



An ISO 9001 - 2008  
Organization



**TWG GROUP**

THE WORD OF GOD

INTERNATIONAL STANDARD

**ISO/IEC-17025:2005 NABL ACCREDITED FOR NDT**

(Dept. of Science and Technology, Government of India)



Accreditation Certificate No: T - 2387  
Metal Lab



सत्यमेव जयते  
Government of India

## SOLAR TRAINING

1. Introduction to photovoltaic (PV) systems. Historical development of PV systems. Overview of PV usage in the world.
2. Solar energy potential for PV, irradiance, solar radiation and spectrum of sun, geometric and atmospheric effects on sunlight.
3. Photovoltaic effect, conversion of solar energy into electrical energy, behavior of solar cells.
4. Solar cells, basic structure and characteristics: Single-crystalline, multicrystalline, thin film silicon solar cells, emerging new technologies.
5. Electrical characteristics of the solar cell, equivalent circuit, modeling of solar cells including the effects of temperature, irradiation and series/shunt resistances on the open-circuit voltage and short-circuit current
6. Solar cell arrays, PV modules, PV generators, shadow effects and bypass diodes, hot spot problem in a PV module and safe operating area. Terrestrial PV module modeling,
7. Interfacing PV modules to loads, direct connection of loads to PV modules, connection of PV modules to a battery and load together,
8. Energy storage alternatives for PV systems. Storage batteries, lead-acid, nickel-cadmium, nickel-metal-hydride and lithium type batteries. Small storage systems employing ultracapacitors, charging and discharging properties and modeling of batteries,
9. Power conditioning and maximum power point tracking (MPPT) algorithms based on buck - and boost-converter topologies,
10. Maximum power point tracking (MPPT) algorithms,

## INSTALLATION

- \* SOLAR PV TECHNOLOGY
- \* TECHNICAL SPECIFICATION AS PER IEC 62548 AND IEC 62257
- \* BATTERY STORAGE TECHNOLOGY AND SELECTION OF BATTERY
- \* SYSTEM DESIGN
- \* DC AND AC CABLE SIZING
- \* GRID - TIE INVERTERS
- \* STRING SIZING
- \* GROUNDING
- \* CHARGE CONTROLLERS
- \* PLANNING
- \* ROOFTOP PV SYSTEM DESIGN WITH BATTERY STORAGE
- \* SITE ANALYSIS
- \* EQUIPMENT
- \* TESTING AND COMMISSIONING

### CHENNAI

No. 5, Boopathy Street, Virugambakkam,  
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### BANGALORE

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### COIMBATORE

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### TRICHY

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### MUMBAI

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### KOCHI

"TWG GROUP KOCHI"  
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Metro Bridge - Piller No - 387  
V.P Marakkar Building,  
V.P Marakkar Road,  
Via - Vanitha & Vinitha Theaters,  
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### VIZAG

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**PUNE | DELHI | GUJARAT | KOLKATA | MYSORE | TRICHY | VELLORE | COIMBATORE | VIZAG | COCHIN**  
**TRIVANDRUM | CALICUT | HYDERABAD | PONDICHERRY | MADURAI | NAGARCOIL | AMARAVATI**

