

Towards a World-Class Energy Sector

# ENERGY

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Volume 22 | 2022

▶ **CONSUMER**

Buying Electrical Appliances?  
Look for the SIRIM-ST Label

▶ **Q&A**

Doing the Best We Can, Says  
REHDA

▶ **PARTING SHOT**

Workplaces Must be Safe and  
Healthy. No Compromises!

▶ **GAS WORKS**

When Ignorance Can Cause  
Accidents, Even Deaths

▶ **BEYOND BORDERS**

Unlocking the Potential of  
Hydrogen

▶ **THEN & NOW**

Look for the Stars



# THINK SAFETY THINK ST

Better Safe than Sorry

Be Energy  
smart



# CONTENTS



## 34 Innovation

Ocean Renewable Energy:  
ASEAN Dives In

## 39 Happenings

Snapshots of Industry Events

## 46 Parting Shot

Workplaces Must be Safe and  
Healthy. No Compromises!

### REGULARS

#### 01 Commentary

#### 02 Industry Bites

Industry News from Malaysia  
and Around the World

### FEATURES

#### 06 Cover Story

Better Safe Than Sorry

#### 12 Consumer

Buying Electrical Appliances?  
Look for the SIRIM-ST Label



#### 16 GasWorks

When Ignorance Can Cause  
Accidents, Even Deaths

#### 19 Q&A

Doing the Best We Can,  
Says REHDA

#### 22 Beyond Borders

Unlocking the Potential of  
Hydrogen

#### 27 Then & Now

Look for the Stars

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## ELECTRICITY AND GAS: LET IT BE A GOOD FRIEND, NOT A DANGEROUS FOE

In the past five years, we recorded an average of 52 electrical accidents a year. In 2020 alone, 45 cases were reported, and they included 28 fatalities and 17 non-fatal accidents. These numbers are quite alarming, and the Commission is revving up its efforts to ensure that safety remains a priority among its consumers.

As one of our initiatives, to reverse this trend, we have made safety the main theme of this issue of Energy Malaysia and call upon all consumers to take appropriate actions to make electrical and gas safety a part of their daily routine at home, at school and at the workplace.

Our cover story draws the big picture of how electricity is a good friend that improves the lives of individuals, households, communities and nations. But when handled badly, it can be a dangerous foe.

As the regulator of electricity supply in the country, we are duty-bound by Malaysian law to oversee electrical safety, from power plants and building sites to workplaces and homes. Unfortunately, we still come across lapses that have caused accidents. We highlight what can be done to prevent such cases.

We also have insights from a Competent Person who shares the safety-first approach at electrical installations, especially power plants and big buildings. Incidentally, the story also points out that Competent Persons have bright career prospects as more and more buildings are constructed – and all buildings require their services.

The past two years have been unsettling to say the least. The COVID-19 pandemic lockdowns triggered the do-everything-from-home lifestyle, including shopping. While many businesses took a hit from the lockdowns, online retailing enjoyed unprecedented growth. Unfortunately, unsafe electrical goods are still proliferating in some online

shopping sites. We are concerned that uncertified electrical appliances and accessories are being sold.

Our Consumer segment's "Buying Electrical Appliances? Look for the SIRIM-ST Label" is an advisory on what to look for when shopping for your electricals, be it at brick-and-mortar stores or through online retail platforms.

The good news is that we are collaborating with established online retailers to sell only SIRIM-ST certified electrical appliances and accessories.

In the Q&A segment's "Doing the Best We Can", the Vice President of the Real Estate and Housing Development Association (REHDA), Datuk Ho Hon Sang, shares how the association makes every effort to ensure its members comply with various regulations and standards governing the construction and building industry, to ensure that every project that is handed over to end users is fit and safe for occupation.

Schools and workplaces are another area of concern. On average, children and adults spend more than one third of their day at school or in the workplace. "Workplaces Must be Safe. No Compromises" writes the Chairman of the National Institute of Occupational Safety and Health (NIOSH), Datuk Wilson Ugak Anak Kumbong, in Parting Shot.

He says the responsibility of keeping workplaces (which includes schools) free from safety risks and hazards rests with employers. He adds that ignorance of the law is not an acceptable excuse for employers when accidents happen.

Sadly, we have found that ignorance caused a few gas accidents as narrated in our GasWorks story. Some business operators did not realise that they needed a Private Gas Licence when using piped gas for their business. To make matters worse, some also employed

inexperienced workers to install and maintain their piped gas systems, which ended with disastrous results.

The Commission has since collaborated with local authorities to ensure small businesses using piped gas have a Private Gas Licence before they obtain a Trade Licence by the local council to start operating. We consider this collaboration a big breakthrough to check the rise in gas-related accidents.

In February 2021, we launched a safety awareness campaign, in collaboration with SIRIM QAS International Sdn. Bhd., Malaysian Electrical Appliances Distributors Association and the Federation of Malaysian Electrical Appliances Dealers' Association. This was widely reported in the media and is captured in the Industry Bites section here.

In the Beyond Borders segment's "Unlocking the Potential of Hydrogen", the International Energy Agency (IEA) reports that the demand for hydrogen has grown more than threefold since 1975. Hydrogen, touted as the clean energy of the future, is much cleaner, storable and has no direct greenhouse gas emissions. It can be produced from fossil fuels as well as renewable energy.

The story notes the huge potential for hydrogen production in ASEAN and calls for a vibrant ecosystem to make this a reality.

**Ir. Md Zakuan  
Hj. Ibrahim**

Director, Safety  
Regulation  
Department, Energy  
Commission



## MALAYSIA

**Improving Malaysia's "Ease of Doing Business"**

"It is important for regulatory best practices to evolve with the needs of businesses," said Dato' Abdul Latif Haji Abu Seman, Director General, Malaysia Productivity Corporation (MPC). "We have to work even faster and closer with businesses now to understand how we can assist them during the COVID-19 pandemic which led to lockdowns and a drastic decrease in economic activities," he added.

He was commenting on the Global Investment Trend Monitor report released by the United Nations Commission on Trade and Development (UNCTAD) last week. Abdul Latif said MPC, an agency under the Ministry of International Trade and Industry (MITI), has been promoting regulatory facilitation to improve the business environment and ease of doing business. For this, it has been working closely with the public and private sectors to initiate various improvement initiatives to resolve regulatory issues that could be a barrier to national productivity growth and competitiveness and affect the inflow of foreign investments.

"With a challenging and highly competitive Foreign Direct Investment (FDI) landscape, the business-as-usual approach will no longer work in the current COVID-19 pandemic," Abdul Latif said, adding that his team at MPC was intensifying regulatory facilitation through its work with MalaysiaMudah or #MyMudah Programme, and received strong support from PEMUDAH, the Government's special task force to facilitate business.

#MyMudah aims to reduce unnecessary regulatory burdens on business and to enable faster economic recovery. Dato' Seri Wong Siew Hai, PEMUDAH's

private sector member, said Malaysia had improved its ranking in the World Bank's "Ease of Doing Business" report for the indicator 'Getting Electricity' from 59th position in 2012 to 4th in 2020.

Source: *Malaysia SME*, 4 February 2021

**Average of 52 Electrical Accidents a Year, says Energy Commission**

Malaysia has recorded an average number of 52 electrical accident cases yearly over the past five years. In 2020, 45 cases were reported. This included 28 fatalities and 17 non-fatal accidents, said the Commission's Chief Executive Officer, Ir. Ts. Abdul Razib Dawood.

Speaking at the virtual launch of the SIRIM-ST Safety Awareness Campaign, he said, "The use of uncertified and faulty electrical equipment is among the causes of electrical accidents. Not only are they a danger to users but also cause undue loss to the country by putting lives in jeopardy when disaster strikes."

Razib noted that the surge in online purchases of electrical equipment since the enforcement of the Movement Control Order last year has been a cause for concern to the Commission because online retail items often do not have the SIRIM-ST approval label.

The safety awareness campaign is a collaboration between the Energy Commission, SIRIM QAS International Sdn. Bhd., Malaysian Electrical Appliances Distributors Association and the Federation of Malaysian Electrical Appliances Dealers' Association. It supports the Government's aspiration for greater collaboration between regulatory bodies and industry players.

"This campaign aims to ensure a broader share of responsibility to drive safety among consumers. The move is timely as the market has been excessively flooded with sub-

standard electrical products over the years," said Razib. "According to Regulation 97(1) of the Electricity Regulations 1994, a manufacturer or importer is required to obtain a Certificate of Approval from the Commission prior to manufacturing, importing, displaying and sale of regulated electrical equipment," he added.

He also said that only electrical equipment with a Certificate of Approval issued by the Commission and bearing the SIRIM-ST label can be sold in the market.

SIRIM President and Group CEO, Datuk Ir. Dr Ahmad Fadzil Mohamad Hani, said all electrical appliances certified by SIRIM are compliant with the Malaysian and international standards, which ensure their safety and quality.

Source: *Malaysian Reserve*, 16 February 2021

**Use Only Authorised Personnel for Electrical Work**

In the interest of public safety, the Energy Commission issued a statement urging the public to seek the advice and services of authorised personnel for the maintenance, repair and installation of electrical equipment/installations. Such personnel are holders of Certificates of Competency issued by the Commission and ST-registered public licensees and electrical contractors.

The Commission explained that in order to obtain a Certificate of Competency, the candidate must pass theoretical, practical and oral examinations on safe and proper electrical procedures. Public licensees and electrical contractors will also need to hire full time Competent Persons registered with the Commission.

It advised the public to request for the ST Competent Person Identification Card (CPIC) before making an appointment to carry out electrical works. People can also scan the QR code to verify that the data is the same as shown in the card. In addition, they can refer to the website [www.st.gov.my](http://www.st.gov.my) that carries the list of Competent Persons registered with the Commission.

Source: *Bernama*, 16 April 2021

### **Modernising Electricity Distribution**

In terms of electricity supply quality in Peninsular Malaysia, Tenaga Nasional Berhad (TNB) has achieved a ranking equal to developed countries like Denmark, France and the United Kingdom, while keeping the tariff rate lower for Malaysians.

Now, TNB plans to be among the best in the world in distribution with its modernisation programme. This is a long-term project designed to give customers more – in terms of reliability of supply, control and empowerment, and connectivity to the grid for solar energy.

The distribution modernisation programme is being led by Chief Distribution Network Officer, Wan Nazmy Wan Mahmood, who lists several main features that TNB is implementing such as smart meters, LED street lighting, smart grid, energy storage and electric vehicle electrification infrastructure. Smart meters give users control over their energy consumption. They have already been installed in Melaka and certain areas in the Klang Valley. LED street lighting is also being installed. Some 400,000 streetlights, or 25% of the total 1.7 million street lamps in the country, now use LED lights that not only last longer but also help local councils make huge savings.

TNB will also be facilitating the establishment of Electric Vehicles (EV) electrification infrastructure in the country, anticipating a future where EV will be a more common sight on the road.

With the country's new target to have 31% of green energy by 2025, it will see solar power being used more widely. Towards this end, the smart grid is an essential component. It will ensure that excess solar energy generated by individuals and companies can be received, supplied, and sold to other power users.

TNB is already using technology and digitalisation to respond to breakdowns and reduce outages. Its mobility solutions not only pinpoint problems, but they can also quickly detect the nearest repair team to attend to any breakdown reported by customers anywhere in the country. A Global Positioning System (GPS), meanwhile, notifies customers of the location of repair teams and their estimated time of arrival.

Source: *The Star*, 28 April 2021

### **Job Opportunities in Renewable Energy Sector**

The ongoing threat of climate change indicates the importance of creating more job opportunities for youths to venture into the renewable sector rather than continuously working on fossil fuels, writes Amanda Yeo in an editorial for the Sun newspaper. The research analyst at Emir Research says this is especially so in the light of current difficulties among aspiring university graduates and fresh graduates in Malaysia who remain vulnerable in securing a decent job arising from the pandemic.

Although the current job market is challenging, the Pew Research Centre's International Science Survey 2019-2020 revealed that around seven in 10 Malaysians

(73%) place more priority on environmental protection, even if it comes at the expense of economic growth and the creation of more job opportunities. The international survey also discovered that out of 1,650 respondents, only 27% chose job creation.

Moreover, the National Youth Climate Change (NYCC) Survey Malaysia revealed that 92% of young Malaysians think that climate change is a crisis.

When Malaysia successfully transforms into a low-carbon economy, every dollar invested in climate adaptation can result in up to USD10 of economic benefit, according to Alok Sharma, president for the 26th Conference of Parties (COP26), during the United Nations Climate Change Conference held in November. In addition, a 2017 study in the *Economic Modelling Journal* showed that investment in renewables could generate, on average, three times as many employment opportunities which is comparable with investment in fossil fuels.

An analysis by the Goldman School of Public Policy at the University of California, Berkeley, added that switching over the grid to renewable sources could stimulate the creation of 500,000 jobs every year through 2035.

Amanda added that when the current administration utilises young people's potential as powerful change agents, Malaysia could reimagine a greener and more sustainable future through green job creation.

Source: *The Sun Daily*, 4 May 2021

## Energy Commission Issues 27 TPA Licences

The Energy Commission has issued licences to 17 Liquefied Natural Gas (LNG) importers and 12 shippers to participate in the Third Party Access (TPA) market, reported the Malaysian Gas Association (MGA). Association president, Hazli Sham Kassim, said the TPA is a fundamental building block for gas liberalisation in the country. A successful TPA will lead to a vibrant and sustainable gas market, he added.

MGA represents more than 130 corporate members serving the entire supply chain, from downstream to upstream. The association said that the Malaysian gas market is expected to become fully liberalised by 2022, when the remaining regulated gas tariff ends on 31 December 2021.

Source: *Bernama*, 5 May 2021

## Power Grid of the Future

TNB has embarked on the smart national grid, which is automated and digitally enabled to ensure maximum reliability and efficiency in power supply. A smart grid, by definition, is one that can communicate between power suppliers and consumers allowing them to participate in changing demands, to make a choice on the type of energy used, save energy and reduce costs. A smart grid can potentially heal itself. Monitors and sensors placed along the grid can identify faults, and inform engineers to fix problems remotely, or with the help of drones.

Up to 2025, TNB will be investing approximately RM5 billion per annum to modernise Malaysia's power grid. This will enable it to facilitate greater penetration of renewables into the grid, manage energy decentralisation, create new platforms for energy solutions, and be resilient against cybersecurity threats and the impact of climate change.

Source: *The Star*, 13 July 2021

## INTERNATIONAL

### Japan to Keep Coal Power Plants, Stricter Rules

Japan will allow coal-fired power plants meeting a stricter efficiency target to continue operating past 2030, defying a growing trend to quit fossil fuels completely as countries like France and Germany have pledged to.

Every power company in Japan will be required to increase the efficiency of their coal power plants to 43%, under guidelines drafted by an advisory body under the Ministry of Economy, Trade and Industry. The Ministry will identify and update relevant ordinances accordingly. The Federation of Electric Power Companies of Japan called the 43% guideline "an incredibly high target."

Currently, Japan urges power companies to maintain an efficiency rate of 44.3% across all thermal power, including liquefied natural gas and petroleum. By setting an explicit target for coal power, the Ministry hopes to encourage companies to make necessary upgrades, and to ensure only the most efficient coal plants survive into the next decade.

The country has 150 coal-fired power plants. In 2019, coal was responsible for 32% of all power generated in Japan, more than any other fuel source except LNG. Just two facilities cleared the threshold in fiscal 2019, while 31 topped 40%, according to the Ministry. Most plants will likely require updates to meet the new target by 2030 or shut down.

The Ministry does not yet plan to impose penalties on companies that fail to comply with the new threshold. It will provide guidance to power companies under the 43% mark to help them meet the target.

Economy Minister Hiroshi Kajiyama had ordered the creation of a framework that will phase out Japan's inefficient and aging coal power plants or force upgrades. The Government is eager to significantly cut back on coal power, which accounts for roughly a quarter of Japan's total carbon emissions. The shift to less carbon-intensive alternatives is aimed at meeting the national goal for net-zero emissions by 2050.

Source: *asia.nikkei.com*, 12 April 2021

### Climate Change Summit

The President of the United States opened the virtual climate summit on Earth Day on 22 April. The 2-day Leaders' Summit on Climate Change from 22-23 April aimed to rally countries to address climate change in a coordinated manner. Forty world leaders, including significant contributors to global carbon emission, attended the summit.

Pledges were made by several countries. There were:



#### USA

President Biden said that the U.S. will aim to achieve a 50-52% reduction in net greenhouse gas emissions in 2030. This new target is much more ambitious than the one that the U.S. pledged in 2014 — that is a 26-28% reduction in emissions by 2025. He also committed to double the amount of yearly monetary assistance to developing countries by 2024. The money will be used to support the efforts of developing nations in combatting climate change.



## CHINA

President of China Xi Jinping repeated China's 2020 plans to reach peak carbon emissions by 2030 and to achieve net-zero emissions by 2060. While China's climate policy remained unchanged, Xi added that China will transit towards a reduction in coal usage in 2026. It is currently the world's largest coal producer and consumer.



## INDIA

Prime Minister of India Narendra Modi reiterated the country's renewable energy target of 450 GW by 2030. Even though India is the third highest carbon emitter, Modi argued that "India's per capita carbon footprint is 60% lower than the global average" and "[they] are doing [their] part". India and the U.S. also launched an energy and climate partnership at the summit.



## UNITED KINGDOM

Prime Minister Boris Johnson made an ambitious declaration to reduce emissions by 78% compared to 1990 levels, in 14 years' time or by 2035. Johnson who announced this goal three days before the climate summit even urged other world leaders to match the UK's targets. He said: "If we actually want to stop climate change, then this must be the year in which we get serious about doing so. Because the 2020s will be remembered either as the decade in which world leaders united to turn the tide, or as a failure."



## BRAZIL

President Jair Bolsonaro pledged to achieve net zero emissions by 2050, ten years ahead of his initial target. He also sought international funding of one billion dollars to support environmental

protection and conservation efforts as he pledged to eliminate illegal deforestation by 2030.

Other countries like Japan and Canada were relatively modest in their goals, aiming to reduce emissions by at least 46% and 40-45% respectively. Russia, the fourth highest carbon emitter, pledged to reduce emissions "significantly". President of Russia, Vladimir Putin, said that the country will be responsible for its international commitments.

Source: <https://motherhip.sg/2021/04/us-climate-summit/>, 24 April 2021

## No Financing for Coal, Oil and Gas

The Asian Development Bank (ADB) will no longer finance coal mining or oil and natural gas production and exploration, as announced in a draft policy statement. The move was welcomed by environmental groups.

