

8 CDP Hours
(Optional CDP for REM)

Workshop on

Energy Management Systems: **The Internal Audit**

Practical internal auditing for ISO 50001 & other Energy Management System



MyHS00015/22-E002



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Workshop Overview

This one-day, activity-based workshop develops practical competency to conduct internal audits for ISO 50001:2018 Energy Management Systems, using an internal audit methodology that is also applicable to other audit programmes and frameworks, including EECA 2024 and AEMAS EMGS. Under the EECA 2024 Guideline for EnMS, organizations are required to conduct an EnMS internal assessment at least once a year, and this workshop directly supports that mandatory requirement. The day begins with an overview of internal audit fundamentals and experience sharing, then progresses into Phase 1: audit planning and preparation, where participants build an internal audit programme, map clause/requirement coverage, and develop an audit plan. In Phase 2: conducting the audit, participants practise preparing and using an audit checklist and generating clear audit findings. The afternoon focuses on reporting and communication, followed by hands-on exercises on root cause analysis and corrective action planning (CAPA). The workshop concludes with verification, closure, system updates, and how audit outcomes feed into management review and continual improvement across ISO 50001 and other energy-related audit schemes.

Workshop Learning Outcomes

By the end of this workshop, participants will be able to:

- Understand the key requirements of ISO 50001 and the purpose of internal audits in an Energy Management System (EnMS).
- Plan and prepare an ISO 50001 internal audit (scope, criteria, audit plan, and sampling).
- Conduct the audit effectively using process-based auditing and good interviewing technique to gather objective evidence.
- Evaluate key EnMS elements (energy review, SEUs, EnPIs, energy baselines, operational controls, and action plans) for conformance and effectiveness.
- Report clear audit findings (NCs/OFs), write audit reports, and follow up corrective actions to support continual improvement.



Workshop Schedule

Time	Schedule
9.00 to 10.00 am	Session 1: Opening & Workshop Overview Session 2: What is Internal Audit? <ul style="list-style-type: none">• Activity 1: Experience Sharing Session 3: How to Conduct Internal Audit?
10.00 to 10.15 am	Break
10.15 to 12.45pm	Session 4: Phase 1 – Audit Planning and Preparation <ul style="list-style-type: none">• Activity 2: Internal Audit Programme• Activity 3: ISO 50001:2018 Clause Coverage Mapping• Activity 4: Internal Audit Plan Session 5: Phase 2- Conduct the Audit <ul style="list-style-type: none">• Activity 5: Internal Audit Checklist
1.00 to 2.00 pm	Lunch Break
2.00 to 3.30 pm	<ul style="list-style-type: none">• Activity 6: Internal Audit Finding
3.30 to 3.45 pm	Break
3.45 to 5.00 pm	Session 6: Phase 3 – Reporting and Communication Session 7: Phase 4 – Corrective Action and Improvement Plan (CAPA) Session 8: Phase 5: Verification, Closure and System Update Session 9: Phase 6: Management Review & Programme Improvement <ul style="list-style-type: none">• Activity 7: Root Cause and CAPA



Trainers' Profile



TRAINER 1

PROF IR TS DR ZAINUDDIN ABDUL MANAN (ZAM)

Zainuddin Abdul Manan is a professor of chemical and energy engineering, the founding director of UTM Process Systems Engineering Centre (PROSPECT), founding Dean of UTM Faculty of Chemical and Energy Engineering, founder of UTM Sustainable Energy Management Program and the CEO and founder of the UTM spin-off company OPTIMISE Sdn Bhd. He began his career as an engineer in PETRONAS and Hume Industries and has been an academic leader, educator, researcher, consultant and professional coach for over 25 years. He completed over 100 R&D & consultancy projects serving local and multinational companies, has numerous patents and over 450 publications that include 20 books/ chapters, 230 refereed journals and 250 conference proceedings on energy and resource conservation using process integration techniques. He is a co-author of the globally referred Book on Process Integration and Intensification - Saving Energy, Water and Resources. Zain is a UK/EU chartered engineer, a Fellow IChemE (UK), Fellow of Academy of Sciences Malaysia, a professional engineer, a professional technologist, a certified energy manager, a Type 1 Type 2 REM (Registered Energy Manager) and a certified trainer for ASEAN energy managers. He has coached professionals from over 500 organisations and delivered over 400 invited talks in professional courses, conferences and seminars worldwide. Zain chaired the Academy of Sciences (ASM) Energy Committee, the ASM Net Zero Task Force and the Energy Efficiency and Conservation Act (Thermal Energy) Drafting Committee under the Malaysian Ministry of Energy. He founded and spearheaded the UTM Sustainable Energy Management initiative that led UTM to save over USD 7 million energy costs (2011-2022), to win the National & ASEAN Energy Awards, and to be ranked 1st globally by Time Higher Education on SDG7.



