

Towards a World-Class Energy Sector

# ENERGY

 Suruhanjaya Tenaga  
Energy Commission

**MALAYSIA**

Volume 13 | 2017  
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## ASEAN CONNECTION

*Energy Malaysia focuses on the cooperation between Malaysia, Thailand and Laos in its efforts to achieve long term energy security.*

## TARIFF: THE BREAKDOWN

*Energy Malaysia simplifies the complex mechanism that powers its consumers and its nation.*



# Striking a Balance

Sustaining Sufficient and Efficient  
Energy for a Better Tomorrow

MYR 8.00 Volume 13

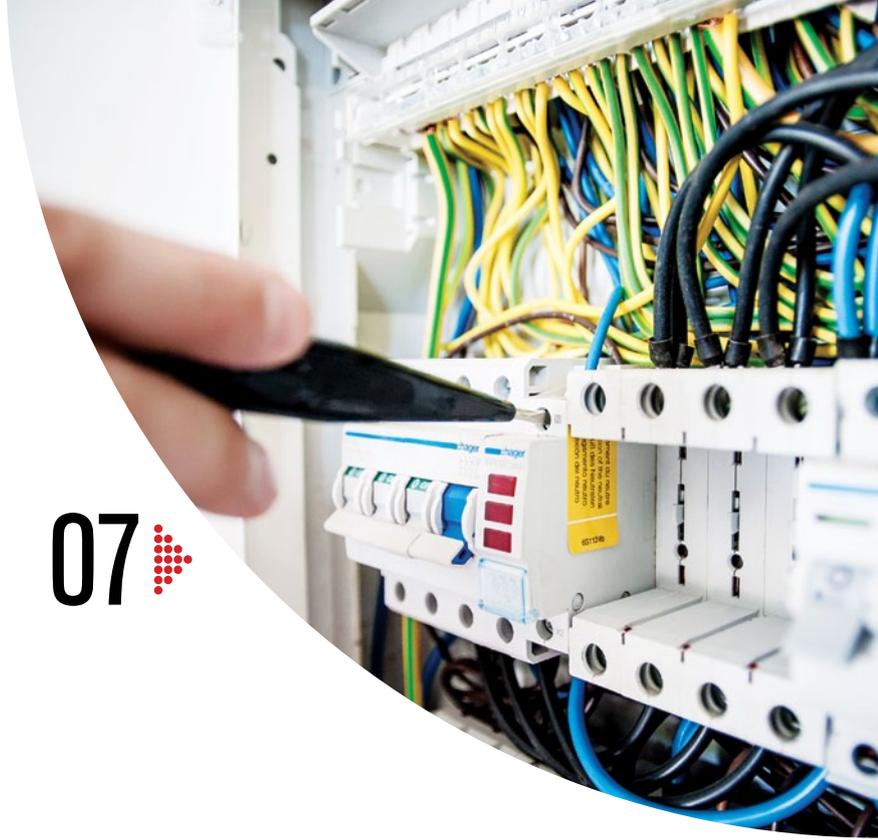
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10-3A, Jalan PJU8/3,  
Damansara Perdana,  
47820 Petaling Jaya,  
Selangor Darul Ehsan, Malaysia.  
Tel: +603-7729 4886  
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# Energising a Better Malaysia

**T**he Energy Commission has always been committed in our effort to balance electricity tariffs to reflect a reliable and efficient supply service. This has quite often been a challenging act, as we need to ensure that electricity supply is affordable enough to feed our country's development needs while also looking out for the long-term energy security of the nation, as well as meeting our global commitment towards reducing the carbon emission.

Presently, Malaysia enjoys one of the lowest electricity tariffs in the world. However, much of this is due to the subsidies on natural gas that the government has provided. While reducing the cost burden on the *rakyat*, subsidies can also negatively impact the economy in the long run. Money that could be spent on other public amenities is being used to artificially hold down the price of natural gas.

Consequently, it is important to note that the subsidy cannot last forever, and calls for a more efficient mechanism for subsidies to be more targeted. This is one of the reasons why the government has implemented a subsidy rationalisation plan. The aim of this is to reduce allocation on subsidies in order to enable efficient spending on development programmes

that benefit critical services to the general public while retaining subsidies for the identified segments only.

Earlier this year, Energy, Green Technology and Water Minister Datuk Seri Panglima Dr Maximus Johnity Ongkili announced that there would be no tariff increase for 2017, and the Energy Commission will endeavour to seek approaches that would enable similar tariff levels going forward into 2018.

This issue of *Energy Malaysia* focuses on these aspects as it attempts to create an understanding on the electricity tariff determination mechanism and its rationale. Through interviews with the various stakeholders, this publication sheds light on a topic that affects everyone but is often not well understood.

I hope that this edition of the Energy Commission's official magazine will help clear any misconceptions about tariff setting or adjustment mechanisms and enhance appreciation that the outcome is with the aim of ensuring long-term benefits for both *rakyat* and nation. **EM**

**Dato' Abdul Razak Abdul Majid**  
*Energy Commission, Malaysia*



# Safe And Efficient Usage Of Electricity

Test the automatic circuit breaker switch in your home today!

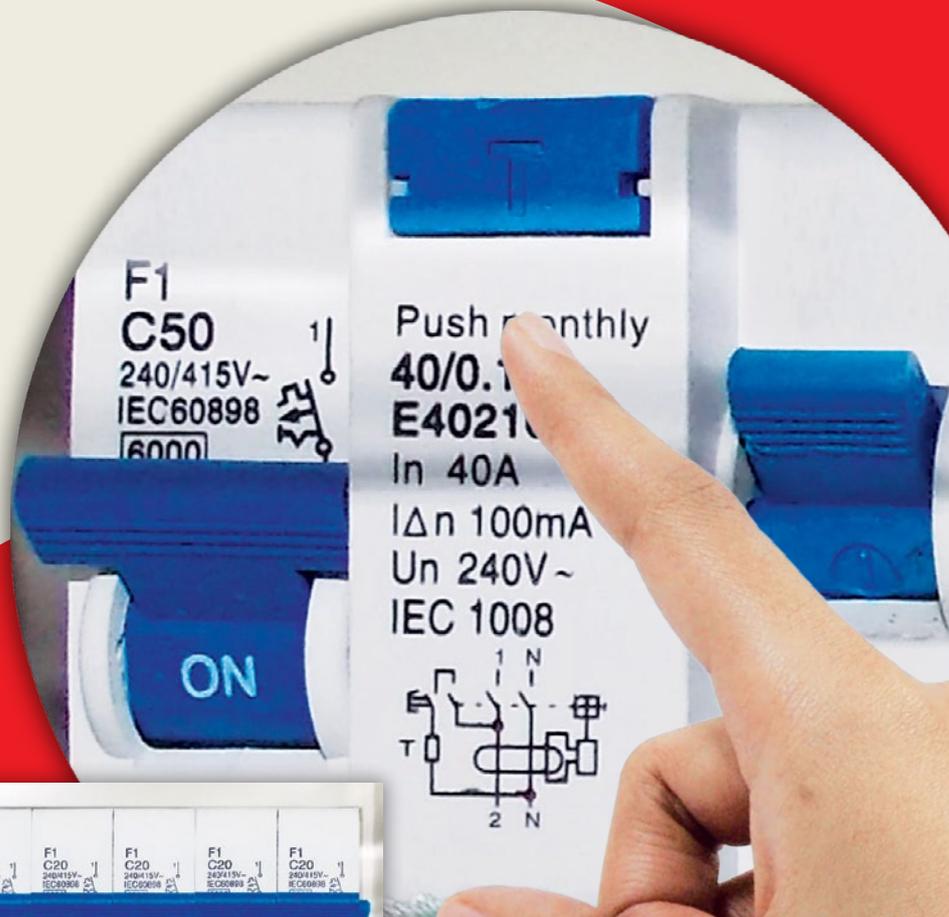
Automatic circuit breaker switches found in the electrical distribution board in your home are to protect you and your family from the dangers of electric shock.

Ensure that the automatic circuit breaker sensitivity does not exceed **100 mA or 0.1 A** and is tested at least once a month to ensure that it always functions satisfactorily.

A simple way to test the automatic circuit breaker is to press the test button (marked 'T'). An automatic circuit breaker switch that works well will trip when the test button is pressed and you can restore the switch to its original position.

If the automatic circuit breaker switch does not trip after the test button is pressed, you should immediately consult a Registered Electrical Contractor for inspection and replacement of the automatic circuit breaker switch.

If you are using an **electric water heater** in the bathroom, make sure that the automatic circuit breaker switch with a sensitivity of not exceeding **10 mA or 0.01 A** is installed in the water heater circuit.



**VALUE OUR LIVES. AVOID ACCIDENTS AND WASTAGE!**

## **PRACTISE EFFICIENT WAYS OF USING ELECTRICITY**

**Switch off electricity when not in use. The more you waste, the more you pay.**

Use energy-efficient electrical appliances such as refrigerators, fans, TV, lights and air-conditioners with energy efficiency labels.

Use electrical appliances at moderate speed, temperature and load.

Use natural lighting and ventilation to reduce the use of electrical appliances.

Monitor the electricity consumption level at your premises.



The MoU was signed by Reach Energy Chief Executive Officer, Shahul Hamid Mohd Ismail and Akimat's Head of Regional Government, Yeraly Togzhanob at the Malaysia-Kazakhstan Business Forum. Also present were the International Trade and Industry Deputy Minister, Datuk Ahmad Maslan; Energy, Green Technology and Water Deputy Minister, Datuk Seri S.K Devamany and the Malaysian Ambassador to Kazakhstan, Syed Mohammad Bakri Syed Abdul Rahman.

## Enhancing Trade Ties

**M**alaysian oil and gas exploration production company, Reach Energy has signed a Memorandum of Understanding (MoU) with the regional government

of Mangystau in Kazakhstan. Under the MoU, Reach Energy will assist in attracting Malaysian companies to invest in the region, specifically within the energy sector.

Currently, Reach Energy has 54 gas and oil wells in the region and plans to increase that to 88 wells by 2026. Datuk Seri Devamany said that to date, the Malaysian-listed company has invested some RM600 million in the oil and gas industry in Kazakhstan. – *Bernama*

## World Gears Up For Electric Cars

**T**echnological advances mean fossil fuel in cars could be phased out within decades but switching to electric carries its own environmental and economic concerns as more and more countries announce radical plans. Britain said it would "end the sale of all conventional petrol and diesel cars" by 2040, following similar proposals by France earlier in July to reduce nitrogen dioxide (NO<sub>2</sub>) pollution.

China issued plans last year requiring that 12 percent of cars sold be battery-powered or plug-in hybrids by 2020, while India has said it wants to replace all vehicles with electric vehicles by 2030. Norway hopes to end sales of new petrol and diesel cars by 2025, and other countries such as Sweden and Denmark and Finland have expressed similar ambitions to phase out fossil fuel engines.

But Flavien Neuvy, economist at French automobile analysts Observatoire Cetelem, said it would be a "bold bet" to suggest that the roads will be filled with only electric cars by 2040. "It's a bold bet because the combustion engine, from an environmental point of view, may become more favourable, as can be seen with cars that can now travel 100km on 2 litres of fuel," Flavien said.

He also believes that the electric car will be much more efficient than today, and

## From Hobby to Energy

**K**ite flying, a traditional pastime loved by many could be the key in producing a continuous supply of renewable energy. The technology involves rigging two giant kites, each up to 70 square metres, to either side of a turbine. The first kite would rise with the wind, up to a height of 450 metres, moving in a figure-eight pattern. The movement pulls a rope that turns a turbine, generating power. As one kite descends, the other rises in tandem, meaning that electricity can be generated almost constantly.



**Above:** The world's first wind farm powered by giant kites.

Popular Mechanics reported that these giant kites, made by Kite Power Solutions hopes to roll it onshore and at sea, building systems with the capacity to produce hundreds of megawatts of power within the decade.

According to the company, it hopes that the technology, helped developed by prominent tech firms around the world, would slash the cost of producing wind energy by conventional turbines. It is also safe to assume that producing energy from these kites would cost so little that developing countries would be able to use it to wean themselves off from carbon-heavy energy sources.

Generating power of this magnitude from wind could be the key to more widespread adoption of wind power. Depending on the location, kite-based generators could provide a constant source of energy almost every day of the year, eliminating renewable energy's biggest disadvantage; its notion as a source of energy that can wax and wane at any given time.

that an improvement from the current average range of 250-300km to 400-500km would be "enough" to make them viable. Cost is an issue however, with electric cars currently selling for thousands of dollars more than their fossil-fueled counterparts. The fashion

for diesel cars in Britain was fueled by government incentives to reduce carbon emissions, but only worsened NO<sub>2</sub> levels on a more local level.

But for now, the momentum appears to be strong, particularly if oil prices rise again.

## Stretch and Twist!

**R**esearchers in the United States and South Korea have invented a new kind of yarn that can generate electricity when it is stretched or twisted. The material, called “twistron,” could be used to harvest energy from the motion of ocean waves, or from changes in temperature, said the report in the journal *Science*.

The yarn is built from carbon nanotubes, which are hollow cylinders of carbon 10,000 times smaller in diameter than a human hair, according to the report. In order to generate electricity, the yarns must be either submerged in or coated with an ionically conducting material, or electrolyte, which can be as simple as a mixture of ordinary table salt and water.

“When you insert the carbon nanotube yarn into an electrolyte bath, the yarns are charged by the electrolyte itself,” said co-author Na Li, a research scientist at the University of Texas at Dallas’ NanoTech Institute. No external battery, or voltage, is needed.

However, the research is still at an early stage, and scientists caution that the technology is not meant for large-scale electricity projects, at least not yet. Instead, lab experiments have shown that a twistron yarn weighing less than a housefly could power a small LED, which lit up each time the yarn was stretched.

Another experiment showed that when sewn into a shirt, the yarns served as a self-powered breathing monitor. “There is a lot of interest in using waste energy to power the Internet of Things, such as arrays of distributed sensors,” Li said. – *AFP*

## The End of Fossil Fuels

**T**he French government unveiled plans to put an end to oil and gas production on its territory in a largely symbolic move it hopes will inspire bigger producing nations to copy. Under a draft law approved by cabinet, no new permits

## First Geothermal Plant

**S**abah will soon house the country’s first geothermal power plant which will be developed by Tawau Green Technology (TGE) in Apas Kiri, Tawau. The plant is set to export 30 Megawatts (MW) of power to the Sabah Electricity Sdn. Bhd. (SESB) grid under the Feed-in-Tariff (FiT) scheme.

Geothermal technology has been considered as both very green, boasting extremely low carbon footprints, while possessing a very high availability rate as clearly demonstrated in other plants worldwide. “As of today, two geothermal well pads are completed, and the third well pad is under construction. Once

operational, Malaysia will rank 16th in the world in terms of geothermal energy generation,” said Datuk Seri Panglima Dr. Maximus Johnity Ongkili, the Minister of Energy, Green Technology and Water.

In its first phase, workers are already digging exploratory wells to establish the parameters and potential of the geothermal reservoir. Calculations estimated that the area has a potential to host a geothermal power plant with the capacity of 67MW at a depth of 2.5km. Further calculations have also shown that the new plant will offset some 200,000 tonnes of carbon dioxide emissions annually.



