

REMARKS FROM

**CEO**

SINGLE BUYER


***SB is proud to launch its newly revamped website this month with major revision done on its web content and structure.***

I believe it is opportune to wish everyone *Selamat Hari Kebangsaan* and *Selamat Hari Malaysia!* The Malaysian Electricity Supply Industry (MESI) has evolved significantly throughout the country's 61 years of independence, and SB has followed suit to be one of the key enablers to this transformation.

The past 3 months have seen a few major events for SB and MESI in general. On 15 August 2018, Peninsular Malaysia recorded a new peak demand of 18,338MW contributed by significantly warm temperatures during this period.

In September, SB supported and participated actively in the Conference of the Electric Power Supply Industry (CEPSI) held in Kuala Lumpur from 17—21 September 2018. SB presented 6 papers in total across various themes during CEPSI 2018.

SB is also pleased to announce the launch of its newly revamped website last month with major revisions done on its web content and structure. The website is designed to be simple, engaging and informative with the aim to provide transparent and easy-to-access information for industry players and stakeholders. This is a huge leap forward focusing on a more streamlined and user-friendly online experience for our viewers.

Echoing YB Minister of MESTECC's vision in her speech at CEPSI 2018, we are committed to assist the Government to realise its aspirations in accelerating growth of sustainable energy in Malaysia and to tackle issues including climate change. In the near future, SB will support and drive itself as the key enabler to further exhilarate transformation of the MESI. 

*Charanjit Singh Gill*

**Head/Chief Executive Officer**  
**Single Buyer**

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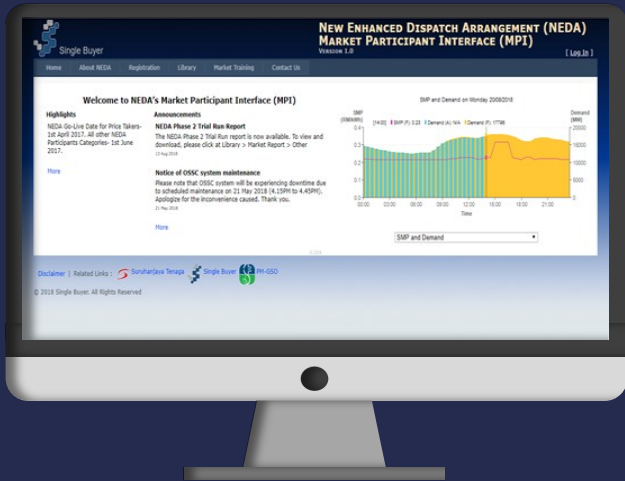
SB Participates in CEPSI 2018

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Guidelines for Single Buyer Market

# NEDA

# MARKET PARTICIPANT INTERFACE



## What is MPI?

- MPI is a web-based platform developed specifically for NEDA participants to submit bids and generation plan
- MPI is also a medium for SB to publish market information such as prices and caps

## What are the information published in the MPI?



### BID SUBMISSION & PROCESSING

- MPI allows NEDA participants to view and modify their energy bids or generation plan



### DEMAND

- MPI publishes Forecast and Actual Demand



### MARKET REPORTS & TRAINING

- MPI publishes market reports and regularly updates training/workshop on NEDA



### SYSTEM MARGINAL PRICE (SMP)

- MPI publishes Forecast and Actual SMP (SMP is the half-hourly price paid to the Price Takers)



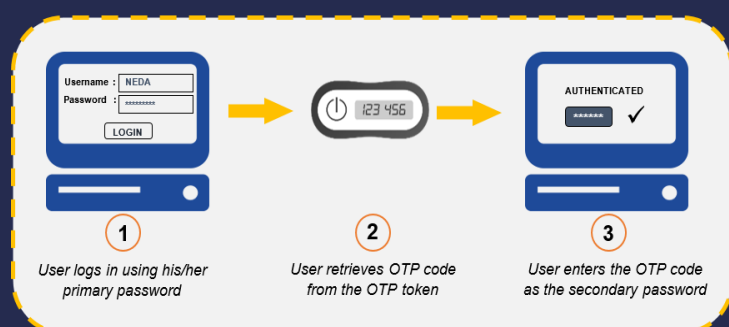
### MONTHLY CAP

- MPI publishes Heat Rate, VOR and Price Caps. These caps set the maximum allowable bids submitted by the NEDA participants



### TRANSMISSION & GENERATION CONSTRAINTS

- MPI publishes system constraints for generators to strategise their bids



## How secure is MPI?

Besides having ordinary login credential that requires only username and password, MPI is also equipped with One-Time Password/Pin (OTP). This feature heightens the security aspect of MPI.



# NEDA

## ENGAGEMENT ACTIVITIES



### MEETING WITH CUF PETRONAS

**01 Aug | Kuala Lumpur**

A follow-up discussion was arranged with CUF Petronas at KLCC to brief on NEDA mechanism to the CUF management. CUF, which currently has a PPA with TNB, is exploring various avenues to sell its excess generation to TNB.



### MEETING WITH MERIDIEN UTILITY

**12 Jul | Putrajaya**

A meeting with the Managing Director of Meridien Utility was held at Marriott Hotel, Putrajaya to explore its potential participation in NEDA. Meridien Utility is a co-generation plant that uses biomass and was previously on the FIT programme.

### MEETING WITH C.H.E. GROUP BHD

**08 Aug | Kuala Lumpur**

A meeting was organised between SB, Sher Engineering (a PSS Consultant) and C.H.E Group Berhad (C.H.E.) at SB's Office. C.H.E. owns several factories and provides OEM services to many companies. C.H.E. was keen to learn about NEDA and how the company can generate additional revenue from participation in NEDA. C.H.E. also plans to conduct a briefing session on NEDA for all their partners.



### MPI & OSSC USER TRAINING FOR NUR POWER

**17 Aug | Kedah**

Following the registration of NUR Power in NEDA, a training on MPI and OSSC was conducted for NUR's personnel. After the training session, SB staff was brought for a short tour around NUR's facility.

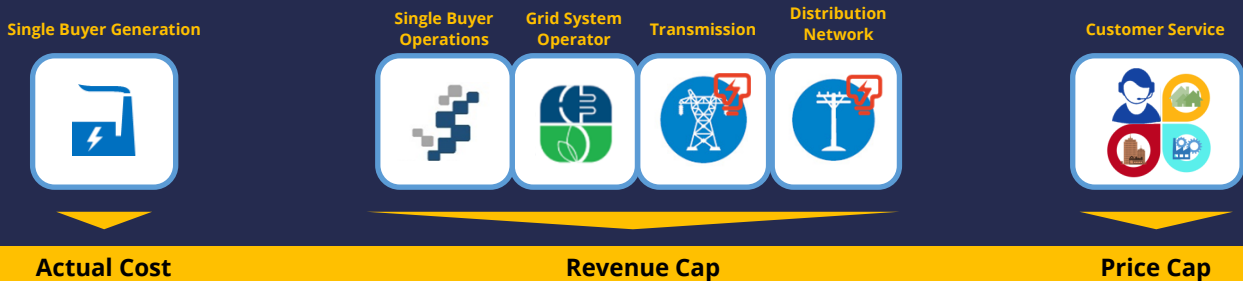


# INDUSTRY REGULATORY FRAMEWORK

In this issue, we will take another step into the IBR mechanism, specifically the **tariff setting** for the business entities in RP2 as described in Annex B of the guideline document<sup>1</sup>.

