FACTSHEETS

CONTENTS

1. Factsheet 1: How will the New Tariff Structure Benefit Consumers?
2. Factsheet 2A: How is the Electricity Sector in Malaysia Improving?
3. Factsheet 2B: How is the Power Sector Becoming More Competitive and Transparent?
4. Factsheet 3A: Can We Afford to Continue Fuel Subsidies?
5. Factsheet 3B: Why are They Taking Away Our Subsidies?
6. Factsheet 4: Are We Generating Too Much Electricity?
7. Factsheet 5: What is the Role of IPPs?
8. Factsheet 6: Why do We Need to be Energy Efficient?
FACTSHEET 1

HOW WILL THE NEW TARIFF STRUCTURE BENEFIT CONSUMERS?

OVERVIEW
Electricity tariffs will be increased as the Government has plans to gradually reduce fuel subsidies for the power sector under the energy subsidy rationalisation exercise. Subsidies touched RM15.578 billion in the year 2012. As of 31 Dec 2012, the total revenue foregone by PETRONAS from the power and non-power sector since 1997 amounted to RM182.8 billion (Source: PETRONAS). However, consumers will be protected through the introduction of a new 2-part pricing tariff structure, which will ensure that tariff adjustments are done in a structured, fair and transparent manner.

The comparison of the current electricity tariffs by country are as follows:

<table>
<thead>
<tr>
<th>Country</th>
<th>2012/2013 Average Tariff (Sen/KWh)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Malaysia</td>
<td>33.54 Sen</td>
</tr>
<tr>
<td>Indonesia</td>
<td>24.4 Sen</td>
</tr>
<tr>
<td>Thailand</td>
<td>36.88 Sen</td>
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<tr>
<td>Philippines</td>
<td>57.24 Sen</td>
</tr>
<tr>
<td>Singapore</td>
<td>63.63 Sen</td>
</tr>
</tbody>
</table>
**Tariff reviews in the past**
The current system of tariff determination consists only of the general cost recovery system. It lacks scrutiny with regard to regulated functions and the cost element.

Tenaga Nasional Berhad (TNB) submits applications for tariff reviews based on cost recovery, return on investments and forecasted sales. This approach to the tariff review raises the question of whether the system is efficient, transparent, predictable and ensures security of supply.

The diagram below illustrates how the new 2-part pricing mechanism will be used to set future tariffs.

**Components of the tariff**
The 2-part pricing tariff structure, regulated through the Incentive Based Regulation (IBR) mechanism, will consist of two components:

- **Cost factor**: Fuel and non-fuel components where the tariffs will be adjusted according to changing global fuel prices, e.g. gas, coal, oil, distillates and other operating costs. The fuel component will be reviewed every six months.

- **Efficiency factor**: This ensures the power sector remains efficient and reliable, through a set of reward/penalty key performance indicators (KPIs) to ensure that TNB – as the transmission and distribution systems owner, as well as being the System Operator (SO) and Single Buyer (SB) entrusted to dispatch power from generators to the consumers – operates efficiently. In cases where TNB does not meet the KPIs, penalties will be imposed on TNB by Suruhanjaya Tenaga (ST). The efficiency factor component will be reviewed every three years.
**How will it benefit consumers?**

The new structure will result in two key benefits for the consumers:

- Instead of using the current general cost recovery method, the new structure is more transparent, in which fuel costs are reviewed every six months.
- At the same time, the industry will be subjected to a set of reward/penalty KPIs, i.e. for any shortfalls in meeting KPIs, penalties will be imposed on TNB by Suruhanjaya Tenaga (ST).

At the initial stage, the current tariff will be raised to market-reflective level. Once the tariff is brought to market rates, the efficiency of the system should allow tariffs to moderate in the future.

**At a glance**

### 2-PART PRICING TARIFF STRUCTURE

- **Cost Factor (60% - 70%)**
  - Fuel
    - Subjected to global fuel prices, generation cost adjustments and subsidy rationalisation
    - Reviewed every 6 months

- **Efficiency Factor (30% - 40%)**
  - System OPEX & CAPEX
  - Generation (Competitive Bidding) (SLAs & PPAs)
  - Transmission (system minutes) & Distribution (SAIDI)
    - Subjected to Reward/Penalty KPIs regulated by ST
    - Reviewed every 3 years

**How will the poor be protected?**

Safety nets are in place to protect low-income groups. In total, about 4.56 million consumers (or 70.67% of the total 6.457 million domestic consumers) will not be affected by the new tariff increase. They include:

- Domestic consumers in the current Lifeline Band (those who consume 1 - 200 kWh per month) are enjoying a rate of 21.8 sen/kWh, which has not been raised since 1997. This accounts for about 3.25 million users.
- Within the Lifeline Band, about 960,000 consumers enjoy free electricity as their electricity consumption falls below 91kWh or RM20 a month.
- Another 1.31 million users who consume between 201kWh and 301kWh electricity per month will also not be affected.
OVERVIEW OF THE MALAYSIAN ELECTRICITY SUPPLY INDUSTRY (MESI)
There are three main electricity supply utilities in Malaysia: Tenaga Nasional Berhad (TNB) in Peninsular Malaysia, Sabah Electricity Sdn. Bhd. (SESB) in Sabah, and Sarawak Energy Berhad (SEB) in Sarawak. In Peninsular Malaysia, TNB is responsible for Generation, Transmission and Distribution (G/T/D) of electricity. There are also a number of Independent Power Producers (IPPs) generating and supplying electricity to TNB. The gas used for power generation is supplied by PETRONAS with the price regulated by the Government at a level much lower than the regional market price; while the cost for coal, another major fuel used for generation, is based on the market price.

