COURSE OVERVIEW NE0009
Applications of Solar Photovoltaic Systems

Course Title
Applications of Solar Photovoltaic Systems

Course Date/Venue
August 26-30, 2024/Fujairah Meeting Room, Grand Millennium Al Wahda Hotel, Abu Dhabi, UAE

3.0 CEUs (30 PDHs) AWARD

H-STK© INCLUDED

Course Reference
NE0009

Course Duration/Credits
Five days/3.0 CEUs/30 PDHs

Course Description

This practical and highly-interactive course includes real-life case studies and exercises where participants will be engaged in a series of interactive small groups and class workshops.

This course is designed to provide participants with a detailed and up-to-date overview of Applications of Solar Photovoltaic Systems. It covers the various renewable energy sources and their roles in combating climate change with a focus on solar energy's potential; the basics of solar radiation, solar PV technology and how solar panels generate electricity; the solar panels, inverters, batteries and mounting systems; the sustainability concepts and practices within the oil and gas industry; the environmental impacts of solar PV systems; the lifecycle analysis and comparison with traditional fossil fuel sources; the techniques for evaluating potential sites for solar installations; and the solar resource assessment and shading analysis.

Further, the course will also discuss the fundamentals of designing solar PV systems; the system sizing, orientation and tilt angle optimization for maximum efficiency; the regulatory landscape for solar energy, financial models for solar projects and best practices for the safe installation of solar PV systems; the solar PV with existing oil and gas infrastructure and how solar PV can power remote operations; the energy storage technologies that complement solar PV systems; the systematic strategies for monitoring the performance of solar PV systems and routine maintenance practices to ensure operational efficiency; the common technical challenges in integrating solar PV systems and potential solutions; and the technological and operational considerations.

During this interactive course, participants will learn the environmental and economic impacts of solar PV systems over their entire lifecycle from manufacturing to disposal; the contribution of solar PV systems to reducing the carbon footprint of oil and gas operations; the solar PV market and the role of solar PV in creating sustainable supply chains; the risks associated with the adoption of solar PV systems; the global energy policies supporting renewable energy adoption; the regulatory framework affecting solar PV installations in specific regions; the role of the oil and gas sector in advocating for policies that support the transition to renewable energy; the emerging technologies in solar energy including advances in photovoltaic materials and system design; and the strategic planning within oil and gas companies for incorporating solar PV and other renewables into their energy mix.

Course Objectives

Upon the successful completion of this course, each participant will be able to:-

- Apply and gain a systematic techniques and approaches on the applications of solar photovoltaic systems
- Recognize various renewable energy sources and their roles in combating climate change with a focus on solar energy's potential
- Discuss the basics of solar radiation, solar PV technology and how solar panels generate electricity
- Identify the components that make up solar PV systems including solar panels, inverters, batteries and mounting systems
- Examine global trends in solar energy deployment and leading countries and implications for the oil and gas industry
- Apply sustainability concepts and practices within the oil and gas industry
- Analyze the environmental impacts of solar PV systems including lifecycle analysis and comparison with traditional fossil fuel sources
- Carryout techniques for evaluating potential sites for solar installations including solar resource assessment and shading analysis
- Discuss the fundamentals of designing solar PV systems including system sizing, orientation and tilt angle optimization for maximum efficiency
- Review the regulatory landscape for solar energy, financial models for solar projects and best practices for the safe installation of solar PV systems
- Integrate solar PV with existing oil and gas infrastructure and explain how solar PV can power remote operations
- Recognize energy storage technologies that complement solar PV systems and carryout systematic strategies for monitoring the performance of solar PV systems and routine maintenance practices to ensure operational efficiency
- Discuss the common technical challenges in integrating solar PV systems and potential solutions including technological and operational considerations
- Analyze the environmental and economic impacts of solar PV systems over their entire lifecycle from manufacturing to disposal
- Quantify the contribution of solar PV systems to reducing the carbon footprint of oil and gas operations

- Assess the solar PV market, identify the role of solar PV in creating sustainable supply chains and manage risks associated with the adoption of solar PV systems
- Engage with stakeholders, discuss global energy policies supporting renewable energy adoption
- Review the regulatory framework affecting solar PV installations in specific regions
- Recognize the role of the oil and gas sector in advocating for policies that support the transition to renewable energy
- Explore emerging technologies in solar energy including advances in photovoltaic materials and system design
- Apply strategic planning within oil and gas companies for incorporating solar PV and other renewables into their energy mix

