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MALAYSIA BOARD OF TECHNOLOGISTS
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TECHIES

Official Bulletin 29th Edition - KDN: PQ1780/J/187 www.mbot.org.my

Malaysia's Biogas Initiatives: DRIVING THE TRANSITION TO CLEAN ENERGY

By Adila Fazliyana Aili Hamzah and Ts. Dr. Muhammad Hazwan Hamzah, Universiti Putra Malaysia

Malaysia, long powered by coal, gas, and oil, is now pushing hard to embrace cleaner energy. A key part of this shift is biogas production, which turns waste into renewable power. For years, fossil fuel made up about 75% of the country's energy source which drove economic growth and caused pollution. Today, Malaysia is changing course following the National Energy Transition Roadmap (NETR), aiming for 70% renewable energy by 2050 while cutting greenhouse gas (GHG) emissions by 45% by 2030. In addition, Malaysia is targeting to achieve carbon neutrality by 2050.

Endowed with a vast, largely untapped supply of waste, Malaysia is ideally positioned to harness biogas as a sustainable energy solution. This abundant waste can be transformed into energy that benefits both the environment and the power grid. Palm oil mill effluent (POME) is one of the wastes from palm oil production. Each year, 452 mills generate 40 to 60 million cubic metres of POME. This amount of POME has the potential to produce 508 MW of electricity through biogas plants. Other wastes that can be used in biogas production are animal waste, agricultural residue, and municipal solid waste. Together, these energy resources could power biogas plants across Malaysia, particularly in rural areas where energy access is often limited.

CONTINUED ON PAGE 02 >>

/what's inside

/editorial committee

ISSN 0128-1313
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/chief editor's note

TECHIES 29th edition covers the exciting transformation shaping Malaysia's future energy landscape. In the next 25 years, renewable energy is expected to contribute to 70% of the energy mix.

Malaysia has abundant biowastes that can be used as raw materials for biogas production. For instance, palm oil mill effluent can be converted to biogas. This technology kills two birds with one stone: it increases the share of renewable energy in the energy mix and avoids methane emissions.

Changes always go hand in hand with challenges. A small change in fuel composition may affect its compatibility with engines. Biofuels derived from Fatty Acid Methyl Esters or Used Cooking Oil Methyl Esters need creative solutions to mitigate their associated impact on engines.

I trust this edition will help us to stay current in the adoption of the new energy system.

Assoc. Prof. Dr. Mohamad Asmidzam Ahamat

CONTINUED FROM PAGE 01 >>

The Renewable Energy Act 2011 established the Feed-in Tariff (FiT) programme under the Sustainable Energy Development Authority (SEDA), marking the beginning of biogas plant projects in Malaysia. The FiT programme offered premium prices for green electricity, significantly increasing the number of biogas facilities, particularly near palm oil mills. POME's versatility as a biogas feedstock is demonstrated by its potential to generate electricity from biogas. In 2021, 135 mills with biogas-capturing facilities harnessed 33% of POME's energy potential. For the year 2022, SEDA reported that out of nine biogas plant projects under the FiT programme (Table 1), eight were fuelled by biogas extracted from POME, while the remaining was fuelled by landfill gas, underscoring POME's dominance as a feedstock. These biogas plants' facilities employ anaerobic digesters, ranging from covered lagoons to continuous stirred-tank reactors, converting waste into biogas to supply fuel to heaters or generators. As of 2022, the capacity of biogas projects under the FiT programme reached approximately 125.3 MW, a fraction of the 847.6 MW potential from other renewable energy sources. This success is demonstrated by projects like FGV Holdings Berhad's 2.4 MW biogas power plant at the Triang palm oil mill in Bera, Pahang. This power plant supplies clean electricity to 15,000 homes within its 30-kilometre radius.

Feed-In Approval Holder	Installed Capacity (MW)	Location
Concord Biotech Sdn. Bhd.	2.40	Sg. Tong, Setiu, Terengganu
Concord Biotech Sdn. Bhd.	2.40	Padang Kubu, Kemaman, Terengganu
Cenergi Endah Sdn. Bhd.	1.20	Mukim Jayabaru, Perak
GLT Sustainable Sdn. Bhd.	1.50	Seberang Prai Selatan, Pulau Pinang
GLT Agro Power Sdn. Bhd.	0.64	Sg. Tinggi, Larut, Perak
Berjaya Energies Sdn. Bhd.	2.00	PPS Bukit Tagar, Selangor
Bell Cenergi YP Sdn. Bhd.	2.40	Chaah Baharu Labis, Johor
Cenergi Elphil Sdn. Bhd.	1.20	Sungai Siput, Perak
SD Plantation TNB Renewables Sdn. Bhd.	1.56	KKS Kempas, Jasin, Melaka

Table 1. Details of commissioned biogas plants in 2022 (SEDA, 2022).

