

CORPORATE PROFILE



OPTIMAL SYSTEMS ENGINEERING SDN BHD
ENGINEERING SUSTAINABILITY

OPTIMAL SYSTEMS ENGINEERING SDN BHD (1111742-H)

A spin-off company of Universiti Teknologi Malaysia (UTM)

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TABLE OF CONTENTS

01

About OPTIMISE

02

CEO's Message

03

OPTIMISE Co-Founders

06

Recognitions

07

Core Services

09

Consultancy

12

Capacity Building

15

Software

19

Track Records

22

About COPE-BEST

23

Awards & Achievements

24

Past Projects



Advancing Sustainable Consumption and Production

OPTIMISE is a leading provider of cutting-edge sustainable systems engineering solutions in ASEAN. It is a spin-off company of Universiti Teknologi Malaysia (UTM), a registered Energy Services Company (ESCO) under Malaysia Energy Commission and a MyHijau-registered company. OPTIMISE provides training, consultancy, and smart system solutions in sustainable engineering and optimization of industrial processes and building facilities, and in sustainable enterprise planning and management. We guide organisations to achieve multiple bottomline benefits of improved profitability and governance via energy, resource, and environmental sustainability.

OPTIMISE differentiations and value-added offerings. OPTIMISE provides consultancy services, signature training programs and award-winning smart IoT systems, technologies, solutions and products. Our offerings that are backed by world-class, internationally validated, and referenced research and innovations in sustainable systems engineering for energy, ESG and resource sustainability. OPTIMISE's proven track records of over 30 years of mentoring, coaching, and providing consultancy services to over 500 organizations enable its clients to deliver performance, embrace sustainability and build resilience in their people, culture, process, and systems. Our cutting-edge smart systems engineering technologies and solutions have been used in building facilities and numerous industries including oil and gas, petrochemical, power generation, food and beverages, fine-chemical, oleochemical, palm oil, chloral-kali, pulp and paper, medical glove, and semiconductors.

OPTIMISE approach to empower organisational resilience and sustainability. We call our approach the *Global Cafe Hi-5 (High-impact-Sustainability)* for widening access to energy, ESG and resources sustainability solutions. *Hi-1* is our mission to produce competent, future-ready energy sustainability change makers through our unique recipe. *Hi-2* is our customised and personalised recipes for organisations and professionals. *Hi-3* are our great chefs, who are certified and competent pros to deliver our innovative recipes. *Hi-4* is our uberised delivery via technology and partnership to enable access to anyone from anywhere at any time. *Hi-5* is our data-driven quality control, monitoring, and improvement that leverages digital technology, analytics, and platforms.

OUR VISION

A society practicing sustainable consumption and production.

OUR MISSION

Advancing circular economy through innovative process integration and smart systems engineering solutions.

OUR PEOPLE

Professional engineers and experienced certified practitioners in Process and Systems Engineering for energy, ESG and resource sustainability. World's Top 2% Scientists (ranked by Stanford University, USA). Social entrepreneurs and advocates



CEO's MESSAGE

**PROF. IR. TS. DR.
ZAINUDDIN ABD MANAN**

CEO of Optimal Systems Engineering

I am privileged to convey this message as the founder and CEO of Optimal Systems Engineering Sdn Bhd (OPTIMISE), and as the leader of the team to champion energy, ESG and resource sustainability via Process Integration and Smart Systems Engineering (PSE) solutions in Malaysia, ASEAN and beyond.

Driven by the mission to build a sustainable society, we formed the Process Synthesis and Design research group at Universiti Teknologi Malaysia (UTM) before the turn of the millenium. Our success in providing PSE solutions for industry led us to establish UTM Process Systems Engineering Centre (PROSPECT) in 2007 and steered PROSPECT on a journey to develop cutting-edge solutions to maximise energy, water and resource savings for facilities based on process integration and smart systems engineering solutions. In 2012, UTM-PROSPECT was ranked 1st globally under the Distinguished Competency (DC#5) of Water, Costs and Optimisation by Elsevier's Scival Spotlight. In 2014, PROSPECT was ranked 1st by Elsevier Scival in the Emerging Competency (EC#49) of "Heat Exchanger, Retrofitting and Design".

Our international success led us to establish OPTIMISE as the spin-off company to commercialise UTM R&D products, services and know-how by "*Advancing circular economy through innovative process integration and smart systems engineering solutions*".

OPTIMISE's core expertise is in process and innovation-driven industrial energy, ESG and resource sustainability using process integration and smart systems engineering solutions. We spearheaded the UTM Sustainable Energy Management program that resulted in UTM amassing over RM30 million (USD 7 million) energy savings between 2011-2020. We led UTM to be the first ASEAN institution certified with 3-star energy management gold standard and to be ranked 1st globally by the Times Higher Education on Clean and Affordable Energy (SDG-7). We have been involved in the development and implementation of the program to train and certify over 1600 ASEAN energy managers, and have outreached over 500 companies via professional training and consultancy. Our technologies and smart solutions have been used in building facilities and by numerous industries from subsectors such as power generation, oil and gas, petrochemical, fine chemicals, oleochemical, palm oil, chloral-kali, pulp and paper, medical glove and semiconductor.

Our team's resilience and agility has enabled us to rise above massive challenges of COVID 19 and climate crisis that have threatened the planet, people and profit. We turn challenges into opportunities, and regard them as defining moments for us to harness our innovations and strong partnership with the government, industry, academia and community, en route to realising our vision of *creating a society practicing sustainable consumption and production*.

OPTIMISE CO-FOUNDER



Prof. Ir. Ts. Dr. Zainuddin Abdul Manan - CEO

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

Prof Ts Ir Dr Zainuddin Abdul Manan FASc, PEng, CEng, Technologist, FIChemE, CEM, REEM is a professor of chemical and energy engineering of Universiti Teknologi Malaysia (UTM). He is the founding director of UTM Process Systems Engineering Centre (PROSPECT), founding Dean of the UTM Faculty of Chemical and Energy Engineering, founder of the UTM spin-off, OPTIMISE, the founder of UTM Sustainable Energy

Management Program and the founder of COPE-BEST. He began his career as an engineer at 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, has numerous patents and over 500 publications that include 20 books/chapters, over 250 refereed journals and 270 conference proceedings on sustainable resource planning and engineering (energy, water, emissions).

