

Uttar Pradesh New & Renewable Energy Development Agency
Vibhuti Khand Gomti nagar Lucknow
FY 2023-24

Discovered Rate of Off-Grid Solar Power Plant(Govt Buildings)FY 2023-24								
Plant Capacity Range(KW)	Base Rate Excluding GST (Rs/KW)	GST @ 12% on 70% amount	GST @ 18% on 30% amount	Rate Discovered including GST (Rs/KW)	Contingent charges @ 3% + GST			Total Cost including all taxes and Centage charges (Rs/KW)
					Contingent charges @ 3%	Contingent charges tax @ 18% (Rs)	Total Contigent Charges	
1 KW TO 10 KW	142080.00	11934.72	7672.32	161687.04	4262.40	767.23	5029.63	166716.67
11 KW TO 50 KW	137280.00	11531.52	7413.12	156224.64	4118.40	741.31	4859.71	161084.35
51 KW TO 75 KW	138850.00	11663.40	7497.90	158011.30	4165.50	749.79	4915.29	162926.59

ऑफग्रिड सोलर पावर प्लांट में कार्यरत फर्मों का नाम व पता

- 1 मेसर्स लार्ड्स माकस इण्डस्ट्रीज प्रा० लि०,
डी-2168 इन्दिरा नगर,
लखनऊ-226016
मोबाईल न०-8766370160
ई-मेल-offgrid@lordsmark.com
- 2 मेसर्स रिच फाईटोकेयर प्रा०लि०,
फलेट 28, महालक्ष्मी इन्क्लेव,
डोर न०-26, टैंक बंक रोड,
नन्गाम्बकम, चेन्नई-600034
(तमिलनाडू) भारत।
मोबाईल न०-9810075920
ई-मेल-richcare2019@gmail.com
- 3 मेसर्स सर्वोटेक पावर सिस्टम लि०,
808, 8वां तल, क्राउन हाइट बिल्डिंग,
नियर होटल क्राउन प्लाजा, सेक्टर-10,
रोहिणी, नई दिल्ली-110085
मोबाईल न०-9818680033
ई-मेल-sarika78@servotechindia.com
- 4 मेसर्स हाई लाईट इन्टरप्राईजेज,
बी-61, इन्दिरा नगर, लखनऊ।
मोबाईल न०-9651183472
ई-मेल-hts3lko@gmail.com
- 5 मेसर्स सोलर इनर्जी डेवलपमेन्ट-
को-आपरेटिव सोसाइटी लि०,
बी-2/2, विश्वास खण्ड, गोमती नगर,
लखनऊ-226010
माबाईल न०-7571009001
ई-मेल-info.sedc.ltd@gmail.com
- 6 मेसर्स ईजी फोटोवोल्टेक प्रा०लि०,
खसरा न०-98, शिखरा रोड,
इण्डस्ट्रीयल एरिया,
मोदी नगर-201204, गाजियाबाद।
मोबाईल न०-9448526791
ई-मेल-rohit.easy02@gmail.com

SCOPE OF WORK

The firms which qualified the technical as well as financial bids will be selected to execute the work with on Secondary School Buildings. These Power Plants are to be installed with minimum technical specifications mentioned in the tender document a brief of the same are in the following pages.

Sno	Solar PV Module Array Capacity (Wp)	PCU Capacity with MPPT and DC to AC Invertor	Battery Bank Capacity /Configuration (Lithium Ferro phosphate battery)	
			Voltage (V)	Capacity (Ah)
1	5000	6000	96	200

GENERAL TECHNICAL SPECIFICATION:

A standalone solar photovoltaic power generator/plant proposed comprises of solar PV modules of given capacity, with battery bank, PCU with necessary control electronics, interconnecting wires / cables, module mounting structures, necessary grounding/earthing etc.