Malaysia's energy transition is driven by policies prioritising biogas and renewable energy. The Ministry of Energy and Natural Resources (KeTSA) aims to achieve a 31% renewable energy share in the national installed capacity mix by 2025, aligning with Malaysia's global carbon reduction commitments. The Malaysia Renewable Energy Roadmap (MyRER) supports this vision by targeting carbon reduction in the electricity sector through its 2035 milestone, estimating a bioenergy potential of up to 2.85 GW from oil palm biomass and POME. Additionally, the National Energy Policy 2022–2040 promotes energy sustainability to foster shared prosperity and emphasize energy's role in driving key economic sectors. Within the palm oil industry, efforts focus on enhancing the cost-effectiveness of energy generation using first- and second-generation bioenergy technologies. Similarly, SEDA has developed the National Renewable Energy Policy (NREP), targeting a 20% renewable energy mix by 2025. These policies reflect the objective of the

Twelfth Malaysia Plan (RMK-12), ensuring a robust framework to address socioeconomic challenges and achieve sustainable, long-term economic growth.

Biogas plants offer many benefits in terms of technology, finances, and the environment. They contribute to the mitigation of climate change by capturing methane from organic waste such as agricultural residues, food waste, and wastewater that would otherwise be released from landfills. Figure 1 illustrates the annual carbon dioxide emissions mitigated by renewable energy sources from 2012 to 2022. Biogas played a significant role, contributing 26% to the emissions reduction, making it the second-largest contributor after solar photovoltaic. The by-product of biogas, digestate, serves as an environmentally friendly fertiliser, reducing the necessity for hazardous chemical alternatives and fostering sustainable agriculture.

Additionally, this approach lessens reliance on fossil fuel, thereby enhancing air quality. Biogas plants are technically flexible and efficient, employing anaerobic digestion to convert waste into energy, generating electricity, heat, or biomethane for vehicles or grid integration. Their scalability accommodates Malaysia's diverse waste sources, and their decentralised design reduces transmission losses, hence enhancing energy security in remote areas. These facilities enhance local economies by generating employment in construction, operation, and maintenance while reducing waste management costs for communities and large companies. Their financial appeal is further enhanced by revenue from carbon credits and energy sales. Biogas plants in Malaysia promote energy security by using the country's abundant biomass, positioning the nation as an example of renewable energy within Southeast Asia, and fostering sustainable development and economic resilience.

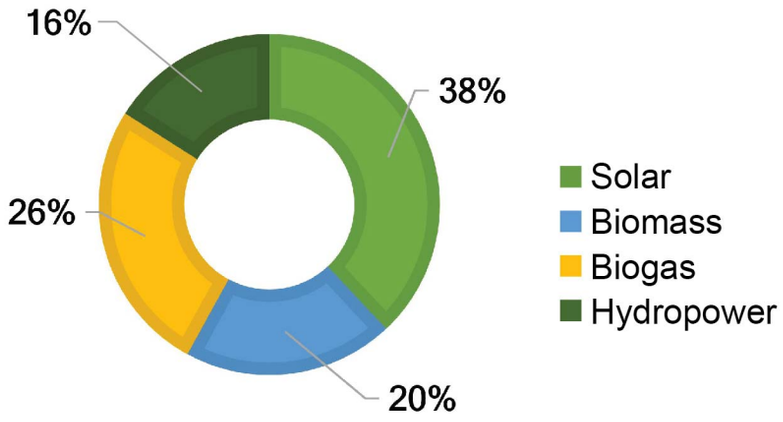


Figure 1. Annual mitigation in carbon dioxide emission by renewable energy resources (2012 to 2022) (SEDA, 2022).

Biogas plant projects in Malaysia also substantially contribute to the Sustainable Development Goals (SDGs) by promoting renewable energy and sustainable practices. They correspond with SDG 7- Affordable and Clean Energy by providing a renewable energy source, lowering dependency on fossil fuel, and boosting energy access in rural regions. By trapping methane from organic waste, they contribute to SDG 13-Climate Action, lowering GHG emissions. Additionally, the use of digestate as organic fertilizer helps SDG 2- Zero Hunger by supporting sustainable agriculture. Economically, biogas plants encourage SDG 8-Decent Work and Economic Growth through job creation, complementing Malaysia's sustainable development approach.

Despite their potential, biogas plant projects in Malaysia face challenges, including high initial capital costs that deter investment, especially for small-scale operators. Lack of technical expertise in the biogas plans hinders its performance and scalability. Another challenge is inconsistent waste supply from agricultural and industrial sources that may disrupt biogas production. Low public awareness and acceptance of biogas as a viable energy source also limit market demand. Overcoming these challenges requires government support, financial incentives, skill development, and awareness campaigns. Looking ahead, Malaysia's abundant resources and commitment to net-zero emissions by 2050 have positioned biogas plant projects as key to sustainable electricity production. Technological advancements, such as improved anaerobic digestion, alongside government subsidies, tax incentives, and clearer regulations, will drive growth. Rising public awareness and regional collaboration further enhance biogas's role in Malaysia's energy transition.

In conclusion, biogas plant projects are crucial to energy transformation in Malaysia, giving a sustainable alternative to capture plentiful waste resources while complying with national and global climate goals. By transforming waste into renewable energy, they mitigate GHG emissions, boost energy security, promote sustainable agriculture, and contribute to numerous SDGs. Notwithstanding challenges such as high investment costs, technological limitations, and legal hurdles, the future outlook is positive, propelled by technological advancements, legislative support, and increased awareness driving expansion. As Malaysia pursues net zero emissions by 2050, biogas plant projects will remain a cornerstone of its renewable energy strategy, supporting economic resilience, environmental sustainability, and a better future for Southeast Asia.

