Ar Zulkifli Zahari

(Pertubuhan Syarikat Syarikat Perkhidmatan Tenaga Malaysia) Malaysia Association of Energy Service Companies

Taiwan International ESCO Seminar

3rd October 2024



- 1. Energy Intensity of Malaysia
- 2. Status of EE Industry in Malaysia
- 3. National Energy Transition Roadmap (NETR)
 - Energy Efficiency as the first of six levers in the NETR
- 4. National Energy Efficiency Action Plan (NEEAP)
- 5. Malaysia Energy Efficiency & Conservation Act (EECA)
- 6. Overview of Other Levers in NETR

MALAYSIA TARGET TO BE TOP 12 IN 10 YEARS

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2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019 2020 2021 2022 2023 2024 2025 2026 2027 2028 2029 2030 2031 2032 2033

Year

Source: IMD Database; MPC Analysis WCR - World Competitiveness Report by IMD

Factors Influencing a Lower Overall WCR Ranking

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Economic Performance Macro-economic evaluation of the domestic economy, employment trends, and price.	<section-header><section-header><section-header></section-header></section-header></section-header>	Business Efficiency Extent to which the national environment encourages enterprises to perform in an innovative, profitable, and responsible manner.	الله Infrastructure Extent to which basic, technological, scientific, and human resources meet the needs of the business.	World Competitivenss Ranking 2023 Factor: Infrastructure Sub-factor: Health and	Position 27/64 Position 35 Position 42
 Domestic Economy International Trade International Investment Employment Prices 	 Public Finance Tax Policy Institutional Framework Business Legislation Social Framework 	 Productivity Labor Market Finance Management Practices Attitudes and Values 	 > Basic Infrastructure > Technological Infrastructure > Scientific Infrastructure > Health and Environment > Education 	Indicators related to ESG: 1. Renewable Energy 2. Forest Area Growth 3. Energy Intensity 4. CO2 Emissions Intensity, etc.	h Position

W W W . M A E S C O . O R G . M Y

Our Electricity Usage Demonstrates Lower Efficiency

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Denmalt

Japan



Source: Our World in Data

Source: Energy Commission

Despite having double the per capita electricity consumption compared to Malaysia, Japan stands out with a remarkable threefold lower electricity intensity, indicating **Japan is more efficient compared to Malaysia**.

MALAYSIA ENERGY INTENSITY





Source: Energy Commission

MAESCO On-Going interfacing to develop National Energy Efficiency Eco Systems

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National Energy Transition Roadmap (NETR - ESCO Platform)

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NATIONAL ENERGY TRANSITION ROADMAP (NETR)

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Energy Efficiency in the National Energy Transition Roadmap

Launched by YAB Prime Minister Dato' Seri Anwar Ibrahim 29 August 2023

The National Energy Transition Roadmap (NETR) positions Energy Efficiency as a key energy transition lever...

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	NETR Pa	art 1			NETR F	Part 2		
Identify fla	gship catalyst projects and initiatives		Establish low-carbon	pathway, energy mix a	and emission targ	et reduction for the	e energy sector	
	6 Energy Transition Levers	10 Flagship Catalyst Projects		Energy	transition ambi	tion and macro p	oosition	
1	Energy Efficiency (EE)	Efficient Switch	A	A		•		
		Renewable Energy Zone (RE Zone)			Ene trans	rgy sition		
2	2 Renewable Energy (RE)	Energy Storage	V		tev	ers V		
		Energy Secure	EE	RE	НҮ	BI	GM	Carbon Canture
		Green Hydrogen	Efficiency	Energy	Hydrogen	Bioenergy	Mobility	Utilisation and Storage
3	Hydrogen	Hydrogen for Power						
4	Bioenergy	Biomass Demand Creation						
F	Green Mability	Future Mobility	*	•	▼ Cross-cutti	ing Enablers	•	*
5	Green Mobility	Future Fuel	Financing and	Human Capita	al Polic	cy and Te	chnology and	
6	Carbon Capture, Utilisation and Storage (CCUS)	CCS for Industry	Investments	and Capabilitie	es Regu	lation	nfrastructure	Governance

W W W . M A E S C O . O R G . M Y



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NETR proposes the following targets:

- •By 2040, achieve energy savings of 21% compared to business-as-usual scenario, specifically: o Residential: 15% o Industrial and commercial: 22%
- •By 2050, achieve energy savings of 22% compared to business-as-usual scenario, specifically: o Residential: 20% o Industrial and commercial: 23%

The targets mark a significant leap from the goals previously declared in the National Energy Policy at 10% for residential and 11% for industrial and commercial by 2040

EE is not a new concept for Malaysia. In 2015, the Government unveiled the NEEAP, detailing a 10- year strategy to improve EE in power consumption for residential, commercial and industrial sectors. Currently, the Plan is on track to achieve its target of reducing electricity demand by 8% by 2025.