How is electricity generated and supplied to you?
Conventionally, electricity is generated through a process of conversion of a primary source of energy like coal, natural gas, oil, hydro and other natural sources including nuclear, to electrical energy. There has also been ongoing development in the use of renewable sources, i.e. solar, biomass, biogas, geothermal and wind, to generate electricity.

In Malaysia, there are two generators of electricity – TNB and the Independent Power Producers (IPPs). Electricity is sent out by the transmission system owned by TNB, and consumers receive their electricity via a distribution network.

In Peninsular Malaysia, the main fuels used in generation in FY2013 are estimated at: natural gas (47.3%), coal (44.5%), hydro (4.2%), oil (1.9%) and distillates (2.1%).

See diagram below:

![Components and characteristics of the electricity supply chain](source: MyPOWER)
**MESI Transformation**

Electricity fuels the engine of growth in Malaysia. Studies were carried out in 2008 to ensure continued financial viability and operational stability of the Malaysian Electricity Supply Industry (MESI). In the last 4-5 years, the electricity sector has gone through tremendous transformation in which several mechanisms have been put in place to make the sector more reliable, efficient, sustainable and transparent.

In 2009, the electricity industry embarked on a transformation programme, which consists of 9 key initiatives, looking at the aspects of governance, structure, fuel supply and security, and the electricity tariff.

These reforms are aimed at enhancing **Reliability**, **Efficiency**, **Sustainability** and **Transparency** in the electricity supply industry.

**The MESI transformation secures a reliable and sustainable industry**

*Source: MyPOWER*
1. Agency Roles
This initiative addresses the current governance framework of the industry and roles of multiple agencies associated with the electricity sector.

The diagram below shows the various agencies involved in the electricity sector and how they are inter-linked:

Taking cognisance of the inter-dependence between the Ministry of Energy, Green Technology and Water (KeTTHA) and various agencies, a Single Entity to look into aspects of policy development for Energy and Electricity has been recommended.
2. Accounts Unbundling
Before IPPs came into the picture in 1993, TNB had the sole monopoly of the electricity supply industry in all three sectors – Generation (G), Transmission (T) and Distribution (D), i.e. G/T/D.

When IPPs came into the picture, the generation sector accounts had to be separated from the whole G/T/D account. Further under the MESI transformation, another one of the initiatives is Accounts Unbundling, which means separating the T & D accounts as well.

TNB has been reorganised into business entities with separate costs and revenues, allowing for a future tariff component in the accounts to show more transparency and accuracy. The 5 distinct business entities are as follows:
1. TNB Generation (TNBG)
2. Single Buyer (SB)
3. Transmission (TNBT)
4. Systems Operator (SO)
5. Customer Services (TNBCS)
This reorganisation will make the whole G/T/D account more transparent, while also encouraging operational efficiency.

3. Ring-Fencing
The ring-fencing of a Single Buyer (SB) and System Operator (SO) is, in principal, to functionally separate the SB and SO from the other business activities of TNB by introducing separation of accounts, independence in decision-making, avoidance in sharing of confidential information and segregation in facilities’ access in their operations. It is critical for creating a level playing field between TNB and other market participants, such as the IPPs, in the procurement of power from the power producers and the operation of the power supply system. It is envisioned that ring-fencing the SB and SO would enhance independence, fair play and transparency in the industry and would result in greater confidence of the market participants and investors.

4. Value Chain Tariff
The introduction of the value chain tariff ensures that the tariff is more transparent, in which each stage of the value chain (G/T/D) all contributes towards the tariff. Under this mechanism, the value chain will also be subjected to reward/penalty key performance indicators (KPIs) implemented and monitored by ST. This results in a cost efficient tariff for the consumer. (See Factsheet 1 on ‘How will the New Tariff Structure Benefit Consumers?’)

5. End User Tariff
The tariffs for the end user will be as follows:
- The rate for Lifeline Band (monthly consumption of up to 200 kWh) will be maintained at a rate of 21.8 sen/kWh.
- This Lifeline Band rate has not been revised since 1997 and continues to benefit 50% of domestic consumers.
- Under Lifeline Band, about 960,000 consumers from the lower-income group enjoy free electricity (for consumption below 91kWh or RM20 per month).
- Therefore, those who use below 91kWh or whose bill is below RM20 a month will continue to enjoy free electricity.
- Under the new tariff rates, consumers using between 201-300kWh per month will also not be affected.
6. Stabilisation Fund
This is a concept that can help cushion spikes in fuel prices so that price volatility in times of fuel crises can be moderated – a temporary buffer between the real cost of supply and the end-user tariff. Hong Kong, Spain, Australia and the State of Maryland in the United States have adopted this concept. The stabilisation fund looks at the industry over the long-term to recover the cost, rather than depending on subsidies which distort the price and signal unsustainable patterns of consumption.

