COURSE OVERVIEW NE0005
Modern Trends in Renewables: Insights into Solar Power, Wind Power Developments and Technologies

Course Title
Modern Trends in Renewables: Insights into Solar Power, Wind Power Developments and Technologies

Course Reference
NE0005

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

Course Date/Venue

Session(s)	Date	Venue
1	June 29-July 03, 2025	Tamra Meeting Room, Al Bandar Rotana Creek, Dubai UAE
2	September 28-October 02, 2025	Al Buraimi Meeting Room, Sheraton Oman Hotel, Muscat Oman
3	January 11-15, 2026	Tamra Meeting Room, Al Bandar Rotana Creek, Dubai UAE
4	April 19-23, 2026	Al Buraimi Meeting Room, Sheraton Oman Hotel, Muscat Oman

Course Description

This practical and highly-interactive course includes various practical sessions and exercises. Theory learnt will be applied using our state-of-the-art simulators.

This course is designed to provide participants with a detailed and up-to-date overview of Introduction to Renewable Energy Technologies. It covers the differences between renewable and non-renewable energy sources; the types of renewable energy, the need for renewable energy and key drivers of renewable energy adoption; the global renewable energy trends, energy storage systems and principles of solar energy; the photovoltaic (PV) systems, solar thermal systems, solar energy applications and design and sizing of solar energy systems; the challenges in solar energy adoption as well as wind energy, basic working principle of wind turbines and onshore and offshore wind farms; and the wind energy applications and storage, wind turbine design considerations and challenges and future of wind energy.

During this interactive course, participants will learn the Identify bioenergy, biomass conversion technologies, ethanol, biodiesel, and advanced biofuels and geothermal energy; the geothermal exploration and drilling, bioenergy and geothermal energy challenges and energy storage for renewables; the components of smart grids, smart meters, sensors, and communication technologies, demand response and grid optimization and benefits and challenges of smart grid integration; the grid balancing and management, grid stability and reliability with intermittent renewable sources; and the role of policy and regulation in renewable energy and the future of renewable energy technologies.

Course Objectives

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

- Apply and gain a basic knowledge on renewable energy technologies
- Discuss the differences between renewable and non-renewable energy sources
- Identify the types of renewable energy, the need for renewable energy and key drivers of renewable energy adoption
- Explain global renewable energy trends, energy storage systems and principles of solar energy
- Recognize photovoltaic (PV) systems, solar thermal systems, solar energy applications and design and sizing of solar energy systems
- Discuss the challenges in solar energy adoption as well as wind energy, basic working principle of wind turbines and onshore and offshore wind farms
- Recognize wind energy applications and storage, wind turbine design considerations and challenges and future of wind energy
- Identify bioenergy, biomass conversion technologies, ethanol, biodiesel, and advanced biofuels and geothermal energy
- Determine geothermal exploration and drilling, bioenergy and geothermal energy challenges and energy storage for renewables
- Identify the components of smart grids, smart meters, sensors, and communication technologies, demand response and grid optimization and benefits and challenges of smart grid integration
- Apply grid balancing and management and discuss grid stability and reliability with intermittent renewable sources
- Identify the role of policy and regulation in renewable energy and the future of renewable energy technologies

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 conveniently saved in a **Tablet PC**.*

Who Should Attend

This course provides an overview of all significant aspects and considerations of renewable energy technologies for energy managers, engineers, technologists and technicians active in the energy sector. Architects, planners, developers, government and local authority staff will also find this course very useful.

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

Haward's certificates are accredited by the following international accreditation organizations: -

- British Accreditation Council (BAC)

  Haward Technology is accredited by the **British Accreditation Council** for **Independent Further and Higher Education** as an **International Centre**. Haward's certificates are internationally recognized and accredited by the British Accreditation Council (BAC). 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.

