

In Collaboration with The IET, The Institution of Engineering and Technology,
College of Engineering - University of Bahrain is Organizing

**DISTINGUISHED WORKSHOP:
PHOTOVOLTAIC AND WIND RENEWABLE ENERGY SYSTEMS:
PRINCIPLES, DESIGN, AND REGULATIONS**

4-6 December 2016
Crown Plaza Hotel, Manama
Kingdom of Bahrain

For details and registration, check inside



Associated with WREC17,
17th World Renewable Energy Congress,
Organized by University of Bahrain

<http://www.wrec2016-bahrain.com/>

For this event information, and updates, check IET website or mycommunity at:

<https://communities.theiet.org/communities/home/164>

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WORKSHOP THEME



WORKSHOP: PHOTOVOLTAIC AND WIND RENEWABLE ENERGY SYSTEMS: PRINCIPLES, DESIGN, AND REGULATIONS

WORKSHOP INTRODUCTION:

In the past few years, Renewable Energy had a significant share of the total global energy production, with a forecast that this will increase reaching 31% in 2035. In 2015 the total installed wind and solar technologies reached 50% of the total installed capacity including fossil fuel, with a global investment reached \$270 billion for these two technologies only. With global energy demand are projected to be shifting toward the developing countries, mainly, China, India and Middle East. The decision that those countries will make, either in term of policies to regulate the energy investment or decisions on the type of energy resources used to supply the growth in their energy need, will impact the global energy landscape in the coming years. Although there are a great enthusiasm and efforts to encourage the introduction of Renewable Energy in the Arabian Gulf region, the current available skills and infrastructure constrain the region from achieving ambitious targets that will secure their position in the global Renewable Energy Landscape. These challenges can be addressed by providing the necessary training to equip the regional market with qualified human resources that will lead the region toward more sustainable energy sources, such as the wind and solar energy. The wind and solar energy systems technology capital costs and their operation and maintenance costs have declined by a large percentage. Also, their availability factors have jointly contributed to the decline of the wind and solar energy electricity cost. Such cost is highly competitive with the energy cost of the conventional power technologies. The two previous facts have encouraged energy users to consider solar and wind energy resources in being in the top list of renewable energy resources. This workshop, which will run for three days will provide the participants with an opportunity to be trained by specialists from one of eight accredited renewable energy laboratories in the world and academics from University of Bahrain who worked closely with assessing Bahrain renewable energy resources and investigated the potential for implantation. The workshop is a great opportunity for electrical power utilities, environmentalists, energy managers, companies and individuals interested in renewable energy to understand two of the primary renewable energy resources for the GCC region in general.

WORKSHOP OBJECTIVES

The present course will expose its attendees to the needed material to understand the background of two renewable energy resources namely: Solar and Wind Energy systems. The course compiles and incorporates the two previous resources with other additional power systems components to come up with a ready, compact and clean energy supplier. The course will guide the attendees to the different phases of sizing renewable energy systems to fulfil certain consumers with their energy demand/requirement. Case studies will be illustrated in this context.

WHAT YOU WILL GAIN:

An understanding of the Photovoltaic and Wind energy systems Knowledge of the methods used to assess the solar and wind energy resources. A technical understanding of the requirements for stand-alone and grid connected Photovoltaic and wind energy systems. An introduction to the Photovoltaic systems international standards IEC 62446-1:2016 A Certificate of participation from the IET. An Access to the World Renewable Energy Congress 2016 sessions.

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|--------------------|---|
| Workshop Language: | English |
| Workshop date: | 4-6 December 2016 |
| Place: | Crown Plaza Hotel Manama Kingdom of Bahrain |

REGISTRATION FEES:

This is not a profitable workshop event.

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|------------------------|---|
| Registration Deadline: | 30 th of November 2016 |
| Registration Payment: | College of Engineering - University of Bahrain. |



WORKSHOP PROGRAM



WORKSHOP AGENDA:

DAY 1: SOLAR POWER

SUNDAY 4 DECEMBER 2016

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|---------------|---|
| 08:00 - 08:30 | Registration |
| 08:30 - 09:00 | Solar Irradiation and resources assessment |
| 09:00 - 09:30 | Solar Cell Characteristics |
| 09:30 - 10:30 | Stand-Alone PV Systems |
| 10:30 - 11:00 | Coffee Break |
| 11:00 - 12:30 | Grid Connected PV Systems |
| 12:30 - 13:00 | Case Studies |
| 13:00 - 14:00 | Lunch |
| 14:00 - 17:30 | Participants are welcomed to attend the World Renewable Congress sessions |