There are **3 types** of tariff setting applicable under the current IBR mechanism: **Actual Cost**, **Revenue Cap** and **Price Cap**.

<sup>1</sup> The Guidelines on Tariff Determination Under Incentive Based Regulation for Tenaga Nasional Berhad [Electricity Supply Act 1990 (Act 447)] - version January 2012



## Actual Cost

- Recovers all actual cost via **tariff adjustments**
- Adjustments occur on a 6-month basis via **Imbalance Cost Pass Through (ICPT)** mechanism
- Actual costs include **electricity supply costs** from the Generators as per their PPAs & SLAs
- Ensures **neutrality** to uncontrolled factors such as fuel price volatility, fuel shortages and generator performances

## Revenue Cap

- Recovers all costs based on **approved annual revenue requirements**
- Revenue requirements are **set prior to the start** of and **fixed throughout** the Regulatory Period (RP)
- Entity is **not exposed** to revenue risks
- Any revenue shortfall or surplus will be **recovered in the next RP tariff** determination
- Drives cost **optimisation** to minimise adjustments in the next RP

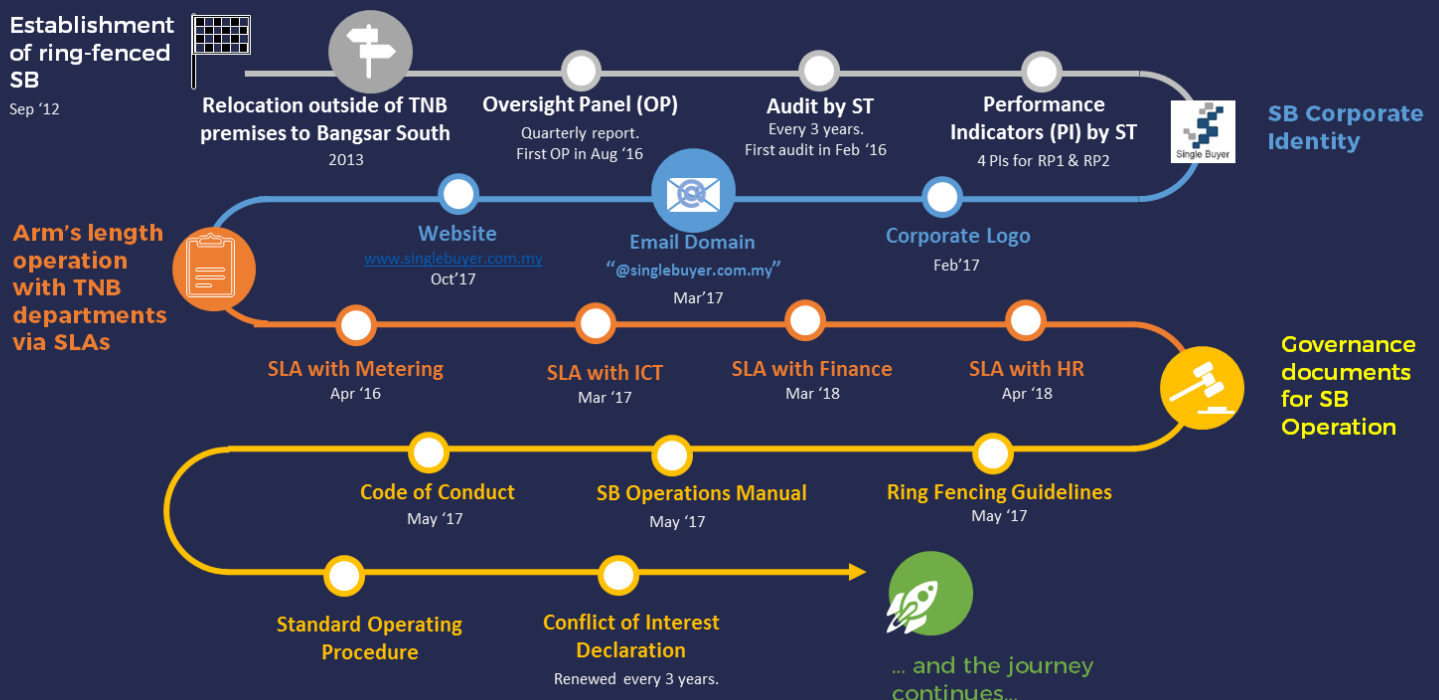
## Price Cap

- Revenues are based on **actual sales**, calculated using a **fixed tariff** set throughout the RP
- Fixed tariff is determined based on **forecasted costs and sales** prior to the start of RP
- Entity is **exposed** to revenue risk as actual sales may vary from the forecast
- Revenue shortfall will **not be recovered** from the end consumers
- Drives **productivity** to meet projected sales

# SINGLE BUYER RING-FENCING

## SB's Transformation Journey

SB has started the transformation journey via ring-fencing to support the evolution of MESI. The major changes undertaken by SB so far, to fulfill the ring-fencing requirements are summarised in the figure below.

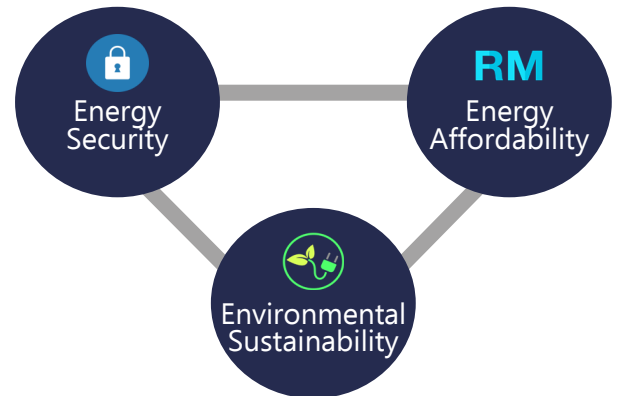


# LONG-TERM POWER GENERATION DEVELOPMENT PLAN

Single Buyer formulates the 20-year Power Generation Development Plan for Peninsular Malaysia to ensure supply meets the forecasted demand

## Philosophy

Energy **Security**, Energy **Affordability** and Environmental **Sustainability** are the three main components of the power generation planning philosophy. Balancing these three components of the **Energy Trilemma** is the key challenge in long-term power generation planning.



