for each of the groups.
  - Provide a test point for each sub-group for quick fault location
  - To provide group array isolation
- b. The string combiner box/ junction box shall be dust proof, vermin proof, and waterproof and made of Polycarbonate Plastic
- c. The terminal will be connected to copper bus-bar arrangement of proper size to be provided. The junction boxes shall have suitable cable entry points fitted with cable glands of appropriate sizes for both incoming and outgoing cables
- d. Suitable markings shall be provided on the bus-bars for easy identification and cable ferrules will be fitted at the cable termination points for identification.

- e. The string combiner box/ junction box shall be with protection class IP 65 for mounting outside in Open weather condition.
- f. Each string combiner box/ junction box will have suitable Reverse Blocking Diodes of maximum DC blocking voltage of 600V / 1000V, whichever causes less power loss, with suitable arrangement for its connecting
- g. The string combiner box/ Array junction Box will also have suitable surge protection device.
- h. The current carrying ratings of the string combiner box/ junction box shall be suitable with adequate safety factor, to inter connect the Solar PV system corresponding to the project capacity, as designed by the Bidder/Bidding Consortium
- i. Necessary sensors and transducers shall be provided in the string combiner boxes to facilitate monitoring of all string parameters in the data acquisition system.
- j. String level remote monitoring facility shall be incorporated to monitor generation and faults at string level.

#### **4. INVERTERS / POWER CONDITIONING UNIT (PCU)**

- a. The PCU / Grid Tied Inverter shall carry a warranty of minimum 5years.
- b. Inverter/PCU shall be non-transformer string inverters, grid tied in nature, shall consist of MPPT controller. Inverters shall be decided based on array design/suitable rating in case of string design, associated control and protection devices etc all integrated into PCU. It shall provide necessary protections for Grid Synchronization. The Inverters should convert DC power produced by SPV modules in to AC power and must synchronize automatically its AC output to the exact AC Voltage and frequency of Grid.
- c. The DC energy produced has to be utilized to maximum and supplied to the bus for inverting to AC voltage to extract maximum energy from solar array and provides 3-ph, 400V AC/ (+10% to - 10%), 50+/- 1.5 Hz with total harmonic voltage distortion less than 3% to synchronize with local grid.
- d. The Inverters shall be of very high quality having efficiency not less than 97% and shall be capable of running in integrated mode.
- e. Degree of protection of the indoor Inverters shall be at least IP-42 and that of outdoor at least IP-65.
- f. Built in with data logging to remotely monitor plant performance through external PC shall be provided (PC shall be provided along with SPV Plant).
- g. The Inverters should be designed to be completely compatible with the SPV array voltage and Grid supply voltage.
- h. The dimension, weight, foundation details etc. of the PCU shall be clearly indicated in the detailed technical specification.

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

n. The PCU shall be capable of operating in parallel with the grid utility service and shall be capable of interrupting line fault currents and line to ground fault currents.

o. The PCU shall be able to withstand an unbalanced Load conforming to IEC standard (+/-5% voltage) and relevant Indian electricity condition. The PCU shall include appropriate self- protective and self-diagnostic features to protect itself and the PV array from damage in the event of PCU component failure or from parameters - beyond the PCU's safe operating range due to internal or external causes. The self-protective features shall not allow signals from the PCU front panel to cause the PCU to be operated in a manner which may be unsafe or damaging. Faults due to malfunctioning within the PCU, including commutation feature, shall be cleared by the PCU protective devices and not by the existing site utility grid service circuit breaker.

p. The Inverter shall go to shutdown/standby mode, with its contacts open, under the following conditions before attempting an automatic restart after an appropriate time delay.

- When the power available from the PV array is insufficient to supply the losses of the PCU, the PCU shall go to standby/shutdown mode.
- The PCU control shall prevent excessive cycling of shut down during insufficient solar radiance.

q. Operation outside the limits of power quality as described in the technical data sheet should cause the power conditioner to disconnect the grid. Additional parameters requiring automatic disconnection are

- Over current
- Earth fault
- And reverse power
- In each of the above cases, tripping time should be less than a few seconds.

r. Detailed technical description of the complete unit of offered Inverter should be furnished with bid document Following Technical documents of Inverter shall be supplied for approval after placement of order

- Detailed technical description of the complete unit
- Instructions for installation and operation
- Electrical diagrams of all internal cabling necessary for installation, maintenance and fault finding.
- Description of electrical and mechanical characteristics of units
- Maintenance and fault finding procedures.

