

IMPACT REPORT 2022

AFFORDABLE AND CLEAN ENERGY

7 AFFORDABLE AND
CLEAN ENERGY

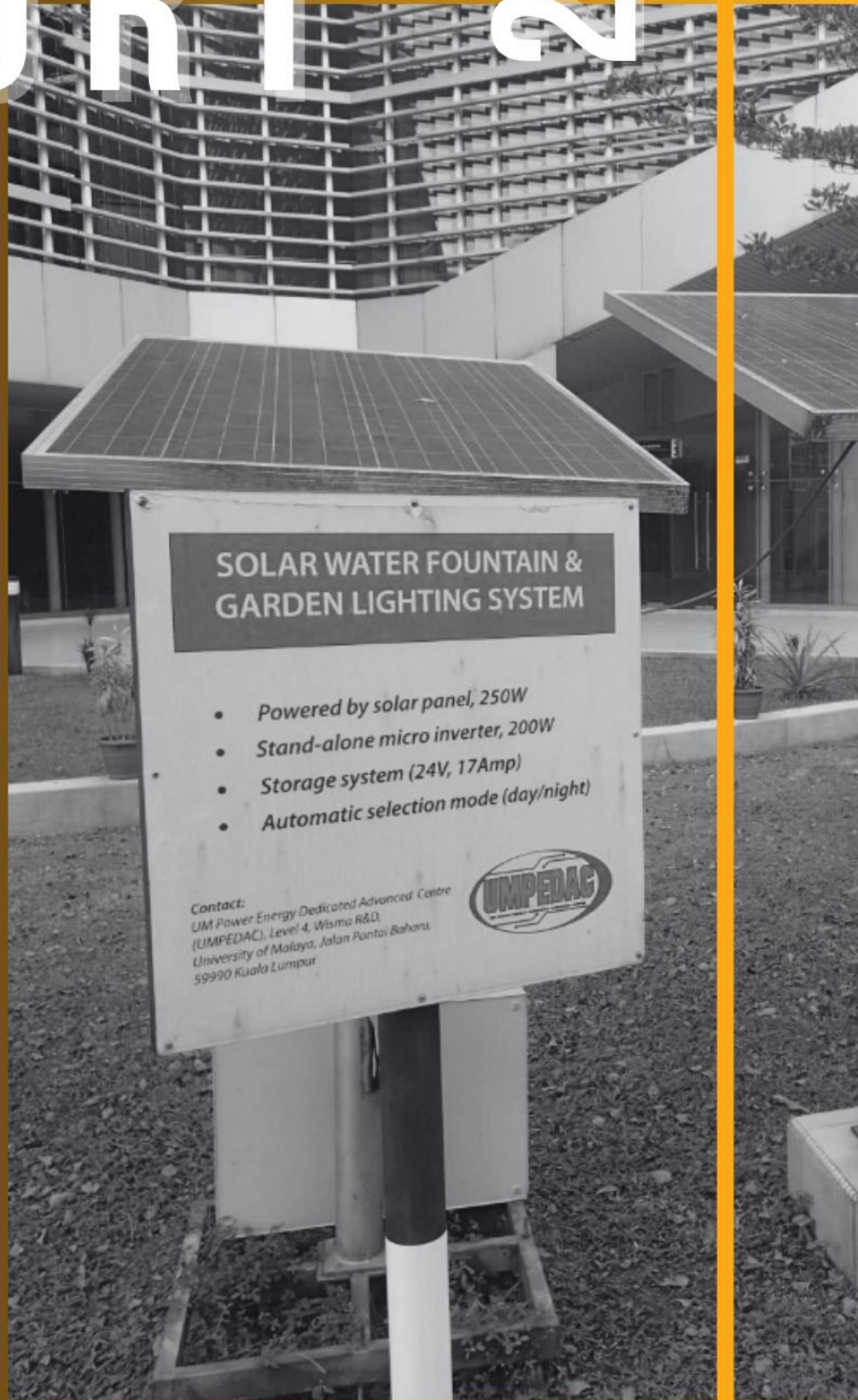


PHOTO SOURCE: SONAR PANELS IN UNIVERSITI MALAYA



UNIVERSITI
MALAYA

EDITORIAL BOARD

PROJECT ADVISORS

Professor. Dr. Yahaya Ahmad
Professor. Dr. Nazia Abdul Majid
Associate Professor Dr. Zeeda Fatimah Mohamad
Dr. Noor Suzaini Mohamed Zaid

PROJECT LEADER AND EDITOR

Rahmat Shah Putra Samsul Rizal

STUDY TEAM

Muhammad Azhar Arif Mohd Azmi
Nur Dinah Izzaty

WITH SUPPORT FROM

Tan Siu Ching
Mohamad Firdaus Ramli
Mohd Fadhli Rahmat
Affan Nasaruddin
Noor Azril Ramli

