SDG 7

AFFORDABLE AND CLEAN ENERGY

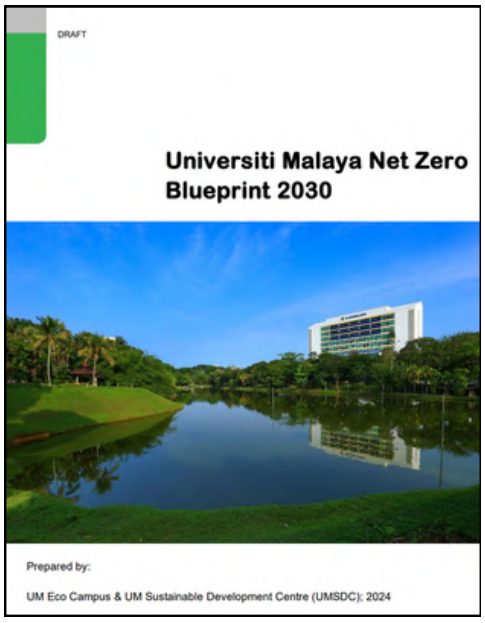
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01 Plan to Upgrade Buildings to Higher Energy Efficiency

Universiti Malaya (UM) has established strategic plans to improve the energy efficiency of its existing buildings through the UM Net Zero Blueprint 2030. Under its Facilities and Energy strategies, the Blueprint identifies building retrofitting and the adoption of energy-efficient systems as key measures to reduce campus energy consumption and carbon emissions. These measures include upgrading existing facilities to improve energy performance, supporting UM's aspiration to achieve a carbon-neutral campus by 2030.

This commitment is further supported by the UM Development Checklist, Revision 03 (May 2024), developed by the Department of Development and Estate Maintenance (JHB). Section 6, Green Technologies & Waste Management, incorporates sustainability requirements into the university's development process. These include passive design measures such as natural ventilation, natural cooling and daylighting, as well as active design measures involving energy-efficient building materials and technologies. The checklist also specifies building thermal performance requirements, including an Overall Thermal Transfer Value (OTTV) of no more than 50 W/m² and a Roof Thermal Transfer Value (RTTV) of no more than 25 W/m².

Together, these documents provide an institutional framework for improving building energy performance through planned retrofitting and the integration of energy-efficient design and technologies into campus development and upgrading works.



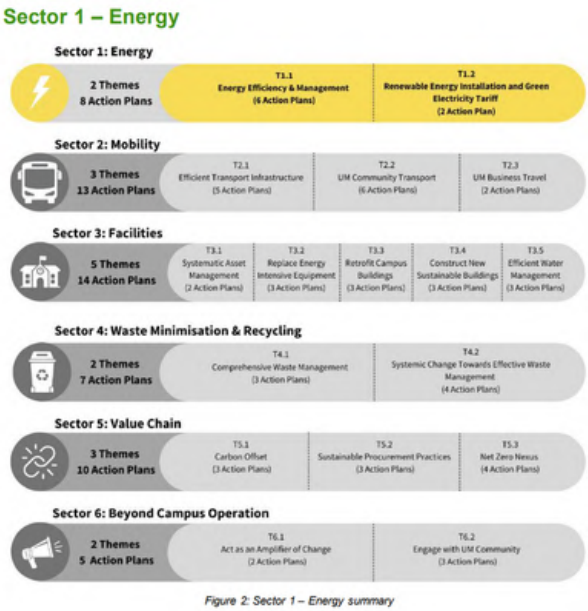
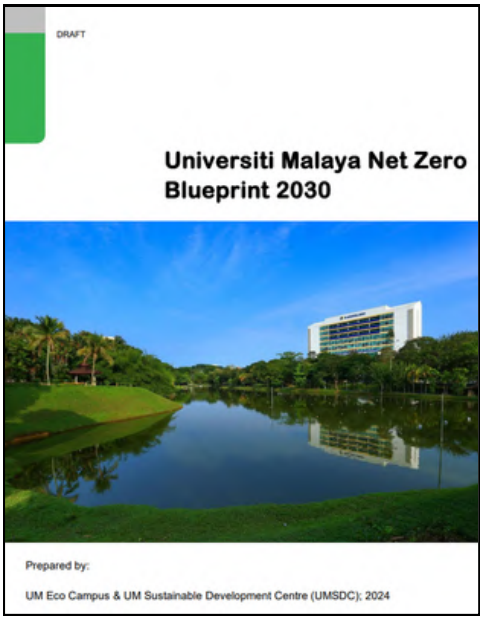


Figure 2: Sector 1 – Energy summary

02 Carbon Reduction and Emission Reduction Process

Universiti Malaya Net Zero Blueprint 2030

Universiti Malaya has established a structured approach to carbon management and greenhouse gas (GHG) emission reduction through its UM Net Zero Blueprint 2030, which provides an institutional framework for monitoring, managing and reducing carbon emissions across university operations. The Blueprint outlines strategic actions to address emissions from various operational sectors, including energy consumption, buildings and facilities, transportation, waste management and institutional activities. It establishes a target of reducing campus-wide carbon emissions by 30%, using 2016 as the baseline year, as part of the University's broader commitment towards achieving carbon neutrality by 2030 and Net Zero emissions by 2050.



The UM Net Zero Blueprint 2030 further outlines specific carbon reduction interventions across campus operations. These include improving building energy efficiency, conducting energy audits, upgrading energy-intensive equipment, expanding renewable energy adoption and promoting more sustainable transportation practices. Additional measures include reducing emissions associated with business travel, encouraging remote working arrangements where appropriate, and identifying high-emission products and services through GHG inventory reporting. These interventions are intended to address emissions at their sources while encouraging more efficient resource use and sustainable operational practices across the University.

To support the implementation of these strategies, the Blueprint also identifies the need for institutional coordination, energy management responsibilities and performance monitoring through designated committees, personnel and measurable indicators. This provides a basis for integrating carbon management into university planning and operational decision-making, while strengthening accountability among relevant departments and stakeholders.

Greenhouse Gases Emission Reporting 2025 for Universiti Malaya

As part of its carbon management process, UM conducts greenhouse gas (GHG) emissions assessments to establish its carbon footprint, monitor emission trends and identify major sources of emissions. The University's GHG inventory covers Scope 1 (direct emissions from university-controlled sources) and Scope 2 (indirect emissions associated with purchased electricity). These assessments provide a baseline for evaluating the University's carbon performance and identifying areas requiring further intervention. The annual GHG reporting process, coordinated by the UM Sustainable Development Centre (UMSDC) with support from relevant university departments, also enables the University to track changes in emissions and assess progress towards its decarbonisation objectives.

Scope 1 Emissions (Direct Emissions)

Fuel Consumption

Total emissions from university-owned vehicles in 2025:

- Total: 366.49 tCO_2e
- Vehicles (cars, lorries, vans): 154.28 tCO_2e
- Buses: 212.21 tCO_2e

This represents a 16% increase from 2024, likely due to higher campus activity and population.

Fugitive Emissions (Air Conditioning Systems)

For the first time, UM included emissions from refrigerant leakage:

- Total: 18,814 tCO_2e

Major contributors:

- R32: highest share
- R22: significant, and being phased out
- Others: R134a, R410A, R407C

This highlights air conditioning systems as a major emission source, with strong potential for reduction through system upgrades and refrigerant transition.

Total Scope 1 Emissions

- 19,180.49 tCO_2e

(Fuel + Fugitive emissions)

Scope 2 Emissions (Electricity Use)

- Total electricity consumption: 73.49 million kWh
- Total emissions: 54,382.95 tCO_2e

This reflects a 4.17% reduction from 2024, attributed to:

- Lower national emission factor
- Improved energy efficiency

Total Emissions (Scope 1 + Scope 2)

- 73,563.41 tCO_2e (2025)
- +29% compared to 2024
- The increase is mainly due to the inclusion of fugitive emissions, improving reporting completeness rather than indicating purely higher operational emissions.