7. Fuel Mix Policy (Fuel Supply and Security)
The country’s fuel mix and fuel supply security must be managed to ensure a reliable electricity supply. Suruhanjaya Tenaga (ST) will monitor the country’s fuel supply to prevent instances where shortage of fuel may occur – this is to ensure that the electricity sector can obtain enough of the relevant fuel to maintain an efficient, secure and environmentally sustainable supply of energy.

8. Competitive Bidding
The competitive bidding process is a price discovery mechanism which determines that only qualified parties will be tasked to ensure the country’s future electricity requirements are met. All future power plant constructions and extension of the current power plants will be determined by a competitive bidding process, conducted by ST, to ensure an arm’s length relationship in these Power Purchase Agreements (PPAs). This exercise will provide the best value to the nation in order to ensure independence, credibility and transparency in the processes. (See Factsheet 2B on ‘How is the electricity sector becoming more competitive and transparent?’)
9. PPA renegotiations (for 1st-generation IPPs only)

A Power Purchase Agreement (PPA) is a commercial arrangement between the IPP and the power purchaser or off-taker. A PPA document contains all the necessary information such as the technical parameters and commercial arrangements required for the development, procurement, financing, fuel supply, and operations and maintenance of plants developed by the IPP.

Through the competitive bidding exercise, the 1st-generation IPPs have been offered extensions based on specific Terms of Reference (TOR) issued by ST. (See Factsheet 2B on ‘How is the electricity sector becoming more competitive and transparent?’)
HOW IS THE POWER SECTOR BECOMING MORE COMPETITIVE AND TRANSPARENT?

OVERVIEW OF COMPETITIVE BIDDING

Under the transformation of the Malaysian Electricity Supply Industry (MESI), competitive bidding will be introduced to ensure independence, credibility and transparency in procuring all new capacity requirements. This exercise will provide the best value to the nation in order to ensure independence, credibility and transparency in the processes.

The Suruhanjaya Tenaga (ST) has been entrusted by the Government to conduct the competitive bidding exercise.

What is a competitive bidding process?
The competitive bidding process is a price discovery mechanism which determines that only qualified parties will be tasked to ensure the country’s future electricity requirements are met. All future power plant constructions and extension of the current power plants will be determined by a competitive bidding process to ensure an arm’s length relationship in these Power Purchase Agreements (PPAs).

The competitive bidding process should ensure:
- Free, fair and effective competition
- Transparency
- Simplicity and cost-effectiveness of process
- Minimal burden on regulator and other stakeholders
- Flexibility to adapt to varying needs of power procurement according to the structure of the sector

How does the process work?
The competitive bidding process would allow any qualified players, new or established, to put in their bids when ST issues a request-for-proposal (RFP) for any new plant. The entire process was embarked upon from the issuing of the RFP, the shortlisting of the bidders and the announcement of the eventual winners, and the results are published on the ST website (http://www.st.gov.my/).

In an effort to improve transparency, ST also announced to all bidders the respective unit cost that each bidder had proposed during the opening of bids. Therefore, all participants received the same information and are able to benchmark their submissions against those of other bidders.

Another notable feature of the competitive bidding process is that all parties will have to bid against standardised PPAs as outlined in the RFP documents. This is to ensure transparency in the process and create a level playing field. All bidders,
including Tenaga Nasional Berhad (TNB), have to adhere to the standard PPA and would have to confirm their compliance to the commercial arrangement in the general form.

What is ST’s role?
The role of ST in the competitive bidding process is to:

- Promote and safeguard competition
- Enable fair and efficient market conduct or, in the absence of a competitive market, prevent the misuse of monopoly or market power

In 2011, ST was assigned to conduct the tender exercise for the 1,000MW coal plant and the Prai 1,000 ~ 1,400 MW combined cycle plant. For this competitive bidding process, the government capped the internal rate of return to 8.5%, in line with other IPP projects worldwide.

OVERVIEW OF POWER PURCHASE AGREEMENTS (PPA)

A PPA is a commercial arrangement between the IPP and the power purchaser or off-taker. A PPA will contain all the necessary information such as the technical parameters and commercial arrangements required for the development, procurement, financing, fuel supply, and operations and maintenance of plants developed by IPP.

It also allocates all the risks associated with the project and is a document which is required by lending institutions to support the financing of the project. Before the introduction of IPPs into the system, all projects were constructed and funded either through the company’s own fund, government funding or the availability of soft loans (e.g. yen credit facility).

The PPA is a standard document used worldwide in contracts between IPPs and electricity supply companies. The typical contract duration for a PPA is:

- 21 years for a gas-based power plant; and
- 25 years for a coal-fired power plant

How are IPPs being paid?
IPPs are paid via 2 components stipulated under the PPA, i.e. the fixed payment and the variable payment:

- The fixed payment, contractually known as Capacity Payment (RM/kW/Month), enables the IPPs to service the loans and pay for the cost of project development, and other fixed costs to run and maintain the plant. An allowable level of returns to shareholders is also included in this component.

- The variable payment, known as Energy Payment, covers the fuel cost incurred to generate the electricity based on demand as well as consumable expenses estimated over the running hours. Variable payment is paid based on actual energy units dispatched.

