Register 3 and the 4th is FREE! Valid till 30 Aug 2013

SOLAR ENERGY & PHOTOVOLTAIC POWER

An essential & comprehensive course on solar energy and photovoltaic power, covering solar energy resources, PV technology and grid-connected and stand-alone PV applications

7th to 8th October 2013, Singapore

Expert Course Faculty

Dr Hugh Outhred

Hugh has 30+ years' experience in energy markets in research, consulting & teaching

Dr Maria Retnanestri

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SOLAR ENERGY & PHOTOVOLTAIC POWER
7th to 8th October 2013

Course Overview

This course will provide a comprehensive discussion of solar energy resources, PV and balance of system technologies, technical standards for PV and grid-connected and stand-alone PV applications. It will discuss international trends in the deployment of PV and present case studies on the experience to date and future prospects for PV in Australia and Indonesia

Course Learning Outcome

- Characteristics of solar energy resources
- PV and balance of system technologies, including PV modules, inverters, batteries, maximum power point trackers, wiring, DC circuit breakers, fuses and lightning protection
- Technical standards for PV systems
- Design of grid-connected and stand-alone PV systems
- International deployment and cost trends for PV systems
- Insights from case studies of the deployment of PV systems in Australia and Indonesia

Who Should Attend

The course is designed for professionals from the electricity industry, PV system designers and government policy makers. Participants should have some technical knowledge of the electricity industry.

Unique Features with powerEDGE Training

- Pre-Course Questionnaire to help us focus on your learning objectives
- Detailed Course & Reference Manual for Continuous Learning and Sharing
- Practical Exercises & Case Examples to better understand the principles
- Limited class size to ensure One-to-One Interactivity
- Assessment at the end of the course to help you develop a Personal Action Plan

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2 Day Course Outline

Solar energy resources

- Solar radiation from the sun,
- Solar radiation at the earth's surface
- Apparent motion of the sun at a point on the earth's surface
- Insolation measurement - direct and diffuse insolation, cloud cover
- Estimating the solar energy resource available for a particular array at a particular site
- General energy yield formulae for a solar array

PV cells, modules and arrays

- Semiconductors, photovoltaic effect & basic PV cell, spectral response, effect of temperature
- PV modules: designs to minimise the effects of cell mismatch & shading
- PV arrays: types and characteristics, including fixed and tracking flat plate and concentrator systems
- Mounting of PV arrays – ground mounted, building mounted, building integrated.
- Array degradation and failure modes
- Current status and future prospects for technical performance and cost of PV arrays

Balance of system components for electricity generation

- Maximum power point trackers
- Inverters: self-commutated and line-commutated
- Circuit components: wiring, junction boxes, fuses, DC circuit breakers, lightning protection
- Batteries: lead acid and other battery types
- Battery management: depth of discharge, effects of cycling, charge regulators

Technical standards for PV systems

- PV modules and arrays
- Grid-connected PV using inverters
- Stand-alone power systems

Design of grid-connected PV systems

- Types of grid-connected systems: rooftop, building-integrated, ground-mounted
- Design of grid-connected PV systems: siting, sizing, component matching, managing fire and electrocution risks
- Power system issues for grid-connected PV systems: voltage rise, harmonics, islanding, under/over voltage and under/over frequency protection, uncertain, time-varying operating level, forecasting
- Operation and maintenance, decommissioning
- Examples of grid-connected PV system design

Design of stand-alone PV systems

- Applications for stand-alone PV systems: remote housing, portable lighting, portable refrigeration, charging stations for phones and laptop computers, water pumping, navigation, telecommunications, PV-diesel hybrid power systems
- Design of stand-alone PV systems: siting, sizing, component matching, protection, operation and maintenance, decommissioning, managing fire and electrocution risks
- Design tools for stand-alone PV systems,
- Examples of stand-alone PV system design
- Design of PV water pumping systems

International deployment and cost trends for PV systems

- Trends in grid-connected PV deployment
- Trends in stand-alone PV deployment
- Trends in PV system technical performance
- Trends in PV system costs

PV deployment in Australia & future prospects

- Deployment of grid-connected & stand-alone PV in Australia – past experience & future prospects

PV deployment in Indonesia & future prospects

- Deployment of grid-connected & stand-alone PV in Indonesia – past experience & future prospects

Your Expert Faculty

Dr. Hugh Outhred

In a 35-year research career, Hugh Outhred (PhD) has contributed to electric power system analysis and control, the theory of electricity industry restructuring and electricity market design, renewable energy technology, renewable energy integration, energy sector policy and sustainability policy. He has taught nearly 100 short courses on electricity industry restructuring and sustainability in a range of countries since 1988.

In 1993 and 1994 he co-authored a report on electricity industry restructuring for the California Energy Commission that highlighted the complexity of electricity restructuring in that context.

In 1995 and 1996 he led a project for the Australian National Grid Management Council to undertake electricity-trading experiments according to the proposed National Electricity Market trading rules prior to their formal implementation.

From 2004 to 2007, he was the founding Presiding Director of the Centre for Energy and Environmental Markets at the University of New South Wales. From 2009 to 2011, he was a Lead Author for the International Panel on Climate Change (IPCC) Special Report on Renewable Energy Sources and Climate Change Mitigation, published in 2011.

Hugh has been a Fulbright Senior Fellow at the University of California Berkeley, USA and has held visiting positions at Massachusetts Institute of Technology in the USA, the University of Liverpool in Britain and the Universidad Pontificia Comillas in Spain.

He has been a Board member of the Australian Cooperative Research Centre for Renewable Energy and an Associate Director of the Centre for Photovoltaic Devices and Systems at the University of New South Wales. He was a member of the NSW License Compliance Advisory Board and a member of the National Electricity Tribunal throughout their existence from 1997 to 2000 and 1998 to 2006 respectively.

Hugh Outhred (PhD), a Fellow of the Australian Institute of Energy & was, prior to his retirement in 2007, Presiding Director of the Centre for Energy & Environmental Markets at the University of New South Wales, Sydney Australia.

Dr. Maria Retnaestri

Dr. Maria Retnanestri is a Visiting Fellow in the School of Electrical Engineering and Telecommunications at the University of New South Wales.

She holds the degrees of Bachelor of Electrical Engineering (STTNAS Jogjakarta), Master of Engineering Science in Electrical Engineering (UNSW) and PhD in Electrical Engineering (UNSW).

In her PhD research, Maria Retnanestri developed the I3A (Implementation, Accessibility, Availability and Acceptability) Framework to investigate overall sustainability of renewable energy projects, considering their institutional, financial, technological, social and ecological sustainability dimensions. From 2008 to 2011, she then further developed and applied this research to identify ways to overcome barriers to renewable energy for sustainable development in Indonesia with financial support from an Australian Development Research Award.

With that financial support, she conducted more than 20 workshops, seminars, public lectures, field visits and study tours in Indonesia involving various kinds of renewable energy stakeholders in knowledge sharing and capacity building activities.

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REGISTRATION FORM

	Early Bird Ends 30 Aug 2013	Normal	Savings
Singapore	SGD 2999	SGD 3199	SGD 200

4 ways to Register

Online Web Registration
info@poweredgeasia.com
(65) 6741 9927
(65) 67478737

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Organisation name .....Industry .....
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Postcode ..... Country .....
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PAYMENT METHODS
By Cheque/ Bank Draft: Make Payable to Asia Edge Pte. Ltd.
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