Zain is a UK/EU chartered engineer, a Fellow IChemE (UK/EU), a professional engineer (PEng), a professional technologist, a certified energy manager, a registered electrical energy manager and a certified trainer for ASEAN energy managers. Zain was the winner of Saudi's Prince Sultan International Prize for Water and was awarded as a Top Research Scientist of Malaysia. In 2014, he was awarded UTM Top Researcher and UTM Top Academician. He has been listed in Stanford University's World's Top 2% scientists. Zain has been a coach of professionals from over 600 organisations and delivered over 400 invited talks in professional courses, conferences and seminars worldwide.

Prof Zain is a Fellow, and was the chair of the of the ASM (Academy of Sciences Malaysia) Energy Committee (2021-2023) and chair of ASM Net Zero Task Force. He is also a chair of the Malaysia's EECA (Energy Efficiency and Conservation Act - Thermal Energy) Drafting committee. He was a member, and the Vice Chairman of the Board of Judges of ASEAN Energy Awards. In 2014, he was appointed as the Project Director for the Green Technology Blueprint for 57 OIC Countries, and as the OIC Ambassador for the World Green Growth Summit. He founded and spearheaded the UTM Sustainable Energy Management initiative that led UTM to achieve over USD 7 million energy savings between 2011 and 2021, 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.

OPTIMISE CO-FOUNDER



Prof. Ir. Ts. Dr. Sharifah Rafidah Wan Alwi - Director of R&D
PEng, MIEM, CEng, MICHemE, Professional Technologists, REEM, CEM, Certified CEM Trainer, Certified HRD Trainer

Prof. Ir. Ts. Dr. Sharifah Rafidah Wan Alwi is a Fellow and R&D Manager of Process Systems Engineering Centre (UTM-PROSPECT), and Professor in Faculty of Chemical and Energy Engineering in Universiti Teknologi Malaysia (UTM). She previously helmed as the Director of UTM-PROSPECT 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 and World Top 2% Scientist 2022 (Single Year and Career Long). 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.

OPTIMISE CO-FOUNDER



Assoc. Prof. Ir. Dr. Lim Jeng Shiun - Director of Products & Services

PEng, CEng, MIChemE, CEM, REEM, CEA, AEMVP, Certified CEM Trainer, Certified HRD Trainer

Assoc. Prof. 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 research fellow 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. Stanford University recognised him as one of the World's Top 2% Scientists. Dr Lim is the Associate Editor for Journal of Cleaner Production, an international high-impact journal focusing on reporting the state-of-the-art related to GHG emissions reductions. He is also the technical secretariat and guest editor for the International Conference of Low Carbon Asia and Beyond. 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 GHG emissions accounting and mitigation strategy.

Dr Lim is a key research team member for the project on the Development of Low Carbon Society (LCS) Scenarios for Asian Regions, an international joint research program between Japan and Malaysia. One of the key outputs of this project is the development of Energy Chapter of LCS Blueprint for Iskandar Malaysia 2025, which is endorsed by the Prime Minister of Malaysia during the COP 18 Doha Climate Change Conference. 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.

RECOGNITIONS



Innovation-Driven, Global R&D Leadership

Global Research Leadership in Energy, ESG and Resource Sustainability. **Ranked among World's Top 2% Researchers (by Stanford, USA)**

Certified Expert Practitioners

Professional Engineer, Professional Technologists, REM, REEM, CEM, ISO50001 Lead Auditor, Certified Energy Auditor, Certified Measurement & Verification Professional (AEMVP).

Accredited HRDC Trainers

Professional trainers and coach in process/thermal energy engineering, GHG accounting, electrical and mechanical energy audit and optimisation.

Government Technical, and Policy Advisors

Advisor and Chair of Energy Efficiency and Conservation Act (Thermal Energy) Drafting Committee, Board of Judges for ASEAN Energy Awards, National Energy Awards; Technical Advisors for PETRA, NRECC, KETSA, KETTHA, MOSTI, MGTC, Energy Commission and SEDA.

30 years+ experience, >500 clients

Consultants for projects and coaching in energy, ESG & Pinch Analysis for resource conservation; >500 local/international organisations.

Energy Service Company, MyHijau

UTM Spinoff Commercialising Energy Solutions; Registered ESCO and Ministry of Finance (MOF). R&D & Commercialisation of know how, products & solutions. MyHijau registered company.

The Centre of Training Energy Managers for the Southern Region of Malaysia

Involved in developing energy manager training module, and in training over 1,600 Certified Energy Managers in collaboration with MGTC.

Our Top 10 Values



Leading Experts in
Thermal Energy,
GHG and Product
Carbon Footprint



Global Top 2%
Scientists in Process-
Driven Smart Systems
Engineering



Leaders in Pinch
Analysis Solutions for
Minimising Energy,
Emissions and
Resources



Certified
Practitioners, Policy
Advisors with Real-
Life Project
References



Signature Trainings
on Energy, GHG,
ESG & Resource
Sustainability

Our Top 10 Values



Reference for
Training and
Certification of
Energy Managers



Leading Showcase
Energy Management
Implementation and
Mentoring



Leading Energy
Sustainability COP via
COPE-BEST and
ENERGISE



Proprietary
Commercial IOT
Smart System
Energy Solutions



Globally Referenced
Books & Publications on
Energy, Resource and
Emission Reductions

A low-angle, upward-looking photograph of several modern skyscrapers with glass facades, set against a bright blue sky with light clouds. The buildings are arranged in a way that creates a sense of height and scale. A large, semi-transparent circular graphic is centered over the image, containing the text 'CORE SERVICES' in a bold, white, sans-serif font. The background of the circle is a dark, muted blue, which contrasts with the lighter blue of the sky and the white text.

CORE SERVICES



CONSULTANCY SERVICES

Our core expertise is in energy, environment, social and governance (E2SG) leading to reduced operating costs, improved energy and resource efficiencies through audit and optimisation of thermal & electrical energy, water, GHG emissions; conducting green audit, life-cycle audit and implementation of energy management system (EnMS) standards such as ISO50001 and AEMAS and GHG accounting and reporting standards such as ISO14064/67.

