

Constructing a Solar power plant is like constructing a house; thereby, there should be no compromise on the components, design, Quality and construction. The solar plants fall under three different types of systems.

## **ON GRID SOLAR SYSTEM:**

On-grid solar power system is a solar power generation system where it is connected to the utility grid. The electricity produced by the system is routed to the grid from where it is used to run the various appliances. The installation of the same is easy to maintain.

## **OFF GRID SOLAR SYSTEM:**

Off-grid systems is independent of grid and have batteries that stores the solar power generated by the system after the load is satisfied. The system consists of solar panels, battery, charge controller, grid box, inverter, mounting structure and balance of systems. During absence of sunlight, the inverter converts battery power to satisfy the loads.

## **HYBRID SOLAR SYSTEM:**

Solar hybrid system is a combination of solar on grid and off grid system, the inverter is connected to the grid and to batteries. Inverter satisfies the loads and stores the excess power into battery, in case the batteries are also satisfied the power from solar is exported into the grid. Here the loads are satisfied on priority basis. The first priority is to solar, second is to Grid and third priority is Battery. Priorities can be programmed in the inverter based on site requirement.

Solar plant in combination with a DG, Wind, or any other power generating source can be sometimes termed as Hybrid system

## **Finance Models for Solar Power Plants**

**Capex** – Capital Expenditure: Owned and Funded by the consumer directly.

**OPEX** – Operational Expenditure: Owned and financed by third party developer and consumer uses the energy from the plant

**RESCO** - Renewable Energy Service company: RESCO developers Owns the plant and sells power to the consumer.

There is also a way to feed power with Power purchase agreement (Between Distribution Company or Energy Consumers).

## **SITE ANALYSIS:**

A detailed site analysis makes our work simpler and the execution smooth. Project Engineer must first visit to analyse the site. He/ She will have to examine the client's electricity needs and area availability to install a solar power plant on the roof of their

Premises / Industry(ies) / Institution/ Ground nearby their Premises or the ground away from their area.

He/She must then make a detailed report of shadows, routing of cables, location of Inverter, DB, Earth Pit Locations, Earth strips, Termination points and any other challenges in the site. The design engineer will then have to design the physical layout and electrical SLD of the site based on the above inputs.

### SELECTION OF MATERIALS:

Once site analysis and Design works are completed, the project coordinator arrange an technical meeting to discuss about the site scenarios, execution time, workflow and the materials involved in this project and then finalises the quantity , make of the material that has to be purchased. Before finalizing the materials, it is also important to discuss and understand the customers preference. After the components are finalised, the Project coordinator and Site engineer should make the BOM (Bill of materials).

In the meantime, Project Coordinator will have to make a final discussion about the layout and SLD with the customer and notify the design for changes after required approvals.

### WHY BILL OF MATERIAL (BOM):

BOM should list out the detailed view of materials (electrical, electronic, Mechanical, Civil) required to erect a Solar Power Plant. It must also include the technical specifications of the materials, availability of materials in the market, competitive rates of all the materials, scope of work and many more. It is very important to analyse the cost of Individual components and the cost of the overall project to have an organized project. Last but not the least, BOM can approximately give the profit details for the company.

BOM needs to be easy to understand and should have the below details:

INSTALLER NAME & LOGO											
Client Name : Site Location : System Model :				Capacity of the plant in Wp:		Date of BOM Generation:			Date of BOM Updation:		
Sl No	Material Description	Vendor Name & Make	Technical Specification	UOM	Qty	Rate / Unit	Amount	GST	Net Amount	Certificate needs to be furnished	Comments

### VENDOR MANAGEMENT, PROCUREMENT & PURCHASE:

Reducing the BOM cost is important and essential without compromising on the quality. Thereby, if a company has two/three Vendors for the major Components, we can select one based on their Payment, Dispatch and service terms along with best price & quality,

A Project Co Ordinator must verify Pricing, Payment Terms, Quality, After Sales Service, Transport Charges, Duration of Material Dispatch, Reputation of a concern and most

importantly maintain a good rapport with all the vendors of a concern. It is never easy to manage multiple vendors at the same time; some vendors may prove fruitful and others may not. But finding a way out, is the key to successful project completion.

Procurement plays a vital role in Project Execution and BOM is a key tool to procure all the materials for the respective site with the technical specification. Project Co Ordinator will then have to Co-Ordinate with the final vendor after various price negotiation and then release the purchase orders. All materials should be available at site by the said time.

#### **TRANSPORTATION:**

The Dispatch team will then have to arrange a mode of transport, depending on the materials that must be delivered. Make sure the transporter has all the required papers, as per Government rules & regulations.

#### **COMMISSIONING A PLANT:**

Once the site engineer receives the materials, the plant would be erected. Commissioning is a way to formalize quality control of installed PV systems. This process ensures that system is safe and performing as per their specifications.

#### **FILING OF DOCUMENTS & HANDOVER:**

After completion and commissioning of installed solar power plant, make sure to save the documents related to that site such as, Proforma Invoice, Purchase Order, Etc. for future references (for company & client). At the time of Handover, make sure to get the commissioning report signed by the client.

#### **MONITORING THE GENERATION:**

The system should be registered on the web monitoring portal and should be monitored on a regular basis by the technical support Experts and find a solution for faulty plants.

*"Quality is remembered long after the price is forgotten." ~ Gucci Family Slogan*



**Author:**

**Abirami S**

**Technical Co-ordinator**

**Academic Editor:**

**Nishitha S**

**Communication Manager**

