COURSE OVERVIEW HE0573
Life Cycle Assessment for Energy Auditors

Course Title
Life Cycle Assessment for Energy Auditors

Course Date/Venue
May 18-22, 2025/Crowne Meeting Room, Crowne Plaza Al Khobar, KSA

Course Reference
HE0573

Course Duration/Credits
Five days/3.0 CEUs/30 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 participants with a detailed and up-to-date overview of Life Cycle Assessment for Energy Auditors. It covers the life cycle assessment (LCA) and its applications in various industries; the ISO 14040 and 14044 standards, four phases of LCA and critical review process; the purpose of the LCA, system boundaries and functional unit and reference flows; the life cycle inventory (LCI) analysis covering data collection methods, data quality requirements, allocation procedures and handling of uncertainties in LCI; and the characterization, normalization, and weighting, selection of impact assessment methods and interpretation of LCIA results.

Further, the course will also discuss the principles of allocation and sources of uncertainty in LCA; the methods for uncertainty analysis and sensitivity analysis techniques; the difference between consequential and attributional LCA; the social life cycle assessment (S-LCA) and life cycle costing (LCC); the process-based and input-output LCA; the advantages and limitations of hybrid LCA; and the LCA of renewable energy systems, LCA of fossil fuel-based energy systems and the LCA of energy storage systems.

During this interactive course, participants will learn the energy efficiency measures, transportation fuels, carbon capture and storage (CCS), energy policy and corporate decision-making; assessing environmental impacts across the supply chain and supplier engagement and LCA for sustainable procurement; the LCA of waste treatment technologies, waste-to-energy systems and circular economy; the LCA of building materials, energy-efficient building designs and LCA of construction processes; the agricultural practices, food production and processing and food packaging; the best practices for LCA reporting and visualizing LCA results; the environmental product declarations (EPDs) and principles of carbon foot printing; and the integration of LCA with other sustainability tools.

Course Objectives

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

- Apply and gain an in-depth knowledge on life cycle assessment
- Discuss the life cycle assessment (LCA) and its applications in various industries
- Review ISO 14040 and 14044 standards, four phases of LCA and critical review process
- Define the purpose of the LCA, determine the system boundaries and identify functional unit and reference flows
- Illustrate life cycle inventory (LCI) analysis covering data collection methods, data quality requirements, allocation procedures and handling of uncertainties in LCI
- Apply characterization, normalization, and weighting including selection of impact assessment methods and interpretation of LCIA results
- Recognize the principles of allocation and sources of uncertainty in LCA as well as apply methods for uncertainty analysis, sensitivity analysis techniques and interpreting and communicating uncertainties
- Differentiate consequential and attributional LCA and apply social life cycle assessment (S-LCA) and life cycle costing (LCC)
- Combine process-based and input-output LCA as well as discuss the advantages and limitations of hybrid LCA
- Discuss LCA of renewable energy systems, LCA of fossil fuel-based energy systems and LCA of energy storage systems
- Determine energy efficiency measures, transportation fuels, carbon capture and storage (CCS), energy policy and corporate decision-making
- Assess environmental impacts across the supply chain and apply supplier engagement and LCA for sustainable procurement
- Discuss LCA of waste treatment technologies, waste-to-energy systems and circular economy
- Identify LCA of building materials, energy-efficient building designs and LCA of construction processes
- Apply agricultural practices, food production and processing and food packaging as well as best practices for LCA reporting and visualizing LCA results
- Discuss environmental product declarations (EPDs), principles of carbon footprinting and integration of LCA with other sustainability tools

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 life cycle assessment for energy auditors, supply chain managers, engineers, sustainability professionals, life cycle designers, environmental and sustainability practitioners and scientist, environmental 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: -