TECHNOLOGY TRANSFER

We drive national and international energy and resource sustainability community of practice via our ENERGISE and COPE-BEST events, and capacity building via the OPTIMISE Academy. We published over 600 articles in international refereed journals, books/chapters, conference proceedings and technical reports.



SMART SYSTEM SOLUTIONS

Developed with globally recognised R&D capabilities and aligned with industrial applications, our smart system solutions enables and empowers organisations and businesses to collect, monitor, target, benchmark, analyse and deploy improvement strategies in reducing energy, water, resource costs and emissions.





CONSULTANCY

ENERGY AUDIT SERVICE

Establish baseline energy utilisation performance for a facility. Identify potential improvement options and cost savings on electricity and thermal energy bills, and provides a company with a clear picture of the overall energy balance and the baseline energy utilisation performance across its facilities.

GHG & CARBON ACCOUNTING: ISO 14064-1:2018

Work with our experts to provide awareness, build capacity and conduct a full set of green house gas (GHG) emissions accounting, reporting and mitigation for your organisation in line with ISO14064-1.

NET ZERO GHG EMISSIONS PLANNING & MANAGEMENT

Explore our systematic approach to design a Net Zero Carbon Emissions Roadmap or Carbon Management Plan for your company to maximise cost savings and mitigate GHG emissions.

ENERGY MANAGEMENT SYSTEM (EMS)

Create awareness across your organisation on the importance of energy management. Develop and deploy an Energy Management System (EnMS) to achieve sustainable savings and comply with energy acts and regulations such as EMEER and EECA.

MEASUREMENT AND VERIFICATION (M&V) FOR ENERGY PROJECTS

Monitor and verify the actual savings from your completed energy audit project feasibility studies with the help of our M&V experts.

MAXIMISING ENERGY AND RESOURCE EFFICIENCY USING PINCH ANALYSIS

Use Pinch Analysis to address the core of energy efficiency issues at industrial facilities so that energy (especially thermal energy and power) and utilities demanded from energy-guzzling equipment and processes can be systematically minimised.

CERTIFIED ENERGY MANAGER, REEM AND REM (REGISTERED ENERGY MANAGER) SERVICES

Comply with regulations such as the EMEER 2008, Energy Efficiency and Conservation Act (EECA 2023) and other regulations in ASEAN and beyond to manage both electrical and thermal energy usage for designated installations with the help of our experienced REEMs and Certified Energy Managers.

PRODUCT CARBON FOOTPRINT STUDY AND REPORTING – ISO 14067

Enhance your product appeal and marketability by accounting for the GHG emissions throughout its different life cycle stages, and learn to apply it in the context of GHG inventory reporting.



Customer Testimonies



In the light of Pinch Analysis development, process plants should consider, retrofit beyond energy audit.

- *Maintenance Manager, Palm Oleo*



I personally appreciate the practical case studies and work sessions and the software / programme developed.

- *Utility Engineer, Petronas Gas Berhad*



I have just realised how easy it is to apply Pinch after attending this workshop.

- *Assistant Director, Suruhanjaya Tenaga*



A very useful tool to redesign or troubleshoot heat exchanger / water network to save utility cost.

- *Energy Audit Engineer, GreenTech Malaysia*



An efficient technique for analysis and reduction of utilities leading to significant savings.

- *Senior Process Engineer, Riau Pulp and Paper Mill*



I am impressed on the power of pinch for energy and utility reductions

- *Process Engineer, Shell Middle Distillate Synthesis*



OPTIMISE ACADEMY

OPTIMISE Academy offers our signature **physical**, **online** and **live** as well as **self-paced** courses to help organisations develop PEOPLE as the key drivers of a sustainable energy management program.

Our training programs are available as **open courses** and **in-house customised** programs (please contact us to discuss how to customise a training to the needs of your staff and company)

Listed below are among our popular training programs:

Management Category:

- Energy Manager Training Course (EMTC)
- Concept and Procedure for the Establishment of Energy Management System (EnMS)
- Building Organisational Resilience via a Sustainable Energy Management Program
- Understanding Energy Efficiency Conservation Act (EECA) and Its Impact on Companies

Technical Category:

- Thermal Energy Recovery Technologist (TERT)
- Industrial Thermal Energy Audit & Analysis (ITEA)
- Energy Audit on Electrical System
- Energy Efficiency Improvement of Mechanical Equipment
- Energy Conservation for Air-Conditioning Systems
- GHG Emissions Accounting and Management
- Chiller Plant Energy Efficiency
- Product Carbon Footprint - ISO 14067
- Water Reuse & Recycling via Pinch Analysis
- Science Based Targets initiative (SBTi)

Awareness Category:

- Now, Everyone Can Contribute Toward Energy Efficiency and Conservation!
- Non-structural Energy Management: Energy Saving Through Behaviour Change
- Strengthening Organisational Resilience for EECA Compliance



WORKSHOP TESTIMONIES



This is an opportunity to learn from and to build network with established pinch practitioners in Malaysia. With the increasing energy prices, it is wise for companies to further improve and optimize their processes to stay competitive and profitable. - **Md Sairol Nizam Bin Md Saidi (Participant of TERT)**



This course has practical work sessions which allow participants to apply what they learn, and by doing so, reinforces their understanding and helps to retain knowledge. You don't know if you truly understand the concept until you've been asked to apply them.- **Lau Zheng Zhou (Participant of GHG Emissions Accounting and Management)**



This training provided up-to-date information and know-how; It is a fruitful sharing delivered by a team of high-level professionals. I shall continue participating with this organisation to gain more. - **Wong Tien Yi (Participant of EnMS)**



The course provides a very good understanding on how, by selecting the right equipment, we tend to save the power consumption which eventually helps the environment and sustainability as well. - **Mera Jane (Participant of In-house Training for Now, Everyone Can Contribute to Energy Efficiency and Conservation)**



The ITEA Training was very useful for companies aiming to enhance energy efficiency of plant operations. From theory to in-depth methodology, participants learnt many new methods from OPTIMISE experienced professors and educators. I recommend those who are going for sustainability to join this training. Well done OPTIMISE! - **Azree Hazwan (Participant of ITEA)**



The hands-on experience with MEASUR software and 3E Plus further enhanced the learning, equipping us with modern tools to assess and implement energy-saving measures effectively. - **Abdul Karim Ziad Wakil (Participant of ITEA)**





SOFTWARE



Comprehensive Smart Management Of Asset Real-Time (C-SMART)

ASSET MANAGEMENT

Asset registering and data tracking.

