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Towards A World-Class Energy Sector

# Energy Malaysia

Suruhanjaya Tenaga
Energy Commission

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## Keeping the Balance

### Between Affordability and National Development Needs

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## Tips



## On-Site






Towards A World-Class Energy Sector
Energy Malaysia
Suruhanjaya Tenaga Energy Commission


## Editorial Board






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# Maximising Energy Utility

In fulfilling its objective and functions, the Energy Commission has to consider the aspirations of its many stakeholders, all of whom have differing expectations with regards to energy policy for the country. These requirements are dichotomous with one another. Typically, power consumers want reliable power at minimal cost, while power producers and suppliers naturally hope to maximise profits without expending much resources.

Ultimately, our prime concern is the health and security of the nation's energy supply, as well as its long term development goals. We understand that this requires a fine balancing mechanism, built on sufficient understanding from all parties involved.

Tariff has been the highlight where electricity is concerned, and the fuel component of tariff is a major driver, to the tariff levels, with the Government determined to ensure that there is minimum or manageable impact to consumers at large. Under a program to bring about transparency the Incentive Based Regulation (IBR), the Imbalanced Cost Pass-Through (ICPT) mechanism has been introduced, whereupon tariffs are set based on predetermined rules and are more reflective of market realities.

Under the IBR mechanism, the tariff is comprised of two components. The first being the base tariff, which is reviewed on a three-yearly regulatory period, and the second is the fuel component, which shall be reviewed every 6-months, wherein the actual fuel costs are computed. ICPT allows the changes of generation costs and fuel prices to be reflected into the tariff, and enables any changes to be channelled to consumers through tariff adjustments over the review period.

Additional fuel cost due to higher fuel prices will be reflected by a positive adjustment in the tariff. Likewise, any reduction or savings will result in a negative adjustment in the tariff as demonstrated in the announcement by Government in February 2015 to effect a 2.25sen/kWh reduction on the average tariff. This continuous process will promote transparency in tariff adjustment as well as provide a predictable impact on the tariff as consumers are informed of market conditions and fuel prices more regularly.

The IBR and ICPT mechanism has been programmed for 6-monthly tariff reviews effective January and July every year. For the tariff level effective July 2015, the fuel costs computed from gas and coal deliveries have been considered along with other approved generation costs from January to June this year. As a result of the computation the Government has decided to maintain the rate of 2.25sen/kWh for the period July to December 2015.

This approach in managing tariff adjustments is already practised in other countries, such as Singapore, Thailand, Philippines and Australia where prices are reflective of market conditions. Moving forward, the ICPT will alert consumers in the country to the possible changes in tariff levels, whilst facilitating the subsidy rationalisation policy announced by the Government. The Energy Commission will play its part in the review process, verifying inputs from all sources and enhancing the implementation of a transparent and efficient tariff setting mechanism.

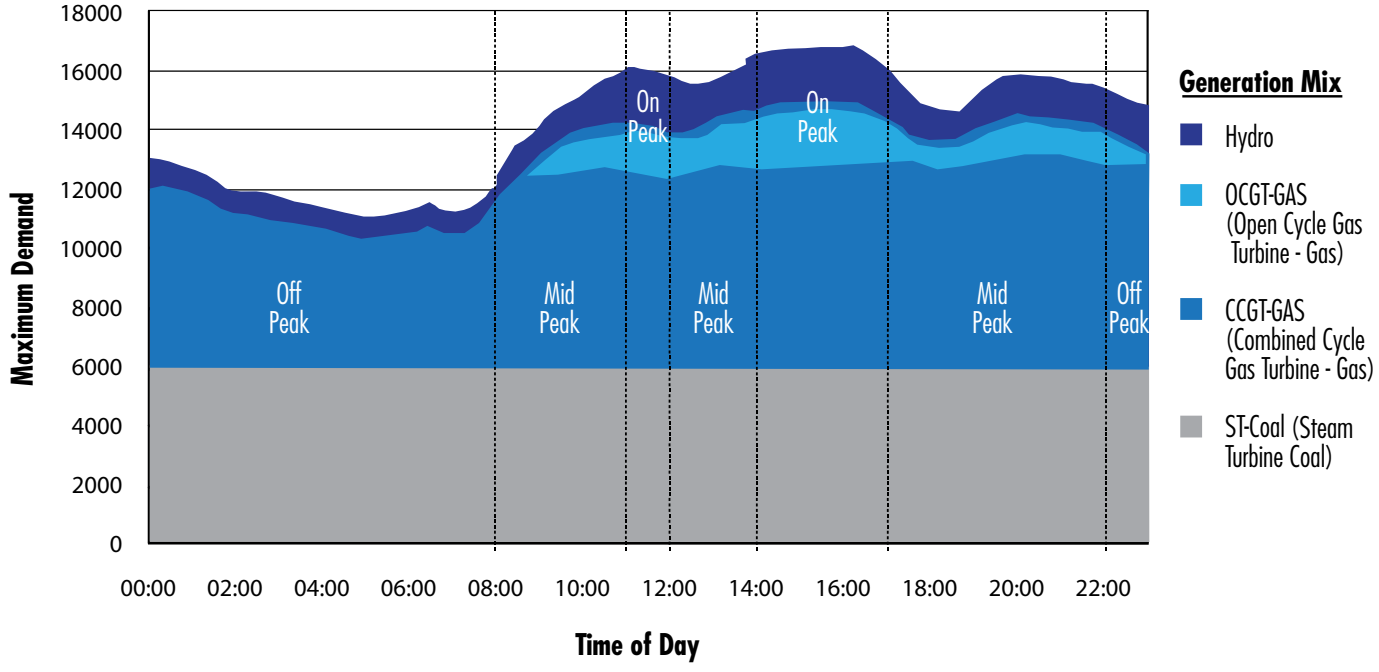
**Dato' Abdul Razak Abdul Majid**
Energy Commission of Malaysia

# Cheaper Operations

The Malaysian government is planning to introduce three different electricity tariffs based on the time-of-day use. The new tariff scheme, named 'Enhanced Time of Use' (EToU) will be introduced to commercial and industrial consumers as an option beginning on the 1st of January 2016. According to **Marlinda Mohd Rosli**, **the Head of the Electricity Pricing Unit** at the Energy Commission, the EToU policy adds a new 'mid-peak' time zone, where tariff rates will be higher than off-peak rates, which apply from 10pm to 8am, but lower than on-peak rates.

This provides a welcome relief for industrial and commercial sector players, as they consume the highest amount of electricity, and allows them to adjust their timings so they can benefit from the lower rates during mid-peak hours, which are from 8am-10am, 12pm-2pm and 6pm-10pm. "The purpose of the EToU mechanism is to reduce the operating costs of consumers and increase efficiency, whether they are  industrial or commercial sectors," she adds.

**ETOU SCHEME OFFERED AS AN OPTION TO COMMERCIAL AND INDUSTRIAL CUSTOMERS**




Under the new scheme, qualified commercial and industrial companies can opt to be considered for mid-peak hours, which are working hours when activity usually slows down (such as during lunch). The price of electricity during these times will be higher than in off-peak hours but lower than in peak working hours.

# Gearing Up for International Energy Trade

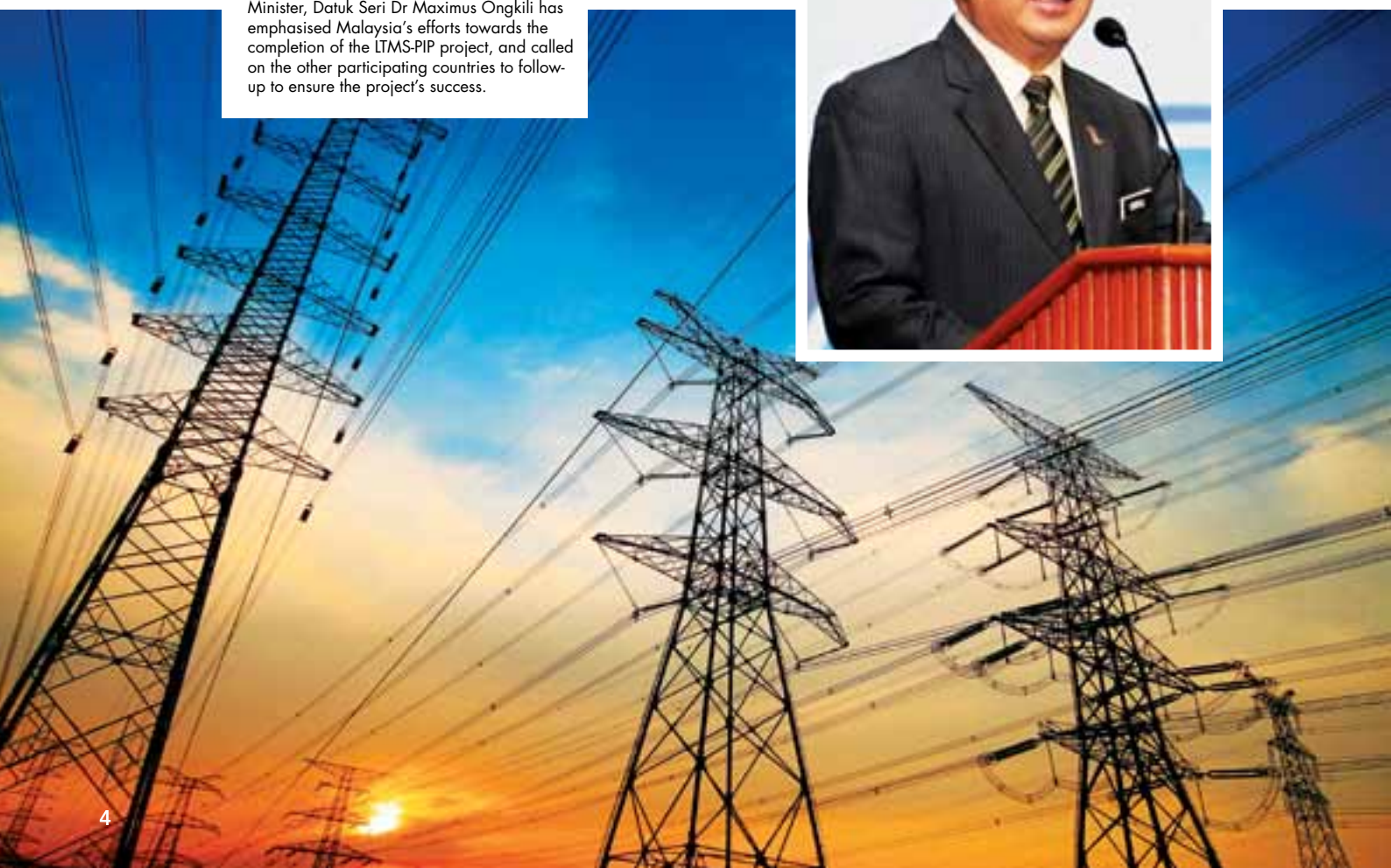
The future of the Laos, Thailand, Malaysia and Singapore Power Integration Project (LTMS-PIP) was one of the main points of discussion at the 33rd ASEAN Senior Officials Meeting on Energy (SOME) held in Kota Kinabalu. Announced in September last year, the project involves cross-border power trading between the aforementioned countries.

LTMS-PIP was developed in an effort to realise the ASEAN Power Grid (APG), a network that connects the grids of each nation. The completion of the project will determine the feasibility of cross-border trading for all four countries.

Energy, Green Technology and Water Minister Datuk Seri Dr Maximus Ongkili, noted that each country needs to stabilise their own power grid first, before exporting to neighbouring members.

"Malaysia is monitoring the ASEAN Power Grid closely as we are in the centre of the ASEAN belt," he said. He also called on the other participating countries to follow-up on their own grid monitoring, in order to ensure the project's success, as it would vastly improve economic activities in the region.

Energy, Green Technology and Water Minister, Datuk Seri Dr Maximus Ongkili has emphasised Malaysia's efforts towards the completion of the LTMS-PIP project, and called on the other participating countries to follow-up to ensure the project's success.



# Understanding Fuel Costs

## How Prices Impact Power Generation

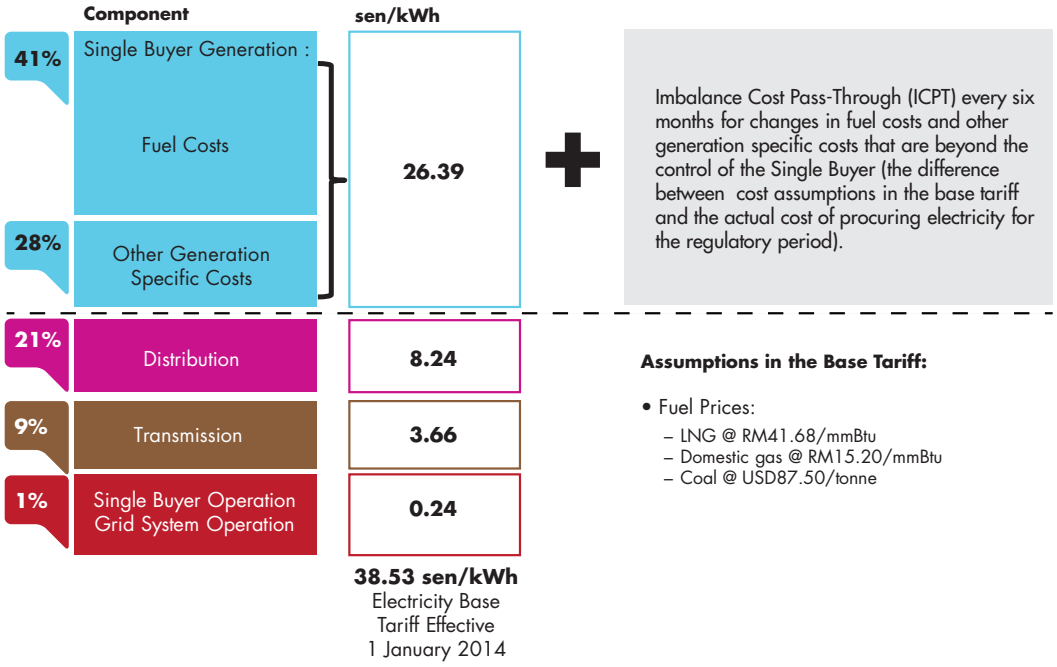

Global fuel prices – especially crude oil – have faced a decline since late 2014, and this has created a ripple effect worldwide, affecting a whole array of industries. One of the effects is the cost of fuel for the generation of electricity, including fossil fuels. Energy Malaysia talks to **Marlinda Mohd Rosli**, **Head of the Electricity Pricing Unit** and **M. Ishan Bakar, Senior Analyst of Industry Development and Electricity Market Regulation** at the Energy Commission to provide valuable insight on how the global fuel prices have affected power generation in Malaysia.


With the significant decline of oil prices worldwide, the electricity price in Malaysia does not seem to be directly affected. The country's main fossil fuels used for generation of electricity are coal, natural gas and Liquefied Natural Gas (LNG), with crude oil only contributing a small amount of the generation mix. While coal and LNG are secured at market price, piped natural gas is secured at the government's approved subsidised price, according to Ishan.

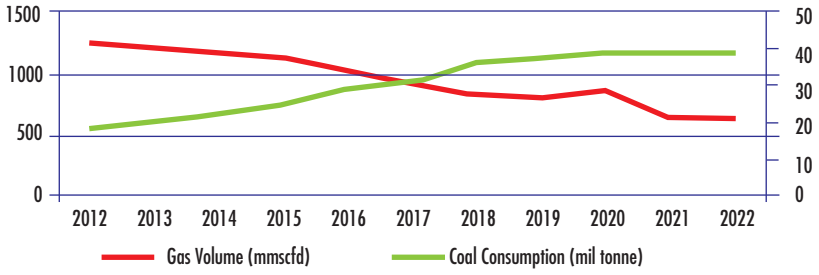
In the first half of 2014, the prices of LNG were increasing, whereas coal was decreasing. To a certain extent, this has resulted in the two off-setting each other, making the price of electricity remain stable during that period.

## INCENTIVE-BASED REGULATION (IBR) FRAMEWORK

### Electricity Base Tariff Components



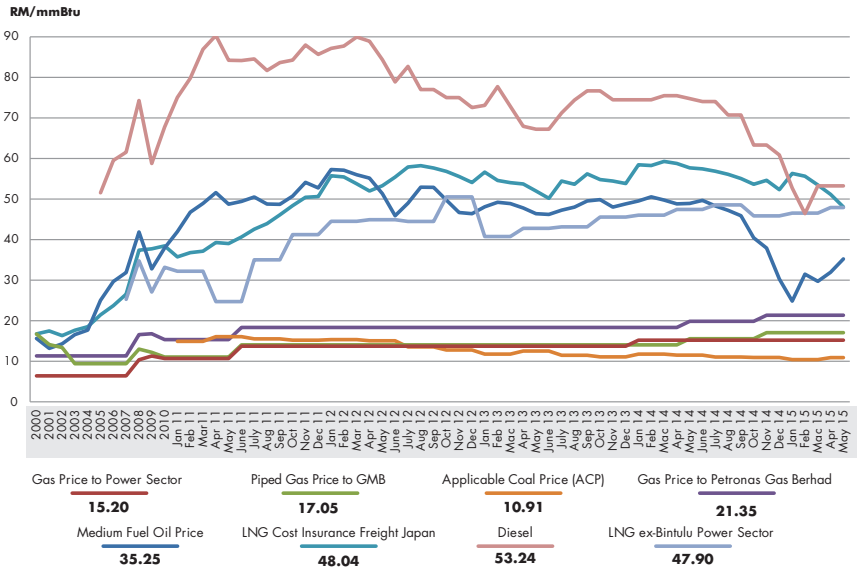

## ANNUAL AVERAGE FUEL CONSUMPTION




**Right:** While natural gas use is declining, coal consumption is expected to increase owing to the planting-up of more coal-fired power plants.

**Below:** Natural gas prices for the power generation sector has remained relatively low owing to subsidies from the government, despite rising cost of LNG elsewhere. This has resulted in negative pressure on gas producers.

