ASSAM POWER DISTRIBUTION COMPANY LTD.

(A Successor Company of Assam State Electricity Board)

O/o the Chief General Manager (NRE),
Bijulee Bhawan (Annex. Building), Paltanbazar, Guwahati-1
E-mail: gmnre.apdcl@gmail.com
Web: www.apdcl.org

Notification

Dated: 08/07/2022

Step by Step Implementation Procedure of 1.5 MW Grid-Connected Rooftop Solar Plant of various capacities in Residential sector in CAPEX Mode under the Phase-II of Grid Connected Rooftop Solar Scheme of MNRE in the State of Assam & under operational area of Assam Power Distribution Company Limited (APDCL)

1. The eligible Residential consumer in the legal possession of the premises on which RTS plant is proposed to be installed shall apply online through www.rodalee.com. In case the applicant is not an Individual (Group Housing Societies/Residential Welfare Associations (GHS/RWA) etc.) authorization Letter (**FORM A1**) is also to be attached while submission of application in www.rodalee.com

   Note:
   i) The minimum & maximum RTS plant capacity is 1 kW & 500 kW respectively.
   ii) Group Housing Societies/Residential Welfare Associations (GHS/RWA) etc. are allowed to install RTS projects up to 500 kW capacity (@ 10 kWp per house).
   iii) The Central Financial Assistance (CFA) structure applicable under this project is as Tabulated below:

Type of Residential Sector	**Central Financial Assistance (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/discovered cost, whichever is lower
Residential sector (above 3 kW capacity and up to 10 kW capacity)	40 % up to 3 kW Plus 20% for RTS system above 3 kW and up to 10 kW.
Group Housing Societies/Residential Welfare Associations (GHS/RWA) etc. for common facilities up to 500 kWp (@ 10 kWp per house).	20% of Benchmark Cost/discovered cost, whichever is lower

   iv) The maximum capacity of the individual Grid Connected RTS Plant to be installed at any consumer will be limited to 80% of the sanctioned connected load of the consumer
   v) For installation of 1 kW Rooftop Solar Power Plant, the minimum connected load of the consumer is 1.25 kW.

2. On receipt of Application, the O/o the CGM (NRE), APDCL will forward the application to the concerned Sub-Divisional Engineer (SDE), APDCL. The SDE shall carryout the Technical Feasibility Study (TFS) and shall be submitted in www.rodalee.com by using his own user ID. The TFS should be signed by concerned residential consumer & SDE, of concerned Sub-Division, APDCL. The hard copy of the TFS report should be kept in safe custody of concerned Sub-divisional office and should be produced as and when required.

3. The empanelled vendor shall visit the premises of allotted residential consumer and submit the following documents to CGM (NRE), APDCL for issuance of final approval

   i) Site survey report as per the Performa enclosed as **Annexure – I**
   ii) Consent Letter from the Residential Consumer willing to install RTS Power Plant within his premises and ready to pay requisite amount (beneficiary contribution) as notified by APDCL to empanelled vendor as per terms and condition specified by APDCL (**Annexure – II**)
   iii) Document required for Project Sanction as per Performa enclosed as **Annexure – III**

4. After issuance of final approval from CGM (NRE), APDCL, the Engineering Procurement & Construction (EPC) agreement will be executed between empanelled vendor and concerned residential consumer as per Performa enclosed as **Appendix-I**.

5. After signing of EPC agreement, the empanelled vendors shall submit written notice of any material being ready for testing to APDCL within 30 days from the date of signing of EPC agreement. The entire lot of materials shall be inspected at one time. **APDCL reserves the full rights, to waive off inspection of material**. The proposed project shall be commissioned as per the technical specifications enclose in **Appendix-II**. Any shortcomings will lead to cancelation of Letter of Award & Competent Authority's decision will be final and binding on the empanelled vendor.

6. After inspection & testing of the materials, Material Dispatch Clearance Certificate (MDCC) / Dispatch Instructions (DI) for dispatch of materials from the manufacturer's works shall be issued by the O/o the CGM (NRE), APDCL based on the report submitted by the inspector.

7. After issuance of Material Dispatch Clearance Certificate (MDCC), the empanelled vendor shall supply the materials to the concerned residential consumer and submit the following documents to CGM (NRE), APDCL for verification:
   i) Copy of tax invoice submitted by the empanelled vendor to residential consumer as per Performa enclosed as **Annexure – VII**. The net invoice amount shall not exceed per kW discovered rate, exclusive of GST. If additional charges have been levied on the consumer for any customization, it shall be clearly specified in the invoice.
   ii) Copy of agreement executed between empanelled vendor and residential consumer for additional cost as per Performa enclosed as **Annexure – VIII (If applicable)**
   iii) Copy of PERT Chart approved by CGM (NRE), APDCL
   iv) Guaranteed Technical Particulars (GTP)/BOM and drawing approved by CGM (NRE), APDCL
   v) Copy of Material Dispatch Clearance Certificate (MDCC) / Dispatch Instructions (DI) for dispatch of materials from the manufacturer's works issued by CGM (NRE), APDCL
   vi) Copy of Materials Received & Handing Over Voucher (MRHOV) as per Performa enclosed as **Annexure – IX** & Copy of MICC (Material Inspection & Clearance Certificate) issued by the authorized official of APDCL as per Performa enclosed as **Annexure – X**
   vii) Contractor's detailed invoice

8. The payment shall be released as per the Performa enclosed as **Appendix-III**.

9. After duly verified & passed documents by the CEO of Concern Electrical Circle of APDCL, the CGM (NRE), APDCL will intimate the following information to the concerned residential consumer
   i) To pay the 80% of net amount of project cost (i.e. project cost - CFA) to the concerned empanelled vendor. All the transaction between consumer and empanelled vendor should be in electronic mode only.

   Note:
   a) The discovered project cost and applicable subsidy of various categories of the rooftop solar power plants under 1.5 MW RTS programme of APDCL are as under

Sl. No	RTS Plant Capacity (kW)	L1 rate excluding GST (Rs./kWp)	L1 rate including GST (Rs./kWp)	* Total Project Cost including GST (Rs.)	Total CFA including GST (Rs.)	** Beneficiary Contribution including GST (Rs.)
1	1	49061.00	55831.42	55831.42	22332.57	33498.85
2	2	45098.37	51321.95	102643.89	41057.56	61586.33
3	3	43951.00	50016.24	150048.71	60019.49	90029.23
4	4	42877.00	48794.03	195176.10	68311.64	126864.47
5	5	42877.00	48794.03	243970.13	78070.44	165899.69
6	6	42877.00	48794.03	292764.16	87829.25	204934.91
7	7	42877.00	48794.03	341558.18	97588.05	243970.13
8	8	42877.00	48794.03	390352.21	107346.86	283005.35
9	9	42877.00	48794.03	439146.23	117105.66	322040.57
10	10	42877.00	48794.03	487940.26	126864.47	361075.79

* The project capacity shall be considered as Inverter capacity or the SPV module array capacity, whichever is lower.

** Beneficiary contribution is net amount of project cost (i.e. project cost - CFA).

b) The empanelled vendor shall not be allowed to charge any extra amount other than the L-1 price (discovered rate) for the capacity of Grid Connected Rooftop Solar PV system as indicated above. However, in case of any customization desired by the beneficiary/consumer, the vendor is allowed to charge extra amount to the beneficiary/consumer, on actual basis, subject to signing of a declaration in this regard in the format attached at **Annexure – VIII**. **APDCL/MNRE shall not be held responsible for any dispute arising out of this agreement.**

ii) To deposit requisite EXIM meter cost to the CEO of concerned electrical circle APDCL. The cost of EXIM meter has already been notified in www.rodalee.com.

10. After installation of the Rooftop Solar Power Plant within the premises of concerned residential consumer, the empanelled vendor shall submit the following documents to CGM (NRE), APDCL:

i) Project Completion Report / Installation Report as per Performa enclosed as **Annexure – XI**
ii) Commissioning report as per Performa enclosed as **Annexure – XII**
iii) Intimation Letter from concerned residential consumer to APDCL for implementation of rooftop solar power plant under RTS (Ph-II) Scheme as per Performa enclosed as **Annexure – XIII**
iv) Claim letter for CFA as per Performa enclosed as **Annexure – XIV**
v) Joint inspection report as per Performa enclosed as **Annexure – XV**
vi) Undertaking/Self- Declaration for domestic content requirement (DCR) fulfillment as per Performa enclosed as **Annexure – XVI**
vii) Guarantee certificate of all systems on Letter Head of the Vendor
viii) Photograph of the installed system

11. After duly verified the Project Completion Report / Installation Report (**Annexure – XI**), the CGM (NRE), APDCL will intimate the concerned residential consumer to pay balance 20% **of** net amount of project cost (i.e. project cost - CFA) to the concerned empanelled vendor.

12. As per terms and conditions of bid document, the CFA amount shall be released to the empanelled vendor after submission of requisite documents as mentioned clause no. 9 above.

Chief General Manager (NRE),
Assam Power Distribution Company Limited
Bijulee Bhawan (Annex Building)
Paltanbazar, Guwahati-01

FORM A1

LETTER OF AUTHORIZATION

(For filling application for installation of Solar Rooftop PV system on behalf of a Trust/ Group Housing Societies/Residential Welfare Associations (GHS/RWA) etc. on Non – Juridical Stamp Paper Rs.100/-)

Date: _____

We,_____ (Name of Trust Group Housing Societies/Residential Welfare Associations (GHS/RWA), etc.), residing at _____ _____ Pin:_____ wish to install Solar Rooftop PV system. We accept all the terms and conditions mentioned by MNRE and any other formats laid down by APDCL for this purpose.

Mr./Ms. _____ (Name of Official /Person), residing at _____ is hereby mutually authorized to accept on our behalf, all the terms and conditions of the Solar Rooftop PV metering arrangement regarding installation and commissioning of Solar Rooftop PV system mentioned under the Application form or any other format prepared in this behalf by APDCL and to execute such documents, agreements and other writings as may be necessary or required for this purpose

Further, the above authorized person namely Mr./Ms _____(Name with Contact Number) is also nominated as the contact person on our behalf for any matter relating to the Installation, Operation and Inspection of Solar Rooftop PV system.

