Transitioning The Nation Towards

Sustainable Energy

MALAYSIA

REIMAGINING SARAWAK'S UTILITIES

FOR SUSTAINABLE DEVELOPMENT

Sarawak Energy GCEO
Datu Sharbini Suhaili outlines the company's vision for the future

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SECURING MALAYSIA'S SOLAR PV ECOSYSTEM
MESTECC announces improvements to NEM and introduces SARE

UPHOLDING ITS MANDATE FOR SUSTAINABILITY
SEDA collaborates for solar PV insurance and REC market; launches PVMS

Sustainable, affordable, renewable and reliable energy for Sarawak and beyond

Sarawak's generation mix is predominantly sustainable and affordable, renewable hydropower, resulting in Sarawak having the lowest tariffs in Malaysia and amongst the lowest in the region.

Bakun Hydroelectric Plant
2,400 MW

Batang Ai Hydroelectric Plant
108 MW

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EDITORIAL
REVIEW

Welcome to the final Issue of Sustainable Energy Malaysia (SEM) for 2018. It has been an eventful final four months of the year. In the previous Issue, we covered highlights of the inaugural renewable energy (RE) town hall chaired by newly-minted Minister of the Ministry of Energy, Science, Technology, Environment and Climate Change (MESTECC), YB Puan Yeo Bee Yin. During the town hall, several key issues were highlighted by the RE industry. In the next four months that followed, some of these key issues were addressed.

Among these issues was the enhancement of the net energy metering (NEM) scheme by finally discarding net billing and adopting the pure net energy metering concept. This will further add to the savings of solar PV owners as excess electricity will no longer be sold at the displaced cost but at the equivalent retail rate. The enhancement of NEM has spawned new business models for behind-the-meter solar PV generation such as solar leasing, direct PPAs, and a hybrid of solar leasing-PPAs.

Another breakthrough was the announcement on reforming the electricity industry - long-awaited by the RE industry - with aims to increase industry efficiency, future-proof industry structures, regulations and key processes, and opening the market to empower consumers. SEDA has been advocating for electricity market reform for the past four years, so much so that the theme of our 3rd ISES 2016 was "Democratising Electricity Supply."

Once the electricity market is liberalised, energy trading among prosumers will be possible and this will further spawn new front-of-the-meter business models such as virtual and federated power plants and virtual net metering. While some energy assets can be aggregated in energy trading, others such as storage systems can be fractionalised to provide flexibility or ancillary services in the new energy system. Grid-edge stability can further be enhanced by electric vehicles (EVs) via vehicle-to-grid (V2G) systems, and this is important as the penetration level of solar PV increases in the electricity mix.

In the series of announcements by the MESTECC Minister, an emerging RE enabler in Malaysia was introduced - the start of a voluntary renewable energy certificate (REC) market. SEDA is the first Malaysian entity to be appointed as an authorised verifier of clean energy generation under the Tradable Instrument for Global Renewables (TIGRs) Registry, operated by APX Inc. With the ability to monetise environmental attributes, RE developers can improve the returns of their RE projects in addition to revenue streams of energy generation sales.

The future of energy is truly exciting. My recent participation at the Annual Meeting of the Global Future Councils under the World Economic Forum confirms that the future will be largely electrified, driven by the need to rapidly decarbonise. Digitalisation will play an important role as the future energy system will require emerging 4IR technologies to respond rapidly with intelligence embedded in many grid-edge applications.

As Malaysia embarks on a journey to achieve 20% RE in the power mix by 2025 (excluding large hydro), our future outlook for this quest remains bright. With this, I am reminded of the closing remarks by the UAE Minister of the Future at the Global Future Councils meeting. He said his job is to future-proof his nation and to make the impossible, possible. His words echoed one of the three guiding principles of Minister Yeo, that is to be future-focused in our work.

At SEDA, our role is ensure that the future energy system will be 100% sustainable energy (SE) - a feat which may seem impossible to some, but in time, we believe it *is* possible. Year 2019 will be an exciting one as we expand SEDA's online presence by transitioning our SEM magazine from print to digital. Thank you to all sponsors who have made this publication possible.

I wish the most joyous of celebrations to our readers who celebrate Christmas, and to all, a blessed new year ahead.

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

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5. **Off-Grid Photovoltaic (OGPV) Systems Design Course**
6. **Operation & Maintenance of Biogas Power Plant Course**

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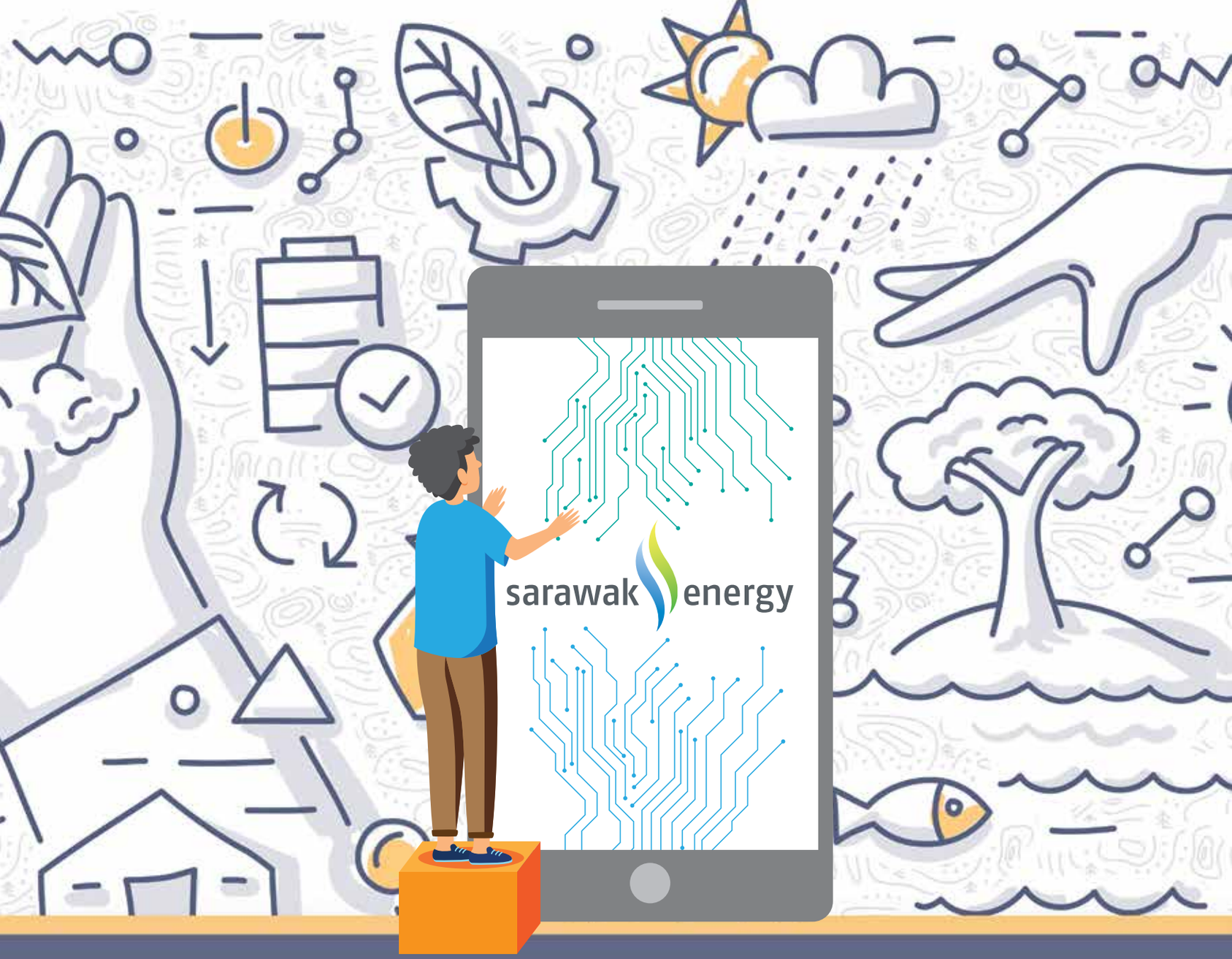
BECOMING A DIGITAL UTILITY OF THE FUTURE

Sarawak Energy goes through its own evolution while the State undergoes an energy shift



As the world transitions from fossil fuel to renewable energy (RE), it is clear that the pursuit of sustainable energy (SE) is well on its way. The question now is, how long will the energy shift take? Specific to Sarawak, the state-owned utility company Sarawak Energy Berhad has already begun including RE in its generation mix to achieve holistic energy development. Here, the company's Group Chief Executive Officer, Datu Sharbini Suhaili, outlines Sarawak's energy transition and how it ties in with Sarawak Energy's own digital transformation.

Renewable hydropower is predominant in Sarawak's generation mix, holding a 75% share in 2018. Sarawak Energy has been steadily adding alternative renewables into the mix, having already ventured into solar and mini hydro to power up communities in the State's interior.

"We hope to add solar generation to the grid in the future. We have a balanced and holistic view of sustainable energy development as we are pursuing energy security, energy reliability, and energy affordability," said Sharbini.

"Therefore, while hydropower makes up the predominant part of our generation mix, we still need to balance that with thermal by harnessing our abundant indigenous coal and gas resources. We expect to achieve a mix of 60%-hydropower and 40%-thermal by 2030. We have almost completely phased out diesel generation."

The company's mission has long been to ensure full electrification for Sarawak while supporting the State's socio-economic growth, with a sincere desire to benefit communities where it builds and operates. Along the way, Sarawak Energy aims to contribute to the global movement in mitigating climate change.

With more and more corporations realising that green business is good business, Sarawak Energy has gone the extra mile to use that to benefit Sarawakians. To begin with, it is well-known that the State offers the lowest average unsubsidised tariffs in Malaysia, among the lowest in ASEAN because of hydropower's low generation cost - 38% lower than Peninsular Malaysia and more than 100% lower than Singapore.

"Our strong focus on hydropower development is based on the fact that large hydro offers the lowest Levelised Cost of Energy (LCOE) among the generation methods available. This gives Sarawak a sustainable and competitive advantage, allowing us to transfer savings to our people and at the same time, attract energy intensive industries by offering very competitive bulk power tariffs to SCORE customers," the GCEO explained.

Sarawak Corridor of Renewable Energy (SCORE) customers benefit from globally competitive tariffs as SCORE is an economic corridor to catalyse the State's industrialisation. SCORE is one of five economic development corridors created by the Malaysian Government as part of its ambitious plan to stimulate investment-led growth in traditionally rural areas.

> To adapt to the changing global energy scenario, we are embracing digitalisation and innovation by taking proactive steps to instil the interest, knowledge, and culture of change within Sarawak Energy.

The long-term 2008-2030 development plan for SCORE focuses on growing the energy sector and targets 10 high-impact priority industries, with the aim of attracting major projects that will also create downstream opportunities for smaller businesses. As these energy-intensive businesses establish themselves locally, they will provide a major economic boost for the areas identified as SCORE growth nodes. Everyone will feel its effects as SCORE gathers momentum.

Taking in a land area of 70,000km^2 with a population of 600,000, SCORE is the second largest of these corridors. It spans the central region of Sarawak, with a thousand-kilometre coastline, eight million hectares of forest, and five million hectares of arable and peat land suitable for agriculture.

1

1. *Sharbini shares his thoughts during a keynote Q&A session at the Conference of the Electric Power Supply Industry (CEPSI) 2018, Kuala Lumpur Convention Centre.*
2. *Sharbini narrates Sarawak Energy's story of pursuing renewable, affordable, and reliable energy development to MESTECC Minister YB Puan Yeo Bee Yin at the company's CEPSI 2018 exhibition booth.*
3. *The timely commissioning of the 944MW Murum hydroelectric plant in September 2016 contributed significantly to the State's decision to reduce domestic, commercial, and industrial electricity tariffs.*

The abundance of competitively priced and reliable energy from renewable hydropower provided by SCORE's hydroelectric infrastructure, which forms the centrepiece of the development strategy, keeps Sarawak attractive to investors for industrial development opportunities made available by this economic corridor.

Energy transition for a State as big as Sarawak is, expectedly, not without its challenges. For Sarawak Energy, a core challenge is making sure that economic and sustainable development are inclusive of the remote and dispersed rural communities. Adding to that is Sarawak's population, sprawled across the State's vast and diverse geographical landscape of winding rivers, dense rainforests, and rugged terrain.

"Sarawak aims to achieve almost full electrification by 2020 through an accelerated rural electrification master plan that is one of our key projects in the next two years. We plan to achieve this with a mixture of grid-connected and off-grid sources," Sharbini stated.

As it stands, rural population electricity coverage is at 91% with overall state domestic coverage at 95%. There has been significant progress since 2009, when overall state domestic coverage was at 79% and rural population electricity coverage at just 56%.

Funded by the Sarawak Government, four strategies under this master plan are: expanding the high voltage distribution network from the existing grid under the Rural Electrification Scheme (RES); extending the Extra High Voltage (EHV) transmission network into rural areas through the Rural Power Supply Scheme (RPSS); electrifying the most inaccessible areas with solar and mini hydro Hybrid systems for relatively larger remote villages; and providing very remote villages with standalone solar or mini hydro systems through the Sarawak Alternative Rural Electrification Scheme (SARES).

"The simultaneous and intense implementation of these programmes will speed up the Government's electrification plan, by catalysing rural development to close the gap between rural and urban communities," he affirmed.

More recently, Sarawak Energy has been researching alternative energy sources since embarking on an investigation into the commercial viability of a hydrogen economy for the State through the production, delivery, storage, and utilisation of this "fuel of the future."

The company's pilot hydrogen production plant and refuelling station is scheduled to be ready in time for a test run of three hydrogen-powered buses that are due in Sarawak by the first quarter of 2019. The production plant and refuelling station is part of several initiatives undertaken by Sarawak Energy to green the transportation sector through low carbon fuels for Kuching, the capital of Sarawak.

In tandem with the State's energy transition and electrification, Sarawak Energy is undergoing its own transformation to keep up with the global digital revolution. Such a process could only better serve Sarawakians and their access to clean energy.

"To adapt to the changing global energy scenario, we are embracing digitalisation and innovation by taking proactive steps to instil the interest, knowledge, and culture of change within Sarawak Energy. This is a crucial step in realising the transformation given that the Digital Revolution has reached our business. There is no alternative but to transform Sarawak Energy into a Digital Utility of the future," the GCEO emphasised.

An integrated ICT blueprint was developed to chart how digital technology can better enable the business throughout the entire value chain - generation, transmission, distribution, and retail. This blueprint leverages on smart technologies and big data to deliver value to the business and customers.

Under the umbrella Pinnacle Programme, Sarawak Energy put in place initiatives to help drive its key focus areas and roadmap towards Sarawak Energy Excellence 2020. Utilising digital tools and solutions, the Pinnacle Programme is aimed at enhancing operational efficiency and improving business outcomes. Solutions like Centralised Fleet Management, Generation EAM, and the Travel & Expense solution seek to optimise costs in both capital expenditure (capex) and operating expenses (opex).

Sharbini also shared how the company sped up response time through the Mobile Field Force Automation (MFFA), which monitors and tracks response times of its technical field crew when attending to customer complaints. On the MFFA dashboard, feedback results are shown in real-time. As of October 2018, the overall customer satisfaction rating for technical and customer service came to an impressive 94%.

"Key benefits of embracing technology and going digital means more efficient decision-making processes as well as improvements in the overall organisational performance. Moving our systems and processes into this new environment and maximising the benefits would make Sarawak Energy a great place to work, where an enabled workforce produces enhanced customer experiences," Sharbini noted.

He also stressed that despite Sarawak Energy being wholly State-owned, and the primary provider of electricity and energy developer of the State, the company operates as a commercial entity. It continuously diversifies its generation portfolio and constantly works at improving its services to remain relevant.

