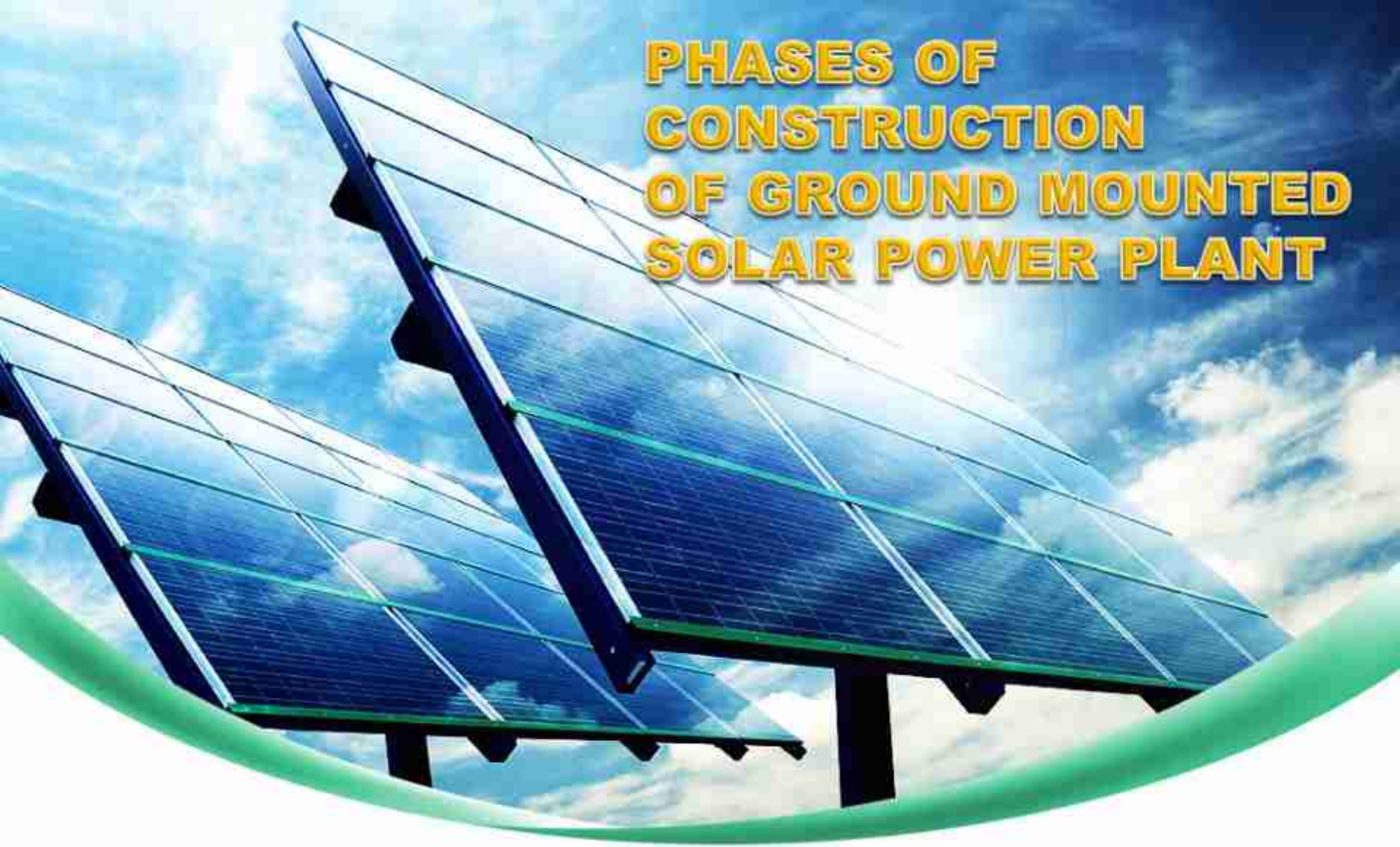


PHASES OF CONSTRUCTION OF GROUND MOUNTED SOLAR POWER PLANT

FIDATO

Fidato Consultants Private Limited

A leading Renewable Energy Advisory and Solar EPC Company

The life-cycle of a PV power plant can be summarized in three main phases.

The first three steps **project phase** is the ones that actually lead to the construction of the power plant, & typically span over 1 or 2 years. For this phase, a considerable number of planning, engineering, and auxiliary services are offered, mainly by the EPCs (Engineering, Procurement, & Construction) companies & their associated partners.

The **generation phase** of the PV power plant is likely to span over 20-25 years and thus it is in support of its Operation & Maintenance (O&M) that services enhancing the value of the facility can be more clearly identified. The number and variety of such services has been increasing in recent years.

End-of-life (EOL) solar panels may become a source of hazardous waste although there are enormous benefits globally from the growth in solar power generation. Global installed PV capacity reached around 400 GW at the end of 2017 and is expected to rise further to 4500 GW by 2050. Eventually, there will be great scopes to carefully investigate on the disposal and recycling of PV panels EOL.