Signature

(With Stamp)

Annexure – I

Site Survey Report
(To be furnished on the letter head of Empanelled Vendor

RFS No: ……
LOA No: …… Date ……..
Allotment No & Date ……
Name of Residential Consumer ……
Address ……

Name of Consumer	**APDCL's Consumer No**	**District**	**Name of Electrical Sub-Division**	**Connected Load (kW)**	**Existing Connection (3Ph / 1 Ph)**	**Latitude**	**Longitude**	**Available Shadow Free Areas (Sq. m)**	**Plant Capacity (kW) based on available Shadow Free Areas (1 kW = 10 sq. m shadow free areas)**	**Plant Capacity (kW) based on 80% of Connected Load (kW)**	**Eligible Plant Capacity (kW)**	**Proposed Plant Capacity under 1.5 MW RTS Program of APDCL (kW)**
(2)	(3)			(4)	(5)	(6)	(7)	(8)	(9)	10 = (4)*80%	11 = Lowest value between 9& 10	

Seal & Signature of the Empanelled Vendor

Date

Name of Residential Consumer
Signature of Residential Consumer

Date:

Annexure – II

Format for the undertaking by the Consumer

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

Ref No _____ Date: _____

To,

The Chief General Manager NRE)
Assam Power Distribution Company Limited (APDCL)
Bijulee Bhawan, Annex Building, Paltanbazar
Guwahati – 1

Sub: Request for installation of Grid Connected Rooftop Solar Power Plant in EXIM metering within my premises under the CAPEX Model through APDCL

Sir,

I …….. (*Name of Consumer*), C/o …….., having Consumer No. …….. of …… Electrical Sub Division / of District …… Pin …….. wish to install …….. KW Grid connected Rooftop Solar Power Plant in CAPEX model at …….. (*Specify name of project site*) under Grid Connected Rooftop Solar PV Program (Phase – II), MNRE, GOI to be implemented by Assam Power Distribution Company Limited.

I hereby undertake that:

1. The Solar Power Plant shall be installed as per guidelines of Ministry of New & Renewable Energy, GOI and through the empanelled vendor of APDCL for availing Central Financial Assistance (CFA) under this program

2. **[Drafted as applicable]**

I have selected M/s …….. from the list of Vendors Empanelled by APDCL, notified on www.rodalee.com as per my choice for site survey, installation & commissioning of Rooftop Solar Power Plant within my premises.

OR

Based on the allotment issued by APDCL, M/s ……., empanelled vendor APDCL under 1.5 MW RTS project was conducted site survey for installation & commissioning of Rooftop Solar Power Plant within my premises.

3. The Engineering, Procurement & Construction (EPC) Agreement will be executed with the empanelled vendor of APDCL after getting final approval from APDCL

4. The requisite beneficiary / consumer's contribution shall be paid to the empanelled vendors as per terms and conditions mentioned in the EPC agreement & EXIM meter cost as notified on www.rodalee.com shall be deposited to APDCL as per instruction issued by APDCL

5. The installed system will be in my possession and will not be transferred to anyone. If shifting of system is required due to shifting of my residence/ occupancy, prior sanction from APDCL will be obtained

6. Personnel from MNRE / APDCL will be allowed to inspect the system installed at any time, if required by them

Signature
Name:
Mobile No:
Address in full

Annexure – III

DOCUMENTS REQUIRED FOR PROJECT SANCTION

Following documents will be required to be submitted for project sanction

Consumer Name: …… Address ……

S. No.	Documents	Yes / No	Page No.
1.	Sanction Request letter on Letter head (**Annexure IV**)		
2.	Copy of CAPEX Agreement (*To be submitted after issuance of final approval from CGM (NRE), APDCL*)		
3.	Coloured Site Photos with Date & Time stamping		
4.	i) BOM (Bill of Material)/ GTP (Guaranteed Technical Particular) as per **Annexure -V,** ii) Drawing of Structure & iii) SLD (Single Line Diagram)		
5.	Solar PV Module Specs Sheet		
6.	Solar PV Module IEC Certificates		
7.	Inverter Specs Sheet		
8.	Inverter IEC Certificates		
9.	Declaration Format associated with Implementation of ALMM Order (**Annexure – VI**)		
10.	DCR Undertaking (individually for each project)		

Seal & Signature of Empanelled Vendor

Date

Annexure – IV

Sanction Request Letter
(On Letterhead of the Vendor)

Letter No. XX/XXX/2022/XXX Dated XX.XX.XXXX

To,

The Chief General Manager (NRE)
Assam Power Distribution Company Limited
Bijulee Bhawan (Annex. Building)
Paltanbazar, Guwahati-01

Sub: Application for approval of project sanction for disbursement of CFA for Installation and Commissioning of Solar PV Plant under XXXX Model in Part X

Ref: 1. Your Allocation Letter XXXX/XXX/XXX dated XX.XX.XXXX

Dear Sir,

In reference to the above allocation letter dated XX.XX.XXXX, allocating us an aggregate capacity of XX kWp (allocated capacity in the category) Solar PV Project under XXXX model under Part X, we request you to kindly issue this consent letter for installation and commissioning of solar PV projects in APDCL's area under the grid connected rooftop scheme as per the following details:

Plant Capacity range (kW)	Total allocated capacity (kW)	Project Cost (Rs/ kWp)	Capacity Sanctioned (kWp)	CFA Amount

We shall complete the Installation & Commissioning of the sanctioned projects as per the terms and conditions of the RFP document and work order issued by APDCL.

Thanking You

Yours faithfully,

(Name of Authorized signatory of the Vendor)
(Designation)

Annexure – V

Specifications of the Components and Bill of Material/ Quantities

LOA No: …….. Date: …….
Allocation Letter No:……. Date: ……..
Consumer name: ……
Address: …….

S. 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			
D	Array Junction Box			
E	AC Distribution Board			
F	Cable (All type)			
G	Earthing Kit (maintenance free)			
H	Solar Meter			
I	Online monitoring system			
J	Any other component			
K	Transformer (*if applicable*)			

Seal & Signature of the Empanelled Vendor

Date:

Annexure – VI

Reference Bidders' Declaration Format associated with Implementation of ALMM Order

(On the letter head of the bidder)

Declaration

To whom so ever this may concern

Reference: (RFP no. and description)

1. We hereby declare that we are fully aware of the binding provisions of the ALMM order and the Lists there under, while quoting the rate in the tender no. [*tender number*] floated by APDCL

2. We understand that the List – I (Solar PV Modules) of ALMM Order, Annexure – I of the O M, issued by MNRE on 10th March 2021 will be updated by MNRE from time to time. We also understand that the Modules to be procured for this project, shall be from the List – I of the ALMM order applicable on the date of invoicing of such modules.

3. We further understand and accept that we shall be liable for penal action, including but not limited to blacklisting and invocation of Performance Bank Guarantee, if we are found not complying with the provisions of ALMM Order, including those mentioned above.

Name:
Designation:
Organization:
Date:

(Signature and Stamp)

Annexure – VII

(Tax Invoice on Company letter Head with GST No.)	
Invoice No.: Invoice Date:	Place of Supply:
Bill To	
Name, contact no. and Address of the consumers	

Sl. No	**Item and Description**	**HSN/SAC**	**Qty**	**Rate**	**CGST**		**SGST**		**Amt**
					%	**Amt**	%	**Amt**	
Total									x

Total in Words	Total amount	x
	Admissible CFA	y
Terms and Conditions	Amount billed to consumer, excluding CFA	Rs. (x-y)
	Total	

Authorized Signature

Annexure – VIII

Agreement between Vendor and beneficiary for additional cost

(To be stamped on non – judicial stamp paper as per the stamp act of the state where the document is made)

This agreement is signed between two parties i.e., M/s (Name of Vendor) registered at address, who is an empanelled vendors in the tender floated by APDCL for implementation of grid connected rooftop solar (GCRTS) PV projects in the State of Assam & under operational area of APDCL, hereby referred to in as the 'Vendor' or 'first party' AND (Name of Consumer, residing at…….), hereby referred to in as the 'customer' or 'second party'.

Both the parties mentioned above, by mutual consent, are entering into an agreement for installation of grid connected rooftop solar project under Phase-II of grid connected rooftop solar programme of MNRE, being implemented by APDCL in the State of Assam. The second party has satisfied itself that the first party is an empanelled vendor in the tender floated by APDCL and rooftop solar project of ….kW capacity will be installed by first party at the residence of second party, under the tender floated by APDCL.

Both the parties referred above, do hereby declare that they are aware of the fact that the L-1 price discovered in the tender floated by APDCL is Rs. /kW. However, the second party has agreed to pay additional cost to the first party for desired customization in the project which is in the form of …….. (mention the customizations). Due to these customizations, the per KW cost of the rooftop project comes out to be…… (Rs.).

The first party hereby declares that the invoice raised to the second party for amount mentioned above, is on actual basis after taking into account the cost of any customization and no other extra/hidden charges are being charged to the second party. The second party hereby declares that they are aware of the provisions of the scheme and do hereby consent to pay the additional cost of customization to the first party for the desired customizations. MNRE and APDCL shall not be, in any case, be held responsible for any dispute arising out of this agreement/financial transactions.

This agreement is entered into ……..day of the month of …….in year……

For First Party
(Name of Company)

For Second Party
(Name of Consumer)

Annexure –IX

MATERIALS RECEIVED & HANDING OVER VOUCHER (MRHOV)

Address of the Contractor :_____

Name of Work :_____

Office of the Project Authority :_____ Name of Division: _____

Work order No. : _____

Sl. No	Description	Accounting Code	Quantity			Value as per Contract	Mode Dispatch viz	Remarks
			Supplied	Rejected	Accepted			

Received from the Turnkey Contractor / Supplier	Handed over & received by the turnkey contractor	Entry Made in Stock Ledger	Checked & countersigned by CEO, Electrical Circle
Sig:	Sig:	Sig:	Sig:
Name:	Name:	Name:	Name:
Designation:	Designation:	Designation:	Designation:
Date:	Date:	Date:	Date:
Seal	Seal	Seal	Seal

NB: The CEO of concerned circle shall authorize the official for receipt of material & subsequent handover of materials to turnkey contractor after maintaining the store ledger.