Potential Investment Opportunities and Impact of NETR's Responsible Transition





Energy Transition Lever: Energy Efficiency

Energy Transition Lever: Energy Efficiency					
Code	Initiatives	Champions			
EE1	 Improve EE awareness Promote awareness for energy-efficient appliances and equipment through public awareness programmes Redesign the 5-star labelling standards to emphasize monetary savings in addition to the technical energy savings 	 Ministry of Energy Transition and Water Transformation Energy Commission 			
EE2	 Improve existing Minimum Energy Performance Standards (MEPS) and 5-star rating bands Increase the number of MEPS-covered equipment Establish an accelerated MEPS progression timeline for key critical appliances align with ASEAN Plan of Action for Energy Cooperation (APAEC) standards Revise the bands for appliances with high 5-Star ratings penetration through periodic reviews 	Energy Commission			
EE3	 Enforce mandatory audits for large commercial and industrial buildings Implement mandatory investment-grade audits focusing on high energy-consuming commercial and industrial sector Establish reporting protocol as well as a strict monitoring mechanism 	Energy Commission			
EE4	 Establish green building codes for energy-intensive residential and commercial buildings Establish a mandatory national standard that outlines EE parameters for both new residential and commercial buildings as well as retrofit for existing building to meet a minimum Building Energy Intensity (BEI) level Mandate disclosure of building energy performance for commercial Buildings 	 Energy Commission Sustainable Energy Development Authority 			
EE5	 Establish an ESCO platform Establish a public ESCO platform to coordinate public building retrofits with private ESCOs streamline funding and create a single financial mechanism in the form of a revolving fund through ESCO platform 	Energy Commission			
EE6	 Launch a major EE retrofit initiative amongst government buildings Identify energy inefficient public buildings (e.g., offices with BEI >200 = ~60-70% of existing building) Develop medium to long-term EE government building retrofit program and implement project via ESCO platform 	Ministry of worksPublic works department			
W	WW, MAESCO, ORG, MY				

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MAESCO STRATEGY TO IMPLEMENT EPC FOCUSING ON HVAC AS A COMMON MEASURE IN RETROFIT GOVERNMENT BUILDINGS IN LINE WITH THE NETR TARGET OF MYR 2B (USD250M) WORTH OF RETROFIT BY 2030

MAESCO STRATEGY TO IMPLEMENT EPC FOCUSING ON HVAC AS A COMMON MEASURE IN RETROFIT GOVERNMENT BUILDINGS IN LINE WITH THE NETR TARGET OF MYR 2B (USD250M) WORTH OF RETROFIT BY 2030

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Signing of MOU between MAESCO & MACRA on the 19th September 2024 witness by Deputy Prime Minister of Malaysia, President of MACRA, President of Institute of Engineers Malaysia and Chairman of MARVEX Organizing Committee

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Energy Transition Levers	Flagship	Modalities	Champion
Energy Efficiency (EE)	Efficient Switch	 Energy Efficiency and Conservation Act (EECA) The EECA Bill approved by parliament on 10th October 2023 to be fully enforce by 1st January 2025 Energy Efficiency Retrofits in Government Buildings To established the ESCO Platform and execute HVAC, Lighting and other potential measures through EPC and to introduce best practices. 	Ministry of Energy and Water Transformation (PETRA)
		Energy Audit for Rail Sector Railway operators to perform energy audit exercise under the Energy Audit Conditional Grant (EACG 2.0) aimed at establishing the current energy consumption baseline, identifying potential energy savings in their premises and lowering utility costs.	Ministry of Transport (MOT)

ENERGY EFFICIENCY & CONSERVATION ACT (EECA) 2023

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OBJECTIVES OF THE DEVELOPMENT OF ENERGY EFFICIENCY & CONSERVATION ACT (EECA)

- A need to have comprehensive legislation (electricity and thermal) to drive energy efficiency. (Continuation from Prelim-DSM Study by EPU)
 - To improve energy efficiency initiative in industry, commercial and residential sector
 - To reduce 45% of carbon emission pledged in COP21 (Paris Agreement) by 2030 based on 2005 level.
 - To support the government aspiration to achieve carbon neutrality by 2050.
- To effectively manage energy demand, promoting efficient and sustainable energy consumption practices.

