Towards a World-Class Energy Sector

Suruhanjaya Tenaga
Energy Commission

ENERGY MALAYSIA

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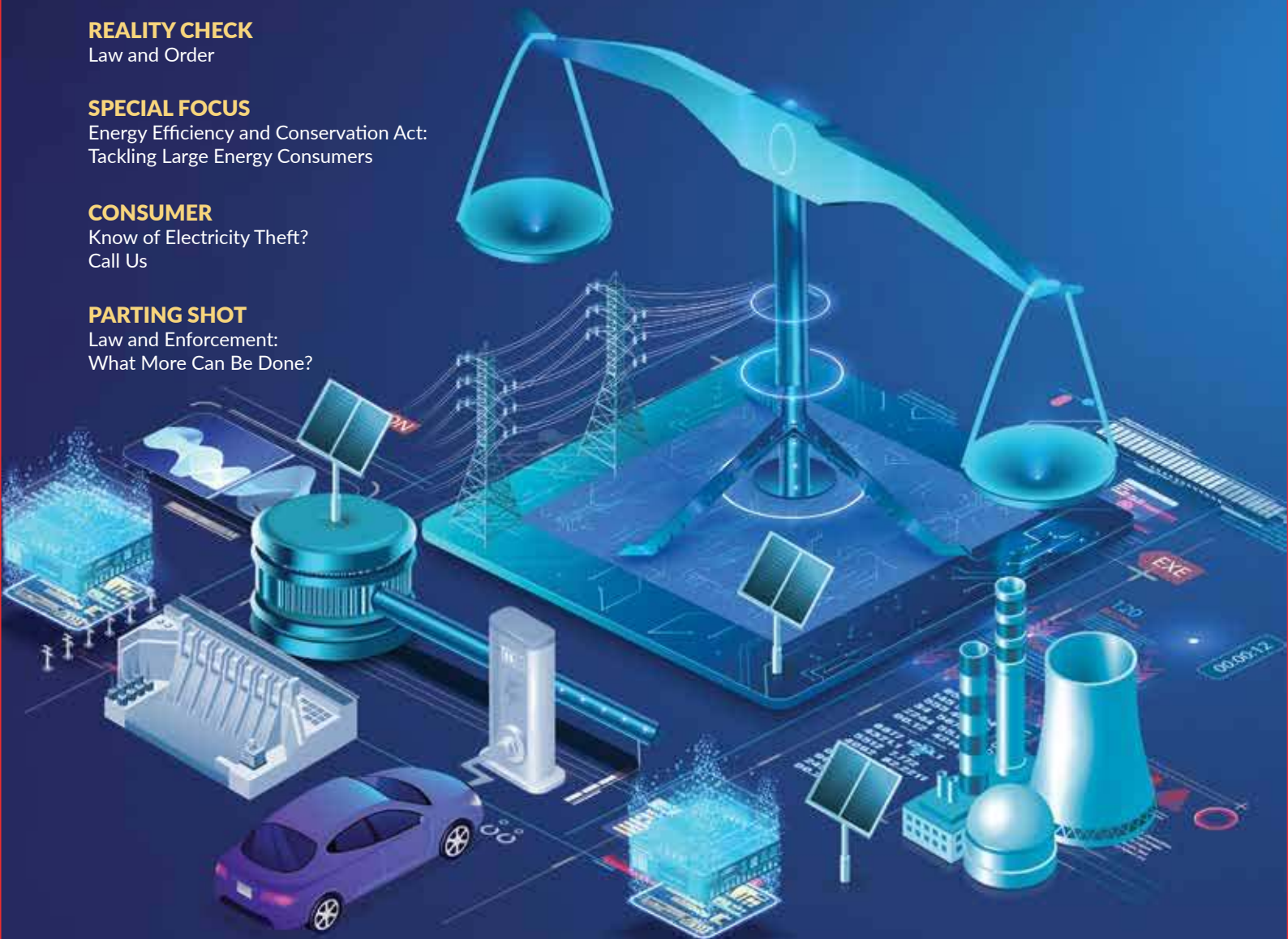

RENEWABLE ENERGY SPACE

IS THERE A NEED FOR REGULATORY CHANGES?

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Be Energy smart

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REGULARS

FEATURES

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REVIEWING OUR REGULATORY ENVIRONMENT

In this issue, we take a look at the laws governing the Commission and the energy industry at large, and how we enforce them as well as the challenges to be addressed as we navigate the energy transition.

Our Cover Story "Renewable Energy Space: Is There a Need for Regulatory Changes?" tells us that change is already upon us. The national call for 70% renewable energy (RE) by 2050 means Malaysia needs to pull out all stops to establish a vibrant RE space that is attractive to investors and cross border trading.

On our radar are six areas that may require a revision of regulations, namely, investment; grid integration and infrastructure; market access and competition; cross border trading; energy efficiency and conservation; and emerging technologies. While our main intention is to protect both investors and consumers from potential malpractices and fraudulent activities, an overly stringent or complex regulatory framework can become a barrier. Besides, we also need to ensure that our RE ecosystem is business-friendly.

The Electricity Supply Act 1990 [Act 447] that has been used to regulate the electricity supply industry is now being reviewed to facilitate fair and competitive cross border trading. So are subsidiary laws relating to the Single Buyer, licensees and a new entity that is to become the implementor of the Energy Exchange Malaysia (ENEGEM). ENEGEM is a milestone for us. This energy trading platform, which is aligned to international conventions, ensures that the system is secure, reliable and upholds the principles of fairness and sustainability.

Legislation takes time, as shown by the Energy Efficiency and Conservation Act 2024 [Act 861] that took five years (slowed by the COVID-19 pandemic) before it was passed in Parliament in 2023. We were a key party involved in the drafting of the bill to ensure the prudent use of energy, especially by large consumers. The Act targets industrial and commercial users who consume more than 21,600 GJ of energy per year, says our Special Focus story "Energy Efficiency & Conservation Act: Tackling Large Consumers." Through the Act, the Commission aims to balance demand and supply, so demand does not go out of control and leave our energy sector in a void that can't be filled, adds the story.

In our Reality Check segment, the story "Law & Order" looks at prevailing laws and regulations, and challenges faced by our enforcement officers. Electricity theft is on the rise, and the story highlights the hot spots and common violations. The Commission works with several enforcement agencies to bring to heel lawbreakers.

We need public assistance to nab offenders, says our Consumer story "Know of Electricity Theft? Call Us". Whistleblowers stand to gain should their cases end up in court, earning as much as

DATO' IR. TS. ABDUL RAZIB DAWOOD
Chief Executive Officer, Energy Commission

"The Electricity Supply Act 1990 [Act 447] that has governed us since the Commission began operations in 2001 is now being reviewed."

50% of the value of fines imposed on guilty parties, says the story. It is troubling to learn that many offenders consider utilities as big profitable companies that can afford to manage losses incurred by electricity theft. For the Commission, one of our concerns is that electricity theft carries the risk of power overloads and short circuits that can cause property damage, even jeopardise lives.

Our Parting Shot segment delves deeper into the wave of electricity crimes with the story "Law & Enforcement: What More Can Be Done?" The hard-hitting article takes to task energy companies and enforcement authorities. It suggests structural changes and technology solutions for energy companies; and robust law and enforcement strategies for regulators. More than anything, enforcement officials must uphold the highest standards of ethical conduct and act without fear or favour.

The story adds that electricity theft can be due to poverty, and calls for a culture of collective accountability and ethical behaviour within the industry, not only to enforce laws strictly but also to foster a shared dedication to sustainability, integrity and social responsibility that promotes fairness and inclusivity.

These are a few key feature stories in this issue, which also carries several other stories. We invite you to go through all stories for more insights of the energy industry.

Happy reading!

NEWS FROM MALAYSIA AND AROUND THE WORLD

MALAYSIA

TNB, Petronas to Jointly Explore Carbon Capture and Storage Technology

Tenaga Nasional Bhd. (TNB) has inked a Memorandum of Understanding (MoU) with Petroliam Nasional Bhd. (Petronas) to explore carbon capture and storage (CCS) technology for gas-fired power plants.

TNB Chief Executive Officer (CEO), Datuk Seri Baharin Din said, "The MoU strengthens the companies' commitment to the National Energy CCS and stands out as one of the key energy transition levers outlined in the NETR."

Petronas President and Group CEO, Tengku Tan Sri Muhammad Taufik said, "The complexity of the energy transition is a systemic challenge that will take work and cooperation with other sectors to achieve the target for carbon neutrality. With the combined experience and technical capabilities as owners of energy infrastructures, the company looks forward to accelerating the development and deployment of CCS technology as part of a decarbonised energy system."

Source: Business Times, 5 November 2023

Single Buyer to Be Carved Out of TNB to Manage Energy Exchange

Malaysia will soon have an energy exchange. But one that has an independent Single Buyer instead of a free market structure.

The proposal was approved by the Cabinet recently and entails a medium-term plan for the Single Buyer to be carved out of TNB to become independent, said Natural Resources, Environment and Climate Change Minister, Nik Nazmi Nik Ahmad. This independent Single Buyer will be responsible for the management of the energy exchange, he added.

"We believe an independent Single Buyer will provide market confidence. The Single Buyer is preparing the energy exchange and working together with the Energy Commission as well as the Ministry to make it happen."

Source: The Edge Malaysia, 14 November 2023

Implementing Carbon Tax, What Experts Say

Malaysia should consider various factors before implementing a carbon tax regime, which is gaining popularity globally, according to experts.

Deloitte Malaysia Country Tax Leader, Sim Kwang Gek said the implementation of a carbon tax must take into consideration the overall cost burden to businesses, especially small and medium enterprises, its legal framework as well as the availability and reliability of data.

Bank Muamalat Malaysia Bhd. Chief Economist, Mohd Afzanizam Abdul Rashid noted that revenue generated by a carbon tax can be used for capacity building for the green economy, such as electric vehicles (EVs) and renewable industries. At the same time, he said fossil fuel subsidies would need to be reduced in order to cut carbon emissions.

"We believe an independent Single Buyer will provide market confidence."

UCSI University Malaysia Assistant Professor in Finance, Liew Chee Yoong, who is also a Research Fellow at the Centre for Market Education, said one of the challenges in introducing a carbon tax is the existence of fuel subsidies. She said the proposed rationalisation of diesel subsidies as announced in Budget 2024 is a step in the right direction.

Taking an opposite view, Malaysia University of Science and Technology Economics Professor, Geoffrey Williams said a carbon tax would not benefit the country significantly as it would impose a huge burden on ordinary people with low income.

"The strategy for Malaysia is to over-produce electricity from renewable and clean energy sources and then to sell it to countries like Singapore, which want clean energy at low cost. Malaysia achieves net-zero by reducing the emissions of buyers, not from reducing its own carbon footprint. It will compete with Vietnam and other countries on this," he said.

Williams said the country can also contribute by providing rare earth resources used in green growth products. In other words, Malaysia benefits from the demand for green growth in other countries as a supplier of green growth solutions, he said.

Source: The Star, 27 November 2023

Malaysia Looking into Early Retirement of Coal Power Plants

Natural Resources, Environment and Climate Change Minister, Nik Nazmi Nik Ahmad said Malaysia was among the 10 countries or agencies invited to attend the launch of France's Carbon Transition Accelerator during COP28 held in Dubai.

"I mentioned we are considering a coal carbon reduction programme by launching a request for information to look into early retirement, mothballing, co-firing or brown

to green swaps. At a JPPPET meeting in 2022, I had already announced no new coal plants."

JPPPET is the Planning and Implementation of Electricity Supply and Tariff Committee.

Nik Nazmi said, "One of the challenges for early retirement in Asia, as acknowledged by the International Energy Agency (IEA) and Asian Development Bank (ADB), is that the coal plants are much younger than those in the West, and finding a financial solution for phasing out coal is challenging."

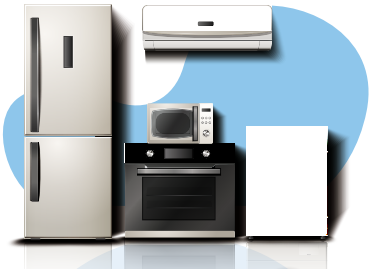
Source: The Star, 5 December 2023

SAVE 4.0 Programme Offers up to RM400 E-Rebate

The Sustainability Achieved via Energy Efficiency (SAVE) 4.0 programme offers an e-rebate of up to RM400 for the purchase of energy efficient electrical appliances.

When launching the programme, Natural Resources, Environment and Climate Change Minister Nik Nazmi Nik Ahmad said that RM50 million was allocated by the Electrical Supply Industry Trust Account (AAIBE) for SAVE 4.0. "Through this programme, our goal is to inspire more electricity users to adopt energy-efficient practices, leading to both energy savings and reduced electricity bills."

Source: Business Times, 10 December 2023



"Our goal is to inspire more electricity users to adopt energy efficient practices, leading to both energy savings and reduced electricity bills."

SEDA Aims to Take Lead in Bioenergy Clustering Initiative

The Sustainable Energy Development Authority (SEDA) aims to lead the charge for a more sustainable energy future by spearheading initiatives to promote bioenergy clustering. The Authority said in a statement that it looked forward to forging partnerships with key stakeholders to accelerate a responsible energy transition for Malaysia, and align them with global sustainability goals.

Source: Business Times, 11 December 2023

Energy Ministry: Putrajaya Laying Groundwork to Liberalise Electricity Market

Putrajaya has already begun work to lay the foundation needed to liberalise Malaysia's electricity market to pull in more renewable energy (RE) investments to fuel the nation's energy transition agenda.

The Government has identified three key agendas moving forward, namely, amending the Electricity Supply Act 1990, reforming the electricity tariff structure, and carving out the Single Buyer from TNB, said Mareena Mahpudz, Senior Undersecretary of the Electricity Supply Division, Ministry of Energy Transition and Public Utilities.

Source: The Edge Malaysia, 14 December 2023

Hydrogen Technology to Boost GDP by 2050

"The Malaysian economy is set for greater prosperity come 2050 with the Hydrogen Economy and Technology Roadmap (HETR), enabling the contribution of about RM1.5 trillion to the Gross Domestic Product (GDP) and creating 200,000 new jobs," said Science, Technology and Innovation Ministry Secretary-General, Datuk Dr. Aminuddin Hassim.

He said Malaysia is already on track to become a green nation with low carbon emissions, thanks to the recently launched HETR. Hydrogen is a clean-burning fuel that produces heat and electricity with only water vapour as a by-product. The HETR ties into the National Energy Policy 2022-2040 and National Energy Transition Roadmap (NETR).

He also said that hydrogen could be made with renewable resources such as solar, wind and hydropower, which Malaysia is rich in.

Source: The Sun, 20 December 2023

UAE's Masdar, Malaysia advance agreement to develop 10 GW of renewable projects

Abu Dhabi Future Energy Company, known as Masdar, said it had signed an agreement to advance the development of up to 10 GW of clean energy projects in Malaysia, building on a preliminary accord earlier this year.

The company said it had signed an "implementation roadmap" with the Malaysian Investment Development Authority (MIDA) to develop projects including solar power plants, wind farms and battery energy storage systems.

Malaysia's Prime Minister Datuk Seri Anwar Ibrahim had said in October the agreement with Masdar to develop renewables projects in the Asian nation was worth USD8 billion.

Source: Reuters, 1 December 2023

ECoS Takes Over Electricity Supply in Sabah

With effect from 3 January 2024, the Energy Commission of Sabah (ECoS) officially took over the regulatory authority of the state's electricity supply from the Energy Commission.

At the handover ceremony, the Energy Commission's CEO, Dato' Ir. Ts. Abdul Razib Dawood said that regulatory authority covers economic, technical, and electrical safety. "The Energy Commission is confident that ECoS is fully prepared to take over the regulation of electricity supply in Sabah and will continue to provide support whenever necessary, and the two parties will continue to work together.

"The Energy Commission is confident that ECoS is fully prepared to take over the regulation of electricity supply in Sabah."

"The Energy Commission will also open an office in Labuan to ensure the regulation of electricity supply on the island runs smoothly, following the decision to maintain supply there under the Federal Government," he added.

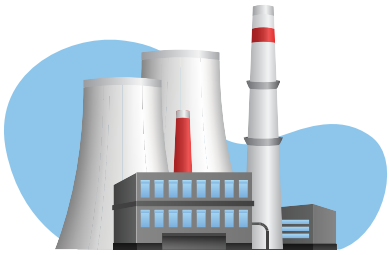
Source: Borneo Post, 3 January 2024

Nuclear Energy Can Help Nation Achieve Net-Zero Target By 2050, Say Experts

While RE is widely touted as the future of energy to reduce greenhouse gas (GHG) emissions into the atmosphere, nuclear power is increasingly being discussed as a necessary part of the energy mix.

Former Special Advisor to the Director General of the International Atomic Energy Agency (IAEA) and Director of Nuclear Security at IAEA, Raja Datuk Dr. Abdul Aziz Raja Adnan said RE such as solar power still has limitations when used to generate base-load electric power, and nuclear energy could support to make it work and to ensure energy security.

Radiation protection consultancy Alypz Sdn. Bhd.'s Managing Director, Jailani Mustafa said nuclear technology has evolved significantly with the emergence of small modular reactors (SMRs), which require significantly less land compared with traditional nuclear plants.



Malaysian innovation and nuclear advocate, Sheriffah Noor Khamseah Al-Idid Syed Ahmad Idid said it is imperative for the Government to collaborate with other stakeholders to reach out to the Malaysian public to increase their awareness of nuclear energy.

Source: Bernama, 12 January 2024

Malaysia's First Large-Scale Green Hydrogen Production Project

Semarak Renewable Energy Sdn. Bhd. (Semarak RE) and PowerChina International Ltd's unit, China Hydropower (Malaysia) Co Ltd, have signed a RM1.88 billion agreement to develop Malaysia's first large-scale green hydrogen production project utilising floating photovoltaic power generation.

The venture in Perak will involve the development of green hydrogen production and storage by deploying floating photovoltaic power generation, contributing to the shift towards sustainable energy.

Source: Business Times, 17 January 2024

Government Approves 22 RE Projects

The Ministry of Energy Transition and Public Utilities via SEDA has approved the development and implementation of 22 RE projects based on biogas and biomass with a capacity of 36.534 MW. The green electricity produced under the Feed-in Tariff (FiT) mechanism would be supplied to TNB as early as 2027, said the Ministry in a statement.

The Ministry said this encompassed 21 projects with a total quota of 29.534 MW for the generation of green electricity from biogas and one project with a quota of 7 MW for electricity generation from biomass.

Source: The Star, 18 January 2024

Integrated Clean Energy Initiative to Revolutionise Landscape, Attract RM12 Billion Investments

The Integrated Clean Energy (TBB) programme 2024 will generate economic spillovers in the form of direct investments worth RM12 billion, and create at least 36,000 job opportunities for the people, said Deputy Prime Minister, Dato' Sri Fadillah Yusof.

Dato' Sri Fadillah, who is also the Energy Transition and Public Utilities Minister, said the programme would also support Malaysia's desired energy transition and carbon footprint reduction initiatives.

"This enhancement will be managed comprehensively, giving priority to the reliability of the supply system, consumer affordability and resource sustainability," he said in a statement in conjunction with International Day of Clean Energy.

Source: Business Times, 26 January 2024

Malakoff Champions Biomass Co-Firing in Malaysia

The Managing Director and Group CEO of Malakoff Corporation Bhd., Anwar Syahrin Abdul Ajib said that the viability of thermal power plants is still relevant in the energy industry. This is because thermal plants can produce electricity with higher efficiency and provide power supply security for the country.

Winner of the Independent Power Producer of the Year award for biomass co-firing at Enlit Asia 2023, Malakoff's existing thermal power plants supply 24.1% of Peninsular Malaysia's total electricity generation. One of Malakoff's key initiatives to significantly reduce GHG emissions involves the decarbonisation of its largest thermal plant with a 2,100 MW capacity through biomass co-firing.

"Many existing coal-fired power plants can be adapted for biomass co-firing, whereby biomass is burned alongside coal. This allows for a gradual transition without significant infrastructure changes," said Anwar Syahrin.

Source: theedgemalaysia.com, 19 February 2024

Energy Commission, TNB Raids Uncover Bitcoin Mining Operations in Penang

A double-storey terrace house in Hijauan Hills and nearby business premises in Penang were raided by the Energy Commission and TNB for suspected electricity theft for bitcoin mining. Nine machines were also seized from an upstairs room of the house, which was the base for illegal bitcoin mining activities.

Energy Commission's Regional Director for Penang, Kedah and Perlis, Muhamad Azmi Ishak stated that the raid was conducted following a two-month investigation and marks the first case in the northern region involving the illegal tapping of electricity for bitcoin mining. "Previously, bitcoin operations were typically carried out on-premises, but now the syndicate has changed its modus operandi to residential areas to deceive the authorities. "We don't hear noise from the machines because the room is soundproofed," he told reporters after the raid.

Muhamad Azmi cautioned that the syndicate's actions of making illegal connections posed a danger to residents living nearby as the high electricity usage could lead to short circuits and fire hazards because the machines operated 24 hours without interruption. In the light of this, he urged the public, especially in residential areas, to report any suspicious activities to enable investigations and prevent such incidents.

Source: Bernama, 22 February 2024

INTERNATIONAL

Indonesia Inaugurates Southeast Asia's Largest Floating Solar Farm

Indonesia has inaugurated a USD100 million floating solar farm, the largest in Southeast Asia, as it seeks more opportunities to transition to green RE.

Cirata floating solar farm, which is expected to generate enough electricity to power 50,000 households, is built on a 200-hectare (500-acre) reservoir in West Java, about 130 kilometres from the capital, Jakarta.

At 192-megawatt peak (MWp), the farm currently generates enough power to supply electricity for the Cirata area.

Source: Malay Mail, 12 November 2023

Britain's Energy Regulator Launches Rules to Speed Up Grid Connection

Britain's energy regulator announced rules to help speed up the connection of new power projects to the grid and clear so-called zombie projects from the connection queue.

Regulator Ofgem said the current "first come first served" process for grid connection has led to a long queue of projects with a backlog of up to 15 years. Under the new rules, projects in the connection queue that have stalled or are unlikely to be built will be stripped out, making room for viable projects.

"We want new power on the grid as quickly as possible, so if you're ready, you can connect sooner. If you're not ready and are blocking the progress of others, you'll be removed," said Eleanor Warburton, Ofgem's Deputy Director for Institutions for Net Zero Energy Systems Management and Security.

Source: Reuters, 13 November 2023

Abu Dhabi Opens One of the World's Largest Solar Projects Ahead of COP28

Abu Dhabi has inaugurated the 2 GW Al Dhafra solar power plant, one of the world's largest solar projects, as it moves ahead with plans to expand its RE capacity and achieve its net-zero emission targets.

The Emirates Water and Electricity Company will procure the electricity supplied by the plant. It will power 200,000 homes and is expected to reduce Abu Dhabi's carbon emissions by

"The current "first come first served" process for grid connection has led to a long queue of projects with a backlog of up to 15 years."

more than 2.4 million tonnes a year, equivalent to removing about 470,000 cars from the road.

The project, said to be the world's largest single-site solar power plant, will raise Abu Dhabi's solar power production capacity to 3.2 GW.

Source: N Business, 16 November 2023

No More Coal Plants, Says Cambodian Prime Minister

Prime Minister, Hun Manet declared that Cambodia will not have any new coal-based power plants, underscoring the country's commitment to green energy.

Presiding over the ground-breaking ceremony of the 150 MW Upper Ta Tai Hydropower Dam in Koh Kong province's Thmar Baing district, Hun Manet laid out the policy of the Government's green energy priority.

"The Cambodian Government is setting a policy to ban coal-fired power plants in the country," the Prime Minister said at the ceremony. "No need to come to Cambodia if someone wants to invest in coal-fired power plants because the Government will not allow it," he said.

Hun Manet added that recently the Government decided to stop the construction of a coal-fired power plant in the Koh Kong province, which can provide up to 700 MW of electricity.

"Coal-fired power plants damage the environment and Cambodia cannot ignore environmental issues," the Prime Minister noted. Instead, the Government would strive to generate more RE from hydropower, solar and biomass. A good part of Cambodia's RE comes from hydropower dams.