Yongping Zhai, head of the ADB's energy sector, said the draft would be deliberated by its board of directors in October. The multilateral development bank, which focuses on eradicating poverty in Asia, laid out conditions under which fossil fuel projects would continue to receive funding, such as where no other cost-effective technology was available.

"The draft coal ban policy is a decade late, but it still helps build the economic case for the energy transition to Governments and investors. It will help avoid more stranded coal assets," said Pedro H. Maniego Jr, senior policy adviser at the Institute for Climate and Sustainable Cities.

Set up in the early 1960s and headquartered in Manila, the ADB has channelled \$42.5 billion into the energy sector across the region between 2009 and 2019, says the ADB website.

Source: *Reuters*, 10 May 2021

## Huge Play in Energy Transition in Asia

Oil and gas (O&G) services provider, Baker Hughes Co sees the energy transition as providing growth opportunities in Southeast Asia and the wider Asia-Pacific on the back of rising demand for energy and increased awareness about carbon emissions.

"Looking at the future, Asia in general and in Southeast Asia as well, there will be a huge play in energy transition," Baker Hughes' Senior Vice-President for Asia Pacific, Maria Sferruzza, told *The Edge*.

"In Europe, for example, gas is already big, and there is a huge focus on hydrogen as an alternative source of energy," said Sferruzza. "If you look at Asia, demand for energy will continue to grow, and O&G — mainly gas — will continue to play an important role as part of the energy mix."

While renewable energy take-up rates have jumped in recent years, issues of reliability remain, with a lack of big-scale technology such as battery storage. To move away from dirtier coal, gas appears as the ideal fuel to move the needle in terms of reducing carbon emissions while ensuring energy supply reliability.

Led by China and India, Asia's gas demand will increase by 150 billion cubic metres in 2021-2025, representing 42% of global demand growth in the period, according to estimates by the International Energy Agency (IEA). Meanwhile, renewable energy capacity across ASEAN is expected to grow to 65 GW in 2025, from 36 GW in 2020.

Source: *The Edge Markets*, 17 May 2021

# BETTER SAFE

*You cannot see, smell or hear electricity but the faintest touch is dangerous – because electric currents can cause serious bodily harm, even death. Electricity, which has become the lifeline of nations, must be treated with the respect it deserves. Failing to do so can have serious repercussions.*

*Electrical safety is our priority, says the Energy Commission which is vested by Malaysian law to oversee electrical safety in the country at power installations and workplaces. Its emphasis is on the prevention of electrical risks through the careful management of electrical installations, with close attention paid to detail and technical competence during installation, operations and maintenance. It also promotes practices and habits to ensure an accident-free home.*

*Still, accidents continue to happen. The Commission explains why and how they can be prevented.*



Total no. of accidents  
**260**  
2016-2020

**5.1%**  
**lower**  
than the  
previous five  
years

Between 2016 and 2020, the Energy Commission recorded a total of 260 accidents, which was 5.1% lower than in the previous five years. Topping the list of causes was poor installation and maintenance works (35.4% or 92 cases), followed by unsafe work procedures (31.5% or 82 cases) and public activities near electrical installations (18.1% or 47 cases).

Are such accidents due to negligence? "Yes and no," says Ir. Md Zakuan Hj Ibrahim, the Director of Safety Regulation at the Commission.

"We have cases of companies that deliberately took safety risks to save on costs. They employed unqualified people to install and maintain electrical installations at their premises when the law

clearly states that only Competent Persons registered with the Commission are authorised to do so.

"Our records also show that accident cases at utilities were mainly due to the failure to comply with safe work procedures as prescribed by the Commission's regulations. In such cases, the Competent Person who was assigned to the job will be held accountable."

To ensure utilities and businesses are knowledgeable about the various electrical safety laws and regulations applicable to them, the Commission publishes guidelines that are regularly updated. They range from guidelines for electrical installations at power plants to industrial, commercial consumers and workplaces of all sizes.



# THAN SO RRY

Workshops and seminars are also conducted to ensure that business owners, relevant staff and their third party contractors are aware of their responsibilities and expectations.

"In the above-mentioned breaches, wrongdoers will face the full brunt of the law," says Ir. Zakuan. "Our procedure is to first investigate the causes of an accident, gather and analyse all material evidence and statements, and if negligence is proven, we will pursue with prosecution that can result in either a compound or a formal charge in court. We usually publish the names of guilty parties in our annual Electrical Safety Achievement Report (Laporan Prestasi Keselamatan Elektrik). We hope that the bad publicity will deter others or repeat offenders.

"Some accidents, unfortunately, are due to ignorance. They mainly involve the public and small businesses. Some people are unaware of the dangers that lurk around electrical installations. For example, flying a kite can be an enjoyable pastime for families here, but when the string gets entangled in a high voltage transmission line, the kite flyer becomes exposed to electrical shocks and arc flashes. We have recorded similar accidents with small contractors engaged to cut trees in residential neighbourhoods or agricultural holders harvesting fruit from their trees. They use long retractable aluminium or metallic poles that sometimes get caught up in power lines."

Electric shock can result in cardiac arrest due to the paralysis effect on the heart and the destruction of the muscle, nerves, and tissue from a current passing through the body; thermal burns from contact with the electrical source; and/or falling or injury after contact with electricity.

Arc flash can cause burns from the high temperatures produced by the arc. It can also lead to blindness from the ultra-violet light produced by the arc and/or hearing loss caused by the pressure wave from the arc blast. "One trend we are concerned about is households and small businesses

using online videos to guide them with electrical installations and maintenance," says Zakuan. "This carries a very high risk and we strongly advise against it."

With Think Safety, Think ST as its motto, the Commission reaches out to different stakeholders to prevent accidents. It conducts targeted safety awareness campaigns, dialogues and seminars that are aimed at local authorities, Government agencies, industry, licensors, consultants, contractors and the public. It also publishes advisory articles in the mainstream and social media and their officers appear on television or radio to disseminate advice and information to the public. Television and radio interviews are stepped up during the flood season and festive

holidays when consumers need to take extra precautions to prevent mishaps.



## Competent Persons Only

The Electricity Supply Act 1990 [Act 447] and Electricity Regulations governing electrical safety, states that only Competent Persons are "to work, operate or be in control of any work or operation of an installation required by any owner, management or licensee of the installation."

The Commission's Deputy Director of the Electrical Competency Unit, Nora Ab Ghani, describes a Competent Person as someone who holds a Certificate of Competency issued by the Energy Commission to perform the work in accordance with the restrictions, if any, as stated in the certificate.



She says, "The certificate is issued to them after they have attended training on specific competencies at an ST-accredited institution or industry and passed the examination that is set with the Commission's approval." There are six categories of Competent Persons, which are:

- Electrical Services Engineer
- Competent Electrical Engineer
- Electrical Supervisor
- Chargeman
- Wireman
- Cable Jointer

"We now have 94,872 active Competent Persons, and the majority of them are working in the energy sector, manufacturing, commercial buildings, Government departments, construction industry and training institutions.

"The Commission's Competent Persons are regionally and globally recognised and are in high demand, especially in the oil and gas sectors. The challenge that they face is keeping up with the fast pace of technological change. They need to gain experience, knowledge and the skills to handle the latest technological developments in the marketplace such as smart buildings and Industrial Revolution 4.0 systems and practices.

"We regularly share with them new developments via our website, social media and invite them to attend seminars and industry engagements conducted by the Commission or other Government agencies."

## Laws and Regulations Governing Electrical Safety

### Electricity Supply Act 1990

This legislation details the functions of the Energy Commission. A crucial function of the Commission is to exercise control over any electrical installation, plant and equipment with respect to matters relating to the safety of persons and the efficient use of electricity and for purposes connected therewith.

The contents of the Act are regularly reviewed by the Commission, and new regulations are enacted. One of them is:

- **Efficient Management of Electrical Energy Regulation 2008:**  
Under this regulation, all installations that consume 3 million kWh or more of electricity over six months must have an electrical energy manager. The energy manager is responsible for analysing the total consumption of electrical energy, advising on the development and implementation of measures to ensure efficient management of electrical energy and monitoring the effectiveness of the measures taken.

### Electricity Regulations 1994

This consists of a comprehensive set of regulations pertaining to electrical safety during the installation, operation and maintenance of electrical installations.

### Safety Guidelines and Codes

The Commission publishes various safety codes and guidelines that are specific to a function or an industry. These are both preventive actions, and at times, based on accident trends. Among them are:

- Non-domestic Electrical Installation Safety Code
- Guidelines for the Design, Installation, Inspection, Testing, Operation and Maintenance of Water Heater Systems
- Guidelines on Gas Piping Systems at Launderettes and Similar Installations
- Enforcement Order for the Installation of Standard Malaysia MS IEC 62305 - Protection Against Lightning
- Enforcement Order for "Electrical Installation of Building" MS IEC 60364
- Guidelines for Approval of Electrical Equipment 2018 (Electricity Regulation 1994).



## No Compromises

Competent Persons can be in-house staff or contractors/consultants hired by business owners/management on a needs-basis, depending on the required competencies, voltage and type of electrical installation. Electrical installations operating at a voltage of 132 KV or more must have a resident Competent Electrical Engineer. Given their cost, it is a common practice for big companies to engage high ranking Electrical Services Engineers and Competent Electrical Engineers as consultants to work on specific functions.

Ir. Ulaganathan Eddikan is a consultant who is a Competent Electrical Engineer as well as an Electrical Services Engineer. He says his company, U-Tech Consultant Sdn Bhd, is engaged by clients for end-to-end M&E works. They are mainly property development companies, manufacturing plants, high rise office buildings and power plants. "Many of them have resident chargemen, but the law requires a Competent Electrical Engineer to conduct monthly inspections on electrical systems for all voltages and we are hired for this purpose.

"Since 2006, we have also been engaged to carry out Permit to Work (PTW) orders issued by the Commission. Here, our clients are building owners, developers, contractors and testers who work for TNB. Our job scope is to ensure all electrical safety precautions are in place. We must ensure that the electrical installations do not endanger lives. These inspections are part of the mandatory compliances as stated in the 447 Act."

Ulaganathan says installations that operate 24/7 are required to have Resident Competent Persons. "Usually, they are on shifts, and every shift requires at least two Competent Persons to work in a buddy system. In the event of an emergency, the Competent Person is the only person who can give the authorisation to do isolation or normalisation of power."

He adds, "It is critical for business owners to recognise that a Competent Person can only perform safety inspections for voltage/installation types as stated in his competency certificate. For example, a 33 KV Competent Person is responsible for 33 KV installations or lower voltages. No short cuts can be taken in this regard."

He says the most common electrical accident is tripping caused by the encroachment of animals such as rats entering dry type distribution transformer systems. "This can cause explosions. When this happens, our action plan is to seal all accesses. Sometimes, lightning strikes on transmission systems can also cause tripping."

Ulaganathan, who has been a registered Competent Person for 33 years, started as a Wireman and progressed to be a Chargeman. After completing his engineering degree at Universiti Malaya in 2001, he sat for various competency examinations and became a Competent Electrical Engineer, and later, an Electrical Services Engineer. He is one of few Competent Persons who can inspect 500 KV installations. According to the Energy Commission, there are only 13 Service Engineers and 40 Electrical Engineers for 500 KV installations in Malaysia today.

### Big Demand. Big Responsibility.

The majority of Competent Persons are electrical chargemen. There are currently 46,289 electrical chargemen in the country.

"Electrical chargemen can work at any place where there is electricity. It is their job to ensure it is a friend and not foe. Every building and worksite – industrial, commercial and even condominiums - needs electrical chargemen, and the demand is not slowing," says Mok Kin Wah, a trainer at TNB Integrated Learning Solutions (previously known as ILSAS). This is an Energy Commission accredited training institution that conducts various types of competency courses approved by the Commission.



**Ir. Ulaganathan Eddikan**

Competent Electrical Engineer and consultant

"The law stipulates that all electrical chargemen must be registered with the Energy Commission as Competent Persons. Having a diploma or degree does not automatically qualify someone as a Competent Person," says Mok. "They need to attend competency courses and pass examinations for their Certificates of Competency." With this, they can register with the Commission as Competent Persons, and obtain a licence to practice. The Certificate must be registered for a minimum of one to five years, and must be renewed to practice.

"At TNB Integrated Learning Solutions, we offer full time (six months, including on the job training) and part time courses (one year, with weekend classes only) for electrical chargemen, wiremen and cable jointers, among others," says Mok. "We also have short courses for high voltage competencies.

Our participants are mainly from utility companies, industries, commercial organisations and staff from the Government and quasi Government organisations. We also have private students who take loans to attend the courses because a competency certificate carries a lot of value. With new malls, office buildings, factories and condominiums, there will always be job opportunities."

"All our trainers are TNB staff who are assigned to teach subjects in their areas of specialisation. The courses involve both theory and practical training. Unfortunately, the COVID-19 pandemic badly affected our training schedule," says Mok. "We conducted online classes but not practical training which is very hands-on. It involves physical demonstrations and testing that can only be done in person. Even the best videos cannot capture this.

"Electrical chargemen are responsible for electrical installations as per the voltage/installation specified in their Competency Certificates," adds Mok, a trainer who has a competency certificate for category B0 up to 33 KV. "Electrical chargemen also sign off that the installation under their watch is safe and poses no electrical hazard to anyone in the building - workers, customers and visitors. In the event of an accident, the Competent Person is answerable, unless proven otherwise."

When there is an accident, the Commission will investigate to establish the root cause and decide if there was negligence on the part of the Competent Person or someone else. Negligent Competent Persons will be blacklisted or suspended.

To date, the Commission has revoked absolutely 15 Certificates of Competency and suspended 39 Certificates of Competency (for six months to three years) for various offences committed under the Electricity Supply Act 1990 (Act 447) and Electricity Supply Regulations 1994 (ESR 1994).

The Commission has also filed five cases in court – two cases are for the failure to register the installation under subsection 21(2) Act 447; two cases for the failure of building owners to appoint a Competent Person to be in charge of installation under subsection



**Mok Kin Wah**

Trainer at TNB Integrated Learning Solutions

23(1) Act 447; and one case for causing damage to a person or property by doing a rash or negligent act under subsection 37(2) Act 447.

Mok says accidents are not always the fault of a Competent Person. "It is compulsory for commercial and industrial premises to employ an electrical chargeman on site. Some do not. In businesses, there is always the talk of cost savings, and safety procedures are compromised. This is when accidents happen."

In the event of a "tripping" or outage, owners or the management will normally push to restore supply as fast as possible. Thus, safety procedures can be compromised.

A typical example is when there is a situation of bad weather or rain, the chargeman is required to issue a stop work order according to safety procedure to prevent any electrical accident due to possible lightning strikes. However, this order is sometimes overturned for economic reasons. Prolonged outage affects revenue generation, and some business owners take a safety risk. They put money ahead of safety, thus making implementation of safety procedures difficult.

The challenge is always "Safety First" or "Customer First".

Mok says, "We are very thankful to Energy Commission for the numerous safety initiatives to promote safety for all types of installation namely residential, commercial and industrial. In line with the Commission's way forward initiatives, we have always been supportive of the Commission's vision to achieve zero electrical accidents."

## Electrical Safety at Home

Between 2016 and 2020, the Commission recorded 260 electrical accidents in the home. Electrical safety inside the home is the responsibility of the occupants, and the Commission recommends that households follow the advice below:

1. Use only approved electrical appliances that carry the SIRIM-ST safety label.
2. Check that you are using the correct wattage in all your fixtures and appliances. If a light fixture has no wattage listed, use a 60-watt bulb or less. For unmarked ceiling fixtures, choose 25-watt bulbs.
3. Keep all electrical appliances in perfect condition. Avoid modifying damaged electrical appliances.
4. Avoid using wet hands to turn on the switch.
5. Avoid using a mobile phone while it is charging.
6. Turn off switches and unplug electrical appliances when leaving home for a few days or more.
7. Do not hang festive ornaments on electrical poles/lines or electrical installations.



8. Avoid overloading an electrical outlet. Check that the outlet is cool to touch, has protective face plates and is in good working order.
9. Avoid using damaged power cords. All power cords and extension cords should be checked regularly for signs of fraying and cracking, and repaired or replaced as needed. They should not be stapled into place or run under carpets and furniture. Cords under carpets pose a tripping hazard, can overheat, while furniture can crush the cord's insulation and damage wires.
10. Keep used and unused cords tidy and secure to prevent damage. Keep them away from children and pets and avoid wrapping them around objects – this can stretch the cord or cause overheating. Never rest a cord on a hot surface to prevent damage to its insulation and wires.
11. Unplug appliances that are not in use. This reduces phantom drain (the amount of energy consumed even when the appliance is not in active use) and protects appliances from overheating or power surges.
12. Keep electrical appliances and outlets away from water to prevent an electric shock. Water and electricity don't mix well. By keeping electrical equipment dry and away from water - aquariums, sinks,

showers and bathtubs, potted plants – the risk of water and electricity coming into contact is lowered.

13. Give your appliance adequate ventilation to avoid overheating and short circuiting. Avoid running electrical equipment in enclosed cabinets and store them away from flammable objects. Pay special attention to your microwave, refrigerator, washing machine and dryer that need space from the wall to function safely.
14. Ensure your exhaust fans are clean to prevent fire hazards. Some appliances have exhaust fans, which can get dirty or clogged with debris and make the appliance work harder. This can shorten the life span of the appliance as well as pose the risk of overheating, or even cause a build-up of dangerous gases that can lead to an electrical fire hazard.
15. Always follow manufacturer's instructions on safety for all your electrical appliances and devices.

### Electrical Safety for Kids

1. Install safety caps and covers over all outlets to keep your kids safe from electric shocks.
2. Prevent accidents by teaching your kids to avoid yanking electrical cords.
3. Place dangerous appliances out of reach of small children. Store toasters, blenders and electric kettles on high shelves or in locked cupboards—or any place where children cannot access them.

### HIGH PRIORITY

**Every home has an automatic circuit breaker to detect leakages and prevent electrical accidents. Test it every month, by pressing the "T" button. The power supply should stop immediately in a functioning circuit breaker. Otherwise, contact a Competent Person registered with the Commission to repair or replace the circuit breaker, and carry out wiring works, if needed.**

### Electrical Safety during Floods

#### During a Flood

During a flood, it is easy to forget the potential danger of the electrical system. However, live electricity is one of the most dangerous elements when dealing with indoor flooding. The following tips will help you protect yourself from electric shock during a flood:

- Do not walk in standing water that covers electrical equipment or outlets. There could be enough of an electrical current in the water that can cause a deadly electric shock.
- Stay away from downed power lines and call the power provider right away to let them know.