• June 2010

Preliminary study to develop Energy Efficiency Master Plan (NEEMP) which includes introducing dedicated legislation.

• August 2011

Energy Efficiency Action Plan was presented by the ministry to the Green Technology and Climate Change meeting chaired by the Prime Minister of Malaysia and the proposed EE legislation was approved and was announce to be enacted by 2014.

• November 2011

Appointed a legal practice to commence working on the dedicated law for Energy Efficiency with relevant agencies.

• April 2013

The act was put on hold and replace with a National Energy Efficiency Action Plan (NEEAP) as the then administration were not confident to administer energy efficiency in the thermal and transport sector due to lack of management capacity.

• July 2013

Key Stakeholders from Professional, Industrial, Commercial & NGO's petitioned to urge the then government to reconsider its decision and reinstate towards establishing the Act.

To re-enforce the need for a dedicated Energy Efficiency Act came from the outcome of the DSM Preliminary Study conducted by the Government Economic Planning Unit in collaboration with UNDP in 2017. The study indicated that a legislative framework is needed to enable and implement a more comprehensive and effective energy efficiency initiatives to compliment the earlier recommendation by the IEA & Stakeholders of the early National Energy Efficiency Master Plan initiatives since 2010.

• 10 Mac 2021

Energy Commission has submitted the Final draft of EECA to NRECC for submission to AGC

• 5 Mei 2023

The Attorney General Chamber has formally approved the new act and issued an official letter to the NRECC

11 October 2023
 Approval of EECA

MALAYSIA ENERGY EFFICIENCY & CONSERVATION ACT (EECA)

REUTERS

Malaysia parliament approves energy efficiency law

After a journey of more than 10 years. On 11th October 2023 Malaysia has its dedicated Energy Efficiency law

October 11, 2023 - 01:02 am EDT

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Energy Efficiency and Conservation Act (EECA) Press statement by DPM on 25th July 2024

HOME NEWS GLOBAL MARKETS PROPERTY NET ZERO 2050 SCALE UP

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News sustainability

Fadillah: Enforcement Of EECA Projected To Save About 2,017 Million GJ, RM97.1 Billion In Energy Cost

In the context of energy efficiency, the Energy Efficiency and Conservation Act (EECA) was passed by Parliament on June 25, 2024, to regulate the efficient use and comprehensive conservation of energy. It emphasises the management of electricity and thermal energy demand.

Fadillah, who is also Energy Transition And Water Transformation (PETRA) Minister, said through the enforcement of this act on industrial, commercial, and domestic sectors until 2050, Malaysia is projected to save an estimated 2,017 million Gigajoules or approximately RM97.1 billion in energy **costs**, and directly reduce carbon emissions by 197,877 metric tons of carbon dioxide.

		PART 1	Preliminary
		PART II	Functions And Powers Of The Commission
		PART III	Duties of Energy Consumer
	FFCA	PART IV	Duties of Person in Charge of Building
FRA		PART V	Provisions Relating to Energy Using Product
		PART VI	Registration of Energy Manager & Energy Auditor
		PART VII	Registration of Training Institution
X		PART VIII	Information Gathering Powers
		PART IX	Enforcement
		PART X	General

Any energy consumer who consumes 21,600 GJ (gigajoules) of energy over a 12-month period will be subject to its regulations and provisions

LARGE ENERGY CONSUMER (INDUSTRIES AND COMMERCIAL BUILDINGS)	Applies to large energy consumer that meets the minimum prescribed threshold of 21,600GJ .
	Need to appoint a Registered Energy Manager (REM).
	Mandatory periodic Energy Audit by a Registered Energy Auditor (REA) and the submission of energy audit report with improvement plan.

Mandatory implementation of the Energy Management System.

Annual submission of annual Energy Efficiency and Conservation report.

Part 3: Duties of Energy Consumer

Any energy consumer who consumes 21,600 GJ (gigajoules) of energy over a 12-month period will be subject to its regulations and provisions

(Equivalent to about RM 1.0 Million (USD 0.25M) for Natural Gas Bill & RM 2.4 Million (USD 0.60M) for Electricity Bill)

*Above data is for electricity only. No data for gas consumption as EECA has not been enforced to obtain data. *Estimated affected installation to reach total of more than 4,000 once EECA is fully enforced

Part 4: Duties of Person in Charge of Building

Any building as described in 3rd Schedule and details will be specified in the Guideline.