- Safety precautions
  - Software for data monitoring with detailed description.
  - Details of data acquisition
  - Factory test reports in details on various parameters.
  - Trouble shooting procedures
  - All maintenance requirements and their schedules, including detailed instructions on how to perform each task.
  - Detailed schematics of all power instrumentation and control equipment and subsystems along with their inter-Vijaya Dairy connection diagrams. Schematics shall indicate wiring diagrams, their numbers and quantities, type and ratings of all components and subsystems.
  - A detailed bill of materials which shall list components model numbers, quantities and manufacturer of each supplied item.
  - All documents and write ups shall be in English. They shall be clean and legible, and must be checked, signed, approved and dated by a competent representative of the Bidder/Bidding Consortium.
- s. The Bidder/Bidding Consortium/Bidding Consortium should note that Inverters/PCU is going to be installed in an area which is prone to hot air of 48 to 50 degree centigrade. Thus the room shelters and air blower/ fan (auto operated as per requirement), if required, for Inverter will be in scope of supply. Integrated solutions into prefabricated structures or in standard metallic container may be accepted. The Bidder/Bidding Consortium/Bidding Consortium shall provide data sheet for Inverter/ Power Conditioning Unit along with their offer.
- t. The PCU/ inverters should be tested from the MNRE approved test centers / NABL /BIS /IEC accredited testing- calibration laboratories. In case of imported power conditioning units, these should be approved by international test houses.
- u. MNRE latest additional guidelines for Inverters:
1. The inverters should be tested as per IEC standards. The following criteria should be followed:
    - i. The benchmarking efficiency criteria for Grid Tied (string inverters) inverter
      - At nominal voltage and full Load is  $\geq 95\%$ .
      - For Load  $\geq 25\%$  is  $\geq 92\%$ .
    - ii. In case of standalone / grid interactive inverter the benchmarking efficiency criteria
      - At full Load is 85%
      - For the Load  $\geq 25\%$  is 80%

- iii. No Load losses should not be more than 5%.
2. The following tests are to be conducted on the inverters:
- a) Efficiency measurement as per IS/IEC 61683 (for system with no MPPT)
  - b) Overall efficiency for Grid Tied inverter as per EN50530
  - c) Islanding Prevention test as per IS 16169/IEC 62116
  - d) PV system characteristics of utility interface as per IEC 61727 (the system should meet all the clauses as per the standard except the clause 5.2.2 of IEC 61727. In case of clause 5.2.2 it should withstand the over /under frequency in the range of 47 to 52Hz)
  - e) Overall charge controller efficiency should be  $\geq 85\%$  at  $\geq 10\%$  Load and  $\geq 92\%$  at full Load.
  - f) System should have IP 65 certification for outdoor use IP 21 & 22 for indoor use.
  - g) Environmental testing as per IEC 60068-2-(1,2,14&30)

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

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

#### 5. ENERGY METERING

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

- a. The Energy Meter shall have 4-quadrant measurement method and shall be suitable for 3-wire as well as 4-wire connection.
- b. The meter shall also record Maximum Demand at set interval. TOD (Time of Day) measurement shall also be possible.
- c. The energy meter shall communicate with the Data Acquisition System / other plant network over MODBUS protocol.
- d. Separate Meters shall be provided for Solar Power Generation and Auxiliary Load consumption.

