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Sustainable Energy

MALAYSIA

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MERDEKA ISSUE

DAWN OF A NEW ERA

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Perspectives from thought leaders and event insights

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EDITORIAL
REVIEW

WELCOME TO THE SPECIAL MERDEKA EDITION OF SUSTAINABLE ENERGY MALAYSIA (SEM)!

This Issue is most meaningful as Malaysians across the country - and around the world - celebrate our 61st Independence Day. The atmosphere is certainly euphoric with the new Government in place following the 14th General Election (GE14).

In the past four months, much has happened. Our 4th International Sustainable Energy Summit (ISES) 2018 carried out from April 10 to 11 in Kuching, Sarawak drew record success through several key indicators - participant-turnout was over 900, we had nearly 80 thought leaders as Chairs and Speakers, and a record number of sponsors and media support. With this, we wish to reiterate our gratitude to the Sarawak State Government for being an exemplary host to our Summit.

There was even greater excitement as we witnessed a change in the Ministry of Energy, Green Technology and Water (MEGTW / KeTTHA), to become the Ministry of Energy, Science, Technology, Environment and Climate Change (MESTECC). YB Yeo Bee Yin and YB Isnaraissah Munirah Majilis were both sworn in as Minister and Deputy Minister of MESTECC respectively on July 2, 2018.

A day after the ceremony, SEDA Malaysia was called upon by YB Yeo for an introductory discussion, which resulted in the organising of an inaugural town hall session for the newly-minted Minister and the renewable energy (RE) industry on July 12. Around 1,600 participants were in attendance at Putrajaya Marriott Hotel. The session was live-streamed on SEDA Malaysia's Facebook page, attracting 16,000 viewers.

Since YB Yeo has taken office, many, including SEDA Malaysia, look forward to her new directions and vision to accelerate the growth of sustainable energy in the country. Under the new Government's Manifesto, the aspirational RE target set for 2025 is 20% (excluding large hydro) in the power mix. This target comes very timely as SEDA Malaysia begins developing the Renewable Energy Transition Roadmap (RETR) 2050.

According to a report released by IRENA (April 2018), globally, we will reach our carbon budget limit in less than 20 years before tipping over the two-degree Celsius limit. By 2050, renewables need to account for two-thirds of total energy use and 85% of total power generation. There is also a strong trend in rising electrification of the energy sector and with RE on the rise, this will help to address climate change (Enerdata 2018). Nevertheless, the move to deep decarbonisation is happening too slowly.

With this Issue, we would like to welcome YBhg Datuk Ir Ahmad Fauzi Hasan as the Acting Chairman of SEDA Malaysia. We would also like to thank the various contributors such as the Ambassador of Sweden to Malaysia, thought leaders in the sustainable energy sector, as well as sponsors and readers of this magazine.

Thank you for standing in solidarity with us to bring about greater energy independence and democracy through the widespread deployment of both RE and energy efficiency (EE).

DR WEI-NEE CHEN
Acting CEO
Sustainable Energy Development Authority (SEDA) Malaysia

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Net Energy Metering

"Solar Energy, Empowering the Consumers"

Concept of NEM

UNDERSTANDING NET METERING

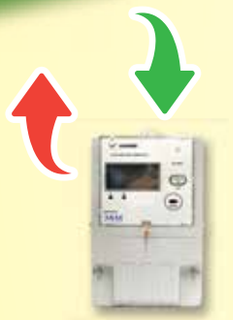
The energy generated by PV is consumed in situ and any excess energy generated is exported to the grid.

Excess energy not used by your home goes back to the electricity grid

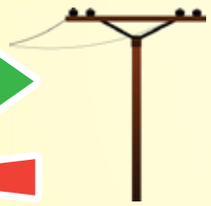
Energy used by your home from the electricity grid

Solar PV array converts energy from sunlight into electricity

- The inverter converts the electricity produced by the solar array from direct current (DC) to alternating current (AC).
- PV meter measures the energy generated by the solar PV system.



- The Bidirectional Meter.
- Indicates energy usage and excess energy produced



- Utility pole / distribution line

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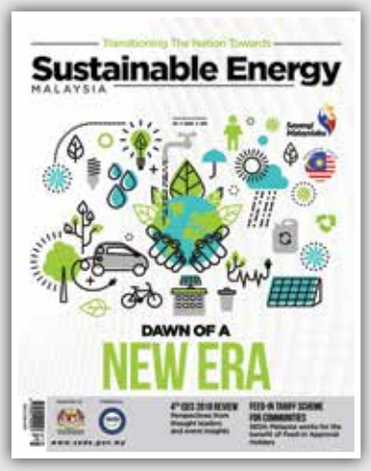

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MINISTRY OF ENERGY, SCIENCE, TECHNOLOGY, ENVIRONMENT & CLIMATE CHANGE

CONGRATULATIONS

YB YEO BEE YIN

ON YOUR APPOINTMENT AS MINISTER OF ENERGY, SCIENCE, TECHNOLOGY, ENVIRONMENT AND CLIMATE CHANGE.

In the spirit of Merdeka, we look forward to the changes the new Ministry will bring in shaping sustainable energy development for Malaysia Baharu.

INAUGURAL TOWN HALL

BETWEEN THE RE INDUSTRY AND THE MINISTER OF ENERGY, SCIENCE, TECHNOLOGY, ENVIRONMENT AND CLIMATE CHANGE

ORGANISED BY SEDA MALAYSIA

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On July 12, 2018, SEDA Malaysia hosted the inaugural town hall session for the renewable energy (RE) industry with Yeo Bee Yin, newly-minted Minister of the Ministry of Energy, Science, Technology, Environment and Climate Change (MESTECC). Also present was Isnaraissah Munirah Majilis, MESTECC Deputy Minister. The crowd consisted of industry players, stakeholders, and the public-at-large, who all gathered at Marriott Hotel, Putrajaya.

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The town hall's key objective was for the Minister to receive first-hand feedback on the following:

- Challenges faced by the RE industry;
- Proposed solutions and the way forward for RE; and
- Performance of SEDA Malaysia.

Key panellists throughout the town hall session were Minister Yeo, Deputy Minister Isnaraissah, Catherine Ridu, then-CEO of SEDA Malaysia, and the session was moderated by Dr Wei-nee Chen, SEDA Malaysia CCO.

Another objective of the town hall was to capture as much feedback as possible on RE, both directly from the floor and on Facebook Live. Prior to this session, the public gave live feedback on SEDA Malaysia's official Facebook page, @SustainableEnergyDevelopmentAuthoritySEDAMalaysia. The public was given an opportunity to provide feedback via the live online Q&A session, online survey, and they were also able to field their questions offline to be answered by Yeo after the town hall.

SEDA Malaysia showcased its commitment to transparency as the agency endeavoured to collect as much feedback as possible from the public. All input was analysed based on the premise of the three core values established by the MESTECC Minister - Excellence, Integrity, and Future-Focus. Overall, 23 key issues arose, of which 16 were within SEDA Malaysia's direct jurisdiction.

This town hall session was heavily promoted through online social media such as Facebook, Instagram, and Twitter, as well as on SEDA Malaysia's website (www.seda.gov.my) and the Ministry's website (www.kettha.gov.my). SEDA Malaysia also hosted a mini exhibition alongside the session which 20 companies partook in. Nearly 1,600 participants were recorded in attendance of the town hall.

1. *"In my Ministry, you don't need to know me. You only need to know how. Knowing me will not give you an advantage in any project."*
2. *Questions pertaining to the RE industry were directed to panellists comprising newly-minted MESTECC Minister Yeo Bee Yin (middle), Deputy Minister Isnaraissah Munirah Majilis (right), and Catherine Ridu, then-CEO of SEDA Malaysia (left).*
3. *Moderated by Dr Wei-nee Chen (right), SEDA Malaysia CCO, this town hall session strove to collect as much feedback as possible from the public during the Q&A session.*
4. *A full house with an enthusiastic crowd. Nearly 1,600 attendees witnessed Yeo deliver her keynote speech for the inaugural town hall session.*
5. *Yeo fielded questions on RE industry issues raised by reporters during the press conference.*
6. *Your voice matters! An active session was recorded where many members of the public - mostly from the RE industry - raised important questions and gave feedback to the town hall panel.*
7. *A snapshot of SEDA Malaysia's booth at the mini exhibition. Twenty companies from the RE industry had set up booths to accompany the town hall session.*

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"... Malaysia intends to reduce its greenhouse gas (GHG) emissions intensity of GDP 45% by 2030 relative to the emissions intensity of GDP in 2005."

GREEN TECHNOLOGY APPLICATIONS FOR THE DEVELOPMENT OF LOW CARBON CITIES (GTALCC)

WHAT is GTALCC?

GTALCC is a 5-year project, facilitating the implementation of low carbon initiatives and to showcase a clear and integrated approach to low carbon development in Malaysia.

WHO is involved?

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SEPANG MAJLIS PERBANDARAN SEPANG

MBPJ

MPHT Majlis Perbandaran Hang Tuah Jaya

ISKANDAR MALAYSIA

OBJECTIVES

- To support the low carbon cities programme.
- Removing all barriers to integrate low carbon urban planning and development.
- To generate GHG emission reductions of 346,442 ton CO_2eq by the end of project.

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Sustainable Energy Development Authority seda MALAYSIA

INSIGHTS ON THE

4TH ISES 2018

SUSTAINABLE ENERGY: THE FUTURE IS HERE

On April 10-11, 2018, Sustainable Energy Development Authority (SEDA) Malaysia together with the Ministry of Utilities of Sarawak jointly organised the 4th International Sustainable Energy Summit (ISES) 2018 held in Kuching, Sarawak. The Summit was co-hosted by the Ministry of Energy, Green Technology and Water (KeTTHA) and the Sarawak State Government. The Summit broke its own record with more than 900 attendees on the first day; 77 thought leaders were invited as Speakers and Chairs at the three plenary sessions and 10 deep dive workshops (DDWs).

Dr Wei-nee Chen, SEDA Malaysia CCO, provides some insights on the Summit that will help in developing the new **Renewable Energy Transition Roadmap (RETR) 2050** as mandated by KeTTHA.

THE BIG PICTURE: WE WILL GET THERE

Let us start with the big picture; this will help us appreciate the insights that converged to form that big picture. First, the background - there is the 7th Sustainable Development Goal (SDG) set by the United Nations (UN) to ensure affordable and clean energy for all, and there is the Paris Climate Accord signed by 197 Parties and ratified by 175 Parties. In Plenary 1 on "Envisioning the Future of Electricity Market: Transformation Towards a Greener Electricity Sector," Sweden, the US, Indonesia, Thailand, and Laos shared their countries' aspirations on energy transition.

Leading the world in energy transition, the Ambassador of Sweden to Malaysia shared key drivers of sustainable energy growth in Sweden. These include liberalising the electricity market, greater cross border energy trading, encouraging greater deployment of energy efficiency (EE), the green certificate trading scheme, adoption of a circular economy by the public, de-fossilisation of the transportation system, and effective waste management. Sweden has the highest renewable energy (RE) and EE targets among EU Member States with 35% by 2030.

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Of interest to the audience was the exit of the US from the Paris Agreement and its impact to the overall climate agenda. Despite this exit, the US Ambassador to Malaysia is confident that carbon dioxide reductions will continue, driven by initiatives within the States, cities, and large corporations. Statistics showed that in the US, 58 cities and towns have committed to 100% RE, as are RE100 companies such as Apple, Google, Microsoft, Facebook, Starbucks, and Walmart. So yes, the big wigs are committed to the global climate agenda. They are committed to getting there. The next question is, how do we get there?

DESIGNING EFFECTIVE RE POLICIES AND AUCTIONS

Although the Feed-in Tariff (FiT) is by far the most widely adopted RE policy instrument followed by net metering, a growing trend in the past few years is the reverse auction mechanism (Exhibit 1). FiT is very useful for mooting an early RE market which has yet to exist. In this mechanism, the government sets the price per unit of RE generated for a fixed tenure and this helps the bankability of RE projects in its infant days.

Once the RE industry and market are reasonably developed, reverse auctions facilitate price discovery which ensures the least cost energy generation options in the country. When it comes to designing auctions, the following considerations should be adopted: transparency and fairness in the tendering process, not cancelling auctions at the last minute, start with a small capacity as early rounds are more expensive than subsequent rounds, no mismatches between generation and transmission capacities, and realistic milestones especially when the RE industry is still lacking experience.

The good news for RE is that auctioned prices for some countries have gone beyond grid parity when compared with new coal or gas power plants (Exhibit 2). When it comes to direct comparison in prices of various energy sources, Dr Allen Eisendrath of the United States Agency for International Development (USAID) cautioned that people tend to compare old hydro or coal plants with new wind

1. *Ambassador Dag Juhlin-Dannfelt on Sweden's Energy Transition.*
2. *US Ambassador to Malaysia HE Kamala Shirin Lakhdhir explaining how the US will achieve energy transition.*

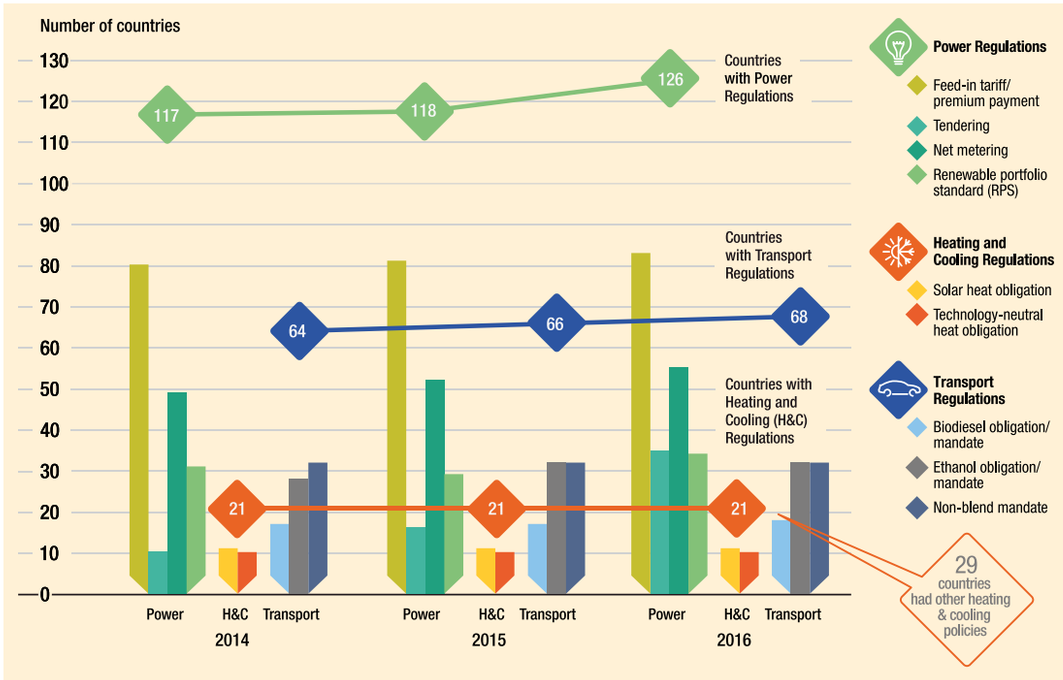


Exhibit 1: Number of RE regulatory incentives and mandates (by type, 2014-16)

Source: RE Policies in a Time of Transition (REN21, April 16, 2018)

or solar photovoltaic (PV), and their conclusion is that hydro and coal are cheaper than wind and solar PV. It is important to realise that they are comparing old, depreciated plants with new plants. Over time, wind and solar PV power plants will also amortise their debt and capital costs and they will get cheaper, just like an old coal or hydro plant.