- 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

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 Engineer** with over **30 years** of practical experience within the **Energy Sectors**. His wide expertise includes **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**, **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**, Improvement, **Material Cataloguing**, **Mechanical & Rotating Equipment** Troubleshooting & Maintenance, **Rotating Equipment** for Process Industry, **Rotating Machinery** Best Practices, **Centrifugal Pumps** Operation, **Positive Displacement Pumps** Repair, **Pump** Maintenance & Troubleshooting, **Heat Exchanger** Maintenance & Repair, **Heat Exchanger** Inspection & Troubleshooting, **Fin-fan Coolers**, Fundamentals of **Engineering Drawings**, **Codes & Standards**, **P&ID Reading Interpretation & Developing**, **Boiler Design**, **Boiler** Inspection & Maintenance, **Boiler** Operation & Control, **Boiler** Troubleshooting & Inspection, **Boiler Instrumentation & Control**, **Steam Boiler** Maintenance, **Boiler & Steam Generation System**, **Boiler** Failure Analysis & Prevention, **Boiler** Burner Management, **Boiler** Water Treatment Technology, **Machinery Failure Analysis**, **Preventive & Predictive Maintenance**, **Condition Monitoring**, Root Cause Analysis (**RCA**), Root Cause Failure Analysis (**RCFA**), Reliability Centred Maintenance (**RCM**), Risk Base Inspection (**RBI**), **Metallurgical Failure Analysis**, **Corrosion Failure Analysis**, **Steam Generation**, **Steam Turbines**, **Power Generator Plants**, **Gas Turbines**, **Combined Cycle Plants**, **Boilers**, **Process Fired Heaters**, Air Preheaters, Induced Draft Fans, All Heaters Piping Work, Refractory Casting, Heater Fabrication, Thermal & Fired Heater Design, Heat Transfer, Coolers, **Pumps**, Turbo-Generator, Turbine **Shaft Alignment**, **Lubrication**, **Mechanical Seals**, **Packing**, **Blowers, Bearings**, **Couplings**, **Clutches** and **Gears**. Further, he is also versed in **Wastewater Treatment Technology**, **Networking System**, **Water Network Design**, **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 **Design** and **Sizing** of all **Waste Water Treatment Plant Associated Equipment** such as **Sludge Pumps**, **Filters**, **Metering Pumps**, **Aerators** and **Sludge Decanters**. His strong background also includes **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 **Project Manager**, **Plant Manager**, **Area Manager**, **Maintenance Manager**, **Engineering Manager**, **Technical Consultant & Trainer**, **Head of Capital Projects**, **Refractory Specialist**, **Construction Superintendent**, **Maintenance Supervisor**, **Mechanical Engineer**, **Project Engineer**, **Process Engineer**, **Maintenance Engineer** and **Thermal Design Engineer** of 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's** and **Bachelor's** degree in **Mechanical Engineering** with **Honours** from the **Purdue University** and **Southern Illinois University** (**USA**) respectively as well as an **MBA** from the **University of Phoenix** (**USA**). Further, he is a **Certified Instructor/Trainer**, **Certified Internal Verifier/Trainer/Assessor** by the **Institute of Leadership & Management** (**ILM**), a member of the **American Society of Heating, Refrigeration and Air-Conditioning Engineers** and delivered various trainings, courses, seminars and workshops worldwide.

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.

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 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

0730 – 0800	*Registration & Coffee*
0800 – 0815	*Welcome & Introduction*
0815 – 0830	***PRE-TEST***
0830 – 0930	***Introduction to Renewable Energy*** *Definition & Importance • Differences Between Renewable & Non-Renewable Energy Sources • Types of Renewable Energy (Solar, Wind, Hydro, Geothermal, Biomass) • Global Transition to Renewable Energy*
0930 – 0945	*Break*
0945 – 1030	***The Need for Renewable Energy*** *Environmental Benefits • Climate Change & Sustainability • Global Energy Demand versus Supply • Fossil Fuel Depletion*
1030 – 1130	***Renewable Energy Technologies: An Overview*** *Solar Power • Wind Energy • Biomass Energy • Hydropower & Geothermal Energy*
1130 – 1215	***Key Drivers of Renewable Energy Adoption*** *Government Policies & Incentives • Technological Advancements • Market Forces & Energy Prices • Public Perception & Demand for Green Energy*
1215 – 1230	*Break*
1230 – 1330	***Global Renewable Energy Trends*** *Current Global Market Share of Renewable Energy • Leading Countries in Renewable Energy Adoption • Investment Trends in Renewable Technologies • Challenges in Scaling Renewable Energy*