Only one (1) PPA follows a Take-or-Pay regime, whereby the IPP offers a minimum take level of energy yearly to the power purchaser at a fixed price.
Under the MESI transformation, what are the improvements that have been made to PPAs?
The 1st-generation PPAs were structured to meet the then prevailing market conditions and perceived uncertainties such as plant costs financing, foreign exchange risk, ground and construction, as well as operational, risks. These commercial risks, previously unknown or managed under Government-backed procurement packages, had to be priced in the limited or non-recourse financing terms (debt where the loan is completely secured by collateral).

Under the renegotiation of 1st-generation IPPs:

- Genting Sanyen Power and Segari Energy Ventures will be granted a 10-year PPA extension.
- Deal is done on a commercial basis at competitive rates.
- Renegotiated PPAs are allowed to stand with some modification to allow the reduction in capacity charges.
CAN WE AFFORD TO CONTINUE FUEL SUBSIDIES?

*International Monetary Fund study*

In January 2013, the International Monetary Fund (IMF) published a study on *Energy Subsidy Reforms*. It was conducted in 176 countries, of which 22 countries had undertaken such reforms. It was found that subsidies are particularly high in oil-exporting countries, accounting for two-thirds of total global fuel subsidies. These subsidies amount to USD$480 billion or 0.7% of total world GDP. It was also reported that removal of energy subsidies could lead to a decline in CO₂ emission.

In the study, it was argued that subsidies depress economic growth in different ways:

a) It discourages investment in the energy sector. Countries with low and subsidised prices have led to many state oil and gas entities falling in the red because they are not able to expand energy production. It becomes unattractive for the private sector to invest in the utility and this has resulted in severe energy shortages and hampered economic activity. It is through good financial management and open competition that Malaysia has managed to keep PETRONAS profitable and viable over the decades.

b) In countries where there have been substantial electricity subsidies, huge losses have been incurred and this has severely impaired their ability to invest in new electricity capacity and improve their quality of service. In the case of Tenaga Nasional Berhad (TNB), it has been able to remain competitive and has managed to maintain a reliable supply because it has been allowed periodic revisions in its tariffs. Even then, TNB’s profits of about RM4billion-4.5billion is not enough to cover its current annual CAPEX of RM7billion.

c) Subsidies create incentives for smuggling and divert resources to destinations with higher prices. Illegal trade increases the cost of subsidies for the country while limiting its ability to tax domestic consumption of energy. Fuel smuggling is rampant in many regions around the world namely, North America, North Africa, Middle East and parts of Asia, including Malaysia.

d) Subsidies cause over-consumption in depleting resources like coal, natural gas and reduce incentives for investment in energy efficiency and renewable energy.

e) Subsidies can hamper our efforts to reduce levels of carbon emission. According to the IMF report, by eliminating subsidies of petroleum products, natural gas and coal, CO₂ emissions could be reduced by 4½ tonnes – representing a 13% decrease in global energy-related CO₂ emissions – as well as a reduction of 10 million tonnes in SO₂ emission and a 13% reduction in other local pollutants.
**Evolution of Peninsular Malaysia’s gas industry as a source of fuel in the power sector**

- The rapid development of the Peninsula’s gas industry is closely intertwined with the country’s own economic development – 60% of the growth in the country’s energy requirements over the last 30 years was met by gas.
- In the process, the gas industry went from being non-existent to being a full-fledged economic sector in a time span of less than 30 years. Today it has become the country’s largest source of primary energy.

Since the 1997 economic crisis, the Government has regulated the price of gas sold to the power sector based on a regulated price – currently set at RM13.70/MMBtu since June 2011 in order to maintain electricity tariffs at an affordable rate for the end consumer.

By selling gas to the power sector at the regulated gas price, PETRONAS has foregone a substantial amount of revenue. As at Oct 2013, the total revenue foregone by PETRONAS from the power sector since 1997 amounts to RM136.97 billion. The expected total revenue foregone based on sales to the power sector in 2013 is RM17.1 billion.

Unlike the petrol subsidy, which is directly borne by the Government, the gas subsidy is borne by PETRONAS. The ‘subsidy’ that PETRONAS has been effectively bearing has been directly beneficial to all electricity consumers be it residential, commercial or industrial. Contrary to popular belief, Independent Power Producers (IPPs) and TNB are not the beneficiaries of subsidised gas.

The Government recognises that, moving forward, the Nation’s future economic development can only be sustained through a fundamental shift in its development strategy. The Government is espousing to shift the foundations of the nation’s competitive basis away from low-cost resources towards productivity and innovation.

**The case for rationalisation from blanket to targeted subsidies**

Nevertheless, the Government’s policy today is still to gradually phase out energy subsidies. This will ensure that the country’s energy resources are utilised efficiently towards sustaining the growth of the Malaysian economy.

Any further delays in the rationalisation of gas subsidies will aggravate the market distortions that already exist and will undermine the long-term security of gas supply in the Peninsula. These distortions include artificially low end-user prices, wasteful/inefficient consumption and over-reliance on gas for economic production. All of these pose an ever-growing risk to the country given that the availability of indigenous supplies continues to deplete.

Currently, heavily-subsidised gas is much cheaper compared to alternative fuels (e.g. diesel, LPG and fuel oil). As a result, consumers shift their consumption of energy from other fuels to natural gas. This has resulted in supply constraints because demand for gas has increased at a much faster rate, relative to other fuels.
WHY ARE THEY TAKING AWAY OUR SUBSIDIES?