MAINTENANCE MANAGEMENT

Manage work order, and track maintenance and engineering activities.

ASSET PERFORMANCE PREDICTION

Learn the asset behavior, and provide early fault detection.

Smart Energy Data Acquisition Real-Time (a-SEDAR)

ENERGY AND WATER MANAGEMENT

Monitor, analyse and control energy and water use.

DETECTION

Notified of abnormality. Early fault detection.

VISUALISATION

Track and record energy and water use in real time.



Personalised Smart Energy Demand Analysis and Reduction (p-SEDAR)

REMOTE CONTROL

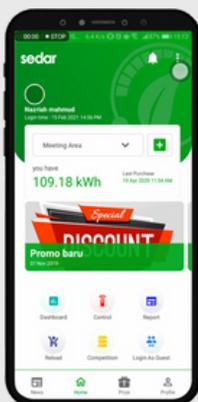
Personalised Smart Energy Demand Analysis and Reduction (p-SEDAR)

PERSONALISED REPORT

Make sense of all these information on your hand, and take action on it.

GAMIFICATION

Create engaging competition among departments and people that encourage awareness of their energy bills.

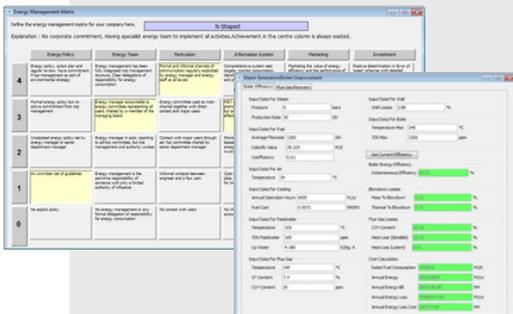


Gold Award Winner - Humanised IoT-based Smart Energy System at the Malaysia Technology Expo (MTE) 2021

OPTIMAL HEAT

ANALYSIS AND SOLUTION OF MAXIMUM THERMAL WASTE HEAT RECOVERY POTENTIAL

- Maximum energy recovery (MER) target
- Design the heat exchanger network (HEN) that achieves the MER target
- Alternative HEN design manipulation
- Determine the multiple utilities level targets to minimise cost
- Determine the system economics
- Determine the right minimum temperature difference.



OPTIMAL AUDIT

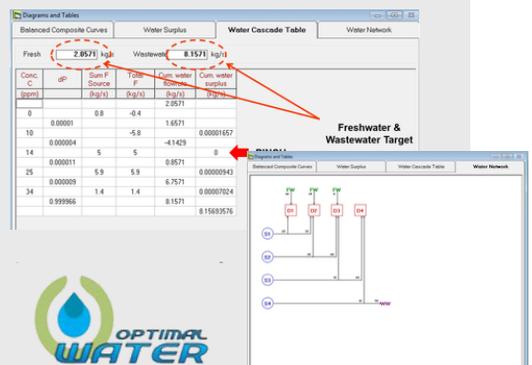
ANALYTICS & SOLUTIONS FOR UTILITIES: ENERGY, GAS EMISSION AND WASTEWATER AUDIT

- Energy Management System Analysis
- Energy trend analysis and load apportioning
- Evaluate equipment energy efficiency analysis
- Recommendations for energy savings measures
- Economic analysis

OPTIMAL WATER

ANALYSE YOUR COMPANY MAXIMUM WATER REUSE POTENTIAL BASED ON PINCH ANALYSIS

- Maximum water recovery (MWR) target
- Design the water exchanger network (WEN) that achieves the MWR target
- Process modification analysis



SOFTWARE TESTIMONY

Testimony from client at HKL

"a-SEDAR is very user friendly, comprehensive, and good platform for energy monitoring systems. At HKL, we have installed more than 20 units of DPMs on main HVAC system and main switch board and connected it to the a-SEDAR system. Through this a-SEDAR system, we can monitor and compare energy data for all DPMs easily through a single platform. The reports generated from this system are very helpful and make it easier for me as an Energy Manager at HKL, the largest hospital in Southeast Asia to prepare and submit a very comprehensive monthly report to HKL's Top Management."

