

from the applicant. In case if material is not supplied within the mutually agreed time period the applicant may opt to change the firm.

10. The applicant/Bank will release the 50% amount after receiving material at site (on joint inspection of verification of material at site as per Annexure-3.) Remaining 50% payment will be after commissioning of the solar power plant in all respect after COD (on joint inspection report as per Annexure-4.)
11. In case any firm receives more than 500 nos of work order from the applicants. It will be mandatory for any firm to inform UREDA along with the status of progress of previously received order and seek written permission of UREDA prior to receiving more work order from applicant.
12. The details of rate and other various terms and conditions mutually agreed upon between the allottees and firm for installation of solar power plant shall be recorded on non-judicial stamp paper of Rs 100/- which shall be legally binding on the parties.
13. It is clarified that UREDA role is solely to facilitate the allottees for the installation of solar power plant. UREDA is not at all involved in arranging or releasing the funds for this scheme. UREDA shall not be responsible in financial/legal/ or in any other manner in case of any kind of dispute arising between allottees and firms at any stage.

14. UREDA right to withdraw the EOI and to reject any proposal from firms

- i) This EOI may be withdrawn or cancelled by UREDA at any time without assigning any reasons thereof. UREDA further reserves the right, at its complete discretion, to reject any or all of the proposals without assigning any reasons whatsoever and without incurring any liability on any account.
- ii) UREDA reserves the right to interpret the proposal submitted by the firms in accordance with the provisions of the EOI and make its own judgment regarding the interpretation of the same. In this regard the UREDA shall have no liability towards any firm and no firm shall have any recourse to UREDA with respect to the selection process.
- iii) UREDA reserves its right to vary, modify, revise, amend or change any of the terms and conditions of the EOI prior to the date of submission. The decision of DIRECTOR UREDA regarding acceptance/Rejection of any proposal will be full and final.

मुख्यमंत्री सौर स्वरोजगार योजना के अर्न्तगत जनपदवार अनुमन्य मार्जिन मनी/अनुदान का विवरण

श्रेणी	सम्मिलित/आच्छादित क्षेत्र	अनुमन्य मार्जिन मनी/ अनुदान की मात्रा
श्रेणी-ए	जिला पिथौरागढ़, उत्तरकाशी, चमोली, चम्पावत, रुद्रप्रयाग, बागेश्वर का सम्पूर्ण क्षेत्र।	25 प्रतिशत
श्रेणी-बी	<ul style="list-style-type: none"> जनपद अल्मोडा का सम्पूर्ण भू-भाग। जनपद पौड़ी गढ़वाल तथा टिहरी गढ़वाल के मात्र पर्वतीय बहुल विकासखण्ड (बी+श्रेणी में वर्गीकृत क्षेत्रों को छोड़कर)। जनपद नैनीताल तथा जनपद देहरादून के मात्र पर्वतीय बहुल विकासखण्ड (बी+ व सी श्रेणी में वर्गीकृत क्षेत्रों को छोड़कर)। 	20 प्रतिशत
श्रेणी- बी	<ul style="list-style-type: none"> जनपद पौड़ी गढ़वाल के दुगड्डा विकासखण्ड के कोटद्वार, सिगड्डी और इनसे जुड़े हुये मैदानी क्षेत्र तथा टिहरी गढ़वाल के फकोट विकासखण्ड के ढालवाला मुनी-की-रेती, तपोवन तथा उससे जुड़े हुये मैदानी क्षेत्र। जनपद नैनीताल के कोटाबाग विकासखण्ड का सम्पूर्ण क्षेत्र। जनपद देहरादून के कालसी विकासखण्ड के मैदानी क्षेत्र। 	
श्रेणी-सी	<ul style="list-style-type: none"> जनपद देहरादून के रायपुर, सहसपुर, विकासनगर व डोईवाला विकासखण्ड के समुद्रतल से 650 मी० से अधिक ऊंचाई वाले क्षेत्र। जनपद नैनीताल के रामनगर व हल्द्वानी विकासखण्ड में आने वाले क्षेत्र। 	15 प्रतिशत
श्रेणी-डी	<ul style="list-style-type: none"> जनपद हरिद्वार एवं उधमसिंहनगर का सम्पूर्ण क्षेत्र तथा जनपद देहरादून व नैनीताल के अवशेष समस्त मैदानी क्षेत्र (श्रेणी-बी, बी व सी में सम्मिलित क्षेत्र को छोड़कर)। 	