Annexure –X

MATERIAL INSPECTION & CLEARANCE CERTIFICATE (MICC)

Name of Work: _____

LOA No. : _____

_____ **Electrical Circle, APDCL**

Sl. No.	Item Description	Delivered	Quantity		Dispatched Clearance / Waived reference	Mode of Dispatch		
			Damaged / Defect/Not cleared for Utilization	Cleared for Utilization in Project		If transported Carrier then Name of the carrier & PR/GR/IR No. With Date	If Delivered by Contractor's Own Transport then Vehicle No. Date of delivery	Reason for non-clearance any other remarks

Inspected, found quality of material as per TS, counted and clear for utilization in project work on behalf of CEO, _____ **Electrical Circle.**

For Turnkey Contractor,
Signature:
Name:
Designation:
Seal and Stamp with Date:

Signature of SDE:
Name:
_____ **Electrical Sub-Division, APDCL**
Seal and Stamp with Date:

Signature of CEO:
Name:
_____ **Electrical Circle, APDCL**
Seal and Stamp with Date:

Annexure – XI

Project Completion Report / Installation report for Grid-Connected Rooftop

Financial year * :			
Approval No. * :			
Proposal Title :			
Installed by agency :			
Title of the Project* :		SPV Capacity (kWp)*:	
Category of the organization/ beneficiary*:		Name of the contact person* :	
Address of contact person* :			
State* :		District/City*:	
Mobile* :		Email*:	
Aadhaar Card Number (For Residential) Copy to be attached.		Latitude:	
		Longitude:	
Other info			
Electricity Distribution Company Name :		Sanction Load	
Electricity consumer account no. as per electricity bill :			

Technology Description & System Design /Specification			
(Compliance to BIS/ IEC Standards is mandatory – Attach Copies)			
1. Solar PV Module:			
Power of each PV Module / Nos.(Wp)* / Make			
Cumulative Capacity of Modules(kWp):			
Solar cell technology :		Tilt Angle of Modules:	
Module efficiency (in Percentage) :		Azimuth	
Indigenous or imported		RFID passed inside or outside:	
2. Inverters:			
Type of inverter :			
Power of each PCU/ Nos. of inverters (kVA)* / Make			
Capacity/Power of PCU/inverters (kVA) :		Type of Charge Controller / MPPT	
Inverter efficiency (Full load) : (in percentage)			
Grid connectivity level phase	Single Phase/ Three Phase	Grid connectivity level Voltage	230 V/ 415 V
3. Mounting Structures			
Type		Surface Finish	
Material		Wind Speed Tolerance	
4. Cables:			
DC Cable Make & Size		Length:	

AC Cable Make & Size (Inverter to ACDB)		Length:	
AC Cable Make & Size (ACDB to Electric Panel)		Length:	
Conductor	Multi strand high conductivity Copper	Insulation/sheath	PVC /XLPE Insulated
5. JUNCTION BOX & DISTRIBUTION BOARDS			
Type	weatherproof, dust & vermin proof	Nos.:	
Make			
6. EARTHING & LIGHTNING PROTECTION			
EQUIPMENT EARTHING			
AC (Nos.)		Earth Resistance	
DC (Nos.)		Earth Resistance	
LIGHTNING ARRESTORS (LA)			
Type			
LA (Nos.)		Earth Resistance	
6. SOLAR METER			
Make:	Class:	RS485 port for remote monitoring (Yes / No)	

(Signature of Residential Consumer)
Name:
Date

(Signature of Vendor)
With Stamp
Date: ____/_____/_____

Verified by

Sign ……
SDE, ... Electrical Sub-Division, APDCL
Date:.....

Annex: Copy of System test & Earth test reports (annexed)

Annexure – XII

Commissioning Test Report

Name of Residential Consumer: ……

Address: ……

Rooftop Plant Capacity: ……

Consumer No: ……

Inverter Testing (DC) Side: Nos. of Inverter: ……. Nos.

Inverter S. No.	Capacity	String 1: Voc	String 2: Voc	Remark

Inverter Testing (AC) Side – Single / Three Phase

Inverter S. No.	Capacity	R – Y/ P-N	Y – B	B - R	R – N	Y – N	B - N	Remark

ACDB & Meter Panel Testing – Single / Three Phase

	R – Y/ P-N	Y – B	B - R	R – N	Y – N	B - N	Remark
ACDB I/C (V)							
ACDB O/G (V)							
Meter Panel I/C							
Meter Panel O/G							

Earthing Pit Details: Nos. of Earth Pit: ……. Nos.

	Earthing AC	Earthing DC	Earthing LA	Remark
Earth Test Value (Ohm)				

Sign ……
SDE, ……. Electrical Sub-Division, APDCL
Date:……

Copy to:
1. The CGM (NRE), APDCL, Bijulee Bhawan, Paltanbazar, Guwahati-01 for kind information.
2. The Concerned Residential Consumer for kind information.

Annexure – XIII

INTIMATION TO APDCL FOR IMPLEMENTATION OF GRID CONNECTED ROOFTOP SOLAR PV PLANT UNDER RTS (Ph-II), SCHEME

To, Date:

The Chief General Manager (NRE),
Assam Power Distribution Company Limited
Bijulee Bhawan (Annex Building), Paltanbazar, Guwahati-01

1.	Name of SPD/Implementing Agency	
2	Name of the Consumer*	
Site Details*		
3	Address of the Rooftop Project Site:*	H No:
		Street Name:
		Village Name:
		District Name:
		State:
		Pin Code:
4	Phone / Mobile no. *	
5	Email Id:	
6	Electricity Consumer No. *	
7	Category (Please) *	☐ Residential
8	Installed Plant Capacity (kWp)*	
9	Connected load (kVA)*	
10	Voltage level at interconnection*	☐ 415 V ☐ 11 kV ☐ above 11 kV
11	Nearest Transformer Details	Location: Capacity:
12	Details of Inverter with Anti-Islanding Protection* Phase (Φ): (Please) Galvanic Isolation (Please)	Make: Capacity: ☐ Single phase ☐ 3-Phase ☐ Inside Inverter ☐ Outside Inverter
14	Both AC and DC components of the SPV power plants Earthed*: ☐	
15	CEIG Inspection required*	☐Yes ☐ No
16	If, Yes, Inspection date * (Attach copy of CEIG Certificate)	
18	Bank Account details	Account No. Bank Branch
19	Date of Grid Synchronization*	
20.	EXIM metering and grid connectivity (Attach acknowledgment from APDCL, if received)	Applied on:
		Fees Deposited On:

*to be provided mandatorily

It is certified that the information furnished above is true to the best of my knowledge.

Name & Signature Consumer /Authorised Signatory

Annexure – XIV

(CFA Claim Letter on Company letter Head)

Ref No…… Date: ……..
To,

The Chief General Manager (NRE),
Assam Power Distribution Company Limited
Bijulee Bhawan (Annex Building), Paltanbazar, Guwahati-01

Sub: Claim Letter for release of CFA for Solar Power Plant of …… kWp capacity installed at …….
Ref:

1. *APDCL* Allocation letter No. …….
2. *APDCL* Consent letter No……

Dear Sir,

This is in reference to *APDCL* allocation and consent letter, We, …….. (Name of Company) has successfully commissioned the …… kWp capacity rooftop solar plant installed at …….. (Name, CA No. & Address Site)

As per the sanction order, …….. (Name of Company) is entitled to CFA of Rs……., post successful installation, commissioning and inspection of the rooftop Solar Power Plant.

Therefore, kindly release the CFA of Rs. ……. (Rs. …. In words) at the earliest

Thanks, and regards,

(Signature)
Signed and Stamp

Annexure – XV

Joint Inspection Report

It is to certify that a Grid Connected Solar PV Power Plant has been installed with following details:

1. Name of the beneficiary: _____
2. Address of installation with pin code: _____
3. Electricity consumer number: _____
4. Solar PV module capacity (DC):_____ kWp
5. Inverter capacity (AC) (Nominal output power): _____ kW
6. Date of installation: _____
7. Date of commissioning (after installation of EXIM-meter):_____
8. Date of Joint inspection: _____
9. Metering arrangement: _____(Net meter/Gross meter/Net billing)

The above system is as per BIS/MNRE specifications and has been checked for its performance on _____ and it is working satisfactorily.

APDCL **EMPANELLED AGENCY** **CONSUMER**

Name

Designation

Date
Sign

Seal

It is to certify that the above system has been purchased with following details:

1. Total project cost ₹ _____
2. CFA amount ₹ _____
3. Amount paid by beneficiary ₹ _____

EMPANELLED AGENCY **CONSUMER**
Name _____
Designation _____
Date _____
Sign _____
Seal

Annexure – XVI

Undertaking/Self- Declaration for domestic content requirement fulfillment

(**On a plain Paper**)

This is to certify that M/S……..[Company Name] has installed ……KW [Capacity] Grid Connected Rooftop Solar PV Power Plant for……. [Consumer Name] at ……. [Address] under sanction number……..dated……..…….[sanction date] issued by……APDCL.

It is hereby undertaken that the PV modules installed for the above-mentioned project are domestically manufactured using domestic manufactured solar cells. The details of installed PV Modules are follows:

1. PV Module Capacity:
2. Number of PV Modules:
3. Sr. No of PV Module:
4. PV Module Make:
5. Purchase Order Number:
6. Purchase Order Date:
7. Cell manufacturer's name
8. Cell GST invoice No

The above undertaking is based on the certificate issued by PV Module manufacturer/supplier while supplying the above-mentioned order.

I, ……on behalf of M/S……[Company Name] further declare that the information given above is true and correct and nothing has been concealed therein. If anything is found incorrect at any stage then the due Central Financial Assistance (CFA) that I have not charged from the consumer can be withheld and appropriate criminal action may be taken against me and my company, as per law, for wrong declaration. Supporting documents and proof of the above information will be provided as and when requested by MNRE/APDCL.

(Signature With official Seal)

For M/S……..……...
Name…..……
Designation……..……..
Phone…….……
Email……..……

Appendix – I

ENGINEERING, PROCUREMENT & CONSTRUCTION AGREEMENT

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

This Engineering, Procurement & Construction Agreement (hereinafter referred to as the "**Agreement**") is entered into on this_____(date), at_____(Location) **BY** and **BETWEEN** a company incorporated under the Companies Act, 1956/2013 or Partnership firms/ Limited Liability Partnership (LLP)/ Limited Liability Company (LLC)/ Sole Proprietorship Firm and having its registered office _____(hereinafter referred to as the " **CONTRACTOR**" which expression shall where the context so admits be deemed to include its executors, administrators, representatives and permitted assigns) of the ONE PART;

AND

_____ legal owner of the premises (address of the customer who he/she intend to get installed the Grid Connected Rooftop solar (GCRS) PV system, (hereinafter referred to as the "**CUSTOMER/BENEFICIARY**" which expression shall where the context so admits be deemed to include its heirs, executors, administrators, representatives and permitted assigns) of the OTHER PART;

The expressions "**CONTRACTOR**" and "**CUSTOMER/BENEFICIARY**", wherever the context so permits or requires shall collectively be referred to as "**Parties**" and individually as the "**Party**".