*“Geothermal energy has the potential to contribute to the energy balancing market and this will be important when variable renewable energy (such as solar and wind) increases in the energy mix.”*

– **Datuk Seri Dr. Maximus Ongkili Johnity**, Minister of Energy, Green Technology and Water (KeTTHA)

will be granted to extract gas or oil and no existing licences will be renewed beyond 2040, when all production in mainland France and its overseas territories will stop.

The country is a minor player in the global hydrocarbons industry, extracting the equivalent of about 815,000 tonnes of oil per year – an amount produced in a few hours by Saudi Arabia. It imports about 99 percent of its oil and gas needs. But 39-year-old centrist President Emmanuel Macron has said he wants France to take the lead as a major world economy switching away from fossil fuels – and the nuclear industry – into renewable sources.

It plans to stop the sale of diesel and petrol engine cars by 2040 as well.

“We are the first country to take this step (phasing out fossil fuel production),” said Nicolas Hulot, the high-profile environmentalist named by Macron

as the Minister for the Ecological and Inclusive Transition in May. The minister later tweeted: “We are determined in the face of climate change at a time when disasters are hitting us hard.”

Above all it will affect companies searching for oil in the French territory of Guyana in South America, while also banning the extraction of shale gas by any means – its extraction by fracking was banned in 2011. The only exceptions to the new rules will be for the capturing of gas from mines, which is considered desirable for security reasons, and one project in Guyana run jointly by oil groups Total, Shell and Tullow Oil. –*AFP*





## Leaders in the Solar Industry

**S**ituated at the equatorial region with an average solar radiation of 400-600 MJ/m<sup>2</sup> per month, Malaysia has promising potential to host large-scale solar power installations. At present, Malaysia is poised to be one of

the leading nations in the solar industry. The nation is ranked third in producing photovoltaic (PV) cells and modules making it well positioned to benefit from the spillover effects of the growing solar power usage worldwide.

According to the Malaysian Investment Development Authority (MIDA) Chief Executive Officer, Datuk Azman Mahmud, the usage of solar power is expected to increase between 12% and 20% over the next five years. Malaysia is now a key exporter of solar panels in the world, particularly to the United States. This has also led to a healthy growth in new businesses, creating ample job opportunities for the nation.

At the end of 2017, MIDA is set to launch the Malaysian Solar PV Roadmap 2030 programme with the goal of driving the country's solar power industry further. According to Datuk Azman, the country aims to generate up to 2,080 MW of energy from renewable sources by 2020.

## A Symbol for Energy

**I**t was considered sacred by the ancient Aztecs, and modern-day Mexicans eat it, drink it, and even use it in medicines and shampoos. Now scientists have come up with a new use for the bright green plant: producing renewable energy. The cactus's thick outer layer, with all those spines, has always been a waste product – until researchers developed a biogas generator to turn it into electricity.

The pilot project was launched in May at Milpa Alta's sprawling cactus market. The far-flung neighborhood is a splash of green amid the smog and concrete of this Latin American mega-city, thanks in part to its more than 2,800 hectares (some 7,000 acres) of fields of prickly pear cactus, known in Spanish as "nopal." The area produces 200,000 tons a year of prickly pear cactus – up to 10 tons of which ends up as waste on the floor of the cactus market each day.

A local green energy start-up called Energy and Environmental Sustainability – Suema, by its Spanish acronym – got the idea to develop a biogas generator to turn that waste into energy. They decided to build it right at the source: the bustling cactus market, where hundreds of workers start each day by cleaning up the waste left from the day before.

Oil-producing Mexico has emerged as a green energy leader in recent years. It won praise in 2015 when it became the first

emerging country to announce its emissions reduction targets for the United Nations climate accord, ambitiously vowing to halve them by 2050. To get there, it is seeking to generate half its energy from renewable sources. Last year, green energy made up 15.4 percent of its energy mix, though just 0.1 percent was from biogas.

Suema is looking to change that with its generator, which will ultimately produce 175 kilowatt hours, enough electricity to keep some 9,600 low-energy light bulbs burning. The generator – a giant silver cylinder surrounded by an intricate web of pipes – churns together organic waste with a special mix of bacteria and heats it to 55 degrees Celsius (131 Fahrenheit) to produce biogas. The leftovers can then be used as compost.

When it reaches full capacity around November, the generator will be able to process three to five tons of waste a day, producing 170 cubic meters (45,000 gallons) of biogas plus a little more than one ton of compost.

The \$840,000 (RM3.52 million) project, funded mostly by the Mexico City government, is popular at the cactus market. The Mexico City government's scientific development chief, Bernardino Rosas, hopes the generator will be the first of many. "Our vision is to reproduce this type of project at each of the city's produce markets, 300 in total, making them energy-sufficient. –AFP

## On Top of the World

**G**lobal market research firm, BMI Research, recently cited Malaysia as one of the leading global investment destinations for renewable energy, along with Singapore and Australia.

"The economic and political climate of Singapore, Malaysia and Australia appear at the top of our Renewables Risk/Reward Index despite the fact that growth in these markets will be slower than in riskier regional neighbours," the report stated.

Malaysia's potential growth in renewable energy capacity and generation, particularly in wind and solar energy is one of the reasons behind its high positioning. The nation's renewable energy sector has been gathering momentum with various energy policies and schemes.

"This supportive energy policy, alongside relatively good access to finance and well-developed grid infrastructure results in Malaysia's risk profiles outperforming the regional average as well," the report stated. –AFP



**MALAYSIA**

**SINGAPORE**

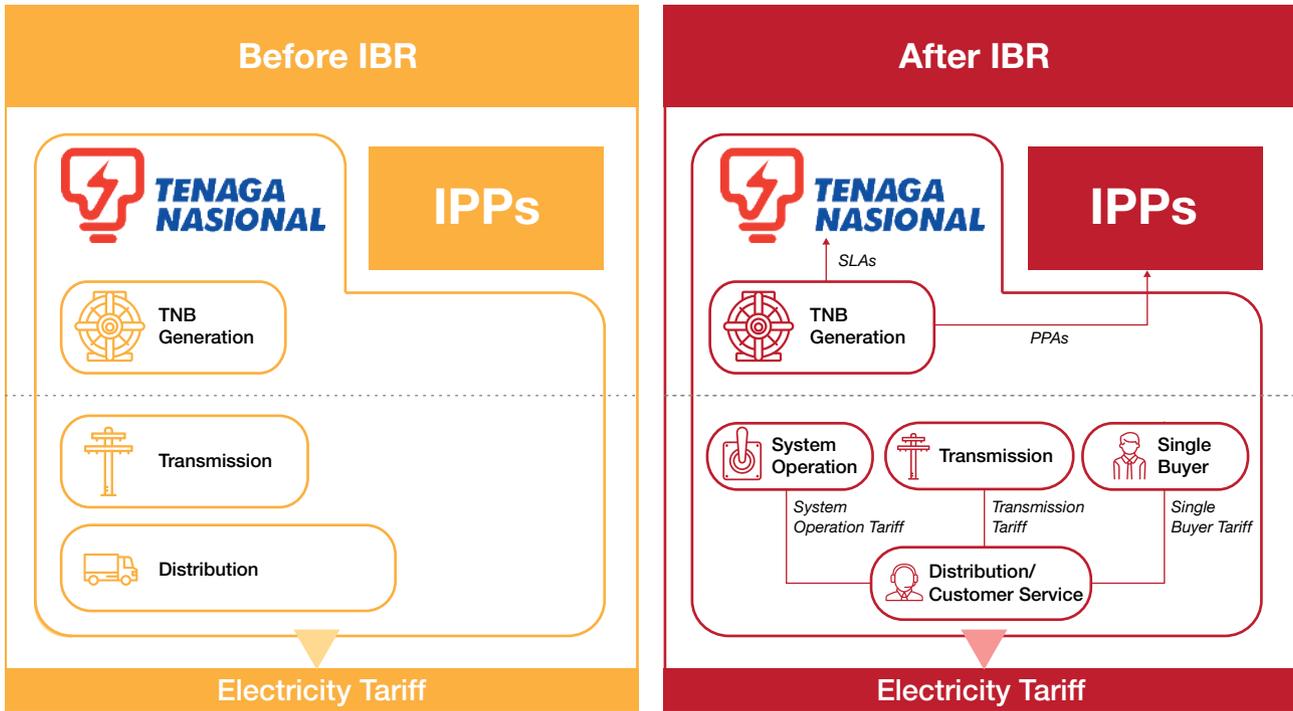
**AUSTRALIA**



# Simplifying The Complex

**T**he steady supply of electricity is a must in ensuring the continued development of Malaysia. However, like everything else, there is a price to pay. In this case, it comes in the form of electricity tariffs. In an advanced developing country like Malaysia, management of the tariff requires a balancing act. If it is too low, the costs of production, transmission and distribution could not be covered. But make it too high, and it could result in a loss of production as industries are unable (or unwilling) to pay the charges. In the following pages, **Energy Malaysia** sheds light on how that balance is achieved by highlighting the methods used to set the tariff.

## Incentive-Based Regulation (IBR)



In the "Before and After IBR" diagram, the scheme provides a structured, transparent and effective tariff setting mechanism while also taking into account the large development and operational expenditures set by the utility company.

Source: Energy Commission

The increased demand for electricity meant massive capital investment to upgrade electricity infrastructure as well as raising tariffs.

### A Brief History

For years, the provision of electricity in Peninsular Malaysia was the responsibility of the government-run National Electricity Board (NEB). However, by the start of the 1990s, the faster pace of industrialisation and higher standards of living, resulted in increased demand for electricity.

The government, realising that meeting this demand, meant massive capital investment to upgrade the electricity infrastructure, as well as raising tariffs, decided to privatise the NEB, thus giving birth to Tenaga Nasional Berhad (TNB). As a privatised entity, TNB was able to tap into avenues of funding from financial markets, while at the same time the government was able to reduce its financial commitment.



The issue of tariffs however has been a rather more complicated issue. The ultimate goal has been to rationalise electricity tariffs so that prices reflect market value. This is expected to encourage more sustainable and responsible use of electricity, while also alleviating the burden on the Treasury (as government subsidies have been keeping costs artificially low).

However, at the same time, the government also recognises that any sudden hike in electricity tariffs would be too much of a shock and detrimental to national development goals. Therefore a gradualist approach has been adopted, with one key approach being the introduction of the Malaysian Electricity Supply Industry (MESI) reform, which is being implemented in

stages in order to ensure reliable, high quality and cost-effective electricity supply for the nation.

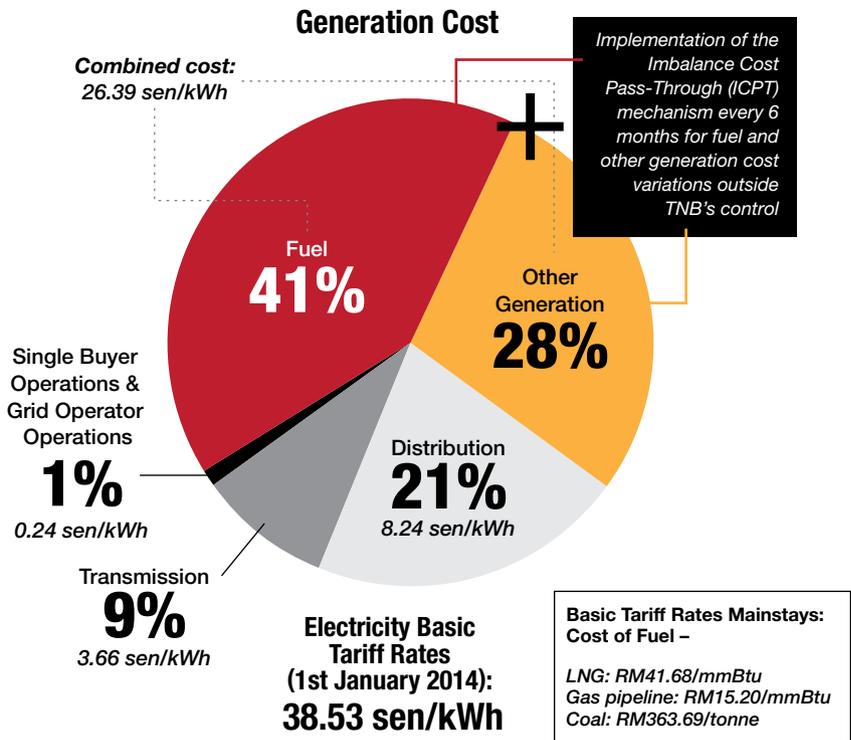
**A Much-Needed System**

Perhaps the most significant development initiated by MESI reform has been the Incentive-Based Regulation (IBR) system, which is a tariff setting mechanism for Peninsular Malaysia. Introduced in January 2014, IBR is overseen by the Energy Commission, which as the energy sector regulator in Peninsular Malaysia and Sabah, is responsible for ensuring fairness for both consumers and utility. In this case, that consumers are charged reasonable tariffs and that the utility enjoys adequate returns for their investment.

As can be seen in the “Before and After IBR” diagram, the scheme provides a structured, transparent and effective tariff setting mechanism while also taking into account the large development and operational expenditures set by the utility company.

