Request for Selection (RfS) Document
for
Selection of Developers for Design, Manufacture, Testing, Supply, Installation & Commissioning of 500 kWp Grid connected Rooftop SPV Power Plants Including Five years Comprehensive Maintenance Contract (CMC) in different location for Residential Sector in the state of Mizoram

Power and Electricity Department,

Government of Mizoram

Kawlphetha Building, New Secretariat Complex, Khatla, Aizawl
Mizoram, PIN: 796001.
E-mail: eincpower@gmail.com; Website: https://power.mizoram.gov.in/

CONTENTS

Contents

Govt. of Mizoram
Power & Electricity Department
Kawlphetha Building, New Secretariat Complex, Khatla, Aizawl
Mizoram, PIN: 796001.
E-mail: eincpower@gmail.com; Website: https://power.mizoram.gov.in/

e-Procurement Notice

Tender Reference No.: T- 15016/1/2020-EC(P)/W/39 : Dated: 27.04.2020

1	Name of the work	Empanelment of Developers for Design, Manufacture, Testing, Supply, Installation & Commissioning of 0.5 MWp Grid connected Rooftop SPV Power Plants Including five years Comprehensive Maintenance Contract (CMC) in different location for Residential Sector in the state of Mizoram.
2	Estimated cost (Rs.)	Rs. 2.95 crores
3	Period of empanelment	12 (Twelve) Months
4	Date of publication of NIT on website: https://mizoramtenders.gov.in/nicgep/app	**28.04.2020 (Tuesday)**
5	Date & time of Pre-bid meeting	**15.05.2020 (Friday)** at 11.30 A.M.
6	Last date & time for receipt of online bids	**21.05.2020 (Thursday)** up to 4:00 PM
7	Submission of original copies of Bid fee & EMD (Offline)	**21.05.2020 (Thursday)** up to 4:00 P.M.
8	Technical Bid Opening Date	**22.05.2020 (Friday)** at 11:00 AM
9	Name & address of office inviting tender	**Engineer in Chief**, **Power & Electricity Department** Kawlphetha Building, New Secretariat Complex, Khatla, Aizawl Mizoram, PIN: 796001. E-mail: eincpower@gmail.com and cerggvymizo@gmail.com
10	Contact no. of procurement officer	1) Er. Thanglawra, SE – 9862537214 2) Er. Laldawngliana, EE - 9436146174 3) Er. Isaac Z. Zote, AE- 7005046960
11	Helpline no. of e-procurement	Customer Support: +91-124-4229071, 4229072, (From 1000 HRS to 1800 HRS on all working days i.e. Monday to Friday), Email: support@isn-ets.com, support@electronictender.com

Any change can be seen on website: https://mizoramtenders.gov.in/nicgep/app **&** https://power.mizoram.gov.in/. **Further details can be seen and download from** https://mizoramtenders.gov.in/nicgep/app & https://power.mizoram.gov.in/

Engineer in Chief
Power & Electricity Department,
Government of Mizoram

Abbreviations

Abbreviations	Full Forms
DSC	Digital Signature Certificate
AC	Alternating Current
ACDB	Alternating Current Distribution Board
Ah	Ampere-hour
ALMM	Approved List of Models and Manufacturers
BOQ	Bill of Quantity
BIS	Bureau of Indian Standards
CCA	Controller of Certifying Authorities
CEA	Central Electricity Authority
CFA	Central Financial Assistance
CEI	Chief Electrical Inspector
CMC	Comprehensive Maintenance Contract
EP	Empanelled Partner
CUF	Capacity Utilization Factor
DC	Direct Current
DCDB	DC Distribution Board
DPR	Detailed Project Report
DG	Diesel Generator
DISCOM	Distribution Company
DPB	Distribution Panel Board
DSP	Digital Signal Processor
EMC	Electromagnetic Compatibility
EMD	Earnest Money Deposit
EMI	Electromagnetic Interference
EN	European Norms
EOI	Expression of Interest
EPDM	Ethylene Propylene Diene Monomers
FF	Fill Factor
FOR	Freight on Rail/Road
FRP	Fibre-reinforced plastic
GHI	Global Horizontal Irradiance
GHS	Group Housing Society
GI	Galvanised Iron
GPRS	General Packet Radio Service
GPS	Global Positioning System
GRP	Glass Reinforced Plastic
GST	Goods and Services Tax
HDPE	High Density Polythylene
Hz	Hertz
IEC	International Electrotechnical Commission
IEEE	Institute of Electrical and Electronics Engineers
IGBT	Insulated-gate bipolar transistor
Imp	Peak Power Current

Abbreviations	Full Forms
INR	Indian Rupees
IP	Ingress Protection
IS	Indian Standard
Isc	Short Circuit Current
ISI	Indian Standards Institute
ISO	International Standards Organization
ITB	Instructions to Bidders
JB	Junction Box
JERC	Joint Electricity Regulatory Commission
JSON	JavaScript Object Notation
kg	kilogram
km/hour	kilometers per hour
kVA	kilo-volt-ampere
kW	kilowatt
LCD	Liquid Crystal Display
LED	Light Emitting Diode
LOA	Letter of Authorization
LOI	Letter of Intent
LPSC	Lightning Protection System Components
LT	Low Tension
MCB	Miniature Circuit Breaker
MCCB	Moulded Case Circuit Breaker
mm	millimeter
MNRE	Ministry of New and Renewable Energy
MMS	Module Mounting Structure
MOSFET	Metal-Oxide Semiconductor Field-Effect Transistor
MOV	Metal Oxide Varistor
MPPT	Maximum Power Point Tracker
MSME	Micro, Small and Medium Enterprises
MW	Mega Watt
NIB	Notice Inviting Bid
NIT	Notice Inviting Tender
NOC	No Objection Certificate
O&M	Operations and Maintenance
PAN	Permanent Account Number
PBG	Performance Bank Guarantee
PCU	Power Conditioning Unit
PR	Performance Ratio
PGT	Performance Guarantee Test
PSU	Public Sector Undertaking
PV	Photovoltaic
PVC	Polyvinyl Chloride
PWM	Pulse width modulation
RFID	Radio Frequency Identification
RFP	Request for Proposal
RfS	Request for Selection
RTS	Rooftop Solar
RWA	Residential Welfare Association

Abbreviations	Full Forms
SBD	Standard Bid Document
SIM	Subscriber Identification Module
SNA	State Nodal Agency
SPD	Surge Protection Device
SPIN	Solar Photovoltaic Installation
SPV	Solar Photo Voltaic
sq.m	square meter
STC	Standard Testing Condition
TAC	Tariff Advisory Committee
THD	Total Harmonic Distortion
TIN	Taxpayer Identification Number
UV	Ultraviolet
V	Volt
VA	Volt Ampere
Vmp	Peak Power Voltage
Voc	Open Circuit Voltage
W	Watt
XLPE	Cross-linked polyethylen
XLPO	Cross-linked Polyolefin
XML	Extensible Markup Language

Section -1

List of Important dates & details of Bids

NIB No: 1 of 2020-2021

1.	Name of work	Empanelment of Developers for Design, Manufacture, Testing, Supply, Installation & Commissioning of 0.5 MWp Grid connected Rooftop SPV Power Plants Including five years Comprehensive Maintenance Contract (CMC) in different location for Residential Sector in the state of Mizoram.	
2	Tender reference No.	T- 15016/1/2020-EC(P)/W/39 : Dt.27.4.2020	
3	Period of empanelment	12 (Twelve) Months	
4	Mode of submission of tender	**Online through State E-Procurement Portal (**https://mizoramtenders.gov.in/nicgep/app)	
5	Tentative Quantity	Grid Connected Rooftop SPV Power Plants of different capacities for implementation under Residential Sector in the state of Mizoram: **500 kWp.**	
6	Cost of Bid document (Non-refundable)	• **For General Bidder:** Rs. 10,000/- (Rupees ten thousand) only. • **For MSME of Mizoram**: Rs. **Nil**	
7	Earnest Money Deposit	• **For General Bidder: Based on the Bid capacity proposed by the bidder in the bid, EMD shall be furnished.** • *EMD amount = (Rs. 5 lakhs) x Bid Capacity in MWp* • **For SSI/MSME of Mizoram**: **Nil.**	
8	Publishing on State e-procurement website	Date: **28.04.2020** at 01:00 P.M.	
9	Date & Time of Pre-bid meeting	**15.05.2020** at 11.30 A.M.	
10	Period of downloading of bidding documents	Start date: 28.04.2020	Time: 2:00 PM
		End date: 21.05.2020	Time: 4:00 PM
11	Bid online submission	Start date: 28.04.2020	Time: 2:00 PM
		End date: 21.05.2020	Time: 4:00 PM
12	Technical bid opening date	**22.05.2020, 11:00 AM**	
13	Authority inviting bids	**Engineer in Chief**, Power & Electricity Department, Government of Mizoram	
14	Address	Kawlphetha Building, New Secretariat Complex, Khatla, Aizawl, Mizoram, PIN: 796001. E-mail: eincpower@gmail.com and cerggvymizo@gmail.com	

Note: The tender fee and Earnest Money Deposit (EMD) in original must be submitted between all working days from **28/04/2020 to 21/05/2020 by 04.00 PM**. If tender fee and EMD are not received before mentioned date and time, tender shall not be accepted.

Place for receiving tender fee & EMD:

The Office of Engineer in Chief,
Power & Electricity Department,
Government of Mizoram, Kawlphetha Building, New Secretariat Complex, Khatla, Aizawl, Mizoram, PIN: 796001.
E-mail: eincpower@gmail.com and cerggvymizo@gmail.com

.

Section-2

Instructions to Bidders

NIB No: 1 of 2020-2021

1. The guidelines to submit bid online can be downloaded from website https://mizoramtenders.gov.in/nicgep/app
2. The interested bidders can download the bid documents from the website of Power & Electricity department and State e-procurement website i.e. "https://power.mizoram.gov.in/" and https://mizoramtenders.gov.in/nicgep/app.
3. To participate in bidding process, bidders have to get 'Digital Signature Certificate (DSC)' as per Information Technology Act-2000 to participate in online bidding. This certificate will be required for digitally signing the bid. Bidders can get above mention digital signature certificate from any approved vendors (CCA). Bidders, who already possess valid Digital Certificates, need not to procure new Digital Certificate.
4. The bidders have to submit their bids online in electronic format with digital Signature. The bids without digital signature will not be accepted. No proposal will be accepted in physical form.
5. Bids will be opened online as per time schedule mentioned in Section 1
6. Bidders should get ready with the scanned copies of cost of documents & EMD as specified in the tender document. Before submission of online bids, bidders must ensure that scanned copy of all the necessary documents have been attached with bid.
7. Bidder have to produce the original D.D. towards tender fee & EMD in approved form to the authority **"Engineer in Chief, Aizawl"** on the date & time as mentioned in the NIB failing which bidder will be disqualified. The details of cost of documents, EMD specified in the tender documents should be the same as submitted online (scanned copies) otherwise tender will summarily be rejected.
8. Uploaded documents of valid successful bidders will be verified with the original before signing the agreement. The valid successful bidder has to provide the originals to the concerned authority.
9. The department will not be responsible for delay in online submission due to any reason.
10. All the required information for offline and online submission should be completed in all respect.
11. Other details can be seen in the bidding documents.

A. Details of documents to be submitted in hard copy (in original) :

a) Covering Letter & Information about the bidding firm as in Annexure-I & 2.

b) Declaration by the bidder, as provided in e-tender document as per Annexure-3.

c) RfP Document fees Draft.

d) All the formats specified in Annexure-4 to 9 of this document.

e) Earnest Money Deposit (EMD) as per Annexure-11.

f) The hard copy should not contain any financial information related to the financial offer.

B. Details of documents to be furnished for online bidding

1. **Scanned copies of the following documents to be up-loaded in .pdf format on the website** https://mizoramtenders.gov.in/nicgep/app and https://power.mizoram.gov.in/**.**
   i. D. D. towards Tender fee.
   ii. Duly pledged EMD (Annexure- 11)
   iii. GST certificate.
   iv. PAN Card
   v. Firm's registration certificate/ Registration certificate of MSME of Mizoram
   vi. Audited Balance sheet of last three years.
2. **Scanned Copies of the Annexure as per the enclosed formats should be uploaded after converting the same to .pdf format.**
   i. **Annexure-1:** Covering letter.
   ii. **Annexure-2:** Information about the bidding firm.
   iii. **Annexure-3:** Declaration by the bidder.
   iv. **Annexure-4:** Annual Turnover.
   v. **Annexure-5:** Net Worth certificate.
   vi. **Annexure-6:** Format for power of attorney for signing of bid.
   vii. **Annexure-7:** Proof of supply/execution of SPV Items/systems in any SNA/Govt. organization/PSU or commissioning certificate of other consumer category in the last seven years. Attach copy of orders & its satisfactory completion certificate.
   viii. **Annexure-8:** Technical details & make of the Equipment's to be supplied.
   ix. **Annexure-9:** Technical detail form.
   x. **Annexure-10:** Price Bid
   xi. **Annexure-11:** Bank Guarantee Format for EMD
   xii. **Annexure-12:** Project Report Format

xiii. **Annexure-13:** Format for Monthly O&M and CMC Report

xiv. **Annexure 14:** Format for Monthly O&M and CMC Report

xv. **Annexure-15:** Operation and Maintenance Guidelines of Grid Connected PV Plants

xvi. **Annexure 16:** Procedure for Performance Testing

3. Duly filled in & digitally signed Price Bid.

4. Uploaded documents of valid successful bidders will be verified with the original before signing the agreement. The valid successful bidder has to provide the originals to the concerned authority on receipt of such letter, which will be sent though registered post.

5. The bidder has to give affidavit stating agree / disagree on the conditions in the SBD. The bidders, who disagree on the conditions of SBD, cannot participate in the tender.

SECTION-3

NOTICE INVITING BID

NIB No: 1 of 2020-2021

Subject: Empanelment of Developers for Design, Manufacture, Testing, Supply, Installation & Commissioning of 0.5 MWp Grid connected Rooftop SPV Power Plants Including five years Comprehensive Maintenance Contract (CMC) in different location for Residential Sector in the state of Mizoram.

Preamble:

With the help of Financial Assistance from MNRE under their Phase II of the their SPV Roof Top Programme 2019-20, Power & Electricity Department, Government of Mizoram wishes to empanel competent, experienced and financially sound Empanelled Partner (EP); to supply, install, commissioning and to maintain Rooftop Solar Photovoltaic Grid connected Systems. A registered company/Firm/Corporation in India (Including MSME of Mizoram) of at least one of the major sub systems namely SPV Cells/ Modules or PV System Electronics (Conforming to relevant National/ International Standards) in the State of Mizoram will be eligible to participate in the Tender. Power & Electricity Department, Government of Mizoram would release the subsidy to the eligible developers after installation of systems as per terms and conditions of this EOI.

Above work is to be carried out on **"Turn Key Basis"** which includes identification of beneficiaries in the State of Mizoram, collection of their share of cost after adjusting MNRE financial assistance, design, supply of SPV systems with all accessories and equipment's, installation, testing, commissioning and maintenance services for 5 years with free replacement warranty on spare parts against manufacturing defects for five years. It also includes obtaining concern DISCOM and Chief Electrical Inspector (CEI) approvals (if required). The successful bidders have to identify the prospective customers/beneficiary i.e. marketing has to be done by successful bidder itself and Power & Electricity Department, Government of Mizoram will also provide the list of beneficiaries, if available. Power & Electricity Department, Government of Mizoram will also provide necessary support in identification of beneficiary through their District Offices/Officials. The successful bidders have to execute the Supply, Installation & Commissioning of Grid connected Rooftop SPV Power Plants after getting due approval from Power & Electricity Department.

The total capacity of Rooftop SPV systems shall be 500 kWp for Residential Consumers only.

