IN-HOUSE WORKSHOP ON

WATER REUSE & RECYCLING

USING PINCH ANALYSIS

✉ inquiry@optimalsystems.my

🌐 www.optimalsystems.my

📞 +6016-7167248

Optimise

Optimal Systems Engineering Sdn Bhd
ENGINEERING SUSTAINABILITY

MyHS00015/22-E002

WORKSHOP
OVERVIEW

Water is a critical utility in industries such as chemical processing, oil & gas, power generation, food & beverage, and semiconductor manufacturing. However, excessive water use and improper wastewater management lead to increased operational costs, environmental penalties, and sustainability concerns.

Water Pinch Analysis (WPA) is a systematic and data-driven methodology for minimizing water consumption, maximizing reuse and recycling, and optimizing wastewater management in industrial operations. By identifying key water sources, process sinks, and integration opportunities, WPA can help industries achieve cost-effective water management while reducing environmental impact.

This comprehensive WPA training will equip participants with practical knowledge, analytical skills, and hands-on experience in applying WPA to real-world industrial scenarios. Participants will learn the fundamental principles and develop water reuse and recycling strategies. The workshop will feature case studies, interactive discussions, and a step-by-step demonstration of WPA applications. In addition, the workshop will also demonstrate the use of Optimal Water software.

LEARNING
OUTCOMES

By the end of this training, participants will be able to:
- Explain the principles of Water Pinch Analysis (WPA)and its role in water conservation
- Apply the step-by-step WPA procedure for minimizing water use and wastewater generation
- Determine maximum water recovery targets and develop optimal water allocation strategies
- Explore how to further minimise water consumption via the holistic Water Management Hierarchy by using the Cost-Effective Minimum Water Network (CEMWN) approach.
- Use Water Pinch Analysis software and tools in real-world case studies
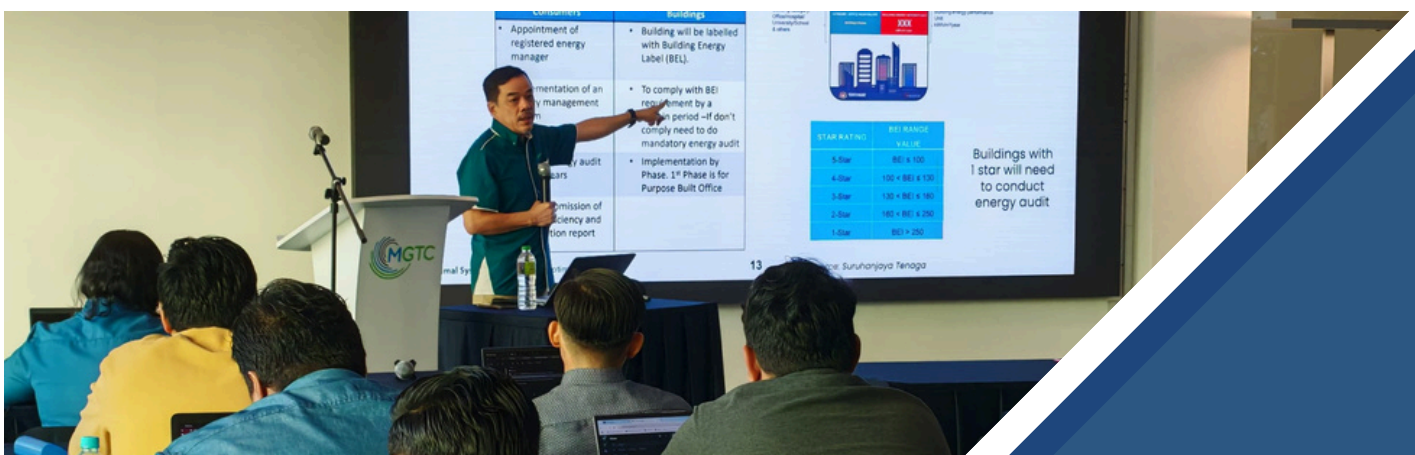
COURSE
OUTLINE

- Overview of Water Pinch Analysis
- Water Pinch Analysis (WPA) Procedure
- Maximum water recovery (MWR) targets using WPA
- Water Network Design to achieve MWR
- Design a Cost Effective Minimum Water Network

WHY ATTEND THIS
TRAINING ?

- Learn how to identify water-saving opportunities in industrial processes
- Understand how to optimize water networks for efficiency and sustainability
- Discover strategies to reduce water, wastewater generation & treatment costs
- Ensure compliance with regulatory standards for water and wastewater management
- Improve your company's environmental performance and operational cost-efficiency
- Learn how to use Optimal Water for Water Pinch Analysis

TARGET
PARTICIPANTS

This workshop is designed for process engineers, plant managers, environmental and sustainability professionals, utility and energy engineers, water resource and facility managers, researchers and academics, as well as regulatory and compliance officers.