By Ts. Nurulhasyimi bin Annur, Eagle Kuching, MISC

BIOFUEL: TOWARDS A GREENER SHIPPING INDUSTRY

At the beginning of 2020, the fuel in the shipping industry had drastic changes to reduce its sulphur content from 3.5% to 0.5%. This quick cut in sulphur content posed significant challenges for the marine industry. Many ship operators face difficulties in dealing with fuel combustion, which is mostly associated with sludge formation, instability, and the most critical is liner scuffing in two-stroke engines.

Initially, it was thought the root cause of liner scuffing was due to the fuel blends but later it was identified as the reaction between Very Low Sulphur Fuel Oil (VLSFO) blends and cylinder oil. Upon finding, oil companies and equipment manufacturers recommend changing the Base Number of cylinder oil from 70 to a lower Base Number, such as 40. Cylinder oils with lower BN are crucial for the neutralisation of sulphur in fuel and reduce the risk of liner scuffing.

In July 2023, International Maritime Organization(IMO) Member States established a strategy to control the emissions from ships. The plan is called the 2023 IMO Strategy on Reduction of GHG Emissions from Ships. The Marine Environment Protection Committee (MEPC 80) includes the target of net zero GHG emissions by 2050.

To achieve the targets, existing fuel will be blended with other additives or chemicals to reduce its So_x, NO_x, CO_2, and other GHG emissions. The utilisation of biofuel is a major step forward in ISO 8217:2024 Marine Fuel Standards. Although biofuel offers a great reduction in its emissions however, it does not have net zero emissions.

The Marine Environment Protection Committee (MEPC) and all players in shipping industries are finding ways to decarbonise and introduce low to zero-carbon fuels. Several options are under consideration, such as Fatty Acid Methyl Esters (FAME), Cashew Nutshell Liquids (CNSL), and waste cooking oil to be blended with the fuel at 1%. However, the challenges are yet to be solved. For example, the addition of CNSL improves fuel's lubricity and energy content. However, its high acidity causes poor combustion characteristics and makes it corrosive.

In 2022, CNSL-blended fuel caused operational challenges, particularly in the Amsterdam- Rotterdam- Antwerp (ARA) region. The reported issues included:

- Accelerated wear of fuel pump components
- Cracks and scratches in fuel systems
- Poor engine performance and loss of power

In general, CNSL-blended fuel experiences late ignition that can cause the production of not favourable combustion products, higher exhaust temperatures, and yield significant carbon deposits. These characteristics contribute to lower

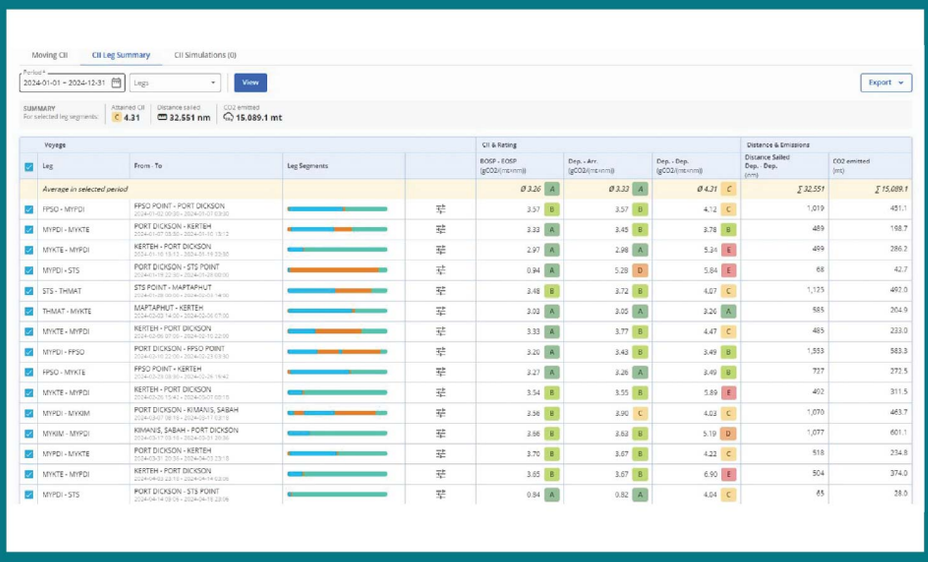
power production and engine efficiency will drop significantly. Between 2023 and 2024, the use of Cooking Oil Methyl Ester (UCOME) became a great option as a biofuel blend. This blend is considered to be more stable and comply with regulatory requirements including GHG emissions, Energy Efficiency Design Index(EEDI), Energy Efficiency Existing Ship Index(EEXI), Carbon Intensity Indicator and MARPOL Annex VI, Regulation 18.3.2. However, this blend has a higher price compared to the FAME blends.