## AVERAGE FUEL PRICE TREND IN RM/mmBtu




*Source: Energy Commission*

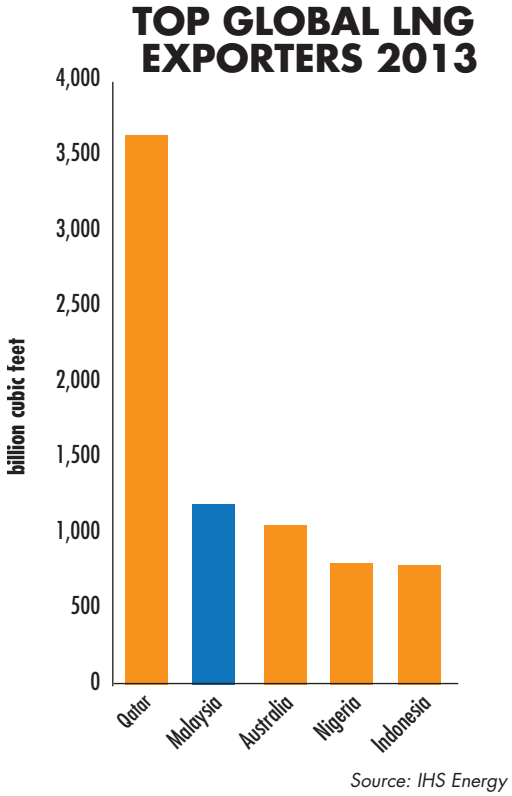
"The continued decline of coal price in the global market during the second half of 2014 is to be reflected in our Imbalance Cost-Pass Through (ICPT) mechanism, which adjusts tariffs according to the global prices of commodities every six months," he explained. He also added that the electricity tariffs for consumers in Peninsular Malaysia have been reduced by 5.8%, or 2.25 sen/kWh (from 1st March to 30th June 2015), from the average base tariff of 38.53 sen/kWh.

The ICPT mechanism under the Incentive-Based Regulation (IBR) framework, a system that uses rewards and penalties to improve the quality and cost of service, allows Tenaga Nasional Berhad (TNB) to

*"The end goal is to remove subsidy of piped gas price, and to reflect actual cost of generation in the electricity tariff."*

**- Ishan Bakar**
Senior Analyst of Electricity Supply and Market Regulation

**Right:** Malaysia is the second largest exporter of liquefied natural gas (LNG) in the world, second only to Qatar.




*Source: IHS Energy*

reflect changes (increase or decrease) of fuel and other generation-specific costs in the electricity tariffs every six months, as determined by the Energy Commission, and is subject to government approval.

The new tariff rates will be calculated based on actual fuel cost and actual generation-specific costs against a baseline fuel price that is incorporated in the base tariff. "Any changes in the global fuel prices will only affect the country after a period of six or seven months," said Marlinda.

Hence, if world fuel prices were to decline, it will be 'passed' to the consumer in the form of reduced tariffs, and vice versa, minimising dependence on government subsidies by letting the global commodities market dictate tariffs.

To ensure a world-class and secure energy sector, the Energy Commission manages the fuel price mechanism which sets tariffs at rates that are fair to all, while continuing to implement new initiatives to save energy and costs

# Hot Savings

## Choosing and Maintaining Water Heaters

One of the biggest energy expenses after air conditioning, water heating makes up a substantial part of the utility bill. **Energy Malaysia** highlights some considerations to keep in mind when planning to install a water heating system.

## Finding The Right Heater

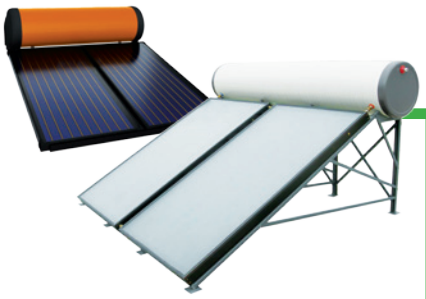
When picking a water heater, consider the size, cost and efficiency, as well as fuel source. Each type of water heater has its advantages and disadvantages.

### 1 Storage Water Heater

The system keeps water pre-heated at a set temperature. It has a lower initial cost than the other options, but energy is wasted in keeping the water at a consistent temperature. Consider buying an insulated storage tank to help save operating costs.

### 2 Tankless Water Heater

This heats water instantaneously, allowing for a constant flow of hot water, and is considered to be at least 8% to 34% more efficient than storage water heaters, according to the US Department of Energy. It can also last for more than 20 years. However, as a result of the limited flow rate of hot water, constant use of the system could soon wear it out. A solution could be to purchase multiple heaters for appliances that need more hot water.



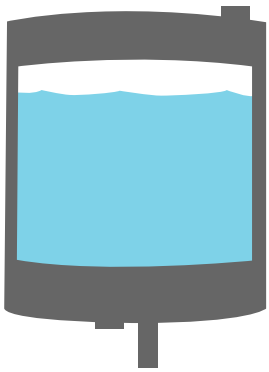
### 3 Solar Water Heater

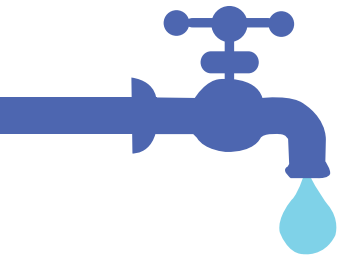
This is more expensive to buy and install, but it's 50% more efficient than other water heaters. They are installed on rooftops to blend into the architecture of the house. On the downside, a backup storage heater may be needed for cloudy days, or for high-demand periods, when a high number of people are using the hot water system at the same time. One way to deal with this problem could be to purchase a solar heating system that has a back-up storage heater.

# Making Your Heater Last

The average water heater lasts for 10-15 years but periodic maintenance check-ups could extend its life.

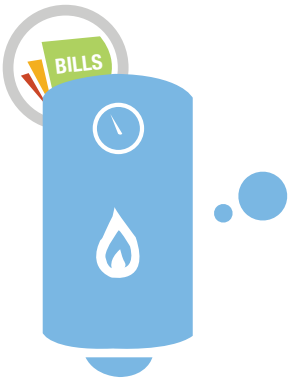
For storage water heaters, make sure to flush water out of the tank once every three months and check the pressure valve and temperature every six months. Also, regularly replace anodes, which help to attract corrosive elements in the water, and can keep the heater from rusting.





Make sure to check and fix leaky faucets, as these could lead to wastage and add costs to your utility bill.

# Reducing Your Water Heating Bill




- Use hot water only when necessary. Take shorter showers and avoid keeping the tap turned on when not in use.
- Install low-flow faucets and waterheads. These help to limit the amount of water wasted when using a heavy-flow faucet.
- Turn down heater's thermostat. Try to keep the temperature at a moderate level of heat.
- Insulate your water heater tank and pipes. This keeps the water warmer for longer and avoids wasting extra energy to reheat the water.

# SHOCK-PROOFING YOUR HEATER

- Purchase water heaters that have been approved by the Energy Commission, which display the SIRIM-ST label.
- Ensure that the hose pipes are made out of non-conductive materials such as plastic and not out of any form of metal.
- Test the earth leakage circuit breaker button on the heater to check if it is in working order.
- Appoint only electrical contractors who are registered with the Energy Commission to perform wiring work on the heater.

# Regulating Power

## The Policies and Procedures to Minimise Energy Use

As the Malaysian economy grew by leaps and bounds, the need arose to secure energy production and supply, while ensuring efficiency. The main crux of efficiency lies in the implementation and adoption of policies, and use of efficient processes and equipment. To this end, the *Electricity Supply Act (ESA) 1990* was implemented in Malaysia, stipulating specifications, standards and best practices for the efficient use of electricity.

### THE MANAGERS OF EE

One of such regulations is the *Efficient Management of Electrical Energy Regulations (EMEER) 2008*, which targets optimising the use of electricity in large companies (those that consume more than 3 million kilowatt hours (kWh) over six-month intervals. According to **Zulkiflee Umar, Head of Energy Management Unit** at the Energy Commission, there are currently 1,936 installations in the country subject to the policy, which also requires that such customers appoint Registered Electrical Energy Managers (REEM).

This is an increase from 1,200 in the year 2000. Zulkiflee explains, "When an installation's energy use exceeds the stipulated figure, what the Energy Commission does is approach them – after sending a notice to the effect that they are large consumers – and request that they appoint an Energy Manager to assist in reducing their consumption of electricity."

These Managers – certified by the Commission – have a number of critical functions, all of which have a central goal: to help large organisations operate efficiently and reduce their electricity usage. To do this, REEMs monitor and record electrical energy generation and consumption, analyse the data, and propose measures that have the potential to help these companies cut down their power use, among other tasks.

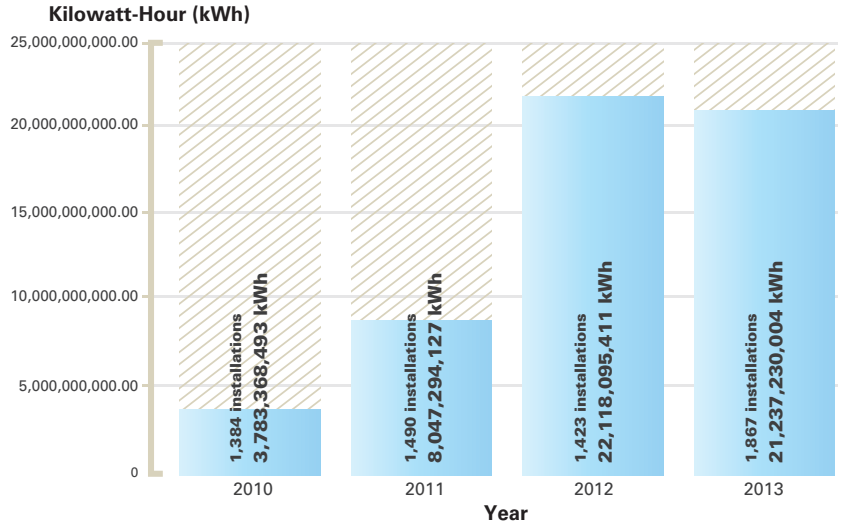
For both large customers and residential electricity users, the *Minimum Energy Performance Standards* (MEPS) – under the amended ESA in 2013 – enforces minimum efficiency standards for five household appliances: air conditioners, refrigerators, televisions, fans (ceiling, wall and desk) and lamps, while the planned addition of other products is underway, including rice cookers, storage water heaters and vacuum cleaners.

MEPS provides energy ratings, from 1 to 5 Stars (a higher number of stars representing greater efficiency), which indicate the efficiency of the appliance. In the form of stickers (EE Label) provided by the Energy Commission, the rating information also includes the power consumption of the appliances (in kWh per year), percentage energy savings compared to a 3-Star model, as well as the model of the product. For air conditioners, refrigerators, televisions and fans, the MEPS rating allowed for domestic use is 2 Stars, while lamps are rated based on their lumen per watts (lm/W) instead of the star ratings.

*"The adoption rate for EE procedures is currently quite low. Of the 1,936 installations available, only 880 have appointed Energy Managers. This is primarily because these plants are located across Malaysia; the logistical challenges to better reach all the installations is being worked on."*

**– Zulkiflee Umar,**
**Head of Energy Management Unit**

**TOTAL ELECTRICITY CONSUMPTION OF INSTALLATIONS SUBJECTED TO EMEER 2008**




*Source: Energy Commission*

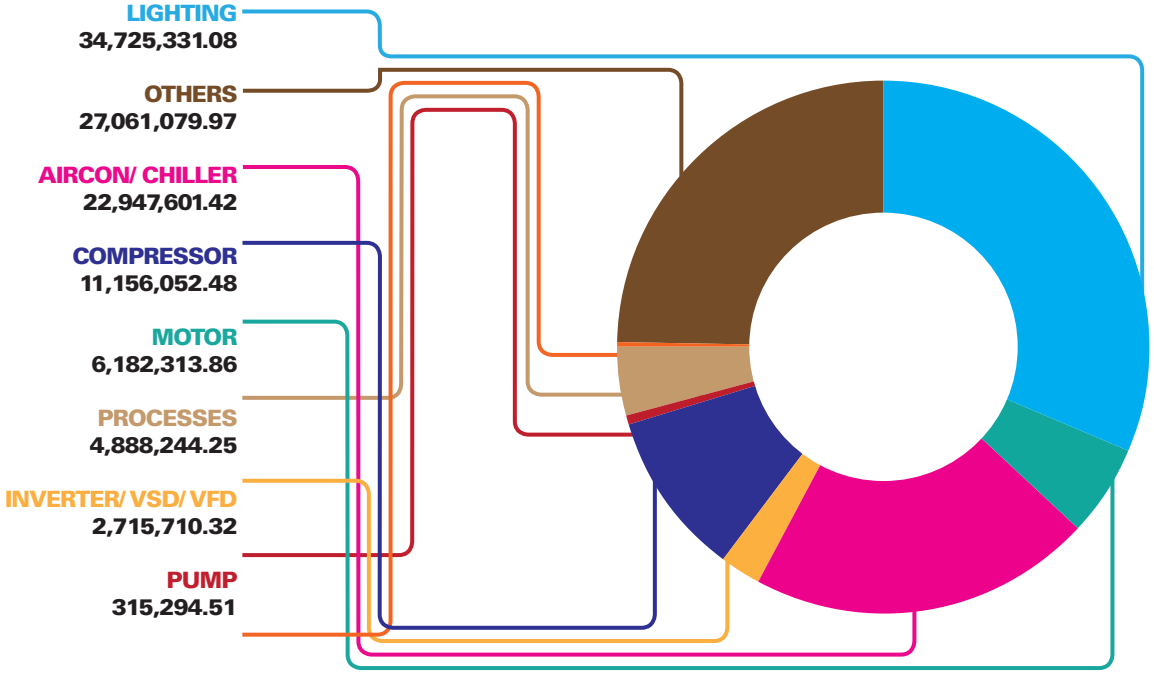
| Number of Energy Service Companies (ESCO) registered | |
|---|---|
| **2013** | **2014** |
| 9 | 36 |

## PARTNERSHIPS FOR EFFICIENCY

In 2013, recognising that to encourage people to adopt EE policies and measures, it has to lead by example, the Malaysian government implemented the Energy Performance Contracting (EPC) system. "The EPC was developed to overcome the capital costs and financing barriers in implementing cost-effective energy efficiency measures. It also provides customers with a comprehensive set of energy efficiency, renewable energy and distributed generation measures and often is accompanied with guarantees that the savings produced by a project will be sufficient to finance the full cost of the project," Zulkiflee noted.

The system contracts qualified Energy Service Companies (ESCOs) to provide energy efficiency-related services – including energy auditing and consultations – for government

### kWh SAVINGS PER ACTIVITY IMPLEMENTED IN 2013




Savings from EE accrued from awareness about EE, and the use of efficient equipment, from variable speed drives (VSDs) to lighting.

*Source: Energy Commission*


buildings, with payments based on guaranteed savings achievable. Among the qualification requirements, ESCOs have to be registered under the *Green Technology Services Code* (222801) and the Energy Commission, as well as the Ministry of Finance. To ensure continuity and sustainability of the system, the Energy Commission is mandated to monitor energy consumption in all government buildings with periodical reports to the Ministry of Energy, Green Technology and Water (KeTTHA).

## MOTIVATED TO SAVE

Since 2009, companies involved in the development of energy efficient projects and installations have been given a number of incentives (investment tax allowance, sales tax and import duty exemptions, and pioneer status) to boost participation of the private sector in advancing efficiency. Project areas covered include heating, ventilating, and air conditioning systems – such as efficient chillers, variable speed drives (VSD) and thermal energy storage systems – and equipment (including compressors and high-efficiency motors), as well as heat recovery and co-generation processes.

Other efforts include the Energy Commission's development of Malaysian Standards (MS), such as the MS ISO 50001:2011 (Energy Management Systems), which stipulates measures to establish, maintain and improve energy management systems, and the MS 1525 (Code Of Practice On Energy Efficiency And Use Of Renewable Energy For Non-residential Buildings).

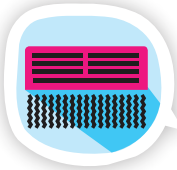
These are only some of the major policies and regulations that have been implemented by the Malaysian government to advance and promote the adoption of EE in the country. As the country approaches 2020 – the deadline set to achieve high-income, industrialised nation status – energy demand and consumption is set to increase significantly. While the Malaysian government is committed to promoting the adoption of efficient use of power, homeowners, and commercial building, industry and factory operators have to make the effort to use less energy, purchase efficiency-rated appliances and equipment, and hire Energy Managers who have been certified by the Energy Commission.

# Optimising Benefits

As Malaysia develops and advances economically, energy use increases significantly. According to statistics from Malaysia Energy Information Hub (MEIH), in the last 20 years, the country's energy consumption has increased by more than 159%. Given this, reducing electricity spending becomes an important issue, not only for financial savings, but also for environment purposes. **Energy Malaysia** suggests 9 simple tips to help reduce monthly tariffs.

1 


**Curb Wastage:** Switch on the lights you really need when you enter a room, and make sure you turn them off when you leave.

2 

**Limit Air Conditioning:** Block direct sunlight with curtains. Using a fan can make you feel 3°C to 4°C cooler. Keep the aircon temperature at 24°C and keep in mind that raising the temperature by just 1°C can reduce your power usage by 10%.

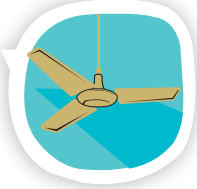
3 **Full Loads:** Always wash clothes and dishes in full loads and air dry them. Similarly with your hair, only use the hair dryer if you are really pressed for time. 

**Cold Clean:** Always wash and rinse your clothes in cold water. If warm water is required, setting washing machines to temperatures between 30°C and 40°C reduces electricity considerably. 4 

5 **Energy Vampires:** Plugged-in chargers not in use and home electronics on standby still consume energy, so switch them off when done.

6 

**Inactive Computers:** Hibernate mode saves more energy than constantly turning computers on and off.

7 **Spinning Fans:** Make sure that ceiling fans rotate counter-clockwise to push hot air up and out of the home. 