- Do not walk in areas where you hear buzzing and popping or see sparks.
- Pay attention to odours. If there is a burning plastic smell, there could be an electrical fire.
- Do not use appliances or electrical equipment affected by the flooding unless an electrician has inspected them and cleared them for use.

#### After a Flood

Even when flood water has been removed from your property, it doesn't mean the threat of an electric shock is gone. Any residual moisture can still make your electrical system and components very dangerous. They may still cause electric shocks or fires, and electrical

equipment may experience rust and corrosion from the moisture. After a flood, it is very important to call an electrician to evaluate the damage to your electrical system and determine what needs to be done. The following components may need to be replaced:

- Wires, circuits, outlets, and switches
- Light and ceiling fixtures
- Heating, ventilation, and air conditioning (HVAC) equipment and water heaters
- Major appliances
- Electronics

*Source: Electrical Safety Foundation International*

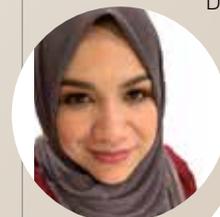


# Buying Electrical Appliances?

## Look for the **SIRIM-ST** Label

*There is a growing concern over the sale and purchase of sub-standard electrical appliances. Such products put public safety at risk. They can cause fires and even take lives, says the Energy Commission, which urges the public to buy only certified electrical appliances that carry the SIRIM-ST label.*

As of 2020, the Energy Commission had investigated 1,071 cases of electrical accidents, and of this, 37 were caused by defective electrical appliances. "They are preventable accidents," says Iffah Hannah Muluk, the Commission's Deputy Director, Electrical and Gas Safety Development.



"We cannot overemphasise the importance of buying electrical appliances that carry the SIRIM-ST label. The label indicates that the product has been tested and certified according to the safety standards of SIRIM and the Commission. We follow global benchmarks, and electrical goods without this label can expose users to danger," she adds.

In Malaysia, there are 34 categories of domestic electrical appliances classified as "ST-controlled" products that must abide by the Commission's "Guidelines for the Approval of Electrical Equipment". These products are subject to testing and certification according to specified standards to avoid the risk of electric shocks and radiation exposure that can affect user safety and/or result in full-blown accidents such as fires and explosions.

The SIRIM-ST labelling is mandatory prior to sale. It is also the final step in a series of actions taken by the Commission to ensure end-to-end regulation. This covers monitoring importers, manufacturers and sellers to ensure that only products with safety certifications are found on the shelves of retailers in Peninsular Malaysia and Sabah.

## Certificate of Approval

The Commission issues the Certificate of Approval (CoA) under Regulation 97(1), Electricity Regulations 1994 to ensure that all activities relating to the manufacture, import, display, sale or advertisement meet the specified safety and efficient use of electricity requirements. This is applicable to:

- Any domestic equipment;
- Any low voltage equipment which is usually sold directly to the general public; or
- Any low voltage equipment which does not require special skills in its operation.

Manufacturers, importers, exhibitors, sellers and advertisers of the above mentioned electrical equipment must ensure that their obligations under the said Regulations are fulfilled. Prior to applying for the CoA, applicants must ensure they are registered as a manufacturer or importer with a Certificate of Registration (CoR) with the Commission, as per Regulation 97C, Electricity Regulations 1994. With this, consumer interest in the use of electrical equipment shall be protected through the determination of the equipment being:

- Compatible with the Malaysian electricity supply system
- Compliant with standards
- Tested by an accredited laboratory.
- Labelled with the SIRIM-ST label

By complying with the specified minimum requirements, the risk of accidents such as a fire, electric shock, explosion, radiation, and other hazards that could result in injuries or deaths, or damage to properties can be minimised or avoided.

## SIRIM Tests

All electrical products, both locally manufactured and imported, must pass the SIRIM test before being affixed with SIRIM-ST labels.



According to SIRIM's head of Electrical and Electronic Certification and Inspection, Ariza Mohd Yusof, locally manufactured products are subject to the SIRIM Products Certification Scheme. "This involves product assessment, testing and annual factory audits. This is to ensure that they meet manufacturing standards, and that the manufacturer has the quality system to consistently manufacture products that meet these standards."

Imported products, on the other hand, come under the Batch Certification Scheme, and must pass the Consignment Test. It requires them to undergo product inspection and testing. Imports that fail the consignment test are destroyed by the Commission.

"Even after these tests, we continue to monitor certified products in the market," says Ariza. "We make random purchases and test them in our laboratories to ensure that they meet our standards. When a manufacturer or licensee is found to have misused the SIRIM-ST label or the product is non-compliant, the offending party is suspended while we conduct investigations. If no remedial actions are taken, we will revoke the manufacturing licence. We then instruct the offender to recall all affected products from the market."

To combat label misuse, SIRIM has developed the SIRIM QAS mobile application that can be downloaded from Google Play Store or the Apple App Store. Consumers can use this application to check on the authenticity of their product by entering the serial number on the SIRIM-ST label before making their purchase.



SIRIM-ST label for electrical appliances approved by the Consignment Service.



SIRIM-ST label for electrical appliances certified by the Product Certification Scheme.

## Crackdown on Illegal Products

The Commission also works with various Government agencies to address the growing trend of dumping and sale of illegal electrical products in stores and online platforms. People buy illegal goods because they are cheaper. What they don't seem to realise is the threat they pose. Such products are usually of low quality, have a relatively low life span and can expose users to harm.

The Commission has taken various preventative steps to counter this trend. They include publicity campaigns in the media and dialogue with Government agencies, professional bodies, resident associations and the technical community. There are also collaborations with the Royal Malaysian Customs, the Ministry of Consumer Affairs, Ministry of International Trade and Industry, Malaysian Communications and Multimedia Commission, MATRADE and the Malaysia Digital Economy Corporation.

"We collaborate with the Customs to prevent the entry of illegal equipment at national gateways such as ports and airports," says Iffah. "Together with the Ministry of Consumer Affairs, we conduct raids on premises suspected of selling illegal products. Many of the raids are based on tip offs."

In 2019, the Commission seized and confiscated illegal products, mainly mobile phone chargers, extension socket outlets, wiring cables and adaptors (plug tops). Sellers who display or sell non-certified electrical products face the possibility of fines not exceeding RM5,000 or imprisonment not exceeding one year or both, if convicted.

"Our officers also routinely inspect local factories and warehouses of importers. In 2019, the Commission issued 22 "show cause" notices that involved 29 Certificates of Approval for non-compliances. Offenders are required to rectify issues highlighted. Failure to act as required will result in the cancellation of their Certificates of Approval. This means they cannot manufacture or import the designated products," adds Iffah.

In recent years, the Commission has stepped up with the monitoring of electrical appliance stores in malls. In 2019, 172 outlets were inspected, and 106 notices issued for the withdrawal of uncertified products. In 2020 and 2021, there were fewer inspections due to the COVID-19 restrictions.

One of the challenges is online sales. "We advise consumers to be extra alert when choosing or buying appliances, especially online," says Iffah. "On our part, the Commission and SIRIM are collaborating with online retailers to develop a microsite, where only appliances with the SIRIM-ST label are displayed. With this, buyers can easily identify and buy only certified products."



## Suspect a Product is Illegal? How to Lodge a Complaint

Consumers can help the Energy Commission prevent the sale of non-certified electrical products by lodging a complaint. They can do so in the following ways:

1. Visit the Commission's website and file the complaint under *e-Aduan*
2. Complaints can also be made on the AduanST mobile app, which can be downloaded from Google Play Store or IOS Apple Store
3. Email to [eaduan@dst.gov.my](mailto:eaduan@dst.gov.my)
4. Call: 03-88708800 (Mon-Fri 8:30am-5:30pm, not including public holidays)
5. Fax: 03-88888651
6. Write to: *Unit Hal Ehwal Pengguna*, Suruhanjaya Tenaga, No 12 Jalan Tun Hussein, Presint 2, 62100 Putrajaya
7. Visit the counter at: Suruhanjaya Tenaga, No. 12 Jalan Tun Hussein, Presint 2, 62100 Putrajaya or any of the Commission's regional offices (refer to the Commission's website for the address)

When a complaint is received, the Commission will send an investigation team to verify its authenticity. When there is wrongdoing, a notice is sent to the offending outlet to stop the said activity. A second team returns to the outlet to ensure compliance. When the outlet fails to comply, the Commission will apply for a warrant to raid the errant outlet and seize all unsafe electrical and electronic equipment.



## Product Safety Awards

"We also want to honour those who are doing the right thing," says Iffah. "As part of the Commission's 20th anniversary celebrations, we launched the Product Safety Award in April 2021. Inspired by the Product Safety Awards of the Ministry of Economy, Trade and Industry (METI) of Japan, our objective is to promote exemplary safety standards among manufacturers, importers, sellers and online retailers of electrical appliances and products."

The ST Products Safety Awards consist of five categories – manufacturers, importers, sellers, providers of e-commerce platforms and accredited institutional bodies conducting electrical competency courses. "We also want to recognise accredited institutions for their efforts in promoting electrical safety to their students," adds Iffah. Each category has a Platinum, Gold or Silver Award, and winners received Certificates of Appreciation and cash prizes.

## Eco Breeze Technologies, Panasonic Malaysia and Institut Kemahiran Mara Lumut win inaugural Product Safety Awards



The Commission announced the winners of the inaugural Product Safety Awards (PSA) 2021 at a prize giving ceremony on 9 November 2021. The platinum award was won by Eco Breeze Technologies and Panasonic Malaysia for the “Manufacturer” and “Importer” categories respectively. Institut Kemahiran Mara Lumut won in the “ST-accredited Institutions for Competency Certificate Training” category.

The PSA was launched to promote and encourage manufacturers and importers of electrical equipment to make electrical safety an integral part of their industry culture. The PSA also recognises ST-accredited institutions involved in training and promoting safety among its participants, to build a pool of Competent Persons who are knowledgeable, skilled and follow high standards of safety in the workplace.

The PSA prize-giving ceremony was officiated by the Minister of Energy and Natural Resources, Datuk Seri Takiyuddin Hassan, who said that the award will encourage and at the same time increase awareness among industry players to make safety a priority when manufacturing or selling their electrical products to consumers.

He added that as a regulator, the Commission has oversight for all aspects of electrical safety, from electrical installations to the supply and sale of electrical equipment by industry players and licence holders. Among its priorities is to protect consumers from dangers arising from electrical products that are not approved by it.

“I believe that the PSA 2021 will encourage those involved in the marketing of electrical products to comply with the laws, regulations and policies that are in place, to ensure their products are approved and their safety is guaranteed. This is also in line with the Ministry’s aspiration and direction to ensure the strategic and safe management of electrical products that also promote energy efficiency.



In his address, the Commission’s Chairman Dato’ Azian Osman said, “PSA was launched virtually on 22 March 2021 by the Commission’s Chief Executive Officer because of mobility restrictions during the COVID-19 pandemic.” He added that the Commission invited 1,800 manufacturers and importers who were registered with it to participate in the awards, and the response was encouraging.

“To authenticate and evaluate entries, the Commission appointed a special panel of 10 professionals, including those with expertise in various fields from Government agencies, the private sector and training institutions. In addition, the judging panel included nine representatives from the Commission.”

There is a lack of knowledge among some small businesses that piped installations, even the most basic, require a Private Gas Licence that is issued by the Energy Commission. This was one of the primary findings of the Commission when investigating a series of gas accidents that occurred in 2018.



# When ignorance can cause accidents, even deaths



The Commission tracks trends in gas accidents cases and locations every five years. According to its 2019 Annual Report, there has been a shift in gas accident locations in the last three 5-year cycles, spanning 15 years.

Initially, for the period 2005 to 2009, accidents occurred primarily at underground installations. This period happened to coincide with the construction of gas infrastructure by gas network owners and their contractors. By becoming more rigorous about licensing conditions of gas pipeline contractors, the Commission successfully reduced the accident rate at these locations.

For the period 2010-2014, the majority of gas accidents were caused by third party activities involving excavation

works near underground gas pipelines that were being installed for gas distribution. This was the period when gas network owners started accelerating efforts to lay distribution pipelines to supply gas to customers, both existing and prospective, in the industrial, commercial and residential segments.

By 2015-2019, gas had become the fuel of choice, especially with industries and commercial businesses because it was more economical than electricity. Among them were business operators such as shopping centres, restaurants and laundrettes who chose gas over electricity supply for their power needs. Unfortunately, during this period there was a sharp 75% increase in gas accidents compared to the previous 5-year period.

## GAS INSTALLATIONS - RULES AND REGULATIONS

### Gas Supply Act 1993 and Gas Supply Regulations 1997

Under this legislation, the Commission regulates Liquefied Petroleum Gas (LPG), Liquefied natural gas and natural gas piping systems in Peninsular Malaysia and Sabah.

### MS830:2021 - Code of Practice for Storage, Handling and Transportation of Liquefied Petroleum Gases

Applicable to gas network owners and suppliers in Peninsular Malaysia and Sabah.

### MS930:2017 - Code of Practice for the Installation of Fuel Gas Piping Systems and Appliances

Applicable for gas end users in the industrial, commercial and residential premises.

Investigations showed that the accidents were largely due to the non-compliance of work procedures by both contractors and licensees (usually business owners/employers). Workers employed to undertake gas installation and maintenance works were also found to be inexperienced and not supervised by Competent Persons registered by the Commission. There was also a lack of awareness that gas installations, no matter the size, must be registered with the Commission. Business owners/operators also needed valid licences to operate their gas supply systems. Under the Gas Supply Act 1993, the Commission is mandated to issue licences for the supply of all piped gas in the country. The Act's Section 11, Part 4 states:

“

**No person shall carry out any activity of (a) import into regasification terminal; (b) regasification of gas; (c) shipping of gas; (d) transportation of gas; (e) distribution of gas; (f) retail of gas; or (g) use of gas, unless such person is licensed under this Act.**”

### Trade Licence versus Private Gas Licence

In 2018 and 2019, there was a spate of accidents in launderettes, including two explosions that resulted in fatalities. “Our investigations found the cause of the accidents was due to the faulty installation of piped gas by unauthorised personnel,” says the Commission’s Ir. Md. Zakuan Hj. Ibrahim, Director, Safety Regulation Department.

“We also found that at the time of the explosions there were about 2,000 launderettes operating without Private Gas Licences, which are issued by the Commission. They had Trade Licences issued by their local council, but were unaware they also needed Private Gas Licences to operate when using piped gas supply,” he adds.

“We reached out to leading launderette franchisors and local councils to rectify the situation. A significant outcome is that

launderette operators are now required to submit their Private Gas Licences before they can obtain their Trade Licences. We are encouraged by this collaboration that involved the Commission, local councils and the Fire Department (Bomba),” adds Ir. Md Zakuan.

In the meantime, the Commission’s enforcement teams at the Regional Offices press on with the inspection of gas-operated commercial premises, to ensure they are safe and comply with regulatory requirements. Some of these inspections are based on public tip-offs.



**How to Get a Private Gas Licence**

There are two steps involved in obtaining a Private Gas Licence (PGL). The standard turnaround time to obtain a PGL is 15 business days.

**STEP 1**

**Covers the Commission's three processes: Approval to Install (ATI), Approval to Operate (ATO) and the issuance of a PGL.**

The ATI process requires the commitment of the business operator to engage a registered gas contractor or Competent Person to design, install and maintain a commercial gas piping system. This is followed by the ATO process that is issued within a week. After that, the Commission will issue the PGL to the operator.

Applications for the ATI, ATO, and PGL can be done via the Commission's Online Application System at <https://oas.st.gov.my/>. This website also provides the list of registered contractors and Competent Persons for installation and inspection.

**STEP 2**

**Requires the business operator to submit the PGL, together with a supporting letter from the Fire Department to the local council to obtain a Trade Licence. They can only commence operations when they have been issued with both a Trade Licence and a PGL.**

Both licences must be prominently displayed at their business premises. Those found negligent in the compliance with the terms and conditions of the PGL are liable to a fine not exceeding RM100,000 or jail term of up to three years, or both. There is also a fine of RM1,000 per day if the installation is not rectified upon conviction.



# Piped Gas Safety Tips



**AT HOME**

- Make sure the gas leak detection device is working properly.
- Use only approved gas kitchen appliances with SIRIM-ST safety labels.
- Keep all gas kitchen appliances in perfect condition, and follow manufacturer's maintenance instructions.
- Switch off the gas valve after each use.
- Hire a gas contractor registered with the Commission for repairs on the gas pipe system.

**AT A BUSINESS**

- Make sure the gas leak detection device is working properly.
- Perform leakage checks on gas installations using soap bubbles or leakage detection liquids.
- Ensure that installation, maintenance and repair work on gas system is supervised by Competent Persons; this is the responsibility of employers/business operators.

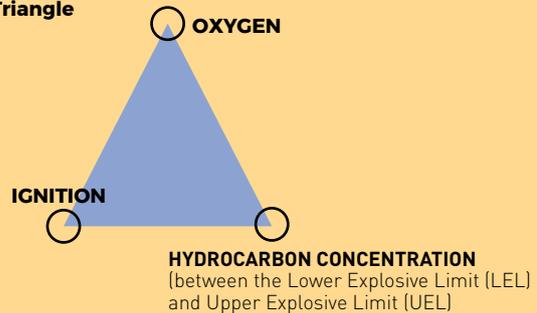


**How Gas Explosions Occur**

The common cause for a gas explosion is a faulty installation that can cause leakages. When a gas leak occurs in a confined space, all it takes is a spark to blow up when the gas reaches a certain level in combination with oxygen.

This is illustrated in the Hydrogen Explosion Triangle below. The triangle is made up of three elements needed for an explosion to occur - hydrocarbon, oxygen, and an ignition source. For example, in a self-service launderette, the hydrocarbon is the liquid petroleum gas or propane. The ignition source is the sparks from the dryer. When the propane concentration in the confined space of a launderette reaches between 2.4% and 9.6% in combination with oxygen, the sparks in the dryer will trigger an explosion.

**Hydrogen Explosion Triangle**



# DOING THE BEST WE CAN



*In the interests of electrical safety, property developers in Malaysia are bound by law to comply with various regulations and standards relating to mechanical and electrical (M&E) works.*

*We talk to the Vice President of the Real Estate and Housing Development Association (REHDA) Malaysia, Datuk Ho Hon Sang, on safety and the future of the Malaysian building industry. He points out that REHDA has oversight for members only and does its best to guide them to lift industry standards.*



**What are the regulations governing electrical and gas safety in property developments - residential (landed and high rise), commercial, industrial and townships?**

The construction and building industry in Malaysia is governed by a variety of laws and regulations. When it comes to electrical and gas safety, we need to follow regulations and standards set out for Mechanical and Electrical (M&E) installations.