TRAINER 2

PROF IR TS DR SHARIFAH RAFIDAH WAN ALWI (SRWA)

Prof Ir Ts Dr Sharifah Rafidah Wan Alwi is a Professor in the Faculty of Chemical and Energy Engineering, Universiti Teknologi Malaysia. She previously helmed as the Director of Process Systems Engineering Centre for ten years (2011 to 2021). She is an expert resource minimisation consultant for multiple industries and is among the leading researchers in resource integration technique development. Prof Sharifah is also the co-founder and Director of Optimal Systems Engineering Sdn Bhd, a UTM Spin-off company. She has been extensively involved in 80 research projects, 17 industrial based projects for various companies and government agencies and has trained engineers from more than 300 companies in the field of sustainable engineering design and management. Together with her team, they have developed 7 resource minimisation software. Sharifah has won various international and national awards such as Green Talents 2009 (Germany), IChemE Highly Commended Sir Frederick Warner Prize 2011 (UK), ASEAN Young Scientist and Technologist Award 2014, National Young Scientist Award 2015, ASEAN-US Science Prize for Women 2016 in Energy Sustainability, Malaysia Research Star Award 2016, 2018, 2019, Top Research Scientists Malaysia 2018 and Sarawak State - International Women Award 2021. She was listed as 'Asian Scientist 100' in 2017 and 'Asia's Rising Scientists' in 2020, and '8 Women Scientists from Asia You Should Know' in 2021 by AsianScientist.com. Sharifah is also the Associate Editor for Journal of Cleaner Production and UTM Sustainable Energy Management System advisor. She has also served as the Chair for the Science Leadership Working Group under Young Scientist Network, Academy of Sciences Malaysia (YSN-ASM) and Chair for Malaysia IChemE Young Engineer Group (YEG). Sharifah is also a professional engineer, a professional technologist, a UK/EU chartered engineer, a certified energy manager, a registered energy manager (Type 1 and 2) and a certified trainer for ASEAN energy managers.



Trainers' Profile



TRAINER 3

ASSOCIATE PROF IR DR LIM JENG SHIUN (LJS)

Associate Professor Ir Dr Lim Jeng Shiun is the Director of Products and Service, Optimal Systems Engineering Sdn Bhd, a UTM spin-off company specialising in providing solutions related to energy conservation and GHG emissions reduction. He is also the Deputy Director of Process Systems Engineering Centre (PROSPECT), Universiti Teknologi Malaysia. His core expertise is in the area of innovative development and application of process systems engineering techniques for resource conservation, and energy and carbon planning. He is also a professionally Certified Energy Manager, Certified Energy Auditor, Accredited Energy Measurement & Verification Professional and a Type 1 Type 2 REM (Registered Energy Manager) certified by the Energy Commission of Malaysia. He is the trainer of the Energy Management Trainer Course conducted by MGTC to certify the Energy Manager. He is also the instructor for MSc Energy Management in UTM, sharing knowledge related to energy efficiency and energy management. As an engineer in practice, he has applied the output of his research work to consultancy projects for the industrial community. He has been extensively involved in more than 35 industrial-based projects for various companies and government agencies. The key clients include local industries and multinational companies such as BERNAS, FABER MEDISERVE, SHELL, OLEON in Malaysia and PERTAMINA in Indonesia. He has assisted those companies to identify energy-saving opportunities worth millions of dollars and GHG reduction opportunities through the use of process integration and process systems engineering approaches in the energy audit and GHG emissions accounting projects. He has shared his project experience in his co-authored book titled Pinch Analysis for Energy and Carbon Footprint Reduction, published by the Institution of Chemical Engineers (IChemE). He has been invited to share his experience on Net Zero carbon for industry and facilities, including on Net Zero Carbon for Palm Oil Industry organised by IChemE.



OPTIMISE Energy Audit, GHG Accounting and EnMS Track Records

- Led UTM to be globally ranked 1st on SDG 7 - Affordable and Clean Energy
- Co-developer of ASEAN EMGS Energy Management System Standards with MGTC.
- Led UTM to win the ASEAN Energy Award and EMGS 3 Star EMGS Gold Standard.
- Involved in certification of energy managers and energy end users for 15 years.
- Developer of award-winning energy audit and energy monitoring software.
- Led UTM to achieve over RM 30 million energy savings between 2011-2023.
- Over 20 years experience in energy audit and optimisation consultancy, R&D and professional training for over 500 national/multinational companies.
- Certified trainer, auditors & centre for training & certification of energy managers.

Selected References

- Shell, Middle Distillate Synthesis
- BP – Amoco
- MLNG
- Felda Proctor and Gamble
- MIMOS Semiconductor
- Riau Pulp and Paper Mill
- Qatar LNG
- Pertamina Engineering Group
- PT Titan Petrokimia Interindo
- Pan Century, IOI Oleochemicals
- BASF – Petronas
- MTBE – Petronas
- Huntsman Tioxide
- Ansell Malaysia
- Hershey Malaysia
- Malaysia Newsprint Industries
- Malaysia Palm Oil Board
- Malaysia Energy Commission
- Technip (M) Sdn Bhd
- PT Chandra Asri
- Petronas Penapisan (M) Sdn Bhd
- Petronas Gas Sdn Bhd
- Kaneka Malaysia
- UKM, UPM, USM, UM, UNIKL

20+

Years Experience in
Energy Audit and
Optimisation

#1

Global Rank in R&D on
'Heat Exchanger.
Retrofitting and Design'
Elsevier Scival 2014

700+

National & Multinational
Companies Benefitted
from our Energy Trainings
and Consultancy Services