Source: Khmer Times, 1 December 2023

EU's Electric Dreams Short-Circuited by EV Charging Gridlock

Electric vehicle (EV) drivers hoping to top up their batteries at one of Repsol's 1,600 Spanish charging stations might well be disappointed, with nearly half lying dormant because they have no power connection.

Such gaps are evident across the European Union (EU), where last week the European Commission announced plans to upgrade the bloc's power grids. These are due to be implemented in 18 months and include addressing EV charging station power shortages.

But despite the declarations of its leaders, red tape is preventing progress towards greener transport in the EU that is on the rise, with permitting one of the major roadblocks.

Industry group ChargeUp Europe said that while the Commission recognised permitting was a problem, it had not proposed any concrete tools or actions. Specific guidelines for member states to accelerate permitting are only expected at some point over the next two years, the plan's timeline shows. This is slowing down the rollout of charging hubs across the 27-member bloc, putting EU targets to phase out petrol and diesel vehicles, as well as its broader climate goals, in peril.

The electrification of transport is one of the key pillars underpinning the EU's goal of reaching carbon neutrality by 2050. To do so, it will ban sales of carbon-emitting vehicles from 2035 and wants to develop a network of EV charging stations.

Source: Malay Mail/Reuters, 4 December 2023

"Battery of Southeast Asia" Plans Move Forward as Laos Enhances Trade Capacity with Cambodia

Laos and Cambodia have reiterated their commitment to enhancing energy trade between the two countries, following the establishment of a 500 kV transmission line in the southern Champasack Province of Laos to the border with Cambodia.

Laos currently supplies energy to Cambodia via a 115 kV transmission line between Champasack Province in Laos, and Stung Treng Province in Cambodia. With the implementation of the new 500 kV line, the transfer of energy is expected to become more efficient.

At present, Cambodia imports around 445 MW of electricity from Laos, with the aim of reaching 6,000 MW by 2030. The country currently imports 25% of its electricity from Laos, Vietnam and Thailand.

Source: The Star, 22 January 2024

ADB Commits Record Climate Finance of Almost USD10 Billion in 2023

The Asian Development Bank (ADB) committed a record amount of climate finance in 2023, to help its developing member countries (DMCs) in Asia and the Pacific cut GHG emissions and adapt to the impacts of a warming planet.

ADB committed USD9.8 billion in climate finance from its own resources last year— USD5.5 billion for mitigation and USD4.3 billion for adaptation — a more than 46% increase on its 2022 climate financing commitments.

The bank's climate adaptation finance commitments in 2023 means that ADB has provided more than USD10.4 billion in cumulative adaptation financing from 2019 to 2023, surpassing its target of USD9 billion in 2019-2024 a year early. Adaptation financing is critical in Asia and the Pacific, which is experiencing more extreme heat, droughts, and heavy rains, but where investments in adaptation remain a fraction of what is required.

Source: ADB Media Release, 31 January 2024

Germany Outlines USD17 Billion Plan to Subsidise Gas-to-Hydrogen Shift

Germany's Government has agreed on plans to subsidise gas power plants that can switch to hydrogen, the Economy Ministry said, with a price tag of USD17 billion in subsidies as part of efforts to supplement intermittent RE and speed up the transition to low carbon generation.

The announcement follows pressure from the industry, impatient for detail after the Government had promised the strategy last year as Germany counts on hydrogen to help the country move away from gas and coal.

The state support for companies to build and operate future hydrogen-ready gas power plants will total around €16 billion (USD17 billion), including capital and operating subsidies.

The Ministry said hydrogen transition plans should be drawn up by 2032 to enable the plants to be fully switched to hydrogen between 2035 and 2040.

Source: Malay Mail, 5 February 2024

IEA and Singapore to Set Up Regional Energy Centre

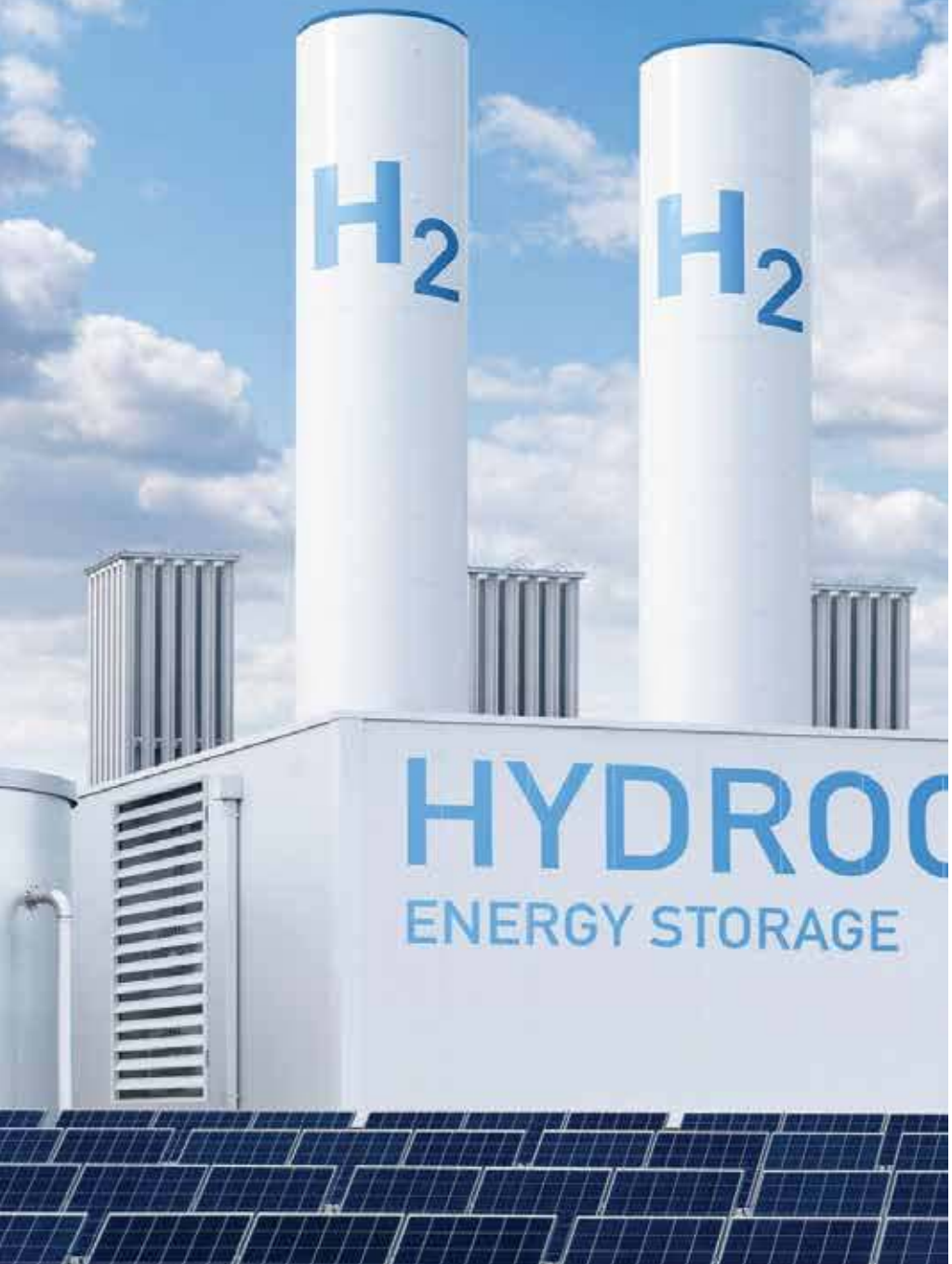
IEA is partnering Singapore to set up a regional office in the Southeast Asian nation to help drive Asia's shift to cleaner energy, the agency and the Singapore Government announced on 13 February 2024. IEA's Regional Cooperation Centre is expected to start operations in the second half of 2024, and it will be the agency's first office outside its Paris headquarters.

The Centre will provide policy guidance, technical assistance and training. It will also focus on deploying renewables and other clean energy technologies in the region, increasing cross-border power trade and improving access to finance for clean energy investments, the IEA and the Singapore Government said in a statement.

Source: The Straits Times, 14 February 2024

RENEWABLE ENERGY SPACE

IS THERE A NEED FOR REGULATORY CHANGES?



Malaysia has stepped up the momentum for various energy transition levers as it advances towards becoming a regional climate change leader with its Net-Zero Carbon Emissions by 2050 ambition.

One of the key levers is renewable energy (RE) generation, whose capacity is to be increased to 70% of the power mix by 2050. This is expected to create a more vibrant and enlarged RE space, characterised by the inflow of investments and outflow of RE as exports.

How will the Energy Commission manage this new dynamic? Is there a need to expand its mandate and various regulatory frameworks that it oversees. Energy Malaysia spoke to the Commission's Chief Executive Officer, Dato' Ir. Ts. Abdul Razib Dawood who highlighted that the fast evolving RE space will necessitate the development of new and amended regulatory measures.

Dato' Ir. Ts. Abdul Razib Dawood
Chief Executive Officer, Energy Commission

In the race towards Net-Zero Carbon Emissions by 2050, Malaysia has set clear targets to progressively increase RE capacity in the power mix to 31% in 2030, 40% in 2035, and eventually 70% in 2050. The decision for 70% by 2050 is confirmed in the RE Strategic Development Roadmap, after studying the memorandum on the RE Strategic Development Road Map and Trade Policy that was tabled to the Cabinet on 3 May 2023.

As of 2022, the Sustainable Energy Development Authority (SEDA) reported that there was 9.93 GW or 24% RE installed capacity. This means is that RE capacity has to increase manifold between 2023 and 2050.

This would require new investments estimated at RM637 billion (approximately USD143 billion) up to year 2050, stated the then Minister of Natural Resources, Energy and Climate Change, Nik Nazmi Nik Ahmad, at a press conference in Putrajaya on 9 May 2023. They will include investments in RE generation resources as well as the strengthening of the grid infrastructure.

At the same press conference, Economy Minister, Rafizi Ramli said that the 70% by 2050 RE target will create economic opportunities for the nation and attract multinationals, especially RE100 companies to operate in Malaysia. RE100 is a global initiative involving companies that are committed to 100% RE across their operations. Rafizi also added that the RE capacity increase can facilitate cross-border trading of any excess capacity with neighbouring countries through a mechanism to be developed and determined by the Government.

Subsequently, on 15 April 2024, the Ministry of Energy Transition and Water Transformation (PETRA) announced the establishment of the Energy Exchange Malaysia (ENEGEM) as the designated platform for the sale of RE between Malaysia and neighbouring countries. ENEGEM acts as the marketplace for green electricity through a bidding mechanism operated by the Single Buyer.

New or Amended Regulations: Six Likely Areas

"The implementation of initiatives to boost RE will necessitate the development of new or amended regulatory measures," said the Chief Executive Officer of the Energy Commission, Dato' Ir. Ts. Abdul Razib Dawood. "To determine the precise regulatory areas that need to be created or modified, we have to study the nation's energy goals, current rules, technical rules and market conditions."

Dato' Ir. Ts. Abdul Razib identified six areas that may require a revision of regulations, namely, investment; grid integration and infrastructure; market access and competition; cross border trading; energy efficiency and conservation; and emerging technologies.

To attract domestic and foreign RE investments, regulations may need to be amended to make the process smoother and more appealing to investors. "This could involve tax incentives, simplified approval processes, and providing guarantees and risk mitigation measures," he said.

Currently, the Commission's regulations have created a structured and predictable framework for investors. "This creates market stability, which is attractive to investors," said Dato' Ir. Ts. Abdul Razib. He added that establishing minimum standards ensure RE projects lead to better long-term outcomes. "A regulated framework also means that both investors and consumers are protected from potential malpractices and fraudulent activities.

"However, we need to be wary of becoming overly stringent or creating a complex regulatory framework that acts as a barrier, dissuading potential investors, particularly small players, from entering the market. Delays in obtaining the necessary approvals and compliances tend to trigger a chain reaction, with delays in project initiation and execution. This is likely to increase the cost of setting up RE projects, potentially reducing the competitiveness of the Malaysian RE market. The reality is RE investors are also being enticed by other ASEAN markets," he added.

"We need to be wary of becoming overly stringent or creating a complex regulatory framework that acts as a barrier."

RE REGULATORY FRAMEWORKS

As at August 2024, RE stakeholders, from industry players to consumers, are regulated by the following legislations and bound by these programmes:

LEGISLATION	PROGRAMMES
• Electricity Supply Act 1990 [Act 447] • Energy Commission Act 2001 [Act 610] • Licensee Supply Regulations 1990 • Electricity Regulations 1994 • Sustainable Energy Development Authority Act 2011 [Act 726] • Renewable Energy Act 2011 [Act 725]	• New Enhanced Dispatch Agreement (NEDA) • Feed-in Tariff (FiT) • Large Scale Solar (LSS) • Net Energy Metering (NEM) • Self-Consumption (SELCO) • Corporate Green Power Programme (CGPP) • Corporate Renewable Energy Supply Scheme (CRESS)

Another critical area of concern is grid integration and infrastructure, which must be able to handle the influx of RE. New regulations may be required for grid upgrades, the construction of transmission lines and the use of smart grid technologies. Equally important is grid stability, especially given the intermittency of variable RE sources such as solar power, the fastest growing RE source in the country. Regulations relating to grid stability and energy storage may need to be enhanced or newly introduced. For example, for energy storage there may be a need for regulations to specify grid access standards and storage solutions capabilities.

In the meantime, the National Energy Policy (NEP) and National Energy Transition Roadmap (NETR) are driving the industry forward by welcoming new entrants to the RE sector. Dato' Ir. Ts. Abdul Razib said, "We must ensure new players have fair market access and competition, and that there is no undue monopoly or dominance of traditional energy players. This might necessitate tariffs and pricing mechanisms to be reevaluated, to make RE more competitive and ensure costs are reflective of the market dynamics."

For cross-border trading, he said that RE investments and operations will need to be bound by international rules and agreements, similar to foreign direct investments. He also called for the promotion of energy efficiency, by enhancing regulations relating to RE to ensure that the energy transition is holistic and sustainable.

With the Government looking to diversify its RE sources, currently dominated by solar and hydro, the RE spectrum is set to include advanced biofuels, geothermal energy and tidal power. "To encourage the development and adoption of these new and emerging technologies, regulatory support may be necessary," said Dato' Ir. Ts. Abdul Razib.

"We have to ensure that RE projects are sustainable, and do not harm local ecosystems or biodiversity. There could also be regulations to encourage more community participation."

"However, we need to guard ourselves against having rigid regulations that are sometimes slow to adapt to technological advancements or market innovations, potentially hindering the growth and evolution of the RE sector," he added.

Widening the Commission's Scope

While safety is a paramount consideration under the Commission's regulatory oversight, Dato' Ir. Ts. Abdul Razib said that the scope of existing regulations encompassing environmental and consumer protection may need to be widened. "We have to ensure RE projects are sustainable, and do not harm local ecosystems or biodiversity. There could also be regulations to encourage more community participation, so that local communities benefit from the development of RE projects.

"As always, we must protect consumers," he said. "Our regulations have to ensure that they benefit from the transition to RE, for example, through fair pricing mechanisms. We may also need to build on existing prosumer regulatory frameworks, to keep up with models that work best to promote more prosumers - customers who are also power producers."

He added, "As the RE sector evolves, regulatory mechanisms would need to be updated to accommodate the growing number of players and increasingly complex nature of the industry. Governments, regulatory agencies and industry stakeholders must continuously review and revise rules to facilitate the expansion of RE sources while preserving the security and sustainability of the energy system. In addition, there is the global transition to RE to be considered, and this can be facilitated through international cooperation and standardisation.

"Given the fluid environment, it would be beneficial for the Commission to remain agile and responsive to the changing regulations, to ensure they foster growth while maintaining stability and fairness in the market," he added.

International Benchmarks

To progress along the RE pathway, the Commission works with international counterparts with sound regulatory models. It has a Memorandum of Understanding with the California Energy Resources Conservation and Development Commission since 2012, and also with the Energy Market Authority of Singapore since 2020.

Dato' Ir. Ts. Abdul Razib said, "As a country that is rather moderately driven by RE, and only accelerating the pace since 2017, we study models in developed countries with a high percentage of RE in their power supply. It is imperative for us to learn from them, to pick up some tips and trends. It is also a great way for us to benchmark ourselves against our peers.

"However, the key lies in planning. It has to be moulded to suit Malaysia's needs. We have seen what happened in Vietnam, which previously was very aggressive with building large solar farms for RE, and then had to curtail due to grid constraints. A similar scenario was played out in Australia, where there had to be a curtailment of excess solar PV generation that affected grid stability and security."

Additionally, most RE sources are variable and intermittent depending on weather conditions. There is thus an essential need to ensure the system remains stable and flexible, which requires a focus on battery storage systems.

Some insightful models and strategies for the Commission include the California Renewable Portfolio Standard (RPS), South Australia's Energy Transition and Singapore's SolarNova Programme.

INTERNATIONAL RE REGULATORY MODELS

California's Renewable Portfolio Standard (RPS)

- **Legally Binding Targets:** California has set aggressive, legally-binding RE targets, ensuring accountability.
- **Promotion of Various RE Sources:** A diverse RE portfolio is encouraged, promoting solar, wind, geothermal and other sources.

South Australia's Energy Transition

- **High RE Penetration:** South Australia's success in achieving high RE penetration rates in its energy mix could offer useful strategies.
- **Battery Storage:** Lessons on battery storage and managing grid stability with high RE inputs could be garnered.

Singapore's SolarNova Programme

- **Urban Solar Adoption:** Singapore's approach to promoting solar PV in urban areas, like Housing & Development Board (HDB) flats and Government buildings, could offer urban application insights.
- **Public-Private Partnerships:** The involvement of private players in public projects has been a successful strategy worth considering.

Regulatory Strategies

With the anticipated entry of various RE sources, the question is whether one regulatory framework will be adequate. Dato' Ir. Ts. Abdul Razib explained, "Whether a broad-based or source-specific regulatory strategy is preferable depends on the precise objectives, requirements and context of the country.

"The choice between broad-based and targeted regulations or a hybrid approach depends on various factors, including the diversity of the RE landscape, the maturity of different technologies and the overall objectives of the regulatory strategy. A careful assessment of the trade-offs and impacts of each approach is essential to develop a regulatory framework that effectively supports the growth and sustainability of the RE sector in Malaysia."

RE Regulatory Strategies: Advantages And Disadvantages

BROAD-BASED RE REGULATIONS

ADVANTAGES	DISADVANTAGES
• Easier to manage and implement because they apply uniformly to all RE sources. • Flexible because they are able to shift with the times and keep up with the dynamics of the market. • Support a variety of technologies and don't prefer any in particular, which can promote the growth of a number of RE sources.	• Lack of targeted support because it is possible that they won't offer the precise incentives or assistance required to promote certain technologies that are especially well-suited for the area. • Inefficiency because a broad-based approach may not optimise the use of resources and some technologies may be less cost-effective in specific applications.

TARGETED REGULATIONS FOR EACH RE SOURCE

ADVANTAGES	DISADVANTAGES
• Support that is tailored, with rules that may offer specific incentives for technology that complements a region's advantages and needs. • Efficient because it encourages technologies that are best suited for a particular place; they can also maximise resource allocation. • Innovation is encouraged in certain RE sectors.	• Administrative complexity because managing numerous, source-specific requirements can be challenging. • Favouritism risks because of the chance of favouring some sectors of the economy or technologies at the expense of others. • Technology evolution with source-specific restrictions might be difficult to keep up with due to the rapid changes in technology.

HYBRID APPROACH

A hybrid approach could also be considered, where a broad-based regulatory framework establishes the general principles and guidelines applicable to all RE sources, supplemented by specific modules or sections tailored to each individual RE source. This approach could combine the simplicity and flexibility of broad-based regulations with the specificity and nuances of targeted regulations.

Energy Exchange Malaysia (ENEGEM)

Malaysia is the first of ASEAN member nations to enter into a multilateral cross border power trading arrangement, which saw the purchase of electricity from Laos via Thailand. It was a historic milestone for the ASEAN Power Grid because the power transfer marked the beginning of its first leg of operations, with interconnections linking the grids in Laos-Thailand-Malaysia, called the LTM. Two years later, LTM was extended to Singapore and is now known as LTMS.

Other legs of the ASEAN Grid are in different stages of development, to connect the grids in Borneo, Indonesia and the Philippines. Malaysia plans to ride on this connectivity to export surplus RE to its ASEAN neighbours.

To facilitate fair and competitive cross-border trading practices, the Government launched ENEGEM. The RE trading platform that kicked off with a pilot auction of 100 MW to Singapore — that is less than 2% of the nearly 7,000 MW installed RE capacity in Peninsular Malaysia — before it is expanded to 300 MW. The pilot project to export at least 100 MW of RE to Singapore will test demand while ensuring ample supply in the local market.

"ENEGEM adopts a comprehensive and well-coordinated regulatory approach," said Dato' Ir. Ts. Abdul Razib. "It is aligned to international conventions that are crucial for the effective implementation and operation of a cross-border electricity exchange system. In addition, it ensures that the system operates securely, reliably and in a manner that upholds the principles of fairness and sustainability. The actual specifics can vary based on the regional context, the countries involved, and the details of Government plans and agreements.

"We are currently reviewing the existing Act 447, to address issues related to activities pertaining to electricity import and export as well as other subsidiary laws relating to the Single Buyer / licensees / new entity as the implementor of ENEGEM," he added.

Third Party Access Arrangements

Central to the energy transition is the Third Party Access (TPA) arrangement. When tabling the 2024 Budget, the Prime Minister announced that TPA will to be explored further; the Commission has already successfully trialed TPA in the gas market and it is to be extended to electricity. This would liberalise the electricity generation market, enabling independent power producers (IPPs) to negotiate directly with their customers and provide higher flexibility for them to seek higher returns as opposed to the competitive bidding under the Large Scale Solar (LSS) scheme or other Energy Commission tenders.

As a start, on 26 July 2024, the Ministry announced the introduction of the Corporate Renewable Energy Supply Scheme (CRESS) that was to take effect from September 2024. This initiative aims to enhance corporate companies' access to green electricity supply through an open grid access system, whereby third parties can supply or purchase electricity via the grid network system with a predetermined system access charge.

Corporate Renewable Energy Supply Scheme (CRESS)

Eligibility and Operating Principles

1. CRESS is open to new RE generators connected to the high voltage (HV) level of the grid and new or existing TNB customers from the commercial and industrial categories looking for additional or new electricity supply demand.
2. RE generators and green consumers must connect directly through the grid network system. Connection limits are based on the findings of the Power System Study (PSS).
3. RE generators should produce firm electricity supply to ensure reliability and system stability. However, they are able to provide non-firm outputs but at a higher system access charge.
4. RE generators and corporate companies can arrange for green electricity supply under mutually agreed terms through the existing supply system.
5. Corporate companies can obtain RE directly from identified RE generators with TPA or through the TNB grid network by participating in the New Enhanced Dispatch Arrangement (NEDA) market.
6. The Commission will regulate the CRESS programme, while the Single Buyer and Grid System Operator will manage market and system operations, including access and dispatch.
7. TNB will continue to play its role as an electricity supplier, delivering the required electricity to corporate companies within and outside of the RE supply period.

Dato' Ir. Ts. Abdul Razib said, "In Malaysia's electricity landscape, TPA stands as a transformative system. It empowers a broad spectrum of stakeholders such as RE100 consumers and RE producers to seamlessly connect with the national grid. By breaking down traditional monopolies, TPA introduces a vibrant and varied electricity market.

"TPA is a pivot to accelerate the integration of RE sources such as solar, significantly reducing carbon emissions. This evolution not only champions the growth of green energy generation but also heralds competitive pricing for consumers, thanks to heightened market competition," he said.

"TPA not only champions the growth of green energy generation but also heralds competitive pricing for consumers, thanks to heightened market competition."

Dato' Ir. Ts. Abdul Razib, however, cautioned, "TPA can bring about a set of challenges in the early stages. The existing grid may require enhancements to accommodate diverse energy sources. A robust regulatory framework (Act, regulations, codes) is paramount to ensure fairness and transparency. As we navigate this transition, temporary market fluctuations are expected, and existing utility companies such as TNB may need support and reassurance to adapt to this progressive shift."

