

SINGLE BUYER

WATT UP ("what's up") ELECTRIFYING THE FUTURE

REMARKS FROM


CEO

SINGLE BUYER

Happy New Year!

Welcome to the first WattsUp edition of 2019. We hope that everyone had a well earned year-end break and are all geared up to tackle the exciting challenges that are in store for the coming year. WattsUp will continue to become a quarterly SB publication designed to communicate relevant information about SB and MESI. In line with the Government's aspiration of a sustainable energy development, the theme of this edition is focused mainly on various Renewable Energy (RE) topics that are relevant to our industry.

2018 has been an amazing year for the industry with a large number of milestones achieved. These include the commercial operation of LTM in early 2018, completion of various industry studies, Government's announcement on MESI 2.0 reform at the CEPSI 2018 conference and last but not least, the JPPPET 2018 workshop held in November 2018. This special workshop was held to support this year's JPPPET resolutions, particularly to discuss the steps in achieving Malaysia's RE target of 20% by year 2025.

On a final note, we would like to take this opportunity to thank everyone for the collaboration and support in the implementation of various initiatives in 2018. Continuing from 2018's positive momentum, we look forward to yet another energising year in Peninsular Malaysia's electricity supply industry. 

Charanjit Singh Gill

Chief Executive Officer
Single Buyer

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NEDA MODULES

In ONE-STOP SETTLEMENT CENTRE (OSSC)

As stated in the NEDA Rules, SB is required to publish market data such as the System Marginal Price (SMP) and Monthly Cap. While the Market Participant Interface (MPI) publishes the data, the One-Stop Settlement Centre (OSSC) formulates the calculation of the market data. The OSSC, which stores generators' commercial data, is viewed as the ideal engine to calculate SMP and Monthly Cap. The derivation of these two data requires information on the Heat Rate and Variable Operating Rate values from OSSC.



OSSC is developed to **facilitate PPA/SLA settlement process** undertaken by Single Buyer

01

To establish a secured, efficient and accurate data exchange platform between MPI and OSSC system.

OSSC has an existing data exchange with external parties such as GSO (SCADA and NORMS), TNB Metering and TNB Finance (SAP).

02

To utilise the commercial (PPA/SLA) data in OSSC, flexible and configurable features are developed to compute bidding calculations such as SMP and Monthly Cap. It also enables NEDA participants to submit billing data for SB validation and settlement processes.

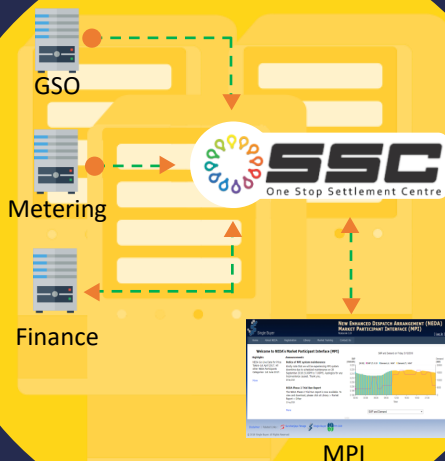
03

To establish a single point of access and consistent workflow in NEDA participation.

04

To enable MPI to utilise OSSC infrastructure and system features including User Login control.

NEDA MODULES DEVELOPMENT OBJECTIVES

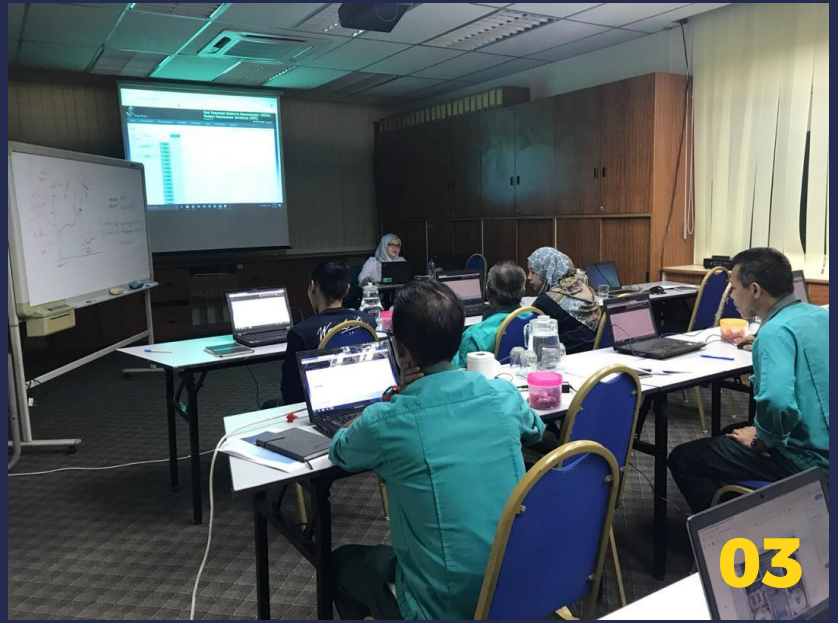


NEDA

ENGAGEMENT ACTIVITIES

01 INTRODUCTORY TALK ON NEDA WITH MOTT MACDONALD MALAYSIA

4 Oct 2018, Bangsar | An introductory session with personnel from Mott MacDonald Malaysia was conducted to brief about NEDA in general. Mott MacDonald is one of the largest power system consultancies in the world. Their thermal power generation experience spans the complete range of skills including feasibility studies, detailed design, contract negotiations and many more.