Another key aspect of IBR is the implementation of separate account reporting, where each of TNB’s various business entities are measured separately for efficiency and cost effectiveness. Therefore, different entities are able to stand or fall according to their own merits. At the same time, this allows the utility to better identify what works and what does not work. The separation of accounts also enable consumers

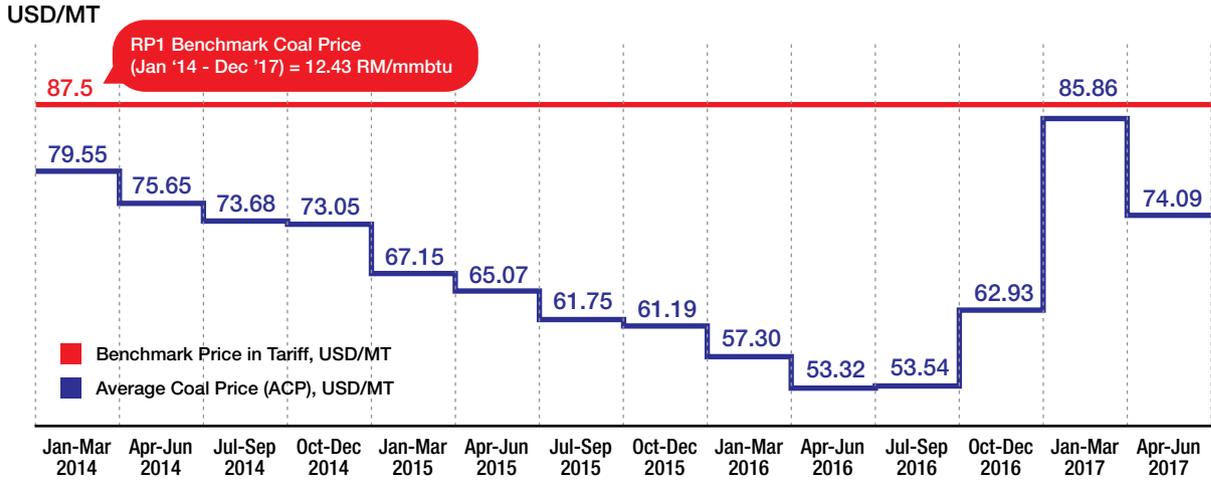
**Basic Components of Electricity Tariff**



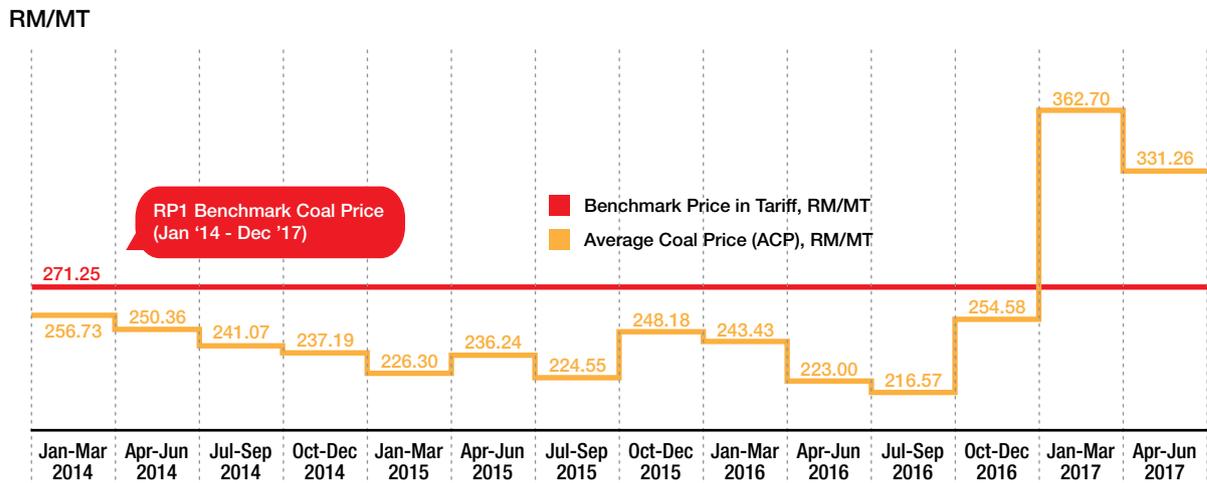
Source: Energy Commission

Incentive-Based Regulation (IBR) was implemented starting in early 2014 which allows consumers to know the basic components of the tariffs.

## Power Sector Coal Prices (USD/MT)



## Power Sector Coal Prices (RM/MT)



	Jan-Mar 2014	Apr-Jun 2014	Jul-Sep 2014	Oct-Dec 2014	Jan-Mar 2015	Apr-Jun 2015	Jul-Sep 2015	Oct-Dec 2015	Jan-Mar 2016	Apr-Jun 2016	Jul-Sep 2016	Oct-Dec 2016	Jan-Mar 2017	Apr-Jun 2017
Base Forex	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1
Actual Forex	3.2273	3.3096	3.2717	3.2468	3.3702	3.6304	3.6362	4.0560	4.2487	4.1822	4.0447	4.0453	4.2242	4.4710
RM/mmbTU	11.76	11.47	11.04	10.87	10.37	10.82	10.29	11.37	11.16	10.22	9.93	11.67	16.62	15.18
RM/GJ	11.15	10.87	10.47	10.30	9.83	10.26	9.75	10.78	10.57	9.68	9.40	11.05	15.76	14.39

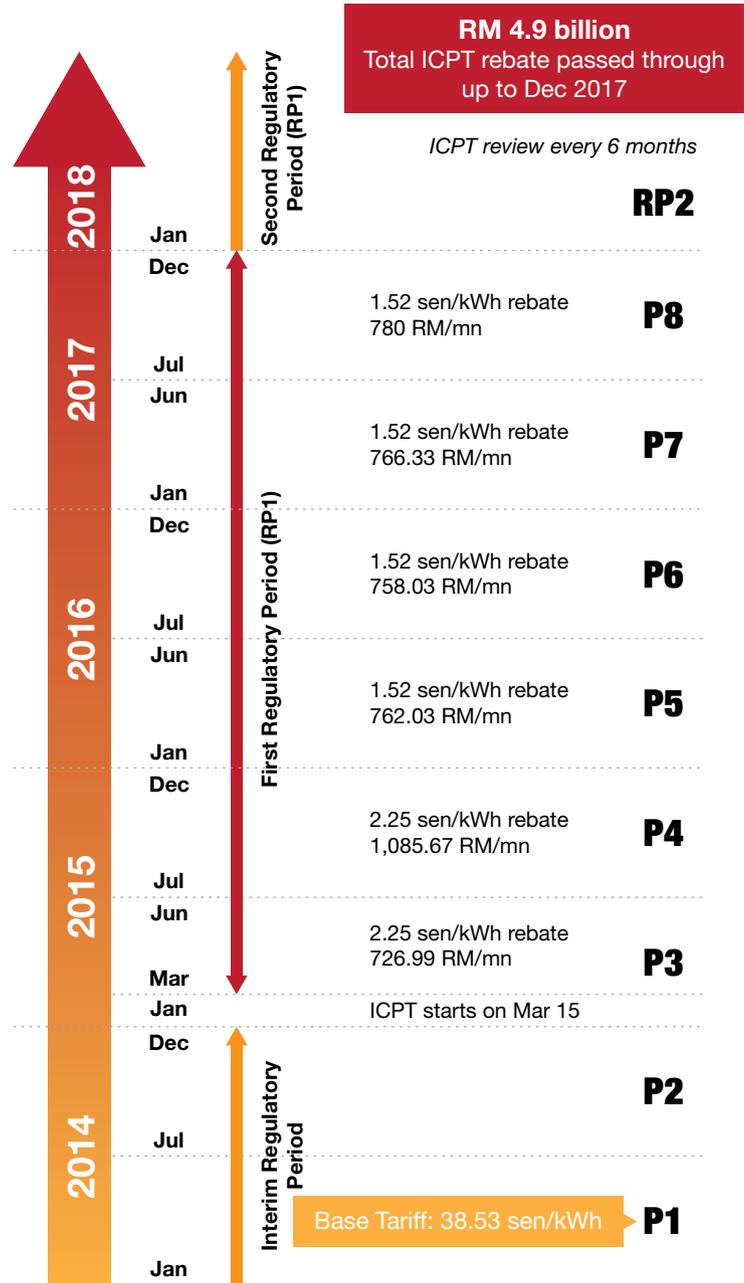
**Notes:**

- Forex of exchange rate is 1USD to RM
- Benchmark coal price is 12.43 RM/mmbTU (11.78 RM/GJ)

Coal price plays a major role in terms of cost structure.

Source: Energy Commission

## IBR Regulatory Period Timeline and ICPT Review



to benefit, as there is greater transparency regarding the cost incurred by the utility.

When it comes to costs, the utility has to contend with fluctuating fuel costs. As such, the Imbalance Cost Pass-Through (ICPT) mechanism was introduced under the IBR system, to take into account such shifts in prices every half-year.

The ICPT is calculated by comparing the actual generation fuel costs with projections from the previous six months. Should there be a change in fuel costs, TNB will transfer the difference to consumers via a surcharge (if prices had gone up) or a rebate (if they had fallen).

### Uncontrollable Factors

In certain aspects, higher electricity tariffs are caused by factors outside the control of both the government and the utility. For instance, given that more than 50% of electricity generated in Peninsular Malaysia come from coal-fired plants, and coal has to be imported from overseas, the less than favourable exchange rate has resulted in higher expenses.

While the situation may be cause for an imposition of a surcharge, the government is also taking into account the impact that this might have on consumer. As such, it has worked to ensure that any rise in tariffs do not affect the less privileged in society, and that the utility matches increased tariffs with improved service quality. **EM**

### Base Fuel Price:

  
**Imported LNG:**  
RM 41.68/mmBTU

  
**Imported Coal:**  
RM 271.25/MT

  
**Domestic Piped Gas:**  
RM 15.20/mmBTU

Source: Energy Commission

The ICPT is calculated by comparing the actual generation fuel costs with projections from the previous six months.

# THE NOT SO TARIF-FYING TRUTH ON TARIFF

**E**nergy is undoubtedly an essential ingredient for a nation's continued economic development. The government has always remained committed to ensuring all its citizens receive a constant supply of electricity at affordable prices. However, consumers are unhappy if there is an increase in tariff as they do not know why it is increasing. **Energy Malaysia** sheds some light on the issue at hand, explaining the role and rationale for the implementation of tariffs in the energy sector.



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IEC 60521 CLASS 2 Y2

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On 30 June this year, Energy, Green Technology and Water Minister Datuk Seri Panglima Dr. Maximus Johnity Ongkili announced that electricity will remain at 38.53 sen/kWh during the second half of the year. However, the scenario is likely to be different come 2018 as a tariff review will be held. This is in line with the Incentive Based Regulation (IBR) framework, which was introduced as an impartial mechanism to determine electricity tariffs.

The overriding concern for the powers is to ensure the health and security of the nation's energy supply, in order to guarantee long-term development goals. Along with this, the authorities have also long

faced a challenge of juggling the different interests of various parties when it comes to electricity tariffs. Among the stakeholders involved are the consumers (residential, commercial and industrial), the utility, power producers, and of course, the government itself.

This is where IBR comes in. Introduced in 2014, it provides a systematic way to incentivise or penalise power utilities based on a set of performance indicators. Under the framework, the government is able to develop a transparent economic regulation for the utility – Tenaga Nasional (TNB) – whereby the electricity company can provide a fair rate in return.

### **How IBR Works**

Under the IBR mechanism, tariffs are broken down into two components. The first being the base tariff, which is reviewed on a triennial regulatory period, while the other is a fuel component, which will be reviewed every six months.

The Imbalance Cost Pass-Through (ICPT) mechanism under the IBR framework allows TNB to make changes to the generation costs while fuel prices are reflected into the tariff. This, in turn, will enable differences to be channelled back to consumers through any tariff adjustments done over the review period. For example, if the global fuel prices were to decline, the difference will be given back to the consumers in the form

*In order to maximise the continuous supply of efficient energy, the government has introduced the Incentive Based Review (IBR) framework.*



## Electricity Domestic Tariff Rate

### Tariff Category

#### Tariff A – Domestic Tariff

	Unit	Current Rate 1 Jan 2014
For the first 200 kWh (1–200 kWh) per month	sen/kWh	21.80
For the next 100 kWh (201–300 kWh) per month	sen/kWh	33.40
For the next 300 kWh (301–600 kWh) per month	sen/kWh	51.60
For the next 300 kWh (601–900 kWh) per month	sen/kWh	54.60
For the next kWh (901 kWh onwards) per month	sen/kWh	57.10

**The minimum monthly charge is RM3.00**

Source: Tenaga Nasional Berhad



of a reduced electricity bill. However, all adjustments that are proposed by TNB will be subjected to the government's approval.

Approximately 2.6 million consumers are impacted by the ICPT mechanism. However, about 4.2 million consumers who use less than 300kWh of electricity monthly, which is equivalent to RM77, are not affected by it. The ICPT cost may differ for each individual consumer, as the ICPT charges depend on the average energy consumed monthly.

**Subsidies – A Blessing and A Curse**

While consumers may be concerned that electricity tariffs will rise in the coming year, it should be noted that Malaysia already has among the lowest charges in the region. In fact, when it comes to residential tariffs, Malaysia's is the cheapest between five ASEAN countries (Malaysia, Singapore, Philippines, Indonesia and Thailand). Only Singapore and

Indonesia have marginally lower rates for commercial consumers, and Malaysia is just second to Singapore.

The Malaysian scenario, where the residential sector enjoys the lowest tariffs, is a contrast to the situation in developed countries where the commercial and industrial sectors are the ones who enjoy the lower charges. This is because whereas the tariff structure of those countries are designed to encourage commercial and industrial activity, Malaysia's is purposely designed to ease the burden on the people.

For years, electricity tariffs have been kept low through subsidising natural gas. However, while subsidies may provide a short-term relief, they are considered ineffective in the long run. As Energy Commission Chairman Dato' Abdul Razak Abdul Majid noted, "The government has many commitments such as providing better infrastructure and transportation to the people. The

**2.6**  
**million**  
**consumers**  
**will be**  
**impacted**  
**by the ICPT**  
**mechanism**



**except for domestic consumers**  
**who use less than 300kWh**  
**of electricity monthly.**

*Source: Energy Commission*

*“The Policy decision to not subsidise the gas price, and by extension, the tariff, is a rational and responsible one, and better apportions the cost of production.”*

**– Dato' Abdul Razak Abdul Majid,**  
Chairman, Energy Commission



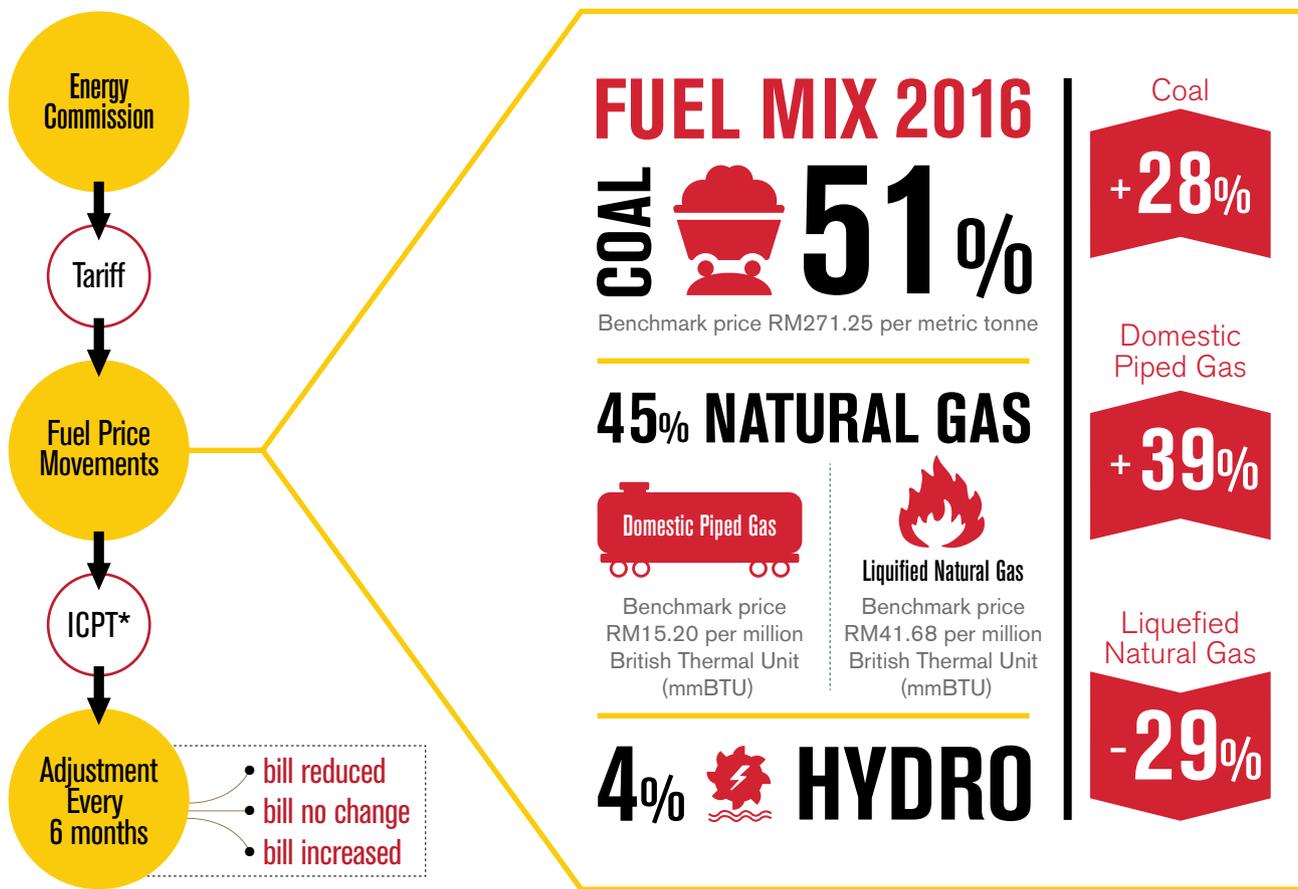
money used for subsidies can be better utilised to build schools, hospitals, roads and much more.”

