COURSE OVERVIEW NE0305
Economics of Renewable Energy Systems

Course Title
Economics of Renewable Energy Systems

Course Date/Venue
Please see page 3

Course Reference
NE0305

Course Duration/Credits
Five days/3.0CEUs/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 Economics of Renewable Energy Systems. It covers the types of renewable energy sources and the comparison of renewable and non-renewable energy systems; the economic principles in energy systems, cost structures of renewable energy technologies, market mechanisms and energy pricing; the energy storage, grid integration and policy and regulation impact on renewable energy economics; the financial modelling in energy projects and capital and operational expenditure (CAPEX & OPEX); the project financing in renewable energy, payback period and return on investment (ROI); and the wind and solar projects and government and multilateral funding sources.

During this interactive course, participants will learn the cost-benefit analysis of renewable energy and economic assessment of solar energy systems; the wind energy economics, biomass and bioenergy economics; the hydropower economics and geothermal energy systems; the energy markets and their dynamics including subsidies, taxes and incentives for renewable energy; the carbon pricing and emissions trading systems, renewable energy certificates (RECs) and their economic value; the global trends in renewable energy economics and policy recommendations for sustainable energy transitions; the emerging technologies and their economic impact; the renewable energy in developing economies; the impact of climate change on renewable energy economics; and integrating renewable energy with traditional energy markets.

Course Objectives

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

- Apply and gain a comprehensive knowledge on economics of renewable energy systems
- Identify the types of renewable energy sources and discuss the comparison of renewable and non-renewable energy systems
- Discuss the economic principles in energy systems, cost structures of renewable energy technologies and market mechanisms and energy pricing
- Carryout energy storage and grid integration and review policy and regulation impact on renewable energy economics
- Illustrate financial modelling in energy projects and describe capital and operational expenditure (CAPEX & OPEX)
- Determine project financing in renewable energy, payback period and return on investment (ROI), financing wind and solar projects and government and multilateral funding sources
- Apply cost-benefit analysis of renewable energy and economic assessment of solar energy systems
- Explain wind energy economics, biomass and bioenergy economics, hydropower economics and geothermal energy systems
- Discuss energy markets and their dynamics including subsidies, taxes and incentives for renewable energy
- Recognize carbon pricing and emissions trading systems, renewable energy certificates (RECs) and their economic value and global trends in renewable energy economics
- Review policy recommendations for sustainable energy transitions and discuss emerging technologies and their economic impact
- Discuss renewable energy in developing economies, the impact of climate change on renewable energy economics and integrating renewable energy with traditional energy markets

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 for economics of renewable energy systems for energy sector professionals, economists & financial analysts, government & policy makers, academics & researchers, NGOs & think tanks and corporate sustainability managers.

Course Date/Venue

Session(s)	Date	Venue
1	May 25-29, 2025	Tamra Meeting Room, Al Bandar Rotana Creek, Dubai, UAE
2	July 21-25, 2025	Glasshouse Meeting Room, Grand Millennium Al Wahda Hotel, Abu Dhabi, UAE
3	September 28-October 02, 2025	Tamra Meeting Room, Al Bandar Rotana Creek, Dubai, UAE
4	November 17-21, 2025	Glasshouse Meeting Room, Grand Millennium Al Wahda Hotel, Abu Dhabi, UAE

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.

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.

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: -

- 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.