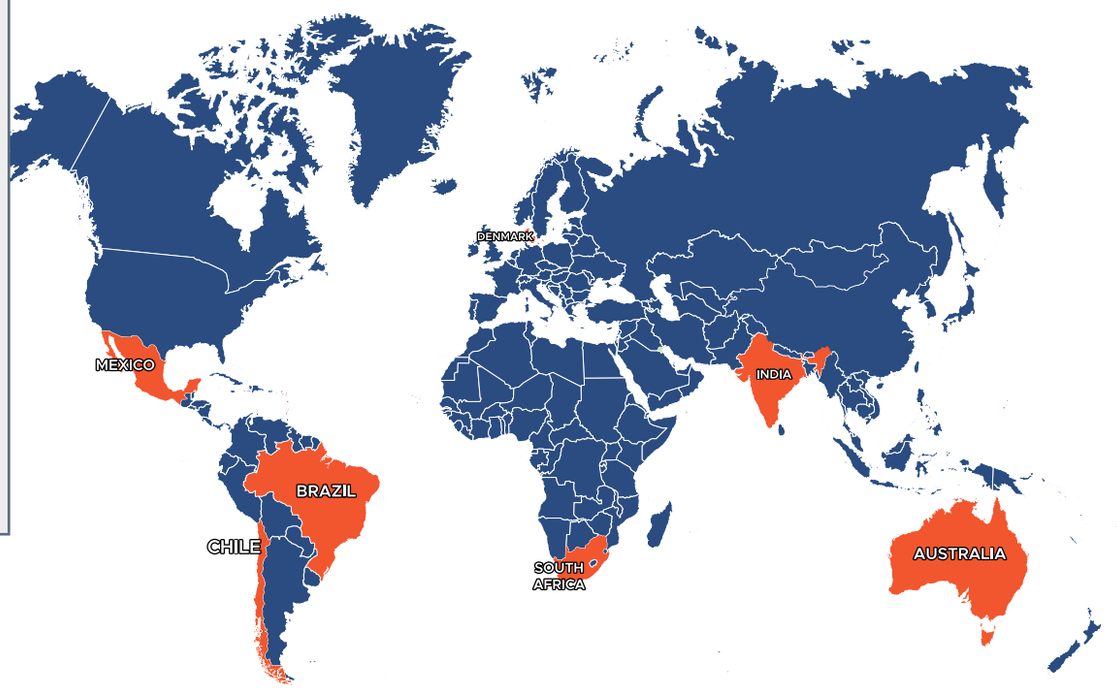
If we think about our power system over a period of decades, we need to realise that as our wind and solar fleets age, they will also get cheaper. We may repower them (new turbines and panels), but they will still get cheaper over time. Dr Eisendrath concluded his message during DDW 5 on designing effective RE policies, and the importance of identifying the least cost generation options that can go to scale and that are inherently low cost when properly developed. The best examples of these options are solar and wind.

Exhibit 2: New RE becoming cheaper than new Coal or Gas

- Australia: wind $80; coal $143; gas $116
- Chile: wind $38; gas $47; coal $57; hydro $60; geothermal $66
- South Africa: wind and PV Rand .62; coal Rand 1.1; gas Rand 1.1 nuclear Rand 1.25
- Denmark, Brazil, India & Mexico also have lower RE costs than new thermal generation costs
- Indian October 2017 wind auction resulted in a price 32% lower than the levelised cost from a new Indian coal plant

Sources: Bloomberg New Energy Finance; IEA; IRENA; Government of South Africa

Source: USAID (4th ISES 2018)



Dr Allen Eisendrath, Global Climate Change Office Director, USAID/ Washington.

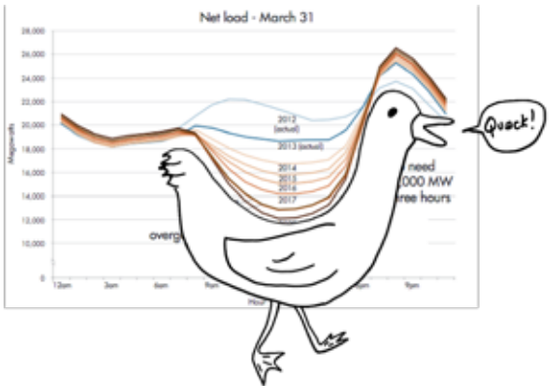
THE DUCK THAT STOLE THE LIMELIGHT

Globally, solar and wind are gaining momentum, not surprising given their ability to scale and having zero marginal cost. Increasing contributions from these variable renewable energy (VRE) resources do pose some problems to the electricity system. In Malaysia, where solar resource is abundant, the "duck curve" (Exhibit 3) experienced by the California Independent System Operator (CAISO) had gained attention at the Summit from beginning to end.

What is the duck curve? Back in 2013, CAISO released a report to show the impact of high penetration of solar PV to the grid on a year-by-year basis. The outcome was a "deep dip" in the midday drop in net load and the shifting of peaks from midday to late afternoon and evening. Sometimes the solar contribution is so great that it leads to negative wholesale prices in the electricity market (just like in Germany) or curtailment (which used to be prevalent in China).

Julia Hamm on the Duck Curve.

Exhibit 3: The Duck Curve



Source: http://insideenergy.org

According to Julia Hamm, President and CEO of the Smart Electric Power Alliance (USA), we should not get too hung up about the duck curve. Solutions do exist to address this phenomenon so we do not need to keep curtailing solar energy. Yes, solutions do exist.

Juergen Bender, Managing Director of Bender-IS Co Ltd, shared some measures to integrate VRE into the grid and these include advanced forecasting tools, creating a flexibility market with greater use of energy storage, plugged in hybrid electric vehicles (PHEVs), greater fuel diversity of variable resources, larger energy balancing regions, cross border energy trading, smart grids, and other intelligent ICT platforms.

Juergen Bender on Integrating Large Scale RE into the Grid.

SOUTH AUSTRALIA'S BLACK WEDNESDAY: WHAT HAPPENED?

Besides the duck (curve), another case worthy of attention is South Australia's famous massive blackout - often blamed on renewables. On Wednesday, September 28, 2016, tornadoes with wind speeds of 190-260km/h and lightning strikes caused three major transmission towers (275kV) to topple. Some wind farms were not configured for ongoing multiple low voltage ride-throughs and they eventually tripped.

Subsequent to the loss of power, the Australian Energy Market Operator (AEMO) offered ceiling spot prices of **AU$14,000 per MWh** - for what normally costs around AU$70 - to call for more electricity supply. The continuous loss of generation overloaded the Heywood interconnector which then tripped, and the State became isolated. By then, available generations were unable to stabilise frequency resulting in a state-wide blackout.

WHAT HAVE WE LEARNED FROM THIS INCIDENT?

According to Dr Navid Haghdadi, Postdoctoral Research Associate of the University of New South Wales, AEMO has since then put in measures such as setting low voltage ride-throughs for wind farms and demand response, the South Australia Government's energy plan including the procurement of batteries (with a commitment by TESLA's Elon Musk to deliver 100MW batteries within 100 days), and the Federal Government's announcement of Snowy Hydro for pumped storage.

On November 28, 2017, the Australian Energy Market Commission (AEMC) made an important decision to change the settlement period for the electricity spot price from **30 minutes** to **five minutes**, effective 2021. This change is important after the surge of the electricity spot price to AU$14,000 per MWh during the blackout when supply was in severe shortage. At a 30-minute settlement period, the financial burden on electricity consumers was high. A five-minute settlement provides a better price signal for investments in fast response technologies, such as energy storage, new generation gas peaking plants, and demand response. It also prevents power utilities from '**gaming**' the electricity market.

"Blackouts of this scale cannot be blamed on VRE alone; it will almost always be the result of a **number** of things gone wrong. Importantly, energy storage came in at the right time and the right price to provide ancillary services and flexibility in times of need," said Dr Haghdadi.

WHAT DID NOT HAPPEN THE FOLLOWING SUMMER...

Dr Haghdadi concluded his message with a positive tribute to VRE. On February 10, 2017, when two 500-MW coal units and multiple gas peaking plants failed during a heatwave, the NSW blackout was likely avoided due to the contributions of wind and rooftop solar PV (~500MW) generated during the most critical time. Looks like the cloud does have a silver lining after all.

ROLE OF BLOCKCHAIN IN THE FUTURE ELECTRICITY MARKET

Admittedly, the DDW that drew the largest crowd was the one on blockchain. What is the blockchain? As explained by Suresh Sadasivan of Bloktex, blockchain is a digitised, decentralised, and distributed shared ledger of transactions which take place in a peer-to-peer (P2P) network. The transaction blocks are encrypted and linked to one another, giving rise to the name of blockchain. The attributes of blockchain include immutability of data, transparency in transactions, security of ledgers, real-time settlements, improved efficiency in transaction costs, and touted frequently as a trust machine.

Made famous by Bitcoin Founder Satoshi Nakamoto back in 2009, blockchain is gaining acceptance in several countries and in applications where trust for transactions is highly valued e.g. financial, supplier chains, government, voting, networking and IoT, cybersecurity, and where provenance tracking is required. Blockchain applications are made useful when smart contracts are embedded in the system. Smart contracts are rule-based logics that execute certain codes once conditions are met.

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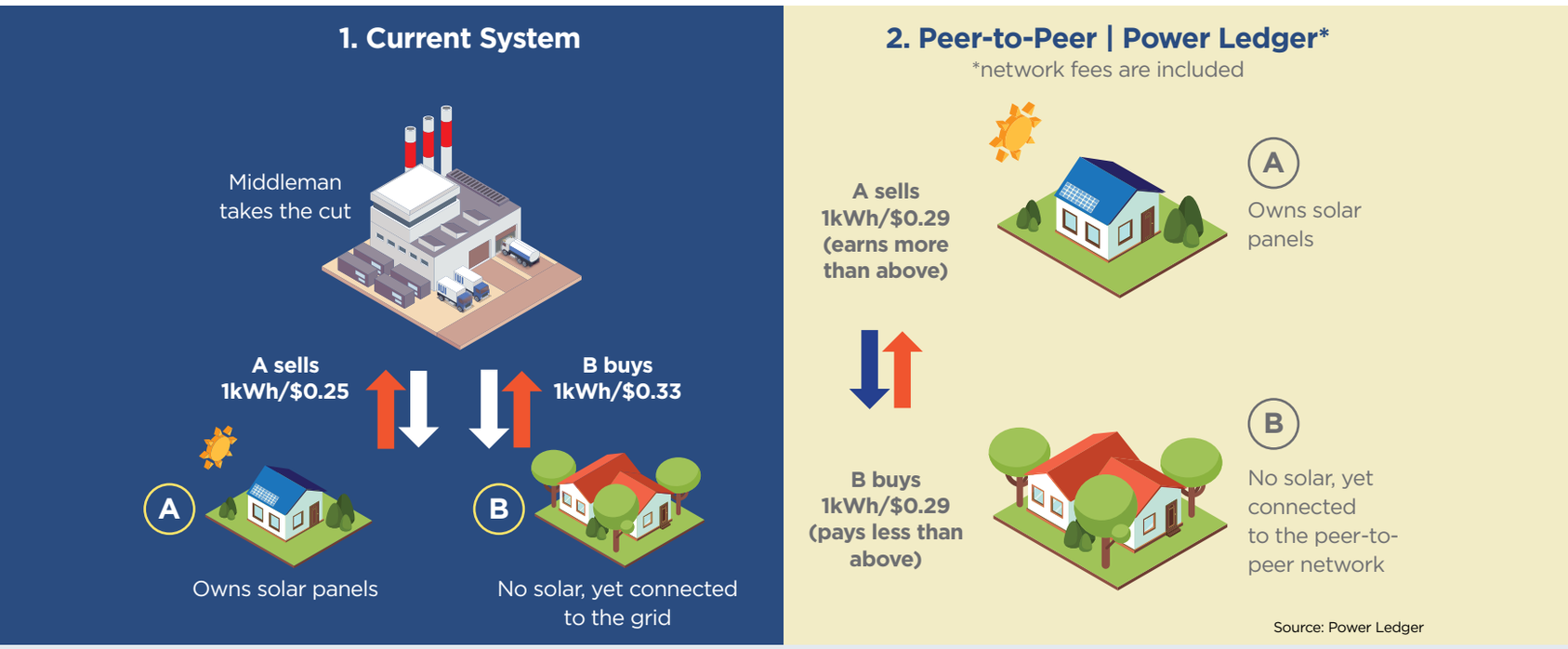
1. *DDW 1: Dr Navid Haghdadi explaining South Australia's blackout.*
2. *L-R: Stephen Chia (NEM Foundation), Vinod Tiwari (Power Ledger), Dr Wei-nee Chen (Chair), Suresh Sadasivan (Bloktex), Martin Lim (Electrify.Asia), Tan Lim Soon Fu (EPC Blockchain).*

It has been acknowledged that the energy sector has somewhat been a laggard compared to other sectors in embracing disruptive technology such as the blockchain. However, in the last 12 months, blockchain has finally made inroads within the energy sector and the application that is gaining the most traction is the P2P energy trading platform among prosumers.

The P2P energy trading platform allows prosumers to sell excess solar PV electricity to consumers within the same grid jurisdiction at a competitive rate. P2P energy trading democratises electricity, allowing consumers to choose their source of supply (Exhibit 4) and this in turn encourages the growth of the solar PV market. Globally, Power Ledger (Australia) has gained the largest market share in terms of the P2P energy trading platform while Electrify.Asia (Singapore) has completed a successful ICO and is gathering momentum on its P2P energy trading platform.

Aside from the P2P energy trading platform, EPC Blockchain Sdn Bhd presents another application in the energy sector focusing on establishing a Blockchain-based Energy Savings Consortium (BESC) with energy savings deployed through energy performance contracting (EPC) and simultaneously, creating a carbon dioxide inventory useful for sustainability reporting. The BESC is developed on the NEM platform and according to Stephen Chia (Director), the NEM Foundation has established a Venture Fund of US$5m to incubate and nurture young startups to develop enterprising blockchain solutions on the NEM blockchain platform. NEM has a local presence in Malaysia where their NEM Blockchain Centre is located in TTDI, Kuala Lumpur.

Exhibit 4: Traditional Electricity System vs P2P Energy Trading System

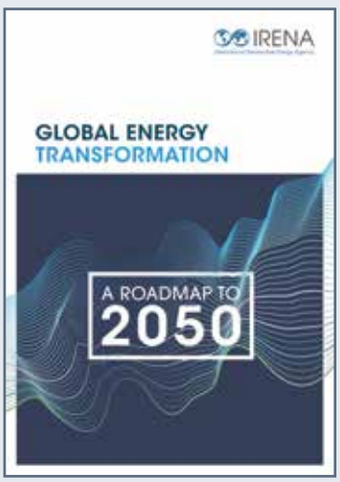


MALAYSIA'S NATIONAL REGULATORY SANDBOX

What is SEDA Malaysia's aspiration for blockchain technology? In Malaysia, net energy metering (NEM) has been slow in terms of the take-up rate. One of the key challenges of NEM is the low displaced cost of surplus electricity sold to distribution licensees. The P2P energy trading platform on blockchain appears to be a viable long-term solution to scale up the distributed solar PV market as surplus solar electricity can be sold at a better rate to other consumers instead of distribution licensees.

Earlier this year, the Ministry of Finance together with the Malaysian Global Innovation and Creativity Centre (MaGIC) had established a National Regulatory Sandbox in which SEDA Malaysia submitted an application to testbed a P2P energy trading platform on blockchain technology. Our aspiration is to catalyse the energy transition in the country and one measure is to enable P2P energy trading and in a later phase, to expand the scope of trading to include the Renewable Energy Certificate (REC).

IRENA's recent publication on the Global Energy Transformation: A Roadmap to 2050 (April 2018) touted blockchain technology as one of the enabling infrastructures to integrate VRE into the grid, and P2P trading as one of the "innovative business models that enhances the system's flexibility and incentivises deployment of renewable technologies."



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2018 ISES International Sustainable Energy Summit

Sustainable Energy : The Future Is Here

4TH ISES 2018 GALLERY

1. YAB Datuk Patinggi (Dr) Abang Haji Abdul Rahman Zohari Tun Datuk Abang Haji Openg (middle), Chief Minister of Sarawak, was greeted by YB Senator Dato' Seri S.K. Devamany (right), former Acting Deputy Minister of KeTTHA, together with YBhg Datuk Dr Yee Moh Chai (left), then-Chairman of SEDA Malaysia, and YBrs Catherine Ridu (second from right), then-CEO of SEDA Malaysia, upon his arrival at Pullman Kuching for the Opening Ceremony of the 4th ISES 2018.
2. The Sarawak Chief Minister took the opportunity to visit the 4th ISES 2018 Exhibition Booth and signed the limited edition of the Sustainable Energy Malaysia (SEM) magazine.
3. MoU signing between SEDA Malaysia and Pusat Latihan Proaktif (PLP) for "Mutual Cooperation on Human Capital Development." Signing took place during the Opening Ceremony.

4. The Sarawak Chief Minister was accompanied by YB Dato' Sri Dr Stephen Rundi Anak Utom (right), Sarawak Minister of Utilities, and the former KeTTHA Acting Deputy Minister (left) during the Summit press conference.
5. The first deep dive workshop (DDW) kicked off with experts from around the world sharing their experiences with integrating large scale distributed solar PV systems to the grid.
6. The Sarawak Chief Minister scanned his palm to launch the 4th ISES 2018.
7. The Sarawak Chief Minister delivered his keynote address during the Opening Ceremony.
8. Full house attendance comprising ambassadors, delegates, speakers, and participants for the Opening Ceremony.
9. Chan Cheu Leong, Authority Member of SEDA Malaysia, presented a memento to Michael Schmela, Executive Director of SolarPower Europe, at the end of DDW 5.
10. Dan Millison of Transcendergy, LLC posed queries to panellists during one of the DDWs.
11. SEDA Malaysia's staff working the agency's booth at the Summit's exhibition.