GENERAL TECHNICAL SPECIFICATIONS

A Grid Tied Solar Photo Voltaic (SPV) power plant consists of SPV array, Module Mounting Structure, Power Conditioning Unit (PCU) consisting of Maximum Power Point Tracker (MPPT), Inverter, and Controls & Protections, interconnect cables, Junction boxes, Distribution boxes and switches. PV Array is mounted on a suitable structure. Grid tied SPV system is without battery and should be designed with necessary features to supplement the grid power during day time. Components and parts used in the SPV power plants including the PV modules, metallic structures, cables, junction box, switches, PCUs etc., should conform to the BIS or IEC or international specifications, wherever such specifications are available and applicable. Solar PV system shall consist of following equipment's/components.

1 Brief Description of the System

The main components of the SPV plant are

- PV Modules
- Civil Work.
- Module Mounting Structure.
- Array Junction Boxes.
- String Monitoring Boxes
- Grid Tie Inverters
- Step- up Transformer – LT
- Step- up Transformer – HT
- SCADA / Monitoring System as per predefined parameters
- Earth System
- Lightning & Surge Protection
- DC Cables.
- AC Cables.
- Illumination System
- AC Metering and Grid Interconnection System.

This list is of general nature and some of the components may not be required or may be combined as per the system finally designed.

2 Typical Power Generation Scheme

The system consists mainly of the following:

- Solar PV array – which produces DC electricity when solar rays are incident on it
- Power Conditioning Units (PCU) or Inverters – which convert DC (Direct Current) electricity into AC (Alternating Current) electricity and facilitate synchronization with the grid power

- Transformers – which transform the AC output of the Power Conditioning Units to the level required at the grid

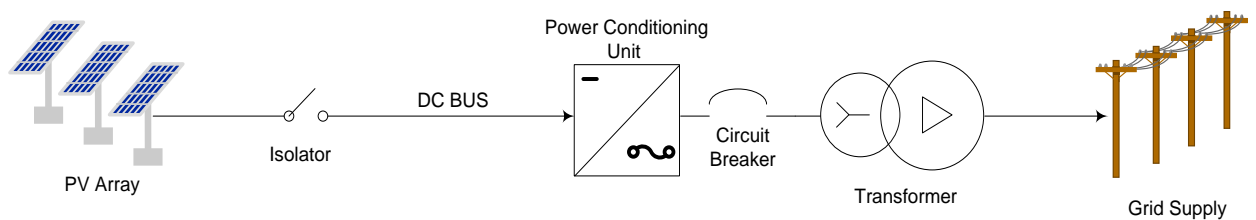
The SPV array (constituting solar PV modules of selected rating connected in series and parallel combinations to build up the Voltage and Current parameters as per desired design modalities) produces DC electricity when Solar insolation is incident on it. The DC power thus produced is taken through various junction boxes and isolators and connected to the Inverter.

The Inverter houses the inverter circuitry which converts DC power supply into AC power supply, the synchronization circuitry which actualizes the tie-up of solar PV source to the grid source and control circuitry. A number of Inverters are connected in parallel as per the desired AC Power required.

Depending on the grid voltage level to which the solar PV power is being synchronized, different levels of step-up transformers may have to be deployed.

The protection and metering circuits play a very significant role in the Inverter operation. Appropriate current transformers and potential transformers are used to tap required feedback signals to initiate action on metering and protection.

A Typical schematic diagram of a Grid connect system is shown below:



3 Typical System Components

SOLAR PHOTOVOLTAIC MODULES:

The PV modules used must qualify to the latest edition of IEC PV module qualification test or equivalent BIS standards Crystalline Silicon Solar Cell Modules IEC61215/IS14286. In addition, the modules must conform to IEC 61730 Part-1 - requirements for construction & Part 2 - requirements for testing, for safety qualification or equivalent IS.