EDITORIAL & DESIGN

Calven Chow Kai Wen
Rahmat Shah Putra Samsul Rizal

Associate Fellows (Corporate Data Centre)

Dr. Bernardine Renaldo Wong Cheng Kiat
Dr. Tan Hsiao Wei
Huzienetta Hamdan

Subject Matter Experts

Professor Dr. Saiful Anuar Karsani
Dr. Muhammad Azzam Ismail

Administrative Support

Kamisah Samsuddin
Norshila Mat Nor

CONTRIBUTORS

Deputy Vice-Chancellor (Academic & International) Office
Deputy Vice-Chancellor (Research & Innovation) Office
Deputy Vice-Chancellor (Student Affairs) Office
Deputy Vice-Chancellor (Development) Office
Registrar Office
Associate Vice-Chancellor (Corporate Strategy) Office
Associate Vice-Chancellor (Global Engagement) Office
Associate Vice-Chancellor (Infrastructure & Information Services) Office
Bursar Office
Department of Development & Estate Maintenance (JPPHB)
Centre for Energy Sciences (CES)
Fakulti Alam Bina
Project Management Centre (PMC)
Power Electronics And Renewable Energy Research Laboratory (PEARL)
UM Sustainable Development Centre (UM SDC)
Universiti Malaya Community Engagement Centre (UMCares)
UM Centre of Innovation & Enterprise (UMCIE)
UM Power Energy Dedicated Advanced Centre (UMPEDAC)

FOREWORD BY ASSOCIATE VICE-CHANCELLOR (CORPORATE STRATEGY)



The Sustainable Development Goals (SDGs) has transformed the landscape of the higher education sector on a global scale. These 17 goals have become a primary reference framework in many institutions' planning of education & learning, research & innovation, as well as strategic partnerships strategies.

The publication of the 17 Universiti Malaya Impact Reports 2022 is crucial to monitor our efforts towards SDGs as we are advancing our excellence through the implementation of the UM Strategic Plan 2021-2025, UM Transformation Plan 2021-2030, and UM Sustainability Policy 2021-2030.

For many years, UM has integrated the SDGs into our leadership, university policies, curriculum activities, RDCIE initiatives, values, investments, and strategic partnerships with stakeholders to demonstrate that UM also “walks the talk.” These efforts involve active engagement from our staff, students, and the broader community of stakeholders and alumni.

Congratulations to the team at the Corporate Data Centre for formulating data-driven comprehensive reports that will serve the University in becoming a Global University Impacting The World.

PREFACE BY DIRECTOR OF THE CORPORATE DATA CENTRE



I am delighted to present all 17 Universiti Malaya Impact Reports for 2022, which review the data related to the Sustainable Development Goals (SDGs) and showcase UM's achievements in 2022. The 17 SDGs serve as a guide for addressing the most pressing issues and critical challenges. Each of the 17 SDGs demands strong collaborative efforts from all levels of society to ensure a more resilient and sustainable future for the next generation.

In the Corporate Data Centre, we apply knowledge and data analytics skills to make informed, evidence-based decisions. This not only helps address current challenges but also ensures preparedness for the future.

These 17 Impact Reports for 2022 are flagship reports designed to assist the University in monitoring and examining our contributions to the country's progress in achieving the 17 SDGs.

I would like to seize this opportunity to express my deep appreciation to my team, who have worked tirelessly to collect and analyse data, enabling us to effectively monitor UM's sustainability efforts. I am also sincerely grateful for the support from UM's top management and the hard work of all colleagues across campus, particularly the Sustainable Development Centre, data managers, and controllers, for their cooperation in providing the SDG data for 2022.

OUR IMPACT IN 2022



24 assistance programs empowered **10694** students in their academic journeys.



12 impactful food assistance programs, including free food, food banks, vouchers, and affordable options, eliminated hunger on UM campus.



Over **20** outreach programs delivered essential health services to local communities in need and refugees.



47 enriching courses featured in the 2022 Short-Term/International Training/Study Tour, part of UM Course Buffet to support lifelong learning.



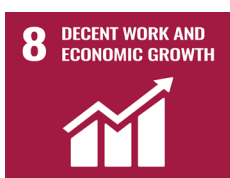
55% Female representation in senior positions



429 participants took on 7 weeks of water conservation challenges during the Kita Jaga Air Challenge 2022.



UM subscribed to the Green Electricity Tariff (GET) program, generating **5.5** million kWh of clean energy



Precision Intervention Program for selected students to produce future-ready graduates enriched with UM DNA.