12. Marcoen Stoop of Hydrogenics Europe NV presented on renewable hydrogen in DDW 10.
13. YAM Tunku Naquiyuddin ibni Tuanku Jaafar from the Negeri Sembilan Royal Family listened to an explanation by RET Division Director, Azah Ahmad of SEDA Malaysia.
14. Richard Taylor, CEO of the International Hydropower Association, discussed the current global hydropower situation with participants.
15. The former SEDA Malaysia CEO presented a memento to YBhg Datuk Ir Ahmad Fauzi Hasan, Chairman of the Energy Commission and now Acting Chairman of SEDA Malaysia.
16. Ir Akmal Rahimi Abu Samah (right), COO of SEDA Malaysia, and Dr Matthias Eichelbrönner of E.Quadrat GmbH & Co Energy Experts exchanged opinions on current global RE issues.
17. Memento presentation by YB Dr Haji Abdul Rahman Haji Junaidi (middle), Sarawak Assistant Minister of Utilities, at the end of DDW 9.
18. During the Summit, a short interim session of an hour and half was dedicated to government bodies, RE industry professionals, and enterprises to match up and discuss potential collaborations with each other.

19. HE Karin Mössenlechner, Ambassador of the Kingdom of the Netherlands to Malaysia (left), HE Maria Castillo Fernandez, Ambassador and Head of the European Union Delegation to Malaysia (middle), and HE Attila Kali, Ambassador of Hungary to Malaysia, pictured during the 4th ISES 2018 Gala Dinner.
20. Panellists for Plenary 1 posed with their mementos to mark the end of their session.
21. YBhg Tan Sri Dato' Ir (Dr) Haji Ahmad Zaidee Laidin (right), Authority Member of SEDA Malaysia, presented a memento to Ir Dr Sanjayan Velautham, representing Executive Director of the ASEAN Centre for Energy based in Jakarta, Indonesia.
22. Russell Marsh of Ernst & Young Solutions LLP spoke on energy storage systems in DDW 10.
23. YB Datuk Amar Douglas Uggah Embas, Deputy Chief Minister of Sarawak (middle), walked with the Sarawak Minister of Utilities (second from right), the Sarawak Assistant Minister of Utilities (left), and the rest of the entourage to the Gala Dinner.
24. Happy faces at the Gala Dinner. Hosted by the Sarawak State Government with a 'Sarawak Cultural Night' theme, guests had a fun time listening to local music, learning traditional dances, and had the chance to explore Sarawakian cuisine.
25. Dr Wei-nee Chen (in red), CCO of SEDA Malaysia, with friends from Task 1 of the IEA PVPS.

WASTE NOT, WANT NOT

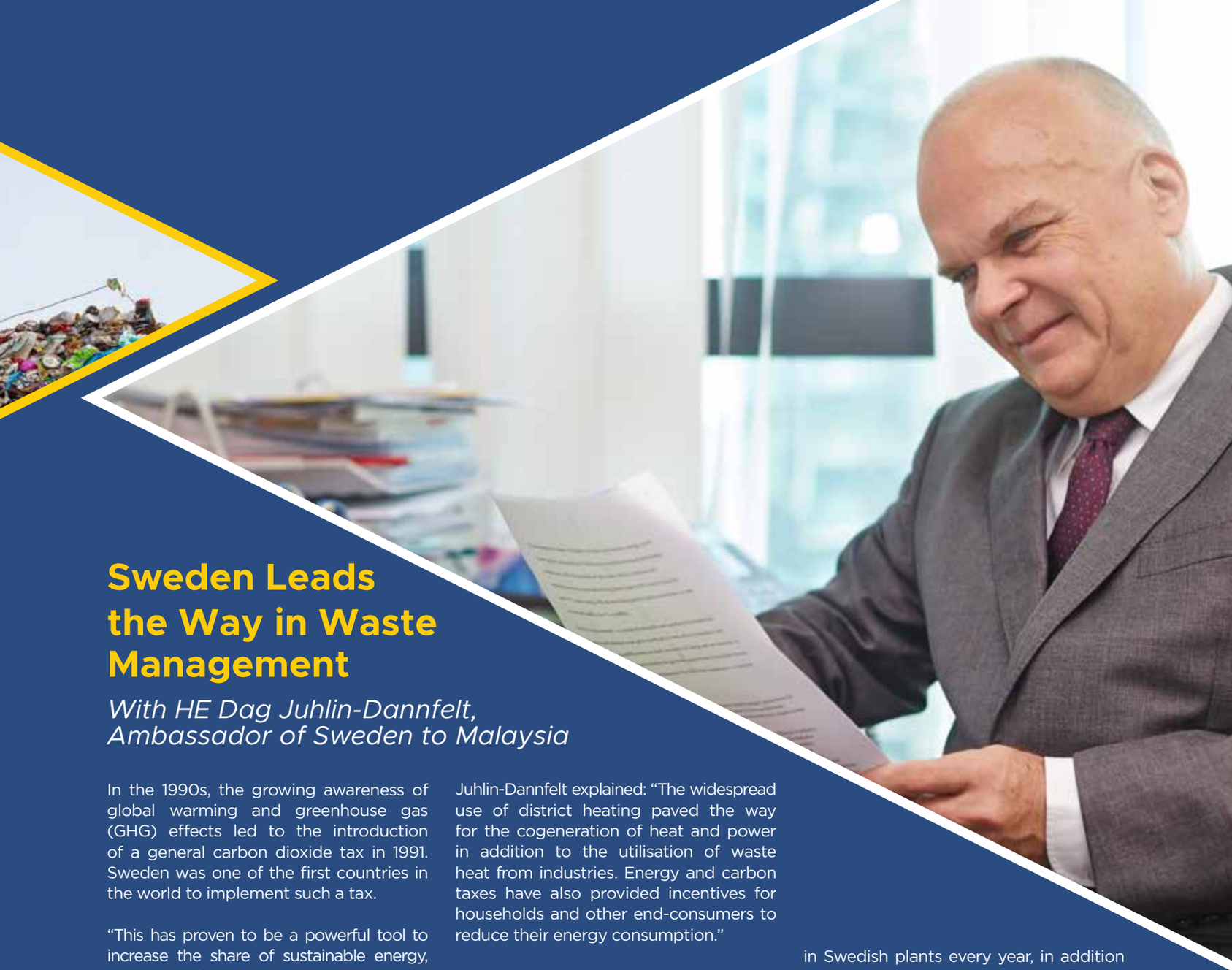
Back in the 1970s, Sweden was heavily dependent on fossil fuel imports. Oil had exceeded 70% of its total energy supply. There were also other environmental problems occuring in the Scandinavian country - the majority of its waste was going to landfills, while in some cases poisonous waste was being disposed of in ways that negatively affected the environment.

In 1973, one of the responses to the Arab-Israeli War - an oil embargo imposed by members of the Organisation of Arab Petroleum Exporting Countries - left Sweden (and many others) in an oil crisis. And it hit the Swedish people hard.

HE Dag Juhlin-Dannfelt was a young boy then, but he still remembers the urgency of that period in Swedish history.

"We could not drive because there was no gasoline. Everyone had to go by bikes. Once you experience such a thing, you only need to learn that lesson once. Since then, we gradually worked on reducing our oil dependency," he reflected.

Due to the aforementioned environmental problems caused by poor waste management, the Swedish government also made efforts to sharpen environmental control and the rules and regulations to improve waste handling. Coupled with a growing understanding of the need to find new solutions for Sweden's energy supply, the Swedish government's overall strategy has been to set clear political targets in both energy policies and environmental policies. These are combined with economic instruments that promote competition between different sustainable technologies in the energy market.



Sweden Leads the Way in Waste Management

With HE Dag Juhlin-Dannfelt, Ambassador of Sweden to Malaysia

In the 1990s, the growing awareness of global warming and greenhouse gas (GHG) effects led to the introduction of a general carbon dioxide tax in 1991. Sweden was one of the first countries in the world to implement such a tax.

"This has proven to be a powerful tool to increase the share of sustainable energy, particularly for heating purposes. It also spurred a shift from heating houses individually to developing more efficient district heating systems," the Ambassador added.

Later in 2003, a green certificate trading scheme was introduced to promote new renewable electricity. Through this scheme, all producers of renewable electricity receive extra revenue in addition to the electricity price revenue. Producers trade their certificates through the market with end-use consumers. This market-based support system has shown to work as a cost effective scheme to lower the dependence on fossil fuels.

Not only did the energy and carbon dioxide taxes and the green certificate trading system provide incentives for new sustainable energy, but they also contributed to an increase in energy efficiency from a systems perspective.

Juhlin-Dannfelt explained: "The widespread use of district heating paved the way for the cogeneration of heat and power in addition to the utilisation of waste heat from industries. Energy and carbon taxes have also provided incentives for households and other end-consumers to reduce their energy consumption."

Sweden has managed to break its heavy dependence on fossil fuels and increase energy efficiency in the last 40+ years, all while supporting the creation of functioning markets for new, environmentally friendly and sustainable energy sources. Indeed, after Sweden introduced the carbon dioxide tax back in 1991, its GDP almost tripled with an increase of 283% between 1991 and 2017; its carbon dioxide emissions decreased by more than 25% in the same period. The Ambassador says this is proof that carbon dioxide emission reductions can truly work with economic growth.

And today, more than 99% of all household waste is recycled in one way or another in Sweden, compared to 38% in 1975. On average, a Swede produces just over 500kg of household waste annually. One of the main reasons for the country's efficient waste management is that just over two million tonnes of household waste is treated and converted to energy in Swedish plants every year, in addition to incinerating a similar quantity of waste from industries. About 50% of waste is recycled, ~49% is reused as energy, and the rest is put towards road construction or ends up in dedicated landfills.

International comparisons show that Sweden is in a good position among countries when it comes to recovering energy from waste. Waste incineration provides heat for more than 800,000 homes and electricity for 250,000 homes. Juhlin-Dannfelt attributes this development to the introduction of a tax on waste sent to landfills. Additionally, landfilling organic waste has been forbidden in the country since 2005. GHG emissions from landfills has decreased dramatically since waste incineration largely replaced landfills as a processing method.

Better yet, Sweden imports waste to fill some production needs for its waste incineration plants.

"It is a good example of a win-win-win situation. In addition to reusing and recycling our own waste, which gives us both energy and raw materials for industrial and other productions, we are paid by other countries to receive their waste. We get additional free resources for energy and raw materials for recycling."

Another achievement saw the Scandinavian country reaching its goal of a 50% renewable energy (RE) share in 2012, several years ahead of the Swedish government's 2020 schedule. The most recent figure of 52% RE - which includes electricity, district heating, and fuel - happens to be the highest in the European Union (EU). The current objective is to boost renewable generation by 25TWh from 2002 to 2020. Sweden is already past the halfway point of this target, chiefly due to an increase in biofuel utilisations and a steadily expanding wind power programme.

By 2040, Sweden hopes to achieve a production of 100% renewable electricity. By 2045, Sweden is to have no net GHG emissions and should thereafter achieve negative emissions. And while few countries consume more energy per capita than Sweden, its carbon emissions are still lower in comparison. The emission rate is low because 83% of electricity production is generated from nuclear and hydroelectric power; cogeneration from combined heat and power (CHP) plants accounts for 10% of electricity output, powered mainly by biofuels; and about 7% of electricity is generated from wind power.

Despite there already being so many lessons for Malaysia to learn from Sweden, Juhlin-Dannfelt opines that the former needs to address the sustainability of its waste management practices.

By 2040, Sweden hopes to achieve a production of 100% renewable electricity. By 2045, Sweden is to have no net GHG emissions and should thereafter achieve negative emissions.

"I have been here for two years now and we have tried to work very actively in pushing the waste management agenda. From our perspective, today's landfill is tomorrow's landmine - and Kuala Lumpur is filled with potential landmines. There should be a strong case for making use of waste incineration for district cooling in Malaysia. District heating technology in Sweden is more or less exactly the same for district cooling and thus could be applied here. This change would lead to huge socioeconomic benefits for Malaysian society."

The Ambassador also urges for more efficient, cross-sectorial cooperation and coordination within the Malaysian government when it comes to sustainability. This would ensure that ministries and agencies do not step on each others toes when trying to implement their own agendas, in addition to stimulating awareness, broadmindedness, pragmatism, and unity within the government. He recounted the Swedish embassy's experience when attempting to bring in a foreign investor willing to pay for, set up, and run a waste-to-energy operation.

"We were sent to four different core ministries and still could not get a firm decision on the investment. There were just too many vested interests in the tipping fee and the waste connection system. We just needed a license for the company to operate in Malaysia. Somehow there is no horizontal coordination between the different ministries and agencies. If you want participation from foreign investors, you must be willing and ready to trade," he reasoned.

On a more encouraging note, Juhlin-Dannfelt spoke of the power of the people to move politicians to action. In Sweden, a Green curriculum has been part of formal education (from K-12) even before the Ambassador began his schooling in the 1960s. Swedes are taught to experience and respect nature at school, and at home from early childhood. And so when the already environmentally conscious nation saw what was happening to their country in the 1970s, they took a stand and demanded that their leaders make permanent changes for the better.

"Not all stakeholders were initially on board, but there was a growing realisation in the 1960s. Swedes who were travelling around the country observed and wondered what was happening to their environment. When the government was pressured to do something, the government reacted. Environmental conservation is now a matter of national security in Sweden," he added.

Even though the people have a role to play in the revolution, the Ambassador stressed that leaders and the government must take initiative and lead by example.

"This is an area where we cannot afford to wait. There will be huge expenses incurred from emergency spending due to floods, forest fires, and other natural disasters. The financial costs of climate change fall under contingency and emergency operations. Should this money be invested early on, it would save society so much more than money. There needs to be long-term perspective."

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STOP WORRYING ABOUT THE DUCK CURVE

Solutions do exist to address the phenomenon

With Julia Hamm, President and CEO of the Smart Electric Power Alliance (USA)

Geographically, Malaysia is fortunate to be in a location conducive for plentiful solar production, and this is evident in the new large scale solar projects and also smaller rooftop installations that have been cropping up in the country. This advantage does have a catch, one that has been most prevalent in California in the US where solar deployment is the most significant. It is known as the "duck curve."

In commercial-scale electricity generation, the duck curve is a graph of power production over the course of a day that shows the timing imbalance between peak demand and renewable energy (RE) production. Specific to California, Julia Hamm explained that solar deployment is from a combination of utility scale solar power plants and customer-sited distributed solar. There is so much solar production during the daylight hours that it often exceeds the amount of electricity demand at the peak.

"So essentially, you have more generation than you need which ultimately means that you are having to curtail the resources from coming into the grid - which is not financially good for the generating plants. It also creates complications because in the morning, you need to have the capacity to be able to ramp down quickly as the sun is coming up, and then the reverse at the end of the day as the sun goes down. You need to have other generating resources that can ramp up quickly to replace the solar production," Hamm continued.

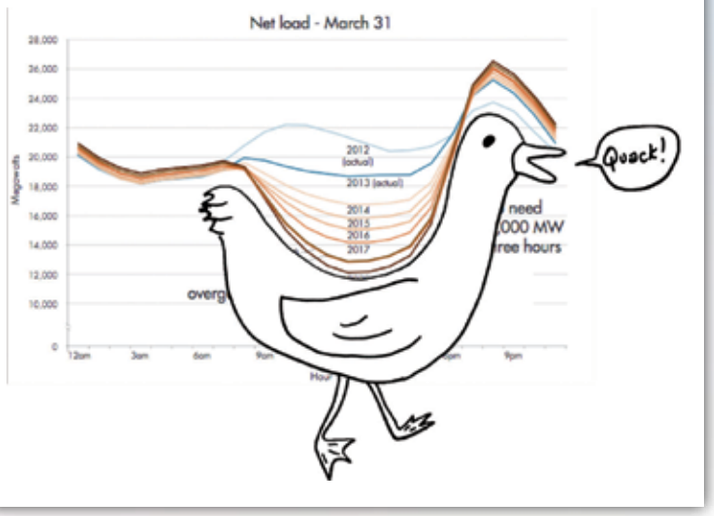
Hawaii is beginning to have very similar issues. California and Hawaii are in the position where they have to reactively find solutions for the issues of very significant solar penetration relative to the net load.

"The opportunity that exists for other places is to learn from these States' experiences and actually go about planning in a different way to ensure that solar - nor any other one resource - becomes a problem. Rather, things need to be balanced in a way where everything is optimised. With the case of solar specifically, one takeaway that I have had the opportunity of learning would be to think about how to grow the solar market in parallel with other things that help with that balancing," she reasoned.

One solution is to put in place demand and response programmes that help shift the demand of electricity to the middle of the day. This includes a change in consumer mentality and behaviour. Pricing mechanisms, like Time-of-Use (ToU) plans, can be utilised for such a change, where pricing signals are sent to customers to encourage them to use electricity during the middle of the day in order to not waste the excess solar generation.

"That is counter to how people thought about electricity for a long time because historically, electricity is the most expensive during the middle of the day and cheapest at night. But now where you have a lot of solar production, you want the reverse. So you have to send pricing signals to customers to think differently and behave differently," she said.