## Criteria/Guidelines

Long-term power generation planning for Peninsular Malaysia incorporates three types of criteria or guidelines:

### Loss of Load Expectation (LOLE)<sup>1</sup>

**1 day per year**

### Herfindahl-Hirschman Index(HHI)<sup>2</sup>

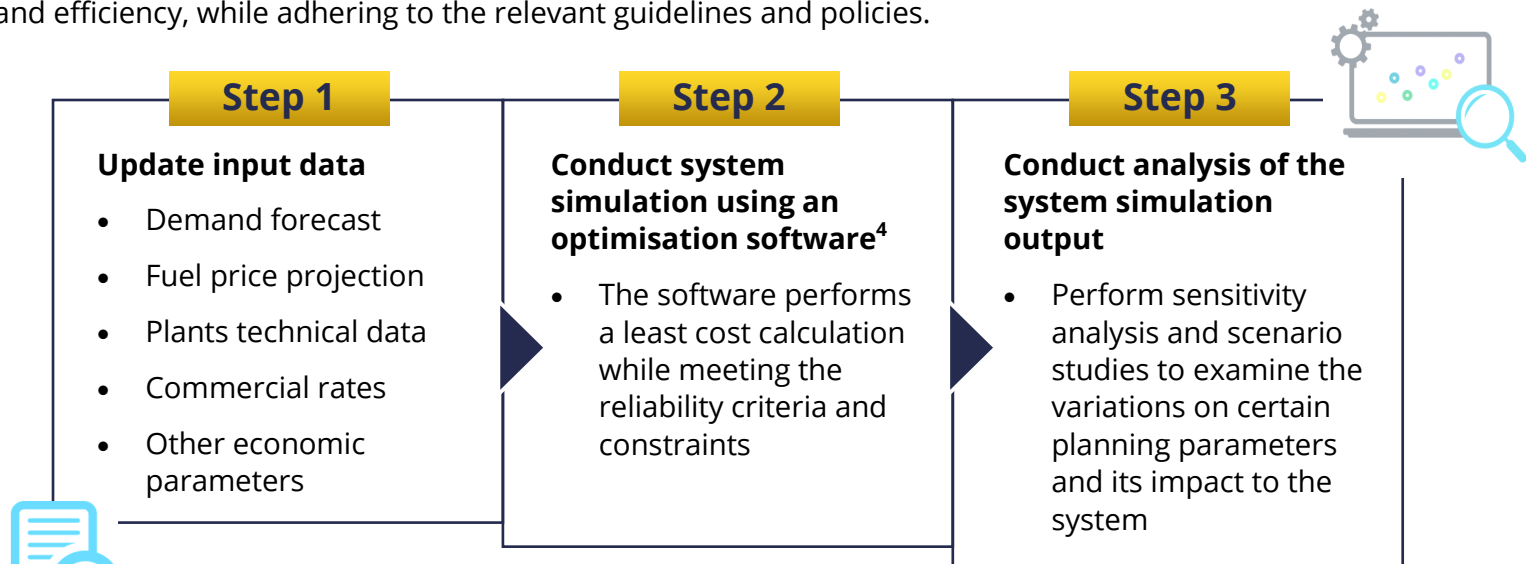
**0.5** by 2020  
**0.4** by 2025

### Minimum Reserve Margin<sup>3</sup>

**28%** (2020 - 2024)  
**25%** (2025 - 2029)  
**23%** (2030 - 2034)  
**20%** (2035 onwards)

## Methodology

The objective is to formulate a least cost long-term power generation development plan subject to financial, fuel and environmental requirements, as well as technical parameters, which includes reliability, technology and efficiency, while adhering to the relevant guidelines and policies.



<sup>1</sup> LOLE is a measure of expected number of days per year in which generating capacity (supply) is insufficient to serve daily peak loads (demand).

<sup>2</sup> HHI is an index used to measure fuel resources diversity. The smaller the HHI number, the more diversified a system is.

<sup>3</sup> Reserve margin is a measure of the generating capacity available over and above the amount required to meet the system peak load.

<sup>4</sup> SB currently utilises PLEXOS as the optimisation tool for generation planning.





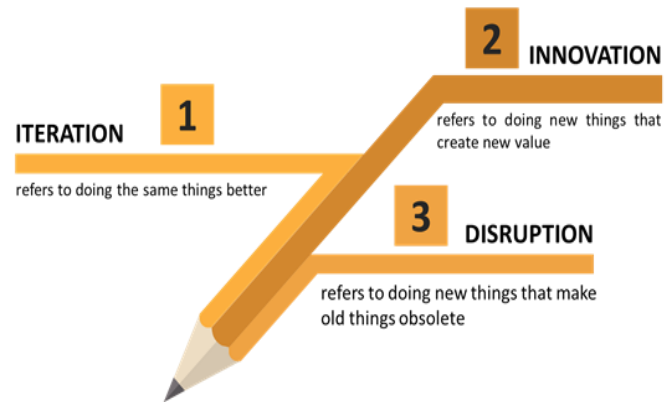
# DISRUPTIVE TECHNOLOGIES

## in the Electricity Supply Industry

### What is Disruptive Technology?

A **disruptive technology** is an innovation that usually puts an end to an established technology, or a revolutionary product or service that gives rise to a new industry. Disruptive technologies change the way we work, live, and behave.

The pathway to disruption involves several types of change: **Iteration**, **Innovation** and **Disruption**.

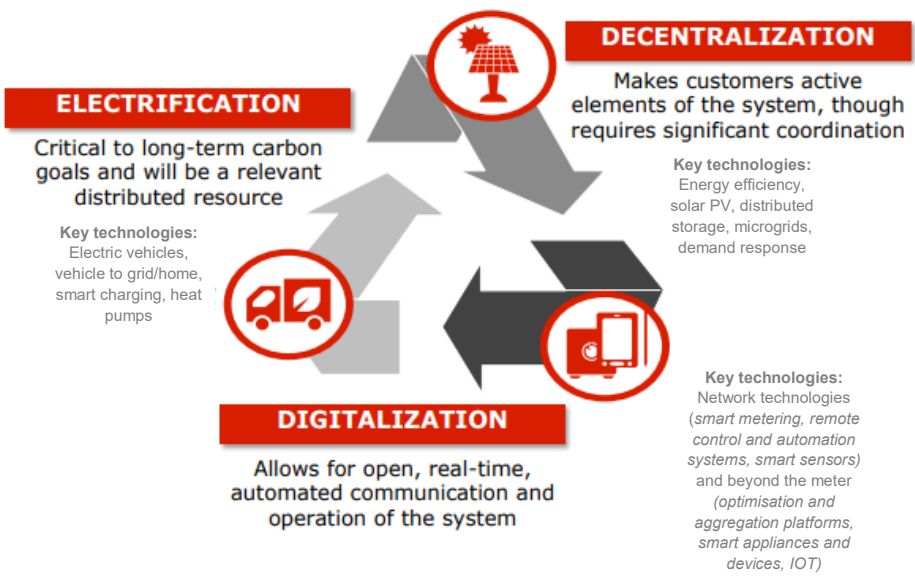


### Examples of Disruptive Technology

Disruptive technology is happening around us without us realising. It has been around since the beginning of time. Steam engine in the age of sail and the internet in the age of post office mail are some examples to better understand what a disruptive technology is.