- 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. 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**. 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 - 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 a **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 course 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 – 0830	***Overview of Renewable Energy Systems*** *Definition of Renewable Energy • Types of Renewable Energy Sources • Comparison of Renewable and Non-Renewable Energy Systems • Global Trends in Renewable Energy*
0830 - 0930	***Economic Principles in Energy Systems*** *Basic Economic Concepts for Energy Systems • Demand and Supply in Energy Markets • Role of Government Policy in Energy Markets • Market Failures in Energy Markets*
0930 – 0945	*Break*

0945 – 1100	***Cost Structures of Renewable Energy Technologies*** *Capital Costs vs Operational Costs • Levelized Cost of Electricity (LCOE) • Economies of Scale in Renewable Energy • Financing Renewable Energy Projects*
1100 – 1230	***Market Mechanisms & Energy Pricing*** *Pricing Mechanisms in Energy Markets • Renewable Energy Certificate Systems • Power Purchase Agreements (PPAs) • The Role of Subsidies in Renewable Energy Pricing*
1230 – 1245	*Break*
1230 – 1330	***Energy Storage & Grid Integration*** *Types of Energy Storage Technologies • Economic Challenges of Energy Storage • Grid Integration Costs and Solutions • Economic Impacts of Grid Modernizations*
1330 - 1420	***Policy & Regulation Impact on Renewable Energy Economics*** *Government Incentives for Renewable Energy • International Policies Promoting Renewable Energy • The Role of Carbon Pricing and Taxes • Renewable Energy Policies in Developing Countries*
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	***Basics of Financial Modelling in Energy Projects*** *Financial Models for Renewable Energy Systems • Cost-Benefit Analysis • Net Present Value (NPV) and Internal Rate of Return (IRR) • Risk Assessment in Energy Projects*
0830 - 0930	***Capital & Operational Expenditure (CapEx & OpEx)*** *Capital Versus Operational Expenditures in Renewable Projects • Financing Options for Renewable Energy Projects • Tax Benefits and Incentives • Debt vs Equity Financing*
0930 – 0945	*Break*
0945 – 1100	***Project Financing in Renewable Energy*** *Structure of Financing for Large-Scale Projects • The Role of Private and Public Financing • Equity Investment versus Loans • Risks and Returns for Investors*
1100 – 1230	***Payback Period & Return on Investment (ROI)*** *Calculating Payback Periods for Renewable Energy Projects • Return on Investment (ROI) Analysis • Sensitivity Analysis in Financial Models • Break-Even Analysis for Renewable Energy Systems*
1230 – 1245	*Break*
1245– 1330	***Financing Wind & Solar Projects*** *Specific Challenges in Financing Wind and Solar • Case Study: Financing Wind Farm Projects • Case Study: Financing Solar Power Installations • Financial Incentives in Wind and Solar Energy Projects*
1330 - 1420	***Government & Multilateral Funding Sources*** *International Financial Institutions Supporting Renewable Energy • Grants and Subsidies for Renewable Energy Projects • Crowdfunding and Community Financing Models • Government Guarantees and Their Impact*
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	***Cost-Benefit Analysis of Renewable Energy*** *Understanding Cost-Benefit Analysis (CBA) in Energy Systems • Social vs Private Benefits in Energy Evaluation • Case Studies of Cost-Benefit Analysis for Renewable Projects • Non-Market Impacts of Renewable Energy Projects*
0830 - 0930	***Economic Assessment of Solar Energy Systems*** *Financial and Economic Aspects of Solar Power • Solar Energy Cost Drivers • Subsidy Schemes and Their Impact on Solar Energy Economics • Economic Modeling for Solar Projects*
0930 – 0945	*Break*
0945 – 1100	***Wind Energy Economics*** *Wind Energy Cost Structures • Financial Considerations for Onshore vs Offshore Wind Projects • Cost Optimization in Wind Farm Operations • Economic Impacts of Large-Scale Wind Installations*
1100 – 1230	***Biomass & Bioenergy Economics*** *Cost Structures of Biomass Power Generation • Feedstock Availability and Cost Drivers • Economic Viability of Bioenergy Projects • Financial Models for Bioenergy Technologies*
1230 – 1245	*Break*
1245 – 1330	***Hydropower Economics*** *Economic Evaluation of Hydropower Projects • Investment and Operating Costs for Hydropower • Environmental Impacts and Their Economic Assessment • Financial Risks in Large Hydropower Projects*
1330 - 1420	***Geothermal Energy Systems*** *Cost Structures of Geothermal Energy Systems • Geothermal Resource Assessment and Cost Drivers • Economic Impacts of Geothermal Power Plants • Financing Geothermal Energy 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 Three*

