

Transitioning The Nation Towards

Sustainable Energy

MALAYSIA



BACK TO THE FUTURE

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MINISTRY OF ENERGY,
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Government Lead By Example (GLBE), 670kWp



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CEO's Message

This magazine marks the final issue for 2017. It has been a busy year for SEDA Malaysia. In the last four months, SEDA has been participating in roadshows organised by the Ministry of Energy, Green Technology and Water (KeTTHA) to promote awareness on sustainable energy and also in support of the Government's aspirations for grassroots outreach to formulate the National Transformation 2050 (TN50).

One of the highlights was the soft launch of the 4th International Sustainable Energy Summit (ISES) 2018 at the 8th International Greentech & Eco Products Exhibition and Conference Malaysia (IGEM) on October 12, 2017 at the Kuala Lumpur Convention Centre. Allow me to do some marketing on the 4th ISES 2018. ISES is a biennial event mooted in partial fulfilment of Strategic Thrust 5 of the National Renewable Energy Policy and Action Plan. Strategic 5 encompasses promotional and awareness building on renewable energy.

Globally, I observed that there is a strong trend in several renewable energy events with regard to our unified concern on the future of energy. This is not a surprise given the urgency of the climate agenda. Some studies have shown that we have consumed over 60% of our global carbon budget and have not more than 10 years to reach carbon neutrality. Admittedly, the energy sector is one of the largest culprits contributing to nearly 80% of the annual CO₂ emissions. SEDA has been tasked to spearhead the sustainable energy agenda in the country. Both renewable energy and energy efficiency are significant climate mitigation measures. Additionally, the greater deployment of renewable energy can contribute to greater national energy security.

While the international topic of interest is largely on the future of energy, at SEDA, we believe the future of energy is in sustainable energy. To us, the future is here. It is up to us to shape the energy sector. Specifically, we believe that future energy will be framed by the 6Ds: decentralised, distributed, deregulated, democratised, decarbonised, and digitised. It is within this framework that the topics of the Summit will be based upon. This coming Summit is special because for the first time in the history of ISES, we will be co-hosting the event together with the Sarawak State Government. Sarawak is my home state, exemplary in high renewable energy in their energy mix.

It is a delight that the Honourable Chief Minister of Sarawak has granted his full support to have the Summit in Kuching. Against this backdrop, I would like to remind that the ISES platform is intended to generate fresh ideas and to discuss lessons learned among thought leaders from various nations, so the learning curve on future energy may be reduced. I look forward to your participation at the 4th ISES 2018.

Here's wishing a Merry Christmas to those who celebrate it, and to everyone a Blessed New Year.

Catherine Ridu
Sustainable Energy Development Authority (SEDA) Malaysia



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GROUP



COMPANY PROFILE

Concord Green Energy Sdn Bhd (CGESB) is established for the purpose of undertaking Renewable Energy (RE) initiatives in Malaysia. The RE initiative involves undertaking the development of biogas plants for power generation purpose in palm oil mills.

The Concord Group is a 1-stop Project Integration Provider in palm oil market. The Group provides complete packages to develop biogas plant to our valued business partners, namely:

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In May 2015, CGESB had successfully signed a Master Agreement with FELDA Global Ventures Holdings Bhd (FGV) to build, operate and maintain FGV's biogas plants complete with power generation facilities at selected FGV's palm oil mills.

Subsequently, in July 2016, CGESB signed the Build, Operate and Own Agreement (BOO) with FGV to immediately start engineering design and project construction at four greenfield mills under Phase 1.

Under Phase 2, CGESB will develop and operate another ten brownfield biogas plants with power generation facilities with FGV.





OBJECTIVES

- To undertake the biogas plants development for renewable energy production at palm oil mills in Malaysia.
- To treat Palm Oil Mill Effluent (POME) and capture its biogas to power generation as green energy.
- To generate revenue by selling the green energy to Tenaga Nasional Berhad (TNB) under the Renewable Energy Power Purchase Agreement (REPPA) at a rate under the Feed-in Tariff (FiT) mechanism issued by the Sustainable Energy Development Authority (SEDA) Malaysia.
- To provide a sustainable solution for palm oil mill industry waste management by reducing carbon emission through a controlled methane capture system.
- To implement the green agenda and to be aligned with the National Renewable Energy Policy.

CONTACT US

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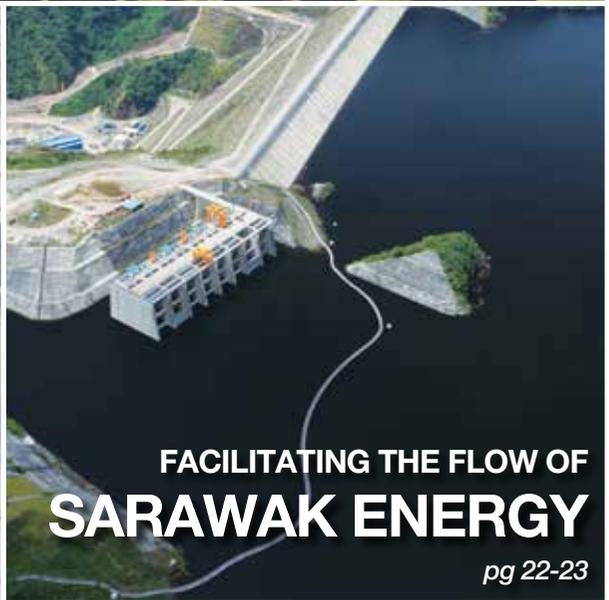
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ENERGY for SARAWAK



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Sarawak Energy Berhad (Sarawak Energy) is a state - owned vertically integrated electricity utility and power development company with a vision to achieve sustainable growth and prosperity for Sarawak by meeting the region's need for reliable, renewable energy.

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Sarawak Energy is focused on the generation, transmission, distribution and retail of electricity. We generate power through hydro, coal and gas, capitalising on Sarawak's abundant indigenous resources, and supply to our customers throughout the state through an extensive network.

Sarawak Energy as the catalyst of Sarawak Corridor of Renewable Energy (SCORE), develops clean and renewable energy to drive investments from energy intensive industries to create a stronger economy for Sarawak and its people.

THE FUTURE IS HERE

SCALING UP MALAYSIA'S RENEWABLE ENERGY MIX

“The new electricity paradigm takes into serious consideration the climate agenda and the need for true national energy security.”

Datuk Dr Yee Moh Chai



An Interview with Datuk Dr Yee Moh Chai, Chairman of SEDA Malaysia on the 4th International Sustainable Energy Summit (ISES) 2018.

Background: SEDA Malaysia is organising the 4th ISES 2018 together with the Ministry of Utilities, Sarawak which will be held on April 10-11, 2018. It is the first time the summit is organised outside of the Klang Valley and the summit will be co-hosted by the Ministry of Energy, Green Technology and Water Malaysia (KeTTHA) together with the Sarawak State Government. The theme of the summit is “**Sustainable Energy: The Future is Here.**”



Y.Bhg. Datuk Dr. Yee Moh Chai visits SJKC Chung Hwa KK to inspect the solar PV installation on 3/4/17 under the SEDA Malaysia Solar PV Community Quota. 

How do you personally envision the future of electricity to be?

At SEDA Malaysia, we always believe that the future of electricity is framed by the 6Ds: decentralised, distributed, deregulated, democratised, decarbonised, and digitisation. Perhaps by now, we owe the readers a quick explanation of the 6Ds. As we are probably familiar, conventional electricity systems are marked by large power plants (typically coal and gas) and electricity is transmitted unidirectionally from the transmission backbone down to the distribution networks, and finally to the consumers. The fuel for power generation (coal, gas) will need to be transported to these centralised power plants.