A more recent example of disruptive technology is the e-commerce. With the introduction of mobile devices and online payment platforms, the concept of commerce has evolved into something completely new. Now, money transactions can be made anytime and anywhere just by using smart phones. It shows that the traditional business model has now changed because new technology has made it possible to do things in a different way.

### Disruptive Technology in Electricity Supply Industry



As for the **Electricity Supply Industry (ESI)**, disruptive technology is driven by the three key trends which are **decentralisation**, **electrification** and **digitalisation**. The most commonly known disruptive technology in ESI is renewable generation.

Distributed generation from renewable resources is a good example of how a technology can change the way we produce, procure and consume electricity.

Source: [World Economic Forum \(The Future of Electricity New Technologies Transforming the Grid Edge\)](#)

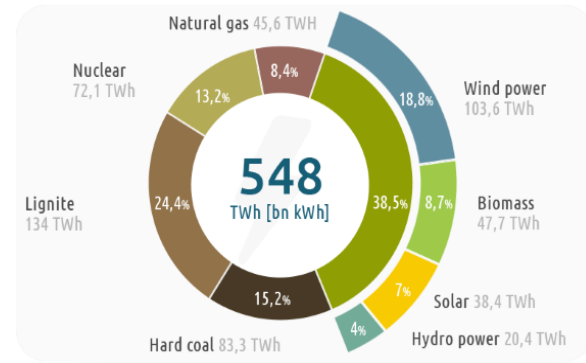
## How are disruptive technologies impacting the utility companies?

Disruptive technologies are impacting the traditional utilities in more ways than one particularly in terms of sustainability of business model, investment and operation of the grid system. Driven by a drastic cost reduction, significant efficiency increase, and encouraging government policies, renewable generation are expanding fast particularly for wind and solar. In Germany, renewable energy resources, which consist of resources from solar PV, wind and biomass, have generated more power in year 2017 than all conventional thermal plants.

Distributed renewable generation has managed to attract new players to participate in energy generation resulting in new market segment. Renewable generation requires smaller investment, easier development and lower risk relative to conventional thermal plants. Solar PV, for example, can be installed on any roof or even on balconies. Private households, farmers and energy cooperatives are the main investors for this technology in Germany and with the FiT scheme, the Return on Investment (ROI) is sufficient for private investors like them.

This new market is impacting the utilities greatly. For example, in 2016, two utilities giants (E.ON & RWE) in Germany have reported combined losses of USD30 billion over two year period. Not only in Germany, other energy markets in the world are also facing the same situation, most remarkably in California and Texas. In these markets, renewable resources shift the merit order of the market, reducing the average wholesale electricity price and reducing the full-load hours of conventional power plants, especially gas-fired power plants.

### Energy Mix in Germany for year 2017



Solar Rooftop in Germany Farming Village

## Disruptive Technologies – Friend or Foe?

At the end of the day, it is all about the management of electrons and disruptive technologies are enablers to manage them better. Depending on from which side you are looking from, it can be either a friend or a foe. But, everyone has to acknowledge that disruptive technologies are indeed OPPORTUNITIES and it is up to us to grab it.

## TRENDING DISRUPTIVE TECHNOLOGIES IN ELECTRICITY SUPPLY INDUSTRY

### E-mobility



Merging of automotive and electricity industry. Main features of E-mobility:

- Electrified
- Autonomous
- Shared
- Connected

### Blockchain



A distributed digital ledger technology that provides a high level of privacy and security without the need for a third party service. It promotes peer-to-peer (P2P) trading.

- **Blockchain 1.0:** Simple transactions using crypto-currency such as Bitcoin
- **Blockchain 2.0:** Smart contracts and automated transaction processes
- **Blockchain 3.0:** Enterprise and mass public application

### Distributed Energy Resources (DERs)

Micro grids powered by:

- renewable generation
- energy storage
- vehicle to grid generation
- demand side response
- virtual power plants



ONCE A NEW TECHNOLOGY ROLLS OVER YOU

*If you're not part of the steamroller*

YOU ARE PART OF THE ROAD



# WATT'S HAPPENING

## JULY - SEPTEMBER 2018



**19 - 21  
JUN**

**Electrify Europe Conference,  
Vienna, Austria**

Two representatives from SB attended the Electrify Europe Conference in Vienna. This conference, participated by worldwide power industry players, is intended to discuss latest key issues, technologies and solutions that address the needs of today's power industry.



**3 - 9  
JUL**

**RE Study Tour,  
Dresden, Germany & Madrid, Spain**

A group of delegates from SB, ST, MESTECC, GSO, Grid Planning and SEDA participated in a study tour to Germany and Spain, as part of the Variable RE Penetration Study by DNV GL. The program aims to develop the competency of local experts in preparing for higher RE penetration in Peninsular Malaysia.



**10  
JUL**

**Technical Visit to Ulu Jelai  
Power Station,  
Cameron Highlands**

SB organised a technical visit to Ulu Jelai Power Station to better understand the hydro operations of Ulu Jelai Power Station. The visit also involved a discussion on operational issues and future plans of the hydro plant.



**11 - 12  
JUL**

**GDP Forecasting Workshop,  
Petaling Jaya**

Monash University Malaysia together with RAM Consultancy Services conducted a 2-day GDP forecasting workshop. This hands-on session was held to guide SB and ST on the workings of the enhanced GDP forecasting model developed for SB.





**16  
JUL**

**LTM-PIP 2.0  
Meeting,  
Bangkok, Thailand**

Malaysian delegates from MESTECC, ST, SB, GSO and TNB, led by YBhg. Datuk Badriyah Abd Malek, attended the LTM-Power Integration Project (PIP) 2.0 meeting in Bangkok.

The meeting was held to update on the LTM-PIP status and discuss the way forward for LTM-PIP 2.0.



**25  
JUL**

**OSSC Engagement Session, TNB  
Janamanjung, Perak**

SB representatives had an engagement session with the Managing Director of TNB Janamanjung to discuss on OSSC related issues.