Note on Scope 3

Scope 3 emissions (e.g., commuting, travel, procurement) are currently excluded due to data limitations. Based on global benchmarks, total emissions could be 3–4 times higher once included. UM is working towards expanding this boundary in future reporting cycles.

Through the implementation of the UM Net Zero Blueprint 2030 and its annual GHG emissions reporting, Universiti Malaya demonstrates an institutional process for measuring, monitoring and reducing its carbon footprint. These efforts support the University's long-term decarbonisation pathway and reinforce its commitment to reducing greenhouse gas emissions across campus operations.

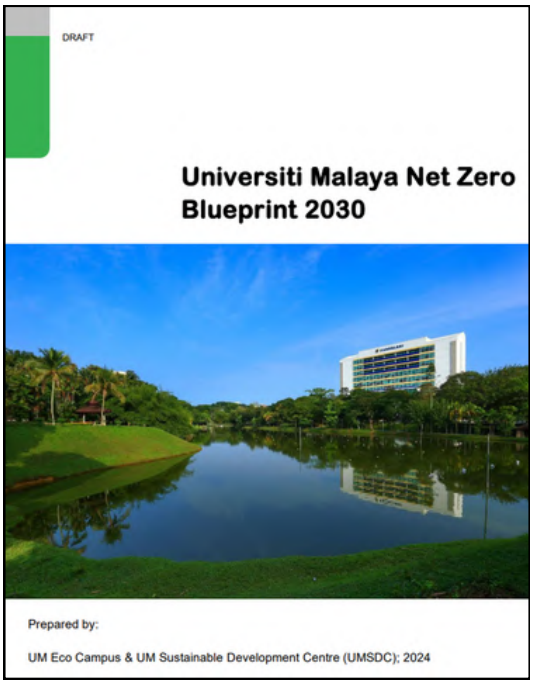
03 Plan to Reduce Energy Consumption

University-Wide Energy Efficiency and Management Plan

Universiti Malaya has established a comprehensive approach to reducing overall energy consumption through its UM Net Zero Blueprint 2030, which outlines strategic action plans to improve energy efficiency and strengthen energy management across university operations. Under Sector 1: Energy, the Blueprint identifies energy efficiency and management as key priorities, supported by specific interventions, implementation timeframes and measurable performance indicators.

Under Action Plan 1.1.1, the Blueprint proposes the establishment of an Energy Efficiency Management Framework to monitor electricity, water and fuel consumption through baseline assessments and key performance indicators (KPIs). These include monitoring energy consumption per square metre and energy usage per capita to assess energy performance and identify opportunities for improvement. This is complemented by Action Plan 1.1.2, which focuses on establishing Building Energy Intensity (BEI) metrics and energy performance requirements to improve energy efficiency across university buildings.

In addition, Action Plan 1.1.3 proposes conducting energy audits of selected university buildings to identify opportunities for reducing electricity consumption and improving operational efficiency. Action Plan 1.1.4 further introduces Energy Performance Contracts (EPC) as a mechanism to facilitate the implementation of energy-saving measures through building audits and energy-efficient solutions.



To strengthen institutional accountability and implementation, Action Plan 1.1.5 outlines the establishment of an Energy Management Committee and the appointment of a dedicated Energy Manager to oversee campus-wide energy initiatives. In line with this strategic direction, Universiti Malaya officially appointed an Energy and Carbon Manager in February 2026 to strengthen the coordination and implementation of energy and carbon management initiatives across the University. This appointment reinforces UM's institutional capacity to oversee energy performance, coordinate energy-saving strategies and support the continuous improvement of campus energy efficiency.

Furthermore, Action Plan 1.1.6 establishes a target to reduce building operational carbon emissions by 30%, using 2016 as the baseline. Collectively, these measures provide an institutional framework for monitoring, managing and reducing energy consumption through systematic assessments, targeted efficiency improvements and dedicated energy management responsibilities. Through the implementation of the UM Net Zero Blueprint 2030, Universiti Malaya continues to strengthen its energy management practices in support of its broader decarbonisation objectives.



04 Energy Wastage Identification

Universiti Malaya (UM) conducts energy consumption analyses, operational monitoring and energy audits to identify areas of high energy use and potential energy wastage across its campus. These efforts include reviewing electricity consumption patterns, assessing building systems and evaluating operational performance to identify energy-intensive equipment and opportunities for improvement. Through these initiatives, UM strengthens its capacity to identify energy wastage and inform targeted energy efficiency measures.

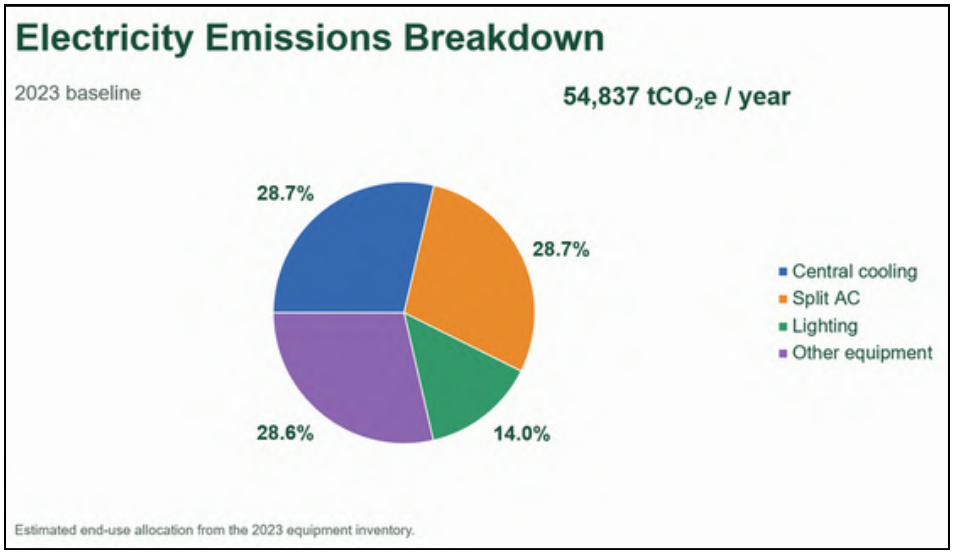
Examples include:

- **Identification of Potential Energy Wastage Through Consumption Analysis and Operational Monitoring** (Page 8)
- **Campus-Wide Electricity Consumption Monitoring** (Page 9 - 10)
- **Energy Auditing and Environmental Retrofitting of UM Heritage Buildings** (Page 11)
- **Electricity Consumption Monitoring and Greenhouse Gas Inventory for 2025** (Page 11)

Identification of Potential Energy Wastage Through Consumption Analysis and Operational Monitoring

Universiti Malaya (UM) analyses electricity consumption by end use to identify energy-intensive systems and prioritise opportunities for improving energy efficiency. The 2023 analysis, based on data obtained from the Office of the Chief Facility Officer and analysed by the UM Sustainable Development Centre (UMSDC), found that central cooling and split air-conditioning systems each accounted for 28.7% of the analysed electricity consumption. Together, these systems represented 57.4% of electricity use, highlighting air-conditioning as a priority area for further energy reviews.

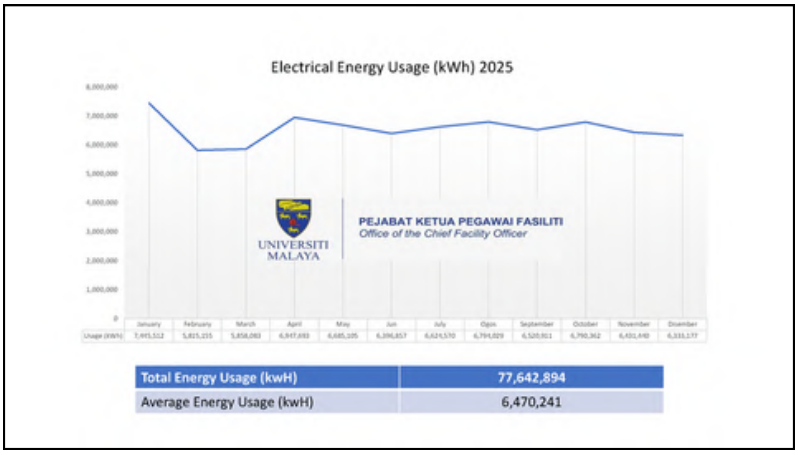
UM also employs or considers operational measures to minimise unnecessary energy consumption, including timers, Internet of Things (IoT) monitoring at selected locations, occupancy-based air-conditioning management, zoning of building services and sensor-controlled systems. These approaches can help identify instances where equipment operates unnecessarily, particularly during periods when spaces are unoccupied.