- a) For the PV modules to be used in a highly corrosive atmosphere throughout their lifetime, they must qualify to IEC61701.
- b) The total solar PV array capacity should not be less than allocated capacity (KWp) and should comprise of solar crystalline modules of minimum 300 Wp and above wattage. Module capacity less than minimum 300 watts shall not be accepted.
- c) Protective devices against surges at the PV module shall be provided. Low voltage drop bypass diodes shall be provided.
- d) PV modules must be tested and approved by one of the IEC authorized test centers.

e) The module frame shall be made of corrosion resistant materials, preferably having anodized aluminum.

f) The bidder shall carefully design & accommodate requisite numbers of the modules to achieve the rated power in his bid. Owners shall allow only minor changes at the time of execution.

g) Plants installed in high dust geographies like Rajasthan and Gujarat must have the solar modules tested with relevant dust standards (Applicable standard would be IEC 60068-2-68).

h) Other general requirement for the PV modules and subsystems shall be the Following:

- i. The rated output power of any supplied module shall have tolerance within $\pm 3\%$.
- ii. 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.
- iii. The module shall be provided with a junction box with either provision of external screw terminal connection or sealed type and with arrangement for provision of by-pass diode. The box shall have hinged, weather proof lid with captive screws and cable gland entry points or may be of sealed type and IP-65 rated.
- iv. I-V curves at STC should be provided by contactor.

i) Modules deployed must use a RF identification tag. The following information must be mentioned in the RFID used on each module. This should be inside the laminate only.

- i. Name of the manufacturer of the PV module
- ii. Month & year of the manufacture (modules)
- iii. Only indigenously manufactured PV panels (only modules) should be used.
- iv. I-V curve for the module Wattage, I_m , V_m and FF for the module
- v. Unique Serial No and Model No of the module
- vi. Date and year of obtaining IEC PV module qualification certificate.
- vii. Name of the test lab issuing IEC certificate.

j) Material Warranty:

Material Warranty is defined as: 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 Ten (10) years from the date of sale to the original customer ("Customer").

- i. Defects and/or failures due to manufacturing.
- ii. Defects and/or failures due to quality of materials.
- iii. Non conformity 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

k) Performance Warranty:

The predicted electrical degradation of power generated not exceeding 20% of the minimum rated power over the 25 year period and not more than 10% after ten years period of the full rated original output.

ARRAY STRUCTURE:

- a) Hot dip galvanized/Suitable Pre Galvanized MS mounting structures may be used for mounting the modules/ panels/arrays.
- b) Structure should have angle of inclination as per the site conditions to take Maximum Solar Irradiation. However to accommodate more capacity the angle inclination may be reduced until the plant meets the specified Performance ratio requirements.
- c) The Mounting structure shall be so designed to withstand the wind speed applicable to project site per IS Standard (like Delhi-wind speed of 150km/hour). Bidder must submit Wind Load Calculation and STAAD Analysis for structure components, fasteners and foundation duly certified by MNRE empanelled Chartered Engineer. Suitable fastening arrangement such as grouting and clamping should be provided to secure the installation against the specific wind speed.
- d) The mounting structure steel shall be as per latest IS 2062:1992 and galvanization of the mounting structure shall be in compliance of latest IS 4759.
- e) Structural material shall be corrosion resistant and electrolytic ally compatible with the materials used in the module frame, its fasteners, nuts and bolts. Aluminum structures also can be used which can withstand the wind speed of respective wind zone. Protection towards rusting need to be provided either by coating or an iodization.
- f) Aluminum frames should be avoided for installations in coastal areas.
- g) The fasteners used should be made up of stainless steel. The structures shall be designed to allow easy replacement of any module. The array structure shall be so designed that it will occupy minimum space without sacrificing the output from the SPV panels
- h) The total load of the structure (when installed with PV modules) on the ground should be less than 30kg/m².
- i) The minimum clearance of the structure from the ground evel should be 300mm.

AC DISTRIBUTION PANEL BOARD:

- a) AC Distribution Panel Board (ACDB) shall control the AC power from PCU/ inverter, and should have necessary surge arrestors. Interconnection from ACDB to mains at LT Bus bar while in grid tied mode.
- b) All switches and the circuit breakers, connectors should conform to IEC 60947, part I, II and III/ IS60947 part I, II and III.
- c) The changeover switches, cabling work should be undertaken by the bidder as part of the project.
- d) All the Panel's shall be metal clad, totally enclosed, rigid, floor mounted, air - insulated, cubical type suitable for operation on three phase / single phase, 415 or 230 volts, 50Hz
- e) The panels shall be designed for minimum expected ambient temperature of