

Engineering Procurement & Construction Of Solar Power System



What You

Will Learn...

- ▶ Fundamentals of solar energy and solar power generation concepts
- ▶ Planning and Project Management of Solar Power Systems
- ▶ Standalone & grid tied systems and its concept
- ▶ Rooftop mounted versus ground mounted models, and applications
- ▶ Electrical fundamentals, circuit theory, power flow concepts and voltage drop effects
- ▶ Facilities power assessments & calculation
- ▶ Creating single line diagram (SLD)
- ▶ Solar panel details, standards and selection of solar panels for SPV power systems
- ▶ Solar panel junction boxes design, wiring design
- ▶ Study on Balance Of Plant (BOP) like inverter, charge controller and batteries, their descriptions
- ▶ Sizing and Selection of BOP equipment and devices, and their placement into solar power design. Overall system configurations, final power assessment and output estimation
- ▶ Storage batteries, concepts, technical explanation, selection and sizing of storage batteries
- ▶ Electrical safety & grounding system, OSHA requirements
- ▶ Lightning arresters and risk assessment for lightning protection system
- ▶ Explanation and requirements of solar power system installation techniques
- ▶ Site inspection, verification and assessment for installation fitness
- ▶ Safety precaution to be taken care during installation
- ▶ Preparing the site for installation
- ▶ Organizing tools, plant and equipment to be used for installation
- ▶ Dos and Don'ts during actual real time installation process
- ▶ Standalone system & grid-tied system similarities and variations in installation
- ▶ Installation methods, orientation and angle counts to follow
- ▶ SPV, CSPV, and CSP technology, differences in installation and concepts
- ▶ Care of solar angle, geographic location and inclination angle and slope for installation
- ▶ Electrical wiring, system and equipment grounding, cable routing, and hook up to BOP
- ▶ Facility distribution system
- ▶ Finish of installation, close out, site cleaning, testing and commission process
- ▶ Handing over to clients

SmartBrains Oil and Energy Institute provides premium training courses for energy industry executives and fresh engineering graduates. Our success and distinguished reputation is thanks to our commitment to provide first-class programmes to our clients. Combining leading professionals from across the industry as lecturers and an interactive, practical format, the lessons learnt in a SmartBrains for Energy course are directly transferable back to the work place.

Our Strategic Objectives

To be recognized by industry and employers as a highly reputable training organization. Provide dynamic leadership, sound management and excellence in training. Continue to improve our services through quality management processes. Invest in and value our people through professional development activities. Grow our business through innovation and to continue to be financially secure. Be influential in the economic development of the industries we serve nation wise

Our Mission

“To provide quality training and assessment services and to prepare our students for a fulfilling professional career in their chosen industry. We are committed to upholding our values of providing excellence in training”

Course STRUCTURE



Introduction to Solar Energy

- Solar Radiation and Geometry
- Physics of light
- Solar radiation at the Earth's surface
- Direct and diffuse radiation
- Apparent motion of sun
- Unit of measurement
- Variation due to latitude, time-of-day and seasons
- Prediction and measurement of solar radiation
- Site Survey and Shadows
- Site analysis and software tools

Fundamentals Of Photovoltaic Technology

- Definition of Photovoltaics
- PV Cells and Types of Cells
- PV Manufacturing
- PV Modules
- Measuring Open Circuit Voltage, Short Circuit
- Current and Measuring Devices
- The I-V Curve, or Electrical Output Profile
- Module Evaluation
- Module Specifications
- PV Performance Rating Conditions
- Factors Affecting PV Performance

System Components and Configurations

Chargers

- Multi-stage charging
- PWM chargers
- Maximum Power Point Tracking (MPPT)
- Temperature sensing
- Design calculations
- Auxiliary battery charging

Inverters

- Square wave, modified square and true sine wave inverters
- Solid-state vs. rotary inverters
- Typical input and output voltages
- Inverter stacking
- Islanding
- Cabling and installation
- Grid tie considerations

Batteries

- Deep cycle (traction) vs. SLI batteries
- Battery ratings
- Gel, AGM, VRLA and wet cell batteries
- Series/parallel connection and safety precautions
- Battery location and enclosures
- Battery protection equipment
- Lightning issues
- Installation

Solar Power System Design

- Considerations for Off - Grid Systems
- Considerations for Grid-Tied Systems
- Determining System Loads
- Creating single line diagram (SLD)
- Hands-on Solar Resource Measurement and Analysis
- PV System Configurations and Design Philosophy
- PV System Designing and Sizing
- Sizing of Balance of Plant (BOP) like inverter, charge controller and batteries, their descriptions
- Sizing and Selection of Cables and wires
- General Arrangement of Switch yard and metering
- General Arrangement of Utility-Scale Power Plant
- Lightning and Surge Protection
- Lightning arresters and risk assessment for lightning protection system
- Electrical safety & grounding system, OSHA requirements

Installation and Mounting Systems

- Pre-Assembly
- Installation Considerations
- Health and Safety Considerations
- Mounting System Types
- Mounting Considerations
- Module Location and Orientation
- Racking Components
- Grounding

PV-System and kW-Scale PV Plant Installation

- Hands - on: kW-Scale PV Plant Installation

Project Planning & Management

- Renewable energy policy & regulatory aspects in india
- Identification of appropriate renewable energy projects
- Methodology and approach for site and resource assessment
- Capacity or system sizing approach
- Project planning
- Techno-commercial bid preparation for renewable / solar power projects
- Bid evaluation - methods and technics
- Contract agreement
- Quality installation practice and commissioning
- O&M planning
- Protocol for inspection and verification
- Protocol for monitoring and evaluation
- Documentation and knowledge management
- Techno-economic feasibility of renewable/solar power projects
- preparation of detailed project reports
- Preparation of project proposal for funding
- Risk assessment



Why

SmartBrains?

SmartBrains is the ultimate choice for all the working & non working engineer's in energy Sector training requirements. Our extensive portfolio of energy training courses are:

- ▶ 100% focused on the Oil and energy industry.
- ▶ Guided by the industry's renowned professionals with unprecedented knowledge of the Oil and energy industry.
- ▶ Highly interactive program with practical and relevant case studies.
- ▶ Training by extensively researched self developed cutting edge techniques.
- ▶ Skill development techniques with comprehensive set of documentation, practical skills and tools used in the Industry.

- ▶ The perfect opportunity to develop network and experiences with knowledge sharing.
- ▶ Internationally acclaimed engineering qualification.
- ▶ Designed for both Fresh engineers and working professionals to attain growth in oil and energy industry.
- ▶ One of the finest international faculty.
- ▶ Interactive, interesting and motivational training sessions.
- ▶ Access to enormous reference books and research materials.

Admission

Requirements

- ▶ Duly Filled Application Form
- ▶ 2 Photographs
- ▶ Photo State of Qualifying Examination
- ▶ Address Proof
- ▶ I.D. Proof
- ▶ Latest Resume

Declaration

- ▶ This training program is on AUTONOMOUS basis conducted by SmartBrains.
- ▶ SmartBrains has right to expel any student at any time for misbehavior, poor attendance without refunding the fees.
- ▶ Certification will be issued only after completion of course, submission of all assignments and passing all the examinations.
- ▶ SmartBrains has its own rules and regulations about conducting examinations and assessment of examinations



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