Smart technology could also help with the duck curve. As we progress towards truly having smart devices and smart homes, we can programme the technology in our houses to make consumption decisions for us as customers. We would be able to pre-cool our houses by running air-conditioners midday while we are at work, and even load our clothes washers and dishwashers at night but set them to operate in the middle of the next day when we are not at home.



Hamm added: "You will not even have to think about it. Your smart devices take pricing signals from your utility so that they run when there is excess electricity. There are a lot ways in which you can use technology as devices get smarter and smarter and as you have advanced management systems. You will be able to shift when your electricity is consumed so that it is utilised during the middle of the daytime hours when you have all of this solar production, so you could end up not ever having the duck curve."

Electric vehicles (EVs) can also become part of the solution. Hamm reminded that again, it is about consumer behaviour - putting in place programmes and pricing mechanisms that incentivise the desired behaviour.

"You need to think about the long-term strategy for building out an EV charging network. If you are anticipating a significant amount of daytime solar production, you may want to encourage customers to charge their EVs when they are at work rather than when they are at home. From a strategic standpoint, you may choose to prioritise building out the workplace charging network before you begin building out other charging station locations," she suggested.

A considerable part of California's solution is to look at energy storage, but to also consider other resources like peaking natural gas plants and technologies that are able to ramp up and down very quickly. Traditional generating plants were not designed for quick up and down ramping, but gas peakers are. And storing some of that midday solar for use at the end of the day can help balance things out.

Hamm concluded that it all comes down to advanced planning.

"It is not that California did not plan in advance, but that technology has changed so much. Many of the opportunities that exist today to prevent the duck curve did not exist when California started with this massive solar deployment. The solutions were not available to California then, but they are available today to other places that are contemplating how significant solar deployment might impact their systems."

> Let us not get too hung up about the duck, solutions do exist to manage the duck curve so we do not keep curtailing solar energy.

THE BRAZILIAN POWER MARKET REFORMATION

How auctions augmented the country's RE agenda

With Ana Paula Ferme, Auction and Energy Trading Manager of the Chamber of Electric Energy Commercialisation (Brazil)

Up until almost two decades ago, the Brazilian power market was mostly supported by hydropower. A severe drought in 2001 then forced Brazil into full scale power and water rationing, ultimately leading its decision-makers to discuss the nation's future and the future of Brazil's power market.

"This happened especially because we had a lack of investments in infrastructure. That moment in history was an opportunity to think about how we can increase and diversify our electricity mix, and which sources would be fostered," said Ana Paula Ferme.

Three years after the water crisis, Brazil then actualised and embarked on a new energy market model. Its main purpose was to recover the Brazilian power market from a web of critical situations and to ensure a continuous energy supply for the country. Ferme repeated that diversification of Brazil's mix was key due to its level of dependency on hydro, and it was crucial to not have to tightly ration its resources again.

"Water prices were also not helping the situation. Besides, it was important to bring in new investments, and for this we had to make the power market attractive," Ferme added.

> "Since the energy market reform was established, wind power sources have increased more than 10 times, and we are seeing the same growth in solar PV."

Bringing competition into Brazil's energy market was the best way to do that. Before the new model, there were only big companies that were vertically integrated, owning the generation, transmission, and distribution services. The new model sought to segregate these services, in addition to segregating the regulated market and the free market.

"This segregation is what started the energy auctions and the response was great. We finally started the energy trading market in Brazil. Auctions have been used as a mechanism to ensure there is competition for price reductions and to also expand our electricity mix, making possible the adequacy of supply," she explained.

Over the years, it became feasible for Brazil to produce new technologies like wind power and solar photovoltaic (PV). Auction results have shown competitive prices for these sources. In an auction that concluded the week before the 4th ISES 2018, wind power price ended at 20$ per MWh while solar PV ended at 35$.

Ferme commented: "This is amazing because if we think back to the recent past, each of these sources were priced six to seven times higher in Brazil. Since the energy market reform was established, wind power sources have increased more than 10 times, and we are seeing the same growth in solar PV."

> "The first is that the State cannot control everything. Too much State intervention can unsettle the market. Secondly, auctions are powerful tools for increasing competition and introducing new technologies."

Having the legal and regulatory framework creates a conducive environment for any market reform. Finding the best applications in energy policies is also always contextual to the implementing country. In Brazil, there was a push for less State integration after the legal and regulatory framework had been built.

"We had many lessons learned, two of which I think are most important. The first is that the State cannot control everything. Too much State intervention can unsettle the market. Secondly, auctions are powerful tools for increasing competition and introducing new technologies," she reflected.

"I can also say that the decentralisation of utilities in Brazil made it possible to reduce their monopoly, segregating supply chain services. Thereby it was possible to raise the competition of the market, especially to build new generation and transmission projects. The distributors are completely regulated and they help to cover loans by regulated and auction contracts."

Brazil has promoted more than 70 auctions since 2004, gaining much experience from all of the processes being organised in the country itself by market operators. Although adopting special influences from the British market, Brazil steadily built its own way to expand its energy market.

"We built our own auction sites and developed auction processes after establishing our own market site. With this experience and results that we achieved, I can say that Brazil is a successful benchmark when it comes to auction application. Our motivation came from a critical situation, and with auctions we could overcome it.

"When we wanted to diversify our energy mix, we offered products with more sources to attend to the same demand. We still have unique demands to attend to in auctions now, but we segregate the demand for specific products of each technology. And this is part of the evolution of the Brazilian power market - because we are aware of our auction sites and the efficiency of procedures, we produce great results over the years," Ferme continued.

Brazil's installed capacity is still mostly based on hydro, around 60%. Ferme acknowledged that building big hydro reservoirs impacts the environment in a significant way, leading to the introduction of environmental licences in Brazil. Wind power and solar PV have been welcome and excellent alternatives.

Another unfortunate water crisis in 2013 motivated Brazil even more to quickly develop lasting solutions. Currently, the limits of hydro reservoirs are controlled and managed as such that when their limits are reached, thermal sources start operating in place of hydro.

"This is why wind power and solar PV are becoming more important in our mix because when they are operating, we do not need to use reservoir water. We can store this water for a longer time.

"Auctions absolutely augmented Brazil's renewable energy agenda. They were a fitting solution for Brazil because they raised the competition, helped develop technologies, and made the supply chain visible. With auctions, we can ensure a demand for these sources by creating a market and creating the best investments for them. And it is important to note that transparency and fairness are very relevant characteristics for auction processes to be successful," Ferme concluded.

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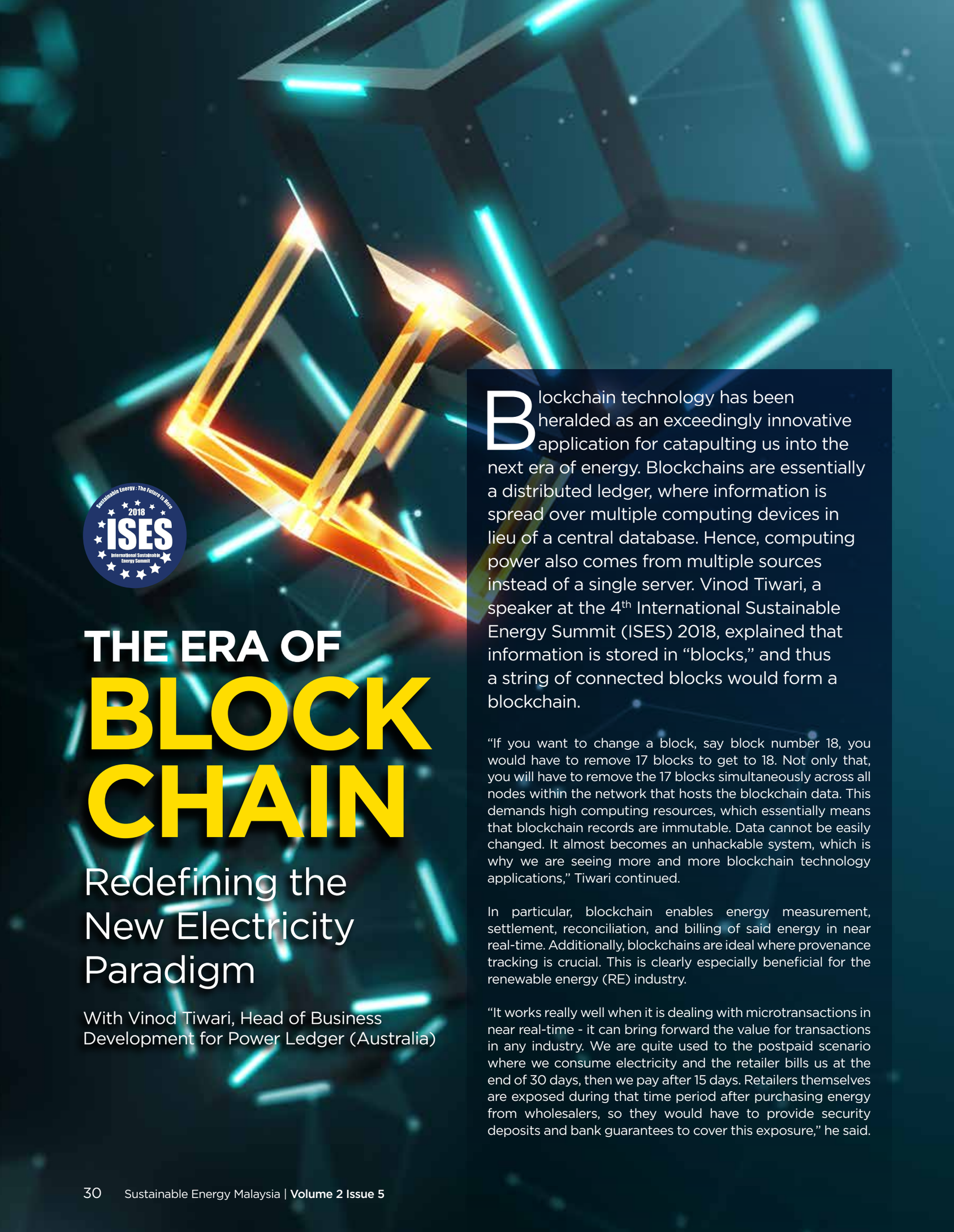


THE ERA OF BLOCK CHAIN

Redefining the New Electricity Paradigm

With Vinod Tiwari, Head of Business Development for Power Ledger (Australia)

Blockchain technology has been heralded as an exceedingly innovative application for catapulting us into the next era of energy. Blockchains are essentially a distributed ledger, where information is spread over multiple computing devices in lieu of a central database. Hence, computing power also comes from multiple sources instead of a single server. Vinod Tiwari, a speaker at the 4th International Sustainable Energy Summit (ISES) 2018, explained that information is stored in "blocks," and thus a string of connected blocks would form a blockchain.

"If you want to change a block, say block number 18, you would have to remove 17 blocks to get to 18. Not only that, you will have to remove the 17 blocks simultaneously across all nodes within the network that hosts the blockchain data. This demands high computing resources, which essentially means that blockchain records are immutable. Data cannot be easily changed. It almost becomes an unhackable system, which is why we are seeing more and more blockchain technology applications," Tiwari continued.

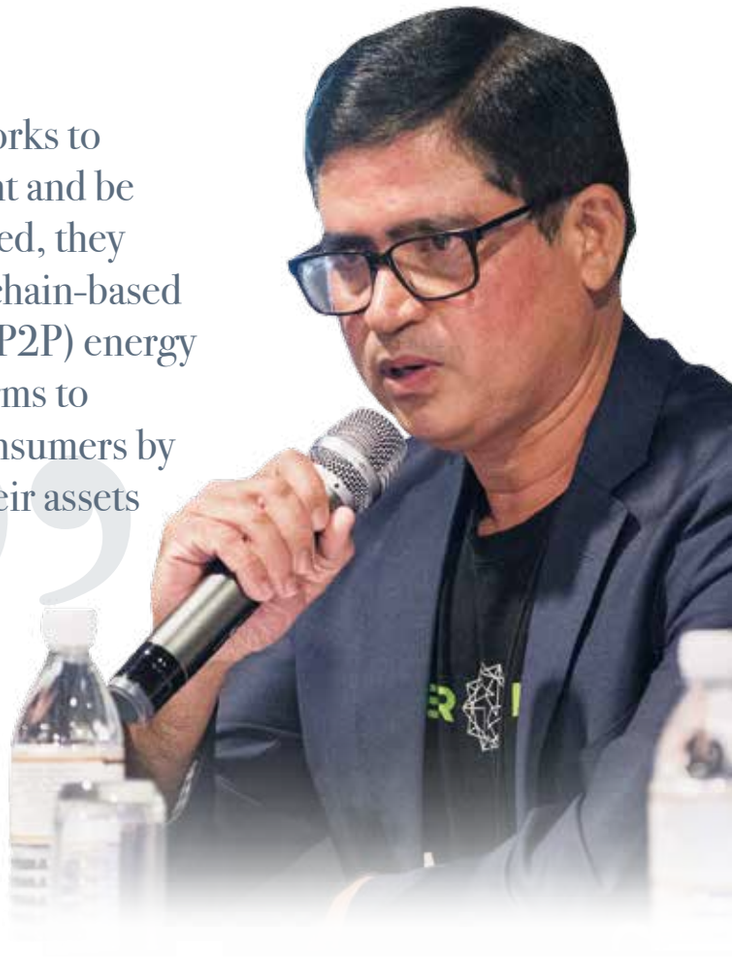
In particular, blockchain enables energy measurement, settlement, reconciliation, and billing of said energy in near real-time. Additionally, blockchains are ideal where provenance tracking is crucial. This is clearly especially beneficial for the renewable energy (RE) industry.

"It works really well when it is dealing with microtransactions in near real-time - it can bring forward the value for transactions in any industry. We are quite used to the postpaid scenario where we consume electricity and the retailer bills us at the end of 30 days, then we pay after 15 days. Retailers themselves are exposed during that time period after purchasing energy from wholesalers, so they would have to provide security deposits and bank guarantees to cover this exposure," he said.

With that in mind, if network operators do not change their approach to charging electricity, the inevitable response is customer defection from the grid. Once energy storage systems become cheap enough, consumers would begin storing their energy instead of selling it back to the grid.

"If I do that and others do that as well, it will cause what is considered grid defection, a significant drop in consumption from the grid. This will force grid operators to increase prices for those who are staying connected, because they need to recover the cost of their assets. And so it is almost like a death spiral because those who are connected are paying a very high price. It would motivate them to install more solar and go off the grid as well," Tiwari cautioned.

"For grid networks to remain relevant and be properly utilised, they can use blockchain-based peer-to-peer (P2P) energy trading platforms to incentivise consumers by monetising their assets better."



For grid networks to remain relevant and be properly utilised, they can use blockchain-based peer-to-peer (P2P) energy trading platforms to incentivise consumers by monetising their assets better. The platform operator receives a fee for facilitating energy transactions, and different tariffs can be created depending on how far the energy is travelling. Additionally, grid operators will receive fees for maintaining the grid. The Power Ledger platform has the ability to apportion the grid fee based on the physical distance between the producer and the electricity buyer, so that the imposed grid fee is fairer to buyers.

"You can define a new structure of tariffs or networks while still incentivising consumers by letting them utilise the assets. You are still incentivising them to stay connected, which is what the grid wants. And you can change things around to make the way we use energy more efficient," Tiwari reasoned.

He believes that blockchain applications will make energy systems a lot more efficient, whether at the wholesale electricity market level or at the P2P energy trading level. There will be a change in consumption behaviour as people interact more with markets to derive the best efficiencies. Pricing signals, for example, can change the utilisation of the grid significantly, having been created for meeting peak demands and incentivising consumers to react to P2P trading platforms.

Regulation plays a role for such changes to happen, especially if the electricity market is highly regulated and only allows the sale of electricity via a Single Buyer. Once the market is liberalised, however, there also needs to be a change in the grid business model.

"Grids can create and be part of application hosts. A grid operator can be an application host and devise new network tariffs to make these transactions happen. So prosumers can trade with consumers, facilitated by an existing physical grid where application hosts could be the energy retailer or a full network," Tiwari reiterated.

While some blockchain-based companies (such as Bitcoin) are energy intensive, Power Ledger happens to use proof of stake (PoS), a type of algorithm by which a cryptocurrency blockchain network aims to achieve distributed consensus.

"It is significantly less energy intensive. Our blockchain network operates on less electricity than a standard laptop. Not all blockchains are super energy intensive," he affirmed.

Furthermore, the disruption of utilities was already happening with the rise of other technologies such as solar PV and energy storage. Companies like Power Ledger are not seeking further disruption either; rather, they look to cooperate with sustainable energy authorities such as SEDA Malaysia to advance their RE agendas, in addition to partnering with grid operators. Existing grid operators come with existing consumer bases, thus the logic lies in supporting grid operations while scaling up the RE market among prosumers.

"We see it as a positive change, and our platform helps to redefine the new electricity paradigm. It makes the electricity system more efficient. It does not overturn the current grid business model, just modifies it to allow greater public participation to trade energy with each other."