Bid Description	Category	Aggregate Capacity
Empanelment of Developers for Design, Manufacture, Testing, Supply, Installation & Commissioning of 500 kWp Grid connected Rooftop SPV Power Plants Including five years Comprehensive Maintenance Contract (CMC) in different location for Residential Sector in the state of Mizoram.	Residential (CAPEX Mode)	500 kWp (***400 kWp*** *for* ***Tender Category*** *and* ***100 kWp*** *for* ***Open Category/New Entrepreneur of Mizoram***)

S.No.	Category (Residential under CAPEX Model)	MNRE Benchmark for the FY 2019-20	Capacity (MWp)	Minimum Bidding Capacity per Bidder	Maximum Capacity per Bidder
1.	1 kWp – 10 kWp	59	500 kWp	50 kWp	100 kWp

Note: MNRE vide Notification No. 318/33/2019-Grid Connected Rooftop Dated 21st January 2020 has clarified that Higher Benchmark for the North Eastern States and Special Category States declared by the MNRE for FY 2019-20 will not be applicable for the sanctions issued under Phase-I of RTS Programme as these rates were intended for Phase-II RTS Programme in which rates of CFA for all the States/UTs has been made equal.

Part –I: -General Conditions:

The bidder should fulfill any of the following conditions: -

1. The bidders should be either a body incorporated in India under the Companies Act, 1956 or 2013 including any amendment thereto and engaged in the business of Solar Power.

   Or

2. The bidder should be a limited liability partnership firm.

   Or

3. The bidder should have a valid PAN & GST registration number.

The Bidder should have an Engineer (B.E./B.Tech Electrical or Diploma in Electrical) as Proprietor / Partner / Director / Employee of the bidder. Brief bio-data of the key personnel is to be shared with Power & Electricity Department, Government of Mizoram.

4. **Technical Eligibility:**

I. For General Bidder and MSME of Mizoram: General bidder should have to qualify the following:

(i) The bidder should have designed, supplied, installed & commissioned at grid connected Solar PV Power Projects having cumulative aggregate capacity not less than **50kWp** which should have been commissioned prior to Techno-Commercial Bid opening date. Vendors have to submit scanned copy of the commissioning certificate and Work Order / Contract / Agreement from the Client / Owner.

(ii) Ministry of New and Renewable Energy (MNRE), Government of India vide ***No. 03/88/2015-16/GCRT Dated 08th September 2016*** has notified that some percentage of total sanctioned capacity may be allocated to the local Project Developers/ Empanelled Partners/Entrepreneurs**.** In the view of this Power and Electricity Department, Government of Mizoram has kept 20% of total sanctioned capacity (i.e. 100 kWp under CAPEX Mode) to be offered to Project Developers/ Empanelled Partners/New Entrepreneurs, having their Registered Office/GST registration located in the State of Mizoram.

(iii) The bidders intended to apply under the Open category/New Entrepreneur category/Reserved Category of Mizoram are exempted from Technical Eligibility Criteria, while those bidders have to meet the Financial Eligibility Criteria in terms of Annual Turn Over/Net Worth estimation etc.

(iv) General Category Bidders are allowed to quote between **Maximum 100 kWp** and **Minimum 50 kWp** for further capacity allocation in the State of Mizoram. Otherwise, their bid will be outrightly rejected.

(v) On fulfilment of these conditions, Open category/New Entrepreneur category/Reserved Category may initially be allocated a **25 kWp** each by the Power and Electricity Department. Subsequently, based on satisfactory progress on the initially allotted 25 kW Capacity, further capacities may be allotted till allocation of **100 kWp**.

Part –II: -The Financial Conditions:

The bidder should fulfill the following financial eligibility conditions: -

1. **Financial Eligibility:**

I. Turnover Requirement:

(i) **For General Bidder:** Bidder should have the minimum average Annual Turnover of INR **15000 per kWp** derived from the last three financial years ending on 31.03.2019 on the basis of audited annual accounts.

(ii) **For MSME of Mizoram:** Bidder should have the average Annual Turnover of INR **5,000 per kWp** derived from the last three financial years ending on 31.03.2019 on the basis of audited annual accounts.

The certificate should be as per the Performa given at Annexure-4

OR

II. Net worth Requirement:

(i) **For General Bidder:** Bidder should have Positive Net Worth of minimum INR **10,000 per kWp** as on 31.03.2020 on the basis of audited annual accounts.

(ii) **For MSME of Mizoram:** Bidder should have Positive Net Worth of minimum **5,000** per kWp as on 31.03.2020 on the basis of audited annual accounts.

2. Net worth certificate should be as per the Performa given at Annexure-5

3. The Participant should have **valid GST No for General Category Bidders, if claiming under** MSME Category, Valid GST No. should be from the State of **Mizoram**.

4. Bidders have to download the bid document from website (https://mizoramtenders.gov.in/nicgep/app and https://power.mizoram.gov.in/) and submit the scan copy of the cost of the bid document to be submitted in shape of demand draft of requisite value as mentioned in Section-1 (List of Important dates & details of Bids) in favour of "***Engineer in Chief, Power & Electricity Department"*** on any Indian Nationalized Bank/Scheduled Bank, payable at "Aizawl". The tender fee in original must be submitted from 28/04/2020 to 21/05/2020 by 04:00 PM in the office of Engineer in Chief, Power & Electricity Department, Aizawl.

Bidders should submit in Part – I (Technical Bid) the earnest money in the form of Bank Guarantee of requisite value as mentioned in "Section-1 (List of Important dates & details of Bids)". The Bank Guarantee shall be made in favour of "***Engineer in Chief, Power & Electricity Department***" payable at ***Aizawl*** from any Indian Nationalized bank/Scheduled bank. The bank guarantee shall remain valid for 12 months plus 3 months claim period. Only Original Bank Guarantee shall be accepted.

Part –III: -Empanelment Procedure after opening of Financial Bid:

(i) The technical bids shall be opened first and evaluated.

(ii) Then the price bid of technically qualified bidders shall be opened.

(iii) Finalisation of Empanelment: The Lowest Rate (i.e. L1) for each part received (and in turn approved by Power & Electricity Department) would be the "Approved Rate". "Approved lowest rate" for each part would be offered to other bidders whose rates are within +5% of L1 (i.e. L2, L3 and so on) to work on the lowest approved rate.

(iv) If quantity/capacity is left unallocated in any category, Power & Electricity Department reserves the right to reallocate the left-over capacity among the bidders.

(v) Power & Electricity Department will initially allocate capacities/quantities to empanelled bidders based on the bid capacities. Power & Electricity Department will review the progress of each agencies/bidders on monthly basis and a performance appraisal will be done after completion of six months. On the basis performance appraisal quantities allocated to agencies may be revised in case agencies are not able to complete the project within the stipulated time period. In this condition preference will be given to those agencies who have completed their allocated projects within the stipulated time. If there are more than one agency who have timely completed their allocated projects, preference will be given to agency who had quoted lower rate i.e. L1.

(vi) Sanctions of project to agencies will be done after submitting all the required documents.

(vii) Power & Electricity Department reserves the right to sanction leftover capacity to successful bidders. Such capacity will first be offered to the L1 bidder followed by L2, L3 and so on till exhaust of the same.

(viii) If Price quoted by the bidders is found to be unacceptable to the Tender Finalisation Committee, in that case the decision of the Committee shall be final and binding to all.

Such bidders who have quoted unrealistic rate and committee does not consider him for further process, in that case committee may consider next realistic rate for the respective category as the discovered rate.

SECTION-4

INSTRUCTIONS TO BIDDERS

NIB No: 2 of 2019-2020

Table of Clauses

A. General

1. Mode of Execution of Programme:

The basis of evaluation of the bids shall be the cost/rate quoted in the Price Schedule. To further clarify, installation and commissioning cost and taxes etc. shall be inclusive to the cost of supply of complete system including 5 years Comprehensive Maintenance Contract (CMC) for evaluation of the bid. Proposers are required to quote rate / cost on firm basis and no price variation on any account shall be considered.

The selected authorized Empanelled Partner of Power & Electricity Department, Government of Mizoram shall execute the work of supply, install, testing and commissioning of Grid connected Rooftop Solar Power Plant systems and provide CMC for 5 years with free replacement warranty. They shall also be required to set up their repair and maintenance service centers for providing effective repair/maintenance services to the beneficiaries / users and meet conditions as given in the Scope of Work.

The Programme shall be carried out as per guidelines and as given hereunder: -

1.1. The EMPANELLED PARTNER shall be allowed to install the systems conforming to the Power & Electricity Department/ MNRE specifications / guidelines after authorization by Power & Electricity Department, Government of Mizoram.

1.2. For this Power & Electricity Department shall give specific targets / limits to each selected EMPANELLED PARTNER and fix prices for sale of systems to the user (beneficiaries).

1.3. The subsidy sanction letter shall be issued to the EMPANELLED PARTNER on identifying the beneficiaries and submitting the complete list of beneficiaries.

1.4. The bidder may claim subsidy from Power & Electricity Department, Government of Mizoram by submitting complete list of beneficiaries along-with full addresses, date of installation, models and makes and serial numbers of systems & PV modules supplied along with the photographs of installed system duly verified by Power & Electricity Department and/or its authorized agency/ies as per the norm of Power & Electricity Department/MNRE. The bidder shall also be required to submit all other relevant documents as required by MNRE under Phase II guidelines.

2. Eligible Bidders

2.1. This Invitation for Bids is open to all bidders as defined in the Notice Inviting Bid (NIB).

2.2. Bidders shall not be under a declaration of ineligibility for corrupt and fraudulent practices by the Central Government, the State Government or any Public Sector Undertakings (PSUs), Autonomous Body, authority by whatever name called under the works.

3. One Bid per Bidder

3.1. Each Bidder shall submit only one Bid for one part. A Bidder who submits more than one Bid will cause the proposals with the Bidder's participation to be disqualified.

4. Cost of Bidding

4.1. The Bidder shall bear all costs associated with the preparation and submission of their Bid, and the Power & Electricity Department will, in no case, be responsible or liable for those costs.

B. Bidding Documents

5. Content of Bidding Documents

5.1. The set of bidding documents comprises the documents listed below, and addenda issued in accordance with Clause 10 of ITB.

1. Notice Inviting Tender
2. Instructions to Bidders
3. Qualification Information
4. Conditions of Contract
5. Specifications
6. Bill of Quantities (BoQ)
8. Form of Bid
9. Form of Bank Guarantee.

5.2. The bidder is expected to examine carefully all instructions, conditions of contract, contract data, forms, terms and specifications, bill of quantities, forms in the Bid Document. Failure to comply with the requirements of Bid Documents shall be at the bidder's own risk. Pursuant to clause 23 hereof, bids, which are not substantially responsive to the requirements of the Bid Documents, shall be rejected.

6. Clarification of Bidding Documents and Pre-bid Meeting

6.1. A prospective Bidder requiring any clarification of the bidding documents may notify the Power & Electricity Department in writing at the address indicated in the Notice Inviting Bid (NIB). The Power & Electricity Department will respond to the request and issue necessary Corrigendum, Addendum after the scheduled pre-bid meeting.

6.2. If Power & Electricity Department decides to hold a pre-bid meeting, the bidder or his authorized representative shall be invited to attend it.

6.3. The bidder is requested to submit any questions in writing or by cable so as to reach the Power & Electricity Department not later than two days before the meeting.

6.4. Minutes of the Meeting (MoM), including the text of the questions raised and the responses given will be transmitted without delay to all purchasers of the bidding documents. Any modifications of the bidding documents, which may become necessary as a result of the pre-bid meeting shall be made by the Power & Electricity Department exclusively through the issue of an Addendum or Corrigendum and not through the minutes of the pre-bid meeting.

6.5. Non-attendance at the pre-bid meeting will not be a cause for disqualification of a bidder.

7. Amendment of Bidding Documents

7.1. Before the deadline for submission of bids, the Power & Electricity Department may modify the bidding documents by issuing Addendum or Corrigendum.

7.2. Any Addendum or Corrigendum thus issued shall be part of the bidding documents and shall be communicated in writing by registered post or by cable to all purchasers of the bidding documents. Prospective bidders shall acknowledge receipt of each addendum by cable to the Employer.

7.3. To give prospective bidders reasonable time in which to take an addendum into account in preparing their bids, the Power & Electricity Department shall extend, if necessary, the deadline for submission of bids.

C. Preparation of Bid

8. Language of Bid

8.1. All documents relating to the Bid shall be in the language specified in the Notice Inviting Bid. Failure to comply with this may result in disqualification of the bidder.

9. Documents Comprising the Bid

9.1. Technical Bid – (Fee/ Technical Cover)

9.1.1. EMD & Tender Fee:

a) Scanned Copy of Demand draft drawn in favour of "Engineer in Chief", payable at "Aizawl" towards Cost of Tender Fee and Earnest Money Deposit as specified in the Notice Inviting Bid (NIB).

9.1.2. Technical Details & Declaration:

a) Proposed work programme (work method, time schedule and financial flow), description, and charts as necessary (Duly to be signed digitally) to comply with the requirement of the Bidding Document.

b) Scanned copy of an Affidavit by the Bidder that they have accepted the Standard Bid Document (S.B.D).

9.1.3. Technical Details of documents:

Scanned copies/Prescribed Formats of Documents to be attached in "My Document" in .pdf format file duly digitally signed by the bidder.

a) Income Tax clearance certificate/PAN Card

b) GST clearance certificate/ GST registration certificate.

c) Proof of completion of similar works during the last 3 years and list of similar works in hand in the prescribed formats in the ITB

d) List of works for which bids already submitted (in format given in ITB)

e) Financial Report for the last 3 years (up to 31/3/2019) certified by chartered Accountant.

k) Annual Turn over Details certified by Chartered Accountant.

L) Net worth certificates certified by Chartered Accountant.

l) List of current litigant cases in which the bidder is involved (in format given in ITB).

m) An affidavit for non-engagement of related persons.

n) Authorized address & contact numbers of the bidder as per instruction in the Notice Inviting Bid (NIB) duly digitally signed.

o) Bid Capacity

p) Undertaking for validity of bid for 365 days.

9.2. **Financial Bid – (Finance Cover**):

I. Duly Quoted & Digitally signed Bill of Quantity (BoQ) in the file supplied by Power & Electricity Department in .xls format shall be uploaded.

II. Declaration by Bidder in the format Section – 6 form of Bid in .pdf format.

NOTE: All the documents should be digitally signed.

9.3. **The following documents, which are not submitted with the bid, will be deemed to be part of the bid.**

Section Particulars

i. Notice inviting Tender
ii. Instruction to the bidders
iii. Conditions of Contract
iv. Contract Data
v. Specifications
vi. Drawings if any

10. Bid Price

10.1. The Contract shall be for the whole Works, as described in Part IV Clause 1.0 of ITB.

10.2. The Bidder shall adopt the Item Rate Method as specified in the Notice Inviting Bid only the same option is allowed to all the Bidders.

10.3. All duties, taxes, royalties and other levies payable by the Contractor under the Contract, or for any other cause, shall be included in the Rates, Prices, and Total Bid price submitted by the Bidder.

10.4. The rates and prices quoted by the Bidder shall be fixed for the duration of the Contract and shall not be subject to adjustment. Bidders are advised to take in to consideration any such escalations in the prevailing taxes/levies/duties. In no circumstances, escalation in the prices will be entertained.

10.5. Quoted price for Grid-connected Rooftop Solar Power Plants are complete in all respect as per Technical Specifications inclusive of all Central/State/Local taxes & duties, packing, forwarding, transit insurance, loading & unloading, transportation & other

charges etc. for destination at any site in the State of Mizoram and inclusive of installation, testing, commissioning, performance testing, training and 5 years CMC charges. The Empanelled Partner is responsible for security of material and equipment. The Empanelled Partner must take adequate measurement for protection of all equipment and material up to commissioning of the system.

10.6. Tenderers should quote their rates considering wide variation of site conditions, variation in price of different components during the year 2019-20 and keeping the quantum and quality of work in mind. If Power & Electricity Department anticipates that rate is abnormally low or high, tender may be rejected.

10.7. ***Maximum allowable project cost would be as per L1 rate or MNRE benchmark cost of respective category, whichever is lower. Any bid quoted above the maximum allowable project cost shall be rejected.***

11. Currencies of Bid

11.1. The unit rates and the prices shall be quoted by the bidder entirely in Indian Rupees (INR).

12. Bid Validity

12.1. Bids shall remain valid for a period of 365 (Three Hundred Sixty-Five) days after the deadline date for bid submission. A bid valid for a shorter period shall be rejected by the Power & Electricity Department as non-responsive.

