

5 Day Solar PV Practitioner Program – Training Modules



Module 1 – Introduction to Solar PV

- Key Drivers of Solar Industry
- Basics of Electrical for Solar
- Solar PV System Characteristics and Types
- Demo of Monitoring

Module 2 – Solar PV Panels

- Panels
- Quality Standards
- Key Performance Indicators
- Advances in Solar PV Technology
- New Commercially Viable Solar Tech
- Demo of Solar Cells and Modules

Module 3 – Solar PV Balance of System Components

- Structure & Earthing
- Cables – DC & AC
- Distribution Boxes and Combiner Boxes – SPD, MCB and Fuses
- Demo of Tools for Site Assessment and Shading Analysis
- Demo of Components

Module 4 – Grid Tied System

- Different types of Grid Tied Inverters
- Key Performance Indicators of Grid Tied System
- Design of Grid Tied System
- Practice Problems
- Demo of Tools for Design
- Demo of Grid Tied System

Module 5 – Off Grid & Hybrid System

- Battery
- MPPT and Charge Controller
- Power Conditioning unit
- Design of off-grid system
- Hybrid System
- Demo of Off –Grid System

Module 6 – PV System Installation and O&M

- Installation Practices
- Cleaning of Panels
- O&M Practices
- Monitoring for O&M

Solar PV Practitioner Program – Day 1



Day 1				
Sl No	Module	Head	Time	Description
1	M1	Introduction, Need for Training and Key Drivers	9:00 am to 10:30 am	Introduction, Agenda of Training, Need for Training. Key Challenges and Drivers of Solar PV Market
2	M1	Fundamentals of Electrical Engineering for Solar	10:30 am to 11:30 am	Electrical Engineering Recap including current, voltage, power, energy, earthing and protective devices
		Tea Break	11:30 am to 11:45 am	
3	M1	Solar PV System Characteristics and Different Types	11:45 am to 12:30 pm	Solar PV Fundamentals and Introduction to Different Types of Solar PV System with Block Diagram
4	M1	Introduction Monitoring Demo of Different Types of PV System	12:30 pm to 1:00 pm	Demo of monitoring of different types of PV System – Grid-Tied, Off-Grid and Hybrid
		Lunch Break	1:00 pm to 1:45 pm	
5	M2	Solar Cells, Characteristics, and Solar Modules	1:45 pm to 4:00 pm	Solar Cells Intro, Type of Solar Cells, Cells to Modules, Familiarization of Data Sheet, Demo of Solar Modules
		Tea Break	3:00 pm to 3.15 pm	
6	M2	Solar Modules Quality Issues and Applicable Quality Standards	3:00 pm to 5:00 pm	Quality Issues in Solar Modules, Key Challenges in Quality Control, Quality Standards, How to tackle quality challenge?
Q & A Session - 5:00 pm to 6:00 pm				

Solar PV Practitioner Program – Day 2



Day 2

Sl No	Mdle	Head	Time	Description
1	M2	Solar Modules Key Performance Indicators	9:00 am to 10:30 am	Solar Modules Key Performance Indicators and importance of each parameter (Degradation Rate, Temperature Coefficient, Efficiency etc.)
2	M2	Advances in Solar PV Technology	10:30 am to 11:30 am	New Solar PV Technologies available in the market, their performance and characteristics (Back Contact, Hetro Junction, Glass to Glass, Twin Peak, Bi-facial PERC etc.)
		Tea Break	11:30 am to 11:45 am	
3	M3	Solar PV Structure	11:45 am to 1:00 pm	Different Types of Structure - Al, GI, MS , Ballast Type , Penetrating Type, Structure for Flat Roof, Sheet Roof and Ground Mounted Installations . Considerations for selecting Structure
		Lunch Break	1:00 pm to 1:45 pm	
4	M3	Wires , Fuse, Earthing , MCB, Surge Protection, Earthing	1:45 pm to 3:30 pm	Solar Wires, AC Wires, MCB, Surge Protection Device, Earthing , Demo of Components
		Tea Break	3:00 pm to 3.15 pm	
5	M3	Site Audit for Structure Design - Considerations and Tools	3:30 pm to 4:00 pm	Key Considerations for Structure Design and Tools available for analysis
6	M3	Demo of Tools use in Shading Analysis	4:00 pm to 5:00 pm	Google Sketchup Demo for Shading Analysis
Q & A Session - 5:00 pm to 6:00 pm				

