Towards a World-Class Energy Sector

ENERGY MALAYSIA

Suruhanjaya Tenaga
Energy Commission

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Exciting and Electrifying

The Future of the Energy Sector

A RENEWABLE ENERGY OUTLOOK
A study on its potential and challenges both globally and in Malaysia.

ONLY THE BEST
A look at how competitive bidding process for large-scale solar and combine cycle plants strengthen Malaysia's energy security.

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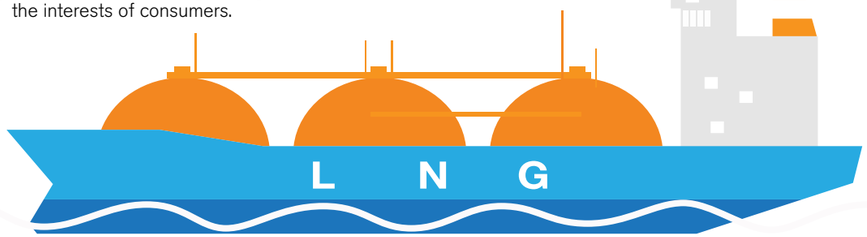

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Gearing Towards a Sustainable Future

With transformative initiatives in place for the coming years, the energy sector is set to undergo major changes and the Energy Commission is at the forefront of expediting them.

We have new targets to achieve, new benchmarks to pass, new expectations to meet, but they all come down to our core roles – to regulate, to promote and to advise. As a unified front of stakeholders and industry players, we are working towards making our vision for the future of this industry, a reality.

While the electricity sector development will be driven by the implementation of the Malaysia Electricity Supply Industry (MESI) 2.0 reforms with the assistance of MyPower 2.0, the renewable energy supply will also be enhanced for long-term sustainability.

To transition smoothly and to meet future demands of the industry, renewable energy will be a game changer in terms of leading the country away from exhaustible energy sources. Investing in renewable energy facilities will go a long way in terms of both environmental and economic progression.

In the coming years, renewable energy will play a pivotal role in elevating the supply globally and regionally. With gross power generation projected to almost double on a global scale, renewable energy sources such as hydropower, wind, solar, bio energy, and geothermal will make up a bulk of the supply by 2050.

Wind and solar power has been highlighted as important contributors of the future energy supply, which is why Malaysia needs to actively explore the high potential of solar energy. To explore this further, an analysis was undertaken by us to identify high solar growth areas and to determine the high renewable energy penetration scenarios, their limitations and how to overcome them.

Each success is a stepping stone to greater triumphs, not only for the industry but to the country and its people. While we are working to further our reach, changes do not happen overnight. Our aim is to continually improve the sector's performance whilst ensuring affordability and sustainability.

As we look to the future, this issue of Energy Malaysia focuses on the latest developments, potential solutions to hurdles, projected growth areas in the industry, and other significant ways we can make major strides in achieving long-term targets. EM

Datuk Ir Ahmad Fauzi Hasan
Energy Commission, Malaysia

Suruhanjaya Tenaga
Energy Commission

Thank You

Datuk Badriyah Abd Malek

The Energy Commission would like to thank Datuk Badriyah Abd Malek for her services as the Deputy Secretary-General (Energy & Green Technology), Ministry of Energy, Science, Technology, Environment and Climate Change (MESTECC).

Congratulations

Puan Noor Afifah Abdul Razak
Deputy Secretary-General (Energy & Green Technology)

We would also like to welcome Puan Noor Afifah Abdul Razak as the new Deputy Secretary-General (Energy & Green Technology), Ministry of Energy, Science, Technology, Environment and Climate Change (MESTECC).

Government to Reactivate MyPower

In its drive to reform Malaysia's electricity industry, the government is reactivating the Malaysia Programme Office for Power Electricity Reform (MyPower) Corp agency. This was announced by the Minister of Energy, Science, Technology, Environment and Climate Change Puan Yeo Bee Yin during a press conference at the Conference of Electric Power Supply Industry (CEPSI) 2018 at the KL Convention Centre in September.

As revealed by the Minister, MyPower Corp is to help implement the reforms set out in the Malaysia Electricity Supply Industry (MESI 2.0 initiatives, and will be active for a total of 36 months. The agency will have a total of 10 to 20 staff, each of them experts in the energy sector.

Puan Yeo further explained that the goals of MESI 2.0 are three-fold – namely to boost efficiency in the industry, to future-proof key processes, regulations and structure in the industry, and to empower consumers by democratising and decentralising the electricity supply industry. The Minister also expressed hopes that the market structure will be more transparent and efficient upon completion of the reforms.
– *New Straits Times*

"The government will act as a driver, but the prime mover of this transformation is the local experts and professionals. Meetings and discussions will be held with stakeholders to assist the government in implementing this."

– Puan Yeo Bee Yin,
Minister of Energy, Science, Technology, Environment and Climate Change

Bangkok Banks on Blockchain Energy

A neighbourhood in Bangkok is adopting a revolutionary new method of trading electricity among residents through a blockchain. This project, which is one of the largest peer-to-peer renewable energy platforms, has a capacity of 635 kW with commercial operations commencing in September this year.

According to David Martin, Managing Director of Australia-based Power Ledger – which is the technology provider and partner of this project, "(The project) encourage more consumers to make the switch to renewable energy, as the cost can be offset by selling excess energy to neighbours."

The project is being carrie out in Bangkok's Sukhumvit neighbourhood, and will encompass a mall, a school, a dental hospital, and an apartment complex. Under this scheme, each location generates electricity from solar power for their own use, before selling it to the others through the blockchain trading system. Any excess will be sent to a storage system and then sold to the grid.

Thai authorities have been encouraging communities to develop renewable energy projects, with the Bangkok Metropolitan Electricity Authority predicting that "peer-to-peer energy trading to become mainstream for power generation in the long run."
– *Thomson Reuters*

Malaysia Focuses on Renewable Energy

Malaysia's Ministry of Energy, Science, Technology, Environment and Climate Change (MESTECC) is dedicated to revving up the country's renewable energy (RE) capacity, and this is expected to lead to a surge in RE deals in the future. This was reported by MIDF Research after attending MESTECC Minister Puan Yeo Bee Yin's first town hall session in July.

During the session, Puan Yeo pointed out that Malaysia's reserve capacity of 30 percent gives it enough of a buffer to build up its RE capacity, without having to build more power plants.

According to MIDF Research, "This suggests in the near future, sector opportunities could tilt heavily towards RE project awards and a dearth of future fossil fuel plants."

It should be noted that Malaysia has been moving towards RE Since 2015, as can be seen by the commissioning of a number of Large Scale Solar (LSS) projects. MIDF Research however opined that, despite the Minister flying the flag for RE, the more likely scenario is for RE to complement rather than replace fossil fuels as Malaysia's main energy source.
– *Retail News Asia*

"Solar accounts for the bulk of Malaysia's RE. However, there is the issue of getting RE sources to reach grid parity for it to be cost competitive and gain a larger share of generation mix without burdening end-consumers."

– MIDF Research

Google Inks Finnish Wind Deal

ICT giant Google has signed a 10-year deal to purchase RE from three wind farms which are being constructed in Finland. The energy from these wind farms, which is expected to be 190 MW, is to be used to power Google's data centre in the country. This is part of a growing trend where large companies sign power purchase agreements (PPAs) to buy cheap renewable energy direct from generators.

According to the International Renewable Energy Agency, the total capacity of corporate PPAs reached a record 5 GW in 2017, with most of the source being wind and solar. However, as European governments remove subsidies for the wind industry, the number of new wind power installations have dropped by 25 percent to 4.5 GW during the first half of 2018, compared with the same period in 2017.

That being said, wind power in Europe is now increasingly competitive with conventional power in terms of pricing, while giving organisations the opportunity to comply with corporate responsibility or sustainability policies. This is reflected in a blog posting by Marc Oman, Google's head of EU energy, who wrote "In a growing number of locations, the cost of new renewable energy is competitive with the cost of power from the grid."
– *Free Malaysia Today*

Enhanced Electricity Grid for Sabah

Sabah's electricity grid is set to be enhanced, with the cost being footed by the Federal government. This was announced by the Minister of Energy, Science, Technology, Environment and Climate Change Puan Yeo Bee Yin, who also noted that the upgrade will help increase the amount of electricity supplied from then west coast of the State to its east coast.

In order to reinforce the grid, six projects have been earmarked so that distribution capacity will be between 200 to 400 MW. These include upgrading a 132 kV line from Segaliud to Damrod to 275 kV, installing two new 132 kV transmission lines from Segaliud to Seguntor and from Sandakan Elopura to Seguntor respectively, and building a new substation at Bukit Nenas. All in all, the total cost of these projects is expected to be RM840 million, with end 2021 or early 2022 as the date of completion.

In addition, Puan Yeo also highlighted the government's effort to improvise the electricity supply in Sabah such as considering the requirements to execute several other projects such as the Southern Link Project that costs RM 1.25 billion. Besides that, she also affirmed the objective of lowering the SAIDI scale in Sabah by 58 percent to 100 minutes per consumer, by the year 2020.
– *Bernama*

Ministry of Energy, Science, Technology, Environment and Climate Change

Leading Malaysia's Energy Change

The Ministry of Energy, Science, Technology, Environment and Climate Change (MESTECC) has a lot of ground to cover to keep up with the Government's plans in increasing the production of renewable energy, energy efficiency and market reforms. The Minister of MESTECC, Puan Yeo Bee Yin is making the necessary plans to achieve its green targets. ***Energy Malaysia*** looks at the aspirations of the Ministry, particularly with regards to the energy sector.

"Green energy will be a new frontier for growth in Malaysia. The science and technology industry is an untapped market, which I believe can help the nation move up the value chain to come out of the middle-income trap."

–Puan Yeo Bee Yin,
Minister of Energy, Science, Technology, Environmentand Climate Change

An Upgrade in Ministry

MESTECC was formed by combining parts of the former Ministry of Energy, Green Technology and Water and the Ministry of Natural Resources and Environment with the Ministry of Science, Technology and Innovation. This, Puan Yeo Bee Yin revealed, has led Prime Minister Tun Dr Mahathir to joke that the Ministry should be called "The Ministry of Many Functions".

While some may worry that the inclusion of energy with so many different portfolios may lead to less focus being placed on it, the Minister has stressed that energy will continue to be a primary concern as it is the backbone of economic development.

The reasoning behind the amalgamation of the former Ministries is to create better communication between the various agencies, which all follow the same framework instead of multiple plans being produced by multiple ministries. This allows for the quicker execution of green strategies.

Through MESTECC, Puan Yeo is hoping to create a regulatory framework within the energy industry with a built-in 'ecosystem'. She describes the ecosystem as a cycle that will continue to sustain itself even after her departure as Minister. "If you want your policies to last beyond your tenure, then a Minister needs to build an ecosystem" she explains. To do so, MESTECC will focus on obtaining the right people, and come up a framework that ensures the continuation of policies and processes. With this, MESTECC hopes to develop Malaysia into a key player in the ASEAN green energy industry.

Moving Towards Renewable Energy

With climate change increasing the frequency of extreme weather events, Malaysia needs to move towards a low-carbon future. Around 56 percent

"It's a definition that if it's not renewable, it's going to run out at some point. And we will have the choice of the collapse of civilisation— and into the Dark Ages we go—or we find something renewable."

- Elon Musk,
CEO of Tesla

of the Malaysia's current energy demand is currently being supplied by oil products, and the use of fossil fuels is detrimental to solving the global climate change problem.

As such, the government plans to increase Malaysia's renewable energy usage. Although renewable energy production in Malaysia has not yet reached grid parity, Puan Yeo is hopeful that we are on the right track, stating, "I think it's achievable by 2025, definitely by 2030". The reason for her confidence is that MESTECC has been having many discussions on how to prepare Malaysia's electrical grid for renewables and what policies should be implemented that will help take us to the 20 percent target.

One major challenge faced by the renewable energy industry is the intermittency problem in energy production, particularly solar energy. Puan Yeo explains that there is a leading international solar panel manufacturer based in Penang, which unfortunately does not really sell their panels nationally due to Malaysia's limitations. This is because in Malaysia, we only receive approximately four hours of direct sunlight as a lot of our rays are reflected back. The discontinuous nature of renewable energy disrupts the flow of energy use.

To overcome this problem, MESTECC will be looking into ways to increase energy storage efficiency. Puan Yeo describes this as "The Holy Grail" of the renewable problem. This is why researchers globally are looking into energy storage technology. Following suit, the Ministry will channel R&D funds to find the technology required to solve the storage issue.

Creating Wealth with Green Energy

Although MESTECC is highly dedicated to the decarbonisation of Malaysia, they will not sacrifice economic growth for it. As such, Puan Yeo stresses that the renewable energy target should not have precedence over energy affordability. It is important to make the market more efficient so Malaysia can continue to deliver affordable electricity, even to those at the bottom of the economic curve.

At the same time, the Minister believes that Malaysia has the potential to drive a successful green economy. "Green energy will be a new frontier for growth in Malaysia" she says. The science and technology industry is an untapped market, which Puan Yeo believes can help the nation move up the value chain to come out of the middle-income trap. The goal of MESTECC is to transform Malaysia into a modern and progressive nation with a strong emphasis on science and technology. Puan Yeo explains that the way to do this is by refocusing the R&D and entrepreneurship funds.