The new electricity paradigm takes into serious consideration the climate agenda and the need for true national energy security. Only renewable energy truly addresses both climate and energy security. Renewable energy addresses climate agenda by not generating harmful greenhouse gas (GHG) emissions during power generation, and renewable energy also offers energy autonomy as energy is available domestically and never-ending in supply. In this aspect, the future of energy will be decarbonised.

As renewable energy is typically harnessed in-situ (e.g. solar, wind, hydro, geothermal), the **decentralised and distributed** electricity system is more suitable than the centralised configuration. However, this provides additional challenges as some forms of renewable energy are variable in nature (e.g. solar, wind) and that would require some intelligence in the network to balance the grid in terms of the dynamic electricity supply and demand.

This is where **digitisation** comes in, in the form of a smart grid. Digitisation can also be extended to other forms of applications such as electricity management in buildings/homes, energy trading among prosumers (i.e. producers and consumers), and wholesale electricity trading including cross border electricity trading.

Finally, the electricity market and industry should be **deregulated** so consumers have the choice to be suppliers and/or producers concurrently. In this way, the electricity market is **democratised** so consumers have the choice of deciding their electricity source (much the same as mobile phone users subscribing to their service providers) and the industry permits greater participation of distributed RE generations.

How will the 4th ISES 2018 address the energy transition to facilitate greater adoption of sustainable energy?

In order for the energy transition to be effective, we need multipronged approaches to address several issues. At the highest level, we need a future energy framework that supports a greater contribution of renewable energy. That's where we have plenary sessions on the electricity market transformation at the ASEAN, national, and state levels. Sarawak is a strategic host for the 4th ISES 2018 as the state has the highest renewable energy contribution in the electricity mix, with over 70% of hydro.

At the ASEAN level, the panellists comprising of Government and international sectors will discuss what the future electricity market will be like, what their countries' aspirations are on sustainable energy, and their targets to meet their climate obligations as pledged under the Paris Agreement. They will address the existential challenges of scaling up sustainable energy in their electricity mix, the effective intervening policies, and the role of regional cooperation to achieve the common goal of decarbonising the electricity sector.

At the national and state levels, the panellists will discuss the strategies to achieve energy balance and security, affordable electricity, and institutionalising climate agenda in electricity transformation. Discussion will include developing policy frameworks that will decouple economic growth from increasing GHG emissions and resource constraint, and technical and entrepreneurial skills required for the new energy paradigm.

Besides framing the overarching energy framework, how will the summit address the three-foot operationalising of energy transition?

Operationalising the energy transition will involve discussions such as integrating large scale distributed solar photovoltaic (PV) systems to the grid, best practices on auctioning large scale renewable energy projects, and sustainable energy access for remote communities. Financing is a crucial component of the energy transition. Each ISES will definitely include a financing session and this summit, the financing will span to include access to international funds such as the Green Climate Fund. There will also be technology-specific sessions such as the global market and industry outlook for the solar PV and bioenergy sectors. Sarawak Energy Berhad will helm two of the deep dive workshops (DDWs) on sustainable hydropower and electricity access for remote communities. This summit, Malaysia is also host to the Photovoltaic Power Systems under the International Energy Agency (IEA PVPS). In this regard, some of the experts from the IEA PVPS will also contribute to the solar PV DDWs.



↑ Program Sikal Elektrik Rakyat 1Malaysia (SERIM), launched by Y.B. Datuk Seri Panglima Maximus Ongkili on 11/4/17 at Universiti Malaysia Sabah.

“...we need a future energy framework that supports a greater contribution of renewable energy.”



↑ Y.Bhg. Datuk Dr. Yee Moh Chai officiated the Safe Electricity programme on 20/08/16 at SJKC St. James Likas.



↑ Y.Bhg. Datuk Dr. Yee Moh Chai during a site visit to IMW power plant of SI Standard Sdn Bhd at Kampung Penimbawan, Tuaran, Sabah.

What are emerging trends that will be discussed at the 4th ISES 2018?

I think if you look around, there are several strong trends in the renewable sector. First is the rise of energy storage solutions (ESS). ESS are particularly critical to scale up variable renewable energy (such as solar and wind). For the longest time, critics of variable renewable energy have highlighted the high capital cost of investment and the intermittency issues. But today, solar and wind have gone beyond coal-parity in certain countries and the only excuse left standing is their intermittency and subsequently their threat to the grid. The good news is that ESS is picking up momentum, partly thanks to the rise of electric vehicles and greater global commitment to reduce pollution. Today, we have an array of ESS to address intraday, intermediate, and long haul low renewable energy supplies in highly overcast days and no wind. In this summit, we have dedicated a DDW to discuss the various forms of ESS, spanning from the rising lithium-ion, comeback of hydrogen fuel, and the innovative use of reservoirs as pumped storage. ESS is an important component in the energy balancing market and can help delay expensive grid upgrade to accommodate greater injection of variable renewable energy to the grid.

Lastly, let me reiterate that the future of energy will be digitised. In many sectors of the industries and markets, digitisation is adopted in massive scale and perhaps, the energy sector is among the last few sectors to be truly digitised. Today, there are many emerging information technologies such as the internet-of-things (IoT), artificial intelligence (AI), big data analytics, 3-D printing, robotics, virtual realities (VR), and the blockchain technologies.

SEDA Malaysia has decided to focus on blockchain technologies as a possible platform to scale up greater renewable energy in the electricity mix. Blockchain technology embeds trust within the platform, thereby reducing chances of fraud. It removes the need for intermediaries, increases efficiency and reduces cost of transaction, and the technology is highly scalable.

Concluding Remarks

The summit is made possible because of the strong commitment and support by the Ministry of Energy, Green Technology and Water Malaysia and the Sarawak State Government. The Organising Chair of the summit is the CEO of SEDA Malaysia, Catherine Ridu. The Organising Chair and her team have worked hard with the Ministry of Utilities, Sarawak to organize the international summit. The summit owes its success to the pool of experts who are willing to contribute and the generous sponsors that have been showering their support and stand in solidarity with us. We also would like to extend our gratitude to the endorsers, the IEA PVPS and the ASEAN Centre for Energy, our official media partners and industry partners, such as the Malaysian Photovoltaic Industry Association (MPIA), the Malaysia Biomass Industries Confederation (MBIC), and the Asian Photovoltaic Industry Association (APVIA). If you need more information on the summit, please visit www.ises.gov.my. I look forward to welcoming you at the summit in Kuching, Sarawak next April!



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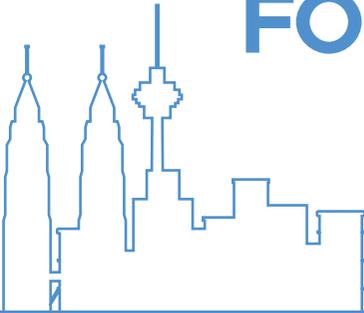
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A CONDUCTIVE ENVIRONMENT FOR MALAYSIA'S RE AGENDA



Under Thrust 3 of the Five Strategic Thrusts of the National Renewable Energy Policy and Action Plan (NREPAP), there is a need to intensify human capital development in the renewable energy (RE) industry by filling the gap of local competency in RE technology. Guided by this framework, the Sustainable Energy Development Authority (SEDA) Malaysia strives to fulfill its mandate of developing the country's RE industry and market.

Part of SEDA's responsibilities pertain to ensuring that RE installations in Malaysia are designed, constructed, operated, and maintained by trained engineers and technicians who work by international quality and safety standards.

Consequently, this in turn ensures that RE power plants operate for the entire committed period of time as stated in the RE power purchase agreement (REPPA) with distribution licensees (DLs) such as Tenaga Nasional (TNB), Sabah Electricity (SESB), and others.