Why do the FAME blends are considered more stable and have a higher demand? There are five points to be considered in the selection of the FAME blends:

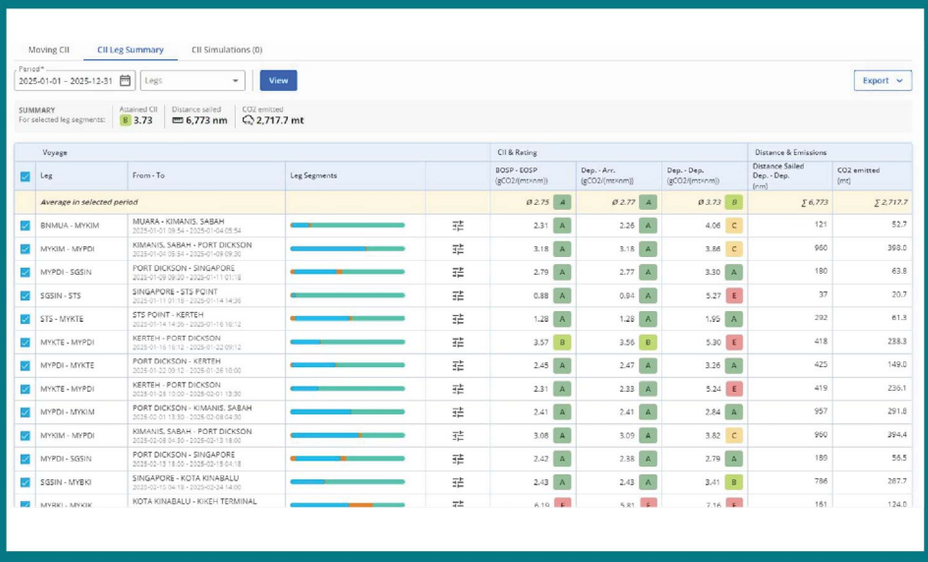
1. **Oxidation stability**
   The fuel can be oxidised and destabilized quickly. As it destabilizes, the fuel becomes darker, viscous, and more acidic.
2. **Cold-flow properties**
   The risk of keeping the fuel below the recommended temperature can lead to filter clogging and increase its pour point.
3. **Corrosive characteristics**
   With the BN 40, the neutralisation is adequate to avoid sulphuric acid corrosion and scuffing of the liners in internal combustion engines.
4. **Microbiome breeding**
   Low risk of microorganisms proliferation that can spoil the fuel.
5. **Calorific value**
   Compared to the CNSL blends, FAME blends have 10% higher calorific values of energy content.

Is my biofuel truly a sustainable fuel alternative?

FAME blends can include a varying mix of the different methyl esters, depending upon the feedstock source. For example using Palm Oil, Sunflower Oil, or beef tallow, will produce different



CARBON INTENSITY INDICATOR(CII) - 2024.



CARBON INTENSITY INDICATOR(CII) - 2025.

FAME blends. FAME compounds are typically in the range of C14 to C20 alkanes. To ensure sustainability, the fuel supplier must ensure that Proof of Sustainability is present before bunkering the fuel.

The Proof of Sustainability indicates the percentage of blend mixed into the Very Low Sulphur Fuel Oil (VLSFO). The raw material and the energy content value are stated in this certificate. This blend drastically reduced the Carbon Intensity Index which requires complying with every year's target by the vessel's class.

My vessel had been part of this biofuel usage testing. The CII index dropped to class B upon the usage of biofuel. As per calculations, the emission of CO_2 dropped significantly and reduced the GHG emissions to achieve the MARPOL Annex VI target in 2050.

Proof of Sustainability (PoS) for Biofuels, Bioliquids and Biomass Fuels V3.0

Applies under the Renewable Energy Directive (EU) 2018/2001 (RED II)

ISCC International Sustainability & Carbon Certification
www.iscc-system.org

Unique Number of the PoS:	EU-ISCC-Cert-DE105-87148405-A240022893-01
Date of Issuance of the PoS:	1-Nov-24

Supplier	Recipient
Name: BP Singapore Pte Ltd	Name:
Address: 7 Straits View #26-01, Marina One East Tower, Singapore 018936	Address:
Certification System: **ISCC EU**	
Certificate Number: EU-ISCC-Cert-DE105-87148405	Contract Number: A240022893

Address of dispatch/shipping point of the sustainable material:	Vopak Singapore - Sebarok Terminal, 1 Pulau Sebarok, Singapore 118327
	☐ Same as address of supplier
Address of receipt/receiving point of the sustainable material:	Vopak Singapore - Sebarok Terminal, 1 Pulau Sebarok, Singapore 118327
	☐ Same as address of recipient
Date of dispatch of the sustainable material:	29-Oct-24

1. General information

Type of Product:	Biodiesel
Type of Raw Material	Used cooking oil (UCO)
Additional Information (voluntary):	
Country of Origin (of the raw material):	Thailand
Quantity:	213.093 m3/15°C ☐ m^3 ☐ metric tons
Energy content (MJ):	7,032,069 MJ
EU RED Compliant material[3]	☑ Yes
ISCC Compliant material (volunt.)[4]	☑ Yes
Chain of custody option (voluntary	Mass balance
Country of biofuel production	Malaysia
Start date of biofuel production[1]	21/10/2014
If applicable, start date of bioliquid/biomass fuel use[1,2]	