AIM OF THE GOALS

SDG 1: End poverty in all its forms everywhere

SDG 2: End hunger, achieve food security and improved nutrition and promote sustainable agriculture

SDG 3: To ensure healthy lives and promote well-being for all at all ages

SDG 4: Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all

SDG 5: Achieve gender equality and empower all women and girl

SDG 6: Ensure availability and sustainable management of water and sanitation for all

SDG 7: Ensure access to affordable, reliable, sustainable and modern energy for al

SDG 8: Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all

SDG 9: Build resilient infrastructure, promote inclusive and sustainable industrialization, and foster innovation

SDG 10: Reduce inequality within and among countries

SDG 11: Make cities inclusive, safe, resilient and sustainable

SDG 12: Ensure sustainable consumption and production patterns

SDG 13: Take urgent action to combat climate change and its impacts

SDG 14: Conserve and sustainably use the oceans, seas and marine resources for sustainable development

SDG 15: Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss

SDG 16: Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels

SDG 17: Strengthen the means of implementation and revitalize the global partnership for sustainable development

The development of the Industrial Relations Strategic Planning Framework - Industry University Hyper Engagement Collaboration Framework (INSIGHT)

The publication of the First E-Magazine for Persons with Disability by The Secretariat AUN-DPPnet.

The establishment of UM Master Plan document to guide the university towards achieving a Carbon-Neutral Campus by 2050.

9 initiatives conducted by the Zero Waste Campaign to establish an integrated solid waste management system

The establishment of UM Carbon Neutrality Acceleration Living Labs to contribute to the university's carbon-neutral performance.

In 2022, Project Pulih joined forces with RHB ISLAMIC to protect Malaysia marine ecosystems.

Rimba Ilmu, or Forest of Knowledge, covers 40 hectares and contains an estimated living collection of around 1,700 species of plants.

UM as the first university in Malaysia to conduct campus elections fully run by students.

UM as part of **28** Global Network Memberships, has International Partners based in UM, and 96 Academia-Industry Collaborations.





Overall Ranked
in band
101-200 /1591

From band **201-300** in 2022



Ranked
50/876
From **201-300**
in 2022



Ranked in band
101-200/647
From band **201-200**
in 2022



Ranked in band
101-200/1218
From band **201-300**
in 2022



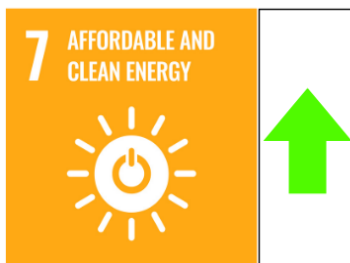
Ranked in band
101-200/1304
From ranked **79**
in 2022



Ranked
3/1081
From ranked **51**
in 2022



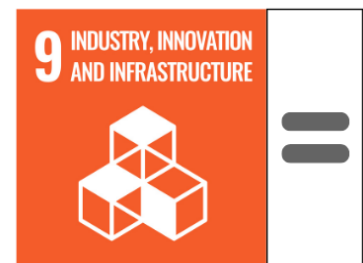
Ranked
60/702
From band **201-300**
in 2022



Ranked
13/812
From **201-300**
in 2022



Ranked in band
401-600/960
From band **401-600**
in 2022



Ranked in band
201-300/873
From band **201-300**
in 2022



Ranked in band
201-300/901
From band **101-200**
in 2022



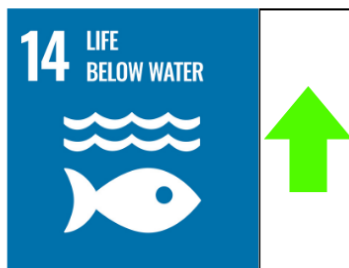
Ranked
72/860
From **101-200**
in 2022



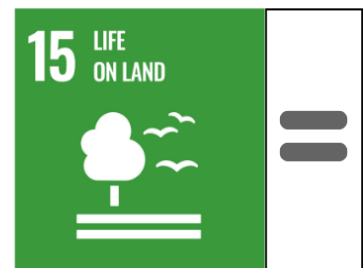
Ranked
73/674
From **201-300**
in 2022



Ranked in band
101-200/735
From band **101-200**
in 2022



Ranked
85/504
From **101-200**
in 2022



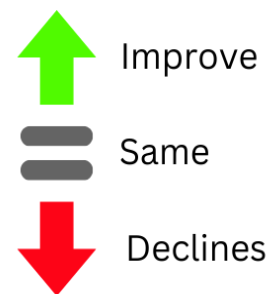
Ranked in band
101-200/586
From band **101-200**
in 2022



Ranked in band
101-200/910
From band **201-300**
in 2022



Ranked
81/1625
From **301-400**
in 2022





UNIVERSITI
MALAYA

University Measures

TOWARDS AFFORDABLE AND CLEAN ENERGY

With the growing urgency of addressing climate change, Universiti Malaya has a responsibility to lead by example. By achieving carbon neutrality in 2050 and promoting clean energy, we would like to contribute to global efforts in combating climate change.