Deadlines and Stakeholder Engagement

"Thus far, there are no deadlines or milestones set for new or amended regulations," said Dato' Ir. Ts. Abdul Razib. "We are still in the transition process and currently the Commission and all related agencies are still discussing and planning on how to achieve the NEP and NETR RE targets. Besides, any new regulations and enforcement measures must be planned and implemented thoroughly to ensure a smooth transition to the whole energy transition process.

"It will also depend on Government policy and the Commission will act upon it to propose relevant new regulations or any amendment to existing regulations, if needed.

"The Commission advocates active stakeholder engagement to develop a robust, inclusive, and forward-looking regulatory framework that can support the growth and sustainability of the RE sector in Malaysia. Such a multifaceted engagement approach helps ensure that policies and regulations are well-informed, balanced and aligned with the evolving needs and opportunities of the energy transition.

"In the rapidly evolving landscape of RE, it is essential for both regulators and industry stakeholders to remain proactive, adaptable and engaged. By having continuous meetings, conferences and formal / informal engagements that involve various stakeholders from across the RE spectrum sharing their views and inputs, it can help the Commission to plan proper milestones and related regulations to achieve the RE target set by the Government," added Dato' Ir. Ts. Abdul Razib.

Growing Malaysia's RE Space: Next Steps

Dato' Hamzah Hussin
Chief Executive Officer, Sustainable Energy Development Authority (SEDA) Malaysia

Energy Malaysia spoke with the Chief Executive Officer (CEO) of the Sustainable Energy Development Authority (SEDA) Malaysia, Dato' Hamzah Hussin, who highlighted the next steps needed to grow Malaysia's RE space. SEDA Malaysia is the Government agency entrusted to realise Malaysia's sustainable energy agenda that is aligned to global sustainability objectives.

"To grow Malaysia's RE space, several actions are needed," says SEDA Malaysia's CEO, Dato' Hamzah Hussin. He cited seven steps to facilitate more RE uptake in the country. They are:

#1: **Expand Electrification:** RE development must go hand-in-hand with the eventual wider adoption of electrification across numerous economic activities and processes. This will ensure Malaysia has a future-proof RE system that is modern, reliable and affordable.

#2: **Encourage Public-Private Partnerships:** The Government, through SEDA Malaysia, encourages partnerships between the public and private sectors to accelerate the development of RE projects. Malaysia also needs to continue investing in RE infrastructure, including solar, wind and hydroelectric power. This will require significant funding and political support, as well as the involvement of private sector partners. There must also be investments in research and development (R&D) to improve the efficiency and reliability of RE technologies. This will help to drive down costs and make RE as competitive, if not more than, traditional energy sources.

#3: **Raise Public Awareness:** The public needs to be more enlightened on the benefits of RE and the importance of reducing greenhouse gas (GHG) emissions. This can help to build support for RE policies and encourage individuals and businesses to make the switch to renewables.

#4: **Improve Energy Efficiency:** The reliance on fossil fuels can be reduced by efficient use of energy. This can be achieved through employing energy efficiency measures introduced by SEDA Malaysia such as the Energy Audit Conditional Grant (EACG), Zero Energy Building (ZEB) and public education programmes. These programmes are designed to reduce the overall demand for energy, thus helping create a more sustainable energy system.

#5: **Promote Innovation:** SEDA Malaysia is continuously exploring mechanisms that can support the adoption of new technologies, solutions and business models related to sustainable energy.

#6: Promote Improvisation: SEDA Malaysia is also continuously reviewing and improvising existing mechanisms such as Feed-in Tariff (FiT) and Net Energy Metering (NEM) to increase their effectiveness and efficiency.

#7: Encourage Cross-Partnerships: Encourage more innovative solutions through collaborations with research institutions and the private sector.

SEDA Malaysia has rolled out incentive schemes such as FiT and NEM to increase RE uptake.

The FiT mechanism was introduced to encourage the utilisation of indigenous RE resources by focusing on four sources, namely, solar PV, small hydropower, biogas and biomass. As of 2022, 1,463.06 MW was approved under this mechanism, which translates to 10,505 projects for solar, small hydropower, biogas and biomass.

While Malaysia makes the most out of the four RE sources, geothermal power is also being explored. The Malaysia Renewable Energy Roadmap (MyRER) has suggested further assessment and deployment enablers are required to harness Malaysia's geothermal potential. An existing study has identified a total of 229 MW potential of geothermal at two locations, that is, Ulu Slim, Perak and Tawau, Sabah.

MyRER also recommends exploring wind potential and the feasibility of wind energy integration. Preliminary estimate of wind potential in Malaysia has been conducted, but further investigation is required for realistic wind potential data. Additionally, new solutions such as hydrogen and energy storage technologies are also being explored.

The NEM programme, which was launched in 2016, is another effort to incentivise RE generation and consumption. Currently into its third iteration (NEM 3.0), it focuses on solar energy generation with the installation of rooftop solar panels and targets three categories of consumers. NEM Rakyat is for domestic consumers, NEM GoMEn is for Government buildings and NEM NOVA (Net Offset Virtual Aggregation) is for commercial buildings. NEM 3.0 has received a favourable response from the public.

Dato' Hamzah said, "I am proud of the contributions of these incentive schemes. They have played a significant part in Malaysia generating 9.93 GW or 24% of RE installed capacity as of 2022. This brings us closer to meeting the country's target for 31% RE in the capacity mix by 2025, and 40% by 2035. These milestones support Malaysia's global climate commitment to reduce its economy-wide carbon intensity (against Gross Domestic Product (GDP)) of 45% in 2030, compared to 2005 level.

"Moving forward, the newly enhanced FiT mechanism (namely FiT 2.0) will be implemented," he adds. "It will incorporate new business models and mechanisms to support new technologies and solutions.

"Despite our incentive schemes, companies and the public face challenges switching to RE," points out Dato' Hamzah, and identified the following barriers:

High Initial Costs: One of the primary obstacles to adopting RE is the high initial installation costs, especially for residential and small-scale systems. Although the price of RE technologies like solar panels has dropped in recent years, they can still be prohibitively expensive for many households and businesses.

Fossil Fuel Subsidies: In certain instances, subsidies for fossil fuels and other Government policies can hinder the competitiveness of RE sources in the energy market. This makes it less appealing for individuals and businesses to invest in RE, even though there are significant potential benefits to doing so.

Legacy of Poor Project Economics: Bioenergy projects, particularly biomass, have a history of unfavourable project economics and a poor operational reliability track record in Malaysia. They face several challenges, including inconsistent feedstock prices and quality, difficulties in securing a reliable supply of feedstock, fluctuations in feedstock prices, and ongoing issues with feedstock quality.

Accessing Grid Connection: RE developers still face a certain level of risk in accessing and developing land for RE projects.

Lack of Awareness: Another barrier is the lack of awareness about the benefits of RE and the potential savings that can be achieved. Many people may not understand how RE works or the long-term benefits it provides, making them less likely to invest in it.

Dato' Hamzah added, "While programmes such as FiT and NEM can help incentivise the uptake of RE, more efforts are needed to overcome all barriers to RE adoption. These challenges can be addressed through a combination of education, regulatory reform, and infrastructure investment."

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LAW AND ORDER

As a regulator, the Energy Commission is governed by the Energy Commission Act 2001 [Act 610] and implements the Electricity Supply Act 1990 [Act 447], Gas Supply Act 1993 [Act 501], Energy Efficiency and Conservation Act 2024 [Act 861], and various regulations that require businesses to comply with safety, technical standards, energy efficiency and fair-trade practices. How does it enforce these laws and regulations and what are the challenges? Where are the hot spots? What are the common violations?

To address these questions, Energy Malaysia spoke to the Commission's former Director of Enforcement and Regional Operations, Ir. Md Zakuan Ibrahim.

In the past five years, electricity theft through illegal bitcoin mining activities has surged by 280% and caused an estimated loss of more than RM2.0 billion in revenue. During these years, a total of 9,568 cases were recorded, starting with 610 in 2018 and increasing to 1,043 in 2019; 2,465 in 2020; 3,091 in 2021; and 2,359 in 2022. While these numbers are alarming, they also reflected improved surveillance and enforcement by both the licensees and the Energy Commission.

The Commission's former Director of Enforcement and Regional Operations, Ir. Md Zakuan Ibrahim, says about 40% of enforcement activities are dedicated to identifying and monitoring those engaged in the "dishonest use of electricity". Such crimes extend beyond monetary losses for power producers, posing risks to the stability of power supply systems as well as public safety, he adds.

These crimes typically involve meter tempering and direct connections before the meter, causing meter readings to fail to reflect the actual power consumption. As a result, power suppliers have to bear the financial losses. Ir. Md Zakuan points out, "On average, the percentage of energy losses that are not billed due to electricity theft amounts to 1% of generation, which is equivalent to about RM300 million per year."

The majority of offenders are illegal bitcoin miners and factories. Ir. Md Zakuan says, "Currently, our enforcement teams are focusing on electricity theft related to digital currency mining, which causes significant losses for our licensees and affects consumers who have to bear the cost of these losses."

Bitcoin mining involves the use of cryptocurrency mining machines that operate 24/7. These machines are not only energy-intensive but also susceptible to short circuits due to the use of non-standard fuses and cables operating beyond their capacity, increasing the risk of fires. Additionally, illegal connections or tampered meter installations can disrupt the stability of electricity supply when demand exceeds capacity, affecting industrial, commercial and domestic consumers.

Usually, electricity thefts are discovered by power distributors such as Tenaga Nasional Bhd. (TNB). Ir. Md Zakuan says, "It is their responsibility to report thefts to us as stipulated under Section 38 of the Electricity Supply Act 1990. Legally, the licensees are authorised to cut off power supply to the premises of offenders and file civil suits to recover revenue losses. The Commission, on its part, classifies these offences as criminal cases under Sub-Section 37(3) of the Electricity Supply Act 1990.

The maximum penalty for tampering with a meter installation (electrical theft) is a fine of RM5,000,000 or imprisonment of up to 10 years, or both.

Ir. Md Zakuan Ibrahim
Director of Enforcement and Regional Operations, Energy Commission
(at the time of interview)

How TNB is trying to stop illegal bitcoin mining

KUALA LUMPUR: Power theft in Malaysia for cryptocurrency mining is a problem that's growing quickly.

But the national utility has a few ideas of how to tamp down the practice.

Tenaga Nasional Bhd (TNB) has proposed a special tariff for bitcoin mining operators in a move to fight electricity theft, its top executive said.

It has also proposed that the Energy Commission (EC) encourage bitcoin mining operators to apply for legal electricity supply.

TNB, which counts Khazanah Nasional Bhd as its largest shareholder, is seeing an increasing number of cases where electricity is used to mine the cryptocurrency illegally – and expects the tally to continue to grow, president and chief executive officer Datuk Baharin Din said in an interview.

Crypto mining, an often energy-intensive computing process via which bitcoin and other tokens are created, has grown rampantly across the globe as digital assets increased exponentially in value.

While there are some efforts to make the process greener, it's regarded in many situations as environmentally unfriendly.

In Malaysia, crypto mining itself isn't illegal.

But some miners steal electricity, for instance, by tampering with meter installation or bypassing the meter and gaining an illegal connection.

Baharin: The irresponsible perpetrators are doing it at the expense of the security and reliability of supply for the public at large

Cases of electricity theft involving illegal bitcoin mining operators surged to 7,209 in 2021 from 610 in 2018, according to TNB.

"The irresponsible perpetrators are doing it at the expense of the security and reliability of supply for the public at large," Baharin said.

Unauthorised electricity connections can also be fire hazards, he added.

TNB has been working with the Malaysia's anti-graft agency, the police, the EC and the local councils to nab power thieves, especially among bitcoin miners.

A total of 18 individuals have been arrested with an estimated electricity theft valued at RM2.3bil from 2018 to 2021, according to Baharin.

Technology can help too, Paul Lim Pay Chuan, managing director and group chief executive officer of a Malaysian electrical power technology company Pestech International Bhd, told *Bloomberg*.

"Implementation of the likes of smart metering, meter data management systems, analytic software and digital power quality products will greatly enhance the availability of critical power demand and supply information," he said.

"That may give the utility such up-to-date data for greater monitoring, planning, and control over the entire eco-system – which includes prevention of power theft." — Bloomberg

Intelligence, Raids & Prosecution

The Commission has enforcement teams based at the head office in Putrajaya, and seven regional offices across Peninsular Malaysia. They are responsible for carrying out intelligence and inspection of premises that are on the Enforcement and Regional Operations Department's radar. Periodically, it receives complaints and tip-offs from businesses or the public.

Based on intelligence and information analysis, the Enforcement and Regional Operations Department devises an enforcement strategy and annual action plan. "Our plan is not set in stone. Besides having a proactive action plan, we also have reactive measures to address complaints that require immediate intervention by the Commission," explains Ir. Md Zakuan.

He adds, "The ongoing digitalisation of the Enforcement and Regional Operations Department will be highly beneficial as it helps us organise and streamline our activities better. In addition, integrating the enforcement module into the broader corporate digitalisation programme is invaluable to enforcement officers, assisting them with information searches, inspections and the issuance of compliance notices."

Thus far, the majority of violations are related to the Electricity Supply Act 1990. The reason could lie in the fact that the electricity industry is relatively mature and serves a larger customer base compared to piped gas. According to TNB, there are about nine million registered electricity consumers. In comparison, the piped gas industry has 4,693 commercial and domestic consumers.

The Commission's regulatory mandate for electricity supply also covers a wider area, from installations to transmission and distribution networks. Whereas for gas, its regulatory authority is limited to piped gas networks, specifically from the city gate to downstream consumers.

Going by the Book

The Enforcement and Regional Operations Department acts on behalf of the Commission to take action against those who violate the following laws and regulations:

Electricity Supply Act 1990 and Regulations that include:

- Electricity Regulations 1994
- Licensee Supply Regulations 1990
- Electricity Supply (Compounding of Offences) Regulations 2017
- Efficient Management of Electrical Energy Regulations 2008

Gas Supply Act 1993 and Regulations that include:

- Gas Supply Regulations 1997
- Gas Supply Regulations (Amendments) 2006

Energy Efficiency and Conservation Act 2024 that includes:

- Energy Efficiency and Conservation Regulations

ENFORCEMENT TERMS

Acts

Bills are prepared by the relevant Ministries to be tabled in Parliament to be passed, after which they must obtain the royal assent by the Yang di-Pertuan Agong (King) before being gazetted and enforced as Acts or laws.

Regulations

Drafted by the Commission with the consent of the Minister, regulations provide details for the implementation of the spirit and contents of the Act.

Guidelines

Official documents issued by the Commission, guidelines notify licensees and relevant parties of the roles and responsibilities that they must comply.

The Enforcement and Regional Operations Department's resources are currently deployed for the following violations:

40%
Electrical theft involving meter tampering.

20%
Unlicensed installations.

20%
Breaches in maintenance compliances.

20%
Importation / manufacture / sale of electrical equipment and appliances without the Commission's approval.

Whether a business needs to be licensed or registered depends on the activities and installations. Power generators such as TNB and independent power producers (IPPs) must be licensed by the Commission. Consumers who receive power at the voltage level of 11 kV and above and / or have standby generators, on the other hand, need to be registered.

Top 4 Violations and Governing Laws

#1 Electricity Theft

Sub-Section 37(3) of the Electricity Supply Act (ESA) 1990

#2 Unlicensed Installation

Section 9(1)(a)@(b) of the ESA 1990

#3 Unregistered Installation

Section 21 of the ESA 1990

#4 Uncertified Electrical Equipment

Regulation 97 of Electricity Regulations 1994

The Klang Valley, with its high population density and high rate of economic activities, is most prone to regulatory violations. It is followed by Penang and Johor that are also relatively densely populated and industrial, compared to the rest of Malaysia.

"Whenever compliance breaches or illegal activities occur, the Department will follow the due process," says Ir. Md Zakuan. It begins with the inspection of the premises, where Compliance Notices are issued to business owners / operators who are required to rectify issues within 14 or 30 days, depending on the case. The premises are then monitored before our Enforcement officers organise raids of premises that fail to comply," says Ir. Md Zakuan.

The Enforcement and Regional Operations Department analyses and evaluates cases reported to them. Based on their findings, investigation papers (IPs) are opened. In accordance with investigation outcomes, the Commission's Enforcement officers will recommend either a compound or prosecution to the Deputy Public Prosecutor when there are justifiable cases to pursue.

According to the Commission's 2021 Annual Report, 58 compounds were issued to TNB, Sabah Electricity Sdn. Bhd. (SESB) and other licensees for violating Regulation 110 (1) and 110 (2) of Electricity Regulations 1994 that resulted in fines valued at RM111,500 being paid that year.

"In the past five years, from 2018 to 2022, our investigations have taken 18 cases to court, and 14 were found guilty," adds Ir. Md Zakuan. For repeat offenders, the entire process is repeated, and our Enforcement officers will propose to the Deputy Public Prosecutor for higher penalties to be imposed by the court."

The Commission is vigilant about lawbreakers and welcomes public tip-offs.

Ir. Md Zakuan says, "Every conviction gets media coverage. Besides being a public censure, it is also a lesson for offenders and a warning to others."

Joint Raids

Joint raids with other enforcement agencies are becoming more frequent and involve covert operations, from stake-outs to surprise strikes at suspected premises. To be effective, planning and interfacing between the various parties and the timing of the raid are imperative.

Ir. Md Zakuan explains, "Each enforcement agency has its own jurisdiction and expertise such as tracking the location and detailed information of offenders to ensure that our raids achieve the results we want. When we investigate law breakers, action taken has to be in accordance with the provisions of our respective laws.

"What unites us all is our goal to uphold the law and regulations that govern us. Overall, the Commission has successfully achieved its enforcement objectives by collaborating with various agencies," says Ir. Md Zakuan.

For electricity theft, the Commission collaborates with agencies such as the National Anti-Financial Crime Centre (NFCC), Royal Malaysia Police (PDRM), Inland Revenue Board (LHDN), Malaysian Communications and Multimedia Commission (MCMC), Cyber Security Malaysia, National Water Services Commission (SPAN) and local authorities.

"The Commission has successfully achieved its enforcement objectives by collaborating with various agencies."

To seize uncertified electrical equipment, both locally manufactured and imported, the Commission teams up with the Royal Malaysian Customs Department, SIRIM and the Ministry of Domestic Trade and Cost of Living Affairs (KPDN). This typically involves raids at stores in shopping malls, warehouses and entry ports.

In 2022 alone, there were 21 joint raids in Peninsular Malaysia and Sabah that generated a fair media coverage. The publicity is part of the Commission's awareness creation efforts, to highlight to the industry the penalties of such illegal activities. At the same time, it is hoped that the publicity will stir public interest to help curb these crimes.

Besides media coverage, the Commission produces safety videos that are posted on its social media platforms to increase awareness on electrical and gas safety among the public. The primary target is students in secondary schools and institutions of higher learning who often use uncertified electrical equipment, especially adaptors bought online. Unfortunately, online shopping sites are not known to screen their products for their authenticity. Students are attracted by their low cost, sales pitch, reviews (not authenticated), little knowing that uncertified products can be fire hazards and cause electrocution.

"The Commission is now working with reputable online stores such as Shopee and Lazada to ensure that only genuine electricals are sold online by them," says Ir. Md Zakuan.

International Benchmarking, Remaining Relevant

"The Commission is keen to foster a culture of self-regulation among industry players," says Ir. Md Zakuan. "For this, bilateral and multilateral cooperation is being considered with international regulatory and enforcement bodies. Through benchmarking with those with more advanced practices, we hope to raise the level of compliance and enforcement in the country. With the dynamic energy transition landscape, we can expect new and amended Acts to be introduced to remain relevant. And this is likely to open up new compliance and enforcement areas as well as challenges," he says.

In the broader scheme of the Commission's organisational structure, the Enforcement and Regional Operations Department contributes to the safety of energy stakeholders, where the public and industries are protected from dangers arising from activities related to the supply of electricity and piped gas, especially through illegal activities. This function is aligned to the Commission's role as stated in the Corporate Vision and Mission.

The future is one of promise as well as uncertainty as Malaysia charts its National Energy Transition Roadmap (NETR) pathway that will see green energy taking the lead in power and gas supply and attracting new players to the marketplace. Thus, it is only pertinent for the Enforcement and Regional Operations Department, on its part, to study how regulators in mature marketplaces are conducting their compliance and enforcement functions since they will be at more advanced stages of decarbonisation and market practices.

VISION

"The Energy Commission is committed, in the public interest, to continually promote a fair, transparent and competitive system in the generation and supply of electricity, and the supply of gas through pipelines, to ensure:

1. optimum supply of electricity at reasonable prices
2. economically efficient and sustainable utilisation of resources
3. **the safety and security of energy consumers**

MISSION

1. To protect both consumers, economically vulnerable consumers and taxpayers, from inefficient and unfair costs arising from expenditure in energy systems, infrastructure and procurements.
2. To always espouse and prioritise open, competitive and market-based methodologies in the procurement of all energy related systems, infrastructure and fuels, and ultimately in energy itself.
3. To secure that all reasonable demands for energy are satisfied with reliable energy supply, ensuring its continuity and quality, which includes power quality and the quality of its facilities and services provided.
4. To constantly promote and support innovation and leading technologies to improve efficiency in energy generation, energy delivery, energy consumption activities, and environmentally sustainable practices.
5. To actively support energy transition efforts whilst ensuring a fair and level playing field for all stakeholders, including equal participation by all consumers big and small, in the energy transition economy.
6. **To ensure the safety and security of energy stakeholders.**
7. To be transparent to all our stakeholders, especially energy consumers and taxpayers, on the progress of our mission statements above.

CORE VALUES

- **PROFESSIONALISM**
- **INTEGRITY**
- **EXCELLENCE**
- **SENSE OF FAIRNESS AND FAIR PLAY**

Enforcement in Mature Deregulated Markets

Mature deregulated energy markets are characterised by a multitude of wholesalers and retailers seeking to increase their market share. Given the complexity and competitiveness of the marketplace, energy regulators have various types of legislation to ensure fair play. In these environments, the priority of regulators is to gain the trust and confidence of consumers by safeguarding their interests to receive an essential service, namely, electricity.

United Kingdom

In the United Kingdom, the energy regulator is an independent non ministerial entity called Ofgem, short for the Office of Gas and Electricity Markets. Its role is to "protect energy consumers, especially vulnerable people, by ensuring they are treated fairly and benefit from a cleaner, greener environment" says its website.

Ofgem regulates a complex retail and wholesale market populated by private suppliers and cross-border trading agreements.

Its enforcement functions are based on various legislations aimed at fair market practices and consumer protection. Besides enforcing licensing conditions and other relevant requirements under its ambit, Ofgem also enforces the competition law that prohibits anti-competitive agreements; consumer protection laws to stop breaches of certain consumer legislations; and is empowered to conduct market reviews of activities connected with the generation, transmission and supply of electricity and the transportation and supply of gas.

Australia

In Victoria, Australia, the Essential Services Commission (ESC) is authorised to regulate the generation, transmission, distribution and sale of electricity and gas. Its enforcement priorities are to "promote transparency and competition in the Victorian energy market for the long-term interests of consumers".

Like many regulators, ESC's goal is to build community and consumer trust in the energy market by promoting and enforcing compliance in the energy and gas sectors. This includes taking action against those found to have breached energy laws and regulations.

What is notable is a report entitled "Priorities for Compliance and Enforcement in Energy 2023-24", which calls for immediate action to protect vulnerable sections of the community facing economic hardships. As such, ESC's compliance and enforcement priorities during this period are as follows:

Payment Difficulty Framework

The framework requires energy retailers to provide assistance to customers who may be experiencing difficulty paying their bills. It ensures that disconnecting a residential customer for not paying a bill is a measure of last resort. It takes account of the cost of living pressures impacting the community. ESC monitors the conduct of retailers to ensure customers are being provided practical assistance to manage their energy usage and bills, and will take enforcement action when consumer protection is not upheld.