**31  
JUL**

**Gas Planning Coordination  
Meeting, Petronas Gas Control  
Centre (PGCC), Segamat**

SB and GSO attended the quarterly Gas Planning Coordination Meeting in PGCC Segamat, to discuss on issues pertaining to short-term gas demand and supply.

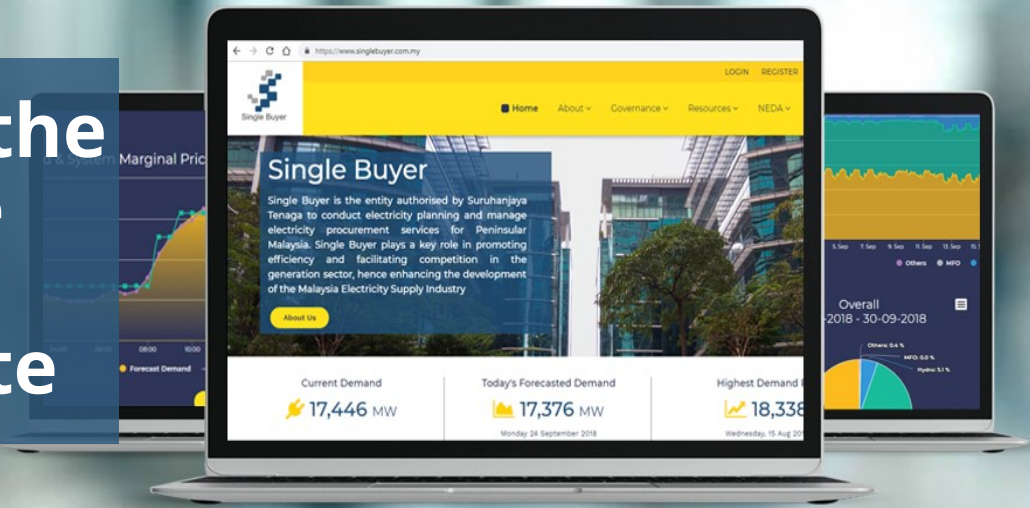


**14  
AUG**

**Failure to Dispatch Instruction  
(FDI) Workshop,  
Kuala Lumpur**

The workshop was conducted by SB as a medium for all relevant parties (SB, TNB Generation and GSO) to discuss and understand the Dispatch Instruction (DI) process, compliance and issues. The workshop also discussed on the Supplemental Agreement (Global Settlement) draft to the SLA.

# Announcing the launch of the new Single Buyer Website



We are pleased to announce that SB has launched its newly designed website with new features and interactive data visualisation

If you have visited the Single Buyer website recently, you may have noticed its fresh new look. We are excited to announce the launch of Single Buyer's newly designed website!

The new website was published on 21 September 2018 @ 6.00PM and it is accessible via the same URL:

<https://www.singlebuyer.com.my>

The goal of our new website is to promote greater information transparency and assist the stakeholders and general public in understanding how SB has

evolved and operates. A key improvement to the website is access to a range of market data which is now downloadable, with enhanced data visualisation and improved navigation.

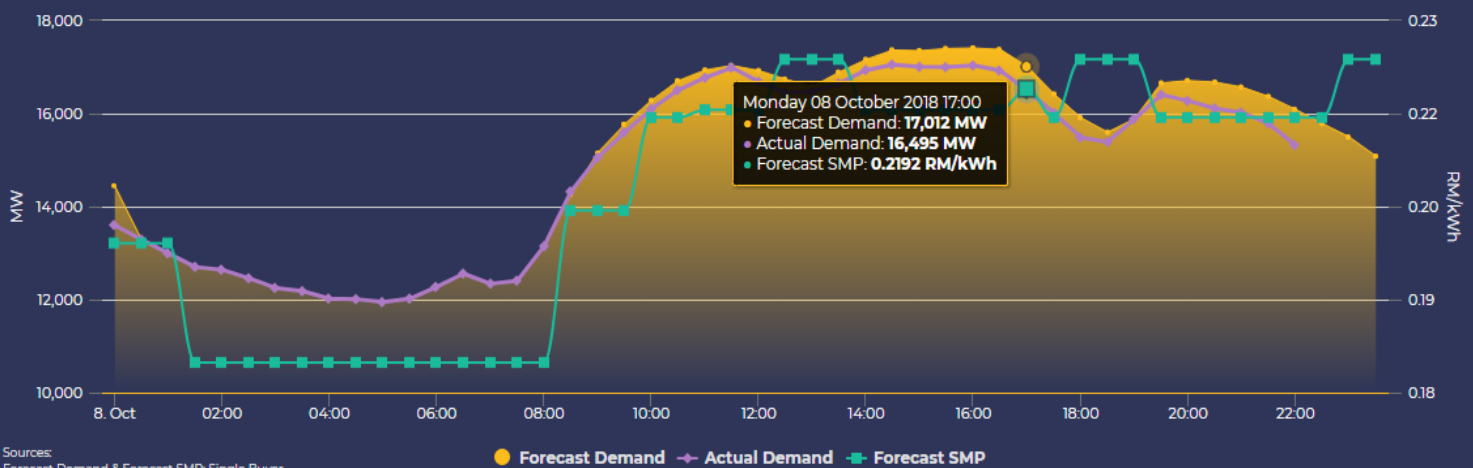
The newly designed website also provides highlights of our activities, publications, newsletters and also latest updates on SB.

We will constantly be updating the website content with relevant information from time to time. We hope that the revamped website will better meet the needs of our stakeholders and fulfill the compliance required under the Single Buyer Market Guidelines.

We welcome any suggestions and feedback on the website for future improvements.

## Let's explore!

Demand & System Marginal Price (SMP) for Monday 08 October 2018



Sources:  
Forecast Demand & Forecast SMP: Single Buyer  
Actual Demand: Grid System Operator

● Forecast Demand    ◆ Actual Demand    ■ Forecast SMP

Resources



# SB celebrates Raya !

On 13 July 2018, SB organised its first ever Hari Raya open house, held at SB's office in Bangsar South. Among the invited guests for the event are from ST, KETTHA, EPU, Petronas, GSO, TNB and players from the industry.

With Hari Raya songs in the background and everyone clad in colourful baju kurung and baju melayu, the joyful Hari Raya mood could be felt by everyone during the occasion.

The event was intended to foster good relationships through the traditional 'open house' gathering and to entertain guests with a wide spread of Hari Raya food.

The event also provided an excellent opportunity for SB staff to celebrate Hari Raya in a warm and friendly atmosphere filled with a sense of goodwill, in the company of external stakeholders.