SUBSIDIES IN MALAYSIA

Malaysia is one of the highest subsidised nations in the world, higher than Indonesia & Philippines – in 2009, we spent RM74 billion in subsidies (source: PEMANDU Subsidy Rationalisation Lab, 2010). This would have been equivalent to providing RM12,900 per household. While once central to efforts to protect the poor, blanket subsidies encourage wastage, overconsumption and inefficient resource allocation. In fact, they often leave the poor worse off as they bear the same costs of the subsidy while accruing fewer of the benefits than the rest of the population.

What is subsidy rationalisation?
After extensive reviews and consultations with many parties, including the public through PEMANDU’s Open Lab Days, the Malaysian Government embarked on a subsidy rationalisation programme. Over 3-5 years, the objective was to reform subsidies in the country from blanket subsidies to targeted subsidies. Subsidy rationalisation is an important component in the building of the nation’s agenda to become a developed nation by 2020.

What is meant by blanketed subsidies and targeted subsidies?
- Blanketed subsidies are subsidies that are enjoyed by all groups of people regardless of their income group, e.g. Malaysia’s fuel subsidy.
- Targeted subsidies are subsidies that are only targeted to a specific group of people, e.g. Bantuan Rakyat 1Malaysia (BR1M) handouts given to Malaysians with a monthly household income of less than RM3,000.

Why subsidy rationalisation?
According to a report by the International Monetary Fund (IMF), the top 20% of the population gets to enjoy 43% of total subsidies while the bottom 20% of the income strata actually receive only 7% of the benefits of subsidies (Source: ‘Energy Subsidy Reform: Lessons and Implications’, IMF Staff Paper, January 2013). This is because higher income groups have higher consumption rates – they have more money to buy scarce products especially when prices of these goods are artificially kept low. On the other hand, the poor will always have limited resources and therefore limited consumption.

Blanketed subsidies are already being phased out in many countries, including Thailand and Indonesia. Subsidy rationalisation will ensure subsidies are targeted to help the poor and underprivileged.

Malaysia also needs to manage and reduce the country’s deficit and we need to encourage investments in line with the nation’s aspiration to become a high income nation by 2020.
Framework of the subsidy rationalisation programme
To create an effective and efficient framework, the Government will:

- Focus on big ticket items
- Maintain subsidy on education but reduce wastage
- Continue subsidising agriculture and fisheries sectors
- Continue subsidising healthcare
- Continue subsidising the poor and underprivileged (through targeted subsidies)
- Engage and communicate with stakeholders
- Implement subsidy rationalisation on a gradual basis

What are the first steps of subsidy rationalisation?
The Government has already started reducing subsidies for fuel and sugar.

Why fuel and sugar?
The fuel subsidy is considered a big ticket item, which will reduce Government expenditure by RM134 million (source: Economic Planning Unit, Program Rasionalisasi Subsidi: [http://www.epu.gov.my/en/17072010_HM_program/]http://www.epu.gov.my/en/17072010_HM_program/). It is also a way to make sure that higher income groups with higher capacity cars do not disproportionately enjoy subsidies. Fuel subsidies represent a serious opportunity cost by diverting funds that could have been used to finance beneficial projects such as welfare schemes and R&D.

The Government sees reducing sugar subsidies as a way to promote a healthy lifestyle and counter increasing cases of diabetes in Malaysia.

What will happen if we don’t rationalise our subsidies?
If subsidies are maintained at the current rate, we will encounter several problems:

- National debt will continue to increase.
- It will reduce Malaysia’s attractiveness for foreign direct investment as the country’s ranking and ratings will fall due to increasing debt and over-spending.

Subsidies and smuggling
- With subsidies, the gap between fuel prices in Malaysia and neighbouring countries such as Thailand and Indonesia (both of which have phased out blanket subsidies) is wide and this encourages smuggling activities.
- Smuggling activities will be reduced if fuel prices and other subsidised commodities (such as sugar) in Malaysia are on par with global market prices.

Targeted subsidies: How will the poor and the underprivileged benefit?
Currently, subsidies are benefiting the wrong target groups. In 2009, students enjoyed RM30.8 billion in subsidies, all consumers RM22.9 billion, companies RM18.0 billion, the poor RM1.7 billion, farmers and fishermen RM0.2 billion and others RM0.4 billion. The larger portion of subsidies should be given to targeted groups, i.e. the poor as well as the farmers and fishermen. Subsidy rationalisation will help us ensure that the right groups are enjoying the subsidies.
**Challenges in changing the subsidy mentality**

Many people believe that everyone is entitled to subsidies especially since Malaysia is an oil producing country. However, subsidies should be targeted at the groups that need it most. By practising blanket subsidies, costs of essentials are kept artificially low and people have no incentive to save resources.

Currently in Malaysia we have generalised subsidies and a targeted income tax system. This is something that the Government is trying to reverse so that we have more targeted subsidies and a wider income tax system – helping the right groups enjoy the subsidies.

*Sources: Economic Planning Unit (EPU), Performance Management & Delivery Unit (PEMANDU)*
ARE WE GENERATING TOO MUCH ELECTRICITY?