WHEREAS:

A. CONTRACTOR is a fully integrated solar solutions provider that offers comprehensive solar solutions to the consumers.

B. CUSTOMER/BENEFICIARY is a of Residential Consumer of APDCL (**L_DOM_A, L_DOM_B, H_DOM_N**)

C. CONTRACTOR has been notified as successful bidder by Assam Power Distribution Company Limited (APDCL) vides its Letter of Allocation No. _____dated _____ for site survey, design, manufacture, supply, erection, testing and commissioning including warranty, operation and maintenance for a period of 5 years of roof-top Solar PV System and has been awarded _____kW capacity in dated _____ for Residential sector.

D. CONTRACTOR and CUSTOMER/BENEFICIARY enter into this Agreement for engineering, procurement & construction of a roof-top Solar PV Power System.

NOW, this Agreement witnessed as follows:

1. PURPOSE & SCOPE OF THE AGREEMENT

1.1 The purpose of this Agreement includes site survey, design, manufacture, supply, erection, testing and commissioning including warranty, operation & maintenance for a period of 5 years of a _____KWp roof-top Solar PV Power System (hereinafter referred to as the **"Solar Power System"**) for the CUSTOMER/BENEFICIARY, (hereinafter cumulatively referred to as the **"Works"**), for which the CUSTOMER/BENEFICIARY has handed over the premises, which is with a clear title and is encumbrance free, to the CONTRACTOR, along with required approvals from concerned authorities, and the CUSTOMER/BENEFICIARY's entering into this Agreement is proof enough of its consent to start work thereon.

1.2 The technical specifications (hereinafter referred to as the **"Technical Specifications"**) that need to be adhered to by the CONTRACTOR in implementing the roof-top Solar PV Plant for the CUSTOMER/BENEFICIARY shall be in accordance with the ones issued by APDCL vide RfS No. _____dated_____ and the performance parameters (hereinafter referred to as the **"Performance Parameters"**) that shall govern the Scope of Duty of the CONTRACTOR regarding the Works for the CUSTOMER/BENEFICIARY are mentioned in detail in **Schedule 1** to this Agreement.

1.3 All the pedestals meant for mounting the modules must be casted on the lintel by removing the tiles and other loose material in the area where the pedestals are to be casted. The surface of the lintel should be thoroughly cleaned and an adhesive should be applied on the lintel surface before casting the pedestals in order to have strong bonding with the lintel. After casting of the pedestals the water proofing material should be applied surrounding the pedestals in order to avoid any water seepage during rainfall.

1.4 Contractor shall ensure that SPV modules, parts of MS structures, other hardware like nuts, bolts and grouting hardware etc., are not loosely scattered over the terrace of a building. These items must be securely stored in an enclosed room where they cannot be affected by winds or such loose materials must be tied properly. Further, Successful bidder shall ensure that rooftop Solar PV system should be designed and installed in such a way that its performance should not be affected due to the problem of water logging at site etc.

1.5 The design, engineering, manufacture, supply, installation, testing and performance of the equipment shall be in accordance with latest appropriate IEC/Indian Standards as detailed in the relevant MNRE's scheme. Where appropriate Indian Standards and Codes are not available, other suitable standards and codes as approved by the MNRE shall be used.

1.6 Any supplies which have not been specifically mentioned in this Contract but which are necessary for the design, engineering, manufacture, supply & performance or completeness of the project shall be provided by the Bidder without any extra cost and within the time schedule for efficient and smooth operation and maintenance of the SPV plant.

2. EFFECTIVE DATE

The Agreement will enter into effect from the date of its execution (the **"Effective Date"**) for all contractual obligations under this Agreement.

3. NON DISCLOSURE & CONFIDENTIALITY

Any information (whether oral, written, visual or otherwise, hard or soft copy as may be provided by either Parties, provided the same is reduced in writing immediately and marked and identified as confidential information) disclosed or made known by the Parties to each other, shall be considered **"Confidential Information"** unless otherwise specified. Both the Parties commit to a strict maintenance of confidentiality, of any information shared by either of the Parties. Any confidential information shared as a result of this Agreement shall remain in force until that particular Confidential Information falls into the public domain through no act or omission on part of the Parties or for a period of two (2) years from the last disclosure, whichever is later

4. COMPLETION PERIOD

The completion period of the project i.e., Design, Engineering, Manufacture, Supply, storage, civil work, erection, testing & commissioning of project shall be one year from the date of issuance of LOA by APDCL or upto 24 Months from Date of MNRE Sanction 19.01.2024, whichever is earlier.

5. WARRANTIES

5.1 The CONTRACTOR hereby warrants to the CUSTOMER/BENEFICIARY that the Scope of Work as executed by the CONTRACTOR shall be of good workmanship for a period of 5 years from Acceptance. During the period of 5 years from the date of completion of work (**"Warranty Period"**) the CONTRACTOR shall rectify any part of the Works done found defective due to faulty materials and workmanship, for reasons solely attributable to the CONTRACTOR.

5.2 The CONTRACTOR will obtain manufacturers' warranties on the PV modules, inverters, as well as other components of the Power System for which manufacturer's warranties are available, in the name of the CUSTOMER/BENEFICIARY. Up until Acceptance, the CONTRACTOR will exercise any rights under the manufacturers' warranties on behalf of the CUSTOMER/BENEFICIARY

6. FORCE MAJEURE

6.1 Force majeure shall mean any cause, existing or future, which is beyond the reasonable control of any of the parties including acts of God, storm, fire, floods, explosion, epidemics, quarantine, earthquake, strike, riot, lock out, embargo, interference by civil or military authorities, acts, regulations or orders of any governmental authority in their sovereign capacity, acts of war (declared or undeclared) including any acts of terrorism.

6.2 None of the parties shall be liable for the failure to perform any obligation in terms of this Agreement if and to such extent such failure is caused by a Force Majeure, provided that none of such acts of Force Majeure will relieve the CUSTOMER/BENEFICIARY from meeting its payment obligations.

6.3 The party prevented to fulfill its obligations (hereinafter referred to as **"the Affected Party"**) by Force Majeure shall notify the other party through written means including fax/email/ post within one week after occurrence and cessation of such Force Majeure and it shall be established by the Affected Party that the Force Majeure had delayed performance of the Affected Party's obligations and services and was beyond the reasonable control of the Affected Party and not due to the default or negligence of the Affected Party.

6.4 The periods for performance of this Agreement as agreed upon shall be extended by the periods of delay caused by such Force Majeure, as long as the period of Force Majeure does not last longer than three months.

6.5 If a Force Majeure continues for more than three months and the parties are not able to reach an agreement on the continuation of the Agreement within a further term of one month, the fulfillment of the Agreement shall automatically be deemed impossible and shall stand suspended / terminated.

7. INSURANCE

7.1 The CONTRACTOR in its own interest shall be responsible to take an insurance policy, if required, for all the materials to cover all risks and liabilities for supply and storage of materials at site, installation, testing and commissioning. *However, this shall not include any insurance of commissioned plant after handing over to the beneficiary.*

7.2 APDCL or CUSTOMER/BENEFICIARY shall not be in any case liable for any third party damages covering loss of human life, engineers and workmen and also covering the risks of damage to the third party/material/equipment/properties during execution of the contract/work. The CONTRACTOR will be solely responsible for against any damage, loss, injury or death of its employees and representatives arising out of the execution of the work or in carrying out the Contract. Liquidation, Death, Bankruptcy etc., shall be the responsibility of bidder. The CONTRACTOR for its own interest is advised to take any insurance for any unforeseen circumstances.

8. SITE ACCESS

8.1 The CUSTOMER/BENEFICIARY shall ensure the accuracy of all information and/or data to be supplied by the CUSTOMER/BENEFICIARY and shall be responsible for acquiring and providing legal and physical possession of the Site and access thereto, for preparation and maintenance of proper access roads to, and provide the right of way for, the Site, and for providing possession of and access to all other areas reasonably required for the proper execution of the Agreement, including all requisite rights of way, on or before the Effective Date.

8.2 The CUSTOMER/BENEFICIARY is under an obligation to provide access to Site at all times to the CONTRACTOR and to APDCL officials, for the entire life of the Power System.

8.3 The progress of Works will be monitored by APDCL and the Power System will be inspected for quality at any time during commissioning or after the completion of the Power System either by officer(s) from APDCL or a team comprising of officers from APDCL.

9. CUSTOMER/BENEFICIARY OBLIGATIONS

9.1 The CUSTOMER/BENEFICIARY shall pay the requisite beneficiary contribution to the CONTRACTOR after receiving intimation from CGM (NRE), APDCL. All the transaction between consumer and empanelled vendor should be in electronic mode only.

10. SITE ADDRESS

The Site address where Works need to be performed to construct the Power System is:_____

11. PROVISION OF DATA

The CONTRACTOR shall be under an obligation to provide all data pertaining to Works and Power System for 5 years to APDCL, *inter alia*, about PV array energy production, solar irradiance, wind

speed, temperature, etc. The customer/beneficiary as such will allow the CONTRACTOR to install a data logging system for power system monitoring.

11.1 The parameters of Works, and/or Power System shall be measured by using solar monitoring system to maintain and to study the performance of Power System.

11.2 For access to real-time data, the CUSTOMER/BENEFICIARY agrees to provide APDCL with the right to install any additional online monitoring equipment(s) on the Power System.

12. INDEMNITY

Both Parties shall fully Indemnify and hold harmless both parties and its affiliates, associates, directors and employees from and against, any and all losses, costs, damages, injuries, liabilities, claims and causes of action, including without limitation arising out of or resulting from claims by third Parties, acts, omissions or breach of any of the both parties affiliates, suppliers, employees, agents or contractors in the performance of both parties obligations under this Agreement or otherwise arising out of the Power System or its usage

13. NOTICES

Any notice through facsimile/e-mail/post and other communication provided for in this Agreement shall be in writing and sent to the address mentioned on the first page of the agreement

14. DISPUTE RESOLUTION

If any dispute of any kind whatsoever arises between Customer and Contractor in connection with or arising out of the contract including without prejudice to the generality of the foregoing, any question regarding the existence, validity or termination, the parties shall seek to resolve any such dispute or difference by mutual consent. .

