

Headline	Healthy reserve margin ensures power supply security		
MediaTitle	Focus Malaysia		
Date	04 Jan 2014	Color	Full Color
Section	News	Circulation	20,000
Page No	42	Readership	60,000
Language	English	ArticleSize	821 cm <sup>2</sup>
Journalist	N/A	AdValue	RM 13,917
Frequency	Weekly	PR Value	RM 41,751



# Healthy reserve margin ensures power supply security

**M**ALAYSIA'S reserve margin for electricity has attracted much attention following the Dec 2 tariff adjustment announced by Minister of Energy, Green Technology and Water (KeTTHA) Datuk Dr Maximus Ongkili. The RM0.0499 sen per kilowatt-hour (kWh) adjustment in new tariffs took effect on Jan 1.

One key argument currently concerns Malaysia's reserve margin, that had been said to be as high as 52% despite data readily available from the Energy Commission that puts the reserve margin at just over 30%. Those who cited Malaysia's reserve margin at 52% also said the international standard was between 5% and 10%. According to the Energy Commission, Malaysia's installed capacity for 2013 was 21,749 megawatts (MW) and the peak demand for last year was 16,560MW on May 13. Therefore, the reserve capacity currently is 31.3%.

There have also been discussions about energy efficiency, as the two-part pricing structure for the tariff adjustment was introduced to Malaysians to improve transparency in the tariffs. The two-part structure showed that 82% of the total RM0.0499/kWh adjustment was the Fuel component, while the Non-Fuel component was 18%. The Fuel component had three parts – coal (RM0.0017/kwh), piped gas (0.005/kWh) and a new addition, liquefied natural gas (LNG) (0.0341/kWh).

Non-Fuel, which is the incentive component for efficiency in operations, capital structure and network performance, was credited at RM0.009/kWh for a start. This will raise RM900 million for Tenaga Nasional Berhad (TNB) to upgrade its transmission and distribution network and deliver higher electricity quality to consumers.

It should be noted that under the Malaysian Electricity Supply Industry transformation, apart from rewards for efficiency under the Incentive Based Regulation (IBR) framework, there are also penalties for TNB for failing to achieve key performance indicators set by the electricity regulator, the Energy Commission. These

Headline	Healthy reserve margin ensures power supply security		
MediaTitle	Focus Malaysia		
Date	04 Jan 2014	Color	Full Color
Section	News	Circulation	20,000
Page No	42	Readership	60,000
Language	English	ArticleSize	821 cm <sup>2</sup>
Journalist	N/A	AdValue	RM 13,917
Frequency	Weekly	PR Value	RM 41,751

KPIs are revised every three years to ensure TNB continuously pushes itself to progressively higher benchmarks in efficiency.

Coming back to the reserve margin, it was suggested that the cause of high electricity tariffs was that consumers have to pay for excess electricity generated. While security in electricity supply has a price, Malaysians are certainly not paying for 52% in excess capacity. According to the International Energy Agency, the ideal reserve margin is between 20% and 35%. Yet the IEA elaborates there is no standard reserve margin applicable because each nation has different socio-economic priorities. For instance:

- ▶ Singapore's minimum reserve margin for system security is 30%. According to Singapore's *Business Times*, the republic's reserve margin in 2013 was 47%.
- ▶ Thailand raised its official reserve margin in June 2013 to 20% from 15%, after the margin fell to 11%, resulting in rolling power cuts across the country. OSK Research suggested that Thailand actually requires an even healthier reserve margin of between 25% and 30%.

Therefore, any suggestion that there is an "international standard" reserve margin of between 5% and 10% is not true. Any country with such low reserve margins would be beset by brownouts, like Thailand was, as well as the Philippines. With a mere 11% reserve margin last year, Thailand has had to import electricity from Myanmar and Cambodia. Politically, any nation with a low reserve margin places its national security at risk of blackmail by its neighbour. For example, in 2006 and 2009, Russia shut off all gas supplies to the Ukraine over debt payments for energy that also put Europe in short supply through winter. Europe is again facing new shut-offs of Russian gas to the Ukraine this winter, after Gazprom warned the Ukraine to pay a US\$900 mil overdue bill. Therefore energy security is the foremost concern of a sovereign state.