On improvement, Sarawak Energy is always seeking ways to enhance its customers' experiences. This means being more customer-focused, especially through technology and innovation.

> Sarawak aims to achieve almost full electrification by 2020 through an accelerated rural electrification master plan that is one of our key projects in the next two years.

Sharbini said: "Our SAIFI and SAIDI indexes have improved and will continue to progress even further. This year, we have been focusing on a digital roadmap for maximum efficiency, by looking into ways to embed digital technologies into our processes."

The GCEO believes that the company is operating on an appropriate model for the times, citing its ability to deliver key benefits to its customers by being involved in the processes of generation through to transmission, distribution, and retail. This accelerates electrification coverage, with governmental support, while providing sustainability, affordability, and security towards a holistic energy development strategy.

"One size does not fit all. Development requires a tailored approach, fitted to the specific purposes of each situation. This is more important when we consider our time and place on the development curve towards deregulation and decentralisation.

"But this is not to say things will not change. The key is to always adapt and maintain agility, so that we are ready for change," he concluded.

1. *The Mobile Field Force Automation (MFFA) allows Sarawak Energy to monitor and track response times of its technical field crew when attending to customer complaints in real-time.*
2. *"Key benefits of embracing technology and going digital means more efficient decision-making processes as well as improvements in the overall organisational performance."*
3. *Bird's-eye view of the Sejingkat power station.*
4. *Sharbini addresses the audience at the recent Sarawak Energy Town Hall.*
5. *Sharbini goes on-site to monitor the progress of a project with SEB Power Sdn Bhd CEO James Ung (right) and others.*
6. *Sharbini, Chairman of the Sarawak Energy Leading Women Network's (SELWN) Council, speaks at the Network's International Women's Day event.*
7. *The SEBcares App is Sarawak Energy's first mobile application for customers, allowing them to - among others - view and manage their utility bills; report on technical, billing, and metering issues; and receive real-time alerts on power outages.*

Net Energy Metering (NEM)

WHAT IS NEM?

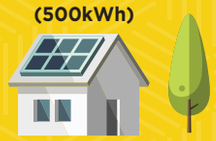
NEM or Net Energy Metering is a practice where energy produced from the installed solar PV system will be consumed first, and any excess will be exported to Tenaga Nasional (TNB). Effective 1 January 2019, the new NEM mechanism will allow electricity users with solar PV system installations at their homes or premises to further reduce electricity bills and hence, create additional savings. The excess energy calculation will be based on the 'one-on-one' principle in this improved NEM mechanism.

Effective 1st January 2019

PREVIOUS NEM

Solar energy that is produced from the installed PV system will be consumed first. Any excess will be exported and sold to TNB at the prevailing Displaced Cost prescribed by the Energy Commission.

(500kWh)



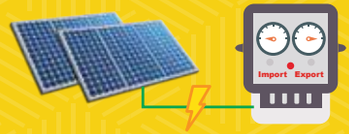
Home with solar PV

500kWh x Gazetted Tariff = RM 180.20

Import x Gazetted Tariff

Block Tariff (kWh)	Prorate (kWh)	Rate (kWh)	Amount (kWh)
First 200	200	0.218	43.60
First 100	100	0.334	33.40
First 200	200	0.516	103.20
First 300	0	0.546	0.00
Total	**500**		**180.20**

(200kWh)



Excess Energy Export to TNB (Solar PV)

200kWh x RM 0.31/kWh = RM 62.00

Export x Displaced Cost

Bill : RM 118.20

NEW NEM

The new NEM mechanism has been improved by adopting the true net energy metering concept, allowing excess solar PV generated energy to be exported back to the grid on a one-on-one offset basis.

(500kWh)

Home with solar PV

500kWh x Gazetted Tariff = RM 180.20

Import x Gazetted Tariff

Block Tariff (kWh)	Prorate (kWh)	Rate (kWh)	Amount (kWh)
First 200	200	0.218	43.60
First 100	100	0.334	33.40
First 200	200	0.516	103.20
First 300	0	0.546	0.00
Total	**500**		**180.20**

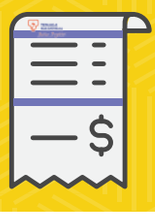
(200kWh)

Excess Energy Export to TNB (Solar PV)

200kWh x Gazetted Tariff = RM 103.20

Block Tariff (kWh)	Prorate (kWh)	Rate (kWh)	Amount (kWh)
First 200	0	0.218	0
First 100	0	0.334	0
First 200	200	0.516	103.20
First 300	0	0.546	0.00
Total	**500**		**103.20**

Export Charges are charged in descending order (start from the highest applicable rate)

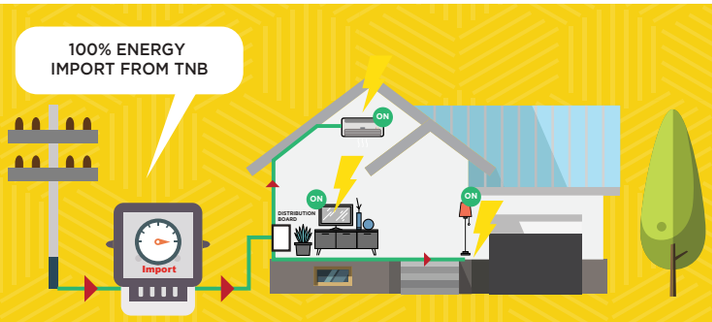


Bill : RM 77.00
(Additional Savings : RM41.20)

Net Energy Metering (NEM)

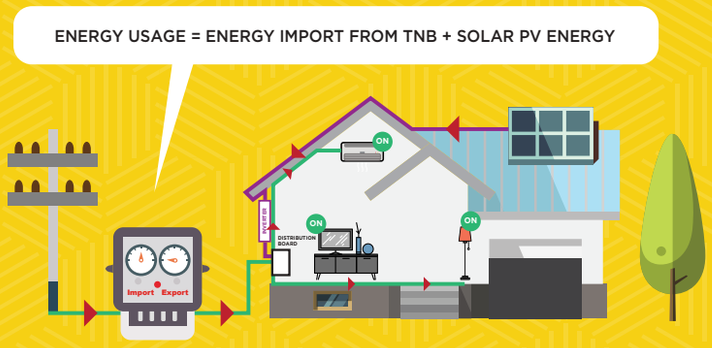
NEM CONCEPT SCENARIOS

NEM
Net Energy Metering



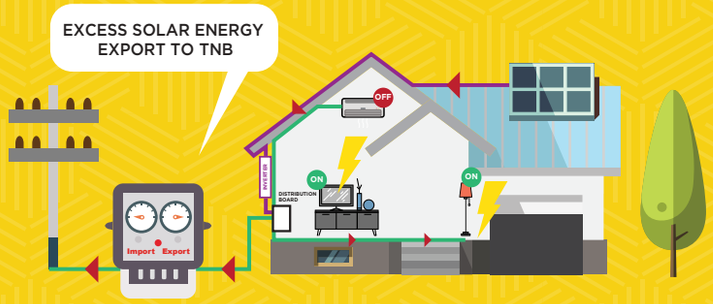
WITHOUT NEM

ENERGY IMPORT = ENERGY USAGE (EQUAL)



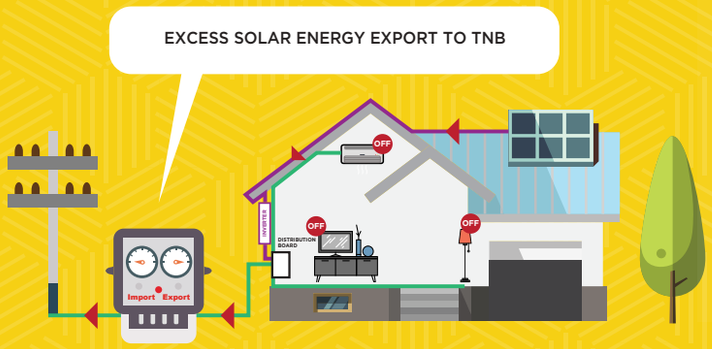
WITH NEM

SCENARIO 1: ENERGY USAGE MORE THAN SOLAR PV ENERGY GENERATED



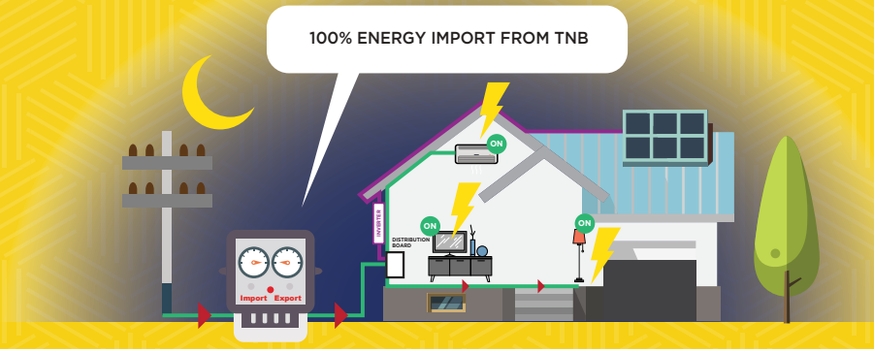
WITH NEM

SCENARIO 2: ENERGY USAGE LESS THAN SOLAR PV ENERGY GENERATED



WITH NEM

SCENARIO 3: NO ENERGY USAGE (NO ONE AT HOME)



WITH NEM

SCENARIO 4: NIGHT TIME NO ENERGY GENERATED FROM SOLAR

For more information regarding NEM or how to apply, please visit:
www.seda.gov.my

KEMENTERIAN TENAGA, SAINS, TEKNOLOGI, ALAM SEKITAR DAN PERUBAHAN IKLIM

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A PROMISING VIEW FOR MALAYSIA'S SUSTAINABLE

On opening day of the International Greentech & Eco Products Exhibition & Conference Malaysia (IGEM) 2018, October 17, Minister YB Puan Yeo Bee Yin of the Ministry of Energy, Science, Technology, Environment and Climate Change (MESTECC) announced that SEDA had revoked a total of 155.7256MW of non-performing Feed-in Tariff (FiT) projects between August and September of this year. In return, SEDA released part of the revoked capacity - 114.5682MW - in November 2018.

The small hydro category has been allocated a quota of 74.5682MW for applications expected to achieve commercial operations by 2020 and 2021. Biogas will be allocated 30MW and biomass, 10MW; these quota amounts are for applications achieving commercial operations by 2021.

According to the Minister, SEDA will also conduct the inaugural exercise of e-bidding for its biogas quota. The aim of the e-bidding process is to create a better pricing efficiency for electricity generated from biogas resources through healthy competition.

MESTECC Minister YB Puan Yeo Bee Yin announces the changes to NEM during IGEM 2018, accompanied by Datuk Ir Ahmad Fauzi Hasan (right), SEDA Acting Chairman, and YB Rajiv Rishyakaran (left), SEDA Authority Member.

ENERGY FUTURE

SEDA conducted a briefing on the e-bidding system with biogas industry players on October 25, and the actual e-bidding commenced on November 19. Interested applicants can submit their applications through the e-FiT online system (efit.seda.gov.my).

Yeo also revealed a few solar PV initiatives to encourage Malaysia's renewable energy (RE) uptake. From the RE town hall held on July 12, 2018, one of the key issues highlighted by the PV industry was the need to change the concept of Net Energy Metering (NEM), from the existing net billing concept to true net energy metering. This would help improve solar PV returns of investment (ROI) under NEM.

After a few months of deliberation, the Minister decided that NEM be improved by adopting the true net energy metering concept. This will allow excess solar PV energy to be exported back to the grid on a one-on-one offset basis. This means that every 1kWh exported to the grid will be offset against 1kWh consumed from the grid, instead of at the displaced cost previously.

OLD NEM SCHEME

(Energy Consumed x Gazetted Tariff) – (Energy Generated x Displaced Cost)

NEW NEM SCHEME
(EFFECTIVE JANUARY 1, 2019)

(Energy Consumed – Energy Generated) x Gazetted Tariff

The old NEM scheme was introduced on November 1, 2016 to encourage rooftop solar PV installations mainly for self-consumption. However, at the end of September 2018, only about 17MW of solar PV was taken up through NEM after two years of its implementation.

Under NEM, there are a few business models. First is the outright purchase of the solar PV system by the owner. In addition to that, there is the solar leasing model. Solar leasing can be a direct contractual agreement between the solar PV investor and customer or via Tenaga Nasional's (TNB's) Supply Agreement for Renewable Energy (SARE) mechanism (also announced by the Minister at IGEM 2018).

Under SARE, TNB will enter a tripartite contractual agreement with the solar PV lessor and the customer. TNB will be responsible for billing, which will incorporate payment for solar leasing, and in return charges a token fee to lessors for billing and collection services.

Through solar leasing, customers can lease-to-own or lease just for energy procurement. Lease-to-own customers can negotiate the upfront down payment with solar PV lessors. This is flexible and the contract is designed to suit a willing buyer/seller mode.

Customers can be charged either a mixed monthly cost or on a per kWh basis through the electricity bill. The solar PV leasing tariff is lower than the retail tariff. There are several companies participating in solar leasing and, at the date of printing, these companies include GSPARX (a wholly-owned subsidiary of TNB Renewables), Ditrolic Solar Sdn Bhd, Atlantic Blue Sdn Bhd, Maqo Solar Technologies Sdn Bhd, and Pekat Teknologi Sdn Bhd.

ADVANCING THE COUNTRY'S RE AND EE AGENDAS
THROUGH COOPERATION

SEDA signed three memorandums of understanding (MOUs) on opening day of IGEM 2018 with signing partners Asian Development Bank (ADB), the Japanese Business Alliance for Smart Energy Worldwide (JASE-W), and APX Inc. The signing ceremonies were witnessed by MESTECC Minister YB Puan Yeo Bee Yin.

The first MOU highlighted the Authority's role to chart a pathway towards a future in renewable energy. The Authority has been tasked to develop the Renewable Energy Transition Roadmap (RETR) 2035, anticipated for completion by the end of 2019.

Through this MOU, ADB will provide three energy experts for a comprehensive peer-review of the Roadmap; these experts include a Senior Energy Economist, a Senior Power Systems and Distribution Expert, and a Senior Energy Policy Expert. ADB will also disseminate key highlights of the Roadmap through knowledge briefs and workshops once it is completed.

The second MOU with JASE-W will develop and promote the concept of Zero Energy Buildings (ZEBs) in Malaysia. Japan is one of the leading countries to emphasise the development of ZEBs. With this MOU, information on energy efficiency, knowledge, services, and technologies will drive the dissemination and promotion of ZEBs and the ZEB concept.

1

The Parties will also cooperate to facilitate potential business opportunities and partnership-based projects, where Japanese knowledge and services for energy conservation and efficiency will benefit Malaysia's industries. JASE-W was appointed by the Ministry of Economy, Trade & Industry, Japan (METI) to disseminate and promote ZEBs and a ZEB series concept in Japan and ASEAN countries.

Last but not least, the MOU between SEDA and APX Inc recognises the former as an authorised verifier or a Qualified Reporting Entity (QRE) of the TIGRs Registry. The Authority is the first entity to be an appointed verifier in Malaysia.

The TIGRs Registry ("Tradable Instrument for Global Renewables Registry"), operated by APX Inc, will provide a platform for renewable energy certificate (REC) trading. A REC represents all environmental attributes of 1MWh of generated RE.


2

3

The REC market will help scale up the domestic RE market and, concurrently, enable international and domestic brands to access clean energy. This is in line with global targets and reporting criteria set by CDP, RE100, and all other major sustainability reporting platforms. Malaysia promotes a voluntary REC market and this will provide an avenue for corporations to drive the domestic RE market.