The remaining **79%** of the commercial or buildings consumption will be

regulated via building energy efficiency requirements known as Building Energy Intensity Labelling (BEI Label).

BUILDINGS Applies to buildings specified in Schedule 3 (First phase - Purpose Built Offices then followed by Hotels, Malls, Private Hospital and etc)

Will be labelled with Building Energy Label (BEL).

BEL will describe Building Energy Intensity (BEI – kWh/m²/year), star rating and building type.

The need to comply with the minimum BEI requirement by a certain period.

Failure of compliance, will require buildings to conduct an energy audit.

Any energy using product as specified in the guidelines.

ENERGY Applies to Energy Using Product consuming electrical energy and thermal energy.
 PRODUCT (EUP) Energy Using Product must meet the prescribed minimum requirement and has a Certificate Of Efficiency (COE).

Locally manufactured and imported energy using product must obtain a Certificate of Registration (COR).

Energy using product sold in market must be affixed with Energy Efficiency Label.

REGISTERED ENERGY MANAGER (REM, REGISTERED ENERGY	Registration (REM) Type 1	of and	Energy Type 2.	Manager
AUDITOR (REA) & TRAINING INSTITUTION	Registration (REA).	of	Energy	Auditor

REGISTRATION OF TRAINING INSTITUTION

Registration of Training Institution for the purpose of REM registration.

Qualifications for registration of training institution

Any training institution may apply to be registered under this Act if the training institution—

(a)is a company, limited liability partnership, firm, society or other body of persons incorporated or established under any written law;

(b)fulfils other prerequisite requirements as may be determined by the Commission; and

(c)has not been convicted of an offence involving fraud, dishonesty or corruption.

GUIDELINE FOR ENERGY AUDIT REPORTING

Suruhanjaya Tenaga

GUIDELINES ON SUBMISSION

OF ENERGY EFFICIENCY AND

CONSERVATION REPORT In Compliance with Energy Efficiency and Conservation Act (EECA)

COMPLETED IN 2021

deline on Energy Management System

This guideline explains on requirement and details of Energy Management System that need to be implemented by Energy Consumer.

Guideline on Energy Efficiency & Conservation Reporting

This guideline states the format and information that must included in EEC Report that need to be submitted in the by Energy Consumer

Guideline on Energy Audit Report

This guideline states the format and information that must included in Energy Audit Report that need to be submitted in the by industries and buildings.

COMPLETED IN 2023

Guide on Registration for Energy manager, Energy Auditor and training institutions cedure on REM,REA and training applications and renewal application.

Guideline on BEI Labelling

This guideline will state the criteria for building that will be subjected under the Act, building labelling requirements and calculation methodology of building energy intensity.

Guideline on MEPS Labelling

This guideline will state the list of energy using product subjected under this Act, application and renewal of certificate of efficiency procedure, calculation methodology of energy efficiency, energy efficiency labelling requirements and testing methodologies of energy-using products

National Energy Efficiency Action Plan (NEEAP) 1.0: 2016 – 2025 2.0: 2026 - 2035

NATIONAL ENERGY EFFICIENCY ACTION PLAN (NEEAP)

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5 Key Initiatives Of NEEAP Programs

1. Initiatives Promotion of 5-Star Rated Appliances

- 2. Minimum Energy Performance Standards (MEPS)
- 3. Energy Audits and Energy Management in Buildings and Industries

4. Promotion of Cogeneration

5. Energy Efficient Building Design

NATIONAL ENERGY EFFICIENCY ACTION PLAN (NEEAP)

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Upcoming Policy

NATIONAL ENERGY EFFICIENCY ACTION PLAN (NEEAP) 2.0

The enforcement of Energy Efficiency & Conservation Act (EECA) will determine the new mandatory requirement to industrial, commercial buildings and residential sectors.

Given that NEEAP 1.0 will end in 2025 and enforcement of EECA from year 2024, it is crucial to conduct a study to ensure the continuity of energy efficiency implementation plan and program in Malaysia.

National EE&C Policy Framework

To produce a National Energy Efficiency & Conservation Policy Framework document.