02 MEETING WITH WASTE MANAGEMENT SYSTEM HOLDING SDN BHD

11 Oct 2018, Bangsar | A meeting with representatives from Waste Management System Holding Sdn. Bhd. (WMSH) at SB office was held to explore its potential participation in NEDA. WMSH is a company specialising in mainstream technology and consultation of waste water management services.



03 MPI & OSSC USER TRAINING FOR PERSTIMA

25 Oct 2018, Pasir Gudang | Following the registration of PERSTIMA in NEDA, a training on MPI and OSSC was conducted for PERSTIMA's personnel.



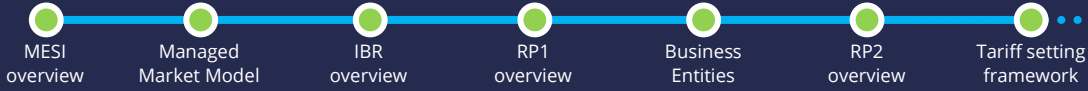
04 4th TECHNICAL MEETING WITH PERSTIMA

22 Nov 2018, Pasir Gudang | A specific technical discussion was held to discuss on the progress and further planning of additional equipment installation by PERSTIMA prior to connection to Distribution network. Prior to this, discussions were held on SCADA requirements and protection systems as per Distribution Grid Code. The meeting was attended by representatives from PERSTIMA, Jurutera Uji Tawah, SB and TNB Distribution.

INDUSTRY REGULATORY FRAMEWORK

In this issue, let's look at SB's RP2 Performance Indicators (PIs). SB is subjected to four (4) PIs as depicted below.

As a quick recap, here are the topics we have covered so far...



SBPI	Weight	Type	Parameters
SBPI1 AVERAGE COST DEVIATION <i>Measures dispatch accuracy between actual & plan</i>	n/a	Monitor only	Not applicable as there is no monetary incentive/penalty setting
SBPI2 LOAD FORECAST ACCURACY <i>Measures short term load forecast deviation based on day-ahead forecast revision</i>	33%	Symmetric	Neutral (Deadband): 1.3% – 3.0% Incentive: 0.8% – 3.5% Penalty: > 3.0%
SBPI3 NEDA COST SAVINGS <i>Measures actual saving in generation cost resulting from competitive rates offered under NEDA</i>	33%	Incentive Only	Neutral (Deadband): 0.0% – 1.0% Incentive: 1.0% – 3.0%
SBPI4 NEDA PARTICIPATION <i>Measures number of generator participants in NEDA</i>	33%	Incentive Only	Neutral (Deadband): 0 – 7 participants Incentive: > 7 participants

SINGLE BUYER RING-FENCING

Single Buyer Governing Documents

SB's operation is strictly governed by a set of governing documents. Compliance to these documents are monitored and subjected to audit at least once every three years.

Conflict of Interest Agreement

Declaration of SB employees' potential conflict of interest

SB Operations Manual and SOPs

Standard Operating Procedures (SOPs) to ensure unbiased operation in daily functions including long-term planning, dispatch scheduling, settlement, etc.

Code of Conduct

Guidelines for conduct of SB employees in ring-fenced environment



Guidelines for SB Market

Guidelines on how SB market is operated

Guidelines for NEDA

Guidelines on how NEDA is operated

Ring-Fencing Guidelines for SB

Sets out the ring-fenced operating practices and procedures in SB operations to ensure compliance asset by the Act and Guidelines for SB market

SINGLE BUYER IN REVIEW 2018

In this special column, SB recaps the various activities and collaborative projects among key industry stakeholders conducted in 2018. SB would like to thank all parties for the close co-operation and we look forward to a more exciting year for MESI in 2019!



COMPLETION OF INDUSTRY STUDIES



01. GDP Forecasting Study

Develop long-term national & state-level GDP forecast model for Malaysia

02. Renewable Energy Penetration Study

Assess impact, penetration level and mitigation plans for RE

03. NEDA Viability Study

Improve NEDA mechanisms

PARTICIPATION IN CEPSI'18



SB presented 6 papers entitled:

01. Development of a Hybrid Load Forecasting Model

02. Environmental Friendly Energy Mix

03. Market Management System: Enabler for NEDA

04. NEDA: Enhancing Efficiency in MESI

05. Enhancing Solar Power Development in Malaysia

06. Ring-fencing of Single Buyer

ENGAGEMENT PROGRAMMES

01. Hybrid Load Forecasting Workshop

02. Renewable Energy Penetration Study Workshop

03. Failure To Dispatch (FDI) Workshop

04. Siting Study Workshop

05. Implementation Strategies for JPPPET 2018 Resolution Workshop

OTHER ACHIEVEMENTS & KEY MILESTONES

01. Completion of SB Website & Ring-fencing awareness video

02. Commercial operation of LTM cross-border trading

03. Signing of 11 PPAs for Transmission-connected Large Scale Solar

04. 3 Participants in NEDA

What's the with

Hype REC?

We have been hearing about how REC can support renewable energy investment but before going any further, what is REC?