SEDA, via our **Renewable Energy Technology (RET) Division**, has developed and is offering competency courses with the respective training partners as follows:

- a. Grid-Connected Photovoltaic (GCPV) Systems Design Course**
 - i. Universiti Teknologi MARA (2013)
 - ii. Selangor Human Resource Development Centre (2014)
- b. Off-Grid Photovoltaic (OGPV) Systems Design Course**
 - i. Universiti Teknologi MARA (2015)
- c. GCPV for Wiremen and Chargemen**
 - i. Universiti Kuala Lumpur British-Malaysian Institute (UniKL BMI), Gombak (2013)
 - ii. Universiti Teknikal Malaysia Melaka (UTeM), Melaka (2015)
 - iii. Akademi Binaan Malaysia (ABM) Wilayah Utara, Kedah (2016)
 - iv. Kolej Kemahiran Tinggi MARA (KKTM), Pasir Mas (2016)
 - v. Institut Kemahiran MARA (IKM), Kota Kinabalu (2016)
- d. Installation and Maintenance of GCPV**
 - i. Akademi Binaan Malaysia (ABM) Wilayah Utara (2014)
 - ii. Selangor Human Resource Development Centre (SHRDC) (2015)
 - iii. Kedah Industrial Skills & Management Industrial Centre (KISMEC) (2016)
 - iv. Terengganu Skills Development Centre (TESDEC) (2017)
 - v. Universiti Kuala Lumpur British-Malaysian Institute (UniKL BMI), Gombak (2017)
- e. Operation and Maintenance of Biogas Power Plants**
 - i. Universiti Tenaga Nasional (UNITEN), Selangor (2017)

Our industry partners and training providers show their commitment by offering these courses on a regular basis. Some of them have even started embedding selected courses into their M.A. Programmes and as value-adding courses in their B.A. Programmes.

The total number of participants that have been trained as of October 2017 are as follows:

GCPV Systems Design Course	GCPV for Wiremen and Chargemen	Installation and Maintenance of GCPV	OGPV Systems Design Course
			
583 Trained Participants	376 Trained Participants	290 Trained Participants	46 Trained Participants

Notably, these training courses were developed via engaging with relevant RE stakeholders such as the Malaysian Photovoltaic Industry Association (MPIA), training institutions, and government bodies such as the Energy Commission (ST), and the Department of Skills Development (JPK) of the Ministry of Human Resource to keep in line with the applicable Malaysian requirements and standards.

Our Biogas Power Plant Training course was very recently developed based on the National Occupational Skills Standards (NOSS), making successful trainees who have completed the course qualified for NOSS certification by JPK.



SEDA's solar PV courses were developed with a strong emphasis on safety, an aspect that can be found in designing, operating, and maintenance. Part of this is because even though solar PV systems are considered to be just like any other electrical system, they are still systems with direct current (DC) behaviour which is more dangerous compared to the common alternating current (AC) electrical systems.

For example, the GCPV Systems Design Course covers the designing of GCPV systems including solar PV modules, inverters, and other associated equipment suitable for Malaysia's climate and capable of producing optimal outputs and performances. This Course has attracted many international participants from around Asia.

SEDA's PV training also caught the attention of the ASEAN Centre of Energy, which led to them appointing us to conduct a PV management training session for ASEAN member states back in 2013.

An important fact to remember is that a company must have at least one employee qualified in GCPV systems design in order to become a registered PV service provider (RPVSP). RPSVP is another strategy for SEDA whereby only certified RPSVPs can undertake solar PV installations, ensuring the safety and quality of these installations.

To date, ~120 RPSVPs are available mainly from SMEs established due to the solar PV market in the country. The maturation of our PV market is evident in some of the RPSVPs who have begun to export their services regionally, as a result of applying the knowledge and skills gained from SEDA's RE training courses.

As the statutory body responsible for sustaining the country's RE agenda, SEDA is also responsible for developing strong government RE policies to support market growth and to create healthy competition amongst industry players. This includes providing a conducive environment for the development of the PV industry by offering the aforementioned competency courses as well as administering industry players with standard compliances.

SEDA has acknowledged and adopted the relevant Malaysian standards for its RE projects under the Feed-in Tariff (FiT) mechanism, especially for solar PV systems that are growing tremendously in the country.

The Department of Standards Malaysia (Standards Malaysia) had pooled together local PV experts to develop various series of Malaysian Standards (MS) for solar PV systems. SEDA has been an active member of the Solar PV Working Group (WG) since its inception.

The WG's deliberations led to Standards Malaysia publishing a number of MS series for both on-grid and off-grid solar PV systems. One important standard is MS 1837:2010 which concerns the installation of GCPV systems. It has been used as the main guide and requirements for the industry and government alike in designing GCPV systems.

Under RE Act 2011 [Act 725], there is also a subsidiary legislation on the Technical and Operational (T&O) Requirements Rules to be complied by all projects under the FiT mechanism. To supplement these requirements, SEDA developed procedures for the testing and commissioning of RE systems.

We are very much aware of the gravity of responsibility when it comes to monitoring the construction of all RE installations, a huge task that must be undertaken. Hence, the series of procedures for testing and commissioning solar PV, biomass, and biogas projects was established to ensure that installations meet and comply with international standards in terms of quality, reliability, and safety - all of which will impact plant performance. The proliferation of solar PV installations made it imperative for SEDA to certify that these installations meet the aforementioned international standards. A lot of emphasis was put on solar PV in the beginning, simply because it is fast-growing and can be applied almost anywhere compared to other RE installations (as long as there is available roof space).

“...by offering competency courses as well as administering industry players with standard compliances.”



In view of Malaysia's commitment to the Paris Agreement, numerous initiatives were and are being implemented across the board of government sectors. For example, under the 2014 budget speech, Prime Minister Datuk Seri Mohammad Najib Tun Abdul Razak announced the approval of funding for installing solar PV systems for government buildings. The Ministry of Energy, Green Technology and Water (KeTTHA) was assigned to coordinate the project with SEDA as the implementing agency.

This initiative demonstrated the participation and commitment of the Malaysian government to realising the Renewable Energy and Green Technology agenda, by showcasing a Government Lead By Example (GLBE) approach with promoting RE in government buildings. The implementation of this project saw SEDA successfully commissioning the installation of solar PV systems for 25 selected government buildings in Putrajaya, culminating in a total installed capacity of 670kWp.

Another showcase project featuring solar PV serves as the pedestrian roof walkway between the National Cancer Institute (IKN) and Putrajaya Hospital, completed with a capacity of 70kWp. The Ministry of Health fully supported this effort as it is in line with their initiatives to Green the country's hospitals.

Both of the aforementioned projects have been estimated to generate ~880MWh per year from the total 740kWp capacity of both solar PV systems, and this helps to eliminate about 616 tonnes of CO₂ emissions annually.

Also of note is the development of the National PV Monitoring and Performance Database. Expected to be ready by mid-2018, this web portal will be able to monitor selected solar PV plants on a national scale, live and historically. The monitoring and performance analysis of these plants have become a necessity to ensure high performance, low downtime, and fault detection in any given power plant. At-site weather data and generation data from inverters also need to be continuously collected for monitoring and performance analysis.



④ The technical experts from SEDA will visit RE installation sites to ensure proper system installation before Testing and Commissioning.

The Database project will additionally provide site-to-site VPN solutions which connects the plants' monitoring systems to SEDA's office for said monitoring purposes, data transmissions, remote management using the dedicated communication network, and will also allow users to subscribe to or purchase data reports generated by the system.

Feedback for this article was provided by Azah Ahmad (Director), Edisham Mohd Sukor, Zurlinda Asma Aziz, and Mohd Idham Mohammad of the Renewable Energy Technology (RET) Division.



Part of the Renewable Energy Technology (RET) Division, led by Director Azah Ahmad.