Wrongful Disconnections

The ESC has made wrongful disconnections a priority in recognition of current energy market conditions and the cost of living pressures facing consumers. Customers should only ever be disconnected by an energy retailer as a last resort. ESC will monitor compliance in this space and take enforcement action where appropriate. It also makes clear that disconnection cannot be used by a retailer as a debt collection tool.

Helping Customers Navigate the Energy Market

Victorian energy consumers need to be able to confidently engage the market and meaningfully assess and compare energy offers. To empower consumers, ESC ensures retailers comply with their obligations to provide customers with clear, timely and accurate information to make informed decisions.

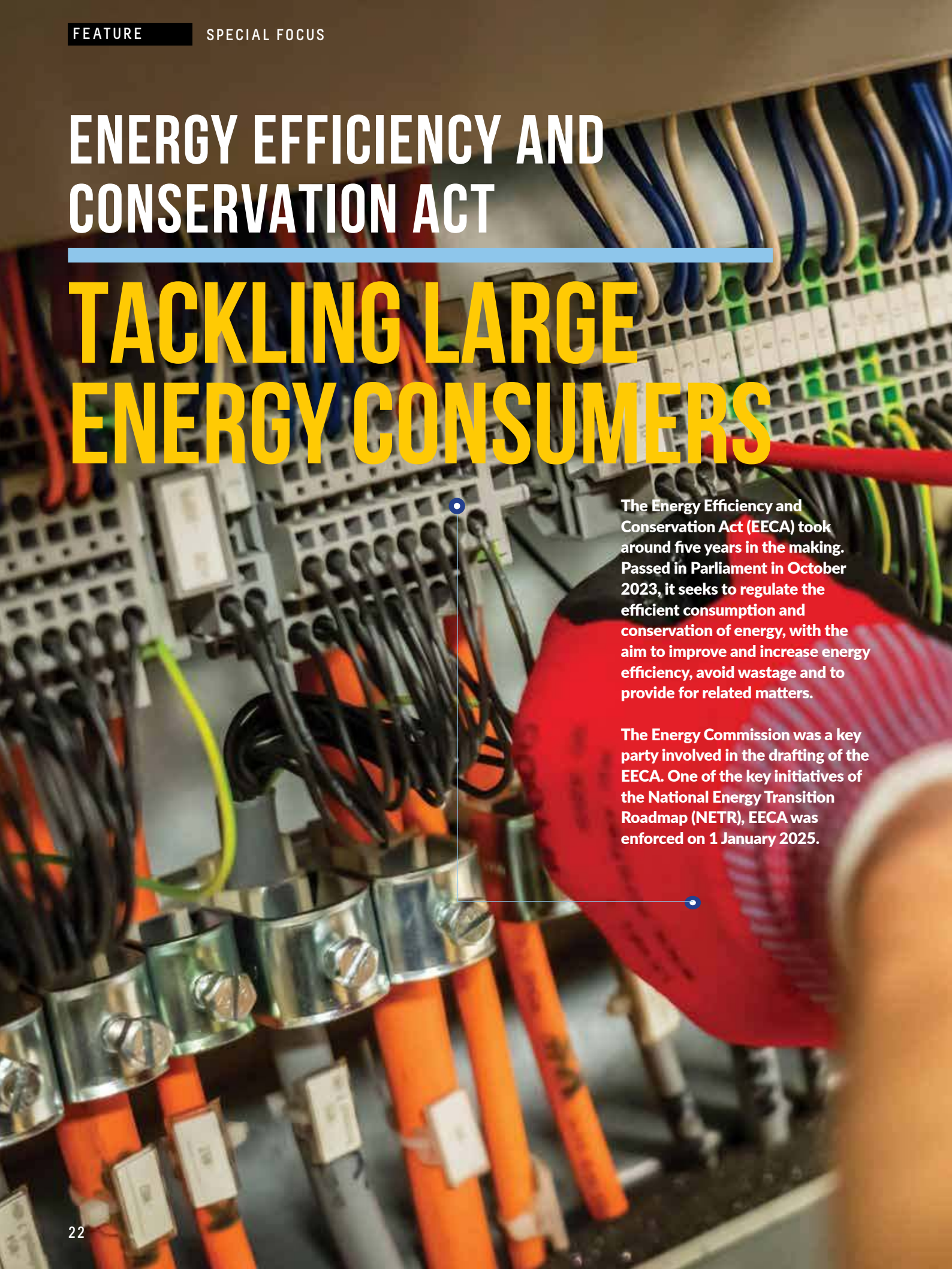
Protecting Customers Experiencing Vulnerability

Energy is an essential service that keeps the community safe and productive. According to ESC, consideration of consumer vulnerability is an enduring priority in its compliance and enforcement work. ESC will work with the wider community, community advocacy services sector, and businesses it regulates to reduce barriers to essential services for those experiencing vulnerability. Its primary goal is to ensure businesses comply with their obligations to protect all customers.

Sources:
https://www.ofgem.gov.uk/energy-policy-and-regulation/compliance-and-enforcement
Energy Services Commission: Priorities for Compliance and Enforcement in Energy 2023-24 (27 July 2023)

ENERGY EFFICIENCY AND CONSERVATION ACT

TACKLING LARGE ENERGY CONSUMERS



The Energy Efficiency and Conservation Act (EECA) took around five years in the making. Passed in Parliament in October 2023, it seeks to regulate the efficient consumption and conservation of energy, with the aim to improve and increase energy efficiency, avoid wastage and to provide for related matters.

The Energy Commission was a key party involved in the drafting of the EECA. One of the key initiatives of the National Energy Transition Roadmap (NETR), EECA was enforced on 1 January 2025.

Energy efficiency is defined in the EECA to mean, "efficiency in the consumption of energy or energy resources which results in the increase in the net benefit per unit of energy." It has a clear focus on the consumption of electricity. The new law, which was enforced on 1 January 2025, will require large industrial and commercial electricity and thermal energy consumers to conduct mandatory energy audits.

"The EECA will regulate industrial and commercial users who consume more than 21,600 GJ of energy per year."

The EECA will regulate industrial and commercial users who consume more than 21,600 GJ of energy per year, equivalent to RM2.4 million in annual electricity bills or RM1 million in natural gas bills.

The Government estimates that compliance with the law should enable these users to reduce electricity bills by up to 25% in the organisation.

In the electricity sector, the Act is set to cover 1,500 out of 27,000 industrial consumers, representing 70 to 80% of industrial consumption; and 500 out of 1.7 million commercial consumers making up 21% of consumption in the commercial segment.

It also requires compliance by office buildings that take up real estate space of 8,000 square metres and above. These buildings will be required to meet the minimum rating set by the Government under the national Building Energy Intensity (BEI) label by having a building energy intensity of at least below 250 kWh per square metre per year.

Currently, 300 Government buildings comply with these requirements. The Act will eventually cover hotels, hospitals and other buildings after future engagements with the Ministry. An estimated 4,102 more buildings are set to be covered under the new law.

With regard to the mandatory energy audit requirement, consumers are given a five-year period (equivalent to one cycle) to meet the EECA requirements, failing which a penalty for non-compliance will be imposed by the Energy Commission. The average compliance cost – covering the appointment of Registered Electrical Energy Managers (REEM), implementation of energy management and energy audits – for one cycle (covering five years) is estimated at RM120,000 per year for industrial users and RM100,000 per year for commercial users.

While EECA does not directly force energy consumers into reducing energy consumption, it promotes energy efficiency by requiring these consumers to manage their energy consumption and ensuring they stay within the prescribed energy efficiency limits. By doing so, it will strengthen the energy efficiency regulatory framework in Malaysia, while ensuring full participation by consumers that fit the bill.

With five of ASEAN member states – Singapore, Thailand, Vietnam, the Philippines, and Cambodia – already having Energy Efficiency Acts in place, it is timely that Malaysia is now on board with globally recognised energy efficiency standards.

Role of the Energy Commission

As the regulator of the electricity and piped gas supply sector in Malaysia, the Energy Commission is responsible for the enforcement of and compliance with the EECA. Its task is to assist the Government in achieving energy savings in line with the country's net-zero carbon emission by 2050 targets.

Sharing insights of the new law and what needs to be done to ensure that it is implemented successfully, the Energy Commission's Director of Energy Efficiency & Conservation, Ir. Ts. Zulkiflee Umar explains, "EECA only covers regulation on the demand side because on the supply side, power producers have their separate power purchase agreements. Whether it is Tenaga Nasional Bhd. (TNB) or independent power producers (IPP), they have outlined what kind of savings need to be made.

Ir. Ts. Zulkiflee Umar
Director of Energy Efficiency & Conservation, Energy Commission

He adds, "Through the Act, the Commission aims to balance demand and supply, so demand does not go out of control and leave our energy sector in a void that can't be filled. If demand is not controlled, then every few years we will need to build a new power plant to cater to it. This is likely to overstretch our resources to produce more energy.

"The new law is also important because up until now energy efficiency has only been measured in the context of electricity. With the EECA, the regulation of energy efficiency has been extended to include thermal energy, which covers natural gas, liquefied petroleum gas, chilled water, hot water and steam. The Commission will thus be regulating energy efficiency covering the entire spectrum of energy users, from industrial, commercial and domestic users.

"In the past, when regulating energy efficiency, we did not make energy audits mandatory," he adds. "Energy audits are the most important part of the regulation because it shows clear proof of what an organisation is doing right or wrong in terms of energy savings measures. It also shows where the organisation can cut back or optimise its energy usage."

The Act also requires consumers to have a clearly defined energy management system, with set goals, targets and time lines. "This is not about equipment or anything like that. It is a set of guidelines to follow to properly manage energy consumption," says Ir. Ts. Zulkiflee. "The Government is making it more formal and systematic as to how much energy can be saved and requires consumers to comply with transparent data collected from energy audits."

The Act targets three groups, namely, industrial facilities and commercial premises; large buildings; and energy-using products. Large industrial and commercial consumers are defined as those who use 21,600 GJ and above of electricity and thermal energy combined. They will be subject to the Act.

For buildings, the Commission will be adopting a phased approach to implementing the EECA. Under Phase 1, the focus will be on office buildings, requiring them to comply with the national BEI Labelling that is star-rated. After that, it will move on to include other commercial buildings such as hotels and hospitals.

WHAT IS BUILDING ENERGY INDEX (BEI)?

The BEI is a benchmarking tool that monitors building energy performance by indicating the intensity of energy per metre square area of the building.

The Index is calculated by taking the ratio between the Annual Energy Consumption of a building (GJ / year) and its Gross Floor Area (GFA).

$$BEI\ (GJ / m2 / year) = \frac{Annual\ Energy\ Consumption\ (kWh)}{GFA\ (m^2)}$$

BEI LABELLING BENEFITS

- Ascertains energy performance of buildings.
- Accelerates efforts to make Government buildings energy efficient through the "Government Leads By Example" campaign.
- Provides and disseminates information to building occupants on energy usage performance of their buildings compared to energy efficient buildings.
- Creates healthy competition among building owners to improve energy use.
- Helps the Government to achieve its national commitment to reduce greenhouse gas (GHG) emissions intensity of Gross Domestic Product (GDP) by 45% by 2030.

LABEL CONCEPT

Star Range
1 Star: Highly inefficient
5 Star: Most efficient

Building Category
Offices / Hospitals / Universities / Schools and the like

Building Energy Intensity Unit
GJ / m2 / year

Star Rating	EIP Range (GJ / m² / year)	EIP Range (kWh / m² / year) 1 GJ = 277.778 kWh	Indication
5-STAR	EIP ≤ 0.324	EIP ≤ 90	Very efficient
4-STAR	0.324 < EIP ≤ 0.396	90 < EIP ≤ 110	Efficient
3-STAR	0.396 < EIP ≤ 0.576	110 < EIP ≤ 160	Moderate efficient
2-STAR	0.576 < EIP ≤ 0.720	160 < EIP ≤ 200	Slightly efficient
1-STAR	EIP > 0.720	EIP > 200	Least efficient

EIP = Energy Intensity Performance

As for the third group, which is energy-using products, the Commission will require only energy efficient products with a minimum 2-star rating to be sold to consumers. The Minimum Energy Performance Standard (MEPS) programme introduced by the Commission star-rates ten product categories: air-conditioners, refrigerators, fans, lamps, washing machines, rice cookers, microwave ovens, television sets, freezers and electric ovens. Ir. Ts. Zulkiflee says, "Of course, when consumers use 5-star rated appliances, it would be the ideal scenario. However, two-stars will be the barest minimum under the new EECA regulations."

WHAT IS MEPS?

Under its Minimum Energy Performance Standard (MEPS) programme, the Commission deploys a dedicated team to test the performance criteria of electrical appliances and equipment based on international and SIRIM-based energy efficiency testing standards. The products, both locally manufactured and imported, are then awarded an energy efficiency star-rating based on the tests. To keep up with new brands entering the market, tests are conducted on an ongoing basis.

As of 2023, the following products have been star-rated in accordance with the MEPS guidelines.

EECA and Net-Zero 2050

Moving forward, EECA will also be riding on the upcoming National Energy Efficiency Action Plan (NEEAP), which will be introduced in 2026. NEEAP is a 10-year programme first introduced and implemented in 2016. When the first cycle ends in 2025, it will be followed by another 10-year cycle from 2026-2035. EECA is set to be a part of NEEAP 2.0, which is expected to further intensify the drive towards energy efficiency.

NEEAP covers various energy efficiency improvement measures and has set targets to be achieved. To date, there have been significant energy savings arising from contributions made by large energy consumers that come under its remit.

Ir. Ts. Zulkiflee says, "The Government devised various tools that have played a pivotal role to help the Government to achieve the NEEAP goals. Most notable is the Efficient Management of Electrical Energy Regulations 2008, which stipulates that power consumers who use 3 million kWh or more for six consecutive months must appoint REEM. All REEM must be registered with the Commission, and their primary function is to track and manage energy usage at their premises. They are also required to submit reports of their organisation's energy consumption data to the Commission every six months.

"Under these regulations, the Commission has been able to track how much energy is being used and energy-reducing measures implemented at premises that go beyond the threshold we have set," says Ir. Ts. Zulkiflee.

The energy efficiency measures and targets to be set under the NEEAP 2.0 will be aligned to the goals and targets set under the NETR. To achieve the country's net-zero carbon emissions ambition, the Government's ultimate target is to improve energy efficiency by 22% by 2050, specifically with a 20% reduction in the residential segment and 23% for industrial and commercial segments.

"There are many benefits to be accrued to organisations who reduce their energy consumption," points out Ir. Ts. Zulkiflee. "It drives down their operating costs and increases the profit margin, thus making them more competitive."

Ir. Ts. Zulkiflee envisages companies running marketing campaigns to educate their consumers on how their products are manufactured using less energy than their competitors. In so doing, these companies will be projecting themselves as responsible corporate citizens committed to reducing wastage and carbon emissions. It is also potentially a win-win for both manufacturers and consumers – these companies will retain / increase their profits by selling more units because their products are cheaper than competing brands while consumers will be paying less for them.

"This approach can be applied to any product or service," says Ir. Ts. Zulkiflee. "In turn, it has the potential to make Made-in-Malaysia products and services more competitive in export markets."

EECA can also have other spin-off benefits such as the creation of green jobs. According to Malaysia's Environmental Sustainability Plan launched in 2017, Malaysia targets 230,000 green jobs by 2030. As of June 2022, 147,170 green job opportunities had been created, said the then Minister of Environment and Water at the launch of the Green Job Portal developed by the Malaysian Green Technology and Climate Change Corporation.

The International Labour Organisation (ILO) defines green jobs as employment that contributes towards environmental protection and conservation in traditional sectors such as manufacturing and construction or in the green sector that includes renewable energy and energy efficiency.

The Commission is also working with business and industry associations such as the Federation of Malaysian Manufacturers (FMM), Federation of

Malaysian Consumer Associations (FOMCA), Cement & Concrete Association of Malaysia (CCAM), Malaysian Iron and Steel Industry Federation (MISIF), Malaysia Association of Energy Service Companies (MAESCO) and Malaysian Association of Registered Electrical Energy Managers (MAREEM) to run awareness programmes for their members.

"The only real challenge in getting people and companies to comply with the EECA is to make them aware of the implications on their businesses and incomes if they don't diligently save energy," says Ir. Ts. Zulkiflee.

Our Own Model

"When drafting the Bill, the Malaysia team looked at how other countries introduced energy efficiency and conservation laws and we did our own comparative analysis. Based on the analysis, we devised a model that was suitable for our country's energy landscape, laws and regulations as well as economic climate," says Ir. Ts. Zulkiflee, who was a member of the EECA drafting team.

The drafting team looked at what is being regulated in Japan, Thailand and Singapore to draw up Malaysia's own guidelines and standards, while taking into account what can work and what cannot in the country.

Ir. Ts. Zulkiflee says, "For example, under the Singapore's energy efficiency regulations, the rating standards for the sale of electrical products are slightly higher than in Malaysia because they import most of their electrical goods, which can be sold at competitive prices.

In Malaysia, we set our own rating in accordance to Malaysian economy perspectives, to prevent non efficient appliances and equipment from being sold in the Malaysian market. Our regulations, while focusing on energy efficiency, also aim to spur local manufacturing and the Malaysian economy at large. It is about having the right balance and a just energy transition," adds Ir. Ts. Zulkiflee.

"When drafting the Bill, we looked at how other countries introduced energy efficiency and conservation laws and did our own comparative analysis."

POWER SUPPLY INDUSTRY

REGULATING IN GOOD AND HARD TIMES

The global power sector has been facing serious challenges in their supply chain networks even before the onset of the COVID-19 pandemic and Russia-Ukraine conflict.

These two crises simply made it all the more challenging. Typically, supply chain disruptions are associated with shortages in production fuels, machinery, components, scarcity of labour, logistical bottlenecks and rising costs that threaten the reliable flow of energy. Rising costs have a big impact on electricity tariffs.

Energy Malaysia asks Dr. Madana Nallapan, Management Consultant, Strategy & Consulting Global Network at Accenture, on what Governments and regulators can do (or already doing) to better manage the volatility and unpredictability of their energy supply chains.

Dr. Madana Nallapan
Management Consultant, Strategy & Consulting Global Network, Accenture

Q What in your view are good times and hard times in the power supply industry?

A I would consider good times to be when fuel prices are cheap, the power supply chain is stable and the grid has ample capacity to supply reliable and safe electricity and gas to consumers.

Hard times would be when the cost of oil, gas and coal are high, compounded by environmental pressures for power producers to decarbonise their operations. Navigating the delicate balance between sustainability and financial considerations poses a challenge, particularly for companies already committed to decarbonising operations. The potential financial strain arising from escalated operational expenses could impede the pace of their decarbonisation endeavours.

Geopolitical tensions leading to trade sanctions and conflicts tend to make things even harder for energy security. When there is geopolitical tension between energy producing nations and importing nations, imposing sanctions to reduce energy exports or import restrictions can trigger supply-demand imbalances leading to price fluctuations or the formation of a bubble. Countries or regions with a high energy import dependency will be the most affected in this situation.

Geopolitical risk (GPR) statistics indicate that in many cases, geopolitical events are usually related to the Middle East, in countries such as Kuwait, Iran and Iraq, which are important sources of Europe's energy supply. Other risks are related to socio-political instability in Europe itself, such as the 2004 Madrid train bombing, 2005 London terrorist bombing, 2015 Paris terrorist attacks, 2014 Russia's annexation of Crimea and the ongoing war between Ukraine and Russia. These challenges can make the European Union (EU) economy highly vulnerable to GPR.

According to the Moody's Global Rating Institute, higher GPR due to Russia's war with Ukraine has reduced the credit flexibility of European countries and has increased energy supply risks for Europe.

Q When and why do supply chain disruptions occur and where do they hurt the power industry most?

A A combination of disruptors is driving supply chain gridlocks and impacting end-to-end operations in the power sector. The pandemic simply revealed the vulnerabilities that already existed within the power industry supply chain.

The biggest disrupters are operational and macroeconomic in nature. Operational disruptions include having limited access to raw materials, needing longer lead times for components, shipping issues, as well as sluggish procurement processes due to divergent product standards coupled with pent-up demand. Macroeconomic disruptions include trade tariffs and quotas that may disrupt the procurement of materials and components from foreign suppliers, and also labour constraints.

I believe these disruptions hurt the power industry the most, particularly impacting capital expenditure (CAPEX) projects by causing delays in their construction. Additionally, they present difficulties for energy suppliers as they struggle to obtain the necessary equipment and parts essential for maintaining seamless operations, thereby leading to elevated operational costs.

Q What can policymakers and power regulators do to mitigate these problems? Please cite some examples.

A It is important for the Government and industry to work together to promote the nearshoring of critical component manufacture.

Countries in the region like Taiwan are already looking at Malaysia as a nearshoring hub. This can potentially drive Foreign Direct Investment (FDI) to Malaysia, while for Taiwan it is part of a strategy to cope with short-term domestic constraints in human and physical capital mobilisation. Domestically incorporated foreign-invested enterprises will make no less contribution to expanding production capacity than local companies.

For example, the current shortage of semiconductors was partly addressed by the Biden Administration with the signing of the CHIPS and Science Act in August 2022, a measure that provides some $280 billion in funding to boost US-based research and manufacturing of semiconductors. This combined with programmes to intensify workforce training in the latest semiconductor technology can help embed the power grid with systems that can run with fewer to no disruption at all.

Another example of how policymakers and regulators are dealing with supply chain disruptions is the introduction of the Inflation Reduction Act of 2022 (IRA) in the US that amended and enacted various clean energy tax incentives such as increased credit or tax deductions if certain prevailing wage and registered apprenticeship requirements by power producers and third-party suppliers are met.

The IRA also incentivises registered apprenticeships, to serve as a training and employment pathway into these high-quality clean energy jobs. To meet the Act's apprenticeship requirements, employers must ensure that a set percentage of total hours worked on a construction project is performed by registered apprentices. The law's apprenticeship utilisation standards require that in 2022, 10% of total labour hours on a supported construction site is completed by qualified apprentices; the requirement increases to 15% by 2024.

The US Government is also actively seeking and supporting innovative manufacturing techniques. For example, the US Department of Energy (DOE) has identified two companies addressing supply chain challenges in the wind power sector by developing innovative manufacturing techniques, with funding support from the agency.

Q Malaysia has the Incentive-Based Regulation (IBR) and Imbalance Cost Pass-Through Mechanism (ICPT) introduced by the Energy Commission to manage energy security and affordability. What are your views on these tariff-setting mechanisms that take account of fluctuating power production costs?

A It is a step in the right direction to create awareness among consumers to enable them to make informed decisions to manage their energy usage by practising energy conservation and implementing energy efficient habits.

I believe that this could even facilitate the widespread adoption of renewable energy (RE) in Malaysia, with particular emphasis on the rooftop solar photovoltaic (PV) sector. This in the long run will only be beneficial for the nation as it would help us wean off our reliance on carbon-emitting non-renewable power generation.

Q Will power trading and Third-Party Access (TPA) arrangements help cushion the impact of production shortages and rising costs? If so, any examples of this?

A In short, yes. The TPA framework and RE exchange will facilitate the liberalisation of the local power sector and RE exports, and will create an enabling environment for private sector investment in strengthening the grid, power generation and energy storage.

A staged approach is necessary for this. As a case study, the European Commission was already working on plans for a European energy market in the 1980s. The aim was to create a market driven by competition. During the 1990s, several European countries began liberalising their power markets, which included efforts to unbundle power generation and distribution. The European Green Paper of 1995 played an important role in establishing the liberalisation of the European energy landscape as a directive for years to come. The next step came in 2000, when the Lisbon Strategy transformed this idea into actual policy. This triggered the creation of energy markets in the EU, and established a rough road map for moving forward.

Today, market coupling enables cross-border trading, allowing several European countries to trade on the same power exchanges – thereby reducing the odds of disruption if a country or certain countries in the EU experiences domestic power production or cost issues.

Q What is the downside of such measures?

A In the context of cross-border electricity trades, a major challenge is the lack of standardisation across different energy markets, where each country has its own policies and regulations. Additionally, there are significant infrastructure costs associated with connecting grids between countries. This extra cost can make it difficult for small countries to enter such markets without significant investments in equipment and technology upgrades. Finally, there is also the risk that one country may use its control over transmission lines or pricing mechanisms to manipulate the market in its favour, at the expense of other participants.