OVERVIEW OF THE RESERVE MARGIN

Reserve margins are calculated according to the following formula:

\[
\frac{\text{Installed Capacity} - \text{Peak Demand}}{\text{Peak Demand}} \times 100\%
\]

In 2013, the estimated reserve margin is only 31.3% with installed capacity of 21,749 megawatt and a peak demand of 16,562 MW.

From the planning perspective, the criteria for reserve capacity has been set within a range of between 20% and 25%.

But in reality, we should be talking about the operating reserve margin. Operating reserve margins are needed to cater for scheduled and unscheduled outages, as well as ‘deration’ in power plants.

Reserve margins vs operating reserve margins?

In the operation of a plant, machinery and equipment sometimes need to be shut down for maintenance and repairs. These are called scheduled outages, similar to when one needs to send one’s car for service. During that time, your car cannot be used and you may need to hire a car or borrow from a friend. There are also unscheduled outages at power plants caused by lightning, floods and other mishaps. This is like having a car break down on you.

Reserve margin also does not take into account the ‘derating’ of plants. Again, this is like a car that, although having a 2,000 c.c. engine, may not be running at its full capacity because of various factors from environmental factors to wear and tear of parts. In the case of a power plant, it means that it may not be able to produce the same capacity as it did when it was brand new.

Therefore, it is much more accurate to consider ‘operating reserve margin’ calculation as it includes the breakdown and unexpected circumstances that may require an increase in the demand of power.
Frequently asked questions about the reserve margin

1. Our reserve margins are too high (at 40%), so why are we building more IPPs?
   - The 40% margin is the reserve margin based on installed capacity and not available capacity at that time.
   - After taking into account scheduled and unscheduled outages and derating, the operating reserve margin is now between 5% and 21%. The recent Sabah experience has shown that the lack of a healthy reserve margin entails to a system being unreliable and unstable.
   - As the country’s economic growth is still on a positive trajectory, the excess capacity is required to cater for the growing demands of consumers. Plants take years to build and a comfortable buffer is required to maintain reliable supply of energy, without disruption to our future economic growth. According to the Peninsular Malaysia Power Development Plan, the projected reserve margins over the next 10 years will decline to 16.4% in 2023, despite new plant-ups.
   - For developed economies, the reserve margins can be less than 10% due to moderated growth rates for power usage over a much larger capacity base.
WHAT IS THE ROLE OF IPPs?

What is an Independent Power Producer (IPP)?
An Independent Power Producer (IPP) is an entity that owns and operates facilities to generate electrical power for sale to utilities (e.g. Tenaga Nasional Berhad, TNB, in Peninsular Malaysia).

Why are IPPs required in Malaysia?
Malaysia experienced a rapid rise in economic development in the mid 1980s, and this led to a significant increase in the demand for electricity. While TNB (then known as Lembaga Letrik Negara, LLN), as the utility, was obliged to meet this increase in demand, the scenario then had stretched its capability.

To meet the surge in demand, the Government took the bold step in the early 1990s of opening the generation sector to allow the private sector to assist in building new power plants to meet the required capacity under the privatisation concept as practised in other parts of the world. This would allow the private sector to assist in financing more infrastructure projects, towards improving the efficiency of the industry and enabling the Government to have more funds for other services for the people such as health care and education.

In early 1990s, five IPPs were awarded licenses to generate electricity to sell to TNB. These five were known as the 1st-generation IPPs.
What is so special about the 1st-generation IPPs?

In the early 1990s, the commercial risks of constructing new power plants were relatively unknown for the country. There were also technical risks as the gas turbine technology was new to the industry then. There were no comparable projects that could be used for the basis of valuation and pricing of the IPPs. Since there was no precedence in financing IPPs then, banks had to be convinced of the project viability. Therefore the 1st-generation IPP developers had to manage all such risks and uncertainties in their Power Purchase Agreements (PPA) in order to satisfy the banks’ financial requirements.

On hindsight, it might seem that the IPPs were offered relatively favourable terms during the inception of the IPP programme in the 1990s. However, this was the environment of the industry then and it was necessary to address the tremendous growth in demand for electricity at the time, as well as to ensure sufficient and reliable supply of electricity in the country.

### Table 1: First-generation IPPs, percentage of TNB shareholding and PPA durations

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<th>IPP</th>
<th>TNB Shares</th>
<th>End of PPA</th>
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<tr>
<td>YTL Power</td>
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</tr>
<tr>
<td>Segari Energy Ventures</td>
<td>20%</td>
<td>30 June 2017</td>
</tr>
<tr>
<td>GentingSanyen Power</td>
<td>-</td>
<td>4 December 2015</td>
</tr>
<tr>
<td>PowertekBerhad</td>
<td>-</td>
<td>13 January 2016</td>
</tr>
<tr>
<td>Port Dickson Power</td>
<td>-</td>
<td>1 January 2016</td>
</tr>
</tbody>
</table>

### Table 2: Second-generation IPPs, percentage of TNB shareholding and PPA durations

<table>
<thead>
<tr>
<th>IPP</th>
<th>TNB Shares</th>
<th>End of PPA</th>
</tr>
</thead>
<tbody>
<tr>
<td>TTPC</td>
<td>20%</td>
<td>30 March 2024</td>
</tr>
<tr>
<td>Pahlawan Power</td>
<td>-</td>
<td>5 August 2020</td>
</tr>
<tr>
<td>Panglima Power</td>
<td>-</td>
<td>27 February 2023</td>
</tr>
<tr>
<td>GB3</td>
<td>20%</td>
<td>30 December 2022</td>
</tr>
<tr>
<td>Prai Power</td>
<td>-</td>
<td>18 June 2024</td>
</tr>
<tr>
<td>Kapar Energy Ventures</td>
<td>60%</td>
<td>8 July 2029</td>
</tr>
</tbody>
</table>