Based on the United States Environmental Protection Agency (EPA) website, a **Renewable Energy Certificate**, or REC (pronounced: rĕk), is a market-based instrument that represents the property rights to the environmental, social and other non-power attributes of renewable electricity generation. RECs are issued when one megawatt-hour (MWh) of electricity is generated and delivered to the electricity grid from a **Renewable Energy (RE)** resource.



REC taken from <http://www.recycledpaper.com/> showing that their company, "Recycled Paper Printing" bought 100% certified wind-energy credits to offset their electricity consumption

REC is used to track RE sources

REC acts as an accounting or tracking mechanism for solar, wind and other green energies as they flow into the power grid. Since electricity generated from RE sources is indistinguishable from that produced by any other source, some form of tracking is required. RECs are also known as Green Tags and Tradable Renewable Certificates (TRCs). <https://www.investopedia.com/terms/r/rec.asp>

Why does REC exist?
Who pushes for REC?

More than 150 leading companies have committed to 100% RE in their electricity usage and they call themselves the "RE100".

RE100 was launched at the Climate Week NYC 2014, a collaborative global initiative uniting currently 158 influential businesses committed to 100% renewable electricity, working to massively increase demand for and delivery of RE while addressing barriers that will enable many more companies to reap the benefits of going 100% renewable.

Among the RE100 companies are Google, IKEA, TESCO, Microsoft and many more as shown below:

RE 100



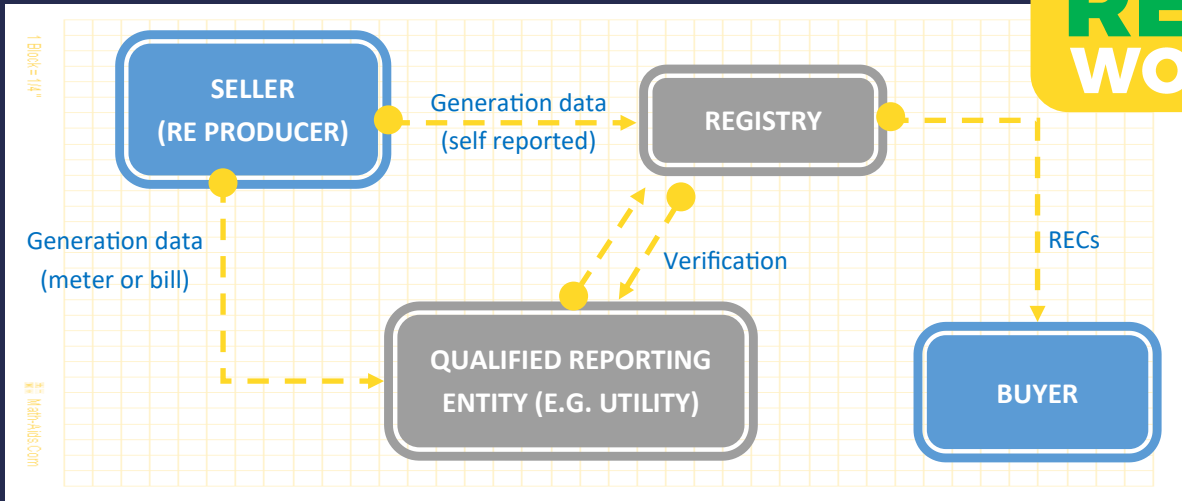
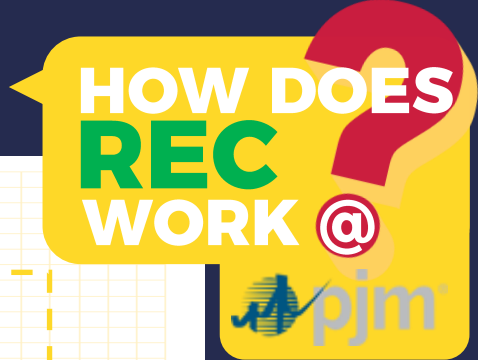


REC is aiming to break the barriers to corporate procurement of RE

Simplistically, the purchase of RECs will enable companies to claim the attributes of RE generation even without having any on-site RE generations or making any direct investments on RE generation projects. So on top of buying electricity from the utilities, they will also make payments to the REC sellers.

However, once the REC has been sold to the buyer, the seller would lose the attributes and surrender the claiming rights on the RE to the buyer. Hence, they can no longer advertise or claim the green energy to their own company.

The following is a simplified process flow of selling and buying REC in the region of PJM jurisdiction.



- 01** In the PJM region, the "Registry" system is called Generation Attribute Tracking System (GATS)
- 02** Firstly, the RE producer needs to be registered in GATS in order to participate in REC programme
- 03** The electricity generated will be metered and the data captured will be passed to GATS
- 04** GATS will issue **1 REC** for each **1MWh** of RE generated and the RECs will be deposited into the GATS account of the generator who produced the RE
- 05** The RE producer then would be able to sell the RECs to the electric utilities or other buyers
- 06** The electric utilities in each state of the United States have different obligations to meet the Renewable Portfolio Standards (RPS) set by the State Government. The state utilities will ensure that their RPS requirement will be met by buying sufficient RECs each month
- 07** RE producer will receive income through the selling of electricity as well as the RECs

Source: <https://www.pjm-eis.com/getting-started/aggregators.aspx>

Note: The process of producing, buying and selling RECs may differ at different locations. At the moment, Malaysia is yet to produce its own mechanism and market fundamentals on REC.