From a political standpoint, tensions between countries can lead to delays in the implementation of cross-border electricity trade projects. Also, changes in Government policies, trade disputes and energy security concerns can affect electricity trade. These challenges can create uncertainty and make it difficult to establish stable energy trade relationships.

Q Regarding companies in the power supply industry, how can they hedge themselves against supply chain issues and supply / demand shocks?

A Power and RE companies are taking steps to resolve these supply chain pressures, including using emergency stocks of components such as transformers to address short-term demand, reviewing and planning all scheduled work, substituting available materials when possible, improving communication with suppliers on the timing and delivery of materials, and digitalising processes to boost efficiency.

The best bet to deal with supply / demand shocks in the future, especially with regard to fuels – coal / gas - is to increase investments in RE to expand RE capacity. From an economic perspective, RE production can technically be viewed as reducing the demand for fossil fuels, which will amount to a reduction in the equilibrium price in the electricity market.

Q The Russia-Ukraine conflict has had serious repercussions on gas supply, and affected countries have made alternative arrangements, including reverting to coal as in Germany. What are your thoughts on this?

A The Russia-Ukraine conflict propelled energy security to the top of the agenda. Major world economies scrambled to find energy sources, using anything and everything they could find to keep the lights on. Governments pushed to accelerate the deployment of solar and wind but also started to buy coal. Climate change targets went on the back burner.

That being said, a whole host of initiatives have been announced by Governments to increase renewable capacity, as well as to speed up decarbonisation efforts. The IRA in the US, the REPowerEU plan in Europe and the GX Green Transformation programme in Japan are just a few examples of policymakers taking bold action.

However, we will see a rise in fossil fuel usage in the short term. In the medium and long-term we will see positive effects where RE deployment and decarbonisation are concerned.

Q Can the energy transition address existing supply chain issues faced by the power industry that is still fossil fuel dependent?

A The energy transition could actually place more pressure on the power sector's supply chain because it demands a massive increase in clean energy technology.

While it is fundamentally possible to deliver the transition at cost by mid-century, three key supply-side challenges must be addressed in the short to medium-term. They are:

1. Scaling manufacturing and supply quickly enough to meet demand, which could be challenging for key raw materials (lithium and copper) that are difficult to substitute and in high-demand, and particularly complex components (offshore wind transport vessels or grid transformers) that are costly and have long lead times.
2. Environmental and social concerns around mining and manufacturing.
3. Geographic concentration of clean energy supply chains, especially in China for solar PV and electric vehicles (EV) battery manufacturing.

These challenges can be addressed by strong regulation and industry action, but might also entail cost trade-offs if nearshoring is also prioritised.

Q It has been forecast that gas prices will spike further as it will co-exist (replacing coal) with renewables in national energy mixes in the new energy world. If so, what can happen and what can be done?

A It has been estimated that our gas imports are going to increase over the years. Replacing coal with gas is only going to speed up this growth. Gas price spikes could put our energy security in jeopardy.

For example, Indonesia is contemplating introducing new limits on the export of liquefied natural gas (LNG), a potential extension of trade curbs that have previously disrupted nickel, coal and palm oil markets.

The nation wants to ensure adequate domestic gas supply and aims to balance local consumption and export commitments, according to Jodi Mahardi, Indonesia's Deputy Coordinating Minister for Maritime Sovereignty and Energy. The country has been moving to prioritise gas volumes for its domestic market to help feed economic growth, especially after supply chain snarls combined with a post-pandemic industrial rebound that triggered a global squeeze on fuel supplies.

Q What are your suggestions for Malaysian policymakers / regulators to future-proof the power sector as we move towards net-zero carbon emissions by 2050?

A Policymakers, regulators and system operators need to allocate appropriate responsibilities and incentives to all relevant organisations within their jurisdiction and ensure these organisations coordinate their work in practice.

Policymakers need to ensure that operators of critical electricity infrastructure identify, assess and communicate critical risks. They also need to engage with industry stakeholders and collaborate to improve readiness across the entire electricity system value chain.

Regulators need to ensure that mechanisms and tools are in place to evaluate and monitor risks and preparedness, and to track progress over time. This is important at the operational level for individual utilities, as well as at the level of policymakers and regulatory authorities who need to understand if strategic objectives are met.

KNOW OF ELECTRICITY THEFT? CALL US

Consumers are often the best alerts for electricity theft that may be happening right before their eyes. It is a civic duty encouraged by the Energy Commission to prevent electrical accidents as well as to protect the interests of consumers at large. For whistleblowers, there is an opportunity for a reward of as much as 50% of the value of fines imposed by the court on guilty parties, says the Energy Commission's former Deputy Director of Enforcement Planning and Coordination Unit, Ahmad Tazmin Mohamad Noordin.

Ahmad Tazmin Mohamad Noordin
Deputy Director of Enforcement Planning and Coordination Unit, Energy Commission
(at the time of interview)

Electricity theft is on rise causing alarm at the Energy Commission. In 2023 alone, there were 23 electrical and fire accidents due to meter tampering and illegal connections, says the Energy Commission's former Deputy Director of Enforcement Planning and Coordination Unit, Ahmad Tazmin Mohamad Noordin. "Unfortunately, there was a fatality in a squatter settlement in Sabah, where direct theft from power lines is common, involving exposed wiring that can trigger short circuits."

However, the majority of power theft occurs among industrial and commercial customers seeking to save on their electricity bills, which can account for as much as 50% of their overhead costs. "They are usually small and medium enterprises (SMEs) such as frozen food factories, restaurants and 24-hour businesses," says Ahmad Tazmin. "In recent years, there has been an increase in cases among residential households as well. What we find is a spike in power theft after tariff hikes," he adds.

Illegal bitcoin mining operations that consume a lot of stolen power have become a growing concern in the past few years. The New Straits Times on 17 February 2022 reported that the police have declared an "all-out war" on illegal bitcoin mining rings that are involved in electricity theft after confiscating machines worth a whopping RM54 million in 2021, compared to only RM1.2 million in 2020.

Bukit Aman Criminal Investigation Department Director, Datuk Seri Abd Jalil Hassan is reported to have said the RM54 million losses involved 570 investigation papers and the arrest of 528 individuals in 2021. In comparison, in 2020 there were only 20 investigation papers opened, involving 26 arrests.

Ahmad Tazmin adds, "It is often difficult to track down the culprits because illegal bitcoin premises are usually unmanned and unregistered customers with the licensee, and our joint raids with Tenaga Nasional Bhd. (TNB) and Sabah Electricity Sdn. Bhd. (SESB) are limited to disconnecting the power supply to the expensive machines so that they can no longer work. This stops losses from unbilled power for TNB and SESB.

The Ripple Effect

On average, public utilities TNB and SESB report losses of RM300 million a year in unbilled power due to electricity theft. Ahmad Tazmin says, "There is a perception among offenders that these utilities are big profitable companies that can afford to manage such losses."

"There is a perception among offenders that these utilities are big profitable companies that can afford to manage such losses."

Among the most common methods of power theft is meter tampering, which involves modifying or manipulating the meter to prevent or lower the reading of actual power consumption. Another method is direct connection, which involves diverting power from a feeder or power line without having to go through the meter. As such there is no record of power usage. Both these actions are deemed offences under Subsection 37(3) of the Electricity Supply Act 1990.

Meter tampering and direct connection usually involve consumers, especially businesses, employing unqualified workers to modify the meter or install wiring to bypass the meter. Ahmad Tazmin says, "The Commission requires electrical or piped gas installations to be undertaken only by Competent Persons registered with us because they will have the necessary competencies to ensure the work is done safely. But the reality is that some businesses choose to prioritise money over safety, and break the law. They find it cheaper to hire unskilled workers with some electrical knowledge to become their power repairmen (and this includes illegal electrical fixtures) so as to reduce their monthly electricity bills."

With meter tampering, components inside the meter need to be manipulated. "Meter manipulation is not easy," says Ahmad Tazmin.

Another tactic that has been surfacing lately is the deployment of electricity saving devices. Electricity saving devices are not approved by the Commission. There have been reports of electrical contractors offering such devices to consumers, including home owners, especially when they are replacing a faulty meter.

"This trend is gaining popularity, with unscrupulous electrical contractors and electricians enticing customers with their pitch to reduce electricity bills. They have become brazen and are promoting their offers on social media platforms such as TikTok and Facebook," adds Ahmad Tazmin.

There are also instances of home owners supplying power from their homes to stalls or shops nearby. While not classified as theft, such extensions are monitored by TNB and SESB because the businesses are paying a domestic tariff rate instead of the higher commercial or industrial rate, and their higher consumption patterns may cause an overload to the system.

Safety Risks

Power theft carries safety risks. The perpetrator of the crime itself is at risk because he or she can be exposed to electric shocks when manipulating with electrical parts. When the installation is not in accordance with the Commission's standard safety procedures, there is also the likelihood of electrical accidents. For example, when fuses fail to operate properly due to improper installation, there can be a short circuit. This can cause an overload or voltage dip that can damage household appliances in the vicinity. Or in the worse-case scenario, cause a fire, which can cause irreparable damage to property and bodily injury, even fatality.

Ahmad Tazmin adds, "Suspicious or fraudulent electricity usage runs the risk of electrocution among users and property damage in the neighbourhood, when there is an explosion. It can also cause power disruptions due to demand outstripping supply planned by the public utility for the area. Outages inconvenience innocent, paying customers in the area.

"In the longer term, consistent losses from power theft will be borne by consumers in the form of higher tariffs. Under the Commission's Incentive-Based Regulation (IBR) tariff mechanism, there is a formula that enables the licensee to recoup rising costs of power production, and this includes unbilled losses. There is thus a strong case for the public to step forward and report their suspicions on power theft," says Ahmad Tazmin.

At the end of the day, the operating principle of power supply is: You Use. You Pay.

How the Public Can Help

Electricity theft is a criminal offence. The Commission urges members of the public to report their suspicions through its website at www.st.gov.my or contact TNB directly. As per the law, the identity of whistleblowers will be kept confidential.

Ahmad Tazmin offers the following tips for the public to spot power theft: overbilling; frequent power disruptions; offers of energy saving devices; and suspicious wiring in electrical installations.

HOW TO SPOT POWER THEFT IN YOUR NEIGHBOURHOOD

1. You are experiencing a sudden increase in your electricity bills, without any changes in your consumption pattern.
2. You are experiencing frequent power disruptions.
3. You are offered electricity saving devices by your electrician or contractor.
4. You notice suspicious wiring in electrical installations.

"At the end of the day, the operating principle of power supply is: You Use. You Pay."

Electrical installations, however big or small, can only be maintained or repaired by Competent Persons authorised by the Commission. To prevent power theft, a few initiatives have been introduced such as installing smart meters (still ongoing) and the Commission has also directed licensees to secure their assets by installing barrel locks and close-circuit television systems (CCTV).

Among other things, smart meters, which are being rolled out in Peninsular Malaysia, can help in the early detection of power theft because they are designed to alert TNB of any meter disturbances. A sudden drop in consumption is considered a red alert, prompting TNB to investigate the cause. Smart meters will enable TNB to take quick action against offenders.

Whenever the Commission receives public tip offs on power theft, it will first verify the information with the licensee, who is required to notify the Commission of any breaches, including theft. When the information is confirmed, raids are organised, together with the licensee and the police, who is vested with the authority to investigate, charge and arrest suspects and take them to court.

"To nab offenders red-handed, we conduct surprise raids," says Ahmad Tazmin. "Upon entering the premises, one of the first things done is for the licensee to disconnect the bypass power supply to stop any further losses."

Given the rising cases of power theft, the Commission has intensified awareness campaigns to promote the risks of power theft to the public on the mass media and social media platforms. It also conducts seminars and workshops for licensees to take preventive measures.

There are also joint enforcement efforts undertaken with other enforcement agencies such as the Royal Malaysian Police (PDRM), National Anti-Financial Crime Centre (NFCC), Malaysia Multimedia Commission (MCMC), local councils and the Inland Revenue Board (LHDN). In the case of LHDN, their involvement is mainly to catch those involved in money laundering, especially with illegal bitcoin mining operations.

POWER THEFT PENALTIES

When convicted by the court, domestic customers are liable to a maximum fine of RM50,000 or a jail term of one year or both for the first offence, and RM100,000 or a jail term of three years or both for the second and subsequent offences.

The maximum penalty for non-domestic customers is a RM1 million fine or jail term of five years or both for the first offence, and a RM5 million fine or jail time of 10 years or both for second and subsequent offences.

Licensees are required to report power theft to the Commission under Section 38 of the Electricity Supply Act 1990.

The Electricity Supply Act also empowers the licensee to disconnect the power supply when there is evidence of power theft. It is also eligible to take civil action in court to recover losses from the defendant.

WHISTLEBLOWER REWARD

In the case of a conviction involving a fine, the court may, on the application of the officer conducting the prosecution, direct the payment of up to 50% of the fine to the person who gave the information leading to the conviction. TNB also has its own reward system for whistleblowers whose information is proven accurate.

DO YOU HAVE A COMPLAINT?

Get in touch with the Energy Commission via the following channels:

Customer Complaints Management System

www.st.gov.my

Download the Application

ADUAN ST

GET IT ON Google Play

Available on the App Store

Telephone

03-8870 8800

Monday - Friday
8:30 am - 5.30 pm
(Excluding public holidays)

Email

eaduan@st.gov.my

Mail

Consumers Affairs Unit,
Energy Commission,
No. 12, Jalan Tun Hussein,
Precinct 2, 62100 Putrajaya

Office Counter

Energy Commission,
No. 12, Jalan Tun Hussein,
Precinct 2,
62100 Putrajaya

LICENSED TO COMPLY

By law, only companies and individuals licensed or registered by the Energy Commission can operate in the electricity supply and piped gas industries in Malaysia. With this come safety, technical and economic regulations that have to be complied.

Nowadays, the energy industry has become fragmented with an assortment of players vying for a share of potentially lucrative businesses in the liberalised marketplace. For the Energy Commission, the concern is small and medium enterprises (SMEs) and micro-enterprises that are either ignorant or complacent about adhering to regulatory compliances.

Energy Malaysia speaks to the Energy Commission's Deputy Director of the Compliance Unit, Khairul Nizam Anuar, who says that the cost of non-compliance can be high, and that high-risk businesses are on its radar. What is encouraging is the trend for self-regulation, especially among bigger companies that are forging ahead with building a culture of compliance within their organisations.

"Our regulations are not difficult to comply," says Khairul Nizam Anuar, Deputy Director of the Compliance Unit, Energy Commission. "There can be no excuses. It is a matter of attitude and we have come across many good ones and a few bad apples. Our responsibility is to ensure that all licensees and those registered with us follow the policies, standards, regulations and guidelines associated with their licences.

"The Commission is the sole authority issuing licences or certifications to companies and individuals to operate in the electricity and piped gas supply industries and licences are issued only to those who meet our technical and safety regulation criteria," he points out.

Khairul Nizam Anuar
Deputy Director of Compliance Unit,
Energy Commission

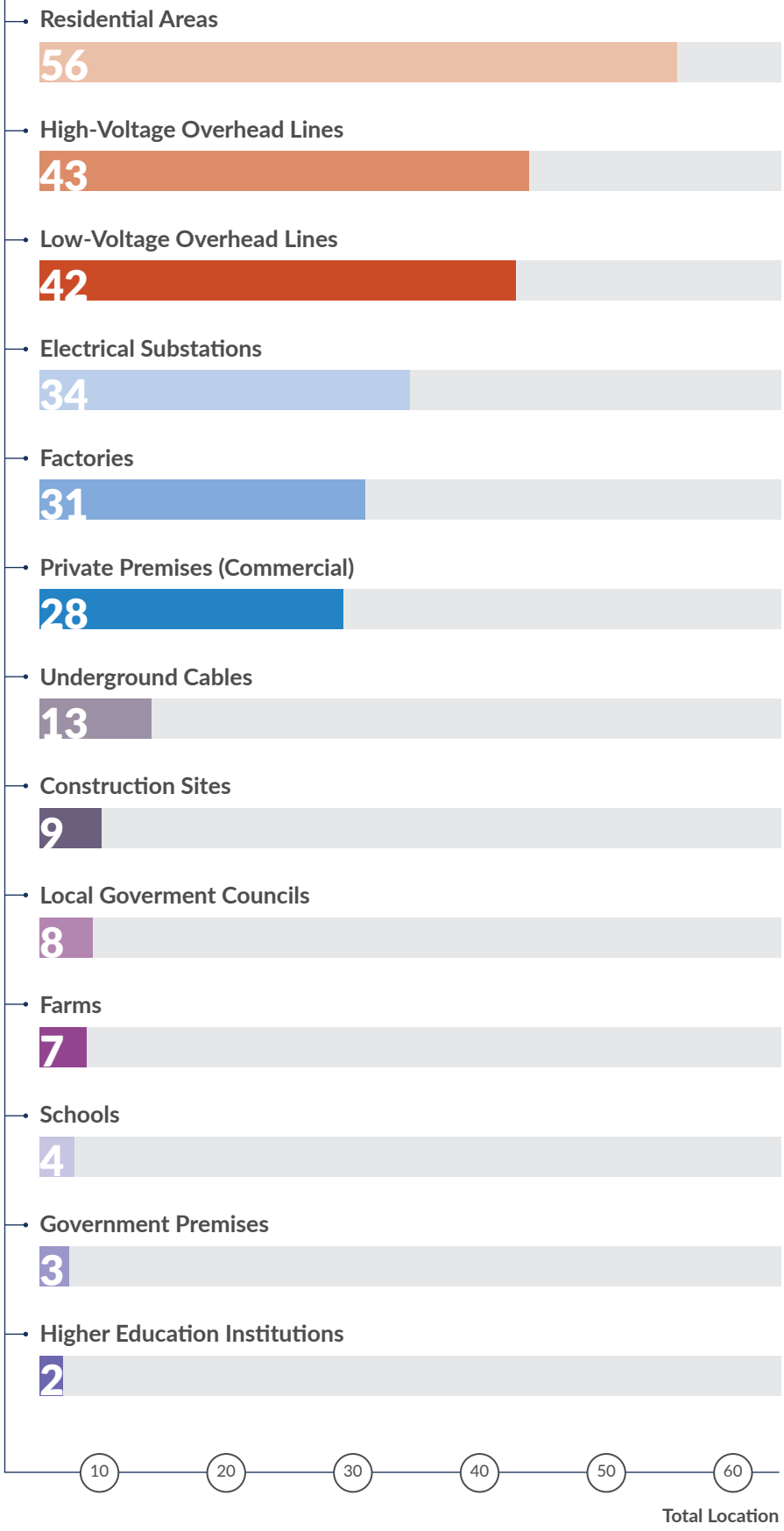
Under technical regulation, applicants must pre-qualify for the eligibility criteria, which includes proven technical proficiency to undertake the scope of work.

Safety regulation is about ensuring that only personnel registered with the Commission are hired for mechanical and electrical (M&E) works. Government and private tenders are encouraged to embed into their planning the deployment of only contractors and Competent Persons registered with the Commission for their M&E works. "The intent is to forestall accidents from happening," says Khairul Nizam.

Operating without a licence is illegal, and unauthorised personnel are the bane of the industry causing accidents due to their substandard work. For the Commission, accidents are strictly no-nos. Every year, it publishes the number of electrical and piped gas accidents, their locations and trends over 5-year cycles in its Annual Report. The Annual Report also names negligent parties who have failed to comply with the Commission's regulations despite warnings. Habitual offenders are blacklisted while some are taken to court.

"We publish these details because of our commitment to transparency and good governance; regulatory compliances are an integral part of good governance. At the same time, we believe that public knowledge is a deterrent, to prevent future accidents from happening," adds Khairul Nizam.

ELECTRICAL ACCIDENTS BY LOCATION 2018 - 2022



Types of Licences and Registrations Issued by the Energy Commission

LICENCE

ELECTRICITY

- Licence for Public Installation.
- Licence for Private Installation with Capacity of 5 MW and above.
- Private Licence with Capacity below 5 MW.

GAS

- Import into Regasification Terminal Licence.
- Regasification Licence.
- Shipping Licence.
- Transportation Licence.
- Distribution Licence.
- Retail Licence.
- Private Gas Licence.
- Procurement Licence.

REGISTRATION

ELECTRICITY

- Registration / Renewal of Electrical Contractors, Electrical Services Contractors, Switchboard Manufacturers, Electrical Signage Contractors, Private Wiring Units and Electrical Repair Contractors.
- Operating Voltage Upgrade.
- Classification of Electrical Contractors under the Electricity Regulations 1994.
- Reinstatement of Contractor Registration.

GAS

- Registration of Gas Contractors.
- Certification and Registration of Gas Competent Persons.

New Developments, Shared Responsibility

The regulatory environment is a dynamic one with market liberalisation and changing technologies. One of the latest developments is the expansion of electrification to new sectors such as transportation that has resulted in shared responsibilities between several Government ministries and agencies. Says Khairul Nizam, "Electric vehicles per se fall under the purview of the Ministry of Transport. However, the Commission's regulatory framework governs electric vehicle charging stations (EVCS)."

The construction, installation and maintenance of EVCS infrastructure and sale of power can only be carried out by the Commission's licensees, who are contractors and charger point operators. Both parties must be registered with and licensed by the Commission. To assist them, the Commission published the EVCS Policy and Guidelines in January 2023 that is found on its website. It also conducts dialogues and awareness training to familiarise licensees of the roles and responsibilities.

Another example of shared responsibility is large scale solar farms, which are subject to the regulatory frameworks of both the Ministry of Housing and Local Government, the Commission and a few other agencies, says Khairul Nizam. "The Ministry retains oversight over location and land acquisition matters, whereas the Commission provides guidelines on capacity planning as well as environmental considerations during construction."

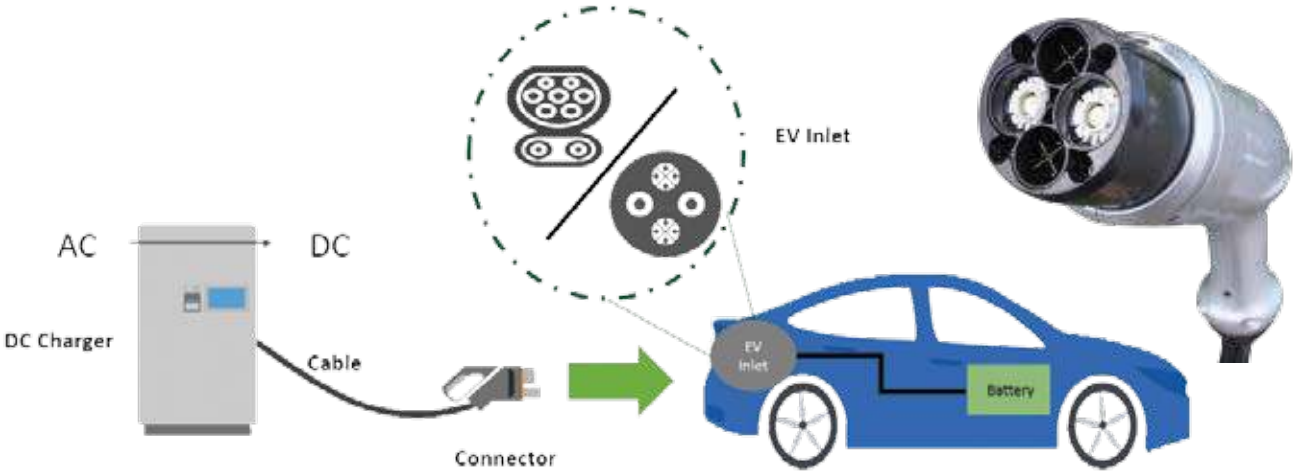
The Commission is the implementing authority of the national Large Scale Solar Programme that was launched in 2016 to ramp up renewable energy (RE) capacity in the country. In a competitive bidding process, tenders are invited and winning applicants are awarded a fixed generation capacity to construct and commercialise their farms within a stipulated time. The objective is to avoid power shortages or oversupply. The Commission has published Guidelines for Solar Farms for project investors to know the do's and don'ts of construction, maintenance and commercial operations.

