| Sr No | Scope and Category Description | Design Basis or Consideration |
|-------|--|---|
| Α | General considerations | |
| 1 | Location | Dhansa, Delhi 28.566682, 76.845802 |
| 2 | Design Ambient Temp | 50 degree |
| 3 | Altitude | 300 Mtrs |
| 4 | Humidity (relative) | 0.67 |
| 5 | MMS Configuration | Fixed Tilt Elevated Structure Suitable for Agriculture Beneath SPV Modules |
| 6 | Plant DC Capacity | 1X 4.925 MWp |
| 7 | Plant AC Capacity | 3.8 MW @ Unity Power Factor |
| 8 | Module Wp (considered) | 545 Wp |
| 9 | String configuration | 28 Nos. module per string |
| 10 | Inverter Type and capacity | Sungrow brand of invertors from Sungrow power supply company Multi-MPPT String Inverter for 1500 Vdc System-295 KVA at 50 deg C |
| 11 | DC Ohmic loss | 1.5% avg. |
| 12 | AC Ohmic loss | 1.5% avg |
| 13 | Boundary Length | 1.0 Km |
| 14 | Pullout test | Considered. |
| 15 | Lateral test | Considered. |
| В | Structure Design | |
| 1 | Design Wind Speed | 170 km/hr as per IS 875 |
| 2 | Pitch Distance | 6.5 Meter |
| 3 | MMS Details | 1.Vertical Column/Leg: 230CS130x35x2.5, HDG with 80 microns coating 2. Purlin – 80CS50x10x2.0, Pregalvanized/Galvalume 2. Rafter – 190CS80x20x2.0, Pregalvanized/Galvalume 3. Front Bracing – 60CU40x2.0, Pregalvanized/Galvalume 4. Rear Bracing – 60CU40x2.0, Pregalvanized/Galvalume MMS design for factor of safety is "0.7" |
| 4 | Module clearance | 2500 mm from NGL.Suitable for agriculture below panels |
| - | | |
| 5 | Pile Foundation details | 2.2 Mtrs Depth X 350 mm Dia PCC Piling |
| C | | |
| | Internal Road (Main road to the Plant) | Plant is connected to Main road, |
| D | Fencing | |
| 1 | Plant Periphery Fencing | A mix of precast reinforced concrete blocks fencing of height 2 m and Chain link fencing will be used. Chain Link Fencing using galvanized barbed wire Height: 2 m Specs for Chain link fencing (without Concertina Wire) Mesh Size: 50mm x 50mm Column Post: Posts shall be 50x50x5 MS angles Barbwire: 3 rows of 2.5mm diameter, 200mm C/C |
| 2 | Plant Switch Yard Fencing | Chain Link Fencing using galvanized barbed wire Height: 2 m Specs for Chain link fencing Mesh Size: 50mm x 50mm Column Post: Posts shall be 50x50x5 MS angles Barbed wire: 3 rows of 2.5mm diameter, 200mm C/C |

| 3 | Main Gate for Entrance | Type of Gate: Tubular sections steel mesh (Swinging) Number of Gates: 1 no. Height of Main Gate: 2.2 m above NGL Width of Main Gate: 4.5m Side Gate: Width: 750mm to 1200mm, Height: 1.5m |
|---|----------------------------|---|
| Е | Drainage, Security Cabin | |
| 1 | Plant Drainage | Natural Drainage shall be followed for routing of drain water. In places where water may get accumulated, suitable flow path for the same shall be provided to connect to Natural Drains. |
| 2 | Security Cabin | 1 no. of Prefabricated Security Cabin at the Main Gate |
| F | Main Control Room | |
| 1 | MCR | Type of Room: Prefab typeQuantity: 1 no. / Area: 13.86 sqm |
| G | SCADA, SLDC and Monitoring | |
| 1 | SCADA | Without any type of redundancy and Cloud storage facilitySCADA own database |
| 2 | Weather Monitoring | One set Integrated Weather stations (for entire Plant): 1. Pyranometer- 2Nos.(1GHI+1GII) 2. Module temperature sensor: -To measure PV module temperature: 1 No. 3. Ambient & Rel. Humidity Sensor-To measure atmospheric temperature and Relative humidity 4. Data logger - 1 no. 5. Feed through UPS supply (from MCR) |
| Н | Miscellaneous | |
| 1 | Lighting | A) LED Lighting for Inverter, Transformer, MCR and Peripheral Lighting. SCADA/Control Room: -300 Lux Equipment rooms 150-200 Lux Office 100-150 Lux Battery & other rooms 100 Lux Other areas including periphery wall 5 Lux Transformer yard 15Lux H Pole and metering point 10Lux Switchyard:-10 Lux B) 100 % conventional AC streetlights without Solar powered streetlight to be used in periphery lighting & Pole height shall be 2 Meters with pole to pole distance 40 Meters with fixture wattage of 12 Watt |
| 2 | Fire Extinguishers | Inverter, Transformer Area & Switchyard Portable fire extinguisher DCP type (10kg): 1no. per Block Portable fire extinguisher CO2 type (9kg): 1no. per Block MCR Portable fire extinguisher DCP type (10kg): 2 Nos Portable fire extinguisher CO2 type (9kg): 1No. |
| 3 | Safety Items | • LT (1.1kV) Rubber Mat• 11 kV Rubber Mat• Sand bucket with stand • Shock Treatment Chart |
| I | Module Cleaning | |