R&D funds should be used on research correlated or driven by the green energy market, while the entrepreneurship fund should centre on bringing the technology into the real world to generate interests while creating more jobs. "The whole science and technology focus will change to be measured by what causes the most impact to the economy" the Minister emphasises. Therefore, to achieve the renewable energy target, MESTECC will rely strongly on the technology that will come into play the next few years, and Puan Yeo is confident that there is enough talent in Malaysia to help the government through this. "MESTECC will be here to empower our experts to change the industry" she proudly states. Once a market has already been established, further innovation and investments will continue to follow.

MESTECC will also focus on reforming and restructuring the renewable market for more efficiency. One way they will do this is by opening up the market to foster competition thus consequently driving costs down, while also placing more emphasis on energy efficiency and renewable energy. Another way MESTECC plans on increasing market efficiency is through reducing government intervention. Puan Yeo reiterates that the role of government is not to intervene, but to empower its players. Finally, MESTECC believes that increasing government transparency while adopting cost efficient and time-based tariffs will further increase market efficiency.

Reforms of Energy Plans

At a town hall meeting held for the renewable energy industry, Puan Yeo mentioned that there will however be an overall renewable energy, energy efficiency and power sector reform. She aspires for all aspects to be in synergy within MESTECC, and revealed that the Ministry will be working closely with Members of Parliament at the constituency level rather than just with Ministers alone.

Another aspect that MESTECC will definitely be reviewing is the existing Incentive-Based Regulation (IBR) and Imbalance-Cost Pass Through (ICPT) mechanism, which Puan Yeo has been critical of in a speech to Parliament. The main criticisms she has for the existing system is its lack of clarity and efficiency. "How do you define regulated profit versus non-regulated profit? How would you define ICPT baseline? How would you calculate them? How do you charge of press through to the consumers?" These are some of the issues she brought up which the Ministry needs to review and reform.

At the Conference of the Electrical Power Supply Industry (CEPSI) 2018, Puan Yeo also announced that MESTECC will be reactivating the special purpose agency, MyPower, as part of Malaysian Energy Supply Industry (MESI) 2.0. MyPower, which stands for Malaysia Programme Office for Power Electricity Reform, will design and drive the implementation of energy reform over the next three years.

MESI 2.0 has been established to achieve three goals: to increase industry efficiency, to future-proof the industry structure, regulations and key process, and to empower consumers, democratise and decentralise the electricity supply industry. Puan Yeo is confident that this transformation programme, which includes future generation, green energy and energy efficiency, will enhance the consumers' experience as well as propel the country forward.

From the amalgamation of various agencies, MESTECC hopes to build Malaysia's energy sector into a cleaner and more sustainable industry. They will focus on channelling their funds into the science and technology required to overcome Malaysia's limitations in harnessing renewable energy, while at the same time restructuring the market to increase competition with goals to turn Malaysia into a green economic powerhouse. EM

THE STAKEHOLDERS SPEAK

Industry Players and the Public Voice Their Views on the Energy Sector

The Malaysian energy industry is undergoing an exciting period of transformation spearheaded by the Ministry of Energy, Science, Technology, Environment and Climate Change (MESTECC) – led by its Minister Puan Yeo Bee Yin. This is encapsulated in the planned reforms to the Malaysian Electricity Supply Industry (MESI) under the MESI 2.0 initiative, which has three key aims, which are to increase industry efficiency, future-proof the industry, and empower consumers.

With these changes in the pipeline, ***Energy Malaysia*** speaks to various stakeholders from the industry and consumers to get their feedback, hopes and aspirations for the energy sector.

"As in other countries, customers in Malaysia too, need to be empowered to manage their electricity bills via initiatives and schemes such as home energy report, time-of-use tariff, energy efficiency initiatives, demand side management and Net Energy Metering."

– Datuk Seri Ir Azman Mohd,
President and CEO of Tenaga Nasional Berhad

Improving Transparency

In order to increase industry efficiency, MESTECC has identified several areas of focus. These include enhancing competition in the sector, adopting a tariff that is more cost-reflective and transparent.

As the sole electricity utility in Peninsular Malaysia, Tenaga Nasional Berhad (TNB) is set to be a key player in the realisation of these objectives. According to its CEO Datuk Seri Ir Azman Mohd, the groundwork for more transparent and cost-reflective tariffs had already been laid out with the implementation of Incentive Based Regulation (IBR) and Imbalance Cost Pass-Through (ICPT) mechanism in 2014.

Under IBR, the base tariff is reviewed every three years, while fluctuations in fuel and generation costs are factored in every six months under the ICPT mechanism. While TNB is responsible for the efficient operation and delivery of electricity, it is neutral on the costs of generation due to market forces. The TNB CEO also revealed that "any savings derived will be passed-through as rebate and conversely any additional costs will be passed-through as surcharge in consumers' electricity bill."

According to Datuk Seri Ir Azman, "Malaysia has one of the lowest tariff rates in the world, particularly for residential consumers." He warned, however, that the high market price of coal, which is between US$91 per metric tonne (MT) and US$105 per MT, is much higher than the forecasted price of US$75 per MT, which was used to calculate the base tariff.

This, he said, will impact the economy and the rakyat. In order to mitigate the effects, Datuk Seri Ir Azman suggested that the utility, regulator (the Energy Commission) and the government work together to come up with solutions. These include surcharge exemption for low-income consumers, optimising system costs by revising or deferring power plant projects, managing the price of regulated gas to the power sector, and setting up a stabilisation fund mechanism.

"Opening up Net Energy Metering is a very positive development which opens up new ways for players to innovate and compete in the industry."

– Datuk Mohamad Nor Ali,
President of the Association of Independent Power Producers

"We are aware that Malaysia has got 5 fuel policies and the fifth fuel is renewable. Somebody proposed that there be a sixth fuel, which is energy efficiency. Where whatever energy you save is considered as energy generated."

– Dr Sulaiman Shaari,
Vice President of Malaysian Photovoltaic Industry Association

Going further, he noted that the current tariff structure needs to be addressed in order to avoid 'price shock' to some consumers, and that the blanket subsidy needs to be replaced with a targeted approach, which identifies vulnerable consumer groups.

The TNB CEO also welcomed the aim of empowering consumers and future proofing the industry, and noted that initiatives such as time-of-use tariffs and digitalisation are important to bringing that about. As such, he revealed that the utility will be installing 1.5 million smart meters across Melaka and the Klang Valley, which will help consumers better manage their energy consumption and their bills.

Moving forward, Datuk Seri Ir Azman, expressed hopes that the Ministry will continue its initiative for greater liberalisation in the power sector, as competition improves market confidence. Secondly, Datuk Seri Ir. Azman also stated that a successful transition towards the new 'end-state' will require close and careful collaboration among the different entities involved.

Boosting Solar

Increasing the use of renewable energy (RE) is one of the ways to future-proof the industry. Thus, MESTECC is determined to increase RE capacity in Peninsular Malaysia to 20 percent by the year 2025.

This move has been welcomed by the Malaysian Photovoltaic Industry Association (MPIA), whose Vice President II, Prof Dr Sulaiman Shaari is optimistic that this will increase the take-up of solar photovoltaic (PV)-friendly schemes, such as net energy metering (NEM), self-consumption (SelCo) or energy storage system (ESS), towards the establishment of smart grid (SG) systems, where individuals and users are able to generate electricity using PV technology for their own use or even perform energy trading within the community.

To further strengthen and proliferate the use of RE, Prof Dr Sulaiman identified four key foundations that must be in place. The first is to have a clear and strong set of cohesive and integrated policy to promote the use of RE. The second is to have suitable mechanisms to initiate, support and facilitate the manifestation of the policy so that the industry may flourish. The third is to have a formula of acceptable and practical standards, guidelines and procedures, so that all parties are fairly and efficiently taken care of, especially to safeguard the safety and interests of the prosumers. Meanwhile, the fourth is to create a conscious and enlightened society ready to embrace the use and growth of RE in a conducive environment.

In synchronicity with increasing the use of RE, Prof Dr Sulaiman also urged for more focus and stronger commitment be placed on increasing energy efficiency (EE) activities. According to him, this can be seen as another form of fuel, as energy saved is energy generated.

This can be coupled through the use of ESS in SG systems, which enable excess energy at a particular location to be stored and used later or to be directly delivered and traded to a location where it is needed. This, Prof Dr Sulaiman said, is crucial for taking RE, in particular, solar PV power, to a different dimension. According to him, the technology to do so is already here, however, the four key foundations must be appropriately addressed.

Ultimately, for Prof Dr Sulaiman, the most important and highly effective step that has to be taken is to focus on creating awareness, providing education and advocating at all levels, including the public and especially the youths. Therefore, he hopes that tireless awareness campaigns by the media are done continuously, whilst at the same time, appropriate education programmes are done, not just in schools and universities, but also in government and non-governmental decision-making departments.

The Power Producers' Views

Another group that will be playing a key role in helping to bring about the goals of MESI 2.0 are the power producers. Datuk Mohamad Nor Ali – the President of the Association of Independent Power Producers (IPP) – lauded the government for changing the NEM mechanism and allowing investors to work with factory/building owners to install solar in their facilities and have private arrangements to sell the electricity to them.

This, he said, will "open up new ways for players to innovate and compete in the industry" and also bring in more investors into the sector, who can take advantage of the lower cost of solar technology. To further the goals of reducing CO^2 emissions, the Association of IPPs President also suggested that it can be achieved by increased utilisation of Combined Cycle Gas Turbine (CCGT) power plants in place of coal, although he warned that costs may go up because of that.

He is also looking forward to the improvement of the current New Enhanced Dispatch Arrangement where in its current form, lacks sufficient participation.

Another point Datuk Mohamad Nor touched on is the competitive tender process for the procurement of generation capacity; a practice that's also commonly done overseas. He revealed that three fossil fuel power plants, currently operating or under construction, were chosen by the same bidding process. The key to the successful implementation of these projects was that the commercial structure offered for these projects were bankable.

On further reforms to the industry, Datuk Mohamad Nor noted that a number of structural changes had already been implemented to ensure fairness and improve transparency. These include the formation of the Single Buyer and the Grid System Operator, both of which are ring-fenced entities to ensure neutrality, as well as the introduction of the third party access (TPA) system for gas. Moving forward, he stated his belief that the Single Buyer and GSO should become fully independent entities, which will improve confidence and help transition the industry to become more open and competitive.

Although much has been done, there is much that still needs to be worked on by the Ministry to prepare the country's energy sector for the future. But with the current resources at our disposal, it seems like it is very much an achievable task if all the bodies can come together towards a united vision. EM

"As my husband and I are retired, we spend most of our time at home, so we use electricity when our neighbours are at work. I've noticed that it doesn't matter what time we use, we still pay the same. Perhaps a staggered tariff system would really ease the burden for stay-at-home guardians and retirees."

– Jennie Ng,
Retiree

"My family and I have always tried our best to be energy efficient to reduce our family's electricity consumptions and save on the electricity bills. We wish to install solar panels at our home in going green, and look forward for the Ministry to subsidise or incentivise domestic users that are trying to go green."

– Noor Hisyam,
Operations Executive

Floating into *New Horizons*

As one of the cleanest and safest of all energy sources, natural gas continues to be in high demand and remains as a vital component of the world's energy supply. An estimated 60 percent of the world's natural gas is trapped in unviable locations where conventional rigs and pipelines will not make do. This is where a floating LNG (FLNG) facility would play a significant role.

Floating liquefied natural gas, also known as FLNG, is not a new idea. Ever since the 90s, FLNG has been seriously considered by the oil and gas industry as a viable option. However, only in the recent years have technological advances and economic drivers provided the opportunity for FLNG to become a commercial reality.

FLOATING LIQUEFIED NATURAL GAS

BY
2050
THERE WILL BE
2
BILLION
more people
on earth

Many will enjoy
A BETTER
STANDARD OF LIVING

INCREASING
THE CURRENT ENERGY DEMAND BY
200%

NATURAL GAS
CAN BE
COOLED TO A LIQUID
for easy shipment to energy-hungry town and cities around the world

THE GAS LIQUEFYING PROCESS HAS ALWAYS HAPPENED
AT INLAND PLANTS

but now the world's first
Floating Liquid Natural Gas Facility
will move the liquefying process out to sea, where the gas is extracted and transfer it directly to the ships that will transport it to customers

Source: Royal Dutch Shell

According to the International Energy Agency, the global demand for natural gas could rise by more than half by 2040. Most of these gas resources are located in hard-to-reach areas, posing many technical and economic challenges.

How it Works

Liquefied natural gas (LNG) is methane gas, chilled to -162°C to become a liquid. This liquid then occupies about 1/600 the space of methane in its gaseous form, making it practical to transport. The conventional approach to producing LNG is to pipe the gas over hundreds of kilometres from offshore to an onshore plant to be processed and liquefied. The gas is then stored on site before being offloaded to a LNG tanker to be taken to market.

FLNG describes a method for developing offshore natural gas in which the gas is extracted from the wellhead to the floater. Then, the gas is processed on-board the floater prior to the liquefaction. Only then, the gas is cooled down to shrink the gas volume by 600 times becoming LNG. The LNG is then stored in a dual row membrane type cargo containment system (CCS) before offloading to LNG carriers. The LNG will then be offloaded to a carrier and taken directly to market.

Comparatively, FLNG is better than the conventional LNG method, due to the opportunity to leverage remote areas for gas, increasing these areas' financial viability. This method also results in less environmental damage due to less piping and factories, leading to less of a carbon footprint. Due to the fact that the FLNG functions off the land, it eliminates the need for pipes connecting it to the land, saving a lot of money that would otherwise be used for the installation and procurement of needed material.

