



COURSE OVERVIEW NE0335

Modern Trends in Renewables: Insights into Solar Power, Wind Power Developments & Technologies

Course Title

Modern Trends in Renewables: Insights into Solar Power, Wind Power Developments & Technologies

Course Date/Venue

November 09-13, 2025/Musandam Meeting Room, Royal Tulip Muscat, Muscat, Oman

Course Reference

NE0335

Course Duration/Credits

Five days/3.0 CEUs/30 PDHs



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 Modern Trends in Renewables: Insights into Solar Power, Wind Power Developments & Technologies. It covers the role of renewables in energy transition and decarbonization; the key policies and regulatory drivers for renewable adoption; the fundamentals of solar power technologies and wind power technologies; the key challenges in renewable energy deployment; the battery storage technologies and applications, pumped hydro and compressed air storage systems; and the role of storage in balancing renewable supply and demand.



Further, the course will also discuss the renewable energy policy and market drivers and advances in PV cell technologies; the concentrated solar power (CSP) innovations, solar tracking and control systems and solar power plant design and optimization; the off-grid and distributed solar solutions and solar power O&M and lifecycle management; the next-generation wind turbine designs, offshore wind power technologies and wind speed and direction measurement techniques; the control systems and smart turbine operation; and the hybrid wind power systems and wind power O&M and asset management.





During this interactive course, participants will learn the energy storage for renewables, smart grids and renewable integration and power electronics for solar and wind systems; the digitalization and IoT in renewable energy, hydrogen production from renewables and resilience and cybersecurity in renewable energy systems; the emerging solar power trends, emerging wind power trends and floating renewable energy platforms; and the decarbonization and sector coupling and roadmap for the future of renewables.

Course Objectives

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

- Apply and gain an in-depth knowledge on modern trends in renewables covering solar power, wind power developments and technologies
- Identify the role of renewables in energy transition and decarbonization including key policies and regulatory drivers for renewable adoption
- Discuss the fundamentals of solar power technologies and wind power technologies as well as the key challenges in renewable energy deployment
- Recognize battery storage technologies and applications, pumped hydro and compressed air storage systems and role of storage in balancing renewable supply and demand
- Discuss renewable energy policy and market drivers and advances in PV cell technologies
- Recognize concentrated solar power (CSP) innovations, solar tracking and control systems and solar power plant design and optimization
- Explain off-grid and distributed solar solutions and solar power O&M and lifecycle management
- Apply next-generation wind turbine designs, offshore wind power technologies and wind speed and direction measurement techniques
- Carryout control systems and smart turbine operation, hybrid wind power systems and wind power O&M and asset management
- Employ energy storage for renewables, smart grids and renewable integration and power electronics for solar and wind systems
- Recognize digitalization and IoT in renewable energy, hydrogen production from renewables and resilience and cybersecurity in renewable energy systems
- Identify emerging solar power trends, emerging wind power trends and floating renewable energy platforms
- Explain decarbonization and sector coupling and roadmap for the future of renewables

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 modern trends in renewables 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 request.



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. Barry Pretorius is a **Senior Instrumentation & Power Engineer** with almost **30** years of extensive experience within the **Oil, Gas, Petrochemical, Refinery & Power** industries. His expertise widely covers in the areas of **Renewable Energy** Technologies, **Renewable Energy: Solar PV & Thermal Solar**, Fundamentals of **Renewable Energy, Solar Energy** Applications, Design & Sizing of **Solar Energy** Systems, Distributed Control System (**DCS**), **DCS** Operations & Techniques, **Plant Control** and Protection Systems, **Process Control & Instrumentation, Cascade Control Loops, Split-Range Control Loops, Capacity Control & Other** Advanced Control Schemes, **Safety Instrumented Systems, Plant Automation** Operations & Maintenance, Programmable Logic Controller (**PLC**), **Siemens PLC Simatic S7-400/S7-300/S7-200, PLC & SCADA** for Automation & Process Control, **Artificial Intelligence, Allen Bradley PLC** Programing and Hardware Trouble Shooting, **Schneider SCADA System, Wonder Ware, Emerson, Honeywell, Honeywell Safety Manager PLC, Yokogawa, Advanced DCS Yokogawa, Endress & Hauser, Field Commissioning and Start up Testing Pre Operations, System Factory Acceptance Test (FAT), FactoryLink ECS, Modicon 484, Rockwell Automation, System Site Acceptance Test (SAT), SCADA HMI & PLC** Control Logic, **Cyber Security** Practitioner, **Cyber Security** of Industrial Control System, **IT Cyber Security** Best Practices, **Cybersecurity** Fundamentals, **Ethical Hacking & Penetration Testing, Cybersecurity** Risk Management, **Cybersecurity** Threat Intelligence, **OT Whitelisting** for Better Industrial Control System Defense, **NESA** Standard and Compliance Workshop, **OT, Cyber Attacks** Awareness - Malware/Ransom Ware / Virus /Trojan/ Phishing, **Information Security Manager, Security System** Installation and Maintenance, Implementation, Systems Testing, Commissioning and Startup, **Foxboro DCS & Triconics, SIS** Systems, Advanced **DC Drives, Motion Control, Hydraulics, Pneumatics and Control Systems** Engineering, **Electrical & Automation Control Systems, HV/MV Switchgear, LV & MV Switchgears & Circuit Breakers, High Voltage Electrical Safety, LV & HV Electrical System, HV Equipment** Inspection & Maintenance, **LV Distribution Switchgear & Equipment, Electrical Safety, Electrical** Maintenance, **Transformers, Medium & High Voltage Equipment, Circuit Breakers, Cable & Overhead Line** Troubleshooting & Maintenance, **Electrical Drawing & Schematics, Voltage Distribution, Power Distribution, Filters, Automation System, Electrical Variable Speed Drives, Power Systems, Power Generation, Diesel Generators, Power Stations, Uninterruptible Power Systems (UPS), Battery Chargers, AC & DC Transmission, CCTV Installation, Data & Fire Alarm System, Evacuation Systems and Electrical Motors & Variable Speed Drives, & Control of Electrical and Electronic devices.**