1. *The first MOU exchange between SEDA and ADB for Malaysia's RETR 2035 was witnessed by MESTECC Minister YB Puan Yeo Bee Yin (second from left).*
2. *SEDA and APX's MOU recognises the former as an authorised verifier / Qualified Reporting Entity for the TIGRs Registry; the Authority is the first to be appointed in Malaysia.*
3. *From SEDA's MOU signing with JASE-W, as witnessed by Yeo, both Parties will be able to exchange information on energy efficiency programme opportunities in Malaysia.*

NURTURING AND PROTECTING AN EMERGING SOLAR PV MARKET

The launch of the country's first-of-its-kind All Risk Solar PV Insurance was initiated by SEDA on the opening day of IGEM 2018. An initiative by the Authority, the Insurance is in place to ensure solar PV investors' systems are well protected. MESTECC Minister YB Puan Yeo Bee Yin was also present to officiate the launch.

The innovative insurance product is provided by Allianz Malaysia via Anora Agency Sdn Bhd, in collaboration with the Malaysian Photovoltaic Industry Association (MPIA).

The Solar PV Insurance is an All Risk comprehensive protection plan. The insurance addresses the post-installation gaps that are typically lacking in the market. Namely, the lack of support services, the high costs of maintenance, and the lack of compensation for damages faced by residential solar PV owners.

Under this scheme, policyholders will not have to bear any cost for repairing or replacing the damaged parts and components. They will also be compensated for the loss of income or savings when their solar PV systems experience downtime for up to six months due to damages or theft.

Solar PV owners such as participants of the Feed-in Tariff (FiT) and Net Energy Metering (NEM) schemes, implemented by SEDA, could worry less about their investments now.

According to Ts Dr Wei-nee Chen, Acting CEO of SEDA, the Authority had approved 12,284 solar PV applications in total under FiT, of which 9,864 solar PV projects are commercially operational as at the end of September 2018.

This insurance scheme is timely for welcoming an emerging domestic solar PV market. It was thoughtfully designed to create an ecosystem with the local PV industry, to protect investments in solar PV systems by individuals and commercial entities.

1. *Yeo witnessed the launch of the Solar PV Insurance by Allianz Malaysia via Anora Agency, in collaboration with MPIA; here, she is pictured with Samuel Soon, Anora Agency CEO.*
2. *Yeo also took part in launching the first national solar PV monitoring system (PVMS).*

DOMESTIC SOLAR PV ECOSYSTEM IS STRENGTHENED WITH PVMS

2

After a year of working on a solar PV monitoring system (PVMS), SEDA successfully launched the nation's first on opening day of IGEM 2018, October 17. Witnessing the launch was MESTECC Minister YB Puan Yeo Bee Yin.

Malaysia is blessed with ample sunshine throughout the year, however, there is no single platform that allows real-time data to be disseminated. This is where the new Monitoring System comes in. The Authority took the initiative to setup a national PVMS that could accurately quantify solar irradiation and solar PV performance data nationwide.

The performance and reliability of key components of solar PV systems, such as PV modules and inverters, will be monitored. PVMS also acts as an information platform for solar PV in the country.

For a start, 120 grid-connected solar PV systems (up to 1MW in capacity) throughout Malaysia are now being monitored on a real-time basis. SEDA targets a total of nearly 150 solar PV sites to be monitored by year end; this would include the 26 government buildings retrofitted with solar PV systems.

Funded by the Malaysian Electricity Supply Industries Trust Account (MESITA) under MESTECC, the Authority has been actively developing this platform ever since the idea was first mooted in 2015. The Authority envisions that the database will become the reference for designing national energy policies and programmes in the future. All data under PVMS is available through subscription.

The PVMS portal can be accessed via: https://pvms.seda.gov.my/pvportal/

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IGEM 2018
GALLERY

1. A group photo to commemorate the MOU signings with MESTECC Minister YB Puan Yeo Bee Yin, SEDA Authority Members and Management Personnel, as well as representatives from ADB, JASE-W, and Anora Agency.
2. SEDA was proud to represent MESTECC at IGEM 2018 with a section dedicated to the Authority as part of the Ministry's pavilion.
3. Yeo (middle) and MESTECC Deputy Minister YB Isnaraissah Munirah Majilis (right) posed for photographers during their visit to MESTECC's pavilion.
4. Datuk Ir Ahmad Fauzi Hasan, SEDA Acting Chairman, presents a token of appreciation to Yeo at the end of opening day, the book 'Energy Democracy: Germany's Energiewende to Renewables.'
5. Visitors were able to receive first-hand information on sustainable energy from SEDA officers.
6. There was much enthusiasm following the debut of renewable energy certificates (RECs) in Malaysia on the second day of IGEM 2018; here, visitors seek more information from a SEDA rep.

SEDA Malaysia in the News

anora
LIFE POSITIVE

YOUR SOLAR INVESTMENT: Secured & Insured

There has been much talk recently about renewable energy, thanks to the Federal Government's push towards environmental sustainability. MESTECC Minister Yeo Bee Yin has announced several upcoming incentives - from zero upfront costs to Net Energy Metering - to encourage the use of solar energy, which forms the bulk of Malaysia's renewable energy.

After all, the sun shines year-round in Malaysia, and if you can harness its power to supplement your home's energy supply and save some money, why not? You get lower energy bills, and you are contributing towards a greener environment.

But before you rush out to install solar panels on your roof, it's good to consider how to protect your solar investment so that it can keep producing energy efficiently.

CHALLENGES

One of the main challenges homeowners have been facing over the past few years is the maintenance and repair of solar panels.

Solar panels could be damaged due to a variety of reasons, from windstorms and lightning to fire, flood and malicious or accidental damages.

When things go wrong, as they sometimes do, it may be difficult to get service support, especially if the original service providers are no longer in business. The original spare parts may also be hard to find or too expensive to replace. And while you are looking for someone to service your system or for the parts to be replaced, you are losing out on the income or savings you would normally be getting.

It is also important to note that the normal home insurance doesn't protect against damage to the solar PV system due to intentional/malicious damages or any other perils, such as lightning damage or theft.

PROTECTION

These risks can be mitigated with the Special All Risk Solar PV Insurance. Offered exclusively by Anora Agency Sdn Bhd, an agency partner of Allianz Malaysia, the Solar PV Insurance addresses issues including the lack of support services, high costs of maintenance and lack of compensation for damages faced by residential and commercial solar PV owners.

The development of the product was a result of a tripartite collaboration between Anora Agency, the Malaysian Photovoltaic Industry Association (MPIA), and Sustainable Energy Development Authority (SEDA) Malaysia.

The Solar PV Insurance's comprehensive protection covers loss or damage to the solar PV system due to any malicious damage, theft or lightning, as well as damage from aircraft aerial devices or articles dropped, fires, explosions, earthquakes and other natural disasters, floods, landslides, burst water pipes and overflowing water tanks, and more.

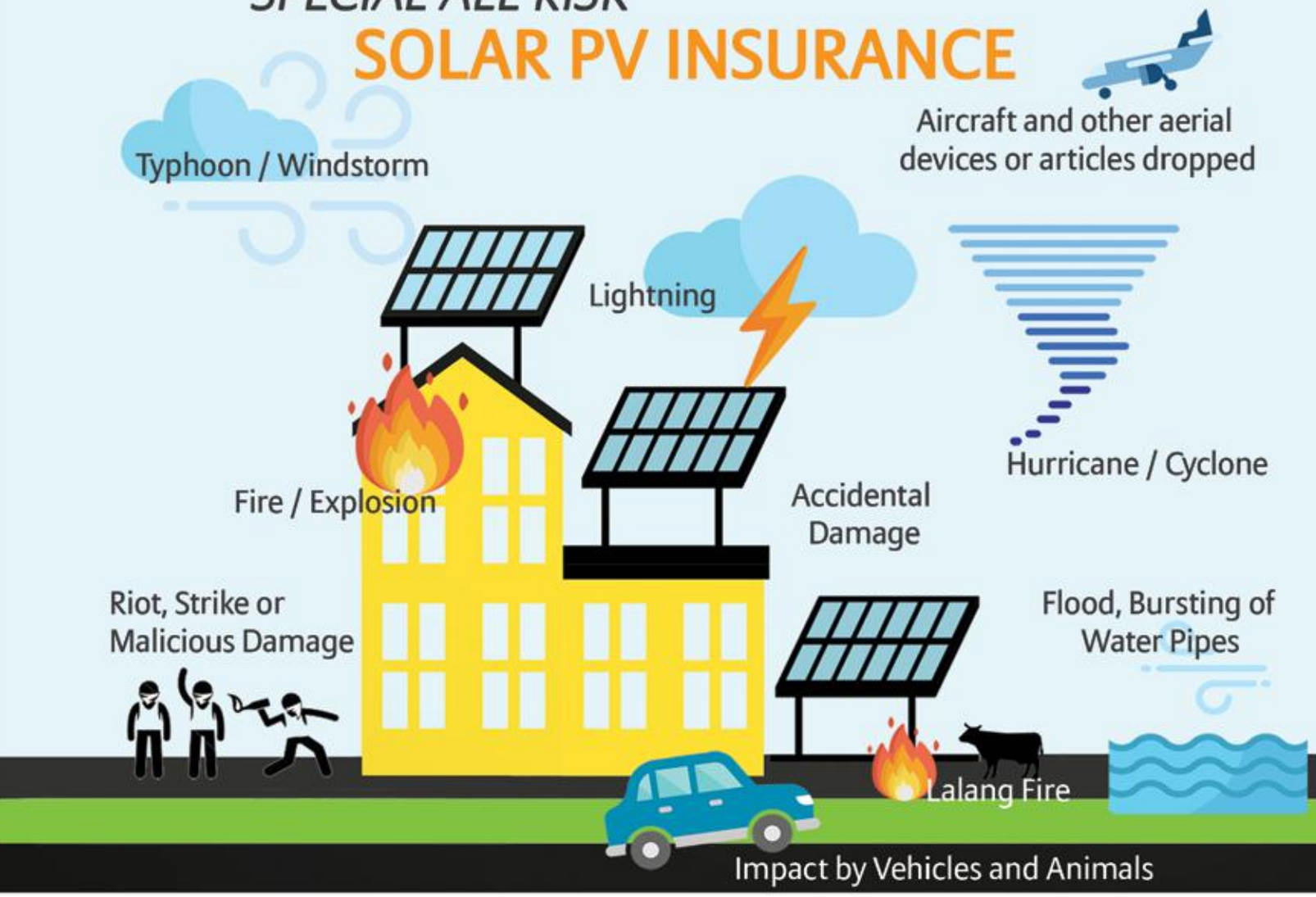
Thus, solar PV owners will not have to bear any costs for repairs or the replacement of parts (including components) and will also be compensated for loss of income or savings should their solar PV system experience down time due to damage or theft.

For more info on the Special All Risk Solar PV Insurance, kindly contact Anora Agency Sdn Bhd at:

Hotline number
011 110 26672
Online solution consultant
m.me/anoraagency
Website
www.anoraagency.com

SPECIAL ALL RISK

SOLAR PV INSURANCE



Having Problems With Your Solar PV Systems?

1 Income or Savings Protection

For those under FiT, NEM & self consumption, your income or savings will be protected.

2 Comprehensive Protection

You can avoid stress or repair cost because of damaged Solar PV system and components.

3 Affordable Premium

Reasonable & affordable premium that doesn't hurt your bottom line.

Powered by Allianz.

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MPiA MALAYSIAN PHOTOVOLTAIC INDUSTRY ASSOCIATION

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ADVANCING MARKETS FOR RENEWABLE ENERGY IN MALAYSIA AND BEYOND

APX Inc CEO Joe Varnas discusses why and how the TIGRs Registry was developed, and what it means for brands, project developers, and government stakeholders in Malaysia.

HOW DID THE TIGRs REGISTRY COME TO BE?

"We began offering our REC tracking services in Asia because a longstanding customer - one of the world's largest technology companies - asked us to help them solve a real challenge: how could they source renewables in a key market, while demonstrating to their consumers (in a metric and credible way) exactly how much impact they were making? The result was the launch of the TIGRs Registry, first to support a large volume of RE transactions in Singapore, and now, to continue supporting transactions across Asia and beyond."

In 2016, APX launched the Tradable Instrument for Global Renewables (TIGRs) Registry. Building on 17 years of experience designing renewable energy certificate (REC) and carbon credit registries, the goal was to give corporate buyers a global option for tracking renewably-generated power and sourcing RECs.

WHAT WAS THE REGISTRY BUILT TO DO?

"We built the TIGRs Registry to give companies two simple things: First, access to renewables, anywhere in the world, no matter how they chose to consume them. Second, 100% assurance that all RE claims they make are backed by an internationally recognised tracking platform."

Today, the TIGRs Registry supports the world's leading brands to track power purchase agreements (PPAs), onsite renewable energy (RE) generation, and to procure "unbundled RECs." For corporate and industrial power consumers, this has opened the floodgates for "greening" operations in countries where clean power was previously not an option. Corresponding demand has been astounding.

COULD YOU DISCUSS SUPPLY AND DEMAND FACTORS IN THE REC MARKET?

"APX registries, including the TIGRs Registry, our US REC registries, and our international carbon registries, support transactions in excess of USD 1 billion per year - this reflects a clear global demand for environmental attributes. On the buyer's side, demand is mostly driven by corporate commitments to achieve environmental targets, which in turn is a powerful approach to demonstrate leadership to consumers. On the supply side, the rationale is very straightforward - developers generate additional revenue by selling RECs."

For project developers, RECs create an additional revenue stream - encouraging new investments in renewable generation assets, supporting project bankability, and shortening payback periods on existing loans. Although REC prices vary by country, fuel type, and purchase arrangement, issuance fees are consistently low enough for developers to generate profit.

Lars Kvale, APX Managing Director, provides an overview of RECs and the TIGRs Registry in Malaysia during the REC Workshop at IGEM 2018.

Roble P. Velasco-Rosenheim, APX Asia Regional Lead, talks about using the TIGRs Registry in Malaysia, its domestic market opportunities, and actionable steps for registering and selling RECs.

HOW HAS YOUR BUSINESS EVOLVED ALONGSIDE THE MARKET?

"What we found almost two decades ago in the US was that brands were willing to pay for 'green.' The question then became how to package it, and the answer - which came out of hundreds of consultations with the private sector, governments, UN and multilateral agencies, non-profits, and developers - was to provide a vehicle for clear metric attribution of ownership. Hence, our registries.

What buyers want is the ability to track, measure, own, and prove. Without a credible registry, the claim to 'green' is something completely intangible. This is a real problem if you are trying to distinguish yourself from the competition. With a registry, however, brands have the ability to demonstrate action publicly - to make good on commitments."

Industry associations have done a lot to improve transparency, which is important across the entire value chain - from corporate governance down to the consumer level. Campaigns and initiatives like RE100, the Science Based Targets initiative, the Renewable Energy Buyers Alliance, the Sustainable Apparel Coalition, LEED, and others are encouraging companies to reimagine how they procure and consume energy.

HAVE ANY MOVEMENTS IN THE MARKET SURPRISED YOU?

"Constantly! Interestingly enough, over the past decade we have seen a real move towards collaboration among corporates. This has done tremendous things for the industry as a whole. Whereas the first private sector sustainability narratives were focused on individual corporate social responsibility activities, the rise of industry associations has done a lot to scale up corporate involvement and collaboration in the RE space. What we are seeing now is that environmentally conscious brands are willing to work together to solve common problems - namely, how and where to source renewables. Frankly, it is the only way forward."

The ability to procure renewable power (both physical power and RECs) varies significantly by country. Factors that affect the ability to procure renewables include physical availability of generation assets, policy-level support (or obstacles), utility involvement, the legal and contractual environment for PPAs, and dozens of other factors.

COULD YOU DISCUSS SOME OF THE GLOBAL VS LOCAL FACTORS THAT RELATE TO MALAYSIA?