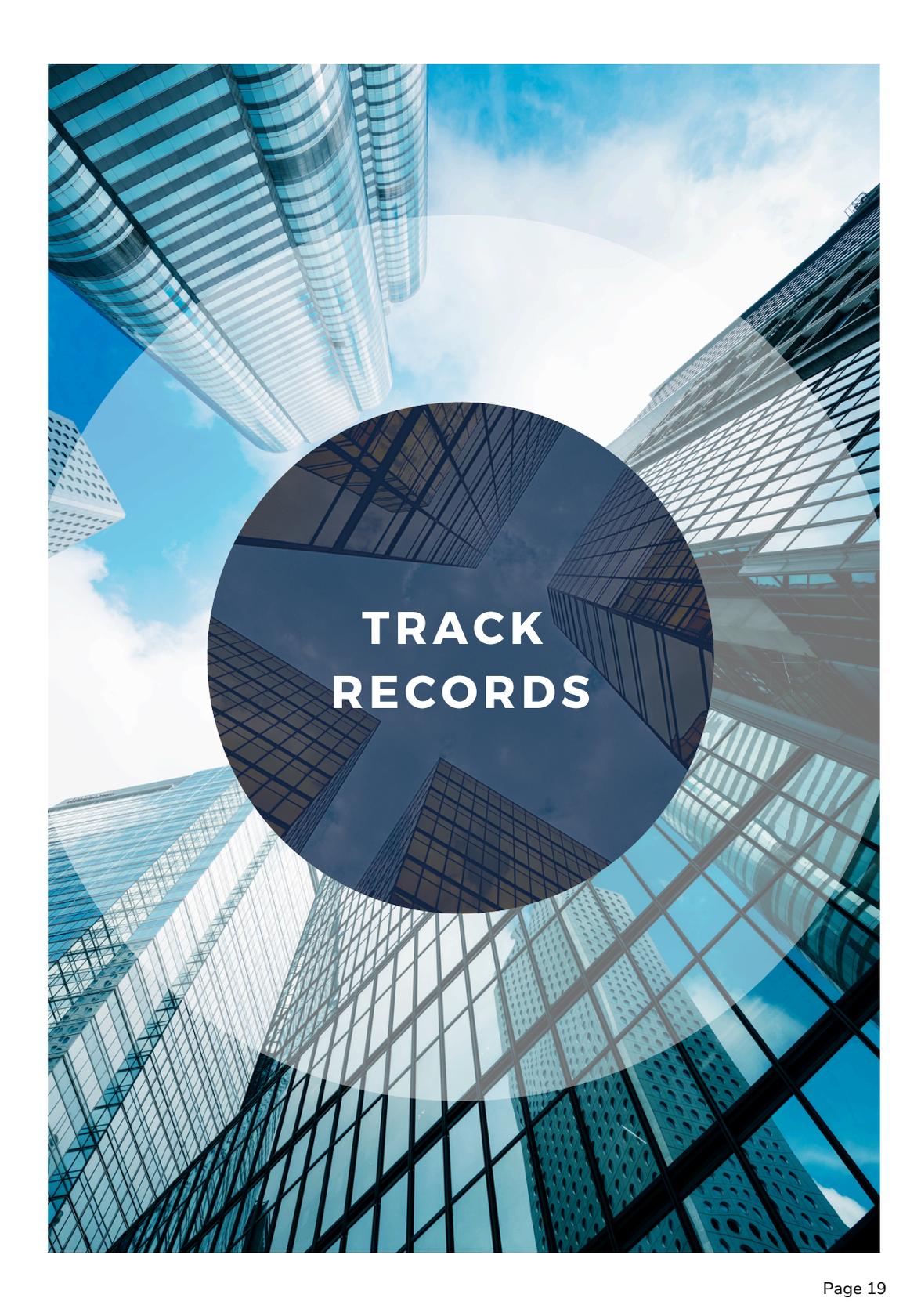
- Suhaidah Suliman, Energy Manager, Radicare (M) Sdn Bhd, Hospital Kuala Lumpur

- INSTITUT PERUBATAN RESPIRATORY (IPR) - 4 Power Meters
- HOSPITAL KUALA LUMPUR (HKL) - 20 Power Meters + 2 Water Meters
- National Pharmaceutical Regulatory Agency (NPRA) - 4 Power Meters



Recent HKL Project Installations





TRACK RECORDS



Physical Workshop

With years of experience in training professionals, we offer company-specific solutions that targets to help business upskill and develop their employee capabilities with relevant knowledge.



Online Workshop

We have successfully organised virtual trainings with participants throughout Malaysia and abroad, bridging the gap of social distance during the pandemic.



On-demand Workshop

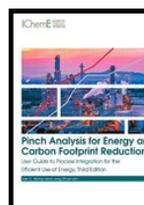
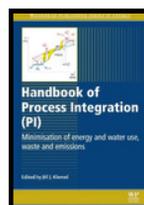
Our latest launch of self-paced learning program caters to industrial professionals to learn flexibly for continuous development.

Track Records

ENERGY, WATER & RESOURCE SUSTAINABILITY LEADERSHIP

- Chair of ASM Energy Committee (2021-2023).
- Chair, ASM MyNet Zero Task Force(2021-2023).
- Chair, Energy Efficiency & Conservation Act (EECA) - Thermal Energy Drafting Committee
- Technical Advisor of KETSA Energy Blueprint, ST, SEDA, MGTC.
- Over 500 Companies Outreached, End-Users Advised & Certified.
- ASEAN EMS 1st ASEAN Certified 3-Star EnMS

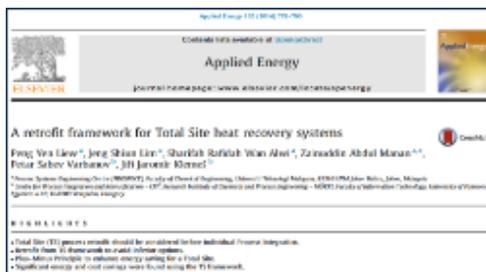
Highlights of Global Publications on Energy, Water, Resource Savings and Emission Reduction



Book 1: **Process Integration and Intensification**

Book 2: **Handbook of Process Integration (PI)**

Book 3: **Pinch Analysis for Energy and Carbon Footprint Reduction**



Research Publication Highlight: **A retrofit framework for Total Site heat recovery systems**



Research Publication Highlight: **Centralised utility system planning for a Total Site Heat Integration Network**

We spearheaded the UTM Sustainable Energy Management Programme toward national and international recognitions

- Ranked No. 1 Globally by THE on SDG-7
- 1st ASEAN-EMGS 3* Energy-Efficient Facility
- Winner of ASEAN Energy Award 2012, 2022
- RM30 Million Energy Savings 2011-2020
- 10 Registered Electrical Energy Managers
- 50 Certified Energy Managers (CEMs)
- A Centre for Energy Managers Certification
- Centre for Continuing Education in SEM
- Certified ASEAN/ISO50001 Trainers/Auditor
- RDCC Leader in Thermal Energy Efficiency



Industrial Retrofit Project

Reported in Chemical Engineering (Global) Magazine for Engineering Practitioner with evidence of FW reduction up to 85.1%, WW reduction to 97.7% and an extremely short payback period of 4 months only.

Real Examples of our Triple-Bottom Line Benefits for companies that utilizes waste heat recovery.