- 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. John Burnip, EHS, SAC, STS, NEBOSH-ENV, NEBOSH-IGC, NEBOSH-IFC, NEBOSH-PSM, NEBOSH-IOG, TechIOSH, is a **NEBOSH Approved Instructor** and a **Senior HSE Consultant** with over **30 years** of practical **Offshore & Onshore** experience within **Oil**, **Gas**, **Refinery**, **Petrochemical** and **Nuclear** industries. His wide experience covers **NEBOSH** International General Certificate in Occupational Health & **Safety**, **NEBOSH** National Certificate in Construction Health & Safety, **NEBOSH** Certificate in Process Safety Management, **NEBOSH** Environmental Management Certificate, **NEBOSH** Certificate in Fire Safety, **NEBOSH** International Oil & Gas Certificate, **PHA**, **HAZOP**, **HAZCOM**, **HAZMAT**, **HAZID**, **Hazard & Risk Assessment**, **Emergency Response Procedures** Behavioural Based Safety (**BBS**), **Confined Space Entry**, **Fall Protection**, **Emergency Response**, H_2S, Safety Management System (**ISO 45001**), **Accident/Incident Investigation** System and Report PSM, **Risk Assessment**, **SCE FMEA Failure Investigations**, Site Management Safety Training (**SMSTS**), **Occupational Health & Safety and Industrial Hygiene, Crisis Management & Damage Control** in Oil & Gas Industry, **Enhancing HSSE Safety Performance & Effectiveness**, **Overhead & Gantry Crane Safety**, **HSSE Principles & Practices Advanced**, **Lifting & Rigging Equipment** Lifting Tackles Inspection License/Relicense, **API 780 Security Risk Assessment Methodology** for Petroleum & Petrochemical, **Advanced Process Safety Management** with PHA, **Quantitative and Qualitative Risk Assessment**, IADC/API **Mobile Drilling Rig Inspections**, **Maintenance and Audits**, **H2s Training and Rescue with Respiratory Equipment**, Job Safety Analysis (**JSA**), **Work Permit & First Aid**, Project HSE Management System, Health & Hygiene Inspection, PTW Control, Process Modules Fire & Gas Commissioning, MSDS, Ergonomics, Lockout/Tagout, Fire Safety & Protection, Spill Prevention & Control, **Tower & Scaffold Inspection**, **Scaffolding** Operations, **Scaffolding** Equipment, Bracket Scaffolds, **Scaffolding** Labelling, **Pre-fab Scaffolding**; Erecting, Maintaining & Dismantling **Scaffolding** in accordance with the **British Standards Code of Practice 5973**; **Heavy Lifting** operations, Cantilevered Hoists, **Offshore** Operations, **Offshore** Construction, Basic **Offshore Safety** Induction & Emergency Training (BOSIET), **Onshore** Fabrication & **Offshore** Pipelaying & Hook-Up, **Crane** Inspection, **Crane** Operations, Oilfield Startup & Operation, Steel Fabrication, OSHA, **ISO 9001**, **ISO 14001**, **OHSAS 18001** and **IMO** (**SOLAS**) Regulations. Mr. Burnip has greatly contributed in upholding the highest possible levels of safety for numerous International Oil & Gas projects, Generation Systems & Platform Revamp, LPG & Gas Compression, Marine, Offshore and Power Plant Construction. Currently, he is the **HSE Advisor** of Solvay wherein he is responsible in planning and implementation of the corporate safety program (OSHA codes).

During Mr. Burnip's long career life, he had successfully carried out numerous projects in **Europe**, **North America**, **South America**, **Southeast Asia**, **Middle East** and the **North Sea**. He had worked for Delta Offshore Group, Solvay Asia Pacific, Likpin Dubai, SADRA/DOT, **ZADCO**, **McDermott** International (USA, Qatar, Egypt, India, Oman, Dubai and Abu Dhabi), **PDO**, **Shell**, **ARAMCO**, Salman Field, Leman Offshore Gas Field, GEC, Harland & Wolff PLC Belfast in North Ireland, Howard Doris – Kishorn in Scotland, **Westinghouse** Electric in Brazil and South Korea and **Chevron** Oil in Scotland as the **Commissioning Project Engineer**, **Project & Safety Engineer**, **Estimating Engineer**, **Senior Instrument Engineer**, **Instrument Field Engineer**, **Lead Instrument Engineer**, **Instrument Engineer**, **Engineer**, **Emergency Response Training Manager**, **HSE Advisor**, **HSE Instructor**, **HSE Supervisor**, **Instrumentation Supervisor**, **Instrumentation Specialist**, **Project Coordinator**, **Instrumentation Technician** and **Tank Farm Instrumentation Technician**.