Meanwhile, the liberalised retail environment has attracted private companies to engage in power sales. Khairul Nizam cites shopping mall Pavilion KL, which is an authorised re-seller of electricity. "It has a public distribution licence that is issued by the Commission to buy electricity in bulk from public utility Tenaga Nasional Bhd. (TNB), and distribute it to stores at the mall at a pre-agreed tariff.

"We expect this business segment to grow, with big building owners becoming power retailers. Another growth area is prosumers, who produce energy with rooftop solar panels or from biofuels and sell the excess to the grid or directly to third parties."

One of the earliest to leverage on power distribution is independent power producer Malakoff Utilities Berhad that has the licence to distribute electricity of up to 153 MW within the

FLOW OF POWER IN AN ELECTRIC VEHICLE CHARGING STATION



prime 72-acre KL Sentral complex. The commercial arrangement dates back to 2011, initially for four buildings and as of 2021, Malakoff is the power distributor for several buildings in the KL Sentral business district.

In 2022, the Corporate Green Power Program (CGPP) was launched to facilitate the direct sale of RE between corporate companies, solar energy producers and utility companies. To ensure compliance to the market rules of fair play, the Commission published guidelines for all three parties to follow. Another new development is cross border sales, and again, the Commission has published guidelines to ensure safe and fair trading practices.

"The Commission monitors all these businesses, to ensure that they are going by the book in terms of safety, technical compliances and market rules," says Khairul Nizam.

Moving forward, the Commission will need to review policies and guidelines for new technologies such as battery energy storage systems (BESS) when they come online. There are also studies ongoing on the utilisation of electric vehicles as generator sets for off-grid electrification. This will create yet another new area of business, which the Commission will regulate in due course.

Khairul Nizam points out, "I have met with some industry players who are already experimenting with these new technologies. They are using electric vehicles as generation sets and BESS to supply RE to communities living in remote areas."

The future is promising with the National Energy Transition Roadmap (NETR) launched by the Ministry of Economy in July 2023. It has identified 10 flagship catalyst projects based on six energy transition levers for action, namely, energy efficiency, RE, hydrogen, bioenergy, green mobility and carbon capture, utilisation and storage (CCUS). These catalyst projects are already in different stages of development.

"In the light of the NETR, the Commission will need to sit down with various stakeholders and map out our regulatory functions moving forward. It will mainly be related to capacity planning," adds Khairul Nizam.

Fragmented Marketplace

With the above-mentioned developments, the industry now has a multitude of players and the marketplace has become fragmented. Says Khairul Nizam, "The Commission is governed by the Electricity Supply Act 1990 [Act 47] and the Gas Supply Act 1993 [Act 501] to regulate licensees.

Our finding is that multinationals and public listed companies are familiar with our regulatory frameworks and adhere to them as part of their corporate governance requirements. Our main concern is SMEs and micro-enterprises, who we consider as being potentially high safety risks."

They include factories, condominiums, small shopping centres, hotels, restaurants, laundrettes and school laboratories that are powered by electricity or piped gas. There is a lack of knowledge among them that they need licences to operate their electrical and gas installations. Equally worrying is the deployment of unauthorised personnel to install and maintain them. Some are simply complacent and take short cuts to save on costs.

A spate of gas explosions at laundrettes in 2020, including fatalities, alerted the Commission to investigate the root cause of the accidents. The findings showed that they did not have the prerequisite gas licences and gas pipelines were installed by unqualified personnel.

The accidents instigated a collaboration between the Commission and various parties such as Local Authorities and others in the business chain. "Piped gas supply is a relatively young industry and there were loopholes that needed to be plugged," says Khairul Nizam. The Commission has since reached out to local councils that issue business licences; insurance companies that underwrite these businesses; the Fire and Rescue Department that monitors fire safety; and the police who report accidents. Through these engagements, the Commission identifies illegal operators and offers advisory services so that they operate within the ambit of the law.

"With the Commission's ongoing digitalisation programme, we expect to be connected online with all related authorities by 2025. The connectivity will help us monitor SMEs and micro-enterprises and address gaps that need to be rectified in the early stages," says Khairul Nizam.

Stakeholder engagement and awareness programmes are a priority at the Compliance Unit. "During stakeholder dialogues, we find a lot of 2-way communication. Participants usually speak up, seeking clarification as well as share their concerns to enable us to provide solutions.

"Our awareness programmes usually cover new or amended policies, standards and regulations. Our officers organise meetings, courtesy visits and workshops to familiarise big and small companies of their responsibilities," adds Khairul Nizam.

Road to Self-Regulation

Big energy companies, particularly public listed companies, are pursuing self-regulation as part of their Environment-Social-Governance (ESG) obligations. Going beyond Government regulations, self-regulation positions them as responsible and sustainable businesses seeking to have a positive impact on the community and the environment.

Khairul Nizam says, "Self-regulation is still at an early stage in Malaysia. It is voluntary and the Commission encourages it because of the many value-added benefits. It will push companies to seek international accreditations and best practices that will lift them to a higher plane, making them competitive in regional and international markets. One of our Government's priorities is to internationalise our businesses, to export Malaysian products and services the world over."

The spin-offs of self-regulation are higher industry standards, protection of consumer interests, increased resilience and productivity. Most importantly, it instils a culture of compliance that covers both Government-imposed regulations and internally developed policies, standards and rules.

"Self-regulation does not cost much," adds Khairul Nizam. "Most of the expenditure is for human resources, particularly training and monitoring staff to institute behavioural changes as desired by the organisation."

The future forward, however, lies in Industry Self-Regulation or ISR, which involves businesses coming together to raise industry standards by establishing an independent watchdog scheme. Many Governments are committed to providing a competitive market environment while attempting to reduce their regulatory burden. ISR represents a more flexible alternative to direct Government regulation.

According to the OECD Digital Economy Paper No 247 on Industry Self-Regulation (2015), ISR can be an advantageous complement to Government policies, but it also poses a number of challenges. ISR can potentially provide important benefits to both the industry and consumers. Its success, however, depends on a number of factors such as the strength of commitments made by participants; industry coverage of ISR; the extent to which participants adhere to the commitments; and the consequences of not adhering to the commitments.

Based on a study of 23 case studies, the OECD report noted that consumer benefits include improved product / service information, enhanced consumer rights, and effective mechanisms for dispute resolution and unfair practices. For the industry, ISR's attraction lies in enhanced consumer confidence / image of participants; disciplinary action against those who fail to meet their commitments; better complaints handling mechanisms; pre-empting formal Government regulation; and shared centralised resources.

The downside is the effectiveness of instruments wielded by the ISR. They may have to be watered down to achieve industry support, says the OECD report. In addition, in the absence of effective enforcement and monitoring, participants might have little incentive to fully adhere to the scheme. Additionally, the self-regulatory body may be prone to be overly "close" to the companies it oversees, even veering towards favouritism when a small number of actors dominate the governance of the scheme. This will call into question the impartiality of ISR.

An ISR that lacks mechanisms for review and evaluation will also undermine the spirit and intent of the scheme. Then, there is the danger that the cost of establishing and operating the ISR might be high and it could be passed onto consumers.

In Malaysia, there is some semblance of ISR in the making. According to Khairul Nizam, the compliance culture in the country is relatively relaxed and needs to mature more. "A good start would be to follow benchmarks in the United Kingdom, European Union and Singapore. We can also leverage on technology and social media to push for higher standards across the board and make our industry truly world class," he adds.

MALAYSIA'S ENERGY POLICIES AND REGULATORY LANDSCAPE:

OUR JOURNEY THUS FAR

Electricity supply is a growing industry. Demand and consumption keep soaring as new discoveries powered by electricity come mainstream, compounded by demand generated by accelerated urbanisation, industrialisation and population growth, the three megatrends shaping the world today.

For the Energy Commission, what is critical is to ensure power is delivered in a safe, reliable, orderly and economical manner so that it is more of a friend rather than a foe. Regulating the energy landscape began under the colonial administration that introduced various technical standards for installations and laid the groundwork for good governance, robust economic returns, and better social cohesion.

Independent Malaysia built on this legacy, and it is ongoing process as Malaysia navigates new policies and regulatory frameworks in the energy space.

Energy Malaysia looks back to where we were and where we are heading in the nation's energy regulatory journey.

Electrification posed different challenges at different times. Still, the Government managed to overcome various hurdles to establish power supply across the length and breadth of the country. Today, almost 100% of Peninsular Malaysia is electrified and with Sarawak not far behind. Sabah with its mountainous terrain, however, lags behind with about 70% electrification but this is set to improve with the implementation of the Sabah Energy Roadmap and Master Plan 2040 (SE-RAMP 2040), officially launched on 19 September 2023. It includes new sustainable energy generation projects and transmission projects.

The initial expansion of electricity supply also saw the adoption of Western engineering standards, technologies and new lifestyles. It was against this background that planning for new horizons began to take shape, and led to the establishment of policy and regulatory instruments for the management and development of the country's electricity industry.

In the Beginning… under British Colonial Umbrella

Much of the history of electricity in Malaysia is a consequence of the British colonial administration. If colonialism brought any benefits, it was in the accumulated expertise of a new industry or a new technology that was introduced to its dependent territories.

Malaysia was one such colonial beneficiary, and experienced the advent of electricity not long after the United Kingdom. In 1882, the world's first coal-fired power station, Edison Electric Light Station, was built in London with the promise of supplying light and warmth to London homes. Not long after in 1900, the Sempam Hydroelectric Power Station was constructed in Raub by the Raub Australian Gold Mining Company to serve its mines as well as neighbouring communities.

During the colonial years, the application, utilisation and adoption of electrical knowledge and techniques were introduced. The administration also introduced general ground rules such as legislations, standards and regulations for the proper, systematic, safe and secure development of the industry.

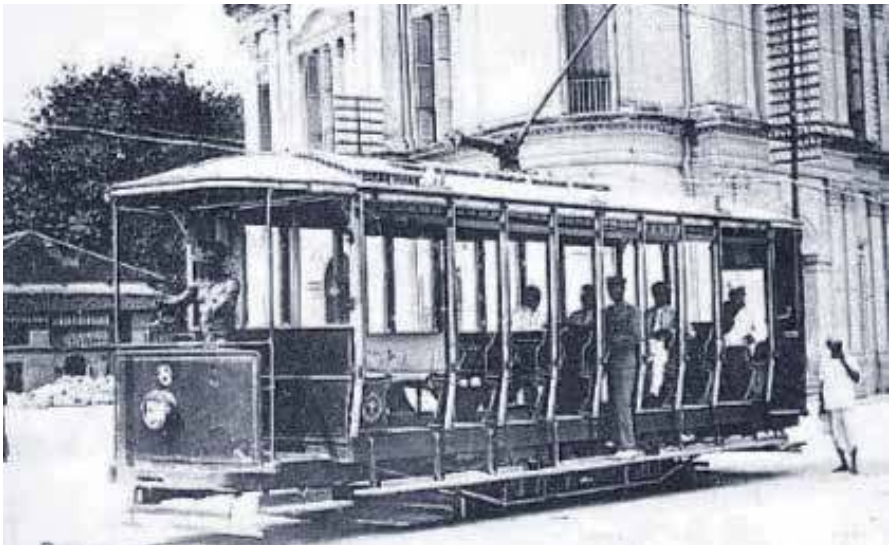
Under British rule, Peninsular Malaysia was said to be on par with other countries, including those in the West by benefitting from electricity supply. However, it lagged behind in terms of execution due to the complex political structure of British Malaya.

The colonial regime then consisted of the two key jurisdictions. One was the Straits Settlements of Singapore, Penang, Malacca and Labuan that were regarded as British territories and Crown Colonies, and came under the direct authority of the British Governor. The Straits Settlements were priority areas for electricity infrastructure development because they delivered substantial economic benefits.

The rest of the peninsula that was made up of the Malay States were divided into the Federated Malay States (FMS) and the Unfederated Malay States (UFMS). The FMS, which consisted of Perak, Selangor, Negeri Sembilan and Pahang, each had a British Resident who wielded much political influence. The FMS was administered collectively by a Federal Council, headed by a British High Commissioner and assisted by a Resident-General, with the United Kingdom being responsible for defence and foreign affairs. For administrative purposes, each state was subdivided into districts managed by British District Officers.

The UFMS states of Kedah, Perlis, Kelantan, Terengganu and Johor, on the other hand, had a greater degree of autonomy; and their rulers enjoyed some political discretion. Each had a British Advisor for administration, and except for Johor, economically they were largely involved in traditional agriculture and fishing.

These Malay States, especially the FMS, were rich in natural resources that were in high demand by British, European and upcoming American industries, for example, natural rubber for tyres in mass-produced cars and tin for the food canning industry. Unfortunately, feudal politics slowed the development of electricity supply in the Malay States, where there was often friction between political administrators, local chieftains and technocrats.



The electrified tram system was introduced in Penang in 1906. (Photo from public domain)

To make matters worse, the colonial administration acted on the dictates of the Colonial Office in London on considerations with regard to political strategy, enforcement and compliance. Despite this chain of command and various other complexities, electricity supply began to spread slowly in the first two decades of the 20th century.

What emerged at first was a "patchwork" quilt of transmission and distribution lines consisting of diverse electrical structures, systems, styles and responsibilities established by individual states and towns, with Penang (Georgetown) and Kuala Lumpur leading the way for others to follow.

For the most part, electrification and power supply was undertaken by private companies who were subject to oversight by the colonial administration. Private operators built power stations, laid transmission lines, supplied and billed consumers. Among the prominent players then was the Perak River Hydro Electric Power (PRHEP) that built the first 66 kV transmission lines to connect to its 45 MW hydro plant to the tin mines of Perak, according to Tenaga Nasional Bhd. (TNB)'s records.

In Penang, a Straits Settlement, Huttenbachs Electric Company became the pre-eminent power operator, establishing its technical superiority on the island as well as Seberang Jaya and Kedah. Like PRHEP, it followed British technical standards for power infrastructure development.

In terms of management and control of electricity supply across the states, the final responsibility rested with the colonial administration in Kuala Lumpur. They did the planning, set milestones and final project endorsement.

The private operators were usually required to establish electrical installations to feed specific businesses or communities that served the interests of the Colonial Government. During this period, supply was channelled primarily to densely populated parts of towns, neglecting would-be consumers in nearby towns and districts.

By 1920, about 12% of the country's population had the luxury of electricity.

Centralised Electricity - New Beginnings, New Environment

Between the two World Wars, a case for centralised electricity supply for Peninsular Malaysia gathered steam. A report from the Electric Adviser to the FMS Government gave clear-cut solutions on the country's electrical problems and prompted the establishment of a nationwide power system.

The report called for the control, coordination and development of electricity supply in the peninsula under a central authority. It identified electricity supply as an essential public need, a basic requirement for economic activities and well-being of the community. It also made clear that the authority should be vested with the Government.

This consequently led to the setting up of the Electrical Board of the Federated Malay States in 1921, followed by the setting up of the Electrical Department headed by a qualified electrical engineer in 1927. The Department was entrusted to control and plan electricity infrastructure development across the peninsula.

However, the Department struggled with the bureaucracy to gain its own autonomy and develop a pan-Malayan approach to the expansion of electricity. Fortunately, its location in Kuala Lumpur meant it could have the ear of decision makers. By 1941, plans for a peninsula-wide unified system of electricity organisation and distribution began to take shape. However, the Japanese Occupation (1941-45) short-circuited these plans.

Thinking National and Liberalisation

The post war years involved the arduous task of rebuilding electricity infrastructure destroyed by retreating British soldiers and the advancing Japanese Army.

The colonial administration proceeded with its unification plans, and established the Central Electricity Board (CEB) of the Federation of Malaya in 1949, with the passing of the Electricity Ordinance 1949. The Ordinance provided for the "making of elaborate power supply arrangements for the peninsula".

"By 1920, about 12% of the country's population had the luxury of electricity."

Before the Energy Commission

Prior to 1990, the responsibility for planning and operation of the electricity supply industry in Peninsular Malaysia and Sabah was vested in the National Electricity Board (NEB) and the Sabah Electricity Board (SEB) respectively, while the Electrical Inspectorate Department, under the Ministry of Energy, was responsible for licensing of private generation and the safety of electrical installations and equipment.

In Sarawak, the Sarawak Electricity Supply Corporation (SESCO) was the supply authority while the State Inspectorate was responsible for licensing and safety matters in the state.

In 1990, the regulatory structure changed. The Electrical Inspectorate Department was abolished and the Department of Electricity Supply formed under the Electricity Supply Act 1990 to act as the industry and safety regulator of the electricity supply industry in Peninsular Malaysia and Sabah.

However, in Sarawak, the State Electricity Ordinance remained in force, providing the State Electrical Inspectorate the legal power to continue with its regulatory functions.

In 1993, the Department of Gas Supply under the Prime Minister's Department was formed to regulate the gas distribution industry. Following this, the Director-General of Electricity Supply was also appointed. Administratively, the two departments were jointly known as the Department of Electricity and Gas Supply (JBEG).

In anticipation of industry deregulation, the Energy Commission Act 2001 was approved by Parliament to take over the functions of the Department of Electricity and Gas Supply. The Energy Commission was established under this Act on 1 May 2001 and became fully operational on 2 January 2002.

The Commission became the regulatory authority for electricity and piped gas supply in Peninsular Malaysia and Sabah in 2002.

On 3 January 2024, its mandate over Sabah was assumed by the Energy Commission of Sabah (ECoS).

A rural CEB power station that used diesel.
Source: Robert Finlock's paper

"The CEB unified power supply in the country under one authority that reported to the Government."

CEB, which replaced the Electrical Department, began operations on 1 September 1949. It inherited the assets of private operators that consisted of 34 power stations with a generation capacity of 39.88 MW. Other legacy assets included transmission and distribution systems above and below ground, valued at close to 30 million Malaysian colonial dollars, and an impressive list of consumers and staff of 2,466, says the TNB website. CEB is the precursor to TNB.

However, they were not adequate because the power plants were small and used a variety of fuels including low grade coal, local charcoal, oil and water. With demand forecast to surge, CEB began large scale planning and sought huge sums of capital and foreign technical experts. Topmost on CEB's agenda was the development of two power plants, namely the Connaught Bridge Power Station in Klang, Selangor and the Cameron Hydro Electric Station in Cameron Highlands, Pahang. It was also entrusted with the development of the national grid.

The CEB unified power supply in the country under one authority that reported to the Government. Its mandate included studying electricity growth forecasts, planning and establishing electricity infrastructure in an integrated manner across different geographies.

In 1965, CEB was renamed NEB, reinforcing its stature as the national public utility. By the 1980s, the NEB was a monopoly supplying electricity across Peninsular Malaysia.

Following restructuring and liberalisation of the energy sector, NEB was corporatised under the Electricity Supply Act 1990. This decision was in line with the Government's privatisation policy. It became public listed as TNB in 1992. As a listed company, TNB was free to raise funds in the equity market for development projects, relieving the Government of the financial burden of funding power plants that were becoming bigger and more costly.

An old flier advertising the NEB.
Source: Blog Jalan Raya Facebook Malaysia

With privatisation, the Government also opened the door to independent power producers (IPPs) in 1993, breaking TNB's monopoly of the generation business. IPPs were contracted to supply at least 30% of the electricity demand in Peninsular Malaysia. The entry of IPPs helped assuage the country's thirst for power in the midst of an economic boom (1987-1996).

With IPPs in the picture, there was now a need to establish an independent regulatory authority for the compliance and enforcement of regulations pertaining to generation. This led to the formation of the Energy Commission under the Energy Commission Act 2001. As a Government Agency, the Commission was also tasked to ensure the successful implementation of key Government energy policies and reforms.

Energy Policies, Incentives and Reforms

Looking back, Malaysia has a good track record for adapting to change as and when needed. Back in the 1970s, during the oil crisis from 1973 and 1979, the Government diversified its energy resources to prevent an over-dependency on oil. This led to the formulation and implementation of significant policies that changed oil consumption trends in the country's energy sector.

During this period, the first National Energy Policy was formulated in 1979, to provide guidelines for long-term energy objectives and strategies to ensure efficient, secure and environmentally sustainable supply of energy. Subject to regular reviews and updates, this overarching policy stood the test of time until the launch of the second National Energy Policy (2022-2040).

Between these two periods, other supplementary policies were introduced in response to external and internal environmental factors. They include the National Depletion Policy in 1980 to limit crude oil and natural gas production to safeguard local reserves. Alongside it was the Four Fuel Diversification Policy, introduced in 1981 to prevent over-dependence on oil as the main fuel source for power production. Oil was by then being overtaken by gas as a generation fuel in the 1980s, when vast gas reserves were discovered in offshore Malaysia. At the same time, coal generation was on the uptrend. Then, the Five-Fuel Diversification Policy took effect 2001, to incorporate renewable energy (RE) as the fifth fuel in the energy mix, after oil, gas, coal and hydro. This was more an energy security strategy rather than a response to the United Nation's Kyoto Protocol.

Still, there were tentative steps to promote RE as a clean fuel. The 2001 Budget provided fiscal incentives to companies that utilised biomass for RE production. It welcomed new players, namely, estates in remote off-grid locations to use palm waste for power generation and supply.

Incentives were rolled out in the form of Feed-in-Tariffs (FiT) for the biomass-generated RE to be sold to the grid at a premium. Meanwhile, the Small Renewable Energy Programme (SREP) that was introduced in 2001 connected these estate-producers to the grid. SREP participants could sell up to a maximum of 10 MW of RE to the grid.

Another step forward was the Biomass Generation & Cogeneration in the Malaysia Palm Oil Mill (BioGen) that was launched in 2002. A United Nations Development Programme (UNDP) and the Global Environmental Facility (GEF) collaboration, BioGen incentivised the development of cogeneration technology.

The National Biofuel Policy (NBP) 2005 added more weight to the development of biofuels, while the National Renewable Energy Policy 2009 was implemented to increase the utilisation of solar, biomass and biogas resources.

Fast forward to the 2020s, the energy sector is undergoing wider liberalisation, mainly via third-party access arrangements that enable new players/investors to participate in the power supply value chain. The industry is also being restructured as Malaysia moves forward to integrate more RE into the electricity system.

These initiatives call for the Government to address the critical challenges of designing suitable RE support schemes, such as de-risking investments by awarding long-term contracts, facilitating consumer participation in the electricity market by reforming end-user tariffs, and enhancing the flexibility of the power system to deal with the intermittency of RE.

Malaysia's Energy Policies (1979-2023)

1. First National Energy Policy formulated in 1979
2. National Depletion Policy introduced in 1980
3. Four Fuel Diversification Policy introduced in 1981
4. Five-Fuel Diversification Policy took effect in 2001
5. Feed-in-Tariffs (FiT) for the biomass-generated RE to be sold to the grid at a premium from 2002
6. Biomass Generation & Cogeneration in the Malaysia Palm Oil Mill (BioGen) was launched in 2002
7. National Biofuel Policy (NBP) launched in 2005
8. Renewable Energy Policy launched in 2009
9. National Energy Policy (2022-2040) launched in 2022
10. National Energy Transition Roadmap (NETR) launched in 2023

"Looking back, Malaysia has a good track record for adapting to change as and when needed."

MESI 1.0 and 2.0 Reforms

For decades, Malaysia's electricity supply industry was monopolistic in nature, led by three main utility companies that have a shared British colonial history, namely, TNB, SESCO and Sabah Electricity Sdn. Bhd. (SESB). In the interest of good governance, the Government has thus far introduced two iterations of the Malaysia Electricity Supply Industry (MESI) reforms, better known as MESI 1.0 and MESI 2.0.

MESI 1.0 was endorsed by the Government in 2009, and consisted of wide-ranging initiatives implemented between 2010 and 2014. Among its achievements are the implementation of the Incentive-Based Regulation (IBR) for transparent tariff setting; and the establishment of the Single Buyer entity. Under the Single Buyer model, Government-backed utilities are to procure electricity from IPPs, often through term contracts. This means IPPs have guaranteed buyers. This is in contrast to fully liberalised electricity markets, where there are multiple competing buyers and sellers. The Single Buyer was a ring-fenced regulated department that was established within TNB in September 2012. Its role was to engage in electricity planning and manage electricity procurement services for Peninsular Malaysia.

