

COURSE OVERVIEW NE0011
Intermediate course on Renewable Energy (PV & BESS)

Course Title

Intermediate course on Renewable Energy (PV & BESS)

Course Date/Venue

August 12-16, 2024/Fujairah Meeting Room,
 Grand Millennium Al Wahda Hotel, Abu Dhabi,
 UAE

Course Reference

NE0011

Course Duration/Credits

Five days/3.0 CEUs/30 PDHs



Course Description



This practical and highly-interactive course includes real-life case studies 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 Renewable Energy (PV & BESS). It covers the basics of solar energy and components of PV systems and PV system design principles; predicting and calculating the energy yield of PV installations in different environmental conditions; the regulatory frameworks, incentives and policies supporting PV deployment in the utility sector; the site assessment for PV installations including PV system sizing and optimization; and the technical and regulatory considerations for integrating large-scale PV systems into the grid.



Further, the course will also discuss the PV systems and ensuring long-term reliability and performance; the fundamentals of battery energy storage systems (BESS); the various battery storage technologies; the BESS for grid applications and operational strategies for BESS; analyzing economic and environmental considerations; and reviewing safety standards and regulations for BESS.

During this interactive course, participants will learn the hybrid PV and BESS solutions for enhanced grid services and renewable integration; the energy management systems (EMS) for renewables; the demand response and load shifting; the financial modeling and project financing; the policy and market mechanisms for renewables; the project planning and development for PV and BESS; the risk management and mitigation in renewable projects; the emerging technologies and trends in the renewable energy sector; and the sustainability and environmental benefits of integrating renewable energy into utility operations.

Course Objectives

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

- Apply and gain a comprehensive knowledge on renewable energy (PV and BESS)
- Discuss renewable energy, basics of solar energy and components of PV systems
- Recognize PV system design principles and apply techniques for predicting and calculating the energy yield of PV installations in different environmental conditions
- Discuss the regulatory frameworks, incentives and policies supporting PV deployment in the utility sector
- Carryout site assessment for PV installations including PV system sizing and optimization
- Explain the technical and regulatory considerations for integrating large-scale PV systems into the grid
- Maintain PV systems and ensure long-term reliability and performance
- Discuss the fundamentals of battery energy storage systems (BESS) and the various battery storage technologies
- Design BESS for grid applications and apply operational strategies for BESS
- Analyze economic and environmental considerations and review safety standards and regulations for BESS
- Apply hybrid PV and BESS solutions for enhanced grid services and renewable integration
- Recognize energy management systems (EMS) for renewables and apply demand response and load shifting
- Illustrate financial modeling and project financing and discuss policy and market mechanisms for renewables
- Employ project planning and development for PV and BESS as well as risk management and mitigation in renewable projects
- Explore emerging technologies and trends in the renewable energy sector and assess the sustainability and environmental benefits of integrating renewable energy into utility operations

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 renewable energy (PV and BESS) for energy professionals, utility operators, energy analysts, government and regulatory professionals, energy consultants and other technical staff.

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

Accommodation


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

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.

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:



Mr. Karl Thanasis, PEng, MSc, MBA, BSc, is a Senior Mechanical & Energy Expert with over 45 years of practical experience within the Energy Sectors. His wide expertise includes Renewable Energy (PV & BESS), Energy Management International Standards, Energy Audit, Energy Efficiency, Industrial Energy Efficiency, Energy Efficiency & Management, Nuclear Power Plant, Renewable Energy, Solar Energy, Thermal Energy, Engineering Drawings, Codes & Standards, P&ID Reading,

Interpretation & Developing, Drawing Interpretation, Oil & Gas Field Commissioning, Start-Up & Troubleshooting, Oil Field Operations & Water Treatment, Seawater & Reverse Osmosis (RO), Water Reservoirs & Pumping Stations, Water Storage Reservoir, Pumping Systems, Interconnecting Pipelines, Pump Houses & Booster Pumping Stations, Water Pipelines Materials & Fittings, Waste Water Effluent Treating Facilities, Sewage & Industrial Waste Water Treatment & Environmental Protection Best Practices, Process Plant Performance & Efficiency, Water Testing, Wastewater Treatment Technology, Industrial Water Treatment in Refineries & Petrochemical Plants, Piping System, Water Movement, Water Filtering, Mud Pumping, Sludge Treatment and Drying, Aerobic Process of Water Treatment that includes Aeration, Sedimentation and Chlorination Tanks. His strong background also includes Pump Operation & Maintenance, Pumps, Turbo-Generator, Turbine Shaft Alignment, Mud Pumping, Sludge Pumps, Filters, Metering Pumps, Steam Turbines, Power Generator Plants, Gas Turbines, Turbine Shaft Alignment, Root Cause Failure Analysis (RCFA), Boilers, Process Fired Heaters, Heater Fabrication, Thermal & Fired Heater Design, Heat Exchangers, Heat Transfer, Coolers, Boiler & Steam System Management, Chiller & Chiller Plant Design & Installation, Pressure Vessel, Safety Relief Valve Sizing & Selection, Valve Disassembling & Repair, Pressure Relief Devices (PSV), Hydraulic & Pneumatic Maintenance, Advanced Valve Technology, Design and Sizing of all Waste Water Treatment Plant Associated Equipment such as Sludge Pumps, Filters, Metering Pumps, Aerators and Sludge Decanters.