Mr. Burnip has a **Bachelor's** degree in **Business Studies** from the **Somerset University** (**UK**). He is a **Certified/Registered Tutor** in **NEBOSH Certificate in Environmental Management**, **NEBOSH International General Certificate**, **NEBOSH International Certificate in Fire Safety & Risk Management**, **NEBOSH Process Safety Management Certificate** and **NEBOSH International Oil & Gas Certificate**; a **Certified Safety Auditor** (SAC); a **Certified ISO 45001** Auditor; an **Environmental Health and Safety Management Specialist** on Fall Protection, Elevated Structures, Material Handling, Trenching & Excavations; a Welding Brazing Safety Technician; a **Certified Safety Administrator** (**CSA**) - General Industry; a **Safety Manager/Trainer** – General Industry; a **Petroleum Safety Manager** (**PSM**) - Drilling & Servicing; a **Petroleum Safety Specialist** (**PSS**) - Drilling & Servicing; a **Safety Planning Specialist**; a **Safety Training Specialist**; a **Certified Instructor/Trainer**; a **Certified Internal Verifier/Assessor/Trainer** by the **Institute of Leadership & Management** (**ILM**) and further holds a Certificate in **Mechanical Engineering Craft Practice** from the **City & Guilds of London Institute**; a **NEBOSH Level 3** Construction Certificate (UK); and holds a **Cambridge Teaching Certificate**. He is a well-regarded member of the **National Association of Safety Professionals**, the **Association of Cost Engineers** (**UK**), **Institution of Occupational Safety & Health** (**TechIOSH**) and an **Associate Member** of **World Safety Organization**. Further, he has conducted innumerable trainings, 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 workshop for technical reasons with no prior notice to participants. Nevertheless, the course objectives will always be met:

Day 1: ***Sunday, 18th of May 2025***

0730 – 0800	*Registration & Coffee*
0800 – 0815	*Welcome & Introduction*
0815 – 0830	***PRE-TEST***
0830 – 0930	***Overview of Life Cycle Assessment (LCA)*** *Definition & Purpose of LCA • Historical Development & LCA • Key Concepts & Terminology • Applications & LCA in Various Industries*
0930 – 0945	*Break*
0945 – 1030	***LCA Framework & Standards*** *ISO 14040 & 14044 Standards • Four Phases of LCA: Goal & Scope, Inventory Analysis, Impact Assessment, Interpretation • Critical Review Process • Case Studies of LCA Applications*
1030 – 1130	***Goal & Scope Definition*** *Defining the Purpose of the LCA • Determining the System Boundaries • Functional Unit & Reference Flows • Identifying Stakeholders & Their Needs*
1130 – 1215	***Life Cycle Inventory (LCI) Analysis*** *Data Collection Methods • Data Quality Requirements • Allocation Procedures • Handling of Uncertainties in LCI*
1215 – 1230	*Break*
1230 – 1330	***Life Cycle Impact Assessment (LCIA)*** *Introduction to Impact Categories • Characterization, Normalization, & Weighting • Selection of Impact Assessment Methods • Interpretation of LCIA Results*
1330 – 1420	***Software Tools for LCA*** *Overview of LCA Software (e.g., SimaPro, GaBi) • Data Management & Modeling Techniques • Case Studies Using LCA Software • Hands-On Session with LCA Software*
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, 19th of May 2025***

0730 – 0830	***Allocation in LCA*** *Principles of Allocation • Physical vs. Economic Allocation • Allocation in Multi-Functional Processes • Case Studies on Allocation*
0830 – 0930	***Uncertainty & Sensitivity Analysis*** *Sources of Uncertainty in LCA • Methods for Uncertainty Analysis (e.g., Monte Carlo Simulation) • Sensitivity Analysis Techniques • Interpreting & Communicating Uncertainties*
0930 – 0945	*Break*
0945 – 1100	***Consequential vs. Attributional LCA*** *Differences Between Consequential & Attributional LCA • When to Use Each Approach • Case Studies Comparing Both Approaches • Policy Implications of LCA Choices*

1100 – 1215	***Social Life Cycle Assessment (S-LCA)*** *Introduction to S-LCA • Social Impact Categories & Indicators • Data Collection & Assessment Methods • Integrating S-LCA with Environmental LCA*
1215 – 1230	*Break*
1230 – 1330	***Life Cycle Costing (LCC)*** *Principles of LCC • Integrating LCC with LCA • Case Studies on LCC • Economic Implications of LCA Results*
1330 – 1420	***Hybrid LCA*** *Combining Process-Based & Input-Output LCA • Advantages & Limitations of Hybrid LCA • Case Studies on Hybrid LCA • Applications in Energy Auditing*
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, 20th of May 2025***