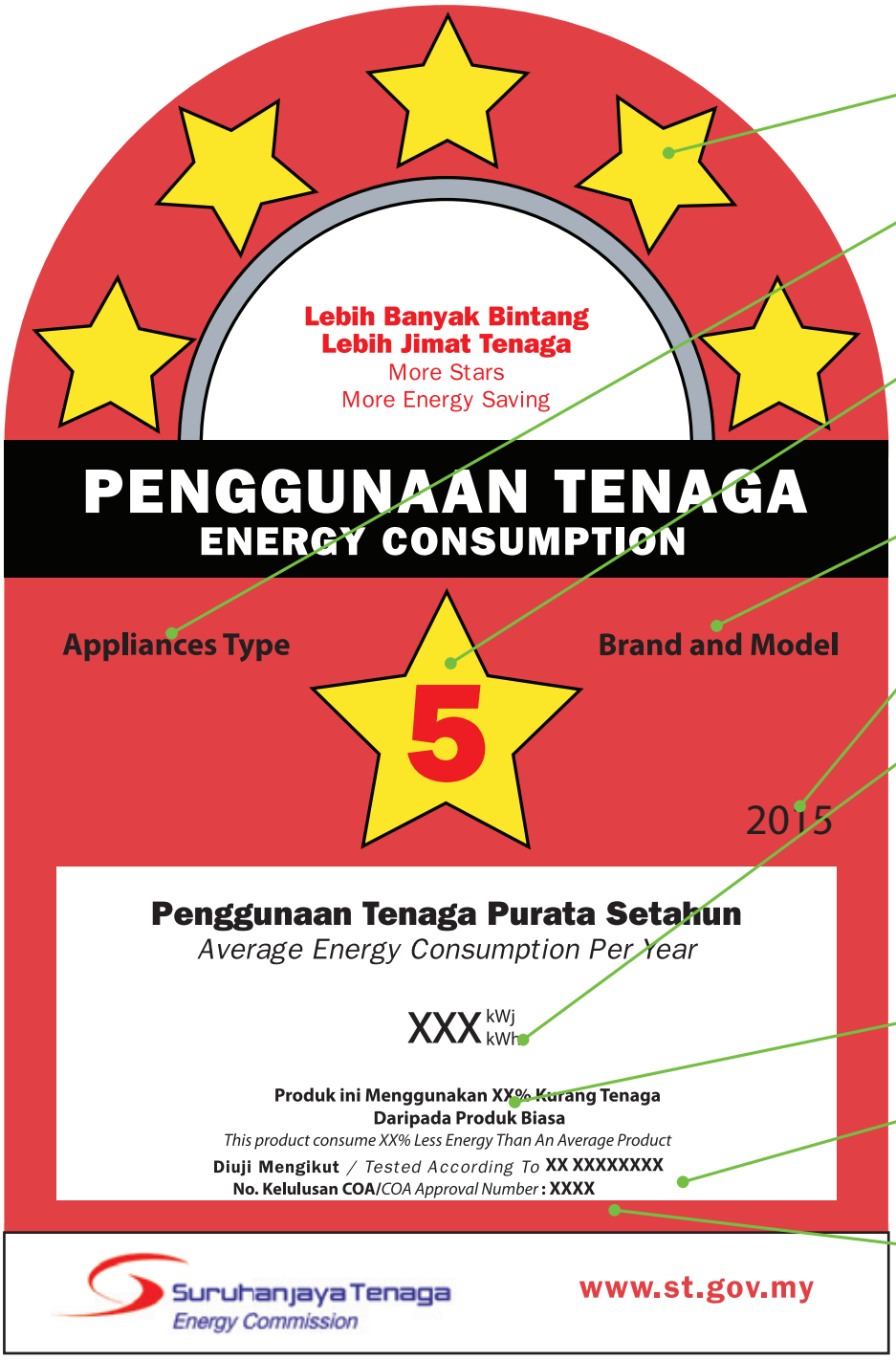
**Icy Knowledge:** Set the temperature of fridges to 15°C and freezers at –18°C, then defrost them regularly to increase efficiency. 8 

9 

**Smart Illumination:** Place lamps in corners, so they can reflect light off two walls and use compact fluorescent light (CFL) and LED globes which are better to light larger rooms and are more energy-efficient than regular bulbs, and use up to 75% less energy on electricity consumption.

To further assist consumers minimise power use and save on their electricity bills, the Energy Commission has established the Energy Rating Label, an informative tag fixed on appliances that meet the requirements of efficient use of electricity. Considering that savings mean a reduction of about 20% to 40% on energy use, it is a great idea to look for it when shopping for and purchasing new appliances. In addition, know that the more stars (from 1 to 5) on a rated device, the more energy-efficient the appliance is.

## ENERGY RATING LABEL




**Energy rating: 1 to 5-Star**

**Appliance type**

**Appliance energy rating (Equals the number in the energy rating)**

**Information on the brand and model**

**Year of rating**

**Energy consumption (in kWh/year)**

**Energy savings compared to the lowest 2-Star rated product (in percentage)**

**Testing standards used**

**Approval to manufacture or import**

*Source: Energy Commission*

# Still on Gas

## Malaysia's Leading Energy Source Gets a Power Boost

By 2020, Malaysia aims to become a fully industrialised, high-income nation. It is to this end that the Malaysian government has, since the early 90s, encouraged the move from an agriculture-based economy to a manufacturing sector-based one, which in turn translates into increased use of energy for industrialisation and production. Between 1990 and 2013, it is no surprise then that final energy consumption in the country increased by 292%, from 13,146 kilotonne of oil equivalent (ktoe) to 51,583 ktoe, of which natural gas held the lion's share and is expected to continue to play a significant role in the country's power sector in the future.

The world's first floating Liquid Natural Gas (LNG) regasification terminal (RGT) located in Sungai Udang, Melaka was completed in 2013, and helped increase the availability of natural gas in the country. A second RGT is currently being constructed in Pengerang and is expected to enter full operation in 2017.

**Right:** Power stations are the single largest consumers of natural gas in Malaysia, accounting for more than 52% of total use in 2013. That year also saw natural gas usage by power stations rise to 13,520 ktoe – the second-highest in 20 years.

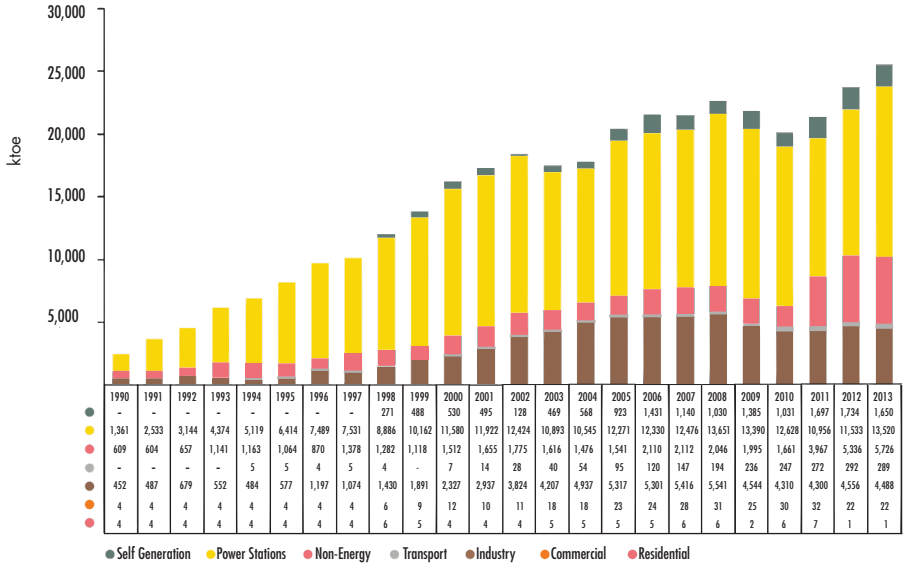
Since natural gas was introduced in Malaysia in the early 80s, it has remained the preferred fuel for power generation, accounting for about 78% of the electricity mix in 2000. Starting in around 2007 however, owing to depleting oil fields and a decline in production, the share of natural gas in the national electricity mix fell to 44.1% by 2013. While the use of coal – particularly in power generation – became increasingly popular, recording a 14.2% increase from 1,348 ktoe to 1,539 ktoe between 2005 and 2013, natural gas consumption rose 10.1% in the same period, from 12,271 ktoe to 13,520 ktoe.

The popularity of natural gas is still growing rapidly, particularly with recent advancements. In 2013, Malaysia's natural gas industry recorded one of its most significant breakthroughs, with the completion of the world's first offshore regasification terminal (RGT) in Sungai Udang, Melaka. With a processing capacity of 3.8 million tonnes per annum (MTPA), the terminal comprises two customised floating storage tankers and the regasification infrastructure on an island jetty.

## FLOW EASY

While Malaysia produces more than 70% of the natural gas it needs, the extra required has to be imported from other countries. According to the Malaysia: Natural Gas Industry Annual Review 2014 by the Malaysian Gas Association, this additional volume is obtained from three primary sources – the Malaysia-Vietnam Commercial

## NATURAL GAS CONSUMPTION BY SECTORS




| | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Self Generation | - | - | - | - | - | - | - | - | 271 | 488 | 530 | 495 | 128 | 469 | 568 | 923 | 1,431 | 1,140 | 1,030 | 1,385 | 1,031 | 1,697 | 1,734 | 1,650 |
| Power Stations | 1,361 | 2,533 | 3,144 | 4,374 | 5,119 | 6,414 | 7,489 | 7,531 | 8,886 | 10,162 | 11,580 | 11,922 | 12,424 | 10,893 | 10,545 | 12,271 | 12,330 | 12,476 | 13,651 | 13,390 | 12,628 | 10,956 | 11,533 | 13,520 |
| Non-Energy | 609 | 604 | 657 | 1,141 | 1,163 | 1,064 | 870 | 1,378 | 1,282 | 1,118 | 1,512 | 1,655 | 1,775 | 1,616 | 1,476 | 1,541 | 2,110 | 2,112 | 2,046 | 1,995 | 1,661 | 3,967 | 5,336 | 5,726 |
| Transport | - | - | - | - | 5 | 5 | 4 | 5 | 4 | - | 7 | 14 | 28 | 40 | 54 | 95 | 120 | 147 | 194 | 236 | 247 | 272 | 292 | 289 |
| Industry | 452 | 487 | 679 | 552 | 484 | 577 | 1,197 | 1,074 | 1,430 | 1,891 | 2,327 | 2,937 | 3,824 | 4,207 | 4,937 | 5,317 | 5,301 | 5,416 | 5,541 | 4,544 | 4,310 | 4,300 | 4,556 | 4,488 |
| Commercial | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 6 | 9 | 12 | 10 | 11 | 18 | 18 | 23 | 24 | 28 | 31 | 25 | 30 | 32 | 22 | 22 |
| Residential | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 6 | 5 | 4 | 4 | 4 | 5 | 5 | 5 | 5 | 6 | 6 | 2 | 6 | 7 | 1 | 1 |

*Source: Petronas, Gas Companies, Power Utilities, IPPs & Self-Generation Plants*

Arrangement Area (CAA), Malaysia-Thailand Joint Development Area (JDA) and from West Natuna, Indonesia.

For imports, such as from Qatar, Nigeria and Brunei, where gas has to be transported via tankers, the gas is transported as Liquefied Natural Gas (LNG). However, for the commodity to reach consumers, it has to be converted back to its gaseous state and fed into the distribution grid. This is where the regasification terminals come in.

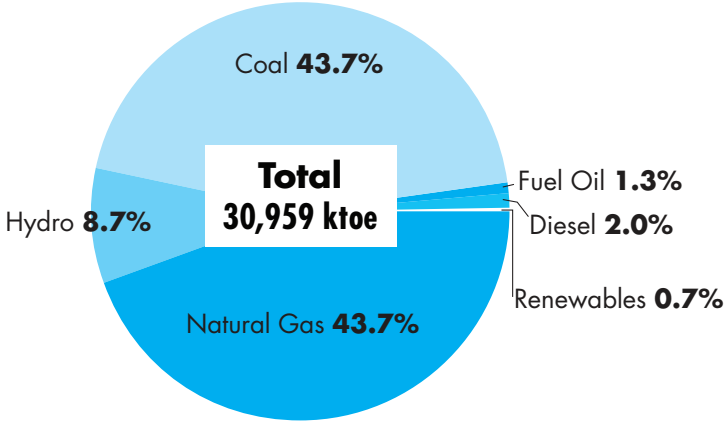
Located 3 km offshore, in contrast to prior onshore processing infrastructure, Malaysia's RGT facilities allow LNG carriers to offload LNG at the terminal, where it is converted to an acceptable state and then fed into the Peninsular Gas Utilisation (PGU) pipeline. The PGU is a distributive grid of more than 2,500 km of high-pressure pipelines constructed in phases, between 1984 and 2001, and a 30km stretch completed in 2012 to connect the RGT to the PGU. The network streamlines the delivery of LNG from offshore fields to consumers on the peninsular, who account for more than 80% of natural gas demand in the country.

The PGU – which was also Asia's first export pipeline, allowed distribution of LNG from Malaysia to Singapore and more recently bring in gas from the JDA – works by channelling raw natural gas produced at Peninsular Malaysia's east coast offshore fields to Gas Processing Plants (GPP). The plants are located in Kertih and Santong, Terengganu, where 2,060 million standard cubic feet per day (mmscfd) of gas – from the JDA, CAA, Indonesia and the GPP – is separated into its main constituents; methane (also called sales gas), propane, ethane, butane and condensate.

For east Malaysia, there is the 250-acre Sabah Oil and Gas Terminal (SOGT), which will receive, store and export 300,000 barrels of crude oil, as well as 1 billion standard cubic feet of gas per day, produced from Sabah's offshore fields. Meanwhile, a 500 km Sabah-Sarawak Gas Pipeline (SSGP) transports gas to an LNG Complex at Bintulu, Sarawak for export, as well as for domestic consumption by industrial and petrochemical users.

**Left:** Gas Processing Plants (GPP) located in Kertih and Santong, Terengganu refine a total of 2,060 million standard cubic feet per day (mmscfd) of raw natural gas daily, produced at Peninsular Malaysia's east coast offshore fields as well as from the Malaysia-Thailand Joint Development Area (JDA), West Natuna and the Malaysia-Vietnam Commercial Arrangement Area (CAA).

**SHARE OF FUEL INPUT IN POWER STATIONS**

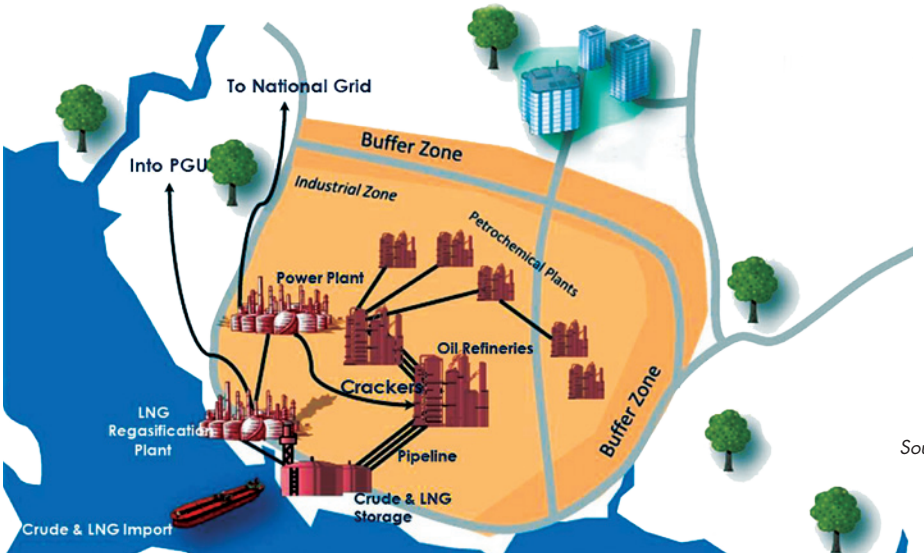



**EXPORT & IMPORT OF PIPED NATURAL GAS AND LIQUEFIED NATURAL GAS (LNG)**

| | 2003 (Ktoe) | 2013 (Ktoe) |
|---|---|---|
| Export LNG | 18,965 | 27,089 |
| Import Piped NG | 1,501 | 7,098 |
| Export Piped NG | 1,402 | 1,497 |
| Import LNG | 0 | 1,450 |

*Source: Malaysia Energy Statistics Handbook, 2014*

## THE PENGERANG INTEGRATED PETROLEUM COMPLEX (PIPC)




A massive step in creating value in the downstream oil and gas chain, the 20,000-acre Pengerang Integrated Petroleum Complex (PIPC) will be an all-in-one oil and gas-processing centre, comprising oil refineries, naphtha crackers, petrochemical plants as well as a liquefied natural gas (LNG) import terminal and a regasification plant.

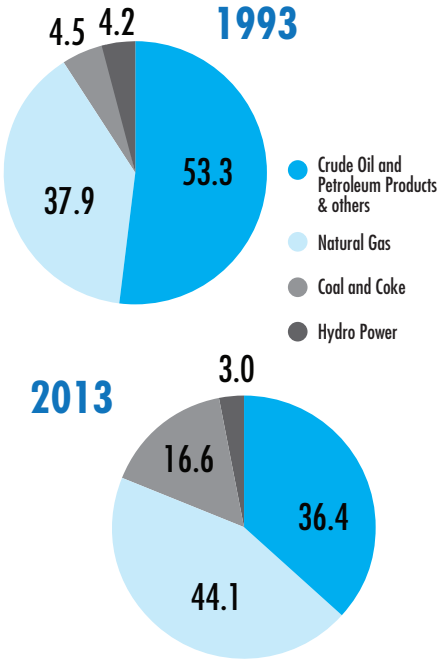
*Source: Malaysia Petroleum Resources Corporation*

**Right:** The use of natural gas in the country has been boosted by the development of the LNG Regasification Terminal in Melaka, which creates more options for importation and gas operators in the country, and greater availability for consumers.