A. MINIMAL TECHNICAL REQUIREMENTS/ STANDARDS:

1. SPV MODULES:

- i. Only indigenous modules (Both cell and Module) of reputed brand (IEC/BIS Tested) shall only be used in the project. The wattage of each module should be at least 250 Wp of 72 cell and open circuit voltage of the PV modules under STC should be at least 42.0 Volts. The module efficiency should not be less than 15% and the fill factor should not be less than 0.70.
- ii. Crystalline high power/efficiency cells > 16% shall be used in the Solar Photovoltaic module.
- iii. The PV modules will be warranted for a minimum period of 25 years from the date of supply. Output wattage should not be less than 90% at the end of 10 Years and 80% at the end of 25 years.
- iv. The terminal box on the module shall be designed for long life out door operation in harsh environment should have a provision for opening for replacing the cable, if required.
- v. The offered module shall be in accordance with the requirements of MNRE.
- vi. The module should be tested according to latest edition of IEC 61215 edition II / IS 14286 for Crystalline cell. The bidder shall submit appropriate valid test certificates. The minimum validity of test report should be till March 2020.
- vii. PV modules must qualify to IEC 61730 Part 1- requirements for construction & Part 2 requirements for testing, for safety qualification. The bidder shall submit appropriate valid test certificates. The minimum validity of test report should be till March 2020.
- viii. The offered Solar module performance test report issued from authorized MNRE/NABAL test lab should be submitted. The test report should be issued on or after 1 April.2016.

- ix. Protective devices against surges at the PV module shall be provided. Low voltage drop bypass diodes shall be provided and if required, blocking diode(s) may also be provided.
- x. The peak power point voltage and the peak power point current of any supplied module and/or any module string (series connected modules) shall not vary by more than 2 (two) per cent from the respective arithmetic means for all modules and/or for all module strings, as the case may be.

IDENTIFICATION AND TRACEABILITY

Each PV module must have sticker inside the module with the following information:

- (i) Name of the manufacturer of PV Module.
- (ii) Month and year of the manufacture of module.
- (iii) Made in India.
- (iv) Unique Serial No and Model No of the module

Following data maybe provided out site in such a way that it should not pull out during harsh environmental condition

- (i) Peak Wattage, I_m , V_m and FF for the module
- (ii) UPNEDA logo

Test reports/ certificate from IEC/NABL accredited laboratory to be mandatorily enclosed for relevant IEC/ equivalent BIS Standards.

The solar module must be from ALMM list approved by MNRE from effective date of implementation as per MNRE order no 283/54/2018-Grid solar dated 3rd Jan 2019 or its latest amendments

2. Lithium ferro Phosphate:

The battery should Lithium Ferro phosphate (Lifepo4) having capacity motioned in the chart at standard conditions. The battery Voltage & AH can be changed keeping the overall KWH same. The voltage selection should be close to V_m of combinations of modules having 72 cells. The configuration of battery assembly should be as per requirement of capacity. The cell should be prismatic type having capacity not less than 40 Ah The other feature of the battery should be:

SNo.	Description	Specification
1	Battery Configuration minimum cell capacity	3.2V- 40 AH; LiFePO4
2	Working Temperature Range (both for charging & discharging)	0-60 Deg C
3	Storage Temperature Range	@ 0-40 Deg- 6 months
4	Cycle Life (Full charge to full discharge @ 25 deg C before capacity of battery falls below 75%)	more than 3000 Cycles
5	Battery Warranty	5 years
6	Type of Cell	Prismatic
7	Depth of Discharge	up to 85%
8	Maximum Discharging rate	up to C rate of battery Capacity
9	Maximum Charging Rate	Up to 0.5 C rate of battery capacity

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

3. Power Conditioning Unit (PCU) cum Invertor

The Power conditioning unit (PCU) should have inbuilt charge controller and Invertor of capacity shall not be less than mentioned in the table above.

The PCU will have following features:

- The PCU should be dual input type, Bi-directional converter, synchronized with Grid Hybrid type such that the Input PF is close to 0.95 with Low THD. where under normal condition the input is fed from a SPV panel and in the absence of SPV power or low SPV power conditions an external AC source can be used for battery charging at C-10 rates so as to reduce the charging time. However the charger circuit must communicate with BMS and control charging profile keeping in mind the SOC of each cell, The charging rate will thus start tapering till charge completion and the State-of-charge (SOC) shall also be available locally on display as well as remotely (if required).
- In case the PV power generated at any instant of time is more than the battery charging power required, this excess PV power shall be used to share the AC load the output of the Inverter output.
- All these operation should be automatic. When battery bank is fully charged, the PCU should have the feature to feed the power generated from solar to load and draw the additional power from main supply to meet the load requirements in the case load is more than solar energy produced. Thus the electricity consumption from grid shall be reduced.
- Solar-Hybrid MPPT charger PCU. The synchronization of BMS and PCU is important aspects and it must be ensured. Considering the importance of this aspects the firm can choose the battery voltage keeping the total watt-hour capacity same.