Also, as Dato’ Abdul Razak pointed out, since gas subsidies were not targeted, they resulted in a huge

bill for the public as the money for them ultimately came from the tax payers. As such, the government decided in 2014 to rationalise subsidies, doing so gradually so that the impact would not be as hard on the consumers.

This means that every six months, the subsidy on gas would be reduced by RM1.50, with the aim that by 2019, the price of gas in Malaysia matches the market value. These new prices are then taken into account when calculating the new tariffs.

## Fuel Price Movements since January 2017



### Benefits of ICPT to Customers

- Savings from fuel cost reduction amounting to RM4.1 billion is shared with customers in the form of rebates since 2015.
- Fair price of electricity.

\*The Imbalance Cost Pass-Through (ICPT)

Source: Tenaga Nasional Berhad

**Hindering Progress**

Aside from being costly in the long run, another argument against subsidies is that they hinder progress in the energy sector. According to Associate Professor Dr Nofri Yenita Dahlan from Universiti Teknologi MARA's Faculty of Electrical Engineering, "subsidising the price of electricity hampers the development of energy efficiency and renewable energy."

An ASEAN-US Science and Technology Fellow and one of the foremost experts in energy economics in Malaysia, Dr Nofri explained that efforts to reach grid parity will be slow as long as electricity prices are kept artificially low through subsidised fossil fuel.

Grid parity is the scenario where the cost of producing electricity from alternative or renewable sources is on par or even lower than that of fossil fuel. This comes about through several ways.

For instance, as technology advances over time, the cost of producing the means of generating renewable energy has fallen. This is the case with solar photovoltaic cells which, according to a study conducted by solar analyst Ben Gallagher for GTM Research, are going down in price at an average



**Professor Dr Nofri Yenita Dahlan**  
Associate Professor  
of University Teknologi MARA

annual rate of 4.4%. Not only are prices going down, but also efficacy is increasing, and modern day solar panels are able to generate more power than their predecessors.

At the same time, since fossil fuels are finite, increasing demand (caused by rising population) and decreasing supply leads to hike in prices. The consumer factor also plays a part as growing awareness of fossil fuels' negative impact on the environment have resulted in more people opting for more sustainable sources of energy, especially in developed countries.

**Keeping the Eye on the Ball**

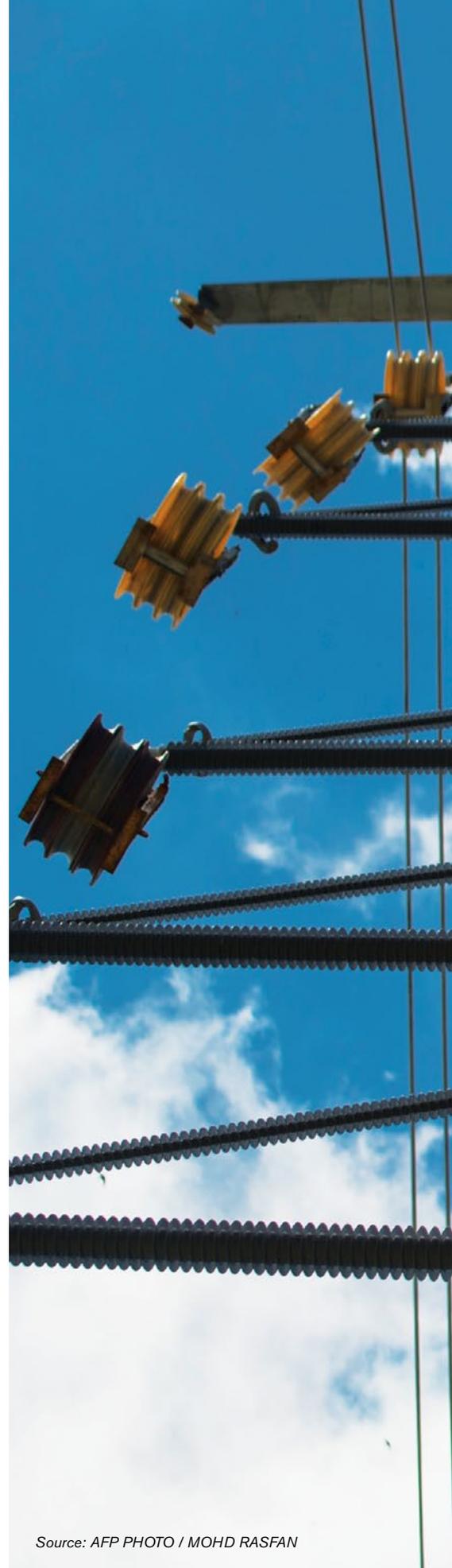
Although the gas subsidies are being reduced, there need not be any concern that prices will swiftly escalate once they are completely removed. This is because the Energy Commission being the regulator of the gas industry (as well as the electricity sector), ensures that this will not be the case.

As Ir. Roslee Esman, the Director of Gas Development and Regulation at the Energy Commission, explained, "There are 830 industries in Malaysia that use gas, and our role is to minimise the impact of gas prices on industries."

He also noted that the gas industry in Malaysia is also being liberalised and is



**Ir. Roslee Esman**  
Director of Gas Development  
and Regulation



Source: AFP PHOTO / MOHD RASFAN



*There are new high-voltage electric power transmission being built daily. The Energy Commission takes its role seriously in delivering continuous and efficient supply of energy to its consumers.*

# ENERGY SAVING PRIORITY

Despite the subsidies and rates given to alleviate the burden that is set on the consumers, more must be done. Energy saving schemes remain the key priority in the government's long term initiatives, especially once the government decides to do away with the subsidies. Here are some ways that the government is working on to increase awareness on saving energy:



## Energy Auditing

*Energy auditing is a systematic process to better understand how and where energy is being consumed, to explore and identify any energy saving potential. This mechanism would help pinpoint which equipment needs to be changed as well as identify items that have the biggest impact on consumption.*

## Feed-In Tariff (FiT)

*FiT is a programme designed to increase investments in renewable energy resources. The programme has been introduced in Malaysia as early as 2004 to drive the country towards energy independence. Its primary goal is not only on savings owing to lower electricity bill, it is also designed for the consumers to make a profit. In the Export Tariff Payment, consumers will be paid for the electricity that they generate through their own renewable energy sources.*



## Net Energy Metering (NEM)



*NEM allows self-consumption of electricity generated by solar photovoltaic (PV) system users while allowing the sale of the excess energy to Distribution Licensee at prevailing Displaced Cost. The priority is for self-consumption, however, some premises, especially industrial or manufacturing companies, which may not be operating during the weekends, therefore, may have excess energy transported to the grid. The credit shall be allowed to roll over for a maximum period of 24 months. This mechanism is especially relevant for consumers that fall under the high electricity tariff block.*

being opened to more players, having long been the domain of near monopoly. The increase in competition will therefore help keep prices competitive.

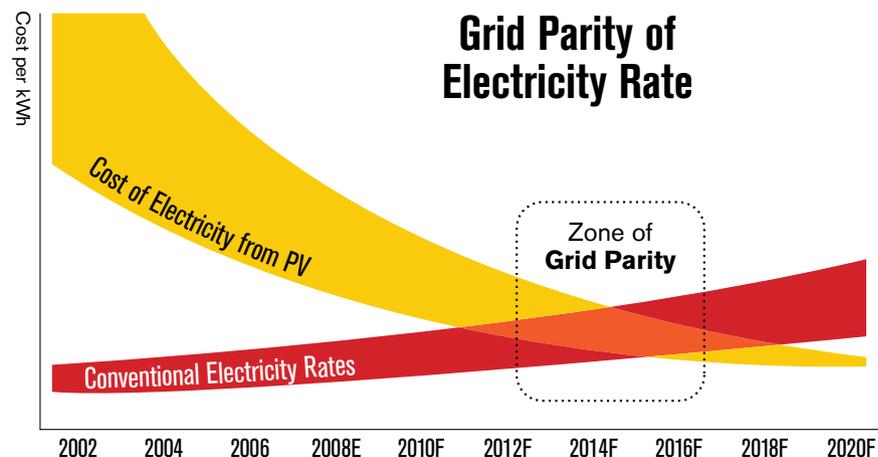
### Providing Relief

Even without subsidies (or rather with much reduced ones), there are still other initiatives that help reduce the impact of higher tariffs on the consumers.

One example is the establishment of Electricity Industry Fund (EIF), which the government can tap from in case of any surcharges resulting from a rise in fuel prices. This is another way for the government to assist the consumers by ensuring that the electricity tariff imposed does not burden them.

The contribution to EIF is the result of the renegotiation between the government and the first generation independent power producers (IPPs). The IPPs agreed to reduce the contract rate up to 20 and 70 percent. As of August 2017, the amount in the fund amounted to about RM1.39 billion.

It should be noted however that in order to maintain the rebate of sen 2.54 per kWh from July to December 2017, the government has taken around RM1.3 billion from the PPA fund. Therefore, industry experts foresee that the rebate



With the introduction of renewable energy, the cost of electricity will decrease and in time, will be able to meet conventional electricity rates.

Source: Energy Commission

is likely to be put on hold in 2018, and the imposition of a surcharge is expected during the next revision.

As for the commercial sector, there are also a number of special schemes formulated especially for the sector. One such scheme is devised specifically for the use of electricity during non-peak hours. For example, at night, when consumers do not use much electricity, industrial plants with high usage of electricity would be given a special tariff. This special tariff would allow them to save money and lower the cost of production.

### External Pressure

The expected increase in electricity tariffs in 2018 is not only caused by the reduction in gas subsidies, but also on external factors beyond the control of Malaysian authorities.

Whereas previously, gas-fired power plants accounted for more than 60 percent of Peninsular Malaysia's electricity generation, this has reduced over the years. In 2016, coal-fired plants produced 51 percent of electricity, with gas-fired plants contributing 45 percent.

## Tariff Rates Amongst Neighbouring Countries (sen/kWh)

Country (Utility)	RATES		
	Residential	Commercial	Industrial
Indonesia (PULN)	45	41	39
Thailand (MEA)	43	51	47
Malaysia (TNB)	22	44	37
Singapore (SP)	56	30	27
Philippines (Meralco)	75	52	50

Source: The Brattle Group and The Lantau Group



*“The nation’s dependence on fossil fuel has to be shifted towards a more sustainable source of energy and the transition has to be done well.”*

**– Ir Azhar Omar,**  
Acting CEO, Energy Commission

Ir Azhar Omar, the Energy Commission’s Acting CEO, pointed out that “70 percent of the tariff is influenced by fuel costs, which is linked to the global market price of coal and LNG.” In addition to changing prices, Malaysia also has to account for foreign exchange fluctuations as we import coal and pay for it in US dollars. Therefore, a weaker ringgit results in higher costs.

**Changes Needed**

There is a certain air of inevitability when it comes to an electricity tariff increase. While consumers may not welcome it, they can help alleviate the impact by practising good energy-using habits. Furthermore, as the price of electricity has been kept artificially low for so long, a more realistic rate may increase appreciation of the true costs of power production, leading to greater consumer responsibility.

Definitely, electricity wastage has been a problem in Malaysia. Datuk Nadzim Johan, the Head Activist of Muslim Consumer’s Association of Malaysia (PPIM), observes that “Often, consumers are not trained to handle



**Datuk Nadzim Johan**  
Head Activist, Muslim Consumer’s Association of Malaysia (PPIM)

such changes in their life. The lack of discipline at home will leave them exposed to any price increase. For instance, quite a lot of people do not practise the simple act of turning off switches when not in use, even though that can save a lot of electricity.”

Sustainability in energy is therefore not just a matter for the supply side, but also the demand side as well. That is why the Energy Commission is also focused on fostering greater awareness of energy efficiency among consumers.

These include, Ir Azhar mentioned, programmes such as the Energy Star rating, where certain household electrical appliances are given energy efficiency star ratings so that consumers will know which ones will help them save the most energy. As for consumers in the commercial sector, they are advised to consult an expert to conduct an energy audit of their company.

In order to ensure the long-term energy security of the country, and that the people are given a steady supply of electricity at reasonable prices, all parties involved – from suppliers to consumers to regulators – need to work together. The focus has to be on the long-term, and any short-term inconveniences need to be tolerated for a much brighter and sustainable future. **EM**

# THE PEOPLE'S INSIGHTS

It is the people that make up the backbone for any nation. It is what drives the economy and the wealth of the nation. Electricity is necessity for all its citizens, without it, they are not able to function properly. The government is responsible in ensuring that the wellbeing of its nation is taken care of. **Energy Malaysia** talks to the consumers of Malaysia on their insights in regards to the electricity tariff.