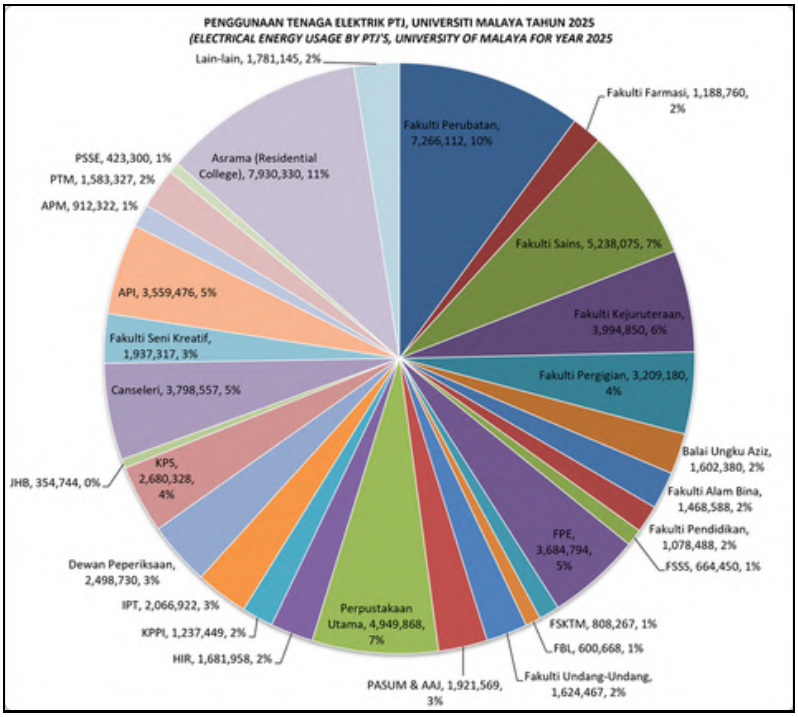


Campus-Wide Electricity Consumption Monitoring

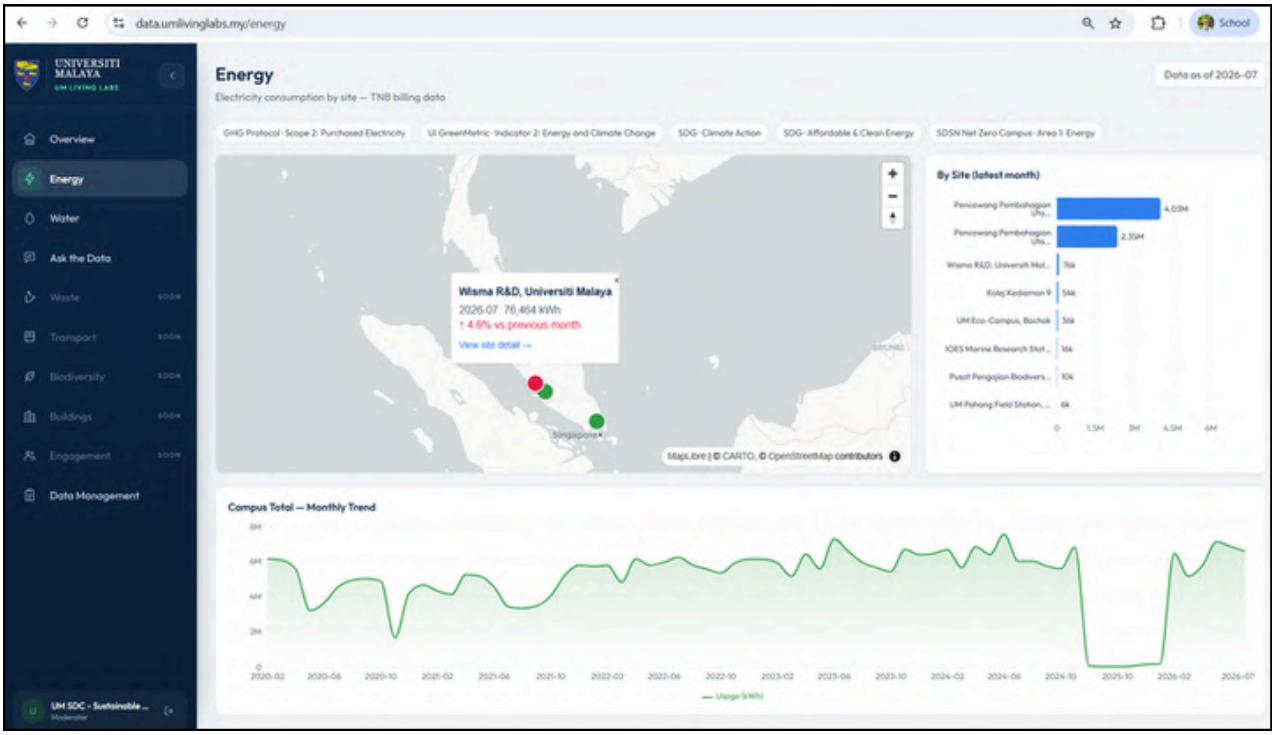
Universiti Malaya monitors campus-wide electricity consumption through utility bills issued by Tenaga Nasional Berhad (TNB), which are centrally managed by the Department of Estate (JHB) in 2025. These bills record electricity usage and expenditure, providing a basis for tracking the University's energy consumption and reviewing changes over time.

Electricity consumption data are also available through the Office of the Chief Facility Officer's Utilities Report, supporting the monitoring of energy use across the University. By analysing electricity consumption patterns and expenditure, UM can identify periods of higher energy demand and areas requiring further investigation, helping to inform energy management measures and minimise electricity wastage.





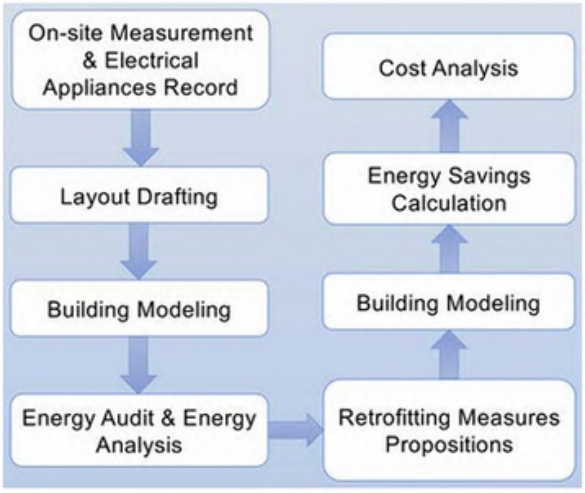
UM is also developing a Sustainability Dashboard to monitor energy data across the University, covering both the main campus and off-campus locations in Jelebu, Bachok and Kota Tinggi. The dashboard is intended to support centralised tracking and comparison of energy consumption across these locations, strengthening UM's ability to monitor energy use and inform energy management decisions.



Energy Auditing and Environmental Retrofitting of UM Heritage Buildings

The Department of Civil Engineering examined the energy performance of Block G, a heritage building at UM, as documented in the Faculty of Engineering's bulletin, Enginitium. The project used an energy audit and Building Information Modelling (BIM) to assess energy consumption and identify inefficiencies in the building's heating, ventilation and air-conditioning (HVAC) and lighting systems.