To countries who are about to take on blockchains on a large scale, Tiwari says that you do not have to reinvent the wheel.

"Look at what has happened in other markets. Maybe Malaysia is not where Australia is right now, but it will get there. And it will have the same issues that Australia has faced. You do not have to reinvent the wheel and find solutions then - you can look at solutions that exist. P2P energy trading is one clear way to deal with grid defection. It is here and it is available; you do not have to work too hard at it."

WHY LOW CARBON CITIES MATTER

And how to break the fossil fuel habit

By Dr Thomas Tang, Director of Partnerships for Eco-Business (Malaysia & China)

Cities are home to more than half of the world's population and much of the world's industry. By 2050, more than 70% of the population is projected to live in urban areas. But cities are vulnerable to climate change, especially extreme weather events. Average global flood losses, estimated by the OECD to be about USD 6 billion per year in 2005, could increase to USD 52 billion by 2050 in 136 of the world's largest coastal cities.

A low carbon imperative for cities is crucial to mitigate climate change - and this is achievable through design planning, breaking old energy habits and securing green finance.

Designing low carbon cities does not mean compromising livability; in practice, astute city planning can enhance the quality of urban living. Compact built-up areas where buildings, residents and jobs are strategically distributed along transit corridors together with interconnecting street networks that consider the needs of pedestrians, cyclists and transit users make transport easy and energy efficient.

This is supported by public transport systems that have accessible stops to serve population and job needs, coupled with social services and environmental amenities like schools, hospitals, parks and green spaces. Mixed-use functions in neighbourhoods, blocks and individual buildings should also be adopted together with people-oriented streets and an emphasis on walkability.

Furthermore, aligning small-sized blocks and buildings along streets to create street fronts and vibrant sidewalks make urban living convenient, healthy and carbon-friendly. Lastly, the design and layout of buildings and streets should be energy efficient and adapted to local climatic conditions.

Can cities really break the habit of fossil fuel-based energy supply?

The World Economic Forum shows that this is possible - unsubsidised renewables (such as hydro, solar, wind, tidal and geothermal) are now the cheapest source of electricity in 30 countries, with renewables predicted to be more cost effective per kWh than fossil fuels by 2020.

In 2017, The Carbon Disclosure Project reported that clean energy developments valued at USD 2.3 billion are being instigated in 150 city projects as part of a plan agreed by city leaders to develop 1,000 infrastructure projects including electric transport and energy efficiency. Over 100 cities now obtain 70% of their electricity from renewable sources and 40 cities are operating on 100% renewable electricity.

> Over 100 cities now obtain 70% of their electricity from renewable sources and 40 cities are operating on 100% renewable electricity.

Much of the momentum for this drive comes from the Global Covenant of Mayors for Climate and Energy; in the US, 58 cities and towns have committed to transition to 100% renewable energy (RE) and an additional 23 global cities have lined up the same goal.

So, old habits can be broken.

In doing so, low carbon cities can enjoy a variety of local benefits including better air quality, improved health, jobs, economic growth, energy independence and attractive cost savings.

The World Bank offers an interactive climate scenario planning tool to help cities plot their path to low carbon freedom. The tool, Climate Action for Urban Sustainability or CURB helps users assess the implications of policy and technology interventions according to cost, feasibility and impact. CURB has a flexible and modular design allowing cities to respond to local realities and focus on information that is most relevant to municipal priorities like energy or emission impacts and cost savings.

The common stumbling block for cities though has been to find finance for low carbon projects especially as most of city-level infrastructure spending is decided at the national level, which has been globally constrained in recent years.

This is exacerbated by the fact that not only do cities have lower credit ratings compared to national governments, the latter also tend to set sovereign limits on how much a city can borrow from the private sector.

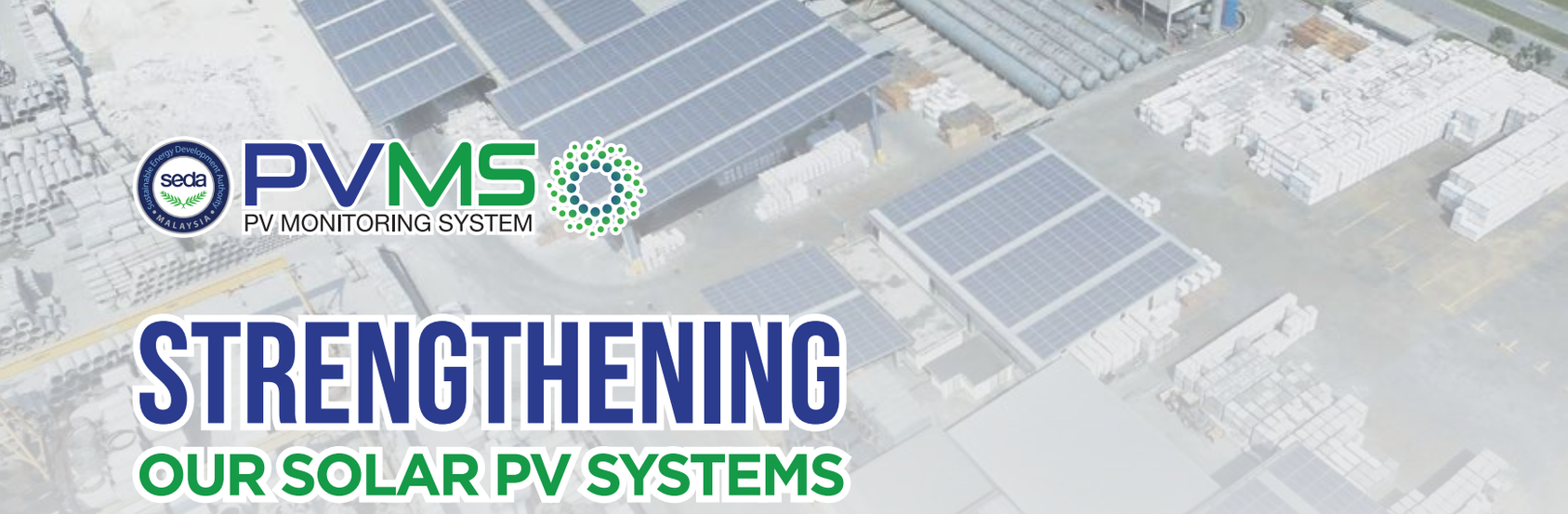
Nonetheless, these issues can be redressed - although this will take time.

National-level policies to improve enabling environments for private investments in green urban infrastructure are being realised, along with decentralisation of authority with more accountable city agencies to come up with robust fiscal bases for city improvements and innovation. Furthermore, local policies are being introduced that promote low carbon behaviour such as congestion charges, parking fees and toll lanes, together with property tax reforms to alleviate urban sprawl. These policies are supported by supplementing local capital markets with low-interest lending or loan guarantees, developing green bonds and setting up green investment banks.

As populations and cities grow, choices made today on urban infrastructure will determine the extent and impact of climate change and the capability of cities to reduce carbon emissions in the future. Investing in low-carbon climate-resilient infrastructure has low incremental costs for cities and can provide long-term benefits like lower operating expenses, avoided fuel costs and better public health.

The time to decide is now.

Presented at the 4th International Sustainable Energy Summit 2018.



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OUR SOLAR PV SYSTEMS

SEDA Malaysia continues the way towards energy transition with PVMS programme

Sustainable Energy Development Authority (SEDA) Malaysia is a statutory body formed under the SEDA Act 2011 [Act 726]. Its key role is to administer and manage the implementation of the Feed-in Tariff (FiT) mechanism mandated under the Renewable Energy (RE) Act 2011 [Act 725]. SEDA Malaysia was conferred all functions related to sustainable energy in the country including to promote, implement, facilitate, and develop activities related to RE.

While its first few years were primarily dedicated to administering the FiT scheme, SEDA Malaysia has grown to become an agency that facilitates other key sustainable programmes that include creating complete ecosystems, both in energy demand management programmes as well as establishing RE and energy efficiency (EE) related training courses. SEDA Malaysia has a sizeable goal for leading the country's energy transition towards a sustainable future. Particularly, the Authority seeks to be an enabler of national solar photovoltaic (PV) deployment, in line with its main objective to drive key sustainable initiatives in the country.

WHAT IS THE PVMS PROGRAMME?

The National PV Monitoring and Performance Database via the PV Monitoring System (PVMS) is an initiative to monitor selected grid-connected solar PV systems for performance and reliability. This programme is funded by *Akaun Amanah Industri Bekalan Elektrik* (AAIBE) or the Malaysian Electricity Supply Industries Trust Account (MESITA) under the Ministry of Energy, Green Technology and Water (KeTTHA). The Authority has been actively developing this project ever since the idea was first introduced in 2015.

The monitoring system was completed on July 1, 2018 and is available for subscription from September 2018 onwards. The PVMS programme will be officially launched at the coming International Greentech and Eco Products Exhibition and Conference Malaysia (IGEM) 2018 in October.

To begin with, 150 grid-connected solar PV systems (up to 1MW in capacity) throughout Malaysia are being monitored on a real-time basis. Both the data and system performance analyses are available upon subscription. This database will become the reference for designing national energy policies and programmes in the future. The link to the website is **pvms.seda.gov.my**.

WHAT ARE THE OBJECTIVES OF PVMS?

- To establish a National PV Monitoring System and Performance Database and be the information platform for solar PV in the country;
- To monitor PV systems in terms of performance and reliability on key components of the PV system such as PV modules, inverters, and others;
- To derive an informative report such as creating a benchmark that can be referenced by local PV providers, owners, universities, government agencies, and the general public; and
- To identify, assess, and analyse technical problems.

The objectives above instill confidence for solar PV as a viable source of clean electricity generation, besides providing relevant and useful data to interested parties such as energy planners and researchers.

WHAT ARE THE BENEFITS OF PVMS TO PV SYSTEM OWNERS?

Participation as a PV system owner is on a voluntary basis. As PV system owners, they would have full access to their own PV systems and would be able to monitor their systems' performances. Necessary measures can be taken should the systems be underperforming, i.e. they are not meeting the expected generation as promised by PV system integrators.

Benefits of PVMS include:

- Cost of installing PVMS devices (data logger, weather station, UPS, etc.) and electrical wiring will be borne by SEDA Malaysia (though subject to the availability of funds);
- Full access to the PVMS webportal to view real-time data, historical data, and monitoring reports of their own PV system; and
- Able to identify technical problems encountered in real-time through the webportal (at the inverter level).

SEDA Malaysia sincerely extends an invitation for participation to other PV system owners in the country. If you are interested, please register as a PV system owner at **pvms.seda.gov.my**.

ABOUT THE PVMS SYSTEM ARCHITECTURE

"INTERNET OF THINGS" (IOT) TECHNOLOGY

PVMS is a web-based application accessible via web browser and hosted by SEDA Malaysia. Adoption of IoT technology in PVMS enables connectivity and data exchange between PV inverters, PVMS devices, and the server (webportal) within the internet infrastructure. IoT allows all of these devices to be remotely connected across the internet infrastructure, resulting in improved efficiency of data capturing and reporting with minimal human intervention.

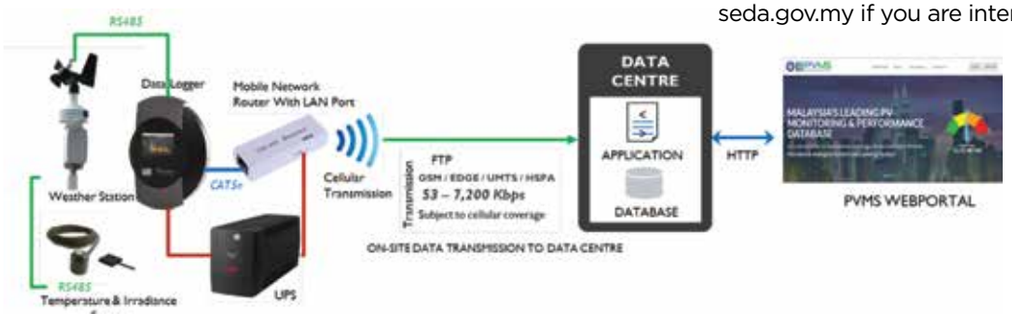
HOW DOES PVMS WORK?

- Data from weather stations, sensors, and PV inverters are collected by data loggers before transmission.
- Data is transmitted to SEDA Malaysia in 10-minute intervals.
- Data is stored, analysed, and processed by the system before it is published on the PVMS webportal.
- The webportal is displayed live; historical data can be remotely accessed with computers and mobile phones via a web-based application.

What are the benefits of PVMS devices?

- Able to communicate with various brands of PV inverters available on the market;
- Steady power supply (no interruptions) from the Uninterruptible Power Supply (UPS);
- The PVMS webportal is developed and proprietarily-owned by SEDA Malaysia; and
- Data will be stored for up to 10 years and can be accessed anytime.

THE PVMS SYSTEM ARCHITECTURE



PV SERVICES

SEDA Malaysia provides other services related to solar PV systems. With a competent and capable team, the Authority is able to deliver:

- **Project Management and Implementation** – Supervises or implements Government or government agency related projects;
- **Testing and Commissioning (T&C)** – Conducts necessary T&C procedures and acts as a third-party witness to ensure that installed PV systems are well-designed and perform as expected at the point of T&C;
- **Training** – Provides PV system training courses for engineers, non-engineers, wiremen, chargemen, and PV installers; customises training courses for targeted groups;
- **Performance Monitoring** – Provides PV monitoring solutions for site owners via PVMS devices and the webportal; and
- **Technical Advisory Service** – A professional technical team answers any queries related to solar PV and other RE technologies.

Please contact SEDA Malaysia at 03-8870 5800 or visit www.seda.gov.my if you are interested in any of the above services.

POWERING OPERATIONAL EXCELLENCE

Sarawak Energy shows adaptability through digital transformation

With Lu Yew Hung,
Group COO of Sarawak Energy (Malaysia)

Lu Yew Hung was appointed GCOO of Sarawak Energy in 2013, a long way from where he started as an electrical engineer for the Sarawak Electricity Supply Corporation (SESCO, now a wholly-owned subsidiary company of the Group) in 1980. He has 37 years of power utility experience, having served the company in various leadership positions responsible for generation, planning, asset management, grid system operations, R&D, regional operations, and others.

In his current role, Lu is responsible for establishing the vision and strategy to lead the Group's operational units in the execution of critical and transformative operational strategic initiatives. These include asset management, infrastructure upgrades, and technological improvements while maintaining engineering and operational excellence.

As such, the GCOO is a strong proponent for fully embracing the technological changes that have been sweeping through the early 21st century. He knows that the survival of organisations depend heavily on how well they roll with those changes.

"Sarawak Energy, as a modern corporation, must be proactive and responsive so as not to be left behind. Instead, we must be ahead of the regional curve. If organisations such as ours do not keep up and adapt, we will become irrelevant and redundant, losing our competitive edge," Lu cautioned.

Particularly, digital technological advancements benefit various industries. These developments lead to process improvements, greater efficiency, as well as a reduction in staffing, inventory, and costs. Specific to the power utility industry, for example, the use of predictive maintenance for asset optimisation could yield up to 45% in reduction in maintenance costs.

Lu believes that a strategy for digital transformation that can be successfully embedded and scaled into an organisation is needed. Subsequently, a digital transformation will also bring about a cultural

Lu leads a town hall session on having an integrated Information Communication Technology Department within Sarawak Energy.

shift, a shift that will positively impose different requirements on people.

He elaborated: "The skill sets that we require from our people today are very different from what was asked for 10 years ago. In our workplace, we need technology-savvy people at all levels of organisation. It is not how hard we work, but how well we use technology in our work that will make a difference."

Adaptability is key in a high performance organisation. Lu stressed that Sarawak Energy must demonstrate winning behaviors and embrace technology. To realise the digital opportunities ahead of the company, Sarawak Energy needs to transform the way it operates.

For ensuring continuous growth and advancing its agenda of sustainability, Sarawak Energy has a Strategic Roadmap clearly designed to consolidate, protect, and optimise the value created by its transformation from a traditional utility into the powerhouse it is today. The Roadmap comprises five Key Focus Areas (KFAs).

"We are midway through this four-year programme to improve on the five KFAs, which are Health, Safety and Environmental (HSE) Excellence, Generation and Network Operational Excellence, Project Delivery Excellence, Talent Management Excellence, and High Performance Culture," Lu continued. "Technology is an enabler for delivery excellence in all of our KFAs, particularly for delivering operational excellence. Additionally, ICT is also being used more and more in other functions such as Human Resources and Corporate Communications."

HSE Excellence sees targets for 95% of employees with Body Mass Indexes (BMIs) of less than 30, zero lost-time injuries and zero fatalities, and 100% compliance with regulatory laws. Project Delivery Excellence covers timely completion, cost discipline within the first quartile benchmark, and high quality contractors and equipment. Generation and Network Operational Excellence requires generation excellence, network excellence, and customer service excellence.