WATT'S HAPPENING

OCTOBER-DECEMBER 2018



Risk Review Workshop

📍 Damansara, Selangor



2-3 October 2018 An Annual SB Risk Workshop was conducted on 2-3 October 2018 to review operational risks related to SB's core functions. These include activities such as load forecasting, gas forecasting, generator settlements and metering data. Non-core risks covering IT infrastructure and human resource are also discussed.



Workshop on Siting Study For Power Plants And Associated Right-Of-Way In Peninsular Malaysia

📍 Bangsar, Kuala Lumpur



22-24 October 2018 The objective of the 3-day workshop is to establish a framework on the assessment parameters for the siting study of new gas, coal and large scale solar PV power plants. The workshop was attended by representatives from MESTECC, Ministry of Water, Land and Natural Resources (KATS), ST, SEDA, Department of Town and Country Planning Malaysia (DTCP), Department of Environment (DoE), Grid Owner and Grid System Operator (GSO). The study is initiated to mitigate issues related to land acquisitions for power plant locations as well as the associated right-of-way (ROW) for the transmission lines.



One-Stop Settlement Centre (OSSC) Training 2.0 for Powertek Berhad & Panglima Power Sdn. Bhd.

📍 Tanjong Kling, Melaka



11 October 2018 SB collaborated with GSO to conduct a training on OSSC with Powertek and Panglima power stations personnel. The training recapped the key OSSC modules particularly on operation and commercial data and updated the users on enhancements made in OSSC.



Regional Coal Buyers Conference 2018

📍 Wilayah Persekutuan Putrajaya

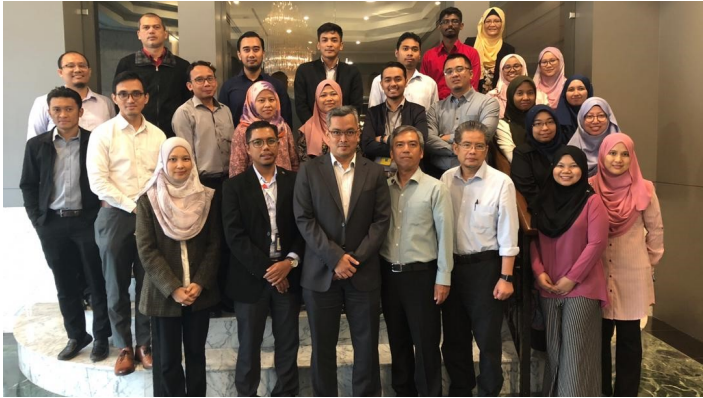


8-10 October 2018 SB representatives attended the Regional Coal Buyers Conference held in Putrajaya. This event was designed as a platform for participants to network and discuss on topics of coal market and coal technical matters. World class speakers in the industry shared their extensive knowledge and the challenges faced as well as the future outlook of the coal industry.



Metering Workshop

Kuala Lumpur



1-2 November 2018 The workshop was attended by SB, TNB Metering (including Meter Data Intelligence Centre), Grid Asset and Grid Maintenance. It serves as a platform for participants to understand and discuss on technical matters related to installation processes, maintenance, replacement, verification, replacement and requirements for future solar generators. A review of the SLA was also conducted to further refine both parties' scope and responsibilities.



Knowledge Sharing Session with Universiti Malaysia Pahang (UMP) Students

Bangsar South, Kuala Lumpur



6 November 2018 A group of engineering students from Universiti Malaysia Pahang (UMP) led by Dr. Mohd Firdaus Basrawi visited SB as part of their industrial visit programme. The objective of this visit is to give exposure to the students on the overview of the electricity industry in Malaysia as well as providing them an opportunity to identify their prospective areas of work in the overall industry once they graduated from the university.



Black Start Test at Sungai Perak Power Station

Sungai Perak, Perak



24 November 2018 Delegates from SB and GSO have been invited by Sungai Perak Power Station to witness the Black Start test of Temenggor Unit 1. This test is critical to ensure its capability to start at any time without any back-feed supply from the Grid. The unit successfully passed the test criteria and hence is in compliance with the Malaysian Grid Code.



Industry to Class Programme at UiTM Shah Alam

Shah Alam, Selangor



27 November 2018 Two SB representatives, Mohd Azlan from Load Forecast and Kamal Arif from Capacity Planning presented on Demand Forecast and Generation Planning to almost 100 electrical power-engineering students in UiTM Shah Alam. This "Industry to Class" programme is aimed to give exposure to the students about the electricity industry and role of SB in MESI.