1330 – 1420	***Basics of Energy Storage Systems*** *The Need for Energy Storage in Renewable Energy Systems • Types of Energy Storage Systems (Batteries, Pumped Hydro Storage) • Challenges in Energy Storage • Case Studies of Energy Storage Projects*
1420 – 1430	***Recap*** *Using this Course Overview, the Instructor(s) will Brief Participants about the Topics that were Discussed Today and Advise Them of the Topics to be Discussed Tomorrow*
1430	*Lunch & End of Day One*

Day 2

0730 – 0830	***Principles of Solar Energy*** *The Solar Energy Resource: Solar Radiation & Availability • Solar Power Conversion Methods • Solar Thermal versus Photovoltaic Technologies • The Role of the Sun in Energy Generation*
0830 – 0930	***Photovoltaic (PV) Systems*** *Basic Working Principle of Photovoltaic Cells • Types of Photovoltaic Technologies (Monocrystalline, Polycrystalline, Thin Film) • Key Components of PV Systems (Panels, Inverters, Charge Controllers) • Efficiency & Performance Factors*
0930 – 0945	*Break*
0945 – 1100	***Solar Thermal Systems*** *Solar Thermal Collectors: Flat Plate, Evacuated Tube • Solar Thermal Power Plants (Concentrated Solar Power) • Heat Storage & Distribution • Applications in Industry & Residential Use*
1100 – 1215	***Solar Energy Applications*** *Off-Grid & On-Grid Solar Systems • Residential, Commercial & Industrial Applications • Solar Water Heating • Solar-Powered Transportation*
1215 – 1230	*Break*
1230 – 1330	***Design & Sizing of Solar Energy Systems*** *Calculating Energy Requirements • Sizing Solar Panels & Batteries • System Integration & Optimization • Safety Standards in Design*
1330 – 1420	***Challenges in Solar Energy Adoption*** *Intermittency & Energy Storage • Land Use & Location Considerations • Cost Barriers & Funding Options • Environmental Impact of Manufacturing*
1420 – 1430	***Recap*** *Using this Course Overview, the Instructor(s) will Brief Participants about the Topics that were Discussed Today and Advise Them of the Topics to be Discussed Tomorrow*
1430	*Lunch & End of Day Two*

Day 3

0730 – 0830	***Basics of Wind Energy*** *History & Development of Wind Power • The Wind Energy Resource: Wind Speed & Availability • Wind Turbines: Types & Configurations • Global Wind Energy Market Trends*
0830 – 0930	***Basic Working Principle of Wind Turbines*** *Aerodynamics of Wind Turbines • Conversion of Wind Energy to Mechanical Energy • Gearboxes, Generators & Control Systems • Efficiency & Performance Optimization*

0930 – 0945	*Break*
0945 – 1100	***Onshore & Offshore Wind Farms*** *Differences Between Onshore & Offshore Wind Power • Site Selection Criteria for Wind Farms • Environmental Impact Assessments • Economic Viability & Cost-Benefit Analysis*
1100 – 1215	***Wind Energy Applications & Storage*** *Integrating Wind Energy into the Power Grid • Storage Options for Wind Energy (Batteries, Pumped Storage) • Hybrid Systems (Wind & Solar) • Off-Grid & Rural Applications*
1215 – 1230	*Break*
1230 – 1330	***Wind Turbine Design Considerations*** *Blade Design & Materials • Turbine Sizing & Scaling • Control Systems & Grid Integration • Operation & Maintenance Best Practices*
1330 – 1420	***Challenges & Future of Wind Energy*** *Variability & Intermittency of Wind • Noise & Wildlife Concerns • Technological Innovations (E.G., Floating Wind Turbines) • Political & Regulatory Challenges*
1420 – 1430	***Recap*** *Using this Course Overview, the Instructor(s) will Brief Participants about the Topics that were Discussed Today and Advise Them of the Topics to be Discussed Tomorrow*
1430	*Lunch & End of Day Three*