Acknowledging the Difficulties

There are several technical challenges that relate to hull motion and its effect on process and equipment. The FLNG facility typically must remain moored on location for at least 20 years without returning to the port. It must be designed to operate in extreme weather environments and the rough seas. One of the key design challenges also includes the adaptability of the equipment. The equipment will be larger, heavier and some of the units may have tall vertical columns, which calls for modifications before FLNG installation.

Safety is a sensitive subject for FLNG because there is no precedent. A new set of safety considerations is introduced because of its complex design and operation procedures. To further advance the development of FLNG, safety must be focused on to mitigate the risks of LNG production and poor analysis.

Our Own Malaysian Pride

Back home, Malaysia's very own PETRONAS has successfully developed a FLNG project, PFLNG Satu, the world's first floating LNG facility. On 5 December 2016, PETRONAS produced the first LNG drop from the PFLNG Satu and delivering its first cargo a few months later.

The PFLNG Satu is rooted at about 180 kilometres offshore of Bintulu, Sarawak and is producing 1.2 million tonnes of LNG per annum. That amount of LNG can be used to generate 100,000 kilowatt per day. With a design life of 20 years, the PFLNG Satu can be redeployed to other fields as they deplete. This is one big reason PETRONAS opted for FLNG, as it results in more value for money and makes once unreachable places a viable source of resources.

Other oil and gas companies such as Shell and Japan's INPEX Corporation have also taken great strides in delivering their first FLNG project. Both are targeting gas from a connected reservoir in Australia's remote Browse Basin, about 200 kilometres off its northwest coast. These FLNG projects allow for access to gas reserves in remote and stranded fields which are otherwise deemed economically unfeasible.

The industry has risen to the technical challenges with risks have been mitigated, allowing the first FLNG projects to be commissioned. Pushing the boundaries of technology and innovation, this technological marvel changed the landscape of LNG production not only in Malaysia but globally as well. EM

The face of the Malaysian energy market has changed in the last few years, with certain structural and systemic developments. This change has resulted in certain enforcement challenges, which the Energy Commission – as the regulator of the industry – has to tackle. ***Energy Malaysia*** looks at the regulatory activities carried out by the Energy Commission, and how its role can be strengthened.

EMPOWERING THE ENERGY COMMISSION

Becoming a World Class Regulator

The Energy Commission ensures that coal is imported at the most reasonable price possible.

The Legal Framework

In order to support its regulatory activities, the Energy Commission has been entrusted with certain enforcement powers. According to Shahrilnazim Shaari, Director of Legal Services and Risk Management, this includes the ability to make codes, guidelines and directions.

Also, under the Electricity Supply Act 1990, it has the authority to obtain any information from any person and the power to enter premises to access computer records. "Together with the implementation of licensee's obligations under sections 9A to 9D of the Electricity Supply Act on, among others, the requirements of licensing standards of a licensee's performance, service and proper annual accounts, the Energy Commission expects improved legal compliance from the industry," Shahrilnazim emphasised.

Beyond enforcement, which primarily includes curbing power theft, the Energy Commission has been given wider powers to carry-out further duties, such as administering compliance inspections, and carrying out audits of performance and safety management of electrical installations, electrical work and equipment.

"The Energy Commission has formulated short and long term programs and plans to bring about improvements to the energy supply sector."

– Shahrilnazim Shaari
Director of Legal Services and Risk Management

One of the functions of the Energy Commission as a regulatory body is to ensure the continuity, reliability and quality of electricity and piped gas supply at affordable cost to the consuming public– while monitoring the financial viability and operational responsibilities of the producers and suppliers of energy.

The Energy Commission is also engaging in public outreach initiatives to raise public awareness of their rights and responsibilities in respect of electricity supply. These include developments in smart metering technology and electrical safety management.

"The challenges arising from such a wide scope of regulatory duties are to be expected besides meeting the interests of the stakeholders, energy industry and the public. The Energy Commission is constantly keeping abreast of the developments in the industry and is giving serious attention to effectively exercising its functions," Shahrilnazim said.

Addressing Supply Costs

While the Energy Commission's role as a regulator encompasses economic, technical and safety aspects, is all boils down to one goal, which is to protect the interest of the consumers. According to Marlinda Mohd Rosli, the Director of Economic Regulation, this encompasses reducing leakages and the cost of supply while increasing efficiency and transparency in the system.

The aim of doing so is to have an affordable price of electricity, thus easing the burden on the consumers. As such, the Energy Commission holds constant discussions with three major stakeholders, namely the Ministry of Energy, Science, Technology, Environment and Climate Change (MESTECC), Tenaga Nasional Berhad (TNB) – the nation's largest utility, and PETRONAS – the main provider of natural gas in the country.

Since 2010, the government has decided to implement the gas price rationalisation exercise until the year to date which has seen natural gas subsidies gradually reducing and gas prices reaching its market value. Although there is the option to review the mechanism as an alternative to reduce the cost of supply, doing so would affect the liberalisation of the gas market in Malaysia, including the Third Party Access (TPA) system. The liberalisation aims to increase competition in the Malaysian gas market, thereby pushing down prices and increasing efficiency as various players vie for a piece of the market share.

While the liberalisation of the natural gas market will, in the long run, lead to competitive prices, gas accounts for 40 percent of Peninsular Malaysia's energy mix, while 54 percent comes from coal, which is imported mostly from Indonesia and Australia.

In order to reduce the cost of coal, the Energy Commission is in the pipeline to introduce ways to optimise the efficiency of coal power plants, so that more energy can be extracted from coal, as well as alternative ways of procuring coal at the least cost.

"In the Economic Regulation Department, we are entrusted to balance the needs of the people for affordable electricity tariffs with the development of fuel prices."

– Marlinda Mohd Rosli
Director of Economic Regulation

It should be noted though that even though it is imported, currently coal is cheaper than natural gas once actual market prices are taken into consideration. To illustrate, as of late September 2018, the price of coal was around RM19 per mmbtu while the price of natural gas was RM25.70 per mmbtu.

Finding Alternative Sources

In the long run, being too dependent on coal is neither good for energy security or for the environment. The government recognises this, which is why the MESTECC Minister has decided to focus on renewable energy (RE), with the aim of having RE account for 20 percent of the nation's energy mix by the year 2025.

While the Energy Commission is very supportive of the push towards RE, it is also aware that the cost of generating electricity through RE currently is marginally higher than fossil fuels that need to be sourced at the optimum cost as well.

Roping in the Demand Side

While the aforementioned strategies all involve the supply side, the Energy Commission realises that it has to take a multi-prong approach to the issue of reducing the burden on consumers by approaching it from the demand side as well.

Already several measures have been introduced in Malaysia to empower consumers to take a more active role in controlling their electricity bills. These include the Net Energy Metering (NEM) scheme, where consumers can produce electricity via solar panels for their own use and be able to sell the excess to the grid. Also, factory owners can also take advantage of the Enhanced Time of Use (EToU) system where using electricity during non-peak hours will be charged at a lower rate than at peak hours.

Moving forward, a number of possible plans are in the pipeline, such as the extension of ETOU to domestic consumers. Perhaps the most exciting potential however is the liberalisation of the electricity retail market, where consumers can choose to purchase electricity from different, competing retailers.

Ultimately, the purpose of the Energy Commission's regulatory initiatives is to future-proof the Malaysian energy sector, so that all stakeholders – especially the consumers – can benefit. EM

HOW CLEAN ENERGY AFFECTS ENERGY SUPPLY

Adding Renewables to the Energy Mix

Malaysia utilises large amounts of coal in its fuel mix to fulfil electricity demand. With goals to increase the country's use of renewable energy, it is time to review the mix. ***Energy Malaysia*** examines the challenges and strategies in incorporating renewable energy into the fuel mix.

As of now, approximately 56 percent of Malaysia's fuel mix is coal due to its price advantage and its ability to provide a balanced fuel mix in the system. Due to the fact that coal emits higher amounts of carbon dioxide compared to natural gas and any other resources, the government plans to reduce from fossil fuel dependence, especially coal,towards renewable energy, with a goal to increase the installed capacity of renewables from three percent up to 20 percent by 2025. However, how will incorporating more renewable energy in the fuel mix affect the security of the supply?

Factoring in the Energy Mix

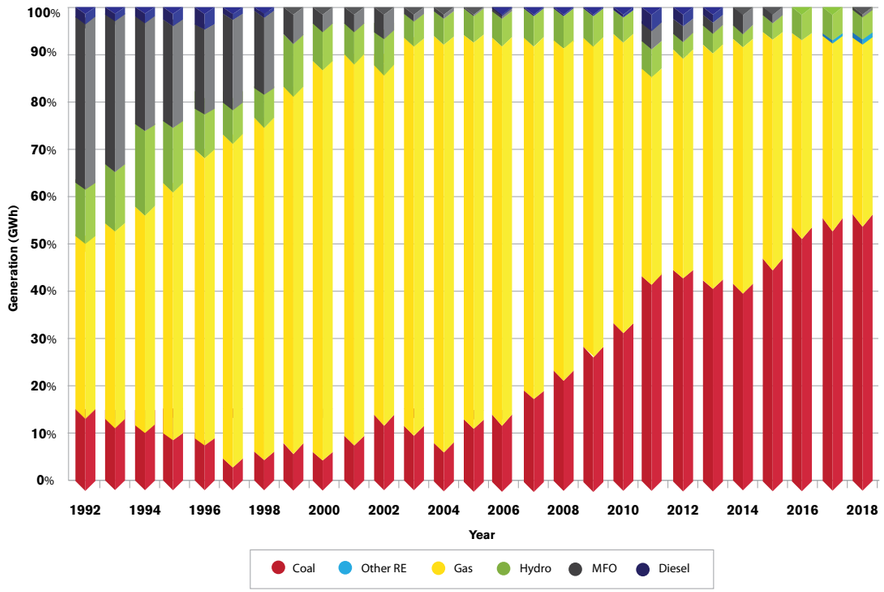
To recognise the challenges in increasing renewable energy supply, it is important to understand the factors that come into play when determining the fuel mix. The Energy Commission's Senior Director of Industry Planning and Development, Ir. Abdul Rahim Ibrahim, explains that energy policy plays an important role in determining the fuel mix concentration for the country.

In the 70s, Malaysia's fuel consumption consisted mainly of hydropower and oil. When gas was discovered in the early 80s, gas became the third fuel source followed by coal which was brought in the late 80s as the fourth fuel. Later in the early 2000s, renewable energy was declared as the fifth fuel source. "These are the policies. The evolution of these policies was made among others to be in line with the historical, social, economic and environmental considerations," explains Abdul Rahim.

Another important factor of fuel mix determination is to ensure the continuity and security of fuel supply. In this regard, fuel sources should be diversified and not be too dependent on a single type of fuel regardless of the fact that it may be cheaper or easily available. "If the energy supply depends too much on one single type of fuel source, the security of its supply is compromised," explains Abdul Rahim. Malaysia implies the Herfindahl-Hirschman Index (HHI) principle of not more than 0.5 in mixture value (HHI < 0.5) for fuel mix. HHI value reflects the fuel mix concentration level in the power supply system. The lower the HHI value, the more type of fuels are in the fuel mix.

Fuel resources are utilised to fulfil electricity demand. As such, electricity demand is another factor in considering the fuel mix. In the case of Peninsular Malaysia, the growth of peak demand increases between two to three percent annually, from 12,000MW in 2005 to 18,000MW in 2017, and the amount of electricity generated was from 80,000 GWh in 2005 to 121,800 GWh in 2017. Typically, the daily electricity demand pattern is higher during the day. Therefore, baseload power plants are required to run with the least cost of fuel whilst peaking power plants to support the demand during the day to operate with higher supply cost. Since approximately 70 percent of the total electricity bill is from the fuel cost, the affordability of the fuel plays another key factor in determining the fuel mix. So, it is important to have a mix that can provide enough energy to satisfy the demand from the population at a lower cost option.

Percentage (%) of Generation Fuel Mix for Peninsular Malaysia (1992-2018)



Source: Energy Commission

"Today, we are looking into more renewable energy to put into the supply system"

– Ir. Abdul Rahim Ibrahim,
Senior Director of Industry Planning and Development in Energy Commission

Finally, the impact of power generation from fossil fuel to the environment is now given higher consideration. This is where renewable energy comes into play. Renewable energy, either through solar, biomass, biogas or mini-hydro are well known as green energy. "Today, the government is looking for more renewable energy to be put into the supply system," he said. This is important because renewable energy has a lower impact on atmospheric carbon dioxide.

The Renewable Challenge and Strategies

In terms of supply stability, renewable energy has limited dependability. For instance, mini-hydro is environmentally friendly, but it is limited to water flow availability and located in certain places, mostly in remote areas. Biogas and biomass are constrained by resource availability and are only suitable for small capacity. However, Abdul Rahim explains that mini-hydro, biogas and biomass have no significant constraints when connected to the grid since the resources generate electricity at a low capacity.

On the other hand, solar energy potential in Malaysia is abundant and is what Abdul Rahim describes as the largest renewable energy potential available. However, solar power has its limitations where it can only generate electricity during the day. Its effectiveness only lasts between four to five hours a day, granted that it is not raining. When large capacity solar photovoltaic plants are connected to the power supply system during dark and gloomy days, the energy and capacity input drops and needs to be compensated to stabilise the system. This is recognised as the intermittency factor, "So, the energy and capacity from solar photovoltaic is very weather dependent," explains Abdul Rahim when describing solar power potential.