Talent Management Excellence focuses on developing a sustainable talent bench strength with "ready now" successors for critical positions and Individual Development Plans (IDPs) for every employee. Last but not least, the company's High Performance Culture is evident through the following measures displayed in its workplace: people demonstrate winning behaviours, the company enables target deliveries for all KFAs, and employees have shared positive experiences indicated through the Sarawak Energy Employee Survey score.

"The last two areas of Talent Management and High Performance cover structured and intensive programmes to fortify our people and culture, in order to deliver the first three areas of HSE, Generation and Network Operations, and Project Delivery. And the digital transformation plays a key role in delivering excellence in these three operational areas," said the GCOO.

"These KFA initiatives are interlinked like the Olympic rings. One cannot be achieved without the other. In our drive to become a top quartile benchmark utility through operational excellence, we must have all KFAs as enablers."


1

The 2010s was a decade of disruption for energy utilities, driven by climate change and environmental challenges, policy and regulation, and most of all, innovation in technologies. By the end of 2015, more than 170 countries had established renewable energy (RE) targets; nearly 150 enacted policies to catalyse investments in RE technologies.

Key changes in the past five years have seen a shift in the energy mix, growth in renewables, a mobility revolution, and the rise of energy storage. Utilities in mature economies - notably Europe and Australia - have been under pressure as their power markets struggle to adjust to these new realities.


2

The outlined KFAs should enable Sarawak Energy to maintain its status as the primary supplier of electricity in the State, and continue to remain relevant in years to come while adapting to new market landscapes.

"Change is the only constant. As a company, we have transformed over the last 100 years. The skills that we require as an organisation have changed, and will continue to change in line with technological advancement and the rapidly-changing global environment," Lu affirmed.

Sarawak Energy is also poised to become a powerhouse in the region, having taken its first step towards realising the Borneo Grid. In 2016, successful cooperation between the company and West Kalimantan through the first power export provided a platform for further cooperation in North Kalimantan. Lu shared that this has also led to further negotiations with Sabah to materialise the Borneo Grid.

"From a traditional utility, we have grown and evolved into an integrated utility and energy development corporation with regional ambition. We have proven to be adaptable in response to our external environment."

1. *Listening to an explanation with GCEO Sharbini Suhaili (2nd from left) and VP for R&D Dr Chen Shiun (right) at Sarawak Energy's Technology Day 2017.*
2. *Lu strongly believes that adaptability is key in a high performance organisation.*

LOW CARBON 'DIET' FOR MORE MALAYSIAN BUILDINGS

BUILDING OWNERS CAN START PRACTISING SUSTAINABILITY WITHOUT BREAKING THE BANK

With Steve Anthony Lojuntin,
Head of the Energy Demand Management (Energy Efficiency) Unit for SEDA Malaysia

Low carbon buildings are not a new concept in Malaysia, having been in the building industry even before the new millennium. It started with the development of the *Energy Efficiency in Buildings Guideline* published by the Ministry of Energy, Green Technology and Water (KeTTHA) in 1986. Then in 2001, the building energy code, *MS 1525 - Code of Practice on Energy Efficiency and the use of Renewable Energy for Non-residential Buildings* was published by SIRIM and the Department of Standards Malaysia (DSM).

In 2000, a number of energy audits on buildings were undertaken and supported by KeTTHA and its agency, the Malaysian Energy Centre (now GreenTech Malaysia). Presently, these efforts are continued by several agencies such as SEDA Malaysia, the Energy Commission (ST), the Malaysian Public Works Department (JKR), and private organisations.

The low carbon building (LCB) programme is a rebranding of the energy efficient building programme with potential renewable energy (RE) integration and aligns it with national and global agendas by emphasising on operational carbon reduction plans. Malaysia's target of reducing its carbon intensity by 45% by 2030 employs its own quantitative metric and has been translated into low carbon city action plans in several locations.

"By logic, the same quantitative carbon metric should be used in the building sector so that any reduction can be quantified, recorded, and also contributes to the country's carbon inventory," said Steve Anthony Lojuntin.

The LCB programme in Malaysia provides direct support to the low carbon cities (LCC) programme. The building sector is a major carbon emitter, according to a study by the United Nations Environment Programme's Sustainable Buildings and Climate Initiative (UNEP-SBCI) and several others, but there are also many opportunities within it to reduce carbon emissions. The LCC programme is currently promoted by the government to facilitate low carbon development in Malaysia as urbanisation rates are quickly increasing.

The low carbon building (LCB) programme is a rebranding of the energy efficient building programme with potential renewable energy (RE) integration and aligns it with national and global agendas by emphasising on operational carbon reduction plans.

An alternative solution, the LCB programme is for building owners who want to go Green but cannot afford to or are having difficulties in proceeding with the transition. Steve assured that they can start with basic sustainable energy measures and steadily improve on these before upgrading to become a certified green building in the future.

"It makes sense to tackle building emissions in order to reduce carbon emissions in cities by implementing the appropriate carbon reduction programme, which is the LCB programme. During the operational phase, buildings release 80% of its carbon emissions because of the amount of energy consumed, according to the UNEP-SBCI Common Carbon Metric (CCM) Report.

"Realistically and practically, sustainable energy is the key solution to reduce a building's operational carbon emissions. It is a straightforward solution. Straightforward solutions are usually cheaper and more affordable," he reasoned.

In 2011, the Low Carbon Cities Framework (LCCF) was developed and published by KeTTHA and GreenTech Malaysia (MGTC) in collaboration with the Malaysian Institute of Planners (MIP) to support the LCC programme. The main criteria of LCCF covers **Low Carbon Environment**, **Low Carbon Transportation**, **Low Carbon Infrastructure**, and **Low Carbon Buildings**.

"The Framework purposely mentions 'Low Carbon Buildings' and not Green Buildings, because the target metric and outcome focus on quantitative carbon reductions. In LCCF, higher carbon reductions will show in a city's low carbon performance," Steve explained.

But what exactly constitutes a Green Building? Steve shared two main elements, which are:

a) adoption or deployment of technologies in improving and managing environmentally related matters on the inside and outside of the building such as energy and water management systems, waste management, use of natural resources and environmentally friendly materials, indoor air quality, improved health quality, productivity, and operational costs; and

b) human factors related to sustainable habits and practices (also known as Green practices).

Contrary to popular belief, a green building does not necessarily require certification. It depends on what users are looking for - a certificate, or sustainable features. There are many buildings without certificates that have sustainable or Green features, operating on less resources such as low energy and water consumptions without affecting the quality and function of the buildings.

"If a building utilises technology that minimises degradation to the environment; has zero or low greenhouse gas (GHG) emissions; is safe to use and promotes healthy and improved environments for all forms of life; and conserves energy and natural resources and promotes the use of renewable resources, then that building can be considered a green building - according to the definition of 'green technology' under the Green Technology Policy," he clarified.

Steve also views the various sustainable building tools in Malaysia as a positive development and an advantage for the sector, though it may seem confusing to the public and industry at first. More tools means more options for selecting the most appropriate ones for a particular building.

"No single tool can provide fair and inclusive assessments for all building types. Take traditional houses for example. While always regarded as environmentally friendly due to low operational energy and using very little resources, there are no tools in Malaysia that suit these types of buildings. They will not comply with or meet most of the conventional criteria, but in reality they produce low carbon emissions," said Steve.

"Sustainability is very subjective and some elements cannot be quantified. That is why each tool will produce different results when assessing the same building, but they may use the same national standards for references and compliances. These include ISO 50001 for energy management, MS 1525 for energy efficiency (EE) and RE requirements, ISO 14000 for environment, QLASSIC for construction quality, and others."

> The LCB programme in Malaysia provides direct support to the low carbon cities (LCC) programme.

He further advised that government buildings are recommended to use MyCREST since it is the governmental green building tool. SEDA Malaysia currently has its own initiative, the Low Carbon Building Facilitation programme, to support the government, especially the Construction Industry Development Board (CIDB) in the promotion of MyCREST. This is through a step-by-step approach within the sustainable energy initiatives starting with basic energy management. Additionally, JKR has announced that using MyCREST is compulsory for any of its projects worth RM50 million and above.

Other tools that are available include JKR's Penarafan Hijau, GBI by Green Building Index Sdn Bhd, GreenRE by REDHA, GreenPASS, and others. There are more than seven sustainable tools available in Malaysia. GreenPASS is also known as the Construction Industry Standard (CIS) 20:2012, developed by CIDB and adopted by SEDA Malaysia for its Low Carbon Building Facilitation programme. The 11th Malaysia Plan (RMK11) document recognises local tools such as Penarafan Hijau, GreenPASS, and GBI for sustainable building development programmes.

Over the years, the most common feedback from the public, government agencies, local authorities, developers, and consultants in the industry pertains to the high costs of green building implementation, especially for existing buildings. Sometimes, this becomes a barrier to the development of the industry. Building owners like to "wait and see."

An alternative solution was required, one that involved an approach from a different angle of sustainability. The aforementioned UNEP-SBCI CCM Report had provided a new way to evaluate sustainable buildings by using the CCM method. In fact, in 2010, Steve, together with Dr Faridah Shafii and Noorly Akmal, had the opportunity to meet with UNEP-SBCI in Paris to bring the CCM method to Malaysia and embed it within the development of LCCF and GreenPASS. Carbon would be used as the alternative metric for evaluation, from the aspect of carbon reduction. The GreenPASS metric, for example, is wholly based on carbon reduction for buildings. LCCF also has a similar assessment methodology for low carbon cities.

"Our advice to existing building owners that cannot afford to go Green the conventional way is: Do not wait. We encourage them to opt for the LCB programme, starting with the basic energy management programme. They can later improve step-by-step until they achieve a certain level to upgrade and become a certified green building.

> "Low carbon buildings are a subset of green buildings. The only difference is that conventional green building assessments are based on compliances to preset criteria while the metric is based on marks or points collected. Low carbon building assessments are based on the carbon metric, where the final quantitative outcome is in carbon reduction performances. It does not matter how the building achieves this, so long as it does not compromise comfort, environment, quality, safety, and laws and regulations," he explained.

Some pilot projects that demonstrated success using the step-by-step approach starting with the LCB programme are KeTTHA's Low Energy Office (LEO) Building (2004), MGTC's Green Energy Office (GEO) Building (2007), and the Low Carbon House P14 in Putrajaya. The first two buildings were designed with only sustainable energy features, focusing on EE. After achieving energy reduction, the building owners gradually implemented other Green features and practices. The GEO Building was upgraded in 2009 and became the first certified green building in Malaysia by GBI. The LEO building followed suit in 2011 with a GBI Silver Certificate.

The Low Carbon House P14 was a typical double-storey building when it was occupied in 2008. The owner utilised basic and very low cost energy saving measures and practices to gradually upgrade to a super energy efficient home. In 2010, the building managed to reduce its energy consumption and operational carbon emissions by up to 64% - beyond the national carbon reduction target of 40%. The building owner then decided to aim for a net zero energy building instead. In early 2017, the House successfully reached this target by deploying onsite RE to offset the balance of energy needed.

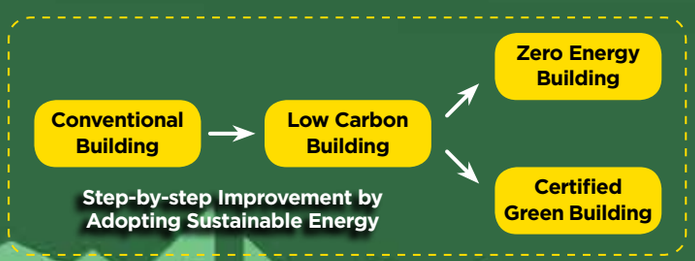
"We believe that existing buildings, including government buildings, can implement the LCB programme and gradually upgrade to certified green buildings at affordable costs. SEDA Malaysia currently facilitates this transition. The voluntary pilot project on low carbon building assessments using GreenPASS and the CCM method just began. We welcome building owners who are interested in this pilot project," Steve encouraged.

He also stressed that building owners should arm themselves with some knowledge before going Green; the rationale, objectives, expectations, targets, and strategies. Without some working insight on the processes, building owners risk becoming victims of 'greenwashing.'

> "Through the adoption of RE technology, it will be possible to attain high performance low carbon buildings and even zero energy buildings in the future."

"If they can afford to implement green buildings the conventional way, they should proceed and let users enjoy the benefits. To be safe, they should get assistance or advice from professionals, industry experts, and government agencies. Do it the right way, from the beginning."

Moving forward, local authorities implementing LCC programmes should prioritise the LCB programme in their procedures since it is a 'quick win' solution. The requirement to adopt MS 1525 for all new buildings is also crucial and will have significant quantitative energy and carbon reduction impacts. Steve confirmed that SEDA Malaysia is keen to facilitate local authorities in the adoption of MS 1525. These services would include capacity building, training, and technical support during the implementation of the pilot programme.



Key factors that contribute to successful energy and operational carbon reductions are:

a) Adoption of relevant MS 1525 elements in the designs, retrofitting, and operations of buildings;

b) Commitment to implementing effective energy management practices during operations, including routine energy monitoring; and

c) Fine-tuning and continuous improvement.

Steve also outlined a strategy for those who are thinking about embarking on green building projects:

a) **What type of Green Building are you looking for?** Are you aiming for a certificate or just a building with Green features? You can proceed with any sustainable building tool for a certificate and there is no harm in having more than one. Government buildings may choose to use MyCREST for the available promotion.

b) **Interested in going Green without certification?** You can implement any of the Green features suitable for your building. It is recommended to prioritise features that have quantitative measures and can significantly reduce carbon emissions related to energy, water, and waste. This option is popular in developed countries as building owners are encouraged by how much they contribute to improving the environment.

c) **Cannot afford to go Green the conventional way?** Do not wait. Start with the low carbon building approach and slowly upgrade until you achieve the highest possible energy and carbon reductions. If your building improves at 1% every month, in a year you will reach 12% and can only improve from there with time. Annual certifications can be awarded by SEDA Malaysia using GreenPASS (www.seda.gov.my/greenpass) based on the degree of carbon reduction performances, until your building reaches a certain level to be upgraded to a green building. MyCREST works best for these situations as GreenPASS is its subcomponent. Alternatively, you might want to pursue an advanced low carbon building. Through the adoption of RE technology, it will be possible to attain high performance low carbon buildings and even zero energy buildings in the future. The Low Carbon House P14 is an instance where the building owner opted for a zero energy building instead of the conventional green building. Zero Energy Buildings are now targeted for a future programme under the Green Technology Master Plan (GTMP).

REDUCING MALAYSIA'S CARBON FOOTPRINT, TOGETHER

KDSF AND GADING KENCANA SHARE THEIR EXPERIENCES WITH SEDA MALAYSIA'S FiT

In 1988, a group of members from the Kiwanis Club of Kuala Lumpur (KCKL) mooted the idea of a facility that would help children with Down Syndrome. At the time, a survey had shown that there were no organisations or agencies advocating for such children. The first Down Syndrome Centre then manifested from this discussion 30 years ago.

The first Centre was declared open by Tun Dr Siti Hasmah Mohamad Ali, spouse of Prime Minister Tun Dr Mahathir Mohamad. The Kiwanis Down Syndrome Foundation (KDSF), a non-profit organisation, was then formed in 1990 to ensure proper management of the set up. Committed to the welfare of children with Down Syndrome, KDSF's main focus pertains to the education of these children below six years old.