When any nation falls short of electricity demand, there are only two options:

- i. Buy from a neighbour if its own national electricity grid is linked to a neighbouring or regional grid, like

those in Europe; or

- ii. Ration electricity distribution, which means rolling power cuts across the nation.

In Europe, the development of trans-national electricity grids creates regional competition for electricity tariffs, enabling a nation with excess power to sell to those hungry for energy. This is good for consumers from a free market perspective. But Asean is still a group of unequal partners in the context of economic sophistication. And by Organisation for Economic Co-operation and Development (OECD) standards, Asean's electricity grid is rudimentary. Malaysia's electricity links that form part of the Asean grid are:

- ▶ TNB's southern grid, connected to the transmission grid of Singapore Power at Senoko via two 230 kilovolt (kV) submarine cables with a transmission capacity of 200MW;
- ▶ TNB's northern grid is connected to the transmission grid of the Electricity Generating Authority of Thailand (EGAT) at Bukit Ketri in Perlis, via a 132kV single-circuit line with a transmission capacity of 80MW. A second link of 300kV with a transmission capacity of 300MW has been added.

In contrast to these transmission links with Malaysia's neighbours, Britain has two high-voltage, under-sea-cable links with Europe, delivering 3,000MW. Britain's latest cable, to the Netherlands, was commissioned in April 2011, as Britain plans to sell 30GW of offshore wind power planned for deployment before 2020 to an energy-hungry Europe.

Having healthy reserve margins of electricity is important to consumers. That is because consumers expect electricity whenever they hit the switch. Reserve margins constitute the security cost in power generation which a country needs to build into its tariff so consumers do not experience outages.

To facilitate an understanding of what a country needs to ensure quality electricity supply, this is a simplified example of electricity planning. Say a country's peak demand for electricity is 10,000MW, it needs to then factor in how many power plants must be built to meet this peak demand. As no power plant, even hydro, delivers 100% of its installed capacity and

commonly produces between 60% and 85% of its rated capacity, this means a 1,000MW power plant will generate up to 850MW at 85% optimal efficiency.

Even then, the 850MW generated does not mean 850MW delivered to consumers. Typically, transmission losses on a 160km 345kV transmission system carrying 1,000MW total about 4.2%, according to American Electrical Power (AEP), which owns the largest transmission system in the United States. However in TNB's case it is 8%, according to its financial

year 2013 report. This is because when electricity flows through transmission and distribution lines, there will be energy losses, mainly in the form of heat. Thus, from the 850MW produced by TNB's 1,000MW power plant, only 782MW eventually reach their destination. Hence for TNB to deliver 10,000MW to consumers, it would need a 30% increase in installed capacity to 13,000MW. That would deliver 10,166MW on tap to consumers, leaving 166MW to spare.

Yet with a 13,000MW installed capacity, there is still a gap in the security of electricity supply. Breaking down our 13,000MW total installed capacity to the sum of 13 power plants of 1,000MW, in any year one or more of these power plants would need to undergo maintenance and therefore go offline, which results in a scheduled outage. Therefore when any one of the 1,000MW power plants goes offline, the impact would be a load loss of 782MW of electricity to consumers. Such a loss means rolling electricity cuts to consumers because demand remains at up to 10,000MW while supply has dropped to 9,384MW. Therefore to avoid scheduled outages, a load loss from a 1,000MW power plant can be met only by a power plant of equal capacity. Hence for security of supply, 14 1,000MW power plants are needed to meet 10,000MW of supply, to guard against power interruptions. This implies a 40% reserve margin, in this simplified example. Therefore the average tariff will be based on the cost of the 14 power-plants.

