COURSE OVERVIEW ME0748-3D
Energy Balance

Course Title
Energy Balance

Course Date/Venue
August 14-16, 2024/Fujairah Meeting Room, Grand Millennium Al Wahda Hotel, Abu Dhabi, UAE

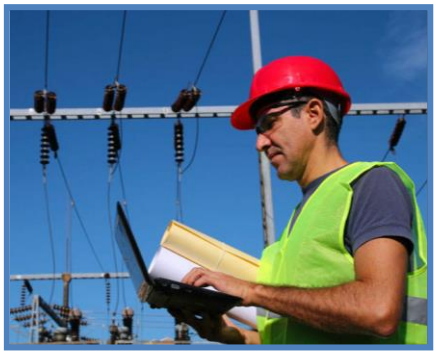
Course Reference
ME0748-3D

Course Duration/Credits
Three days/1.8 CEUs/18 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 delegates with a detailed and up-to-date overview of Energy Balance. It covers the energy balance principles, significance in environmental and engineering applications and its role in sustainable development; the basic thermodynamic principles relevant to energy balance; the first and second laws of thermodynamics and how they apply to energy systems; the different forms of energy focusing on kinetic, potential, thermal, chemical, electrical and the processes of energy conversion and efficiency implications; the units of energy measurement including joules, calories, BTUs and kWh and the instruments used for measuring energy in various forms; and the energy sources including renewable and non-renewable and their roles in the global energy balance.



Further, the course will also discuss the Sankey diagrams and energy flow charts to visualize energy inputs, transformations and outputs in a system; the energy inputs, outputs and losses in oil and gas production, oil refinery and petrochemical manufacturing processes and strategies for improving energy efficiency; the energy flows in residential and commercial buildings including heating, ventilation, air conditioning (HVAC) systems; building design strategies for energy conservation; and the energy balance considerations in renewable energy systems like solar, wind, hydro and bioenergy and their integration into the grid.

During this interactive course, participants will learn the environmental impacts associated with energy production and consumption; the greenhouse gas emissions and strategies for minimizing environmental footprint; the energy use and efficiency in various modes of transportation including electric vehicles and the role of transportation in global energy balance; the energy storage technologies like batteries, pumped hydro, thermal storage and their importance in managing energy balance in the grid; the smart grids and the concept of demand response for balancing energy supply and demand; the life cycle analysis (LCA) approach for assessing the environmental impacts of energy systems from production to disposal; the energy policies and regulations that impact energy balance including incentives for renewable energy and efficiency standards; the techniques for conducting energy audits in industrial, commercial and residential settings; and the strategies for effective energy management.

Course Objectives

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

- Apply and gain a comprehensive knowledge on energy balance
- Discuss energy balance principles, significance in environmental and engineering applications and its role in sustainable development
- Recognize basic thermodynamic principles relevant to energy balance including the first and second laws of thermodynamics and explain how they apply to energy systems
- Identify different forms of energy focusing on kinetic, potential, thermal, chemical, electrical and the processes of energy conversion and efficiency implications
- Determine the units of energy measurement including joules, calories, BTUs and kWh and identify the instruments used for measuring energy in various forms
- Explore energy sources including renewable and non-renewable and sinks and identify their roles in the global energy balance
- Use Sankey diagrams and energy flow charts to visualize energy inputs, transformations and outputs in a system
- Analyze energy inputs, outputs and losses in oil and gas production and oil refinery and petrochemical manufacturing processes as well as apply strategies for improving energy efficiency
- Examine energy flows in residential and commercial buildings including heating, ventilation, air conditioning (HVAC) systems and build design strategies for energy conservation
- Discuss the energy balance considerations in renewable energy systems like solar, wind, hydro and bioenergy and their integration into the grid
- Recognize the environmental impacts associated with energy production and consumption including greenhouse gas emissions and enhance strategies for minimizing environmental footprint
- Determine energy use and efficiency in various modes of transportation including electric vehicles and recognize the role of transportation in global energy balance

- Employ energy storage technologies like batteries, pumped hydro, thermal storage and describe their importance in managing energy balance in the grid
- Explain smart grids and the concept of demand response for balancing energy supply and demand
- Carryout life cycle analysis (LCA) approach for assessing the environmental impacts of energy systems from production to disposal
- Review energy policies and regulations that impact energy balance including incentives for renewable energy and efficiency standards
- Apply appropriate techniques for conducting energy audits in industrial, commercial and residential settings and strategies for effective energy management