*"As a consumer, I would love to enjoy the rebates that are currently given by the government based on the fact that I could save money. However, as a teacher who specialises in economics, subsidies would do nothing but harm in the end. Like petrol, the government should also do away with subsidies on the electricity tariff."*

*"These subsidies could be used to develop rural areas that has little to no supply of electricity. The government could also invest in its pursuits of renewable energy. These alternatives would provide a boost and in the long run, the price of electricity will be at a level that would benefit its consumers."*

**Yusof Tafri**  
Teacher



*"Before settling here in Malaysia, I was living abroad in Japan and the price of electricity there is not cheap. I've also been to Singapore, Philippines and China, and I can safely say that Malaysia has one of the cheapest electricity rates in Southeast Asia."*

*"In my opinion, I don't think that consumers should be unhappy if there is a price increase in the tariff. Most of them could afford expensive mobile phones, expensive cars and clothes, I'm very confident that they are able to pay an extra few more ringgit when that situation arises."*



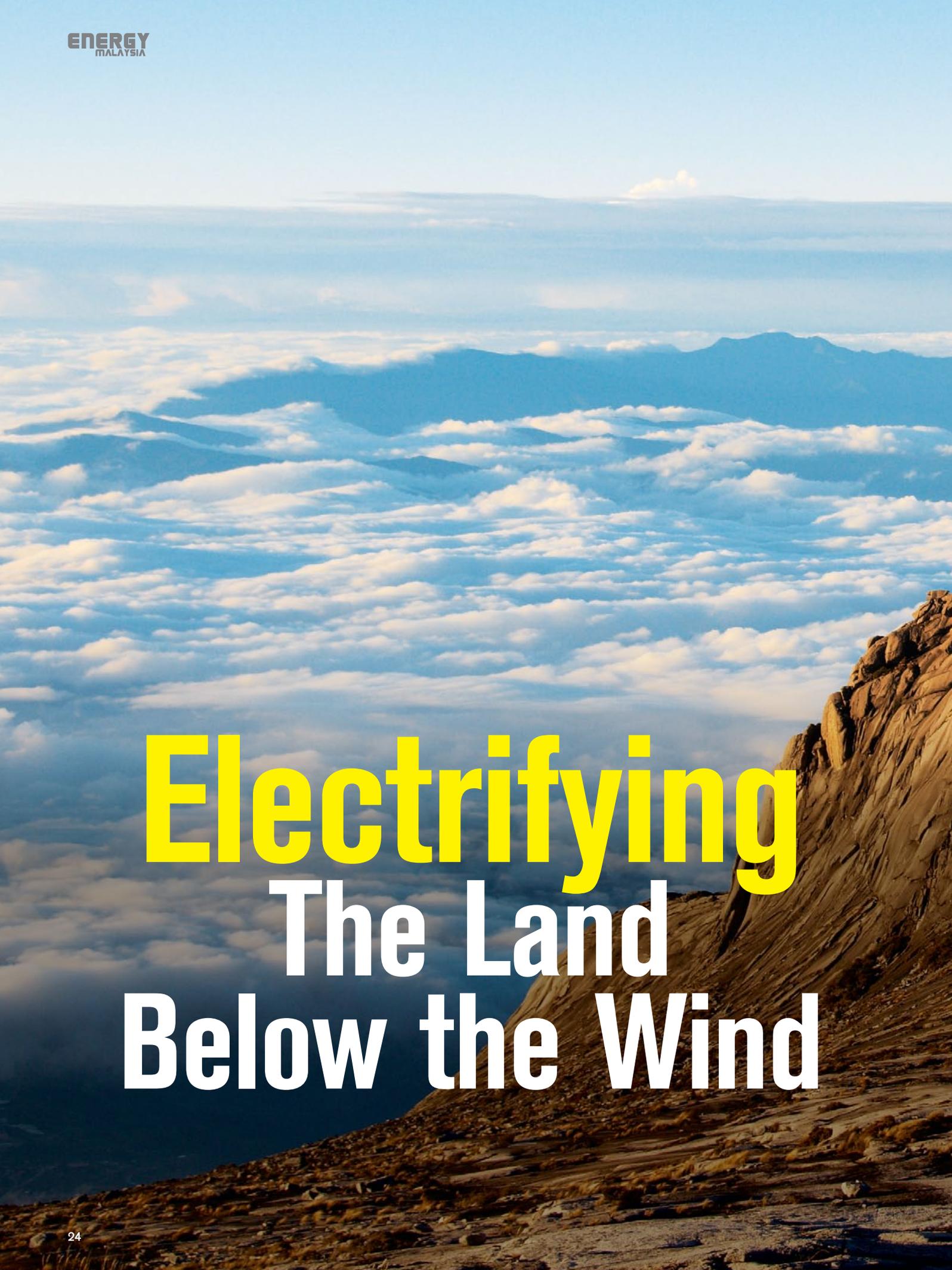
**Haslinda Mokhtar**  
Homemaker

*"I am happy that the government has decided that the price of electricity would not increase for this year. Lately, with the current economic climate, the price of everything has been increasing. I wouldn't be surprised if the government decided to increase the price of electricity too."*

*"Being a mother of three, the electricity usage in the house is quite high but I have been diligently reading up on ways to conserve electricity. Most of the appliances in my home have a 4 to 5 star energy rating, meaning that the appliances are energy efficient. As the weather brings a mix of rain and sunshine, the cool climate allows me to set the air conditioner at a level that does not consume too much electricity. These ways are effective and I've been using this method to teach my kids too!"*



**Brandy Yap Tein Lee**  
Accountant



# **Electrifying** **The Land** **Below the Wind**

*Abundant with various natural resources, Sabah and Labuan still rely on electricity to meet demands in support of its economic growth.*

**S**abah is the third most populous state in Malaysia with the population of 3.54 million in 2015. Yet only 82.8% of the consumers are domestic customers consuming only 28.8% of the total power generated. **Energy Malaysia** takes a look at the electricity tariffs in East Malaysia and why the electricity industry in Sabah and the Federal Territory of Labuan needs a boost.

### **An Origin Story**

Sabah had electricity as early as 1910 which was supplied by 3 separate organisations. The utility-scale supply was only commenced in 1922 by the Sandakan Light & Power Co. Ltd to Sandakan town through a 1,964kW timber waste-fired power station. Kota Kinabalu (formerly known as Jesselton) and Labuan followed on with supply from Jesselton Ice Co. Ltd and Labuan Rural Board respectively. In 1957, these three organisations consolidated to form North Borneo Electricity Board. This entity was renamed Sabah Electricity Board when North Borneo formed Malaysia with Federation of Malaya and Sarawak in 1963 after it changed its name to Sabah.

However, in 1984, Sabah Electricity Board was renamed as Lembaga Letrik Sabah (LLS) as a result of the enactment of Lembaga Letrik Sabah Act 278. Previously under the administration of the Sabah State Government, LLS is placed under the administration of the Federal Government to guarantee better allocation of fund for infrastructure development to mirror the state's economic growth. LLS then was privatised vide a Privatisation Agreement dated 26th August 1998 and subsequently changed its name to Sabah Electricity Sdn. Bhd. (SESB) on 1st September 1998. 80% of the equity in SESB

is held by Tenaga Nasional Berhad while the Sabah State Government holds the remaining 20%. Under the privatisation plan, the Government was to increase SESB tariff by 28% in 2000, 20% in 2004 and 3.58% in 2008 but unfortunately, it wasn't executed.

SESB power stations accounted for 57% of total installed generation capacity of 489MW at the point of privatisation. Unfortunately over the years, SESB lost to Independent Power Producers (IPPs) as the largest electricity producer in Sabah where SESB's capacity share is of 40% only out of 1,133 MW.

**The East vs The West**

Peninsular Malaysia has a higher average base tariff rate when compared to Sabah and Labuan. With no increase in tariffs for the second half of 2017, the average base tariff rate in Peninsular Malaysia is at 38.53 sen/kWh and 34.52 sen/kWh in Sabah and Labuan at the present. Only after 13 years of SESB's privatisation, first tariff revision was executed in 2011.

Taking effect starting 1st January 2014, the new rate for Sabah was announced together with the new tariff rate for Peninsular Malaysia. The Government announced a tariff hike for Sabah and

Labuan with a 5 sen/kWh or 16.9% increase at an average tariff of 34.52 sen/kWh from the previous 29.52 sen/kWh average rate. The average increase by sector is as follows:-

<b>Domestic</b>	<i>Average increase of 3.98 sen/kWh or 15.5%</i>
<b>Commercial</b>	<i>Average increase of 5.83 sen/kWh or 17.6%</i>
<b>Industrial</b>	<i>Average increase of 5.00 sen/kWh or 17.2%</i>

The tariff structure for Sabah was announced with the aim to narrow the widening gaps between the electricity generation cost and the current tariff rate to support its state's utility. The tariff structure will assist SESB in addressing the increase in operation and maintenance cost and high infrastructure cost for supply reliability and quality improvement. The government policy for subsidy rationalisation including gradual reduction of expensive fuel oil subsidies will also be addressed with the revision of the tariff rates in Sabah and Labuan.

*The increasing costs of generation and supply calls for the revisions of tariffs.*



### Lending a Helping Hand

Though Sabah and Labuan have lower average electricity tariff compared to Peninsular Malaysia, the revision of the electricity tariff is a continuous measure to allow SESB to meet the increasing costs of supply since 1986.

As of now, the average tariff of 34.52 sen/kWh is still not sufficient to sustain SESB's operations and infrastructure development. Without any increase in tariffs for the next term, the gap will become wider in comparison to the cost of supply of 55.68 sen/kWh without subsidies and 43.37 sen/kWh with subsidies respectively. Thus, a structured and gradual tariff increase needs to be effected as a solution to reduce the gap between the true cost of supply and required revenue.

From 2012-2016, due to that substantial gap, SESB has been reliant on Government financial assistance for electricity supply needs in Sabah which sums to RM4,148 million. The financial assistance is intended for operating and investment support which consists of fuel subsidy, tariff support subsidy, tariff rebate, grant as well as soft loan. The details of the government financial assistance from 2012 to 2016 are as follows:-

Operating Support	Investment Support
<b>Fuel Subsidy</b> RM2,509 million	<b>Grant</b> RM476 million
<b>Tariff Support Subsidy</b> RM83 million	<b>Soft Loan</b> RM1,023 million
<b>Tariff Rebate</b> RM57 million	
<b>Total = RM4,148 million</b>	

### Sabah Electricity Tariffs



UNIT SEN/KWH	
Tariff DM – Domestic Tariff	Current Rate 1 Jan 2014
For the first 100 kWh (1-100 kWh) per month	17.5
For the next 100 kWh (101-200 kWh) per month	18.5
For the next 100 kWh (201-300 kWh) per month	33.0
For the next 200 kWh (301-500 kWh) per month	44.5
For the next 500 kWh (501-1000 kWh) per month	45.0
For the next kWh (1001 kWh onwards) per month	47.0
<i>The minimum monthly charge is RM5.00</i>	

Source: [www.sesb.com.my](http://www.sesb.com.my)

*Note: The postponement of the 2011 tariff revision for 75% of the domestic consumers (with monthly consumption below 350 kWh) was carried out in the form of an adjustment in monthly bills. This postponement on adjustment of bill ended on 31/12/2013.*

### Peninsular Malaysia Electricity Tariffs



UNIT SEN/KWH	
Tariff A – Domestic Tariff	Current Rate 1 Jan 2014
For the first 200 kWh (1-200 kWh) per month	21.80
For the next 100 kWh (201-300 kWh) per month	33.40
For the next 300 kWh (301-600 kWh) per month	51.60
For the next 300 kWh (601-900 kWh) per month	54.60
For the next kWh (901 kWh onwards) per month	57.10
<i>The minimum monthly charge is RM3.00</i>	

Source: [www.tnb.com.my](http://www.tnb.com.my)

SESB has embarked on various initiatives to unceasingly improve the security and reliability of electricity supply in Sabah and Labuan. However, with the people's interest in mind further improvements need to be done in order to meet rising demands and support Sabah's economic growth. **EM**



# The State of Gas

## Championing Competencies in the Gas Industry



**U**TM-MPRC Institute for Oil & Gas (previously known as Gas Technology Centre – GASTEG) and University Teknologi Malaysia have organised training programmes with regards to matters of gas. Professor Dr. Rahmat Mohsin, the Director of the Institution further elaborates on the importance of these programmes for the gas industry.

The training programmes to date comprise of three major categories to include gas engineers, gas fitters and those affiliated with the gas supply. The institute has also been given a mandate by the Ministry of Higher Education in 2013 as the Industrial Centre of Excellence (ICoE) in the promotion of various activities for fresh

graduates to acquire industrial bridging programme through the graduate employability (GE) scheme.

Prior to approval, the current programmes organised by the institute are fully vetted by the Energy Commission. This is to ensure that the programme is in line with the requirements under the *Gas Supply Act 1993*. The Energy Commission would determine the appropriate entry level such as the basic qualifications and requirements needed to attend the course and the evaluation of Gas Engineers will be based on the examinations and project assessments while other programmes would only require an assessment through examination.

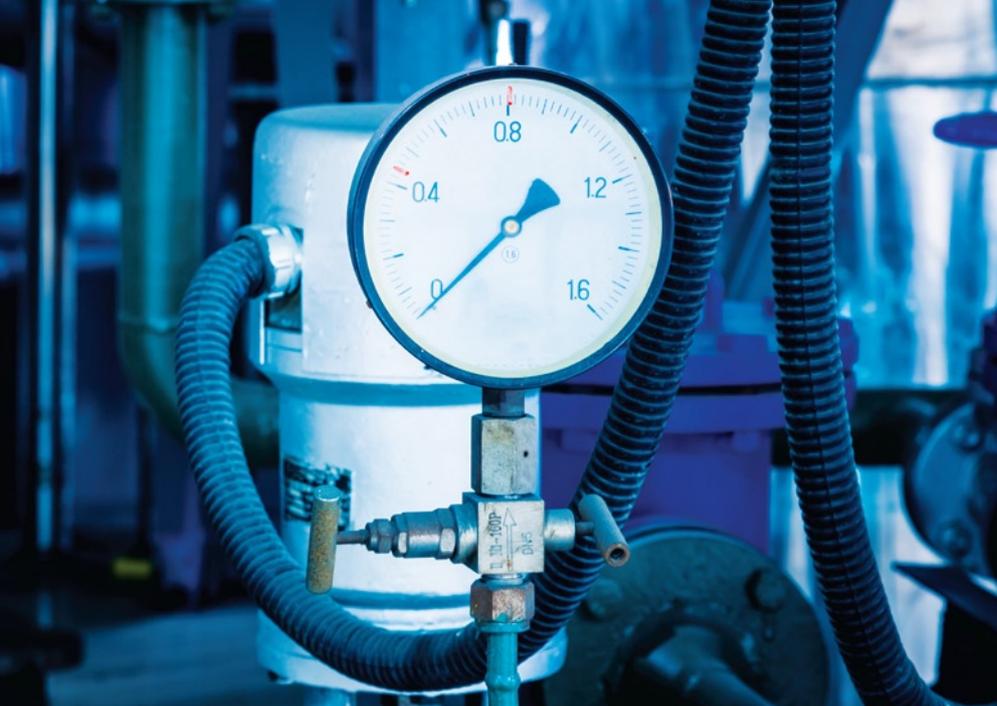
Eligible candidates will be provided with comprehensive training materials which include training modules and a training schedule for the overall activities involved. At the end of the session, an assessment will be

conducted by the Energy Commission for deliberation and due approval. Candidates that pass the assessment are eligible to sit for the examination for a Certificate of Competency.

Since its establishment, the overall success rate has been encouraging. Participants who have successfully attended and passed the evaluation are awarded a certificate upon the approval of the Energy Commission. The majority of the competent skill force in the gas industry in Malaysia has undergone the appropriate level of training conducted by the institute. Recognition that was given by the Energy Commission to the institute in 1997 has directly allowed the institute to spur positive outcomes to the gas industry in Malaysia by providing professional training to its personnel.

More than 400 companies have participated in the course organised by the institute, which in turn increases the level of understanding among gas





## A CERTIFICATE COURSE IN

1

### **Gas Engineers and Gas Engineering Supervisors**

This professional course is dedicated for those who intend to serve the gas industry as a competent person that are eligible to engage in the endorsement of the highest level of gas installation classes – which may involve Natural Gas (NG) or Liquefied Petroleum Gas (LPG). Those that intend to pursue the course must have at least an Engineering Diploma that is recognised either locally or abroad. Candidates who successfully pass the course evaluation would be considered for an interview conducted by the Energy Commission in order to be certified as a gas competent personnel. The participants for this course are usually professional engineers, managers, supervisors, company owners and consultants. Once application is successful, the course will be delivered within 98 hours of contact.