During Mr. Pretorius's career life, he has gained his practical experience through several significant positions and dedication as the **Senior Technical Analyst, Team Leader, Pre-operations Startup Engineer, Automation System's Software Manager, Automation System's Senior Project Engineer, Power Engineer, PLC Specialist, Site Manager, Senior Project & Commissioning Engineer, Technical Director, Project Engineer, Radio Technician, A T E Technician** and **Senior Instructor/Trainer** from various companies like the **ADNOC Sour Gas, Ras Al Khair Aluminum Smelter, Johnson Matthey Pty. Ltd, Craigcor Engineering, Unitronics South Africa Pty (Ltd), Bridgestone/Firestone South Africa Pty (Ltd)** and **South African Defense Force**.

Mr. Pretorius's has a Higher Diploma in **Electrical Engineering Heavy Current**. Further, he is a **Certified Instructor/Trainer** and delivered numerous trainings, courses, workshops, seminars and conferences internationally.



Accommodation

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

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.

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: Sunday, 09th of November 2025

0730 – 0800	Registration & Coffee
0800 – 0815	Welcome & Introduction
0815 – 0830	PRE-TEST
0830 – 0930	Global Renewable Energy Landscape Current Global Market Trends & Growth Forecasts • Role of Renewables in Energy Transition & Decarbonization • Key Policies & Regulatory Drivers for Renewable Adoption • Comparative Analysis of Solar, Wind & Other Renewables
0930 – 0945	Break
0945 – 1030	Fundamentals of Solar Power Technologies Photovoltaic (PV) Technology Principles • Types of PV Cells: Mono-Crystalline, Poly-Crystalline & Thin-Film • Concentrated Solar Power (CSP) Overview • Efficiency Factors Affecting Solar Performance
1030 – 1130	Fundamentals of Wind Power Technologies Basic Wind Energy Conversion Principles • Horizontal versus Vertical Axis Turbines • Onshore versus Offshore Wind Power Systems • Key Efficiency Determinants in Wind Energy
1130 – 1215	Key Challenges in Renewable Energy Deployment Intermittency & Variability of Renewable Resources • High Upfront Capital Cost Barriers • Grid Integration & Transmission Challenges • Environmental & Land Use Considerations
1215 – 1230	Break



1230 – 1330	Energy Storage & Integration Overview Battery Storage Technologies & Applications • Pumped Hydro & Compressed Air Storage Systems • Role of Storage in Balancing Renewable Supply & Demand • Hybrid Renewable-Storage Projects
1330 – 1420	Renewable Energy Policy & Market Drivers International Agreements (Paris Agreement, COP) • Government Subsidies & Feed-in Tariffs • Corporate Renewable Energy Purchase Agreements (PPAs) • Impact of Carbon Pricing & Emission Trading Schemes
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: Monday, 10th of November 2025