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 energy balance for electrical engineers, electrical staff, instrumentation and control engineers and staff, maintenance engineers, power system protection and control engineers, building service designers, data systems planners and managers, electrical 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$ 3,750 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:-

- 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 **1.8 CEUs** (Continuing Education Units) or **18 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:

Mr. Karl Thanasis, PEng, MSc, MBA, BSc, is **Senior Mechanical & Maintenance Engineer** with over **45 years** of extensive industrial experience. His wide expertise includes Air Conditioning (**HVAC**) Systems, **Thermodynamics & Energy Systems**, Life Cycle Analysis (**LCA**), **Piping & Pipeline**, Maintenance, Repair, **Shutdown**, **Turnaround & Outages**, **Maintenance & Reliability** Management, **Mechanical Maintenance** Planning, Scheduling & Work Control, Advanced Techniques in **Maintenance** Management, **Predictive & Preventive** Maintenance, **Maintenance & Operation Cost Reduction** Techniques, Reliability Centered Maintenance (**RCM**), **Machinery Failure** Analysis, **Rotating Equipment Reliability** Optimization & Continuous Improvement, **Material Cataloguing**, **Mechanical & Rotating Equipment** Troubleshooting & Maintenance, **Root Cause Analysis & Reliability** Improvement, **Condition** Monitoring, **Root Cause Failure Analysis** (RCFA), **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 Exchangers**, Heat Transfer, Coolers, **Power Plant** Performance, Efficiency & Optimization, **Storage Tank** Design & Fabrication, **Thermal Power Plant** Management, **Boiler & Steam** System Management, **Pump** Operation & Maintenance, **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, **Pressure Vessel** Design & Fabrication, **Pumps**, Turbo-Generator, Turbine **Shaft Alignment**, **Lubrication**, Mechanical **Seals**, Packing, **Blowers**, **Bearing** Installation, **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**.

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's** and **Bachelor's** degree 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 Internal Verifier/Trainer/Assessor** by the **Institute of Leadership & Management** (**ILM**) a **Certified Instructor/Trainer** and has delivered numerous trainings, courses, seminars, workshops and conferences worldwide.

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: ***Wednesday, 14th of August 2024***

0730 – 0800	*Registration & Coffee*
0800 – 0815	*Welcome & Introduction*
0815 – 0830	***PRE-TEST***
0830 – 0930	***Introduction to Energy Balance:*** *Overview of Energy Balance Principles, Significance in Environmental and Engineering Applications, and its Role in Sustainable Development*
0930 – 0945	*Break*
0945 – 1030	***Thermodynamics & Energy Systems:*** *Basic Thermodynamic Principles Relevant to Energy Balance, including the First and Second Laws of Thermodynamics, and How They Apply to Energy Systems*
1030 – 1130	***Energy Forms & Conversions:*** *Different Forms of Energy (Kinetic, Potential, Thermal, Chemical, Electrical) and the Processes of Energy Conversion and Efficiency Implications*
1130 – 1230	***Measurement & Units of Energy:*** *The Units of Energy Measurement, including Joules, Calories, BTUs, and kWh, and the Instruments Used for Measuring Energy in Various Forms*
1230 – 1245	*Break*
1245 – 1330	***Energy Sources & Sinks:*** *Exploration of Energy Sources (Renewable and Non-Renewable) and Sinks, and Their Roles in the Global Energy Balance*
1330 – 1420	***Energy Flow Diagrams:*** *Introduction to the Use of Sankey Diagrams and Energy Flow Charts to Visualize Energy Inputs, Transformations, and Outputs in a System*
1420 – 1430	***Recap***
1430	*Lunch & End of Day One*

Day 2: ***Thursday, 15th of August 2024***

0730 – 0830	***Energy Balance in Oil & Gas Production:*** *Analyzing Energy Inputs, Outputs, and Losses in Oil & Gas Production Processes and Strategies for Improving Energy Efficiency*
0830 – 0930	***Energy Balance in Oil Refinery & Petrochemical Manufacturing:*** *Analyzing Energy Inputs, Outputs, and Losses in Oil Refinery & Petrochemical Manufacturing Processes and Strategies for Improving Energy Efficiency*
0930 – 0945	*Break*
0945 – 1100	***Energy Balance in Buildings & Architecture:*** *Examination of Energy Flows in Residential and Commercial Buildings, including Heating, Ventilation, Air Conditioning (HVAC) Systems, and Building Design Strategies for Energy Conservation*
1100 – 1230	***Renewable Energy Systems:*** *The energy Balance Considerations in Renewable Energy Systems such as Solar, Wind, Hydro and Bioenergy and their Integration into the Grid*
1230 – 1245	*Break*