2

### **Gas Distribution for Gas Fitters**

This course is intended to address the requirement competency in serving the gas industry skill force as competent Gas Fitters Class I, Gas Fitters Class II and Gas Fitters Class III, according to their skill requirements. This particular course is further subdivided according to the relevant classes to suit the appropriate

class installation as specified by the Gas Act 1515. The basic academic qualification for this type of course is SPM Leavers. The course is suitable for those involved in the installation and operation of gas system facilities at a technical entry level, such as technicians, operation and maintenance staff, charge man, technical supervisors and technical personnel.

3

### **Gas Distribution for Responsible Persons**

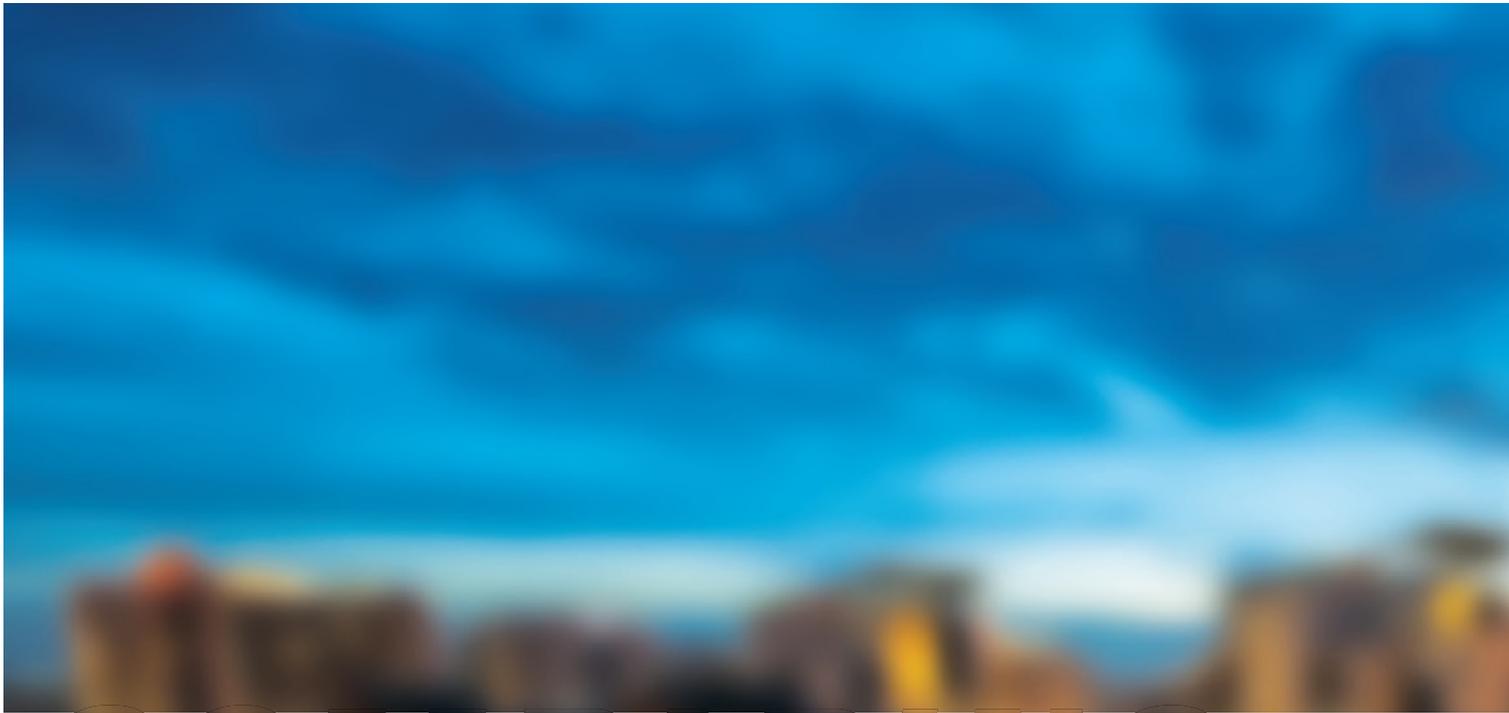
This is a dedicated course in the basic operation and installation of gas system facilities for those in charge at any premise installed with gas pipe facilities.

The course is intended to address technical knowledge of the basic gas properties, piping installations, operation and maintenance of the gas system with a special topic on gas-related acts and standard practices. The course is typically attended by technical personnel, gas facility owners and end users from institutions or companies with gas piping facilities. The course offered would enable the basic understanding of the gas properties, relevant standards and acts, gas safety measures and an overall study on gas operations and its maintenance. It would directly provide the participants with close knowledge and familiarisation with their own gas piping facilities.

operators and industrial practitioners. At present, there are 46 series of professional Course in Gas Distribution for Gas Engineers and Gas Engineering Supervisors that have been conducted to an estimated 700 participants from the gas industry. Apart from that, the institute has also conducted 87 series of Responsible Person Course of which more than 1300 participants have attended. Meanwhile, more than 450 participants have successfully attended the Gas Fitters Course Class I, II and III. Most of the successful participants are currently rendering their expertise by serving in the gas sector.

For all courses offered by the institute, familiarisation of gas installation facilities would be further addressed through site visit sessions at gas installation sites located within close vicinity of the course centres. The centres for facilitating the courses are located in Johor Bahru (for the southern region), Kuala Lumpur (for the central region), Kota Kinabalu (for Sabah) and Alor Star (for the northern region).

The programmes conducted are of significant importance to equip the nation with a competent human resource that is capable of upholding the integrity and safety of gas installation and its operating system. Operating the gas distribution system in a safe manner plays a major role towards contributing and generating highly effective means of energy, for the overall benefit of the nation. **EM**



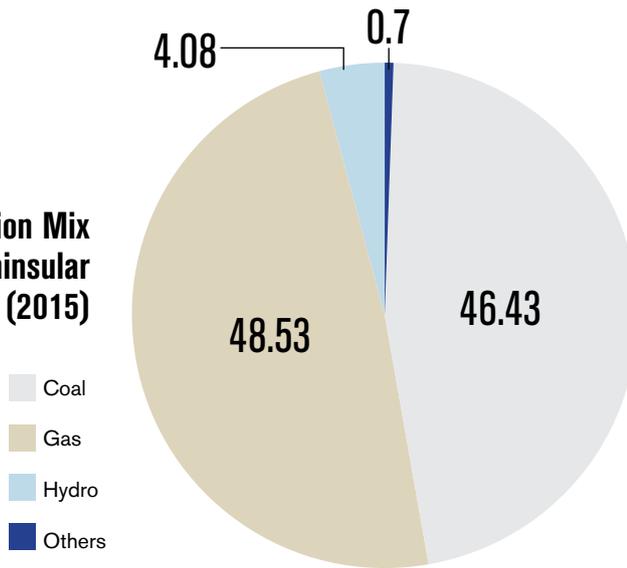
# ***COMPARING ELECTRICITY SELLING PRICES***

**T**he Energy Commission regularly analyses the latest energy statistics, analytics and reports in the energy industry. It then showcases the results of these studies in publications, which are available in hard copy or for download on the Energy Commission's website. By ensuring such transparency and making the information available to the general public, the energy sector regulator hopes to engender a deeper appreciation of the issues that affect the sector in the country.



*For the past century, electricity remains one of the driving forces of its nation's wealth and sustainability.*

**Generation Mix for Peninsular Malaysia (2015)**



- Coal
- Gas
- Hydro
- Others

Source: Performance and Statistical Information in Electricity Supply Industry in Malaysia (2015) by Suruhanjaya Tenaga Malaysia (p.90)

Getting feedback would be beneficial for both parties in maintaining the efficiency and effectiveness of the power consumed.



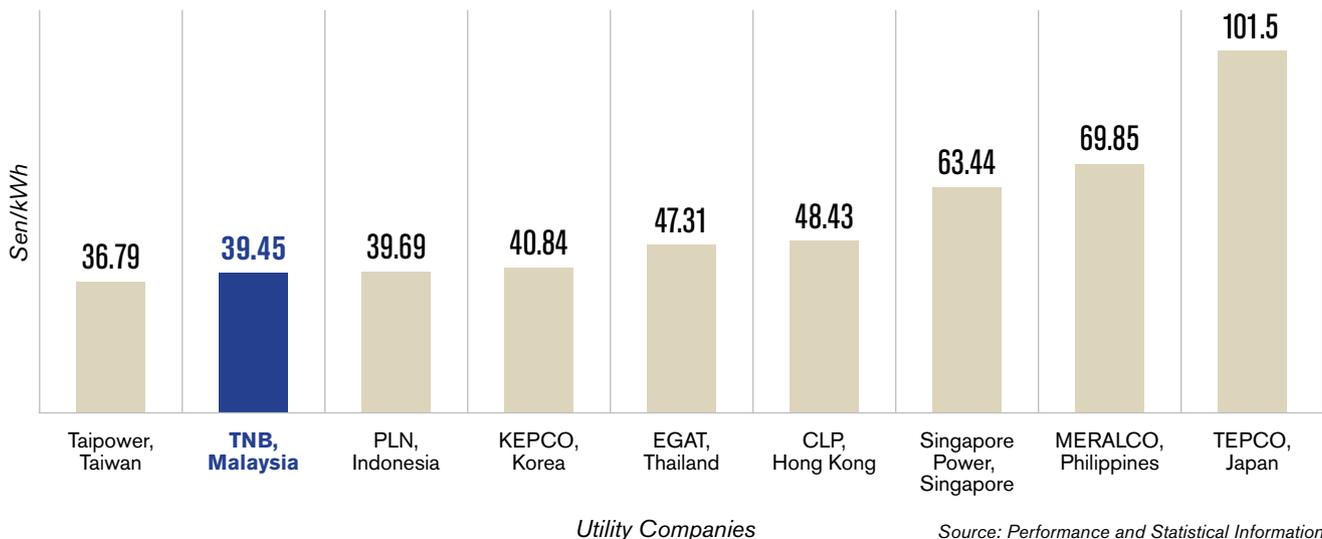
**Setting the Average**

In the *Performance and Statistical Information in Electricity Supply Industry in Malaysia (2015)* report, which is published annually by the Energy Commission, a comparative study was made comparing the average price of electricity between utility companies in nine Asian countries.

These companies and countries include Tenaga Nasional Berhad (TNB) in Malaysia (Peninsular), Taipower in Taiwan, Perusahaan Listrik Negara (PLN) in Indonesia, and Korea Electric Power Corporation (KEPCO) in the Republic of Korea. Also in the

list are the Electricity Generating Authority of Thailand (EGAT) in Thailand, CLP of Hong Kong, Singapore Power of Singapore, the Manila Electric Company (MERALCO) of the Philippines, and Tokyo Electric Power Company (TEPCO) of Japan.

**Electricity Average Selling Price Among Asian Utility Companies As Of 2015**



Source: Performance and Statistical Information in Electricity Supply Industry in Malaysia (2015) by Suruhanjaya Tenaga Malaysia (p.90)



The average selling price of electricity was calculated by factoring in the different tariffs imposed on various sectors in the country. These include Domestic, Commercial, Industrial, Public Lighting, Mining and Agriculture. As such, on a sector to sector comparison, some utilities may charge less for certain types of consumers than others, although their overall charges may be higher.

One such example would be the rate imposed on commercial consumers in Peninsular Malaysia by TNB compared to that of PLN in Indonesia. The Indonesian utility charged around the equivalent of 47.18 sen per kWh, which is slightly lower than TNB's price of 47.68 sen per kWh.

However, when we take domestic tariffs into consideration, we see that Malaysian homeowners enjoy a much lower price of electricity than their Indonesian counterparts. Whereas domestic consumers in Indonesia pay around 41.27 sen per kWh of electricity, those in Malaysia only need to fork out 32.67 sen per kWh.

**Comparing Costs**

Overall, people residing in Peninsular Malaysia enjoy one of the lowest

electricity tariffs in the East Asian region, with TNB selling electricity at an average price of 39.45 sen per kWh. Only Taipower in Taiwan charges less at 36.79 sen per kWh. On the upper end of the scale, the three most expensive electricity utilities in Asia are Singapore's Singapore Power with an average selling price of 63.44 sen per kWh, the Philippines' MERALCO which charges 69.85 sen per kWh, and Japan's TEPCO, which tops the table with a price of 101.5 sen per kWh.

A crucial element that determines the electricity tariff in Malaysia is the base tariff and Imbalance Cost Pass Through (ICPT). The base tariff comprises the cost of transmission and distribution system, base fuel purchasing cost; operation, maintenance and administration costs. Other factors taken into consideration include fuel prices, the consumer price index (CPI), and the ringgit exchange rate.

Using the ICPT mechanism, the Malaysian Government can revise the tariff every six months, imposing either a surcharge or a rebate depending on the variances between actual customer demand and forecast

demand or variances between actual fuel prices and forecast prices.

**The Role of Consumers**

Being among the lowest among nations has its advantages, but implementing subsidies on tariff will be detrimental in the long run. Presently, consumers are still enjoying rebates given by the government but it aims to rationalise the price of tariff as they did with gas. Based on the study, many policies and implementations can be done in order to remain competitive in terms of energy security and efficiency.

One example would be providing more information on household electricity bills to spread awareness towards consumers to change their behaviour. Additional indirect measures include a more comprehensive report and easy-to-use online interfaces. An assessment study has been made that shows direct feedback could result in energy saving from 5% to 15% while indirect feedback from 0% to about 10%. Considering the cost and practicality of these, it is a great way to improve efficiency and conservation of electricity.