 [www.singlebuyer.com.my](http://www.singlebuyer.com.my)

Single Buyer

Home About Governance Resources NEDA Event & Media Centre

LOGIN REGISTER CONTACT US SEARCH

Welcome to the new Single Buyer website

We are pleased to announce the launch of Single Buyer newly designed website with new features and interactive data visualization

Current Demand <b>15,311 MW</b>	Today's Forecasted Demand <b>17,226 MW</b> Friday 28 September 2018	Highest Demand Recorded <b>18,338 MW</b> Wednesday, 15 Aug 2018, 4:00PM
Current Installed Capacity <b>24,124 MW</b> as of July 2018	Today's Forecasted Energy <b>364,255 MWh</b> Friday 28 September 2018	Highest Energy Recorded <b>388,524 MWh</b> Wednesday, 15 Aug 2018

Real-time system information

Events & Media Centre »

## News & Events

**02-Aug-2018**  
**Knowledge Sharing Session: Failure To Dispatch Instruction**  
On 1st August 2018, a knowledge sharing session on 'Failure to...

**05-Jun-2018**  
**Demand Forecast Committee**  
The Demand Forecast Committee (DFC) meeting was held in ST on 5 June...

**02-May-2018**  
**Single Buyer Business Plan**

Up-to-date news and events



# Did You Know

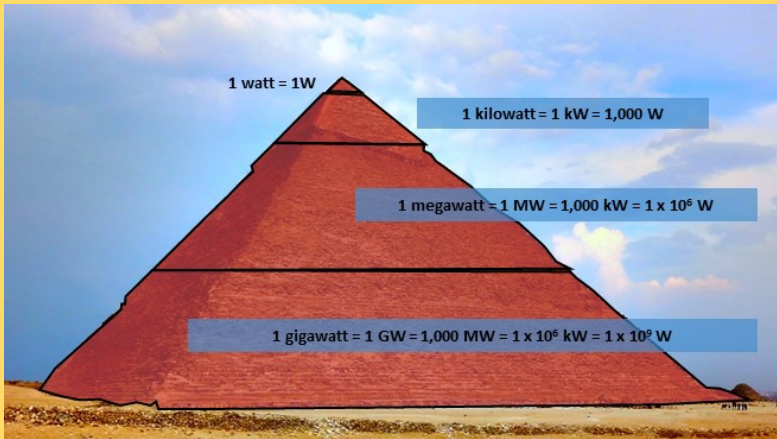
# Watt is Power & Energy? The Tale of Two Words

Power and energy are two words that have been often used interchangeably although they have different meanings. However, they are undeniably closely related to each other.

In physics, power is defined as the rate of doing work, or also described as the amount of energy per unit time. As such, the expression of power and energy is related to each other through time.

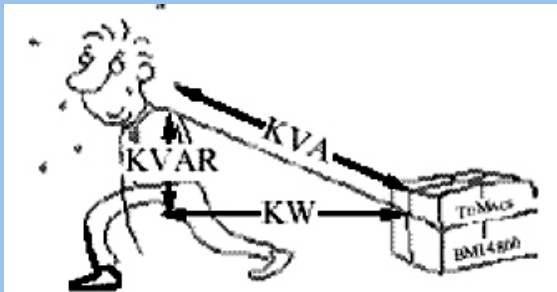
$$power = \frac{work}{time}$$

The International System of Units (SI) for power is watt (W). In the context of electrical power, the electrical energy is measured in watt-hour or simply Wh, kWh, MWh or GWh depending on the amount of power produced or needed in a defined period. The common prefixes associated with watt (and other units) are illustrated below.



AC systems supply or consume two kinds of power: Active Power (watt (W)) and Reactive Power (volt-ampere reactive (var))

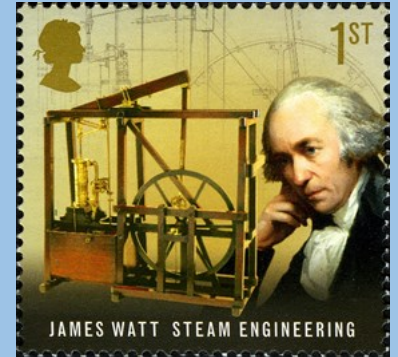
In this illustration, Din is dragging a heavy load. Din's Actual Power is in the forward direction, where he most wants his load to travel (kW). Unfortunately, Din cannot drag his load on a perfect horizontal way as he would get a terrible backache. So his shoulder height adds a little Reactive Power (kVAR). The Apparent Power Din is dragging (kVA) is this vectorial summation of kVAR and kW.



In the power system, Reactive Power (VAR) is required by inductive loads such as transformers, induction motors and high intensity discharge (HID) lighting. VAR is supplied by synchronous generators (most power plants) and capacitors.

Reactive Power also supports the voltage that must be controlled within the allowable limit for system reliability. Interestingly, at very low levels of system demand, transmission lines act as capacitors that contributes Reactive Power to the system and increase system voltages. On the other hand, at high levels of demand, transmission lines absorb reactive power and thereby lower system voltages.

Watt is named after James Watt for his contributions in the development of steam engines.



**Q:** How do you describe power and energy of a 100W bulb?

**A:** At any time, the power needed to light the bulb is 100W.

After **1 hour**, the amount of energy used by the 100W bulb is **100Wh**.

After **3 hours**, the amount of energy consumed by the 100W bulb is **300Wh**.

Electrical power can be supplied in the form of **Direct Current (DC)** or **Alternating Current (AC)**.

The type of electricity commonly supplied to consumers is in the form of AC. However, some equipment particularly electronic devices (e.g. computer, television) need DC supply in order to function. You may notice that in these devices, AC/DC adapter is embedded in their electrical wire for supply.

There is no reactive power in DC, since voltage and current is always constant in DC.



Thomas Edison: Inventor of bulbs and proponent of DC



# SB PARTICIPATES IN CEPSI 2018

CEPSI is one of the most prestigious events of the Association of the Electricity Supply Industry of East Asia and the Western Pacific (AESIEAP) which is organised biennially since 1976. The 22<sup>nd</sup> Conference of the Electric Power Supply Industry (CEPSI) was held at the Kuala Lumpur Convention Centre recently between 17—22 September 2018. This is the second time Malaysia is trusted to become the host since 22 years ago in 1996.

SB is proud to have six papers accepted and presented during this established conference. These papers and presentation will be available for download at the CEPSI website soon at [www.cepsi2018kl.org](http://www.cepsi2018kl.org).

## 01 DEVELOPMENT OF A HYBRID LOAD FORECASTING MODEL FOR PEN. MALAYSIA

*Authors: Syazwani Aman, Mohd Azlan bin Uda Kanardin, Noor Suryanni binti Ab. Rani, Muhammad Syafiq b. Mazli, Deserie Donis Ebin and Abdul Malik Mohd Jaafar*

The paper studies the development of a new hybrid load forecasting model, which combines the strengths of traditional econometric technique, end-use model and post-estimation adjustments.