Solar PV Practitioner Program – Day 3



Day 3				
Sl No	Mdle.	Head	Time	Description
1	M4	Grid Tied Inverter Introduction, Types and Monitoring Demo	9:00 am to 10:30 am	Grid Tied Inverter Overview, Different Types of Grid Tied System – String, Central, Module Level Power Electronics – Optimizers, Micro-inverters
2	M4	Grid Tied Inverter – Key Performance Indicators	10:15 am to 11:30 am	Key Performance Indicators (Efficiency, MPPT etc.), Familiarization with data sheet
		Tea Break	11:30 am to 11:45 am	
3	M4	Design of Grid Tied System	11:45 am to 1:00 pm	Charge Controller Need & Basics, Charging Curve for a Battery, Functioning including PWM, MPPT Charge Controller Basics, MPPT Algorithm Basics, Key Performance Indicators, Design Problem
		Lunch Break	1:00 pm to 1:45 pm	
4	M4	Practice Problem – Grid Tied System	1:45 pm to 3:00 pm	Demo of off-grid products and components: Solar Lighting and direct dc applications
5	M4	Grid Tied System – Case Study and Demo of System	3:00 pm to 4:00 pm	Inverter Basics Recap , Introduction, Key Performance Indicators of Inverters, Data Sheet, Design Problem of Inverters . PCU Data Sheet Familiarization
		Tea Break	3:00 pm to 3:15 pm	
6	M4	Tools for Design of Grid Tied System	4:00 pm to 5:00 pm	PV Syst and other design softwares/Tools from Inverter Manufacturers Demo
Q & A Session - 5:00 pm to 6:00 pm				

Solar PV Practitioner Program – Day 4



Day 4				
Sl No	Mdle.	Head	Time	Description
1	M5	Off Grid and Hybrid System – Introduction and Key Components	9:00 am to 9:45 am	Off-Grid and Hybrid System SLD and Key Components in SLD
2	M5	Battery	10:15 am to 11:30 am	Battery Basics, Type of Batteries, Difference with Car Battery, Battery Data Sheet Terms/Comparison, Battery Key Performance Indicators, Design Problem. Advances in Battery Technology
Tea Break			11:30 am to 11:45 am	
3	M5	Solar Off-Grid System – Charge Controller and MPPT	11:45 am to 1:00 pm	Charge Controller Need & Basics, Charging Curve for a Battery, Functioning including PWM, MPPT Charge Controller Basics, MPPT Algorithm Basics, Key Performance Indicators, Design Problem
Lunch Break			1:00 pm to 1:45 pm	
4	M5	Demo of Off-Grid Products	1:45 pm to 2:15 pm	Demo of off-grid products and components: Solar Lighting and direct dc applications
5	M5	Solar Off-Grid System – Inverter and Power Conditioning Unit	2:15 pm to 3:00 pm	Inverter Basics Recap , Introduction, Key Performance Indicators of Inverters, Data Sheet, Design Problem of Inverters . PCU Data Sheet Familiarization
Tea Break			3:00 pm to 3:15 pm	
6	M5	Solar Off-Grid System – Design Concepts	3:15 pm to 5:00 pm	Design Basics and Calculation of Sample Problem
Q & A Session - 5:00 pm to 6:00 pm				

Solar PV Practitioner Program – Day 5



Day 5

Sl No	Mdle.	Head	Time	Description
1	M5	Hybrid Solar Power Plants	9:00 am to 10:00 am	Hybrid Power Plant SLD and System Design Considerations
2	M6	Solar PV Installation	10:00 am to 11:30 am	Standard Practices for Installation – Good/Bad Practices. Guidelines on Safety and Checklist
		Tea Break	11:30 am to 11:45 am	
3	M6	Site and Lab Visit, Demo of Components and Installation	11:45 am to 1:00 pm	Site Visit, Demo of Components, Installation, Q&A
		Lunch Break	1:00 pm to 1:45 pm	
4	M6	Site and Lab Visit, Demo of Components and Installation	1:45 pm to 3:30 pm	Site Visit, Demo of Components, Installation, Q&A
		Tea Break	3:00 pm to 3:15 pm	
5	M6	Solar O&M	3:15 pm to 4:30 pm	Operations & Maintenance of Solar Plants – Key Considerations and Cleaning of Solar Modules
6	M6	Session Summary and Feedback	4:30 pm to 6:00 pm	Summary of Key Insights from Session and Feedback from Participants