To avoid power disturbance and to maintain supply reliability, Energy Commissions together with the Single Buyer and Grid System Operator have hired a consultant to conduct a study on the impact of solar energy penetration in the power system of Peninsular Malaysia and Sabah. The study is geared to determine the stability concern due to the intermittency factor. It was discovered that if solar photovoltaic energy penetration is at 15 percent of the peak demand, there will be no significant impact on the system operation. At 16 percent, the peak load capacity during the daytime will be equivalent to the peak load capacity at night. At more than 30 percent, the grid system may fall under the stability concern zone.

Abdul Rahim stresses that before the percentage of renewable energy installed capacity reaches this stability concern zone, it is worth incorporating renewable energy into the fuel mix. It just needs to be managed properly. To mitigate the fluctuation and intermittency problem, Abdul Rahim says that according to the aforementioned study, it is recommended that the renewable energy supply to run parallel with an additional 11 percent of its capacity, sourcing from a conventional power plant. Therefore, if there is any sudden reduction in capacity (due to weather conditions in the day), this 11 percent of additional power will be able to compensate and stabilise the supply system. "Of course, technology is always available to provide a solution" he adds.

The Energy Commission is also implementing strategies to tackle energy efficiency from the demand side by optimising electricity usage. If electricity is used efficiently, then its consumption is reduced and subsequently the need for electricity generation. The government has introduced the National Energy Efficiency Action Plan (NEEAP), which is designed to reduce electricity consumption by eight percent or more by 2025 as compared to business as usual (BAU). The saving also means a reduction of about 2500 MW in terms of maximum demand.

Furthermore, to enhance more renewable energy capacity, the government has embarked on Large-Scale Solar procurement and introduced more schemes to promote renewable generation. These include Net Energy Metering, self-consumption and solar leasing.

Malaysia is dedicated to incorporating more renewable energy into its fuel mix. Various strategies will be implemented to overcome any security and affordability challenges in future electricity supply. EM

As Malaysia is a leading producer of palm oil, biomass is a viable renewable energy source, especially in areas without grid connectivity.

EXPANDING *the* GAS SUPPLY NETWORK

As the sole distributor of natural gas in Peninsular Malaysia, Gas Malaysia Berhad is tasked with laying out the pipelines which transports the gas from their facilities to residential, commercial and industrial customers. All in all, Gas Malaysia Berhad operates and maintains a Natural Gas Distribution System (NGDS) network measuring more than 2,100 km. One person who is responsible for ensuring that the infrastructure is properly set up is Abdul Hafiz Fikri Abdul Latif, a Project Engineer, who tells ***Energy Malaysia*** more about the nature of his profession.

"Project engineers have to think like a contractor, act like a client".

– Abdul Hafiz Fikri
Gas Malaysia Berhad,
Project Engineer

According to Abdul Hafiz Fikri, in order to be a project engineer, an individual must possess a Bachelor's Degree in Engineering. While he himself has a degree in Mechanical Engineering from Steven's Institute of Technology in New Jersey, he stresses that a specific engineering degree is not required. In fact, a person with a civil or chemical engineering degree could also be hired for the position. Of course, a good grasp of Mathematics and Physics is necessary.

Three of the most crucial responsibilities a project engineer has to be mindful of project planning, managing the contractors and sticking to a deadline. As a project engineer, Abdul Hafiz Fikri is required to monitor the contractor's work at the site and that the quality specified is maintained without any accidents or incidents.

Three Stages of Site Creation

There are three stages a project engineer has to go through when first setting up a site, the first is the engineering aspect, the second is procurement and the third one is construction. Once a project has been awarded, the project engineer would be required to approach relevant authorities in the area for approval. Upon receiving the approval they would need to make sure that the pipes are laid in correct alignment, which would require the project engineer to provide the drawing, to identify all the utilities at the site. Even though the drawings and procedures are done by the contractors, it's the duty of the project engineer to review it.

They will then move on to procurement, which involves purchasing the equipment such as parts for the pipes, valves and fittings, as well as hiring manpower for construction work. Once that's done, construction work commences, which takes up the most amount of time in a project. However, the duration of the project really depends on the length of the pipe laid. For example, a five-kilometre pipe would take approximately six to seven months to complete.

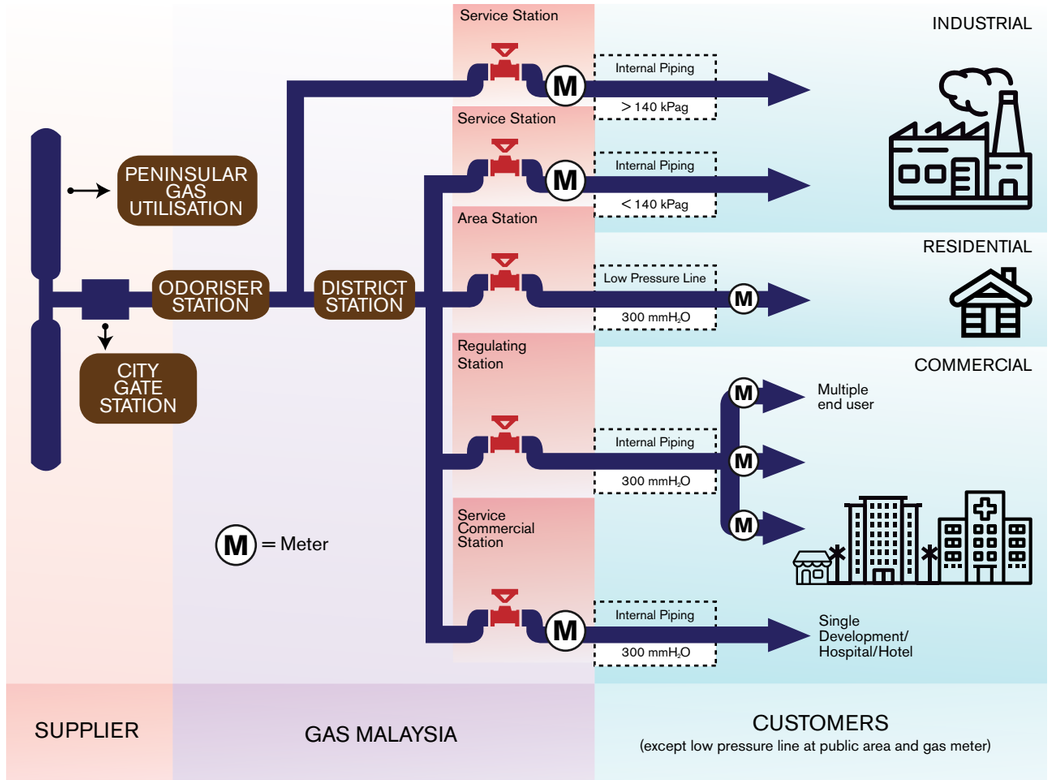
A Project Engineer's Routine

The life of a project engineer is no walk in the park; Abdul Hafiz Fikri is sometimes required to manage six projects at a time. This poses a challenge at times, as he needs to monitor these projects with limited resources and to complete it within the allocated time. Another challenge faced in the limited number of contractors in the field.

Travelling is also part and parcel of the job in Gas Malaysia Berhad. Abdul Hafiz Fikri, for example, has to cover Pahang and Terengganu in the east coast, Kota Damansara and Subang Jaya in Selangor in the central area, and Batu Pahat and Kluang in Johor and some parts of Melaka in the south. However, a project engineer is only required to be at the site 40 percent of the time, as a project supervisor would also be at the project site to monitor the progress, which will then be reported to the project engineer.

One of the biggest challenges Abdul Hafiz Fikri faces is when contractors decide to cut corners as their objective, aside from ensuring that the project is completed on time, is to maximise profits. Since sites are not supervised 24/7, this provides the opportunity for them to take shortcuts. The only way to overcome this challenge is to anticipate the move before it is made. Recalling some wise words his manager imparted to him, Abdul Hafiz Fikri said that project engineers have to "think like a contractor, act like a client".

GAS MALAYSIA : NATURAL GAS DISTRIBUTION SYSTEM



Source: Gas Malaysia Berhad

As for the future of the industry, Abdul Hafiz Fikri states that the challenges he faces with the contractor will soon come to pass in hopes of them adopting a more ethical route and to not cut corners but to maintain safety and quality. The public also needs to be educated and understand on the nature of the work and that when the gas pipes are laid it is done in a safe and secure manner. He also hopes for more pipeline contractors out there to come out and participate in Gas Malaysia Berhad's infrastructure projects in order to meet future gas demand. EM

Left: *Given the high utilisation of gas, creating a gas-safe environment is an important component of laundry operations.*

Inset: *Fixed gas leakage detectors are placed where the gas is used. The gas detection system shall automatically send a signal to shut the automatic valve when sufficient Lower Explosion Limit (LEL) is detected.*

LAUNDERETTES

Mandated to Operate at Optimum Safety Standards

Gas safety plays an important role in the business operations of a launderette. The regulatory framework that governs gas piping installations at commercial launderettes provides a comprehensive and systematic approach to design, install, operate and maintain gas piping systems.

The Energy Commission is responsible to regulate commercial Liquefied Petroleum Gas (LPG) and natural gas piping systems throughout Peninsular Malaysia and Sabah. This is made possible from the provisions related to piped gas supply stipulated in the Gas Supply Act 1993 and Gas Supply Regulations 1997.

Laundry franchisees and operators were invited by the Energy Commission to Hotel Bangi-Putrajaya, Selangor to participate in a seminar titled Legal Empowerment, Licensing and Gas Safety on 26th September 2018. The objectives of the seminar were to inform the participants about the legal requirements and installation standards pertinent to launderettes gas piping installations.

During the seminar, the participants were informed of the correct procedures to obtain installation approvals such as Approval to Install (ATI), Approval to Operate (ATO) and license related to commercial LPG piping installations as well as industrial best practices that can be applied to their premises. The participants were also informed that only registered gas contractors and competent persons are allowed to design, install and maintain commercial gas piping system. EM

MAINTAINING GAS INSTALLATION SAFETY

EXPLAINING ATI AND ATO

Gas installations and operations have always been a rigid, strictly monitored process. This is due to the vast amounts of potential accidents that could happen in the industry. The strict application process is divided into plenty of carefully taken steps. ***Energy Malaysia*** takes an in-depth look at Approval To Install (ATI), Approval To Operate (ATO), the steps taken before approval is granted and the vital statistics regarding both types of approvals.

Approval To Install (ATI) & Approval To Operate (ATO)

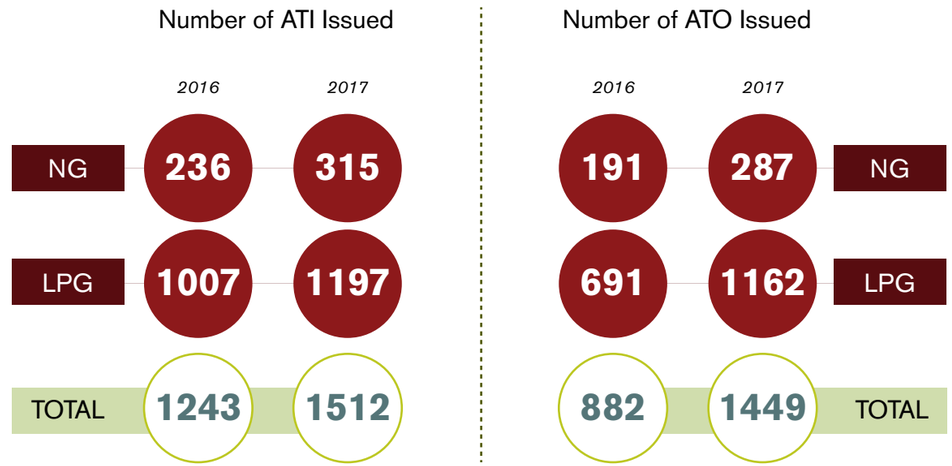
As stipulated in Regulation 15 of the Gas Supply Regulations 1997 (GSR), the Approval to Install (ATI) is an approval issued by the Commission to the owner (through a registered gas contractor) of the gas piping system prior to the installation. The ATI was introduced in the GSR to ensure that only certified competent contractors and competent persons by the Commission are allowed to design and install the piping system according to relevant standards accepted by the Commission such as *MS 830 and *MS 930.

Subsequently, after the installation has been completed and tested, a registered gas contractor will then apply for an Approval to Operate (ATO) from the Commission prior to the commissioning of the piping system. The requirement for ATO is stipulated in Regulation 16 of the GSR. The purpose of ATO is to ensure that the piping system is installed and tested according to the approved standards as indicated during ATI submission.

How To Apply For ATI & ATO?

The ATI is applied online via a registered gas contractor through the Commission's Online Application System (OAS). In the OAS, the applicant who is the competent person hired for the project will declare details of the system to be installed such as the type of premises, the scope of work, the type of gas used and the class of installation. The applicant will then make an online payment of RM 200 as a processing fee and submit the hardcopy of the application form together with the design calculations and drawings to the Commission for review. A complete ATI application will be approved within 15 working days and the ATI certificate can be downloaded and printed by the applicant.