- e. In case more than one inverter circuits are used for synchronizing with the grid then similar meters shall be provided for each inverter output circuit.
- f. Additionally one digital summator shall also be provided for calculation and display of total concurrent energy/ demand of all the feeders.
- g. Meters shall comply with the requirements of CEA Regulations on Installation & Operation of Meters.
- h. The functional Specification of the energy meters shall be as follows:
  - Applicable IS : IS 13779 or IS 14679 depending upon accuracy of meters.
  - Accuracy Class Index: 0.2S
  - Power factor range: Zero lag-unity-zero lead
  - Display parameters : LCD test, KWH import, KWH export, MD in KW export, MD in KW import, Date & Time, AC(phase wise and line wise) current and voltages and power factor and frequency (Cumulative KWH will be indicated continuously by default & other parameters through push-button) .
  - Power Consumption: Less than 4VA in Voltage circuit and 2 VA for Current circuit. - Frequency: 50 Hz with + / -5% variation
  - Test Output Device: Flashing LED visible from the front
  - Billing data: Meter serial number, Date and time, KWH import, KWH export, MD in KW (both export and import), History of KWH import and export, & MD (both export & import).
  - All these data shall be accessible for reading, recording and spot billing by downloading through optical port/RS485 on MRI or Laptop computers at site.

## **6. INTEGRATION OF PV POWER WITH GRID:**

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

## **7. DATA ACQUISITION AND LOGGING**

- i. Data Acquisition System shall be provided for each of the solar PV plant.
- ii. Data Logging Provision for plant control and monitoring, time and date stamped system data logs for analysis with the high quality, suitable PC. Metering and Instrumentation for display of systems parameters and status indication to be provided.

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



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

**8. POWER & CONTROL CABLES:** Cables of appropriate size to be used in the system shall have the following characteristics:

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

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

**9. DC DISTRIBUTION BOARD:**

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

**10. AC DISTRIBUTION PANEL BOARD:**

- a) AC Distribution Panel Board (DPB) shall control the AC power from PCU/ inverter, and should have necessary surge arrestors. Interconnection from ACDB to mains at LT Bus bar while in grid tied mode.
- b) All switches and the circuit breakers, connectors should conform to IEC 60947, part I, II and III/ IS60947 part I, II and III.
- c) The changeover switches, cabling work should be undertaken by the bidder as part of the project.
- d) All the Panel's shall be metal clad, totally enclosed, rigid, floor mounted, air - insulated, cubical type suitable for operation on three phase / single phase, 415 or 230 volts, 50 Hz
- e) The panels shall be designed for minimum expected ambient temperature of 45 degree Celsius, 80 percent humidity and dusty weather.
- f) All indoor panels will have protection of IP54 or better. All outdoor panels will have protection of IP65 or better.
- g) Should conform to Indian Electricity Act and rules (till last amendment).

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

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

**11. PCU/ARRAY SIZE RATIO:**

11.1 The combined wattage of all inverters should not be less than rated capacity of power plant under STC.

11.2 Maximum power point tracker shall be integrated in the PCU/inverter to maximize energy drawn from the array.

**12. EARTHING AND LIGHTNING PROTECTION SYSTEM**

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

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

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

**12.3. EARTHING PROTECTION:**

i. Each array structure of the PV yard should be grounded/ earthed properly as per IS:3043-1987. In addition the lightning arrester/masts should also be earthed inside the array field. Earth Resistance shall be tested in presence of the representative of Department/TSREDCO as and when required after earthing by calibrated earth tester. PCU, ACDB and DCDB should also be earthed properly.

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

**12.4 GRID ISLANDING:**

i. In the event of a power failure on the electric grid, it is required that any independent power-producing inverters attached to the grid turn off in a short period of time. This prevents the DC-to-AC inverters from continuing to feed power into small

sections of the grid, known as “islands.” Powered islands present a risk to workers who may expect the area to be unpowered, and they may also damage grid-tied equipment. The Rooftop PV system shall be equipped with islanding protection. In addition to disconnection from the grid (due to islanding protection) disconnection due to under and over voltage conditions shall also be provided.