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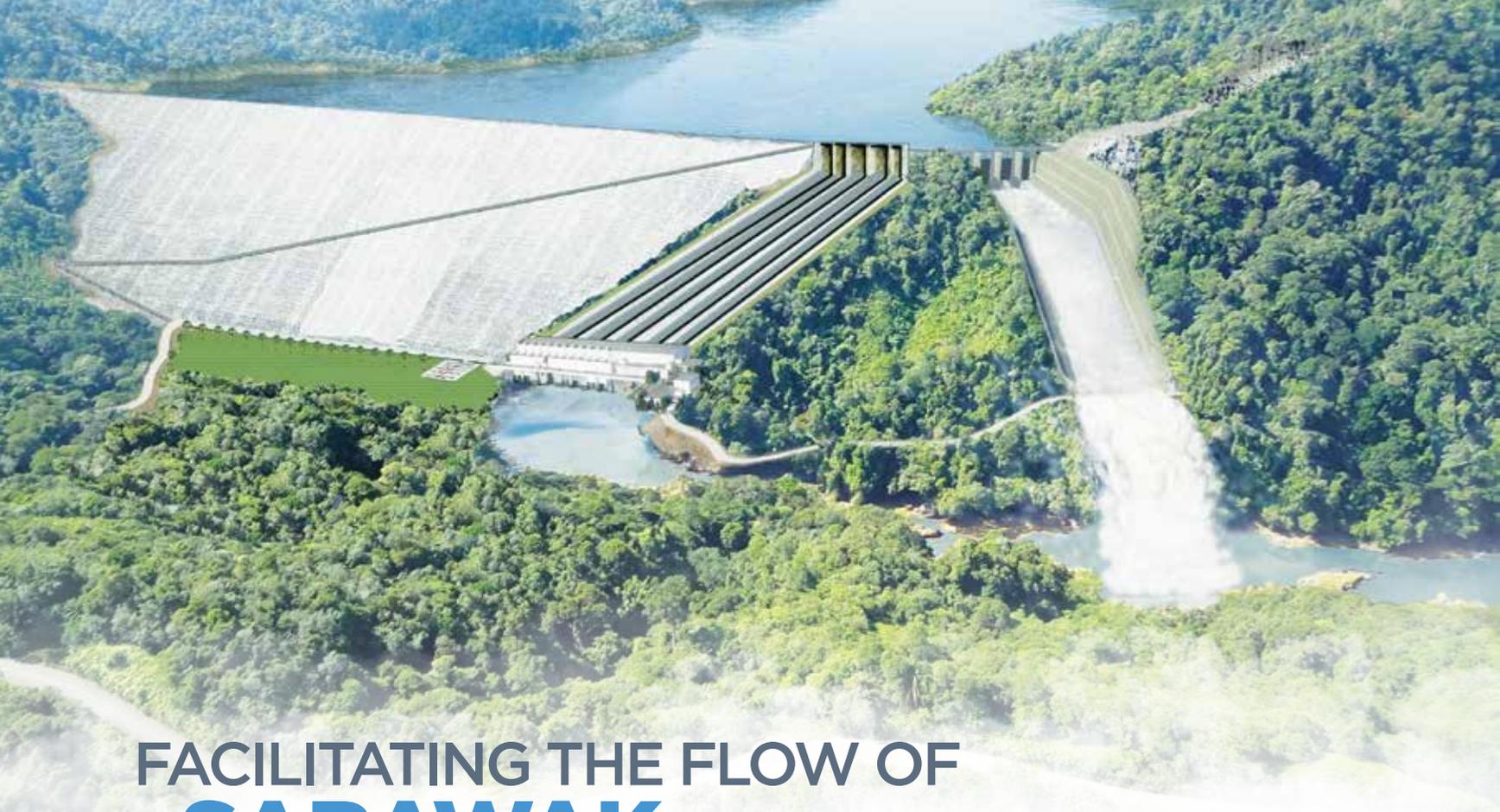
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Artist's Impression of the Baleh HEP

FACILITATING THE FLOW OF **SARAWAK** **ENERGY**

Becoming a powerhouse in the ASEAN region

Although the use of lowercase letters in Sarawak Energy Berhad's (SEB) logo signals its openness and humility towards its customers and its community, the company's capital expenditures (capex) committed over the years on feasibility assessments and the construction of new hydropower facilities indicates its towering ambition to be a regional powerhouse for ASEAN.

To further ensure that Sarawak receives reliable and efficient electricity supply, SEB has also been kept busy with the commissioning of a major new coal-fired power plant that is expected to come on-stream next year. Sarawak Energy has also completed the critical parts of a new 500kV transmission backbone that runs almost parallel to the current 275kV backbone.

Another initiative saw SEB introducing two blocks of a new combined-cycle (CC) gas turbine plant in Kidurong to the grid, proving to be a good strategy for better diversification and security of electricity supply.

"Sarawak has abundant indigenous natural resources including gas, coal, and water which are being harnessed to meet our energy demand. While our generation mix is predominantly renewable and affordable hydropower, we also develop coal and gas resources for a balanced generation mix to ensure the security of our supply," explained James Ung, Chief Executive Officer (CEO) of SEB Power Sdn Bhd, which is a wholly-owned subsidiary that owns and operates Sarawak Energy's coal, gas, and hydropower generation assets.



JAMES UNG
Chief Executive Officer (CEO)
of SEB Power Sdn Bhd

"With the development of hydropower, our grid carbon emission intensity has been lowered by over 70%..."

Current and future electricity mixes of Sarawak.

Generation Mix (%)	2017	2020	2025
Hydro	73.43	63.35	67.93
Gas	12.65	14.75	16.52
Coal	10.21	20.26	14.89
Diesel	2.42	0	0
Off-Grid Diesel	0.94	0.77	0.02
Alternative Energy	0.35	0.87	0.65
Installed Capacity (MW)	4,701	5,449	7,415

“With the development of hydropower, our grid carbon emission intensity has been lowered by over 70% compared to 2010,” Ung added.

Part of Sarawak’s plans for energy transition and to provide 24-hour access to electricity to all Sarawakians, no matter how remote, includes the primary approach of connecting rural households to the State Grid. If this is not feasible, however, then off-grid alternatives are explored.

“Rural electrification is a challenging task due to the vastness of Sarawak and the mountainous geographical terrains, along with a dispersed population - half of which is rural-based,” said Ung.

“We began introducing rural solar and mini hydro hybrid stations under our Rural Electrification Scheme (RES) in 2009, to address the most remote parts of Sarawak. Currently, there are 17 solar hybrid power stations in operation throughout the interior of Sarawak. Another 12-15 stations are in various stages of implementation and are expected to be commissioned within the next two years.”

For a long while, around half of Sarawak’s annual generation capacity was accounted for by diesel and natural gas, 35% from hydropower, and 15% from coal. The State also reduced the share of fossil resources in its generation mix, aiming for at least 60% of hydropower contribution (nearly double the original amount) while coal and gas will each provide about 20% to the mix.

“Today, our installed capacity is more than 4,600MW, with hydropower representing about 75% of the generation mix. To ensure the security of supply and to harness our abundant indigenous coal and gas resources, thermal power plants are also a part of our mix,” Ung continued.

The Balingian Coal-fired Power Plant adopts the latest and more environmentally-friendly Circulating Fluidised Bed (CFB) boiler technology, has an installed capacity of 600MW, and is expected to produce first power in 2018. Meanwhile, work on the proposed extension of Bintulu’s Tanjung Kidurong Power Station is continuing with the addition of a 2x400-MW CC gas plant.

Prior to the Sarawak Corridor of Renewable Energy (SCORE), Sarawak’s energy demand grew to only about 1,000MW over 50 years. With SCORE, demand took a quantum leap and from 2010 to 2016, the State’s energy capacity increased from 1,300MW to 4,600MW.

SCORE demand is driven by bulk power customers. Sarawak Energy has signed multiple Power Purchase Agreements (PPA) with both local and international SCORE customers possessing energy-intensive businesses for a current committed supply of more than 2,000MW.