12.2. In exceptional circumstances, prior to expiry of the original time limit, the Power & Electricity Department may request that the bidders may extend the period of validity for a specified additional period. The request and the bidders' responses shall be made in writing or by email. A bidder may refuse the request without forfeiting his Earnest Money. A bidder agreeing to the request will not be required or permitted to modify his bid but will be required to extend the validity of his earnest money for a period of the extension.

13. Earnest Money

13.1. The Bidder shall furnish, as part of the Bid, Earnest Money, in the amount specified in the Notice Inviting Bid.

13.2. The Earnest Money shall, at the Bidder's option, be in the form of Bank Guarantee/Demand Draft of a scheduled commercial bank, issued in favour of the name

given in the Notice Inviting Bid. The Bank Guarantee shall be valid for 12 months or more after the last date of receipt of bids. Other forms of Earnest Money acceptable to the Power & Electricity Department are stated in the Notice Inviting Bid.

13.3. Any bid not accompanied by an acceptable Earnest Money, unless exempted in terms given in the Notice Inviting Bid, shall be rejected by the Power & Electricity Department as nonresponsive.

13.4. The Earnest Money of unsuccessful bidders will be returned within 30 days of issue of LOA by Power & Electricity Department to successful bidders.

13.5. The Earnest Money of the successful Bidder will be discharged when the Bidder has signed the Agreement and furnished the required Security Deposit/ Performance Bank Guarantee (PBG) as mentioned in **clause 27.**

13.6. **The Earnest Money may be forfeited:**

a) if the Bidder withdraws the Bid after bid opening (Technical Bid) during the period of Bid validity;

b) in the case of a successful Bidder, if the Bidder fails within the specified time limit to

i. Sign the Agreement; and/or

ii. Furnish the required Performance Security.

14. Alternative Proposals by Bidders

14.1. Bidders shall submit offers that comply with the requirements of the bidding documents, including the Bill of Quantities (BoQ) and the basic technical design as indicated in the drawings and specifications. Alternative proposals will be rejected as non-responsive.

D. Submission of Bids:

15. Sealing and Marking of Bids

15.1. **The Bidder shall place the two separate files (File I) marked "Technical Bid" and "Financial Bid" (File –II). The file will have markings as follows:**

Technical Bid: To be opened on date and time of Technical Bid opening.

Financial Bid: Not to be opened except with the approval of Power & Electricity Department.

The contents of the Technical and Financial Bids shall be as specified in clause 9 of the EoI. All documents are to be signed digitally by the bidder.

15.2. The first and second files containing the Technical and Financial Bids shall a) be addressed to the Power & Electricity Department at the address provided in the Notice Inviting Bid b) bear the name and identification number of the Contract; and c) provide a warning not to open before the specified time and date for Bid opening as defined in Bid information sheet.

16. Deadline for Submission of Bids

16.1. Complete Bids (including Technical and Financial) must be received by the Power & Electricity Department at the address specified in the Notice Inviting Bid (NIB) not later than the date and time indicated in the Notice Inviting Bid.

16.2. The Power & Electricity Department may extend the deadline for submission of bids by issuing an amendment in accordance with Clause 7 of the EoI, in which case all rights and obligations of the Power & Electricity Department and the bidders previously subject to the original deadline will then be subject to the new deadline.

E. Bid Opening and Evaluation

17. Bid Opening

17.1. The Power & Electricity Department will open the bids received (except those received after deadline). In the event of the specified date for the submission of bids being declared a holiday for Power & Electricity Department, the Bids will be opened at the appointed time and location on the next working day.

17.2. The files containing the technical bid shall be opened. The document marked "***cost of bidding document"*** will be opened first and if the cost of the bidding documents is not there, or incomplete, the remaining bid documents will not be opened, and bid will be rejected.

17.3. In all other cases, the amount of Earnest Money, forms and validity shall be announced. Thereafter, the bidders' names and such other details as the Power & Electricity Department may consider appropriate, will be announced by the Department at the opening.

17.4. The Power & Electricity Department will prepare minutes of the Bid opening, including the information disclosed to those present.

17.5. Evaluation of the technical bids with respect to bid security, qualification information and other information furnished in Part-I of the bid in pursuant to Clause 9 of EoI, shall be taken up and completed and a list will be drawn up of the responsive bids whose financial bids are eligible for consideration

17.6. The Power & Electricity Department shall inform, by email, telegram or fascimal, the bidders, whose technical bids are found responsive, date, time and place of opening as stated in the Notice Inviting Bid. In the event of the specified date being declared a holiday for the Power & Electricity Department, the bids will be opened at the appointed time and location on the next working day through they or their representative, may attend the meeting of opening of financial bids.

17.7. At the time of the opening of the ***'Financial Bid'***, the names of the bidders whose bids were found responsive in accordance with clause 20 of the EoI will be announced. The financial bids of only these bidders will be opened. The remaining bids will be returned unopened to the bidders. The responsive bidders' names, the Bid prices, the total amount of each bid, and such other details as the Power & Electricity Department may consider appropriate will be announced by the Power & Electricity Department at the time of bid opening. Any Bid price which is not read out and recorded, will not be considered in Bid Evaluation

17.8. The Power & Electricity Department shall prepare the minutes of the opening of the Financial Bids.

18. Process to be Confidential

18.1. Information relating to the examination, clarification, evaluation, and comparison of bids and recommendations for the award of a contract shall not be disclosed to bidders or any other persons not officially concerned with such process until the award to the successful Bidder has been announced. Any attempt by a Bidder to influence the Power & Electricity Department 's processing of bids or award decisions may result in the rejection of their Bid

19. Clarification of Bids and Contacting the Power & Electricity Department

19.1. No Bidder shall contact the Power & Electricity Department on **any** matter relating to its bid from the time of the bid opening to the time the contract is awarded.

19.2. Any attempt by the bidder to influence the Power & Electricity Department's bid evaluation, by any means, bid evaluation, bid comparison or contract award decision may result in the rejection of his bid.

20. Examination of Bids and Determination of Responsiveness

20.1. During the detailed evaluation of "***Technical Bids***", the Power & Electricity Department will determine whether each Bid (a) meets the eligibility criteria defined in Clauses 3 and 4; (b) has been properly signed; (c) is accompanied by the required securities; and (d) is substantially responsive to the requirements of the bidding documents. During the detailed evaluation of the "***Financial Bids***", the responsiveness of the bids will be further determined with respect to the remaining bid conditions, i.e., priced bill of quantities, technical specifications and drawings.

20.2. A substantially responsive "***Financial Bid***" is one, which conforms to all the terms, conditions, and specifications of the bidding documents, without material deviation or reservation. A material deviation or reservation is one (a) which affects in any substantial way the scope, quality, or performance of the Works; (b) which limits in any substantial way, inconsistent with the bidding documents, the Power & Electricity Department's rights or the Bidder's obligations under the Contract; or (c) whose rectification would affect unfairly the competitive position of other bidders presenting substantially responsive bids.

20.3. If a "***Financial Bid"*** is not substantially responsive, it will be rejected by the Power & Electricity Department and may not subsequently be made responsive by correction or withdrawal of the nonconforming deviation or reservation.

21. Corrections of Errors:

21.1. Bids determined to be substantially responsive, will be checked by the Power & Electricity Department for any arithmetic errors. Errors will be corrected by the Power & Electricity Department as follows:

a) where there is a discrepancy between the rates in figures and in words, the rate in words will govern; and

b) where there is a discrepancy between the unit rate and the line item total resulting from multiplying the unit rate by the quantity, the unit rate as quoted will govern.

21.2. The amount stated in the Bid will be adjusted by the Power & Electricity Department in accordance with the above procedure for the correction of errors and shall be considered

as binding upon the Bidder. If the Bidder does not accept the corrected amount, the Bid will be rejected, and the Earnest money shall be forfeited in accordance with Clause 13 of EoI.

22. Evaluation and Comparison of Bids

22.1. The Power & Electricity Department will evaluate and compare only the bids determined to be substantially responsive in accordance with Clause 20 of EoI.

22.2. In evaluating the bids, the Power & Electricity Department will determine for each Bid the evaluated Bid price by adjusting the Bid price by making correction, if any, for errors pursuant to Clause 21 of EoI.

22.3. If the Bid of the successful Bidder is seriously unbalanced in relation to the Department's estimate of the cost of work to be performed under the contract, the Power & Electricity Department may require the Bidder to produce detailed price analysis for any or all items of the Bill of Quantities (BoQ), to demonstrate the internal consistency of those prices with the construction methods and schedule proposed.

23. Price Preference

23.1. There will be no price preference to any bidder.

F. Award of Contract

24. Award Criteria

24.1. Power & Electricity Department will award the Contract to the Bidder whose Bid has been determined to be substantially responsive to the bidding documents and who has offered the lowest evaluated Bid price, provided that such Bidder has been determined to be (a) eligible in accordance with the provisions of Clause 2 of EoI, and (b) qualified in accordance with the provisions of Section 3 of the EoI.

25. Power & Electricity Department 's Right to accept any Bid and to reject any or all Bids

25.1. Notwithstanding Clause 24 above, the Power & Electricity Department reserves the right to accept or reject any Bid, and to cancel the bidding process and reject all bids, at any time prior to the award of Contract, without thereby incurring any liability to the affected Bidder or bidders or any obligation to inform the affected Bidder or bidders of the grounds for the Power & Electricity Department's action without any reason.

26. Notification of Award and Signing of Agreement

26.1. The bidder whose Bid has been accepted will be notified of the award by the Power & Electricity Department prior to expiration of the Bid validity period by cable, email, telex or facsimile confirmed by registered letter. This letter (hereinafter and in the Part I - General Conditions of Contract called the "**Letter of Acceptance**" will state the sum that the Power & Electricity Department will pay to the Contractor in consideration of the execution and completion of the Works (hereinafter and in the Contract called the "Contract Price").

26.2. The notification of award will constitute the formation of the Contract, subject only to the furnishing of a performance security.

26.3. The Agreement will incorporate all agreements between the Power & Electricity Department, Government of Mizoram and the successful Bidder. It will be signed between the Power & Electricity Department, Government of Mizoram and the successful Bidder.

26.4. The Bidders need to complete the assigned capacity within 12 Months from Date of issuing Letter of Allocation (LoA) or till completion of project, whichever is earlier.

27. Security Deposit by way of Demand Draft or Performance Bank Guarantee (PBG):

27.1. EMD of successful bidder will be returned after acceptance of Empanelment with Power & Electricity Department and submission of 10% of Project cost as Security Deposit by way of D.D. or required Performance Bank Guarantee (PBG) of the requisite amount and in the format (Annexure 17) prescribed by Power & Electricity Department and after the receipt of confirmation of their D.D./ PBG from their respective banker, against the Letter of Award (LoA) within 15 days from the date of such notification.

27.2. The Security deposit amount i.e. DD/ PBG shall be released after 5 years from the date of commissioning on compliance of entire obligations in the contract. In case the successful bidder is not able to furnish the PBG for 5 years of validity, then PBG with initial validity period of 2 years may also be accepted by Power & Electricity Department provided the successful bidder shall renew/extend the BG, 30 days before the expiry of the same. If the successful bidder does not extend the PBG, the same shall be forfeited by Power & Electricity Department.

27.3. The Security Deposit/Performance Guarantee shall be submitted in the form of bank guarantee in favour of “Engineer in Chief, Power & Electricity Department” payable at Aizawl from any Indian Nationalized bank/Scheduled bank.

27.4. Non-submission of Security Deposit/Performance Guarantee within the time frame, shall lead to forfeiture of EMD and cancellation of LoI/LoA.

27.5. If Bidder/MSME unit fails to carry out the work allotted to him as per the provisions of the tender documents, then such Bidder/MSME unit may be black listed for future awards of work.

28. Plant Performance Evaluation

28.1. The successful bidder shall be required to meet minimum guaranteed generation with Performance Ratio (PR) at the time of commissioning and related Capacity Utilization Factor as per the GHI levels of the location during the O&M period. PR should be shown minimum of 75% at the time of inspection for initial commissioning acceptance to qualify for release of payment. Minimum CUF of 13.5% should be maintained for a period of 5 Years so as to achieve annual CUF within + 10% and - 15% of the declared value for fulfilling one of the conditions for release of for release of PBG

28.2. The bidder should send the periodic plant output details to Power & Electricity Department for ensuring the CUF. The PR will be measured at inverter output level during peak radiation conditions. The PR and CUF will be calculated as per the methods mentioned in Annexure-17. The Empanelled Partner is not authorized to work on DISCOM's electric line of 11 KV and LT having potential danger of electricity. For any work on the DISCOM's line, a written request must be made to the Power and Electricity Department and work can only be done by trained employees.

29. Five Years Comprehensive Maintenance Contract (CMC)

29.1. The Grid Connected Rooftop SPV Power Plant contract price includes the provision of 5 years mandatory Comprehensive Maintenance Contract (CMC). To ensure long term sustainability of the system, the bidder must provide his representatives name, full address, mobile number and photographs to Power & Electricity Department with one hard copy as well as the names and contact details of all technicians must also be provided. Failure to do shall invite penalty and administrative action.

29.2. The Comprehensive Maintenance Contract shall include servicing & replacement guarantee for parts and components (such as Electronics, Inverter, PV modules and Other hardware) of Grid Connected Rooftop SPV Power Plant for five years from the date of installation. **PV modules shall be warranted for 25 years**. The date of CMC maintenance period shall begin on the date of actual commissioning of Grid Connected Rooftop SPV Power Plant and it's net

metering connection with existing DISCOM Grid. It is mandatory for the contractor to carry out CMC regularly and submit report to Power & Electricity Department quarterly. Failure to submit quarterly CMC reports timely shall invite penalty and action.

29.3. For any issue related to operation & maintenance, a contact number shall be made available to the consumer to resolve immediately, if the bidder do not attempt the rectification of any such defect within 07 (Seven) days of communication of such complaint to the bidders, the bidder will be liable for a penalty of Rs. 100 Per Day beyond 07 (Seven) Days of reporting of such complaint. Further if the outage of the plant is more than 30 days continuously, then the 50% PBG amount shall be encashed by Power & Electricity Department and if the outage is exceeding more than 60 days than complete PBG amount shall be encashed. This will be applicable till 5 years of O&M as per the scope of the RFP. Bidder shall monthly O&M report as per the ***Annexure- 13***. Unless otherwise terminated under relevant clauses, this contact contract shall be deemed to have been completed on the expiry of Comprehensive Maintenance Contract (CMC) during guarantee period

30. Payments

30.1. No mobilization advance amount would be paid by Power & Electricity Department to the EMPANELLED PARTNER.

30.2. Bidder can collect payment from Beneficiary share in suitable instalment as per signed agreement between them.

30.3. The subsidy amount for a Solar PV system at the lowest rate declared by Power & Electricity Department shall be released to the EMPANELLED PARTNER as per the following:

30.4. 80% after submission of the following necessary documents in duplicate at Power & Electricity Department and after getting certificate of installation and its satisfactory performance from beneficiary and on-site verification/ inspection of the systems by Power & Electricity Department and/or its authorized inspection agency/ies, as per norms of Power & Electricity Department and after Commissioning:

I. Bills in triplicate.

II. Beneficiary-wise record of system duly typed in English as per Power & Electricity Department/ MNRE requirement.

III. Submission of duly filled ***Annexure-12*** & ***Annexure-13.***

IV. Photographs of the installed power plant with beneficiary (Hard & Soft copy)

V. 7 days of RMS data of the plant. Details of updating data in SPIN portal of MNRE.

The Subsidy will be released to the EMPANELLED PARTNER subject to further release of the same from MNRE, GoI for the Project.

Balance 20% subsidy after completion of first year of successful O&M as per the bid.

I. Bills in triplicate.

II. Beneficiary-wise record of system duly typed in English as per Power & Electricity Department/MNRE requirement.

III. Submission of duly filled ***Annexure-14***

IV. One year of RMS data of the plant.

EMPANELLED PARTNER should note that subsidy will be released subject to release of same from MNRE, GoI

31. HANDING OVER ASSET:

After successful installation, commissioning, testing of complete system, the asset is to be handed over to the concerned Beneficiary. The handing over note covering the details of all the materials used and total work executed must be signed jointly by the Empaneled Agency and beneficiary Applicant. The copy of handing over note along with beneficiary's certificate according to specified format (***Proforma- A attached***) is required to be submitted by EoI applicant for release of subsidy. The Empanelled Partner shall have be solely responsible for any damage resulting from his operations up to the commissioning and handing over of the system. The Empanelled Partner shall ensure provision of necessary safety equipment such as barriers, signboards, warning lights, alarms etc. to provide adequate protection.