OCTOBER-DECEMBER 2018 WATT'S HAPPENING



Developed by Energy Exemplar Pty Ltd, first released in 2000



Provides a flexible graphical user interface and object-oriented data handling and visualisation



Uses cutting edge Mixed Integer Programming (MIP) and stochastic optimisation technique



Power, water and gas system simulation software



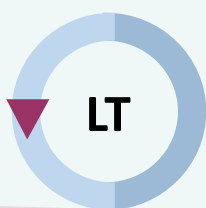
Used globally by Power Generation Companies, Transmission System Operators, Electricity and Gas Market Operators, Energy Commission and Regulators, Energy Traders, Analysts, Consultants, Academics and Research Institutions



Applications in power system

- Demand Forecasting
- Capacity Expansion Planning
- Transmission Modeling
- Market Analysis
- Renewable Energy Integration

4 SIMULATION PHASES



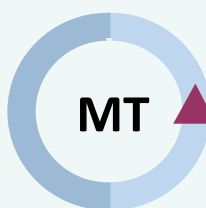
10 to 50 years
LONG TERM

- Generation/Transmission Expansion, Optimal Investment
- Output:
 - ◆ New Builds/Retirements
 - ◆ Reserve Margin



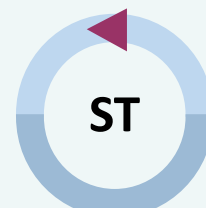
1 to 10 years
PROJECTED ASSESSMENT OF SYSTEM ADEQUACY

- Plant Outage Scheduling, Monte-Carlo Random Outages
- Output:
 - ◆ Maintenance Schedule
 - ◆ Reliability indices (e.g. LOLE)



1 year
MEDIUM TERM

- Resource Allocation
- Output:
 - ◆ Operating Policies
 - ◆ Fuel Procurement & Planning



1 day to 1 week
SHORT TERM

- Chronological Unit Commitment
- Output:
 - ◆ Fuel Consumption
 - ◆ Emission
 - ◆ System Cost

LONG TERM CAPACITY EXPANSION MODELING

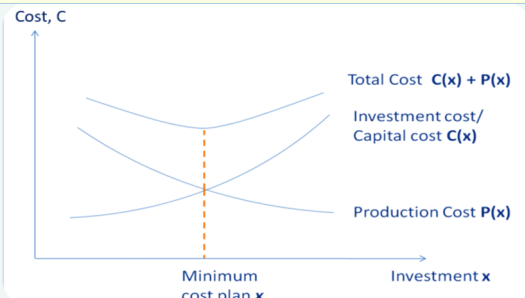
INPUT

- Demand Forecast
- Fuel Prices
- New Build Options
- Retirement/Extension
- Hydro Energy
- Plant Commercial Rates
- Unplanned Outage
- Planned Outage
- Available Capacity

SIMULATION

The objective function of capacity expansion in LT plan seeks to **minimise the Net Present Value (NPV) of investment and production total costs**

Year	Investment	Production	Total Cost
1	1000000	5000000	6000000
2	2000000	5000000	7000000
3	3000000	5000000	8000000
4	4000000	5000000	9000000
5	5000000	5000000	10000000
6	6000000	5000000	11000000
7	7000000	5000000	12000000
8	8000000	5000000	13000000
9	9000000	5000000	14000000
10	10000000	5000000	15000000



OUTPUT

- Capacity Plant-up
- Capacity & Energy Mix
- Fuel Projection
- System Cost
- Emission Projection
- System Adequacy & Reliability

Annual exercise of input update into PLEXOS typically takes up to **2 weeks**

A 20-year simulation from LT-PASA-MT-ST phases normally takes **1.5 hours** to complete

Depending on case complexity, it could take **1 to 3 days** to extract, check and analyse the results

IMPLEMENTATION STRATEGIES FOR JPPPET 2018 RESOLUTION WORKSHOP



JPPPET 2018 RESOLUTION IMPLEMENTATION WORKSHOP WITH STAKEHOLDERS

SB recently organised a workshop with key stakeholders on 27 and 28 November 2018 to strategise on the implementation of JPPPET¹ 2018 resolutions. The workshop was held in Melaka and attended by representatives from MESTECC, ST, SEDA, GSO and TNB Grid Planning.

The 2-day event began with opening remarks and presentations by the SB's top management on overview of SB roles and functions and in particular, the long-term generation planning process. The key objective of the process is in finding a delicate balance between energy security, sustainability and affordability. The day ended with a round table discussion on the 4 gallery walk topics presented.

The first half of Day 2 started with a presentation from Dato' Abdul Razak Abdul Majid of MyPower on the upcoming MESI 2.0 reform. The workshop continued with discussions on strategies to implement the JPPPET 2018 resolutions and the way forward moderated by Dr. Nor Azlan Mostafa of SB. The resolutions and key take-aways from the workshop are compiled and circulated to the participants for further action.

The workshop ended with a closing remark by Pn. Noor Afifah Abdul Razak, the Deputy General Secretary of MESTECC. She emphasised on the Government's commitment to shape MESI's future via various initiatives that will be spearheaded by MESTECC in 2019.

¹ Jawatankuasa Perancangan dan Pelaksanaan Pembekalan Elektrik dan Tarif



Dato' Abdul Razak Abdul Majid presented on the upcoming electricity industry reform on behalf of MyPower



En. Suhane Sutree (TNB Grid Planning) during the gallery walk on transmission planning



En. Koh Keng Sen (SEDA) during the gallery walk on FIT and NEM

GALLERY WALK TOPICS

01 Background on Competitive Bidding in Malaysia

by Pn. Akmarhayu Rahim and Pn. Nazrina Hilmi of SB

02 Procurement of RE Resources via FIT and NEM

by En. Koh Keng Sen and En. Edisham of SEDA

03 New Enhanced Dispatch Arrangement (NEDA)

by Cik Alfifa Fauzan and Pn. Nazaitul Idya Hamzah of SB

04 Transmission Planning

by En. Suhane Sutree Chit of TNB Grid Planning

Renewable Energy Fun Facts!