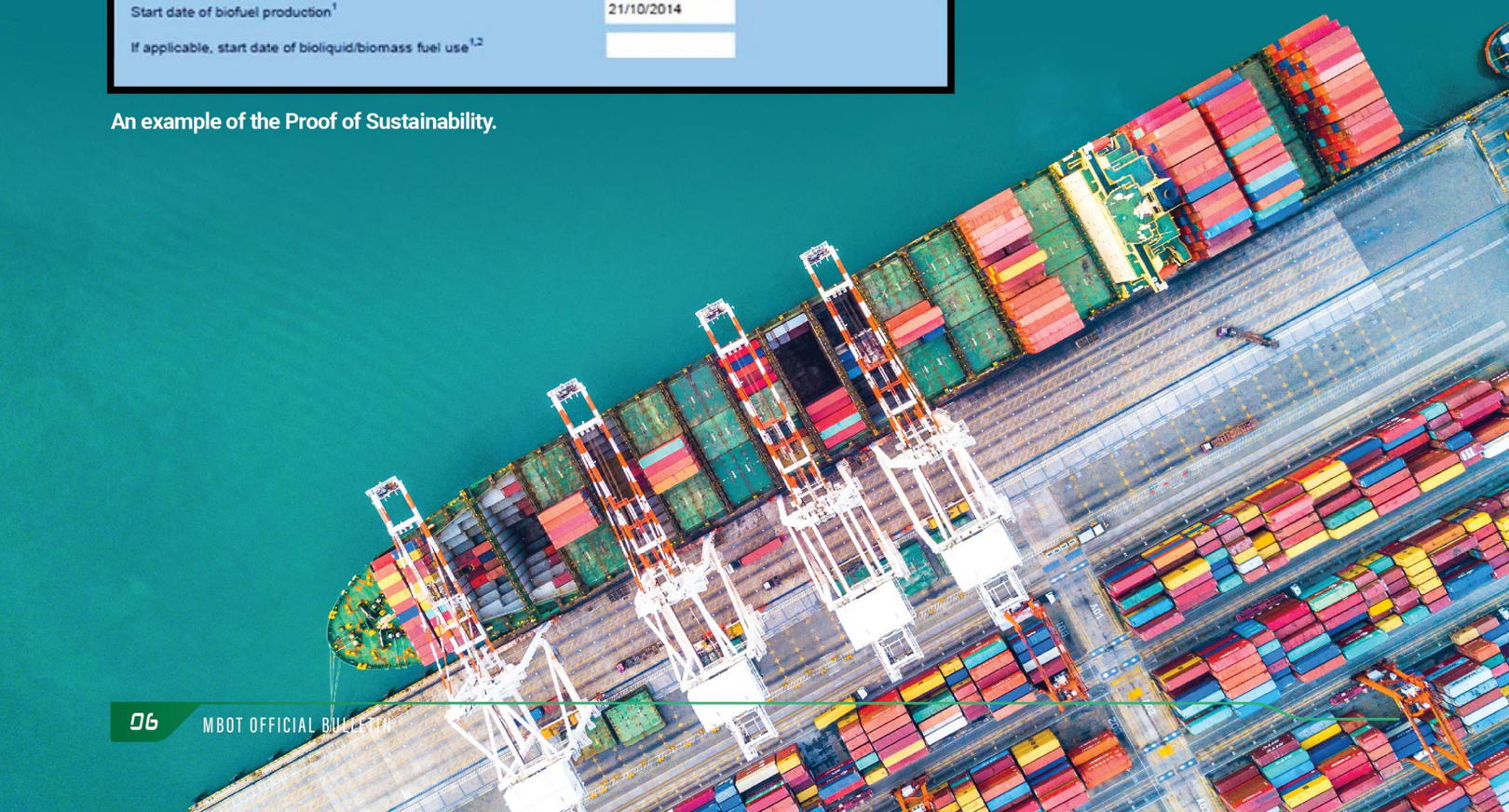
An example of the Proof of Sustainability.

Summary
As decarbonisation and legislation drive the development of low-to-zero carbon fuel. The demand for biofuel is growing exponentially, especially in B10-B30 blends, particularly in Europe and Singapore. Biofuel provides an excellent way to achieve immediate reduction in emissions.

In addition, ISO8217:2024 now recognises biofuels containing such as Fatty Acid Methyl Esters (FAME), but this revision is still not a comprehensive test slate, which has led to fuel analysis company developing the APS-Biopackages to provide correct specifications of fuel usage onboard.

All of these collective efforts indicate that the shipping industry is well on its way to decarbonisation goals, but many challenges need to be overcome. In the next 10 years, the vessels will be not the main contributor to GHG emissions, air pollution, and release of harmful gases to the environment. The target for 2050 is to ensure net zero carbon emissions.

The use of biofuel is one of the steps to achieve the target of a clean environment in the shipping industry.



Drive Business Value Through Sustainability Practices

an interview with

CHARLOTTE WOLFF-BYE

Vice President and Group Chief Sustainability Officer
PETRONAS

PERSONAL BACKGROUND AND LEADERSHIP

Charlotte, PETRONAS has had a significant impact on Malaysia's energy sector and sustainability efforts. Can you share your journey and how your leadership has shaped Malaysia's approach to energy transition and sustainability?

Throughout my career, I've gained international experience across different sectors, including steel, mining, and telecommunications. Over the past decade, I have dedicated myself to the energy industry, with the clear aim to drive business value through sustainability practices.

I've held this post at PETRONAS for four years now, and my role involves developing the sustainability component of our business strategy and operations, cultivating a sustainability mindset and culture within PETRONAS and mobilising resources to deliver on our objectives at scale and speed.

As Malaysia's national oil company, PETRONAS shoulders broader responsibilities compared to peer companies that operate purely in response to market conditions.