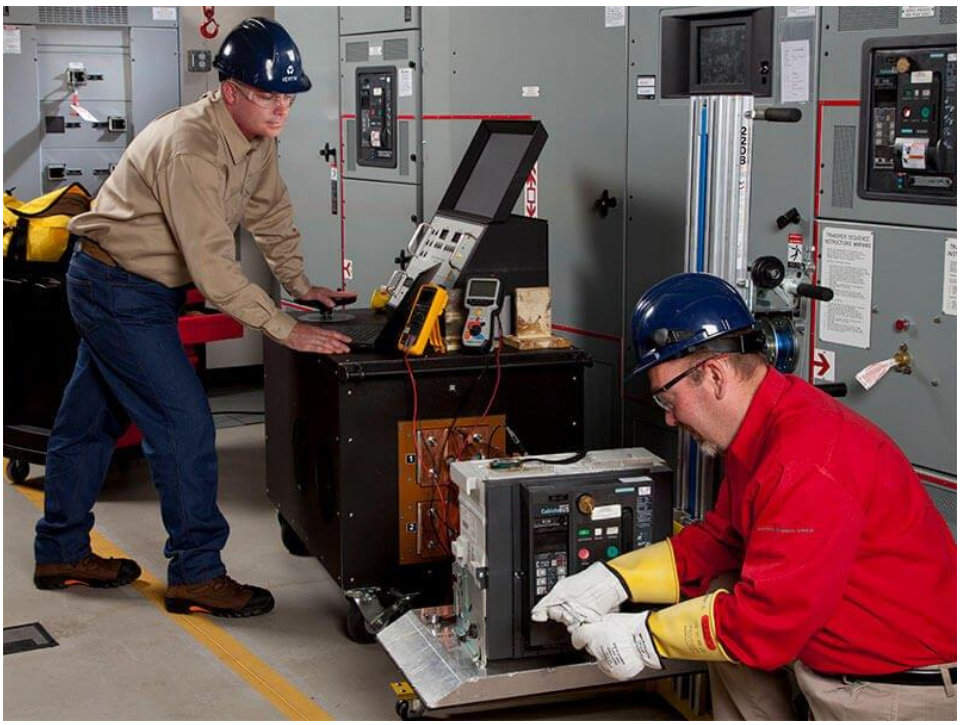
1245 – 1330	***Environmental Impact of Energy Systems:*** *The Environmental Impacts Associated with Energy Production and Consumption, including Greenhouse Gas Emissions, and Strategies for Minimizing Environmental Footprint*
1330 – 1420	***Energy Balance in Transportation:*** *Energy Use and Efficiency in Various Modes of Transportation, including Electric Vehicles, and the Role of Transportation in Global Energy Balance*
1420 – 1430	***Recap***
1430	*Lunch & End of Day Two*

Day 3: ***Friday, 16th of August 2024***

0730 – 0830	***Case Studies on Industrial Energy Efficiency:*** *Review of Real-World Case Studies Highlighting Successful Energy Efficiency Improvements and Energy Balance Optimizations in Industrial Settings*
0830 – 0930	***Energy Storage & Grid Management:*** *Overview of Energy Storage Technologies (Batteries, Pumped Hydro, Thermal Storage) and their Importance in Managing Energy Balance in the Grid*
0930 – 0945	*Break*
0945 – 1030	***Smart Grids & Demand Response:*** *Introduction to Smart Grids and the Concept of Demand Response for Balancing Energy Supply and Demand*
1030 – 1130	***Life Cycle Analysis (LCA) for Energy Systems:*** *The Life Cycle Analysis Approach for Assessing the Environmental Impacts of Energy Systems from Production to Disposal*
1130 – 1230	***Energy Policy & Regulation:*** *Examination of Energy Policies and Regulations that Impact Energy Balance, including Incentives for Renewable Energy and Efficiency Standards*
1230 – 1245	*Break*
1245 – 1345	***Energy Auditing & Management:*** *Techniques for Conducting Energy Audits in Industrial, Commercial, and Residential Settings, and Strategies for Effective Energy Management*
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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