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

### **13. POWER CONSUMPTION:**

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

### **14. CIVIL WORKS:**

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

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

### **15. PROJECT SCHEDULE & PROGRESS MONITORING**

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

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

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

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

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

## **16. DRAWINGS, DATA AND DOCUMENTS**

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

- General description of equipment offered specifying the important features, make, technical parameters, materials of construction, etc. to enable the owner to have proper understanding of the equipment offered and its operation.
- Technical literature, catalogue and publications
- Layout of Complete Power Plant Installation showing location of all major sub-systems
- Single line diagrams of all systems and sub systems of the entire power plant including that of the MMS structures.
- Typical general arrangement and foundation details
- General lighting scheme
- Type tests certificates of all major equipments like switchgear, Inverters, Solar Modules etc.
- Single line schematic diagram of electrical system for grid interfacing and grid interconnection from Solar plant
- General arrangement drawings and circuit diagrams of Module, Inverters, Transformers, and overall solar plant arrangement
- The Bidder/Bidding Consortium shall submit a list of all drawings and documents proposed to be submitted. The list will be approved by employer/ consultant and may be modified if necessary
- Each drawing/ documents in the list shall be identified with a serial number, description and scheduled date of submission.

**For Approval:**

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

**Instruction Manuals for Operation & Maintenance**

- Complete and comprehensive instruction manuals for operation and maintenance of the equipment with drawings. This shall include the following:
  - Preventive maintenance schedule for each equipment
  - Procedure for shut down and start-up of the entire power plant
  - Safety procedures for safe operation of equipment and complete system
  - Specification of equipments installed.
  - Test procedure for site tests

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

**17. DELIVERY**

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

## 18. INSTALLATION GUIDELINES

- All the electrical installations shall conform to the Indian Electricity Act, Indian Electricity Rules, and regulations.
- The mechanical and Civil installation shall conform to the applicable Acts and Rules of corresponding Inspectorate and other relevant authorities, if any.
- Provision of cable glands, ferrules, cable lugs, tags, sealing kits shall be arranged.
- Supply and installation of first aid boxes, shock treatment charts, rubber mats, and key board etc.
- Erection, testing and commissioning of various equipment shall be done strictly as per manufacturer's instructions.
- Cables shall be laid in conduits as per the electrical installation procedures
- The minimum bending radius of cables shall be 12D and 15D for LT and LT cable respectively.
- Interplant cable shall be laid to trenches, tunnel or overhead structure as per site condition. Digging and refilling of cable trenches, required erection accessories shall be in the scope of work of the Bidder/Bidding Consortium.
- Cable shall be fixed to cable racks or cable trays or run on cleats or in conduits, which shall be fixed to concrete brick work or steel structure as required for proper support of the cables, easy accessibility and neatness of appearance.
- Perforated trays shall be provided for control cables.
- Approved type of danger boards, boards inscribing 'ISOLATED', 'DO NOT CLOSE, MEN AT WORK' in English, Telugu, Hindi and Local languages shall be provided in sufficient numbers.
- Special care shall be taken to make the enclosed equipment protected against entry of rats, lizard, and creeping reptiles which may create electrical short circuits.
- Approved cable markers of reinforced concrete shall be provided and fixed to mark each and every diversion of all buried cable routes. A marker shall also be placed every 50 meters along straight portions of each route. A concrete cable marker shall also be provided and fixed to mark the position of every buried joints.
- Distinguishing labels of non-corrodible material marked in accordance with the cable numbers of the cabling diagram shall be permanently attached to each end of every cable. The phase or polarity of each power cable core at the cable ends shall be identified.
- Mounting of Inverters, Electrical panels, Dc and Ac junction boxes, Monitoring systems shall be done with proper mounting procedures with neat look.

## 19. ERECTION, TESTING, COMMISSIONING

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

- The Bidder/Bidding Consortium shall be responsible for proper, quick retrievable and neat storage and also undertake the conservation of all consignments including damaged boxes. During storage of equipment, the Bidder/Bidding Consortium shall take into account deterioration and carry out the re-conservation of the complete equipment/parts/supplies as may be necessary as per the storage instructions of the Manufacturer of equipment/ components. The Bidder/Bidding Consortium shall also supply the consumables required for such re-conservation work and repair/ replace parts required thereof for the proper functioning of the equipment after erection and commissioning.
- The Bidder/Bidding Consortium shall retrieve the equipment/ materials from stores and transport the same to erection site.
- The Bidder/Bidding Consortium shall unpack and do visual checking against physical damages to the equipment/cases, clean equipment before start of erection. Damage/ shortage, if any, shall be reported to the Employer/ Consultant and shall be rectified/replaced expeditiously, so as not to upset the erection and commissioning schedule.
- The Bidder/Bidding Consortium shall provide all necessary erection equipment and tools & tackles including material handling equipment, cranes, compressors and other equipment and instruments and consumables, all commissioning equipment and instruments, welding equipment, winches, alignment tools, precision levels, etc., which may be required for carrying out the erection and commissioning work efficiently.
- All instruments shall be properly calibrated before use. Unless otherwise specified, the above erection equipment/ materials shall be the property of the Bidder/Bidding Consortium. However, Employer's prior permission shall be required for removal of these erection equipment/ materials from the site. The Bidder/Bidding Consortium shall ensure that proper procedure and documentation is maintained at entry gate of Employer's premises for such items as might be carried back by the Bidder/Bidding Consortium after completion of work.