We contribute to the nation's development, and we must ensure that energy demand is met while balancing affordability and sustainability. This is critical because reliable and accessible energy is the foundation for economic growth - the energy sector is a major source of national income in Malaysia.

At the same time, our nation's energy supply is dominated by coal, oil and gas. According to the International Renewable Energy Agency, fossil fuels provided over 95% of Malaysia's total primary energy mix over the past decade.

Consequently, the energy sector is the largest contributor to greenhouse gas emissions in Malaysia, accounting for close to 80 per cent of total emissions as reported in Malaysia's fourth Biennial Update Report to the United Nations Framework Convention on Climate Change.

So, it is imperative for PETRONAS' business strategy to complement Malaysia's policies and initiatives related to sustainability and decarbonisation.

The PETRONAS Energy Transition Strategy has three main thrusts, which are: Core Business - providing more energy with fewer emissions, New Business - capturing new cleaner growth opportunities, and achieving Net Zero Carbon Emissions by 2050.

Since 2012, we have reduced cumulative emissions by more than 22 million tonnes of carbon dioxide equivalent (MtCO2e). Over the past seven years, we have managed to reduce more than half the carbon intensity of our upstream operations.

Our strategy is being realised and I am very proud of the substantial progress that we are making. Since 2012, we have reduced cumulative emissions by more than 22 million tonnes of carbon dioxide equivalent (MtCO2e). Over the past seven years, we have managed to reduce more than half the carbon intensity of our upstream operations.

In 2024, we achieved an important milestone in our efforts, when we recorded 46.0 MtCO2e of greenhouse gas emissions, which is well within our 2024 target of limiting Malaysian operational greenhouse gas emissions to below 49.5 MtCO2e.

Another notable achievement is a more than 60 per cent reduction in methane emissions from our Groupwide natural gas value chain operations, exceeding our 2025 target of a 50 per cent reduction from a 2019 baseline. Our 2030 target of a 70 per cent reduction is now within reach. Accelerating reduction in methane emissions is important, given methane's potent impact on global warming and Malaysia being a signatory to the Global Methane Pledge that promotes a 30 per cent reduction in national methane emissions by 2030.

Going forward, we'll continue to drive down our operational emissions through four main levers, which are: energy efficiency, electrification, zero routine flaring and venting, and carbon capture and storage.

We also launched the PETRONAS Supplier Support Programme in 2024, which will help Malaysia's oil and gas services and equipment suppliers to become more sustainable in support of Malaysia's National Energy Transition Roadmap.

Sustainability is more than about emissions reductions and this is why our strategic priorities also include the ethos of 'thriving with nature' and 'fostering a just transition'.

CARBON RECORDS

Some of our readers may not be familiar with the term 'carbon records'. Could you explain what carbon records are and how they help scientists understand both Earth's past and current climate conditions?

Carbon records can refer to direct measurements of carbon emissions or indirect measurements from various sources that infer historical carbon levels.

Today, satellites and atmospheric monitoring stations allow scientists to monitor and track levels of atmospheric carbon dioxide directly. But these records only go back a few decades and are unable to provide a picture of how the earth's climate changed over hundreds and thousands of years.

To understand carbon data further back in time, we need to use carbon records derived through indirect records, or "proxy data", from various environmental indicators such as tree rings, sediment layers and ice cores.

For example, ice cores in Antarctica and Greenland have trapped air bubbles that contain trace amounts of ancient atmosphere. Scientists and researchers can analyse the gases in these bubbles and reconstruct carbon dioxide levels up to hundreds of thousands of years back.

Carbon records, and international scientific collaboration, remain important because they allow us to understand past climate patterns and help us to identify and calculate human contributions to climate trends. This in turn allows us to improve our climate projections.

CARBON DATA EXTRACTION AND ANALYSIS

What methods are used to extract and analyse carbon data, and how have technological advancements improved the accuracy and efficiency of this process?

There are many ways to extract carbon data, depending on the type of carbon record.

For example, to extract carbon records from ice cores, researchers drill deep inside ice sheets and collect ice cores in the shape of cylinders.

Ice sheets build up over thousands of years from deposits of snowfall. These layers hold tiny bubbles of atmosphere that include greenhouse gases such as carbon dioxide. These air bubbles are extracted by scientists by melting, crushing, or grating the ice in a vacuum.

To analyse the age of the ice layers, scientists use various methods including measuring the chemical composition of the ice and using computer modelling.

FUTURE OUTLOOK AND ADVICE

Looking ahead, where do you see the energy sector in Malaysia in the next 10-20 years, especially in terms of clean energy adoption and carbon reduction? What advice would you give to young professionals passionate about addressing climate change?

Obviously no one can predict the future, but 20 years from now would be just 5 years off from the year 2050,

which is when Malaysia aims to reach net zero emissions and when some of our young graduates today would be leaders of PETRONAS.

If the nation stays the course in support of the Paris Climate Agreement and the whole of society unites and works towards this cause, then I feel Malaysia will have a good chance of becoming a 'lower carbon economy' with strong competitive attributes for future growth.

Many of the ingredients to make the energy transition a success are in place. For example, we have the National Energy Transition Roadmap – which PETRONAS is supporting - that sets six energy transition levers for Malaysia to shift towards more sustainable energy sources. The National Climate Change Policy 2.0 just came out last year, and the Climate Change Act is on its way.