Day 4

0730 – 0830	***Basics of Bioenergy*** *Definition & Types of Bioenergy (Biofuels, Biogas, Biomass) • The Role of Biomass in Renewable Energy • Biomass Feedstocks & Sources (Agriculture, Forestry, Waste) • Carbon-Neutral Properties of Bioenergy*
0830 – 0930	***Biomass Conversion Technologies*** *Direct Combustion & Co-Firing • Gasification & Pyrolysis • Anaerobic Digestion & Biogas Production • Biomass-To-Liquid (BTL) Technologies*
0930 – 0945	*Break*
0945 – 1100	***Biofuels: Ethanol, Biodiesel & Advanced Biofuels*** *Production Methods for Biofuels • First, Second & Third-Generation Biofuels • Benefits & Challenges of Biofuels • Biofuels in Transportation & Industrial Sectors*
1100 – 1215	***Basics of Geothermal Energy*** *Geothermal Resources: Types & Locations • Geothermal Power Plants: Flash, Binary & Dry Steam Systems • Applications of Geothermal Energy (Heating, Cooling, Electricity Generation) • Environmental & Economic Aspects of Geothermal Energy*
1215 – 1230	*Break*
1230 – 1330	***Geothermal Exploration & Drilling*** *Geothermal Reservoir Management • Exploration Techniques (Geophysical Surveys, Drilling) • Challenges in Geothermal Energy Extraction • Case Studies of Successful Geothermal Projects*

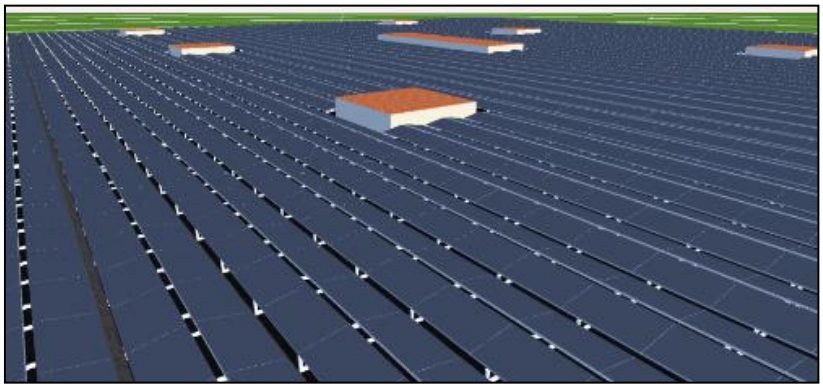
1330 – 1420	***Bioenergy & Geothermal Energy Challenges*** *Sustainability & Resource Availability • Land & Water Use Considerations • Environmental & Social Impacts • Policy & Regulatory Barriers*
1420 – 1430	***Recap*** *Using this Course Overview, the Instructor(s) will Brief Participants about the Topics that were Discussed Today and Advise Them of the Topics to be Discussed Tomorrow*
1430	*Lunch & End of Day Four*