Built by a **psychiatrist** and an **engineer**
14 months of travel, **550 hours** in the air
25,000 miles around the world entirely on solar energy

01



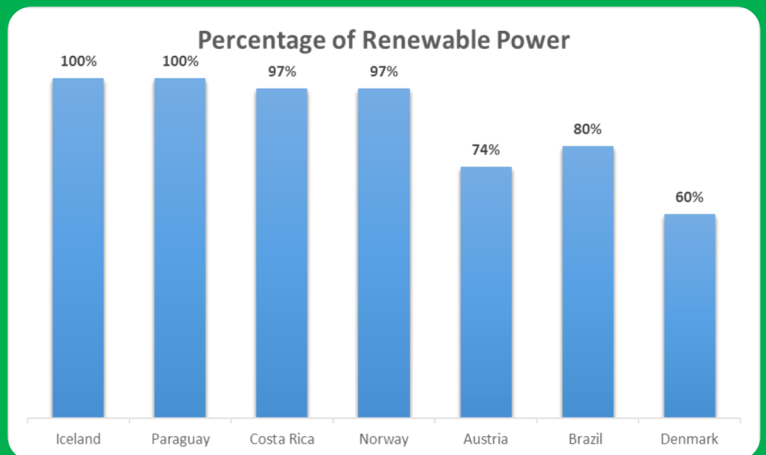
Solar Impulse 2

Bertrand Piccard (a psychiatrist), worked with André Borschberg (an engineer and entrepreneur who trained as a pilot in the Swiss Air Force) to build an aeroplane that runs entirely on solar energy. The airplane, called **Solar Impulse 2**, is certainly an amazing engineering achievement, with a wingspan larger than a B-747 jumbo jet and weight similar to an average 5,000 pounds family car. The plane has a total of **17,248 photovoltaic solar cells** on the wings and fuselage which are used to charge four lithium batteries.

02

Countries at, or, close to 100% Renewable Grid

While there are plenty of myths going around about the feasibility of having 100% renewable grid, countries like **Iceland**, **Paraguay** and **Norway** have already, or, almost reached this target. The main renewables in these countries are hydropower, wind, geothermal, and solar.



Source: International Energy Agency

100% IN 139 COUNTRIES

Transition to 100% wind, water, and solar (WWS) for all purposes (electricity, transportation, heating/cooling, industry)

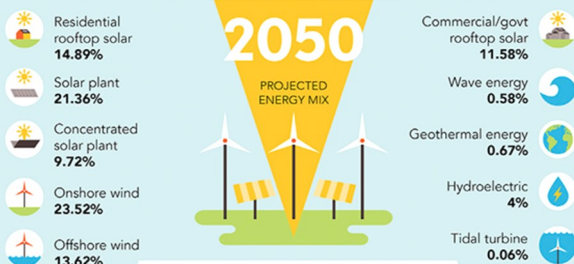


Illustration: The Solutions Project

03

100% RE worldwide may be possible by 2050

According to a study led by Mark Jacobson from Stanford University, it is possible for the world to obtain 100% energy from renewable sources by 2050. The study builds a roadmap that shows how 139 countries can achieve this by completely transitioning to wind, water and solar. Successful execution of the plan may avoid 1.5 degrees Celsius of global warming, they claim.

MOA

GENERATOR ENGAGEMENT ACTIVITIES

Stakeholder engagement is critical to SB's ability to deliver value to its stakeholders. For this reason, the Market Operation and Assessment unit (MOA) of SB conducted technical visits to two new power plants to seek feedback, share information and discuss specific issues.

On 7 August 2018, SB visited TNB Manjung Five Power Station (M5) to gain a better understanding on the 1,000MW coal plant ultra-supercritical technology. The plant tour was followed by a discussion on various operational issues such as coal stockyard management, outage plan and plant emission.

On 25 September 2018, SB visited the Connaught Bridge Power Station (CBPS) in Klang for a knowledge exchange session. CBPS held a site tour and conducted a technical presentation on the plant's 375MW single-shaft combined cycle gas plant. This was followed by a presentation by SB on its roles and functions, as well as a discussion to explore concerns and suggestions for future improvement.



Watt Say You New 2k19 version

New year, new us! It's always exciting heading into a new year. Let's hear some words, resolutions and wishes from our beloved SBians.



← **WattSayYou??** 🎤👤
Aishah, Dinesh, Syafiq ...

Dinesh Shankar 🇮🇳

A New Year inspires us to set new goals and to make new commitments to improve ourselves. Therefore, my new year resolution is to have a healthier eating habit and save more money. Happy New Year to all SBians! Wishing you and your family a joyful and blessed new year ahead!

11:59 ✓✓



Aishah Zawawi 🇲🇾

My New Year resolution is to take steps to connect with whatever is missing from my life – things like getting away with my family for the weekend or taking time to pursue a hobby. In other words, my goal is to achieve a work-life balance in 2019.

Syafiq Rosley 🇲🇾

My new year resolution is I don't want to have any more regrets. Whenever I feel like doing something, I'm just gonna do it. Life is too short. Be yourself, and beat your yesterday self.