These developments will help steer the energy sector towards a lower carbon future in the next 10 to 20 years, which will see an improved emissions profile for oil and gas production, diversification of renewable energy sources and innovative energy solutions will play important parts in the national energy system.

Internationally, the world is already experiencing bumps on the road, where the competing priorities of energy access, affordability, and security are adding political, economic, and social pressure on national leaders to reconsider policy ambitions. Yet, the energy industry takes a long-term perspective and the decarbonisation trend remains solid. I am cautiously optimistic that with focused delivery and the correct investments, Malaysia can achieve its climate goals.

"If the nation stays the course in support of the Paris Climate Agreement and the whole of society unites and works towards this cause, then I feel Malaysia will have a good chance of becoming a 'lower carbon economy' with strong competitive attributes for future growth.

For young professionals who are passionate about contributing towards the sustainable development of Malaysia, my advice would be to equip yourself with the right skills that will allow you to contribute to the science and engineering that is needed to halt and adapt to climate change. There is tremendous global demand for "green skills" and expertise across many sectors – from consulting and energy to transportation and other industries – so look for a field that interests you and work towards building your knowledge and experience. This has also been my own journey.

By Ts. Muhammad Firdaus bin Rosli, Industrial Registered Energy Manager

Energy Transition in Malaysia: A Sustainable Future for Environment, Society, and Economy

Malaysia is at a crucial juncture in its energy transition journey, balancing economic growth with environmental sustainability. The country's reliance on fossil fuels to power its development for decades has been interrupted by increasing concerns over climate change and carbon emissions. To address these concerns, Malaysia has begun shifting towards renewable energy sources. The National Energy Transition Roadmap (NETR) is a key initiative to drive this change, ensuring a greener future while fostering economic prosperity and an improved quality of life.

Environmental Health: A Cleaner and Greener Malaysia

The most pressing reason for Malaysia's energy transition is the urgent need to mitigate environmental pollution and improve public health. Fossil fuel combustion, especially from coal-fired power plants, releases harmful greenhouse gases (GHGs) and air pollutants like sulphur dioxide (SO_2) and nitrogen oxides (NO_x). These gases cause respiratory diseases and climate change.

The transition to renewable energy— primarily solar, hydro, and biomass—can significantly reduce carbon emissions. Malaysia's abundant sunshine offers immense potential for solar energy, and hydroelectricity provides a sustainable alternative to coal and gas power plants. By expanding the utilisation of these clean energy sources, Malaysia can improve air quality, protect natural ecosystems, and reduce the impact of climate-related disasters like flooding and rising temperatures.

Moreover, sustainable energy policies promote responsible land use and conservation efforts. For instance, integrating solar farms with agricultural land can enhance biodiversity, while biomass energy production from palm oil waste reduces deforestation rates. As Malaysia advances its energy transition, the long-term benefits for environmental health will be profound, ensuring cleaner air, safer water sources, and a more resilient ecosystem.

New Social Life: A Shift Towards Green Lifestyles

The energy transition is not just about infrastructure and policy changes; it also brings significant shifts in social life. As Malaysia moves toward renewable energy sources, the public must adopt greener lifestyles, including energy-efficient practices, electric vehicle (EV) adoption, and sustainable consumption habits.

With government incentives for EVs and improved public transport networks, urban mobility will transform, reducing dependency on fossil fuels and lowering urban air pollution. More Malaysians will shift from conventional petrol-powered vehicles to EVs, leading to cleaner cityscapes, reduced noise pollution, and healthier living environments.

Additionally, as renewable energy sources become more prevalent, communities will have greater access to decentralized and off-grid power solutions, especially in rural areas. Solar panels and microgrid systems can bring electricity to remote villages, improving education and healthcare access while reducing reliance on diesel generators.

Another significant social impact is the rise of job and educational opportunities. The growing renewable energy sector will require a skilled workforce, prompting educational institutions to develop courses in sustainable energy management, environmental sciences, and green technology engineering. This shift will create new career pathways and inspire younger generations to participate in Malaysia's sustainable development.

Economic Blooming: Green Investments and Job Creation

The energy transition presents vast economic opportunities for Malaysia. By embracing renewables and clean technologies, the country can attract both local and foreign direct investments in green industries. The shift to a sustainable economy is expected to increase Malaysia's GDP by RM220 billion by 2050 and create approximately 310,000 new jobs across various sectors.