ENERGY-EFFICIENT RENOVATION AND BUILDING

Universiti Malaya (UM) has been actively implementing effective energy management since the publication of the UM Eco-Campus Blueprint in 2016. The blueprint emphasises that energy conservation is one of the key aspects to consider when planning the construction of any building at UM, in addition to the usage of energy-efficient appliances in efforts towards carbon reduction.

The Department of Development and Estate Maintenance (JPPHB) has adopted this blueprint and references the National Energy Efficiency Standard in Buildings to establish a common standard for the construction or renovation of all buildings at UM. This standard is known as the UM Development Checklist, as outlined in Section 6 (Green Technologies

and Waste Management). The checklist was reviewed in 2018 and is applicable to all UM members.

These efforts have continued through the UM Transformation Plan 2021-2030, with the goal of achieving a carbon-neutral campus status by 2030, as envisioned by the Vice-Chancellor. This can be observed in Theme 6: Enhance Learning and Work Environment, under Objective 2: Green Campus.

Five strategies have been announced to create a sustainable campus, including Strategies 2 and 3, which state that “all new buildings and existing building upgrades must be energy efficient.” To promote these sustainability practices among the campus community, the UM Sustainability Policy was introduced. The emphasis on energy management can be seen in

Point 4: Energy Management under Pillar 3: Environment.

Source:

- 1) <https://sustainability.um.edu.my/doc/Sustainability%20UM/Policies%2C%20Guidelines%2C%20Handbook/UM%20Sustainability%20Policy%202021-2030.pdf>
- 2) <https://sustainability.um.edu.my/doc/Sustainability%20UM/Policies%2C%20Guidelines%2C%20Handbook/FINAL%20English%20UMECB2016%20UMPRESS.pdf>
- 3) [https://jpphb.um.edu.my/img/portal/ark/UM%20Development%20Checklist%20Rev01%20\(February%202018\).pdf](https://jpphb.um.edu.my/img/portal/ark/UM%20Development%20Checklist%20Rev01%20(February%202018).pdf)
- 4) <https://strategy.um.edu.my/img/files/UMTP%20Booklet%202021-2030.pdf>

UPGRADING EXISTING UM BUILDINGS TO HIGHER ENERGY EFFICIENCY

We recognise the effects and implications energy has on the environment and climate change. That is why UM is committed through our Net Zero Carbon target and low carbon energy solutions to continually develop and manage our infrastructures in way that is consistent with SDG 7.

UM plans to develop and infuse more renewable energy applications into consideration through UM Master Plan and UM Transformation Plan for a wider and larger scale. These are important steps in realising UM's aspiration to be a carbon-neutral campus by 2050.

In our long-term plan document,

UM Transformation Plan 2050, we have outlined 10 major programmes to be realised under UM Carbon Neutral Campus Initiatives 2030 which includes Solar Photovoltaic (PV) Projects and Electricity Supply System Upgrading. We have identified more and more buildings to be upgraded to higher energy efficiency. Some of our achievements in 2022,

Pusat Agrosains Pintar Universiti Malaya Going Solar Energy

Building and infrastructures at the Pusat Agrosains Pintar UM transitioned to full use of solar energy. Solar energy as renewable energy fully utilised in this center which has a wide-open area and receives sunlight all year round. Solar energy at the Farm Office Complex uses

9,000W PV 120,000W AC batteries which can store energy for use by the Farm Office for about a week.

A total of three (3) sets of solar panels are placed on the roof of the building with capacity 3,000W PV which is 12 units of 250W individual solar panels for each one (1) set.

Both tube wells extract groundwater using solar energy for turn on the underground pump. Each one (1) set of solar panels for one (1) tube well unit using six (6) individual solar panel units with a capacity of 300W.



Solar Panel at Pusat Agrosains Pintar UM

Faculty of Built Environment is Getting Green Building Index (GBI) Certification

This certificate is assessing the Energy Efficiency, Indoor Environmental Quality, Sustainable Site Planning and Management, Material Resources, Water Efficiency and Innovation. This certificate is important because it helps to recognise our efforts in progressing towards green campus. The Green Building Index (GBI) is Malaysia's recognised green rating system to promote sustainability in the built environment and raise awareness about environmental issues and responsibility to the future generations.