Day 4

0730 – 0830	***Energy Markets & Their Dynamics*** *Introduction to Energy Market Structures • Market Competition and Renewable Energy Integration • Supply-Demand Analysis in Energy Markets • The Role of Energy Trading in Renewable Economics*
0830 - 0930	***Subsidies, Taxes, & Incentives for Renewable Energy*** *Government Subsidies and Their Economic Impacts • Tax Incentives and Renewable Energy Systems • Global Case Studies on Subsidy Schemes • The Role of Subsidies in Energy Transition*
0930 – 0945	*Break*
0945 - 1100	***Carbon Pricing & Emissions Trading Systems*** *Carbon Markets and Carbon Credits • Impact of Carbon Pricing on Renewable Energy Systems • Emissions Trading Systems (ETS) • Economic Impact of Global Climate Agreements*
1100 - 1230	***Renewable Energy Certificates (RECs) & Their Economic Value*** *The Role of RECs in Promoting Renewable Energy • How RECs Impact the Financial Viability of Renewable Projects • Market Dynamics of RECs • Case Studies on REC Markets*

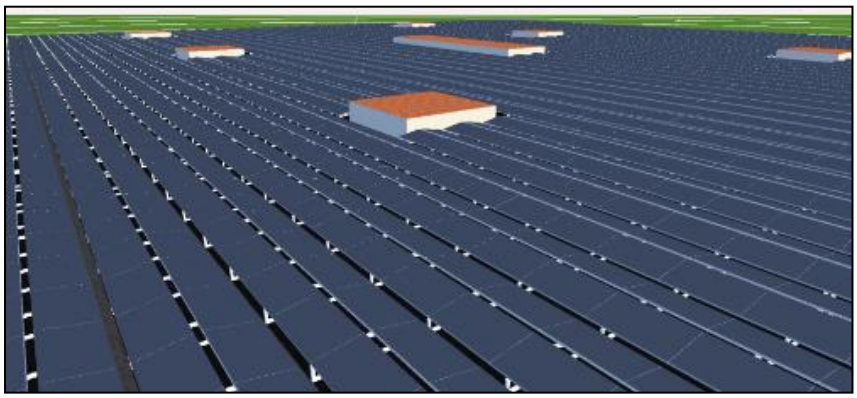
1230 – 1245	*Break*
1245 - 1330	***Global Trends in Renewable Energy Economics*** *Renewable Energy in Emerging Economies • Trends in Renewable Energy Investment • Economic Development and Renewable Energy Growth • The Future of Renewable Energy Markets*
1330 – 1420	***Policy Recommendations for Sustainable Energy Transitions*** *Designing Policies for a Renewable Energy Future • The Role of Governments in Energy Transitions • Successful Global Policy Frameworks for Renewable Energy • The Economic Potential of Renewable Energy Transitions*
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*