### WIDER ACCESS

Further strengthening availability of natural gas for local consumption, a second LNG RGT is currently being developed as part of the Pengerang Integrated Petroleum Complex (PIPC) in Johor Bahru, which will also include petrochemical plants, oil refineries, crude oil and LNG storage facilities, naphtha crackers, an LNG import terminal and power plants to supply electricity to consumers in Peninsular Malaysia. The 3.8 MTPA-capacity terminal will be connected to the on-site power plants and the PGU, and is expected to commence operations in 2017.

### NATIONAL PRIMARY ENERGY SUPPLY (%)




*Source: Malaysia Energy Statistics Handbook, 2014*

More than just improving access to and consumption of natural gas, the RGT has the potential to strengthen energy security and enhance liberalisation of the gas supply industry in the country. This is evidenced by the fact that, after 2013, the country has a wider choice range for gas suppliers. In addition, the Third Party Access (TPA) framework proposed by the Malaysian government will allow the participation of the downstream sector, as any gas supplier in the country could import LNG, regasify at the RGT and use the pipeline after paying a tariff, and sell the gas to consumers in Peninsular Malaysia.

To implement the TPA however, the Gas Supply Act 1993 will need to be amended by the Energy Commission – a process which is currently in progress and will be tabled in Parliament later this year. The amendment will allow the Energy Commission to expand its regulatory powers in the gas downstream sector in the Peninsular Malaysia, Sabah and Labuan.

The development of the natural gas sector in Malaysia ensures that the increased demand for power across all economic sectors can be met from a source that is more sustainable. The development of the Floating Liquefied Natural Gas (FLNG) facility, which is capable of producing 1.2 million tonnes of LNG per annum over 20 years, when it becomes operational next year, will boost Malaysia's total production capacity to 27 million tonnes per annum, as well as the country's position as the second largest LNG exporter in the world.

# Regional Solutions

## The Issues of Southeast Asia's Energy Sector

There are many challenges facing the global energy sector, such as fuel supply and sustainability, which affect every country, including Malaysia. Therefore remedial steps should be taken by all stakeholders in preparation for potential problems. **Energy Malaysia** sits down with **Nobuo Tanaka – Global Associate for Energy Security and Sustainability at the Institute of Energy Economics, Japan**, and **Dr Dejan Ostojic – the Lead Energy Specialist from the World Bank** to get their views on these matters.

## Nobuo Tanaka

Global Associate for Energy Security and Sustainability at the Institute of Energy Economics

**What are the pressing challenges seen in the global energy landscape at the moment?**

I would say it is the issue of the big uncertainties in energy. A typical example is the geopolitical instability in the Middle East, which is creating an environment that dictates the prices of oil and gas. This geopolitics concern is very difficult to predict because of the terror groups that are present in the area, which elevate levels of risk and reduces investment in the region. Therefore the future potential of production is in trouble unless some form of geopolitical stability is achieved.

**What would you recommend to Malaysia in terms of the planning the balance of energy portfolio?**

As Malaysia is a producer of gas and oil, I would say that it is in a good position and has the potential for renewable energy like biofuels. To use these sources for the future, global requirements need to be met such as the reduction of carbon dioxide emissions. While Malaysia is already a resource-rich country on which it can depend on for growth, the government should do the right thing. This means conserving energy, and developing technologies that concentrate on renewable energy for the country to continue its growth.

Malaysia is also strategically located within ASEAN, and so it can create a network of gridlines and pipelines for greater connectivity in the region. I think this is a huge opportunity to tap into.

**What circumstances would impact energy provision in Malaysia in terms stability and affordability?**

In Malaysia, the main issue is how the government is subsidising the cost of oil and gas. Unfortunately, this encourages wasteful consumption, thus the subsidies should be phased out gradually. Naturally, when oil prices are high, there is a strong incentive by the government to subsidise oil prices to benefit those from the lower income group. However with the current low oil prices, there is an opportunity to start progressively removing the subsidies, and this would send an important message to the public to be more frugal with energy.

Developing economies depend heavily on energy sources, and procuring supply to match the ever-increasing demand is becoming a real challenge. The market is tightening and in the longer run we have to prepare for a shortfall. The government needs to be credible and transparent with their formulation of policies as the energy sector requires substantial infrastructure for supply and distribution, and the private sector would not be enthusiastic to invest any effort into it if the government is not consistent with their policies. Therefore the establishment of favourable government policies is paramount. In times of low oil prices, we should not waste resources; instead we should look for means to guarantee future supplies.

**What are some of the more urgent pre-emptive measures which should be adopted and practiced by private players in the energy sector, as well as relevant regulatory agencies and Malaysian energy consumers?**

With price volatility being a constant occurrence, one can only prepare for rainy days by conserving energy and investing money for the future such as in the upstream fossil fuels or in new technologies. Malaysia has huge potential, so it is imperative that the government comes up with a good strategy to deal with energy issues.

# Dr Dejan Ostojic

## Lead Energy Specialist at the World Bank

**What are the pathways in guaranteeing energy security and sustainability, while also prioritising social considerations? What are some very successful approaches to this issue that you have witnessed in other countries that could be emulated by Malaysia?**

In my observation, the Malaysian government is very conscious about how to address the subsidy and pricing issues in the energy sector to rebalance or find the right trade-offs for the future. What I think is difficult, is having a longer-term view. What we have observed in countries that have been successful is that they have longer-term roadmaps which were adopted and became a sort of social compact in the society, so they are not subject to political changes that may occur during an election cycle.

The skyline of Kuala Lumpur. With the rapid expansion and development of cities across Southeast Asia, energy efficiency, and safe and sustainable supply of power must be considered to meet rising future demands.

The private sector has always been keen to do profitable business, and the government usually has projects that the private sector find appealing enough to get involved in. If one party in that contract keeps changing views and policies, then the other party would not feel secure enough to engage productively and to organise these investments.

**In the East Asian and the Pacific region, how much do you estimate is required for further investment in the energy sector?**

If you chart energy sub-segments like oil, gas and power, you will find that the investments are quite significant. What is important to understand is the investment needs in comparison to the size of the economy – what is the percentage of GDP that these countries need to invest? For example in Southeast Asia and China, about 2% of GDP goes into the power sector currently, and that percentage will decrease as the economy grows.

**What are some of the most significant ways that energy and sustainability related concerns have an impact on society and any examples of this that you have observed in the Malaysian context?**

At the World Bank, we try to formulate our solutions on the basis of certain global threats. We observe them and then apply this knowledge to local countries to figure out how that information can be useful to the clients in those nations. When we talk specifically about energy sustainability in society, the issue that first comes to mind is secure, affordable and reliable supply of energy for the various needs of the country.

In the last couple of decades however, we have had increasing concerns about the environmental impact of providing energy to meet needs. We also have to bear in mind that the energy policies are important in balancing trade-offs between different needs of the community. That is why the government has a delicate role in harmonising the needs of various stakeholders and various segments of the population.

If we do not introduce sustainability principles in urban planning, there will be little that we can do later on because these developments last for centuries, making change difficult. Southeast Asia is going through a massive transformation, so it is critically important that the expansion plans of cities recognise the need for energy efficiency and the sustainable supply of power.

The fact is that the economy is moving more towards services, which is an important sector as Malaysia is aiming to become a high-income country by 2020. The government needs to weigh allocating these funds into energy subsidies or improving health and education services. Those are the trade-offs the government has to decide – what is the biggest value added and what is most important for society and development?

Speaking to Nobuo Tanaka and Dr Dejan Ostojic, it is clear that the Malaysian energy sector – while reflecting trends and realities in the global arena – also has its own unique challenges and opportunities. The biggest takeaway one gets from these conversations is that both industry and authorities need to work together to pre-empt the problems that have yet to manifest themselves. To quote Nobuo Tanaka, "Malaysia has a bright future in energy, if the government can take advantage of it."

# BE ENERGY SMART

The habit of using electricity and gas safely and efficiently should be nurtured from an early age. This practice should begin at home and parents should show their children good practices such as:

- ☑ Turn off all electrical and gas appliances when not in use.
- ☑ Get the services of registered electrical and gas contractors for repairs and regular checks.
- ☑ Do not overload a socket outlet with multiple electrical appliances.
- ☑ Use electrical appliances that have ST-SIRIM safety label and energy efficiency label.
- ☑ Press the 'T' button on the automatic circuit breaker switch in your home once a month to ensure it functions satisfactorily.

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Suruhanjaya Tenaga
Energy Commission

# Generation Development Plan

## Securing Enough Capacity for the Future

As increased economic activity is expected to result in a spike in electricity usage, one of the challenges faced by the authorities is to properly manage generation capacity and ensure the nation's long-term energy supply and security.

Peak electricity demand in Peninsular Malaysia is forecast to rise from 16.901GW in 2015 to 20.336GW by 2020. Overall electricity usage is also expected to increase from 102.383TW/h to 123.692TW/h during the same time period.

While electricity demand has been rising, and is expected to keep on doing so, generation capacity has remained more or less the same. In fact, prior to the switching-on of the 1,000MW Manjung 4 ultra-supercritical coal-fired power plant in April this year, no extra capacity had been added to the grid for more than five years.

The situation – where demand has been on an upward trajectory with supply remaining stagnant – has also resulted in the reserve margin being cut from 41% in 2011 to less than 30% as of June 2015. Also, at present, total generation capacity in Peninsular Malaysia is slightly less than 22GW. Given that peak demand in 2020 has been estimated at 20.336GW, it is imperative for additional capacity to come online.

The Energy Commission realises this, which is why it plans for up to

### 20-YEAR SUPPLY-DEMAND OUTLOOK

| | Year | Sales (GWh) | Growth (%) | Generation (GWh) | Growth (%) | Peak Demand (MW) | Growth (%) | MW increase |
|---|---|---|---|---|---|---|---|---|
| FORECAST | 2014 | 103,804 | 3.9% | 114,549 | 3.2% | 17,152 | 3.6% | 590 |
| | 2015 | 107,563 | 3.6% | 117,834 | 2.9% | 17,697 | 3.2% | 545 |
| | 2016 | 111,366 | 3.5% | 121,794 | 3.4% | 18,282 | 3.3% | 585 |
| | 2017 | 115,275 | 3.5% | 125,860 | 3.3% | 18,880 | 3.3% | 598 |
| | 2018 | 119,301 | 3.5% | 130,045 | 3.3% | 19,492 | 3.2% | 612 |
| | 2019 | 123,446 | 3.5% | 134,350 | 3.3% | 20,111 | 3.2% | 619 |
| | 2020 | 127,383 | 3.2% | 138,421 | 3.0% | 20,721 | 3.0% | 609 |
| | 2021 | 131,310 | 3.1% | 142,474 | 2.9% | 21,288 | 2.7% | 568 |
| | 2022 | 134,982 | 2.8% | 146,243 | 2.6% | 21,794 | 2.4% | 506 |
| | 2023 | 136,680 | 1.3% | 147,869 | 1.1% | 21,979 | 0.8% | 185 |
| | 2024 | 141,360 | 3.4% | 152,718 | 3.3% | 22,524 | 2.5% | 545 |
| | 2025 | 144,340 | 2.1% | 155,725 | 2.0% | 22,938 | 1.8% | 414 |
| | 2026 | 147,008 | 1.8% | 158,390 | 1.7% | 23,300 | 1.6% | 363 |
| | 2027 | 149,519 | 1.7% | 160,886 | 1.6% | 23,637 | 1.4% | 337 |
| | 2028 | 151,982 | 1.6% | 163,328 | 1.5% | 23,965 | 1.4% | 328 |
| | 2029 | 154,457 | 1.6% | 165,781 | 1.5% | 24,294 | 1.4% | 329 |
| | 2030 | 156,781 | 1.5% | 168,070 | 1.4% | 24,598 | 1.3% | 304 |
| | 2031 | 159,008 | 1.4% | 170,458 | 1.4% | 24,934 | 1.4% | 337 |
| | 2032 | 161,292 | 1.4% | 172,907 | 1.4% | 25,279 | 1.4% | 345 |
| | 2033 | 163,474 | 1.4% | 175,245 | 1.4% | 25,608 | 1.3% | 329 |
| **Average period growth rates, % pa:** | | | | | | | | |
| **2014-2023** | | | **3.1%** | | **2.9%** | | **2.8%** | |
| **2014-2033** | | | **1.6%** | | **1.5%** | | **1.4%** | |

The Energy Commission has come up with a long-term forecast of electricity demand and supply in Peninsular Malaysia

*Source: Energy Commission*

Mohd Rizal Ramli, head of the Capacity Development Unit, explains how the Energy Commission is securing a sustainable and reliable supply of electricity for the future.

10GW worth of additional capacity by the year 2020, by building 13 new power plants and expanding three existing ones. According to **Mohd Rizal Ramli**, **Head of Capacity Development Unit** at the Energy Commission, this is "part of (Malaysia's) long-term generation capacity development plan, which is to cater for future need."

Elaborating, Rizal revealed that the Generation Planning Committee (*Jawatankuasa Perancangan Pelaksanaan Pembekalan Elektrik dan Tarif* – JPPPET) has come up with a 20-year forecast of demand (otherwise known as the Long-Term Load Forecast), which runs from 2013 to 2033. These figures are revised twice-a-year to ensure that the Commission's strategies are reflective of and responsive to market realities.

## BREAKING DEPENDENCY

Aside from contracting and approving the building of new power plants, the Energy Commission also hopes to enhance Malaysia's energy security by ensuring fuel diversity. As Rizal explained, the current fuel mix for electricity generation is highly dependent on natural gas and coal. Two fuel-types account for 52% and 43% of capacity respectively, with the rest being hydro-power (5%), and renewables such as solar and biomass (1%).

This dependence on coal and gas presents long-term problems as it makes the country too reliant on a limited source of fuel feedstock. In fact, in 2011, a severe gas shortage forced gas-fired power plants in the country to switch to more expensive petroleum-derived distillates, such as diesel, increasing cost by nearly fivefold.

It was expensive, but it had to be done, considering that natural gas then accounted for 56% of Malaysia's electricity generation. Incidentally, the gas crisis of 2011 was the catalyst which led to the promotion of coal as a near co-equal contributor to overall generation capacity.

## RENEWABLE FACTOR

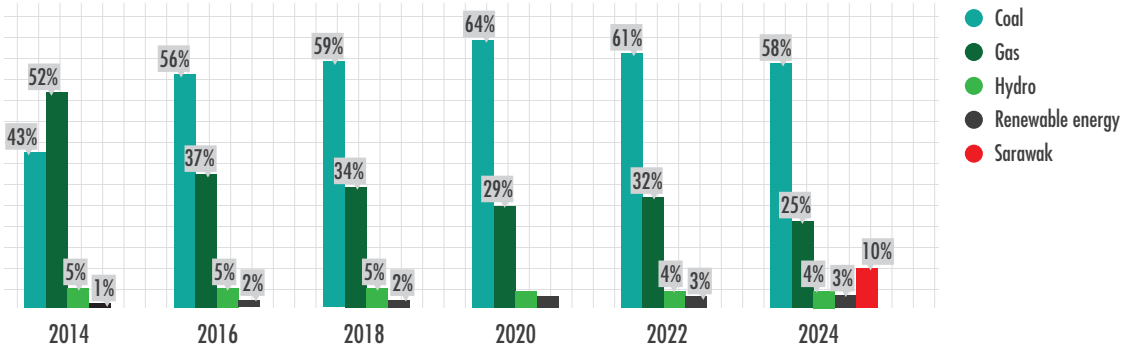
Another factor affecting energy policy is the pledge by Prime Minister Datuk Seri Najib Tun Razak that Malaysia will achieve a 40% reduction carbon emissions intensity, from 7.57 tonnes per capita to 4.54 tonnes, benchmarked against 2005 levels, by 2020.

This promise was made during the 2009 United Nations Climate Change Conference in Copenhagen, and has contributed to the increased focus on renewable sources of energy including hydropower, solar power and biomass.

As part of the push towards renewables, the Renewable Energy Act 2011 was passed, which opened the door for the feed-in tariff (FiT) system where individuals and private corporations generate electricity using renewable sources (such as solar and biomass). The FiT participants then sell this power to the main utility provider – Tenaga Nasional Berhad (TNB) – who pays them a premium of almost four-times the going rate for electricity.

Aside from individual homes and offices, large-scale solar power facilities have also been erected across the country. Examples include the 5MW Melaka World Solar Valley Farm, an 8MW solar farm located in Pajam, Negeri Sembilan, and a 10.25MW one in Gemas, Negeri Sembilan.

## GENERATION DEVELOPMENT PLAN 2014-2024




*Source: Energy Commission*

### LOOK EAST

Admittedly, the capacity of solar photovoltaic power plants and other renewables such as biomass is small compared to those of natural gas and coal stations. Thus, the non-fossil fuel that holds the most promise for electricity generation is hydropower. In Peninsular Malaysia, a total of six hydroelectric stations have been slated for completion from now until 2022, adding a total of 937MW to the national grid.

According to the Generation Development Plan formulated by the JPPPET, hydroelectricity will comprise 4% of Peninsular Malaysia's electricity generation. It is obvious though that hydropower, while contributing more than other renewables, cannot match fossil fuels in terms of output.

Among the problems preventing the expansion of hydropower in Peninsular Malaysia are geographical obstacles, particularly weak river currents and the lack of landmass. This is not the case in East Malaysia, especially Sarawak. Under the Sarawak Corridor of Renewable Energy (SCORE), the state is estimated to have the potential capacity to generate 20GW of electricity from hydropower alone, and projects near completion include the 2.4GW Bakun Dam, 1.2GW Baram Dam and 1.295GW Balleh Dam.

In the past, electricity produced in Sarawak is consumed in the state with some of it being sold to Sabah. This is set to change by 2024 as that is the year when the laying of a High Voltage Direct Current (HVDC) cable connecting West and East Malaysia will be completed. This will allow the transmission of 2GW of electricity from Sarawak – most, if not all, of it generated by hydropower – to Peninsular Malaysia.