No single tariff type or structure is the unequivocal best to use in a global comparison across cities. Furthermore, multiple tariff types may be available to some customers. However, the Malaysian government has been carrying some of the burden all in the pursuit of easing the lives of its citizens, and perhaps it is time that change comes from the demand side. **EM**



# THE ASEAN

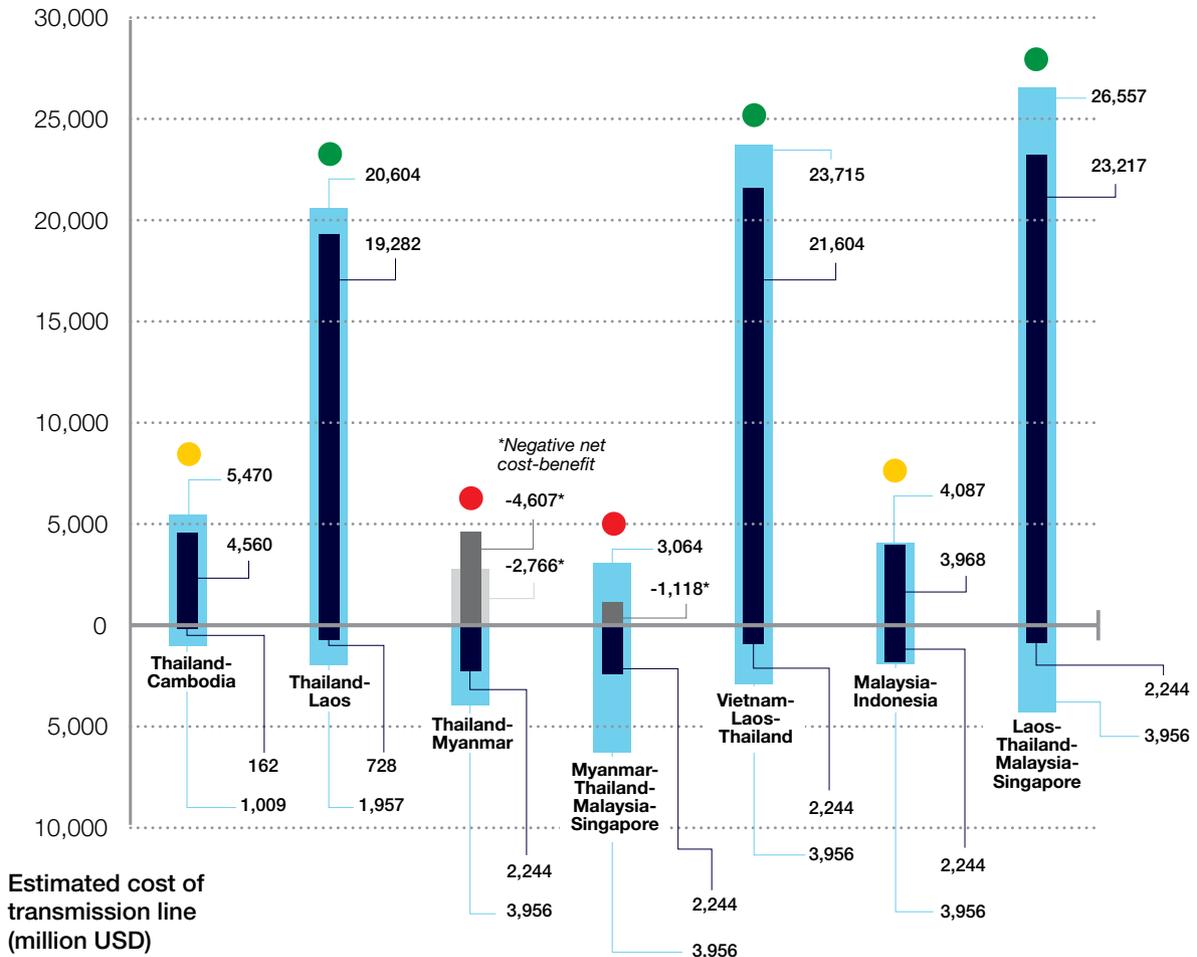
**D**riven by the economic and industrial development, population growth, and higher living standards, the demand for electricity in the Asia-Pacific region is projected to be more than double between 2010 and 2035. This significant growth rate is higher than that of any other region in the world. A critical component of the region's economic development lies in its capacity to secure reliable, affordable and sustainable energy supplies.



# AAAP CONNECTION

## Proposed Projects

Possible cumulative net cost-benefit range (million USD)



Estimated cost of transmission line (million USD)



Source: Economic Research Institute for ASEAN and East Asia (ERIA)

*The completion of the LTMS-PIP is definitely a complex issue, once solved, would definitely bring immense benefits for all parties.*

Malaysia signed a tripartite agreement between its neighbouring countries, Laos and Thailand to expand Lao PDR hydropower electricity generation and interconnection to Malaysia through Thailand. The agreement will enable Malaysia to purchase up to 100MW from Laos using Thailand's transmission system and expects to export another 100MW of power to Singapore via Thailand and Malaysia's network by 2020 as the second phase.

As the first multilateral energy exchange or trading in ASEAN, this understanding is an important step for the expansion under the Laos-Thailand-Malaysia-Singapore Power Integration Project (LTMS-PIP). The sale of energy will be pursued under the initial phase of the LTMS-PIP which has the four countries engaged in talks and activities supporting LTMS-PIP as a pathfinder to complement existing efforts towards realising multilateral electricity trade in

the Asean Power Grid and the Asean Economic Community.

### Positive Impacts

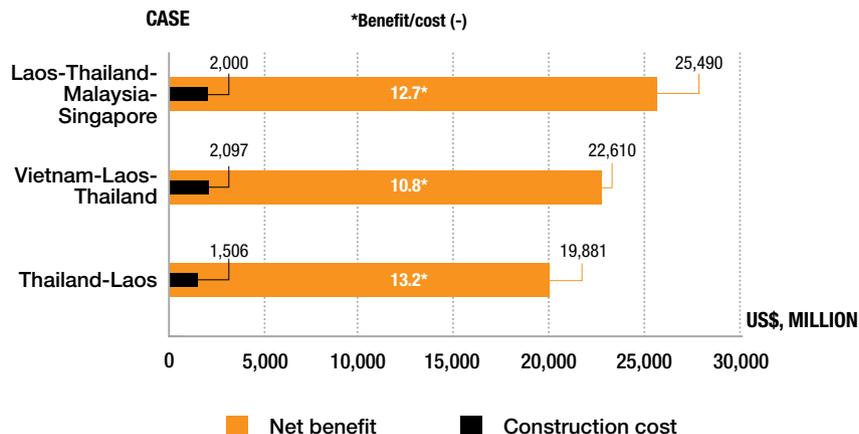
During the signing of the project, the Malaysian Minister for Energy, Green Technology and Water, Datuk Seri Maximus Ongkili Johnity said that this project demonstrates Malaysia's effort to meet its commitment to bring down greenhouse gas emissions, as set out in

the Paris agreement on climate change. Malaysia has progressively focused on intensifying the proportion of renewable energy sources in the energy mix. According to the 11th Malaysia Plan, the country aims to have 2,080 MW of renewable electricity capacity by 2020.

Power exchange is good economics as it can result in benefits such as reduced cost of electricity supply in addition of improving electricity availability. This is a milestone for ASEAN in energy trading. It is not something recent, having subsisted in discussion for more than a decade under the ASEAN Power Grid Initiative, which seeks to boost economic cooperation among member countries, and also heighten energy security in the region. Furthermore, it would benefit Malaysia, with pricing being very competitive and below the average tariff rate of 38.53 sen as compared to conventional sources.

The LTMS-PIP will also have particularly positive knock-on effect for Laos. The country, assisted by financial support from China, has invested heavily in developing its hydropower network in recent years with the hope of becoming the "battery of Southeast Asia" and providing the country with new markets will bring in more foreign investment and stimulate its economy.

## Return on Investment, 2025-2035



A study was conducted on the interconnection between various nations. This study shows the amount of money that can be saved with the implementation of the ASEAN Grid. As Malaysia has paved the way with the LTMS-PIP project, it is expected to profit US\$12.7 million on its return on investments.

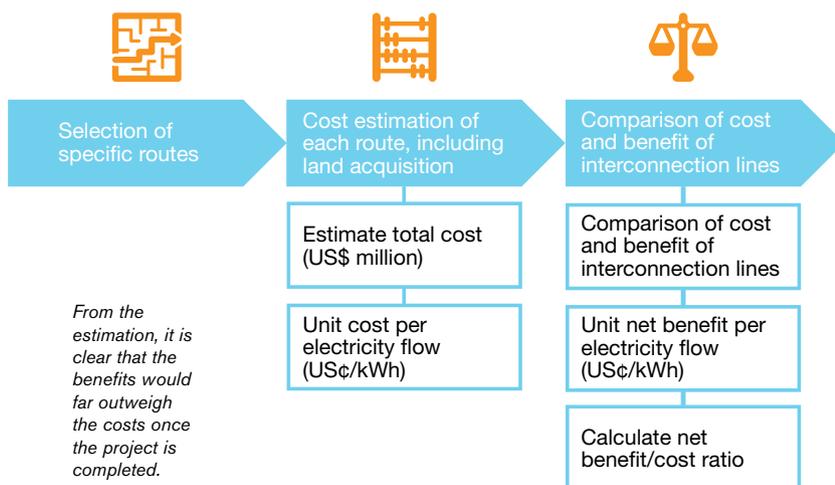
Source: Economic Research Institute for ASEAN and East Asia (ERIA)

### Beneficial Partnership

Energy is the key driver to transform ASEAN into a stable, secure, prosperous, competitive and resilient economic region. A fully functioning regional grid bears many benefits to the countries involved. Through such interconnection, the development of renewable energy resource which are in abundance around the region could be further developed.

In addition, the interconnected grids can take advantage of the varying timing of peak and non-peak hours in different countries which could save a large portion of the investment in expensive peak power generation capacities. It is also capable of enhancing the overall capacity of countries to adopt renewable sources of power generation, such as solar voltaic and hydroelectricity. According to the ASEAN research, by implementing feed-in-tariff (FIT) policy for renewable energy, the adoption rate of renewable energy can be increased by 70 percent.

## Methodology for Cost Estimation



Source: Economic Research Institute for ASEAN and East Asia (ERIA)

The LTMS-PIP project is still in its infancy stage however, but it is a start in the right direction. Other nations from ASEAN can take heart that this dream of having an integrated power grid shared among them can finally be realised, for the benefit of all in terms of energy security of efficiency. **EM**

# NATION'S POW



# POWER OPERATORS



**T**he National Grid is one of the most important infrastructure that is running the nation today. This grid system ensures a sustainable source of electricity without any disruption for the nation. **Energy Malaysia** powers into the life of a Grid System Operator (GSO), the people responsible for handling the system that powers the very nation.

## An Enormous Role

Almost everything is being powered by electricity and the demand for electricity seems destined to rise. As demand increases, the tolerance for failing to supply adequate electricity starts to wear thin.

Ir. Gurcharan Singh, the Head of Grid System Operator believes that there is only one primary function of a GSO and that is to ensure that the power is supplied to consumers throughout

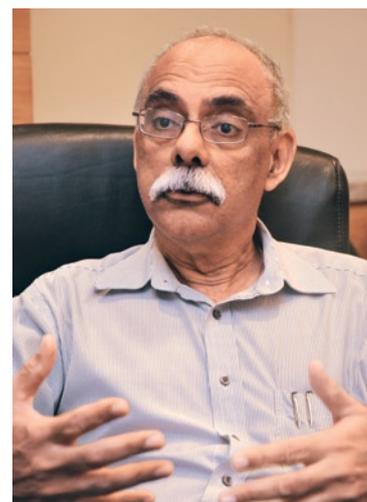
the peninsula at an optimum cost.

The operators would coordinate and direct electricity flows onto and over the transmission system, balancing the generation's supply and user demand in accordance to a regulated framework set by the Energy Commission.

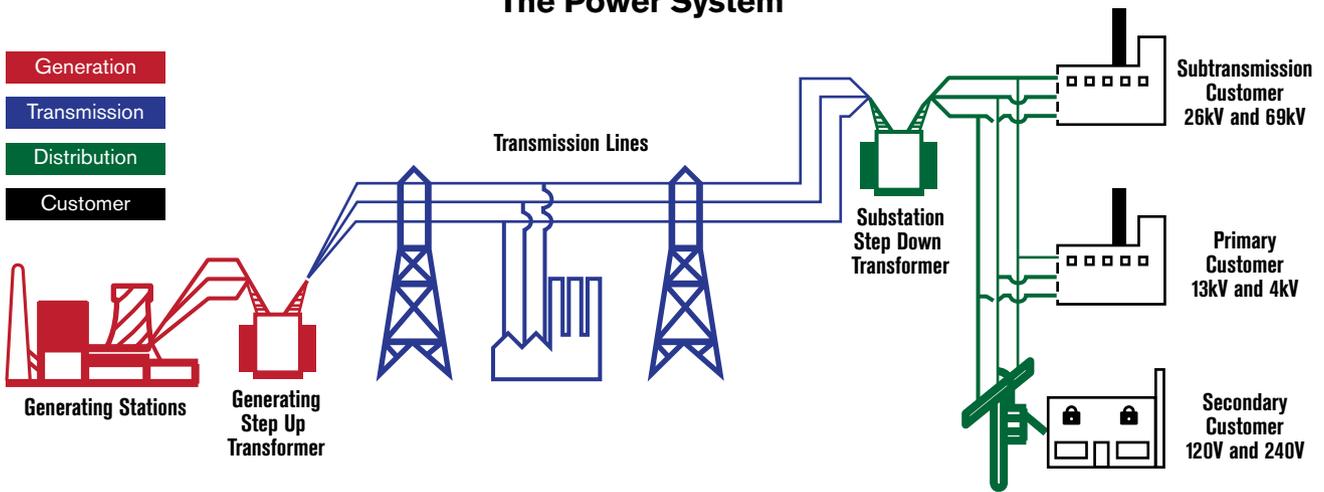
Grid system operators role are by no means a walk in the park as they have to manage their work by the minute. The National Grid provides a baseload, with

*"The energy landscape is continuously changing. We have to adapt to these challenges head on. Our aim is to achieve no disruption and no power quality issues in the National Grid so that our nation is continuously powered consistently and effectively."*

**– Ir Gurcharan Singh,**  
Head of Grid System Operator



## The Power System



The National Grid shows the process and importance in supplying electricity to the nation from generating power to the consumer receiving it.

Source: The Malaysian Grid Code

safety and fault tolerance margins. The peak load times vary, for example, the load during 7am would be high as many manufacturers and offices would need power to begin work and production. The GSO has to monitor the situation, using the proper voltage and right frequency to supply the power. The grid usually does not have a large buffering capability to match the loads with the generation. Therefore, operators would match the load with the generation produced to prevent overloading failures of the generation equipment.

### Ever-changing Landscape

To improve operations and further reduce the probability of a blackout, Gurcharan and his department has invested in a state of the art technology from overseas. This intelligent system would be able to forecast any errors ahead of time and be able to rectify it before it implodes. Take for example, that the nation is prone to lightning strikes which will then lead to power outages and blackouts. This tech automatically reacts to the problem and ensures that there is enough power being supplied through. Gurcharan also said that, Malaysia is one of the first nations that has this type of tech in its operations in the National Grid.

As more and more countries are turning to green energy, Malaysia is also adopting this initiative. The use of solar energy is steadily rising, although

it is great for the environment, it is challenging to manage. Gurcharan states that what makes it complicated for a GSO is having the ability to ramp up and down quickly, which will be required as the sun energy vary in intensity due to the weather that the country is experiencing.

Technology has greatly eased the burden of the operators. Still, it only means that the technical aspect of the job has increased with all the progress in the technology. Gurcharan has stressed that the competency among system operators has to be at the highest level to accommodate the technology at their disposal.

### Only the Best

The job of a GSO is exciting yet very demanding. A grid system operator undergoes hours and hours of training, and their continuing education resembles what the airlines give their pilots; extended sessions in full-scale simulators around 4-6 times in a year, so the trainers can set up dire problems and see if the trainees can diagnose the situation and respond fast enough to prevent a catastrophe.

The increased training did not come without difficulty. Gurcharan said that it requires vast amounts of time to do it, and nobody has a lot of time. The utility industry is no different from

anybody else. On the job, operators have to typically work four 12-hour days a week, alternating between days and nights. However, all GSO are paid really well. With overtime, they commonly earn six-figure salaries.

Recruiting has been quite a challenge. The department look for candidates with some background in engineering, but they also need certain personality traits, like the ability to work collaboratively and have appropriate organisational and technical skills. Operations are also governed by rules about how much air pollution a generating station is allowed to emit; how much it is permitted to raise the temperature of the lake or river it uses for cooling water; and how much power must be generated within a geographic area, regardless of capacity elsewhere, to ensure reliability. Some of that is built into computer programming, and some of it is drilled into the operators' heads.

It is important that people know how significant the National Grid is and the people operating them. It is the heart of the nation, pumping the life and productivity of its people with continuous supply that is effective and efficient. **EM**



Mohd Elmi bin Anas, the Director of Electrical Safety Regulation, (second from left) officiating the launching of Energy Commission's two new code & guideline in hopes of creating awareness.

