
WIND & SOLAR POWER - RENEWABLE ENERGY TECHNOLOGIES



WHAT YOU WILL LEARN:

- The fundamentals of Photovoltaic technology
- The Essentials of wind power technology
- The vital practical issues of wind and solar power technology
- The practical steps in installing photovoltaic systems and windpower systems
- How to design and install simple photovoltaic and windpower systems
- How to deal competently with contractors and consultants installing these systems
- How to assist your company in complying with the ever growing "Greenhouse Gas" Laws
- To use the 32 Point checklist before commencing any work on Wind and Solar Power Systems

WHO SHOULD ATTEND:

- Mechanical, Electrical, Electronic Engineers
- Technicians
- Electricians
- Control and Instrumentation Engineers
- Facility Managers
- Energy Specialists
- And those who are keen to improve the environment and take advantage of cheap and clean power

The Workshop

In the past ten years there has been a significant increase in applying wind and solar power technologies from the domestic user to the corporate market. There has been a dramatic improvement in the efficiencies in these technologies and this has helped make the applications economical. Specific energy yields from wind turbines have increased by 60% and installation costs have dropped significantly (up to 50% in many cases). Global wind generating capacity has reached 100,000 MW capacity in March 2008 with almost 20,000 MW installed during 2007 alone.

Applications of photovoltaic (PV) systems are growing rapidly worldwide with worldwide installation of PV modules skyrocketing to 2,826 MW in 2007 (= 62% growth from 2006). Many countries are passing legislation to enforce greater use of PV systems and this is helping to drive up the production of these systems.

All of these technologies are interdisciplinary requiring a knowledge of topics as varied as aerodynamics, electricity and wind statistics for wind power and mechanical engineering, electronic and electrical engineering for solar power.

This workshop will outline the step by step process of designing, installing and commissioning photovoltaic and wind powered systems. It should be emphasised that this is not an advanced in-depth workshop but one covering the important issues enabling you to do simple designs and then to investigate the design and installation issues in more detail after the workshop either by further study or in conjunction with experts in the field.

In recent years the annual growth rate of the solar and wind energy industry has consistently exceeded 30% with 3 digit growth figures in many regional markets. So in these rather challenging economic times; this is a good industry in which to focus one's career on.

Pre-requisites

You will need a fundamental understanding of electrical systems and an understanding of the fundamental issues driving renewable energy development. We will provide this material to you if you feel you would like some further pre-course reading.

Please bring a calculator (or computer) and pen along to the course to assist with the calculations.

The Program

INTRODUCTION

- Course Overview
- Energy
- Renewable and Sustainable Energy
- Applications of the technology
- Sustainable Energy
- Economics of Renewable Energy
- Forces Driving the technologies today
- Fundamentals of Electricity (dc and ac)
- Basics of Electronics for Renewable Energy
- Fundamentals of Mechanical Engineering

PHOTOVOLTAIC ENERGY SYSTEMS

FUNDAMENTALS OF PHOTOVOLTAIC TECHNOLOGY

- Applications
- Photovoltaic System components
- Typical System configurations
- Photovoltaic cells
- Modules and Arrays

MECHANICAL DESIGN AND INSTALLATION

- Mechanical Design
- Panel Assembly and Roof Attachment methods
- Mechanical Design Problems

ELECTRICAL DESIGN AND INSTALLATION

- Electrical System overview
- Inverters
- System Electrical Design
- Grid Connection
- Design Problems
- Storage of energy
- Load Profiles

SYSTEM INSTALLATION AND COMMISSIONING

- Check List of Items

WIND ENERGY

FUNDAMENTALS OF WIND ENERGY

- The wind Resource
- Mechanics of Wind
- Local Effects on Wind Flow
- Wind Assessment at a Potential Site

DEVELOPMENT

- Finance
- Site Design
- Planning
- Contracts

TURBINE TECHNOLOGY

- System Design
- Aerodynamics and Power Control
- Dynamics and Fatigue
- Electricity Generation
- Integration

BRIEF OVERVIEW OF MISCELLANEOUS SYSTEMS

- Solar Water Heating Systems
- Energy Efficient Building Design
- Hybrid Energy Systems

OPERATION AND MANAGEMENT

- Management
- Site Commissioning
- Monitoring and Maintenance
- Safety

TROUBLESHOOTING OF SYSTEMS

- Typical Problems
- Tips & Tricks

SUMMARY, OPEN FORUM AND CLOSING