The audit found that HVAC systems accounted for approximately 58–87% of total energy use, while lighting contributed around 20–25%. It also identified inadequate insulation, outdated windows and limited natural lighting as factors contributing to excessive cooling demand. The findings identified the building systems and features with the greatest potential for energy savings, informing proposed retrofitting measures.





Electricity Consumption Monitoring and Greenhouse Gas Inventory for 2025

UM's 2025 greenhouse gas inventory records monthly electricity consumption and associated Scope 2 emissions. Total reported electricity consumption for the year was 73,490,477 kWh, based on the data available at the time of the study. This figure provides an institutional baseline for tracking energy use and assessing changes over time.

Monthly consumption ranged from approximately 5.18 million kWh in September to 6.96 million kWh in May. Such data can help identify periods of higher electricity demand and inform further investigation into the buildings, equipment and operations contributing to consumption.

2025	Usage (kWh)	Emission (kgCO2e)
Jan	6,010,692	4,447,912.08
Feb	5,279,635	3,906,929.90
Mac	5,387,308	3,986,607.92
Apr	6,419,581	4,750,489.94
May	6,962,187	5,152,018.38
Jun	6,561,080	4,855,199.20
July	6,552,290	4,848,694.60
Aug	5,778,865	4,276,360.10
Sept	5,182,119	3,834,768.06
Oct	6,520,432	4,825,119.68
Nov	6,398,767	4,735,087.58
Dec	6,437,521	4,763,765.54
Total	73,490,477	54,382,952.98

05 Local Community Outreach for Energy Efficiency

In 2025, Universiti Malaya promoted awareness of clean energy and sustainable energy use through educational outreach, hands-on learning and community engagement. These initiatives introduced students and young people to renewable energy technologies, energy conservation and practical applications of sustainable energy solutions.

Through collaboration with schools, community partners and educational institutions, the University encouraged greater understanding of clean energy and its role in reducing reliance on fossil fuels, supporting energy transition and building a more sustainable future.

Examples include:

- **DIY Made Simple 2025: Waste to Energy, Innovate for a Greener Future** (Page 13)
- **Solar Car Workshop on Renewable Energy** (Page 14)
- **Sustainable Energy Outreach in Sarawak** (Page 14)

DIY Made Simple 2025: Waste to Energy, Innovate for a Greener Future

Now in its ninth year, DIY Made Simple is an annual nationwide programme by Yayasan MR D.I.Y., in collaboration with Universiti Malaya (under UMCares) and supported by the Ministry of Education, aimed at fostering student innovation and sustainability. In 2025, the programme adopted the theme Waste to Energy: Innovate for a Greener Future, encouraging secondary school students to develop innovative solutions that convert waste into reusable energy sources.

Held at Universiti Malaya from 2 to 4 September 2025, the programme featured student projects exploring alternative energy generation, including bio-batteries, mini turbines, solar panels made from electronic waste and hydrogen production from wastewater. Through hands-on experimentation and prototype development, students gained practical exposure to clean energy technologies and the potential of waste-to-energy solutions. The initiative raised awareness of renewable energy and sustainable energy practices among young people, supporting community education on clean energy and its role in building a greener future.



Solar Car Workshop on Renewable Energy

Turning classroom learning into hands-on innovation, the UM Makers Club organised a solar car workshop on 23 May 2025 at SJK(C) Yu Hua to introduce students to renewable energy and energy efficiency. Supported by Cytron Technologies, the workshop introduced participants to clean energy sources and the importance of reducing reliance on non-renewable energy. Students built solar-powered cars using solar panels and recyclable materials, ending with a friendly race that encouraged creativity, teamwork, and problem-solving while promoting interest in sustainable technology.



Sustainable Energy Outreach in Sarawak

In 2025, Dr Tan Chia Kwang continued supporting rural electrification initiatives for remote longhouse communities in Bario, Sarawak through his expertise in sustainable energy systems and micro-hydro technology. As part of community-focused energy projects, he contributed technical training, field research, and knowledge-sharing activities aimed at improving reliable electricity access and promoting sustainable living in off-grid rural areas.



06 Renewable Energy Pledge

Universiti Malaya (UM) promotes the transition towards renewable energy beyond its campus through research dissemination, community engagement and knowledge-sharing initiatives. These efforts raise awareness of renewable energy solutions, encourage wider adoption of clean energy technologies and support the broader transition towards a low-carbon society.

Examples include:

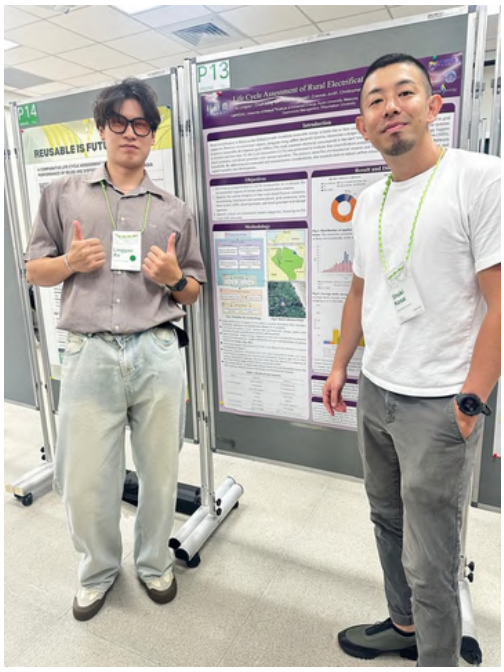
- **UM-GEV Energy Transition Talk 2025** **(Page 16)**
- **International Promotion of Renewable Energy Adoption through Research Dissemination** **(Page 16)**
- **Research Seminar: Innovative Nanomaterials for Sustainable Technologies and Green Manufacturing** **(Page 17)**
- **Webinar: Sustainable Engineering Design and Energy Technology of Offshore Wind Turbine** **(Page 18)**

UM-GEV Energy Transition Talk 2025



UM Power Energy Dedicated Advanced Centre (UMPEDAC) has successfully organized UM-GEV Energy Transition Talk 2025 on 24th April 2025 at Research Management & Innovation Complex (KPPI), Universiti Malaya. The event featured engaging talks and discussions on the future of sustainable energy, green technologies, and the global energy transition. It was a great opportunity to gain valuable insights from industry experts and academic leaders, as well as to network with professionals in the energy sector and to prepare to embark on the participants' professional journey.

International Promotion of Renewable Energy Adoption through Research Dissemination



Universiti Malaya (UM), through its UM Power Energy Dedicated Advanced Centre (UMPEDAC), promotes renewable energy adoption beyond the university through international research dissemination. From 21 to 24 September 2025, a UMPEDAC PhD student participated in the Green Innovation & Engineering International Conference at National Taiwan University, presenting research titled Life Cycle Assessment of Rural Electrification in Malaysia.

The study evaluated four rural electrification options, including grid connection, Solar Home Systems (SHS) and diesel generators. Findings highlighted the potential of solar home systems as a lower-carbon electricity solution for rural households, while exploring the use of second-life electric vehicle batteries to improve energy storage affordability and support wider solar energy adoption.

Through this international platform, UM shared research findings and technical perspectives to promote renewable energy solutions for communities beyond the university.

Research Seminar: Innovative Nanomaterials for Sustainable Technologies and Green Manufacturing

A research seminar entitled "Innovative Nanomaterials for Sustainable Technologies and Green Manufacturing" was organized by Centre for Energy Science, Universiti Malaya on April 30, 2025 at the Engineering Tower, Faculty of Engineering, Universiti Malaya. The seminar was delivered by Professor Kwang Leong Choy from Duke Kunshan University, China. This seminar explored the role of advanced nanomaterials in tackling critical global issues related to energy and environmental sustainability. It showcased the creation of nanostructured materials with minimal ecological footprint, alongside novel, vacuum-free fabrication methods for devices that support a greener future. Key focuses include the engineering and production of nanomaterials derived from abundant natural resources, as well as their eco-friendly processing techniques for use in engineering, renewable energy systems and efficient energy storage. A major highlight was the adoption of scalable, low-energy, and sustainable manufacturing strategies-such as aerosol-assisted chemical vapor deposition-that drastically cut energy use and environmental harm. The discussion clarified the fundamental mechanisms governing these processes, allowing for atomic-level precision in material design. Furthermore, the study evaluated the functional characteristics of these nanomaterials, underscoring how earth-abundant elements enhance sustainability and how these green synthesis methods contribute to broader ecological advancements.