EE Initiatives 2026-2035

To identify energy efficiency initiatives to be implemented in Malaysia for next 10 years from 2026 to 2035.

Impact of EECA

To review and quantify the impact from the enforcement of EECA in Malaysia.

National Energy Transition Roadmap (Other Levers)

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In May 2023, the Government reaffirmed its commitment to unlock economic opportunities through a low-carbon transition, setting out the ambitious target to achieve 70% RE installed capacity in the power mix by 2050. NETR aims to reinforce this ambition and inform an accelerated RE rollout by affirming two essential targets:

- Target 1: 70% RE installed capacity share by 2050
- Target 2: No new coal power plant

In alignment with these strong RE ambitions, an accelerated pathway is needed to scale RE uptake in Malaysia over the next three decades.

Fossil fuel sources still dominate the national power landscape, and contributed 33% of Malaysia's GHG emissions in 2019. Transitioning to low-emission RE is vital to decarbonise the national power system. It is equally crucial that Malaysia strikes the right balance between sustainability, security, and affordability as it navigates the energy trilemma towards a more resilient, low-carbon power ecosystem.

Malaysia is blessed with substantial RE resources, with almost 290 GW of technical potential estimated across the country. Solar photovoltaic (PV) technical potential alone is estimated to reach 269 GW. Just a small fraction of this RE potential has yet been realised, with just over 9 GW of installed capacity, and greater than 95% untapped technical potential.

Over the last decade, the Government of Malaysia has established long-standing programmes and supporting policies to catalyse rollout of RE technologies. These programmes have helped stimulate significant RE growth over the past decade. Since 2011, solar PV remains the most encouraging segment of the national RE landscape with an installed capacity compound annual growth rate (CAGR) of 48%, expanding from 0.1 GW to 2.6 GW.

Malaysia has also successfully established itself as a major international hub for PV components manufacturing, building a globally recognised green energy industry. Six out of 10 of the world's largest solar PV companies operate in Malaysia, listing Malaysia as one of the top exporters in the global solar PV industry.

Flagship catalyst projects and initiatives for RE

Energy Transition Levers	Flagship	Modalities	Champion
Renewable Energy (RE)	Renewable Energy Zone (RE Zone)	Integrated RE Zone A large-scale integrated sustainable development spanning the entire energy supply chain, from generation and energy storage to efficient demand management and consumption. A pilot RE Zone will be established encompassing an industrial park, zero-carbon city, residential development and data centre.	Khazanah Nasional Berhad
		Solar Park Centralised LSS parks co-developed by TNB, in partnership with SMEs, cooperatives, and state economic development corporations. These parks will consist of 100 MW deployment per site across 5 sites in several states.	TNB
		 Hybrid Hydro-Floating Solar PV (HHFS) Development of 2500 MW HHFS potential at TNB hydro dam reservoirs will increase RE generation close to 24- hour availability. The hydro plant acts as energy storage by conserving the water in the reservoir during peak hours and discharging it during non-peak, while providing quick response to the duck curve. Lower investment by utilising existing hydro infrastructure as compared to battery energy storage system (BESS) and solar PV. Potential scaling up for future green hydrogen feedstock in collaboration with other hydrogen producers such as Gentari as the green electron offtaker. 	TNB
		Residential Solar The construction of 4.5 MW solar capacity across 450 homes in City of Elmina and Bandar Bukit Raja. Up to 10 kW solar capacity per house through rooftop leasing with offtake within the township by high-demand users from the commercial or industrial sector.	Sime Darby Property
	Energy Storage	Energy Storage System (ESS) Development of utility-scale ESS to enable higher penetration of variable RE in Malaysia.	NRECC Energy Commission
	Energy Secure	Sabah Energy Security Initiative An integrated initiative is underway to secure the long- term energy supply and support the socioeconomic development of the state. This includes: the development of LSS and small hydropower plants; the formulation of policy and regulatory framework on biowaste to ensure a consistent supply of feedstock; and the feasibility of geothermal for power generation.	Energy Commission of Sabah

NETR proposes the following targets:

Blue Hydrogen: To completely phase out the use of grey hydrogen as a feedstock by 2050.

Green Hydrogen: To produce up to 2.5 Mtpa of green hydrogen by 2050 from RE such as hydroelectric power and solar.

Low-carbon Hydrogen Hubs: To establish one low-carbon hydrogen hub by 2030, and an additional two hubs by 2050, bringing the total to three hubs.