### GETTING MORE FROM LESS

Rizal warned however that, "Although renewable energy will help in terms of fuel security and ensure a steady supply of electricity, fossil fuels are still comparatively cheaper. This will definitely affect tariffs as investing in renewable energy may result in a temporary hike in electricity prices because of the initial expenses in building new dams without proper balance, renewable energy power plants and installing new solar cells."

According to the Generation Development Plan, by the year 2024, 58% and 25% of electricity used in Peninsular Malaysia will come from coal and gas respectively. While this is an improvement from the 2014 figures of 52% gas and 43% coal, it also shows that while the usage of fossil fuels can be reduced, it cannot be eliminated.

Therefore, the solution is to find ways to enhance the operations of power plants which will ensure optimal returns. For example, by using coal with a higher caloric value and utilising technology such as supercritical or ultra-supercritical generators, more power can be extracted from less feedstock, resulting in a smaller carbon footprint. One example of this is the aforementioned Manjung 4 power plant. Similarly, in gas-fired plants, the use of efficient turbines will increase output while minimising input.

As global fossil fuel reserves are decreasing every year, governments and agencies around the world – including Malaysia – are strengthening measures to diversify their energy sources. While the country's existing electricity generation and transmission infrastructure base is strong, further improvement should always be encouraged and implemented with the understanding that power generation and supply remains the backbone of any economy, and a diverse fuel source helps ensure energy security.

# Where are the Watts?

## Alleviating Technical and Non-Technical Losses

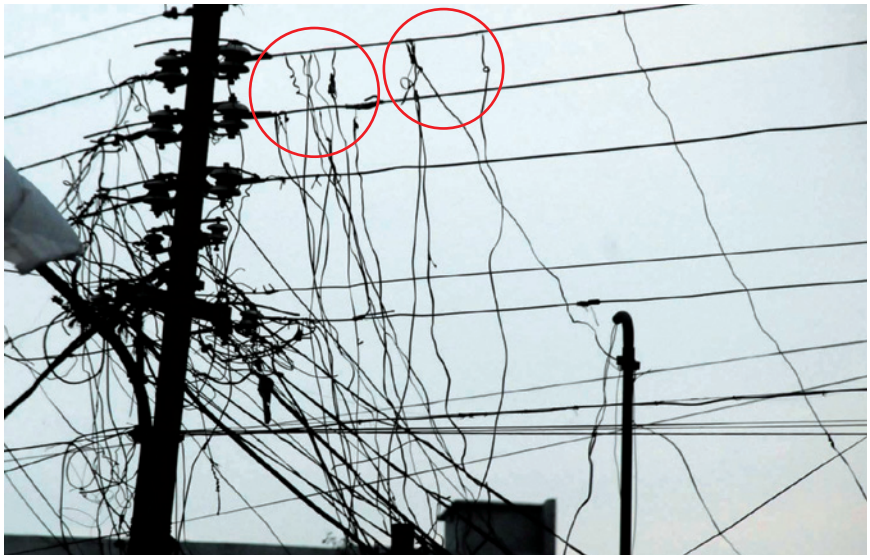
Not all the electricity that is generated at power plants reach a utility's residential and commercial customers. This is because transmission and distribution losses, as well as power pilferages, occur along the way. These losses are grouped into two main types according to the nature of the loss – technical losses within the distribution system, and non-technical losses such as electricity theft. Although in general these losses amount to a small fraction of total output, steps still have to be taken to mitigate them to increase the efficiency of power delivery. **Energy Malaysia** speaks to **Abdul Razib Dawood**, **Head of Market Operation Unit** at the Energy Commission to learn more about these losses.

Technical losses can be loosely defined as the power lost when energy is dissipated during electrical transmission – predominantly as heat, but energy does get expended as noise as well – chiefly because of the inherent resistance of the conductors themselves. For example, when the electrical transmission voltage of 500kV is lowered to the household level of 240V via a step-down transformer, the electricity will pass through a series of winding conductors, which are coils of wire made of copper.

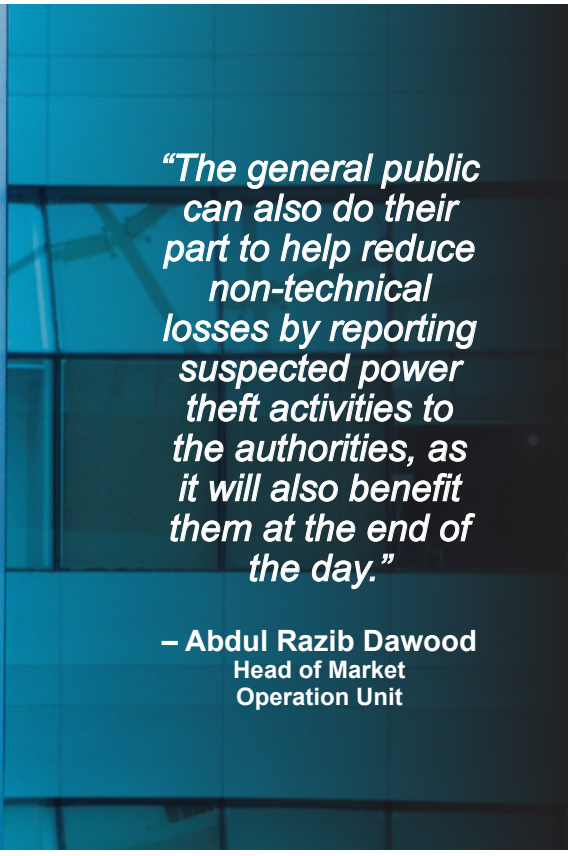
"These wires heat up as a result of the passage of electricity, drawing energy from the current running through it. Since this process of energy loss is defined by the law of physics, it is not possible to eliminate it completely, the only option is to minimise it," Abdul Razib explains. Therefore, the magnitude of technical loss along the distribution network is determined by the network's design and characteristics; the more possibilities there are for energy dissipation, the greater the technical loss.

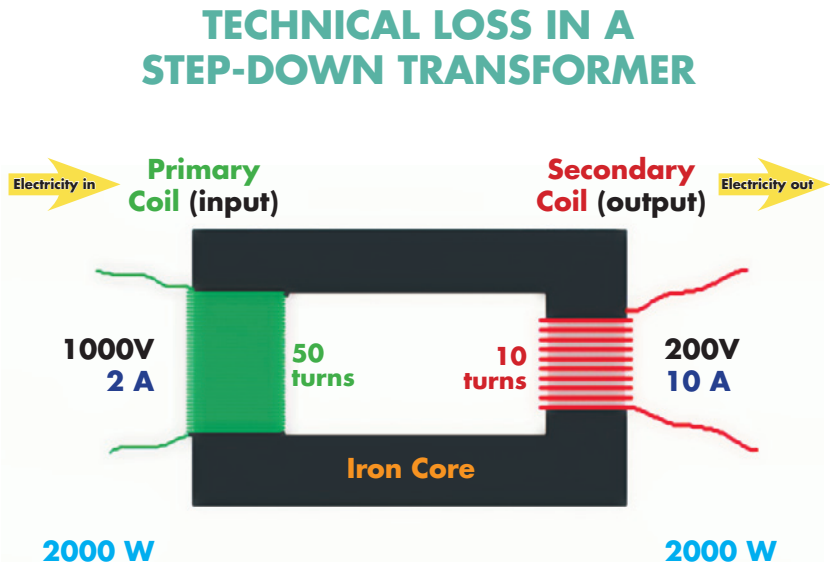
Non-technical losses on the other hand are those sustained via factors outside the power system, such as meter tampering and power pilferages, otherwise known as electricity theft. When power is misappropriated in this manner, the electricity distribution network is burdened with wasted power generated and unrecorded usage. Abdul Razib elaborates, "Meter bypassing is the most common method of power theft, although some thieves go as far as attaching cables to transmission lines to tap into the power feed directly."

Regardless of the way technical and non-technical losses occur, they affect both the power utility and its customers. The less of these losses incurred, the more revenue power companies can earn. Tenaga Nasional Berhad (TNB), for instance, operates under the Incentive Based Regulations (IBR) mechanism, where there are fixed revenue requirements. Therefore with higher profits, electricity tariffs could be reduced, benefiting the end consumer. In addition, the losses also necessitate increased power generation to meet demand and compensate for the reductions in the system.



Some power pilferers attach wires directly to uninsulated transmission lines (circled) in this example of a non-technical loss. The vertical cables are cast from the ground, hooking onto the utility's power lines.




The energy lost when voltage is reduced by a step-down transformer is an example of a technical loss. The primary and secondary coils increase in temperature during the voltage drop, drawing energy from the electricity flowing through them.

*Source: custompowertransformer.com*

## MITIGATING MEASURES

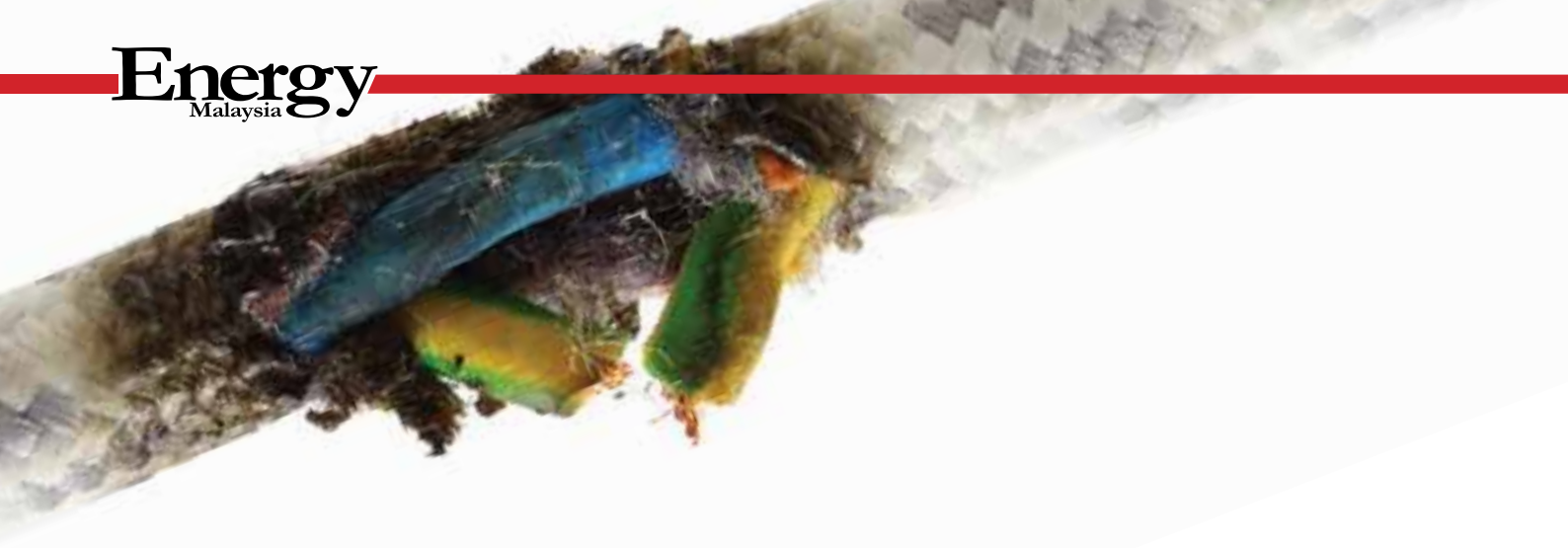
To curb these losses, TNB and the Energy Commission have identified and applied several measures. Non-technical losses are given particular attention as they are typically the result of criminal acts. "So prevalent are these cases that TNB has created their own enforcement team dubbed the SEAL team, although unlike its United States military namesake, this SEAL stands for Special Engagement Against Losses," Abdul Razib remarks. Armed with a court order, representatives from the Energy Commission and the SEAL team can raid the premises of suspected power thieves and collect evidence for legal action.

Some remote areas of the country, like the backwaters of Sabah, are commonly plagued by cases of power pilferages committed by illegal squatters. These thieves take advantage of the desolation that these rural locations provide to brazenly hook cables to the uninsulated overhead transmission lines to power up their dwellings with free electricity. Regular patrols are conducted to remove these felonious fittings, ensuring that the transmission network in these places remains intact.

Advanced metering instrumentation is also employed to further monitor these unlawful activities, such as the use of the remote metering system (RMS). "These intelligent meters have already been applied at industrial addresses, and they provide TNB with a detailed glimpse of the electricity usage of a given industrial consumer via readings that are sent online," Abdul Razib expounds. "In a similar vein, the meters in the smart grid system, which is in the midst of being implemented in the country, will alert TNB if they are being tampered with," he adds.

Although it is difficult to reduce technical losses, there are certain steps that can help lessen their severity, such as to increase the voltage of the lengthier transmission network lines to 500kV. This is because at a given amount of power, a higher voltage equates to less current and resistance in the system, which in turn results in less losses. Other measures include emulating South Korea by introducing aluminium conductors as opposed to copper ones, which cost more initially but give a decent return on investment in the long run with reduced technical losses.

In April 2015, TNB calculated its total losses due to technical and non-technical losses to be 7.71%, the bulk of which is attributed to transmission and distribution losses. With constant policing and institution of more efficient methods to further reduce these losses, TNB, in collaboration with the Energy Commission, would undoubtedly achieve its goal of meeting its benchmark figure of 5%.



# Electrical Mishaps

## Common Causes and Prevention Methods

In 2002, a total of 31 cases of to electrical accidents were reported, of which 14 were fatal, according to a report published by the Energy Commission in 2011. Comparatively, in 2014, 63 cases were reported, 27 of them resulting to death. This is a matter of grave concern, as the number of injuries and fatalities due to electrical accidents have increased by 33.3% in the span of 10 years. The number of injuries resulting from these accidents is believed to be much higher, as to some of them were not reported. **Energy Malaysia**, using facts and figures on electrical accidents from the past few years, examines the trends and patterns that were involved.

### THE CAUSES

In the report titled *Strengthening Electrical Safety Practices through Legislation* published by the Energy Commission, most of electrical accidents occurs because of the improper and lack of maintenance of electrical equipment and installations. Agencies such as the Standards Department as well as Industrial Research Institute of Malaysia (SIRIM) were given the task to regulate the safety standards for electrical equipment.

Many electrical appliances, such as air-conditioner units, fans and power plugs will undergo thorough testing at SIRIM's research facilities to ensure that they are safe to use. They are then given a sticker of approval bearing SIRIM – ST logo to signify that the appliances are safe for the general public to use. Using non-SIRIM approved appliances, even though they are much cheaper to purchase, may be dangerous to use in the event of a malfunction as their safety is not guaranteed.

**Causes of Electrical Accidents (2002 - 2014)**

| Cause of Accident | Percentage % | Total cases |
|---|---|---|
| Failure to maintain installations | 36.2 | 276 |
| Non-compliance with safe working procedures | 30.7 | 234 |
| Trespassing of utility substations | 10.9 | 83 |
| Activities near transmission/distribution | 11.1 | 85 |
| Misused / Unsafe wiring installation | 3.0 | 23 |
| Defects on electrical equipment/tools | 2.8 | 21 |
| Other causes | 5.4 | 41 |
| **Total** | **100** | **763** |

*Source: Energy Commission*

In addition, according to the Energy Commission, most electrical accidents occur in the workplace, mostly because of non-compliance with safety standards. For example in 2014, a man was electrocuted while carrying out underground cable works

**Left:** Failure to maintain electrical installations are the biggest causes of electrical accidents, accounting for nearly 40% of all cases from 2014. Faulty appliances and poor maintaining, besides being hazardous, will only slow down productivity.

An example of a Residual Current Circuit Breaker (RCCB). An RCCB is located in the fuse box of every building, residential, commercial, or industrial, and will automatically the power supply in the event of an overload. It can also be manually turned off to stop the power supply, for safety measures.

in Pontian, Johor. Improper planning of excavation work and failure to comply with Permit To Work (PTW) procedures, caused the accident to happened, which eventually killed the victim upon contact with the exposed high voltage cable. This accident could have been avoided if there have been more thorough planning and inspection of the area done to identify the locations of these cables.

Similar mishaps could also occur at homes. For example, in 2013, a Japanese couple were electrocuted in their Mont Kiara home by a faulty water heater. Upon investigation by the Energy Commission, they discovered that the RCCB (residual current circuit breaker), the protection device that cuts the power supply in case of a leakage current, was not functioning, and thus did not 'trip' (switch-off automatically). Worst, the victims were using metallic shower hose. Due to this accident, the Energy Commission and SIRIM took the initiave to hold a meeting with water heater manufacturers and retailers, and made a decision that an external RCCB should be installed with all new units of water heaters, for additional protection. Most water heaters have a built-in circuit breaker, although they may fail due to various reasons, such as the cables melting as they are unable to withstand the heat, or not being able to detect currents properly. An external RCCB serves as an added

## How to prevent electrical accidents:

Always make sure hands are dry before touching electrical switches. Water is a conductor, and it may leak into the switches and cause a short circuit, which could result in an electric shock.

When cutting down trees or doing renovation work, pay attention to see where nearby power cables are, and always be careful around them, as they carry high voltages, and could cause serious injury.

Only hire certified professionals, as they have the necessary knowledge and competence to install electrical equipment that are safe to be used.