In the case of electrical installations, we have to comply with the Code of Practice for electrical installations in buildings (MS 1979: 2015). There are also standards pertaining to the efficient use of power (Efficient Management of Electrical Energy Regulations 2008). The Electricity Regulations 1994, meanwhile, states that all property developers must employ qualified authorised personnel to undertake the installation, operation and maintenance of electrical equipment and systems.

To ensure the safety of mechanical installations, property developers must abide by the standards of American Society of Heating, Refrigerants and AC Engineers (ASHRAE) for indoor environment control technology pertaining to heating, ventilation and air conditioning (HVAC) systems. They also follow the standards of the Sheet Metal and Air Conditioning Contractor National Association (SMACNA), an international trade association that promotes quality and excellence in the sheet metal and air conditioning industry.

In addition, we have to subscribe to the regulations prescribed in the Malaysian Standards (MS), Fire and Rescue Department (JBPM) and National Water Services Commission (SPAN).

Besides federal rules and regulations, property developments have to follow the state's requirements, such as for water services (for instance, Air Selangor in Selangor and Kuala Lumpur). Whenever there are no standards, the industry may refer to the British Standards (BS) or its equivalent for M&E installations.



**How does REHDA ensure that developers and contractors comply with these regulations, especially in preventing the use of substandard materials such as electrical cables and wiring?**

REHDA is recognised as the leading body for private property developers. However, not all developers are REHDA members.

Our members are involved in various types of property development, from traditional housing projects to condominiums,

townships, towering commercial complexes, shopping malls, state-of-the-art golf courses, hospitals, theme parks and industrial estates.

Due to the various types of development which our members undertake, and as a responsible association, we advise our members to adopt a comprehensive action plan that continuously safeguards compliances with M&E regulations in all their projects that prioritises safety and efficiency. The plan is to include:

- Engagement with M&E consultants, shareholders and directors. Usually, they are registered professional engineers and members of the Association of Consulting Engineers Malaysia (ACEM).
- Evaluation of their past projects and experiences to gauge whether they have the right skills and competencies to undertake the project at hand.
- Undertake reference checks with fellow developers on the performance of their M&E consultants' track record.
- Undertake quality assurance of materials submitted for approval during the construction stage. A Project Quality Plan must be drawn up incorporating how work will be conducted and suppliers and sub-contractors must be approved before work begins.
- Monitoring by the Quality Control team at each stage of construction to ensure all standards and compliance criteria are met before the completion of the project.



**How does REHDA manage developers found to have cut corners and compromised safety in their M&E installation procedures and quality of materials used?**

We can only handle cases related to REHDA members. In the event we receive feedback from reliable sources or from whistle-blowers who have strong evidence, REHDA will have a dialogue with the developer concerned and seek clarification. If there is evidence of sub-standard work, and the developer fails to take steps to rectify it, we will raise the matter with the membership committee for deliberation. A decision will then be made whether to terminate the membership of the errant developer or to continue the membership, subject to some conditions.



**What is the rate of accidents caused by below par M&E works? Please provide examples.**

We have not received any such feedback so far. Hopefully, this goes to show that all our members comply with the regulations and standards applicable to their development.



**What is REHDA doing to raise the standard of the industry?**

We have responded to calls from the Government to improve the standard of the industry. We are pushing for more productive construction technologies such as Industrial Building Systems (IBS) and the digitalisation of design and construction.

We are also actively promoting sustainable development initiatives such as green certification, usage of green products, renewable energy, rainwater harvesting and the application of IBS technologies.

In addition, REHDA has proposed to the Government to provide grants and tax incentives for those involved in green certification and implementing IBS technologies.



**How are developers incorporating "green" and Internet of Things (IoT) features in their projects?**

Developers are aware of the need to have "green" elements in their developments. This is what buyers of today want. REHDA members have started incorporating features such as lifts with regenerative features, and rainwater harvesting tanks because they do not incur excessive costs. They are also installing additional water meters in swimming pools and water features to monitor the rate of water consumption.



**How can IoT improve safety?**

Safety standards in buildings have shown significant improvements from the use of Internet Protocol Closed Circuit Television (IPCCTV) that shows activities in real time. IPCCTVs can be tracked from any device linked to it and the QR codes can specifically identify people, including trespassers. They can also alert owners/operators of any accident that occurs at premises.



### What are the key achievements and challenges faced by the industry?

REHDA members work well as a team and are very collaborative. We have also embraced digital transformation and during the COVID-19 pandemic lockdown, we continued to engage with members via webinars and video conferencing.

Property development was one of the industries seriously affected by the COVID-19 pandemic.

In REHDA Selangor for instance, our members continuously pushed for REHDA Selangor to lobby for the opening of the property and construction sector and the supply chain. As this was a national issue handled by the Ministry of Health, we told our members to be patient as our objective was the same as the Government's – to balance public health with economic priorities.

Developers are also affected by the rising cost of compliance. There are now more planning requirements, new regulations and restrictions on utility works that incur additional costs.

At REHDA, we take a serious view of developers who jeopardise safety standards. We are focused on safety and efficiency for the full duration of a development, so that a building or project that is handed over is fit and safe for occupation.

We are also engaging the Government in their efforts to revise Acts related to the industry, such as Housing Development (Control and Licensing) Act 1966 (Act 118), as well as Employees' Minimum Standards of Housing, Accommodations and Amenities Act 1990 (Act 446) which addresses workers' accommodation, to make it more practical and easy to manage.

Currently, our industry is also facing acute labour shortages and we are in discussion with the Government to resolve this issue.

Another challenge developers face is that policies implemented at the federal level are not done so at the state and district levels. This has led to a lot of ambiguity.



### Anything else you wish to add, Datuk?

I would like the Government to have regular scheduled discussions with stakeholders in the real estate industry to address some regulations imposed by various authorities and governing bodies. I also want to push for more green technologies and productive construction technologies to be adopted for the future growth of the building industry.

**Datuk Ho Hon Sang has been in property development for almost 40 years. Currently the Chief Executive Officer (CEO) of the Mah Sing Group, he previously served as the CEO of Sunsuria Berhad. Prior to that, Datuk Ho was the Managing Director of Property Development, Sunway Berhad. He also had stints in engineering consultancy, road privatisation and facilities management.**

**Besides being the Vice President of REHDA and Chairman of REHDA Selangor, Datuk Ho is also a National Committee Member of FIABCI Malaysia and a member of the Institute of Engineers Malaysia.**



# UNLOCKING

## the Potential of

# Hydrogen

Hydrogen has been used as a source of power for more than 200 years. Once used to power internal combustion engines especially in modern refining, it is now being promoted as the clean energy of the future.

Light, storable and energy-dense, hydrogen produces no direct greenhouse gas emissions. And it can be extracted from fossil fuels. A 2019 report by the International Energy Agency (IEA) says that demand for hydrogen has grown more than threefold since 1975 and continues to rise, and it is almost entirely supplied by fossil fuels.

The US Energy Information Agency says hydrogen producers, marketers, Government agencies and other organisations categorise or define hydrogen according to the energy source used for its production. When it is produced from coal, it is called brown hydrogen, from natural gas or petroleum it is grey hydrogen and from renewable energy, it is green hydrogen. Grey hydrogen combined with carbon capture and storage/sequestration is sometimes referred to as blue hydrogen.

An increasing number of countries around the world are formulating policies and supporting investments in hydrogen technologies as part of their clean energy transition. In the last few years, global spending



on hydrogen energy research, development and demonstration projects by national Governments has risen, although it remains lower than its peak in 2008.

However, for hydrogen to make significant contributions, it needs to be adopted in sectors where it is completely absent, such as transport, buildings and power generation, says a 2019 IEA report.

Hydrogen can be extracted from fossil fuels and biomass, from water, or from a mix of both. Natural gas is currently the primary resource used in hydrogen production, accounting for around 75% of the world's hydrogen production.

The production cost of hydrogen from natural gas is influenced by a host of technical and economic factors, with gas prices and capital expenditures being the two most important. Fuel costs are the largest component cost in producing hydrogen. Low gas prices in the Middle East, Russia and North America mean it is cheaper to produce hydrogen in these regions. Gas importers like China, India, Japan and South Korea have to contend with higher gas import prices which makes it more expensive for these countries to produce hydrogen.

Electricity generation from renewable energy or nuclear power may be an alternative, and this will involve using the power grid for hydrogen production. With the declining cost of renewable electricity, particularly with solar PV and wind, interest is growing for the production of electrolytic hydrogen and there have been several demonstration projects in recent years. Building electrolyzers at locations with excellent sun and wind conditions will potentially lower the cost of renewable energy resources required for hydrogen production.



# How Hydrogen is Produced

Hydrogen can be produced from a variety of resources such as natural gas, nuclear power, biomass and renewable power like solar and wind. It is a clean fuel because when consumed, its by-product is only water. This makes it an attractive fuel alternative for transportation and electricity generation as well as many other applications. In addition, hydrogen is an energy carrier that can be used to store, move, and deliver energy produced from other sources.

Hydrogen fuel can be produced using several methods. The most common are natural gas reforming (thermal process) and electrolysis; other methods include solar-driven and biological processes.

- **Thermal Processes:** The thermal process for hydrogen production typically involves steam reforming, a high-temperature process in which steam reacts with a hydrocarbon fuel to produce hydrogen. Hydrocarbon fuels that can be used include natural gas, diesel, renewable liquid fuels, gasified coal or gasified biomass. Today, about 95% of all hydrogen is produced from the steam reforming of natural gas.
- **Electrolytic Processes:** Water can be separated into oxygen and hydrogen through a process called electrolysis. Electrolytic processes take place in an electrolyser, which functions much like a fuel cell in reverse — instead of using the energy of a hydrogen molecule like a fuel cell does, an electrolyser creates hydrogen from water molecules.
- **Solar-driven Processes:** Solar-driven processes use light as the agent for hydrogen production. There are a few solar-driven processes, such as photobiological, photoelectrochemical and solar thermochemical. Photobiological processes use the natural photosynthetic activity of bacteria and green algae to produce hydrogen. Photoelectrochemical processes use specialised semiconductors to separate water into hydrogen and oxygen. Solar thermochemical hydrogen production uses concentrated solar power to drive water splitting reactions often along with other compounds such as metal oxides.
- **Biological Processes:** Biological processes use microbes such as bacteria and microalgae and can produce hydrogen through biological reactions. In microbial biomass conversion, the microbes break down organic matter like biomass or wastewater to produce hydrogen, while in photobiological processes the microbes use sunlight as the energy source.

*Source: Office of Energy Efficiency and Renewable Energy, US Department of Energy*

**Various Uses of Hydrogen**

Hydrogen is mainly used by big industries today, namely, oil refining, steel manufacturing and industrial chemical production. Almost all of the gas is produced from fossil fuels.

In the transport sector, the large-scale use of hydrogen fuel cell vehicles will depend on fuel cell costs and the availability of refuelling infrastructure. Shipping and aviation have limited low-carbon fuel options available now, and this presents opportunities for hydrogen-based fuels to be developed in the near future.

In buildings, hydrogen could be integrated into existing natural gas networks, with the highest usage potential to be found in residential and commercial buildings in densely populated cities. In the longer term, hydrogen could also be directly used in boilers and fuel cells to power a building’s electricity generator in the event there is a disruption in supply.

In power generation, hydrogen is one of the fuels that can easily be stored and deployed. Hydrogen combined

with ammonia can be used in gas turbines to increase output and ammonia can also be used in coal-fired power plants to reduce carbon emissions.

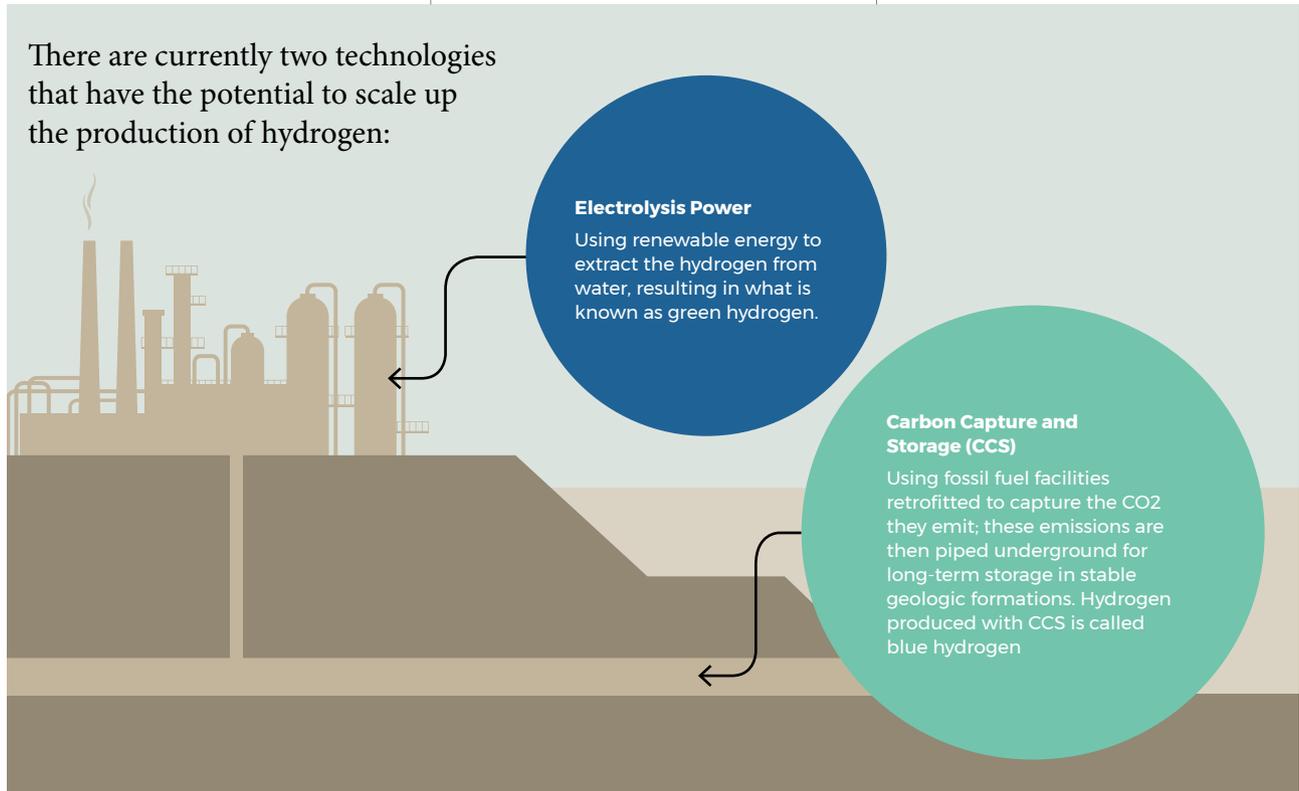
In 2000, hydrogen – along with nuclear and renewables – were seen as vital energy sources to decarbonise the power generation and transport sectors. Today, power and transport account for around 40% of total greenhouse gas emissions. The rest comes from other sectors such as oil and gas, manufacturing and agriculture.

Many industries, however, find it challenging to achieve drastic reductions in carbon emissions. The aviation industry, for example, needs fossil fuels to carry jets across oceans as fuel batteries lack the density for long-haul travel. Also, electricity alone cannot provide the heat required for steel, aluminium and plastic production. Even the hydrogen produced today for industrial use – 75 million tonnes per year delivered to refineries and chemical plants – comes from coal and natural gas that contribute about 2% of global emissions.

Still, hydrogen offers a clear benefit. It has the energy density and high combustion temperatures of fossil fuels, but with the potential for zero carbon emissions. Demand for hydrogen is projected to grow rapidly in the coming decades. The Hydrogen Council, an industry consortium, estimates that demand will be 40% higher in 2030 than today, and almost 200% higher in 2040, reports an article published in The Edge Singapore, 26 August 2021.

Technologies such as Electrolysis Power and Carbon Capture and Storage (CCS) have been shown to work and are being used today around the world – but are still costly, roughly two to four times the cost of producing hydrogen from fossil fuels, also known as grey hydrogen. However, the price of green hydrogen is dropping rapidly, driven by the lower cost to produce renewable energy. Boston Consulting Group estimates that early in the next decade, blue and green hydrogen will be competitive with grey, with green hydrogen becoming the lowest cost option.

There are currently two technologies that have the potential to scale up the production of hydrogen:



“

**Hydrogen is today enjoying unprecedented momentum. The world should not miss this unique chance to make hydrogen an important part of our clean and secure energy future. ”**

*Fatih Birol, Executive Director of the International Energy Agency in The Future of Hydrogen (Technology Report, June 2019)*



### ASEAN's Big Advantage

Rising demand for low-carbon hydrogen creates huge opportunity in Southeast Asia. The region produces large amounts of grey hydrogen to support its steel, refining and petrochemicals industries. Retrofitting existing facilities with carbon capture and storage would make Southeast Asia a leader in blue hydrogen and provide the foundation to scale up CCS technologies that capture and store emissions from coal and natural gas power plants. ASEAN also has the potential to become one of the world's most competitive producers of green hydrogen, due to its abundance of renewable energy resources such as solar, wind and hydropower. Locally produced green hydrogen can be used in the region to support demand for low carbon options for power generation and transport. It also has tremendous export potential to high-demand countries like China, Japan and South Korea.

A vibrant ecosystem that supports innovation and growth will be key to achieving this potential. Policymakers could also play a crucial role in building legal and regulatory frameworks to incentivise and support investments in low-carbon energy.

In Malaysia, the state of Sarawak initiated a hydrogen project in 2017. A part of Sarawak's Green Agenda, the project involved the establishment of an integrated hydrogen production plant and a refuelling station in Kuching. At the same time, the state announced the introduction

of hydrogen-powered vehicles. Two years later, the pilot project was operationalised, and Sarawak Energy, the state energy development company, issued a media statement that read: "Sarawak launches South East Asia's first integrated hydrogen production plant and refuelling station, unveils hydrogen buses." (Sarawak Energy, 27 May 2019)

### Sarawak Strategy: Hydrogen for Transportation

The integrated hydrogen production facility was built and is operated by Sarawak Energy, along with a hydrogen refuelling station for the state's electric buses, which are owned and operated by the Sarawak Economic Development Corporation (SEDC).

The hydrogen production facility can produce 130 kg of hydrogen per day at a purity of 99.999% and is capable of supporting and fully refuelling up to five fuel cell buses and ten fuel cell cars per day. When used in fuel cells for transportation, hydrogen has zero carbon emission, with water and heat being its only by-products.

At the launch of the integrated hydrogen facility on 27 May, 2019, Sarawak Energy Chairman Datuk Amar Abdul Hamed Sepawi said, "We are supporting Sarawak's vision for an emission-free public transportation sector through the twin pillars of a hydrogen economy framework and battery electric vehicles.