0730 – 0830	***LCA of Renewable Energy Systems*** *Solar PV Systems • Wind Energy Systems • Hydropower Systems • Bioenergy Systems*
0830 – 0930	***LCA of Fossil Fuel-Based Energy Systems*** *Coal-Fired Power Plants • Natural Gas Power Plants • Oil-Based Energy Systems • Comparative LCA of Fossil Fuels*
0930 – 0945	*Break*
0945 – 1100	***LCA of Energy Storage Systems*** *Battery Storage (e.g., Li-ion, Lead-Acid) • Pumped Hydro Storage • Thermal Energy Storage • Comparative LCA of Storage Technologies*
1100 – 1215	***LCA of Energy Efficiency Measures*** *Insulation Materials • High-Efficiency Appliances • Lighting Systems • HVAC Systems*
1215 – 1230	*Break*
1230 – 1330	***LCA of Transportation Fuels*** *Conventional Fuels (Gasoline, Diesel) • Biofuels (Biodiesel, Ethanol) • Electric Vehicles & Charging Infrastructure • Comparative LCA of Transportation Fuels*
1330 – 1420	***LCA of Carbon Capture & Storage (CCS)*** *Overview of CCS Technologies • LCA of CCS in Power Plants • Environmental Trade-Offs of CCS • Case Studies on CCS LCA*
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, 21st of May 2025

0730 – 0830	***LCA in Energy Policy*** *Role of LCA in Energy Policy Formulation • Case Studies of LCA in Policy-Making • Regulatory Frameworks & LCA • Future Trends in Energy Policy & LCA*
0830 – 0930	***LCA in Corporate Decision-Making*** *Integrating LCA into Corporate Sustainability Strategies • LCA for Product Development & Innovation • Communicating LCA Results to Stakeholders • Case Studies of Corporate LCA Applications*
0930 – 0945	*Break*
0945 – 1100	***LCA in Supply Chain Management*** *Assessing Environmental Impacts Across the Supply Chain • Supplier Engagement & LCA • LCA for Sustainable Procurement • Case Studies on Supply Chain LCA*
1100 – 1215	***LCA in Waste Management*** *LCA of Waste Treatment Technologies (e.g., Recycling, Incineration) • Waste-to-Energy Systems • Circular Economy & LCA • Case Studies on Waste Management LCA*
1215 – 1230	*Break*
1230 – 1330	***LCA in Building & Construction*** *LCA of Building Materials (e.g., Concrete, Steel) • Energy-Efficient Building Designs • LCA of Construction Processes • Case Studies on Building LCA*
1330 – 1420	***LCA in Agriculture & Food Systems*** *LCA of Agricultural Practices • Food Production & Processing • LCA of Food Packaging • Case Studies on Agricultural LCA*
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, 22nd of May 2025

0730 – 0830	***LCA Case Studies in Energy Auditing*** *Case Study: LCA of an Industrial Facility • Case Study: LCA of a Commercial Building • Case Study: LCA of a Residential Energy System • Lessons Learned from Case Studies*
0830 – 0930	***LCA Reporting & Communication*** *Best Practices for LCA Reporting • Visualizing LCA Results (e.g., Graphs, Charts) • Communicating LCA to Non-Experts • Preparing LCA Reports for Certification*
0930 – 0945	*Break*
0945 – 1100	***LCA & Environmental Product Declarations (EPDs)*** *Introduction to EPDs • LCA as the Basis for EPDs • Developing & Certifying EPDs • Case Studies on EPDs*
1100 – 1230	***LCA & Carbon Footprinting*** *Principles of Carbon Footprinting • LCA for Carbon Footprint Assessment • Carbon Labeling & Certification • Case Studies on Carbon Footprinting*
1230 – 1245	*Break*
1245 – 1300	***Emerging Trends in LCA*** *Digitalization & LCA (e.g., AI, Big Data) • Integration of LCA with Other Sustainability Tools • Advances in LCA Methodologies • Future Challenges & Opportunities in LCA*

1300 - 1345	***Capstone Project: Applying LCA in Energy Auditing*** *Project Planning & Goal Setting • Data Collection & Inventory Analysis • Impact Assessment & Interpretation • Presenting LCA Results & Recommendations*
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*

Practical Sessions

This practical and highly-interactive course includes real-life case studies and exercises:-

Course Coordinator

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