Ung commented: “We anticipate the demand for energy to increase further. Sarawak Energy began exporting power to West Kalimantan early last year, as part of our aspiration to establish a Trans Borneo Grid and to become a powerhouse in ASEAN. In the meantime, we are also establishing plans for interconnection with our other neighbours in Borneo - Sabah and Brunei.”

Batang Ai, Bakun, and Murum are the main hydropower plants that help feed renewable energy into the Grid. The Batang Ai Hydroelectric Dam was built in the 80s with an installed capacity of 108MW. It took two decades before the 2400-MW Bakun Dam was constructed and commissioned in 2011, and finally the Murum Dam in December 2014.

“Batang Ai Hydroelectric Power (HEP) Plant has been running smoothly with high availability and efficiency since its commissioning in 1985. Ongoing maintenance and improvement works are carried out, primarily to digitise and automate the power plant to ensure efficiency and safe operations for the next thirty years,” Ung added.

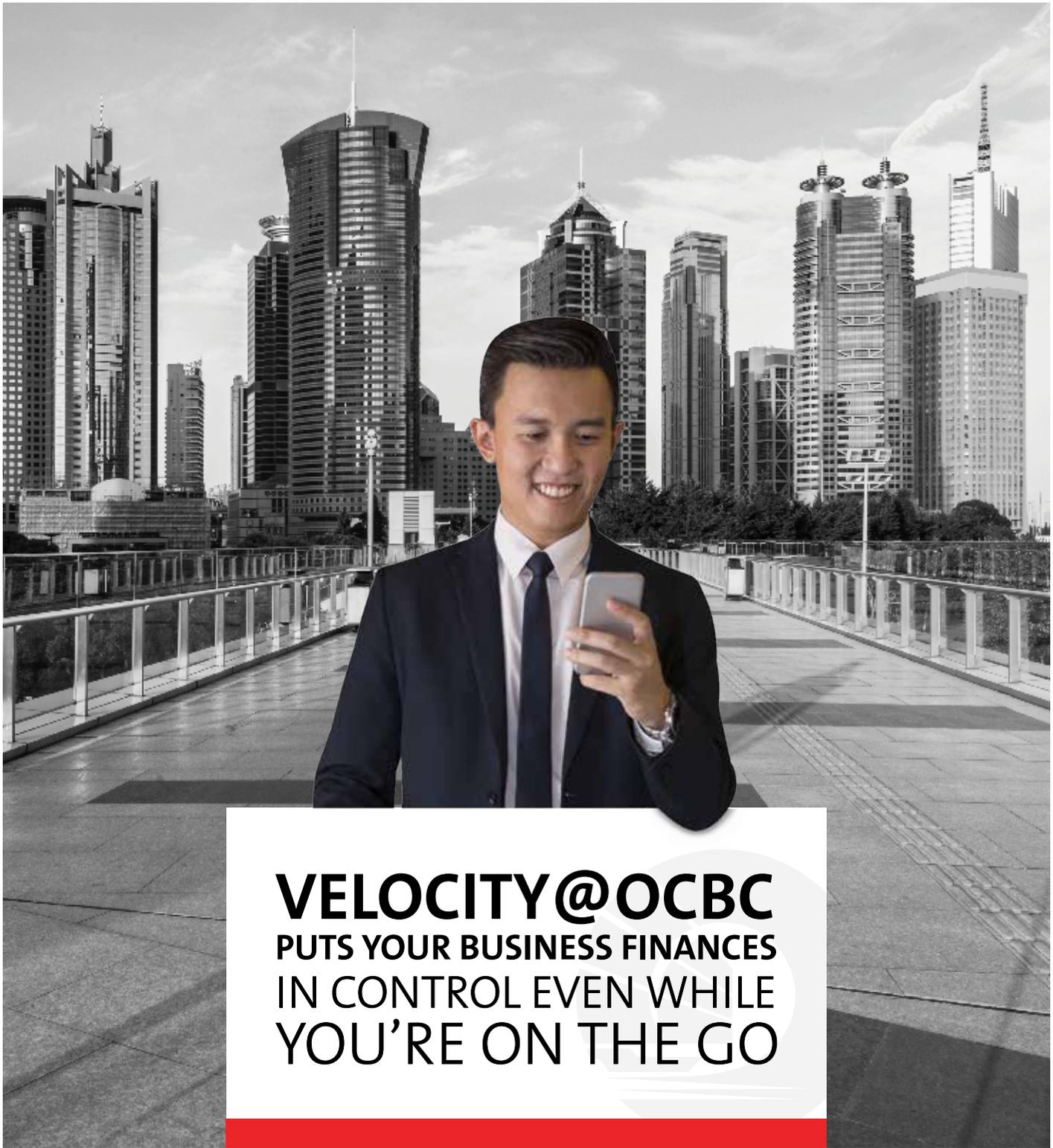
On top of that, The Baleh Project is expected to be completed by 2025 with an installed capacity of 1,285MW, while The Kota 2 Mini Hydro in Lawas is expected to be completed in 2018 with an installed capacity of 17MW.

Additionally, there are other hydropower projects in various stages of feasibility studies.

“We will continue to develop hydropower as our predominant source of generation and according to the International Hydropower Association Sustainability Protocol, to meet organic demand and to power Sarawak’s economic development. As a fully government-owned entity, any decision to proceed with the construction of hydroelectric projects in the State depends on energy demand and approval from the State government,” Ung reminded.

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PART 2

AN ACCOUNT OF DEVELOPING MALAYSIA'S RE RESOURCES

Previously, we briefly discussed the development of the Feed-in Tariff (FIT) in Malaysia as well as the successes stemming from its implementation from the standpoint of SEDA Malaysia's FIT Division. In this issue, we are taking the opportunity to go into detail while also summarising the Division's experiences with each renewable energy (RE) resource, namely solar PV, biogas, biomass, and small hydropower.

SOLAR PV

Under the FIT mechanism, homeowners are able to install solar PV systems with an installed capacity of up to 12kW within their residential compounds by applying through the individual quota. From 2011 to 2013, applications were processed on a first-come-first-served basis through the e-FIT system. Nonetheless, the high demand for individual quota generated significant amount of traffic to the e-FIT system during each quota opening. Accordingly, ICT introduced the New Queue System in 2014 to enhance the application process through the online system. Demand for individual quota far exceeded supply, thus a decision was made whereby applicants who were not successful in obtaining a quota in 2014 would be given the 2015 quota. In anticipation of the high volume of applicants in subsequent years, SEDA introduced e-balling for the 2016 and 2017 quota whereby the individual queue number is determined randomly by an automated system.

Commercial and industrial solar PV developers are able to participate in the FIT program through the non-individual quota. Unsurprisingly, the demand for non-individual quota far exceeds the supply. Quota in this category was awarded via a first-come-first-served basis when FIT first started. However, a balloting system was introduced in 2014 onwards to ensure a fair award of projects in light of the high volume of applicants for PV projects up to 425kW. Solar PV projects above 425kW and up to 1MW had to apply through manual submissions. Projects in this category were assessed under a merit-point based system in 2014 and 2015, while a pass-fail criteria method was adopted in 2016.

In order to ensure that FIT projects are fairly distributed among small and major players, SEDA imposed a maximum limit for new PV installations at 1MW from 2014 onwards. Such a move prevents a single major company from seizing a large stake of the FIT quota, which consequently denies smaller players to participate. Accordingly, imposing a maximum limit in the installed capacity of a PV installation would benefit small local players to develop their expertise in the field, with the hopes of becoming a major player in the future so that such companies can eventually compete internationally. Gading Kencana, Atlantic Blue, and Ditrolic Solar are among the PV installer companies with humble beginnings but have now been able to secure PV development projects internationally and take part in utility-scale solar projects.