"We have built South East Asia's first integrated hydrogen production

plant and a refuelling station. This allows us to harvest green hydrogen as the first steps towards enabling a hydrogen-based economy and in building a green energy future for the transportation sector in Sarawak and the region."

The pilot hydrogen project is a growth strategy for the development of renewable energy in the state. Sarawak Energy plans to leverage on this project to explore the potential of hydrogen in the state's energy mix, especially for a green transportation system. It is also studying opportunities for energy storage, with a view to export its green energy resources. The project is also expected to contribute to the body of local and global knowledge regarding hydrogen technologies and applications, especially in a tropical environment.

The integrated facility was designed and built according to all relevant regulations, codes, standards and best practices referenced from the design and operation of other international world class facilities.

The pilot project is a collaboration between Sarawak Energy and Linde EOX Sdn Bhd, a subsidiary of Linde Malaysia. The Linde Group is among the world's leading industrial gases and engineering companies. The collaboration is to be a platform for knowledge-sharing and transfer of technology.

# How Safe Is Hydrogen

In the last decade hydrogen-based technologies have become more efficient and cost-effective as a result of more financial resources being spent on research and development globally.

However, according to an article published by World Economic Forum, 25 April 2019, the transition to a hydrogen-based society will not be easy. It requires the development of a completely new infrastructure and consolidated action by various stakeholders – from equipment manufacturers and technology integrators to energy companies and Government agencies.

Although collaborative efforts have been made by several leading global companies, the adoption of hydrogen is still difficult. A major reason for this is the public perception of the safety of hydrogen.

The view of hydrogen being dangerous is most likely influenced by certain historical accidents, including the Hindenburg disaster.

In 1937, a hydrogen-filled German passenger airship caught fire and was destroyed as it tried to dock in the US city of New Jersey. Of the 97 people on board, 36 died. The cause of the disaster remains unclear. There are theories being put forth, including one claiming that a static spark ignited the hydrogen and caused the explosion. Another catastrophe was the Space Shuttle Challenger in 1986. The NASA space shuttle exploded after take-off, killing all seven people on board. Investigations revealed that a mechanical failure was mostly to blame. However, the hydrogen powered space shuttle has given the impression that hydrogen is not a safe fuel.

The public generally perceives hydrogen as highly flammable and explosive. Although this is true, it is still safer than most commonly used fuels. Hydrogen needs a higher minimum concentration than most common fuels to burn. Measured

by percentage volume in air, it requires the air to have 4% of hydrogen to be flammable, compared to 0.6% for diesel fuel, 1.4% for gasoline, 1.2% for propane, 3.3% for ethanol and 5% for methane. In terms of ignition temperature, hydrogen and methane are safer than other fuels as they require a much higher temperature to burn.

The hydrogen generation market is expected to reach over USD199 billion by 2023, according to market research firm Markets and Markets, while the global market for hydrogen fuel cell-powered electric vehicles will reach about 583,360 units by 2030 in Asia Pacific, Europe and North America, forecasts Frost & Sullivan. The burgeoning hydrogen industry could very well present hydrogen in better light insofar as safety is concerned, especially when Governments call upon industries to adopt its usage as part of national decarbonisation agendas.



# Look for the Stars



**Electrical appliances are must-haves in homes today. Introduced as “modern conveniences” in the 20th century, they have become household fixtures that many of us cannot do without. But they come at a cost: higher power consumption. As we amass more and more electrical appliances in our homes, consumption soars, derailing decarbonisation efforts in a world struggling to manage global warming.**

To counter this trend, many Governments are mandating the manufacture and sale of energy-efficient electrical goods that are star-rated – the more the stars, the more energy efficient. In Malaysia, the Energy Commission’s Minimum Energy Performance Standards (MEPS) is responsible for star-rating electrical appliances and lamps. As at end 2021, it has enforced the importation and sale of eight appliances that must carry the MEPS star-rating.

Here, we look at the past, present and future of common electrical appliances in the marketplace.

Baby boomers are likely to remember collecting sticks to start their wood fire stoves for cooking and using charcoal irons to press their clothes. With electrification, their lifestyle changed, and even more so, with the arrival of “domestic helpers” in the form of refrigerators, electric irons, washing machines, microwave ovens and the like. Creature comforts came in the form of fans, air conditioners, television, mobile phones, computers and a variety of personal care products such as hair dryers and electric toothbrushes. Homes are now a hub of electrical appliances and devices.

Without a doubt, homes today cannot function without electrical appliances. The thrust now is for energy efficient appliances that will perform the same functions using less energy.

In 1992, the US Environmental Protection Agency (EPA) introduced the energy star label to guide the public to identify energy-efficient appliances to reduce energy consumption. This was a turning point for electrical appliances and led to a series of technological breakthroughs in manufacturing to satisfy the global demand for energy-efficient products.

In Malaysia, the energy star labelling of electrical appliances became one of the earliest priorities of the newly established Energy Commission. A year after its formation, the Commission set up the Energy Rating Work Group in 2002. Consisting of technical experts from the Commission, testing laboratory, stakeholders and business associations, the Work Group mapped out the development and enforcement of the Minimum Energy Performance Standards (MEPS), a demand-side management strategy to regulate and promote the use of energy efficient household appliances and lamps. MEPS specifies the minimum level of energy performance that appliances, lighting and electrical products must meet or exceed before they can be offered for sale or used for commercial purposes.

By enforcing MEPS, the Commission plans to progressively eliminate energy inefficient appliances from the marketplace. To implement MEPS, the Electricity Regulations 1994 was amended in 2013.

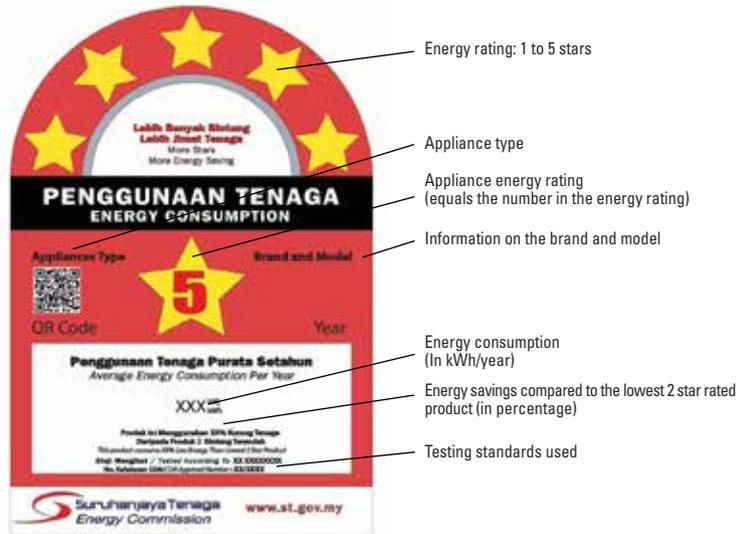
According to the Commission's Deputy Director for Electrical Equipment Unit, Shaiful Rizal Mazlan, "The primary objective of MEPS is to save electricity, reduce electricity demand growth, reduce greenhouse gas emissions (GHG), phase out inefficient products and promote an energy efficiency lifestyle among domestic consumers."

As a starting point, the Commission identified five common electrical appliances for the MEPS labelling system. They are refrigerators, air-conditioners, televisions, fans and lamps, which are Tubular Fluorescent lamps (TFL), Compact Fluorescent Lamps (CFL), Light Emitting Diode (LED) lamps and Incandescent lamps. These electrical goods can be imported or sold only upon complying with the MEPS energy labelling system.

In 2018, the Commission added another appliance to the MEPS stable: washing machines. In March 2021, two more appliances were added, namely, microwave ovens and rice cookers. Currently at the development stage are freezers, which are to be MEPS energy star-labelled this year. Next in line are electric ovens and water dispensers, scheduled for enforcement with the MEPS label in 2023 and 2024 respectively.

Under MEPS, the 2-star labelling is the lowest and carries the least energy savings. The most efficient products are those with a 5-star label that deliver the highest energy savings. It is mandatory for manufacturers and importers to affix the "Energy Efficiency" label indicating the number of stars and show MEPS-related information prior to selling the products to consumers.

## How We Rate Appliances Using the Efficiency Label



MEPS development process consist of five stages. They are:

1. Research – to study existing performance standards (if any) and benchmark against other countries for testing requirements.
2. Statistical analysis – to compile and analyse import data for appliances. (quantity, type, market share and the like).
3. Working Group (WG) – to establish a technical meeting group consisting of the Commission, testing body and relevant stakeholder(s).
4. Testing and Data Collection – to collect samples from stakeholders for testing and data analysis to determine the star-rating.
5. Implementation of star-rated MEPS product – to notify stakeholders of the date of enforcement of MEPS-rated appliance/lighting.



**"The Energy Efficiency star rating is a mechanism that allows consumers to compare models, usage and choose the most efficient electrical appliance. Not all safe electrical appliances are energy efficient, but all energy efficient appliances are guaranteed to be safe."**

*Shaiful Rizal Mazlan,  
Deputy Director for Electrical Equipment Unit,  
Energy Commission*

## MEPS Electrical Appliances:

# Back then and Now

Here, we highlight the energy efficiency improvements made over the years for five MEPS-labeled appliances.



### REFRIGERATORS

Fridges and freezers are by far one of the highest consumers of electricity among home appliances. Why? They need to remain switched on all the time and are continuously drawing power to maintain a constant temperature.

The more products they contain the harder they have to work to stay cool, so you can save energy by not overloading them or leaving the door open.

#### Back Then

Invented by the American company General Electric, GE refrigerators were introduced in Malaysia during the 1950s and 1960s. They were received with much fanfare because refrigerated food (both fresh and cooked) last longer in the hot, humid tropics. They were also among the first big electrical investments in many homes, and refrigerator

salesmen were known to travel to rural areas to make sales just before they received electricity supply.

The earliest refrigerators did not have freezers and if they did, they were small compartments just enough for ice cube trays. In time, freezers grew in size, and refrigerators came with two or more doors – for cooling, freezing, and crispers for vegetables. Power consumption rose accordingly to about 2,200 kWh/year.

When the environmental movement gained momentum in the 1980s, manufacturers began to pay heed to the power consumption of refrigerators. The elimination of chlorofluorocarbons in refrigerator sealed systems was a big step forward, and reduced power consumption to about 1,700 kWh of energy. Refrigerators in the 1990s became less bulky and had sleek designs and energy efficient technologies. This saw energy consumption declining further to 850 kWh/year.



#### Now

In 2014, refrigerators became the first MEPS star-labelled electrical appliance in the country. This involved a thorough study undertaken by the Commission in collaboration with the Danish International Development Agency (DANIDA). The star labelling took account of the usage pattern, that is, the time of use and size of the refrigerator by household, among others.

A typical refrigerator now uses about one half of the energy that a model of comparable size would have used in the 1970s. Energy efficiency of modern-day refrigerators saw consumption declining to as low as 460 kWh a year, which is less than a 100 watt light bulb.

### AIR CONDITIONERS

Air conditioners are another energy guzzler, especially when turned on all day long. As a general rule, it is more efficient to use air conditioners at night because the outside temperature is lower, and it requires less work to bring the room temperature down.





### Back Then

A 25-year-old engineer named Willis Haviland Carrier invented the first modern air conditioner in 1902 that consisted of an industrial fan blowing water over steam coils that were filled with cold water. The excess humidity condensed

on the coils, resulting in cooler air. Carrier's invention was based on the vapour compression cycle, same as in a refrigerator.

The initial demand for air conditioners in the West came from industries and was later adopted across all sections of the population in the post-War years.

In Malaysia, air conditioners began to replace ceiling fans in offices and commercial buildings in the 1950s and 1960s. The demand for air conditioners spiked with rapid industrialisation that began in the 1970s, since factories require temperature and humidity to be maintained at particular levels. Wealthy homes in urban areas started to invest in air conditioners, to improve personal comfort in hot, humid Malaysia.

In the 1990s, Governments around the world pledged to reduce emissions at the Rio Earth Summit. A multitude of actions were taken, including the call for air conditioning manufacturers to introduce efficiency improvements with new air conditioning technologies. Today, new air conditioners use about 50% less energy than they did in the 1990s.

### Now

Most urban Malaysian homes have at least one air conditioning unit. The 2020 census shows that total households with air-conditioners has increased manifold, from 0.8% in the 1970s to 16.2% in 2000, with possibly more today.

In terms of electricity consumption, air-conditioners are one of the biggest consumers of electricity among domestic appliances, consuming an average of 1,167 kWh.



Consumers now have a choice of two types of air-conditioners: inverters and non-inverters. While both perform the same function, inverter air-conditioners are more energy efficient because they eliminate unnecessary energy consumption by efficiently controlling the compressor speed.

Moving forward, the USA is pushing to change the way air conditioners work. "Everything is still based on the vapour compression cycle, the same process as a century ago," says Colin Goodwin, the technical director of the Building Services Research and Information Association in the USA. "What has happened is we've expanded the affordability of the air conditioner, but as far as efficiency, they've improved but they haven't leaped."

A scheme to encourage engineers to build a more efficient air conditioner was launched in 2018 by the Rocky Mountain Institute (RMI), a US-based energy policy think-tank, and endorsed by the UN Environment Program (UNEP) and the Government of India. They are offering US\$3 million to the winner of the inaugural Global Cooling prize. The aim is to design an air conditioner that is five times more efficient than the current standard model, but which costs no more than twice as much money to produce.

Meanwhile, the US Energy Department's Emerging Technologies Program is working on the next big thing in air conditioning: non-vapor compression technology, which doesn't use Hydrofluorocarbons (HFCs) that harm the environment, to usher in a new era of cooling. It's estimated that non-vapor compression technologies could reduce energy consumption by as much as 50%.

### TELEVISION

Televisions are the cornerstone of home entertainment. Since increasing viewing time means increasing power consumption, it is important to choose an energy efficient television. MEPS energy labelled televisions are designed to save energy in all usage modes: sleep, idle, and on. As a general rule of thumb, each additional star represents a 20% increase in efficiency.



### Back Then

The demand for televisions is closely linked to the history of television broadcasting, which began in the US in the late 1920s. However, the golden age of television came in the 1950s when television sets became more affordable, and programmes moved away from radio formats and new types of shows came on air.

## SAVE INCENTIVES

The major obstacle to buying energy efficient products is that they cost more. To address this, the Government introduced Sustainability Achieved Via Energy Efficiency, namely SAVE 2.0 and SAVE 3.0 in 2021 and 2022 respectively. SAVE is implemented by SEDA Malaysia and supported by the Energy Commission.

Under SAVE 2.0 and SAVE 3.0, households are entitled to a RM200 e-Rebate and RM400 e-Rebate respectively when they buy select appliances that carry a 4-star or 5-star MEPS energy efficiency label. Besides increasing the total number of energy efficient electrical appliances in households, SAVE aims to increase public awareness about reducing consumption.

The Commission's Shaiful says, "We look forward to consumers buying electrical appliances with a higher star rating (4 or 5 star). This will not only help save the country's resources and preserve the good environment but also reduce their electricity bills in the longer term."

In Malaysia, television broadcasting began in 1963, showing monochromatic black and white shows on television sets that consumed less than 80 W. In the meantime, several key technological developments took place in the television industry, and they led to the introduction of colour television. In 1982, the first colour programme was transmitted on New Year's Day.

The take-up of colour television, however, was slow because of the cost, but by the 1990s most homes had colour television sets.

The next big breakthrough came with paid cable and satellite television in 1996. They offered 24/7 programmes that became a lifestyle choice in many homes. Later, in the 2010s, the analogue system that had been in place for decades was replaced by the digital system. Digital television enabled higher-quality pictures and had more frequency space.

Also, around this time, Liquid Crystal-Display television (LCD TVs) made their debut. LCD TVs are thin and light, but have some disadvantages compared to other display types such as high power consumption, poorer contrast ratio, and inferior colour gamut. Still, by 2007 LCD TVs sales surpassed the older Cathode Ray Tube (CRT) televisions worldwide. Sales of CRT TVs dropped rapidly after that, as did the sales of competing technologies such as plasma display panels and rear-projection television.

### Now

Despite the dominance of LCDs, other technologies were developed to address its shortcomings. This saw the emergence of LED and organic light-emitting diode (OLED) televisions that offer better viewing, use less power, and are less complex and less expensive to build.

Televisions have also grown to be larger, and 65-inch set sets are not uncommon in Malaysian households. While great strides in efficiency have allowed us to have television

sets that consume significantly less energy than before, bigger sizes inevitably have bigger requirements. New technologies like HDR do not help either, as making televisions brighter requires more energy. Most of the time though, this amounts to the televisions consuming about the same energy as they used to a few years ago. Larger televisions also generate more heat. This could cause issues in hot countries when the television isn't placed in a temperature-regulated environment.

Digital television facilitated innovations like smart TVs. A smart television, sometimes referred to as connected TV or hybrid television, is a television set with integrated Internet and Web 2.0 features, and is an example of technological convergence between computers, television sets and set-top boxes. Besides the traditional functions of television sets and set-top boxes provided through traditional broadcasting media, these devices can also provide Internet TV, online interactive media, over-the-top content, as well as on-demand streaming media, and home networking access. These TVs come pre-loaded with an operating system.

Smart television is catching up quickly in urban Malaysia, where it is used for movie streaming services as well as gaming.

MEPS energy star rated televisions were enforced in 2014.





### ELECTRIC FANS

Most homes have one or many fans. The most common are ceiling fans, while standing, table and box fans are preferred for their portability.

Compared to the other four popular domestic appliances, fans do not consume as much power, but wastage occurs when households keep fans switched on when there is no one around.

Nowadays fans come with timers that enable them to be programmed to switch off after a set time.

### Back Then

Ceiling fans were invented in 1882 by German American inventor Philip Diehl, who adapted an electric motor he had designed for use in the Singer sewing machine; he decided to install the motor into what became the world's first ceiling fan. By the 1920s, ceiling fans were commonplace in the USA, operating with four blades instead of the original two.

When air conditioners were introduced in the 1950s, ceiling fans began to phase out from popular usage in the USA, but they became hugely popular in tropical countries such as Malaysia. During the Organisation of the Petroleum Exporting Countries (OPEC) oil crisis in the late 1970s, improvements were made in induction motor technology, and it led to the production of ceiling fans that consumed between 70-80 W of power. By the 1980s, fans with self-cooling motors and less wobbly blades were produced.