32. Corrupt or Fraudulent Practices

The Power & Electricity Department requires the Bidders/Contractors to strictly observe the laws against fraud and corruption in force in India, namely, Prevention of Corruption Act, 1988.

33. Other *Power & Electricity Department* Rights

Empanelment of Agency may be reviewed from time to time. In case of change of Law, guidelines, Regulation etc. of the Company/ Power & Electricity Department reserve the right to discontinue the empanelment with one-month notice in advance.

Power & Electricity Department reserves the right to terminate contract or part thereof at any time giving 1 months' notice of termination or the reason thereof. Empanelled Partner will not be entitled for any compensation / damages / losses on account or such termination.

DISCOM may be entitled to deduct directly, form the subsidy to be paid to the Empaneled Agency, any sum or sums payable by him and which sum/sums due on account of Empanelled Partner's default in any respect of all the liabilities referred to. In case of any doubt or interpretation of the terms and conditions, the decision of Power & Electricity Department will be final and binding upon the Empanelled Partner.

34. Indemnity

The Empanelled Partner agrees to defend, indemnify and hold harmless Power & Electricity Department, its officers, directors, consultant, agents, employees and affiliates (and their respective officers, directors, agents and employees) from and against any and all claims, liabilities, actions, demands, judgments, losses, costs, expenses, suits, actions and damages arising by reason of bodily injury, death or damage to property sustained by third parties that are caused by an act of negligence or the wilful misconduct of the Empanelled Partner, or by an officer, Director, Sub-Empanelled Agency, Agent or Employee of the Empanelled Partner.

35. Termination

If the Empanelled Partner fails to execute the project within the contractual period as per clauses within this document or as may be mentioned in this RFS, Power & Electricity Department at its own discretion may terminate the contract of the Empanelled Partner. Power & Electricity Department shall not be responsible for any loss incurred by the Empanelled Partner. The Empanelled Partner will be communicated and given 15 (Fifteen) days notice with regards to this decision by Power & Electricity Department. Department reserves the right to terminate the empanelment at any time, with or without giving any explanation of the same to the Empanelled Partner

SECTION-5: GENERAL TERMS & CONDITIONS

NIB No: 1 of 2020-2021

1. Introduction:

The instruction/information contained in the bid documents are for guidance and compliance of the intending bidder. Bidders are advised to obtain clarification from Power & Electricity Department, if any, prior to submission of their bid, failing which it will be deemed that the stipulation made in the bid documents have been read, understood and are acceptable to the bidder.

Bidder shall bear all costs associated with the preparation and submission of the bid, journeys undertaken by them and subsequent bidding process till the empanelment as a successful bidder and the Power & Electricity Department shall in no case, shall be responsible or liable for these costs, regardless of the conduct or outcome of the bidding process.

2. Scope of work:

2.1. Identification of prospective beneficiaries and providing necessary assistance in online applications for Rooftop Solar on behalf of beneficiary for Power and Electricity department and setting up of service centers.

2.2. Preparation of Detailed Project Report (DPR) of the proposed Proposal of SPV Power Plant.

2.3. Obtaining Net-metering approval from concerned DISCOM for grid connectivity.

2.4. Submission of proposal with all required documents to Power & Electricity Department for sanctioning of the project.

2.5. Execution of the work shall be carried out in an approved manner as per the technical specification of NIB, in case of any dispute relevant MNRE/BIS/ISI specification shall be followed and work carried out to the reasonable satisfaction of the engineer in charge.

2.6. The contractor shall complete the work of Design, supply, civil work, erection, testing and commissioning of SPV grid connected Power Plant within 90 days from the date of issuance of subsidy sanction letter. In event of failure to install and commission the SPV system within the mentioned date, the EMD/security deposit cum performance guarantee up to 100% shall be forfeited and will lead to disqualification of the Developer for 3 years or as decided by Power & Electricity Department, Government of Mizoram.

2.7. The work covers Design, supply, installation, commissioning and comprehensive maintenance for 05 (Five) Years.

2.8. Vendors for supply and installation of the RTS shall establish a service Centre to cater the maintenance needs of beneficiaries for 5 years. In case if it is not economically viable for an individual vendor then Group of vendors can establish service Centre. Their contact details will be made available on the website of the DISCOMs.

2.9. All the material required for the installation of solar power plant as per the work order issued shall be kept at site in custody of the contractor, Power & Electricity Department shall not be responsible for any loss or damage of any material during the installation. The contractor shall be responsible and take an insurance policy for transit-cum-storage-erection for all the materials.

2.10. The contractor shall take entire responsibility of electrical safety of the installations including connectivity with the grid and follow all the safety rules and regulations applicable as per Indian Electricity Act-2003, CEA guidelines and Joint Electricity Regulatory Commission (JERC) for Manipur and Mizoram (Metering for Grid Connected Renewable Energy) Regulation 2016, it shall be responsibility of the contractor to take NOC from concerned authority and engage person as per provisions as per in CEA Rules and Regulations.

The Empanelled Partner shall ensure proper safety of all the workmen, material, plants and equipment belonging to him. In case any accident occurs during the construction / erection or during guarantee period for work undertaken by Empanelled Partner thereby causing any minor or major or fatal accident will be the responsibility of the Empanelled Partner. The successful Bidders shall follow and comply with the employer's safety rules relevant provisions of applicable laws pertaining to the safety of workmen, employees, plant and equipment.

The Empanelled Partner shall also arrange all certificates and test reports of the module and inverter and other equipment. The Empanelled Partner must adhere to the Operation and Maintenance procedure given in **Annexure-15** of this document.

The subsidy claims of the systems installed and commissioned shall be processed with following documents:

a. Dated Claim letter from the bidder on its letter head certifying that the SPV modules deployed in the systems installed are of INDIAN make, and all the technical specifications of the components supplied and installed are in accordance with the

specifications given in this document and all the information / documents provided alongwith the claim letter are is correct and factual.

b. DISCOM Registration letter.

c. Copy of the ID proof of user.

d. Permission of CEI / EI to energize Solar PV System (if required) and Self Certification for Solar Roof Top Installations (if required) duly signed and sealed by authorized person of the Empanelled Partner.

e. Invoice of the System billed to the beneficiary.

f. Copy of Checking Sheet or Meter replacement Performa filled by DISCOM at time of providing bidirectional meter at beneficiary's premises, which must be duly signed by authorized person of DISCOM and beneficiary.

g. Certificate of Bi-directional meter installation (IN ORIGINAL COPY ONLY) jointly signed by representative of DISCOM, Empanelled Partner and Beneficiary.

h. Photograph of the system with placard held by the beneficiary and representative of Agency or DISCOM representative showing the name of the beneficiary, DISCOM registration number and system capacity.

i. System details in prescribed format giving the details of the system capacity in kW, make rating and number of SPV modules, make, rating and number of Invertors etc.

j. Correct mobile no. of beneficiary shall be mentioned in the claim letter.

k. Invertor login ID and password of each beneficiary shall be shared by the Empanelled Partner with DISCOM and the same shall be mentioned in claim form.

l. Certificate of the beneficiary that the system is installed and commissioned in all respect with the date of commissioning, system and invertor capacity, etc. and that he has been provided the 05 (Five) Year Warranty Card and the O &M Manual.

m. Overwritten certificates/ documents shall be outrightly rejected and not processed for subsidy payment.

n. Self-certified copies of documents will be submitted in support of claims made by the Empanelled Partner and the Partner shall bring the original copies of documents for verification by DISCOM officials. Details of similar work done ONLY along with copies of the orders and certificates from the customers to be attached with the EOI.

3. Net metering of Power:

3.1. Net metering is the concept which records difference between export of generated energy and import of energy from DISCOM grid during billing cycle. The SPV power

consumer shall pay for the net energy in a billing period as per applicable retail supply tariff as determined by regulatory commission, if the supplied energy by the DISCOM is more than the injected energy by the solar PV sources of the consumer(s).

3.2. Joint Electricity Regulatory Commission (JERC) for Manipur and Mizoram has issued "***Joint Electricity Regulatory Commission (JERC) for Manipur and Mizoram (Metering for Grid Connected Renewable Energy) Regulation 2016***". The SPV Power generators/beneficiaries going for installation of SPV Power Plants under this scheme will also be governed by the rules & regulations of JERC Metering for Grid-connected Renewable Energy Regulation 2016 and other related regulations as notified by JERC and amended time to time. The Empanelled Partner shall abide by the registration process and follow the timelines given in the JERC guidelines.

3.3. The Empanelled PARTNER shall bear the entire cost of metering arrangement provided including its accessories. The installation of meters, wherever applicable, shall be carried out by the Empanelled PARTNER as per the procedures in vogue of the DISCOM(s) with their permission.

3.4 Net Meters shall conform to the Metering Regulations of the state and have to be procured from approved vendors of Power & Electricity Department, Government of Mizoram.

3.5 The Distribution system strengthening cost, if required, shall be borne by the beneficiary applicant

4. Bid documents:

Tender documents shall comprise of all the documents mentioned in this Bid. In addition to these any other documents/amendments/revisions or instructions issued by Power & Electricity Department from time to time to bidders till due date of opening of the offers, shall also be deemed to be integral part of the bid document.

5. Price:

The bidder shall quote their price as per schedule of items of work. The contract price rates shall be firm and binding and shall not be subject to any variation except for statutory variation of taxes and duties during the contractual completion period. ***The price shall be inclusive of all taxes, duties and levies including GST and 5 years CMC etc. as on the opening date of tender.*** The price shall also include designing, manufacturing, inspection, supply, transport, insurance, handling etc. All applicable charges for taking

necessary clearance such as commercial tax, road permit etc. wherever required are also deemed to be included in the contract price.

Maximum allowable project cost would be as per L1 rate or MNRE benchmark cost of respective category, whichever is lower. Any bid quoted above the maximum allowable project cost shall be rejected.

6. Inspection of the factory and Tests:

To ensure the quality of the system, Pre-Dispatch Inspection of the material proposed to be used by Empanelled Vendor, Pre-Dispatch Inspection of the Material is mandatory condition. Pre-Dispatch inspection of material will be conducted by a Technical Officer of Power and Electricity Department or any other person authorized by Power and Electricity Department. The Empanelled Vendor will offer the material for inspection along with routine test certificates. Detailed instructions of Pre-dispatch inspection of material done at point of source of material (i.e at works of the manufacturer) shall be made available to the Empanelled Vendor.

OR

Alternatively, Power and Electricity Department, at its discretion, may select upto 1% samples on random basis out of a lot supplied at site before installation and get these tested at a MNRE recognized test house at Empanelled Vendor's cost. In case of installation of SPV Modules without following this testing procedure, no subsidy payment shall be considered for such project(s).

The following facilities shall be provided by the Vendor at his own cost to the inspecting officer:

a. Suitable accommodation and local conveyance between arrival point, place of stay, works and departure point.

b. Vendor shall arrange "To and Fro" air tickets of economy class for journey of inspecting officer from nearest airport of work place of inspecting officer to their works or place where inspection is to be carried out and back at vendor's cost after coordinating with inspecting officer. Suitable Transport facility for inspecting officer from his work place to the nearest airport for "To and Fro" journey will also be arranged by the vendor. In case, place of inspection is not

connected through air, vendor will arrange "To and Fro" air tickets of economy class at their cost upto the nearest airport of place of inspection and onward journey from nearest airport to place of inspection and back by suitable means i.e taxi/train (2nd AC Class) at the cost of vendor.

c. In case place of inspection is within 500 km distance from HQ of Inspecting Officer, vendor will make suitable travelling arrangement upto the destination of Inspection and back by taxi/train (2nd AC Class) at Vendor's Cost.

d. No deductions towards air fare / travel expenses will be made by the payment making authority, if inspection is waived by the competent authority.

7. Subsidy Pattern and Release:

Subsidy for GCRT Power Plants of Residential Electricity Consumers, will be as per CFA under MNRE Phase II. Sector-wise eligibility of Central Financial Assistance (CFA) and state share incentive/Awards.

Type of Residential Sector	**CFA (as percentage of benchmark cost or cost discovered through competitive process whichever is lower)**
Residential Sector (maximum up to 3 kW capacity)	40% of benchmark cost
Residential Sector (above 3kW capacity and up to 10kW capacity)	40% up to 3 kW Plus 20% for RTS above 3kW and up to 10kW
Group Housing societies/Residential Welfare Associations (GHS/RWA) etc. for common facilities up to 500 kWp (@10 kWp per house), with the upper limit being inclusive of individual rooftop residents in that GHS/RWA at the time of installation of RTS for common activity	20%

The subsidy shall be released in the following manner:

80% of the subsidy amount would be released after successful commissioning and acceptance of the project, balance 20% would be released after one year after successful meeting O&M subject to further release from Ministry of New and Renewable Energy (MNRE), Government of India for the same.

8. Liquidated Damages for Delay in Completion & CMC:

If the supplier fails in the due performance of the contract to deliver any part of the equipment or complete the work within the time fixed under the contract or any extension

there of granted to him by Power & Electricity Department and/or to fulfill his obligations in time under the contract, They shall be liable to pay to Power & Electricity Department @0.5% per month plus the applicable GST up to a maximum of up to 10% of work value delayed beyond contract period. The same will be applicable if monthly CMC report will not be submitted within a week of due date.

This excludes delay in the completion of the work due to unforeseen reasons beyond the control and without the fault and negligence of the Empanelled Partner including act of God or public anomie action of the Government in its sovereign capacity, floods, epidemics, strikes, lockouts, fires, and accidents. In the event of the aforementioned contingencies, the Empanelled Partner shall in writing inform the DISCOM within 15 days of such event. The DISCOM on merits of the request will provide extension to complete the work.

9. Risk & Cost:

If the contractor fails to complete the awarded work up to extended period of one year from the scheduled date of completion then Power & Electricity Department will be at liberty to cancel the said work order and will get the full or part of left over work to be completed by way of engaging alternate contractor and completion of the said work shall be got completed at risk & cost of the failed contractor and failed contractor shall be liable to pay all the dues to Power & Electricity Department, Government of Mizoram.

10. Insurance:

The supplier shall arrange for transit and erection insurance of the materials & equipment's for setting up of Solar Photovoltaic System. In case of any theft or damage of equipment during erection period the same will be responsibility of supplier to get it rectify at their own cost. The supplier shall also be responsible to take insurance for third party liability covering loss of human life, engineers and workmen and also covering risks of damage to the third party/material/equipment/properties during execution of the contract

11. Assignment/ Sub-letting:

The EMPANELLED PARTNER shall not assign or sublet, manufacture, shop testing, packing & forwarding, transportation, transit insurance, supply in whole or part, and its obligations to any third party to perform under the order/contract.

12. Completeness of Tender:

All fittings, assemblies, accessories, hardware items etc. & safety and protection devices as required shall be deemed to have been included in the tender, whether such items are specifically mentioned in the BoM or not.

13. Compliance with Regulations:

The supplier/contractor shall comply with all applicable laws or ordinances, codes approved standards, rules and regulations and shall procure all necessary municipal and/or other statutory bodies and government permits & licenses etc. at their own cost. The contractor shall leave the purchaser, Engineer in Chief, Power & Electricity Department harmless as a result of any infractions thereof.

14. Agreement:

The successful qualified suppliers shall have to enter into an agreement in the office of the Engineer in Chief, Power & Electricity Department, in prescribed format before commencement of supply.

15. Income Tax / GST:

Without prejudice to the obligations of the supplier under law, any income tax and GST which Power & Electricity Department may be required to deduct by law/statute, shall be deducted at source and shall be paid to income tax authorities on account of the supplier. Department shall provide the supplier a certificate for such deductions of tax. (GST/Cess means all applicable Tax/Cess under GST Laws. GST Laws means IGST Act, GST (Compensation to the state for Loss of Revenue) Act, CGST Act, UTGST Act and SGSCT Act 2017 and all related ancillary legislations).