Similarly, the ATO can also be applied online through the OAS for a processing fee of RM 100. The applicant is required to submit the ATO application form together with the Certificate of Completion (B form), Test Certificate (C Form), pictures of the installation as well as the as-built drawings of the piping system and other relevant documents specified in the OAS. A complete ATO application will be approved within 7 working days and the ATO certificate can be downloaded and printed by the applicant.



Both years showed a large difference between the amount of ATIs and ATOs issued, signifying a general preference for LPG over NG.

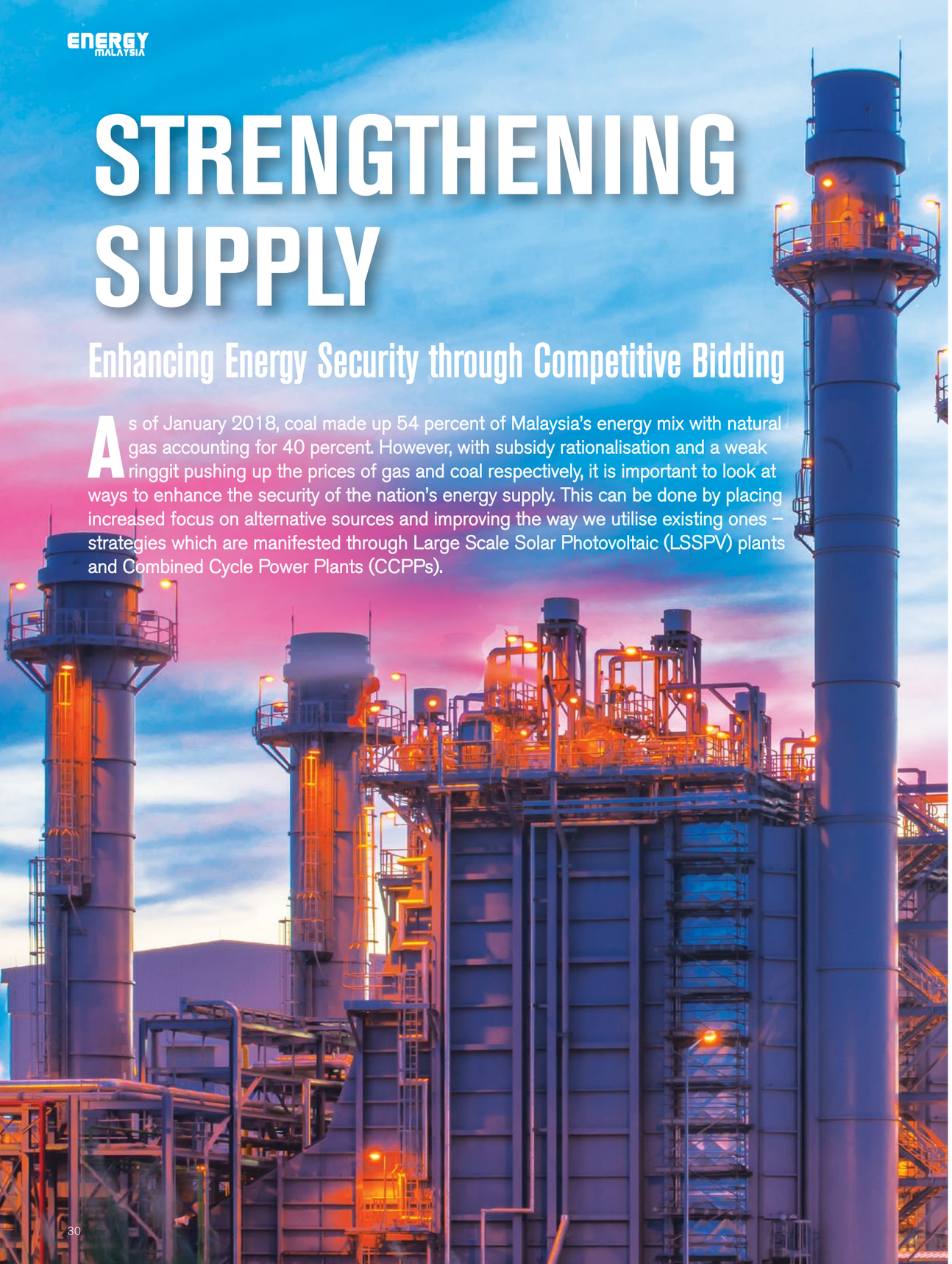
Source: Energy Commission

Both the installation and operation of gas facilities are fraught with both hazards and opportunities. This means ATIs and ATOs must both be meted out with extreme care in order to ensure the safe operation and progress of the Malaysian gas industry. EM

STRENGTHENING SUPPLY

Enhancing Energy Security through Competitive Bidding

As of January 2018, coal made up 54 percent of Malaysia's energy mix with natural gas accounting for 40 percent. However, with subsidy rationalisation and a weak ringgit pushing up the prices of gas and coal respectively, it is important to look at ways to enhance the security of the nation's energy supply. This can be done by placing increased focus on alternative sources and improving the way we utilise existing ones – strategies which are manifested through Large Scale Solar Photovoltaic (LSSPV) plants and Combined Cycle Power Plants (CCPPs).



Solar power has been in use in Malaysia for a number of years, with individual home and business owners participating in scheme such as the Feed-in Tariff (FiT). However, it was not until 2016 that power producers got in on the action.

In March that year, the Energy Commission announced the first round of bidding to build LSSPV plants, with the aim of having a total capacity of 250 MWac, with 200 MWac in Peninsular Malaysia and 50 MWac in Sabah. However, such was the scale of the response that the Commission ended up approving a total of 19 projects with a combined generation capacity of around 450 MWac in January 2017.

The fact that the tender was oversubscribed is testament to the belief that power players in the country have in the prospects of solar power. Additionally, as revealed by the Deputy Director of Systems Operations at the Energy Commission, Mohd Rizal Ramli, the price of solar PV modules had gone down, which made LSSPV farms even more viable investments.

This was reinforced in the second round of tenders, which took place in February 2017, in which the Energy Commission set a target aggregate capacity of 460 MWac, with 360 MWac from Peninsular Malaysia and 100 MWac from Sabah. For this round, the Commission received bids with a total generation capacity of 1,632 MWac, more than three times the target amount. A total of 41 bids with a combined capacity of around 562 MWac were later shortlisted.

According to Mohd Rizal, the increased number of projects selected during the second round is due to the reduction in the maximum capacity. As he explained, "We went down to 30 megawatts maximum per project, that's why we have more participants bidding this time around."

Connecting the Plant

Of course, one of the most important things to consider is how the LSSPV plant will be connected to the grid, so that energy generated can be sold to Tenaga Nasional Berhad (TNB) or Sabah Electricity Sdn. Bhd. (SESB) under a Solar Power Purchase Agreement. According to Mohd Rizal, the Energy Commission has identified a number of injection points for the plants to connect to the electricity network. Power System Study will then determine whether or not a plant can be built there and as to how much the particular injection point can receive energy generated by the plant.

Incidentally, one of the main challenges facing the solar PV in Malaysia is that of intermittency of sunlight. While Malaysia has abundant sunlight for the most part, it also has periods of overcast skies and monsoon rains, which limits the amount of sunlight available, in turns impacting the amount of electricity generated by solar PV. From system perspective, a sudden, large drop of outputs due to weather conditions could result in significant power imbalance, poses risk on reliability and quality of supply.

The Bidding Process

The high number of tenders made for the two rounds of LSSPV bids is also reflective of the success of the competitive bidding process, which is implemented according to the Electricity Supply Act 1994, and related regulations, codes and guidelines.

For Round 1bid, the process begins with a prequalification exercise to identify the technical and financial capabilities of potential developers and the suitability of their proposed sites. Once pre-qualified, the bidders can participate in the next stage by submitting proposals based on the Request for Proposal (RFP) documents issued by the Energy Commission.

The bid preparation then takes approximately six months to prepare, where a Power System Study (PSS) will be conducted, Preliminary Environmental Impact Assessment (EIA), conditional approval from relevant authorities, such as the Public Works Department (JKR) and proof of financing support from financial institutions.

The Energy Commission then conducts its evaluation which would take four months. All bidders will be screened by a working group and evaluated by the Technical Committee (TC) where the TC would then make recommendations for the Commission's Board approval.

Once they are short-listed and selected to enter, negotiations will be made to finalise the project documents, particularly the Solar Power Purchase Agreement. Once these are finalised, they can proceed with the construction of their facilities, which will take 12 to 18 months depending on the complexity of the work.

Competitive Bidding for Conventional Power

With the Minister of Energy, Science, Technology, Environment and Climate Change YB Yeo Bee Yin planning for clean energy to make up 20 percent of Malaysia's energy generation by the year 2025, we can expect a continued focus on LSSPV.

However, solar power and other alternative sources of energy are just there to complement and not replace existing ones such as coal and gas. As Alwi Abdul Rahman, the Deputy Director of Conventional Capacity Procurement at the Energy

"Intermittency of sunlight is one of the biggest challenges for solar PV in Malaysia, as we have periods of overcast skies and monsoon rains, which limits the amount of sunlight available."

– Mohd Rizal Ramli
Deputy Director of System Operations

Commission explained, intermittent renewable energy sources cannot generate the amount of energy needed to meet demand.

With this in mind, the next best step – to fulfil the nation's mission to reduce its carbon footprint and strengthen energy security – is to find ways to optimise conventional energy sources. This is best done through the use of gas turbines CCPPs, which have the ability to produce 50 percent more energy than open-cycle plants.

Just as with LSSPV plants, the bidding process for CCPPs is a competitive one. As Alwi explained, this is because a previous exercise into directly-negotiated CCPPs resulted in tariffs that were so unattractive, it put an end to that particular method of procurement.

However, even with competitive bidding, the process is not without its share of complications. For instance, if the commissioning date for the transmission line or gas pipeline were unknown, that would affect when the plant commences operation. This in turn will result in an inconclusive tender exercise.

Therefore, the pre-tender phase – which is when the exact location of the plant and timeframe for the routing of transmission line and gas pipeline are determined – is of great importance, and is an exercise in its own right. According to Alwi, this can take up to two years; not counting the time taken for the government to approve the funds, to secure the land, and access the site for soil tests and other data. All in all, an open tender exercise for CCPP can take up to six years, including selection of plant site and approval of land for transmission line and gas pipeline.

Those who wish to participate in a tender must also undergo a pre-qualification exercise, and must be either an experienced sole developer or part of a consortium. The sole developer or lead consortium member must have good financial fundamentals. They should also have sufficient previous experience in building and operating power plants or (in the case of insufficient experience) be a partner with an organisation that has the necessary qualifications.

Once they pass the pre-qualification exercise, shortlisted parties will be invited to participate in the tender process, where they will have to submit a technical and commercial proposal. The successful bidder will usually be the one able to offer the lowest tariffs.

As the nation's energy sector regulator, the Energy Commission is tasked with safeguarding the security of Malaysia's energy supply and ensuring that Malaysians receive energy at competitive tariffs. Through commissioning LSSPVs and CCPPs pursuant to competitive bidding exercises, it is able to meet those two requirements. EM

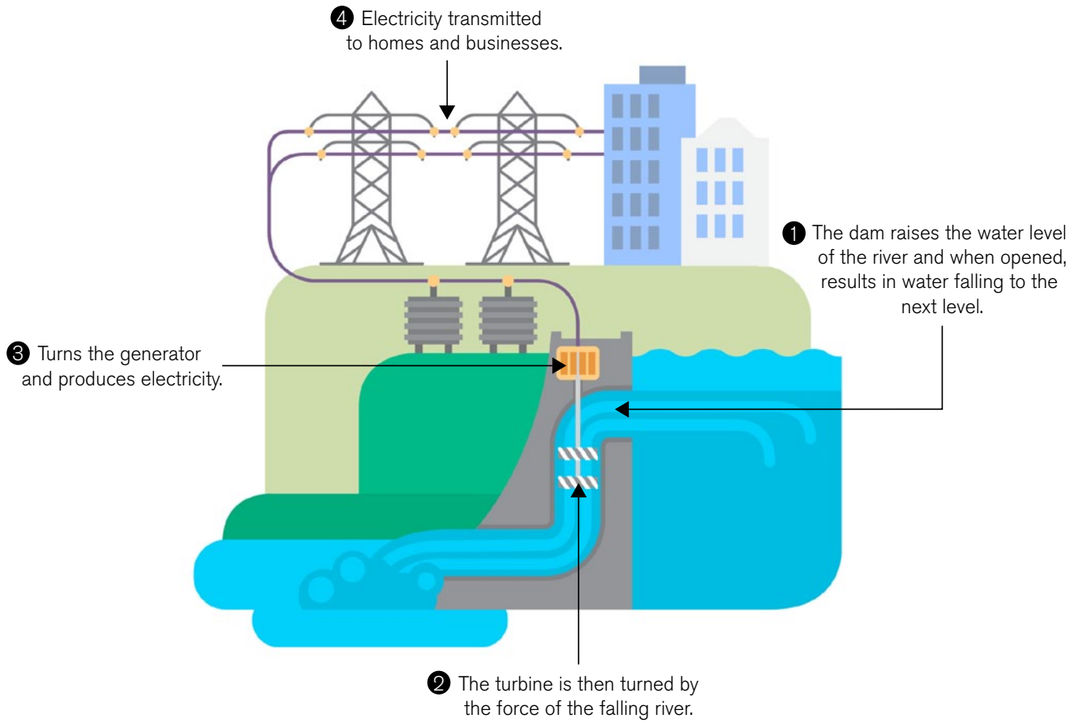
NORWAY
– WATER AT WORK –

One of the most beautiful countries on Earth, Norway utilises its natural resources for more than just tourism. A Scandinavian country with an abundance of glaciers and deep coastal fjords, it is natural progression for this enterprising country to explore the possibilities of its topography in hydroelectricity, resulting in an open electric market heavily based in clean energy.