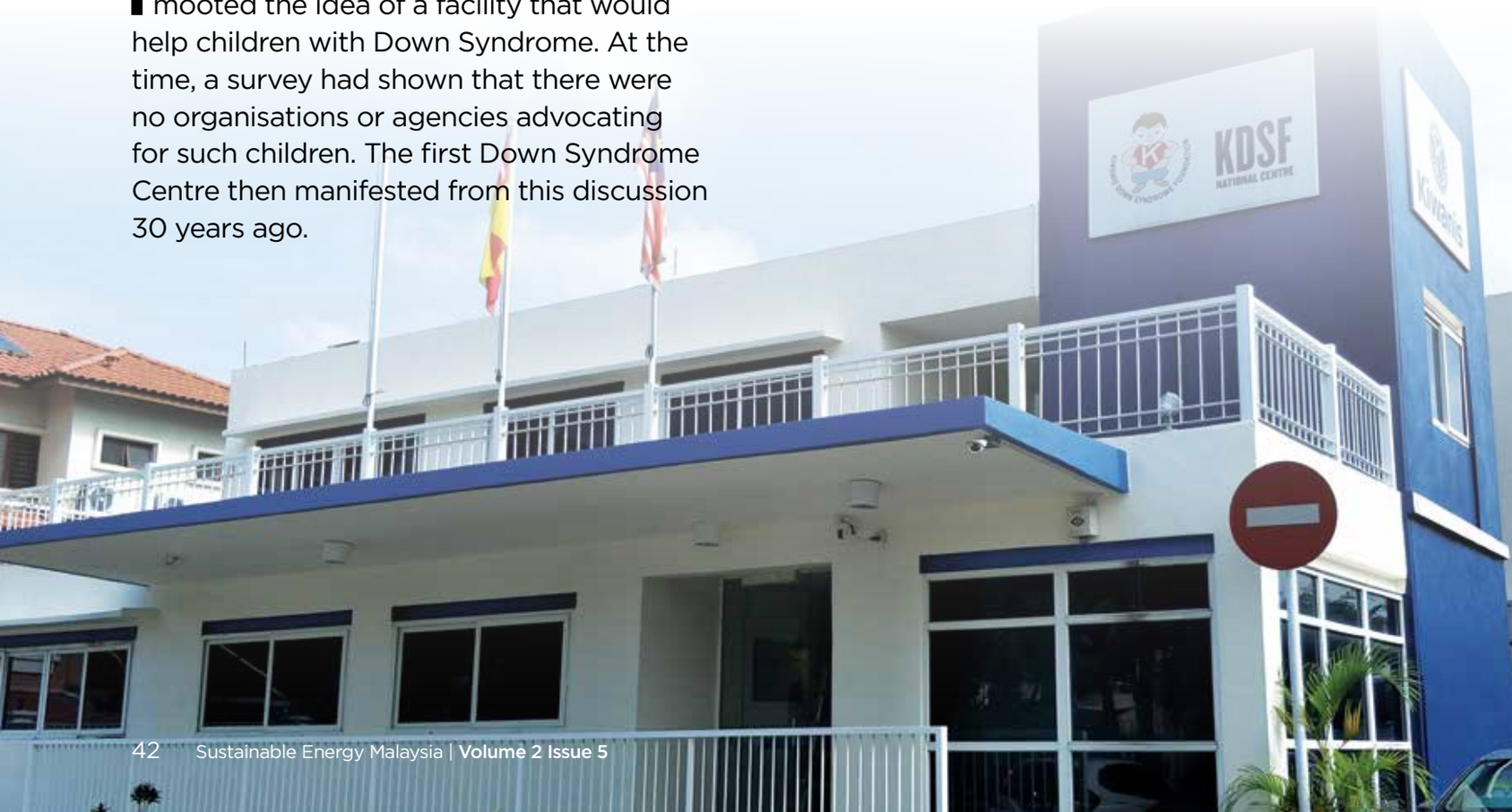
KDSF now manages five Down Syndrome Centres in Malaysia with locations in Petaling Jaya, Johor Bahru, Klang, Melaka, and Kulai. The Centres implement the Early Intervention Programme, a special needs education programme that utilises Robert Dellar's curriculum.

The Foundation's management committee comprises industry volunteers who are also advocates of sustainability, and thus had the vision to initiate the journey of becoming a Feed-in Approval Holder (FiAH) community.

"When the Feed-in Tariff (FiT) scheme became available for communities, we proceeded to apply. The purpose was to reduce our carbon emissions to help the environment and to benefit from the reductions in our electricity bills through income derived from FiT," said Chen Thiam Leong, Property Management Chairman of KDSF.

"The very visible PV installation on the roof of our Centre in Petaling Jaya is a good showcase to KCKL members and visitors for harvesting renewable energy (RE). This FiT scheme has helped us offset our monthly energy bill by up to 85% and fulfills our desire to do our part in reducing the national carbon footprint," he explained.

"We have enjoyed an income averaging RM2,300 per month. This translates to an ROI of less than 7.5 years for our capex on the solar PV installation."



Joining KDSF on this journey was Gading Kencana as the service provider. Gading Kencana was the first Malaysian solar PV service provider to obtain ISO 9001:2008 and OHSAS 18001:2007 certifications. It was also first to innovate rooftop solar PV systems, using the "A-shape" of roofs on traditional Malay houses to enhance cooling effects for buildings in tropical climates. This was not previously possible as then-conventional systems were based on European and American designs.

And Gading Kencana truly distinguishes itself in the area of innovation. When land issues in Melaka forced yield to significantly compensate for less space, the company rose to the occasion. Together with cutting-edge innovations in systems and technologies, Gading Kencana actualised a world-class achievement - the world's most resource-efficient solar farm.

Gading Kencana's collaboration with KDSF speaks to its ability and willingness to also work on smaller-scale projects for the benefit of communities.

"I am a member of KCKL. From the beginning of the construction of the Centre in Petaling Jaya, KCKL had always wanted some form of solar PV installation for the Centre be it solar street lighting or solar power generation," shared Datin Hasnah Awang, a Company Director of Gading Kencana.

When the FiT scheme for communities was introduced by SEDA Malaysia, Gading Kencana wasted no time in sending a team to study possible locations for a solar PV installation and the appropriate capacities. Following that, a financial and technical proposal was submitted to KCKL and KDSF management committees. Upon their agreements, Gading Kencana proceeded with application procedures to SEDA Malaysia.

"Besides KDSF, we have also engaged Sikh/gurdwara communities and Muslim/mosque communities. We did a roadshow to introduce FiT and the benefits that NGOs can gain through FiAH participation," said Hasnah.

"It is a known fact that many mosques and gurdwaras depend on donations to pay their utility bills. Bills may also be paid in arrears as donations can at times be few and far between. Having a FiT income can overcome this problem and also improve the kitty of gurdwaras and mosques for other activities."

KDSF has certainly attested to these advantages, and is now a role model for others.

"Our solar PV panels are visible from the courtyard to create awareness in visitors, parents, and Club members. Since the project's inception, we have answered queries from other NGOs and similar centres wishing to install PV panels. Gading Kencana has also brought potential clients to visit and view our installation," Chen affirmed.

Chen also showed some insight with his ideas that might help facilitate more RE usage in communities like his.

He suggested: "Perhaps the government can help identify companies willing to sponsor PV installations for charity homes as part of their CSR activities, and provide them with tax incentives for the sponsored sum. However, we do not advocate extending the tenure of the FiT scheme as Net Energy Metering (NEM) is a good enough incentive - provided there are PV sponsors."

Hasnah lauded SEDA Malaysia's FiT scheme for communities and attributed its successes to the "silent but effective" way it assists NGOs to operate with a steady income.

"The FiT programme under SuriaKU (pilot programme) has also shown that eradication of poverty is effective. Whatever funds allocated for monthly donations to the poor can be redirected into a one-time investment in a solar PV installation under FiT, which guarantees income generation," she added.

"Public awareness towards going Green is still at a low level, however. Educating the public is a key element to make any programme successful."

IT ALWAYS PAYS TO GO GREEN

YBBM and Eco-Gallery see SEDA Malaysia's FiT as a way to better society

Yayasan Belia Buddhist Malaysia (YBBM) was formed in 1979 under the auspices of the Young Buddhist Association of Malaysia, with the main objective of raising funds to facilitate the training and development of Buddhists in the country. Its vision is to build up Malaysian Buddhism through collective efforts and self-help methods. Further to developing Malaysian Buddhism, YBBM is on a mission to ensure that Buddhism continues to flourish in a multi-racial and multi-religious society.

Presently, YBBM manages four funds in its portfolio: The **Malaysian Sangha Fund**; the **Memorial / Personal Charity Fund**; the **GIFT Project**; and the **Bodhi Park Development Fund** - formed to help finance Bodhi Park's building and development costs. The park is a milestone for YBBM in its mission to advance Malaysian Buddhism.

Bodhi Park is located in Section U12, Shah Alam. The Selangor Government allocated a piece of land in 2008 for the park to be constructed on. Work began the following year, and the park was completed in 2010. Now, Bodhi Park is a bastion of Buddhist development in the country.

YBBM Chairman Dato' Ang Choo Hong said: "Bodhi Park's primary function is to serve as a training centre for youths. They come from all over Kuala Lumpur and Selangor and frequently use this place for their camps. We also get international visitors.

"I proudly declare to our visitors that this is perhaps the first eco-friendly Buddhist centre in Malaysia. Not only do we have our own solar PV system, but we also practise rainwater harvesting."

Under Ang's visionary management, YBBM became a Feed-in Approval Holder (FiAH) community under SEDA Malaysia's Feed-in Tariff (FiT) scheme.

"As an engineer, I am fully aware of the importance of renewable energy (RE) and the FiAH programme. I discussed the feasibility of installing solar panels at our site with my committee members, and it was well received. The project would be economically feasible on top of providing us with a shaded car park," he elaborated.

FiT has benefitted YBBM through the generated income that is used to offset Bodhi Park's electricity bill. Ang thinks it is still a worthwhile investment even though the offset amount does not add up to much after deducting capital expenditures.

"We generate about RM4,000 of electricity per month, which is also about the same amount of electricity consumed," the Chairman specified.

Because YBBM's solar PV system was intentionally installed as a roof for its car park, the car park has become an attraction of sorts. Visitors first notice this unconventional feature, and find it interesting that the solar panels also serve as the roof. The shade from the roof also helps reduce heat on the ground.

While designing this particular system, YBBM's service provider, Eco-Gallery, decided that the community should benefit beyond the monthly FiT income. Teoh Soo Leong, Director of Eco-Gallery, shared that this is why they implemented the BIPV Carport System for YBBM.

"Car park users cannot help noticing the unique rooftop material. Instead of the typical tiles or metal sheets, there are units of solar PV panels linked to one another in an organised manner. This aligns with the intended educational purpose for temple goers, especially students. They learn about solar PV as an energy source," Teoh continued.

YBBM is one of four community establishments that Eco-Gallery has designed and implemented its solar PV systems for, under the FiT scheme. Through other programmes, Eco-Gallery has applied similar systems for 15 schools across the country.

Teoh affirmed: "Our company is driven by the belief that the systems we implement must benefit the planet and its people, apart from making a living from it. We have always wanted to implement PV power systems that will help those who really need the energy for basic use, such as in rural electrification.

"Organisations such as YBBM are contributing to our society's social education and welfare works, but are largely dependent on donations and volunteers to operate. We met YBBM through like-minded mutual friends."

Teoh also believes that having relatively "lenient" guidelines for the community sector does help with RE adoption, even though most of these organisations do not have immediate financial capabilities. With that being said, this inability to afford the initial cost remains the primary barrier to participation in the FiT scheme.

"RE adoption will increase manifold if financial aid is made available for the FiT programme, particularly for communities and residential users. SEDA Malaysia and the government could have been financial guarantors," he suggested.

> Ultimately, SEDA Malaysia succeeded in developing and implementing a framework to facilitate RE generation opportunities.

The Director also pointed out that many welfare organisations do not own their premises, or the legal papers of ownership or the rights of use cannot be easily obtained due to "historical" reasons or bureaucracy. Eventually, these organisations drop the idea of going Green.

Moving forward, Teoh called for the government and SEDA Malaysia to stamp out malpractices in order for the nation to achieve our RE targets and, subsequently, energy security. They need to ensure that only genuine developers are awarded contracts, FiA statuses, and PPAs; strict adherence to safety and quality; and that projects are being completed on time. Defaults and fraudulent practices must not be tolerated and be dealt with according to the law.

Ang thinks that the government can continue by improving on FiT, by making it more attractive for residential and community users to invest in.

"The government should concentrate on securing the participation of residential and community users rather than large scale solar farms. This approach is less capital-intensive as it involves little space cost and generates better public awareness of energy usage," he continued.

Teoh ended on a more encouraging note.

"Discounting any shortcomings, limitations, or situations out of its control, SEDA Malaysia has executed its mission professionally. For some years, it has been a reference for neighbouring countries wishing to develop their respective RE sectors in an organised manner. Ultimately, SEDA Malaysia succeeded in developing and implementing a framework to facilitate RE generation opportunities."

A BRIEF REVIEW OF

NEM'S PROGRESS SO FAR

TAKE-UP RATE NEEDS IMPROVEMENT; SEDA MALAYSIA HAS PLANS TO BOOST APPLICATIONS

The Net Energy Metering (NEM) scheme is a five-year solar PV programme intended to complement Malaysia's Feed-in Tariff (FiT) mechanism and encourage renewable energy (RE) deployment as meted out in the 11th Malaysia Plan (RMK11). NEM was initially executed by the Ministry of Energy, Green Technology and Water (KeTTHA), and is regulated by the Energy Commission (ST) with the Sustainable Energy Development Authority (SEDA) Malaysia as the implementing agency.

From November 2016 until 2020, each year, 90MW of capacity is scheduled to be released in Peninsular Malaysia and 10MW in Sabah and FT Labuan - though the proposed allocations will be reviewed as needed. A total of 500MW have been allocated for applications. With the cost of solar PV decreasing substantially annually, energy consumers can benefit from generating their own solar energy.

In NEM, solar energy that is produced from the installed PV system will be consumed first. Any excess will be exported and sold to distribution licensees (DLs, i.e. TNB and SESB) at the prevailing Displaced Cost prescribed by ST. The scheme is applicable to all domestic, commercial, and industrial sectors so long as they are customers of TNB (Peninsular Malaysia) or SESB (Sabah and FT Labuan).

The main advantage of the NEM scheme revolves around consumers saving on their utility bills as they use less of the electricity imported from the grid. NEM is handy for consumers who fall under the high electricity tariff block. In many countries, the scheme is often used to hedge any future fluctuations or increases in the electricity tariff.

1

While any generated excess energy will be exported to the utility grid, the priority of NEM is for self-consumption. However, some premises, especially industry or manufacturing companies, that may not be operating during weekends could have this excess energy exported to the grid. The credit shall be allowed to roll over for a maximum of 24 months and net-off at the prevailing Displaced Cost.

And by generating clean energy, NEM consumers contribute to the reduction of carbon dioxide emissions, hence reducing their carbon footprint and helping to mitigate climate change.

Unfortunately, these obvious benefits of the scheme have yet to attract more applicants. Since its launch in November 2016, NEM's take-up rate as at June 2018 only included 13.9MW out of the 300MW allocated up until 2018; a mere 4.6%.

SO WHAT CAN SEDA MALAYSIA DO TO STIMULATE DEVELOPMENT?

For starters, early this year, the 1MW-cap per project had been removed in response to industry feedback. ST, as the regulator, was in agreement with this move. It is mostly applicable to commercial and industrial consumers, and utilisation can be made available through roofed solar PV panels e.g. rooftop areas for car parks.

Domestic users' returns on investment (ROIs) would take around eight to nine years, a situation partly caused by a lack of incentives for residential use. SEDA Malaysia realises that this makes NEM less attractive for domestic consumers. The agency is working to push for a tax relief of sorts, but also reminds readers that ownership of a solar PV system can be used to hedge against future tariff hikes.

The Green Investment Tax Allowance (GITA) helps companies achieve their ROIs within four to five years. Many of these companies have opted for self-consumption as well. To further encourage NEM applications, solar leasing could be an option for development. Solar leasing would be open to companies who are willing to invest by selling and having a separate power purchase agreement (PPA) in collaboration with rooftop owners. SEDA Malaysia expects to see more of this concept executed in the near future.

Most important to the agency is educating the public on the benefits of clean energy, to shift away the emphasis on making money. Investments in solar PV systems are worthwhile as they can last 25 years. RE education should start from primary school and continue on to secondary, as afforded to composting and recycling activities. SEDA Malaysia knows that awareness needs to be instilled from an early age, and as such will be working closely with students towards this goal. It may take 10 years to see results, but once Malaysian society is in a Greener mindframe, then the initial investment costs would not be an issue.

RE is now embraced globally, an effort that is further supported by the Malaysian government. Even though there are no official quantitative measurements recorded, SEDA Malaysia believes that the rakyat have accepted the concepts of self-consumption and NEM as solar PV prices have dropped (and continued to drop) significantly.

More recently, during the inaugural town hall session for the RE industry on July 12, 2018, industry feedback strongly recommends that in order to mobilise NEM, the agency should: (i) revert NEM to its true definition of net metering by energy instead of net billing; (ii) if (i) is not acceptable, then the prevailing displaced cost needs review to reflect its accurate value as according to its definition in the RE Act 2011 [Act 725]; and (iii) increase awareness on the environment and climate change, and change mindsets to not focus on ROIs only.

SEDA Malaysia and the new Ministry of Energy, Science, Technology, Environment and Climate Change (MESTECC) will be studying and deciding the way forward based on these town hall findings.

1. *NEM Industrial Project Showcase: 675.3kW solar PV system installed on the rooftop of Lean Lee Trading Company Sdn Bhd.*
2. *NEM Industrial Project Showcase: 200kW solar PV system installed on the rooftop of Aident Corporation.*

PUMPED HYDRO STORAGE

(PHS) UTILISING CLOSED MINING ASSETS

By Chih-Ting Lo, President of
EELO Solutions Inc (Canada)

Energy storage is one piece of the puzzle in solving the renewable energy (RE) intermittency challenge. Significant advances in technologies and cost reduction are in exponential growth these last few years, including moving technologies such as redox flow batteries into commercialisation and bringing new excitements in fuel cells. The author is electrified with all the advances and firmly believes that the future in energy storage is multi-sourced.