Mr. Thanasis has acquired his thorough and practical experience as the **Water Engineer, Project Manager, Plant Manager, Area Manager - Equipment Construction, Construction Superintendent, Project Engineer and Design Engineer.** His duties covered **Plant Preliminary Design, Plant Operation, Write-up of Capital Proposal, Investment Approval, Bid Evaluation, Technical Contract Write-up, Construction and Sub-contractor Follow up, Lab Analysis, Sludge Drying and Management of Sludge Odor and Removal.** He has worked in various companies worldwide in the **USA, Germany, England and Greece.**

Mr. Thanasis is a **Registered Professional Engineer** in the **USA and Greece** and has **Master and Bachelor** degrees in **Mechanical Engineering with Honours** from the **Purdue University** and **SIU** in **USA** respectively as well as an **MBA** from the **University of Phoenix** in **USA.** Further, he is a **Certified Instructor/Trainer.**

Course Program

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

Day 1: Monday, 12th of August 2024

0730 – 0800	Registration & Coffee
0800 – 0815	Welcome & Introduction
0815 – 0830	PRE-TEST
0830 – 0930	Overview of Renewable Energy: The Role of Renewable Energy Sources in Today's Energy Mix & their Importance for Water & Electricity Utilities
0930 – 0945	Break
0945 – 1030	Basics of Solar Energy: Solar Radiation Fundamentals, the Solar Spectrum & How Photovoltaic Cells Convert Solar Energy into Electricity
1030 – 1130	Components of PV Systems: Detailed Exploration of PV System Components, including Panels, Inverters, Mounting Systems & Balance of System (BOS) Components
1130 – 1215	PV System Design Principles: Introduction to the Design Criteria for PV Systems, Considering Load Assessments, Solar Resources & System Sizing
1215 – 1230	Break
1230 – 1330	Energy Yield Analysis: Techniques for Predicting & Calculating the Energy Yield of PV Installations in Different Environmental Conditions
1330 – 1420	Regulations & Incentives: Overview of Regulatory Frameworks, Incentives, & Policies Supporting PV Deployment in the Utility Sector
1420 – 1430	Recap
1430	Lunch & End of Day One

Day 2: Tuesday, 13th of August 2024

0730 – 0830	Site Assessment for PV Installations: Procedures for Conducting Site Assessments, including Solar Resource Assessment & Site-Specific Constraints
0830 – 0930	PV System Sizing & Optimization: Advanced Methodologies for Sizing PV Systems & Optimizing for Maximum Efficiency & Economic Return
0930 – 0945	Break
0945 – 1100	Grid Integration of PV Systems: The Technical & Regulatory Considerations for Integrating Large-Scale PV Systems into the Grid
1100 – 1215	Case Studies of Utility-Scale PV Projects: Analyzing Real-World Examples of Utility-Scale PV Installations & their Operational Insights
1215 – 1230	Break
1230 – 1420	Maintenance & Reliability of PV Systems: Strategies for Maintaining PV Systems & Ensuring Long-Term Reliability & Performance
1420 – 1430	Recap
1430	Lunch & End of Day Two

Day 3: Wednesday, 14th of August 2024

0730 – 0830	Fundamentals of Battery Energy Storage Systems (BESS): The Role of Energy Storage in Electricity Networks, Focusing on the Integration with Renewable Energy Sources
0830 – 0930	Battery Technologies: Overview of Various Battery Storage Technologies, including Lithium-Ion, Flow Batteries & their Suitability for Utility-Scale Applications

0930 – 0945	Break
0945 – 1100	Designing BESS for Grid Applications: Principles of BESS Design Tailored for Grid Stability, Peak Shaving & Renewable Integration
1100 – 1215	Operational Strategies for BESS: Exploring How BESS can be Operated to Enhance Grid Reliability, Provide Ancillary Services & Support Renewable Energy Sources
1215 – 1230	Break
1230 – 1330	Economic & Environmental Considerations: Analyzing the Economic Viability & Environmental Impact of Incorporating BESS into Utility Operations
1330 – 1420	Safety Standards & Regulations for BESS: Overview of Safety Standards, Best Practices & Regulatory Considerations for BESS Deployment
1420 – 1430	Recap
1430	Lunch & End of Day Three

Day 4: Thursday, 15th of August 2024

0730 – 0830	Hybrid PV & BESS Solutions: Design Principles & Benefits of Combining PV & BESS for Enhanced Grid Services & Renewable Integration
0830 – 0930	Energy Management Systems (EMS) for Renewables: The Use of EMS to Optimize the Operation of Renewable Energy Sources C BESS in Utility Networks
0930 – 0945	Break
0945 – 1100	Demand Response & Load Shifting: Utilizing PV & BESS for Demand Response Initiatives & Load Shifting to Meet Peak Demand Efficiently
1100 – 1215	Case Studies on PV & BESS Integration: Detailed Discussion on Successful Case Studies of PV & BESS Integration by Utilities Worldwide
1215 – 1230	Break
1230 – 1330	Financial Modeling & Project Financing: Techniques for Financial Modeling of Renewable Energy Projects & Understanding the Nuances of Project Financing
1330 – 1420	Policy & Market Mechanisms for Renewables: Current Market Mechanisms, Policy Drivers & Challenges for Renewable Energy Integration in the Utility Sector
1420 – 1430	Recap
1430	Lunch & End of Day Four

Day 5: Friday, 16th of August 2024

0730 – 0930	Project Planning & Development for PV & BESS: Key Stages in the Project Development Lifecycle, from Conception Through to Execution
0930 – 0945	Break
0945 – 1100	Risk Management & Mitigation in Renewable Projects: Identifying, Assessing & Mitigating Risks Associated with Renewable Energy Projects
1100 – 1230	Innovations in Renewable Energy Technologies: Exploring Emerging Technologies & Trends in the Renewable Energy Sector that Could Impact Future Projects
1230 – 1245	Break
1245 – 1345	Sustainability & Environmental Impact: Assessing the Sustainability & Environmental Benefits of Integrating Renewable Energy into Utility Operations
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

Mari Nakintu, Tel: +971 2 30 91 714, Email: mari1@haward.org