Some other projects include developing systems for energy management for ease of governance. In embracing the era of IR 4.0,

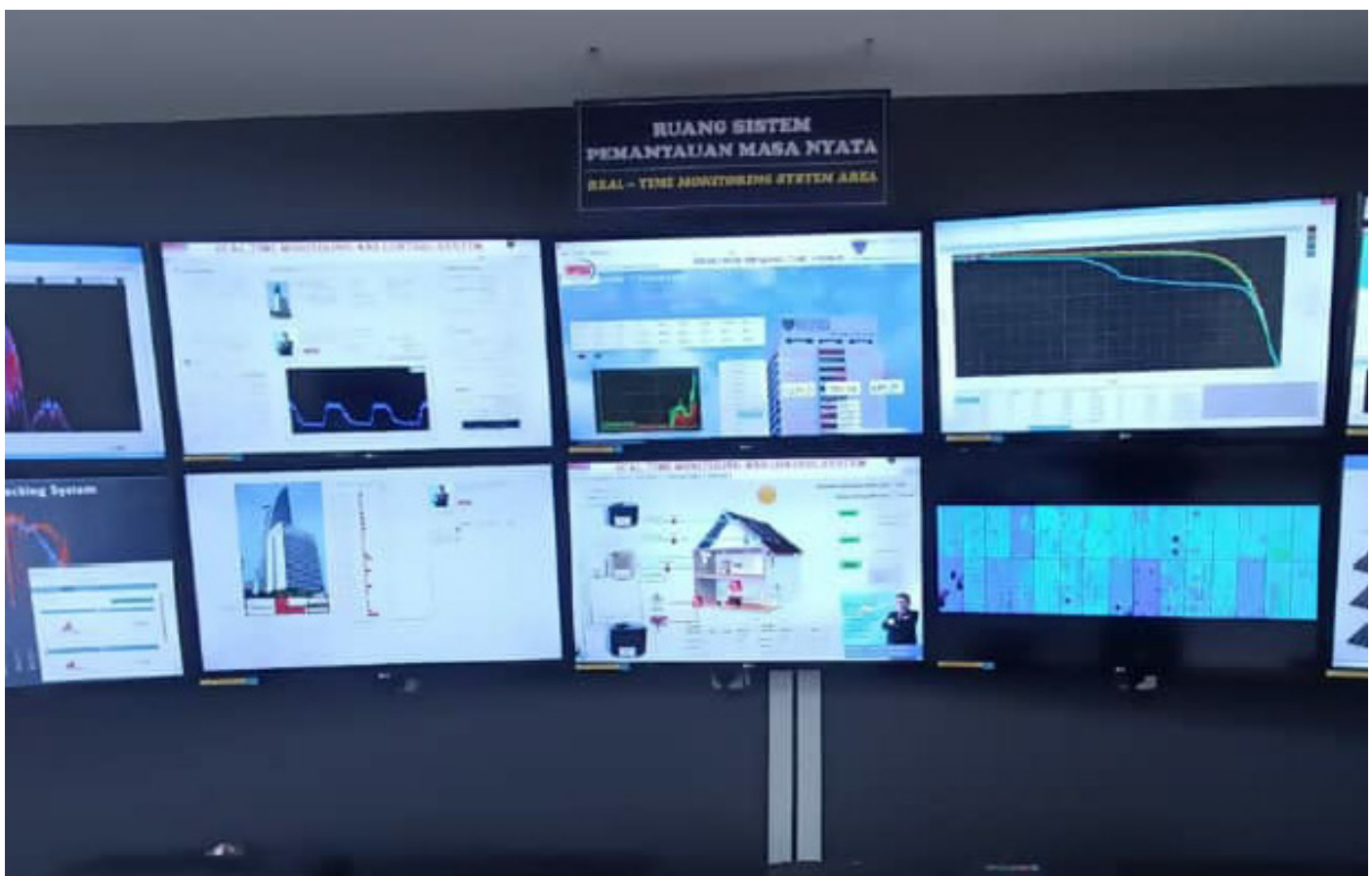
UM is at the forefront of incorporating the Internet of Things (IoT) into its system operations.

Furthermore, the university places a strong emphasis on technology research and development. Several examples of ongoing research projects related to energy-efficient buildings include the study of 'air purification and cooling systems employing the concept of a living green wall' and 'the implementation of green roofs/walls for enhancing outdoor thermal comfort conditions.' These are just a few instances of the ongoing research initiatives concerning energy-efficient buildings carried out within UM campus. Additionally, the university has also conducted assessments to determine the carbon footprint of its buildings.

CARBON REDUCTION AND EMISSION REDUCTION PROCESS THROUGH BUILDING ENERGY MONITORING SYSTEM

UM through its research centre, UM Power Energy Dedicated Advanced Centre (UMPEDAC) uses a Building Energy Monitoring System (BEMS) which is a comprehensive system that tracks and manages energy usage within a building or facility. Its primary purpose is to monitor, control, and optimise energy consumption to enhance energy efficiency and reduce energy waste to meet sustainability and environmental goals.

BEMS also allows for the remote management of building systems, including heating, ventilation, and air conditioning (HVAC), lighting, and other energy-consuming equipment.