If the parties fail to resolve, such a dispute or difference by mutual consent, within 45 days of its arising, then the dispute shall be referred by either party by giving notice to the other party in writing of its intention to refer to arbitration as hereafter provided regarding matter under dispute. No arbitration proceedings will commence unless such notice is given. Any dispute in respect of which a notice of intention to commence arbitration has been given in accordance with Sub Clause 14.1, shall be finally settled by arbitration.

14.1 In all other cases, any dispute submitted by a party to arbitration shall be heard by an arbitration panel composed of three arbitrators, in accordance with the provisions set forth below:

The Customer and the Contractor shall each appoint one arbitrator, and these two arbitrators shall jointly appoint a third arbitrator, who shall chair the arbitration panel. If the two arbitrators do not succeed in appointing a third arbitrator within Thirty (30) days after the later of the two arbitrators has been appointed, the third arbitrator shall, at the request of either party, be appointed by the Appointing Authority for third arbitrator.

If one party fails to appoint its arbitrator within thirty (30) days after the other party has named its arbitrator, the party which has named an arbitrator may request the Appointing Authority to appoint the second arbitrator.

If for any reason an arbitrator is unable to perform its function for a period of 45 days or more, the mandate of the Arbitrator shall terminate in accordance with the provisions of applicable laws as mentioned in Clause 15 (Governing Law) and a substitute shall be appointed in the same manner as the original arbitrator.

Arbitration proceedings shall be conducted with The Arbitration and Conciliation Act, 1996. The venue or arbitration shall be Guwahati.

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

The arbitrator(s) shall give reasoned award. Notwithstanding any reference to the arbitration herein, the parties shall continue to perform their respective obligations under the agreement unless they otherwise agree.

Cost of arbitration shall be equally shared between the Contractor and Customer.

15. **GOVERNING LAW**

All questions concerning the construction, validity and interpretation of this Agreement will be governed by the laws of India, and the courts at Guwahati, India shall have exclusive jurisdiction with respect to any Dispute that occurs according to, or in relation to, the Agreement.

16. **SEVERABILITY**

If any provision of this Agreement is deemed or held by a court of competent jurisdiction, to be contrary to law or otherwise unenforceable, the provisions of this Agreement shall be enforced to the extent legally permissible and unenforceability of any of the provisions of this Agreement shall not affect the remaining provisions of this Agreement, which shall remain in full force and effect.

17. **LIMITATION OF LIABILITY**

17.1 Subject to Clause 12 of this Agreement, but notwithstanding anything contained anywhere else in this Agreement, in no event shall a Party be liable, whether in contract, tort or otherwise, to the other Party for special, indirect or consequential loss or damages (such as, not exclusively, loss of production, loss of reputation, loss of income, loss of profit), except in case of fraud, wilful default or reckless misconduct by the defaulting Party.

17.2 The maximum aggregate liability of the CONTRACTOR to the CUSTOMER/BENEFICIARY, arising out of or in connection with this Agreement or any breach, non-performance or performance of any provisions hereof, after Acceptance, and till up to the period of operation and maintenance, cannot amount to more than 5% (five per cent) of the Price for the Power System.

18. BINDING AGREEMENT

18.1 This Agreement, along with its Schedules, in and of itself is an enforceable binding contract and constitutes the entire agreement between the Parties with respect to the subject matter hereof to the exclusion of all other understandings and assurances, either written or oral. The clauses contained in this Agreement shall not be construed as creating a partnership or joint venture, agency or employment relationship among the Parties. The relationship between the Parties under this Agreement is as principal to principal basis.

IN WITNESS WHEREOF the authorized signatories of the Parties hereto have signed this Agreement on the day, month and year first above written:

FOR AND ON BEHALF OF **< Name of Contractor> M/s**_____	FOR AND ON BEHALF OF **<Name of Customer/ beneficiary,>** _____
_____ AUTHORISED SIGNATORY	_____ AUTHORISED SIGNATORY
NAME: DESIGNATION: _____ WITNESSNAME:	NAME: DESIGNATION: _____ WITNESSNAME:

Appendix – II

TECHNICAL SPECIFICATION

The proposed projects shall be commissioned as per the technical specifications given below. Any shortcomings will lead to cancelation of CFA in full or part as decided by *APDCL*. Domestic Modules are to be used failing which it will be assumed that system is not matching the requirement of the scheme and bidder's PBG shall be forfeited. Competent Authority's decision will be final and binding on the bidder.

1. DEFINITION

A Roof Top Solar (RTS) Photo Voltaic (PV) system shall consist of following equipment/components:

1. Solar Photo Voltaic (SPV) modules consisting of required number of Crystalline PV modules
2. Inverter/PCU
3. Module Mounting structures
4. Energy Meter
5. Array Junction Boxes
6. DC Distribution Box
7. AC Distribution Box
8. Protections – Earthing, Lightning, Surge
9. Cables
10. Drawing & Manuals
11. Miscellaneous

1. Solar PV modules

1.1. The PV modules and Solar Cell used should be made in India.

1.2. The PV modules used must qualify to the latest edition of IEC standards or equivalent BIS standards, i.e. IEC 61215/IS14286, IEC 61853-Part I/IS 16170-Part I, IEC 61730 Part-1 & Part 2 and IEC 62804 (PID). For the PV modules to be used in a highly corrosive atmosphere throughout their lifetime, they must qualify to IEC 61701/IS 61701.

1.3. The rated power of solar PV module shall have maximum tolerance up to +3%.

1.4. The peak-power point current of any supplied module string (series connected modules) shall not vary by +1% from the respective arithmetic means for all modules and/or for all module strings (connected to the same MPPT), as the case may be.

1.5. The peak-power point voltage of any supplied module string (series connected modules) shall not vary by + 2% from the respective arithmetic means for all modules and/or for all module strings (connected to the same MPPT), as the case may be.

1.6. The temperature co-efficient power of the PV module shall be equal to or better than -0.45%/°C.

1.7. Solar PV modules of minimum capacity 250 Wp to be used.

1.8. The PV Module efficiency should be minimum 16%.

1.9. Solar PV modules of minimum fill factor 75%, to be used.

1.10. All electrical parameters at STC shall have to be provided

1.11. The PV modules shall be equipped with IP 65 or better protection level junction box with required numbers of bypass diodes of appropriate rating and appropriately sized output power cable of symmetric length with MC4 or equivalent solar connectors. The IP level for protection may be chosen based on following conditions:

i. An IP 65 rated enclosure is suitable for most outdoor enclosures that won't encounter extreme weather such as flooding.

ii. An IP 67 rated enclosure is suitable at locations which may encounter temporary submersion at depths of up to one meter.

iii. An IP 68 enclosure is recommended if there may exist situations of submergence for extended periods of time and at substantial depths.

1.12. All PV modules should carry a performance warranty of >90% during the first 10 years, and >80% during the next 15 years. Further, module shall have performance warranty of >97% during the first year of installation—degradation of the module below 1 % per annum.

1.13. The manufacturer should warrant the Solar Module(s) to be free from the defects and/or failures specified below for a period not less than five (05) years from the date of commissioning:

1.14. Defects and/or failures due to manufacturing.

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

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

1.17. PV modules must be tested and approved by one of the NABL accredited and BIS approved test centres.

1.18. Modules deployed must use a RF identification tag laminated inside the glass. The following information must be mentioned in the RFID used on each module:

i. Name of the manufacturer of the PV module
ii. Name of the manufacturer of Solar Cells.
iii. Month & year of the manufacture (separate for solar cells and modules)
iv. Country of origin (separately for solar cells and module)
v. I-V curve for the module Wattage, Im, Vm and FF for the module
vi. Unique Serial No and Model No of the module
vii. Date and year of obtaining IEC PV module qualification certificate.
viii. Name of the test lab issuing IEC certificate.
ix. Other relevant information on traceability of solar cells and module as per ISO 9001 and ISO 14001.
x. Nominal wattage +3%.
xi. Brand Name, if applicable.

1.19. Other details as per IS/IEC 61730-1 clause 11 should be provided at appropriate place. In addition to the above, the following information should also be provided:

i. The actual Power Output Pmax shall be mentioned on the label pasted on the back side of PV Module.
ii. The Maximum system voltage for which the module is suitable to be provided on the back sheet of the module.
iii. Polarity of terminals or leads (colour coding is permissible) on junction Box housing near cable entry or cable and connector.

1.20. Unique Serial No, Model No, Name of Manufacturer, Manufacturing year, Make in India logo and module wattage details should be displayed inside the laminated glass.

2. Inverter/PCU

2.1. Inverters/PCU should comply with applicable IEC/equivalent BIS standard for efficiency measurements and environmental tests as per standard codes IEC 61683/IS 61683, IS 16221 (Part 2), IS 16169 and IEC 60068-2(1,2,14,30) /Equivalent BIS Std.

2.2. Maximum Power Point Tracker (MPPT) shall be integrated in the inverter/PCU to maximize energy drawn from the array. Charge controller (if any) / MPPT units environmental testing should qualify IEC 60068-2(1, 2, 14, 30)/Equivalent BIS standard. The junction boxes/enclosures should be IP 65 or better (for outdoor)/ IP 54or better (indoor) and as per IEC 529 Specifications.

2.3. All inverters/PCUs shall be IEC 61000 compliant for electromagnetic compatibility, harmonics, Surge, etc.

2.4. The PCU/ inverter shall have overloading capacity of minimum 10%.

2.5. Typical technical features of the inverter shall be as follows-

i. Switching devices: IGBT/MOSFET
ii. Control: Microprocessor/DSP
iii. Nominal AC output voltage and frequency: as per CEA/State regulations
iv. Output frequency: 50 Hz
v. Grid Frequency Synchronization range: as per CEA/State Regulations
vi. Ambient temperature considered: -20°C to 60°C
vii. Humidity: 95 % Non-condensing
viii. Protection of Enclosure: IP-54 (Minimum) for indoor and IP-65(Minimum) for outdoor.
ix. Grid Frequency Tolerance range: as per CEA/State regulations
x. Grid Voltage tolerance: as per CEA/State Regulations
xi. No-load losses: Less than 1% of rated power
xii. Inverter efficiency (Min.): >93% (In case of 10 kW or above with in-built galvanic isolation) >97% (In case of 10 kW or above without inbuilt galvanic isolation)
xiii. Inverter efficiency (minimum): > 90% (In case of less than 10 kW)
xiv. THD: < 3%

xv. PF: > 0.9 (lag or lead)

xvi. Should not inject DC power more than 0.5% of full rated output at the interconnection point and comply to IEEE 519.