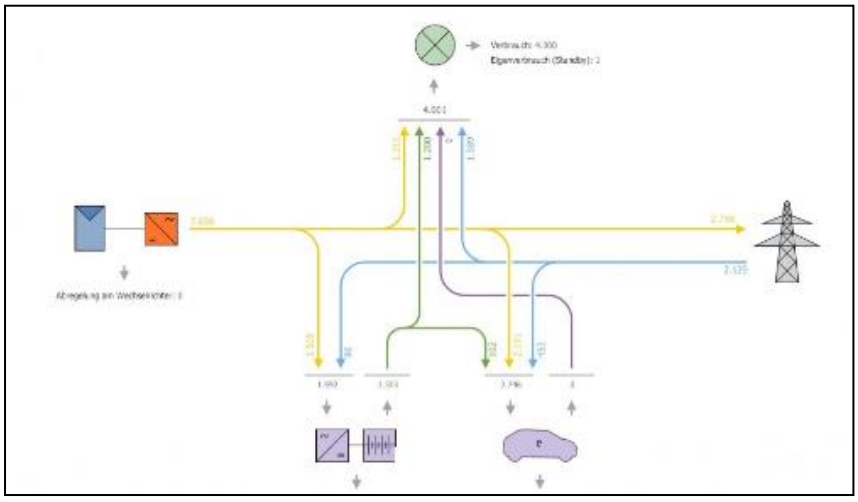
Day 5

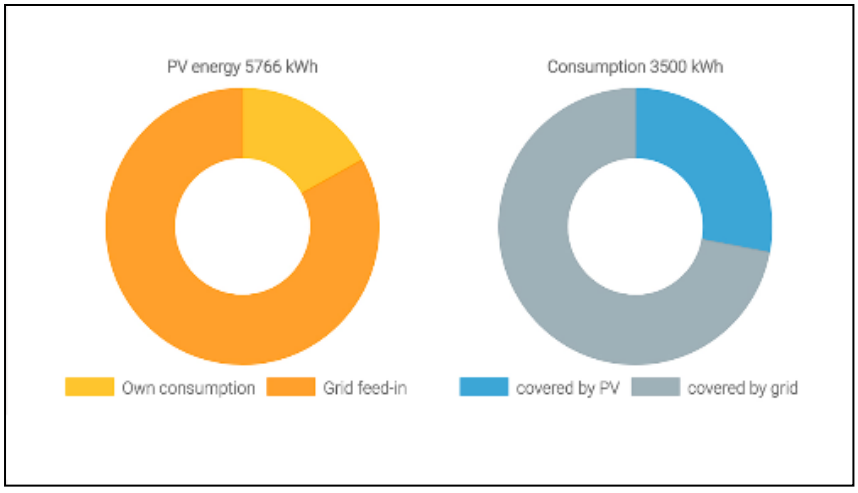
0730 – 0830	***Case Study: Successful Renewable Energy Projects*** *Examining Successful Renewable Energy Projects • Financial Strategies That Led to Project Success • Key Lessons Learned from Project Failures • Impact on Local Economies and Job Creation*
0830 - 0930	***Emerging Technologies & Their Economic Impact*** *The Role of Energy Storage in Renewable Energy Economics • The Economic Implications of Smart Grids • The Future of Hydrogen as a Renewable Energy Source • Artificial Intelligence in Renewable Energy Systems*
0930 – 0945	*Break*
0945 – 1100	***Renewable Energy in Developing Economies*** *Challenges and Opportunities for Renewable Energy in Developing Countries • Financing Renewable Energy in Emerging Markets • Impact of Renewable Energy Projects on Local Economies • Policy Recommendations for Scaling Renewable Energy in Developing Economies*
1100 - 1140	***The Impact of Climate Change on Renewable Energy Economics*** *Economic Challenges Presented by Climate Change • Renewable Energy as a Solution to Climate Change • The Role of Renewable Energy in Achieving Climate Goals • Economic Modeling for Climate Change Adaptation in Energy Systems*
1140 – 1230	***Integrating Renewable Energy with Traditional Energy Markets*** *Challenges of Integrating Renewable Energy into the Grid • Balancing Supply and Demand with Renewable Energy • Market Mechanisms for Smooth Integration • The Role of Traditional Utilities in the Renewable Energy Transition*
1230 – 1230	*Break*
1230 – 1345	***Future Outlook & Economic Prospects for Renewable Energy*** *Long-Term Economic Trends for Renewable Energy • Predictions for the Future of Renewable Energy Markets • The Economic Potential of Next-Generation Renewable Technologies • Steps Needed to Ensure the Continued Success of Renewable Energy Systems*
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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