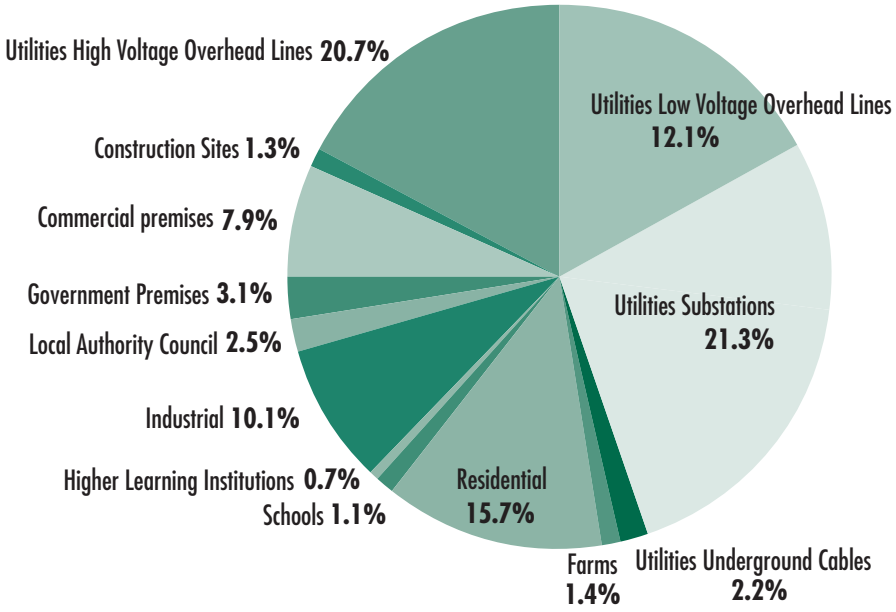
Never connect too many power plugs to a single power outlet as this will increase the risk of overloading and equipment damage.

When buying electrical appliances, always look for a SIRIM logo, which means that the product has been tested and certified by SIRIM, and is safe to use.


When checking for damage on appliances, always turn off the power supply and disconnect them from the power sockets first, to make sure there is no electricity flowing through them.

In case of a fire due to electrical short circuits, disconnect the power supply first before taking the necessary steps to extinguish the fire.

## Where Electrical Accidents Happen




**Right:** Utilities substations are where most electrical accidents occur, attributed to the presence of high-voltage cables. Higher learning institutions account for 0.7% of the locations where electrical accidents occured, while accident at homes, which account for 15.7%, are mainly due to failure to adhere to proper safety measures.

**Below:** Statistics showing the number of fatal and non-fatal electrical accidents from 2002 – 2014. The highest number of accidents was in 2006, with 79 cases, of which 37 were fatal.

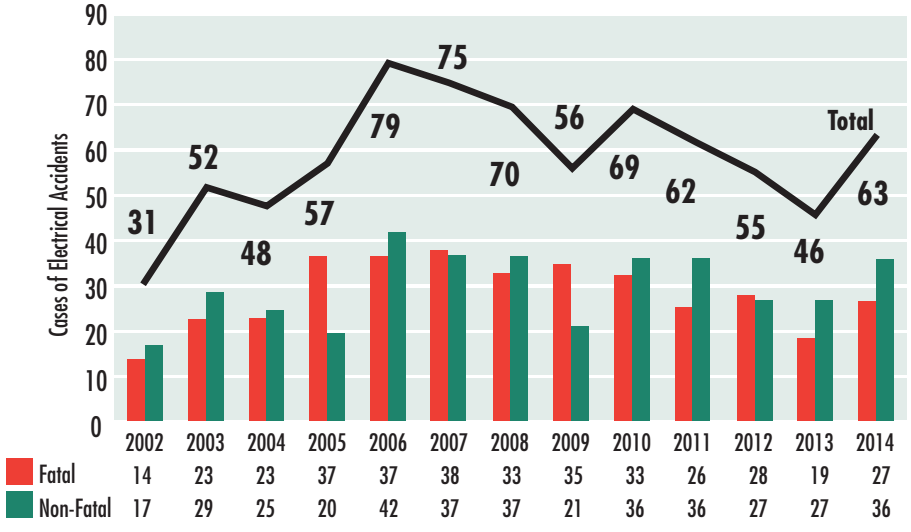
*Source: Energy Commission*

layer of protection, and is designed to detect any leakage currents, and then 'trip,' or cut the power supply to the water heaters.

### PROPER INSTALLATION

When installing new electrical equipment in buildings, only wiremen certified by the Energy Commission should be engaged, as they have the knowledge, necessary training and competence to do the job. The Energy Commission has adopted the MS IEC 60364, a document published by the International Electrotechnical Commission (IEC), which serves as an international standard for electrical installations in buildings, and acts as a guide to professional wiremen and electrical engineers. The document provides detailed guidelines on installing important protection systems such as an effective earthing system and over current relays to protect the consumers.

## Electrical Accidents from 2002 to 2014




| | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Fatal | 14 | 23 | 23 | 37 | 37 | 38 | 33 | 35 | 33 | 26 | 28 | 19 | 27 |
| Non-Fatal | 17 | 29 | 25 | 20 | 42 | 37 | 37 | 21 | 36 | 36 | 27 | 27 | 36 |

*Source: Energy Commission*

Electrical safety awareness is very important in keeping the public knowledgeable on the dangers of electricity and faulty appliances. In collaboration with many power utilities and associations, such as The Electrical and Electronics Association of Malaysia (TEEAM), many electrical safety campaigns, were organised. The RCCB Campaign aims to teach and train the consumers on how to test the circuit breakers to prove that they are still functioning. Electrical accidents can be avoided, but adhering to the safety regulations that are already in place is crucial.

Suruhanjaya Tenaga
Energy Commission


# 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 is 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'). 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.

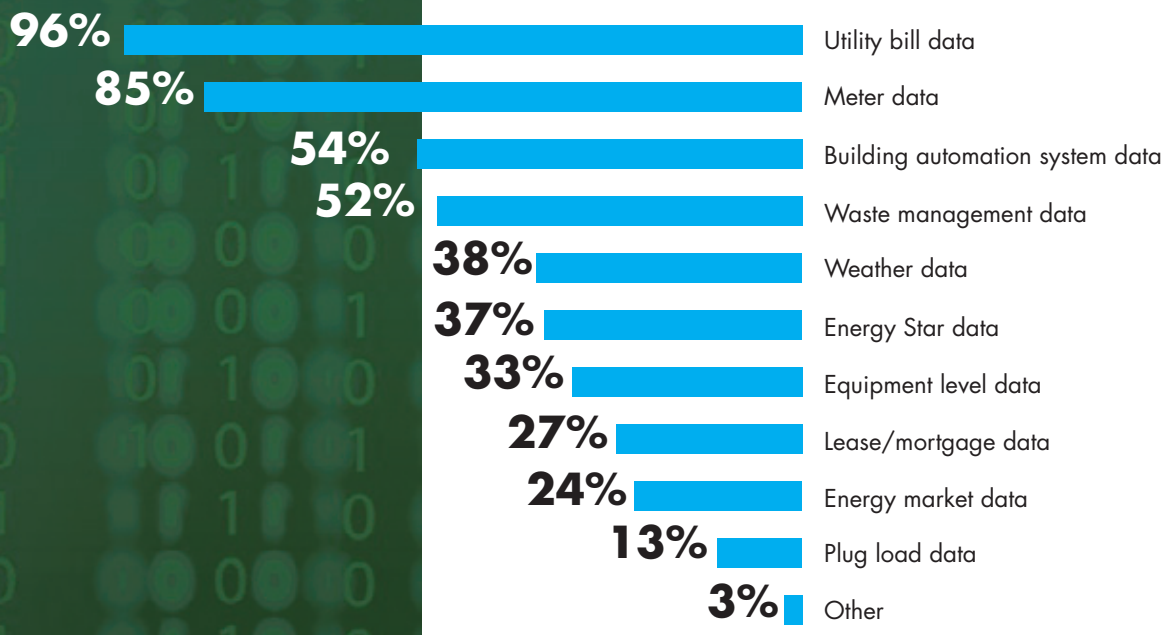
Energy Commission | No. 12 Jalan Tun Hussien, Precinct 2, 62100, Putrajaya
Toll Free Number: 1 800 2222 78 | Telephone: 03 8888 8500 | Fax: 03 8888 8637 | Website: www.st.gov.my

# Crunching the Numbers

## Using Big Data to Manage Energy Consumption in Buildings

It is always a challenge to run a building economically, especially if it is a commercial edifice with a labyrinth of electromechanical fittings that provide lighting, cooling or heating needs. These buildings contribute more than 40% of the world's energy use. However, there is a huge opportunity to manage and reduce this excessive energy use, by utilising information gathered from daily maintenance of the building, data management and smart technology. **Energy Malaysia** looks at how big savings can come from Big Data.

## BUILDING DATA TYPICALLY COLLECTED BY FACILITY MANAGEMENT




*Source: GreenBiz Group*

**Above:** In order to gauge the general performance of a building, facility managers glean information from pertinent data such as these.

'Big data' loosely describes any large sums of data, whether in structured, semi-structured or in unstructured forms, that could be sifted through for useful information. The amount of data is usually too large for normal software tools to process and analyse, requiring instead artificial intelligence programmes embedded with complex algorithms. In essence, it is a single database of all data such as utility bills, asset information and more that is easily accessible to stakeholders.

### TAPPING INTO BIG DATA

According to US Environmental Protection Agency, the average commercial building wastes 30% of the energy it consumes, giving rise to the urgent need to find new ways for improved energy efficiency. By dredging into the wealth of information that is Big Data, facility managers can gather information about their building's energy usage as well as overall performance, and use that data to make adjustments

accordingly. The end result is a drop in energy consumption, lower operating and maintenance costs and higher levels of occupant comfort.

Data analytics that take advantage of Big Data allows for easy and fast identification of areas of inefficiency, and facilitates the implementation of targeted energy-saving initiatives. These management systems also have the convenience of customisable tech tools that can be tailored to suit the goals and abilities of a particular company.

For example, in 2011, software giant Microsoft was able to slash its energy budget by US$1.5 million simply by utilising Big Data to better manage its power consumption. Some 125 buildings on Microsoft's main campus had their over 30,000 building system components – and more than 2 million points where building systems ranging from lighting to heating, ventilation and/or air conditioning (HVAC), to power monitoring – connected to sensors. These systems produce half a billion data transactions in a 24-hour period.

The sensors immediately started to give feedback, and faults were picked up as the diagnostic system detected assets that were not working effectively. For instance, the system noticed that some dampers in the variable air volume network were open partially instead of being closed, and giving more cooling than was required.

## MANAGEABLE BUILDING SYSTEMS


Some of the various facilities that can be controlled by building management systems.

*Source: IBM*

Big Data has a huge potential to cut energy losses within buildings, and it is steadily gaining a foothold in Malaysia.

## Big Data in Malaysia

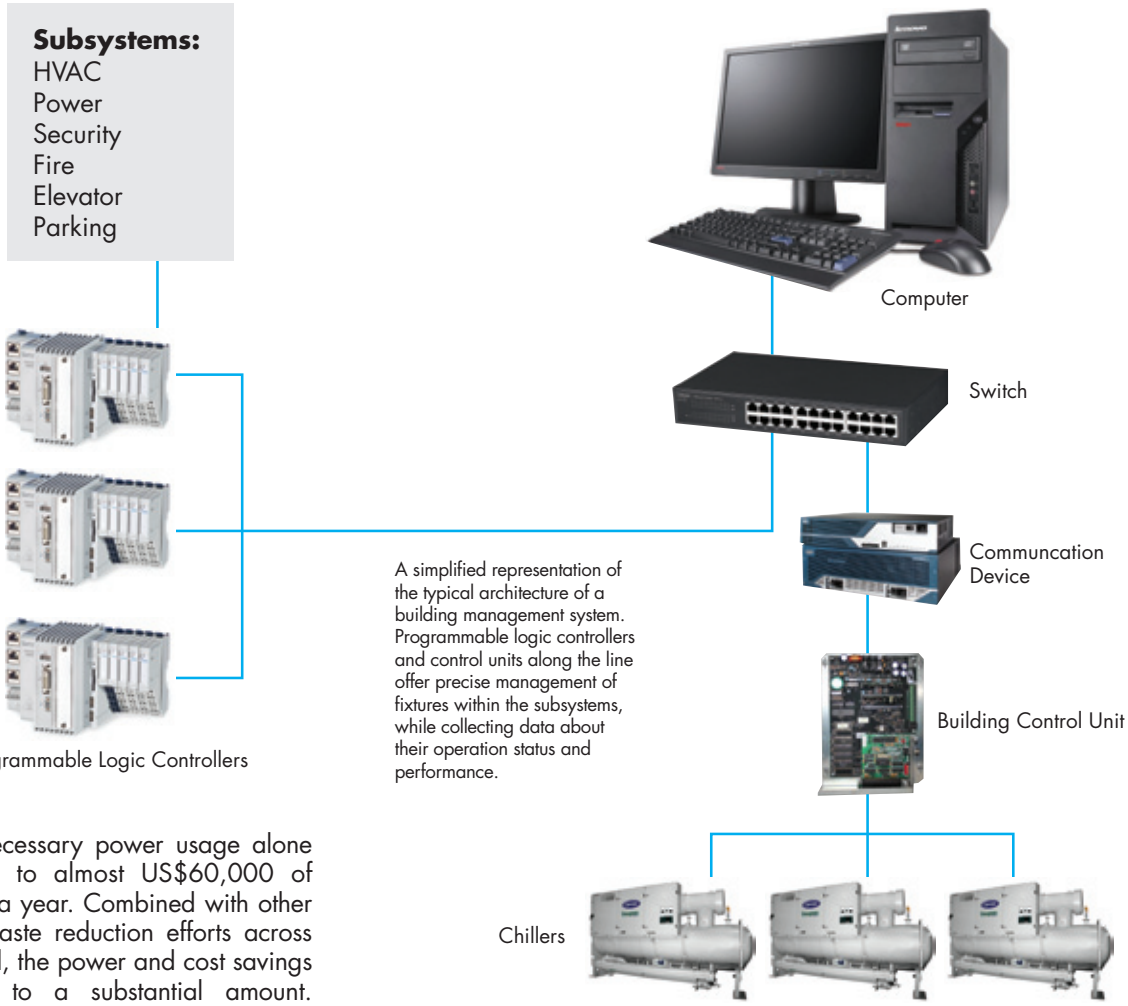
There are several Big Data management systems in use in Malaysia today, such as the MySPATA system, which came about during a Government Asset Management Committee meeting in 2009. It was decided then that the *Sistem Pengurusan Aset Tak Alih* (SPATA), which stands for Fixed Assets Management System, and *Sistem Pengurusan Aset Alih* (SPA) which is Movable Assets Management System, are to be developed to help in the management of certain government assets.

The MySPATA system is used to regulate government fixed assets such as land, buildings and infrastructure, while the SPA system keeps tabs on movable assets such as computers, furniture and vehicles.

Once the assets are registered on these systems, their whereabouts and usage can be more effectively tracked in a systematic, holistic and sustainable way. Hence, they can be utilised in a more efficient and optimum way, reducing energy wastage that would otherwise occur due to mismanagement of asset usage.

In a similar vein, solution providers such as iBMS Technology and ASI Malaysia, which offer automation and IT infrastructure solutions, give the Malaysian corporate sector the option to take advantage of Big Data within their buildings with their comprehensive management systems. Aside from consultation and installation, these companies also provide maintenance and around-the-clock support to ensure that the systems run smoothly.

## BUILDING MANAGEMENT SYSTEMS (BMS)




A simplified representation of the typical architecture of a building management system. Programmable logic controllers and control units along the line offer precise management of fixtures within the subsystems, while collecting data about their operation status and performance.

*Source: Reliability Centre India*

This unnecessary power usage alone translates to almost US$60,000 of wastage a year. Combined with other similar waste reduction efforts across the board, the power and cost savings add up to a substantial amount. Microsoft started to achieve energy savings of up to 20% each time they commissioned a building.

### QUICK FIXES

Big Data's influence goes beyond detecting energy usage; it transforms how facilities are managed as an overall unit as well. The building management systems (BMS) report faults on the spot, and rectification works can be planned immediately.

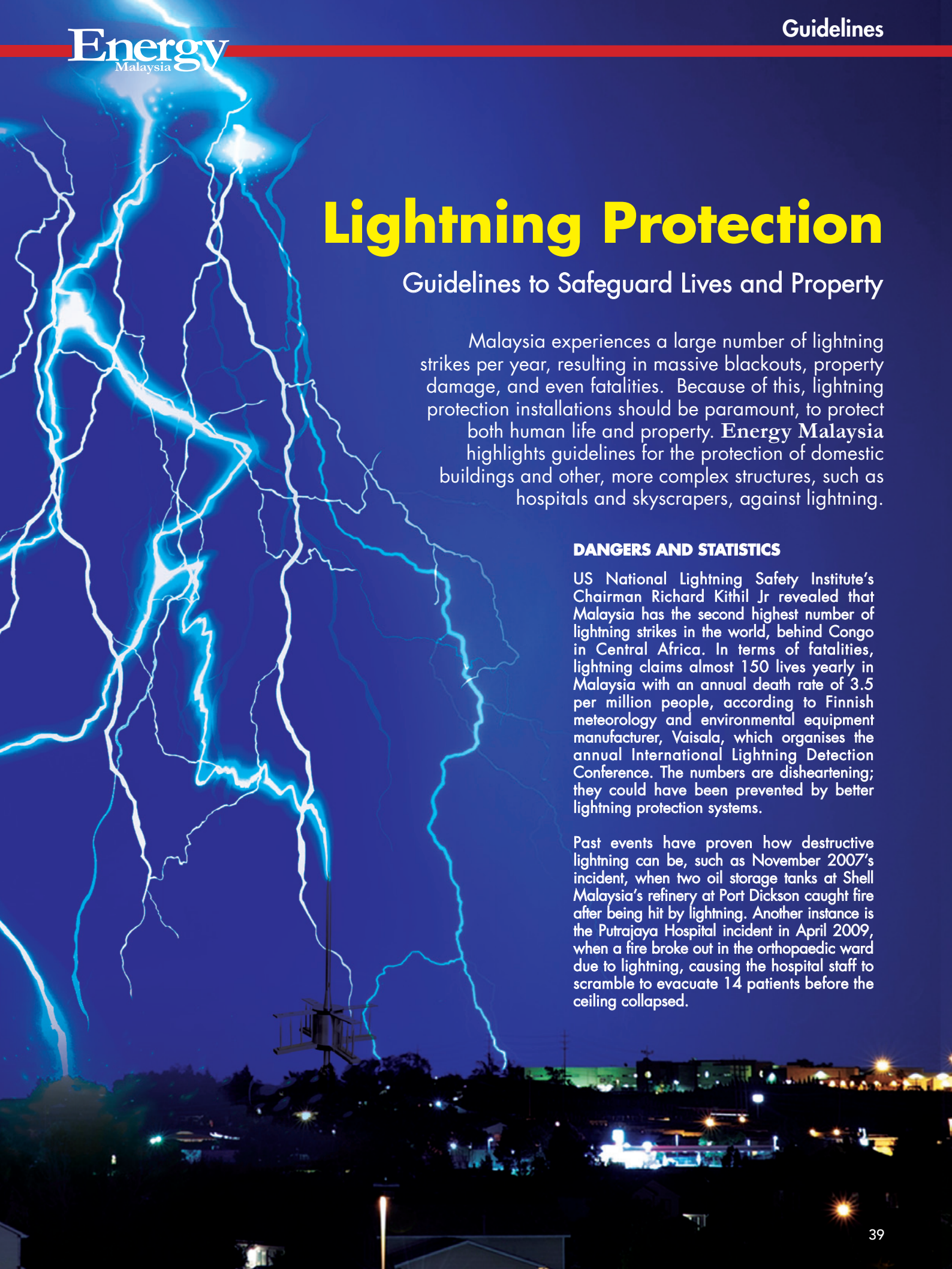
This gives the facilities crew the option to prioritise maintenance needs. They can determine what problems can wait to be fixed along with the estimated cost of putting the repair on hold. The system is helpful in this regard, arranging the urgency of fixing faults based on cost of repair. Next in line, the system could start producing its own work orders, instructing repair jobs to be carried out where needed, reducing response time.