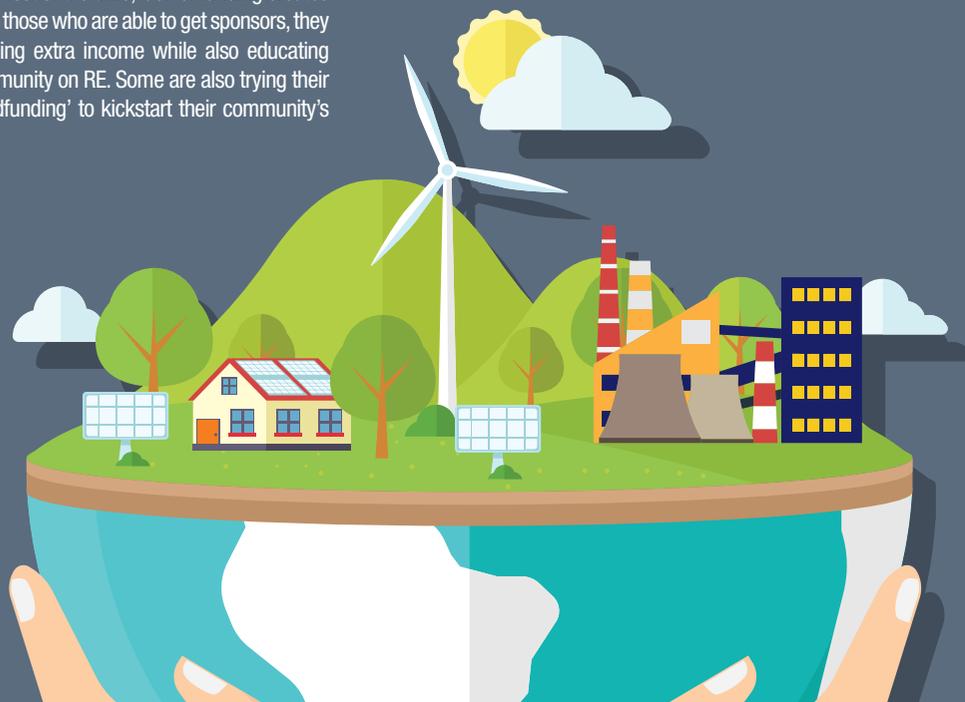
SEDA also introduced a special category for communities under the solar PV quota. This was to ensure communities eligible for applications - namely places of worship, schools, and care centres - were able to apply without having to compete with commercial applicants.

For the community quota, though it seems that every year the quota is not fully subscribed, it was observed that there were a myriad of communities getting more interested in RE on a yearly basis. The word would get around the communities of this programme and many would enquire and try to find ways to participate. Unfortunately, most of the time, lack of funding creates a barrier. But to those who are able to get sponsors, they are now enjoying extra income while also educating their own community on RE. Some are also trying their hand at 'crowdfunding' to kickstart their community's installations.

BIOGAS

After a slow uptake in the beginning, biogas picked up with a big demand for its quota due to the revision of the landfill bonus definition to include agriculture waste in 2014; the increase of the bonus FIT rate for the use of locally manufactured or assembled gas engine technology from RM0.01/kWh to RM0.05/kWh; and the Malaysian Palm Oil Board (MPOB) mandating the implementation of biogas capture for all new palm oil mill applications from January 1, 2014 and for existing mills applying for expansions throughout the country. The demand now far exceeds the annual allocation of biogas quota.

The overwhelming interest in the biogas quota paved the way for the emergence of a number of project development and investment companies specialising in biogas projects, e.g. Cenergi, GLT, and Green & Smart. Even local gas engine assemblers are stepping into the biogas game, such as Sime Darby Industrial. Biogas plant developers tend to opt for gas engines that are locally assembled given that installations that use local engines will be entitled to an additional five cents on top of their basic FIT rate. As for biogas projects from landfills, we have a number of landfill concessionaires that have applied for the biogas quota, namely KUB-Berjaya, Cypark, and SWM. Moving forward, biogas projects will be the key driver for FIT as there will no longer be quotas for solar PV past 2017 in the foreseeable future.



BIOMASS

Biomass has been the most challenging resource in terms of implementation and the farthest from the targeted capacities. Biomass for power generation is of the lowest value in terms of economic returns for a palm oil mill (POM) owner, hence the emphasis on generating power is low on the priority list. In addition, empty fruit bunch (EFB) has many competing uses aside from burning for power generation. EFB applications include mulching, pelletisation, and composting into organic fertiliser. As such, the various applications of EFB makes the feedstock highly competitive, thus leading to feedstock shortages and price escalations. Ideally, for power generation from biomass to work, the initiative should be driven by the POM owners themselves (i.e. owners of the waste) to ensure a constant supply of feedstock. Technology-wise, Malaysia is still on a learning curve on how to optimize the EFB fuel treatment to yield the best energy output, but the technical know-how to improve the fuel treatment process is improving significantly. Finally, there are also instances where the grid network is unable to cater to the amount of power intended to be injected, since POMs are often located in remote areas.

SMALL HYDRO

The challenges of small hydropower plants mostly revolve around the need for developers to obtain numerous permits, ensuring commitment from all stakeholders, and meeting the milestones scheduled within a three-year framework. It has been observed that small hydro developers are unable to complete their projects within the three-year time frame, hence SEDA is in the process of extending the application period to five years instead. The time needed to obtain the permits, relevant orders, etc. takes 1.5 times longer on average than anticipated.

RE FUND

Like other programmes around the world, the implementation of FIT has had its fair share of challenges. One major component to determine the lifeline of the FIT mechanism is the RE Fund. The RE Fund is currently derived through a 1.6% contribution collected from consumers' electricity bills, except for domestic consumers with an electricity consumption of less than 300kWh/month or consumers currently paying an electricity bill of less than RM77/month.

Under the FIT mechanism, payments to Feed-in Approval Holders (FiAHs) are guaranteed from the RE Fund for a period of 21 years for solar PV, small hydro, and geothermal power plants and 16 years for biomass and biogas. Therefore, quota caps are essential to ensure that there will be adequate funds to make FIT payments to FiAHs throughout their power purchase agreement (PPA) tenures. However, the collection at 1.6% is insufficient to cater the demand for RE. Thus, the limited size of the RE Fund prevents the nation from realising its true RE development potential.

In many countries where the FIT system is implemented, quotas on RE installed capacities are highly discouraged as these caps limit RE growth and constrain its impact. The avoidance of such caps is possible in countries where the electricity tariff is deregulated. However, in a regulated electricity market such as Malaysia's, the funding source for FIT is limited to a fixed percentage imposed on the utility's electricity revenue. Once the electricity market in Malaysia is deregulated, or when FIT has been operating for a considerable period of time, then the removal of the caps may be possible.

CHALLENGES OF RE DEVELOPMENT

Additionally, when FIT was introduced in 2011, it was envisioned that the participants in the market would have been able to obtain the bank loans needed to finance their projects on account of the high degree of security for investors. Even so, as the field of RE was still new to the local market during the earlier days, the problem faced by RE developers was not the lack of funds in the capital market, but the lack of skills within the financial institutions to evaluate the applications and provide the funds expeditiously. As such, SEDA continues to put great effort to overcome this issue by providing capacity building through a series of engagements with leading banks and relevant stakeholders from time to time.

Other major hurdles of RE development include the highly subsidised electricity tariff in our country whereby the low tariff is one of the biggest barriers towards RE implementation; the challenge of setting up a new prevailing displaced cost that can be agreed upon by all relevant parties; the urgency of implementing RE is not well understood and not appreciated by some sectors; the long gestation period for the RE market and industry to reach maturity in order for RE to make significant contributions towards our country's energy mix; and RE being decentralised and spread out throughout the country.

LESSONS LEARNT

To the countries who are about to embark on their own FIT programmes, such initiatives can be successful given the implementation of appropriate policies coupled with a comprehensive framework and action plan. It took Malaysia about three years to get FIT off the ground. It is important to go back to basics instead of completely copying another country's implementation - policymakers should work with the local ecosystem for any programme to be successful. A good policy is one that benefits the citizens, the government, and the industry. The main goal is to acquire buy-ins from network operators/Distribution Licensees.