Webinar: Sustainable Engineering Design and Energy Technology of Offshore Wind Turbine

A webinar entitled "Sustainable Engineering Design and Energy Technology of Offshore Wind Turbine" was organized by Centre for Energy Science, Universiti Malaya on Apr 12, 2025 via online. The seminar was delivered by Prof. Dr. Chong Wen Tong from the Faculty of Engineering, Universiti Malaya, Malaysia. The speaker demonstrated how fundamental engineering principles can be successfully applied across different scales of technological innovation. The talk provided insights into the design and development of high-efficiency home appliances, i.e., the critical aspects of sustainable product design, including advanced fluid dynamics modeling, energy efficiency optimization, material selection strategies, and ergonomic considerations that would lead to successful commercialization. The focus then shifted to current research in offshore renewable energy systems, particularly the innovative wind turbine designs that address marine challenges like structural stability and maintenance accessibility. The cross-axis wind turbine technology exemplified how industrial design experience can influence large- scale renewable energy solutions. This integrated approach demonstrates the versatility of sustainable engineering principles in advancing both consumer products and renewable energy systems, contributing to global sustainability goals.



07 Energy Efficiency Services for Industry

In 2025, Universiti Malaya strengthened industry engagement in energy efficiency and clean energy through strategic partnerships, applied research and knowledge exchange. Collaborations with industry partners, including Schneider Electric Malaysia and Sungrow, supported the development of energy-efficient solutions, renewable energy research and capacity building to address real-world energy challenges.

The University also facilitated knowledge sharing between academia and industry through the 7th International Conference on Clean Energy and Technology 2025 (CEAT2025). These initiatives promoted the exchange of technical expertise, the exploration of innovative clean energy technologies and the adoption of energy-efficient practices, contributing to industry efforts towards a low-carbon economy.

Examples include:

- **UM–Schneider Electric Collaboration (free)** **(Page 20)**
- **UMPEDAC–Sungrow Collaboration on Clean Energy (free)** **(Page 20)**
- **7th International Conference on Clean Energy and Technology 2025 (CEAT2025) (paid for services)** **(Page 21)**
- **Industry Collaboration to Develop Skills in Sustainable Data Centre Operations (free)** **(Page 22)**
- **2025 IEEE 23rd Student Conference on Research and Development (SCOReD 2025) (paid for services)** **(Page 23)**

UM–Schneider Electric Collaboration

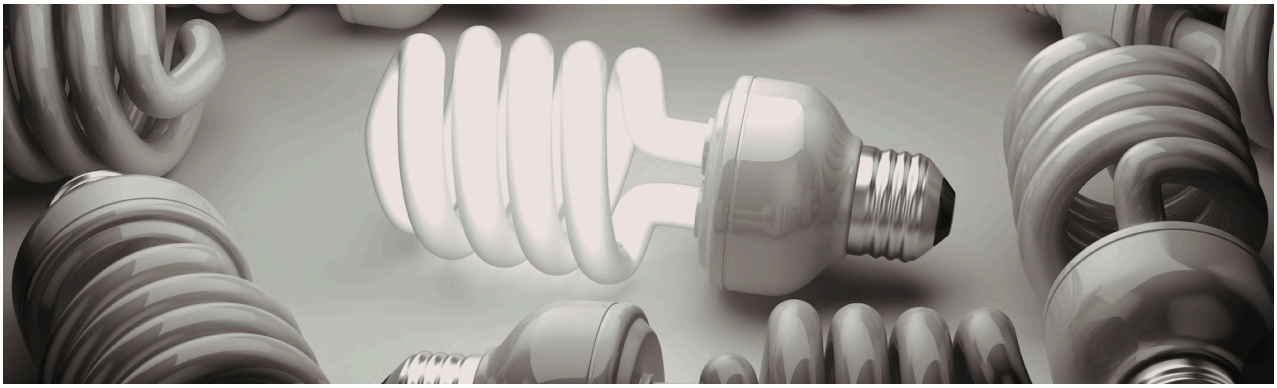
Strengthening energy efficiency in industry, a collaboration between Universiti Malaya and Schneider Electric Malaysia was established through a Memorandum of Understanding (MoU) to advance sustainable technology, applied research, and capacity building in energy management through initiatives such as the Schneider Global Student Experience, industrial training, and joint research on real-world energy challenges, supporting industry in adopting energy-efficient solutions while developing future talent for a low-carbon economy.



UMPEDAC–Sungrow Collaboration on Clean Energy

A collaboration with Sungrow, a solar photovoltaic (PV) inverter manufacturer, supports energy efficiency and renewable energy research at the UM Power Energy Dedicated Advanced Centre (UMPEDAC). A sponsored inverter was provided to support ongoing research under the UM Living Labs Towards Just Net Zero initiative, focusing on repurposed electric vehicle batteries for demand-side energy management and assessing environmental and economic benefits. This collaboration strengthens industry engagement in clean energy innovation and energy efficiency solutions.





7th International Conference on Clean Energy and Technology 2025 (CEAT2025)

The 7th International Conference on Clean Energy and Technology 2025 (CEAT2025), held in association with the AUN/SEED-Net Regional Conference Towards Carbon Neutrality, was organised by the UM Power Energy Dedicated Advanced Centre (UMPEDAC) with support from the Ministry of Higher Education, AUN/SEED-Net, and the Japan International Cooperation Agency (JICA).

The biennial conference provided a paid for services platform for researchers, academics, industry practitioners and other stakeholders to exchange knowledge and share developments in clean energy, energy efficiency, energy transition, sustainability, net-zero, ESG and related technologies. The conference contributed to knowledge-sharing and engagement with industry on clean energy and energy efficiency solutions, supporting efforts to promote energy efficiency and the transition towards cleaner energy among industry stakeholders. The conference served as a platform for knowledge exchange, technical engagement and dissemination of clean energy and energy-efficiency practices to industry practitioners.





Photo credit: National Science and Technology Development Agency (NSTDA)

Industry Collaboration to Develop Skills in Sustainable Data Centre Operations

On 21 February 2025, Universiti Malaya (UM), through its Higher Institution Centre of Excellence (HICoE), UM Power Energy Dedicated Advanced Centre (UMPEDAC), signed a Memorandum of Understanding (MoU) with Basis Bay, a Malaysian data centre and IT solutions provider, to establish the Basis Bay Data Centre Foundation Certificate (BBDCFC). The collaboration aims to address the growing demand for skilled professionals in the data centre industry through specialised training and industry-relevant knowledge development.

The certificate programme covers key areas of data centre management and operations, including infrastructure design, security, sustainability and renewable energy. UM contributes UMPEDAC's expertise to the development of a comprehensive curriculum, combining theoretical learning with practical applications such as case studies, simulations and potential visits to operational data centres. Through this collaboration, UM supports industry capacity-building by facilitating access to specialised knowledge and training in sustainable data centre operations and renewable energy.





2025 IEEE 23rd Student Conference on Research and Development (SCOReD 2025)

The 2025 IEEE 23rd Student Conference on Research and Development (SCOReD) was successfully held at Universiti Malaya, Kuala Lumpur, Malaysia from 25-26 November 2025. This flagship conference was organized by Universiti Malaya IEEE Student Branch (UM) in collaboration with IEEE Malaysia Section. The paid for services conference provided a platform for local and international researchers, engineers and scientists from academia and industry to present and discuss the latest technological advances and research progress in the fields of renewable energy, sustainability, green energy transition, computing, technology, engineering, and other related areas.