2.6. The output power factor of inverter should be suitable for all voltage ranges or sink of reactive power, inverter should have internal protection arrangement against any sustain fault in feeder line and against the lightning on feeder.

2.7. All the Inverters should contain the following clear and indelible Marking Label & Warning Label as per IS16221 Part II, clause 5. The equipment shall, as a minimum, be permanently marked with:

i. The name or trademark of the manufacturer or supplier;

ii. A model number, name or other means to identify the equipment,

iii. A serial number, code or other marking allowing identification of manufacturing location and the manufacturing batch or date within a twelve-month time period.

iv. Input voltage, type of voltage (a.c. or d.c.), frequency, and maximum continuous current for each input.

v. Output voltage, type of voltage (a.c. or d.c.), frequency, maximum continuous current, and for a.c. outputs, either the power or power factor for each output.

vi. The Ingress Protection (IP) rating

2.8. Marking shall be located adjacent to each fuse or fuse holder, or on the fuse holder, or in another location provided that it is obvious to which fuse the marking applies, giving the fuse current rating and voltage rating for fuses that may be changed at the installed site.

2.9. In case the consumer is having a *3-ϕ* connection, *1-ϕ/3-ϕ* inverter shall be provided by the vendor as per the consumer's requirement and regulations of the State.

2.10. Inverter/PCU shall be capable of complete automatic operation including wake-up, synchronization & shutdown.

2.11. For CFA calculation, minimum of following two shall be considered:

i. Solar PV array capacity in KWp

ii. Inverter Capacity in KW

2.12. Integration of PV Power with Grid & Grid Islanding:

i. The output power from SPV would be fed to the inverters/PCU which converts DC produced by SPV array to AC and feeds it into the main electricity grid after synchronization.

ii. In the event of a power failure on the electric grid, it is required that any independent power-producing inverters attached to the grid turn off in a short period of time. This prevents the DC-to-AC inverters from continuing to feed power into small sections of the grid, known as "islands." Powered islands present a risk to workers who may expect the area to be unpowered, and they may also damage grid-tied equipment. The Rooftop PV system shall be equipped with islanding protection. In addition to disconnection from the grid (due to islanding protection) disconnection due to under and over voltage conditions shall also be provided, if not available in inverter.

iii. MCB/MCCB or a manual isolation switch, besides automatic disconnection to grid, would have to be provided at utility end to isolate the grid connection by the utility personnel to carry out any maintenance. This switch shall be locked by the utility personnel.

3. Module Mounting Structure (MMS):

3.1. Supply, installation, erection and acceptance of module mounting structure (MMS) with all necessary accessories, auxiliaries and spare part shall be in the scope of the work.

3.2. Module mounting structures can be made from three types of materials. They are Hot Dip Galvanized Iron, Aluminium and Hot Dip Galvanized Mild Steel (MS). However, MS will be preferred for raised structure.

3.3. MMS Steel shall be as per latest IS 2062:2011 and galvanization of the mounting structure shall be in compliance of latest IS 4759. MMS Aluminium shall be as per AA6063 T6. For Aluminium structures, necessary protection towards rusting need to be provided either by coating or anodization.

3.4. All bolts, nuts, fasteners shall be of stainless steel of grade SS 304 or hot dip galvanized, panel mounting clamps shall be of aluminium and must sustain the adverse climatic conditions. Structural material shall be corrosion resistant and electrolytically compatible with the materials used in the module frame, its fasteners, nuts and bolts.

3.5. The module mounting structures should have angle of inclination as per the site conditions to take maximum insolation and complete shadow-free operation during generation hours. However, to accommodate more capacity the angle of inclination may be reduced until the plant meets the specified performance ratio requirements.

3.6. The Mounting structure shall be so designed to withstand the speed for the wind zone of the location where a PV system is proposed to be installed. The PV array structure design shall be appropriate with a factor of safety of minimum 1.5.

3.7. The upper edge of the module must be covered with wind shield so as to avoid build air ingress below the module. Slight clearance must be provided on both edges (upper & lower) to allow air for cooling.

3.8. Suitable fastening arrangement such as grouting and calming should be provided to secure the installation against the specific wind speed. The Empanelled Agency shall be fully responsible for any damages to SPV System caused due to high wind velocity within guarantee period as per technical specification.

3.9. The structures shall be designed to allow easy replacement, repairing and cleaning of any module. The array structure shall be so designed that it will occupy minimum space without sacrificing the output from the SPV panels. Necessary testing provision for MMS to be made available at site.

3.10. Adequate spacing shall be provided between two panel frames and rows of panels to facilitate personnel protection, ease of installation, replacement, cleaning of panels and electrical maintenance.

3.11. The structure shall be designed to withstand operating environmental conditions for a period of minimum 25 years.

3.12. The Rooftop Structures maybe classified in three broad categories as follows (**drawings as mentioned in RfS**):

i. Ballast structure

a. The mounting structure must be Non-invasive ballast type and any sort of penetration of roof to be avoided.
b. The minimum clearance of the structure from the roof level should be in between 70-150 mm to allow ventilation for cooling, also ease of cleaning and maintenance of panels as well as cleaning of terrace.
c. The structures should be suitably loaded with reinforced concrete blocks of appropriate weight made out of M25 concrete mixture.

ii. Tin shed

a. The structure design should be as per the slope of the tin shed.
b. The inclination angle of structure can be done in two ways-
   b.1. Parallel to the tin shed (flat keeping zero-degree tiling angle), if the slope of shed in Proper south direction
   b.2. With same tilt angle based on the slope of tin shed to get the maximum output.
c. The minimum clearance of the lowest point from the tin shade should be more then 100mm.
d. The base of structure should be connected on the Purlin of tin shed with the proper riveting.
e. All structure member should be of minimum 2 mm thickness.

iii. RCC Elevated structure: It can be divided into further three categories:

A. Minimum Ground clearance (300MM – 1000 MM)

a. The structure shall be designed to allow easy replacement of any module and shall be in line with site requirement. The gap between module should be minimum 30MM.
b. Base Plate – Base plate thickness of the Structure should be 5MM for this segment.
c. Column – Structure Column should be minimum 2MM in Lip section / 3MM in C-Channel section. The minimum section should be 70MM in Web side and 40MM in flange side in Lip section.
d. Rafter - Structure rafter should be minimum 2MM in Lip section / 3MM in C-Channel section. The minimum section should be 70MM in Web side (y-axis) and 40MM in flange side (x-axis).
e. Purlin - Structure purlin should be minimum 2MM in Lip section. The minimum section should be 60MM in Web side and 40MM in flange side in Lip section.
f. Front/back bracing – The section for bracing part should be minimum 2MM thickness.
g. Connection – The structure connection should be bolted completely. Leg to rafter should be connected with minimum 12 diameter bolt. Rafter and purlin should be connected with minimum 10 diameter bolt. Module mounting fasteners should be SS-304 only and remaining fasteners either SS-304 or HDG 8.8 Grade.
h. For single portrait structure the minimum ground clearance should be 500MM.

B. Medium Ground clearance (1000MM – 2000 MM)(for reference only)

a. Base Plate – Base plate thickness of the Structure should be Minimum 6MM for this segment.
b. Column – Structure Column should be minimum 2MM in Lip section / 3MM in C-Channel section. The minimum section should be 80MM in Web side and 50MM in flange side in Lip section.
c. Rafter - Structure rafter should be minimum 2MM in Lip section / 3MM in C-Channel section. The minimum section should be 70MM in Web side and 40MM in flange side in Lip section.
d. Purlin - Structure purlin should be minimum 2MM in Lip section. The minimum section should be 70MM in Web side and 40MM in flange side in Lip section.
e. Front/back bracing – The section for bracing part should be minimum 2MM thickness.
f. Connection – The structure connection should be bolted completely. Leg to rafter should be connected with minimum 12 diameter bolt. Rafter and purlin should be connected with minimum 10 diameter bolt. Module mounting fasteners should be SS-304 only and remaining fasteners either SS-304 or HDG 8.8 Grade.

C. Maximum Ground clearance (2000MM – 3000 MM) (for reference only)

a. Base Plate – Base plate thickness of the Structure should be minimum 8 MM for this segment.
b. Column – Structure Column thickness should be minimum 2.6MM in square hollow section (minimum 50x50) or rectangular hollow section (minimum 60x40) or 3MM in C-Channel section.
c. Rafter - Structure rafter should be minimum 2MM in Lip section / 3MM in Channel section. The minimum section should be 80MM in Web side and 50MM in flange side in Lip section.
d. Purlin - Structure purlin should be minimum 2MM in Lip section. The minimum section should be 80MM in Web side and 50MM in flange side in Lip section.
e. Front/back bracing – The section for bracing part should be minimum 3MM thickness.
f. Connection – The structure connection should be bolted completely. Leg to rafter should be connected with minimum 12 diameter bolt. Rafter and purlin should be connected with minimum 10 diameter bolt. Module mounting fasteners should be SS-304 only and remaining fasteners either SS-304 or HDG 8.8 Grade.

D. Super elevated structure (More than 3000 MM) (for reference only)

D.1. Base structure

a. Base Plate – Base plate thickness of the Structure should be 10MM for this segment.
b. Column – Structure Column minimum thickness should be minimum 2.9MM in square hollow section (minimum 60x60) or rectangular hollow section (minimum 80x40).
c. Rafter - Structure Rafter minimum thickness should be minimum 2.9MM in square hollow section (minimum 60x60) or rectangular hollow section (minimum 80x40).
d. Cross bracing – Bracing for the connection of rafter and column should be of minimum thickness of 4mm L-angle with the help of minimum bolt diameter of 10mm.

D.2. Upper structure of super elevated structure –

a. Base Plate – Base plate thickness of the Structure should be minimum 5MM for this segment.
b. Column – Structure Column should be minimum 2MM in Lip section / 3MM in Channel section. The minimum section should be 70MM in Web side and 40MM in flange side in Lip section.
c. Rafter - Structure rafter should be minimum 2MM in Lip section / 3MM in Channel section. The minimum section should be 70MM in Web side and 40MM in flange side in Lip section.
d. Purlin - Structure purlin should be minimum 2MM in Lip section. The minimum section should be 60MM in Web side and 40MM in flange side in Lip section.
e. Front/back bracing – The section for bracing part should be minimum 2MM thickness.
f. Connection – The structure connection should be bolted completely. Leg to rafter should be connected with minimum 12 diameter bolt. Rafter and purlin should be connected with minimum 10 diameter bolt. Module mounting fasteners should be SS-304 only and remaining fasteners either SS-304 or HDG 8.8 Grade.