### Table 3: Third-generation IPPs, percentage of TNB shareholding and PPA durations

<table>
<thead>
<tr>
<th>IPP</th>
<th>TNB Shares</th>
<th>End of PPA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Janamanjung</td>
<td>100%</td>
<td>31 August 2031</td>
</tr>
<tr>
<td>Tanjung Bin Power</td>
<td>-</td>
<td>27 September 2031</td>
</tr>
<tr>
<td>Jimah Energy Venture</td>
<td>20%</td>
<td>31 December 2033</td>
</tr>
</tbody>
</table>
Frequently asked questions about IPPs

1. Why should IPPs enjoy subsidies?
   IPPs do not benefit from any gas subsidies as the cost of gas is a pass through cost to TNB.

   [Diagram: Consumers, not IPPs, benefit from gas subsidies]

   PETRONAS sells gas at GoM controlled (subsidised) price
   Generators sells power to TNB based on controlled gas price
   TNB supplies power at controlled tariff to consumers
   GoM via PETRONAS subsidises consumers

2. Why is there a difference between TNB’s and IPPs’ cost of production?
   First-generation IPPs’ costs of production were higher than TNB’s due to several reasons:
   i. The building of power plants by IPPs incurs financing cost, foreign exchange risk, ground and construction risks, and operational risks. Initial investment for new plants were high and loans were difficult to obtain as the IPPs were part of a maiden industry with no precedence. The IPP plants were financed by private financial institutes, unlike TNB plants which were financed and guaranteed by the government.
   ii. TNB already had the equipment and the older power plants have already depreciated in value, making its overall generating costs lower. Moreover, utility-based costings would be different from commercially-based costings to reflect the true costs of the plant and capital overlay with its whole spectrum of risks.
   iii. The cost of IPP plants are based on a single green field installation.

Going forward, one of the 9 initiatives under the transformation of the Malaysian Electricity Supply Industry (MESI) is to ensure that all future generation planting-up will be based on competitive bidding.

3. Are IPPs the cause of the electricity tariff increase?
   The Government has been subsidising the fuel costs for electricity generation for many years. This subsidy, which now amounts to RM15 billion a year, is not sustainable. The Government has plans to reduce fuel subsidies for power generation in the very near future. As a result, the electricity tariff has to increase to reflect the true cost of the fuels used for generation. As such, neither IPPs nor TNB is the cause of the hike in electricity tariff.
WHY DO WE NEED TO BE ENERGY EFFICIENT?

By definition, energy efficiency simply means to use less energy to accomplish the same task.

It is something that affects every single individual, from purchasing energy-saving household appliances, to the use of more efficient industrial equipment, both of which will help the end user to save energy, reduce the cost of operations and in the process generate the same desired results or better.

Why is Energy Efficiency important?
The efficient use of energy will result in energy saving, hence less money being spent on energy, which then translates into lower energy/electricity bills.

The overall benefits of energy efficiency are:

**Cost:**
- Reduced energy costs leads to lower operating costs and therefore higher profits
- Positive effect on productivity and competitiveness.

**Environment protection:**
- Reduction in emissions that contribute to global warming
- Less air pollution and a cleaner environment
- Energy Efficiency is also the most promising means to reduce greenhouse gas in the short run.

**Security of supply:**
- Curbing global or national energy demand growth, improves security of supply.
- Less usage of energy means less burning of fuel, which leads to long-term reduction in energy utilisation. This helps prolong the availability of natural resources such as fossil fuel, coal and gas.
What are the initiatives undertaken by Suruhanjaya Tenaga (ST) to promote energy efficiency?
ST has been promoting energy efficiency practices among industrial, commercial and domestic consumers through various capacity building and incentive programmes since 2001.

- **Key Initiative 1: Rating and labelling of appliances.**
  Labelling of appliances is an effective tool to inform consumers about the energy consumption of the goods. Labels have already been applied for refrigerators, fans, air conditioners, and TV's. At present the 5-star labelling is voluntary. It is planned that the labelling shall be mandatory for selected appliances and shall be applied to more appliances in the future.

- **Key Initiative 2: Minimum Energy Performance Standards (MEPS)**
  MEPS are for setting the minimum energy performance for energy consuming equipment to be sold in the market. By introducing MEPS to equipment, it can be ensured that low efficient technologies are not dumped in the market, which makes it difficult for energy efficient technologies to be attractive as the investment cost difference will be high. Currently, MEPS has been introduced for refrigerators, fans, air conditioners, televisions and lamps.

- **Key Initiative 3: Energy Audits and Energy Management in Buildings and Industries**
  Energy audits are consultancy services for identification of energy saving potentials in facilities. It has been demonstrated in earlier studies that savings of 10% or more are readily available at low or no cost, just by introducing better practices and reducing leaks etc. Energy audits and energy management will be done in commercial buildings and industries. Currently all Government Ministries and Agencies are to institute the Energy Management Procedures for Buildings.