### BETTER REPORTS

The system also streamlines energy reporting, yielding only one common report. If done the traditional way – generating piecemeal reports for each department – a facilities team at a company could take weeks to select and combine reports across all its divisions, and disseminating that information to determine where energy was utilised.

In comparison, the multitude of data is processed instantaneously with this new setup, furnishing the team with a single report. For instance, it used to take up to six hours to generate an in-depth performance report on an air handler – complete with details like the performance of components like economisers and chilled water valves. Now, the same report can be ready under a minute.

The Big Data found in buildings can serve as the foundation for more effective methods of reducing energy consumption, specifically in the commercial sense. The right analytics solution and management system will immensely help facility managers to achieve a smaller carbon footprint for the building, as well as help building management save cost and more importantly, energy.



# Lightning Protection

## Guidelines to Safeguard Lives and Property

Malaysia experiences a large number of lightning strikes per year, resulting in massive blackouts, property damage, and even fatalities. Because of this, lightning protection installations should be paramount, to protect both human life and property. **Energy Malaysia** highlights guidelines for the protection of domestic buildings and other, more complex structures, such as hospitals and skyscrapers, against lightning.

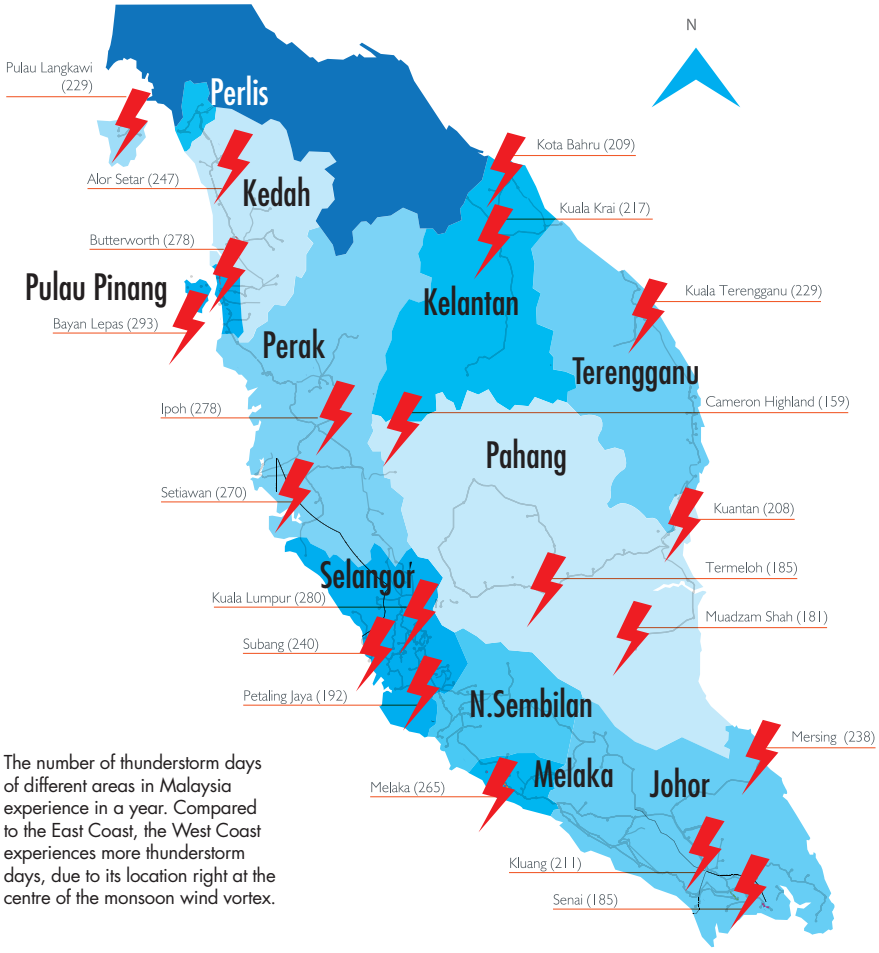
### DANGERS AND STATISTICS

US National Lightning Safety Institute's Chairman Richard Kithil Jr revealed that Malaysia has the second highest number of lightning strikes in the world, behind Congo in Central Africa. In terms of fatalities, lightning claims almost 150 lives yearly in Malaysia with an annual death rate of 3.5 per million people, according to Finnish meteorology and environmental equipment manufacturer, Vaisala, which organises the annual International Lightning Detection Conference. The numbers are disheartening; they could have been prevented by better lightning protection systems.

Past events have proven how destructive lightning can be, such as November 2007's incident, when two oil storage tanks at Shell Malaysia's refinery at Port Dickson caught fire after being hit by lightning. Another instance is the Putrajaya Hospital incident in April 2009, when a fire broke out in the orthopaedic ward due to lightning, causing the hospital staff to scramble to evacuate 14 patients before the ceiling collapsed.

## THUNDERSTORM DAYS IN PENINSULAR MALAYSIA

More than just a natural phenomenon, lightning can cause major property damage and loss of life if the right safety measures are not put in place. This means that lightning protection systems are important in Malaysia, as the country records a total of nearly 200 thunderstorm days – days on which thunder can be heard, mainly in the West Coast of the Peninsular Malaysia, according to *Journal of Theoretical and Applied Information Technology*, published in 2011. This is due to its location, which is at the centre of the monsoon wind vortex where it changes direction from northeast to southwest.



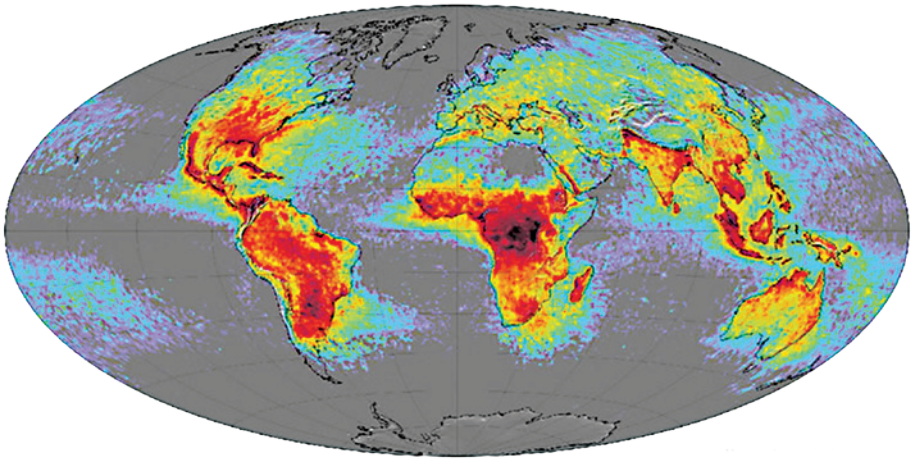

The number of thunderstorm days of different areas in Malaysia experience in a year. Compared to the East Coast, the West Coast experiences more thunderstorm days, due to its location right at the centre of the monsoon wind vortex.

### PROTECTIVE MEASURES

To cope with the problems posed by lightning, the Department of Standards Malaysia has adopted the relevant safety standards set by the International Electrotechnical Commission (IEC) published in 2007. The MS IEC 62305 document extensively explores the effects of lightning on property, and provides comprehensive guidelines on the required design and installation of lightning protection systems in a wide variety of structures, ranging from domestic buildings to larger structures, such as commercial buildings and hospitals. In addition, it provides detailed information on lightning risk assessment, and general principles on lightning protection systems. The Energy Commission has also published a simplified version of the document, titled the *Handbook on Guide to Lightning Protection Systems*. For example, one recommendation is that installation work for lightning protection systems should only be done by electrical contractors registered with the Energy Commission, as they employ competent persons who have been properly tested and certified.

Commercial buildings such as offices, airports and hospitals, however, require complex measures for protection from lightning. Proper air termination systems need to be installed or positioned on

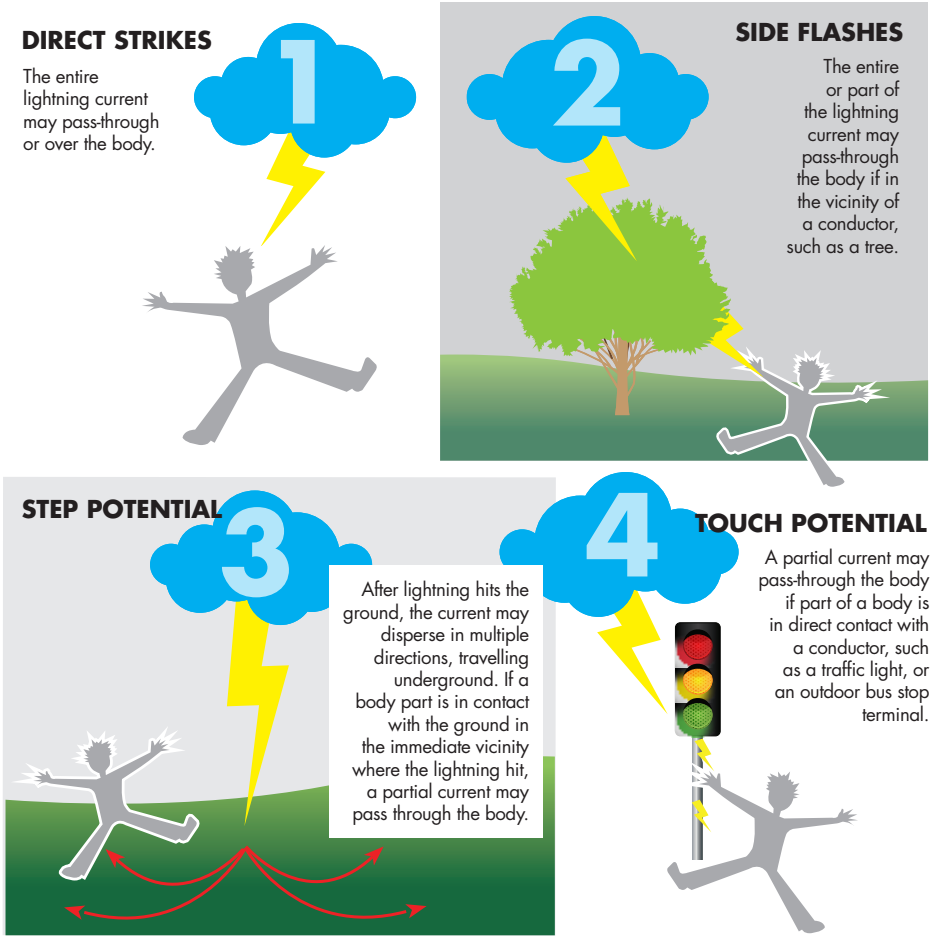
## WORLD LIGHTNING MAP




Global lightning density map given in terms of lightning flashes per km² per year. All countries located in and around the equator experience the highest flash densities, although South America is unique due to its more tropical weather caused by the Andes mountains.

## LIGHTNING INJURIES

Although lightning can cause injuries in many different ways, here are four common lightning-related injuries




## Keep Safe from Lightning!

- If ever caught in the open during a thunderstorm, immediately seek shelter. Gazebos or bus stops are not the best places to be under as they are open spaces and may be near exposed metal structures that could conduct electricity.

- Do not stand under trees. As lightning seeks the path of least resistance, the moisture and sap in trees make them better conductors than air, and lightning can travel through the ground, possibly affecting anything nearby, such as a person.

- Contrary to popular belief, a car is much safer, as it is a Faraday cage, thus protecting anyone inside it.

- In residential homes, damage to household items such as televisions and modems may still occur even if a lightning rod is installed properly. This may be due to power surges when lightning strikes nearby power cables. In this case, owners of the residential properties should disconnect electrical appliances from power sockets in the event of a thunderstorm. If a laptop has to be used, disconnect it from the charger, and use surge protectors – electrical extensions that offer some protection against power surges.

top of the buildings, based on three methods, i.e rolling sphere method, protective angle method or the mesh method, which is then connected to the down conductors which in turn links to the earth termination system.

In some cases, the down conductors are connected to the 're bars,' the steel reinforcement bars within the major columns of a building, applying a principle in physics known as the 'Faraday cage.' A Faraday cage is any container that is made of a conductive material such as steel, which blocks electricity and radiation from the outside, preventing the contents inside from being affected, thus acting as a shield.

Besides reinforcement bars, the most common way to earth a building is by grounding wires, which are only triggered during a lightning strike, activating a circuit breaker that causes a temporary shutdown in electrical supply to prevent damage to electrical installations due to an electricity overload. It is imperative to use wires and equipment that are certified by SIRIM and the Energy Commission, as the use of substandard components and equipment may cause harm.

While lightning rods, grounding wires, and preventive measures, such as disconnecting items from power sockets during a thunderstorm may help, they are only precautionary. The public should make sure that only professionals certified by the Energy Commission install their lightning protection systems, and use electrical equipment that are ST - SIRIM approved. Lightning cannot be prevented, but the damage that results from it certainly can be, if these measures are adhered to.

# Energising the Future

## The 6th Malaysian National Energy Forum

The 6th Malaysian National Energy Forum, held on 10th of March 2015 was officiated by the Minister of Energy, Communications and Green Technology, who was represented by Datuk Loo Took Gee, the Secretary General of the Ministry of Energy, Communications and Green Technology (KeTTHA), and organised by the Energy Commission, the Malaysian Gas Association and the Energy Council of Malaysia.


Jointly organised by the Energy Commission and the Malaysian Gas Association, the 6th National Energy Forum turned out to be a successful event, with attendees gaining valuable insight on the journey of sustainable energy, especially in Malaysia.

With the theme 'Sustainable Energy for Malaysia: Where are we?', the forum drew more than 360 participants, comprising industry players ranging from key stakeholders, industry captains, regulators and senior Government officials.

In the opening speech, Datuk Loo said that the government will strive to ensure the sustainability of energy supply, placing focus on the diversification of the energy mix with the goal of maintaining self-sufficiency in the utilisation of Malaysia's resources. "Long-term measures to increase energy security will include reducing dependence on imported fuel, such as coal and LNG, increasing the number of suppliers and reducing overall demand through energy efficiency and conservation measures," she said.

The first keynote speaker Mr Nobuo Tanaka, former Executive Director of IEA and the current Global Associate for Energy Security and Sustainability at the Institute of Energy Economics, Japan, spoke about current global issues. He highlighted that the global energy system is influenced not just by policies but by the unstable situation in Iraq, the friction between Russia

**Right:** The event was attended by many big names in the energy sector, including, (front row, right to left) CEO of the Energy Commission Datuk Ir Ahmad Fauzi, Lead Energy Specialist from the World Bank Dr Dejan Ostojic, Global Associate for Energy Security and Sustainability at the Institute of Energy Economics, Japan Nobuo Tanaka, Chairman of the Energy Commission Dato' Abdul Razak Abdul Majid, President of the Malaysian Gas Association Ir Pramod Kumar Karunakaran, and Board member at the Energy Commission Dato' Dr Nadzri Yahaya.

**Below:** The forum was opened by the Secretary General of the Ministry of Energy, Green Technology and Water, (KeTTHA), Datuk Loo Took Gee, who mentioned that the Malaysian government will endeavour to safeguard the continuous supply of energy.

and Ukraine, as well as turmoil in the Middle East. These factors, Tanaka believes, will adversely affect oil markets. "In the future, half of the future oil from Middle East will be derived from Iraq," he said, "But investments are not happening due to geopolitical risks."

Dr Dejan Ostojic, the Lead Energy Specialist from the World Bank and the second keynote speaker, talked about the dual energy challenges – environmental sustainability and energy security. "If not addressed, it will lead to doubling carbon dioxide emissions and local pollution by 2030 as well as an increased dependence on energy imports in East Asia and the Pacific," he elaborated. Dr Ostojic believes that energy efficiency, renewable energy and low carbon technologies form a sustainable energy path, but the combined effort of governments, city planners and civil society will be the key to success.

Several panel discussions followed, where panellists discussed topics such as 'Price Reforms for Energy in Malaysia', 'Enhancing Energy Self-Sufficiency' and 'Innovation and Emerging Technologies in Energy'. The final roundtable discussion put the spotlight on the question 'Sustainable Energy for Malaysia – Where do we go from here?' which touched on energy challenges in the country and the need for Malaysians to modify their thinking in order to ensure energy sustainability.

The forum was brought to a close by Ir Pramod Kumar Karunakaran, the President of the Malaysian Gas Association. In his remarks, he stressed that sustainable energy is an important stepping stone on the path to becoming a high-income nation, providing clean and reliable energy solutions in an affordable and efficient manner while opening doors for promising economic opportunities and favourable social development.