According to the Energy Commission, there are no new plants scheduled for installation this year in Peninsular Malaysia. Therefore with no new capacity, a higher electricity demand growing at 4.1% per year and the retirements of older plants, this

Headline	Healthy reserve margin ensures power supply security		
MediaTitle	Focus Malaysia		
Date	04 Jan 2014	Color	Full Color
Section	News	Circulation	20,000
Page No	42	Readership	60,000
Language	English	ArticleSize	821 cm <sup>2</sup>
Journalist	N/A	AdValue	RM 13,917
Frequency	Weekly	PR Value	RM 41,751

will see Malaysia's reserve margin decline from 31% last year to about 20% next year. In order to deliver on Malaysia's gross domestic product (GDP) target of 5.7% next year, 5.9% from 2016 to 2020 and 6.2% from 2021 to 2030, the Energy Commission will add 10,882MW between next year and 2020, and another 12,213MW from 2021 to 2030.

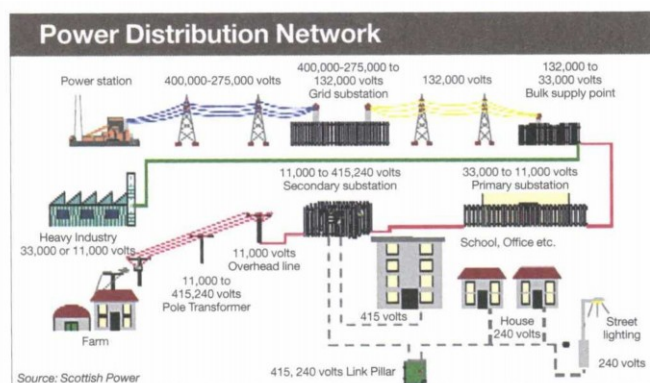
Going forward, Malaysian consumers are assured of a quality electricity supply with the Malaysian Electricity Supply Industry transformation. There is now greater transparency in the industry, with the introduction of

a two-part pricing structure for tariffs as well as IBRs to reward TNB for its efficiency.

What Malaysians want from TNB is to step up another notch in delivering quality electricity to consumers, now it has emerged among the "Best Electric Utilities in Asia" in the coveted Platts Top 250 Global Energy Company Rankings for 2013. Greater innovation in products and services from now, especially towards lowering the cost of operations that leads to lower

tariffs when electricity pricing reaches free-market levels, will put a halo on TNB and win over Malaysian consumers instead of its having to justify itself with every tariff hike. Think like an AirAsia of electricity! **FocusM**

**Johnny Yuen** is a consultant strategist with the Centre for Strategic Engagement (CENSE). He has advised key Malaysian decision-makers and has over 30 years of experience in communications. Comments: editor@hckmedia.my



Additional generation capacity until 2020		
Year		
2015	Batu Manjung 4 coal power plant	1,010 MW
	Connaught Bridge Repowering	343 MW
2016	TNB Hulu Terengganu Hydro	265 MW
	TNB Ulu Jelai Hydro	372 MW
	Tanjung Bin coal-power plant	1,000 MW
	TNB combined cycle gas power plant	1,071 MW
	Extension of licence for Genting Sanyen combined cycle gas power plant	675 MW
2017	Petronas Pengerang Cogeneration power plant	400 MW
	Extension of licence for Segari Energy Ventures combined cycle gas power plant	1,303 MW
	Extension of licence for TNB Pasir Gudang combined cycle gas power plant	275 MW
	Competitive bidding for coal-power plant under Track 3A	1 x 1,000 MW
2018	Additional capacity for Chenderoh 5 hydro	12 MW
	Competitive bidding for coal-power plant under Track 3B	1 x 1,000 MW
2019	Tekai Hydro	156 MW
	Competitive bidding for coal-power plant under Track 3B	1 x 1,000 MW
2020	Combined cycle gas power plant	1 x 1,000 MW
	<b>Total</b>	<b>10,882 MW</b>

Source: Energy Commission