SITE SELECTION & LAND ACQUISITION

Sites receiving good amount of solar radiation and closer to the STU/CTU (i.e. State Discoms or Power Grid Corporation of India) are usually selected for the setting up a solar power site. State Govt. may provide Government waste/non-agricultural land to speed up the process. But good solar radiation and proximity to the CTU are not the only criteria for selection of land. The cost of land is a very important factor too. The cost of land should be kept as low as possible in order to make it attractive to the developer.

SITE SURVEY

Site survey provides crucial information when designing the solar power plant and 3 important factors considered during a Site Survey are:

-Approach and Technical Feasibility
-Land Topography
-Site boundary

Design & Engineering

Design & Engineering is the most important stage of a project and can result in recurring losses for 25 years if project is not designed properly . It includes following major areas:

1. **Architectural designing-** includes PV array layout , MMS foundation layout, string grouping layout, equipment layout etc.
2. **Civil designing-** includes structure foundation, equipment foundation and control room foundations and other details as per soil report and seismic zone.
3. **Structural Engineering-** includes designing of module mounting structure as per wind and seismic zones so as to bear a significant wind pressure and rust free design for 25 years.
4. **Electrical designing:** includes DC & AC side designing, loss calculations, shadow analysis, cable sizing, string sizing , single line diagrams etc.
5. **Other calculations-** PV syst generation simulation reports, earthing calculations, cable loss calculations , STAAD report for structure, other monitoring schematics and reports.

LEVELLING OF SITE

Levelling of site is important to avoid the shading problem which can result in the inconsistent power output when required. The points where the mounting structure is to meet the foundation must be level, and any mounting bolts must be spaced correctly. It is critical that careful measurements be made both for spacing and for flatness.

LAND GRADING

Developing The land & Bosh Cutting For Marking of pile point.

ANALYSE THE DIRECTION

Checking and marking the north-south direction with the help of a compass.

ALIGNING THE LOCATION

Aligning the location for the foundation for mounting structure

MARKING FOR MOUNTING STRUCTURE FOUNDATION

Marking of the mounting structures foundations as per the design.

AUGURING (DRILLING HOLES FOR FOUNDATION)

Drilling foundation pits with DTh Machine or Tractor Auguring & Column Alignment

PILE CASTING AFTER COLUMN ALIGNMENT

PIER FOUNDATION

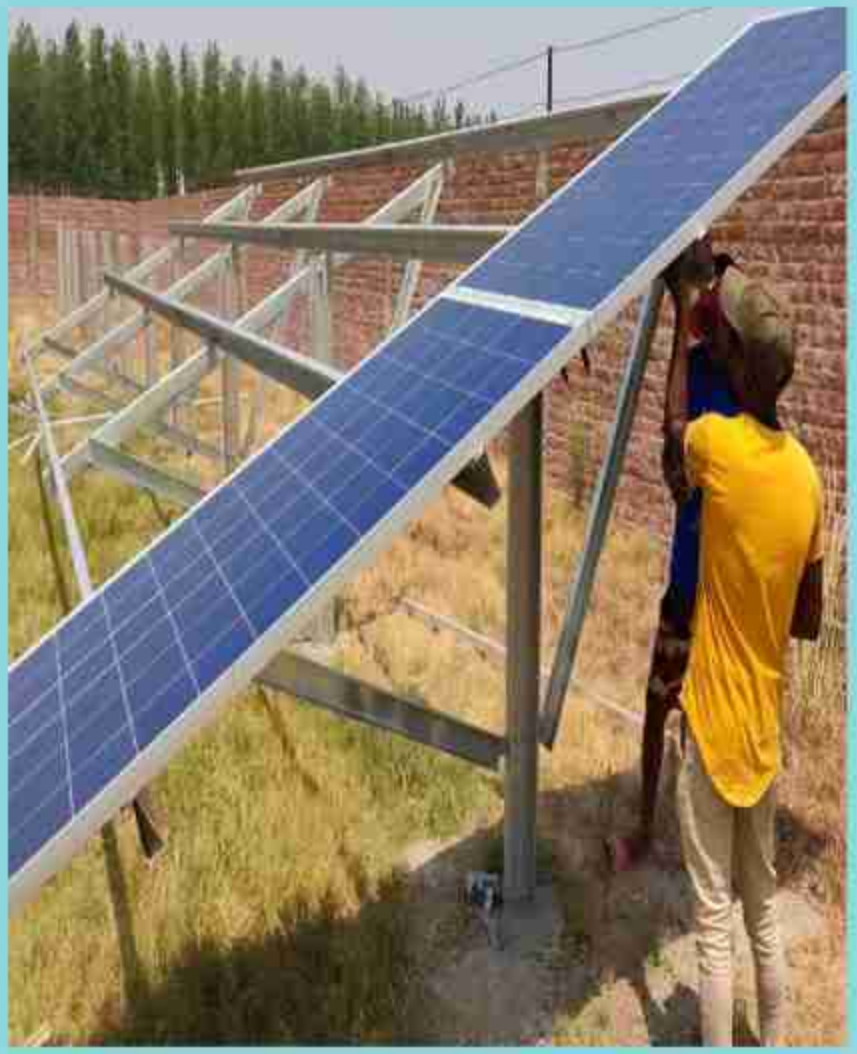
All foundations of pier should be at same height for proper alignment and lesser shadow losses.