Reference Energy Minimisation Projects

- 56**
 mil./year
Refinery Project
 Energy savings by Retrofit of Heat Recovery System
- 18**
 mil./year
Middle Distillate
 Energy savings by Total Site Heat Integration Retrofit Study
- 3.3**
 mil./year
Oleochemical
 Energy and Water Recovery Savings

Reference Water Minimisation Projects

- 4**
 months
Semi-Conductor Plant
 85.1% freshwater reduction
 97.7% wastewater reduction
 4 months payback period
- 22**
 months
Chlor Alkali Plant
 35.8% freshwater reduction
 100% wastewater reduction
 1.87 years payback period
- 60**
 months
Mosque
 95.3% freshwater reduction
 67.7% wastewater reduction
 5 years payback period
- 18**
 months
Paper Mill Plant
 14% freshwater reduction
 14% wastewater reduction
 1.5 years payback period



ABOUT COPE-BEST

Convention of Promotion of Energy Sustainability Best Practices



 **COPE-BEST 2021**
252 Participants



 **COPE-BEST 2022**
1121 Participants



 **COPE-BEST 2023**
1010 Participants

COPE-BEST IN BRIEF

The Convention on Promotion of Energy Sustainability Best Practices (COPE-BEST) is a conference that advances the synergy between energy sustainability best practices and open innovation across stakeholders from universities, industry, policymakers and civil society from ASEAN and beyond. COPE-BEST is a **green, low carbon fully online interactive conference that is Accessible to Anyone from Anywhere at Anytime**. COPE-BEST which integrates sustainability, accessibility, inclusivity, synergy and originality with its 10 Uniqueness is the winner of the 2022 IChemE Global Award on Public Engagement. Themed "Race to Net Zero", COPE-BEST is a clarion call to action for ASEAN energy stakeholders to swiftly transition to Net Zero emissions through energy sustainability best practices and innovations.

COPE-BEST AIMS

- **Showcase energy sustainability (ES) best practices, open innovations, winners of R&D invention awards and energy awards** from universities, industry, policymakers and civil society.
- **Foster partnership among energy stakeholders** from universities, industry, policy makers and civil society.
- **Catalyse and promote adoption of innovative ES technologies and practices** through local, regional and global partnership for the goals.
- **Build a sustainable and resilient COPE-BEST Community of Practice** among national, regional and global networks of universities, industry, policy makers and civil society.



AWARDS & ACHIEVEMENTS

- Prof. Ir. Ts. Dr Zainuddin Abdul Manan, CEO of Optimal Systems Engineering recognized as **Top 10 Leaders in Professional Training & Coaching in Malaysia – 2023**.
- COPE-BEST as a recipient of the **2022 IChemE Global Award under Public Engagement Category**.
- **p-SEDAR, Gold Award Winner** - Humanised IoT-based Smart Energy System at the Malaysia Technology Expo (MTE) 2021.
- **W2W (Waste-to-Wealth Trading Platform) Gold Award Winner** at the Malaysia Technology Expo (MTE) 2021.
- **Winner, Superb Teraju, 2016, eSMART** – Energy management system with certification.
- **Winner, High Impact Programme 2 (HIP 2), eSMART** – Energy management system with certification.
- **HRDF Penjana Grant for Thermal Energy Auditor and Thermal Energy Recovery Expert Certification Programme**.
- **Gold Award and Special Award for Industry, HiRECS – Heat Integration Software for Retrofit, Controllability and Safety, 20th Industrial Art & Technology Exhibition (INATEX), 2018.**
- **Prince Sultan Bin Abdul Aziz International Prize for Water, Water Demand Management, 2008.** Awarded the by Kingdom of Saudi Arabia.
- **National Champion for Business Plan Competition 2006**, Multimedia Development Corporation Sdn Bhd.
- **Gold Medal, IPTA Expo on Research & Development 2005 – Matrix: A Computer Software for Maximising Energy and Water Efficiency in Industry and Urban Sectors.** (The exhibition has now been branded as PECIPTA (International Exposition of Research and Inventions of Institutions of Higher Learning), Ministry of Higher Education.
- **Silver Medal, Optimal Heat; 31st International Exhibition of Invention, New Techniques, Products, Geneva, 2003.**



PAST PROJECTS



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- GHG Accounting and Capacity Building for Kaneka (M) Sdn Bhd - **December 2024**
- A Comprehensive National Energy Efficiency Benchmarking for the Building Sector - **31 December 2024**
- A Four-Days In-House Workshop on "MAXIMISING INDUSTRIAL THERMAL ENERGY EFFICIENCY & GHG ACCOUNTING" for BASF PETRONAS Chemicals Sdn Bhd - **4 November - 7 November 2024**
- Resolving Economizer Issues for Hershey Malaysia Sdn Bhd - **October 2024**
- Energy Audit for Knauf Insulation Sdn Bhd - **October 2024**
- Thermal Energy Audit for Ansell Seremban - **August 2024**
- Perform REEM services in relation to EFF for UnigraFood Processing Asia Pacific Sdn Bhd - **July 2024**
- Energy Audit on Thermal Oil Heater System for Ansell Seremban Sdn Bhd - **May 2024**
- Development of GHG Inventories for PNE Electric - **April 2024**
- Service of Boiler Works Bunge Loaders Croklaan Oils Sdn Bhd - **April 2024**
- A Half-Day Workshop on Now, Everyone Can Contribute Toward Energy Efficiency and Conservation for Nirvana Asia Group - **23 April 2024**
- Real-Time Utility Network Energy Efficiency Optimisation with RENKEI [ASEAN Japan Research Consortium] - **12 March 2024**
- Development of GHG Inventory for Majlis Perbandaran Sepang - **23 February 2024**
- A Two-Days In-House Workshop on INDUSTRIAL THERMAL ENERGY AUDIT for UNIKL - **22 January-24 January 2024**

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- Parameter Measurements for Grundfos Pump System at Gleneagles Hospital Kuala Lumpur - **December 2025**
- Energy Audit for Dyson Global Development Campus (GDC) - **October 2025**
- Consultation ISO14064-1 GHG for Eternal Materials (M) Sdn Bhd - **September 2025**
- Development of GHG Inventories for AMIC: Gem Projects - **July 2025**
- Energy Efficiency Project for CIBA Vision Johor Sdn Bhd - **June 2025**
- Development of GHG Inventories for TROX Malaysia Sdn Bhd - **May 2025**
- Energy Audit For Knauf Insulation Johor - **March 2025**
- A Two-Days In-House Workshop on Strengthening Organisational Resilience for EECA Compliance for Carsem (M) Sdn Bhd - **10 March - 11 March 2025**