Since 2000, important inroads were made with manufacturers offering higher priced ceiling fans with more decorative value. In 2009, Brushless Direct Current Motors (BLDC) began to be used in ceiling fans. This new motor technology ushered in a new era of energy efficient ceiling fans; it also reduced power consumption

to below 50 W. Subsequent efforts at improving this technology has seen power consumption falling to as low as 35 W to 28 W, while achieving the same level of performance as standard 70-80 W fans.

In Malaysia, fans have become a common fixture since the electrification of households in the 1950s and 1960s; it was one of the earliest purchases after electric light bulbs. Although air conditioners are the preferred choice of middle-and high-income households, the majority of Malaysian homes have fans either as the primary or secondary cooling appliance.

### Now

Today's ceiling fans are as varied in style as they are in function. The blades can be made of wood, metal, canvas, polycarbonate, or other materials, and there is no more rattling. Fans with blades connected directly to the motor eliminate exposed screws and other parts, allowing for sleeker, smoother designs.

Four blades were once standard, but you'll often find five blades in newer fans, which are up to 60 inches wide and tilted at angles to maximise air flow. Not only do they have multiple speeds but they also run more quietly.

Among the innovative features today are single-blade fans that have a 630-inch blade with an 18-degree pitch, so it is aerodynamic while pushing plenty of air around. Some come with built-in air filters to trap allergens and reduce odours while circulating air. Fans with integrated lights are no longer new, but the trend is to use LED lighting to enhance energy efficiency and up-lights to help reduce glare.

Consumers can also have outdoor ceiling fans, which include wet-rated fans that can withstand rain, snow, and wind. They are sealed to protect wires and are made of weather-resistant Acrylonitrile Butadiene Styrene (ABS) plastic. Damp-rated fans are not designed for direct exposure to water but they can tolerate humidity in garages, covered patios, bathrooms, and laundry rooms.

Most fans today come with remote controls; pull chains are relics of the past. Even wall switches are obsolete. You can now control your fan with a remote or take advantage of built-in timers or thermostatic sensors.

MEPS energy star-labelled fans were enforced in 2014.





## WASHING MACHINES

Washing machines have been around longer than you'd think. This household appliance first appeared in the 1760s while its modern version first came out in 1908. The automatic washing machine was introduced in 1937, and it significantly freed up time from domestic chores. In USA, washing machines had a social impact – it saw women having the time to join the women's liberation movement.

In Malaysia, washing machines started becoming a household appliance from the 1970s onwards. Today, most urban homes have a washing machine, although hand washing is a preferred choice with some people. In addition, commercial laundrettes are trending with young urban families.

### Back Then

One of the first innovations of washing machines was the use of technology in the form of a rotating drum. Another was replacing wringers, which consisted of two cylinders that squeezed water out of the clothes. But they were not good enough and required further wringing by hand. Wringers were later on replaced by the spinning process in the 1950s. With this, clothes were spun in the drum at a very high speed inside a perforated container. This idea of applying centrifugal force to dry the clothes was invented before electricity but electricity made it easier.

Consumers also wanted washing machines that would clean without destroying their clothes; with machines that run at different speeds, adjusted to suit the fabric. To overcome this, machines that sloshed water through clothing

were invented. In addition, washing machines in the 1960s were fitted with buttons to control rinse temperature, wash temperature, spin speed, and agitation speed. The other development was a clock timing device embedded on the machine to facilitate the operation for a predicted period. The user no longer needed to be there to monitor the machine.

### Now

Modern washing machines come in two categories: front loaders and top loaders. Front loaders are usually said to be better since they provide a more thorough and vigorous wash, use less energy and less water. They are also kinder on the clothes.

Before choosing a washing machine, you need to find out about its energy consumption and performance, to know what constitutes a good and bad washing experience. Also, you should analyse factors such as its capacity, design and range of programmes. A good washing machine should be able to tackle stains such as oil, among others. While washing machines save a lot of time, they are likely to break down just like any other electrical appliances. Therefore, they need proper maintenance from time to time to last longer and also to avoid power leaks and shocks.

MEPS energy star rated washing machines were enforced in 2018.

### Washing Machines Delivered Highest Energy Savings in 2019

Sales data from importers and manufacturers showed that between January-September 2019, washing machines recorded the highest annual energy savings among six MEPS star-labelled appliances sold. During this period, a total of 477,013 washing machines were sold, and they resulted in an annual energy savings of 12.39 GWh.

Source: Energy Consumption & Energy Savings of Six MEPS-labelled Appliances (January-September 2019)

Kelengkapan Appliances	Jumlah Jualan (Unit) Total Sales (Unit)	Penggunaan Tenaga (Pengilang & Pengimport) (GWj) Energy Consumption (Manufacturers & Importers) (GWj)	Penggunaan Tenaga Berdasarkan Penarafan Indeks 2 Bintang / Lampu T8* (GWj) Energy Consumption Based on 2 Star Rating Index / T8 Lamps* (GWj)	Penjimatan Tenaga Tahunan (GWj) Annual Energy Savings (GWj)	Penjimatan Tenaga Tahunan (%) Annual Energy Savings (%)
Penyaman Udara Air Conditioners	1,013,962	2,858.67	3,751.55	892.88	23.8%
Kipas Fans	3,082,102	589.62	739.73	150.11	20.3%
Peti Sejuk Refrigerators	411,169	158.78	188.89	30.12	15.9%
Televisyen Televisions	573,838	78.84	132.02	53.18	40.3%
Lampu Lamps	52,964,140	2,035.88	3,194.24*	1,158.36	36.3%
Mesin Basuh Washing Machines	477,013	11.51	23.90	12.39	51.8%**
Jumlah Total	58,522,224	5,733.30	8,030.33	2,297.04	

In tropical ASEAN countries, solar power has taken root as the choice renewable energy source. Now, efforts are underway to tap another source of renewable energy that is plentiful in the region – the seas.

ASEAN targets to have a 36% share of renewable energy in the regional energy mix by 2030. This is estimated to require around USD300 billion worth of investments in the renewable energy sector. While solar energy has gained a foothold in the region, a newcomer that is starting to make waves is ocean renewable energy or ORE. It is abundantly available in Southeast Asia, which has many islands and high tides. It is estimated that collectively, the region has around 1 TW of ORE potential that can be tapped from tidal streams.

Like in most parts of the world, ORE is mainly at the developmental stage in ASEAN.

The Sentosa Floating Tidal Turbine in Singapore and Universiti Teknologi Malaysia's (UTM's) vertical-axis marine current turbine in Malaysia have shown evidence of the wave energy potential in Southeast Asia. In the Philippines, ORE is being studied to supply power to around 2.5 million households, which are without electricity or have limited electricity supply for four to six hours a day. Most of these households are in the rural, remote coastal and off-grid areas. In the less developed ASEAN member states, the focus is on islands that offer potential for ORE development; currently, these islands depend mainly on fossil fuels to generate electricity.

According to Renewable and Sustainable Energy Reviews (Volume 137, March 2021) published online by Science Direct, the ASEAN region accounts for 4.3% of total global energy demand. Fossil fuels meet most of this demand – oil contributes 37% and natural gas 21% to the total regional energy mix. In addition, greenhouse gas emissions (GHGs) in the region have increased over the last two decades, with an increase of 5% per year due to rapid economic growth. The region is facing an 'energy trilemma dilemma', with a pressing need to find a balance between growing energy demand (due to population growth and economic development) and environmental

sustainability. Most ASEAN member nations have pledged to lessen their carbon emissions under the Paris Climate Change Agreement, through the development and use of renewable energy. The strategic thrust is to diversify renewable energy production from various sources.

# Ocean Renewable Energy ASEAN Dives In



# What is Ocean Renewable Energy (ORE)

Tides, waves and currents can be used to produce electricity. Although still at the research and developmental stage and not yet commercially available, promising ocean technologies include:

- Wave energy, whereby converters capture the energy contained in ocean waves and use it to generate electricity. Converters include oscillating water columns that trap air pockets to drive a turbine; oscillating body converters that use wave motion; and overtopping converters that make use of height differences.
- Tidal energy produced either by tidal-range technologies using a barrage (a dam or other barrier) to harvest power between high and low tide; tidal-current or tidal-stream technologies; or hybrid applications.
- Salinity gradient energy, arising from differing salt concentrations, which occurs where a river empties into an ocean. Demonstration projects use "pressure retarded osmosis", with freshwater flowing through a membrane to increase the pressure in a tank of saltwater; and "reverse electro dialysis" with ions of salt passing through alternating tanks of salt and freshwater.
- Ocean thermal energy conversion, which generates power from the temperature difference between warm surface seawater and cold seawater at 800–1,000 metres depth.

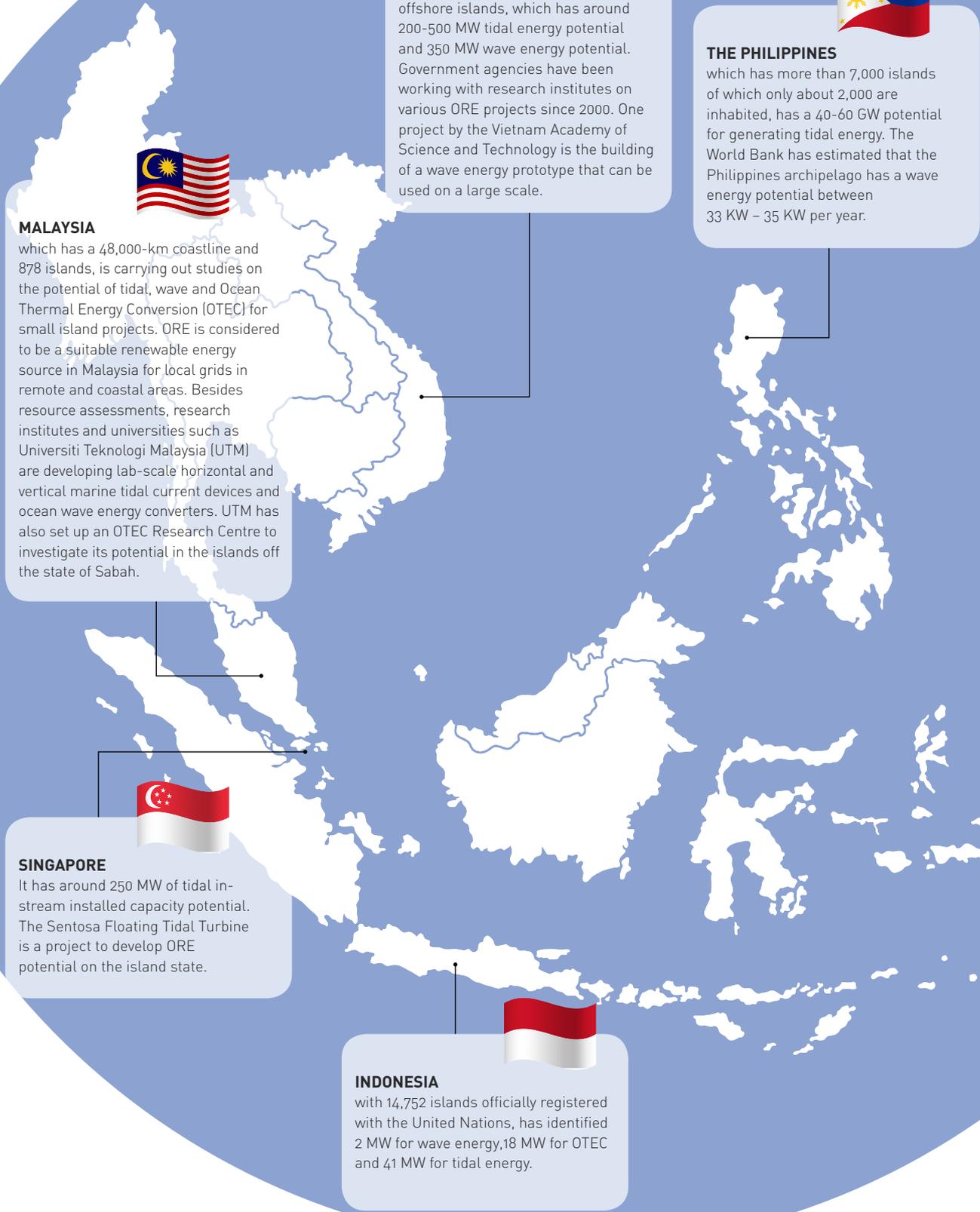
Source: International Renewable Energy Agency

## Promising Source of Renewable Energy

Oceans are a promising source of renewable energy for ASEAN countries that lie between the Indian and Pacific Oceans. The countries in the region see ORE as a viable alternative source of clean and renewable energy. The vast untapped potential of ORE can be a dependable source of energy because it comes from accessible sources such as wind, water bodies and the natural forces of the sun, moon and Earth. Besides, ORE-generated energy can be deployed onshore or installed offshore, to be used by oil platforms, weather and climate monitoring stations and fish farms.

Although many of the initiatives are still at the laboratory scale, countries like Indonesia and the Philippines are already involved in large scale projects that could power off-grid areas. Countries that have conducted the most studies on potential ORE resources are Indonesia, Malaysia, Philippines, Singapore and Vietnam.

In other Southeast Asian countries, ORE activities mainly relate to studying its potential and exploring sites for resource assessment. For example, Brunei has an estimated 335 KW of tidal energy and 0.66 GW of wave energy potential. Thailand is also assessing the potential of wave energy. The King Mongkut University of Technology Thonburi has proposed looking at the Andaman Sea and Gulf of Thailand as possible sites for harnessing wave energy. Myanmar's Yangon River has tidal currents of four to six knots and a tidal range of around five and seven metres. The country has also created a small-scale prototype of an ocean energy device, which has an electricity output of 20 KW.



**MALAYSIA**

which has a 48,000-km coastline and 878 islands, is carrying out studies on the potential of tidal, wave and Ocean Thermal Energy Conversion (OTEC) for small island projects. ORE is considered to be a suitable renewable energy source in Malaysia for local grids in remote and coastal areas. Besides resource assessments, research institutes and universities such as Universiti Teknologi Malaysia (UTM) are developing lab-scale horizontal and vertical marine tidal current devices and ocean wave energy converters. UTM has also set up an OTEC Research Centre to investigate its potential in the islands off the state of Sabah.

**VIETNAM**

It has a 3,260-km coastline and many offshore islands, which has around 200-500 MW tidal energy potential and 350 MW wave energy potential. Government agencies have been working with research institutes on various ORE projects since 2000. One project by the Vietnam Academy of Science and Technology is the building of a wave energy prototype that can be used on a large scale.

**THE PHILIPPINES**

which has more than 7,000 islands of which only about 2,000 are inhabited, has a 40-60 GW potential for generating tidal energy. The World Bank has estimated that the Philippines archipelago has a wave energy potential between 33 KW – 35 KW per year.

**SINGAPORE**

It has around 250 MW of tidal in-stream installed capacity potential. The Sentosa Floating Tidal Turbine is a project to develop ORE potential on the island state.

**INDONESIA**

with 14,752 islands officially registered with the United Nations, has identified 2 MW for wave energy, 18 MW for OTEC and 41 MW for tidal energy.

## Socio-economic Advantages

The development of an ORE sector in Southeast Asia could lead to more job opportunities, especially for related industries such as oil and gas, maritime and offshore energy. Knowledge and skills transfer from one sector to another within the region could help build a robust and reliable ORE supply value chain. ORE is also potentially more stable than other forms of energy like oil and gas when it comes to the price of energy. This will, in turn, provide job security and long-term employment once this sector is developed in the region.

Community-driven ORE projects could also enhance the livelihoods of rural communities by providing the energy required to satisfy community needs.

For example, the energy produced from an ORE power plant could power up freezers for a fishing village.

Training and development programmes tailored for rural communities could also include new business models through which communities could gain additional income from the energy system. ORE can also be used to produce clean water by creating a multi-output system that can make water and electricity at the same time through a wave-driven desalination system. There is ongoing research and feasibility studies on how these systems can incorporate ORE into making electricity and water.

## The Challenges

Despite the opportunities ORE can offer, there are challenges to be addressed in order to fully utilise this form of energy in the region.

One of the main technical issues in the deployment of ORE is installation. Similar to oil and gas, the successful installation of ORE infrastructure requires good weather and sea conditions and sound technical expertise. However, utility companies argue that installation problems are more related to the issue of site selection rather than technological problems.

Similar to other renewables, realising the potential of ORE is related to the economies of scale and its competitiveness compared to fossil fuels. However, island dwellers and people living in off-grid areas may view this from a different lens than established power consumers. For example, electricity cooperative representatives in the Philippines say that as long as ocean energy can meet the energy demand of the islands, consumers will be willing to pay the cost. These islands and remote areas are not connected to the national grid and depend mainly on diesel generators for electricity.

Also, ORE is relatively new in the region and limited to laboratory scale and not large-scale operations. Even in places with more mature ORE technologies, such as the EU and UK, the reliability of capital and operating costs estimates are still uncertain. This is because ORE technologies are diverse and most of them are not at the commercial stage yet. The impact on marine life and the environment, and potential conflicts over the usage of marine space is another concern. According to the European Commission (2014), environmental mitigation analysis

is needed to examine the impact of energy installations and devices in the water on marine life. There is also a need to study areas of cooperation (or conflict) over the use of ocean space for other maritime activities such as defence, shipping and fishing.

It is envisaged that the adoption and deployment of ORE can encounter long and complicated bureaucratic procedures and social acceptance. Due to a lack of space, smaller countries like Singapore and Brunei will have difficulty scaling up renewable energy like wind and ORE. Less developed member states such as Cambodia, Laos and Myanmar, in the meantime, are likely to face difficulties in developing renewable energy like ORE because of insufficient resources, reliable infrastructure and development capacity.

To overcome the challenges, each ASEAN member state has its own strategies and mechanisms to develop its renewable energy resources. Singapore differs from the rest by applying a more technology-focused approach rather than looking at installed-capacity because of the country's small size; it also views itself as a technology leader, being the most developed country in the region. Malaysia and Thailand, on the other hand, prefer the 'tried and tested' approach to develop their renewable energy sector. Thailand's bio-energy production is the result of the country's strength in the agriculture sector, while Malaysia's focus on solar PV installations comes from its technical and value chain experience in semiconductors and electronics manufacturing. It ranks as a world leader in the manufacture of solar photovoltaic modules and cells.

## MALAYSIA RAISES RENEWABLE ENERGY (RE) TARGET FROM 20% TO 31% IN 2025

Under the Renewable Energy Transition Plan 2021-2040, Malaysia aims to increase its share of renewable energy (RE) in its installed capacity to 31% in 2025 (from the initial 25% by 2025) and 40% in 2035.

To achieve this, the focus is on Peninsular Malaysia because it accounts for 80% of the country's electricity demand. For the 31% RE target in 2025, 26% is to come from the peninsula in 2025. For the 40% target in 2035, the peninsula is to account for 32% of RE.