# Malaysia's Gas Market Liberalised

Since the implementation of the 10th Malaysia Plan in 2011, in which the Prime Minister emphasised increasing productivity and efficiency in the energy sector, the liberalisation of the Malaysian gas market has grown closer than ever to becoming a reality. With that in mind, the Energy Commission and the Malaysian Gas Association organised a workshop on the Liberalisation of Malaysian Gas Market on the 23rd of April. Sporting the theme "Opportunities and Way Forward," the event provided a platform for players in the industry to share their experience, findings, knowledge and expertise in improving the infrastructure of gas supply.

Currently, the Malaysian gas market is a closed one, noted Director of Gas Development and Regulation at the Energy Commission Ir Roslee Esman in his presentation during the workshop. The existing *Gas Supply Act 1993* (GSA 1993) regulates gas supply and distribution activities downstream of the city gate stations located at the city limits, which measures and adjusts pressure to the required consumption pressure. On the other hand, upstream of the city gate station, gas supply is economically self-regulated by Petronas and its subsidiaries, with the safety aspect being regulated by the Department of Occupational Safety and Health (DOSH) under the *Petroleum (Safety Measures) Act 1984*.

With such a restrictive environment to market gas, an amendment to the GSA 1993 was proposed in a bid to introduce liberalisation to the market. The government has handed the task of overseeing a competitive gas market under the proposed Third Party Access (TPA) System to the Energy Commission.

This prompted the Energy Commission to launch several consultation sessions with relevant parties, as far back as 2012, in anticipation of the draft amendments. The amendments are currently being reviewed by the Economic Planning Unit and the Attorney General's Chambers and is expected to be tabled in a parliamentary sitting soon.

With the TPA System in place, major gas infrastructures – namely regasification terminals, transmission pipelines and distribution pipelines – would be accessible to parties other than the owners or their affiliated companies, under arms-length terms and conditions. This opens avenues for additional gas supplies to be secured by parties other than Petronas, satiating current and future needs as well as giving rise to a healthy competition between suppliers. The Chairman of the Energy Commission, Dato' Abdul Razak Abdul Majid, acknowledged that supervising the market would be a challenging responsibility which would involve ensuring the security, reliability and sustainability of gas supply in Peninsular Malaysia and Sabah.

The workshop saw several speakers from various backgrounds delivering presentations on the market liberalisation process and the attributes of a liberalised market, such as its effect on gas prices. These included industry experts such as Rashdan Radzi, Head of Commercial, Malaysia Gas Management at Petronas, Rajnish Goswami, Head of Gas and Power Consulting – Asia at Wood Mackenzie, and Kevin Selleslags, Head of Origination and Business Development at Petronas UK. The proceedings were chaired by Ho Sook Wah, the Secretary General of the Malaysian Gas Association.

Rajnish Goswami, Head of Gas and Power Consulting – Asia at Wood Mackenzie (far left) addresses a question posed by an audience member. On his left are fellow speakers at the workshop, Kevin Selleslags, Head of Origination and Business Development at Petronas UK, Ruzaimi Abd Halim, Head of Commercial (Third Party Access & Infrastructure) at Petronas Gas Berhad, Faizal Mydin Pitchay, Head of Gas Policy & Planning Gas Management at Petronas and Ir Roslee Esman, Director of Gas Development & Regulation at the Energy Commission, and event chair Ho Sook Wah, Secretary General of Malaysian Gas Association.

# Exchanging Experiences

## Saudi Electricity Company Visits

The Energy Commission welcomed a delegation from the Saudi Electricity Company on the 29th of April 2015, comprising key representatives of the company and led by Chairman Dr Saleh Alawaji.

Saudi Electricity Company Chairman, Dr Saleh Alawaji (centre) taking notes during a presentation. On his left is Energy Commission Chairman Dato' Abdul Razak Abdul Majid.

Accompanying the Saudi Electricity Company Chairman to the Energy Commission Headquarters in Putrajaya were Distribution and Customer Services Executive Vice President Mansour Al-Qahtani, Generation Executive Vice President Ayesh Al-Shamari, Supply Chain Senior Vice President Sulaiman Al-Hubaishi, HV Projects Vice President Ibrahim Al-AlJarbou, Director General of Technical Cooperation Salem A Balamash, and Sr. Financial Analyst, Member of Restructuring Projects Abdulaziz Al-Muhaiza.

The session began with opening remarks by Dato' Abdul Razak Abdul Majid, Energy Commission Chairman, followed by a short speech by Dr Saleh Alawaji.

The Saudi Electricity Company then proceeded to present some slides about their operations. The Energy Commission also gave presentations, which provided an overview of the Malaysian electricity and piped gas supply industry, the Malaysian electricity supply industry (MESI) transformation, as well as the electricity tariff and incentive based regulations.

# Reducing Carbon Footprint

To promote Energy Efficiency (EE), and reduce Malaysia's carbon footprint, the Energy Commission organised the Summit on the Liberalisation on EE on the 20th of May 2015, at the Shah Alam Convention Centre (SACC) in Shah Alam, Selangor.

The Summit served to enlighten industry players and the public on the efforts undertaken by the Commission to promote EE, and targets to reduce Malaysia's carbon footprint.

The event focused on the challenges faced in adhering to the regulations introduced by the Energy Commission, as well as statistics on the progress achieved since the standards were implemented. Energy Commission CEO Datuk Ir Ahmad Fauzi Hassan delivered the welcome address, and announced that the target of reducing energy use by 5% in over 25 government offices has been surpassed, as the actual figure stood at 5.6%. The presenters in the seminar included representatives from the public and private sector, and from companies affected by the new regulations. The legislation known as Efficient Management of Electrical Energy Regulation 2008 (EMEER 2008) stipulates that any installations that consumes over 3 million kWh over a 6-month period has to hire a registered Energy Manager to monitor and improve the efficiency of their power use.

The first speaker, Dato' Dr Nadzri Yahaya, Deputy Secretary General of the Ministry of Energy, Green Technology and Water (KeTTHA), highlighted the government's efforts in spurring the adoption of EE, such as tax incentives for energy efficient premises, and discounts for installing EE features. He added "there can be economic growth without too much energy consumption, and we have to do it to not be held ransom by our excessive power use."

Hafiza Yob, a Regulatory Officer with the Commission then presented a discourse titled Regulation and Policies on Energy Efficiency, which covered the topics of EMEER 2008 and Minimum Energy Performance Standard (MEPS), as well as the promotion of Energy Performance Contracting (EPC) in the government sector. In her talk, she emphasised the Government's goals on EE in the 10th Malaysia Plan, which includes the reduction of carbon dioxide emissions by 732,000 tonnes, cutting energy use by 17W yearly, and the phasing out of inefficient incandescent light bulbs in 2013.

Delivering a lecture titled *Empowering Customers Toward Greener Living: Home Energy Calculator*, Ir Kartina Hashim, Manager of the Green Technology Division at Tenaga Nasional Berhad (TNB), focused on the implementation of the new Home Energy Calculator, which will result in increased financial savings in the long run as customers are able to accurately monitor their electricity use. *Meeting Energy Management Standard and Regulation* was presented by Ir Kasim Ahmad, Head of the Energy Efficiency Section at SIRIM Berhad, who elaborated on where to go if building owners intend to install new EE hardware.

Ir Al-Khairi Mohd Daud, Asean Energy Management Accreditation Scheme (AEMAS) Country Expert, expanded on Energy Management Standards, and provided a thorough explanation of the role and the requirements to become a qualified Energy Manager. He mentioned that out of nearly 1,950 customers in the country requiring Energy Managers, 872 have hired them over the last year.

Finally, Abdul Malik Atan, Senior Analyst of Green Growth, Malaysian Green Technology Corporation, in the concluding speech, talked about the MyHijau Programme and Green Technology Financing, and his efforts in providing the EE equipment for premise owners. The Green Technology Financing scheme provides funding for companies investing in EE technology, while the MyHijau programme aims to promote the purchase of goods and services that are environment-friendly.

# Fostering Cooperation

## 33rd ASEAN Senior Officials Meeting

From the 25th to 30th of May 2015, the 33rd ASEAN Senior Officials Meeting (SOME) on Energy and Associated Meetings was held in Kota Kinabalu, Sabah, Malaysia. The meeting served as a platform for officials in the ASEAN region to analyse and mull over local and international issues impacting the energy sector.

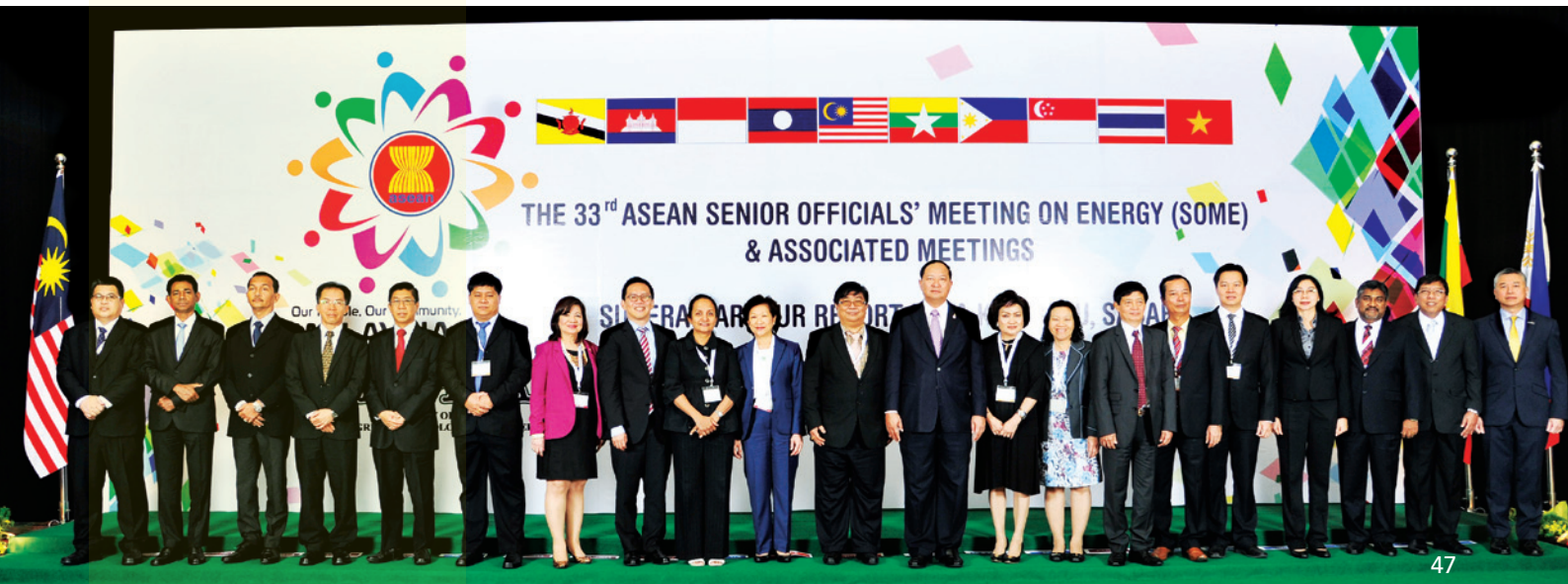
The Ministry of Energy, Green Technology and Water (KeTTHA) took the lead as Malaysia is the Chair of ASEAN for 2015, and spearheaded the discussions. The 33rd SOME focused on discussing the next phase of the ASEAN Plan of Action for Energy Cooperation, which is a framework on how the region will progress in energy cooperation from 2016 to 2020. Meetings and consultations with dialogue partners and international organizations were also held.

An example of energy cooperation in ASEAN, the pilot project is currently being brokered between Malaysia, Thailand, Laos and Singapore to install power transmission lines to fully connect the four countries' energy grids. After negotiations between senior officials on the project is concluded, the Memorandum of Understanding is expected to be drawn up and signed between the four countries in the third quarter of 2015.

Commenting on the project, Datuk Loo Took Gee, the Secretary General of KeTTHA said, "The capacity will be 100 MW initially, which can be scaled up later." It is hoped that projects like this multinational power connectivity plan will allow for the further fortification of electricity trading between ASEAN nations.


**Above:** (Left to right) Energy Commission CEO, Datuk Ir Ahmad Fauzi, Energy Commission Board member Dato' Nadzri Yahaya and Director of Energy at the Economic Planning Unit Datin Badriyah Abd Malek poring over presentation material.

**Below:** The 33rd ASEAN Senior Officials Meeting provided the perfect opportunity for ASEAN officials to discuss issues that affect the energy sector in the region.



# Advocating Piped Gas Safety

On the 28th of May, the Regulation and Safety of Piped Gas Systems Seminar was held at the Melaka International Trade Centre (MITC) in Ayer Keroh, Melaka.

The seminar served as an avenue for participants to raise questions regarding issues on gas supply and safety.

The day-long seminar, organised by the Energy Commission with the theme of 'Accountability Breeds Responsibility', was inaugurated by Ir Roslee Esman, Director of Gas Development and Regulation Department at the Energy Commission, and aimed to provide an understanding of the current provisions of the Gas Supply Act 1993 and the Gas Supply Regulations 1997. Aside from that, the seminar also emphasised on the safe operation of the gas pipeline system, which includes storage systems and reticulation pipelines that lead to consumers' cooking equipment.

Information regarding compliance to the latest requirements and conditions issued by the Energy Commission was also disseminated at the seminar, along with guidance on the requirement for licensing for piped gas installations. Additionally, participants were also enlightened on the duties and responsibilities of a license holder, which includes the appointment of gas-competent persons at their business premises.

A total of 115 participants, from Melaka, and its neighbouring states Negeri Sembilan and Johor, attended the seminar. They consisted of gas contractors and representatives from supermarkets , hotels, resorts, UTM–MPRC (Universiti Teknologi Malaysia – Malaysia Petroleum Resources Corporation), Petronas, and the Mara Skills Institute, as well as government agencies such as the Department of Occupational Safety and Health (DOSH) and the Public Works Department (PWD). Also present at the seminar were Md Rasdi Abdullah, the Regional Director of the Melaka Energy Commission, and Ir Idris Jamaludin, the Regional Director of the Johor Energy Commission.

# 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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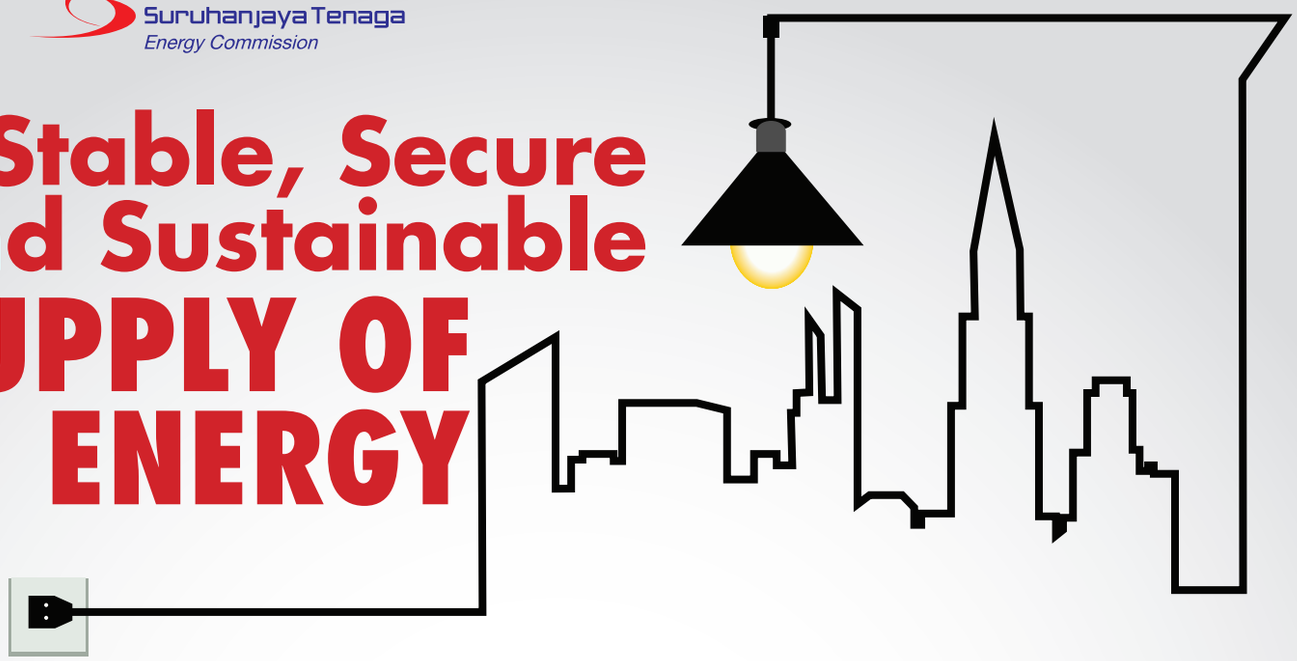
Suruhanjaya Tenaga
Energy Commission

# A Stable, Secure and Sustainable SUPPLY OF ENERGY



Established under the *Energy Commission Act 2001, Suruhanjaya Tenaga* (ST – The Energy Commission) is a statutory body entrusted with regulating the energy sector, in particular, electricity and piped gas in Peninsular Malaysia and Sabah to ensure security, reliability, safety, efficiency and economy.

## 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 market operation, and the quality of supply services.

### Promotes
energy efficiency and the use of renewable energy, as well as research, development and innovation to improve the performance of the electricity and piped gas industries.

### Plans and develops
laws, regulations, codes, guidelines development programmes for the energy sector.

### Licenses and certifies
the supply of electricity and piped gas, the competency of electricity and gas personnel, training providers, contractor firms and energy services firms, energy efficiency managers, electrical equipment and installations, and gas pipelines.

### Monitors and audits
performance of licensed and certified service providers, generation fuel and piped gas supplies, electricity and piped gas installations, electrical and gas equipment importers, manufacturers and retailers.

### Investigates
complaints, accidents and offences; takes legal action and arbitrates if necessary.

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