Hydrogen presents itself as a versatile and future-proof source of low-carbon energy carrier. The transformative potential of a hydrogen economy not only reduces carbon footprint but also offers new economic opportunities, diversify fuel sources, and facilitates the effective monetization of natural resource endowments, such as solar and hydroelectric capabilities.

Hydrogen holds significant promise as an alternative to natural gas in various sectors including industry, transportation and power generation. By harnessing the potential of hydrogen, Malaysia could become a forerunner in advancing the energy transition while diversifying its economy and enhancing its energy security.

Malaysia has embarked on this journey to tap into the potential of hydrogen. This is particularly evident in Sarawak, where projects such as H2ornbill and H2biscus, in collaboration with Japanese and South Korean partners respectively, have made significant strides. These initiatives are congruent with Sarawak's Hydrogen Economy Roadmap, focusing on utilising hydrogen to transform Sarawak into a developed state by 2030. Looking ahead, the forthcoming HETR will further augment Malaysia's hydrogen ambitions.

Key Target of NETR for Hydrogen (Lever 3)

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Flagship catalyst projects and initiatives for Hydrogen

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Energy Transition Levers	Flagship	Modalities	Champion
Hydrogen	Green Hydrogen	Sarawak Hydrogen Hub Implementation of three integrated projects to produce green hydrogen will propel Sarawak as a regional green hydrogen hub. These projects involve the development of a green hydrogen production plant in Kuching by 2025 for domestic use, and two plants in Bintulu by 2027, mainly for export purposes. Sarawak State Government through SEDC Energy is collaborating with strategic partners to develop the state into a green hydrogen hub.	SEDC Energy
H ₂	Hydrogen for Power	Co-Firing of Hydrogen and Ammonia Green hydrogen and ammonia co-firing in collaboration with PETRONAS to decarbonise TNB generation plants.	TNB

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Bioenergy acts as a key enabler to support energy transition. Given this, NETR outlines two key targets to support and enable other energy transition levers:

- Increase biorefinery capacity to 3.5 billion litres by 2050
- Increase biomass and biogas power generation capacity to 1.4 GW by 2050

Bioenergy covers biomass, biogas, and biofuels, and offers a key source of renewable primary energy supply. Biomass and biogas are used as zero-carbon energy supply sources for power generation. Biofuel, primarily in the form of biodiesel, is used across the transport industry. In 2019, bio-based products contributed 1% of TPES, comprising 648 kilotonnes of oil equivalent (ktoe) of biodiesel, 204 ktoe of biomass, and 118 ktoe of biogas.

Bioenergy is widely categorized based on the type of feedstock used to produce it:

- **First-generation** bioenergy is primarily derived from food crops such as palm oil
- Second-generation bioenergy is derived from non-food biomass such as agricultural waste residue, forest residue, livestock waste, fisheries waste, used cooking oil (UCO), as well as municipal solid waste (MSW)
- **Third-generation** bioenergy is derived from algae, and reflects a technologically nascent industry that is not yet economically viable, but has the potential to emerge as a competing feedstock source of bioenergy

Due to concerns such as land competition and food security, second generation feedstock is viewed as the current most favourable bioenergy feedstock. NETR aims to capitalise Malaysia's strong bioenergy potential, with focus on two key segments, namely agriculture-related bioenergy and non-agriculture waste such as UCO and MSW.

Palm oil related residue consist of the majority of potential bioenergy generation potential in Malaysia. Hence, NETR will place its focus on addressing challenges relating to palm oil biomass in agriculture-related bioenergy.

Key Target of NETR for Bioenergy (Lever 4)

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Bioenergy Generation Potential in Malaysia (MW)

Flagship catalyst projects and initiatives for Bioenergy

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Energy Transition Levers	Flagship	Modalities	Champion
Bioenergy	Biomass Demand Creation	Biomass Clustering Development of biomass clusters with a centralised plant using aggregated feedstock from multiple neighbouring mills. Biomass clustering is expected to improve economies of scale as well as securing larger and more reliable feedstock.	KPK NRECC SEDA
		Biomass Co-firing Co-firing initiative at the existing 2100 MW Tanjung Bin Power Plant by burning biomass along with coal. Biomass sources include empty fruit bunch (EFB) pellets, wood chips, wood pellets, bamboo pellets, coconut husk and rice husk. A pilot phase of co-firing will commence in 2024 with the scale-up potential to a minimum of 15% biomass co-firing capacity by 2027.	KPK Malakoff