- **Key Initiative 4: Targeted rebate and support programmes**
  Energy efficiency programmes will be designed and implemented to create a market for transformation towards more energy efficient technologies. Rebate programmes are currently available to provide support to cover the incremental capital costs for energy efficient technology e.g. 5-star appliances as compared to average appliances.

- **Key Initiative 5: Energy Efficient Building Design**
  For new and existing buildings, programmes are currently being undertaken to demonstrate energy efficient design features.
What can we do as individuals to be energy efficient?

Sometimes we forget that the simplest actions are the most effective. For example:

- Simply switching off the lights in rooms that are not in use.
- Setting our air-conditioner thermostats at higher temperatures.
- Changing fluorescent lights to LED ones (new installation costs may be high but the savings are worthwhile in the long run).
- Switching electrical appliances off at the mains instead of leaving them on standby can save power. Furthermore, plasma TVs and screens, in particular, are mega electricity guzzlers; their electricity consumption is proportionate to the size of the screen.
- Equipping homes with eco-friendly, electricity saving solutions to reduce energy bills.
- Cleaning out refrigerators regularly.
- Minimise opening the refrigerator door too often.
- Cleaning air-conditioner filters to optimise operations.
- Insulating roofs of home and offices.
- Drawing curtains to keep out the heat.
- Using gas stoves to boil water.
- Having quick showers with medium temperature.
- Washing clothes in cold water, instead of hot water.
- Minimise using the tumble dryer to dry your clothes.
In Malaysia, the sources of renewable energy (RE) include solar, solid waste, mini-hydro, biogas and biomass. We have two different bodies, which govern the development of Renewable Energy.

- The Ministry of Energy, Green Technology and Water Malaysia (KeTTHA), on policy issues
- Sustainable Energy Development Authority (SEDA), mainly on the administration of Feed-in-Tariff and promotion of RE

In the Eighth Malaysian Plan, renewables were announced as the fifth fuel in the energy supply mix. RE has been targeted to be a significant contributor to the country's total electricity supply. With this objective in mind, greater efforts are being undertaken to encourage the utilisation of renewable resources, such as biomass, biogas, solar and mini-hydro, for energy generation.

The Government has launched several fiscal incentives to stimulate the emergence of RE activities and technologies. Palm oil mills, sawmills, manufacturers and large institutions can benefit by using local technology to generate income and reduce operating costs. RE resources are available in two primary forms: biomass residues from agriculture wastes (palm oil waste, wood waste, rice husks, etc.), municipal solid waste and energy from the sun.

**Why Renewable Energy?**

The Government is adopting renewable energy initiatives:

- To reduce our dependence on fossil fuel gas and oil reserves, which are becoming more expensive and difficult to find. It also reduces our dependence on imported fossil fuels, improving our energy security.
- To cut the country's carbon emissions and preserve the environment for future generations
- To encourage growth of the RE Industry which will contribute to economic growth
- To increase and enhance awareness on the role and importance of RE among the public


**How is Renewable Energy being promoted?**

In Malaysia, Renewable Energy is being promoted by enabling small Renewable Energy Power Producers (such as industry, commercial and individual home owners) to sell power generated from RE to power utilities. The feed-in tariff (FiT) system mandated under the Renewable Energy Act 2011 [Act 725] allows such a mechanism to take place. Act 725 essentially protects the rights of the buyers and sellers of electricity generated thus creating a conducive business environment for the FiT system to operate.
What are the overall economic benefits for the Public and Private sector?

- An increase in local production of RE-related equipment, such as boilers, solar panels and water heaters, and an increase in the construction, operation and maintenance of biomass power plants.
- A greater emphasis on R&D activities for local exportable RE technologies, as well as an opportunity to develop options for future trading of CO₂ emissions.
- An increase in fuel handling services, including collection, treatment, transportation, storage and logistical services and the creation of RE-related businesses, such as trading companies for RE resources.
- Generation of income from the sale of electricity to the main grid and conservation of fossil fuels that reduce the dependency on energy imports.
- Improved corporate image with “green” technologies and a chance to open up marketing opportunities.
- Create more jobs and income for the country.

How is Renewable Energy being funded?

One of the objectives set by SEDA is to promote and implement the national policy objectives for renewable energy. Consumers contribute 1% of their electricity bills to the RE Fund. The fund is used to support development in the RE sector.

In order to enhance the role of RE in the country, an additional 0.6% contribution is required on top of the current 1% imposed in the electricity bill. The additional contribution will increase the fund size to spur more development in the RE sector and enable more people to generate electricity using RE.

What are the strategies adopted by Malaysia to address the issue of climate change?

The National Policy on Climate Change 2009, has 10 strategic thrusts:

- Facilitate harmonisation of existing policies and institutions
- Institute measures on low carbon economy
- Support climate-resilient investment
- Strengthen environmental and resource conservation
- Consolidate the energy policy
- Integrate cross-cutting issues
- Support Knowledge-based decision making
- Improve collaboration
- Increase awareness and community participation
- Strengthen involvement in international programmes

(Source: National Policy on Climate Change 2009, Ministry of Natural Resources and Environment Malaysia)

(Sources: GreenTech Malaysia, KeTTHA, SEDA)