Exclusive Smart Training Kit - H-STK®

*Participants of this course will receive the exclusive "Haward Smart Training Kit" (**H-STK®**). The **H-STK®** consists of a comprehensive set of technical content which includes **electronic version** of the course materials, sample video clips of the instructor's actual lectures & practical sessions during the course conveniently saved in a **Tablet PC**.*

Who Should Attend

This course provides an overview of all significant aspects and considerations of applications of solar photovoltaic systems for energy managers, engineers, supervisors and other technical staff involved in the renewable energy sector.

Training Methodology

All our Courses are including **Hands-on Practical Sessions** using equipment, State-of-the-Art Simulators, Drawings, Case Studies, Videos and Exercises. The courses include the following training methodologies as a percentage of the total tuition hours:-

30% Lectures
20% Practical Workshops & Work Presentations
30% Hands-on Practical Exercises & Case Studies
20% Simulators (Hardware & Software) & Videos

In an unlikely event, the course instructor may modify the above training methodology before or during the course for technical reasons.

Course Fee

US$ 5,500 per Delegate + **5% VAT**. This rate includes H-STK® (Haward Smart Training Kit), buffet lunch, coffee/tea on arrival, morning & afternoon of each day.

Course Certificate(s)

Internationally recognized certificates will be issued to all participants of the course who completed a minimum of 80% of the total tuition hours.

Certificate Accreditations

Certificates are accredited by the following international accreditation organizations:-

- The International Accreditors for Continuing Education and Training (IACET - USA)

  Haward Technology is an Authorized Training Provider by the International Accreditors for Continuing Education and Training (IACET), 2201 Cooperative Way, Suite 600, Herndon, VA 20171, USA. In obtaining this authority, Haward Technology has demonstrated that it complies with the **ANSI/IACET 2018-1 Standard** which is widely recognized as the standard of good practice internationally. As a result of our Authorized Provider membership status, Haward Technology is authorized to offer IACET CEUs for its programs that qualify under the **ANSI/IACET 2018-1 Standard**.

  Haward Technology's courses meet the professional certification and continuing education requirements for participants seeking **Continuing Education Units** (CEUs) in accordance with the rules & regulations of the International Accreditors for Continuing Education & Training (IACET). IACET is an international authority that evaluates programs according to strict, research-based criteria and guidelines. The CEU is an internationally accepted uniform unit of measurement in qualified courses of continuing education.

  Haward Technology Middle East will award **3.0 CEUs** (Continuing Education Units) or **30 PDHs** (Professional Development Hours) for participants who completed the total tuition hours of this program. One CEU is equivalent to ten Professional Development Hours (PDHs) or ten contact hours of the participation in and completion of Haward Technology programs. A permanent record of a participant's involvement and awarding of CEU will be maintained by Haward Technology. Haward Technology will provide a copy of the participant's CEU and PDH Transcript of Records upon request.

- British Accreditation Council (BAC)

  Haward Technology is accredited by the **British Accreditation Council** for **Independent Further and Higher Education** as an **International Centre**. BAC is the British accrediting body responsible for setting standards within independent further and higher education sector in the UK and overseas. As a BAC-accredited international centre, Haward Technology meets all of the international higher education criteria and standards set by BAC.

Accommodation

Accommodation is not included in the course fees. However, any accommodation required can be arranged at the time of booking.

Course Instructor(s)

This course will be conducted by the following instructor(s). However, we have the right to change the course instructor(s) prior to the course date and inform participants accordingly:

Dr. Ahmed El-Sayed, PhD, MSc, BSc, is a **Senior Electrical & Nuclear Engineer** with over **35 years** of extensive experience in the **Power**, **Petroleum**, **Petrochemical** and **Industrial** industries. He specializes in **Power Systems Control**, **Power Systems Security**, **Nuclear Power Plant**, **Renewable Energy**, **Solar Energy**, **Biomas Energy**, **Biogas Energy**, **Thermal & Photovoltaics Energy**, **Nuclear Steam Supply System**, **Nuclear Reactor**, **Energy Generation**, Power Electronics, Electrical Substations, Tariff Design & Structure Analysis, PLC, SCADA, DCS, Power Generation, **SIS**, **SIL**, **ESD**, Alarm Management Systems, Fieldbus Systems and Fiber Optics. He is currently the **Systems Control Manager** of **Siemens**.