Part of the Feed-in-Tariff (FIT) Division, led by Director Gladys Mak. 

Having everyone on board is another important factor, from all levels of government and the public - it is all about engagement, engagement, and more engagement. Strong leadership is also required to push the RE agenda and to drive the FIT programme. Most importantly, a dedicated and talented team to serve the country's agenda and implement the programme is key. SEDA started with a small team of about 30, with about five people overseeing the FIT applications. This has now grown to only about 15 folks in the FIT division handling over 10,000 applications located all over Peninsular Malaysia, Sabah, and Labuan. The strong sense of responsibility, team spirit, and dedication make for the successful FIT implementation in Malaysia.

Using technology wherever possible eases the burden on the government and citizens. In Malaysia, all FIT applications are carried out predominantly via an online portal, the previously mentioned e-FIT system. This also discourages any unnecessary interaction or intervention where approvals are concerned and ensures a more transparent processing of applications. Also, with the use of ICT, SEDA does not need to employ a huge number of personnel to implement FIT, thus reducing overheads. Nowadays, when everybody is into the Internet of Things, other countries may look into having their own system such as that of our e-FIT.

Lastly, remember to start small and only have grander targets once you have built up the resources i.e. skilled workers, manufacturers, developers, and financial institutions to name a few. The main hurdle of any energy project is financing. It will be essential to have local financial institutions to approve the financing for these kinds of projects. Some countries may need governmental intervention to mandate/incentivise financial institutions to do so. On the other hand, it could also be possible for a country to establish state-owned financial institutions that provide Green financing.

Feedback for this article was provided by Gladys Mak (Director), Ir. Zamri Laton, Rubita Hani, Ahmad Syafiq, Koh Keng Sen, Frederick Wong, and Nur Haziqah of the FIT Division.

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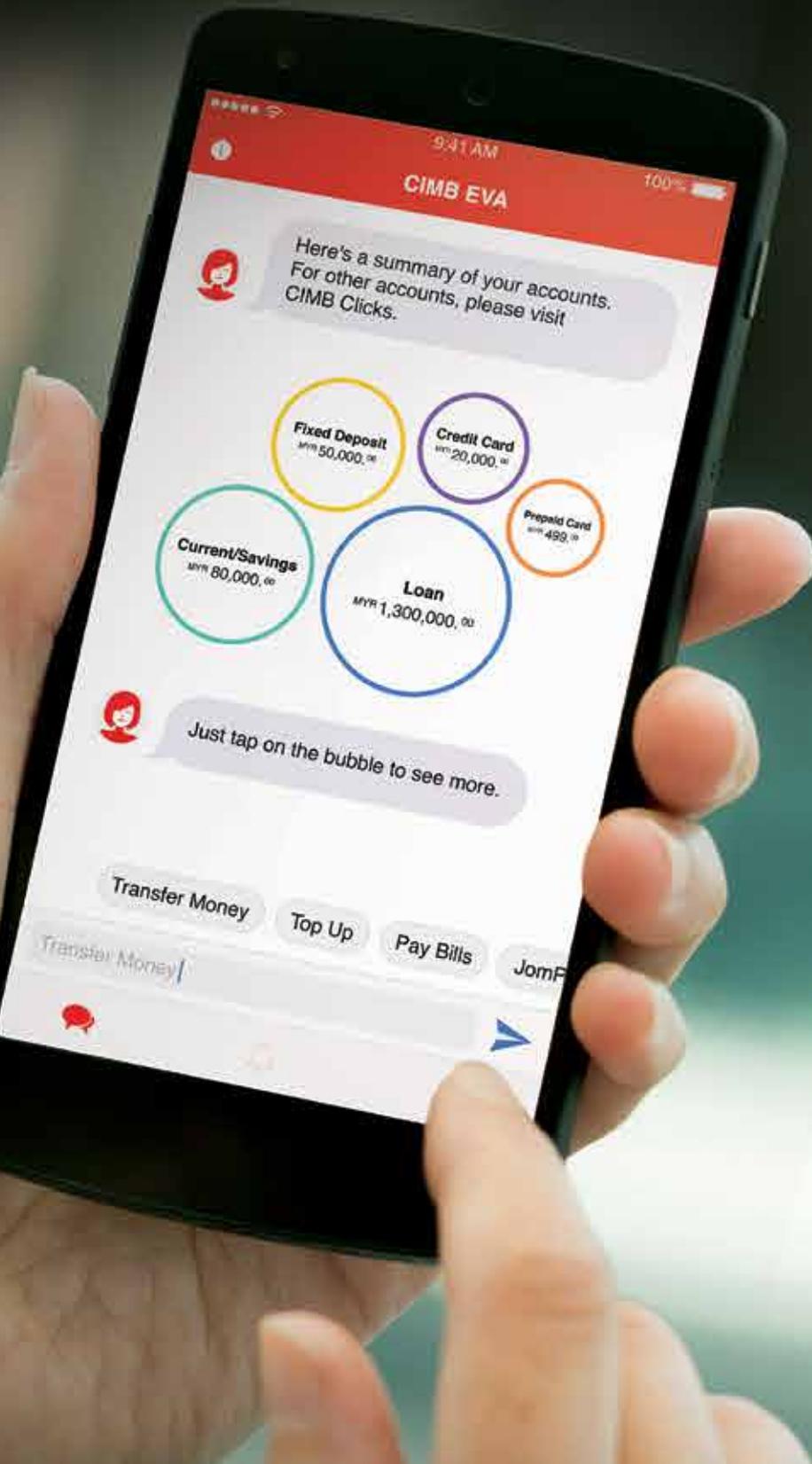
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WHAT'S IN STORE AT 4th ISES 2018



Sustainable Energy : The Future Is Here

DAY 1

10th April 2018

TIME	PROGRAMME
8.30 am	Registration
9.00 am	Opening Ceremony
10.00 am	Networking Break/VVIP visit booths
10.30 am	<p>PLENARY SESSION 1: Envisioning the Future of Electricity Market: Transformation Towards a Greener Electricity Sector</p> <p>In this session, the panellists, comprising of Government and international sectors will discuss what the future electricity market will be like, the countries' aspirations on sustainable energy, and their targets to meet their climate obligations as pledged under the Paris Agreement. They will address the existential challenges of scaling up sustainable energy in their electricity mix, the effective intervening policies, and the role of regional cooperation to achieve the common goal of decarbonising the electricity sector.</p>
11.45 am	<p>PLENARY SESSION 2: Capital Planning: Reinventing the Business Model for Power Utilities in the Future Electricity Market</p> <p>Globally, the process of energy transition from fossil fuels to renewable energy is shaping the future electricity market such that power utilities are required to change their business model to prevent falling into victims of the utility death spiral. In some countries, power utilities are starting to invest in sustainable energy and e-mobility infrastructure. This session will discuss the impact of energy transition to the business of power utilities and how the utilities are reinventing the business models to remain relevant in the future electricity market. The discussion will include the measures for utilities to adopt in order to avoid stranded carbon assets and the relevance of baseload in the future electricity market.</p>
1.00 pm	Networking Lunch Press Conference
2.15 pm	<p>DDW 1: Integrating Large Scale Distributed Solar PV Systems to the Grid</p> <p>DDW 2: Bioenergy: Outlook for Bioenergy Market and Developing Sustainable Business Models</p>
3.45 pm	Networking Break
4.00 pm	<p>DDW 3: Global PV Market and Industry Outlook for 2018</p> <p>DDW 4: Sustainable Hydropower: Harnessing the Future Now</p>
5.30 pm	End of Day 1
7.00 pm	Appreciation Dinner