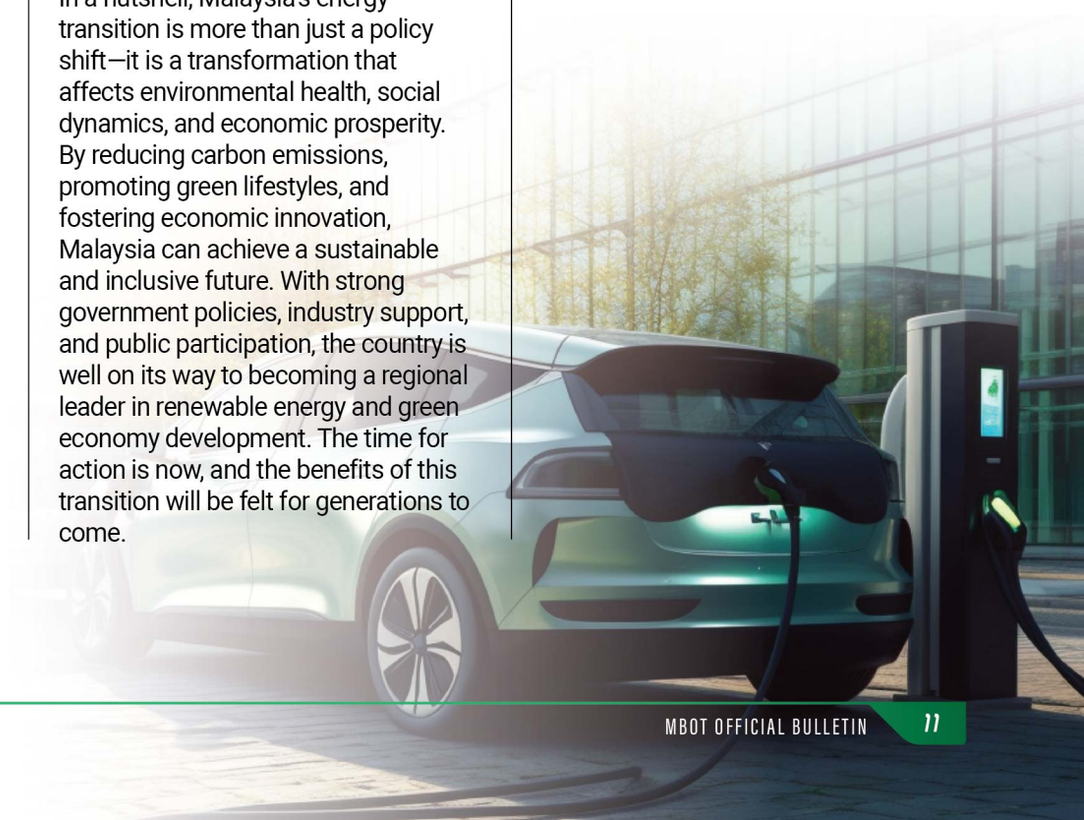
Investment in solar, wind, and hydroelectric energy projects will boost Malaysia's position as a leader in renewable energy within the ASEAN region. Companies involved in solar panel manufacturing, energy storage solutions, and green hydrogen production will benefit from government incentives and international partnerships.

Moreover, the energy transition promotes energy independence, reducing Malaysia's reliance on costly fossil fuel imports. By generating more electricity from local renewable sources, the country can stabilise energy prices and improve national energy security. Lower energy costs will benefit businesses, making Malaysia more competitive in the global market and encouraging sustainable industrial growth.

Beyond direct investments in renewable energy, energy efficiency programs will also play a crucial role in economic growth. Energy-efficient buildings, smart grids, and sustainable urban planning will reduce overall energy consumption and operational costs for businesses and households alike. With a better energy management approach, Malaysian industries can enhance their productivity while minimizing environmental impact.

In a nutshell, Malaysia's energy transition is more than just a policy shift—it is a transformation that affects environmental health, social dynamics, and economic prosperity. By reducing carbon emissions, promoting green lifestyles, and fostering economic innovation, Malaysia can achieve a sustainable and inclusive future. With strong government policies, industry support, and public participation, the country is well on its way to becoming a regional leader in renewable energy and green economy development. The time for action is now, and the benefits of this transition will be felt for generations to come.

“Moreover, the energy transition promotes energy independence, reducing Malaysia's reliance on costly fossil fuel imports. By generating more electricity from local renewable sources, the country can stabilise energy prices and improve national energy security. Lower energy costs will benefit businesses, making Malaysia more competitive in the global market and encouraging sustainable industrial growth.



MBOT-JPK JOINT RECOGNITION'S ROADSHOW

The Malaysia Board of Technologists (MBOT) and the Department of Skills Development (JPK) organised a roadshow to disseminate information related to the MBOT-JPK Joint Recognition for accredited centres and training providers. This roadshow aims to strengthen inter-agency collaboration to recognise training institutions and raise awareness about Professional Technical Certification. Forty-nine representatives from accredited centres and training providers across the East Zone participated in this roadshow.

The roadshow was graced with the presence of Ts. Dr. Mahaletchumy Arujanan, Chairperson of the Technology and Technical Professional Development Council and Board Member of MBOT. The Registrar of MBOT, Dr. Md Fauzi Md Ismail was presence at the roadshow.

Three speakers shared their thoughts throughout this roadshow. The first speaker, Ts. Mad Zufri Ismail from JPK shared his insights on the national direction for skills development. He emphasised that JPK's has an important role in advancing the Technical and Vocational Education and Training (TVET) sector. Then, the presentation by Mrs. Mek Eshah Awang from the Skills Development Fund Corporation (PTPK) provided an overview of the availability of various training financing schemes. The third speaker, Mrs. Nur Sakinah binti Ishak had asserted the importance of Professional Technical Certification offered by the Technology and Technical Professional Development Council of MBOT.

/mbot registration

59,241	12,854	25,720	3,623
Graduate Technologists	Qualified Technicians	Professional Technologists	Certified Technicians

101,438 Total MBOT Registrants (As of April 2025)

TECHIES is published by the Publication Committee of the Malaysia Board of Technologists.