## 02 ENVIRONMENTAL FRIENDLY ENERGY MIX

*Authors: Hartini Kamaruzzaman, Ahmad Fairuz Abd Jamil, Marlia Adilah Mohamad, Kamal Arif Kamal Ismadi, Nur Naqiuddin Safa'a and Dr. Nor Azlan Mostafa*

The paper studies the energy mix for the power sector in Peninsular Malaysia and Sabah, and explores the options available to achieve the aspired greenhouse gas (GHG) emission reduction targets of 45% by year 2030.

## 03 MARKET MANAGEMENT SYSTEM: ENABLER FOR THE NEW ENHANCED DISPATCH ARRANGEMENT (NEDA)

*Authors: Nurhafiza Harun and Ir. Nor Ziha Zainol Abidin*

The paper studies the IT infrastructures i.e. One Stop Settlement Centre (OSSC) and Market Participant Interface (MPI) which have been introduced by SB to implement NEDA in Peninsular Malaysia electricity market.

## 04 NEDA: ENHANCING EFFICIENCY IN MALAYSIA ELECTRICITY SUPPLY INDUSTRY

*Authors: Ir. Nor Ziha Zainol Abidin and Nazaitul Idya Hamzah*

The paper presents a comprehensive overview of NEDA, its unique characteristics, and the outcome and challenges after one year of NEDA implementation.

## 05 ENHANCING SOLAR POWER DEVELOPMENT IN MALAYSIA: A FUNDAMENTAL APPROACH IN SHAPING THE FUTURE

*Authors: Arif Hazwan Ab Wahab and Aizuddin Mohd Sopian*

The paper studies the implementation of solar power projects in Malaysia and proposes a new approach to increase efficiency of solar energy by reducing transmission losses and cost.

## 06 RING-FENCING OF SINGLE BUYER — PERCEPTION OF STAKEHOLDERS

*Authors: Aeni Haryati Hashim and Nur Naqiuddin b. Safa'a*

The paper presents concrete views on the stakeholders' perceptions of SB for the first time in the industry, based on the data collected through surveys of industry stakeholders.





# MEET THE PEOPLE BEHIND SB

## GENERAL MANAGER

## TECHNICAL ADVISORY & INDUSTRY DEVELOPMENT

## RAYMOND MICHAEL



**In this issue, we speak to Raymond Michael about his background, roles in SB and the industry's future outlook**

**WattsUp: Can you tell us a bit about your background?**

**Raymond:** After graduating with a B.Sc in Electrical Engineering from University College of Cardiff, I started my career with Lembaga Letrik Negara on 1 June 1984. Since then, I gained substantial operational working experience across various generation technologies such as OCGT, CCGT and ST-Coal/Gas/MFO at several power stations i.e. Connaught Bridge, Paka and Kapar.

In 1997, I was transferred cross-division to support the Transmission System Performance Audit team. Then I moved to the Grid System Management Department and subsequently the Grid System Operator which provided me the opportunity to engage with IPP and TNB generators, and establish technical credibility on operational and grid code compliance matters.

**WattsUp: How and when did you first join SB? What is your role in SB?**

**Raymond:** Upon the formation of SB in 2012, I was approached to take up the position of SM (Generation). Initially my role in SB was to provide technical support to SB (w.r.t. PPA requirements, grid code tests), stake-holders and ST (w.r.t. LSS Guidelines development).

Currently, as General Manager (TAID) my role includes providing independent and credible technical advice on generation,

transmission and industry development to SB, ST and stakeholders, as well as providing technical support to ST and stakeholders for MESI new initiatives.

**WattsUp: What is your favourite part about working in SB?**

**Raymond:** The workplace environment in SB is simply amazing. Colleagues in SB are very passionate, dedicated, committed and are always enthusiastic to learn and share their knowledge. The SB management is also very open and supportive of ideas, new initiatives and promotes staff to submit technical papers for participation at local and international conferences.

**WattsUp: How do you think the electricity industry will look like 10 years from now?**

**Raymond:** MESI evolution is already underway with the introduction of LSS generation in the grid system, as well as New Enhanced Dispatched Arrangement (NEDA) which brings in new players to the Single Buyer Market. In 2030 higher penetration of LSS is expected in the RE mix. Selective introduction of capacity market and energy market with suitable frameworks may reduce and eventually replace the need for very long-term PPAs.

Introduction of ancillary services such as frequency regulation and spinning reserve could provide the required impetus for higher deployment of integrated smart meters with centralised control capability for demand response duty. Anticipated cost reductions for batteries and energy storage systems could trigger direct employment of such technology in the transmission grid for demand response duty, as well as adoption of energy storage hybrid applications for variable renewable energy (VRE) generation such as LSS.

**WattsUp: Can you share your life motto with us?**

**Raymond:** My life motto in my early working days was to "Work hard, and play hard". This seemed good enough back then but later I adapted my motto to "Work smart, and play smarter" after coming across the book "Make a life, not just a living" by Ron Jensen. While it is great to be very passionate and dedicated to our work; it is also important to look after our health and spend quality time with our families. More recently I have adopted another interesting motto "The only person I should try to be better than is the person I was yesterday."

**WattsUp: What advice would you give for the newcomers in SB?**

**Raymond:** These are exciting times for SB as we are on the frontier of industry evolution MESI 2.0. Newcomers in SB should always strive to give your best and proactively enhance your knowledge, competencies and communication skills, as well as keep up with the latest trends in the supply industry.

So, it does not really matter at which point of the electricity industry you start from. All you really need is a good attitude for a great future with SB!

**WattsUp: Apart from your career, do you have a life goal that you would like to achieve?**

Going forward, I intend to participate more actively in community activities focused on ensuring sustainable development in the locality and to give back to society by way of organizing charity works for the less fortunate. 🙏









# GUIDELINES FOR SINGLE BUYER MARKET

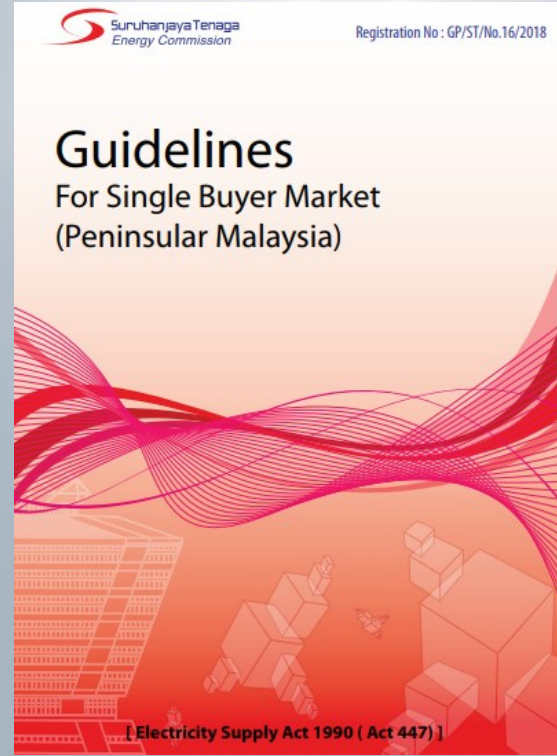
Malaysia's electricity market is governed primarily by the Electricity Act 1990 (Amendment 2015) ("Act") and Guidelines for Single Buyer Market (Peninsular Malaysia) ("Guidelines"), which was effective beginning 18 April 2018. The Guidelines supersede the Single Buyer Rules introduced by ST in 2012.