This annual conference continues to serve as a vibrant platform for students, researchers, and professionals to present their innovative ideas, share experiences, and exchange knowledge that shapes the future of technology and engineering.

The theme for this year's conference, "Convergence of Intelligent Systems and Sustainable Engineering: Shaping the Future of Technology and Society," underscores the importance of integrating intelligence, sustainability, and innovation to address the challenges of our rapidly evolving world. Through this theme, SCOReD 2025 aims to highlight the transformative potential of research that bridges cutting-edge technologies — such as artificial intelligence, data analytics, smart systems, and green engineering — with sustainable development and societal progress.

Over the years, SCOReD has grown into a well-recognized platform that nurtures the next generation of innovators, fosters collaboration between academia and industry, and inspires creative solutions to real-world problems. This year's conference features stimulating keynote speeches, insightful technical sessions, and engaging discussions that reflect the breadth and depth of contributions from our diverse participants.



08 Policy Development for Clean Energy Technology

Universiti Malaya (UM) informs and supports governments as they shape policy on clean energy and energy-efficient technology. In 2025 this support worked at four levels.

Examples include:

Local:
- **Local: Supporting Clean Energy and Energy-Efficient Technology Policy Development (Page 25 - 26)**
- **Local: Strengthening Low-Carbon City Planning - (Page 27)**

Regional:
- **Regional: Advancing ASEAN's Path to Carbon Neutrality (Page 28)**

National:

- **National Participation in Energy Standards Development and Review (Page 29)**
- **UM Contribution to the Guide on xEV Battery Afterlife Management (Page 30)**
- **National: Guiding Malaysia's Clean Mobility and Energy Transition (Page 31)**

Global:
- **Global: Asia-Pacific Perspectives on the Energy Transition (Page 32)**
- **Global: Contributing to International Climate Policy Dialogue and Collaboration (Page 33)**

Local: Supporting Clean Energy and Energy-Efficient Technology Policy Development

Universiti Malaya (UM) supports local efforts in clean energy and energy-efficient technology policy development through institutional sustainability frameworks, policy refinement initiatives and multi-stakeholder engagement. These efforts provide strategic direction for sustainable energy practices, promote knowledge exchange and contribute to broader discussions on low-carbon development.

UM's commitment is established through the Universiti Malaya Transformation Plan (UMTP) 2021–2030, which identifies Sustainable Campus to Achieve Campus Carbon Neutral Status as one of its key objectives under the theme of Enhancing the Learning and Work Environment. The plan recognises UM's role in promoting a green and low-carbon campus culture through the introduction and enhancement of sustainability programmes, energy-efficient buildings and infrastructure development. Its strategies include improving energy efficiency across the campus, installing large-scale on-site energy generation capabilities, limiting greenhouse gas emissions, complying with green building standards and strengthening sustainability practices through relevant organisational structures and policies.

Building on this strategic direction, UM developed the UM Net Zero Blueprint 2030, which was endorsed in principle by the University Management Committee on 11 December 2024. The Blueprint establishes a structured pathway towards achieving a carbon-neutral campus by 2030 and net-zero emissions by 2050. It outlines strategies covering energy, mobility, facilities, waste minimisation and recycling, value chain and beyond-campus operations, including renewable energy deployment, green electricity adoption and operational energy efficiency. The Blueprint was further refined through a dedicated workshop on 3–4 November 2025, involving the review of baseline data, action plans, measurable emission reductions and renewable energy interventions. This refinement strengthens UM's approach to clean energy adoption and provides practical insights that can inform wider policy and decision-making.

UM further strengthened its policy development efforts through the UM Sustainability & ESG Policy Development Workshop, held on 16–17 December 2025 and organised by the Universiti Malaya Sustainable Development Centre (UMSDC), in collaboration with the UM Centre of Excellence on ESG. The workshop aimed to consolidate existing sustainability initiatives into an integrated master sustainability policy that embeds Environmental, Social and Governance (ESG) principles across university governance, operations, research and teaching. Through focused group discussions involving different stakeholder clusters, the workshop brought together academic and non-academic staff, students, representatives from public and private higher education institutions, industry partners, alumni and government agencies. The participation of government agencies provided an opportunity for cross-sector dialogue and knowledge exchange on sustainability and ESG policy directions, supporting the development of more integrated and collaborative approaches to sustainability.





In addition to policy development and stakeholder engagement, UM shares its sustainability frameworks, strategic documents and technical insights through various knowledge-sharing, exhibition and collaboration platforms, including the World Urban Forum (WUF). These platforms provide opportunities to showcase UM's approaches to sustainable campus development, energy transition and decarbonisation, while facilitating dialogue and the exchange of ideas with government representatives, policymakers, academic institutions and other stakeholders.

Through these strategic plans, policy refinement exercises and multi-stakeholder engagement initiatives, UM contributes to local-level knowledge exchange and policy development in clean energy and energy-efficient technologies, supporting broader efforts towards a low-carbon and sustainable future.



Local: Strengthening Low-Carbon City Planning

Local authorities are where much of Malaysia's energy transition takes place, through the buildings, transport and street lighting they plan and regulate. The national Low Carbon Cities Framework (LCCF) guides this work, and UM has taken part in it since 2013 by implementing renewable energy and sustainability projects on its own campus. On 9 July 2025, Dr Cheah Chan Fatt, Research Fellow at UM's Ungku Aziz Centre for Development Studies, published an analysis in Bernama on how the framework can better support Malaysia's net-zero transition. He noted that smaller municipalities often struggle to adopt low-carbon strategies because of funding limits and policy misalignment. He called for stronger government incentives and regulations to accelerate renewable energy adoption in urban areas, and for closer collaboration between government agencies, industry and local communities.



Figure 1. "Strengthening LCCF's Role in the Net-Zero Transition" by Dr Cheah Chan Fatt, Ungku Aziz Centre for Development Studies, UM, published by Bernama on 9 July 2025. Source: bernama.com (screenshot).

Regional: Advancing ASEAN's Path to Carbon Neutrality

On 1 and 2 October 2025, UMPEDAC hosted the AUN/SEED-Net Regional Conference towards Carbon Neutrality, held together with the 7th International Conference on Clean Energy and Technology (CEAT 2025) at Wyndham Grand Bangsar, Kuala Lumpur. The conference was supported by the Ministry of Higher Education and the ASEAN University Network/Southeast Asia Engineering Education Development Network (AUN/SEED-Net), a network funded by the Japan International Cooperation Agency (JICA). It was officiated by Madam Sugawara Minako, Chief Representative of JICA Malaysia, and opened by UM's Deputy Vice-Chancellor (Research & Innovation), Professor Ir. Dr. Kaharudin Dimyati.

The conference brought researchers, industry practitioners and policymakers from across the region together to exchange ideas on clean energy. Its themes included energy policy and carbon management, net-zero emissions and carbon neutrality, renewable energy, energy efficiency, smart grids, electric vehicles and the hydrogen economy. Keynotes addressed justice in the resource supply chains that underpin clean energy transitions in ASEAN, and how to scale clean energy innovation. By convening this regional dialogue with government and intergovernmental partners, UM helped shape a shared ASEAN agenda for carbon neutrality.



CEAT2025

1ST & 2ND OCTOBER 2025
WYNDHAM GRAND BANGSAR KUALA LUMPUR

AUN/SEED-Net Regional Conference towards Carbon Neutrality in association with The 7th Clean Energy and Technology International Conference (CEAT 2025)

Program Schedule

DAY 1 - 1st October 2025

OPENING CEREMONY Level 2 (Ballroom 2)	
Registration	8:00 a.m. - 9:00 a.m.
National Anthem & Recital of Doa	9:15 a.m. - 9:20 a.m.
Welcoming Remarks Professor Ir. Dr. Jeyraj Selvaraj (HICoE UMPEDAC Executive Director)	9:20 a.m. - 9:25 a.m.
Opening Speech Professor Ir. Dr. Kaharudin Dimyati Deputy Vice-Chancellor (Research & Innovation) Universiti Malaya	9:25 a.m. - 9:35 a.m.
Officiating Speech Mdm Sugawara Minako Chief Representative (JICA Malaysia)	9:35 a.m. - 9:45 a.m.
Conference Launching & Best Paper Award Photo Session	9:45 a.m. - 10:00 a.m.
Coffee break (foyer Ballroom 2)	10:00 a.m. - 10:10 a.m.