STUB AND COPING

The stub shall be set correctly in accordance with approved method at the exact location and alignments and alignment and in precisely correct levels. The stub setting templates shall be used for proper setting of stubs.

MMS INSTALLATION AFTER COMPLETION OF PILE CASTING

MODULE ALIGNMENT ON MODULE MOUNTED STRUCTURE



FOUNDATION FOR MOUNTING THE TRANSFORMER

DC CABLE LAYING & CONDUIT DRESSING

STRING CABLE LAYING FROM MODULE TO SMCB

DC CABLE LAYING FROM SMCB TO INVERTER

UNDERGROUND

OVER CABLE TRAY

DC CABLE TERMINATION IN SMCB WITH MC4 CONNECTOR

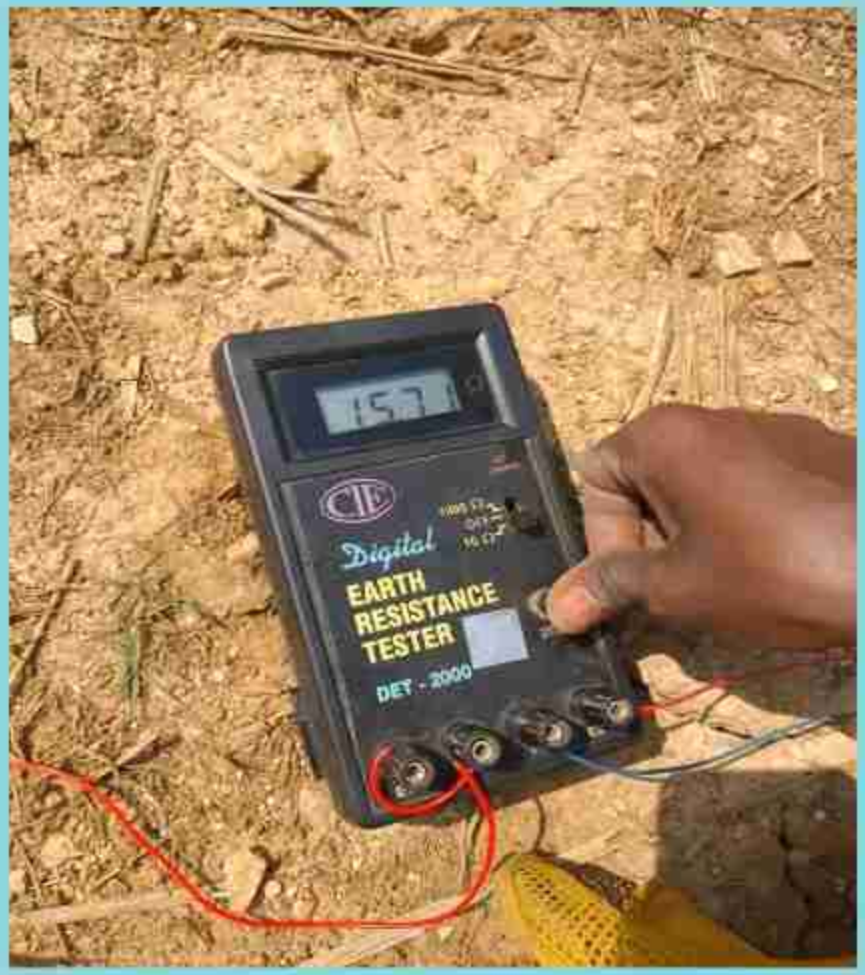
INVERTER STATION EQUIPMENTS ERECTIION (IDT, INVERTER , ICOG PANEL, METERING PANEL,PLC & UPS)

DC VOLTAGE TESTING IN OPEN CIRCUIT (VOC) SYSTEM VOLTAGE

IDT ERECTION & HT CABLE END TERMINATION

IDT & ICOG PANEL PRE-COMMISSIONING TESTING

EARTH PIT TESTING & THERMO GRAPHIC TEST



OVER HEAD TL LINE 33KV FROM ICR TO PSS

The output power from SPV would be fed to the inverters which converts DC produced by SPV array to AC and feeds it into the main electricity grid after synchronization. In case of grid failure, or low or high voltage, solar PV system shall be out of synchronization and shall be disconnected from the grid

TRANSFORMER YARD

600V AC LT Cable From Inverter to IDT

6.875 MVA Inverter Control Room

11 KV or 33 or 132 KV SWITCHYARD/PSS as per Evacuation Voltage

Fidato Consultants Private Limited

A Leading Renewable Energy Advisory & Solar EPC Company

Registered Address: 209/1, Kishan Nagar Extension, Dehradun, Uttarakhand
Corporate Address: 2nd Floor, 1 Engineers Enclave, GMS Road, Dehradun, Uttarakhand

www.fidatoconsultants.com info@fidatoconsultants.com 0135-7961900, 7567628414