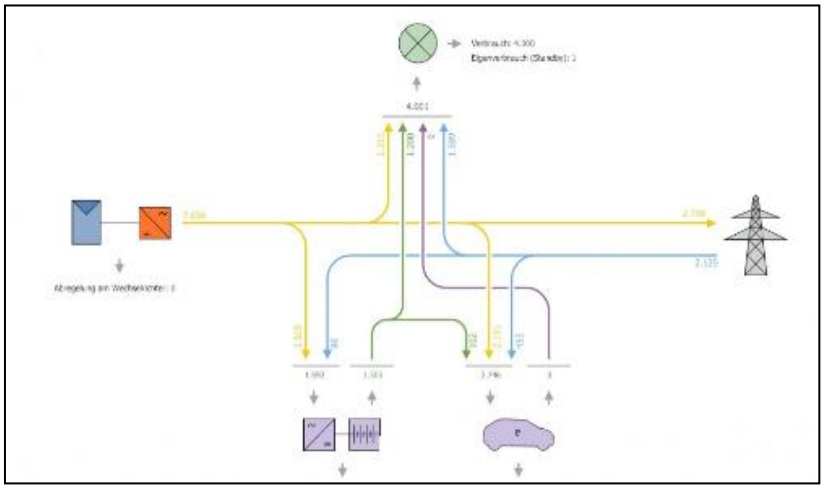
Day 5

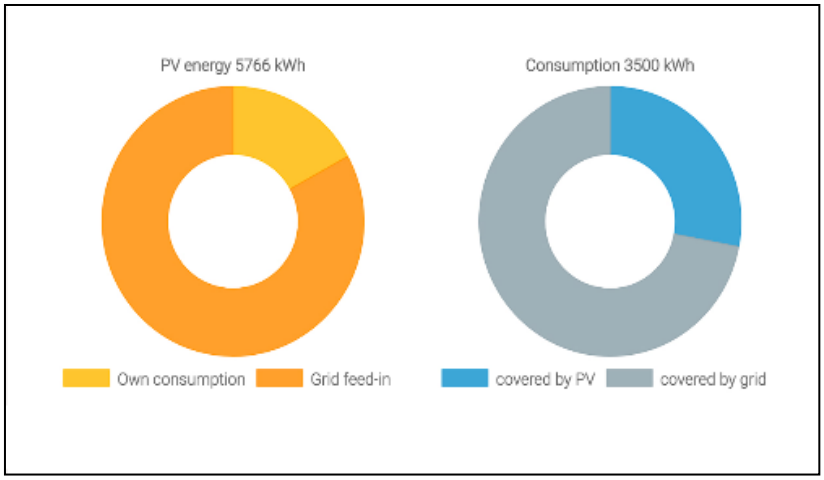
0730 – 0830	***Energy Storage for Renewables*** *The Role of Energy Storage in Renewable Energy Systems • Types of Storage: Mechanical, Electrical & Chemical • Battery Technologies (Li-Ion, Flow Batteries, Solid-State Batteries) • Emerging Trends in Energy Storage Solutions*
0830 – 0930	***Smart Grids & their Role in Renewable Energy*** *Definition & Components of Smart Grids • Smart Meters, Sensors & Communication Technologies • Demand Response & Grid Optimization • Benefits & Challenges of Smart Grid Integration*
0930 – 0945	*Break*
0945 – 1040	***Integrating Renewables into the Grid*** *Grid Balancing & Management • The Role of Virtual Power Plants • Grid Stability & Reliability with Intermittent Renewable Sources • Case Studies of Grid Integration*
1040 – 1135	***The Role of Policy & Regulation in Renewable Energy*** *Government Incentives & Subsidies • Renewable Energy Targets & Regulations • International Cooperation on Renewable Energy • Future Trends in Renewable Energy Policy*
1135 - 1230	***Future of Renewable Energy Technologies*** *Emerging Technologies: Wave Energy, Tidal Energy & Hydrogen •Innovations in Materials (Solar Cells, Wind Turbine Blades) • Decentralized Energy Production & Microgrids • Future Projections for Renewable Energy Adoption*
1230 – 1245	*Break*
1245 – 1345	***Career Opportunities & Challenges in Renewable Energy*** *Skills Required for the Renewable Energy Workforce • Opportunities in Design, Operation & Maintenance • Job Trends & Growth Areas in the Renewable Energy Sector • The Role of Education & Training in Advancing Renewable Technologies*
1345 – 1400	***Course Conclusion*** *Using this Course Overview, the Instructor(s) will Brief Participants about the Course Topics that were Covered During the Course*
1400 – 1415	***POST-TEST***
1415 – 1430	*Presentation of Course Certificates*
1430	*Lunch & End of Course*

Simulators (Hands-on Practical Sessions)

Practical sessions will be organized during the course for delegates to practice the theory learnt. Delegates will be provided with an opportunity to carryout various exercises using our state-of-the-art simulator "PV*SOL Premium".







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Course Coordinator

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