16. Training Program, After Sales Service and Availability of Spare Parts:

16.1. The responsibility of organizing training program for Solar Power Plant will rest on the successful bidder. The training program will be organized in consultation with Department/Consignee. The training program will focus on operation and maintenance of Solar Power Plant. Printed leaflet/literature should be made available in English/Mizo by the Supplier regarding the operation and maintenance of their Solar Power Plant.

16.2. The Supplier shall depute authorized Service Engineer within 7 days from the date of the intimation of fault, and establish sufficient inventory of spares in the State in consultation with Power & Electricity Department to provide satisfactory and uninterrupted services during the warrantee period.

17. Force Majeure conditions:

In the event of either party being rendered unable by force majeure to perform any obligation required to be performed by them under this agreement, relative obligation of the party affected by such force majeure shall be treated as suspended during which force majeure condition last.

The term force majeure shall have herein mean riots (other than among the contractor's employee), civil commotion, war (whether declared or not), invasion, act of foreign enemies hostilities, rebellion, insurrection, military coup to usurp power, act of God such as earthquake, lightening, floods, fires not caused by contractor's negligence and other cause which the contractor has no control and accepted as such by the Engineer in Chief, Power & Electricity Department, whose decision shall be final and binding.

If the work is suspended by force majeure conditions lasting for more than 45 days, the purchasers shall have the option of canceling this contract in whole or part thereof, at its discretion. The contractor shall not claim for compensation for force majeure conditions.

18. Jurisdiction of the Court:

The laws applicable to the contact shall be the laws in force in India. The court assigned to the State of Mizoram shall have exclusive jurisdiction in all matters arising under this contract.

19. Arbitration:

Following standard Arbitration Clause shall become operative post award of contract to the Empanelled Partner:

Any question, dispute or difference whatsoever arises between DISCOM and Empanelled Partner, in connection with this agreement except as to matters, the decision for which has been specifically provided, either party may forthwith give to the other notice in writing existence of such questions, dispute, difference and the same shall be referred to the sole arbitration of a person nominated by Engineer in Chief of Power & Electricity Department. This reference shall be governed by Indian Arbitration Act prevailing at the time of dispute and the rules there under. The award in such arbitration shall be final and

biding on all the parties. Work under the agreement shall continue during the arbitration proceedings unless the DICOM or the Arbitrator directs otherwise.

DISCOM may at any time by notice in writing to the Empanelled Partner either stop the work altogether or reduce or cut it down. If the work is stopped altogether, the Empanelled Partner shall only be paid for work done and expenses legitimately incurred by him as on preparation of the execution of the work up the date on which such notice is received by them. Such expenses shall be assessed by DISCOM whose decision shall be final and binding on the Empanelled Partner. If the work is cut down the Empanelled Partner shall not be paid for the work as so cut down, but in neither case shall be paid any compensation what so ever for the loss or profit which he might have made if he had been allowed to complete all the work included in the contract.

20. Warranty:

The Grid connected solar PV system for the project supplied, installed and commissioned shall be guaranteed by the empanelled agency for a minimum period of 5 (Five) years from the date of successfully commissioning of the system, regarding quality of design, material, workmanship quality of process/ manufacturing, performance, efficiency, installation, etc.

In the event any defect is found or developed in the system within the Guarantee period, shall be rectified by the empanelled agency at his own expense promptly.

21. Maintenance:

Notices, statements and other communications sent by Power & Electricity Department through registered post or email or fax to the Empanelled partner at his specific address shall be deemed to have been delivered.

The work will have to carried out by the Empanelled Partner with prior intimation to Power & Electricity Department, work carried out without informing Power & Electricity Department shall not be accepted and the concerned DISCOM has the right to reject it.

All equipment /materials shall be suitably packed for transport / carriage at site and outdoor storage during transit. Fragile material shall be packed with warning on the outside for recognition. The operation and maintenance must be carried out as per **Appendix 15**.

The Empanelled Partner has to submit the **photograph of the beneficiary person standing at the site of solar plant**, **sign board fixed in English/Mizo**, **with name of the beneficiary, Consumer number, Address Proof (Electricity Bill, EPIC, Aadhar etc.) Capacity and date of installation.**

Any other item not specifically mentioned in the specifications, but which are required for the Supply, Installation and Commissioning of the Solar Power Plant is deemed to be included in the scope of the specification as per relevant and latest IS, IEC and MNRE guidelines.

SECTION-6: TECHNICAL SPECIFICATION

NIB No: 1 of 2020-2021

Technical Specifications for Empanelment of Developers for Design, Manufacture, Testing, Supply, Installation & Commissioning of 500 KWp Grid connected Rooftop SPV Power Plants Including 05 (Five) years Comprehensive Maintenance Contract (CMC) in different location for Residential Sector in the state of Mizoram.

1. General Description & Configuration:

The brief technical details for the various Rooftop SPV power plants are as follow:

(A) Technical requirement for Grid rooftop PV system:

S. N.	SPV Power Plant Capacity (KW)	SPV Capacity (kWp)	PCU Rating (KVA)	Module Mounting Structure (MMS)
1	1-500 kWp	1 to 500 kWp	Same as SPV Capacity	As per design

The rooftop installation of Solar Power Plant consisting of crystalline solar module, mounting systems and pure grid tie central/string inverter. The Solar Photovoltaic Power Plant shall cater the electricity demand as per the proposed hours or duration per day. The Power Plant shall provide a reliable and independent power supply at a voltage and frequency levels to suit the grid voltage and frequency.

2. Major Components of the system:

The following are the major components of the system:

- Solar PV Array
- Array Mounting Structure
- Junction Box
- Grid Tied Inverter
- Data Logger
- Cables
- Bi-Directional Meter

3.1. <u>Solar PV Module / Array</u>

3.1.1. Solar Photo Voltaic (SPV) modules/ array shall be of high efficiency made of crystalline silicon solar PV cells and shall also satisfy the **MINIMAL TECHNICAL REQUIREMENTS / STANDARDS FOR SPV SYSTEMS.** The module should satisfy all MNRE specification including ALMM, if applicable. The Solar Panel including solar cells should be Indian make.

3.1.2. The terminal box on the module should have a provision for opening for replacing the cable, if required.

3.1.3. The rating of each individual module should not be less than **300Wp** at Standard Test Conditions (STC) (Higher ratings can be used) and shall meet following minimum requirement:

Efficiency of module ≥ 16%

Fill factor shall be greater than 70%.

General requirements for PV module:

a. Module shall be made up of mono or poly crystalline silicon cells.
b. The interconnected cells shall be laminated in vacuum to withstand adverse environmental conditions
c. The module frame is made of corrosion resistant materials, preferably having aluminium anodized finish
d. The minimum clearance between the lower edge of the modules and the developed ground level shall be 300 mm in case of flat roof. The clearance may vary for shed or ballast type structure.
e. Surge arresting device to be provide at junction box and module shall be provided with bypass diode.
f. The SPV module must be IEC 61215, IS 14286 and IEC 61730 Part I and Part II certified from any of the accredited certifying agencies. The module must comply with The PV module must also comply with IEC 61853 Part-I, IS 16170-Part-II and IEC 61701/IS 61701
g. Each solar PV module shall be warranted by the manufacturer for at least 90% of its rated power after initial 10 years and 80% of its rated power after 25 years from the completion of the trial run.
h. Each PV module deployed must use a RF identification tag. The following information must be mentioned in the RFID used on each module. (This can be

inside or outside the laminate, but must be able to withstand harsh environmental conditions).

- Name of the manufacturer of the PV module
- Month & Year of the manufacture (separate for solar cells and modules)
- Country of origin (separately for solar cells and module)
- I-V curve for the module
- Wattage, Im, Vm and FF for the module
- Unique Serial No and Model No of the module
- Date and year of obtaining IEC PV module qualification certificate
- Name of the test lab issuing IEC certificate
- Other relevant information on traceability of solar cells and module as per ISO 9001.

3.2. **Module Mounting Structure**

3.2.1. The structure shall be provided on terrace of the building.

3.2.2. The structure shall be designed in accordance with the latitude of the place of installation. The support structure should be designed so that the load on buildings does not cross the limit of 40 Kg / sq. m, for roof mounted type. The array mounting structure shall be designed to allow easy replacement of any module and shall be in line with site requirement. Structure shall be designed for simple mechanical and electrical installation.

3.2.3. The array structure shall support SPV modules at a given orientation, absorb and transfer the mechanical loads to the ground properly.

3.2.4. The mounting structure shall be of anodised aluminium and shall be as per relevant standards and shall withstand wind speeds of 150 Km/hour. The support structure angle should be of dimension 50x50x5mm. The minimum thickness of galvanization shall be at least 80 microns. Fixing fasteners shall be of Stainless steel, all nuts & bolts stainless steel. Legs assembly shall be of MS Hot Dip galvanized pipes after fabrication/Anodised Aluminium. Mounting structure shall have anodized aluminium /MS hot dip galvanized GI/ C Channel etc. The mounting structure steel shall be as per latest IS 2062: 2011 and galvanization of the mounting structure shall be in compliance of latest IS 4759.

3.2.5. The minimum clearance of the lowest part of the module / module structure and the terrace shall not be less than 300 mm for flat roof.

3.2.6. The total load of the structure (when installed with PV modules) on the terrace should be less than 60 kg/m2

3.2.7. The mounting structure steel shall be as per latest IS 2062: 2011 and galvanization of the mounting structure shall be in compliance of latest IS 4759.

3.3. **Junction Boxes**

3.3.1. The junction boxes are to be provided in the PV array for termination of connecting cables. The Junction Boxes (JBs) shall be made of GRP/FRP/Powder Coated Aluminium /cast aluminium alloy with full dust, water & vermin proof arrangement. All wires/cables must be terminated through cable lugs. The JBs shall be such that input & output termination can be made through suitable cable glands.

3.3.2. Copper bus bars/terminal blocks housed in the junction box with suitable termination threads Conforming to IP65 standard and IEC 62208 Hinged door with EPDM rubber gasket to prevent water entry. Single / double compression cable glands. It should be placed at 5 feet height or above for ease of accessibility.

3.3.3. Each Junction Box shall have High quality Suitable capacity Metal Oxide Varistors (MOVs) / SPDs, suitable Reverse Blocking Diodes. The Junction Boxes shall have suitable arrangement monitoring and disconnection for each of the groups.

3.3.4. Suitable markings shall be provided on the bus bar for easy identification and the cable ferrules must be fitted at the cable termination points for identification.

3.3.5. All fuses shall have DIN rail mountable fuse holders and shall be housed in thermoplastic IP 65 enclosures with transparent covers

3.4. **Grid–Tied String or Central Inverter:**

a. Grid Connected Inverters shall convert DC energy produced by the solar array to AC energy such that it synchronizes with the existing AC power sources on site in same frequency. The AC power output of the inverter shall be fed to the rated AC distribution board (metering panel & isolation panel), which also houses the energy meter. The system

should always work in solar priority mode such that power drawn from other sources (Grid or DG) is minimum depending upon the load requirement.

b. The inverter shall have inbuilt MPPT (Maximum Power Point Tracker) feature so as to extract maximum power from PV modules at any moment of time.

c. The system shall have inbuilt shut down/ wake feature such that it automatically wakes-up in the morning and supply power, provided there is sufficient solar energy and the grid voltage and frequency are in range. Similarly, once the Solar is down it should automatically go in to sleep mode to minimize the losses.

d. The Inverter can be of either Central or String type.

e. The inverter shall have inbuilt Anti-Islanding feature such that whenever the grid voltage and/or frequency go out of pre-set range, the inverter shall be immediately disconnected from the grid. The inverter will reconnect after a pre-determined time when the grid is back in the range. The same shall be applicable when there is a power cut.

f. The unit shall be able to synchronize with Diesel Generators (DG) or Hybrid PCU of similar or higher capacity as well and supply solar power to loads in solar priority mode. The quality of DG or Hybrid PCU shall be such that voltage and frequency output is within the stipulated limits.

g. The Inverter shall provide 1 Phase/ 3 phase output, 230V/ 415V (with grid tracking of -20% to +15 %/), 50 Hz (with grid tracking of ±5% i.e. 47.5 to 52.5 Hz) supply on AC side.

h. At rated power, the inverter output's current THD shall be less than 3%.

i. Also, the Inverter should perform at 100% capacity throughout the operating temperature range (i.e. 0-50 degrees ambient). There should be no de-rating of output power within the operating temperature range.

j. It shall be capable of complete automatic operation, including wakeup, synchronization and shut down.

k. Ingress protection: For outdoor installation Minimum IP-65 and for indoor installation minimum IP-20 degree of protection is required. This is valid for both string and central type inverter. For outdoor installation inverter is to be placed under shade.

TECHNICAL PARAMETERS OF PURE GRID TIED STRING OR CENTRAL INVERTER

PARAMETERS	SPECIFICATIONS
Switching devices	IGBT/MOSFET
Control	Microprocessor /DSP
Output Voltage/ Frequency	230V/ 415V for 1-Phase/ 3 phase systems & 50Hz
Voltage Synchronization Range	-20% to +15% of the nominal output voltage
Frequency Synchronization Range	±5% of Nominal output Frequency
Continuous Rating	As per the site but without any de rating from 0-50 degrees
Inverter Type	String/ Central Inverters
Galvanic Isolation	Must for both String and Central Inverters above 100 kW.
THD	Less than 3%
Regulation	≤ 2%
Internal Protection System	Array ground fault protection Input reverse polarity protection Grid Over/ Under Voltage & Frequency Anti-islanding Protection
Indications/ Displayed parameters	Inverter ON Grid ON Inverter under voltage/over voltage Inverter over-temperature Earth Fault/ Low Insulation Resistance
Circuit Breakers	PV Mains
ENVIRONMENTAL	
Operating Temperature Range	0-50 degrees ambient
Humidity	95% non-condensing
Enclosure	IP-20/ IP-65 for Indoor and outdoor inverters respectively

STANDARDS	
Efficiency Measurement	IEC 61683
Environmental testing	IEC 60068-2 (1,2,14,30)
Interfacing with utility grid	IEC 61727 or Equivalent
Islanding Prevention Measurement	IEC 62116 or Equivalent
GENERAL ELECTRICAL DATA	
Efficiency	> 95% at nominal voltage & power as per IEC 61683 or equivalent international efficiency standards
No load losses	Less than 1% of rated power
Cooling	Forced air cooling with temperature controlled cooling fan
DISPLAY	
Display type	LCD / LED Display
DISPLAY PARAMETER	
DC	Voltage Current Power
On grid connected mode	Line status Grid voltage Grid frequency Export Power Cumulative Export Energy
Interface (Communication protocol)	Suitable port to be provided in the inverter. i) On site upgrade of Software ii) On site dumping data from the memory iii) Web based remote monitoring system
Web monitoring	Matched with the monitoring and data logging system
PROTECTION	
DC Side	Input over voltage Reverse-polarity protection Reverse current to PV array protection, over voltage, Under voltage protection Over current
AC side	i) DC inject protection to grid ii) Over voltage and Under voltage

	iii) Over current iv)Over and under grid frequency protection v) Anti-Islanding protection
Isolation Switch	PV array Isolation switch (DC)
Safety	IEC 62109 Part 1 & 2
Environmental Testing	As per IEC 60068-2

DATA ACQUISITION SYSTEM/PLANT MONITORING/REMOTE MONITORING:

Data Acquisition System shall be provided for each of the solar PV plant. An RMS may be used for this purpose. The upfront cost of RMS system shall be borne by the developer and running charges may be borne by the consumer thereafter. EMPANELLED PARTNER shall share all login details with Power & Electricity Department for remote monitoring of the projects.

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.

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. (For all systems over 40kW)

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. The temperature sensor along with Solar Irradiance system is required for all projects over 40kW.

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).

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.

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.

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.

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.

Computerized AC energy monitoring shall be in addition to the digital AC energy meter.

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.

All instantaneous data shall be shown on the computer screen.

Software shall be provided for USB download and analysis of DC and AC parametric data for individual plant.

Provision for instantaneous Internet monitoring and download of historical data shall be also incorporated.

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.

Ambient / Solar PV module back surface temperature shall be also monitored on continuous basis for all solar projects over 40kW.

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.

Remote Monitoring and data acquisition through Remote Monitoring System software at the owner/Power & Electricity Department 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 bidder.