Building Energy Monitoring System at UMPEDAC(BEMS)



Solar Panel Parking Lot (Level G), Solar Tracker (Level 3) at UMPEDAC Building



PLAN TO REDUCE ENERGY CONSUMPTION THROUGHOUT UM CAMPUS

Energy management stands as a critical pillar of UM's unwavering commitment to establishing a sustainable and environmentally conscious campus. This profound commitment finds expression in two foundational documents: the UM Sustainability Policy and the UM Eco-Campus Blueprint, which serve as cornerstones for the university's sustainability initiatives.

Within these documents, we find a well-defined, three-fold strategy for energy management. This strategy sets the path for the progressive transformation of the university's energy landscape and encompasses the following sequential stages:

1) Energy Conservation: This initial phase emphasizes comprehensive planning during early project phases. It encourages the integration of passive design elements into building structures, such as natural light and ventilation to reduce energy consumption. During this phase, the planning must incorporate a range of energy conservation strategies.

2) Enhancing Operational Efficiency: In the subsequent stage, the focus is on the deployment of energy-efficient appliances throughout the campus infrastructure. The goal is to optimise operational efficiency, thereby promoting energy conservation across campus facilities.

3) Adoption of Renewable Energy Sources:

These well-thought-out initiatives represent UM's approach to energy management.

Furthermore, to support the broader energy conservation program across the university, a range of guidelines has been established.

Notable among these are the "Guideline on Energy Monitoring and Management for Energy Saving in the University of Malaya" and the "Energy Saving Culture Guideline."

These documents serve as invaluable references, providing guidance and insights to the university community, promoting a culture of energy efficiency and sustainability on campus.



Energy & The Community

OUTREACH PROGRAMMES FOR ENERGY EFFICIENCY

Universiti Malaya is integral parts of Malaysian communities. By promoting clean energy practices, we engage with the local community to drive broader adoption of sustainable technologies. By promoting clean energy, we also instill sustainable practices in our communities, ensuring a more environmentally conscious citizens.

PROGRAMMES FOR LOCAL COMMUNITY TO LEARN ABOUT IMPORTANCE OF ENERGY EFFICIENCY AND CLEAN ENERGY

UM is committed to connecting with the community as part of its efforts to become a university for society and fulfill its corporate social responsibility. To this end, the university has established the UM Community Engagement Centre (UMCares) as the entity responsible for managing and coordinating community engagement efforts at UM.

One ongoing project is “*Pengoptimuman Penggunaan Tenaga Elektrik Di Bangunan Sekolah*” involves an outreach program to schools surrounding UM. The scope of this community outreach program encompasses aspects related to electrical energy consumption, load flow, optimisation

techniques, and applications of artificial intelligence. The primary goal of this outreach initiative is to facilitate knowledge and technology transfer within the community, ultimately aiming to optimise electricity usage without compromising the students’ comfort.

PUBLIC PLEDGE TOWARD 100% RENEWABLE ENERGY

UM has publicly pledged its commitment to transforming into a green campus, as demonstrated by the presentation of the “Low Carbon and Green Campus Initiatives in UM” during the 12th edition of the World Class Sustainable Cities (WCSC) in 2021. The university is transitioning its campus operations by embracing a sustainability framework aimed at creating an environmentally friendly campus. One of UM’s key objectives in adopting this framework is to achieve the

status of a carbon-neutral campus.

UM has pledged to renew its commitment to focus on transitioning from fossil fuel dependency to greener and more sustainable alternatives. The goal is to progress in phases toward achieving 100% reliance on renewable energy sources such as solar, biomass, biodiesel, wind, and others in the years to come. This initiative aligns with one of the focus areas outlined in the UM Transformation Plan (UMTP), which emphasises the transition to Smart Campus initiatives. These initiatives aim to create a cleaner, greener, safer, connected, and more seamless campus community experience and are in harmony with UM’s Master Plan 2050.

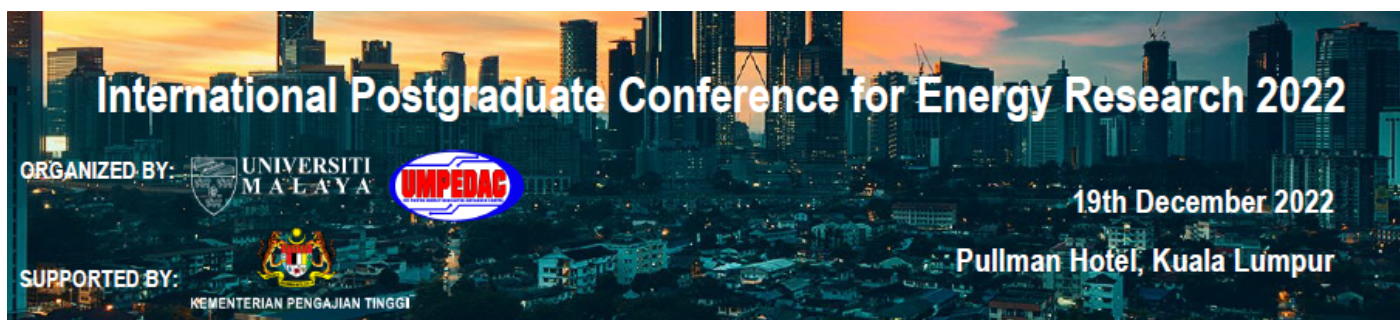
PROVIDING DIRECT SERVICES TO LOCAL INDUSTRY AIMED AT IMPROVING ENERGY EFFICIENCY AND CLEAN ENERGY