These projections were shared by the Minister of Energy and Natural Resources at a virtual meeting with ASEAN Ministers on Energy and the Minister of Economy, Trade and Industry of Japan held on 21 June 2021.

He added that the country's installed RE capacity now stands at 7,995 MW, and is projected to increase to 18,000 MW by 2035. Peninsular Malaysia's RE capacity, meanwhile, is projected to increase from the current 4,430 MW to 10,944 MW in the next 15 years.

Since solar has the highest RE potential, Malaysia plans to introduce battery energy storage systems, with a total capacity of 500 MW from 2030 onwards.

With these targets in place, the Minister said carbon emission intensity from the power sector is set to decline by 45% in 2030 and a further 60% in 2035, compared to the 2005 level, in line with Malaysia's

Nationally Determined Contributions targets under the Paris Climate Agreement.

He noted that Malaysia's energy transition plan should be affordable in line with the United Nations Sustainable Development Goal 7 of ensuring to ensure access to affordable, reliable, sustainable and modern energy for all. "Therefore, while Malaysia is pushing for a higher target of RE in its capacity mix, the Ministry will take into account the affordability of the energy transition for its people and the resiliency of the country's energy system."

The transition plan is an outcome of the National Renewable Energy Policy, introduced in 2011 to diversify the fuel mix in the country. Government agency Sustainable Energy Development Authority (SEDA), which is entrusted to oversee the RE transition, has adopted the following strategies on the ground:

- Implementation of Enhanced Net Energy Metering (NEM) scheme and solar leasing
- Implementation of the Large-Scale Solar (LSS) programme
- Implementation of non-solar renewable energy projects
- Establishment of RE facilitation programmes by the SEDA Malaysia
- Enabling greater access to renewable energy sources

Solar power is recognised as the primary source of RE in the country, and several market mechanisms have been introduced to facilitate solar power generation. For example, the LSS programme has led to the establishment of large-scale solar farms. The NEM scheme, in the meantime, has incentivised Small Medium Enterprises (SMEs) and prosumers to generate solar power for their own consumption

and sale of excess energy to the grid.

Among the non-solar renewable energy projects is the production of ORE. Currently, various universities, research institutes and private project developers are working with the Government to develop turbine prototypes, test-beds and pre-commercial ORE technologies. One such example is the Universiti Teknologi Malaysia (UTM) OTEC Centre. In addition, the Government has established different agencies to drive ORE activities in the country through policy support, funding and R&D.

The National Oceanography Directorate (NOD) is the central agency coordinating all oceanographic and marine science-related R&D initiatives. It is also spearheading efforts to include ORE in the national renewable energy roadmap.

The Government also provides various types of funding support for RE producers. These include the ScienceFund, which focuses on innovative applied science that has the potential to create high impact; and the TechnoFund, which provides financing to pioneering renewable energy projects at different levels of technological readiness – from prototype to commercial and industrial scale.



## NEW FORMAT OF EE CHALLENGE 2021 ATTRACTS MORE ENTRIES

The Energy Commission's Energy Efficiency Challenge 2021 (EE Challenge 2021) attracted 772 entries, the highest ever for the annual competition. With its new format, it was encouraging to find entries from participants as young as seven years old. The 2021 theme on energy efficiency and electrical and gas safety stirred interest among students of various ages, from primary to tertiary.

In its seventh year running, the EE Challenge is an annual programme introduced by the Commission to promote energy efficient practices among younger people. Due to COVID-19 restrictions, the Challenge was not held in 2020. In 2021, it was rebranded as the EE Challenge Stay at Home edition.

The new format had four categories, namely:

**#PosterChallenge**  
a poster drawing and colouring competition

**#ArticleChallenge**  
an article or research paper writing competition

**#Video4Challenge**  
a 3 to 4-minute video production competition

**#Promote2Challenge**  
a 1 to 2-minute advertisement video production competition

In his address at the prize giving ceremony held in Kuala Lumpur on 30 November 2021, the Minister of Energy and Natural Resources, Datuk Seri Takiyuddin Hassan said, "Energy efficient practices should be started and practised at home because children spend a lot of time at home with their family."

He added that to ensure energy efficiency initiatives and energy saving measures are implemented widely and comprehensively, the Government introduced the National Energy Efficiency Action Plan (NEEAP) from 2016 to 2025. "As of October 2021, an accumulated energy savings of 4.3% had been achieved through the NEEAP, compared to the original target of 3.9% for 2021."

Also speaking at the event was the Chairman of the Energy Commission, Dato' Azian Osman, who said, "Activities to promote energy efficient practices are expected to continue to ensure environmental sustainability for future generations. To parents, guardians and teachers, set a good example for children by using electricity efficiently, because parents, guardians and teachers are the best examples for children to follow."

## What the Winners Say...



Writing is one of my favourite hobbies. I spent a lot of time researching on energy efficiency to write my article. My idea was based on saving energy at home and doing a small energy saving project at university, where I learned about energy conservation measures (ECM) at the computer lab. I then created some 'SOPs' for my family to follow, for example, turning off the lights, fans and appliances after using them. I also got a solar PV installed on the roof of our house so that we could do our part by using renewable energy."

Winner of EE #ArticleChallenge  
Age Category: 20-26 (English)  
Sharmila Kandaya, 25  
[Masters in Power Systems, UTEM]



How technology develops over the years does not matter if consumers don't change their habits.

We can do little things to prevent energy wastage. I will apply what I learned during this EE Challenge by advising my family and friends to switch off all appliances when not in use. I also want to encourage my family to set aside one hour every day for zero electricity use. This can make a difference in the future."

Winner of EE #ArticleChallenge  
Age Category: 16-19 (English)  
Wan Muhamad Amirul, 17  
SMK Kelapa Sawit,  
Kulai, Johor



We use gadgets a lot in our daily lives, and make a lot of common mistakes in the way we use them. My team decided to produce a video to show others the right way of consuming energy. While producing the video, we learned a lot about energy efficiency. We plan to encourage more of our family and friends to save energy by following some simple steps. The headmistress at our school also encourages us to save energy by switching off lights and other electrical appliances when not in use."

Winners of EE #Promote2Challenge  
Age Category: 13-15  
Noor Farina, 15  
Nur Humairah, 15  
Awatil Afrina, 15  
[Kolej Genius Insan, Nilai]



“

We learned about energy efficiency in school and decided to produce a video that is funny and appealing to many people. During this process, we learned the value of friendship, teamwork and especially electricity savings from using appliances with a 4-star or 5-star Energy Efficiency (EE) rating. After doing our video, we started practising what we learned and saw the electricity bills in our homes go down a lot. Our teachers also taught us a lot about energy efficiency and our families are following what we suggest at home. ”

Winners of EE #Video4Challenge  
Age Category: 16-19  
Farah Insyirah, 17  
Nurin Sabrina, 17  
Wan Ainun Sophia, 17  
Nurul Fareezah, 17  
(SMK Yan, Kedah)

## STATE GOVERNMENTS BRIEFED ON TARIFF SETTING

On 12 April 2021, the Commission organised a stakeholder engagement session entitled “The Impact of Fees and Additional Charges by State Governments on Electricity Tariffs”.

The briefing session held for State Government representatives was attended by Datuk Zurinah Pawanteh, Secretary General of the Ministry of Energy and Natural Resources (KeTSA) and other senior officials of the Ministry.

In his welcoming address, the Commission’s Chief Executive Officer, Ir. Ts. Abdul Razib Dawood, said, “The main objective of this session is to share with State Government representatives on the mechanism the Commission uses to set electricity tariffs in Peninsular Malaysia. This is undertaken by us in our role as the regulatory authority for electricity and gas supply in Peninsular Malaysia and Sabah.

“The Commission is entrusted with three areas of regulation, namely, economic regulation, technical regulation and safety regulation. Under economic regulation, we are required by the Government to ensure that the country has a secure and reliable supply of electricity that is made available at a reasonable cost to consumers,” he added.

“Electricity is the backbone of economic progress. In fact, one of the key indicators for measuring a country’s progress is the standard and quality of electricity supply. In 2019, Malaysia was ranked fourth in the “Getting Electricity” category in the World Bank’s “Ease of Doing Business Report 2020”, from among 190 economies measured,” noted Abdul Razib.

In Peninsular Malaysia, the Commission sets electricity tariffs by using the Incentive-Based Regulation (IBR) mechanism that is transparent and aims to be equitable to all parties. “Our responsibility is to achieve a balance between electricity providers and consumers,” said Abdul Razib. “We scrutinise every single detail that makes up the tariff in a prudent and detailed manner. Rest assured, the setting of electricity tariffs in the country is highly regulated and no party can arbitrarily charge what is considered unreasonable by the Commission.

“This is because we have a great responsibility to look after the interests of consumers. We study all aspects that are critical to ensure that electricity supply, infrastructure and services provided to consumers are at an optimum level and that there is no room for compromises or errors. Ultimately, our priority is to ensure that the nation’s economic prosperity is achieved, and the interests of the people taken care of,” he added.

During the engagement session, the Commission’s officers briefed participants on how the IBR works and the elements involved in determining electricity tariffs.

“

**We scrutinise every single detail that makes up the tariff in a prudent and detailed manner. Rest assured, the setting of electricity tariffs in the country is highly regulated and no party can arbitrarily charge what is considered unreasonable by the Commission.”**

”





“**Decarbonisation will complicate the future of gas in Malaysia. However, gas will most likely continue to be one of the main energy sources in the country.**”

## THE FUTURE OF GAS

“Although the global gas market was seriously affected by the COVID-19 pandemic, the demand of gas will be back,” predicts Professor Dr Ken Koyama, Chair of Energy Economics at Universiti Tenaga Nasional (UNITEN). “Liquefied Natural Gas (LNG) will gradually attract more attention as the global economy recovers,” he added.

Professor Koyama, who is also the Managing Director of the Institute of Energy Economics, Japan (IEEJ), was speaking at a live webinar on “How COVID-19 Changes the Dynamics of the Gas Market and What is the Implication to Malaysia” on 28 April 2021.

Professor Koyama noted that global energy demand trajectories by energy source indicated a steady and stable growth in natural gas demand. This suggests natural gas as the preferred energy option in the world. Demand came mainly from Europe, the Commonwealth of Independent States (CIS), and North America. The Asia Pacific region, in the meantime, is becoming a very important international gas market.

Based on global gas and LNG trade analysis, Professor Koyama said that LNG trade will be higher than the pipeline trade in the near future with the LNG trade becoming more competitive than pipeline trade. For the past two decades, pipeline trade dominated the gas market.

In a global analysis of LNG import by region, he noted a steady increase in LNG imports from 2000 to 2019. He said that Japan started the importation of LNG more than 50 years ago to combat air pollution in the country. In recent years, China and other Asian countries are becoming important LNG importers.

One of the major reasons for the high demand for LNG in Asia is to reduce the heavy reliance on coal for power generation. About 47% of Asian power generation is from coal, the most polluting of fossil fuels. There is thus a gradual switching from coal to natural gas, a more environmentally friendly energy source. He added that carbon-neutral targets and advanced innovative technology for low carbon energy could also have a significant impact on the Asian energy market as well as geopolitics.

Based on these trends, Professor Koyama says Malaysian energy policymakers must be cognisant of the following implications:

- Gas needs to play an important role in Malaysia’s energy mix.
- Competitive, flexible, and affordable gas procurement will be key to Malaysia’s energy policy.
- Malaysia needs to consider the potential of the gas market when constructing its energy policy.
- Decarbonisation will complicate the future of gas in Malaysia. However, gas will most likely continue to be one of the main energy sources for the country.
- Innovation in energy technologies such as the production of blue hydrogen (ammonia) may become a potentially important energy source to Malaysia as well.



## WINNERS OF NATIONAL ENERGY AWARDS 2021

The National Energy Awards (NEA) was held on 11 September 2021 for the fourth consecutive year to recognise local energy industry players who have made exceptional achievements in renewable energy (RE) and energy efficiency (EE). The 2021 awards honoured the winners in various categories.

Eight organisations won in the Best Practices in Energy Management category, six for Energy Efficient Buildings, and eleven for Best Renewable Energy Projects. Three special awards were also given for Best Practices in Energy Performance Contracts, Best Sustainable Practices by Institutions of Higher Learning and Best Sustainable Financing.



In his address, the Minister of Energy and Natural Resources, Datuk Seri Takiyuddin Hassan said, "The NEA is instrumental in identifying the best practices for EE and RE

initiatives by Malaysian organisations. The winners were selected after a thorough and vigorous evaluation process to ensure that only the best are selected. They will go on to represent Malaysia at the ASEAN Energy Awards."

## The winners of NEA 2021 represented Malaysia at the ASEAN Energy Awards (AEA) 2021.

### CATEGORY 1 (A): ENERGY MANAGEMENT (EM)

#### EM Building Large

Winner: Universiti Teknikal Malaysia Melaka  
Runner Up: Hospital Segamat

#### EM Building Small & Medium

Winner: Hospital Yan, Kedah  
Runner Up: Hospital Tanjung Karang

#### EM Industry Large

Winner: Mycron Steel CRC Sdn. Bhd.  
Runner Up: Kerry Ingredients (M) Sdn Bhd (Tampoi Branch)

#### EM Industry Small & Medium

Winner: Indah Water Konsortium Sdn Bhd  
Runner Up: Pharmaniaga LifeScience Sdn Bhd

### CATEGORY 1 (B): ENERGY EFFICIENCY (EE)

#### EE Designed Building

Runner Up: Amari Hotel Johor Bahru

#### Tropical Building

Winner: Pusat Pertubuhan Arkitek Malaysia (PAM Centre)

#### Retrofitted Building

Runner Up: Menara Korporat Persada PLUS, Subang

#### Green Building Large

Winner: MCMC Tower HQ 1

#### Green Building Small & Medium

No winner this year

#### Merit Award

Neapoli – Nilai Memorial Park  
Celcom Corporate HQ

### CATEGORY 2: RENEWABLE ENERGY

#### On Grid National Grid

Winner: Concord Green Energy Sdn. Bhd.  
Runner Up: Kerian Energy Sdn Bhd

#### On Grid Local Grid

Winner: Tonibung  
Runner Up: Pekat Solar Sdn Bhd

#### Off Grid Thermal

Winner: Ramatex Textiles Industrial Sdn Bhd  
Runner Up: Eco Power Synergy Sdn Bhd

#### Off Grid Power

Winner: Telekom Malaysia Berhad  
Runner Up: IEEE Curtin Malaysia Student Branch

#### Cogeneration

Winner: IOI Bio-Energy Sdn Bhd

#### Biofuel

Winner: Reviva Sdn Bhd  
Runner Up: Petron Refining & Marketing Sdn Bhd

### SPECIAL AWARDS

#### Energy Performance Contracts (EPC) Winner

Owner: Besi Apac Sdn Bhd  
ESCO: Cofreth (M) Sdn Bhd  
Runner Up:

Owner: Hospital Tuanku Ampuan Najijah, Kuala Pilah  
ESCO: Medivest Sdn Bhd

#### Best Sustainable Practices by Institutes of Higher Learning

Winner: Universiti Teknikal Malaysia Melaka  
Winner: Monash University Malaysia

#### Sustainable Energy Financing

- Conventional Financing  
Winner: Hong Leong Bank  
Runner Up: Maybank
- Islamic Financing  
Winner: OCBC Al-Amin Bank Berhad  
Runner Up: Maybank
- Development Institutions & Others  
Winner: Malaysia Debt Ventures Berhad

## MALAYSIA WINS BIG AT AEA 2021

Malaysia scored the greatest number of awards at the ASEAN Energy Awards (AEA) 2021 held in Brunei on 17 September 2021, when 17 Malaysian entries won across various categories.

At AEA 2021, Malaysia dominated with 13 winners in the coal, energy efficient buildings, green buildings, energy management in building and industries, renewable energy projects and special submission categories. It also saw three other winners for the 2nd ASEAN Energy Youth Awards (AEYA). In addition, Wong Tin Song of the Ministry of Energy and Natural Resources (KeTSA) was conferred the ASEAN Excellence in Energy Management, an individual award. The sweep is a vote of confidence for the nation's efforts in the deployment of sustainability technologies,

More than 69 organisations have participated in AEA since 2018, with over 40 winning awards for their sustainability initiatives. Speaking on Malaysia's big win, the Minister of Energy and Natural Resources, Datuk Seri Takiyuddin Hassan, said, "Let me convey my heartiest congratulations to the 17 Malaysian participants who won at this year's AEA 2021. Their success reflects Malaysia's leadership in rolling out game-changing sustainability practices in our energy sector. Additionally, I hope that their achievement will inspire more Malaysian organisations to embark on sustainable energy practices in their operations, thereby contributing significantly to Malaysia's carbon emission reduction targets."

ENERGY EFFICIENCY AWARDS		
Energy Management in Buildings and Industries Awards		
Small and Medium Buildings	Winner	Energy Management at Hospital Tanjung Karang
	1 <sup>st</sup> Runner-Up	Energy Management Systems at Hospital Yan
Large Buildings	Winner	Sustainable Energy Management Systems in Public University: Towards a Smart and Dynamic Campus (Universiti Teknikal Malaysia Melaka)
Small and Medium Industries	Winner	Energy Management Initiatives at Indah Water Konsortium Sdn. Bhd's Putrajaya 1 Regional Sewage Treatment Plant (RSTP)
	1 <sup>st</sup> Runner-Up	Energy Conservation Initiatives to Reduce Electricity Consumption (Pharmaniaga LifeScience Sdn Bhd)
Energy Efficient Building Awards		
Retrofitted Building	1 <sup>st</sup> Runner-Up	Menara Korporat Persada Plus
Tropical Building	1 <sup>st</sup> Runner-Up	Pertubuhan Arkitek Malaysia (PAM Centre)

RENEWABLE ENERGY AWARDS		
Off-Grid Category		
Thermal	Winner	Rematex Fuel Switch Project from Fossil Fuel to RE-Biomass, Rematex Textile Industrial Sdn. Bhd
On-Grid Category		
Local Grid	2 <sup>nd</sup> Runner-Up	144 kWp Solar Hybrid with 274 kWh Energy Storage System for the Barat Tioman Beach Resort, Pekat Solar Sdn. Bhd
National Grid	2 <sup>nd</sup> Runner-Up	14 MW Kerian Mini Hydroelectric Project, a run-of-river scheme at Sg. Kerian and Sg. Bintang, located at Selama District, Perak, Kerian Energy Sdn. Bhd
Biofuel Category		
	Winner	Integrated Palm Waste Management Facility (IPWMF): A Biomass Manufacturing Plant and Biogas Power Plant with Rooftop Solar. Phase 1: Palm Biomass Solid Fuel Plant, Reviva Sdn. Bhd

Special Submission Category		
	Winner	Food Waste Anaerobic Treatment Technology (FWATT) Model AD E-50, Alam Flora Environmental Solution Sdn. Bhd

ASEAN Excellence in Energy Management by an Individual 2021		
	Winner	Wong Tin Song, Ministry of Energy and Natural Resources

Clean Coal Technology Utilisation for Power Generation Category		
Large	Winner	Jimah East Power Sdn. Bhd

2 <sup>nd</sup> ASEAN Energy Youth Awards (AEYA)		
High School Level		
Poster/ Infographic Category	3 <sup>rd</sup> Runner-Up	Kueh Pang Lang from SMK Infant Jesus Convent Johor Bahru Malaysia
College Level		
Video Category	Winner	Chiaw Kher Ai from Monash University Malaysia
	2 <sup>nd</sup> Runner-Up	Ong Teng Hao from Heriot Watt University Malaysia

## ENERGY TRILEMMA CHALLENGE FOR THE POWER SUPPLY INDUSTRY

The energy trilemma, of finding the right balance between environmental sustainability, energy security and energy equity, has been an ongoing challenge for the electricity supply industry.