| 1 | Piping Arrangement Septic Tank and Soak Pit | Cleaning Arrangement: Piping Arrangement Type of Pipe: Below ground HDPE Pipe - PE100 (Polyethylene 100) and PN10 (Nominal Pressure 10) Cleaning Cycle: As proposed in O&M Section No. of tanks & Type: 1 Nos., Outdoor PVC Tank Tanks capacity: As per design considering cleaning cycle Bore well: 1 Nos of Bore well Water Availability: Assumed to be available underground within depth of 100 ft. Provision for suitable robotic cleaning as well Near Control Room Area: Precast Septic Tank (2.1m x 2.1mx 1.5 m) 1 no. Scalk Pit (1 2m diameter, 1 5m donth) 1 no. |
|---|--|--|
| J | Cable Laving | • Soak Fit (1.211 diameter, 1.511 depui). 1 no. |
| 1 | String cables | Solar string cable shall be laid in cable tray above ground |
| 2 | Fiber Optic Cables | Fiber optic cable shall be armored and buried directly in ground (wherever possible) else it will be cable tray arrangement |
| 3 | DC Power Cables (from Module to Inverter) | Cables shall be laid in cable tray properly mounted on fixed structure |
| 4 | 11 kV HT Cables | 11 kV Cable Direct buried in ground Road Crossing: Cables shall be laid in hume pipe. With brick protection and danger tape |
| K | Earthing and Lightening | |
| 1 | Earth Pits | Type of Earth pit: Conventional/ Treated Material of Electrode: Copper bonded Diameter of Electrode: 17 mm Length of Electrode: 3 m Array Main Earthing Conductor - GI (25 x 3 mm) / wire AC Main Earthing Conductor - GI (50 x 6 mm) / wire |
| 2 | Lightning Protection | Type: Early Streamer Emission (ESE) Type Conservation area: Level IV Triggering: As per OEM Radius of Protection: 107 m (or as per OEM) |
| L | DC PART | |
| 1 | PV Modules | Rayzon make Monocrystalline 545 wp Total Nos. 9083 |
| 2 | Inverters | Sungrow brand of String Inverters Type: Compatible with Module Connector, MC4 Rated Voltage: 1500V dc (as per configuration offered) Current Rating: 15A / 30A / as per design requirement 13 Nos. |
| 3 | PV Connectors | • MC 4 connector without fuse; Current Rating: 15A / 30A / as per design requirement |
| 4 | DC Cables (Module to Inverter) | Insulation: Electron Beam XLPO Outer Sheath: Electron Beam XLPO Unarmored Cable |
| Μ | AC Part | |

| 1 | Inverter Duty Transformers | Type: 2 Winding 2 MVA: Equal to cumulative Inverter kVA (at unity power factor) of block size at 50 deg. C. MV Rating: 11 kV LV Rating: As per Inverter Output Voltage(800 V) Impedance: As per Inverter Manufacturer's recommendation Cooling: ONAN Connection: LV side – Star Connection, MV side – Delta Connection Winding: Copper Insulation: Class A Flux Density: 1.8 wb/sqm @ 100% voltage Current Density: 3.5 A/sqmm Tap Changer: OCTC (Off Circuit Tap Changer) Fault current Withstand: 2 sec |
|---|---------------------------------------|--|
| 2 | HT Power Cables | Cross Sectional Area: 240 sq. mm /as per design requirement Rated Voltage: 11 kV Voltage Grade: 6.6 / 11 kV (Earth Grade) Conductor: Aluminum, Single/Three Core Insulation: XLPE Filler and: As per IS/ OEM Inner Sheath: PVC ST2 (extruded) Outer Sheath: PVC ST2 Armoring: GS Flat strip |
| 3 | Communication Cable | RS 485 & CAT 6 |
| 4 | Fibre Optic Cables | Single mode Fibre Optic |
| N | MV Switchgear | |
| 1 | ICOG Switchboard | General Details Nominal System voltage:11 kV Breaker: Vacuum (draw out) Fault Breaking Capacity of CB: 20 kA for 1 sec Thickness of Material: 2.5 mm (Load bearing member), 2 mm (Non load bearing member) Paint Shade : RAL 7032 (Epoxy Powder Coating) Bus Bar: Aluminum Alloy Bus Bar Rating: As per Design Installation: Outdoor MFM (Class 0.5), Communication: Modbus Current Transformer (CT): Secondary Current: 1 A / Class of Insulation: Class E Protection: 0.5, 5P20 / Burden: 5VA Short Circuit Rating: 20kA for 1 sec Line PT: Ratio: As per design Protection: 0.5, 3P |
| 0 | UPS/Battery | |
| 1 | UPS (5 kVA) – MCR | Capacity: 5 kVA (Capacity as per Design) Input Voltage Variation: 415/230/240V±10% (as per OEM) Phase of Input Supply: 3 Φ Output Voltage: 230/240V±10% (as per OEM) Backup time: 30 min Overload Capacity: 125% for 5 min & 150% for 30 sec Outgoing: MCBs (SP/DP) Battery Type: VRLA/ SMF Backup time: 30 min |
| Р | 2-Pole Structure & Transmission Infra | |
| 1 | ABT Meter | Main & Check ABT Meter |

| 2 | 11 KV PT | 2-Core PT CL 0.2s,50VA |
|---|--|---|
| 3 | 11 KV CT | 2-Core CT 0.2s 10VA |
| 4 | 11 KV Isolator | 11 kV Manual isolator with Earth Switch |
| 5 | 11 k LA | LA Station Class |
| 6 | Four pole structure for power evacuation | Two in one out |