According to the main factors of user population and capacity of natural or man-made water sources, hydropower plants may be built in various sizes from 'micro-hydros' to power a few homes to 'superdams' such as the Hoover Dam in America which services millions.

With some of the lowest electricity tariffs in Europe, Norway is also highly self-sufficient with 99 percent of national power production due to hydropower. Pioneer industrialists secured the rights to develop hydropower starting from the late 19th century, fulfilling the goal of converting enormous water force into cheap electricity to help fuel the country's industrialisation and laying the foundations for companies such as Norsk Hydro and Elkem. In 1892, Former Norwegian Prime Minister Gunnar Knudsen also sent a letter outlining the importance of hydroelectric power for industrial potential which kick-started long term efforts to ensure the Norwegian state retained a controlling interest in this field to ensure usage in perpetuity for the benefit of the nation.

The industry advisory body Energy Norge is positive that the country could be fully operational on clean energy, becoming the world's first city fully powered by renewable energy by 2050. This would open up the potential to mitigate issues arising from climate change and decrease of demand of manpower in Norway's oil industry. Under Energy Norge's green energy programme, a 24-point plan has been developed for a smooth switch to electricity which includes free charging and tax exemptions for drivers of electric cars.



How It Happens

The first of the four major components of every hydropower plant is the dam which raises the water level for it to fall and controls the water flow. The resulting reservoir is effectively the resulting stored energy.

The force of falling water causes the turbine to spin by pushing its blades.

The turbine then converts the kinetic energy from the falling water into mechanical energy. Windmills also function on the same premise with the power source of wind instead of water.

The generator is connected to the turbine by shafts and gears spinning as the turbine does so and converting the turbine's mechanical energy into electrical energy as any other generator.

Finally, properly insulated transmission lines convey the electrical energy to homes and businesses, providing cheap renewable energy to lower costs and promote industrial growth.

The Tysso II 180-MW hydropower plant was comissioned and built with Alstom-manufactured equipment in 1967.

Point of Pride

A progressive world leader in clean energy and environmental policy, and currently the largest hydroelectricity producer and sixth largest in the world, Norway would play a large role in the Future speculated fully interconnected European Super Grid not only in keeping up a steady supply of clean renewable energy to the continent but also in mitigating any supply instability.

Power plants are symbols of national pride in terms of self-sufficiency and in a state of unofficial competition for capacity, efficiency and aesthetics. Increasing numbers of such installations have been put into operation due to global warming resulting in an increased average water inflow to help alleviate rising water levels along with providing clean energy to all of Norway and its neighbouring countries as needed. This state of affairs has prompted proposals for the government of Norway to refurbish and upgrade all hydropower resources, primarily in terms of environmental improvements not only for greater domestic efficiency but also to expand in order to accommodate exports for international demand.

This long-standing effective hydroelectric network has also allowed the government of Norway to explore alternative beyond everyday uses such as electric and hybrid modes of transportation as well as creatively applications for energy storage to ensure minimal disruption in the electrical grid.

As a nation with goals of greater environmental sustainability and in possession of abundant natural resources, Malaysia is uniquely primed to follow Norway's example in the utilisation of hydropower. EM

THE FUTURE IS...
RENEWABLE ENERGY

Across the globe, nations both large and small, are increasingly acknowledging the importance of research and development in the field of renewable, inexhaustible energy. Malaysia is certainly an integral part of this ongoing drive, being a growing nation with rising energy demands. ***Energy Malaysia*** takes an in-depth perspective on the possibilities and challenges of RE in Malaysia.

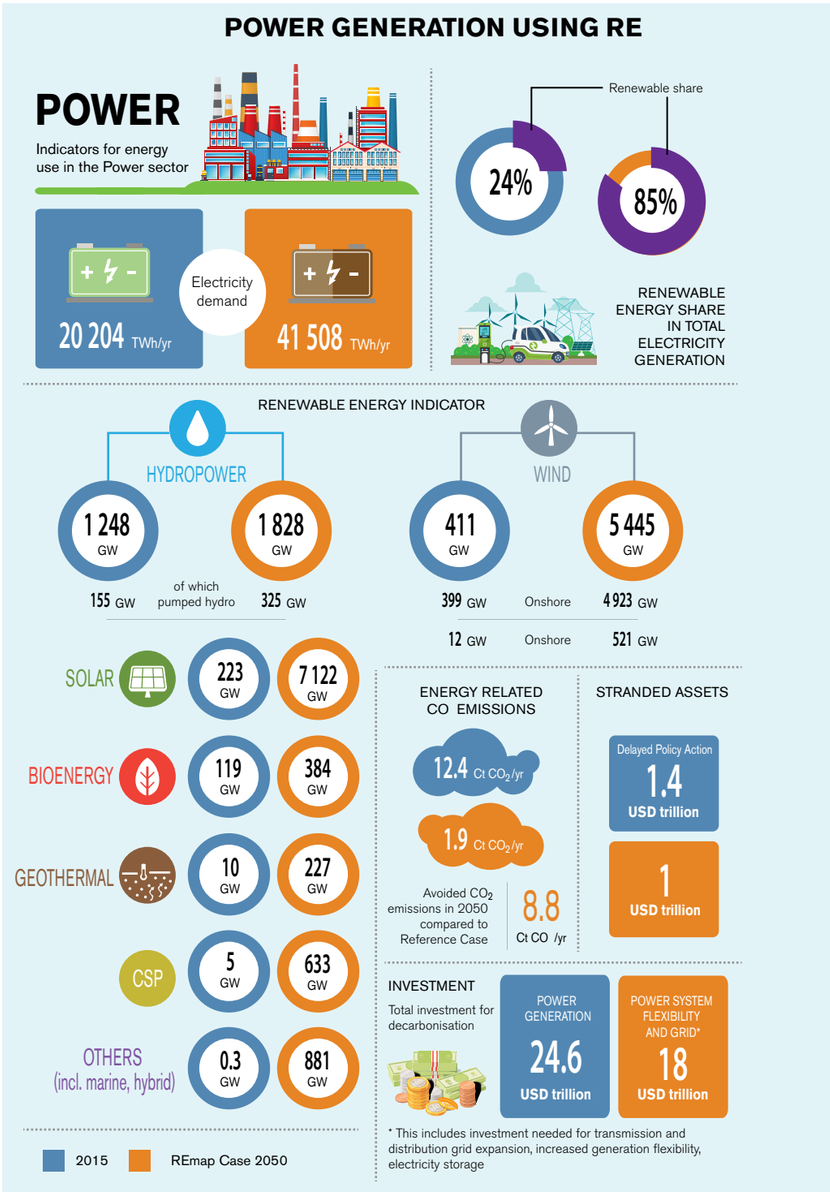
Global Outlook on Renewable Energy

The recent *2018 Renewable Energy Roadmap Report* by the International Renewable Energy Agency (IRENA) has revealed the need for a global shift towards RE sources to cater for rising energy demands the world over. Globally, it has been forecast that the gross power generation will almost double with RE making up to 85 percent of the supply by 2050.

Of the 85 percent, the highest RE contributors would be from hydropower, wind, solar photovoltaic, concentrated solar power (CSP), bioenergy, and geothermal. Upon an in-depth look into these potential sources, it was determined that solar and wind energy specifically will play an important role in the power generation sector.

In line with these reported projections, fossil fuel use for energy would drop to one-third of today's consumption. Seeing the biggest decline in usage would be oil and coal, at 70 percent and 85 percent respectively. On the other hand, the use of natural gas would peak towards 2027 and would subsequently be the largest source of fossil fuel by 2050 despite declined production.

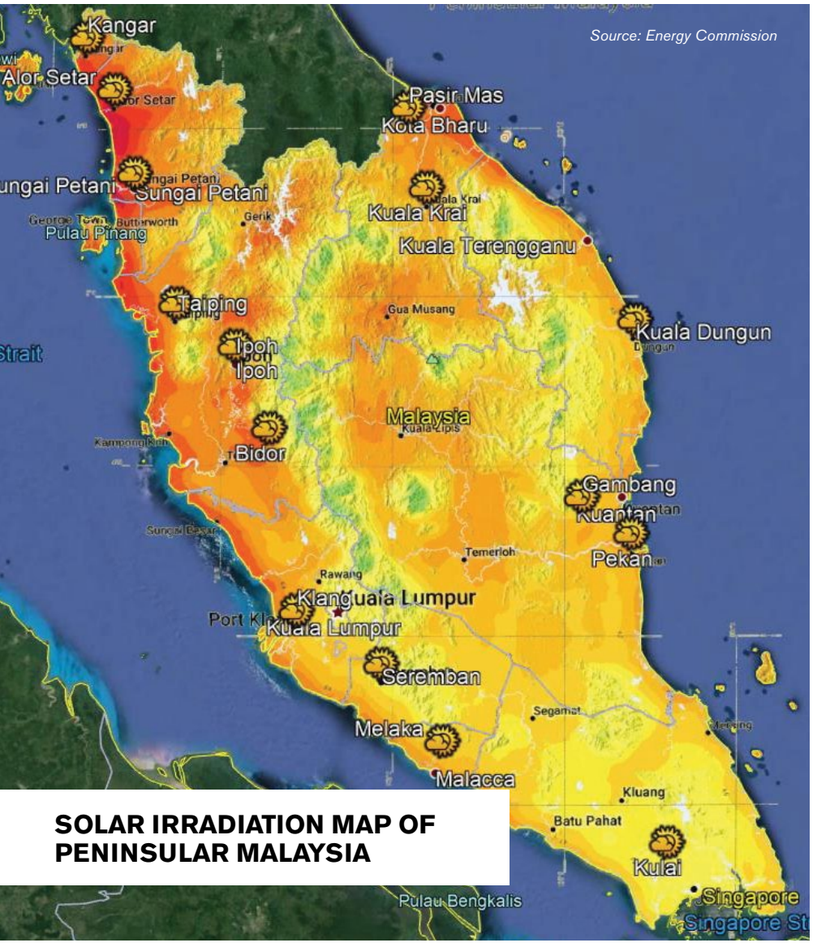
To facilitate the transition of the energy sector globally, energy efficiency and RE will have a resounding impact both economically and environmentally. While other avenues can also help mitigate climate change, the adoption of RE and energy efficient methods can together reduce 90 percent of the energy-related carbon dioxide emissions.



Source: International Renewable Energy Agency

Local Significance of Renewable Energy

Malaysia has been blessed with a wealth of energy resources, to provide for our national demands. The nation is surpassing 32 million people as of late 2018 and the energy demands show no sign of slowing down. Our energy needs are heavily dependent on either finite resources such as fossil fuels or hydroelectric plants which are costly and need a lot of acreage for implementation. The fluctuating costs of fossil fuels also constitute a major segment of the budgetary concerns in the energy sector.



SOLAR IRRADIATION MAP OF PENINSULAR MALAYSIA

Long-term average of daily/yearly sum, period from 1999 (2007 in the East) to 2015

According to the latest IRENA Renewable Energy Roadmap Report's figures, it has been forecasted that the construction of new power plants or hydroelectric dams will not be able to supply the demand adequately. Breakthroughs in RE technology dictate that Malaysia should also look into implementing a greater percentage of energy from renewable sources. The nation's geography and abundance of sunlight due to being close to the Equator, certainly boosts the chances of successfully implementing photovoltaic energy generation, for instance

Strengths of Renewable Energy in Malaysia

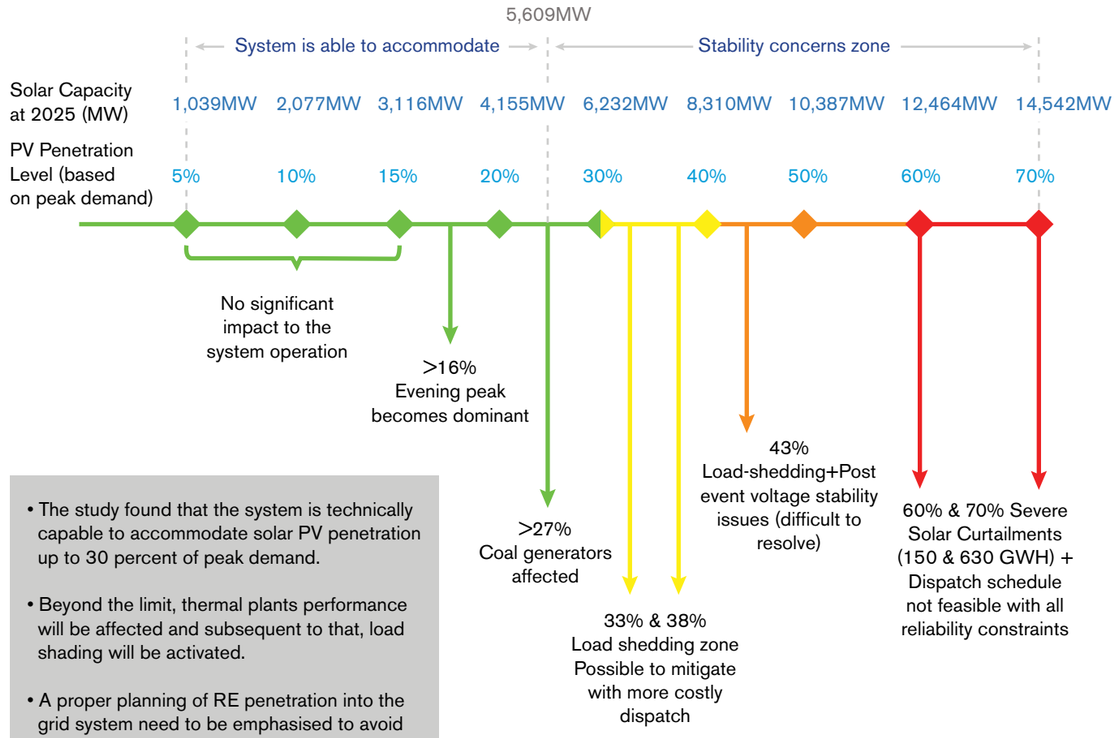
Infinite availability and inexhaustible supply are the two terms most commonly associated with RE. Solar power is one such source that Malaysia would do well to explore. The first step would be to identify key potential regions with higher solar irradiance, where solar-powered facilities can be set up to reap the full benefits.