"Until recently, the challenge for buyers was sourcing and tracking renewables in specific geographies. Europe, the US, and Australia all have long-standing REC registries - and we are proud to have built all of the infrastructure in the US - but apart from these markets, there has been virtually no way to track renewables globally. For companies with operations outside of the 'easy' markets, this was a huge problem. Now, with TIGRs set up to meet global sourcing criteria, our goal is to simplify procurement internationally.

As a general rule, buyers want a standard instrument, but the reality is that circumstances on the ground are different in each country. With clients in more than 60 countries, we have tons of experience adapting solutions to different regulatory environments and market conditions. Our approach is to work closely with governments, brands, developers, utilities, and industry associations to provide the simplest possible solutions for buyers, sellers, and regulators."

Recent developments in the Malaysian REC market are contributing to a higher volume of liquid RECs. The recent signing of a memorandum of understanding between SEDA Malaysia and APX at IGEM 2018 will support the highest standard of verification for RECs, to ensure buyers can purchase high-quality RECs in Malaysia - a key demand centre for corporates.

SO, WHAT IS THE WAY FORWARD? WHERE IS THE MALAYSIAN REC MARKET GOING?

"Frankly, a lot of that will depend on how domestic stakeholders choose to navigate the big questions. We see the role of a registry as an enabler. The rest is up to market participants.

SEDA is doing tremendous things to move the market forward, and we are proud to be working alongside them. By supporting the development of a voluntary REC market in Malaysia, SEDA is unlocking the potential for significant investments in new renewable energy assets, which will assist Malaysia in meeting its NDC targets and to achieve the targeted 20% RE share of its power mix by 2025.

From a pure economics perspective, we are seeing that countries with larger volumes of available RECs are more capable of attracting multilateral investments from leading brands, including many of those in the IT, apparel, and household products sectors. We are truly excited about the Malaysian market, and look forward to the journey ahead."

PVMS
PV MONITORING SYSTEM

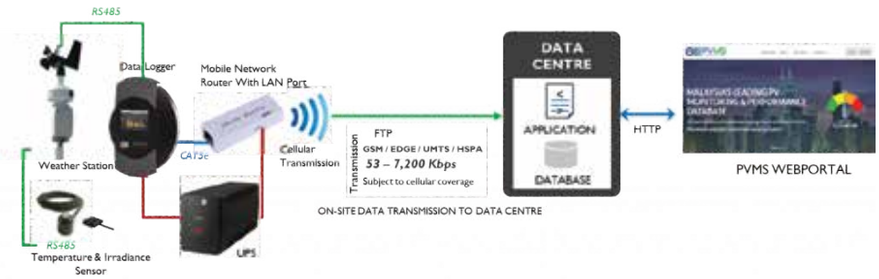
MALAYSIA'S LEADING PV MONITORING & PERFORMANCE DATABASE

Up-to-date information, real-time monitoring and reports on solar photovoltaic (PV) in Malaysia. Harness and energise tomorrow's energy, today.

The National PV Monitoring & 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, Science, Technology, Environment and Climate Change (MESTECC).

For a start, 150 grid-connected solar PV systems (up to 1MW capacity) throughout Malaysia are being monitored on a real-time basis. Both data and system performance analyses are available upon subscription. The Database will become the reference for designing national energy policies and programmes in the future.

The PVMS system architecture

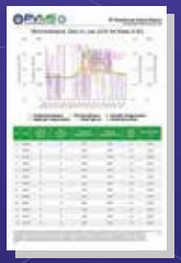


PVMS REPORTS

What's included?

Summary
Energy Generation

Plant Performance
Performance Ratio, Reference Yield, Specific Yield & Final Yield



Meteorological Data
Global Irradiance, Ambient Temperature, Wind Speed, Wind Direction & PV Module Temperature

Irradiation Data
Daily Irradiation

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SEDA Acting Chairman Datuk Ir Ahmad Fauzi Hasan stated that SEDA and APX will jointly promote the growth of a voluntary REC market and hopes this initiative will spur corporates to drive the country's RE growth.

SEDA MALAYSIA AND APX INC

ENCOURAGE DOMESTIC RE GROWTH WITH RECs

While the concept of the Renewable Energy Certificate (REC) is still in its infancy in Malaysia, the country is well on its way to develop a voluntary REC market. On October 18, second day of IGEM 2018, SEDA organised and hosted the first REC Workshop in Malaysia as a way to prepare local industry players and to announce the Authority's role as an authorised verifier or Qualified Reporting Entity (QRE) for the TIGRs Registry.

The Tradable Instrument for Global Renewables (TIGRs) Registry is a trusted international platform where corporate buyers in Malaysia can access RECs. SEDA, in partnership with APX, is ensuring that local accessibility to RECs will be done in a transparent and credible way. But what exactly is a REC?

RECs are proof that energy has been generated from renewable sources such as solar or wind power. Each REC represents the environmental benefits of 1MWh of RE generation. When you purchase RECs, RE is generated on your behalf. For project developers, RECs generate additional revenue for each MWh of RE they produce. For corporate buyers, they are essential for meeting global sustainability targets.

"RE is good business. The TIGRs Registry, operated by APX, will enable industry players to trade and sell their RECs to corporate purchasers who are committed to demonstrating that they are going all out to do business based on a low carbon economy," said Datuk Ir Ahmad Fauzi Hasan, Acting Chairman of SEDA, in his opening remarks.

During the Workshop, participants heard from speakers such as Tan Tze Meng of the Malaysia Digital Economy Corporation (MDEC), Achmat Nadhrain Ibrahim, Senior General Manager of Cypark Resources, and Roble P. Velasco-Rosenheim, Asia Regional Lead of APX.

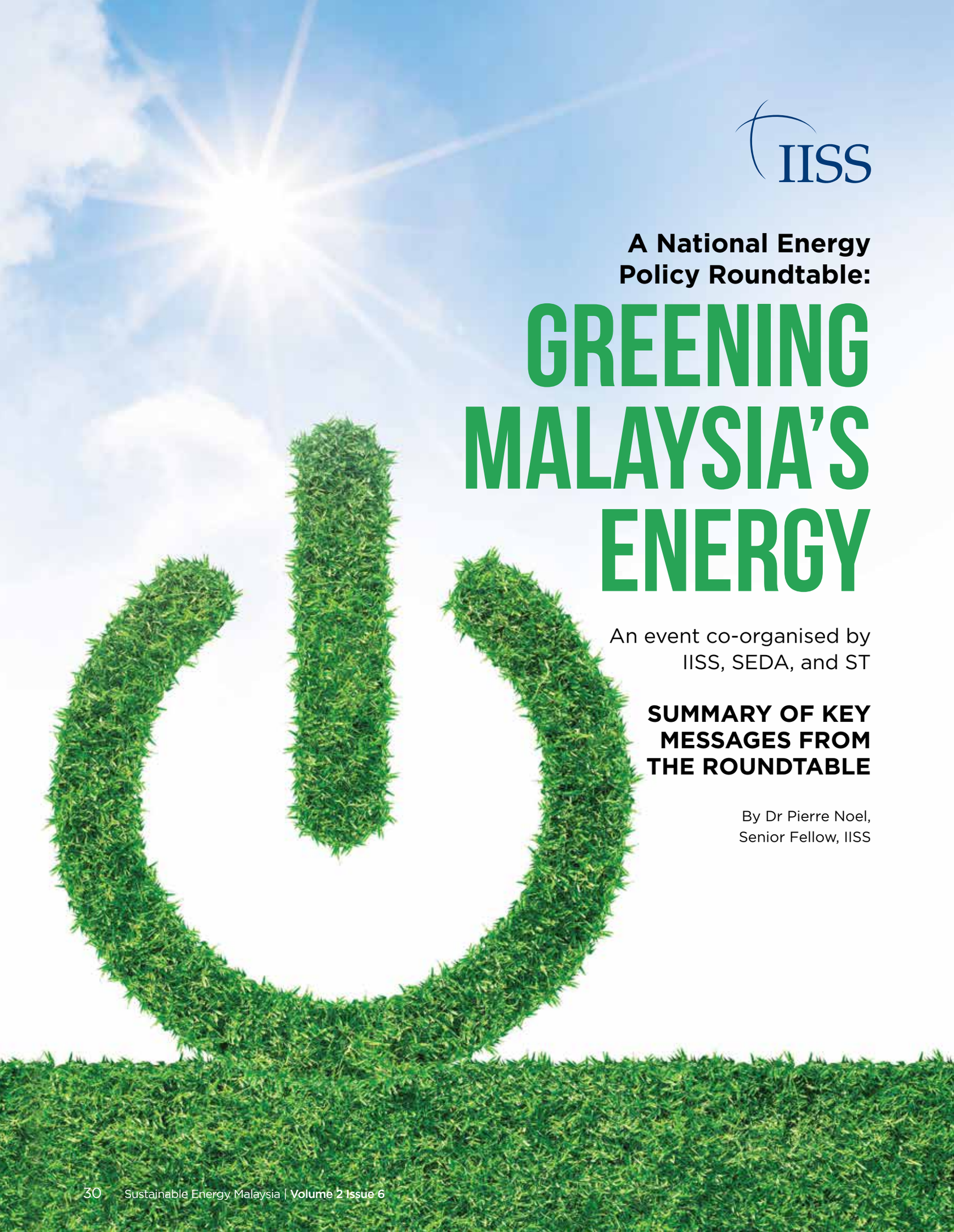
Setting the scene for Malaysia's REC market, APX Managing Director Lars Kvale touched on some market fundamentals in his presentation. He put forth that a successful REC market requires clear rules on REC ownership; clear rules on the interaction between incentive programmes and REC ownership; standardised contracts; a clear REC definition; transparency; and a settlement process for RECs.

Daniel Ruoss, Vice President of the Clenergy Group, spoke about the lessons that came out of Australia's mandatory REC market. Among other highlights, the Aussie REC market drove the growth of RE, which in turn pushed down wholesale and retail electricity prices; it attracted massive investments and created a huge ecosystem with service providers, vendors, and manufacturers; and it created about 15,200 new jobs (as reported by the Clean Energy Council this year).

Indeed, this collaboration between SEDA and APX is intended to set the country apart as a regional leader in RE. The local REC market should support Malaysia in achieving the 20% RE target by 2025 while enabling international brands to access clean energy, in line with global targets and international reporting criteria such as RE100, Science Based Targets Initiative, CDP, and other key reporting frameworks.

"I think this REC scheme is really going to help create a vibrant and liberalised industry for RE production and consumption in Malaysia. With a REC market in place, I am confident we can achieve what Minister Yeo Bee Yin has been espousing in her speeches - that we should reach the 20% RE target by 2025," Ahmad Fauzi concluded.

The REC Workshop organised by SEDA and APX concluded with a moderated Q&A panel. Renewable energy certificates are a globally recognised tool that enables companies to purchase renewable power in a transparent and credible way.



A National Energy Policy Roundtable:

GREENING MALAYSIA'S ENERGY

An event co-organised by IISS, SEDA, and ST

SUMMARY OF KEY MESSAGES FROM THE ROUNDTABLE

By Dr Pierre Noel,
Senior Fellow, IISS

On October 19, 2018, the International Institute for Strategic Studies (IISS), a London-based think tank with operations in Singapore, Washington DC and Manama (Bahrain), joined forces with the Sustainable Energy Development Authority (SEDA) of Malaysia and the Malaysian Energy Commission (ST) to organise a National Energy Policy Roundtable. The general theme for the meeting was "Greening Malaysia's Energy."

The event was part of the IISS Greening of Asia project, which looks at the political economy of energy and environmental policy in 11 emerging Asian countries. The ultimate goal is to assess the likely pace and timing for the transition to greener energy systems in Asia.

The Malaysia Energy Policy Roundtable had three sessions, focussing respectively on: renewable energy (RE) deployment policy; how to make the electricity fuel-mix greener; and the future of natural gas as a clean fuel for manufacturing, in a context of price deregulation, market opening and transition to LNG.

Dr Noel delivers the opening remarks at the Malaysia Energy Policy Roundtable.

IS CHEAP ENERGY COMPATIBLE WITH A GREEN TRANSITION?

One of the key messages from the Malaysian Government at the event is that energy policy should try to minimise the procurement cost of energy. This is consistent with MESTECC Minister Yeo Bee Yin's message delivered just one day after our event, during her 'town-hall meeting' on October 20, that "there should be no increase in the cost of doing business" because of energy policy. In other words, energy should be as cheap as possible.

A key contribution of our National Energy Policy Roundtable was to allow for a better understanding of how this basic position from the government - keep energy as cheap as it can be - may interact with the aspiration to a greener energy system.

A CARBON TAX WOULD ENSURE GAS WINS AGAINST COAL

Since the early 2000s, Malaysia's electricity system has seen a decisive turn to coal, the growth of which has covered 70% of demand growth from 2000 to 2017. Natural gas still generates about as much electricity as coal but is now clearly more expensive, and this is exacerbated by gas price deregulation. Coal and gas together generate more than 80% of the country's electricity. Natural gas emits about 50% less carbon dioxide than coal per kWh. Therefore, the greener option is more expensive and could become ever more so in the years ahead. As far as the competition between gas and coal is concerned, greening the fuel-mix may not be compatible with cost minimisation.

The first session, Deploying Renewables: the Way Forward, included discussions on renewables policy in Malaysia, RE regulatory frameworks, and creating RE markets.

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It could change if a high-enough financial penalty - a tax, or otherwise - was levied on carbon dioxide emissions, reflecting the value of the environmental damage from carbon emissions. However, there was little support expressed for that option at our Roundtable and Minister Yeo, at her town-hall meeting on October 20, explicitly ruled out a carbon tax for the time being. Note that a tax on coal, as opposed to carbon dioxide, could achieve roughly the same outcome, at least for the power sector. It would have the advantage of being mostly a tax on imported fuel - although that would not change the fact that electricity prices would have to go up somewhat, in order to pay for a greener fuel-mix.

THE ROLE OF RENEWABLE ENERGY

Given the realities discussed above, an implicit message from our event is that the greening of Malaysia's power sector should rely primarily on the deployment of RE technologies, mainly solar and wind. Minister Yeo made this explicit on October 20. The Government is actively working towards delivering the campaign promise to bring renewable generation capacity to 20% of the total mix by 2025, excluding large hydro. During IGEM 2018, Minister Yeo announced that the existing net energy metering (NEM) scheme would be enhanced, effective January 1, 2019. In addition, she revealed that the third phase of the large-scale solar (LSS) auctions would begin early next year.

The decision to reduce carbon emissions from the power sector mainly via renewables deployment assumes that the rapid growth of renewables would not lead to an increase in final electricity tariffs. In early-adopter countries, higher final tariffs reflect large producer subsidies, something that Malaysia will not replicate as the cost of renewables has dramatically gone down in the past ten years.

The cost of solar and wind now stands below gas and even coal, on a so-called 'levelised-cost' basis, in many places. Evidence was presented at the Roundtable that significant potential for cheap, large-scale solar exists in Malaysia, including floating solar on hydroelectric reservoirs. A clear message emerged from the discussions that Malaysia should emulate countries like India or Australia, in auctioning 'shovel-ready' renewable projects to the private sector. These auctions would reveal the true cost of renewables at scale in Malaysia and allow the country to minimise the cost of ramping up clean energy.

GREEN TRANSITION AS REVOLUTION?

Beyond auctions for renewable projects, a more radical view of the future electricity system emerged from the discussions. Cheap renewables would be combined with electricity storage (including from battery systems) or super-flexible plants, to phase out traditional, less flexible baseload plants. Electric vehicles (EVs) would provide decentralised storage and act as a source of ancillary services to the grid.

This brave-new-world vision raises important questions:

- The cost of the technologies involved, including energy storage, is going down, but there is no clear evidence that renewables plus storage is competitive today as an alternative to baseload generation.
- Moreover, even though there are many experiments worldwide, no significant electricity system has successfully broken away from the traditional system by integrating large-scale renewables, decentralised renewables, energy storage and demand response. It is not clear, therefore, how this vision can inspire confidence to those in charge of the system - governments, regulators and system operators - that they can plan for such a transition while keeping responsibility for system reliability.