0730 – 0830	Advances in PV Cell Technologies High-Efficiency Cell Designs (PERC, TOPCon, HJT) • Bifacial Solar Panels & Yield Improvements • Perovskite Solar Cells & Hybrid Tandems • Flexible & Building-Integrated PV (BIPV)
0830 – 0930	Concentrated Solar Power (CSP) Innovations Parabolic Trough & Solar Tower Systems • Molten Salt Thermal Energy Storage • Dish Stirling & Fresnel Lens Designs • Efficiency & Scalability Improvements
0930 – 0945	Break
0945 – 1100	Solar Tracking & Control Systems Single-Axis versus Dual-Axis Tracking Mechanisms • Automation & Smart Tracking Algorithms • Impact on Yield & Cost-Benefit Analysis • Maintenance Requirements for Tracking Systems
1100 – 1215	Solar Power Plant Design & Optimization Site Assessment & Solar Resource Evaluation • Panel Orientation & Tilt Optimization • Minimizing Shading & Soiling Losses • Digital Twin Technology for Performance Simulation
1215 – 1230	Break
1230 – 1330	Off-Grid & Distributed Solar Solutions Rooftop Solar Applications for Households & Businesses • Solar Microgrids in Remote Communities • Solar-Powered Irrigation & Water Pumping • Portable Solar Systems for Disaster Relief
1330 – 1420	Solar Power O&M & Lifecycle Management Predictive & Preventive Maintenance Strategies • Drone-Based Inspection & Fault Detection • Recycling & End-of-Life Management of PV Modules • Performance Monitoring & Degradation Analysis
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: Tuesday, 11th of November 2025

0730 – 0830	Next-Generation Wind Turbine Designs Larger Rotor Diameters & Taller Towers • Direct-Drive & Gearless Systems • Lightweight Blade Materials & Aerodynamics • Floating Offshore Wind Turbines
0830 – 0930	Offshore Wind Power Technologies Fixed-Bottom Offshore Wind Farms • Floating Platform Designs (Spar, Semi-Submersible, Tension-Leg) • Cabling & Subsea Transmission Systems • Challenges in Offshore Construction & Maintenance
0930 – 0945	Break
0945 – 1100	Wind Resource Assessment & Siting Wind Speed & Direction Measurement Techniques • GIS & Remote Sensing Tools for Site Analysis • Wake Effect & Turbulence Modeling • Environmental & Social Impact Considerations
1100 – 1215	Control Systems & Smart Turbine Operation SCADA & Real-Time Monitoring • Pitch & Yaw Control Optimization • Predictive Analytics for Fault Prevention • Energy Curtailment & Grid Demand Response
1215 – 1230	Break
1230 – 1330	Hybrid Wind Power Systems Wind-Solar Hybrid Integration • Wind-Diesel Hybrid for Remote Applications • Wind-Hydrogen Production for Energy Storage • Case Studies of Hybrid Projects
1330 – 1420	Wind Power O&M & Asset Management Condition Monitoring Systems (CMS) • Drone & Robotic Inspection Technologies • Predictive Maintenance Using AI & Machine Learning • End-of-Life Recycling & Repowering Strategies
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: Wednesday, 12th of November 2025

0730 – 0830	Energy Storage for Renewables Lithium-Ion, Sodium-Ion & Flow Batteries • Thermal & Mechanical Storage Solutions • Hydrogen as an Energy Carrier • Storage Sizing & Economics
0830 – 0930	Smart Grids & Renewable Integration Advanced Metering Infrastructure (AMI) • Demand Response & Load Balancing • Grid Stability with High Renewable Penetration • Microgrids & Virtual Power Plants (VPPs)
0930 – 0945	Break
0945 – 1100	Power Electronics for Solar & Wind Systems Inverters: String, Central & Micro-Inverters • Maximum Power Point Tracking (MPPT) Technology • Grid-Forming versus Grid-Following Inverters • Fault Ride-Through (FRT) Capabilities
1100 – 1215	Digitalization & IoT in Renewable Energy IoT-Enabled Monitoring Systems • Big Data Analytics for Performance Optimization • AI-Driven Predictive Maintenance • Blockchain for Renewable Energy Trading
1215 – 1230	Break



1230 – 1330	Hydrogen Production from Renewables Electrolysis Powered by Solar & Wind • Green Hydrogen versus Blue Hydrogen • Storage & Transportation Challenges • Emerging Hydrogen Economy Opportunities
1330 – 1420	Resilience & Cybersecurity in Renewable Energy Systems Vulnerabilities in Digital Energy Systems • Cybersecurity Best Practices for Renewable Assets • AI-Based Threat Detection & Mitigation • Disaster Recovery & Continuity Planning
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