In 2018, the Government announced MESI 2.0, to further strengthen governance structures, regulations and key processes, to align itself with the expectations of the new energy world. The ultimate goal was to future-proof the industry and meet consumer expectations.

The highlights of MESI 2.0 are the liberalisation of the coal and gas markets. They also envision the establishment of a wholesale market (including a capacity market) and making ring-fenced Single Buyer an independent entity. This is still a work in progress.

Under the MESI 2.0 reforms, IPPs are to be empowered to source fuel in an open market. With fuel costs accounting for roughly 40% of the electricity tariff and nearly 70% of power generation costs, this move is seen as an opportunity for them to reduce their generation costs and ultimately drive down tariffs for consumers.

Gas Market Pathways

Gas is one of the primary fuels for power generation in Malaysia. The consumption of gas in power generation is expected to increase under the National Energy Transition Roadmap (NETR), when no more coal-fired power plants are to be built. Currently, the gas supply industry is in the midst of adjusting to a business world without subsidies.

In the 1980s, natural gas was relatively cheap because it was a residual product released into the atmosphere when oil was in production. The gas was captured, processed, and transported by pipeline to gas power plants, the first being TNB Paka in Terengganu that was commissioned in 1988 (and decommissioned in 2019). Also known as the Sultan Ismail Power Station, this power plant was closest to the gas processing facility in Kertih, Terengganu.

At that point in time, the intention was to spur the country's nascent gas industry.

A turning point came with the Asian Financial Crisis in 1997, which led to the introduction of gas market regulation. Prior to this, gas prices for downstream consumers were based on market value, and contractually linked to a substitute petroleum product. However, as part of the overall stimulus and recovery package implemented in the aftermath of the Asian Financial Crisis, the Government stepped in to regulate domestic gas prices to attract foreign direct investments and boost the oil & gas industry, a pillar of the national economy.

By 1997, the Government had begun subsidising gas prices for the energy sector, by establishing a fixed gas price structure. Regulated gas prices to the power and non-power sectors were lower than the formula-based contracted prices between Petroliam Nasional Bhd. (Petronas) and its end users. The price differences were absorbed by Petronas.

With the cost of subsidies becoming heavier by the year, it became evident that the regulated gas pricing system was no longer sustainable. In 2008, the first steps were taken to remove subsidies gradually. Under the 10th Malaysia Plan (2011-2015) and the more recent New Energy Policy (2022-2040), the Government stance is a strategy of elimination or rationalisation of subsidies that will eventually see gas prices for the power and non-power sectors achieving market parity.

One of the outcomes of subsidy rationalisation is the introduction of Malaysian Reference Price (MRP), the weighted average price of liquefied natural gas (LNG) Free-on-Board exported from Malaysia as declared by the Department of Statistics, Malaysia (DOSM). The MRP provides standardisation of price markers across the gas value chain. Its movement is aligned with LNG market prices, allowing all parties to benefit fairly from the return of LNG sales. However, there is a lagging effect of six to seven months between the quarterly MRP and Brent.

To provide a legal basis for these market reforms, the Gas Supply (Amendment) Bill 2016 was passed in Parliament and came into force on 16 January 2017. The Gas Cost Pass-Through (GCPT) mechanism, which is similar to the Imbalance Cost Pass-Through (ICPT) applied to the electricity supply industry, was introduced earlier in 2014.

Both mechanisms operate based on the ICPT model. The goal is to make up for differences between forecast and actual prices and volumes. ICPT/GCPT allows consumers to enjoy rebates or pay surcharges, depending on the forecast and actual price difference.

Another highlight of the 2016 Bill is the introduction of the Third-Party Access (TPA) system, to be implemented by the Commission. Under TPA, any party who possesses a shipping licence from the Commission can utilise existing gas infrastructure to buy and sell gas in the market. TPA aims to promote healthy competition among gas suppliers, and for consumers to benefit from competitive prices and better services. Most of all, it aims to enhance the security of supply.

Under this Bill, the Commission's regulatory scope was expanded beyond piped gas distribution and reticulation, to include LNG regasification terminals and transportation through onshore gas transmission pipelines. This empowers the Commission to regulate the downstream gas sector where market participants such as shippers, importers, transporters, distributors and retailers are clearly defined.

TPA is regarded as a milestone in gas market liberalisation because consumers no longer have to buy gas only from Petronas or Gas Malaysia. In October 2019, the first TPA LNG cargo arrived in Malaysia, dubbed as the "Trial Cargo". The LNG was unloaded at the Sungai Udang Regasification Terminal (RGT) in Melaka for transportation and delivered to the TNB power plant in Port Dickson, Negeri Sembilan. It was the outcome of a sales and purchase agreement between TNB Fuel Services Sdn. Bhd. (TNBF), TNB and Shell Malaysia Trading Sdn. Bhd.

Since then, another cargo was brought in by a third party shipper in 2021, says the Commission's Director of Strategic Planning & Communication, Rumaizi A Halim, previously the Deputy Director of Third Party Access Unit. He adds that following the COVID-19 pandemic and Russia-Ukraine tensions, there has been a price spike in the global LNG market. Gas prices at TTF in Europe (TTF stands for Title Transfer Facility, a virtual trading point for gas in Netherlands), soared from USD15/MMBtu in February 2022 to USD79/MMBtu in September 2022. Therefore, global gas prices were simply too high for third party shippers to import gas to Malaysia in 2022 and 2023, says Rumaizi. However, global gas prices were less volatile in 2023 and showed a gradual downtrend pattern. This will provide opportunities for shippers to bring in LNG for Malaysian market in 2024 onwards, he adds.

Transitioning to Net-Zero Carbon Emissions by 2050

Currently, the document that is causing a buzz is the NETR, which was officially launched in August 2023. It is being seen by industry players as the strongest signal yet of the Government's commitment to achieve the country's aspirations for net-zero carbon emissions by 2050.

Phase 1 of the NETR builds upon the National Energy Policy 2022-2040, and identifies 10 flagship catalyst projects that are based on ongoing initiatives across various stakeholders. These projects are expected to bring significant investments to accelerate Malaysia's energy transition towards a 70% RE capacity by 2050.

"Real progress to deliver according to the NETR will require infrastructural and

Rumaizi A Halim
Director of Strategic Planning & Communication, Energy Commission

legislative reforms on a national scale," says Abhishek Kumar, KPMG's Head of Infrastructure, Strategy & Operations in Malaysia. "The Government has a heavy responsibility to introduce robust policy and regulatory frameworks to establish a level playing field that fosters a favourable investment climate for financing and implementing its initiatives," he added. (KPMG Media Release, 15 August 2023).

Thus far, Malaysia's carefully chartered directions, development and expansion of energy infrastructure and services are recognised by international multilateral agencies as one of the country's strongest assets for promoting socio-economic and industrial development. They have also led to the establishment of robust policy and regulatory frameworks, which will serve as stepping stones to help steer the country towards the achievement of Malaysia's net-zero carbon ambitions by 2050.

ENERGY EFFICIENCY CHALLENGE 2023

10 YEARS ON... AND STILL GOING STRONG

The Energy Efficiency Challenge (EE Challenge) 2023 celebrated a decade of trying to cultivate the habit of prudent energy use among school children.

Organised by the Energy Commission, the annual competition entered its 10th year, and it saw students accumulating as much as 1,515,011 kWh in energy savings, which is equivalent to a total electricity bill savings of RM771,126.00 and an avoidance 1,181.71 tonnes in carbon dioxide emissions.

The 2023 competition attracted 2,677 entries from schools across the country. It had four entry categories: poster drawing, storytelling, creative video and energy efficiency reporting. The first two categories were opened to primary schools while the last two categories were meant for secondary schools. Participants were assessed on energy savings achieved over a 4-month period, from 1 June 2023 to 30 September 2023.

In his address at the EE Challenge 2023 prize giving ceremony held in Putrajaya on 14 December 2023, the Minister of Energy and Natural Resources, Nik Nazmi Nik Ahmad said that awareness and appreciation of the younger generation about energy efficiency is important in supporting the implementation of the country's sustainable development agenda and to achieve Malaysia's aspiration for net-zero greenhouse gas (GHG) emissions as early as 2050.

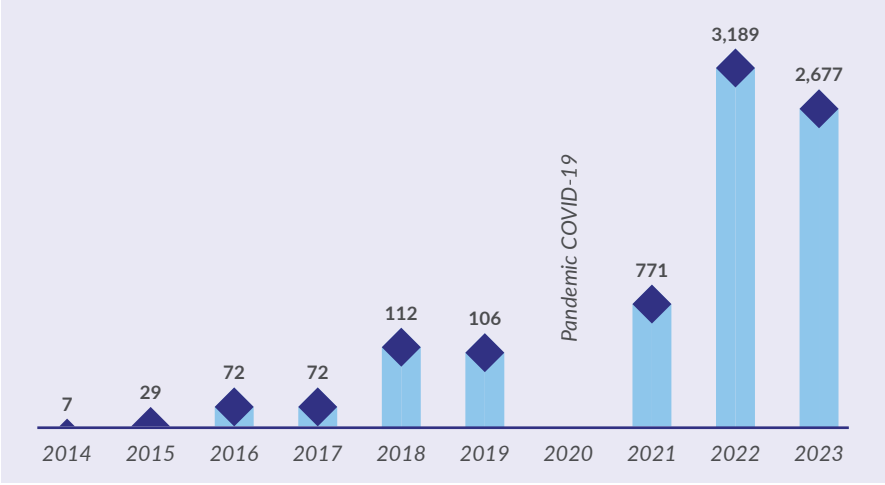
"The younger generation like our children are a catalyst to expand the adaptation and application of energy efficient practices, further contributing towards the reduction of carbon emissions and the effects of climate change," he added.

Also speaking at the event was the Commission's Chief Executive Officer, Dato' Ir. Ts. Abdul Razib Dawood, who said that based on a report produced by the Commission, schools that participated in the competition this year recorded a decrease in cumulative electricity consumption of 92,665 kWh, which was equivalent to RM47,152.00 saved in terms of electricity costs.

"It is our hope that the energy efficiency practices adopted during the competition period will continue even after the competition is over, to ensure the sustainability of the environment. To the parents and guardians, I urge them to set a good example for their children by using electricity efficiently," he added.

The annual event was introduced in 2014, with just seven schools participating, and peaking with 3,189 schools in 2022. One of the key events in the Commission's annual calendar, the EE Challenge seeks to educate and foster a culture of energy efficiency in schools. It aims to create awareness among students, teaching staff and others working in the school on the positive effects of energy savings on the environment.

EE CHALLENGE PARTICIPATION 2014-2023



Of the 2,677 entries received in 2023, there were 2,393 entries for the poster category; 149 for storytelling; 70 for creative video; and 65 school reports on energy efficiency.

What some winners have to say...

"I want to say that energy savings is important, and so is saving water. We should use energy and water only when we need it. We also must try to use clean energy, like putting solar panels in our homes. I also try to encourage my friends and family to save more energy and water. My mum is my biggest role model and she encouraged me to enter this competition and tell the story of energy efficiency in a creative way and through public speaking."

Winner of #Story-Telling-Challenge
Siti Amni Nasuha Mohd Muzri
Standard 4,
SK Convent Sentul 2,
WP Kuala Lumpur

"The role models in my life are my father who is a funny guy and my mother, who has encouraged me to draw since I was little. I did a comic-book drawing on Facebook of how people can save electricity by turning off light switches in their homes when there is no one there. Not only light switches, they can also turn off their microwaves, air conditioners and other electrical appliances and equipment. I wanted to show how easy it is for people to save energy by doing these small things."

Winner of #Poster-Drawing-Challenge
Ooi Zi En
Standard 6,
SJK (C) Keat Hwa,
Alor Setar, Kedah

"We could win this challenge because we had a very good teacher who was our biggest influence. He is also like our friend. We joined "Squad Energy Efficiency", a student association at our school and were active in going around to talk to students on why it is important to save electricity for the environment and for future generations. "Squad Energy Efficiency" also does tree planting on the school ground, to help make the school more environment-friendly."

Winner of Most Creative Video
- **Muhammad Izzul Haziq Rozaiman**
- **Arif Haiqal Mohd Taupek**
- **Nazrul Airil Shah Shah Kamal Azrin**
- **Muhammad Asyrap Mukmin Rozaiman**
- **Hafizuddin Yahya – Teacher**

SMK Datuk Syed Ahmad, Kedah

ENTRIES RECEIVED

#Poster-Drawing-Challenge	#Story-Telling-Challenge	Most Creative Video	Most Energy Efficient School
2,393	149	70	65

WINNERS LIST

#STORY-TELLING-CHALLENGE

1st **Siti Amni Nasuha Mohd Muzri**
SK Convent Sentul 2,
WP Kuala Lumpur

2nd **Muhammad Hafie Sidqi Saiful Azrul**
SK Seri Tasik,
WP Kuala Lumpur

3rd **Nur Aliyya Rania Mohd Razali**
SK Tembila,
Terengganu

MOST CREATIVE VIDEO

1st **SMK Datuk Syed Ahmad, Kedah**

2nd **SMK (A) Kuala Abang, Terengganu**

3rd **SMK Perimbun, Selangor**

MOST ENERGY EFFICIENT SCHOOL

1st **SMK Kemumin, Kelantan**

2nd **SMK Taman Nusa Damai, Johor**

3rd **SMK Sultan Ismail II, Terengganu**

WINNERS LIST

#POSTER-DRAWING-CHALLENGE

PRIMARY 1 - 3

1st **Nur Shafiyyah Rania Shahrul Hazman**
SK Putrajaya Presint 8(3),
WP Putrajaya

2nd **Aaliyah Koh Yu Qing**
SK Visi Sandakan,
Sabah

3rd **Aimie Humaira Nasrul**
SK Sungai Kantan,
Selangor

PRIMARY 4 - 6

1st **Ooi Zi En**
SJK (C) Keat Hwa,
Kedah

2nd **Muhammad Jibreel Fahri M. Farouk**
SK Sri Bukit Pasir,
Johor

3rd **Celest Cheong**
SJK (C) Kwang Hwa,
Pulau Pinang

NUCLEAR AWARENESS WORKSHOP

The Energy Commission conducted an in-house nuclear awareness workshop on 29 February 2024 to discuss how nuclear power could be yet another clean energy source in Malaysia's race towards decarbonisation. The speakers at the workshop highlighted that Malaysia had already laid the foundation for nuclear energy generation, and has the expertise to take it to the next stage.

The workshop offered participants with a crash course on the fundamental principles of nuclear technology, its ability to generate electricity, and the regulatory requirements of nuclear power plants (NPPs). It also dispelled fears surrounding the safety of nuclear energy. There was also discussion on whether nuclear energy has to become a fuel generation option, to enable Malaysia to meet the target to achieve its net-zero carbon emissions by 2050.

The day-long workshop outlined what will be required to prepare for the country's nuclear power development should the Government choose to embark upon it.

Topics discussed included the global dynamics of NPPs; engineering aspects of building and operating NPPs using various types of reactor technologies; education and training in the 3S – nuclear safety, security, and safeguards; application of nuclear techniques in research and development; nuclear waste management; nuclear liability and compensation; and the licensing process involved in operating NPPs.

The speakers came from across the spectrum, from international nuclear experts to researchers and academics from institutions of higher learning that offer nuclear programmes. The majority have worked at or received professional training from the International Atomic Energy Agency (IAEA).

2023 NATIONAL ENERGY AWARDS HONOURS 38 GREEN PLAYERS

The 2023 National Energy Awards (NEA) commended 38 companies and institutions for their efforts in applying renewable energy (RE) and energy efficiency practices into their day-to-day operations.

Officiating the event on 8 March 2024, Deputy Prime Minister, Dato' Sri Fadillah Yusof said 114 entries were received for NEA 2023, which saw a reduction of more than 1.4 GW in cumulative energy consumption. "This is equivalent to electricity bill savings of over RM200 million (at the current tariff) and a reduction in carbon emissions of over 23,000 metric tons per year," he said.

The Deputy Prime Minister, who is also the Minister of Energy Transition and Public Utilities, added that he was happy to share that 23 of the NEA 2023 winners had represented the country at the ASEAN Energy Awards 2023 (AEA), with 12 of them returning home with awards in various AEA categories.

"I am very proud of the achievements of the NEA 2023 winners because it is proof that Malaysia has succeeded in creating a viable RE industry with local players who are competent, qualified and competitive," said Dato' Sri Fadillah. He added that the NEA and AEA winners are the best in the field of sustainable energy at the national and regional level, and that their victory shows the ability of the local industry to present ideas and innovative solutions in optimising supply and sustainable energy use.

Dato' Sri Fadillah also said that the energy sector, including electricity supply, accounts for almost 80% of the total greenhouse gas (GHG) emissions in Malaysia, adding that his Ministry is determined to reduce the carbon footprint of the electricity supply sector.

A total of 114 submissions were received for NEA 2023's four categories comprising: Energy Management, Energy Efficient Building, Renewable Energy and Special Awards. The winner of each category received a cash prize of RM40,000 while the runner up received a RM15,000 cash prize.

The NEA has been organised annually by the Ministry since 2018, to recognise organisations that adopt energy practices that are in line with the nation's just energy transition, net-zero carbon emission goals, and sustainable development goals.

ST DATASHARE

January to June 2024

ELECTRICITY AND PIPED GAS SUPPLY

Total Energy (GWh):
22,426 GWh

Peak Demand (MW):
19,716 MW [11 May 2023]

Installed Capacity (MW):
25,862 MW

Reserve Margin (%):
31.20%

*This data only covers the Peninsular part of the grid system.

Generation Mix (%)

Coal:
51.70%

Solar:
1.90%

Gas:
39.20%

Others:
0.20%

Hydro:
7.00%

SAIDI (Minutes / Customer / Year)

Peninsular Malaysia:
47.88
Minutes / Customer / Year
(until 31 May 2024)

Labuan:
367.35
Minutes / Customer / Year
(until 30 April 2024)

ENERGY SUSTAINABILITY

PPTEC Compliance (%):

76%
Compliance in 1,522 installations

Electricity Savings under NEEAP (%)*:

5.82%
8,772 GWh
equivalent to
RM2.21 billion

*This savings is as of 31 May 2024

Renewable Energy (RE) Installed Capacity (%)

Hydro
47.23%

Biomass
2.88%

Solar
47.59%

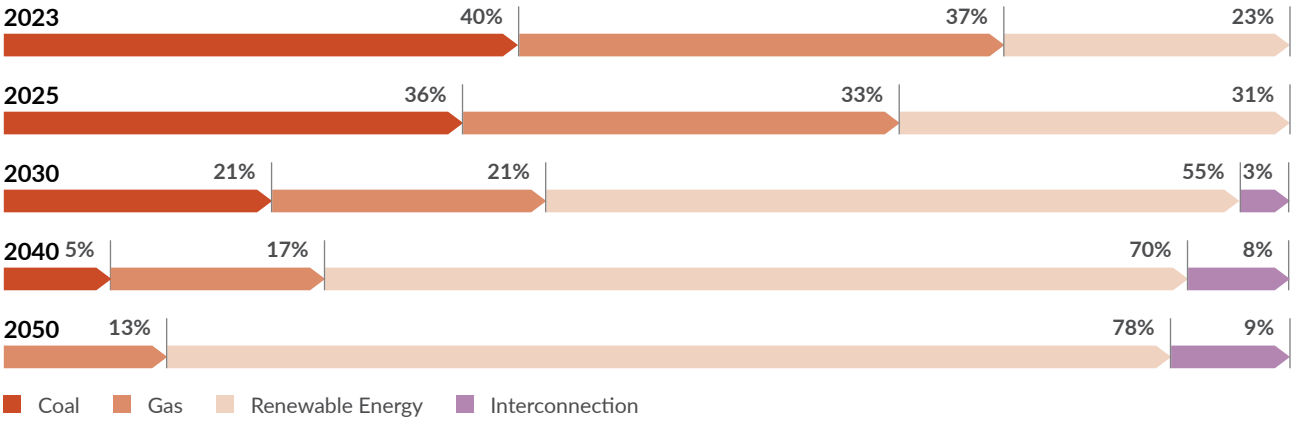
Biogas
2.30%

Covers Peninsular Malaysia and Sabah only.
- Data sources are TNB, IPP, SESB, Single Buyer, SEDA, MGTC, OAS and ECOS.
- Self-gen with "other" fuel is excluded.
- Total hydro includes mini hydro capacity.
- Refers to RE installed capacity in 2022.

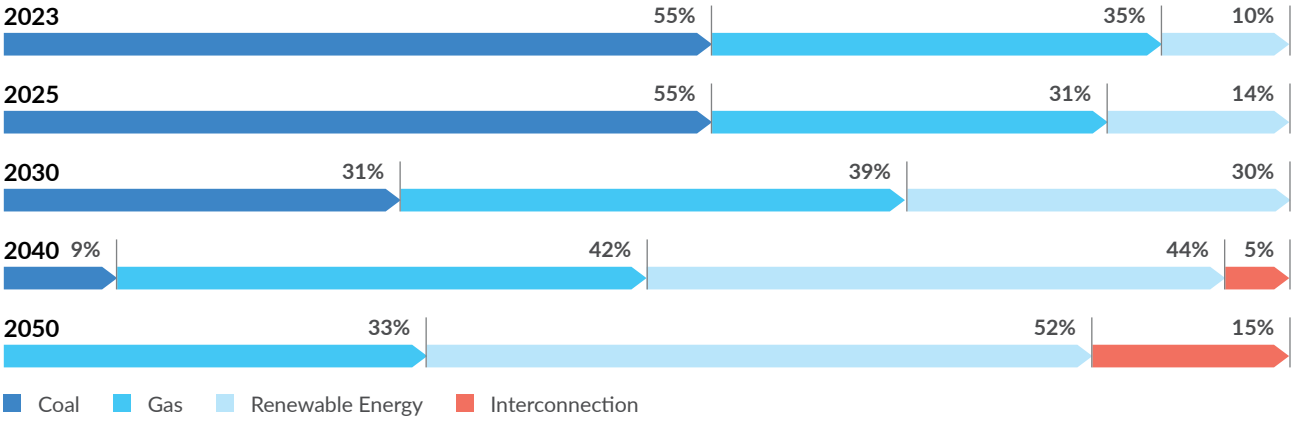
RE POWER PLANTS FOR COMMISSIONING

TC Sunergy Sdn. Bhd. *Hulu Selangor, Selangor* **20.00 MW**	Asiabina Solar Sdn. Bhd. *Kerian, Perak* **50.00 MW**	Ragawang Power Sdn. Bhd. *Pekan, Pahang* **50.00 MW**	Ranhill Solar 1 Sdn. Bhd. *Batang Padang, Perak* **50.00 MW**
Sun Estates Sdn. Bhd. *Batang Padang, Perak* **10.00 MW**	Bakateam Services Sdn. Bhd. *Seberang Perai Tengah, Pulau Pinang* **15.00 MW**	Classic Solar Farm Sdn. Bhd. *Chuping, Perlis* **50.00 MW**	Sharp Ventures Solar Sdn. Bhd. *Klang, Selangor* **50.00 MW**
Fusion Trend Sdn. Bhd. *Kuala Selangor, Selangor* **13.00 MW**	GBS Suria Sdn. Bhd. *Gopeng, Perak* **50.00 MW**	Cypark Suria Merchang Sdn. Bhd. *Merchang, Terengganu* **100.00 MW**	

PROJECTED CAPACITY MIX OF PENINSULAR MALAYSIA, 2023-2050 (%)



PROJECTED ENERGY MIX OF PENINSULAR MALAYSIA, 2023-2050 (%)



ECONOMIC EFFICIENCY

Regulatory Period:

RP3 (2022-2024)

Average Base Tariff Rate for Peninsular Malaysia:

39.95 Sen / kWh

Tariff Adjustment under ICPT Mechanism for January to June 2024:

- Domestic Consumers
  - Usage of 600 kWh & below: **Rebate 2 sen/kWh**
  - Usage of 601 – 1,500 kWh: **No surcharge/rebate**
  - Usage of 1,500 kWh and above: Surcharge **of 10 sen/kWh**
- Non-Domestic Consumers under the B, D, H, H1& H2 Tariff, and Water & Sewerage Operators: **Surcharge of 3.70 sen/kWh**
- Local Government Street Lights: **Surcharge of 10 sen/kWh**
- Other Non-Domestic Consumers: **Surcharge of 17 sen/kWh**

The Government had allocated **RM1.9 bilion** for ICPT adjustment for the period of January to June 2024

REGULATORY QUALITY

Number of Complaints Received:

965
Complaints

Number of Complaints Resolved:

904
Complaints

Number of Complaints Under Investigation / For Further Action:

61
Complaints

SAFETY

PRIMARY CAUSES OF ACCIDENTS

ELECTRICITY

- Non-compliance with safe work procedures.
- Improper installation / maintenance.