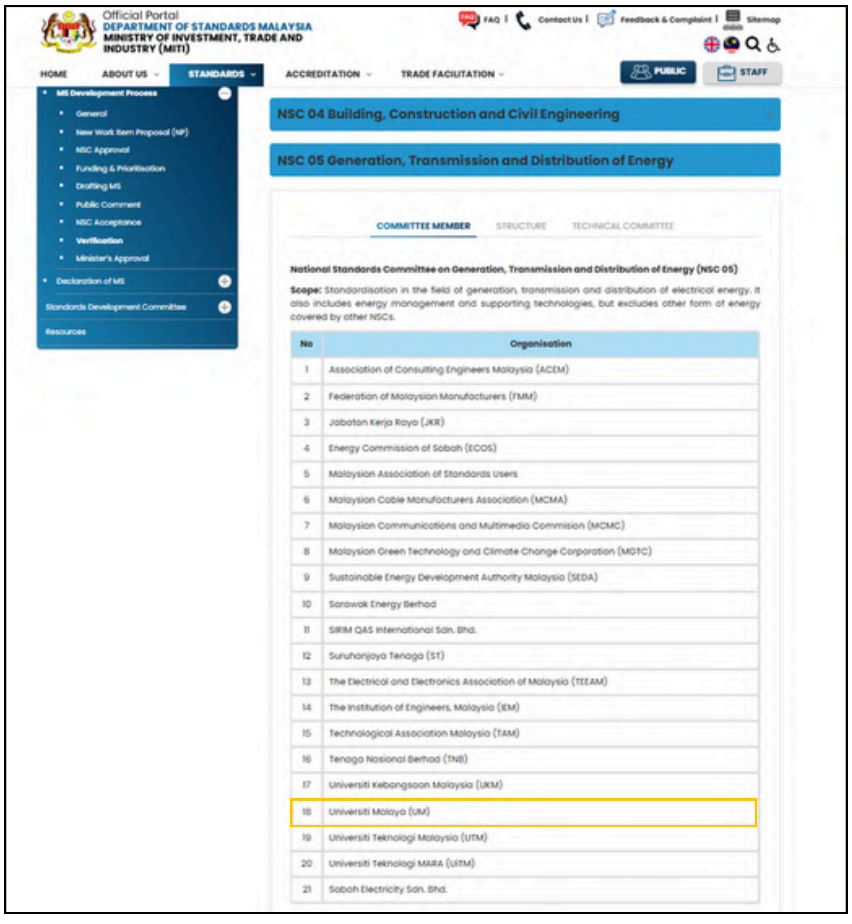
Above: Official programme of the AUN/SEED-Net Regional Conference towards Carbon Neutrality in association with CEAT 2025, organised by UMPEDAC, Wyndham Grand Bangsar, Kuala Lumpur, 1–2 October 2025, showing the officiating speech by the Chief Representative of JICA Malaysia. Source: umevent.um.edu.my/CEAT2025.

National Participation in Energy Standards Development and Review

At the national level, Universiti Malaya (UM) supports the development of standards for the energy sector through the participation of its academic staff in national standards committees, technical committees and working groups under the Department of Standards Malaysia. This includes involvement in the National Standards Committee on Generation, Transmission and Distribution of Energy (NSC 05), which oversees standardisation in electrical energy generation, transmission and distribution, including energy management and supporting technologies.

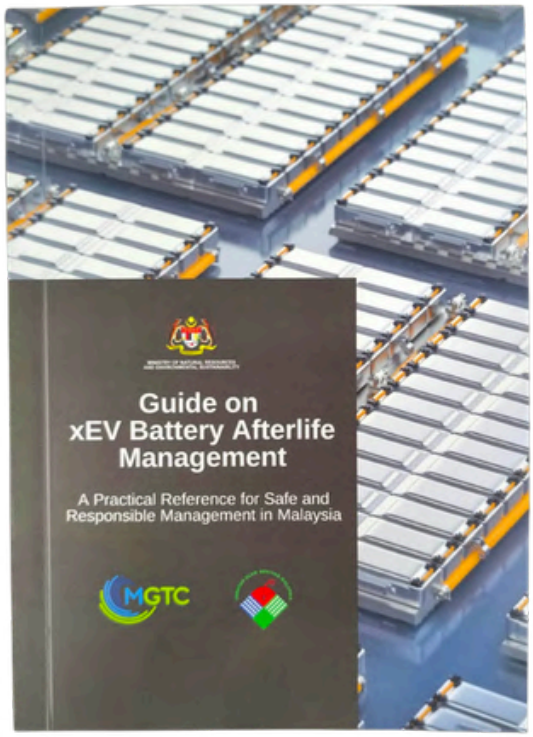
UM's academic expertise contributes to the development, review and adoption of Malaysian Standards, including the adoption of relevant international standards. Areas of participation include circuit-breakers and similar equipment for household use (NSC 05/TC 5/WG 1) and cable lugs, tools and dies (NSC 05/TC 14/WG 2). These standards support the safety, reliability and technical performance of electrical equipment and infrastructure.

Through its involvement in national standardisation activities, UM contributes technical expertise and research perspectives to the development of standards that guide the energy sector. This engagement supports the establishment of consistent technical requirements for electrical systems and related technologies, contributing to the advancement of reliable energy infrastructure and the wider national energy development agenda.



UM's Contribution to the Guide on xEV Battery Afterlife Management

Universiti Malaya, through its Power Energy Dedicated Advanced Centre (UMPEDAC), contributed to the formulation of the Guide on xEV Battery Afterlife Management in 2025 under the Twelfth Malaysia Plan (RMK-12). Led by the Malaysian Green Technology and Climate Change Corporation (MGTC), with support from the Ministry of Natural Resources and Environmental Sustainability (NRES), the guide was developed through collaboration with government agencies, technical experts and industry stakeholders. UM was acknowledged alongside national agencies, including the Ministry of Economy, Department of Environment, Energy Commission and Sustainable Energy Development Authority Malaysia, for its contribution to the formulation of the guide. Developed in 2025, the guide was formally launched in 2026.

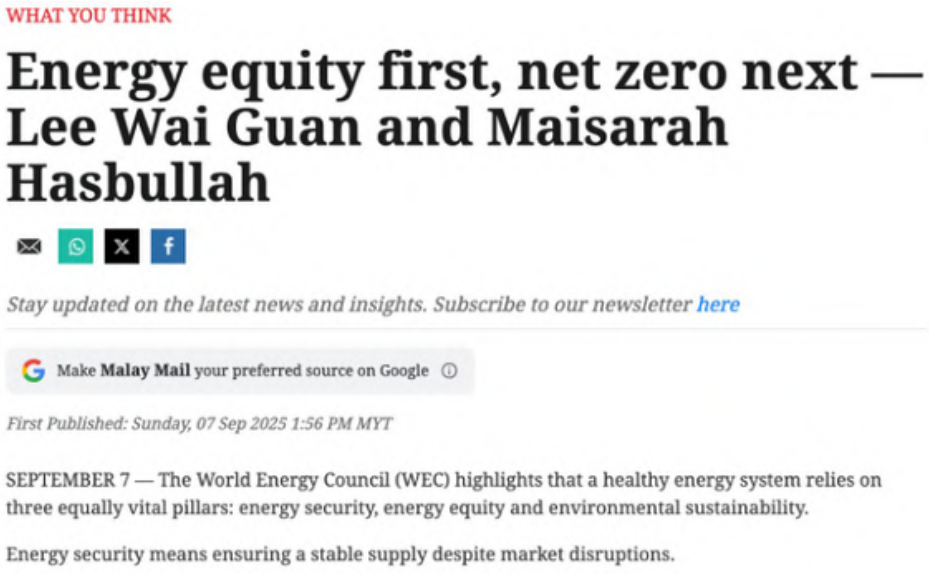


The guide provides a national framework for managing electric vehicle batteries after their automotive use, covering battery assessment, reuse, repurposing, recycling and disposal. Importantly, it identifies a regulatory gap: pathways for reusing and repurposing end-of-use batteries are not yet formally governed by specific national regulations. It recommends practices to guide stakeholders until a dedicated regulatory framework is established. By contributing technical expertise to this guide, UM supported the development of guidance relevant to Malaysia's clean mobility transition, battery energy storage and circular economy, with potential to inform future regulatory and policy development.