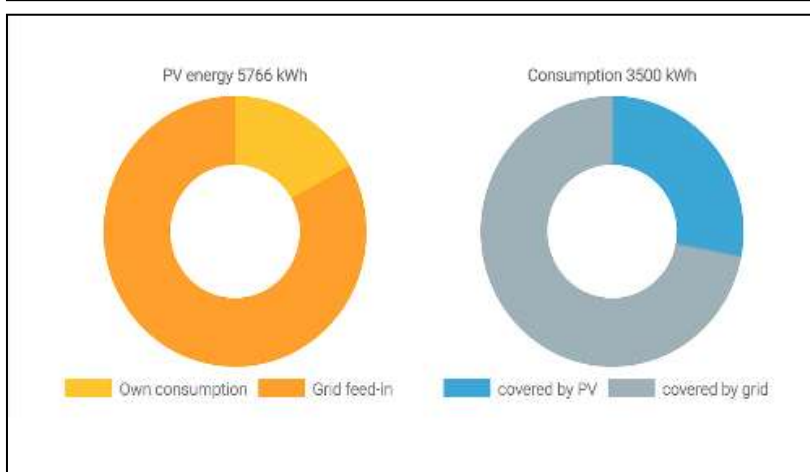
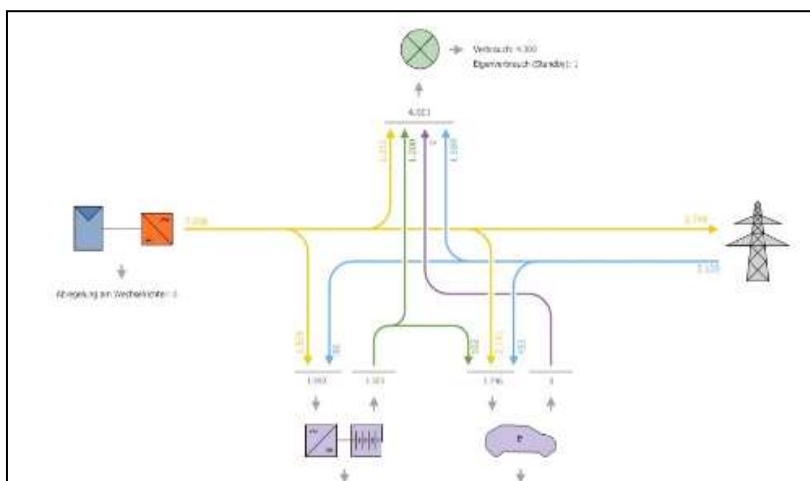
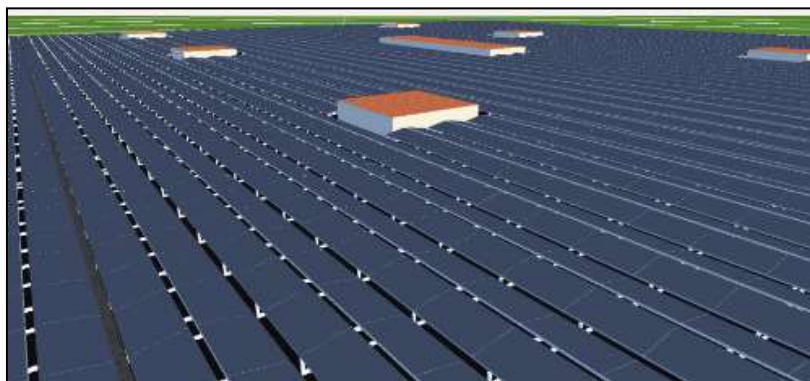
Day 5: Thursday, 13th of November 2025

0730 – 0830	Emerging Solar Power Trends Tandem Perovskite-Silicon PV Breakthroughs • Space-Based Solar Power Concepts • Agrivoltaics & Dual Land-Use Innovations • Solar Energy in Transportation Applications
0830 – 0930	Emerging Wind Power Trends Ultra-Large Offshore Wind Projects (>15 MW Turbines) • Airborne Wind Energy Systems • 3D-Printed Wind Turbine Components • Bio-Inspired Blade Designs
0930 – 0945	Break
0945 – 1040	Floating Renewable Energy Platforms Hybrid Floating Solar & Wind Farms • Marine Energy Integration (Tidal, Wave) • Anchoring & Mooring Innovations • Environmental & Navigational Safety
1040 – 1135	Decarbonization & Sector Coupling Electrification of Heat & Transport • Power-to-X (PtX) Technologies • Coupling Renewable Energy with Desalination • Industrial Decarbonization through Renewables
1135 – 1230	Global Case Studies & Best Practices Successful Utility-Scale Solar Power Projects • Pioneering Offshore Wind Farms • Hybrid Renewable-Storage Deployments • Policy Models from Leading Renewable Nations
1230 – 1245	Break
1245 – 1345	Roadmap for the Future of Renewables Technology Cost Reduction Pathways • Global Investment Trends & Financing Models • Opportunities for Developing Countries • Long-Term Sustainability & Climate Goals Alignment
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”.



PV*SOL Premium

Course Coordinator

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