PIPED GAS

Improper installation / maintenance.

PRIMARY ACCIDENT LOCATIONS

ELECTRICITY

Utility installations.

PIPED GAS

Private buildings (commercial).

Number of Electrical Accidents:

17 Cases

Number of Piped Gas Accidents:

1 Case

COMPETENCY & CONTRACTORS

Total Number of Electrical Certificates of Competency Issued:

2,777 Certificates

Number of Electrical Contractor Registrations (ERC, EC, ESC, ESIC, SBM, PWU): *

8,059 Registrations

Total Number of Institutions Accredited to Facilitate Electrical Competency Examinations:

138 Institutions

Total Number of Gas Certificates of Competency Issued:

1,274 Certificates

Number of Gas Contractor Registrations:

117 Registrations

Total Number of Courses Accredited to Facilitate Gas Competency Examinations:

3 Courses

* ERC: Electrical Repair Contractor
EC: Electrical Contractor
ESC: Electrical Service Contractor
ESIC: Electric Sign Contractor
SBM: Switchboard Manufacturer
PWU: Private Wiring Unit

CERTIFICATES OF APPROVAL

Number of Certificates of Approval for Electrical Equipment

5,582 New Certificates of Approval
3,194 Renewals

Number of Certificates of Approval for Manufacturers and Importers for Electrical Equipment:

182 New Certificates of Approval
337 Renewals

Number of Certificates of Approval for Gas Fittings, Appliances and Equipment:

717 Certificates of Approval

Number of Certificates of Approval for Manufacturers, Assemblers and Importers for Gas Equipment

90 Certificates of Approval

Number of ATI and ATO

1,066 ATI and **1,038** ATO

ELECTRICAL AND GAS LICENCES

Number of Electrical Licences:

4,412 Licences

Number of Third Party Access Licences:

39 Licences

Number of Private Gas Licences:

4,260 Licences

Number of Retail Gas Licences:

628 Licences

INVESTIGATION PAPERS

Number of Investigation Papers Opened for Legal Action:

37 Investigation Papers

Number of Prosecution Cases:

21 Cases

Number of Compounds:

72 Compounds

Amount of Compounds Paid:

RM80,000.00

LAW AND ENFORCEMENT

WHAT MORE CAN BE DONE?

Dr. Nora Yusma Mohamed Yusop
Director of the Institute of Energy Policy and Research (IEPRe), Universiti Tenaga Nasional (UNITEN)

As the regulator of electricity and piped gas supply in Peninsular Malaysia, the Energy Commission is governed by laws that empower it to ensure the supply of safe, reliable and affordable electricity to consumers.

However, these functions are at times being undermined by power theft, billing fraud, failure to comply with regulatory standards, and cyberattacks. While there are structures in place to deal with them, the challenge lies in their growing complexity as the industry matures with the energy transition and market liberalisation.

What are the hotspots of crime in the energy industry that law and enforcement officials need to look out for? What steps are needed to curb them? And what needs to be done to ensure that laws are upheld without fear or favour?

Dr. Nora Yusma Mohamed Yusop, Director of the Institute of Energy Policy and Research (IEPRe) at Universiti Tenaga Nasional (UNITEN), writes that good enforcement is part of good governance and essential for a sustainable energy macroeconomy.

The energy sector is grappling with many issues, the foremost of which is the energy transition to improve its impact on planetary health. As it stands, it accounts for about 80% of greenhouse gas (GHG) emissions and there is intense pressure for it to switch over to clean energy sources for electricity generation and consumption. Lurking behind this big picture is an underworld, fraught with crimes that threaten energy security and safety, critical infrastructure and national security.

High on the list of offences are power theft, billing fraud, environmental and safety non-compliances and cyberattacks on electrical infrastructure; the latter is putting nations on high alert and energy companies rushing to strengthen their digital defences.

Technology Solutions

Competition, affordability concerns, perceived lack of enforcement, and, in some cases, ignorance of the law, all contribute to the motivations behind offences that are punishable by law. By gaining insights of these motivations, the industry can customise preventive and enforcement strategies to tackle the underlying issues and foster a stronger and more ethical energy industry.

Already in place are various preventative solutions that include leveraging on technology, deploying robust law enforcement strategies, employing high calibre enforcement professionals, structural changes to legislative and operational frameworks, and engaging in multi-sector and international collaborations.

In Amsterdam, Netherlands, authorities have said that the implementation of Advanced Metering Infrastructure (AMI) achieved significant improvements in electricity theft reduction and overall efficiency with the installation of smart meters. Smart meters not only provide precise measurements of electricity consumption but also offer the convenience of real-time monitoring and the ability to remotely disconnect power supply when they detect unauthorised usage. This initiative has had a significant impact on reducing power theft and improving billing accuracy.

In Peninsular Malaysia, the roll-out of smart meters is underway. As at end 2022, there were 2.3 million smart meters installed, says Energy Watch (23 December 2022). Smart meters are not new, says the utility company, Tenaga Nasional Bhd. (TNB), on its website. “They have been implemented in first world countries such as in the United States of America, United Kingdom, Japan and China. Malaysia is proudly the first country in Southeast Asia to implement the smart meter technology countrywide.”

According to TNB’s 2022 Annual Report, nine million smart meters are to be installed in homes and businesses by 2029. Smart meters record electricity consumption and communicate this information automatically to TNB for monitoring and billing. They read daily power consumption and provide more accurate bills. They can also raise red flags on power theft, based on anomalies in consumption patterns.

Indeed, the International Energy Agency (IEA) acknowledges the crucial role of technological advancements in addressing electricity-related crimes. Industry experts emphasise the importance of AMI, real-time monitoring and data analytics in defending energy infrastructure against unlawful activities.

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Robust Law and Enforcement Strategies

What is also required to tackle energy related crimes is a wide-ranging mandatory and supplementary law enforcement strategies. They must ensure that the entire legal and enforcement process is transparent and upholds the rule of law, to win public trust in the system to act without fear or favour whenever laws are broken.

Malaysia can draw inspiration from some international models recognised for their outstanding law and order practices. Norway, for example, offers several lessons. It has consistently ranked among the top 10 in Transparency International (TI) Corruption Perception Index. Based on reports from the Global Advice Network (GAN) Business Anti-Corruption Portal and the Norway Corruption Report, it is uncommon to find instances of administrative corruption and petty bribes in Norway. The 2015 Organisation for Economic Cooperation and Development's (OECD's) "Government at a Glance" report revealed that Norwegians expressed high levels of satisfaction with the services that institutions provided.

Back in 2012, when TI conducted an evaluation of Norway's integrity system, the study found no instances of corruption in Norway, including bribery and similar charges. It also revealed no evidence of close networks or conflicts of interest. However, the survey highlighted sectors most prone to high levels of corruption included Local Government, corporate operations (especially oil and gas, and building construction), foreign development and public procurement.

Another model to emulate is our neighbour Singapore, widely recognised for its robust legal system and highly effective law enforcement strategies. Singapore's dedication to combating corruption is evident in its enforcement of anti-corruption laws. It ranked fifth on the TI Corruption Perceptions Index 2022, highlighting its commitment to transparency and efforts to combat corruption.

It is vital for enforcement agencies and regulatory bodies to have transparent hierarchies of power, and make appointments solely based on merit. They also need to have strong legal frameworks and internal policies that clearly forbid any form of favouritism, and have clear guidelines to maintain impartiality when handling cases. Establishing whistleblower mechanisms will assist in the reporting of malpractices.

As it stands, the Malaysian legal system has provisions for whistleblowers to be shielded from any form of retaliation. It is encouraging to note that a growing number of power theft incidents nowadays are due to public tip-offs.

Investigations of illegal activities must also be objective. By regularly rotating personnel within law enforcement agencies, the potential for exerting undue influence in the enforcement and prosecution process can be avoided.

As such, it is paramount to follow proper procedures and guidelines in the quest for justice. This will ensure thorough investigations into wrongdoings, and for all parties to be given a fair hearing. This process will build public trust in Government institutions and the judicial system.

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Ethical Conduct, International Exposure

Tackling crime calls for professionals with a combination of legal expertise, data mining and analysis skills, and rigour for field work. A comprehensive grasp of evolving energy laws and regulations is absolutely essential to progress in their career.

In addition to legal knowledge and expertise, there are also other factors for professionals to succeed in this field. Top of the list is integrity. Enforcement professionals must have the moral fibre to resist external pressures and temptations, especially when induced with gratifications from wrongdoers, not entirely uncommon in this industry that is associated with big bucks.

Another much-needed quality is adaptability to the changing environment, especially in keeping up with technology. The energy industry is going through a rapid evolution, and there is a corresponding deployment of criminal tactics to undermine the functioning of energy systems. Top-notch experts will need to know how to act with the latest developments.

Those seeking a long-term career in this field need to commit themselves to continuous learning, by attending knowledge sharing workshops, specialist training courses and certifications such as in energy law developments. There is also the benefit of international exposure or collaboration experiences, considering the global nature of this field.

The energy industry has a demand for enforcement specialists, especially in cybersecurity that is looking for analysts / experts, threat intelligence analysts, cryptographers and other experts to deal with cybersecurity risks. Cryptographer specialists, for instance, are responsible for designing and implementing cryptographic solutions to protect sensitive information and communication in cross-border power trading systems. Having a world view allows these professionals to grasp various challenges, implement effective strategies, and play a role in creating standardised cybersecurity protocols that can be used anywhere in the organisation.

International exposure and collaboration experiences open new doors for enforcement professionals, who stand to gain from having a broader viewpoint. They also become attuned to international best practices and learn from successful strategies in other jurisdictions that can be adopted in their home ground.

Structural Changes

There has to be a strong structural framework both at the corporate level and operational level to combat illegal activities in the energy sector.

First and foremost, there must be thorough regulatory oversight. A strong regulatory framework with well-defined and strict guidelines is essential, with regulatory bodies mandated with the necessary authority and resources to effectively enforce regulatory compliances, to guarantee that all entities in the energy sector uphold ethical standards and fulfil their legal obligations.

In Malaysia, the Energy Commission is governed by Electricity Supply Act 1990 and Gas Supply Act 1993. These are the overarching legislations that cover a variety of other supplementary legislations, regulations, standards and guidelines introduced with the changing energy landscape. It is also the implementer of various Government energy-related policies and programmes introduced from time to time, as part of national development.

It is important for authorities to regularly review and improve existing legislative frameworks in order to adapt to the changing landscape. Legislators need to work together with industry experts to pinpoint areas for improvement, adjust to technological progress, and pass laws that promote efficient prosecution and deterrence. There must be comprehensive systems and processes working side-by-side to ensure the integrity and stability of the energy sector.

Internationally, there are conventions to combat energy-related illegal activities. One of them is the Energy Charter Treaty (ECT), which took effect in 1998. ECT provides the legal framework to protect foreign investments in the energy industry, facilitate cross-border energy cooperation, and ensure fair and equitable treatment for investors and their investments in the energy sector. Currently, ECT has 56 signatories and contracting parties, which includes both the European Union (EU) and the European Atomic Energy Community (Eurotom). Malaysia is not one of them.

Malaysia's energy policies, legal considerations, and national interests may have influenced its choice not to become a party. Still, it may be timely to revisit the ECT given Malaysia's current focus on attracting more foreign direct investments in clean energy industries as well as to engage in cross-border power trading. ECT's legal framework can hold actors accountable for energy-related illegal activities. Investors engaging in fraudulent practices, corruption, or environmental violations can be subject to legal actions under the treaty. In cases where regulatory conflicts arise due to illegal activities, the ECT's dispute resolution mechanisms offer a platform for resolving disagreements between investors and host states. This can contribute to a fair and impartial resolution of legal issues related to energy investments.

Operational structures also need to change with the surge of power crime. The industry can leverage on digitalisation to address illegal activities. By transforming the operational structure with technology solutions such as AMI, real-time monitoring, data mining and analytics systems, the power industry can detect abnormalities, possible tampering, or unauthorised entry into the grid.

Real-time monitoring systems can help the industry promptly address irregularities in critical infrastructure such as power grids and distribution networks. Distributed optical fibre sensing technology, for instance, can be used to connect sensor arrays to the power grid monitoring network, allowing for real-time monitoring of the distribution network.

The integration of data analytics can be used to detect fraudulent activities. Through the analysis of extensive data sets, any unusual occurrences related to billing discrepancies, irregular consumption patterns, or suspicious transactions can be quickly identified and thoroughly examined.

Data mining techniques can be employed to detect attacks and determine their location, to prevent large power failures. Working in tandem with real-time monitoring tools, it has been successful in providing accurate load values for service restoration and provide estimations in distribution systems. Additionally, an improved monitoring and measuring system using blockchain technology has been proposed, to enhance the efficiency of infrastructure monitoring processes. By taking a proactive approach, any unauthorised access, equipment tampering, or suspicious activities can be swiftly addressed.

"It is important for authorities to regularly review and improve existing legislative frameworks in order to adapt to the changing landscape."

There also has to be a multi-stakeholder approach when dealing with illegal activities. To facilitate this, collaborative information sharing platforms can be embedded within the operational structures of regulatory bodies, law enforcement agencies, industry stakeholders and relevant non-governmental organisations (NGOs). Sharing intelligence and best practices in a timely manner enhances the agility and effectiveness of the response.

Instances of multi-stakeholder collaboration also include regulatory bodies teaming up with energy companies to enhance cybersecurity measures; partnerships between public and private sectors to conduct audits on critical infrastructure; and the establishment of community-based reporting systems with the support of law enforcement agencies.

Within the private sector, it is highly recommended for companies to give utmost importance to internal controls, carry out frequent audits, and establish strong cybersecurity measures to strengthen their defences against potential threats. Staff and other stakeholders such as vendors and community leaders need to be educated with crime awareness campaigns, to highlight to them the consequences of energy related crime on the community at large. Their timely reporting of suspicious activities can help stamp out industry crime.

High Level Interventions

Some crimes require high level interventions because of their sweeping economic, environmental and societal ramifications.

In Malaysia, the Cyber Security Bill was tabled in Parliament in April 2024. Its goal is to strengthen the regulatory powers and enforcement of cybersecurity breaches by the National Cyber Security Agency (NACSA). "The Cybersecurity Bill aims to establish a more comprehensive, encompassing cybersecurity law to complement existing legislation," said Prime Minister Dato' Seri Anwar Ibrahim in a statement (New Straits Times, 24 November 2023).

Large-scale industry corruption can be a curse. A case in point is the "Lava Jato" or Operation Car Wash in 2014.

A World Bank Case Study titled "Confronting Corruption in Sectors and Functions: State Owned Enterprises" provides some insights. It says that the scandal, Operação Lava Jato (Portuguese for "Operation Car Wash") exposed one of the largest corruption scandals in the world and resulted in the largest corruption investigation by the Federal Police in Brazil's history. It started as an investigation into money laundering, and eventually uncovered corruption in contracts worth billions of dollars that had been awarded to construction companies across Brazil. Investigations that centred on contracts with state-owned enterprise (SOE) Petrobras, the Brazilian Petroleum Corporation, later revealed that corruption was embedded in virtually all public investment contracts in Brazil. Investigators implicated high-level politicians in Brazil and at least 11 other countries in Latin America and beyond. The impact of Operation Car Wash was felt across Latin America.

The investigations exposed many systemic problems in the governance of Brazil's SOEs. Among the outcomes are the introduction of Brazil's National Strategy against Corruption and Money Laundering (ENCCLA); and provisions in the new SOE framework to promote transparency and corporate governance – SOEs in Brazil are now required to establish an internal audit function that reports directly to the board and the audit committee. Brazil also became a signatory to the OECD Anti-Bribery Convention, which establishes punishments for individuals and companies bribing public officials from other countries in order to gain an advantage in international transactions.

Culture of Collective Responsibility

In instances where access and affordability to power supply are issues, authorities will need to adopt a holistic and inclusive approach to ensure this vulnerable section of society is not deprived of the fundamental right to an essential service. Possibilities to be considered are targeted social impact initiatives that offer economic support to individuals with low or no income, to address the financial motivations behind power theft. Awareness campaigns are also recommended, to highlight to them the risks and perils of tampering with electrical systems, to discourage accidents and illegal activities.

The authorities need to find a common ground to allow illegal settlements the right to power connections. Utilities, meanwhile, can introduce payment plans that are adaptable to the financial situations of low-income households. This will help the poor to have legal access to electricity without having to resort to theft.

As we wrap up this conversation on tackling illegal activities in the energy industry, it's essential to highlight the significance of continuous collaboration and innovation. The energy industry is constantly changing and evolving, offering a range of new challenges and opportunities. In order to effectively address industry crime, it is crucial for all stakeholders involved — regulatory bodies, law enforcement, industry players and the public — to maintain an ongoing and open dialogue.

There must also be a culture of collective accountability and ethical behaviour within the industry, not only to enforce laws strictly but also foster a shared dedication to sustainability, integrity and social responsibility. Through collective effort and a commitment to excellence, we have the opportunity to build a strong and reliable energy industry that addresses societal demands, protects the environment, and promotes fairness and inclusivity.

ENERGY MALAYSIA

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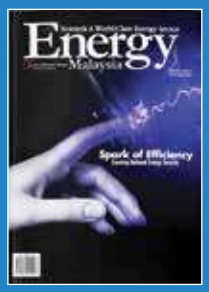

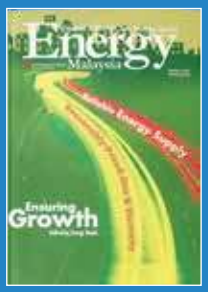

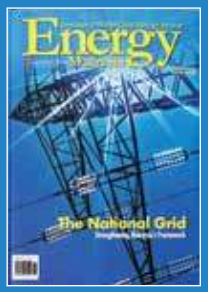

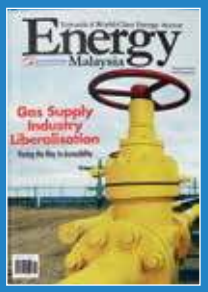

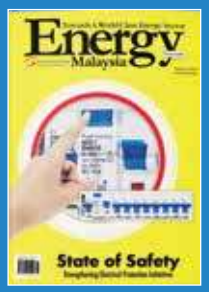

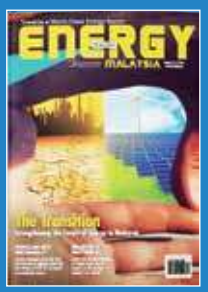

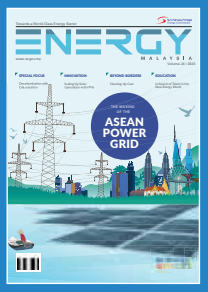

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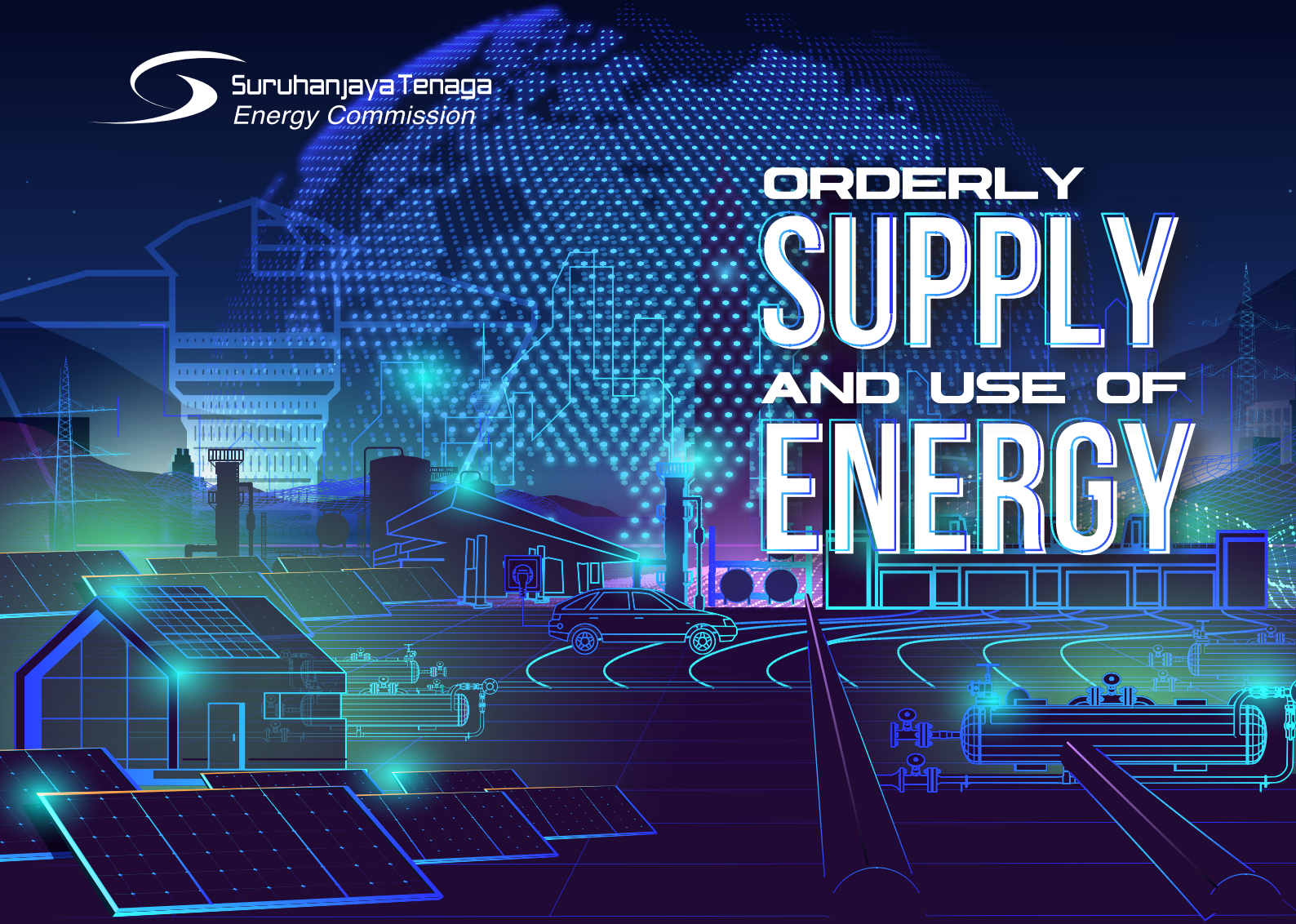

Suruhanjaya Tenaga (ST), a statutory body established under the Energy Commission Act 2001, is responsible for regulating the energy sector, specifically the electricity supply and piped gas supply industries in Peninsular Malaysia and the Federal Territory of Labuan.

THE ENERGY COMMISSION

ADVISES
Ministers on all matters concerning the national policy objectives for energy supply activities, the supply and use of electricity, the supply of gas through pipelines and the use of gas.

REGULATES
electricity and piped gas tariffs and the quality of supply services, as well as promotes competition and prevents misuse of monopoly power.

PROMOTES
good practices, as well as research, development and innovation in the electricity and piped gas industries.

PLANS AND DEVELOPS
laws, regulations, rules, guidelines and programmes for the orderly development and functioning of the electricity and piped gas industries.

LICENSES AND CERTIFIES
electricity and piped gas suppliers, competent electricity and gas personnel, training providers, contractors, equipment and installations, energy service companies and energy managers.

MONITORS AND AUDITS
performance and compliance of licensed and certified suppliers, service providers, installations, equipment importers, manufacturers and retailers.

INVESTIGATES
complaints, accidents, offences and industry issues; and enforces compliance.

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