WORKSHOP
SCHEDULE

Day 1	
Time	**Tentative**
8.30 to 9.00	Registration and course overview
9.00 to 10.30	Overview of **Water Pinch Analysis**
10.30 to 10.45	Break
10.45 to 13.00	**Water Pinch Analysis (WPA) Basics and Procedure**
13.00 to 14.00	Lunch Break
14.00 to 15.30	**Maximum water recovery (MWR) targets using Water Composite Curves**
15.30 to 15.45	Break
15.45 to 17.00	**Maximum water recovery (MWR) targets using Water Cascade Table**

WORKSHOP
SCHEDULE

Day 2	
Time	**Tentative**
9.00 to 10.30	**Water Network Design (Part 1)**
10.30 to 10.45	Break
10.45 to 12.30	**Water Network Design (Part 2)**
12.30 to 13.00	**Optimal Water Demo**
13.00 to 14.00	Lunch Break
14.00 to 15.15	**Cost benefit analysis**
15.15 to 15.30	Break
15.30 to 17.00	**Cost Effective Minimum Water Network (CEMWN)**

TRAINERS'
PROFILE

Trainer 1

PROF IR TS DR ZAINUDDIN ABDUL MANAN

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

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.

OPTIMISE Energy, ESG and Sustainabllity 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 and water 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

500+
National & Multinational Companies Benefitted from our Energy Training Workshops

OPTIMAL
WATER

Optimal Water is a software solution by Optimal Systems Engineering (OPTIMISE) designed to analyze and optimize water recovery in industrial and urban settings. Using Pinch Analysis, it helps businesses design efficient water recycling networks, reduce freshwater consumption, and minimize wastewater discharge, ultimately leading to lower utility and treatment costs.

Key Features

- Minimises fresh water usage and wastewater generation.
- Identify a facility's Maximum Water Recovery (MWR) targets.
- Design Optimal Water Exchange Network (WEN).
- Assess the impact of process changes on water consumption

Benefits

- Lower costs of water utilities and wastewater treatment
- Improved efficiency by identifying water-saving opportunities
- Maximise cost savings from optimized water recycling.
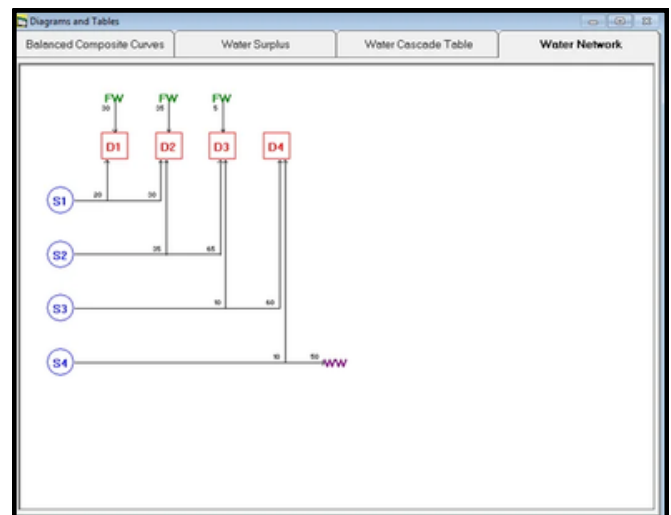- Sustainable water management for industries and buildings.

OPTIMAL
WATER

Determine minimum freshwater and wastewater target
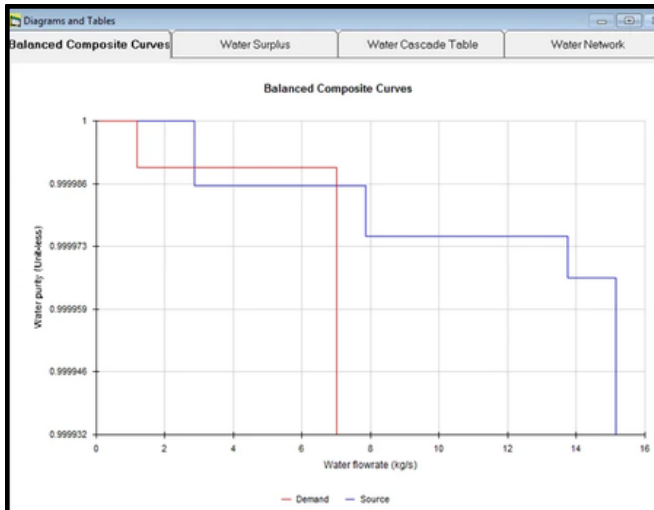
Water Composite Curves

Water Network Design