As per an analysis undertaken by the Energy Commission, potential solar growth areas were identified as per higher solar irradiation. Kedah, Perak, KL-Negeri Sembilan-Melaka, Pahang, Johor and Kelantan were all recognised as high-potential regions where solar photovoltaic installations are expected to grow.

Along with photovoltaic plants, biomass plants are another highly viable option for Malaysia. Looking into this avenue to replace current energy trends is especially pressing given the environmental and waste issues of the oil palm industry. Biomass power plants make use of oil-palm by-products otherwise deemed as wasteful.

Although the cost of setting up the infrastructure to generate RE from such sources may be considerable at the time of incorporation, the long-term economic and environmental benefits far outweigh this initial expense.

IMPACT OF SOLAR PV PENETRATION TO THE SYSTEM OPERATION



- The study found that the system is technically capable to accommodate solar PV penetration up to 30 percent of peak demand.
- Beyond the limit, thermal plants performance will be affected and subsequent to that, load shading will be activated.
- A proper planning of RE penetration into the grid system need to be emphasised to avoid those circumstances.

Source: Energy Commission

Potential of Solar Energy Penetration

To fully gauge the capabilities of solar energy in Malaysia (particularly Peninsular Malaysia and Sabah), a study was conducted by the Energy Commission to determine the acceptable level of RE penetration (specifically solar) into the grid system.

The assessment tested the limits on solar penetration into the grid system, explored control measures and drew up potential solutions to overcome the challenges. It also looked into the solar development in other countries and measures adopted in managing high RE penetration level.

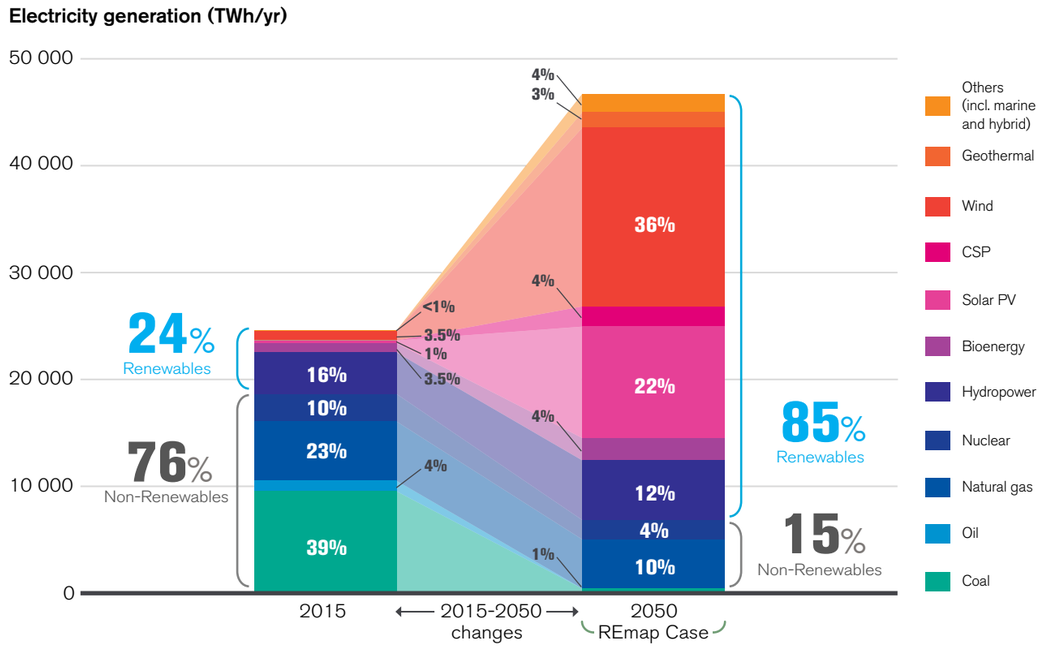
The study found that the system is technically capable of accommodating solar PV penetration up to 30 percent of the peak demand. Though beyond this limit, the thermal plants performance will be affected and subsequent to that, load shedding will be activated. Load shedding is the action of lessening or interrupting the energy supply to avoid excessive pressure on the generation plant.

To avoid these circumstances, a proper planning of RE penetration into the grid system needs to be emphasised. Accordingly, a summary of potential control measures were explored, specific to these conditions. While some of the challenges could be specific to a grid system, the control measures adopted by utilities with higher RE penetration levels also have many similarities.

Challenges and Control Measures for RE Integration

Challenges	Control Measures
Variable Renewable Energy (VRE) generator technical requirements Very limited connection requirements in the early years when VRE penetration level was low, resulting in undesired frequent VRE generator disconnections and cascading effects.	**Interconnection standards (Grid Codes)** Interconnection standards (Grid Codes) should be strengthened to ensure the VRE generators' steady-state and dynamic behaviours fulfil power system operation requirements.
High variability and stochastic nature of VRE The high variability and stochastic nature of VRE generation output pose challenges on stable power system operation.	**Implement and improve VRE forecasts** System operators should implement VRE forecasting system and continuously improve the forecast accuracy. VRE forecasting is the key enabler for stable power system operation.
Increase in reserve requirements The variability and stochastic nature of VRE increase the reserve requirements on both the volumes and ramp rates.	**Widen the balancing area, interconnections** Interconnections can improve reliability of supply. Widening the balancing area with interconnection has two effects: achieving geographically diversified VRE variability; and sharing of reserves; resulting in less reserve requirements. This interconnection also allow short-term trading of excess energy from VRE, enabling optimum utilisation of generation resources in the interconnected systems. **Improve reserve dimensioning methodology** Germany studied adaptive reserve dimensioning, taking into account daily VRE forecasts.
High penetration, shortage of ancillary services providers As the penetration level become high, the existing flexible generators such as hydroelectric and open cycle gas turbine generators would be pushed offline, reduce the reserve providing generators in the system during the VRE high generation periods. At the same time, higher reserves are required for stable operation of the system.	**Improve flexibility of power system** Improve flexibility of existing baseload generators that provides ancillary services to the system and strengthen the transmission grid to allow the flexible operation of existing generators. **Market design to accommodate VRE** By designing an ancillary services market with high incentives, another revenue stream for conventional generators can be created, making them financially viable with reduced load factor. **Alternative reserve providers** The battery storage technologies are promising with '0' stability limit and very fast ramping capability. The VRE generators such as wind turbines are technically capable of providing balancing power and voltage support services.

Source: Energy Commission



The Rising Importance of Solar and Wind Energy in the Power Sector

Source: International Renewable Energy Agency

Current State of Power Generation

The reach of RE in Malaysia is quite limited as of now. Most of the nation is still dependent upon the existing National Grid Network, which in turn is already designed and suited to the present system of energy generation.

While Peninsular Malaysia is largely powered by coal or gas-fired plants, East Malaysia, particularly Sarawak is more inclined towards hydroelectric power. The existing facilities and equipment in place are particularly suited to this need, and therefore may require modifications to suit the influx of energy from new RE sources.

Smaller scale RE plants are already present in some offshore islands, as well as outposts and settlements in the country's interior. Most households and enterprises in the country still prefer to be connected to the default grid, and are rather hesitant to install new infrastructure.

More than 80 percent of the country's energy needs are still supplied by exhaustible sources. Fundamentally, this means that energy security in the country must constantly be improved as it can be affected by external influences. For instance, the supply chain of coal and its prices may affect the continuity of power generation in Malaysia. Simply put, it brings to the forefront the imminent need to set and meet RE targets in the coming years.

Looking forward, the Ministry of Energy, Science, Technology, Environment and Climate Change has set a target for 20 percent of the country's electricity to be generated from renewable sources by 2025. In line with this, a detailed framework is being planned to assure both energy affordability and RE adoption in order to propel the country's development forward. Steadily and surely, Malaysia stands to join the global shift towards cleaner and renewable energy. EM

LOOKING FORWARD TO REFORMS

The changes to the Malaysian energy industry, as announced by the Ministry of Energy, Science, Technology, Environment and Climate Change (MESTECC), will affect all areas of the economy. An ASEAN Energy Management System (AEMS) Energy Manager and a Registered Electrical Energy Manager (REEM) – Ir Bernard Sagaiyaraj – the General Manager of Bureau Veritas Building and Infrastructure division – gives his views on the subject.

Q: What are some of the changes you foresee taking place in the local energy market, with the establishment of the Ministry of Energy, Science, Technology, Environment and Climate Change (MESTECC)?

A: As a combination of the former Ministry of Science, Technology and Innovation (MOSTI), the former Ministry of Energy, Green Technology and Water (KeTTHA) and the climate change division of the former Natural Resources and Environment (NRE) Ministry, MESTECC helps to bridge the gap between science, innovation and the energy sector. As such, science and technology innovations can be easily commercialised without the gap factor.

Further commercialisation of R&D efforts is also another change that is set to take place, especially in light of MESTECC announcing that 50 percent of R&D funds will be allocated for experimental research. Previously, research and innovation were solely focused on academic purposes.

I am also happy that MESTECC is inviting experts from the energy industry to participate in R&D, in order to rejuvenate our local energy sector and reduce greenhouse gas emission to slow down global warming or climate change. This will also act as a catalyst to attract Malaysian entrepreneurs and innovators to work on clean or renewable energy since the Ministry is willing to support innovation in this industry. Local car manufacturers could also use this opportunity to get involved in electric car R&D with the move to produce it commercially in near time future.

Q: How will these changes affect the local energy sector and what are some of the possible challenges that will be faced with these changes put in place?

A: I see the glass as optimistically 'half-full' with this MESTECC direction. The local utility market is craving for more innovation and to increase energy generation diversity in Malaysia. What we need are for more means to generate energy without increasing our carbon footprint and which minimises the use of land. This is in order to protect our ecosystem.

Under the direction MESTECC is heading, more localised clean energy generation solutions can be developed. The local utility market can also use this opportunity to ingest new technologies and establish them as energy sector leaders for the ASEAN.

MESTECC could also consider imposing a Carbon Tax on companies generating energy through coal or other fossil fuels in order to fund clean energy and climate change reversing initiatives. However, that requires political courage. Additionally, Green Tax rebates may be introduced for companies generating clean energy to ease their financial burdens. Furthermore, Clean Energy should also include Energy Efficiency (EE) and not just Renewable Energy (RE) as the energy that you do not use, is 'clean".

"The local energy market must readily adopt technological change or advancement when the energy policy focuses on clean energy generation."

– Ir Bernard Sagaiyaraj,
General Manager of Bureau Veritas Building and Infrastructure Division

Q: In your opinion, what are the strategies that the government, stakeholders and industry players should take to overcome these challenges?

A: The local energy market must readily adopt technological change or advancement when the energy policy focuses on clean energy generation. One pressing needs is for proper knowledge workers to design, operate and maintain EE and RE systems. Also, these companies can also could tie up with local and overseas technology partners familiar with clean energy, digitalisation, the Internet of Things, AI, nanotechnology and automated knowledge sharing.

Digitalisation and automation are crucial as these are the themes of the Industrial 4.0 revolution. At the same time, technology enhancement is nothing without financial feasibility and the correct business process. Firms should therefore find the appropriate financial model to offset the increase in capital cost expenditure when establishing new large scale clean energy projects.

One popular model is Energy Performance Contracting where the project investor and the customer share the energy savings or the savings on the tariff. The business process must also be crystal- clear to the customer who must understand concepts like energy baselining methodologies and moving baselines.

Q: MESTECC is currently reviewing power projects that have been awarded through direct negotiations, with the aim of focusing on competitive bidding. How will this affect the local energy market?

A: Competitive bidding process for IPPs will definitely change the energy market landscape. Presently, the local energy sector distribution is mainly being handled by TNB, and they either generate energy or purchase from IPPs. These are companies that were awarded with IPP rights with advantageous fixed upside pricing, and were also given various benefits through the Power Purchase Agreement (PPA) and fuel subsidy.

However, TNB has to purchase the electricity at a higher rate which directly contributes to increased energy utility tariffs. With the competitive bidding process, IPPs need to reduce the selling price of electricity rate and maintain a decent profit margin by producing and managing resources more efficiently.

IPP rights could also be awarded to companies generating energy through RE. While this has been done before to companies which planned to pursue solar PV energy generation, they encountered certain financial challenges which prevented them from fulfilling their goals.