- It leads to the issue of the cost of mistakes. In Australia, planning errors, as renewables grew and traditional capacity investment stalled, led to extreme system stress, prolonged periods of very high wholesale prices and even blackouts. Emerging countries like Malaysia will want to learn from these costly mistakes, in order not to repeat them.

EMISSIONS REDUCTION DEPENDS ON DISPLACING COAL

Another issue could prove important. Evidence from European countries, presented at the Roundtable, shows that the impact of renewables' deployment in itself does not have a significant impact on carbon dioxide emissions, unless the role of coal is significantly reduced in mid-merit and baseload generation. In most circumstances, a high-enough carbon penalty is required to allow gas to displace coal, while renewables reduce the role of fossil fuels in general. The US is an exception, where very cheap natural gas has made a carbon tax redundant. In India however, the installation of 150GW of renewables between 2015 and 2022, amounting to 30% of total capacity at that date, will only reduce emissions from the power sector by 20% compared to a scenario where coal would meet all the growth in demand.

Getting policy right so that cheaper renewables grow in Malaysia is indeed desirable. The country will learn useful lessons from it, on its way to a potentially more profound transformation of the power system, once renewables can be combined with storage at costs competitive with fossil fuels. However, in a system dominated by coal and gas, where natural gas becomes more expensive and the Government rules out a tax on carbon for the moment, the contribution of renewable electricity to reducing carbon dioxide emissions will likely remain modest.

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> Evidence was presented at the Roundtable that significant potential for cheap, large-scale solar exists in Malaysia, including floating solar on hydroelectric reservoirs.

CLEAN FUELS FOR THE MANUFACTURING SECTOR

The final session of the event was dedicated to natural gas as a fuel for Malaysia's manufacturing industry. The country's success story with gas as an industrial fuel has relied on regulated prices. Deregulation will make prices converge with LNG over time. The response by industrial gas consumers is uncertain, but for many, the intrinsic advantages of gas will mean they keep with it. A more competitive wholesale gas market, brought about by regulatory reform, should make the transition smoother. There seems to be only a limited risk of a fall-back to more polluting fuels. Biomass (from the palm industry) may compete against natural gas in some usages. Gas price deregulation could further support the growth in the market share of electricity in final industrial energy consumption. However, the net environmental implications of this would depend on the greening - or not - of the power generation sector.

3

1. *Panellists of the second session, Coal, Gas and Renewables: Towards a Cleaner Mix, touched on Malaysia's future fuel mix for power among other subtopics.*
2. *Datuk Ir Ahmad Fauzi Hasan, SEDA Acting Chairman, closes the Roundtable with a keynote address on The Energy Transition: Managing Risks, Seizing Opportunities.*
3. *The one-day event, held at the Kuala Lumpur Mandarin Oriental Hotel, garnered a lot of interest from industry stakeholders and players.*

SCALING UP MALAYSIA'S SOLAR PV MARKET

FOREIGNERS INVITED TO GROW LOCAL ECOSYSTEM ALONGSIDE NEM AND SARE

January 1, 2019 will mark the dawn of an improved solar energy era for Malaysians through the commencement of new policies. On November 22, 2018, Minister YB Puan Yeo Bee Yin of the Ministry of Energy, Science, Technology, Environment and Climate Change (MESTECC) held a briefing for and dialogue session with local solar PV industry players at Hilton Hotel, Kuala Lumpur regarding the improved Net Energy Metering (NEM) scheme and the new Supply Agreement for Renewable Energy (SARE).

The Minister affirmed that the Government intends to provide sustainable, reliable, and affordable solar energy for the rakyat, a point which she has been emphasising and advocating for since she was sworn into office. Towards that, at IGEM 2018 Yeo had announced new policies that will take into effect come the new year - NEM and SARE. During the briefing, Yeo then announced new policy and requirements for foreign investors in Malaysia, specifically for solar PV projects.

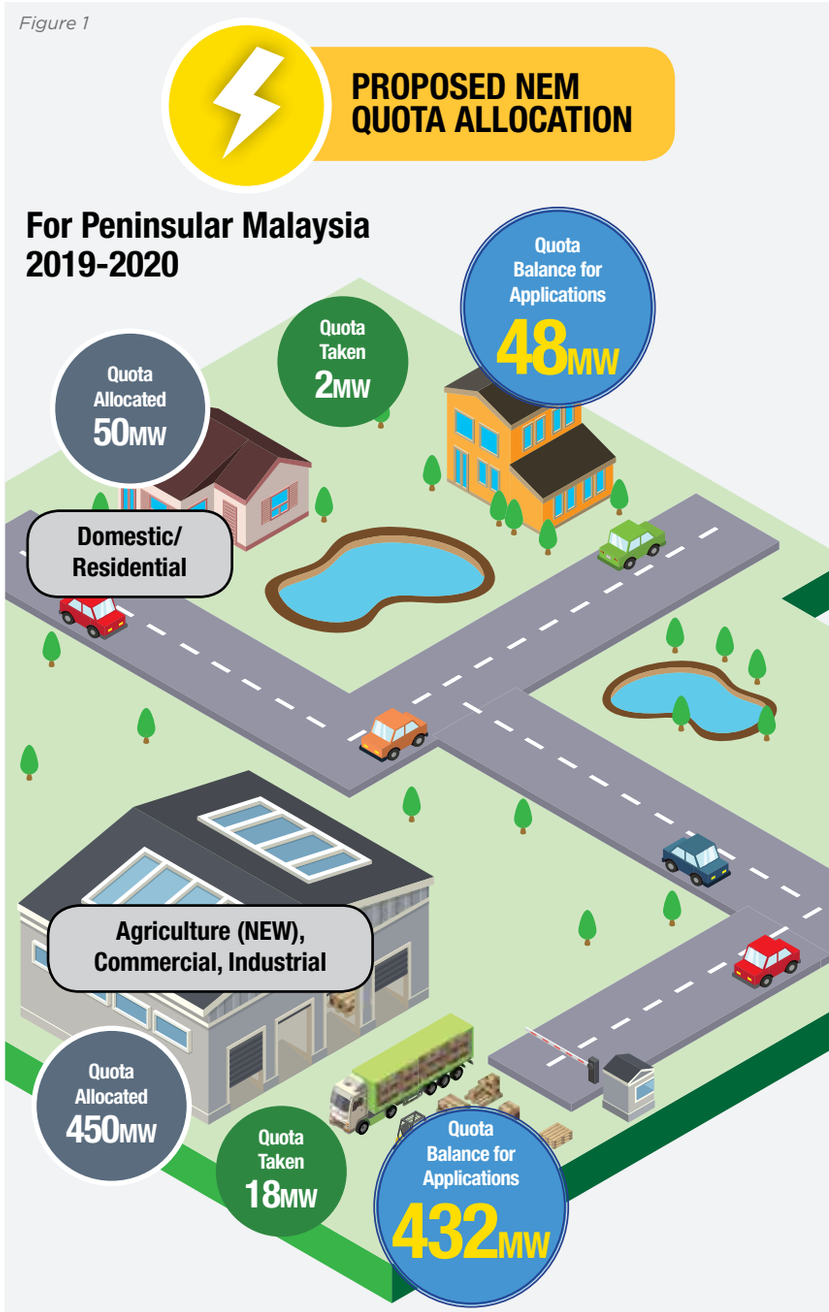
"I hope our solar players will not only share the solar solutions pie in Malaysia, but also become regional market leaders by providing solar solutions to other countries in ASEAN," she said during her opening speech at the briefing.

Organised by SEDA with the Energy Commission (ST) and Tenaga Nasional (TNB), the briefing and dialogue session welcomed over 300 participants from over 100 companies. Solar industry players had the opportunity to ask questions and discuss the following topics with Minister Yeo and other authority figures in the industry.

1. IMPROVED NEM SCHEME

Adjusting from the net billing concept to pure net energy metering, the revised NEM scheme will improve ROIs and increase electricity savings per month. The new scheme is only applicable to Peninsular Malaysia, where applicants must be registered TNB customers. Previously approved NEM applicants in Sabah will be transitioned to the self-consumption scheme.

Figure 1



OUTRIGHT PURCHASE		VIA DIRECT / SARE CONTRACT	
CASH TERM	LOAN	SOLAR PPA	SOLAR LEASE

SARE is a TNB platform for behind-the-meter business models such as solar leasing, solar PPAs, or a hybrid of both as an alternative to direct contracts. Through SARE, TNB takes care of billing, collection, and remittance of payments from customers to solar investors/lessors. In return, TNB charges a service fee of two sen per kWh.

Under solar PPAs, customers pay for solar energy generated (RM/kWh) over an agreed tenure, but do not own the solar PV systems. For solar leasing (hire purchase), customers negotiate on the upfront down payments and pay monthly instalments to own solar PV systems over an agreed tenure.

Figure 1 shows domestic and non-domestic quota allocations - 500MW in total - including the quota balance towards 2020. Agriculture will be a new category added to NEM.

The formula for the new "one-on-one" calculation was explained during the briefing, whereby customers receive credit for exporting excess solar energy to the grid. For example, if a customer imports 900kWh from the grid while exporting back 300kWh of excess electricity from solar production, they will only be charged for 600kWh by TNB. Existing NEM customers must sign new contracts for the new NEM rates to apply to them.

2. PURCHASE MODES

Under the new NEM and self-consumption schemes, there are a few purchase modes available for customers. Outright purchases can be made with cash or through loans. Direct contracts with solar investors/lessors or SARE contracts with TNB can be agreed upon with solar power purchase agreements (PPAs) or through solar leasing.

3. NEW POLICY AND REQUIREMENTS FOR FOREIGN INVESTORS

The dialogue session was most abuzz for the Minister's announcement on foreign investors and how new policy and requirements would affect the domestic solar PV market. Yeo believes that many local solar players are now well-equipped for foreign competition, and she looks forward to studying the results of these implementations.

Foreign participation is allowed only as investors/lessors for solar PV projects above 250kW with the following stipulations:

- Companies must be locally incorporated;
- Companies must have a minimum paid-up capital of at least RM10 million;
- Companies are required to hire 100% domestic engineering, procurement and construction (EPC) contractors who must be locally sourced through engagements with Malaysian PV service providers;
- In terms of operations, a minimum of 80% local employment is required.

1. *"The Government intends to provide sustainable, reliable, and affordable solar energy to Malaysians. I hope Malaysia's solar industry will grow, and we can be ASEAN leaders by providing solar solutions to other countries."*
2. *From left: Dialogue session moderated by Ts Dr Wei-nee Chen, SEDA Acting CEO. Panellists are Abdul Razib Dawood, Energy Commission COO; YB Puan Yeo Bee Yin, MESTECC Minister; Sansubari Che Mud, TNB General Manager (Sustainable Energy Development); and Ir Nirinder Singh Johl, TNBX Sdn Bhd Managing Director.*

LOW CARBON CITIES IN MALAYSIA: THE INSTITUTIONAL CHALLENGES

By the Green Technology Application for the Development of Low Carbon Cities (GTALCC) Project Team

WHY IS THERE A NEED FOR LOW CARBON CITIES IN MALAYSIA?

Climate change is impacting earth's ecosystems and causes extreme weather in many parts of the world. The changes are occurring faster than predicted due to massive carbon emissions globally. The Intergovernmental Panel on Climate Change (IPCC) provides the scientific basis for climate change, its impacts and risks, as well as options for adaptation and mitigation.

Low carbon cities (LCC) are an effort to reduce carbon emissions and mitigate global warming and climate change. It refers to cities planned with sustainable principles and features as well as initiatives that preserve the environment and reduce the negative impacts of human activities on the environment. Important components of LCC include usage reductions on energy, water, and solid waste in cities.

FOCUS GROUP DISCUSSION (FGD) ON THE INSTITUTIONAL FRAMEWORK FOR LCC

On August 13-14, 2018, the GTALCC team in Malaysia organised a focus group to discuss the institutional framework for LCC. The objectives of the FGD were to identify issues, obstacles, and challenges that come with implementing LCC in the country. The findings of the FGD are summarised in the following sections.

REVISITING THE INSTITUTIONAL FRAMEWORK

All stakeholders at the FGD opined that there should be a specialised body to coordinate all green and low carbon initiatives in their respective cities. The most relevant and best model to emulate, currently, is the State of Malacca's Green Technology Corporation which falls under the purview of the Chief Minister's Office. Similarly, at the federal level, there should be the same portfolio under the Prime Minister's Department. This is because the current National Green Technology and Climate Change Council has so far not been able to ensure nationwide implementation of LCC.

Another concern for the present institutional framework is the mismatch or misalignment of jurisdictions or authorities. This refers to the fact that SEDA, a federal agency involved in developing relevant LCC policies and providing funding for LCC initiatives by local authorities, is under the purview of the Ministry of Energy, Science, Technology, Environment and Climate Change (MESTECC). However, local authorities are under the purview of the Ministry of Housing and Local Government (KPKT), mandated to instruct and coordinate the activities of local authorities.

While Malaysia is committed to reducing 45% of its carbon emissions intensity by 2030, there are no clear instructions on how much carbon is to be reduced at the state and local levels. It is thus suggested that KPKT be consistently consulted in meeting the country's international commitment. This is because there are different types of local authorities in a State and the carbon emissions of a city council like Ipoh is much higher than a district council like Gerik. On that note, the role and direction of the City Mayor / Council President should be strengthened to 'mainstream' LCC in their city's development.

There must also be a clear system of power delegation or instruction from the federal, to the State, and then to the local authorities. Currently there have been instances where a federal agency is dealing directly with local authorities without going through the state government. This is also due to the fact that there is no specific agency at the state level in charge of LCC. It is suggested that a state agency be created, perhaps in a similar form to Green Technology Corporation. Thus, the federal agency will only deal with the corporation, and this ensures clear reporting from the local authority to the corporation before going to the federal level. The corporation will also be in a better position to strategise the LCC agenda for all local authorities, to facilitate its initiatives and provide a clear, comprehensive, and cross-departmental policy for LCC in the State.

Interactive knowledge-sharing session during SEDA's focus group discussion on the LCC institutional framework.

If there is a dedicated agency at the federal and state levels to implement LCC, there must also be a dedicated department in local authorities for implementing LCC. The department or unit will consist of officers from various disciplines as LCC covers many aspects besides town planning. This shall reduce the present burdens of the Planning Department which has to plan and collect data for LCC.

EMPOWERING LOCAL AUTHORITIES AS THE LCC AGENT

There was a general consensus among the FGD participants that capacity building is needed for local authority officers. In the case of Majlis Perbandaran Hang Tuah Jaya (MPHTJ), a special unit on LCC has been formed with officers trained in climate change and LCC. Hence the same is suggested for other local authorities. The appointed field expert can act as the 'climate change communicator' and train other officers to facilitate LCC implementation in the local authority.

Another capacity development aspect is the ability of the officer to ensure effective enforcement of laws and regulations pertaining to LCC. In this respect, annual training or refresher courses are needed, not only for top level officers also officers implementing the work. This will increase the diversity of expertise as well as encourage expertise-sharing that can later improve the overall enforcement of relevant policies and regulations.

It is also important that capacity building extends to final users, i.e. the general public. In particular, public awareness should be consistently heightened through both conventional and social media. Information can also be shared during town hall sessions or religious events / activities. To spur the interest of future generations, effort is needed to include information on LCC environmental issues and climate change in school curricula. The state government through the State Economic Planning Unit (UPEN) needs to work with local authorities to increase awareness of LCC among the general public.

Participants from various agencies and the GTALCC team assemble for a group photo at the end of the workshop.