**Project experiences including research and consultancy projects of company directors under UTM.*

PAST PROJECTS

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- REISO SIRIM – Resource Efficiency Audit for MSM Johor & Penang - **2022 - 2023**
- Developed MGTC Energy Management System Standards **2022-2023**
- In House Energy Manager Training Course for PNB - **July 2023**
- GHG Accounting and Capacity Building for Kaneka Malaysia - **February 2023 – Ongoing**
- Development of GHG Inventory for Majlis Perbandaran Sepang - **September 2023 - Ongoing**
- Development of GHG Inventories for PNE Electric Sdn Bhd - **September 2023 - Ongoing**

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- Utility Audit for Kellogg's Malaysia Kellogg's - **2020 - 2021**
- Risk Assessment on Energy Systems Planning Resilience to Climate Change Ministry of Higher Education under the Fundamental Research Scheme Grant - **2020 - 2023**
- Maximising Heat Recovery Network Under Variable Operability Conditions UTM Research University Grant - **2020 - 2023**
- Malaysia Sustainable University Campus Network / MYSUN European Union Project - **2020 - 2023**
- M&V for solar thermal energy project for UNIDO - **2020**

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- REISO SIRIM Resource Efficiency Audit for MSM Johor and Penang - **2022-2023**
- Capacity Building and Preliminary Thermal Energy Audit for Ansell N.P. Sdn. Bhd. - **2022 - 2023**
- Energy Audit for Ambu Sdn Bhd - **09 Mei 2022 – 07 Ogos 2022**
- Energy Audit for Mölnlycke Health Care Sdn Bhd - **21 Feb 2022 – 1 Julai 2022**
- Detailed Energy Audit of a Medical Glove Factory Engie (M) Sdn Bhd - **2022**

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- Detailed Energy Audit for MPKu Buildings Majlis Perbandaran MPKu Kulai - **2019**
- ASEAN-JAPAN Energy Efficiency Partnership (AJEEP) Certification MGTC - **2019-2020**
- TRIGENSITE - A Software to Optimize Industrial Energy Across Multiple Site Copyrighted Software - **2019**
- Smart Energy Demand Allocation Realtime (SEDAR) Copyrighted Software - **2019**
- Detailed Energy Audit for MPKU Building Majlis Perbandaran Kulai - **2019**

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- REISO SIRIM – Preliminary Audit for Delima Oil Product Sdn. Bhd. - **2021**
- Utility Audit for Kellogg Asia Products Sdn. Bhd.- **19 Okt 2020 – 31 Mac 2021**
- A Comprehensive National Energy Efficiency Benchmarking Study for Building Sector AAIBE, KETSA - **2021 - 2022**
- SIRIM's Resource Efficiency and Industrial Symbiosis Opportunity Assessment (REISO) Programme – Energy Audit and Resource Efficiency for a Palm Oil Refinery in Pasir Gudang SIRIM - **2021 - 2022**

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- Development of Online System for Industrial Energy and Emission Reductions MRUN - **2018 - 2022**
- Thermal Energy Audit for Solar Thermal Feasibility for JB Cocoa, UNIDO - **2018**
- Development Of Technical and Non-Technical Parameters of Renewable Energy and Energy Efficiency In Malaysia INCEIF, AAIBE, KETSA - **2018**
- Energy Audit Conditional Grant For Industrial Sector Under RMK-11 for Heng Hiap - **2018**

PAST PROJECTS

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- UTM-TRG 3.6 Auditing Processes for Energy Consumption And Savings For UTM JB Campus - Cluster Approach **UTM Research University Grant - 2018 - 2021**
- UTM-TDR40: Eco-Industrial Park Planning and Design for enhanced Business Edge for Park Owners in Malaysia **UTM Research University Grant - 2018 - 2022**
- UTM-TDR 40.1 (T1): Industrial Waste Identification And Mapping From Geospatial Technologies For Eco-Industrial Park Design **UTM Research University Grant 2018/22**
- UTM-TDR40.2(T1): Modelling Of Eco-Industrial Park Network Design **UTM Research University Grant 2018/22**
- UTM-TDR 40.3(T2): Modelling Of Eco Industrial Park Business Model **UTM Research University Grant 2018-2022**
- UTM-TDR 40.4 (T2): Environmental Consciousness And Sustainable Development Performance Of Eco-Industrial Park In Malaysia **UTM Research University Grant 2018 - 2022**
- UTM-TRG 3.5 UTM – Smart Digital Energy Campus – Energy Controller Prepaid System For Hostel **UTM Research University Grant 2018 - 2021**
- Techno-Economic Feasibility Study of an Integrated Low Carbon Industrial Site **UTM Research University Grant 2018 - 2020**
- Design And Optimisation Of Simultaneous Water And Energy Systems For Process Industry **UTM Research University Grant 2018 - 2020**
- HIR 9.2 : Design and development of food waste to biogas converter system **UTM Research University Grant 2018-2021**
- Palm Oil Recovery for Spent Bleaching Earth for Maximum Solvent Recovery and Minimum Energy Utilisation - **EcoOils Sdn Bhd.**

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- Simultaneous Water and Energy Minimization Considering Water Management Hierarchy **UTM Research University Grant 2018-2019**
- Carbon Sequestration Pinch Analysis CAPA: A novel technique for targeting land-use and carbon sequestration Copyrighted Software - **2018**
- MRUN 4.3 – Online System For Single Site And Total Site Heat And Emission Recovery Network Analysis, Malaysia Research University Network **2018-2022**
- MRUN 4.2 – Online System For Industrial Energy And Emission Reductions Malaysia Research University Network 2018 - 2022

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- Development of Green Port Award System (GPAS) Documentation Bintulu Port Authority - **2017**
- Integrated Industrial Site Planning for Minimising Resource Utilisation and Pollution **UTM Research University Grant 2017-2019**

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- Retrofit of Oleon Sdn Bhd Plant for Utility Conservation Using Pinch Analysis Oleon - **2016**
- Analytical And Experimental Modelling of Desolventisation System for Eco OilsEco Oils - **2016 - 2018**
- Non-Shipping Emission Analysis at Johor Port and Port of Tanjung Pelepas Johor Port Authority - **2016-2018**
- Development of online system for Energy Management System (EnMS) Superb Teraju - **2016-2018**
- Process Plant Improvement and Intensification Lahad Datu Edible Oils **2016-2017**
- Steam Systems Optimisation for Kerry Ingredients Kerry Ingredients **2016**