During his career life, Dr. Ahmed has been actively involved in different Power System and **Nuclear System** Activities and also in Teaching and Consulting. His vast industrial experience was honed greatly when he joined many International and National Companies such as **Siemens**, **Electricity Authority** and **ACETO** industries.

Dr. Ahmed has **PhD**, **Master's** & **Bachelor's** degree in **Electrical Engineering** from the **University of Wisconsin Madison**, **USA** and **Ain Shams University**, respectively. Further, he is a **Certified Instructor/Trainer**, a **Certified Internal Verifier/ Assessor/Trainer** by the **Institute of Leadership and Management** (**ILM**), an active member of IEEE and ISA as well as numerous technical and scientific papers published internationally in the areas of Power Quality, Superconductive Magnetic Energy Storage, SMES role in Power Systems, Power System **Blackout** Analysis, and Intelligent Load Shedding Techniques for preventing Power System Blackouts, HV **Substation Automation** and Power System Stability.

Course Program

The following program is planned for this course. However, the course instructor(s) may modify this program before or during the course for technical reasons with no prior notice to participants. Nevertheless, the course objectives will always be met:

Day 1: ***Monday, 26th of August 2024***

0730 – 0800	*Registration & Coffee*
0800 – 0815	*Welcome & Introduction*
0815 – 0830	***PRE-TEST***
0830 – 0930	***Overview of Renewable Energy Sources:*** *Introduction to Various Renewable Energy Sources and their Roles in Combating Climate Change with a Focus on Solar Energy's Potential*
0930 – 0945	*Break*
0945 – 1030	***Fundamentals of Solar Energy:*** *Understanding the Basics of Solar Radiation, Solar PV Technology, and How Solar Panels Generate Electricity*

1030 – 1130	***Solar PV Systems Components:*** *Detailed Overview of the Components that Make Up Solar PV Systems, including Solar Panels, Inverters, Batteries and Mounting Systems*
1130 – 1230	***Global Trends in Solar Energy:*** *Examination of Global Trends in Solar Energy Deployment, including Case Studies from Leading Countries and Implications for the Oil & Gas Industry*
1230 – 1245	*Break*
1245 – 1330	***Sustainability in the Oil & Gas Sector:*** *Introduction to Sustainability Concepts and Practices within the Oil & Gas Industry, Highlighting the Importance of Transitioning to Renewable Energy Sources*
1330 – 1420	***Environmental Impact Assessment:*** *Understanding the Environmental Impacts of Solar PV Systems, including Lifecycle Analysis and Comparison with Traditional Fossil Fuel Sources*
1420 – 1430	***Recap***
1430	*Lunch & End of Day One*

Day 2: ***Tuesday, 27th of August 2024***

0730 – 0830	***Site Assessment for Solar PV Installation:*** *Techniques for Evaluating Potential Sites for Solar Installations, including Solar Resource Assessment and Shading Analysis*
0830 – 0930	***Solar PV System Design Principles:*** *Fundamentals of Designing Solar PV Systems, including System Sizing, Orientation, and Tilt Angle Optimization for Maximum Efficiency*
0930 – 0945	*Break*
0945 – 1100	***Regulatory & Policy Framework:*** *Overview of the Regulatory Landscape for Solar Energy, including Permits, Incentives, and Policies Affecting Solar PV System Installation in the Oil & Gas Sector*
1100 – 1230	***Financial Models & Incentives:*** *Analysis of Financial Models for Solar Projects, including Cost-Benefit Analysis, Payback Periods, and Understanding Government Incentives and Subsidies*
1230 – 1245	*Break*
1245 – 1330	***Safety & Installation Standards:*** *Best Practices for the Safe Installation of Solar PV Systems, including Understanding National and International Standards and Guidelines*
1330 – 1420	***Hands-on Installation Workshop:*** *Practical Session on Installing a Small-Scale Solar PV System, Covering Component Assembly, Wiring, and Safety Measures*
1420 – 1430	***Recap***
1430	*Lunch & End of Day Two*