National: Guiding Malaysia's Clean Mobility and Energy Transition

In 2025, UM's Power Energy Dedicated Advanced Centre (UMPEDAC), a Higher Institution Centre of Excellence, contributed to the national Guide on xEV Battery Afterlife Management under the Twelfth Malaysia Plan. The guide was led by the Malaysian Green Technology and Climate Change Corporation (MGTC), with support from the Ministry of Natural Resources and Environmental Sustainability (NRES). It acknowledges UM alongside the Ministry of Economy, the Department of Environment, the Energy Commission and the Sustainable Energy Development Authority. The guide sets a national framework for managing electric-vehicle batteries after automotive use, covering assessment, reuse, repurposing, recycling and disposal. It also identifies a regulatory gap: no specific national regulation yet governs the reuse and repurposing of end-of-use batteries. UMPEDAC's contribution draws on its research on repurposing retired electric-vehicle batteries for energy storage, which supports battery storage, clean mobility and the circular economy. The guide was developed in 2025 and formally launched in 2026.

UM academics also informed public policy debate on the National Energy Transition Roadmap (NETR) and the National Energy Policy. On 7 September 2025, Lee Wai Guan and Maisarah Hasbullah of the Department of Science and Technology Studies, Faculty of Science, published "Energy equity first, net zero next" in Malay Mail. Drawing on UM research, they argued that energy equity, energy security and environmental sustainability depend on one another, and that equity must come first. They recommended completing rural electrification, communicating time-of-use tariffs better so households can benefit from them, designing fair tariffs that still fund grid investment, and reporting the progress of the national roadmaps transparently with room for civil society input.



WHAT YOU THINK

Energy equity first, net zero next — Lee Wai Guan and Maisarah Hasbullah

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First Published: Sunday, 07 Sep 2025 1:56 PM MYT

SEPTEMBER 7 — The World Energy Council (WEC) highlights that a healthy energy system relies on three equally vital pillars: energy security, energy equity and environmental sustainability.

Energy security means ensuring a stable supply despite market disruptions.

Above: "Energy equity first, net zero next" by Lee Wai Guan and Maisarah Hasbullah, Department of Science and Technology Studies, Faculty of Science, UM, published by Malay Mail on 7 September 2025. Source: malaymail.com (screenshot).

Global: Asia-Pacific Perspectives on the Energy Transition

On 2 October 2025, UM's Faculty of Law co-organised the international seminar "Asia-Pacific Perspectives on Climate Change and the Energy Transition: Reflections from Malaysia, Australia and Japan" at the Dayak Cultural Foundation in Kuching, Sarawak. UM's partners were Universiti Malaysia Sarawak, Curtin University Malaysia and Nagoya University. Nagoya took part through its research project "Building Climate Change Governance through Multistakeholder Cooperation: The Case of Low-Carbon Hydrogen", funded by the Japan Society for the Promotion of Science (JSPS). The seminar brought together scholars, policymakers, industry and civil society to discuss pathways towards a just and inclusive energy transition. Sarawak was chosen as the venue because of its growing role as a regional hub for low-carbon hydrogen and other energy transition projects.

Professor Jason Chuah of UM delivered the welcome address, and His Excellency Noriyuki Shikata, the Japanese Ambassador to Malaysia, gave the opening keynote. UM academics contributed across the programme. Dr Sheila Lingam spoke in the session on climate change governance and policy, and Dr Petrina Tan in the session on investment and corporate governance. In the session on community interests and human rights, moderated by Associate Professor Dr Ramy Bulan, Associate Professor Dr Sharon Kaur discussed the social and environmental implications of the energy transition. Through this international cooperation, UM contributed legal and governance expertise to the design of policy for low-carbon hydrogen and other clean energy technologies.



Above: Official poster of the international seminar "Asia-Pacific Perspectives on Climate Change and the Energy Transition: Reflections from Malaysia, Australia and Japan", co-organised by the Faculty of Law, UM, with UNIMAS, Curtin University Malaysia and Nagoya University, Kuching, Sarawak, 2 October 2025. Source: h2governance.gsid.nagoya-u.ac.jp.

Global: Contributing to International Climate Policy Dialogue and Collaboration

Universiti Malaya (UM) contributes to international climate action and policy dialogue through its participation in the United Nations Climate Change Conference (COP), building on its involvement in COP28 and COP29. At COP30, held in Belém, Brazil, in November 2025, UM strengthened its engagement with Malaysia's national climate agenda through the UM Climate Change Advisory Panel and collaboration with the Ministry of Natural Resources and Environmental Sustainability (NRES).

UM's multidisciplinary contributions covered various aspects of climate action, including ocean stewardship, the blue economy, climate security, artificial intelligence for urban resilience and climate adaptation. UM academics shared research expertise and perspectives through international discussions, while student representatives contributed youth perspectives through speaking engagements, panel discussions and the presentation of youth-led climate initiatives.

These engagements provided opportunities to connect academic research, policy discussions and international partnerships, while sharing knowledge and perspectives relevant to global climate action, energy transition and sustainable development. Through its continued participation in international climate platforms, UM supports cross-border knowledge exchange and collaborative approaches to addressing climate challenges.



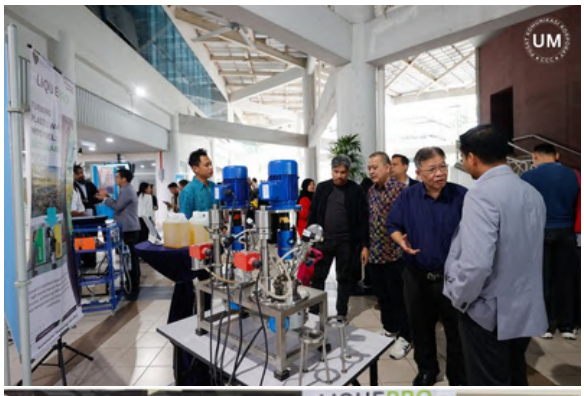
09 Assistance to Low-Carbon Innovation

UM–Deep Tech Startup Accelerator



UM Deep Tech (UMDT), the flagship startup accelerator under UM Centre of Innovation and Enterprise (UMCIE), supports the growth of university-based start-ups that contribute to a low-carbon economy. Through structured mentorship, industry engagement, and commercialisation pathways, UMDT enables research-driven innovations to transition into market-ready ventures.

At the UMDT Demo Day, 10 start-ups from its third cohort showcased transformative solutions, including innovations in clean energy and resource efficiency. Among them, LiquePro Technology addresses the global plastic waste challenge by converting mixed plastic waste into high-value liquid fuels such as gasoline, diesel, and jet fuel within a short processing time, without requiring sorting or cleaning. This solution promotes a circular approach to waste while introducing alternative energy sources.





Another start-up, UMTechVis, developed an automated solar panel cleaning system that ensures panels remain free from dust and debris, improving efficiency and optimising renewable energy output. This innovation supports the performance and reliability of solar energy systems, contributing to cleaner energy generation.

Through platforms such as UMDT, UM provides direct support to start-ups in scaling low-carbon technologies, demonstrating a strong institutional commitment to advancing sustainable innovation and accelerating the transition towards a low-carbon and circular economy.