ENABLING ENVIRONMENTS

i) Finance

When all factors point to local authorities as the driving agent for more LCC in Malaysia, there is an urgent need to focus on their financial and technical capacities to implement LCC. At the moment, the agencies at the federal or ministerial level are receiving and holding funds that will later be allocated to selected local authorities. During the FGD, most of the stakeholders have raised concerns on the manner of recipient selection and fund distribution between local authorities. As such, there should be a system for ensuring fair distribution among local authorities. There is also a need for a system to identify international funds and a special fund at the local authority level to ensure the success of their LCC programme.

ii) Recognition

There is a need to recognise stakeholders for their initiatives towards LCC. For private developers, acknowledgement through green labeling and awards should be given regardless of the size of the company or the scale of the development. This will further motivate them to be more innovative towards green and sustainable developments. For householders practicing the low carbon lifestyle by installing renewable energy systems or energy efficiency appliances, they should be entitled to tax rebates. Last but not least, there should be similar incentives for all local authorities that introduce LCC initiatives, rather than being selective.

iii) Data

One notable aspect of the LCC framework is that data mining is needed for evidence of low carbon initiatives. In this regard, local authorities must provide relevant data that shows energy or waste reduction that translates to greenhouse gas (GHG) emission reduction or carbon reduction for the transportation sector. This data, however, must be retrieved from relevant agencies; not all are willing to share data for various reasons. It is thus suggested that providing date be made compulsory for all agencies, or, alternatively, the Ministry is required to provide baseline data and foster "big data sharing."

THE WAY FORWARD

Various strategies have been developed in the pursuit of making Malaysian cities low carbon. To ensure this objective is achieved, it is important for Malaysia to establish a clear and comprehensive institutional framework to support LCC implementation. Through this framework, it is hoped that all parties, especially local authorities, can play more effective roles in ensuring that LCC planning and development are achievable. It is pertinent that local authorities are empowered to ensure the effective implementation of LCC in Malaysia. Hence, the federal and state governments should establish the appropriate institutional framework to support LCC implementation at the local levels.

This article was written by Associate Professor Dr Rasyikah Md. Khalid of UKM, based on feedback from the stakeholders' workshop on the subject. It is part of a series of articles commissioned under the GTALCC project.

"... 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 APPLICATION 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 urban development in Malaysia.

WHO is involved?

WHY GTALCC & HOW?

To support the implementation of low carbon cities program

Removing 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

MINISTRY OF ENERGY, GREEN TECHNOLOGY AND WATER

UNDP

gef GLOBAL ENVIRONMENT FACILITY INVESTING IN OUR PLANET

seda Sustainable Energy Development Authority MALAYSIA

http://www.gtalcc.gov.my
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WHERE RE MEETS RENAL CARE

SEDA Malaysia's FiT eases the burdens of Muar Lions Renal Centre

The Muar Lions Renal Centre is a well known non-profit charitable organisation and provider of haemodialysis treatments for lower-income patients with chronic kidney failure. Established in April 1994, the Centre has blossomed into one of the largest renal centres in Johor.

"We started with just two used machines in a rented place about 24 years ago. We were founded to help end-stage renal patients with their quality of life beyond dialysis," said Chua Wee Beng, an Administrator for the Centre.

Today, Muar Lions treats ~150 patients with 50 dialysis machines. It occupies two separate shop lots in a mixed development area where the population is representative of Malaysia's own diverse demographic.

Notably, patients without any income are fully subsidised by the Centre. Muar Lions unburdens its patients by providing various medical care and financial aid. And they have been doing so with generous help from friends, associates, and the public who donate money to the cause.

When it came time to go green and join the feed-in approval holder (FiAH) community, the Centre's support system was also there to lend a hand.

Visiting Lions from Taiwan learning about the functions of dialysis procedures.

"We came to know about the feed-in tariff (FiT) scheme through media reports and our own members who have prior application experiences. After weighing out the costs and benefits, we decided to apply to add another income stream for our cause. We undertook a donation drive to seek public help in financing the costs of installation," Chua elaborated.

The Centre invested ~RM300,000 from said donations, and it records ~RM60,000 in returns per annum. With a 20% ROI, the returns constitute ~2% of Muar Lions' annual revenue.

"Now, we receive about RM5,000 a month through the FiT scheme. It has helped us offset our utility bills, and this eases our financial burden. We are able to care for more patients with the additional revenue," he continued.

The company to join Muar Lions on their FiT journey was Starlight Green Energy (SGE) Sdn Bhd. Founded in 1999, SGE was first involved in property development in Johor (and was known as Prism Star Properties Sdn Bhd back then).

"In 2014, we changed our business operations to focus on renewable energy (RE), especially solar panel solutions. Thereafter, we diversified into other solar-related products such as small off-grid solar systems and solar lighting. Our company will continue looking for other types of RE business in 2019," said Lim Kwee Heng, a Director of SGE.

"Being a green energy company, our main role is to promote RE to as many people as possible. With our professional ability to create reliable systems, it allows consumers to have more confidence in solar energy. We also act as a communication platform between SEDA / the Government and communities."

Lim noted that many organisations and clubs in the country have to deal with financial difficulties, especially non-profits. As such, SEDA's FiT community quotas can provide some financial reprieve to these organisations.

"The Muar Lions Renal Centre specifically treats low-income patients by offering relatively low fees. And some patients get free dialysis services, even when the Centre's monthly expenses are greater than its monthly income. As a company director for SGE, I empathised with Muar Lions' situation and needs. I knew the FiT scheme would help them."

He further opined that the most successful part of SEDA's and the Government's RE policy and programme, is FiT.

"Without FiT, Malaysia's RE agenda would not have been carried out smoothly. Global warming is the main cause of environmental challenges. Solar energy produces the least amount of carbon emissions compared to other sources, especially power generators. I look forward to seeing more RE initiatives from the Government," Lim expressed.

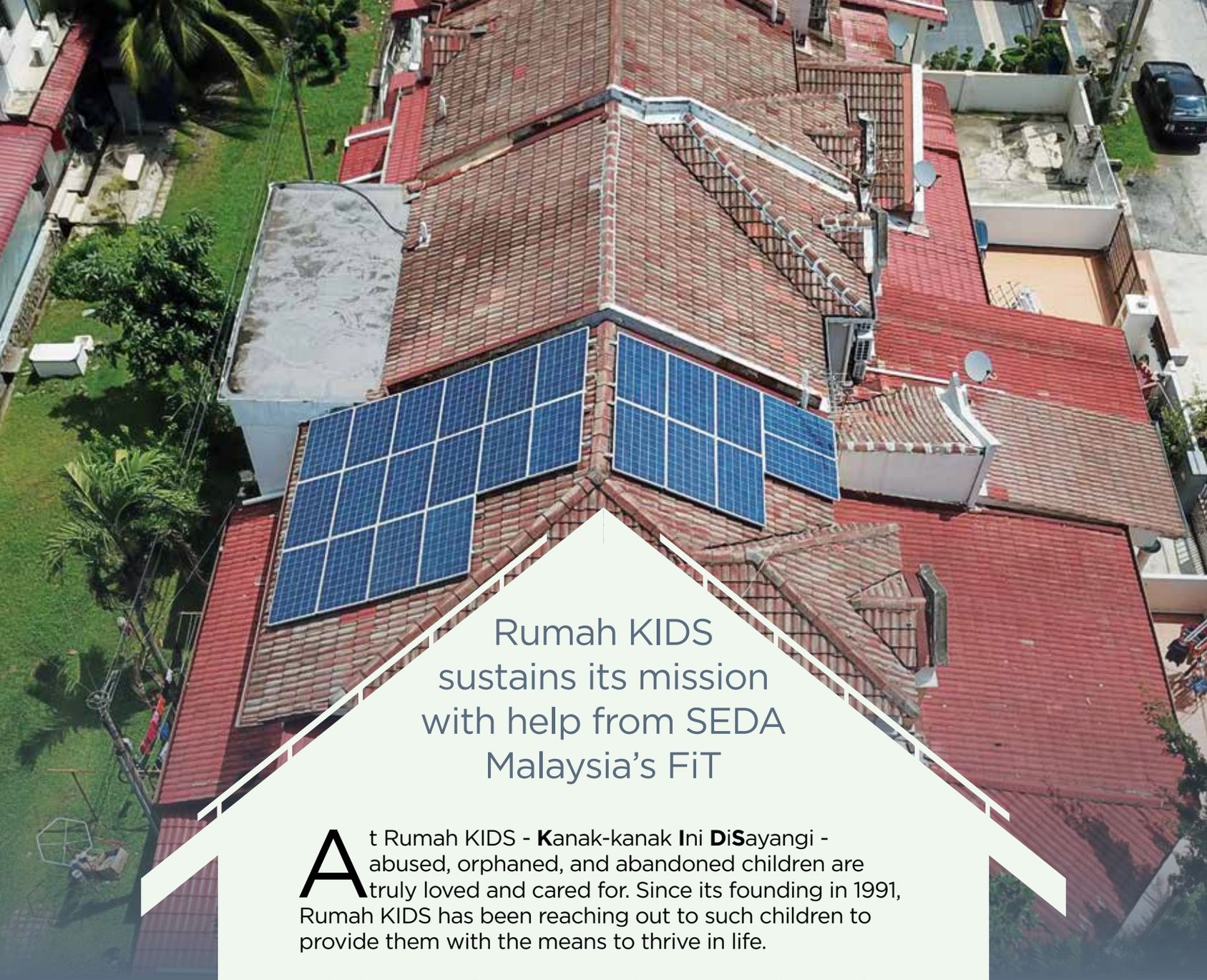
Chua echoed the plight of non-profit organisations, thinking that the Government could encourage them more by giving specific grants for such initiatives.

"These grants will enable non-profits to generate long-term and independent income. At the same time, the Government could also lower the entry barriers in order to allow a broader base of participation," he added.

The Renal Centre has become an example to others since the installation of its rooftop solar PV system.

"We are the tallest building in the vicinity, so our roof has not attracted any undue attention. However, we often receive requests from other Lions clubs and associations to visit our Centre, so that they may learn more about solar PV systems," Chua concluded.

Discussing the Muar Lions solar initiative with donors Tan Sri Francis Lau Tuang Nguang (middle) and Dato' Sia Swee Seng (right).



Rumah KIDS sustains its mission with help from SEDA Malaysia's FiT

At Rumah KIDS - **K**anak-kanak **I**ni **D**i**S**ayangi - abused, orphaned, and abandoned children are truly loved and cared for. Since its founding in 1991, Rumah KIDS has been reaching out to such children to provide them with the means to thrive in life.

Under the guidance of house parents, children are introduced to a new family where they develop familial bonds with others in a loving environment. There is joy and security to be found in a healthy routine of study, chores, play, and rest. Beyond attending to the children's basic needs of food, clothing, shelter, and education, Rumah KIDS also ensures that the spiritual, mental, and physical needs of every child are met.

In an environment shielded from the violence, abuse, and neglect they once knew, many of the Rumah KIDS children go on to finish their education, consequently empowered to lead productive lives in society.

EMPOWERING COMMUNITIES TO SUCCEED

Throughout the last 27 years, Rumah KIDS has housed, fed, and nurtured over 800 children. They were given opportunities to realise their full potential with the help of a community of supporters, ranging from individuals to corporations and non-profit agencies partnering with Rumah KIDS in its mission.

"Being an NGO dedicated to serving underprivileged children, we were approached by our supporters to apply for community feed-in approval holder (FiAH) status to help minimise our financial burden and, additionally, contribute to the country's green agenda," said David Janssen Nathan, Public Relations Manager for Rumah KIDS.

"I believe that gaining investment returns from the feed-in tariff (FiT) scheme will help us maintain the Organisation in the long run. Roughly, we receive an average of RM704.95 per month towards our utility bill."

Rumah KIDS' service provider happens to be one of the top solar companies in Malaysia, Pekat Solar Sdn Bhd - a subsidiary company of Pekat Teknologi Sdn Bhd. PEKAT boasts 20 years of professional experience, growing in leaps and bounds since its inception by completing a significant number of prestigious landmark projects for the nation.

PEKAT's extensive experience with lightning protection was consolidated into its PV system installation design. It is committed to ensuring maximum yields from PV systems, providing reliable lightning protection services, as well as hassle-free service for its premier customers. PEKAT specialises in on-grid and off-grid solar PV systems for large scale solar (LSS), Net Energy Metering (NEM), and self-consumption.

"Corporate social responsibility (CSR) initiatives are taken very seriously at PEKAT. We want to enhance the quality of life for the communities in which we operate," explained NorSurayaah Abd. Majid, a Pekat Solar Project Engineer.

"Pekat Solar was proposed by a community associate to collaborate on a CSR programme for Rumah KIDS. It is a very deserving recipient."

NorSurayaah stated that FiT assists in creating a better environment for generations to come by reducing Malaysia's carbon emissions.

"It also helps to create awareness among the nation on the importance of renewable energy (RE) towards a sustainable environment for all," she continued.

"We provide an explanation on the history and functions of SEDA to the communities under our CSR programmes. We stress the importance of SEDA's role in making our contributions to these communities a reality."

She also believes that FiT has been the most successful programme thus far since its introduction in 2011.

"It made solar PV investments commercially feasible with trusted and stable technology. Furthermore, the introduction of the investment tax allowance (ITA), together with the existing capital allowance, enhances the commercial investor's ROIs.

"To improve project financing, the Government also introduced the Green Technology Financing Scheme (GTFS) to aid with interest costs imposed by financing bodies. In order to amplify the growth of green tech in Malaysia, the Government should provide a personal tax incentive that can help citizens with affordability and ROIs. After all, it is the taxpayers' money we are talking about. The rakyat must come first."

David, in conclusion, took time to commend the Authority's role in enabling FiAH communities.

"SEDA has done a great job with respect to FiT community quotas. We appreciate how much our own participation as a FiAH community has helped sustain our mission to care for underprivileged children."

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.

Increases health of general populations.

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Annual Meeting of the Global Future Councils in progress. (Photo Credit: Arab News)

WORLD ECONOMIC FORUM'S ANNUAL MEETING OF THE GLOBAL FUTURE COUNCILS 2018:

SHAPING A NEW ARCHITECTURE FOR GLOBALISATION 4.0

Many would have heard about the prestigious World Economic Forum (WEF) that convenes each year, a platform for renowned thought leaders to discuss important global issues that help shape a more sustainable and inclusive future for all. WEF's agenda is developed by the network of Global Future Councils (GFC) comprising interdisciplinary knowledge dedicated to promoting innovative thinking; the members are selected based on referrals by other experts.

This year, GFC's portfolio includes two categories: the Global and Regional Agendas and the Enablers of the 4th Industrial Revolution. There were 38 Councils and over 700 members convening in Dubai, November 11-12, 2018 for intensive discussions. This year the Council on Advanced Energy Technologies invited Ts Dr Wei-nee Chen, Acting CEO of SEDA, to be a member from 2018 to 2019. It is a platform of opportunities as Malaysia is represented to exchange views on energy transition and the technologies that can accelerate this important global agenda.