Day 3: ***Wednesday, 28th of August 2024***

0730 – 0830	***Hybrid Energy Systems:*** *Exploring the Integration of Solar PV with Existing Oil & Gas Infrastructure, including Hybrid Systems Combining Solar with Diesel Generators*
0830 – 0930	***Microgrids & Off-grid Solutions:*** *Understanding How Solar PV can Power Remote Operations, including the Design and Management of Microgrids for Off-Grid Installations*
0930 – 0945	*Break*
0945 – 1100	***Energy Storage Solutions:*** *Introduction to Energy Storage Technologies that Complement Solar PV Systems, including Batteries and their Application in Smoothing Energy Supply*

1100 – 1230	***Monitoring & Maintenance:*** *Strategies for Monitoring the Performance of Solar PV Systems and Routine Maintenance Practices to Ensure Operational Efficiency*
1230 – 1245	*Break*
1245 – 1330	***Case Studies:*** *Analysis of Successful Solar PV Projects within the Oil & Gas Industry, Highlighting Lessons Learned and Best Practices*
1330 – 1420	***Technical Challenges & Solutions:*** *Discussion of Common Technical Challenges in Integrating Solar PV Systems and Potential Solutions, including Technological and Operational Considerations*
1420 – 1430	***Recap***
1430	*Lunch & End of Day Three*

Day 4: ***Thursday, 29th of August 2024***

0730 – 0830	***Life Cycle Analysis:*** *Detailed Analysis of the Environmental and Economic Impacts of Solar PV Systems Over their entire Lifecycle, from Manufacturing to Disposal*
0830 – 0930	***Carbon Footprint Reduction:*** *Quantifying the Contribution of Solar PV Systems to Reducing the Carbon Footprint of Oil & Gas Operations*
0930 – 0945	*Break*
0945 – 1100	***Market Trends & Future Prospects:*** *Examination of the Solar PV Market, including Future Technology Trends and their Potential Impact on the Oil & Gas Industry*
1100 – 1230	***Sustainable Supply Chains:*** *Exploring the Role of Solar PV in Creating Sustainable Supply Chains within the Oil & Gas Sector, including Considerations for Sourcing and Logistics*
1230 – 1245	*Break*
1245 – 1330	***Risk Management:*** *Identifying and Managing Risks Associated with the Adoption of Solar PV Systems, including Technical, Financial, and Regulatory Risks*
1330 – 1420	***Stakeholder Engagement:*** *Strategies for Engaging Stakeholders, including Employees, Communities, and Investors, in the Transition Towards Renewable Energy*
1420 – 1430	***Recap***
1430	*Lunch & End of Day Four*

Day 5: ***Friday, 30th of August 2024***

0730 – 0830	***Global Energy Policies:*** *Overview of Global Energy Policies Supporting Renewable Energy Adoption and their Implications for the Oil & Gas Sector*
0830 – 0930	***National & Local Regulations:*** *The Regulatory Framework Affecting Solar PV Installations in Specific Regions, including Compliance and Reporting Requirements*
0930 – 0945	*Break*
0945 – 1030	***Advocacy & Public Policy:*** *Understanding the Role of the Oil & Gas Sector in Advocating for Policies that Support the Transition to Renewable Energy*
1030 – 1130	***Innovations in Solar Technology:*** *Exploring Emerging Technologies in Solar Energy, including Advances in Photovoltaic Materials and System Design*
1130 – 1230	***Strategic Planning for Transition:*** *Frameworks for Strategic Planning within Oil & Gas Companies for Incorporating Solar PV and other Renewables into their Energy Mix*

1230 – 1245	*Break*
1245 – 1345	***Workshop:*** *Creating a Sustainable Transition Plan: Participants Work in Groups to Create a Strategic Plan for Integrating Solar PV Systems into their Operations, Considering Economic, Environmental, and Regulatory Aspects*
1345 – 1400	***Course Conclusion***
1400 – 1415	***POST-TEST***
1415 – 1430	*Presentation of Course Certificates*
1430	*Lunch & End of Course*

Practical Sessions

This practical and highly-interactive course includes real-life case studies and exercises:-

Course Coordinator

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