BANK OF BARODA

Baroda Apex Academy

Design, supply, installation, testing and commissioning of Solar System at Baroda Apex Academy Building at Ahmedabad

Revised Technical Specifications

Section- 2

Revised Technical Specification of Solar System

E-1 SOLAR POWER SYSTEM

1.0 Scope :

Design, Engineering, Supply, Installation, Testing & Commissioning of Grid connected Solar PV Power Plant (KWP) consisting of Solar PV modules, Power Conditioning Unit (Inverter with all accessories/ features), Junction Boxes, PVC Pipes, Cables/Wires including connectors/plugs/fuses, ACDB, Suitable Lightening Arrestor / Earthlink etc. and accessories along with Tool kit and spares for 1 year. The scope of work includes suitable mounting structure (structural steel items) including anchoring, civil work, with all cables, hardware, nuts, bolts, with civil works and fabrication as approved by client and architecture etc. With liasioning work to avail grid connection from local authority complete in all respect. Obtaining all statutory approval shall be in the scope of contractor, no extra/additional payment shall be made by the bank for the same.

2.0 Specifications

Special features of the system:

- MNRE approved PV Module
- PV mounting structures of MS cold rolled sections galvanized extremely durable and corrosion free and tested for all weather conditions.
- The system components such as junction boxes, connectors, conduits, plugs, cables, will be of solar grade/IP65 grade which can withstand extreme weather conditions.

Solar PV Modules and Mounting Structures: PV Size: Min 50 KWp

- Make: PV modules shall be MNRE approved
- Type: Mono Crystalline
- PV panels Wattage: Min 520 Wp
- No of Panels and cells per panels: As per manufactures standard
- Dimensions, rated Voltage, Open Circuit voltage, Rated Current, short Circuit Current, maximum system Voltage, weight per panels Cell efficiencies and Module Efficiency shall be as per the manufactures standard.
- Indian/International Certification: IEC

- **Mounting structures:** MS Galvanized. The PV modules are mounted on the structure and the entire PV array shall be in systematic arrangement of PV modules structures such that shadow of nearby structures should not fall on other structures. The structure shall support SPV modules at a given orientation, absorb and transfer the mechanical loads to the ground properly.

Inverter:

- Make: ABB, APC, Havells, Delta, Fronius, SMA after prior approval of Consultant
- Rated capacity: As per Required KVA
- Efficiency: Min 94%
- Output voltage & Frequency: 415 V, 3phase, 50 Hz
- Voltage & frequency tolerance limit: Voltage +- 10%, Frequency +- 3%
- Number of units to be used: As per manufacture standard
- Voltage THD < 3%
- No-load loss < 1% of rated power
- Wide range of Grid voltage & frequency parameters for synchronization
- Sinusoidal current modulation with excellent dynamic response
- Unit wise & integrated Data logging
- Protection against over current, Synch loss, over temp, DC bus over voltage, EMI &RFI.
- Power regulation in the event of thermal overloading
- Bus communication via RS 232/RS 485/MPI/Profibus DP-interface for integration
- Integrated protection in the DC and three-phase system
- Insulation monitoring of the PV array with sequential fault location.

Safety Features:

- Earthing of all outdoor equipment and provision of associated earthing systems, Electrodes and connections shall be done in accordance with the recommendations in the latest IEEE. Earth electrodes shall be provided throughout the plant areas along with the main earth grid. The number of earth electrodes shall be according to achieve the total earth grid resistance less than one (1) ohm
- When the grid fails, it leads to "Islanding" of the local grid and the load from the main grid. As a safety measure, the inverter is disconnected immediately and power is not exported to the grid.

- The inverter shall have features like sleep mode, invoke mode and export mode so that any disturbances on the grid such as overload short-circuit, over-voltage etc., disables the firing circuit of the inverter and causes it to quietly withdraw from the grid.

Protection Features:

- Isolation transformer to be provided at the output of the inverter to avoid injection of DC power into the grid.
- Over-voltage protection to be provided by using varistors at the output of the inverter.
- For lightning protection, a set of varistors to be provided at the input of inverter.

Metering:

- In addition to other normal measuring devices, suitable Digital type Energy meter to be provided in the control panels to record Energy/KWH being saved/utilized due to use of solar Energy.

Warranty:

Solar panel performance warranty shall be for **minimum 25 years** and **entire system** warranty shall be for **minimum 10 years** against any manufacturing defects. However, for the purpose of calculating validity period of performance bank guarantee, guarantee/warranty shall be considered as **5 Years. Entire Solar System** warranty shall be **5 Years** from the date of completion.

LIST OF APPROVED MAKE / MANUFACTURER FOR ELECTRICAL WORK MATERIALS

Modules	Waaree, Adani, Tata, Havells, Panasonic.
Inverter	ABB, APC, Havells, Delta, Fronius, SMA, ETON.
PVC Pipes & Accessories	ISI & FIA approved & manufactured from virgin material. Precision (PPI)NIHIR, , Vraj)
Flexible Copper Wires	FRLS type : Havell's, Finolex, RR kabel, polycab, Avocab
Distribution boards	LEGRAND - Ekinox3 / SCHNEIDER - Acti9 / HAGER - Novello Plus/ / L&T Factory fabricated. Double door type.
ACB/ MCB/RCCB	LEGRAND - DX3 / SCHNIEDER – ACTI 9(A9N) / HAGER- NC / L&T
Water Tight Junction Box	Hensel , Sintex, spelsberg
M.S. Boxes	Fabricated out of CRCA sheets / Angle / Strip continuously welded (sample to be approved) with Powder coating / Colour coating.
Chemical Type Earthing & LA	OBO, Cape, JEF
Steel / Structural Steel	TATA, SAIL, VIZAG