SURGE PROTECTION

Internal surge protection shall consist of three MOV type surge arrestors connected from +ve and –ve terminals to earth (via Y arrangement) or other suitable devices should be provided.

i. EARTHING PROTECTION

- Each array structure of the PV yard and metal casing should be grounded/ earthed properly as per IS: 3043 latest edition.

Necessary earthing/ grounding is to be provided on the body of the inverter.

The quality and standards of the system will be strictly adhering to the national/international standards specified as per MNRE Govt. of India norm.

4. BALANCE OF SYSTEM (BOS) ITEMS/ COMPONENTS:

The BOS items / components of the SPV power plants/ systems deployed must conform to the latest edition of IEC/ Equivalent BIS Standards/ MNRE specifications.

A. Mounting Structure

- The module & frame structure shall be mild steel, hot dipped galvanized (120 micron) with corrosion resistant painting for holding the PV modules.
- Each panel frame structure shall be so fabricated as to be grouted on ground on its legs. The size of angle iron/C channel should not be less than 40X40X5 mm. Anti-Theft Nut Bolts of SS (with washers) should be used for mounting modules for better theft proofing. Regarding civil structures the bidder need to take care of the load bearing capacity of the roof and need arrange suitable structures based on the quality of roof.
- The total load of the structure (when installed with PV modules) on the terrace should be less than 60 kg/m². The minimum front clearance of the structure from the roof level should be 300 mm.
- The legs of the structures made with hot dip GI angles will be fixed and grouted in the RCC foundation columns made with 1:2:4 cement concrete. The foundation should be as per design of structure to withstand maximum wind loading.
- There shall be a minimum air gap of 3+/- 0.3-cm between the facing edges of two adjacent modules on all sides.
- Each panel frame structure shall have inclination between 20- 40 degrees depending on the site location seasonal load requirement. A weather proof junction box as per the relevant ISI specifications, to be provided where the module terminals shall be interconnected and output taken.
- All nuts bolts and fasteners should be made of stainless steel.
- The structure should be designed to allow easy replacement of any module and shall be aligned with site requirement.
- The structure should be designed for simple mechanical and electrical installations. It will be designed to withstand severe cyclone/ storm with the speed max.150 Km/hr. as per IS 875 part 3.

- x. The systems should be installed at ground level / roof top at least the height of 45Centimeter with a CC block of 30X30X30 Cm with each support.

B. Battery Trolley/Rack For Lithium battery

A metallic cabinet of minimum 22 SWG thick made of pre-coated galvanized (60-micron thickness) MS sheet for housing the storage battery indoors should be provided with proper lock and key. The cabinet should be inscribed with UPNEDA written on front faces. The size of cabinet should be as per battery size. Danger logo as approved by UPNEDA shall be screen printed on it... The necessary switch gear, MCB etc to ensure the safety may be installed in cabinet. The cabinet have a modular design featuring uninterruptible maintenance and easy installation. The cabinet should be as per standard for safe storage of lifepo4 battery.

C. Electrical connections

High quality ISI mark copper wires/cables of reputed makes are to be provided for connecting Solar Modules, from junction box to PCU, and Battery.

A suitable connection point shall be provided to the consumer from PCU, at a distance not more than 05 meters, from where consumer shall have its own wiring to the use points.

D. Junction Boxes:

The junction boxes for 5KW and above are to be provided in the PV array for termination of connecting cables. The J. Boxes (JBs) shall be made of polycarbonate/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 JB's shall be such that input & output termination can be made through suitable cable glands. 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. Each Junction Box shall have High quality Suitable SPDs fuses on +ve side. Suitable Reverse Blocking Diodes. The Junction Boxes shall have suitable arrangement for disconnection for each of the groups. 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. DC DPBs shall have sheet from enclosure of dust & vermin proof conform to IP 65for outdoor and IP54 for indoor protection. The bus bars are made of copper of desired size. Suitable capacity MCBs/MCCB shall be provided for controlling the DC power output to the PCU along with necessary surge arrestors AC Distribution Panel Board (DPB) shall control the AC power from PCU/ inverter, and should have necessary surge arrestors. 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).