- The Bidder/Bidding Consortium shall provide erection consumables like oxygen and acetylene gas, welding rods, solder lugs, oil, grease, kerosene, cotton waste, etc. required for erection of equipment and steel structures.
- The Bidder/Bidding Consortium shall construct and maintain his own site offices and stores as required for the work and arrange for maintaining in the area placed at the Bidder/Bidding Consortium's disposal in a neat manner.
- The Bidder/Bidding Consortium shall provide his scheme for mobilization with Bar Chart indicating clearly the resources, manpower and machinery proposed to be deployed to ensure timely completion of work and quality of workmanship
- On request, the Employer may help the Bidder/Bidding Consortium by providing any special handling/construction equipment needed in the interest of work subject to availability and on payment of hire charges and other conditions of Employer. The charges shall be recovered from any bill of the Bidder/Bidding Consortium due immediately thereafter.
  - o All safety, health and pollution control measures as required to be adopted as per the Statutory Regulations and the Safety conditions for Bidder/Bidding Consortiums issued along with the tender or otherwise required or implied by statutory regulations or practices shall be strictly followed by the Bidder/Bidding Consortium during the execution of the Contract. The Bidder/Bidding Consortium shall set up a suitable safety organization of his own at site in this regard.
- Labor facilities such as shelter, food shall be arranged by the Bidder/Bidding Consortium. On request drinking water shall be provided by the employer.
- The Employer shall deploy/supply Supervising/operating & maintenance personnel and all raw materials, utilities & services required for commissioning.
- Auxiliary power supply facility for system testing & commissioning, Inverter auxiliary, luminaries, control room, Inverter room, site office and other power consuming areas shall be provided by the Employer
- The results of pre commissioning Test, start-up tests and commissioning report shall be recorded jointly by the Bidder/Bidding Consortium and the TSREDCO. And a cumulative report shall be duly submitted by the Bidder/Bidding Consortium to
- The Bidder/Bidding Consortium shall rectify the defects observed during the Commissioning period promptly.
- Successfully commissioning as be accepted if the complete system remains synchronized with the grid for a period of 48 hours without any disturbance or interruption. During this period the system shall generate power during sunshine hours and export power to the grid and during dark hours shall remain synchronized with the grid. If there is an outage isolation from the grid during this period due to defects in the system, then commissioning period shall start afresh after rectification of the said defect.

However if the ambient or the grid parameter are beyond the specified limits if any shall not be considered as stoppage.

- The Commissioning and project completion certificate shall be issued by the Employer subject to relevant conditions.

## 20. CONNECTIVITY

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

Plant Capacity	Connecting voltage
Up to 10KW	230- Single Phase or 415V - three phase at the option of the consumer/ beneficiary
Above 10kW	At 415V - three phase or HT/EHT level (11kV/33kV/66kV) as per DISCOM rules

- The maximum permissible capacity for rooftop shall be 1 MW for a single net metering point.
- Utilities may have voltage levels other than above; DISCOMS may be consulted before finalization of the voltage level and specification be made accordingly.
- For large PV system (Above 100 kW) for commercial installation having large Load, the solar power can be generated at low voltage levels and stepped up to 11 kV level through the step up transformer. The transformers and associated switchgear would require to be provided by the SPV bidders.