DAY 2: WIND POWER

MONDAY 5 DECEMBER 2016

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|---------------|---|
| 08:30 - 09:00 | Types of Wind Turbines |
| 09:00 - 09:30 | Aerodynamics of Wind Turbines |
| 09:30 - 10:30 | Stand-alone & Grid connected Wind Turbines |
| 10:30 - 11:00 | Coffee Break |
| 11:00 - 12:30 | Wind resources characteristic and assessments methods. |
| 12:30 - 13:00 | Environmental Aspects and Impacts |
| 13:00 - 14:00 | Lunch |
| 14:00 - 17:30 | Participants are welcomed to attend the World Renewable Congress sessions |

DAY 3: GRID CONNECTED PV: TESTING AND COMMISSIONING REQUIREMENTS

TUESDAY 6 DECEMBER 2016

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|---------------|---|
| 09:00 - 10:30 | IEC 62446-1: Grid connected PV systems Documentation, commissioning tests and inspection. |
| 10:30 - 11:00 | Coffee Break |
| 11:00 - 12:00 | IEC 62446: Grid connected PV systems Documentation, commissioning tests and inspection. |
| 12:00 - 12:30 | Panel Discussion |
| 12:30 - 13:00 | Closing Ceremony |
| 13:00 - 14:00 | Lunch |

WORKSHOP INSTRUCTORS



PROF. RALPH GOTTSCHALG: LOUGHBOROUGH UNIVERSITY, UK. Professor of Applied Photovoltaics, Centre for renewable energy systems technology (CREST), Loughborough University, UK. Prof. Gottschalg is the head of the Applied Photovoltaics Research Group at CREST and the UK representative for PV modules to all international standard committees. He worked as a research engineer in the energy department of the Fraunhofer Institute for Systems and Innovations Technology, Karlsruhe, Germany, before joining CREST in 1996.



DR. TOM BETTS: LOUGHBOROUGH UNIVERSITY, UK. Senior Lecturer in Applied Photovoltaics, Centre for renewable energy systems technology (CREST), Loughborough University, UK. Dr. Betts is a senior lecturer in the Applied Photovoltaics Research Group of the Centre for Renewable Energy Systems Technology within the department's Energy Division. His research areas include the development of indoor and outdoor PV module characterisation techniques and environmental modelling of factors influencing PV module efficiency under real operation.



DR. MAAMAR TALEB: UNIVERSITY OF BAHRAIN. Associate Professor, Department of Electrical and Electronics Engineering, University of Bahrain, Kingdom of Bahrain. He obtained a Ph.D degree in Electrical Engineering from Clarkson University, USA in 1990, A M.Sc degree in Electric Power Engineering from Rensselaer Polytechnic Institute, USA in 1986. Dr. Taleb Research Interests are in Renewable Energy Applications, Power System Quality issues, and Power Systems Modeling.



DR. HANAN ALBUFLASA: UNIVERSITY OF BAHRAIN. Assistant Professor, Department of Physics, University of Bahrain, Kingdom of Bahrain. Dr Albuflasa obtained her MSc and PhD in renewable energy from Loughborough University, UK. She organised and delivered a number of workshops, talks at a national level. Her research area focuses on Renewable Energy systems and resource assessment, Power System, Environmental physics.

WORKSHOP REGISTRATION AND CONTACTS





IET WORKSHOP (4-6 December 2016):

This workshop is related to the congress theme, during the congress (4-6 December 2016). For more detailed information about this IET related workshop during the congress, this is available also at [Congress Workshop](http://www.wrec2016-bahrain.com/congress_workshops.htm) (http://www.wrec2016-bahrain.com/congress_workshops.htm)

For the IET workshop quick information, direct contact and details, please refer to the below contact:

Dr. Ebrahim Mattar (ebmattar@uob.edu.bh).

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POSTAL:

IET-WERC16-BH Workshop.

College of Engineering, Isa Town Campus. University of Bahrain

P. O. Box 32038

Kingdom of Bahrain.

Congress Website: WWW.WREC2016-BAHRAIN.COM

CONGRESS DELEGATES REGISTRATION:

For congress delegates registration, please contact the local organization committee on:

WERC16-BH

College of Engineering, University of Bahrain.

University of Bahrain, P. O. Box 32038, Kingdom of Bahrain.

Tel: ++ 973 17 876601, ++ 973 17 876603

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email engdean@uob.edu.bh , WWW.WREC2016-BAHRAIN.COM

Or via:

Bahrain IET Local Network: Bahrain.IET@theiet.org

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