D.3. If distance between two legs in X-Direction is more than 3M than sag angle/Bar should be provide for purlin to avoid deflection failure. The sag angle should be minimum 2MM thick, and bar should be minimum 12Dia.

D.4. Degree - The Module alignment and tilt angle shell be calculated to provide the maximum annual energy output. This shall be decided on the location of array installation.

D.5. Foundation – Foundation should be as per the roof condition; two types of the foundation can be done- either penetrating the roof or without penetrating the roof.

a. If penetration on the roof is allowed (based on the client requirement) then minimum 12MM diameter anchor fasteners with minimum length 100MM can be used with proper chipping. The minimum RCC size should be 400x400x300 cubic mm. Material grade of foundation should be minimum M20.
b. If penetration on roof is not allowed, then foundation can be done with the help of 'J Bolt' (refer IS 5624 for foundation hardware). Proper Neto bond solution should be used to adhere the Foundation block with the RCC roof. Foundation J - bolt length should be minimum 12MM diameter and length should be minimum 300MM.

3.13. Material standards:

i. Design of foundation for mounting the structure should be as per defined standards which clearly states the Load Bearing Capacity & other relevant parameters for foundation design (As per IS 6403 / 456 / 4091 / 875).
ii. Grade of raw material to be used for mounting the structures so that it complies the defined wind loading conditions (As per IS 875 - III) should be referred as follows (IS 2062 – for angles and channels, IS 1079 – for sheet, IS 1161 & 1239 for round pipes, IS 4923 for rectangular and square hollow section)
iii. Test reports for the raw material should be as per IS 1852 / 808 / 2062 / 1079 / 811.
iv. In process inspection report as per approved drawing & tolerance should be as per IS 7215.
v. For ascertaining proper welding of structure part following should be referred:
   a. D.P. Test (Pin Hole / Crack) (IS 822)
   b. Weld wire grade should be of grade (ER 70 S - 6)
vi. For ascertaining hot dip galvanizing of fabricated structure following should be referred: -
   a. Min coating required should be as per IS 4759 & EN 1461.
   b. Testing of galvanized material
      - Pierce Test (IS 2633)
      - Mass of Zinc (IS 6745)
      - Adhesion Test (IS 2629)
      - CuSO4 Test (IS 2633)
      - Superior High-Grade Zinc Ingot should be of 99.999% purity (IS 209) (Preferably Hindustan Zinc Limited or Equivalent).
vii. Foundation Hardware – If using foundation bolt in foundation then it should be as per IS 5624.

4. Metering

4.1. A Roof Top Solar (RTS) Photo Voltaic (PV) system shall consist of following energy meters:
   i. EXIM meter: To record import and export units
   ii. Generation meter: To keep record for total generation of the plant.

4.2. The installation of meters including CTs & PTs, wherever applicable, shall be carried out by APDCL as per the terms, conditions and procedures laid down by APDCL. The cost of the EXIM meter will be borne by respective residential consumer.

4.3. **Generation meter**: To keep record for total generation of the plant. The unidirectional electronic multifunctional meter (Solar Meter), displaying parameter details like energy, power, voltage, current and power factor etc shall be installed in solar ACDB having a spare RS485 port for APDCL use

5. Array Junction Boxes:

4.1 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 aluminum /cast aluminum 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. Suitable markings shall be provided on the bus-bars for easy identification and cable ferrules will be fitted at the cable termination points for identification.

4.2 Copper bus bars/terminal blocks housed in the junction box with suitable termination threads Conforming to IP 65 or better standard and IEC 62208 Hinged door with EPDM rubber gasket to prevent water entry, Single /double compression cable glands should be provided.

4.3 Polyamide glands and MC4 Connectors may also be provided. The rating of the junction box shall be suitable with adequate safety factor to interconnect the Solar PV array.

4.4 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.

4.5 Junction boxes shall be mounted on the MMS such that they are easily accessible and are protected from direct sunlight and harsh weather.

5 DC Distribution Box (DCDB):

5.1 May not be required for small plants, if suitable arrangement is available in the inverter.

5.2 DC Distribution Box are to be provided to receive the DC output from the PV array field.

5.3 DCDBs shall be dust & vermin proof conform having IP 65 or better protection, as per site conditions.

5.4 The bus bars are made of EC grade copper of required size. Suitable capacity MCBs/MCCB shall be provided for controlling the DC power output to the inverter along with necessary surge arrestors. MCB shall be used for currents up to 63 Amperes, and MCCB shall be used for currents greater than 63 Amperes.

6 AC Distribution Box (ACDB):

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

6.2 All switches and the circuit breakers, connectors should conform to IEC 60947:2019, part I, II and III/ IS 60947 part I, II and III.

6.3 The isolators, cabling work should be undertaken as part of the project.

6.4 All the Panel's shall be metal clad, totally enclosed, rigid, floor mounted, air -insulated, cubical type suitable for operation on *1-ϕ/3-ϕ*, 415 or 230 volts, 50 Hz (or voltage levels as per CEA/State regulations).

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

6.6 All indoor panels will have protection of IP 54 or better, as per site conditions. All outdoor panels will have protection of IP 65 or better, as per site conditions.

6.7 Should conform to Indian Electricity Act and CEA safety regulations (till last amendment).

6.8 All the 415 or 230 volts (or voltage levels as per CEA/State regulations) AC devices / equipment like bus support insulators, circuit breakers, SPDs, Voltage Transformers (VTs) etc., mounted inside the switchgear shall be suitable for continuous operation and satisfactory performance under the following supply conditions.

i. Variation in supply voltage: as per CEA/State regulations
ii. Variation in supply frequency: as per CEA/State regulations

6.9 The inverter output shall have the necessary rated AC surge arrestors, if required and MCB/ MCCB. RCCB shall be used for successful operation of the PV system, if inverter does not have required earth fault/residual current protection.

7 Protections

The system should be provided with all necessary protections like earthing, Lightning, and Surge Protection, as described below:

7.1 Earthing Protection

i. The earthing shall be done in accordance with latest Standards.

ii. Each array structure of the PV yard, Low Tension (LT) power system, earthing grid for switchyard, all electrical equipment, inverter, all junction boxes, etc. shall be grounded properly as per IS 3043-2018.
iii. All metal casing/ shielding of the plant shall be thoroughly grounded in accordance with CEA Safety Regulation 2010. In addition, the lightning arrester/masts should also be earthed inside the array field.
iv. Earth resistance should be as low as possible and shall never be higher than 5 ohms.
v. For 10 KW and above systems, separate three earth pits shall be provided for individual three earthing viz.: DC side earthing, AC side earthing and lightning arrestor earthing.

7.2 **Lightning Protection**

i. The SPV power plants shall be provided with lightning & over voltage protection, if required. The main aim in this protection shall be to reduce the overvoltage 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. Lightning arrestor shall not be installed on the mounting structure.
ii. The entire space occupying the SPV array shall be suitably protected against Lightning by deploying required number of Lightning Arrestors (LAs). Lightning protection should be provided as per NFC17-102:2011/IEC 62305 standard.
iii. The protection against induced high-voltages shall be provided by the use of Metal Oxide Varistors (MOVs)/Franklin Rod type LA/Early streamer type LA.
iv. The current carrying cable from lightning arrestor to the earth pit should have sufficient current carrying capacity according to IEC 62305. According to standard, the minimum requirement for a lightning protection system designed for class of LPS III is a 6 mm^2 copper/ 16 mm^2 aluminum or GI strip bearing size 25*3 mm thick). Separate pipe for running earth wires of Lightning Arrestor shall be used.

7.3 **Surge Protection**

i. Internal surge protection, wherever required, shall be provided.
ii. It will consist of three SPD type-II/MOV type surge arrestors connected from +ve and –ve terminals to earth.

8 CABLES

8.1 All cables should conform to latest edition of IEC/equivalent BIS Standards along with IEC 60227/IS 694, IEC 60502/IS 1554 standards.
8.2 Cables should be flexible and should have good resistance to heat, cold, water, oil, abrasion etc.
8.3 Armored cable should be used and overall PVC type 'A' pressure extruded insulation or XLPE insulation should be there for UV protection.
8.4 Cables should have Multi Strand, annealed high conductivity copper conductor on DC side and copper/FRLS type Aluminum conductor on AC side. For DC cabling, multi-core cables shall not be used.
8.5 Cables should have operating temperature range of -10°C to +80°C and voltage rating of 660/1000 V.
8.6 Sizes of cables between array interconnections, array to junction boxes, junction boxes to Inverter etc. shall be so selected to keep the voltage drop less than 2% (DC Cable losses).
8.7 The size of each type of AC cable selected shall be based on minimum voltage drop. However; the maximum drop shall be limited to 2%.
8.8 The electric cables for DC systems for rated voltage of 1500 V shall conform to BIS 17293:2020.
8.9 All cable/wires are to be routed in a RPVC pipe/ GI cable tray and suitably tagged and marked with proper manner by good quality ferule or by other means so that the cable is easily identified.
8.10 All cable trays including covers to be provided.
8.11 Thermo-plastic clamps to be used to clamp the cables and conduits, at intervals not exceeding 50 cm.
8.12 Size of neutral wire shall be equal to the size of phase wires, in a three phase system.
8.13 The Cable should be so selected that it should be compatible up to the life of the solar PV panels i.e. 25 years.

9 DRAWINGS& MANUALS:

9.1 Operation & Maintenance manual/user manual, Engineering and Electrical Drawings shall be supplied along with the power plant.

9.2 The manual shall include complete system details such as array lay out, schematic of the system, inverter details, working principle etc.

9.3 The Manual should also include all the Dos & Don'ts of Power Plant along with Graphical Representation with indication of proper methodology for cleaning, Operation and Maintenance etc.

9.4 Step by step maintenance and troubleshooting procedures shall also be given in the manuals.

9.5 Vendors should also educate the consumers during their AMC period.

10 Miscellaneous:

10.1 Connectivity: The maximum capacity for interconnection with the grid at a specific voltage level shall be as specified in the AERC regulation for Grid connectivity and norms of APDCL and amended from time to time.