Key targets:

The NETR builds on existing national targets outlined by the Low Carbon Mobility Blueprint (LCMB) and the DTN targets. By 2050, the NETR aims to:

Elevate the public transport modal share to reach 60%

Accelerate the penetration of xEV (4W) share of the vehicle fleet to 80%

Accelerate the penetration of electric two-wheelers' (E2W) share of the vehicle fleet to 80%

Foster robust local EV manufacturing capabilities to achieve 90% local xEV manufacturing

Continue improvements in ICE fuel economy

Challenges

- Inadequate public transport infrastructure and connectivity,
- Slow adoption of sustainable public transportation
- The need to comply with the ASEAN fuel economy standards.
- The lack of affordable EV models
- Slow expansion of charging infrastructure
- Disparity in upfront costs between E2W and ICE 2W hinders the transition.

Flagship catalyst projects and initiatives for Green Mobility

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Energy Transition Levers	Flagship	Modalities	Champion
Green mobility	Future Mobility	EV Charging Stations Installation of 10,000 EV charging stations by 2025 along highways and at selected commercial buildings in collaboration with strategic partners, among others, TNB, Plus Malaysia Berhad (PLUS), Permodalan Nasional Berhad (PNB), Gentari and Sunway Group.	MITI
		Mobile Hydrogen Refuelling Station Introduction of the first mobile hydrogen refuelling station for transportation in Peninsular Malaysia, in collaboration with NanoMalaysia Berhad, PETRONAS, United Motor Works (UMW) and the MGTC.	MOSTI
		Public Transport Electrification This project involves electrification of first and last mile public transport and upgrading infrastructure and electrical lines at bus depots for charging, with maintenance, repair and overhaul (MRO) opportunities for local SMEs.	MOT Prasarana
		Solar Photovoltaic (PV) Installation for Rail Operations The Rail Sector Energy Management and Renewable Energy (EMRE) Action Plan entails the installation of Solar Photovoltaic (PV) systems for non-traction electricity usage in rail operations such as stations and depots.	MOT
	Future Fuel	Biofuels Hub A bio-refinery will be developed in Pengerang, Johor, to serve as a catalyst for creating hubs to produce a range of bio-based products, including SAF, hydrotreated vegetable oil (HVO), advanced sustainable fuel (ASF) and biochemicals.	PETRONAS

Key Target of NETR for Carbon Capture Utilization Storage (CCUS) (Lever 6)

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Key targets

NETR proposes the following targets:

- By 2030:
 - o Develop 3 CCUS hubs (2 in Peninsular Malaysia, 1 in Sarawak)
 - o Total storage capacity up to 15 Mtpa
- By 2050:
 - o Develop 3 carbon capture hubs
 - o Total storage capacity between 40 to 80 Mtpa

CCUS plays a pivotal role in energy transition. The IEA posits that reaching net-zero will be extremely challenging without CCUS and its role will extend to almost all parts of the global energy system. The contribution of CCUS will grow over time as technology improves, cost reduces and cheaper abatement options in some sectors are exhausted.

Globally, there is a growing trend towards building a robust CCUS ecosystem using a cluster or hub strategy. This method encourages emitters within the same cluster to invest and utilize shared CCUS infrastructure, such as CO2 pipelines and storage facilities to reduce the overall cost of CCUS.

Based on the IEA's projections, there is a noticeable disparity between the current capacity of CCUS and the anticipated future needs. The current gaps in CCUS adoption can be traced back to its nascent stage and high implementation costs. Establishing comprehensive CCUS systems encompassing CO2 capture, transport, and storage, demands substantial capital investment, thus posing a significant hindrance to widespread adoption. However, with the costs of CCUS technologies on a steady decline, and given the forecasted rise in carbon pricing, the economic viability of CCUS is predicted to gain considerable momentum in the coming years.

Energy Transition Levers	Flagship	Modalities	Champion
CCUS	CCS for Industry	Regulatory Framework Development of policy and regulatory framework to facilitate the implementation of CCUS projects, including transboundary carbon movement.	Ministry of Economy
co		Kasawari and Lang Lebah CCS Implementation of CCS catalyst projects for Kasawari and Lang Lebah high-CO2 gas fields in collaboration with the Sarawak Government, which are expected to be in operation by 2026 and 2028 respectively. CCS technology will be used to capture CO2 from the gas production field and store it in the depleted fields.	PETRONAS

Thank You

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