E. DATA ACQUISITION SYSTEM / PLANT MONITORING

- i. Data Acquisition System shall be provided for each of the solar PV plant having capacity 10 KW or above.
- ii. Data Logging Provision for plant control and monitoring, time and date stamped system data logs for analysis. Metering and Instrumentation for display of systems parameters and status indication to be provided.
- iii. Read out integrated with data logging system.
- iv. 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

F. OTHER FEATURES

A toll-free number (i.e. 1800 180 0005) of IVRS of UPNEDA and 14 digit UID number of minimum computer font size 72 or 13 mm (issued/provided by UPNEDA) is to be embossed/punch in front of battery box by contractor/ bidder, which in case of non-working/operational problems etc of system will be dialled by the beneficiary etc to lodge a complaint in respect of system problems. The IVRS will divert the complaint to Contractor/ bidder through E mail, SMS etc. The contractor/ bidder will have to rectify the same to make/ restore the system to working position within 72 hours in the warrantee period of 5 years, failing which the system may be get rectified on contractor/ bidder cost and the cost will be recovered by contractor/ bidders pending claims what so ever and appropriate action as per noncompliance etc of agreement will be considered/taken.

G. INSTALLATION OF SYSTEM:

The system should be properly installed at site. The SPV module mounting structure should be properly grouted depending upon the location and requirement of the site. The grouting should be such that it should withstand the maximum wind speed /storm. Adequate space should be provided behind the PV module/array for allowing unobstructed air flow for passive cooling. Cables of appropriate size should be used to keep electrical losses to a bare minimum. Care should be taken to ensure that the battery is placed with appropriate levelling on a structurally sound surface. All wiring should be in a proper conduit or capping case. Wire should not be hanging loose. Any minor items which are not specifically included in the scope of supply but required for proper installation and efficient operation of the Solar Power Generator/Plant system are to be provided by the manufacturer as per standards.

H. ELECTRIC CABLE

All the cables shall be supplied conforming to IEC 60227–IS 694 / IS 1554 – IS / IEC 60502 shall be of 650 V/ 1.1 kV grade as per requirement. Only PVC copper cables shall be used.

I. TRACEABILITY OF THE PRODUCT TO BE SUPPLIED

In order to prevent the misuse of the product such as unauthorized sale or diversion to the open market, the following incorporation shall be made in the product.

- a) Engraving (or) Screen printing of UPNEDA at a suitable place on the main components like SPV Panel, battery, PCU to be used in the installation of the solar power pack.
- b) The unique system ID number as provided by UPNEDA shall be permanently pasted (or) marked on each component of the system.

WARRANTY AND MAINTENANCE

- The PV modules will be warranted for a minimum period of 25 years from the date of supply. (Output wattage should not be less than 90% at the end of 10 Years and 80% at the end of 25 years)
- The mechanical structures, electrical components including battery and overall workmanship of the complete Solar PV Power Pack must be warranted against any manufacturing/ design/ installation defects must be warranted for a minimum of 5 years from the date of commissioning and handing over of the system.
- The Comprehensive Maintenance (within warranty period) shall be executed by the firm themselves or through the authorized dealer/ service centre of the firm in the concerned district.
- It is mandatory for the contractor to open an authorized service centre in the concerned district before the supply/ installation of the system.
- Necessary maintenance spares for five years trouble free operation shall also be supplied with the system.
- The supplier shall be responsible to replace free of cost (including transportation and insurance expenses) to the purchaser whole or any part of supply which under normal and proper use become dysfunctional within one month of issue of any such complaint by the purchaser.
- The Comprehensive Maintenance (within warranty period) will include the total system including Battery etc whatsoever at site.
- It is an essential part of the contract that the bidder shall provide warranty of the system for 5 years. During the warranty following maintenance will required to be carried out by the contractor.
 1. Quarterly checking up keeping and replacement of the any component or subcomponents of the system for proper operation of the system.

2. Repairing/replacement of all defective components and sub-components including battery of the system as per the requirement to ensure proper operation of the system.

- The scope of work includes repairing/replacement of power plant to make the system functional within warranty period whenever a complaint is lodged by the user at site. The contractor shall attend the same within a week. Apart from this any complaint registered/ service calls received / faults notified in the report generated by the IVRS should be attended to and the system should be repaired/ restored/ replaced within 4 days.
- In case of any damage or breakage of the component due to negligence or fault of beneficiary or theft etc, the same shall be replaced at users cost.
- In case of Solar PV module damaged due to natural calamity, contractor shall replace the same at his own cost, if required during warranty period.
- The safety and security of the system shall be sole responsibility of the user.