10.2 Safety measures: Electrical safety of the installation(s) including connectivity with the grid must be taken into account and all the safety rules & regulations applicable as per Electricity Act, 2003 and CEA Safety Regulation 2010 etc. must be followed.

10.3 Shadow analysis: The shadow analysis report with the instrument such as Solar Pathfinder or professional shadow analysis software of each site should be provided and the consumer should be educated to install the system only in shadow free space. Lower performance of the system due to shadow effect shall be liable for penalty for lower performance.

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

Solar PV Modules/Panels	
IEC61215 and IS14286	Design Qualification and Type Approval for Crystalline Silicon Terrestrial Photovoltaic(PV)Modules
IEC 61701:2011	Salt Mist Corrosion Testing of Photovoltaic(PV) Modules
IEC 61853-1:2011/ IS16170-1:2014	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 etc)
IEC61730-1,2	Photovoltaic(PV) Module Safety Qualification–Part1:Requirementsfor Construction,Part2:Requirements for Testing
IEC 62804	Photovoltaic (PV) modules – Test method for detection of potential-induced degradation. IEC 62804-1: Part 1: Crystalline Silicon
Solar PV Inverters	
IEC62109 or IS: 16221	Safety of power converters for use in photovoltaic power systems –Part1:General requirements, and Safety of power converters for use in photovoltaic power systems Part2:Particular requirements for inverters. Safety compliance (Protection degree IP65 or better for outdoor mounting,IP54 or better for indoor mounting)
IS/IEC61683latest (as applicable)	Photovoltaic Systems – Power conditioners: Procedure for Measuring Efficiency (10%,25%,50%,75%&90-100%Loading Conditions)
IEC 60068-2 /IEC62093 (as applicable)	Environmental Testing of PV System–Power Conditioners and Inverters
IEC 62116:2014/ IS16169	Utility-interconnected photovoltaic inverters - Test procedure of islanding prevention measures
Fuses	
IS/IEC60947(Part 1, 2 &3),EN50521	General safety requirements for connectors, switches, circuit breakers(AC/DC): 1)Low-voltage Switchgear and Control-gear,Part1:General rules 2)Low-Voltage Switchgear and Control-gear, Part2:Circuit Breakers

	3)Low-voltage switchgear and Control-gear,Part3:Switches, disconnectors switch-disconnectors and fuse-combination units 4) EN50521:Connectors for photovoltaic system-Safety requirements and tests
IEC60269-6:2010	Low-voltage fuses-Part6:Supplementary requirements for fuse-links for the protection of solar photovoltaic energy systems
Solar PV Roof Mounting Structure	
IS2062/IS4759/AA6063 T6	Material for the structure mounting
Surge Arrestors	
BFC17-102:2011/ NFC 102:2011/ IEC 62305	Lightening Protection Standard
IEC 60364-5-53/ IS15086-5(SPD) IEC 61643- 11:2011	Electrical installations of buildings-Part5-53:Selection and erection of electrical equipment-Isolation, switching and control Low-voltage surge protective devices-Part11:Surge protective devices connected to low-voltage power systems-Requirements and test methods
Cables	
IEC 60227/IS 694, IEC60502/IS 1554 (Part 1&2)/IEC69947(as applicable)	General test and measuring method for PVC(Polyvinylchloride) insulated cables (for working voltages upto and including1100V,andUV resistant for outdoor installation)
BSEN 50618	Electric cables for photovoltaic systems (BT(DE/NOT)258),mainly for DC Cables
Earthing/Lightning	
IEC 62561/IEC 60634 Series(Chemical earthing) (as applicable)	IEC 62561-1: Lightning protection system components (LPSC) - Part: Requirements for connection components IEC 62561-2: Lightning protection system components (LPSC) – Part 2:Requirementsfor 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 or better protection for outdoor use, and IP54 or better protection for indoor use

Appendix – III

PAYMENT TERMS

A. Net Amount of Project Cost (i.e. project cost – CFA):

The net amount of project cost (i.e. project cost - CFA) shall be paid by the concerned roof top owner to the empanelled vendors as per the following methodology:

i. 80% payment against supply of materials at site after duly verified by APDCL along-with necessary documents indicated herein under:
   - Copy of Detailed Project Execution Plan/PERT chart and its approval by APDCL
   - Copy of Guaranteed Technical Particulars (GTP) and drawing approved by APDCL
   - Material Dispatch Clearance Certificate (MDCC) / Dispatch Instructions (DI) for dispatch of materials from the manufacturer's works. MDCC/DI shall be issued by authorized officer of APDCL
   - Submission of the certificate by the authorized officer of APDCL that the 100% of the billable item(s) have been verified and delivered to site i.e., MICC (Material Inspection & Clearance Certificate) issued by the authorized official of APDCL
   - Contractor's detailed invoice

ii. 20% payment after completing plant installation and submission of written inspection request to APDCL.

NB:
   a) All the above documents shall be verified & passed by the CEO of Concern Electrical Circle of APDCL
   b) The beneficiary / residential consumer shall pay the requisite amount to the concerned vendor after receiving intimation from CGM (NRE), APDCL.

B. Net Amount of Project Cost (i.e. project cost – CFA):

The applicable CFA will be released on submission of following documents:
Joint Commissioning Report (JCR)
Claim Letter
Guarantee certificate on Letter Head of the Vendor.
Geo-coordinates and photos of the site
The CFA shall be released by APDCL, only after receipt of the same from MNRE
The Tentative schedule of disbursement of CFA shall be as follows:

Sl. No	Milestone	Release of CFA amount
1	Supply & Installation including Synchronization & Commissioning of the Plant of the Plant and accepted by APDCL	70%
2	Completion of first year of successful Maintenance by the bidder	6%
3	Completion of second year of successful Maintenance by the bidder	6%
4	Completion of third year of successful Maintenance by the bidder	6%
5	Completion of fourth year of successful Maintenance by the bidder	6%
6	Completion of fifth year of successful Maintenance by the bidder	6%

Bill of Quantity (BoQ)												
RTS Plant Capacity : 1 kW to upto 10 kW												
Sl. No	ITEM DESCRIPTION	Compliance	Make	Unit	Quantity required for RTS Plant									
					1 kW	2 kW	3 kW	4 kW	5 kW	6 kW	7 kW	8 kW	9 kW	10 kW
1	Minimum Array capacity of Crystalline Solar PV modules	i) The PV modules and Solar Cell used should be made in India. ii) The solar module should be in the List – I (Solar PV Modules) of ALMM Order iii) The PV modules used must qualify to the latest edition of IEC standards or equivalent BIS standards: IEC61215 and IS14286, IEC 61701:2011, IEC 61853-1:2011/IS16170-1:2014, IEC 62716, IEC61730-1,2, IEC 62804	• It should be in List – I (Solar PV Modules) of ALMM Order • Individual Capacity of the module shall be specified by the empanelled vendor	kW	1	2	3	4	5	6	7	8	9	10
2	On-Grid Solar Inverter /PCU: XXX kW (1-φ/3-φ Phase)	The Inverter / PCU must qualify the latest edition of IEC standards: IEC62109 or IS: 16221, IS/IEC61683 latest, IEC 60068-2 /IEC62093, IEC 62116:2014/ IS16169	• The maker of inverter / PCU shall be specified by the empanelled vendor • 1-φ/3-φ Phase inverter should be as per existing connection of consumer	kW	1	2	3	4	5	6	7	8	9	10
3	Module Mounting Structure (Tin roof / GI Structure)	i) All the specification of MMS shall be as per the RfS issued by APDCL / implementation procedure notified by APDCL. Hot Dip Galvanized Iron, Aluminium and Hot Dip Galvanized Mild Steel (MS). However, MS will be preferred for raised structure. ii) The type of materials of MMS shall be as per requirement of project location and it should be specified by the empanelled vendor iii) The materials of MMS should compliance IS2062/IS4759/AA6063 T6.	• The maker of MMS shall be specified by the empanelled vendor	Lots	As required									
4	Array Junction Boxes (AJB)	The AJB should compliance IEC 60529	The maker of AJB shall be specified by the empanelled vendor	No.	As required									
5	DC Distribution Box (DCDB)	i) May not be required for small plants, if suitable arrangement is available in the inverter ii) DCDBs shall be dust & vermin proof conform having IP 65 or better protection, as per site conditions	The make & rating of DCDB shall be specified by the empanelled vendor (if applicable)	No.	1	1	1	1	1	1	1	1	1	1

Bill of Quantity (BoQ)												
RTS Plant Capacity : 1 kW to upto 10 kW												
Sl. No	ITEM DESCRIPTION	Compliance	Make	Unit	Quantity required for RTS Plant									
					1 kW	2 kW	3 kW	4 kW	5 kW	6 kW	7 kW	8 kW	9 kW	10 kW
6	AC Distribution Box (1-φ/3-φ Phase)	All the specification shall be as per the RfS issued by APDCL / implementation procedure notified by APDCL	The make & rating of ACDB shall be specified by the empanelled vendor (if applicable)	No.	1	1	1	1	1	1	1	1	1	1
7	DC Cable	All the specification shall be as per the RfS issued by APDCL / implementation procedure notified by APDCL	The make and rating should be specified by the empanelled vendor	Mtrs.	20	40	60	80	100	120	140	160	180	200
8	Conduit Pipe		Make should be specified by empanelled vendor	Bundle	As required									
9	Connectors		Make should be specified by empanelled vendor	Pair	As required									
10	Earthing Equipments	The earthing shall be done in accordance with latest Standards	The type of earthing shall be specified by empanelled vendor	Lots	As required									
11	Earthing Cable	Each array structure of the PV yard, Low Tension (LT) power system, earthing grid for switchyard, all electrical equipment, inverter, all junction boxes, etc. shall be grounded properly as per IS 3043-2018. The lightning arrester/masts should also be earthed inside the array field	The size of earthing cable shall be specified by empanelled vendor	Mtrs.	As required									
12	Lighting Arrestor	Lightning protection should be provided as per NFC17-102:2011/IEC 62305 standard	The maker of LA shall be specified by empanelled vendor	Nos.	1	1	1	1	1	1	1	1	1	1
13	Solar Meter (0.5 Class) uni-direction	Unidirectional electronic multifunctional meter (Solar Meter), displaying parameter details like energy, power, voltage, current and power factor etc shall be installed in solar ACDB having a spare RS485 port for APDCL use	The maker of solar meter shall be specified by the empanelled vendor	Nos.	1	1	1	1	1	1	1	1	1	1