As a research university, UM's services related to energy efficiency focus on knowledge sharing and knowledge creation through workshop/talk sessions and research collaboration. Our research centers work toward the same goal by organising talks and conferences to disseminate the latest developments in the field and collaborating with local and international players to drive industry growth.

The centers affiliated with UM had facilitated various seminars and conferences as part of their efforts in the energy sector.

Notable among these are the 2022 AUA Academic Conference on Sustainable Energy and Green Technology, the International Postgraduate Conference for Energy Research, a research seminar on "Energy Transportation and Heat Exchanger Fouling Mitigation," and a webinar focusing on "Engineering HVAC 4.0 for Smart Buildings." Additionally, UM scholars have been actively engaged as speakers at external events such as the 6th International Conference on Energy and Environmental Science. These conferences and talks are instrumental in disseminating recent advancements and developments in the field of energy management.

In addition to these knowledge-sharing events, UM, through its Centers of Responsibility, has forged strategic research partnerships with both local and international industrial entities. These collaborations have yielded significant outcomes. For instance, the Power Electronics and Renewable Energy Research Laboratory (PEARL) has collaborated with Kawasaki Heavy Industries to enhance the efficiency of power conditioners. Similarly, the Nanotechnology and Catalysis Research Centre (NANOCAT) has engaged in a research partnership with Nanomalaysia Berhad, focusing on the development of cost-effective and efficient processes for hydrogen technology applications.



INTRODUCTION

The objective of the conference is to create a stimulating environment for graduate students to discuss their on-going research work on energy with peers and experienced researchers from academia. The target audience of the forum are PhD students, recently graduated PhDs, supervisors, and master students in the related area of Energy. The conference will be in hybrid mode (physical and virtual).

A URL link will be provided to online presenters before the conference starts.

CALL FOR PAPERS

Papers are invited on all topics related to energy systems, and especially with the following:

Smart Grid Design and Security	Energy in Buildings
Power Electronics and Energy Conversion	Energy Technology
Power Systems and Smart Grids	Energy Conversion
Wind Power	Energy Efficiency
Solar Energy	Energy Transfer
Biomass and Bioenergy	Energy Storage
Renewable Energy	Energy Planning
Alternative Fuels	Thermodynamics

IMPORTANT DATES

Abstract/Full paper submission (Extended Deadline)	20 November 2022
Notification of Acceptance	5 December 2022
Author Registration Deadline	9 December 2022
Conference Date	19 December 2022

CONFERENCE FEES

Category	Fees (Local)	Fees (International)
Presenter (with publication)	RM 800	USD 250
Presenter (without publication)	RM 250	USD 80
Online presenter (without publication) and online poster	RM 150	USD 50
Online presenter (with publication)	RM 600	USD 200
Non-presenter and poster (physical)	RM 200	USD 60

Fees include all technical sessions, coffee breaks and lunch, conference proceedings (softcopy), and hard copy of the conference program.

**Each online presenter is eligible to access the morning session, keynotes and the virtual session.

Notes:

AWARDS

INFORMING AND SUPPORTING GOVERNMENTS IN CLEAN ENERGY AND ENERGY-EFFICIENT TECHNOLOGY POLICY DEVELOPMENT

UMPEDAC has been in collaboration with many government agencies, industries and international bodies since 2005 and has significantly contributed to the development of government policies. These include the Langkawi Low Carbon Mobility Blueprint, Electric Vehicles Roadmap Development, and the Development of Training Needs, Capacity Building, and Standards to Support Electric Vehicles Value Chain in Malaysia. More recently, MGTC and the UM have further strengthened their partnership by providing technical cooperation within a