01:35 ✓✓



MEET THE PEOPLE BEHIND SB

SENIOR MANAGER (SHORT TERM SCHEDULING)
MARKET OPERATION & ASSESSMENT

ZUHAIRI HASHIM

In this issue, we speak to Zuhairi Hashim about his background, roles in SB and his new year resolutions for 2019

01 **WattsUp: Thank you for talking to us amid your busy schedule. First, can you tell us a bit about yourself?**

Zuhairi: I was born and raised in Negeri Sembilan. I pursued my B.Sc in Electrical Power Engineering in Ohio State University as a JPA scholar in 2002. Upon graduating in 2006, I received an offer from TNB to work as a Production Study Engineer in the Transmission Division. Interestingly the name 'Production Study' has evolved over the years into 'Operation Studies' and 'Short Term Scheduling', but essentially the job scope remains the same. I have been working in this area since I started joining TNB until today.

Throughout the years, I began to develop a passion in doing the job. Some of the key areas I've covered during those years are: preparation of Unit Commitment Schedules (UCS), fuel forecast which includes gas nomination and coal dispatch forecast, generator outage coordination, hydro management planning and demand forecast for short to medium-term. Performing these tasks have increased my knowledge on many aspects of the power system supply and demand. In short, I can say my job is to plan in ensuring that the country will have adequate supply of electricity at all times.

04 **WattsUp: We see you love your job, so which part of SB that you love the most?**

Zuhairi: The very first is the people. SB has a bunch of young people who are full of potential and possess great determination to move forward. Their enthusiasms create a very positive environment in the office that is crucial for a progressive and efficient workplace. Their friendliness also makes the office feels like a second home to me.

We also have a very supportive management team who always welcomes new ideas and innovations while providing the best platform for the staff to continue improving our skills and competency.

02 **WattsUp: That made us wonder when did you first join SB? And what is your role in SB?**

Zuhairi: I have been with SB since its formation in 2012. The Operation Scheduling unit which I previously worked with was taken out from the Energy Procurement Department of Planning Division and was restructured to become a unit under the Power and Resources Planning of SB. After the SB restructuring exercise in 2017, the section is now called Short Term Scheduling, which resides under the Market Operation and Assessment unit. I am currently heading the team which performs the functions mentioned earlier.

03 **WattsUp: Can you share any interesting stories working in the MOA team in SB?**

Zuhairi: I can say that working in this team has opened up many opportunities for me to meet various people, which in my opinion, is the most interesting part of my job. I have met a wide range of people not just from the electricity sector, but also from other corporate entities and industries.

Among the people I have worked with are from other utilities like Singapore, Thailand and Laos, academicians from various learning institutions, national and state agencies such as the Meteorological Department of Malaysia.

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

Zuhairi: If you find yourself working in SB, you should be very thankful. It doesn't matter if you get a desktop, a hands-on or a site job, all that matter is you give your best in everything you do. Learn to love your work and build your passion alongside it. You will find pure happiness in your work. And always stay modest and humble!

06 **WattsUp: What are your new year resolutions for 2019?**

Zuhairi: For 2019, I aim to live a healthier lifestyle. The recent session with Kevin Zahri during the teambuilding event has made me realise that it is not that difficult to take care of your body and be healthy. The choices are abundant and it is you who make the decision. I would like to also volunteer and give more to charity because as the saying goes, the more you give, the more you get. With these resolutions, the main thing is to keep myself organised in multitasking and in finding a work-life balance. Last but not least, I wish everyone a blessed new year ahead! 🙏

MARKET OUTLOOK

UNDERSTANDING NET ENERGY METERING (NEM)

PREVIOUSLY:

The concept of NEM is that the energy produced from the solar PV system installed will be consumed first, and any excess to be exported and sold to the distribution licensee will be at the prevailing Displaced Cost prescribed by the Energy Commission (at 31 sen/kWh vs. TNB tariff block of over 50 sen/kWh)

NEM participants:

- Domestic
- Industrial
- Commercial
- Agriculture

From 1 Jan 2019, there will be no more differences in the selling and purchasing prices of electricity

EFFECTIVE JANUARY 2019*


The true net energy metering concept is now being adopted and this will allow excess solar PV energy generated to be exported back to the grid on a "one-on-one" offset basis.


**Only applicable for Peninsular Malaysia*


New NEM bill calculation:

Reflects 1-to-1 principle which shows the total import unit, total export unit and the net payable amount



 During the day, solar power produces energy to help power-up your home.

 When the solar system generates more energy than your household uses, the excess energy is exported to the grid. For the additional energy generated, you'll get a bill credit.

 When your house gets power from the grid, the cost is offset with your bill credits.
The net payable amount = Total Import — Total Export (credits)
For more info on bill calculation: www.tnb.com.my

SB CORNER

IT IS CHRISTMAS IN THE HEART

In conjunction with the recent Christmas, an SBian shares a glimpse of how Christmas is celebrated in Malaysia

A month-long celebration!

During the whole month of December, a group of carolers will hop from house to house to sing Christmas songs to the families they visit. Days prior to Christmas, families will decorate their Christmas trees with sparkling ornaments and dazzling tree lights. This is a fun activity especially for the young ones.

On Christmas Eve, the festivities begin with mass in church followed by a small private dinner at home. On Christmas day, though some opt for mass, this day is normally celebrated with open houses having friends and families wearing their best outfits. The fun time comes at night when everyone gathers and exchanges gifts with each other.