Pump hydro storage (PHS) is the oldest energy storage technology with the largest global installed capacity. In 2017, IRENA reported that 169GW or 96% of the global energy storage is in the form of PHS. This bulk energy storage system is typically in the scale of hundreds or thousands of megawatts with four to ten hours of storage capacity. Bath County Pumped Storage Station, currently the world's largest battery located in the United States, has a 3,060MW installed capacity and can operate for 11 hours with a total storage capacity of 33,660MWh. In comparison, a Tesla Model X has a lithium ion battery with a total storage capacity of only 0.1MWh.

A PHS operates with the following concepts:

There are two water reservoirs, an upper and a lower one. Water is moved in a closed loop between the two reservoirs.
When there is surplus or cheap energy, such as from excess renewable power generated in the early afternoon, water is pumped from the lower reservoir to the upper reservoir.
When electricity demand increases, water is released from the upper reservoir to generate power same as other hydroelectric power plants.
This process can be repeated daily with more than 40 years of operating life.

The large-scale nature of PHS results in a high capital project even though the installed cost per megawatt-hour is lower than other technologies. The levelised cost of energy (LCOE), the measure of the life-cycle cost, is $150 to $200 USD per MWh (lithium ion battery for peak replacement is $270 to $360 USD per MWh). Most PHSs are built where there is a natural geological opportunity such as an existing waterfall with a large reservoir on top or at the bottom or two neighbouring valleys that are in different elevations. Without this, the cost to design and build a two-reservoir system would be astronomical.

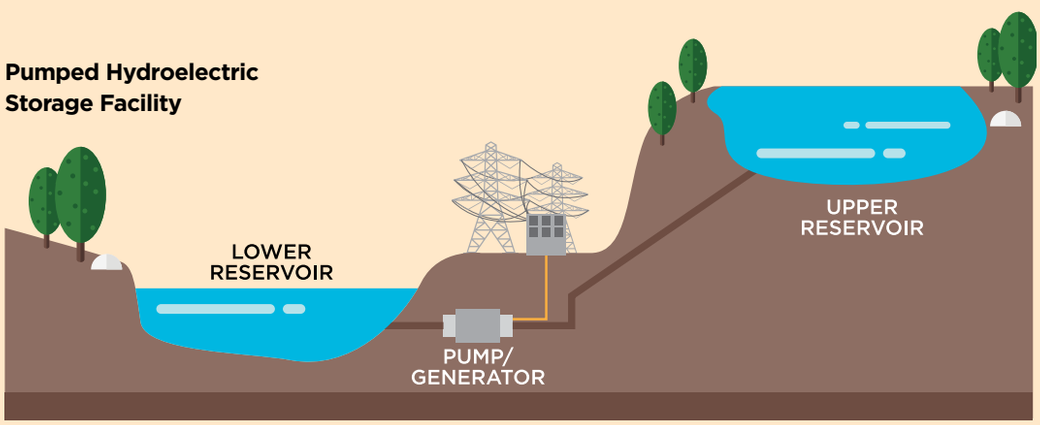
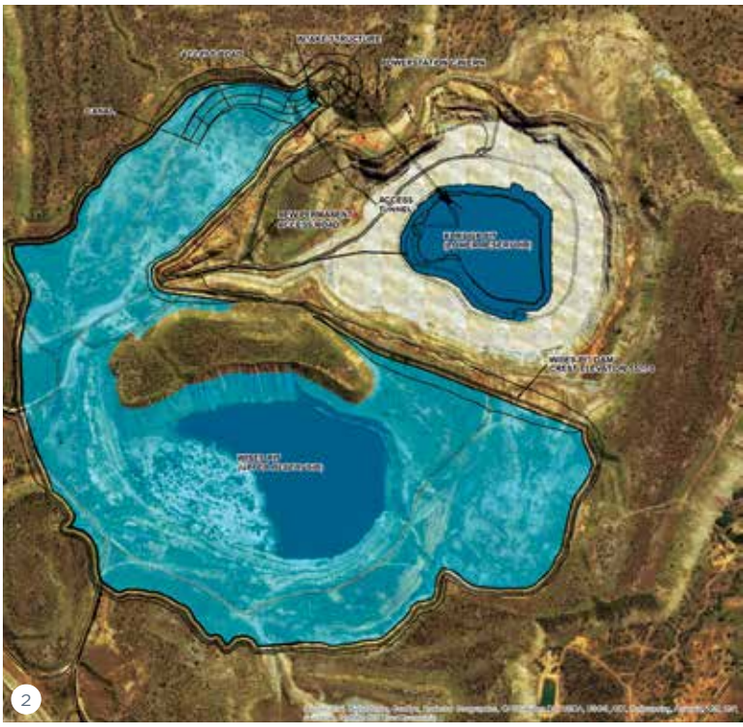


Figure 1: Depiction of Pumped Hydro Storage (PHS). Courtesy of Dominion Energy.



Mining is the business of moving large volumes of earth thereby creating sizable lakes on the surface or tunnels underground. Rocks that contain the metal or mineral of interest, termed the ore, are transported and processed to recover the material of interest. Mining operations are in remote areas and often large transmission infrastructure is built for the mine. Once the life of the mine depletes, it enters the closure phase and the environment and ecosystem are restored to their original state as much as possible, including removing all surface infrastructure and remediating contamination. The lakes and tunnels created by mining activities are left as-is and are filled by rivers, rainfall, snowmelt, and ground water. It is important to note these lakes differ from the tailings facility where used process water is stored, monitored, sometimes treated, and released only if it exceeds environmental compliance requirements.

Because these lakes and tunnels have been engineered and constructed over the life of mine, they become the aforementioned geological opportunity! Depending on the orebody and mining methodology, one or both of the upper and lower reservoirs are built during the life of mine. The existing electrical transmission infrastructure, if planned in advance so that it is not removed for a future PHS, further offsets a significant portion of the capital cost. Genex Power's Kidston 'K2-Hydro' PHS, a 250MW and 2,000MWh PHS project in Australia, is projected to cost only 25-30% of a typical PHS. Furthermore, there are limited additional environmental impacts to build a PHS in a closed mining asset and it can sustain jobs and economic benefits in remote communities that previously relied on mining.

PHS, like other energy storage systems, are being deployed with a sense of urgency globally. For example, China is committed to building 40GW of total installed PHS capacity by 2020, an additional 11.5GW to be built and commissioned based on the 2018 International Hydropower Report. There are growing interests of PHSs using closed mining assets in Canada, Germany, and Australia. Several projects propose to include a large solar plant that co-locates with the PHS to take advantage of surplus power to pump water to the upper reservoir and minimise operating costs to further improve the project economics.

At the time of preparing this article, there is no installed PHS in Malaysia and mining is one of the main industries. Therefore, the author encourages that a high-level PHS potentials assessment be conducted to identify closed or near life of mine operations that are suitable to supplement the growing renewable power mix in the electrical grid.

1. *Figure 2: Barrick Gold's Cortez open pit in Nevada - an operating surface mining operation. Courtesy of Barrick Nevada.*
2. *Figure 3: Kidston 'K2-Hydro' PHS - the Wises pit and the Eldridge pit from mining will be transformed into upper and lower reservoirs for the PHS. Courtesy of Genex.*

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MALAYSIA

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ADVERTISING RATE

PAGINATION

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Inside Front Cover (IFC)		15,000
Outside Back Cover (OBC)		18,000
Inside Back Cover (IBC)		15,000
Facing Editor's Note (FEN)		13,000
Facing Content Page (FCP)		13,000
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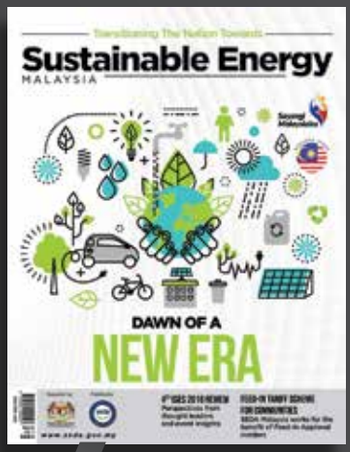
Sustainable Energy Malaysia Magazine is the country's premier source of sustainable energy (SE) content for white collar professionals as it covers extensively on SE development, policies, and market outlooks for all SE industry players in Malaysia.

A vast majority of our magazine's audience consist of executives or managers working at the top line of various organisations in the country. It serves as a platform for investment which enables your newest innovations to reach the right target groups and support lead generation. Apart from helping to improve local customer sentiment, the magazine aims to provide a global perspective on the deployment of SE developments in tandem with the nation's efforts in advocating the global climate agenda.

SUSTAINABLE ENERGY MALAYSIA MAGAZINE PUBLICATION DETAILS

Publisher	SEDA Malaysia
Category	Industry Professionals & Enterprises
Target Audience	20 years old and above
Frequency	3 times a year
Number of Pages	Min 48 pages (Including cover)
Size	29.7cm (H) x 23cm (W)
Circulation	5,000 print run
Distribution	Government bodies and Agencies Financial Institutions Industry Professionals and Investors



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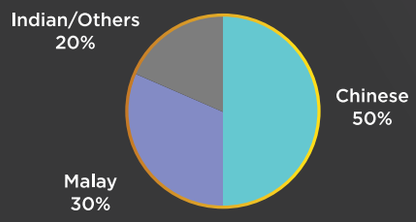
RACE



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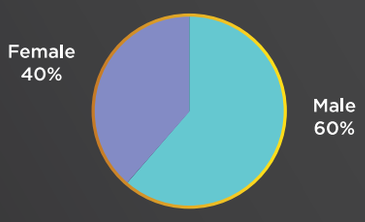

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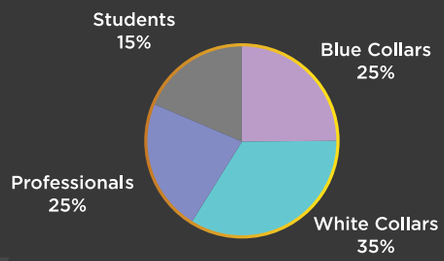

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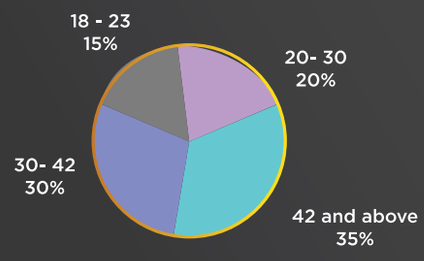

CALENDAR
OF EVENTS

7-15 APRIL 2018
KUCHING, SARAWAK

50th IEA PVPS TASK 1 MEETING

Malaysia (via SEDA Malaysia) hosted the 50th IEA Photovoltaic Power Systems Programme (PVPS) Task 1 Meeting in Kuching, Sarawak. There was an insightful exchange on the status of solar PV and energy transition between representatives from Germany, Japan, South Korea, Belgium, Denmark, Sweden, Thailand, Switzerland, Austria, China, Australia, and Spain. The delegates also participated in the 4th ISES 2018 and went for site visits to Sarawak Energy and LONGi Kuching's cell plant together with representatives from KeTTHA and SEDA Malaysia.

15 APRIL 2018
KOTA MARUDU, SABAH

JELAJAH YAHIJAU PROGRAMME

A lively atmosphere was documented during the sharing of information on SEDA Malaysia and knowledge on renewable energy at "Program Jelajah YaHijau Sabah 2018: Kota Marudu." Together with other KeTTHA agencies, SEDA Malaysia took the opportunity to introduce itself and sustainable energy to the locals.

The final strategic thrust under the National Renewable Energy Policy and Action Plan (NREPAP) relates to developing an awareness programme so that there is a greater acceptance and participation by the general public and private sector in the sustainable energy programmes administered by SEDA Malaysia.

The activities cover local awareness programmes which include engagement with stakeholders through seminars/workshops, open days, exhibitions, collaboration with NGO partners, as well as international liaisons through meetings and seminars attended.

18-19 APRIL 2018

TAMBUNAN, SABAH

JELAJAH YAHIJAU PROGRAMME

SEDA Malaysia participated in the two-day Jelajah YaHijau Programme in Tambunan to promote and share knowledge on sustainable energy in Malaysia. The event took place at Dewan Pisompuruan and was officiated by YB Datuk Seri Panglima Dr Maximus Johnity Ongkili, former KeTTHA Minister. He was accompanied by Tan Sri Datuk Seri Panglima Joseph Pairin Kitingan, 7th Chief Minister of Sabah, and Amin Abdullah, CEO of YaHijau.

13 MAY 2018

PUTRAJAYA

COURTESY VISIT FROM BUREAU OF STANDARDS, METROLOGY AND INSPECTION OF TAIWAN

SEDA Malaysia received a courtesy visit from the Bureau of Standards, Metrology and Inspection of Taiwan whereby eight Bureau representatives were present for the meeting. The main objective was to discuss the Taiwan Renewable Energy Certification (T-REC) Mechanism and Trading Guidance Pilot Programme Updates (2018). The meeting was chaired by YBrs Catherine Ridu, then-CEO of SEDA Malaysia.

14 JUNE 2018

PORT DICKSON, NEGERI SEMBILAN

POWER PLANT PRE-ASSESSMENT FOR KUALITI ALAM

SEDA Malaysia's team visited Kualiti Alam Sdn Bhd in Port Dickson with the objective to pre-assess current power plant conditions and capabilities before SEDA Malaysia or its representatives conduct the Acceptance Test and Performance Assessment (AT&PA). AT&PA is a requirement under the Renewable Energy (Technical and Operational Requirements) Rules 2011; it is required before SEDA Malaysia can award FiTCD status to the plant.

31 MAY 2018

PUTRAJAYA

STAKEHOLDER ENGAGEMENT SESSION WITH RE INDUSTRY

SEDA Malaysia hosted an engagement session with the renewables industry to discuss the aspirational Renewable Energy target outlined in the new Government's Manifesto under Promise 39. The session concluded with an agreed list of enablers to be tabled to Minister Yeo Bee Yin to catalyse the energy transition and to meet Malaysia's climate commitment.

22 JUNE 2018

PUTRAJAYA

MEETING WITH HAZAMA ANDO CORPORATION

SEDA Malaysia had a fruitful meeting with Japanese investors from Hazama Ando Corporation who are keen to invest in renewables to meet their country's RE obligations. The meeting was led by Dr Wei-nee Chen, SEDA Malaysia CCO, with discussions on the possibility of Malaysia supplying unbundled Renewable Energy Certificates to meet Japan's climate commitment. The Corporation was represented by eight officers during this meeting.

26 JUNE 2018

PUTRAJAYA

STAKEHOLDER ENGAGEMENT SESSION WITH RE INDUSTRY

Final engagement session with stakeholders in the renewables industry to ascertain their aspirations and the challenges they face for SEDA Malaysia to table to the new Ministry of Energy, Science, Technology, Environment and Climate Change (MESTECC). The session was chaired by Ir Akmal Rahimi Abu Samah, COO of SEDA Malaysia. The Authority is eager for further discussions with the new Government on the way forward for national energy transition.

3 JULY 2018

PUTRAJAYA

KeTTHA AND AGENCIES RAYA OPEN HOUSE

A day after her swearing-in ceremony, YB Yeo Bee Yin gave her first speech as MESTECC Minister at the aforementioned Raya Open House. She called for Integrity, Excellence, and Future-focus in the new Ministry, with an emphasis on transparency.

"We are not here to get paid. You do not work for me, but for the people. Every time we do our jobs, we must ask ourselves: Have we done the best that we can?"

25-26 JULY 2018

PUTRAJAYA

TRAINING FOR ENERGY MANAGEMENT AND ENERGY AUDITS IN BUILDINGS

A two-day training session on Energy Management and Energy Audits in Buildings (under the RMK11 Energy Audit Conditional Grant Programme) was held at SEDA Malaysia to intensify human capital development in the sustainable energy industry.

31 JULY 2018

PUTRAJAYA

FAREWELL CELEBRATION FOR FORMER SEDA MALAYSIA CEO

July 31 marked the conclusion of YBrs Catherine Ridu's service as CEO of SEDA Malaysia. She is moving on to serve the country in the Ministry of International Trade and Investment. SEDA Malaysia sincerely thanks and applauds her for steadily leading the Authority over the past four years and two months.

RENEWABLE ENERGY (RE) FUND

WHAT ARE THE IMPACTS OF HAVING RE FUND TO SUPPORT THE FEED-IN TARIFF (FiT) MECHANISM?

POSITIVE IMPACTS ON :

ECONOMY

Hedges against conventional fuel price volatility.

Creates RE - related jobs.

Financial security through Renewable Energy Power Purchase Agreement (REPPA).

Creates spin off businesses.

NATIONAL AGENDA

Promotes a decentralised and democratised form of electricity system.

Government's commitment to 20% of RE electricity generation by 2025.

Increases energy security and autonomy.

SOCIETY

RE, a common landscape for the community.

Community engagement through climate change mitigation.

Increases public awareness for renewables.

ENVIRONMENT

Reduces dependency on fossil fuels.

Lowers carbon dioxide (CO_2) emissions for cleaner air.

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