2018-2019 PORTFOLIO OF GLOBAL FUTURE COUNCILS

GLOBAL AND REGIONAL AGENDAS

Global Future Council on **Biodiversity and the Bio-economy**
Global Future Council on **Cities and Urbanisation**
Global Future Council on **Consumption**
Global Future Council on **Cybersecurity**
Global Future Council on **Development Finance**
Global Future Council on **Digital Economy and Society**
Global Future Council on **Energy**
Global Future Council on **Entrepreneurship**
Global Future Council on **Financial and Monetary Systems**
Global Future Council on **Food Systems Innovation**
Global Future Council on **Geopolitics**
Global Future Council on **Health and Healthcare**
Global Future Council on **Human Rights and Technology**
Global Future Council on **the Humanitarian System**
Global Future Council on **Information and Entertainment**
Global Future Council on **Infrastructure**
Global Future Council on **Innovation Ecosystems**
Global Future Council on **International Trade and Investment**
Global Future Council on **Long-term Investing**
Global Future Council on **Mobility**
Global Future Council on **the New Economic Agenda**
Global Future Council on **New Metrics**
Global Future Council on **the New Social Contract**
Global Future Council on **Production**
Regional Future Council on **Europe**
Regional Future Council on **the Korean Peninsula**
Regional Future Council on **the Middle East**
Regional Future Council on **Russia**

ENABLERS OF THE FOURTH INDUSTRIAL REVOLUTION

Global Future Council on **Advanced Energy Technologies**
Global Future Council on **Agile Governance**
Global Future Council on **Biotechnology**
Global Future Council on **Computing**
Global Future Council on **Human Enhancement and Longevity**
Global Future Council on **Neurotechnologies**
Global Future Council on **New Network Technologies**
Global Future Council on **Space Technologies**
Global Future Council on **Values, Ethics and Innovation**
Global Future Council on **Virtual and Augmented Reality**

> What is the 4IR? It is a fusion of technologies bridging between the physical, digital, and biological spheres, sometimes collectively known as cyber-physical systems. Examples of technologies under 4IR include AI, IoT, robotics, blockchain, big data, nanotechnology, quantum computing, biotechnology, the industrial fifth-generation wireless technologies (5G), additive manufacturing / 3D printing, and fully autonomous vehicles.

GLOBALISATION AND THE 4TH INDUSTRIAL REVOLUTION

Central to the theme of globalisation is the impact of the 4th Industrial Revolution (4IR) on this phenomenon. Technology plays a defining role in shaping the opportunities and risks in each phase of globalisation. One of the key takeaways on how 4IR is impacting globalisation (aka Globalisation 4.0) is that technology is only useful when it becomes part of a system or solution that contributes to a changed world.

Of the emerging 4IR technologies, artificial intelligence (AI) is perhaps ranked the highest in terms of impact. China is regarded as the top country in AI investments and one often cited is the Social Credit System. The system utilises technology to perform social scorings of their citizens based on the integration of the Internet of Things (IoT) and AI with a set of algorithms that respond to social credit scoring. While some technologies and applications are country-specific, there are others that have reached global scale.

The high proliferation of technologies also requires that a global system and standards be established in order for greater integration of global trade and wealth distribution. The good news with these emerging technologies is that they are relatively low cost, and this enables a more remote nation to take part in globalisation. Internet applications such as Airbnb, Uber, and Grab have enabled people from many parts of the world to transact and benefit from the low start-up costs of these enabling digital platforms.

Blockchain, another emerging technology touted for its strong provenance tracking, transparency, and immutable data, holds promises of a global platform for transactions requiring high levels of trust. While the world celebrates the opportunities that these emerging technologies bring to the next level of globalisation, it is important that the Councils continue to define a set of shared values that should drive the future, ones that are built on values which are "truly cross-cultural, striving for common good, safeguarding human dignity, and acting as stewards for future generations."

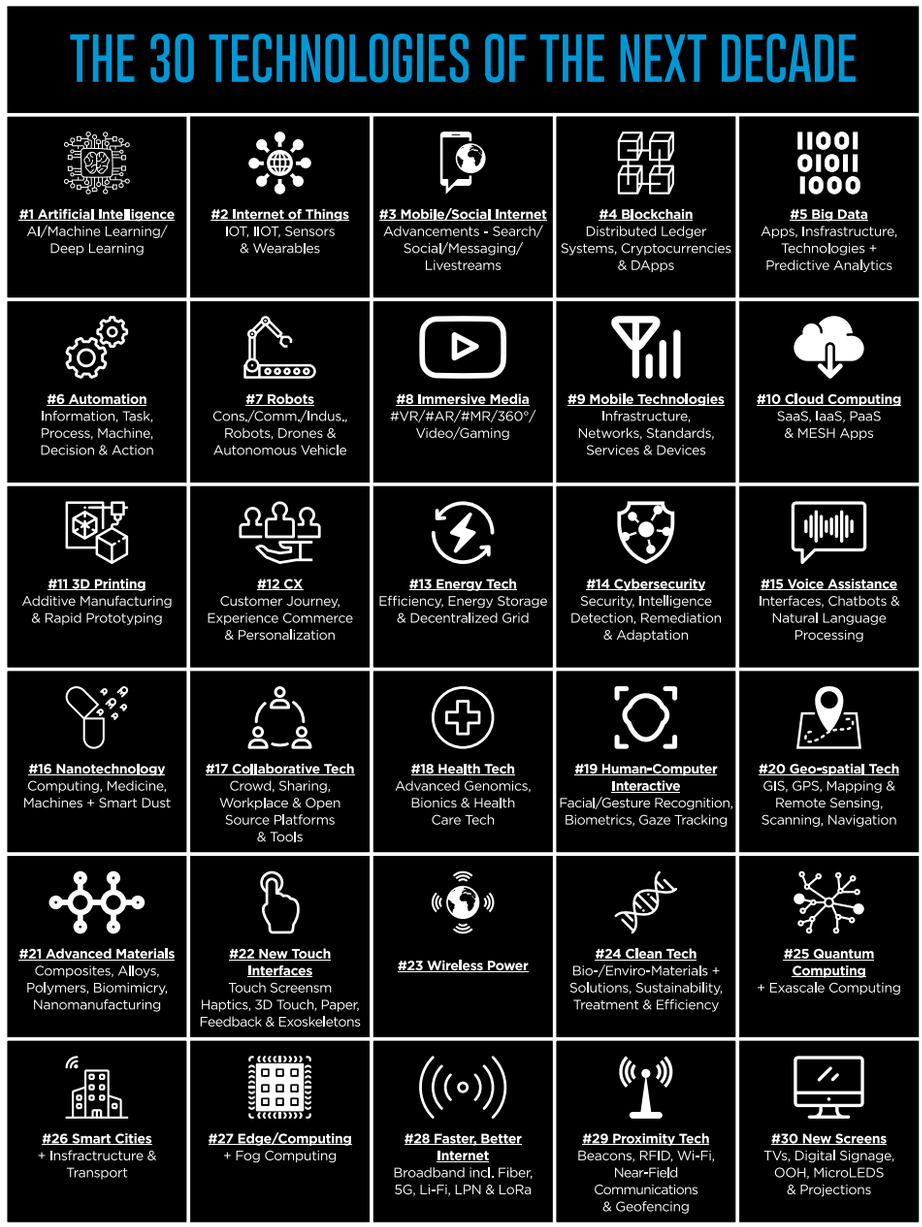
GFC: ADVANCED ENERGY TECHNOLOGIES

The Global Future Council on Advanced Energy Technologies has 27 members (including one Council Fellow and two Council Managers). This Council relates very closely to the Councils on the Future of Energy and Mobility.

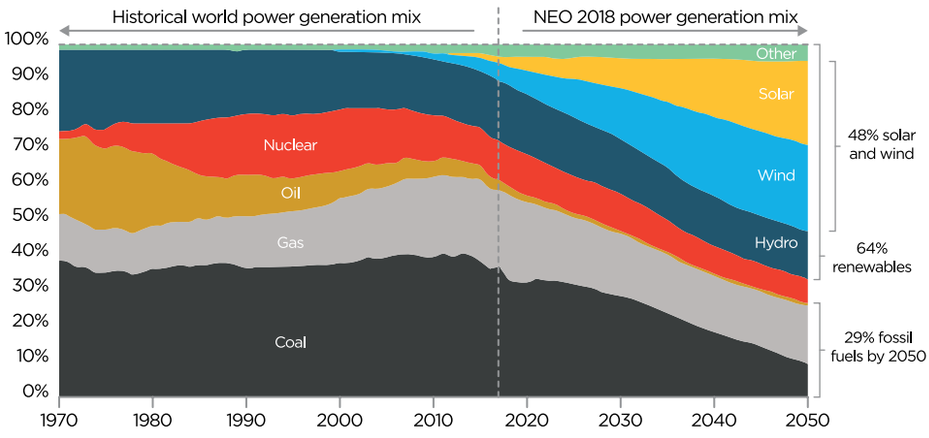
What does the future of energy look like? Most of us agree that the future of energy shall be underpinned by the 4Ds: decarbonisation, decentralisation, democratisation and digitalisation. Energy transition remains the focus. The group's vision is to accelerate the decarbonisation of the energy system driven by the urgency to maintain the global average temperature increase below the climate goal of 2oC; to deliver universal access; and to reduce air pollution.

Today, approximately 19% of final energy is electricity; that portion could be doubled by 2050 with deep decarbonisation. When reviewing the energy system, it was agreed that the future of energy will largely be electricity, driven by the fact that electricity is the easiest to decarbonise. Specifically, when looking into the future power mix, coal and oil are predicted to decline, gas to plateau, while renewables will continue to grow especially solar and wind (New Energy Outlook, BNEF 2018).

Unpredictability of Future Energy Systems: The increasing contribution of variable renewable energy (VRE) such as solar and wind in the energy mix challenges mainstream energy forecasting, and the future energy system increases in complexity with decentralisation as more consumers transit into the role of prosumers, producing and consuming energy at the same time. The challenges with an energy system that is difficult to predict, with increasing VRE and distributed energy generation sources, require an energy transition roadmap that will chart the pathway to ensure that the future energy system is reliable, affordable, and sustainable.



Created by: Sean Moffitt @seanmoffitt, Managing Director, @Wikibrands



Source: Bloomberg NEF, IEA

When reviewing the list of clean energy technologies and tracking their progress, the International Energy Agency (IEA) highlighted that only four technologies are on track: solar (power), electric vehicles (transport), lighting and data centres, and networks (buildings). There is not a single clean technology under the industry that is on track.

From the advanced energy technologies perspective, there is a need to map out the enabling and emerging technologies with the appropriate government policy interventions and business models as part of the energy transition roadmap.

At the heart of energy transition is the need to create an energy balancing market that will balance the energy supply and demand in the future energy system, which is added in complexity by the changing portfolio of energy sources and their lack of predictability. The future energy system should prioritise renewable resources and then balance the energy market by providing flexibility such as energy storage solutions and demand response via time-of-use. Grid edge stability can further be enhanced by the increasing electric vehicles (EVs) via vehicle-to-grid (V2G) technology.

Hydrogen Renaissance: Although the lithium-ion (Li-ion) battery is often cited as an exciting energy storage solution that attracts global attention, at the recent GFC meeting there was a "hydrogen renaissance" - an existing technology that has been making a comeback recently. In the early days, hydrogen was viewed as simply too expensive and not viable. It was a premature technology, conceived before its time.

Members of the Global Future Council on Advanced Energy Technologies.

Members of the Sub-Group focusing on Digitalisation of Energy Systems.

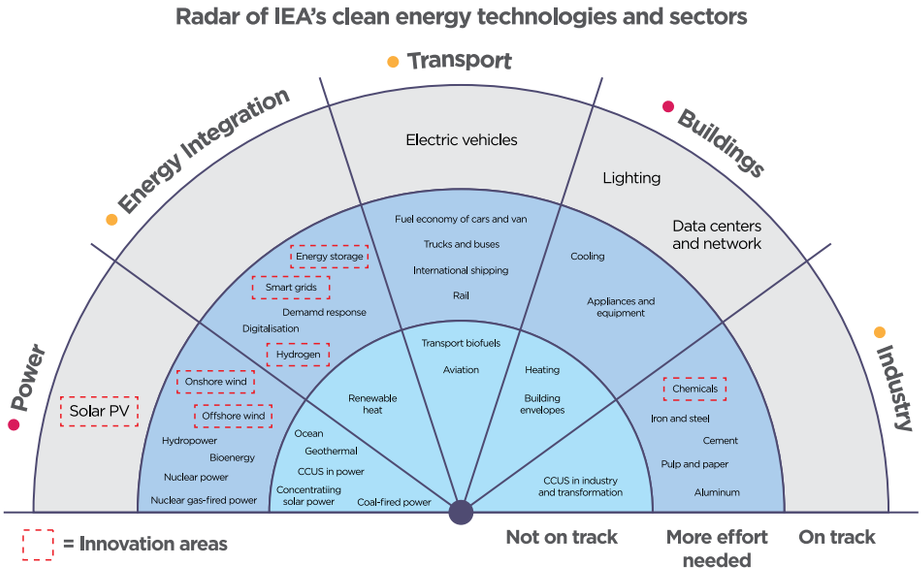
Now, it looks like its time has arrived. With the increasing curtailment of wind and solar in some countries and developers not being compensated for any curtailment, such energy can be channelled to generate hydrogen instead. This form of hydrogen is considered "green" as the resources are green compared to other forms of "less" green hydrogen, for instance "grey" hydrogen from fossil fuel steam reforming or "blue" hydrogen from steam reforming combined with carbon capture and storage (RECharge, September 2018).

Hydrogen can help address seasonal energy storage and it can be used in scenarios where electricity cannot, making it a great candidate for sector-coupling. Sector coupling refers to the idea of integrating energy consuming sectors - buildings (heating and cooling), transport, and industry - with the power producing sector (Clean Energy Wire, April 2018).

Digitalisation of Energy Systems: The future energy system will need a platform that can communicate rapidly with other actors that will respond speedily with great flexibility. Digitalisation shall underpin the future energy system as the grid network architecture will be both transactive and intelligent. Emerging technologies like IoT will interface between the physical and cyber realms for data collection, and this can be processed by AI technologies and/or smart contracts depending on applications.

Blockchain technologies are already in pilot runs for energy and environmental attributes trading (such as RECs and carbon) and EV charging. The prospect of an integrated national and global energy system based on digitalisation is exciting. Even so, there are many dots to connect, issues to address, regulations to clear, and protocols and standards to adopt before these pilot projects can be upscaled to live deployment.

There was interesting insight from a team member of the Digitalisation sub-group who thinks that this kind of project will require the alignment of tripartite entities: the Corporate sector, the Society at large, and the Government. Typically the corporate sector will pilot the digital project and when there is acceptance and adoption by society at large, then the government steps in to formalise the framework.



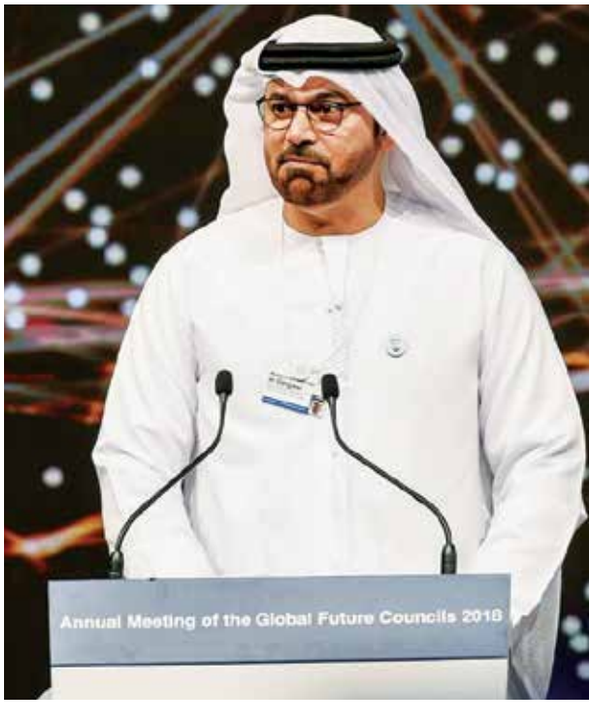
As each sub-group contributes to accelerate and incubate projects and collaborations relating to the advanced energy technologies agenda, there is mindfulness of the power of aggregating the various work streams of the Council that can deliver a portfolio of technologies and solutions, especially in the areas of power and energy integration which are greater than the sum of their individual parts. Dr Chen certainly looks forward to an engaging year ahead as Malaysia benefits from the insights into advanced energy technologies and the key enablers that can accelerate our energy transition.