The bidders shall be obligated to push real-time plant monitoring data on a specified interval (say 15 minute) through open protocol at receiver location (cloud server) in XML/JSON format, preferably. Suitable provision in this regard will be intimated to the bidders.

All the relevant parameters of Inverter should be available for remote monitoring over internet using GPRS based monitoring solution. The monthly charge of SIM card and server will be borne by the bidder. The list of parameters should include:

PV Side	PV Voltage, PV Current, PV Power, total Generation etc.
Grid Side	• Inverter Voltage, Current, Frequency • Mains Voltage, Current, Frequency • Active Faults

A. **<u>BI-DIRECTIONAL SINGLE/THREE PHASE INVERTER:</u>**

It should be an IGBT/MOSFET based; microprocessor/DSP controlled inverter & should incorporate PWM technology and all the desired safety features for reliable running of PCU.

The below minimum features should be ensured in the inverter unit:

- Operation without any derating from 0 to 50 degrees of ambient temperature

- Overloads of 110% for 60 sec, 125% for 30 sec and 150% for 5 sec.
- Inverter should be able to sustain load imbalance between the phases.
- Automatic reset of all non-critical faults such as overloads, AC over voltage/ under voltage etc. once the fault has been cleared
- Facility to export excess PV power to grid incase consumption of loads is less than the generation. This is a futuristic feature and provision should be there to enable & disable this export feature.

TECHNICAL SPECIFICATIONS

PARAMETERS	SPECIFICATIONS
Output Voltage	230Volts ± 1% single phase, 2 wire output /415Volts ± 1% three phase, 4 wire output. Nominal voltage could be adjusted ± 5% via system set points.
Output Frequency	50Hz ± 0.5% during stand alone inverter operation. Inverter to follow generator frequency up to ± 3 Hz of the nominal output frequency during synchronized operation
Voltage Synchronization Range	-20% to +15% of the nominal output voltage
Frequency Synchronization Range	±5% of Nominal output Frequency
Continuous Rating	As per system rating
Surge Rating	Up to 150% of the continuous rating for a minimum of 30 seconds
Waveform	Sine wave output
THD	Less than 3%
Efficiency	At 25% load> 85% At 50% load> 90% At 75 % load and above> 92%
Regulation	≤ 2%
Phase Load imbalance	At least 30% between phases
Internal Protection System	• Inverter continuous overload • Short circuit protection • Over/under AC voltage protection • Over/under frequency protection

Display (Inverter/ MPPT Charger)	• Inverter O/P Voltage, Current, Frequency • Mains Voltage, Current, Frequency • Mode of Operation, Active Faults • PV Voltage, Current, Instantaneous Power, Daily Generation, Total Generation (for each Solar Charger channel separately)
MCBs	• PV (each Channel) • Mains • Load
Environmental	
Operating Temperature Range	0-50 degrees ambient
Humidity	0-90% non-condensing
Enclosure	IP-30

REMOTE MONITORING

All the relevant parameters of PCU should be available for remote monitoring over internet using GPRS based monitoring solution. PCU shall have GPRS ability based on SIM card which shall be provided by the bidder. The monthly charge of SIM card will be borne by bidder. The list of parameters should include:

Solar Charge Controller	PV Voltage, PV Current, PV Power, Daily Generation, Total Generation. (All above parameters to be included for all MPPT channels individually)
Inverter/ Mains Charger	• Inverter Voltage, Current, Frequency • Mains Voltage, Current, Frequency • Active Faults

3.5. **DC Distribution Board (DCDB):**

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 inverter along with necessary surge arrestors.

DCDB shall consist of MCBs of suitable specifications which can withstand respective flow of current, with the purpose of providing the option for isolating the SPV arrays. **The DCDB, DCCB (consisting of fuses, MCBs, MCCBs and SPDs) may not be required separately) if already comes inbuilt with the inverter.** In such case the Empanelled Partner will have to provide the Specification Sheet of the inverter highlighting the same.

3.6. **AC Distribution Board (ACDB):**

3.6.1. AC Distribution Panel Board (DPB) shall control the AC power from inverter, and should have necessary surge arrestors. Interconnection from ACDB to mains at LT Bus bar while in grid tied mode.

3.6.2. All switches and the circuit breakers, connectors should conform to IEC 60947, part I, II and III/ IS60947 part I, II and III.

3.6.3. The changeover switches, cabling work should be undertaken by the bidder as part of the project.

3.6.4. 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

3.6.5. The panels shall be designed for minimum expected ambient temperature of 45 degree Celsius, 80 percent humidity and dusty weather.

3.6.6. All indoor panels will have protection of IP54 or better. All outdoor panels will have protection of IP65 or better. Should conform to Indian Electricity Act and rules (till last amendment).

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

3.7. **Cables and accessories**:

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

a. Shall meet IEC 60227/IS 694, IEC 60502/IS1554 standards
b. Temp. Range: –10°C to +80°C.

c. Voltage rating 660/1000V

d. Excellent resistance to heat, cold, water, oil, abrasion, UV radiation

e. Flexible

f. Sizes of cables between array interconnections, array to junction boxes, junction boxes to Inverter etc. shall be so selected to keep the voltage drop (power loss) of the entire solar system to the minimum (2%)

g. For the DC cabling, XLPE or, XLPO insulated and sheathed, UV-stabilized single core multi-stranded flexible copper cables shall be used; Multi-core cables shall not be used.

h. For the AC cabling, PVC or, XLPE insulated and PVC sheathed single or, multi-core multi-stranded flexible copper cables shall be used; Outdoor AC cables shall have a UV-stabilized outer sheath.

i. The cables (as per IS) should be insulated with a special grade PVC compound formulated for outdoor use. Outer sheath of cables shall be electron beam cross-linked XLPO type and black in colour.

j. The DC cables from the SPV module array shall run through a UV-stabilized PVC conduit pipe of adequate diameter with a minimum wall thickness of 1.5mm.

k. Cables and wires used for the interconnection of solar PV modules shall be provided with solar PV connectors (MC4) and couplers

l. All cables and conduit pipes shall be clamped to the rooftop, walls and ceilings with thermo-plastic clamps at intervals not exceeding 50 cm; the minimum DC cable size shall be 4.0 mm2 copper; the minimum AC cable size shall be 4.0 mm2 copper. In three phase systems, the size of the neutral wire size shall be equal to the size of the phase wires.

m. 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. In addition, cable drum no. / Batch no. to be embossed/ printed at every one meter.

n. Cable Jacket should also be electron beam cross-linked XLPO, flame retardant, UV resistant and black in colour.

o. All cables and connectors for use for installation of solar field must be of solar grade which can withstand harsh environment conditions including High temperatures, UV radiation, rain, humidity, dirt, salt, burial and attack by moss and microbes for 25 years and voltages as per latest IEC standards. DC cables used from solar modules tao

array junction box shall be solar grade copper (Cu) with XLPO insulation and rated for 1.1kV as per relevant standards only.

p. The ratings given are approximate. Bidder to indicate size and length as per system design requirement. All the cables required for the plant shall be provided by the bidder. Any change in cabling sizes if desired by the bidder shall be approved after citing appropriate reasons. All cable schedules/ layout drawings shall be approved prior to installation.

q. 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: 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.

r. The total voltage drop on the cable segments from the solar PV modules to the solar grid inverter shall not exceed 2.0%.

s. The total voltage drop on the cable segments from the solar grid inverter to the building distribution board shall not exceed 2.0%.

3.8. **Earthing and Lightning Protection:**

Each array structure of the PV system should be grounded/earthed properly using adequate number of earthing kits as per IS: 3043-1987. In addition, the lighting arrester/masts should also be earthed inside the array field. Earth Resistance shall be tested in presence of the representative of Departments as and when required after earthing by calibrated earth tester. PCU, ACDB and DCDB should also be earthed properly.

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. The earthing resistance values shall conform to relevant IS/ Indian electricity rules.

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 standards. 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.

Based on available roof area solar PV panels will be installed on the roof of the building. The output of the panels (DC electricity) connects to the power conditioning unit / inverter which converts DC to AC. The inverter output will be connected to the control panel or distribution board of the building to utilize the power. The inverter synchronizes with grid and also with any backup power source to produce smooth power to power the loads with preference of consuming solar power first. If the solar power is more than the load requirement, the excess power is automatically fed to the grid. For larger capacity systems connection through step up transformer and switch yard may be required to feed the power to grid. In case of grid failure, there should provision of protection for isolating the SPV plant from the grid.

4. Control Room

The control room shall be provided by the end users.

5. Quality and adaptability of the equipment

Interested Companies must verify the grid behavior, solar insolation levels and general site conditions on their own before bidding. The bidder shall accordingly ensure that the equipment and the design submitted shall be able to perform as per guaranteed performance levels in the available site conditions. The design of the plant and the equipment offered shall be evaluated for its quality and adaptability to the site conditions.

6. 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 Power & Electricity Department/ owner.

A list of requisite spares in case of 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.

7. Danger Boards and Signage:

Danger boards should be provided as and where necessary as per IE Act. /IE rules as amended up to date. Signage shall be provided one each at solar array area and main entry from administrative block. Text of the signage may be finalized in consultation with Department/ owner.

8. Fire Extinguishers:

The fire fighting 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.

12. Drawings & Manuals:

Two sets of Engineering, electrical drawings and Installation and O&M manuals are to be supplied. Bidders shall provide complete technical data sheets for each equipment giving details of the specifications along with make/makes in their bid along with basic design of the power plant and power evacuation, synchronization along with protection equipment.

Approved ISI and reputed makes for equipment be used.

For complete electro-mechanical works, bidders shall supply complete design, details and drawings for approval before progressing with the installation work.

13. Planning and Designing:

The bidder should carry out Shadow Analysis at the site and accordingly design strings & arrays layout considering optimal usage of space, material and labour. The bidder should

submit the array layout drawings along with Shadow Analysis Report to Owner for approval.

Power & Electricity Department 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.

The bidder shall submit preliminary drawing for approval & based on any modification or recommendation, if any.

14. Safety Measures:

The bidder shall take entire responsibility for electrical safety of the installation(s) including connectivity with the grid and follow all the safety rules & regulations applicable as per Electricity Act, 2003 and CEA guidelines etc.

15. Display Board

The bidder has to display a board at the project site (above 25 kWp) mentioning the following:

Plant Name, Capacity, Location, Type of Renewable Energy plant (Like solar wind etc.), Date of commissioning, details of tie-up with transmission and distribution companies, Power generation and Export FY wise.
The size and type of board and display shall be approved by Engineer-in-charge before site inspection.

16. Manpower Training

The supplier/contractor shall train the users for the operation & maintenance of the plant.

Annexure-1: Format for Covering Letter

NIB No: 1 of 2020-2021

(***To be submitted in the official letter head of the company***)

To,

The Engineer in Chief,
Power & Electricity Department, Government of Mizoram
Kawlphetha Building, New Secretariat Complex,
Khatla, Aizawl,
Mizoram, PIN: 796001.

Subject: Empanelment of Developers for Design, Manufacture, Testing, Supply, Installation & Commissioning of 0.5 MWp Grid connected Rooftop SPV Power Plants Including five years Comprehensive Maintenance Contract (CMC) in different location for Residential Sector in the state of Mizoram.

Sir,

We are hereby submitting our offer in full compliance with the terms and condition of the above NIB No. We have submitted the requisite amount of "***Earnest Money***" in the form of Bank Guarantee, valid for twelve months plus three months claim period.

The tender is uploaded on https://mizoramtenders.gov.in/nicgep/app **&** https://power.mizoram.gov.in/ as per the requirement of the website separately Technical Bid & Financial Bid.

(Signature of Authorized Signatory)
Name:
Designation:
Company Seal:

Annexure-2: Information About The Bidding Firm

NIB No: 1 of 2020-2021

(*To be submitted in the official letter head of the company*)

SL. No.	Particulars	
1.	Name of the Bidder	
2.	Address of Bidder with Telephone, Fax, email	
3.	Address of the Registered Office	
4.	Address of the works	
5.	GPS Co-ordinate of Registered Office	
6.	GPS Co-ordinate of Factory Campus	
7.	Name & Designation of Authorized Signatory for Correspondence (Attach Power of Attorney as per **Annexure-6**)	
8.	Nature of Firm (Proprietorship/Partnership /Pvt. Ltd./Public Ltd. Co./Public Sector)	
9.	Permanent Account Number (PAN)/TIN (Attach proof)	
10.	Firm's Registration Number (Attach proof)	
11.	Sales Tax/Value Added Tax Registration Number (Attach proof)	
12.	Specify the Item Originally Manufactured (SPV module/Electronics) (Attach copy of Registration Certificate of Industry Department)	
13.	Details of in-house testing facility (Attach Proof)	
14.	Office/ Dealer and Service network in Mizoram with TIN No. (Give details)	
15.	Quoted quantity	
16.	Particulars of Earnest Money	

17.	Place where Materials will be Manufactured	
18.	Place where Materials will be Available for Inspection	
19.	Other details and remarks, if any	

Yours faithfully,

(Signature of Authorized Signatory)

Name :

Designation :

Company seal :

(Separate sheet may be used for giving detailed information duly signed)

Annexure-3: Declaration by the Bidder

NIB No: 1 of 2020-2021

(*To be submitted in the official letter head of the company*)

I/We_____ (here in after referred to as the Bidder) being desirous of tendering for the rate contract for work under the above mentioned tender and having fully understood the nature of the work and having carefully noted all the terms and conditions, specifications etc. as mentioned in the tender document, DO HEREBY DECLARE THAT:

1. The Bidder is fully aware of all the requirements of the tender document and agrees with all provisions of the tender document.
2. The Bidder is capable of executing and completing the work as required in the tender.
3. The Bidder accepts all risks and responsibilities directly or indirectly connected with the performance of the tender.
4. The Bidder has no collusion with any employee of Power & Electricity Department or with any other person or firm in the preparation of the bid.
5. The Bidder has not been influenced by any statement or promises of Power & Electricity Department or any of its employees, but only by the tender document.
6. The Bidder is financially solvent and sound to execute the work.
7. The Bidder is sufficiently experienced and competent to perform the contract to the satisfaction of Power & Electricity Department.
8. The information and the statements submitted with the tender are true.
9. The Bidder is familiar with all general and special laws, acts, ordinances, rules and regulations of the Municipal, District, State and Central Government that may affect the work, its performance or personnel employed therein.
10. The Bidder has not been debarred from similar type of work by any SNA/ Government Dept. /PSU.
11. This offer shall remain valid for Six months from the date of opening of the tender.
12. The Bidder gives the assurance to execute the tendered work as per specifications terms and conditions.
13. The Bidder confirms the capability to supply and install required no. of systems per month.

14. The Bidder accepts that the earnest money be absolutely forfeited by Power & Electricity Department if the Bidder fails to undertake the work or sign the contract within the stipulated period.

(Signature of Authorized Signatory)

Name:

Designation:

Company Seal:

Annexure-4: Format For Financial Requirement – Annual Turnover

NIB No: 1 of 2020-2021

[On the letterhead of Bidding Company]

To,

The Engineer in Chief,
Power & Electricity Department, Government of Mizoram
Kawlphetha Building, New Secretariat Complex,
Khatla, Aizawl,
Mizoram, PIN: 796001.

Dear Sir,

Sub: Empanelment of Developers for Design, Manufacture, Testing, Supply, Installation & Commissioning of 0.5 MWp Grid connected Rooftop SPV Power Plants Including five years Comprehensive Maintenance Contract (CMC) in different location for Residential Sector in the state of Mizoram.

We certify that the Bidding Company had an average Annual Turnover of Rs. ---------- ---------- based on audited annual accounts of the last three years ending 31.03.2019 to meet the financial eligibility criteria of the NIB No._ _ _ _ _ _ _ _ _ _ _ _ _.

Authorised Signatory *Statutory Auditor*

(Power of Attorney holder) *(Stamp & Signature)*

Date:

Annexure-5: Format For Financial Requirement - Net Worth Certificate

NIB No: 1 of 2020-2021

[*On the letterhead of Bidding Company*]

To,

The Engineer in Chief,
Power & Electricity Department, Government of Mizoram
Kawlphetha Building, New Secretariat Complex,
Khatla, Aizawl,
Mizoram, PIN: 796001.