Malaysia's energy landscape is monopolistic in electricity generation in Malaysia. There is really no energy 'market' and increasing the market share of IPP in energy generation sector will energise the flywheel in the decentralisation of the energy sector. The decentralised energy sector will reduce capital needed for energy distribution and increase the efficiency of utilising energy generated.

However, one of the bigger hurdles of decentralisation is the actual physical distribution system which is now controlled by a single utility and this needs to be addressed. Of course homes can be connected to a smart grid with smart meters and distributed sensors but today, electricity still needs to enter your home via a cable.

Q: MESTECC is also pushing to increase the contribution of renewable energy (excluding hydro) from 2 percent to 20 percent in the medium term. With regards to incorporating more renewable energy locally, how will this affect local utility providers and IPPs?

A: Increasing RE generation to 20 percent will definitely reduce dependency on coal, which accounts for 54 percent of energy generated. However, since Malaysia has to import coal, it is not sustainable in the long term.

On the downside, local utility providers and IPPs would be affected by higher cost of energy generation as geographical factors in Malaysia limit consistent RE generation throughout the year. Malaysian energy companies should therefore look into exploring options like hybrid or mixed mode energy generation method to reduce this limitation.

Energy storage methods are also not properly utilised in the Malaysian energy sector. They can help store energy generated off peak to be used during peak period. This helps to improve the efficiency of RE apart from alleviating the energy generation load throughout the day.

COMPETITIVE ENERGY MARKETS

Bringing to the Fore What is in Store

Globally, countries are moving away from regulatory domination of the energy market towards multi-stakeholder competitive energy markets. Change brings about development but it is also a disruptor to set ways and practices. In this context, the Chair of Energy Economics of Energy Economics at UNITEN and Chief Economist, Institute of Energy Economics, Japan, Prof. Dr Ken Koyama on 9 October 2018, spoke at the Energy Commission on 'Competitive Energy Markets: Why it matters and what is the challenge?'

Chair of Energy Economics of Energy Economics at UNITEN and Chief Economist, Institute of Energy Economics, Japan, Dr Koyama, delivering his speech on competitive energy markets.

Dr Koyama presented statistics that showed trends in global energy demands and capacity, energy sources and their necessity in the future. He predicts that Asia will be the gravity centre of the energy market, namely China, in the 2040s. Dr Koyama further deliberated on deregulation or liberalisation and the mix of factors that affect the energy sector's market reform, such as price, renewable energy introduction, the inability in obtaining investments or achieving an adequate energy mix.

A tool of industrialisation, electrification, continues to progress, globally, ahead of oil, natural gas and coal, reports Dr Koyama. Electrification is the process by which a machine or a system is wired to a circuit that burdens an electricity generator. In an ideal situation, on a global scale, electricity generation should exceed the load placed on it by consumption, eventually.

In contrasting global power generation and global power capacity, Dr Koyama asserted that half of the world's total power capacity will be comprised of intermittent renewable energy, which requires refinement with the aim of reducing cost and enhancing grid stability. In a further comparision of primary energy sources such as oil, coal, gas, renewables and nuclear, graphically, from 1990 to 2050, Dr Koyama found that coal falls significantly and below renewables, whereas dependence on fossil fuels will still be high in 2050.

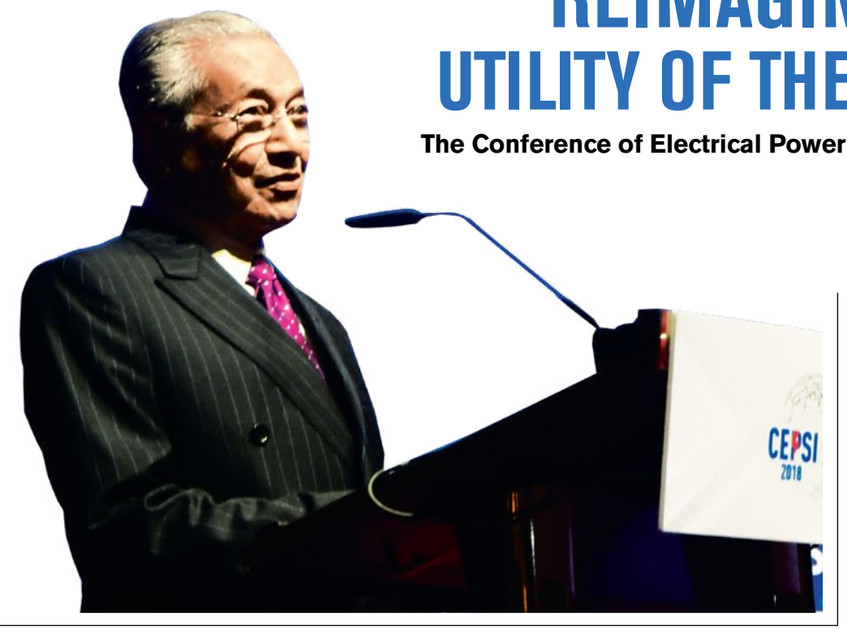
Government policies implemented in Germany, Norway, France, United Kingdom, India and China and car manufacturer plans to produce Fuel Cell Vehicles (FCV) and Electric Vehicles (EV) were also discussed. Car manufacturers highlighted were Toyota, Volkswagen, Renault-Nissan, Hyundai, Ford and Honda with projected production plans and sales to turn the conventional car market to a predominantly electric vehicle market by 2030.

Dr Koyama brought up the issue that utility suppliers may be faced with a 'missing money' problem in a competition-based wholesale market. This means the cost of the upkeep and implementation of utility resources at the electric service standard customers can rely on, cannot be offset by income garnered. The inflow of renewable energy exacerbates the problem. Dr Koyama also spoke of the need for financial backing to support electricity supply security in a deregulated market, while electrification continues. He also elaborated on the solution, the introduction of different types of capacity markets, from capacity markets meeting supply capacity obligations to strategic reserved capacity, which provides power generated on demand. Market reform is necessary to make the electric energy market, uniform.

In the light of emerging challenges, Dr Koyama concluded that it is vital for any nation to take into account the lessons learnt from 'advanced experiences' to work towards market reform. EM

REIMAGINING UTILITY OF THE FUTURE

The Conference of Electrical Power Supply Industry 2018



Malaysian Prime Minister, Tun Dr Mahathir Mohd delivering a special address at the conference.

Held every two years, the Conference of Electrical Power Supply Industry (CEPSI) is the premier event of the Association of the Electricity Supply Industry of East Asia and the Western Pacific (AESIEAP). Bringing together top players in the power industry from over 30 countries, it is the definitive platform for the discussion of challenges and opportunities in the sector.

Having hosted CEPSI in 1996, Malaysia once again played host to the prestigious event from 17 to 22 September 2018. Organised by Tenaga Nasional Berhad (TNB) and held at the Kuala Lumpur Convention Centre, its theme "Reimagining Utility of the Future," underpins the current reality of how the electric supply industry is transforming.

In her keynote address on the first day of the conference, YB Yeo Bee Yin, the Minister of Energy, Science, Technology, Environment and Climate Change (MESTECC) reflected the theme by urging industry's experts to come up with solutions by'reimagining' beyond our own current limitations.

The Minister also announced that as part of Malaysia's Energy Supply Industry (MESI) 2.0 reforms, MESTECC will reactivate MyPower to design and drive the implementation of power electricity reform for three years. These goals include increasing industry efficiency, future-proofing the industry structure, regulations and key processes, and empowering consumers by democratising and decentralising the electricity supply industry. In addition, it aims to bring about a more transparent and efficient market structure and a tariff based on market conditions.

The highlight of the first day was without a doubt the speech given by Prime Minister Tun Dr Mahathir Mohamad, who made his second appearance in CEPSI, having been Prime Minister in 1996 when Malaysia last hosted the conference. In his speech, the Prime Minister revelled in how electricity has provided us with the power to do almost anything, but warned that we will need to find less polluting means of generation.

Some of the key changes that Malaysians can expect then, as mentioned at the event are a push to reach a balance between affordability & adoption of renewable energy; followed by an expansion to 20 percent RE capacity in the Peninsular by 2025.

Also highlighted is a possible collaboration between electric power industries and telcos, with the latter riding on existing power lines thus resulting in greater efficiency and convenience. Also smart meters are being rolled out to allow consumers to track their electricity usage on a daily basis.This will go a long way to reduce carbon emissions, as it encourages users to be cautious with their electricity consumption.

Environmentally concerned Malaysians will also be glad to know that the country has eschewed the use of nuclear power over concerns about public safety and the environment.

All in all, the event provided the perfect platform for the electrical power supply players to discuss the best way forward in dealing with the future of the industry. By bringing together the experts, lively discussions and valuable knowledge was shared during CEPSI 2018. Thanks to the joint efforts of AESIEAP and TNB, the event was undoubtedly a success. EM

With almost 2,000 attendees from over 30 countries, CEPSI 2018 garnered a who's who of the Asia-Pacific power sector.

PREDICTING THE WORLD ENERGY MARKET

On 14 August, Energy Commission Talk Round 10 on "Geopolitics and Uncertainties in the World Energy Market with Special Focus on Oil and LNG" was presented by Prof. Dr Ken Koyama, Chair in Energy Economics of Energy Commission at UNITEN. The talk was attended by representatives from the Commission, industry players and stakeholders.

The presentation aimed to address the emerging geopolitical risks and uncertainties in the world of energy market, and its implications to the stability, volatility and sustainability of the energy market. Additionally, the presentation also highlighted the importance of advanced technology to affect the future of energy transition and will try to shed light on the issues of geotechnology.

Dr Koyama shared that there are major uncertainties for the oil market beyond 2018 as the oil market will become vulnerable to geopolitical risks. There could be a major shortage whereby Iranian oil export could be declining alongside the oil production in Venezuela. He also added that geopolitical problems and supply interruptions could cause severe shortage in the oil market.

On the downside, Dr Koyama also forewarned that there could be an increase in the accelerated production of shale oil which will offset global production problems and that there could be a serious 'trade war' and global economic slowdown.

The economic impacts of peak oil demand were also brought to attention as Dr Koyama delved into the implications of peak oil demand and explained that oil consumption can turn into a decline in the not too distant future in some circumstances. For example, the rising of dependence on the Middle East crude oil will increase geopolitical risk for a stable supply. He concluded by stating that the role of the consuming countries will continue to be as important as producing countries' own efforts.

The stability, volatility and sustainability of the global energy market are affected by the geopolitical risks in addition to uncertainties. Therefore, it is critical to forecast the geopolitical risks and uncertainties for a stable global energy market. EM

A Seminar on Electrical Design, Installation and Safety First For Lasting Cable was jointly organised by the Energy Commission and the Malaysian Cable Manufacturers Association (MCMA) on the 28th August. The seminar was attended by 170 representatives from government agencies, stakeholders, manufacturers and importers across Malaysia.

SAFETY FIRST!

Seminar on Electrical Design Installation & Safety First For Lasting Cable

Officiated by the Chairman of the Energy Commission, Datuk Ir Ahmad Fauzi Hasan, on behalf of the Deputy Minister of Energy, Science, Technology, Environment and Climate Change (MESTECC), YB Isnaraissah Munirah Majilis, the seminar acted as a platform to educate industry players and consumers on testing, commissioning and maintenance for a lasting electrical cable in addition to identifying unsafe/ non-compliance of cables. Further, it is also to ensure public safety in relation to electrical cable design for domestic and non-domestic installations in Malaysia. Case studies and analysis of electrical accidents and fires involving cables were also discussed during the seminar.

In his keynote speech, Dato' Dr Abdul Razak, MCMA President, stated that there has been RM5 billion loss due to fire accidents. He further explained the importance of pre-identifying fire hazards and emphasised the eradication of substandard cables in the energy market will have a tremendously positive effect on the rate of electrical accidents.

During his opening speech, Datuk Ir Fauzi pointed out that in 2017 there were 53 electrical accident cases reported and thus far in 2018, 37 cases have been reported. The investigations conducted by the Commission show that the leading cause of the electrical accidents is due to improper installation and maintenance of equipment. Other causes include dangerous activities near public electrical installations, trespassing at electrical installations and misuse of electrical systems. He then raised the awareness on electrical safety and urged that there should be an increase in the safety of electric cables.

The seminar also held discussions on various topics such as electrical safety on cables, testing and certification of cables and electrical fire analysis, to name a few.

These sessions were conducted by representatives from the Energy Commission, Standard and Industrial Research Institute of Malaysia (SIRIM), Jabatan Kerja Raya (JKR), Jabatan Bomba dan Penyelamat, Tenaga Nasional Berhad (TNB) and the Institution of Engineers Malaysia (IEM).

These sessions touched on issues like the factors of electrical accidents and fires. Additionally, it was shared that substandard wires and cables are one of the main causes of those accidents. With that, the presenters highlighted the proper standards and procedures, and requirements of a properly certified cables and wires.

To finish off the presentations, a dialogue session was conducted to share insights and comments on all the 8 presentations.

The seminar was a good platform promoting communication among wire and cable industry associations, relevant trade and professional groups as well as wire cable manufacturing enterprises in the country – to work out substantial steps they can only take when done together, like raising awareness on the importance of proper installation and maintenance of equipment and eradicating substandard electric cables. EM

Suruhanjaya Tenaga
Energy Commission

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 promote competition and prevent 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, codes, guidelines, 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.

Suruhanjaya Tenaga (Energy Commission of Malaysia) | st_malaysia | ST_Malaysia | Portal ST

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