GETTING READY FOR DAVOS

The intensive two-day meeting concluded with a closing message by the UAE Minister of Cabinet Affairs and the Future, who is also a GFC Co-Chair. It was interesting to note that the United Arab Emirates has a Minister dedicated to the future. According to HE Mohammad Abdullah Al Gergawi, his responsibilities are to prepare the nation for the future and to "make the impossible, possible."

With that, the Minister announced that the UAE Government had launched three initiatives, namely the Future Possibilities Report, the Future Possibilities Index, and the Department of Possibilities. These initiatives are intended to highlight promising and innovative ideas and emerging fields, emerging trends based on key vital sectors around the world, as well as analyse and evaluate proposed ideas.

In his concluding remarks on the GFC meetings, his message highlighted the continual focus on "shaping the future and enhancing public-private partnerships to develop effective solutions for global challenges" and to explore the myriad of opportunities facilitated by the new phase of globalisation - Globalisation 4.0 - driven by 4IR and its contribution to more than seven billion people. That will be the key agenda for the next World Economic Forum taking place in Davos-Klosters, Switzerland, January 22-25, 2019 as the Forum remains committed to improving the state of the world.



Closing Message by the UAE Minister of Cabinet Affairs and the Future, who is also a Co-Chair of the Global Future Councils.
(Photo Credit: Arab News)

CONCRETE STEPS TOWARDS SUSTAINABILITY

MALAYSIA'S SUSTAINABLE ENERGY FUTURE IS BUILDING UP WITH SEDA'S PURPOSEFUL DIRECTION

It is the new Government's aspiration to scale up renewables in the national power mix, from the current 4% to 20% by 2025 (excluding large hydro). Tasked to champion our country's energy transition is the Sustainable Energy Development Authority (SEDA) Malaysia, an agency under the Ministry of Energy, Science, Technology, Environment and Climate Change (MESTECC).

On November 8, SEDA held its Open Day 2018 in Penang to provide the latest updates on renewable energy (RE) and energy efficiency (EE). This was a way to document Malaysia's progress and arm citizens with important knowledge, while also recognising the efforts that are being put into building our sustainable future.

The event was graced by Tan Sri Dato' Academician Ir (Dr) Ts Ahmad Zaidee Laidin, a SEDA Authority Member, who was accompanied by SEDA Acting CEO, Ts Dr Wei-nee Chen.

1. *Tan Sri Ahmad Zaidee, SEDA Authority Member and MBOT President, delivers the opening speech during SEDA's Open Day 2018.*
2. *Azah Ahmad, SEDA RET Director, and Steve Lojuntin, SEDA EDM Director, answer queries from the crowd.*

"Sustainable energy (SE) is gaining greater momentum globally as issues like climate change and energy security escalate. Through SEDA's annual Open Day, we wish to empower the public to be better informed and proactive citizens on issues of sustainability," said Dr Chen.

Highlights of SEDA's Open Day 2018 were:

IMPROVED NET ENERGY METERING (NEM) MECHANISM WITH "ONE-ON-ONE" CALCULATION

Effective January 1, 2019, NEM will no longer be based on the net billing concept, but purely on net energy metering. Under the existing net billing framework, excess electricity is sold to Tenaga Nasional (TNB) at a displaced cost of 31 sen per kWh. Under the new scheme, a monthly electricity bill will be: consumption (from TNB) minus generation (from solar) multiplied by the retail electricity tariff. This will result in additional electricity savings per month and will aid with returns of investment (ROIs) in solar photovoltaic (PV) systems.

ENERGY EFFICIENCY - LOW CARBON BUILDING PROGRAMME

Sustainable energy requires both renewable energy and energy efficiency to work in synergy. Each unit of electricity that is efficiently used will mean that less electricity is needed to replace any wastage. The Authority advocates the drive for Low Carbon Buildings and has introduced measures to improve energy efficiency in buildings. Additionally, SEDA supports MESTECC in drafting the new Energy Efficiency and Conservation Act (EECA), expected to be gazetted by the end of 2019.

GREEN TECHNOLOGY INCENTIVES BY THE MALAYSIAN INVESTMENT DEVELOPMENT AUTHORITY (MIDA)

For interested investors who attended Open Day, a bankability presentation on Green Technology Incentives via MIDA was delivered to the public. Aligning with the Budget 2019 announcement, RM2 billion from the Green Technology Financing Scheme (GTFS) has been made available at selected commercial banks where the Government will continue to subsidise 2% of the interest cost for the first five years.

SOLAR PV INSURANCE BY ALLIANZ MALAYSIA THROUGH ANORA AGENCY SDN BHD

Since the launch of the Solar PV Insurance, an initiative by the Authority, during the International Greentech & Eco Products Exhibition & Conference Malaysia (IGEM) 2018, SEDA, Allianz Malaysia, and Anora Agency have continuously made efforts to educate the public on the service product. This mainly serves solar PV owners such as recipients of the feed-in tariff (FiT) and NEM schemes, implemented by SEDA, to ensure their PV investments are well protected. SEDA hopes that this first-hand information will entice more insurance companies to offer such products and that feed-in approval holders (FiAHs) will subscribe to similar insurance schemes, as the goal is to protect solar PV system investments, income, and damage repair.

APPRECIATION CERTIFICATES FOR SEDA'S REGISTERED TRAINING PROVIDERS

Since its inception, the Authority has been collaborating with various training institutes to develop a pool of competent solar PV installers in the country. During Open Day, SEDA extended its appreciation to the following training institutes for their roles in developing highly competent PV installers: Universiti Teknologi Mara (UiTM), Universiti Teknikal Malaysia Melaka (UTeM), Universiti Tenaga Nasional (UNITEN), Kedah Industrial Skills & Management Development Centre (KISMEC), Akademi Binaan Malaysia (ABM) Wilayah Utara, Terengganu Skills Development Centre (TESDEC), and Selangor Human Resource Development Centre (SHRDC).

MEMORANDUM OF UNDERSTANDING (MOU) BETWEEN MALAYSIA BOARD OF TECHNOLOGISTS (MBOT) AND MALAYSIA PHOTOVOLTAIC INDUSTRY ASSOCIATION (MPIA)

Representatives for the MOU signing were Ts Mohd Nazrol Marzuke, MBOT CEO, and Chin Soo Mau, MPIA President. The ceremony was witnessed by Tan Sri Dato' Academician Ir (Dr) Ts Ahmad Zaidee Laidin, MBOT President and SEDA Authority Member, Prof Dr Sulaiman Shaari of UiTM, and Ts Dr Wei-Nee Chen, SEDA Acting CEO. MBOT will be providing a recognition programme to qualified MPIA members to become certified Professional Technologists (Ts) in the niche expert area of PV systems. This model is deemed the appropriate way forward for the solar PV industry in Malaysia.

LAUNCHING THE NEM CALCULATOR WEBSITE

To enhance public understanding of NEM, SEDA supported MAQO Solar's initiative to launch the NEM Online Calculator which allows the public and investors to calculate solar PV investments in terms of electricity savings. This estimation technology is made available with rooftop systems being identifiable via Google Maps.

1. *Appreciation certificates were presented to several local institutions to recognise their efforts in intensifying human capital development in the field of solar PV.*
2. *Commemorating the MOU exchange between MBOT and MPIA, as witnessed by SEDA.*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CALENDAR
OF EVENTS

6 SEPTEMBER 2018

SHANGHAI, CHINA

ASIASOLAR PV INNOVATIVE TECHNOLOGY EXHIBITION & COOPERATION FORUM

Ts Gladys Mak, SEDA Acting COO, represented the country and spoke at the AsiaSolar Conference in Shanghai. She had the opportunity to discuss the status of solar PV in Malaysia.

7 SEPTEMBER 2018

PUTRAJAYA

SOLAR PV INSURANCE

SEDA mooted a solar PV insurance protection scheme for households under the FiT programme. This was achieved in collaboration with Allianz Malaysia through Anora Agency Sdn Bhd and the Malaysian Photovoltaic Industry Association (MPIA).

13 SEPTEMBER 2018

SINGAPORE

SOLAR ENERGY RESEARCH INSTITUTE OF SINGAPORE (SERIS)

YB Rajiv Rishyakaran, SEDA Authority Member, led a delegation to SERIS under the National University of Singapore. Their objective was to learn about the renewable energy certificate (REC) market and the scope of a Verifier in Singapore.

ELECTRIFY SINGAPORE

The same delegation paid a visit to Electrify Singapore to understand how energy trading works among prosumers using blockchain technology in Singapore.

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.

SEDA was also pleased to have LONGi Solar Technology Co Ltd representatives at the office. They briefed the Authority on LONGi's mono-crystalline solar module.

14 SEPTEMBER 2018

PUTRAJAYA

A VISIT FROM JOHOR

SEDA was delighted to welcome YB Tan Hong Pin, Johor State Exco for Local Government, Science and Technology, and the Johor State Government delegation at the office. Authority representatives briefed the delegation on the implementation of the FiT mechanism in Malaysia.

18-20 SEPTEMBER 2018

KUALA LUMPUR

CONFERENCE OF THE ELECTRIC POWER SUPPLY INDUSTRY (CEPSI) 2018

SEDA was part of CEPSI 2018 at the Kuala Lumpur Convention Centre. A huge crowd roamed the Authority's booth to meet SEDA officers and discover the latest updates on sustainable energy.

19 SEPTEMBER 2018

PUTRAJAYA

FAREWELL CELEBRATION FOR IR AKMAL RAHIMI ABU SAMAH

The former SEDA Chief Operating Officer was honoured with a farewell event involving all SEDA staff. The Authority sincerely thanks Ir Akmal Rahimi for his contributions during his tenure with SEDA.

20 SEPTEMBER 2018

PUTRAJAYA

SEDA met with Prof Dr Bernhard Truffer from the Swiss Federal Institute of Aquatic Science and Technology (Eawag) and Dr Yap Xiao-Shan from Utrecht University, Netherlands. They talked about how developing countries facing both industrial upgrading and environmental sustainability challenges should move forward.

24 SEPTEMBER 2018

PUTRAJAYA

Ts Dr Wei-nee Chen, SEDA Acting CEO, met with Dr Matthias Eichelbrönner of E.Quadrat GmbH & Co and David Wedepohl of the German Solar Industry Association (BSW) at SEDA HQ. They discussed Malaysia's participation in the Berlin Energy Transition Dialogue in April 2019.

2 OCTOBER 2018

PUTRAJAYA

SEDA had fruitful discussions with Bursa Malaysia on the country's voluntary REC market to enhance corporate ESG reporting and disclosures. Several countries have supported REC markets to help scale up renewables.

5 OCTOBER 2018

PUTRAJAYA

A CONVERSATION WITH ITALY

SEDA had the honour of welcoming HE Ambassador Cristiano Maggipinto and Gerardo De Maio from the Italian Embassy for an informal exchange on renewables in both countries. Through this, it was found that Italy has realistically committed to reducing its final energy consumption by a total of 10 Mtoe by 2030; reaching a 28% share of renewables in total energy consumption by 2030; and hitting a 55% share of renewables in electricity consumption by 2030. SEDA looks forward to more of these interactions with Italy in the future.

9 OCTOBER 2018

PUTRAJAYA

A MEETING WITH SRI LANKA

SEDA met with a delegation from the Sri Lanka Institute of Development Administration (SLIDA) to give them an overview of Malaysia's modernisation and transformation initiatives, particularly for sustainable energy.

11 OCTOBER 2018

PETALING JAYA, SELANGOR

A Workshop on Energy Management, Energy Efficiency, and Low Carbon Buildings and an Introduction to the Malaysian Standard MS 1525 were conducted with the Sepang Municipal Council (MPSepang) at the Crystal Crown Hotel.

23 OCTOBER 2018

BANGI / KUALA LUMPUR

Ts Dr Wei-nee Chen represented SEDA and gave a talk on 'The Role of Blockchain Technology in the Future of Electricity' at the MESTECC-APCTT 4th Industrial Revolution Conference 2018 - "New and Emerging Technologies in Achieving SDGs" which took place at Hotel Bangi-Putrajaya.

On the same day, SEDA attended a luncheon hosted by the Swedish Embassy at the Petronas Twin Towers. During the gathering, a productive meeting on waste management was attended by Malaysian experts, headed by KPKT Sec-Gen YBhg Dato' Sri Haji Mohammad Mentek, and a Swedish delegation led by specialists from the Swedish Waste Management Association (Avfall Sverige) and the Environmental Protection Agency.

24 OCTOBER 2018

PUTRAJAYA

A MOMENT WITH YB KHAIRY JAMALUDDIN

The Authority had the honour of welcoming the Rembau MP and his delegates to a meeting at SEDA HQ. Chaired by YB Rajiv Rishyakaran, there were discussions on RE updates in Malaysia during the meeting.

25 OCTOBER 2018

JOHOR BAHRU

LOW CARBON CITIES SEMINAR

In conjunction with World Architecture Day, the Pasir Gudang Municipal Council (MPPG) and the Malaysian Institute of Architects (PAM) held an LCC Seminar where Steve Lojuntin, SEDA EDM Director, presented a paper on 'MS 1525 and Low Carbon Buildings for Low Carbon Cities.' The use of RE for non-residential buildings is an important building code document for more energy efficient structures with low carbon designs.

25 OCTOBER 2018

SINGAPORE

36TH ASEAN MINISTERS ON ENERGY MEETING (AMEM)

SEDA recorded participation in a preparation meeting at AMEM 2018, accompanying MESTECC Deputy Sec-Gen YBhg Datuk Badriyah Abd. Malek.

25 OCTOBER 2018

PUTRAJAYA

BIOGAS E-BIDDING BRIEFING

A briefing on the e-bidding system for biogas industry players was conducted by SEDA, following MESTECC Minister YB Puan Yeo Bee Yin's FiT quota allocations announcement at IGEM 2018. The actual e-bidding commenced on November 19, 2018.

26 OCTOBER 2018

SUNGAI RELANG, SELANGOR

SITE VISIT TO SG RELANG ORANG ASLI VILLAGE

SEDA conducted a site visit to the Sungai Relang Orang Asli Village as residents were interested in seeing the location where the solar PV system would be installed for the village. This project is an initiative of the Selangor State Government to supply electricity to orang asli villages.

29 OCTOBER 2018

PUTRAJAYA

LOOKING AHEAD WITH ROMANIA

SEDA was honoured to receive a courtesy call from HE Constantin Nistor, Ambassador of Romania to Malaysia, and Razvan Nicolescu, former Romanian Minister of Energy, to discuss the way forward for the renewable energy sector.

12 NOVEMBER 2018

GOMBAK, SELANGOR

Mohd Amirshaifulrazain Abu Zaini and Mohd Adzha Husin of SEDA's RET Division gave a lecture and shared knowledge on solar energy to students at the Kulliyyah of Architecture and Environmental Design, International Islamic University Malaysia (UIAM).

13 NOVEMBER 2018

PETALING JAYA, SELANGOR

FMM ENERGY EFFICIENCY & CONSERVATION CONFERENCE 2018

SEDA was an exhibitor for the FMM Conference at the Royale Chulan Damansara Hotel, themed "Adapting to Energy Industry Transformation" this year. The Authority grabbed the opportunity to engage with SEDA stakeholders, particularly from the energy efficiency industry.

14-16 NOVEMBER 2018

MARRAKESH, MOROCCO

52ND IEA PVPS EXCO MEETING

Ts Gladys Mak and Azah Ahmad (SEDA RET Director) represented the Authority at the ExCo Meeting. In attendance were 45 delegates, operating agents, and invitees from 22 countries. The next gathering will take place in Helsinki, Finland in May 2019.

SEASON'S GREETINGS AND
HAPPY NEW YEAR

2019

Malaysia's energy transition will not be without its challenges, but working together will ensure that we are ready for anything.

TOWARDS A SUSTAINABLE ENERGY FUTURE

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