Dear Sir,

Sub: Empanelment of Developers for Design, Manufacture, Testing, Supply, Installation & Commissioning of 0.5 MWp Grid connected Rooftop SPV Power Plants Including five years Comprehensive Maintenance Contract (CMC) in different location for Residential Sector in the state of Mizoram.

This is to certify that Net worth of _____ {insert the name of Bidding Company}, as on 31st March 2019 is Rs _____. The details are appended below.

Particulars	**Amount (In Rs.)**
Equity Share Capital	
Add: Reserves	
Subtract: Revaluation Reserve	
Subtract: Intangible Assets	
Subtract: Miscellaneous Expenditure to the extent not written off and carried forward losses	
Net Worth as on 31st March 2019	

Authorised Signatory *Statutory Auditor*

(Power of Attorney holder) *(Stamp & Signature)*

Annexure -6: Format of Power of Attorney for Signing Bid

NIB No: 1 of 2020-2021

POWER OF ATTORNEY

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

Know all men by these presents, we…….(name and address of the registered office) do hereby constitute, appoint and authorize Mr. / Ms.……(name and residential address) who is presently employed with us and holding the position of…….

as our attorney, to do in our name and on our behalf, all such acts, deeds and things necessary in connection with or incidental to our bid for **All tenders notified by Power & Electricity Department during 2019-20,** including signing and submission of all documents and providing information / Bids to Power & Electricity Department, representing us in all matters before [Insert Name], and generally dealing with Power & Electricity Department in all matters in connection with our bid for the said Project.

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

For

_____Signature

Accepted by

…….. (Signature)

(Name, Title and Address of the Attorney)

Note: The mode of execution of the Power of Attorney should be in accordance with the procedure, if any, lay down by the applicable law and the charter documents of the executants (s) and when it is so required the same should be under common seal affixed in accordance with the required procedure.

Annexure-7: Details of Orders Received and Executed in Last 3 Years

NIB No: 1 of 2020-2021

Details of Orders Received & Executed by the Manufacturer/Supplier for Supply of **SPV Power Plant** to SNA/ Govt. Organization during Last 07 (Seven) Years.

SL. No.	Name of Agency/ Organization	Purchase Order No., Date & Ordered Qty.	Capacity of SPV Power Plant	Delivery Schedule	Qty. Supplied Within Delivery Schedule	Qty. Supplied After Delivery Schedule	Date of Full Supply

Yours faithfully,

(Signature of Authorized Signatory)

Name:

Designation:

Company Seal:

Note:

(a) Attach Photocopies of Work Orders

(b) Attach Photocopies of Certificate of Satisfactory Performance Issued by Concerned Nodal Agency/*PSU*/ Govt. Organization/Private Entities

(c) Separate sheet may be used for giving detailed information in seriatim duly signed. This bid Performa must be submitted duly signed in case separate sheet is submitted

Annexure-8: Format for Technical Details

NIB No: 1 of 2020-2021

Sub: Empanelment of Developers for Design, Manufacture, Testing, Supply, Installation & Commissioning of 500 kWp Grid connected Rooftop SPV Power Plants Including five years Comprehensive Maintenance Contract (CMC) in different location for Residential Sector in the state of Mizoram.

S. N	Particulars	Details	Make
1	Mounting arrangement for Solar module		
2	Solar module frame material		
3	Module type		
4	No. of solar cells per module		
5	Make of Solar module (Attach IEC Certificate)		
6	Country		
7	Weather resistant HDPE junction Box (IP55)		
8	Max. Temperature rise of solar cells under severe working condition over max. ambient temperature		
9	Nominal voltage		
10	Operating voltage of solar module (nom)		
11	Peak power voltage (Vmp)		
12	Peak Power current (Imp)		
13	Open circuit voltage (Voc)		
14	Short circuit current (Isc)		
15	Make of PCU and Origin		

Undertaking

a) We agree to install and supply quality Solar Power Plant as per NIB specifications.
b) We agree to give performance guarantee as specified and to abide by the scope of the guarantee as prescribed under the tender document.
c) We agree to operate as per the terms & conditions of the tender.

We undertake to supply quality products for promoting energy efficiency in the era of lighting systems.

(Signature of Authorized Signatory with Name Designation & Company Seal)

Filling Instructions:

1. The SPV components will be generally guaranteed as per General Terms & Conditions. The Empanelled Partner can also provide additional information about the system and conditions of Guarantee as necessary. The Guarantee card to be supplied with the system must contain the details of the system supplied as per format given above.

2. During the Guarantee period Power & Electricity Department/users reserve the right to cross check the performance of the systems for their minimum performance levels specified in the MNRE specifications.

Annexure-9: Technical Detail Form

NIB No: 1 of 2020-2021

(***To be submitted in the official letter head of the company***)

Warrantee Card

1.	Name & Address of the Manufacturer/ Supplier of the System		
2.	Name & Address of the Purchasing Agency		
3.	Date of Supply of the System		
4.	Details of PV Module(s) Supplied in the System		
	(a)	Name of the Manufacturer	
	(b)	Make	
	(c)	Model	
	(d)	Serial No.	
	(e)	Wattage of the PV Module(s) under STC	
	(f)	Guarantee Valid Up To	
7.	Designation & Address of the Person to be Contacted for Claiming Warrantee Obligations		

(Signature of Authorized Signatory with Name Designation & Company Seal)

Filling Instructions:

- The Rooftop SPV Power Plants components will be generally guaranteed as per General Terms & Conditions. The Empanelled Partner can also provide additional information about the system and conditions of Guarantee as necessary. The Guarantee card to be supplied with the system must contain the details of the system supplied as per format given above.
- During the Guarantee period Power & Electricity Department/users reserve the right to cross check the performance of the systems for their minimum performance levels specified in the MNRE specifications.

Annexure-10: Price Bid

(*To be submitted in BoQ.xls format uploaded in State e-procurement portal*)

NIB No: 1 of 2020-2021

Sub: Empanelment of Developers for Design, Manufacture, Testing, Supply, Installation & Commissioning of 500 kWp Grid connected Rooftop SPV Power Plants Including five years Comprehensive Maintenance Contract (CMC) in different location for Residential Sector in the state of Mizoram.

S. N	Name of Work/Project	Bidders to enter unit Rate per KW (inclusive of all taxes and charges) (In Figure)	Bidders to enter unit Rate per KW (inclusive of all taxes and charges) (In Word)	Bid Capacity in kWp
1	Empanelment of Developers for Design, Manufacture, Testing, Supply, Installation & Commissioning of 500 kWp Grid connected Rooftop SPV Power Plants Including five years Comprehensive Maintenance Contract (CMC) in different location for Residential Sector in the state of Mizoram.	Rate to be filled up in Financial Bid format only	Rate to be filled up in Financial Bid format only	

1 Above quoted price for **Solar Power Plants** are complete in all respect as per Technical Specifications inclusive of all Central/State/Local taxes & duties, packing, forwarding, transit insurance, loading & unloading, transportation & other charges etc. for destination at any places in Mizoram and inclusive of installation, testing, commissioning, operation & maintenance, performance testing, training and 5 years CMC charges.

2 Certified that rates quoted for **Solar Power Plants** are as per specifications, terms & conditions mentioned in the bid document.

3 Price will be quoted in complete numeric figure and words.

4 For each category more than one contractor will be empanelled.

5 The offered rate should be valid for one year which may be extended as per requirement of Power & Electricity Department.

(Signature of Authorized Signatory)

Name:

Designation:

Company Seal:

Annexure-11: Format for Submitting Bank Guarantee for Earnest Money

NIB No: 1 of 2020-2021

(*To be submitted in Rs. 100/- Non-Judicial Stamp Paper to be purchased in the name of the issuing bank*)

To,

The Engineer in Chief,
Power & Electricity Department, Government of Mizoram
Kawlphetha Building, New Secretariat Complex,
Khatla, Aizawl,
Mizoram, PIN: 796001.

WHEREAS ……..…….. (Supplier's name) (thereinafter referred to as "Supplier"), a company registered under the Companies Act, 1956 and having its registered office at ……..…… is required to deposit with you, the Purchaser, by way of Earnest Money Rs. ……..…….. (Rupees ……. only) in connection with its tender for the work with reference to Notice Inviting Bid (NIB) No. ……..…… dated ……..……. as per specification and terms and conditions enclosed therein.

WHEREAS the Supplier as per "Notice Inviting Bid, point no. 3 Earnest Money" has agreed to establish a Bank Guarantee in Your favour through us valid up to …….……..….. (date) instead of deposit of earnest money in cash.

WHERAS you have agreed to accept a Bank Guarantee from us in …… instead of earnest money in cash from the Supplier.

1. We …….…… (Bank) hereby agree and undertake to pay you on demand the said amount of Rs. …….. (Rupees …… only) without any protest or demur in the event the Supplier/Tenderer after submission of his tender, resiles from or withdraws his offer or modifies the terms and conditions thereof in a manner not acceptable to you or expresses his unwillingness to accept the order placed and/or letter of intent issued on the Supplier/Tenderer for the work under "Notice Inviting Bid Ref. No.: "_ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _".

2. Your decision as to whether the Supplier/Tenderer has resiled from or has withdrawn his offer or has modified the terms and conditions thereof in a manner not acceptable to you or has expressed his unwillingness to accept the order placed and/or Letter of Intent issued by you on the Supplier/Tenderer for the work under "Notice Inviting Bid Ref. No. :_ _ _ _ _ _ _ _ _ _ _ _ _ in this regard, shall be final and binding on us and we shall not be entitled to question the same.

3. Notwithstanding anything contained in the foregoing, our liability under this Guarantee shall be restricted to Rs. …….. (Rupees ……..……..…….. only).

4. This Guarantee shall remain valid and in full force and effect up to ……..…….. (Date) and shall expire thereafter unless an intimation is given to the Bank by you earlier in writing discharging us from our obligation under this Guarantee.

5. We shall not revoke this Guarantee during its currency except by your consent in writing.

6. This Guarantee shall not be affected by any change in the constitution of the Supplier/Tenderer or yourselves or ourselves but shall ensure to your benefit and be enforceable against our legal successors or assignees by you or your legal successors.

7. Notwithstanding anything contained herein above unless a demand or claim under this Guarantee is made on us in writing within six months from the date of expiry of this Guarantee we shall be discharged from all liabilities under this Guarantee thereafter.

8. We have power to issue this Guarantee under our Memorandum and Articles of Association and the undersigned who is executing this Guarantee has the necessary power to do so under a duly executed Power of Attorney granted to him by the Bank.

Signed and Delivered

For and on behalf of …….. Bank.

(Banker's Name)

Name of Bank Manager: …….

Address ……..……

……..…

Annexure-12: Project Report Format

NIB No: 1 of 2020-2021

Format for Summary Project Report for
Grid Connected Rooftop and Small SPV Power Plants

1. Name of Bidder:

2. Rfs no.:

3.Project details (Site location & Address):

4. Brief about the Rooftop Solar Power Generation System:

5. Details of the beneficiary:

6. Specifications of the Components and Bill of Material/ Quantities:

Sl. No	**Component**	**Specifications**	**Quantity**	**Make**
A	Solar PV module			
A.1	Aggregate Solar PV capacity (kWp)			
B	Grid Tie inverter (Type and Capacity)			
B.1	Aggregate Inverter capacity (kVA)			
C	Module mounting structure (Certified by a Structural Engineer *(Mandatory for 101 kWp to 500 kWp)*			
D	Array Junction Box			
E	AC Distribution Board			
F	Cable (All type)			
G	Earthing Kit			

	(maintenance free)			
H	Meters			
I	Online monitoring System			
J	Any other component			
K	Transformer			

7. Unit cost of solar power generation:
8. Cost benefit analysis, payback period:
9. Expected output/annum:
10. Respective drawings for layout, electrical wiring connections, earthing, components etc.:
11. Connectivity details with grid and metering arrangement (with sketch diagram):
12. Copy of electricity bill of the beneficiary and consumer number:
13. Any other information:
11. Documentary proof regarding beneficiary type as per clause 1.2 of the RfS:

(*The above information should be limited up to 2-3 pages only*)

Annexure 13: Project Completion Report for Grid-Connected Rooftop

NIB No: 1 of 2020-2021

Financial year * :			
Approval No. * :			
Proposal Title :			
Installed by agency :			
Project initiated by :			
Technology Description & System Design /Specification (Compliance to BIS/IEC Standards is mandatory)			
1. Module			
Capacity/Power of each PV Module(Wp)* :	1. Capacity/Power 2. Capacity/Power		1. Nos: 2. Nos:
Cumulative Capacity of Modules(KWp):			
Solar cell technology :			
Module efficiency (in Percentage) :			
2. Inverters			
Type of inverter :			
Make of inverter :			
Capacity/Power of each PCU/inverters (VA)* :		Capacity/Power Nos.	
Capacity/Power of PCU/inverters (KVA) :			
Inverter efficiency (Full load) :(in percentage)			

3. Metering Arrangement			
Details of Metering			
Type of Meter* :			
Make of Meter :			
4. Other informations			
Units of electricity generated by the solar plant as per meter (in KWh):			
Monitoring Mechanism :			
No. of personnel to be trained in O&M :			
Task & Expected Schedule(in Months):			
Grid connectivity level:			
Grid connectivity level phase* :		Grid connectivity level Voltage* :	
Costing of Project			
Hardware cost :	Rs.	Total Cost of Installation :	Rs.

Annexure-14: Format for Monthly O&M and CMC Report

NIB No: 1 of 2020-2021

[On the letterhead of Bidding Company]

To,

The Engineer in Chief,
Power & Electricity Department, Government of Mizoram
Kawlphetha Building, New Secretariat Complex,
Khatla, Aizawl,
Mizoram, PIN: 796001

Dear Sir,

Sub: Empanelment of Developers for Design, Manufacture, Testing, Supply, Installation & Commissioning of 500 kWp Grid connected Rooftop SPV Power Plants Including five years Comprehensive Maintenance Contract (CMC) in different location for Residential Sector in the state of Mizoram.

Date of Installation.....

Power & Electricity Department Dispatch Order No..... Dated.....

Place of Supply.....

Project Capacity:

Address of the site:

Component	Activity	Description	Date	Name / Signature	*Remarks
PV Module	Cleaning	Immediately clean any Bird droppings / dark spots on module.			
	Cleaning	Clean PV modules with plain water or mild dishwashing detergent.			
	Inspection	Infrared camera inspection for hot			

	(for plants 50 kWp)	spots; bypass diode failure.			
PV Array	Inspection	Check the PV modules and rack for any damage.			
	Inspection	If any new objects, such As Vegetation Growth etc., are causing shading of the array. Remove if any.			
	Vermin Removal	Remove bird nests or vermin from array and rack area.			
Junction Boxes	Inspection	Inspect electrical Boxes for corrosion, Intrusion of water or vermin. Check position Of switches and breakers. Check status of all protection devices.			
Wiring	Inspection	Inspect cabling For signs of cracks, defects, lose connections, corrosion, overheating, arcing, short or open circuits, and ground faults.			
Inverter	Inspection	Observe instantaneous operational indicators on the faceplate. Inspect Inverter housing or shelter for any physical maintenance. Check for connection tightness.			
Inverter	Service	Clean or replace any air filters.			

Instruments	Validation	Verify monitoring instruments (pyranometer etc.) with standard instruments to verify their operation within tolerance limits.			
Transformer	Inspection	Inspect transformer oil level, temperature gauges, breather, silica gel, meter, connections etc.			
Plant	Monitoring	Daily Operation and Performance Monitoring.			
Spare Parts	Management	Manage inventory of spare parts.			
Log Book	Documentation	Maintain daily log records.			
Tracker (if any)	Inspection	Inspect gears, gear boxes, bearings, motors.			
	Service	Lubricate bearings, gear as required.			

Date	Generation kWh	Grid outage (hh:mm)	Inverter down period (hh:mm)	Remarks
1				
2				
3				
4				
5				
6				
7				
8				

9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				
23				
24				
25				
26				
27				
28				
29				
30				
31				

Total generation for the month in kWh:

Cumulative generation since commissioning in kWh:

CUF for month in %:

Cumulative CUF since commissioning in %:

(Signature of Authorized Signatory)

Name:

Designation:

Company Sea

*****Provide details of any replacement of systems/components, damages, plant/inverter shut down (planned/forced), breakdown, etc under remarks.