The Commission's Chief Executive Officer Ir. Ts. Abdul Razib Dawood said that when planning for power generation, the Commission took into consideration the energy trilemma. This is reflected in the implementation and adoption of the Government's policies and planning criteria. "However, the outbreak of COVID-19 created an additional challenge to the planning for the electricity supply industry because it has impacted the overall demand growth," he added.

According to the Peninsular Malaysia Generation Development Plan 2020, net demand is projected to grow by 0.6% per annum for 2021 to 2030 and

1.8% per annum for 2031 to 2039. By 2030, 6,077 MW of new capacity is required to meet demand growth, with the reserve margin projected to reach below 25% by 2039.

Abdul Razib said this new capacity will be generated through competitive bidding in order to achieve optimum cost that will translate to a more affordable tariff rate to consumers. "The new capacity requirement is projected to increase post-2030 to 9,924 MW with an additional 500 MW of battery energy storage system for the 2031 to 2039 period, while the reserve margin is expected to reduce further to 21% by 2039," he said.

To support Malaysia's commitment towards a sustainable energy pathway, the supply capacity mix in Peninsular Malaysia will see an increase in RE share from 17% to 31% in 2025, while the thermal capacity share will reduce from 82% to 69% by the end of the horizon.

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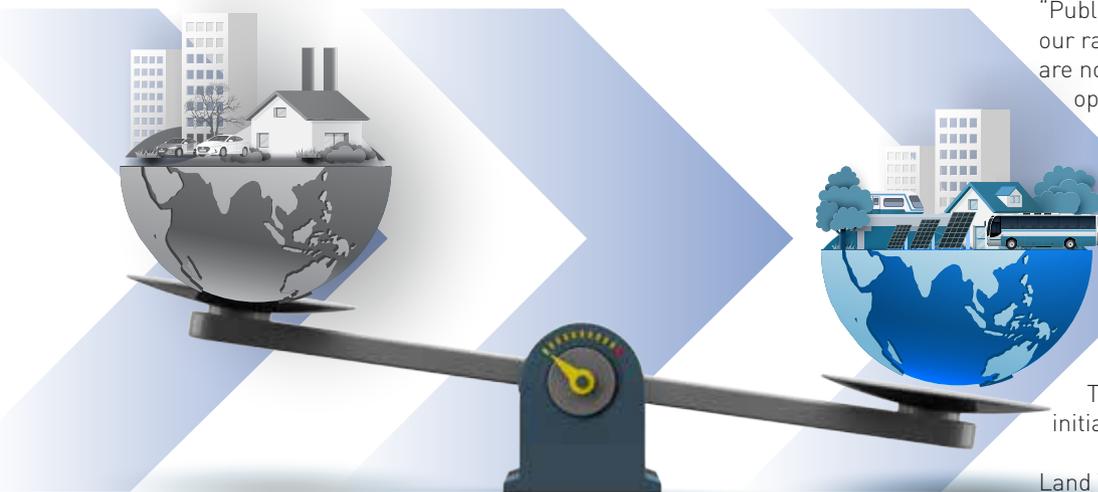
"As a result, carbon emission intensity per GDP for Peninsular Malaysia's power sector is projected to be on the downtrend with a 45% reduction by 2030 compared to the 2005 baseline, in line with Malaysia's commitment at COP21 (21st Conference of the Parties), and a further 65% reduction by 2039," he said.

He added that in the interest of achieving the 30% solar penetration target by 2039, the Government has taken into consideration the energy trilemma and its impact on consumers. "The Government has tasked the Grid System Operator to conduct a study to assess the solar energy penetration limits and possible impacts on the grid stability due to excessive supply of solar energy, in terms of infrastructure and associated costs.

"The Government will then analyse the findings from the study in the interest of cushioning the associated costs that may be borne by consumers and decide further in accordance with recommendations made," said Abdul Razib.

In order to strike the right balance in the energy trilemma, the annual system cost is estimated to be between RM28.79 billion in 2021 to RM41.96 billion in 2030, and RM52.53 billion by 2039. Abdul Razib noted that these figures are based on the optimal generation expansion plan along with the least cost dispatch simulation. "While addressing the energy sustainability and security pillars, the other key priority is in ensuring the public has access to affordable energy. The focus is to ensure that a reasonable tariff is charged to the consumers," he added.





“Public bus service is to complement our rail service,” she said. “There are now more than 1,500 buses in operation, that is, 20 buses for 100,000 persons in Greater Kuala Lumpur. The target is to achieve 50 buses for 100,000 persons as suggested by the World Bank. Also, our focus is to introduce more buses that are either hybrid or fully electrified,” she added.

There are also sector specific initiatives as follows:

Land Transport – Electric Vehicles (EVs) represent a promising step towards lowering GHGs in the transportation sector. There is a need to improve the infrastructure that supports EV usage en masse. With the upcoming launch of the Policy on Electric Vehicle Industry, Malaysia aims to scale up and spur the EV industry in the country.

Maritime – Ports around the country have implemented green programmes in line with International Maritime Organization (IMO) standards. This includes investing in more energy-efficient and environmentally friendly cargo handling fleets, and monitoring carbon emissions from port equipment and vehicles. Malaysia is also a voluntary participant in IMO-initiated programmes such as Partnerships in Environmental Management for the Seas of East Asia (IMO-PEMSEA) Project and Green Voyage 2050.

Aviation – Malaysia also participates in the voluntary pilot phase of the Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA) as part of its effort to reduce carbon emissions. CORSIA recognises the need for sustainable aviation fuel and supports the global aviation industry’s goals for environmental protection. The Government is committed to funding research on bio jet fuel as a resource in the Eligible Fuels Policy; RM40 million was allocated for sustainable fuel research grants under the 2020 Budget.

## Malaysia Moves towards **Low Carbon Mobility**

At a roundtable discussion entitled “Can Malaysia be Net Zero Emissions by 2050?”, the Ministry of Transport gathered feedback from Government and private sector experts on the viability of reducing greenhouse gas emissions (GHGs) in the transport sector. Held on 19 July 2021, the roundtable was chaired by Normah Osman, the Deputy Secretary General (Policy) of the Ministry of Transport.

“Transportation systems form the backbone of a country’s economy and social growth, including Malaysia,” said Normah in her keynote address. “Our transport sector uses around 40% of total energy output and contributes about 30% of GHGs.

“One of the strategies outlined in the 11th Malaysia Plan (2016-2020) is to encourage low carbon mobility by adopting more energy efficient vehicles in public transportation and encouraging more people to buy electric vehicles. This will enable Malaysia to realise its aim to reduce GHG intensity by 45% by 2030,” she added.

There are also various other policy documents to achieve this target. Among them are the National Transport Policy 2019-2030 to ensure the transport system will be efficient, clean and resilient with minimal impact on the environment. Other parallel initiatives in the pipeline are the National Energy Policy by the Economic Planning Unit and the Low Carbon Mobility Blueprint. Yet another is Mode Shift, based on the notion that while we cannot completely stop people from buying a car, we can influence their travel choices through regulation, infrastructure design and providing alternative transport choices.

“The Government is committed to improving public transport,” said Normah. “Mass transit will not only reduce emissions but also reduce road congestion in urban areas. Hence, in recent years, the Government is giving more attention to rail transportation system and has approved a number of mega projects.



With people spending an average of six to eight hours at school or work, it is important for workplaces to be safe and healthy. When accidents happen here, there is much pain and loss, not forgetting the long-term damage to the reputation of the organisation. In such cases, we should not be looking for scapegoats but try to look at the root causes of accidents, says the Chairman of the National Institute of Occupational Safety and Health (NIOSH), Datuk Wilson Ugak Anak Kumbong, who writes on the responsibility of employers to keep their workplaces free from all safety risks and hazards. But he adds that ignorance of the law is not an acceptable excuse for employers to get off the hook.

**Workplaces  
must be safe and  
healthy.**

**No compromises!**

In the past 15 years, from 2005 to 2019, the Energy Commission's 2019 Annual Report noted that there were 895 electrical accidents, including 445 fatalities. The majority of the accidents occurred in the workplace.

The most accident-prone premises cited in the report were electricity substations, high voltage and low voltage overhead transmission lines, factories and commercial buildings. Even schools, which should be the safest of places, were not spared.

In 2017, a fire rocked the nation's conscience when 23 people, mainly children, died at Darul Quran Ittifaqiyah, a *tahfiz* (Muslim religious school) in Kampung Datuk Keramat, Kuala Lumpur. Following the tragedy, the Fire and Rescue Department inspected 956 *tahfiz* and found that more than half of them were high risk premises for accidents by fire. Among the fire hazards identified were faulty electrical sources.

NIOSH subsequently published a special guidebook on fire hazards and risks for all *tahfiz* and state-run religious schools. It was a joint effort between us and the Selangor *Tahfiz* Al-Quran Institutions Coalitions (PINTA Selangor). We also introduced Occupational Safety and Health (OSH) programmes in schools and *tahfiz* schools, to educate students on electrical safety as well as to highlight to the management of their role and responsibilities to ensure the safety of all those entrusted to their care.



### Energy Commission's Touchpoint Programme

In 2014, the Energy Commission launched Touchpoint, a corporate social responsibility programme to ensure electrical safety in the community, particularly among low-income groups. Under this programme, the Commission's officers visit various premises to test the safety of their wiring systems, appliances and residual current circuit breakers. When lapses are found, ST-authorized technicians are appointed to carry out rectification works. A total of RM10,000.00 is allocated for each site under this programme. As at 2021, the Commission had implemented Touchpoint at 44 sites in Peninsular Malaysia and Sabah.

### Bound by Law

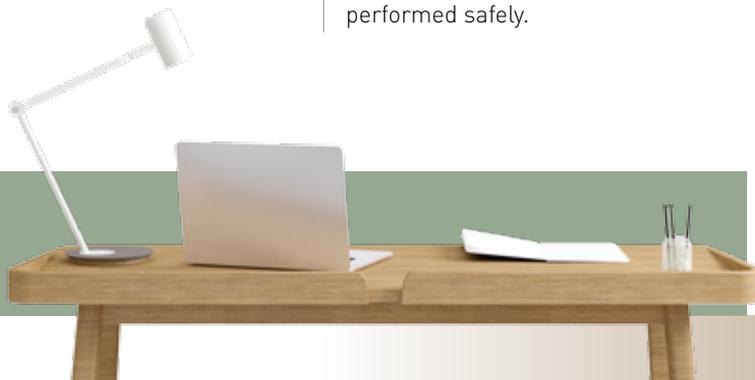
According to the American Occupational Safety and Health Administration, most electrical accidents in the workplace occur for three reasons, namely, unsafe equipment or installation; unsafe work environment; and unsafe work practices. The responsibility for these falls on the shoulders of employers and the management. They must be committed to ensuring electrical safety in the workplace.

A US Department of Labour report in 2015 found that compliance with Lock Out Tag Out (LOTO) is one of the best practices in electrical management and standards. LOTO is a set of procedures that are used to ensure that equipment is shut down, inoperable, and (where relevant) de-energised. This allows maintenance and repair work on the system to be performed safely.

The US report found that LOTO can prevent an estimated 250,000 incidents, 120 fatalities and 50,000 injuries each year.

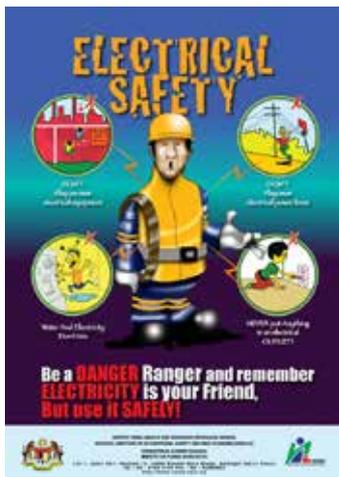
In Malaysia, all employers are bound by the Occupational Safety and Health Act 1994 that states that "one of the duties of an employer is to provide information, instruction, training and supervision to employees to ensure safety, health and welfare at work". There can be no excuse for any employer to say that he/she is not aware of his/her responsibility to safeguard electrical safety at their workplace.

On our part, NIOSH works at ensuring that employers and their appointed representatives comply with legislation pertaining to all safety requirements, including electrical and piped gas safety. We also update them on the latest developments by disseminating relevant information through training seminars, conferences and consultancy services. Our communication channels vary from face-to-face interactions to remote learning and the distribution of hard copy safety literature.



Employers also have to comply with other laws and regulations enforced by the Energy Commission as well as the Department of Occupational Safety and Health (DOSH). This includes conditions stipulated in the Electricity Supply Act 1990, Electricity Regulations 1994, Licence Supply Regulations 1990, Gas Supply Regulations 1997, Gas Supply Act 1993 and Efficient Management of Electrical Energy Regulations 2008. In addition, there are safety of electrical and piped gas compliances to follow under the Occupational Safety and Health Act 1994, Factories and Machinery Act 1967 and Petroleum Act (Safety Measures) 1974. The latter comes under the jurisdiction of the Department of Occupational Safety and Health (DOSH).

Another regulatory authority for safety is the Fire and Rescue Department or BOMBA, which plays an active role in mitigating or minimising fires caused by electrical sources. When an accident occurs, the department analyses all available data and traces the root cause(s), as required under the Fire Services Act 1988 (Amendment 2020). Under the Uniform Building By-Laws (UBBL) 1984, employers must ensure their premises are safe for occupation and have in place proper evacuation procedures in the event of a fire.



### Accident-prone Workplaces

The utility sector has the most accident-prone workplaces. This covers electrical substations, low voltage and high voltage transmission lines.

Given the nature of what they do, these workplaces carry high risk electrical hazards. A Ministry of Human Resources, Malaysia (NIOSH) research study on the utility sector in 2016 found that workplaces in this sector had ineffective OSH management systems, failed to adhere to safe operating procedures and lacked management commitment.

Another NIOSH research study undertaken in 2019 on empowering the Principal Employer's role and responsibilities found that companies in the utility sector had improper/poor housekeeping (77.8%) that was identified as the main safety hazard, followed by manual handling (68.5%) and use of high-powered equipment (64.5%).

Factories are another workplace of concern. Even when they employ third party agencies to install and maintain their facilities, the responsibility for safety rests with the employer as stipulated in Section 15 of the Occupational Safety and Health Act (OSHA)1994. In my opinion, it would be more cost efficient for factories to have their own competent personnel for the installation and maintenance of electrical installations at their premises.

There are allegations of factories employing unqualified migrant labour to save on costs instead of hiring qualified Competent Persons for their electrical and gas installations and maintenance. There are two perspectives to this. Firstly, is the employer's lack of awareness that such risks can have a long-term impact on the reputation of the company when an accident occurs. Secondly, is the confidence of some employers that such actions done knowingly will go unnoticed by the authorities.

As I see it, we do not need scapegoats when an electrical accident happens. Instead, we should strategise and properly plan to improve the safety record in our country from year to year. It is more meaningful and productive to sit down and discuss, to find the root cause(s) of accidents and work at addressing safety gaps. With better awareness, knowledge and enforcement, the number of accidents is likely to decline.

Overall, workplace accidents are on the decline. In 2015, the national occupational accident rate per 1,000 workers was 2.81. It fell to 2.18 in 2020. Meanwhile, our national occupational fatality rate per 100,000 workers was 4.84 in 2015 and decreased to 2.09 in 2020.

Compared to ASEAN and world records, our figures are quite insignificant. Referring to 2019 data, in general, Malaysia's national occupational accident rate for the year was 2.71. For the same year, it was 2.20 in Japan while in the United Kingdom, it was 2.54. In Singapore it was 3.96, the Republic of Korea 5.36 and the United States of America 28.00. However, we need to bear in mind that these comparisons are a guide only, due to differences between countries in the incident reporting format, enforcement procedures and level of non-reporting incidents related to awareness.

However, we can never be complacent and be satisfied with our relatively low accident rate because every injury and every life matters. No one wants an accident to happen to them, a family member, a friend or in the community.

### **Preventive Actions**

NIOSH promotes prevention, to avoid accidents that cause pain, distress and losses that cannot be measured in simple terms. Besides physical damage to people and property, there is the emotional trauma to be endured by survivors, their families and the community.

At NIOSH, we conduct various training programmes to improve occupational health and safety in the country. We have four programmes highlighting electrical and gas safety for Occupational Safety and Health practitioners, trainers and workers preparing for the Competency Certificate and Safety Passport. These programmes stress on electrical safety legal compliances and the roles and responsibilities of safety personnel in different industries.

For example, in our Safety and Health Officer training programme, participants learn about basic electrical legislation and electrical safety practices so that they have the knowledge to manage and advise their employers on electrical best practices to be implemented. We also have similar programmes for

OSH personnel such as site safety supervisors, auditors and corporate Safety and Health Committee members.

NIOSH also offers industry-specific customised programmes as part of our consultation services. This can include modules on electrical and piped gas safety as required by the industry. In addition, we have customised modules on comprehensive electrical safety, LOTO, workplace inspection, risk management relating to hazard identification, risk assessment and Hazard Identification, Risk Assessment and Risk Control / Determining Control (HIRARC/DC).

In the final analysis, workplace safety is the responsibility of many parties who need to work together to promote electrical safety at every level of Malaysia's population. Currently, there is a critical knowledge gap that needs to be addressed – especially with regard to raising awareness among building owners on the need to check on their electrical wiring system every 10 years, to ensure their premises are not exposed to fire hazards.

Perhaps a joint campaign for this is timely?



# Orderly **Supply** and Use of **Energy**

**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 Sabah.



## 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.