# Priority in Safety

**A**s the energy sector regulator, the Energy Commission is responsible for overseeing and promoting electrical safety in Peninsular Malaysia and Sabah. One way it does so is through publishing various codes and guidelines aimed at creating awareness among industry players and stakeholders. Two recent examples are the *Non-Domestic Electrical Installation Safety Code* and the *Guideline for the Design, Installation, Inspection, Testing, Operation & Maintenance of Water Heater Systems*, both of which were launched in Putrajaya on 24 August by Mohd Elmi Anas, the Energy Commission's Director of Electrical Safety Regulation.



The event has attracted 150 participants from various industries, each eager to learn on the new developments in the guideline.

Under the *Electricity Supply Act 1990*, the Energy Commission is mandated to investigate any reported electrical accidents. Over the past 15 years, it has done so in over 899 cases of electrical accidents inclusive of 448 fatal cases. This works out to an average of 58 electrical accidents cases per year over this period of time.

In-depth investigations revealed that the majority of accidents resulted from improper equipment installation and maintenance. Other causes include failure to follow safe work practices, carrying out dangerous activities near public electrical installations, trespassing at electrical installations, and misusing electrical systems. Despite that majority of accidents took place at utility's installation, 26% of incidents occurred in the non-domestic electrical installations such as factory premises, commercial buildings and schools, whilst 15.7% involved residential premises.

Therefore, the Energy Commission organised this seminar, not only to promote the new code and guidelines, but also to instil awareness of the various safety risks and the measures to overcome them.

**Ensuring Electrical Safety**

The *Non-Domestic Electrical Installation Safety Code* was developed and issued by the Energy Commission, in line with Section 33B of the *Electricity Supply (Amendment) Act 2015*. This section states that the owner or operator registered under this Act, licensee for

retail & licensee for a private installation must comply with the Code and the safety management programme contained within it.

Among the objective of the Code is to provide safety requirements in relation to design, construction, operation, inspection, testing and maintenance of non-domestic installations. Additionally, the Code addresses the type of safety tools and equipment used in carrying out electrical works.

The Code also states that owners or operators of non-domestic electrical installations, retail licenses and private installations are responsible for ensuring the safety, maintenance and repairs of their own installations. Public licensees on the other hand are required to comply with another Code, namely *Electrical Infrastructure Safety Code*, and prepare their own safety management plan.

**Securing Water Heater Systems**

As mentioned, improper installation and maintenance is the primary

cause of electrical accidents in Malaysia. Following the incoming number of electrical accidents involving water heaters, the Energy Commission drafted the *Guideline for the Design, Installation, Inspection, Testing, Operation and Maintenance of Water Heater Systems*, to address specific aspects of electrical wiring, accessories and safety aspects in the operation and use of water heater systems.

This guideline covers instantaneous, storage and solar water heaters (with a capacity of up to 300 litres), and is aimed at all stakeholders in the water heaters industry as the main target group. This includes manufacturers, importers, installers, those who carry out maintenance and repair work, and of course the general public.

The industry and general public should comply with this new guideline in order to protect their interest and to educate themselves about certain safety measures to be taken with regards to water heaters.

Moving forward, the Energy Commission is in the final stage of preparing the *Electrical Infrastructure Safety Code*, and is also drafting the *Guideline for the Design, Installation, Inspection, Testing and Maintenance of High-Risk Installations or Locations*. These initiatives are aimed at protecting the public from electrical hazards, and are being developed in collaboration with industry players. **EM**

# Europe's Role as Energy Regulators

**E**volv Energy Markets (EEM) is focused on the fast-growing Asian-Pacific market. Their extensive hands-on market experience in Europe allows for tailored solutions for a specific market. As such, Mark Dalton, the Director of EEM was invited by the Energy Commission to give a talk on the European Union's role as regulators in the energy market.



Dalton started his talk by highlighting the differences between regulatory bodies in the Malaysian and European energy sector. For example, whereas the Energy Commission in Malaysia is responsible for both regulating the energy market and creating policies that benefit the people; in Europe, policy makers and regulators are separate entities.

Dalton further explained how energy policy is set in the European Union. Policy makers would first recommend the change and then the regulators would then work with the industries affiliated to implement these policies. Once the implementation is complete, transporters or market operators would push these policies into "network codes".

In some instances, policies might not bring about the desired result. Dalton emphasised though that does not necessarily mean that there was



*Ir Azhar Omar, the acting CEO of the Energy Commission taking notes and learning the system of Europe's Energy Regulators.*

a failure in regulation. One example he gave was the power outages in Adelaide, Australia, which he pointed out were due to weak policymaking.

This came about because the Australian Energy Market Commission seemingly did not raise policy issues with the Australian government. Instead of being proactive, it waited for instructions to examine the areas of concern such as the workings of the East Coast Australia Wholesale Market and the Retail Energy Market. As a consequence, the energy policy did not reflect the reality of what is happening yet ends up having to shoulder the market failure.

Mark Dalton also said that it is critical for Board of Regulators to be independent of government control. Although it might not be popular, regulations exist for a

reason. Apart from monitoring, investigating and enforcing compliance, it aims to promote consumer interests as well. Through effective oversight, there will be transparency in markets and price levels will not expand exponentially.

European energy regulators are also effective when it comes to policing market rules. After all, it would not be in the consumer's interest for the market confidence to fall. In order to achieve maximum efficiency, staffs employed not only have to be sufficient but must also be knowledgeable in the relevant fields. The appropriate monitoring systems are also needed for timely information as well. On a national level, regulators could work with

other countries to learn on how they tackle their own issues with regards to the energy markets as well.

Though the system may not be completely perfect, it is showing great results. The Energy Commission has received great insights and perspective from their neighbours in the west. With this, they are able to improve their current system to ensure the energy market in Malaysia is managed both effectively and efficiently. **EM**

# The Green Master Plan

**O**n 12 October, the Minister of Energy, Green Technology and Water, Datuk Seri Panglima Dr. Maximus Johnity Ongkili officiated the 8th International Greentech & Eco Products Exhibition & Conference Malaysia (IGEM 2017), ASEAN's leading green technology business innovation platform. During the launch, the Minister unveiled the Green Technology Master Plan (GTMP) which outlines Malaysia's strategic plans for green technology development to create a low-carbon and efficient economy.



*Datuk Seri Panglima Dr. Maximus Johnity Ongkili officially kicks off the 8th International Greentech & Eco Products Exhibition & Conference Malaysia (IGEM2017).*

Themed 'Powering Green Cities', the three day event is helmed by the Ministry of Energy, Green Technology and Water ( KeTTHA) and co-organised by Malaysian Green Technology Corporation (GreenTech Malaysia). The eighth edition features 350 booths from 20 countries and is set to attract 25,000 visitors. The event aims to generate RM1.6 billion in business leads for the green industry.

The exhibition floor displayed the latest green innovations in developing sustainable cities in the areas of green energy, green transport, green buildings and green industry. The floor also incorporated the Green Energy zone where it featured leading solar industry players from all over the world. The Green Transport zone displayed the latest sustainable transport innovations from leading automotive manufacturers including Volvo, Honda and BYD Auto.

The Green Building zone featured a range of organisations that are championing the incorporation of sustainable building practices such as Malaysian Timber Certification Council, AL-CO Malaysia, which are supported by the IGEN 2017 Conference. The Green Industry zone also showcased manufacturing and production leaders both local and international.

Several strategic partnerships were forged at IGEN 2017 including a tripartite agreement between Petronas Dagangan Berhad, TNB Energy Services and GreenTech Malaysia to boost the network of electric charging stations across the country. An MoU was also signed between Prasarana Malaysia Berhad and GreenTech Malaysia for the development of Prasarana's sustainability blueprint, which were inked during the official opening ceremony.

Since its inception in 2010, IGEN has established a successful track record, generating more than RM10 billion in



*The 3-day event attracted more than 25,000 visitors, from all over the world. This is a positive indication that Malaysia is capable of being a forerunner in the global green movement.*

business leads, attracting over 2,000 exhibitors and 380,000 visitors from 50 countries. IGEN 2017 appears set to surpass its initial business leads target of RM1.6 billion.

Before officiating the event, Datuk Seri Panglima Dr. Maximus Johnnity Ongkili gave his views on the GTMP. The plan, which is endorsed by the government provides a consistent framework to align the strate goals of stakeholders across the country, enabling a concerted national effort that will leverage on green technology growth with targeted revenues of RM180 billion and more than 200,000 jobs by 2030.

GTMP will pave the way for this green future by laying the foundation for a holistic shift in socio-economic development whilst adhering to the principles of sustainability. In doing so, the GTMP will deliver impactful

long-term results cementing Malaysia's position as a forerunner in the global green movement in line with the National Transformation 2050 aspirations.

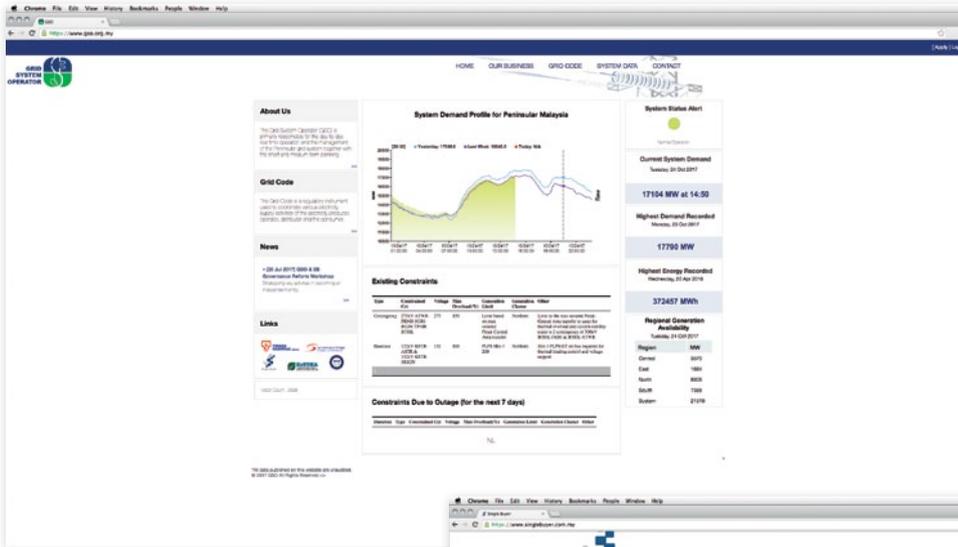
This event has been a dynamic and diverse platform that has proven itself to be a successful green catalyst for nations, near and far, and for businesses of new and established. Everyone in this industry is urged to leverage on the multitude of incredible opportunities on offer at IGEN this year and the years to come. **EM**

# Enhancing Transparency *through Technology*



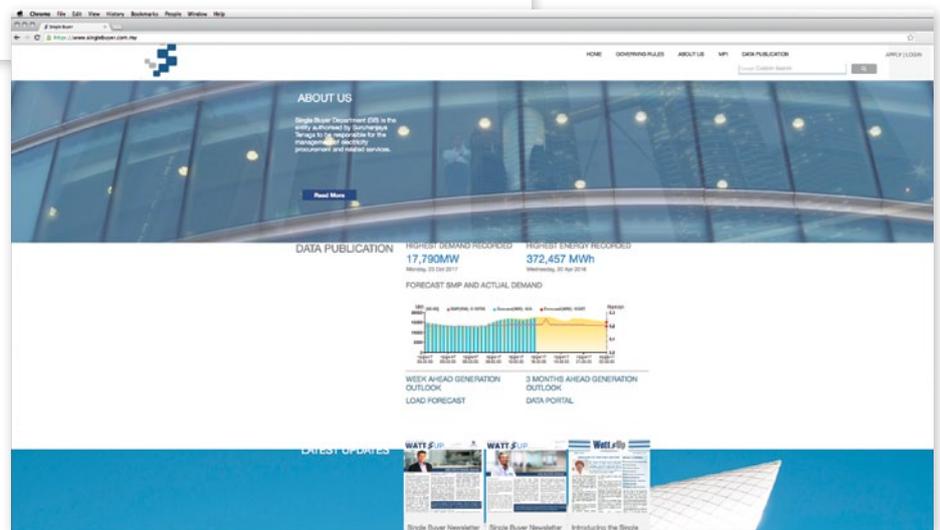
*Datuk Seri Panglima Dr. Maximus Johnity Ongkili, alongside Energy Commission's Chairman Dato' Abdul Razak Abdul Majid during the launch of the SB and GSO websites.*

**O**n 12 October 2017, as part of the government's effort to promote transparency in Malaysia Electricity Supply Industry (MESI), Single Buyer (SB) and Grid System Operator (GSO) websites, easily accessible to industry players and the general public, have been developed. The websites are intended for disseminating operational and planning information on the electricity supply situation in the country.



Both of these websites were launched with the aim of promoting transparency within the energy industry and ensuring that information pertaining to it is easily accessible to industry players and the general public.

The launch of the two websites was officiated by the Minister of Energy, Green Technology and Water, Datuk Seri Panglima Dr. Maximus Johnity Ongkili together with the Energy Commission's Chairman, Dato' Abdul Razak Abdul Majid, Energy Commission's Acting Chief Executive Officer, Ir Azhar bin Omar, SB Head, Charanjit Singh Gill and GSO Head, Ir Gurcharan Singh. The launch was held in conjunction with the International Greentech & Eco Products Exhibition & Conference Malaysia (IGEM) 2017.



SB is responsible for the management of electricity purchasing from power generation plants. GSO on the other hand is responsible for the day to day real-time operation and the management of the Peninsular Malaysia grid system operation including interconnections with Thailand and Singapore.

The establishment of SB and GSO was one of the initiatives towards creating a more transparent MESI. The Energy Commission separated the operations of SB and GSO from other activities of Tenaga Nasional Berhad (TNB), through the enforcement of the Electricity Supply Act (Amendment) 2015 which came into force as of January 1 last year. With the separation arrangement, SB and GSO are now operating autonomously where their functions, operations and performance are under the supervision of the Energy Commission.

As ring-fenced entities, SB and GSO are required by the industry to demonstrate transparency, independence and non-discriminatory conduct in its operations. One such platforms is with the establishment of the websites in order to publish relevant real-time operation information publicly for the benefits of all industry players and users.

The operation costs of SB and GSO are embedded as a portion of the electricity tariff defined under the Incentive-Based Regulation

(IBR) framework. Consumers would be able to enjoy a secure and reliable supply at optimum costs as a result of the creation of ring-fenced SB and GSO.

All the information can be obtained at [www.singlebuyer.com.my](http://www.singlebuyer.com.my). The website displays historical and forecasted electricity demand, whereas daily grid system operational data including real time electricity demand, grid situation and electricity generation information can be found at [www.gso.org.my](http://www.gso.org.my)

These websites are a sign that the energy sector is embracing change in order to spur its developments. These breakthroughs would eventually change the landscape on how the industry is adapting to modern technology, which in turn enhances energy security and efficiency in this nation. **EM**

# WE WOULD LIKE TO HEAR FROM YOU!



Energy Malaysia welcomes your questions, comments and suggestions to help the Energy Commission of Malaysia work better at safeguarding your interest.

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# 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; arbitrates and enforces compliance.