

Solar Energy System Design

Mapping International Codes for Photovoltaic (PV) Systems

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About the Course

This Solar Energy and Electrical System Design training course provide the delegates with the information necessary for adequately planning, and therefore successfully installing, a photovoltaic (PV) system per international design specifications. It navigates the delegates through the important steps of primary site inspection and evaluation of suitable locations for PV systems. It illustrates unique elements of residential, industrial and utility-scale solar applications with and without Batteries Energy Storage Systems (BESS). It includes vital design aspects – including load calculations, efficiency estimation, mechanical and electrical power conversion, and protection equipment design where the delegates are acquainted with formulas used to design a PV system, trying gained knowledge about site review, code compliance, layout, system components, and cable sizing.

Moreover, detailed training on using PV System, a worldwide bankable software, to simulate different types of PV power plants correctly, considering all design aspects and interpreting the outcome of the software report. It is furnished for engineers interested in entering the solar power sectors and has a basic knowledge of electrical and mechanical engineering and mathematical and physics concepts. Those unfamiliar with how PV works, the elements of a PV system, and/or solar power ROI should take a Solar Energy Systems overview.

Core Objectives

Upon completing this course, the delegate will be able to:

- Perform PV power plants site location survey and assessment
- Design a PV power system complying with international codes and suitable for the project location
- Understand PV system equipment data sheets and use them to design a PV power system
- Simulate and validate the PV power system design using PV System software and produce an Energy yield assessment report
- Prepare Site layout, Electrical single line diagram, Grid code compliance and PV power system tailored specifications

Training Approach

This training course will combine presentations with practical exercises, hands-on projects, and case studies. The delegates will be encouraged to participate actively in the questions & answers sessions. Moreover, specific expectations of each delegate will be discussed to ensure that they are treated as much as possible.

The Attendees

Likewise, it will be valuable to the professionals but not limited to the following:

- Electrical Engineers
- Mechanical Engineers
- Solar (PV) Business Development Engineers
- Solar (PV) Technical Sales Engineers
- Technical Office Design Engineers
- Solar (PV) Operations And Maintenance Engineers
- Renewable Energy Professionals
- Engineering Managers
- Technical Office Managers

DAILY DISCUSSION

DAY ONE

PHOTOVOLTAIC (PV) SITE ASSESSMENT

- Initial Site Inspection
- Shade Calculations
- Structure Assessment (Rooftop)
- Modules Location and Spacing (Rooftop) – Constraints
- Flood Risk (Minimum)
- Grid Offer
- Batteries Location
- Metering Point
- Pros and Cons Of Rooftop
- Ground Mount and Building Integrated
- Large Commercial, Community, and Utility-Scale Solar

DAY TWO

PHOTOVOLTAIC (PV) SYSTEM DESIGN – PART I

- PV System Sizing
- System Efficiency Calculation
- Structure Loadings
- Ballasted Systems
- Electrical Loads and Size
- Grid Code
- Steady-state and Dynamic System Studies

DAY THREE

PHOTOVOLTAIC (PV) SYSTEM DESIGN – PART II

- PV Modules and Inverters Selection
- String Sizing
- Inverter Selection and Sizing
- Overall System Design
- DC Cables Sizing
- AC Cables Sizing
- Trenching and Conduits Design

DAY FOUR

PHOTOVOLTAIC (PV) SYSTEM DESIGN – PART III

- Electrical Interconnection and Protection
- Weather Monitoring Station
- Batteries Energy Storage System (BESS)
- Data Acquisition and Plant Control
- Operation & Maintenance Considerations in System Design
- Planning Design Considerations

DAY FIVE

SIMULATION SOFTWARE (PVSYST)

- Overview
- Site Location Meteorological Data
- Simulation General Parameters
- System Parameters
- Detailed Losses Parameters
- Shading Scene
- Energy Management Parameters
- Results Reporting and Interpretation
- Advanced Simulation Options
- Other Simulation Software
- Project