PAST PROJECTS

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- Sustainable Energy Management Program Universiti Teknologi Malaysia **2016 - Present**
- Energy Monitoring System Installation Institut Perubatan Respiratory KL - **2016**
- Energy Monitoring System Installation National Pharmaceutical Respiratory Agency - **2016**
- An integrated Pinch Analysis Framework for Low Carbon Industrial Site Planning **UTM Research University Grant 2016 - 2018**
- Development Of Online System: Shipping Emissions Accounting (SEA) And Emissions Improvement Measures (EIM) For Port Of Tanjung Pelepas Johor Port Authority - **2016-2018**
- Development Of Online System: Shipping Emissions Accounting (SEA) And Emissions Improvement Measures (EIM) For Johor Port Johor Port Authority - **2016 - 2018**
- Non-Shipping Emission Analysis In Johor Port Johor Port Authority - **2016 - 2018**
- Non-Shipping Emission Analysis In Port Of Tanjung Pelepas Johor Port Authority - **2016 - 2018**
- Pembangunan Indeks Kelestarian sebagai Perancangan Transformasi Pelabuhan Hijau IISJ Project - **2016 - 2017**
- A Multi-Period Energy Conservation Strategy With Long-Term Thermal Energy Storages **UTM Research University Grant 2016 - 2017**.
- Green Technology Blueprint for OIC Countries - **IDB 2014-2015**

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- Ship Emission Analysis at Johor Port and Port of Tanjung Pelepas Johor Port Authority - **2015 - 2016**
- Design Gap Analysis for Fractionation & Distillation Plants Works Evyap Sabun - **2015 - 2016**
- 3D Design and Modeling of Oleochemical Plants Evyap Sabun - **2015 - 2016**

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- HAZOP Study for Fatty Acid Fractionation Plants Evyap Sabun - **2015 - 2016**
- Energy Monitoring System Installation Hospital Kuala Lumpur - **2015**
- A Holistic Framework For Design Of Cost Effective Minimum Energy Network (CEMEN) **UTM Research University Grant 2015 - 2018**
- Ship Emissions Analysis In Johor Port Johor Port Authority - **2015 - 2016**
- Ship Emissions Analysis In Port Of Tanjung Pelepas, Johor Port Authority - **2015 - 2016**

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- Design of a Cogeneration System for FABER Incineration Plant FABER Mediserve - **2014**
- Design and optimization of modernization and efficient operation of energy supply and utilization systems using renewable energy sources and ICTs, EU Project in collaboration with University of Pannonia, Hungary - **2014-2016**
- Holistic Resource Planning for Industrial Parks: A Waste-To-Resources Process Integration Approach, **UTM Research University Grant 2014-2015**
- Integrated palm oil industry cluster for eco-community **UTM Research University Grant 2014 - 2015**
- A Holistic Carbon Emission Planning And Management From Stationary Point Sources **UTM Research University Grant 2014 - 2016**

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- Retrofit of Middle Distillate Synthesis Plant Using Pinch Analysis Shell Middle Distillate - **2011**
- Retrofit of Petroleum Refinery Plant of PERTAMINA PERTAMINA Indonesia - **2011**
- Development of Low Carbon Society in ASEAN Region - **2011**

PAST PROJECTS

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- Design of Co-generation System for BERNAS - **BERNAS 2008**
- Baseline Study for Energy Efficiency and Renewable Energy Award System for Malaysia - **MGTC 2008**
- Improvement of Energy Efficiency for an Incineration Plant Phase 2 - **Pantai Medinvest 2007**

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- Improvement of Energy Efficiency for an Incineration Plant Phase 1 - **Pantai Medinvest 2007**
- Retrofit for Energy Efficiency improvement of an Oleochemical Plant PCOC - **2007**
- Optimal Audit – An Integrated Resource Conservation Software for Sustainable Development Copyrighted Software - **2007 - 2009**

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- Retrofit of Gas Processing Plant for Maximum Energy Recovery - **1994**
- Retrofit for Simultaneous Reductions in Energy and Fouling Costs in a Palm Oil Refinery - **1994**
- Process Integration of An Oleochemical Plant Henkel Oleochemicals - **1994**

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- New Design and Retrofit of Petroleum Refinery Using Pinch Analysis - **@Linnhoff March, UK**
- ADB Energy Conservation Studies for Malaysian Industry 30 Malaysian Factories - **1991-2093.**

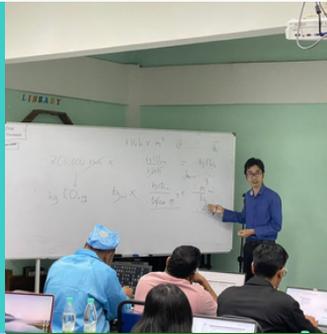


Portable Audit Instruments Used In Our Energy Audit Projects

- Ultrasonic Flowmeter T, Gas, Liquid Flows
- Gas Analyser Gas Composition, T and Flow
- Air Velocity Meter Air Speed (m/s)
- Energy Analyser I, V, PF, kW, kWh
- Illuminance Meter Lux
- Portable Humidity Meter T, Relative Humidity
- Portable Infrared Thermal Imaging Camera Equipment Thermography (heat distribution), Temperature Profile

**Project experiences including research and consultancy projects of company directors under UTM.*

**IN-HOUSE
WORKSHOP**



SOFTWARE



CONSULTANCY



**PUBLIC
WORKSHOP**

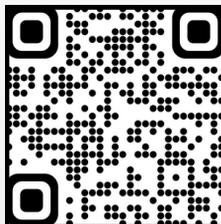


**ON-DEMAND
TRAINING**

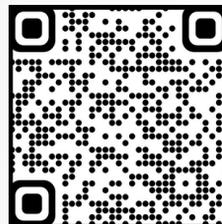
Scan for
Upcoming Workshop



Scan for
In-house Workshop



Scan for Software



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Consultancy