*Daily register is to be maintained by the bidder at each location greater than 50 kWp. The same may be inspected by Power & Electricity Department or its Authorised representative at any time 5 years of O&M period. The Register will have the information about the daily generation, Inverter downtime if any, Grid outages.

Annexure-15: Operation and Maintenance Guidelines of Grid Connected PV Plants

NIB No: 1 of 2020-2021

For the optimal operation of a PV plant, maintenance must be carried out on a regular basis.
All the components should be kept clean. It should be ensured that all the components are fastened well at their due place.

Maintenance guidelines for various components viz. solar panels, inverter, wiring etc. are discussed below:

1. SOLAR PANELS

Although the cleaning frequency for the panels will vary from site to site depending on soiling, it is recommended that
The panels are cleaned at least once every fifteen days.

- Any bird droppings or spots should be cleaned immediately.
- Use water and a soft sponge or cloth for cleaning.
- Do not use detergent or any abrasive material for panel cleaning.
- Iso-propyl alcohol may be used to remove oil or grease stains.
- Do not spray water on the panel if the panel glass is cracked or the back side is perforated.
- Wipe water from module as soon as possible.
- Use proper safety belts while cleaning modules at inclined roofs etc.
- The modules should not be cleaned when they are excessively hot. Early morning is particularly good time for module cleaning.
- Check if there are any shade problems due to vegetation or new building. If there are, make arrangements for removing the vegetation or moving the panels to a shade-free place.
- Ensure that the module terminal connections are not exposed while cleaning; this poses a risk of electric shock.
- Never use panels for any unintended use, e. g. drying clothes, chips etc.
- Ensure that monkeys or other animals do not damage the panels.

2. CABLES AND CONNECTION BOXES

- Check the connections for corrosion and tightness.
- Check the connection box to make sure that the wires are tight, and the water seals are not damaged.
- There should be no vermin inside the box.
- Check the cable insulating sheath for cracks, breaks or burns. If the insulation is damaged, replace the wire.
- If the wire is outside the building, use wire with weather-resistant insulation.
- Make sure that the wire is clamped properly and that it should not rub against any sharp edges or corners.
- If some wire needs to be changed, make sure it is of proper rating and type.

3. INVERTER

- The inverter should be installed in a clean, dry, and ventilated area
- Remove any excess dust in heat sinks and ventilations. This should only be done with a dry cloth or brush.
- Check that vermin have not infested the inverter. Typical signs of this include spider webs on ventilation grills or wasps' nests in heat sinks.
- Check functionality, e.g. automatic disconnection upon loss of grid power supply, at least once a month.
- Verify the state of DC/AC surge arrestors, cable connections, and circuit breakers.

4. SHUTTING DOWN THE SYSTEM

- Disconnect system from all power sources in accordance with instructions for all other components used in the system.
- Completely cover system modules with an opaque material to prevent electricity from being generated while disconnecting conductors.
- To the extent possible, system shutdown will not be done during day time or peak generation.

INSPECTION AND MAINTENANCE SCHEDULE

Component	Activity	Description	Interval	By
PV Module	Cleaning	Clean any bird droppings/ dark spots on module	Immediately	User/Technician
	Cleaning	Clean PV modules with plain water or mild dishwashing detergent. Do not use brushes, any types of solvents, abrasives, or harsh detergents.	Fortnightly or as per the site conditions	User/Technician
	Inspection (for plants > 100 kWp)	Use infrared camera to inspect for hot spots; bypass diode failure	Annual	Technician
PV Array	Inspection	Check the PV modules and rack for any damage. Note down location and serial number of damaged modules.	Annual	User/Technician
	Inspection	Determine if any new objects, such as vegetation growth, are causing shading of the array and move them if possible.	Annual	User/Technician
	Vermin Removal	Remove bird nests or vermin from array and rack area.	Annual	User/Technician
Junction Boxes	Inspection	Inspect electrical boxes for corrosion or	Annual	Electrician

		intrusion of water or insects. Seal boxes if required. Check position of switches and breakers. Check operation of all protection devices.		
Wiring	Inspection	Inspect cabling for signs of cracks, defects; lose connections, overheating, arcing, short or open circuits, and ground faults.	Annual	Electrician
Inverter	Inspection	Observe instantaneous operational indicators on the faceplate of the inverter to ensure that the amount of power being generated is typical of the conditions. Inspect Inverter housing or shelter for physical maintenance, if required.	Monthly	Electrician
Inverter	Service	Clean or replace any air filters.	As needed	Electrician
Instruments	Validation	Spot-check monitoring instruments (Pyranometer etc.) with standard instruments to ensure that they are operational and within	Annual	PV Specialist

		specifications.		
Transformer	Inspection	Inspect transformer oil level, temperature gauges, breather, silica gel, meter, connections etc.	Annual	Electrician

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

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

Solar PV Modules/Panels:	
IEC 61215/ IS 14286	Design Qualification and Type Approval for Crystalline Silicon Terrestrial Photovoltaic (PV) Modules
IEC 61701	Salt Mist Corrosion Testing of Photovoltaic (PV) Modules
IEC 61853- Part 1/ IS 16170: Part 1	Photovoltaic (PV) module performance testing and energy rating –: Irradiance and temperature performance measurements, and power rating
IEC 62716	Photovoltaic (PV) Modules – Ammonia (NH3) Corrosion Testing (As per the site condition like dairies, toilets)

IEC 61730-1,2	Photovoltaic (PV) Module Safety Qualification – Part 1: Requirements for Construction, Part 2: Requirements for Testing
IEC 62804	Photovoltaic (PV) modules - Test methods for the detection of potential-induced degradation. IEC TS 62804-1: Part 1: Crystalline silicon (mandatory for applications where the system voltage is > 600 VDC and advisory for installations where the system voltage is < 600 VDC)
IEC 62759-1	Photovoltaic (PV) modules – Transportation testing, Part 1: Transportation and shipping of module package units
Solar PV Inverters	
IEC 62109-1, IEC 62109-2	Safety of power converters for use in photovoltaic power systems – Part 1: General requirements, and Safety of power converters for use in photovoltaic power systems Part 2: Particular requirements for inverters. Safety compliance (Protection degree IP 65 for outdoor mounting, IP 54 for indoor mounting)
IEC/IS 61683 (as applicable)	Photovoltaic Systems – Power conditioners: Procedure for Measuring Efficiency (10%, 25%, 50%, 75% & 90-100% Loading Conditions)
BS EN 50530	Overall efficiency of grid-connected

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

	testing of PV Inverters
Fuses	
IS/IEC 60947 (Part 1, 2 & 3), EN 50521	General safety requirements for connectors, switches, circuit breakers (AC/DC): a) Low-voltage Switchgear and Control-gear, Part 1: General rules b) Low-Voltage Switchgear and Control-gear, Part 2: Circuit Breakers c) Low-voltage switchgear and Control-gear, Part 3: Switches, disconnectors, switch-disconnectors and fuse-combination units d) EN 50521: Connectors for photovoltaic systems – Safety requirements and tests
IEC 60269-6	Low-voltage fuses - Part 6: Supplementary requirements for fuse-links for the protection of solar photovoltaic energy systems
Surge Arrestors	
IEC 62305-4	Lightening Protection Standard
IEC 60364-5-53/ IS 15086-5 (SPD)	Electrical installations of buildings - Part 5-53: Selection and erection of electrical equipment - Isolation, switching and control
IEC 61643-11:2011	Low-voltage surge protective devices - Part 11: Surge protective devices connected to low-voltage power systems - Requirements and test methods
Cables	
IEC 60227/IS 694, IEC 60502/IS 1554 (Part 1 & 2)/ IEC69947	General test and measuring method for PVC (Polyvinyl chloride) insulated cables (for working voltages up to and including 1100 V, and UV resistant for outdoor

	installation)
BS EN 50618	Electric cables for photovoltaic systems (BT(DE/NOT)258), mainly for DC Cables
Earthing/Lightning	
IEC 62561 Series (Chemical earthing)	IEC 62561-1 Lightning protection system components (LPSC) - Part 1: Requirements for connection components IEC 62561-2 Lightning protection system components (LPSC) - Part 2: Requirements for conductors and earth electrodes IEC 62561-7 Lightning protection system components (LPSC) - Part 7: Requirements for earthing enhancing compounds
Junction Boxes	
IEC 60529	Junction boxes and solar panel terminal boxes shall be of the thermo-plastic type with IP 65 protection for outdoor use, and IP 54 protection for indoor use
Energy Meters	
IS 16444 or as specified by the DISCOMs	A.C. Static direct connected watt-hour Smart Meter Class 1 and 2 — Specification (with Import & Export/Net energy measurements)
IS 2062/IS 4759	Material for the structure mounting
Solar PV Roof Mounting Structure	
IS 2062/IS 4759	Material for the structure mounting

Annexure 16: Procedure for Performance Testing

NIB No: 1 of 2020-2021

Operational Acceptance Test Procedure

Part A: Performance Ratio (PR) - Test Procedure

1. Performance Ratio as determined through the PR Test Procedure specified here should not be less than 0.75 for Operational Acceptance Test.

2. The Performance Ratio Test to prove the guaranteed performance parameters of the power plant shall be conducted at site by the Contractor in presence of the Company. The Contractor's Engineer shall make the plant ready to conduct such tests. The Operational Acceptance Test shall be commenced, within a period of one (1) month after successful Commissioning and, there will be continuous monitoring of the performance for 30 days. Any extension of time beyond the above one (1) month shall be mutually agreed upon. These tests shall be binding on both the parties to the contract to determine compliance of the equipment with the guaranteed performance parameters. This monitoring will be performed on the site under the supervision of the Company/ Company's engineer.

3. The test will consist of guaranteeing the correct operation of the plant over 30 days, by the way of the efficiency rate (performance ratio) based on the reading of the energy produced and delivered to the grid and the average incident solar radiation.

4. PR shall be demonstrated against the installed DC Capacity.

5. The Efficiency or performance ratio (PR) of the PV Plant is calculated as follows (according to IEC 61724)

Performance Ratio (PR) = **YA / YR**

Where;

Y_A = Final (actual measured) PV system yield in kilo-watt hours at the point of measurement during the testing period, and

Y_R = Reference yield calculated as the product of the insolation on the plane of the collector (i.e. PV modules) in kWh/ m^2 during the testing period and the installed DC capacity of the plant in kW.

Monitoring System for PR Verification

The following instrumentation will be used to determine the Solar Plant Performance:

- Power Meter at the delivery point.
- Power Meter for each inverter for reference only.
- One nos. calibrated pyranometer to determine irradiance on the plane of array (with a target measurement uncertainty of ± 2).
- One nos. calibrated pyranometer to determine irradiance on horizontal plane (with a target measurement uncertainty of ± 2)
- Two nos. thermocouples to measure module temperature with a measurement uncertainty of ±1 °C.
- Shielded ventilated thermocouple with a measurement accuracy of ±1°C.
- Data measurement shall be witnessed in the format mutually agreed before the start of PR test by the employer and the contractor jointly for the said period.
- The Contractor shall show the specified PR for Operational Acceptance.

Part B: The procedure for Performance Guarantee Test (PGT) - cum- Final Acceptance Test- shall be as follows:

1. A weather station with a calibrated pyranometer shall be installed by the Contractor at the location mutually agreed by the Contractor and Power & Electricity Department. The test report for the calibration shall be submitted by the Contractor for approval by Power & Electricity Department. The calibration should be traceable to a national/international laboratory. The output of this pyranometer for shall be logged in the Data Logger system.
2. In case the pyranometer is found to be working erratically then immediately the Contractor shall take necessary steps to rectify and/or recalibrate the instrument to the satisfaction of Power & Electricity Department.. However, for the dispute period for which such error has occurred and until the instrument is recalibrated to the satisfaction of Power & Electricity

Department., data from any one of the following list of sources as decided by Power & Electricity Department will be used:

i. A separate pyranometer installed by the Company near the site, if available

ii. Average of two closest solar power projects, as identified by Power & Electricity Department.

iii. Nearest MNRE weather station

3. "Actual Delivered Energy" from the plant supplied by the Contractor shall be noted for every month and summed up for entire year. For this purpose, the net delivered energy at the metering point shall be taken into account.

4. Further, if the plant is not able to achieve the *CUF of 15%* during PGT and O&M period and there is a shortfall in energy generation, then the Contractor shall be penalized as per relevant Clause of the Tender.

5. The Contractor shall share with Power & Electricity Department all the radiation, generation, etc. parameters details and all other factors necessary for Power & Electricity Department to corroborate the estimate. Power & Electricity Department has the right to cross verify data submitted by the Contractor by all possible means/sources.

Following factors may be noted for computing the Base CUF:

6. Effect due to variation in annual insolation shall only be considered for computing the Base CUF.

7. Effect due to variation of meteorological parameters e.g. ambient temperature, wind speed, humidity etc. shall not be considered.

8. **Generation loss due to grid outage (or power evacuation system which is not in the scope of the Contractor**): The measured global solar radiation of the period of the outage of the power evacuation system shall be excluded to calculate average global solar radiation for the period of PGT and O&M.

Annexure 17: SECURITY DEPOSIT BY WAY OF DEMAND DRAFT/ PERFORMANCE BANK GUARANTEE (PBG) FORMAT

NIB No: 1 of 2020-2021

(To be submitted in Rs. 100/- Non-Judicial Stamp Paper to be purchased in the name of the issuing bank)

To,

The Engineer in Chief,
Power & Electricity Department, Government of Mizoram
Kawlphetha Building, New Secretariat Complex,
Khatla, Aizawl,
Mizoram, PIN: 796001

OUR LETTER OF GUARANTEE NO.:

In consideration of Power & Electricity Department having its office at (hereinafter referred to as "Department" which expression shall unless repugnant to the content or meaning thereof include all its successors, administrators and executors) and having issued Work Order No…….. dated:……. with/ on M/s (here in after referred to as "The Agency" which expression unless repugnant to the content or meaning thereof, shall include all the successors, administrators, and executors).

WHEREAS the Agency having unequivocally accepted to perform the services as per terms and conditions given in the Work Order/ Sanction Order No…….. dated:…….. and

Power & Electricity Department having agreed that the Agency shall furnish to Power & Electricity Department a Security Deposit by way of D.D./ Performance Guarantee for the faithful performance during the entire contract, of the value of ₹ .

In case of Bank Guarantee:

We,……..... ("The Bank") which shall include OUR successors, administrators and executors herewith establish an irrevocable Letter of Guarantee

No…… in your favour for account of……. (The Agency) in cover of performance guarantee in accordance with the terms and conditions of the Work Order/ Sanction Order.

Hereby, we undertake to pay up to but not exceeding…….. (say…… only) upon receipt by us of your first written demand accompanied by your declaration stating that the amount claimed is due by reason of the Agency having failed to perform the Work Order/ Sanction Order and despite any contestation on the part of above named-agency.

This letter of Guarantee will expire on……..…after which date this Letter of Guarantee will become of no effect what so ever whether returned to us or not.

……..

Authorized signature Chief Manager/ Manager Seal of Bank

Note: PBG shall be valid till completion of 5 years‘ O&M period.

Proforma -A (By the customer)

Sr.No.	Component	Observation	
1	Name of the customer with photograph (enclose USER ID proof- Pan card / Aadhaar card / Voter ID)		PHOTOGRAPH
2	Location with GPS Lat &Long		
	Capacity(kWp)		
	Location		
3	Whether training was provided by installer for operation and maintenance		
4	Whether the following documents were provided or not		
	I-V curves of all modules		
	Inverter manual		
	Guarantee card for system		
5	Date of handing over of the system		
6	Cost breakup	Total project cost: User Share: MNRE Share: Loan:	

This is to certify that all information given above is true and correct to the best of my knowledge.

(User signature and stamp)

Date:

Place:

Proforma-B: Format for submission of Financial Bid Format:

For Project under CAPEX Category:

Sr. No.	Description	Quantity	Unit	Benchmark Cost (Rs. /Wp)	Bid Capacity in kWp
1	Empanelment of Developers for Design, Manufacture, Testing, Supply, Installation & Commissioning of 0.5 MWp Grid connected Rooftop SPV Power Plants Including five years Comprehensive Maintenance Contract (CMC) in different location for Residential Sector in the state of Mizoram.	1.00	kWp	59.00	

----------END----------