



# COPE-BEST WORKSHOPS

*Race to Net Zero*

OCT 11, 2024 (9AM TO 5PM)

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## CB WORKSHOP 3: Maximising Industrial Energy Efficiency Using Pinch Analysis

**Mode:** Physical | **Fee:** RM1300/pax; USD 450 (for overseas participants)





# OVERVIEW

Numerous successful industrial applications worldwide including the project experiences of Optimal Systems Engineering show that implementation of Pinch Analysis typically enable industries to maximise energy efficiency and cost savings, often resulting in attractive payback period of less than three years.

This workshop aims to equip participants with the competency to apply the Pinch Analysis techniques and tools to target, design and retrofit energy systems, analyse thermal energy losses from the processes, evaluate options to improve energy recovery and analyse energy and cost saving potentials. Toward this end, participants will be trained to perform calculations, use spreadsheet and also be introduced to our proprietary Optimal Heat software. Additionally, the workshop will provide key guiding principles for retrofit of industrial energy recovery system to maximise energy efficiency and minimise energy cost.

# WORKSHOP OUTCOMES

At the end of this workshop, participants are expected to be able to:

1. Understand the benefits and application of heat integration.
2. Understand the basic concept on heat integration and Pinch Analysis.
3. Target maximum energy recovery by using Composite Curves and Problem Table Algorithm.
4. Apply Pinch Analysis rules to achieve the maximum energy recovery target.
5. Familiarise with Optimal Heat software for heat integration.
6. Understand the importance of heat exchanger network retrofit.
7. Apply the steps to perform heat exchanger network retrofit.
8. Perform retrofit case study.

# WORKSHOP OUTLINE

1. Maximising Energy and Resource Cost Savings using Pinch Analysis.
2. Essential Pinch Analysis Working Concepts & Principles
3. Setting the Benchmark Minimum Energy Targets (MET)
4. Use of Pinch Analysis Software: Optimal Heat
5. Key Guiding Principles for MET-Driven Design and Retrofit
6. MET-Driven Process Retrofit with Industrial Case Study



# WORKSHOP BENEFITS

**If you are an energy manager, energy auditor, or energy service company.**

- Equip yourself with the expertise to manage thermal energy. The anticipated enactment of the Malaysia Energy Efficiency & Conservation Act (EECA) shall unlock opportunities for energy managers with the competency to audit, manage, and optimize thermal energy systems apart from electrical energy.
- Gain competency to perform practical retrofit of existing facilities. Learn from certified experts and practitioners on how to perform optimal thermal energy recovery analysis to retrofit existing facilities practically, and gain the support of top management to achieve triple bottom-line benefits.
- Offer value-added energy audit services for the ASEAN community. If you are an energy auditor, you will be able to offer value-added energy audit services to your customer by incorporating thermal energy recovery of the process. You can also offer energy audit services under the newly announced Energy Audit Conditional Grant (EACG) which supports energy auditing of both electrical and thermal energy. Widespread and holistic implementation of Energy Management System covering thermal and electrical energy in the region is expected to significantly increase the demand for thermal energy analysis experts in Malaysia and across ASEAN.

**If thermal energy is the leading energy cost in your manufacturing site.**

**1. *Huge potential reduction in energy bills from thermal heat recovery.***

- Over 7000 successful process integration applications worldwide, including our project experiences have resulted in thermal energy savings of between 10 to 50%, and a payback period of less than 3 years. Our recent petroleum refinery retrofit project for example amassed an annual savings of USD 12 Million.
- 2. *"We already have heat recovery systems in place. How could we benefit more?"***
- Our experience shows that plant renovation, plant expansion, the addition of new product lines, consideration of total site, and area-wide integration could lead to ample energy cost-saving potentials.



# WORKSHOP SCHEDULE

**OCT 11, 2024 (FRIDAY)**

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8.30 am - 9.00 am	Registration and Breakfast	
9.00 am - 10.00 am	Maximising Energy Efficiency & Cost Savings Using Pinch Analysis	Prof Ir Ts Dr Zainuddin Abd Manan
10.00 am - 10.30 am	Essential Pinch Analysis Working Concepts & Principles	Prof Ir Ts Dr Sharifah Rafidah Wan Alwi
10.30 am - 10.45 am	Break	
10.45 am - 12.30 pm	Setting the Benchmark Minimum Energy Targets (MET) Use of Pinch Analysis Software: Optimal-Heat	Prof Ir Ts Dr Sharifah Rafidah Wan Alwi
12.30 pm - 2.30 pm	Lunch	
2.30 pm - 3.30 pm	Key Guiding Principles for MET-Driven Design and Retrofit	Prof Ir Ts Dr Zainuddin Abd Manan
3.30 pm - 3.45pm	Break	
3.45 pm - 4.30 pm	MET-Driven Process Retrofit with Industrial Case Study	Prof Ir Ts Dr Zainuddin Abd Manan



# SPEAKERS' PROFILE



**SPEAKER 1**

## **PROF IR TS DR ZAINUDDIN ABDUL MANAN**

**FASc, FIChemE, PEng, Professional Technologists, CEng, CEM, REEM, Certified CEM Trainer, Certified HRD Trainer**

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 registered electrical 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. Dr. Zain is the Chair of Academy of Sciences Malaysia Energy Committee and the MyNet Zero Task Force, and the Chair of Malaysia's Energy Efficiency and Conservation Act (Thermal Energy) Drafting Committee. He founded and spearheaded the UTM Sustainable Energy Management initiative that led UTM to achieve over USD 7 million energy savings between 2011 and 2023, to win the ASEAN Energy Awards in 2012, the National Energy Award 2022, the first AEMAS 3-Star ASEAN Certified Energy-Efficient organisation, and UTM to be ranked 1st globally by Times Higher Education on SDG7 –Affordable and Clean Energy.



# SPEAKERS' PROFILE



**SPEAKER 2**

**PROF IR TS DR SHARIFAH RAFIDAH WAN ALWI**  
P.B.S, PEng, CEng, MChemE, MIEM, REEM, CEM

Prof Ir Ts Dr Sharifah Rafidah Wan Alwi is a Professor in the School 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 electrical energy manager and a certified trainer for ASEAN energy managers.



# SPEAKERS' PROFILE



**SPEAKER 3**

## **ASSOCIATE PROF IR DR LIM JENG SHIUN** **PEng, CEng, MlChemE, CEM, REEM, CEA, AEMVP**

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 Registered Electrical 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.