In general, the Guidelines serve as a governance document that specify the operations of the Single Buyer market as well as roles, functions, acts and behaviour of the market players. These include daily processes and interactions between Single Buyer and all market players such as the power generators, fuel suppliers and the Grid System Operator.

Although the Guidelines are applicable to all market players, much emphasis is placed on Single Buyer as the main market participant. Among the key components of the Guidelines are:

-  ring-fencing requirements
-  governance arrangement of SB
-  scheduling methodology, procedures and processes
-  data publication
-  rule change
-  contracting for new capacity

The Guidelines can be accessed and downloaded from ST's website ([www.st.gov.my](http://www.st.gov.my)) and SB's website ([www.singlebuyer.com.my](http://www.singlebuyer.com.my)).



## SB CORNER

### Your wishes for Malaysia

In conjunction with the recent National Day and Malaysia Day celebrations, the editorial team asked SBians on their wishes for our beloved country...



**MUHAMMAD  
IZZUDDIN  
MOHD IZAM**

I've always imagined Malaysia to strive among the top nations in technology, economy and also humanity. And moving towards a developed country, I wish we remain united amidst our diversity as it is our greatest strength.



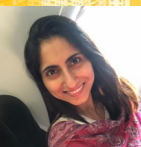
**ELAINE PANG  
KAI LYN**

I wish for Malaysia to continue to strive for excellence in every area righteously. May it continue to be a nation that peacefully embraces the racial and religious cultural differences.



**MOHD AZLAN  
UDA KANARDIN**

My hope is for all of us to leverage on our diversity, young and old, from all races and tribes to uplift our country into the shining beacon that we all know it is. Selamat Hari Malaysia!



**PARVEEN KAUR  
MALHI**

I wish the country to be united as one, regardless of race, religion and status and be proud to say we are Malaysian and not by each other's race.

## WORDS OF WISDOM



We are all Malaysians. This is the bond that unites us. Let us all always remember that unity is our fundamental strength as a people and as a nation.

*- Tunku Abdul Rahman*

## CONTACT US

We welcome any comments or content that you would like us to include in the upcoming editions of WattsUp.

Please email us at [sbet@singlebuyer.com.my](mailto:sbet@singlebuyer.com.my)

# UNDERSTANDING THE DIFFERENT TYPES of RESERVES



## RESERVE MARGIN

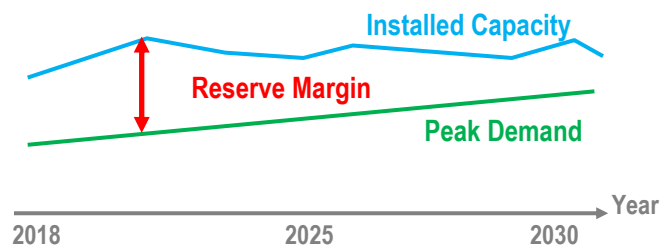
### A guide for long-term generation capacity planning

- ◆ **Reserve margin** is a guide used by the Peninsular Malaysia system, besides the Loss of Load Expectation (LOLE) criteria to gauge the generation system adequacy and reliability
- ◆ The margin is to cover for demand and supply variations (e.g. planned maintenance, forced outages)
- ◆ Reserve margin requirement differs from one system to another. It depends on factors such as season and weather variability, load factor and regional interconnectivity
- ◆ Peninsular Malaysia's reserve margin was **33%** in 2017

#### Minimum Reserve Margin Requirement for Peninsular Malaysia

28% (2020 - 2024)  
 25% (2025 - 2029)  
 23% (2030 - 2034)  
 20% (2035 onwards)

$$\text{Reserve Margin} = \frac{\text{Installed Capacity} - \text{Peak Demand}}{\text{Peak Demand}} \times 100\%$$



## OPERATING RESERVE & SPINNING RESERVE

### A guide for short-term generation scheduling and daily system operation

- ◆ **Operating Reserve (OR)** is the generating capacity that is available to the system operator within a short interval of time to meet demand, in case a generator goes into forced outage or there is a disruption in supply

$$\text{Operating Reserve} = \text{Installed Capacity} - \text{Scheduled Outage} - \text{Peak Demand} - \text{Generation Constraint}$$

- ◆ **Spinning Reserve (SR)** is the additional output from a **synchronised generating unit**, which is realisable in real time, in order to arrest a grid system frequency drop
- ◆ This frequency drop may be due to loss of generation, loss of external interconnector or mismatch between generation and demand
- ◆ Hydro plant is one of the main contributors to **SR requirement** due to its fast ramping capability

#### Spinning Reserve requirement

Capacity of system's largest\* unit → 1,000MW

+

Regulating reserve → 200MW

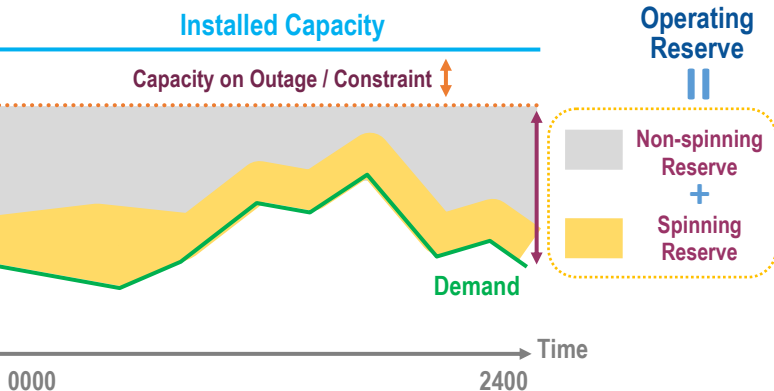
+

Capacity of next largest unit → 1,000MW

+

Capacity of largest CCGT\*\* block → 700MW

=



**2,900MW** Operating Reserve requirement

\*Currently, the largest unit in the Peninsular Malaysia is a coal plant  
 \*\*CCGT stands for Combined Cycle Gas Turbine