The gifts and spirit of giving...

One of the most popular Christmas icons is Santa Claus. People often expect Santa to ride his reindeer sleigh, squeeze through the chimney in the middle of the night and place gifts under the Christmas tree. In reality, the true Santa is our moms and dads, brothers and sisters, uncles and aunts, or your loved ones who keep the Christmas spirit alive with their generous gifts!

In the spirit of giving, we should not forget the less fortunate. My deepest appreciation to SBians for sharing our blessings with a small contribution to Mr. Douglas, an ex-TNB staff who is currently caring for his two special need sisters. May his family be blessed always.✿



Emily

WORDS OF WISDOM

Tomorrow is the first blank page of a 365 page book. Write a good one.

- Brad Paisley -

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

DISCLAIMER

Disclaimer: The contents of this newsletter are of a general nature and is intended for informational purposes only. You are advised to seek specific advice on any matter that may be affected by such information. The views of third parties set out in this newsletter are not necessarily the views of SB.

RENEWABLE ENERGY SCHEMES

Let's welcome the NEW year edition of 2019 WattsUp with an overview of the main Re-NEW-able Energy (RE) options available in Peninsular Malaysia

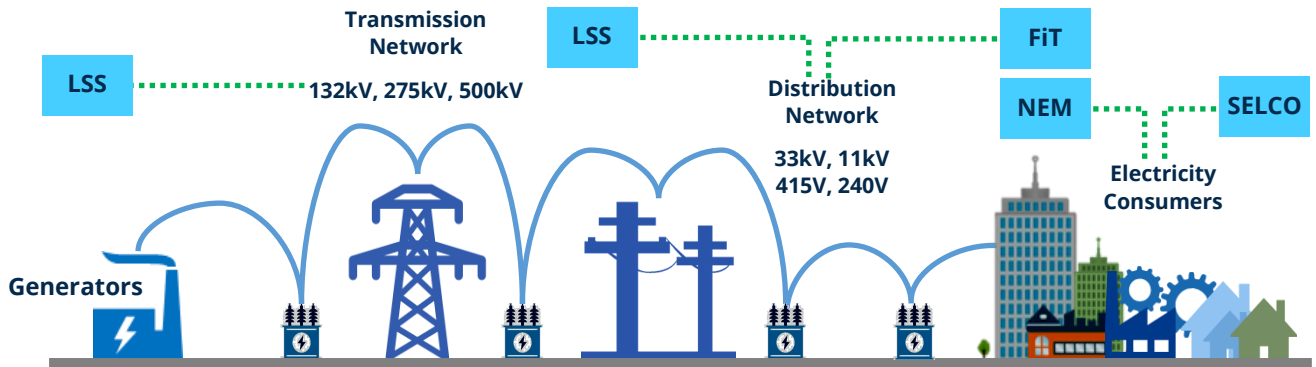
A lot of acronyms are often used in the industry when this subject matter is being discussed. To name a few, the common ones are **FIT, NEM, LSS and many more...**



- ✧ **LSS = Large Scale Solar**
- ✧ For **Solar PV** only
- ✧ **Quota-based**—procured through **Competitive Bidding** by ST
- ✧ Bounded by **PPA**, up to 21-year term
- ✧ Payment at **PPA rates**
- ✧ **Direct connection** to either Transmission or Distribution MV network
- ✧ **Capacity limit:**
 - ♣ > 30MW for Transmission connected
 - ♣ > 1MW for Distribution connected

- ✧ **NEM = Net Energy Metering**
- ✧ For **Solar PV** only
- ✧ **Quota-based**—managed by SEDA
- ✧ Bounded by **NEM contract** with perpetual term. **SARE** may also be part of the arrangement
- ✧ Payment based on **1-to-1 principle** for the excess energy exported to grid
- ✧ **Indirect connection** to Distribution network (via owner's internal distribution board)
- ✧ **Capacity limit:**
 - ♣ < 72kWp for 3-phase
 - ♣ < 12kWp for 1-phase

RE Connection Options



- ✧ **FiT = Feed in Tariff**
- ✧ For **Solar PV, Biomass, Biogas, and Small Hydro**
- ✧ **Quota-based**—managed by SEDA
- ✧ Bounded by **REPPA**, term varies by RE type. For solar, 21 years
- ✧ Payment at **prevailing FiT rates**
- ✧ **Direct connection** to Distribution network
- ✧ **Capacity limit** < 30MW

- ✧ **SELCO = Self Consumption**
- ✧ For **Solar PV** only
- ✧ **No Quota**
- ✧ Self-regulated, however registration is required for certain limit installed
- ✧ Does **not involve payment**—self-consume to offset customer energy usage
- ✧ **No direct connection** to Distribution network
- ✧ **Capacity limit** (if beyond, must register with ST):
 - ♣ < 72kWp for 3-phase
 - ♣ < 24kWp for 1-phase

Other acronyms:

- * **ST:** Suruhanjaya Tenaga
- * **SEDA:** Sustainable Energy Development Authority
- * **PPA:** Power Purchase Agreement
- * **REPPA:** Renewable Energy Power Purchase Agreement
- * **SARE:** Supply Agreement for Renewable Energy—a tripartite agreement between Customer, Solar Investor/Lessor and TNB. The business models supported by SARE includes solar leasing, PPA or a hybrid of both.