## 21. TOOLS & TACKLES AND SPARES:

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

**22. DANGER BOARDS AND SIGNAGES:**

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

**23. FIRE EXTINGUISHERS:**

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

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

**24. Technical Specifications:**

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

**25. PLANNING AND DESIGNING:**

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

**26. TRANSFORMER “IF REQUIRED” & METERING:**

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



## SECTION - VI

# OTHER PROVISIONS

**SECTION - VI  
OTHER PROVISIONS**

**1 ROLE OF BENEFICIARY DEPT.**

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

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

- a. Obtain statutory & non-statutory clearances and to make area development plan within project location.
  - b. Frame out transparent project land allotment/right to use policy and specify procedures pursuant to the relevant State policies and their amendments thereof.
  - c. Enter into Right to Use/ Lease agreement and give possession of land within 03 (Three) months from the Effective Date of the PPA to the SPD for the entire period of the Project.
  - d. Coordination among various State and Central agencies for speedy implementation of projects
  - e. Support during commissioning of projects and issue of commissioning certificates.
- While it will be the endeavor of the beneficiary Dept.as described above to facilitate support in their respective area of working but nevertheless, SPD shall be overall responsible to complete all the activities related to Project Development at its own risk and cost.

**2 SCOPE MATRIX**

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

<b>S. No</b>	<b>KEY FUNCTIONS</b>	<b>ROLE/ RESPONSIBILITY</b>
1	Providing the shadow free Rooftop/ Land/Plot	Beneficiary Dept.
2	Internal Water Supply Arrangement	Beneficiary Dept.
3	Land Leveling/Roof clearing	SPD
4	Illumination System (For Primary Pathways)	SPD
5	Construction of Cable Tray	SPD
6	Construction of Office Complex (if required)	SPD
7	Construction of Boundary Wall/ Fencing for the projects (where ever required)	SPD
8	O & M Services	SPD
9	Construction Power Arrangement from plant to 230/440/11 KV existing Line	SPD
10	Approval from TSTRANSCO/TS DISCOMS/CEIG / Electrical Inspectorate, etc.	SPD

#### **4 SCOPE OF SPD**

##### **4.1 LIGHTING**

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

##### **4.2 DRAINAGE SYSTEM (where ever required)**

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

##### **4.3 SECURITY (If Required)**

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

##### **4.4 BUILDING CONTROL ROOM**

It is proposed to a build a suitable control room for the Solar Project. (Where ever required)

##### **4.5 WEATHER MONITORING STATION (WMS)**

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

##### **4.6 CONSTRUCTION POWER: To be arranged by the SPD.**

##### **4.7 WATER RESOURCE: To be made available by the SPD.**



## SECTION - VII

# FINANCIAL BID



SECTION-VII

**FINANCIAL BID**

(On the official Letterhead of the firm)

(To be submitted in a separate envelope)

Design, Supply, Installation, Commissioning, Maintenance and Operation of **1200KWp Grid Connected Ground Mounted power plants at 8 locations of each 150KWp at Vijaya Dairy plants of TSDDCFL, Telangana under RESCO mode**

Project Type	Levellised cost for supply of power for 25 years from Grid Connected Solar PV Power Plant as per MNRE/TSREDCO/TRANSCO/DISCOM Specifications under Net Metering Scheme under RESCO MODE (Rs./KWh)	
	In Figures	In Words
Design, Supply, Installation, Commissioning, Maintenance and Operation of <b>1200KWp Grid Connected Ground Mounted power plants at 8 locations of each 150KWp at Vijaya Dairy plants of TSDDCFL, Telangana under RESCO mode</b>		

**Certified that:**

1. The bidder has to quote unit rate only and will be uniform for the entire 25 years period.
2. above rates are in accordance with specifications & various terms & conditions mentioned in the tender document.
3. The rates are inclusive of all taxes and duties of Govt. of Telangana as well Govt. of India prevailing from time to time.
4. Amount shall be quoted in INR / kWh up to two decimal places.
5. In the event of any discrepancy between the values entered in figures and in words, the values entered in words shall be considered.

Authorized Signature:

Name:

Designation:

Name & Address of the Company/Consortium



## SECTION - VIII

# SAMPLE FORMS & FORMATS FOR BID SUBMISSION