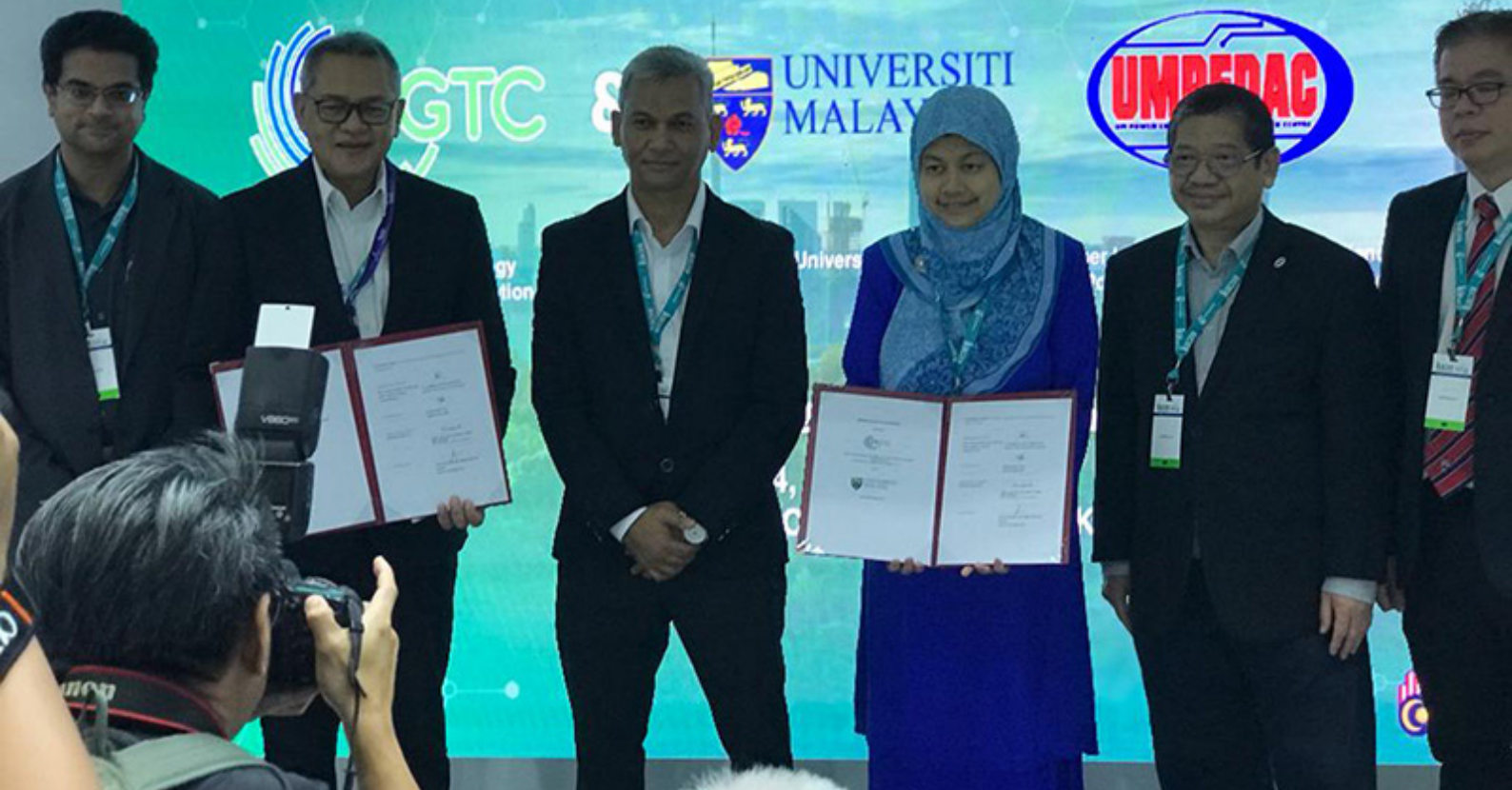
framework for program execution, which includes “Training on Solar PV for Beginners” and “Solar PV System Design and Operation.”

In addition, UM was invited to attend the International Electrotechnical Commission / Technical Committee on Electrical Power/Energy Transfer Systems For Electrically Propelled Road Vehicles And Industrial Trucks Online Meeting on 25-27 April 2022. This invitation was extended due to UM’s active involvement in national standard development committees. The presence of this delegation was crucial to ensure Malaysia’s representation in international discussions and safeguard the nation’s interests in international standard development.

In the same year, UM was appointed as a member of the feasibility study on biomass to energy as part of the national energy transition for the national energy policy 2040. This engagement is a source of pride for the university and aligns with the university’s aspiration to be a thought leader in national policy development. On 22 September 2022, UM was invited to provide input during a stakeholder engagement session for the Green Technology Innovation Roadmap (GTIR) by the Ministry of Environment and Water (KASA). The GTIR is expected to encompass various sectors, including energy, water, manufacturing, construction, transportation, and waste management.



Memorandum of Agreement





7 AFFORDABLE AND CLEAN ENERGY



CDC welcomes your enquiries and feedback on this report.

Please email: corporate_data@um.edu.my