DAY 2

11th April 2018

TIME	PROGRAMME
9.00 am	<p>PLENARY SESSION 3: National and State Electricity Market Transformation Roadmap</p> <p>In this session, the panellists will discuss at the national and state levels, the strategies to achieve energy balance and security, affordable electricity, and institutionalising the climate agenda in electricity transformation. Discussion will include developing policy frameworks that will decouple economic growth from increasing GHG emissions and resource constraint, and the technical and entrepreneurial skills required for the new energy paradigm.</p>
10.30 am	Networking Break
11.00 am	<p>DDW 5: Best Practice on Auctioning of Large Scale Renewable Energy Projects and Designing Effective Sustainable Energy Policies</p> <p>DDW 6: The Future Role of Blockchain Technologies in the Energy Market</p>
12.30 pm	Networking Lunch
1.30 pm	<p>DDW 7: Low Carbon Cities Development Programme</p> <p>DDW 8: Final Frontier: Ensuring Sustainable and Equitable Energy for All</p>
3.00 pm	Networking Break
3.30 pm	<p>DDW 9: Unlocking Affordable Financing for Sustainable Energy Investments: The Role of International Donors and Financial Institutions</p> <p>DDW 10: The Emergence of Energy Storage Systems: Opportunities & challenges</p>
5.00 pm	Closing Session
5.30 pm	End

Deep Dive Workshop (DDW)

*SEDA Malaysia reserves the right to amend the programme without any prior notice

keynote speakers



Y.A.B. DATUK PATINGGI
ABANG HAJI ABDUL RAHMAN ZOHARI
TUN DATUK ABANG HAJI OPENG
Chief Minister of Sarawak



Y.B. DATUK SERI PANGLIMA
DR. MAXIMUS JOHNITY ONGKILI
Minister of Energy, Green Technology & Water



Y.B. DATO SRI
DR. STEPHEN RUNDI ANAK UTO
Minister of Utilities Sarawak



Y.BHG. DATUK
DR. YEE MOH CHAI
Chairman of SEDA Malaysia



Y.BHG. DATO' IR. ALICE JAWAN
Permanent Secretary
Ministry of Utilities, Sarawak



Y.BHG. DATO' SERI IR. DR. ZAINI UJANG
Secretary General
Ministry of Energy, Green Technology & Water

speakers & chairs profile



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**Y.BHG. DATO' NIK AZMAN
NIK ABDUL MAJID**
Director-General,
Economic Planning Unit
(Human Capital & Energy),
Prime Minister's Office.



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**Y.BHG. DATO'
LEONG KIN MUN**
President of Malaysia
Biomass Industry
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MR. SHARBINI SUHAILI
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Department of Urban
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«
MS. JULIA HAMM
President & Chief
Executive Officer,
Smart Electric Power
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»
IR. GAËTAN MASSON
Director,
Becquerel Institute.



»
**IR. DR. SANJAYAN
VELAUTHAM**
Executive Director,
ASEAN Centre for Energy
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**IR. AKMAL RAHIMI
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Chief Operating Officer,
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DR. ALLEN EISENDRATH
Global Climate Change
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United States Agency for
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«
DR. CHEN SHIUN
Vice President of Research
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Sarawak Energy Berhad
(SEB).



»
DR. JUNICHI FUJINO
Programme Director,
Institute for Global
Environmental
Strategies (IGES).



»
**DR. MOHD AZMAN
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Chief Executive Officer,
Malaysian Green Technology
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DR. HONGPENG LIU
Director of Energy Division,
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and Social Commission for
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DR. THOMAS TANG
 Director for Corporate
 Sustainability AECOM Asia.



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MR. ALEXANDRE VIANA
 Executive Manager of
 Auctions & Regulated Market,
 Brazilian Committee of
 Regional Electric Integration
 (BRACIER).



MR. DAN MILLISON
 Manager,
 Transcendery L.L.C.



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 Principal,
 EELO Solutions.



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MR. CHIN SOO MAU
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 Malaysian Photovoltaic
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 Group Managing Director
 PEKAT Group of Companies.



»
MR. FRANK HAUGWITZ
 Director,
 Asia Europe Clean Energy
 (Solar) Advisory Co. Ltd.



»
MR. HEIN OOMEN
 Business Development -
 M&A - Project Management
 Renewable Energy -
 Sustainability, Emerging
 Markets ENGIE Solar
 (Solairedirect).



**MR. NORIZAL KHUSHAIRI
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MR. MICHAEL SCHMELA
 Executive Advisor,
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MR. POLYCARP WONG
 Vice President (Hydro),
 Sarawak Energy Berhad
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**MS. SUNDUS
 CORDELIA RAMLI**
 Head of South East Asia,
 REnescience Orsted.



Sustainable Energy : The Future Is Here



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 Senior Researcher,
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 Laboratory (NREL).



«
**MR. SURESH NAIDU
 SADASIVAN**
 Innovation Advisor,
 BLOKTEX.



«
MR. VINOD TIWARI
 Head of Business
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GENERATING A SUSTAINABLE ENERGY SECTOR



Sustainable Energy : The Future Is Here

The International Sustainable Energy Summit (ISES) is a biennial event organised by the Sustainable Energy Development Authority (SEDA) Malaysia. The knowledge-based renewable energy and energy demand management platform will be held from April 10-11, 2018 at Pullman Hotels and Resorts in Kuching, Sarawak.

Participants and stakeholders will be networking and engaging in discussions, presentations, and a mini exhibition centering around the theme 'Sustainable Energy : The Future Is Here.'

On the second day of the International Greentech & Eco Products Exhibition and Conference Malaysia (IGEM) 2017 at the Kuala Lumpur Convention Centre, Minister of Energy, Green Technology and Water (KeTTHA) Datuk Seri Panglima Dr. Maximus Johnity Ongkili soft launched the 4th ISES 2018.

"This coming ISES is significant as it will be the first summit hosted outside of the Klang Valley," said Catherine Ridu, Organising Chair of ISES 2018 cum Chief Executive Officer of SEDA.

"For the first time in the history of ISES, we will be co-hosting the summit together with the Sarawak State Government. Sarawak is my home state, exemplary in high renewable energy in their energy mix. It is a delight that the Chief Minister of Sarawak, The Honourable Datuk Patinggi Abang Abdul Rahman Zohari Openg, has granted his full support to have the summit in Kuching," she shared.

Dr. Abdul Rahman Junaidi, Assistant Minister for Utilities, Sarawak and Datuk Ir. Alice Jawan, Permanent Secretary of the Ministry of Utilities, Sarawak represented their state government during the soft launch of ISES 2018. Also present were Datuk Seri Ir. Dr. Zaini bin Ujang, Secretary-General of KeTTHA, and Datuk Dr. Yee Moh Chai, Chairman of SEDA Malaysia.

Ridu also highlighted that the global trending topic in the energy sector largely focuses on the future of energy. This is expected given the urgency of the climate agenda, through studies that show that we have consumed over 60% of our global carbon budget with only 10 years to reach carbon neutrality. The energy sector is one of the major culprits causing nearly 80% of annual CO₂ emissions.



1 Chief Minister of Sarawak Y.A.B. Datuk Patinggi Datuk Amar Abang Haji Abdul Rahman Zohari Openg (middle) pictured here with KeTTHA Minister Y.B. Datuk Seri Panglima Dr. Maximus Johnity Ongkili, KeTTHA Deputy Minister Datuk Seri Dr. James Dawos Mamit, Assistant Minister for Utilities, Sarawak Y.B. Dr. Hj. Abdul Rahman Hj. Junaidi, SEDA Malaysia CEO Catherine Ridu, and the rest of the entourage during a courtesy call to the CM regarding 4th ISES 2018.

"At SEDA Malaysia, we believe the future of energy is in sustainable energy. To us, the future is here. It is up to us to shape the energy sector."

The coming summit will facilitate deep dive workshops (DDWs) and plenary sessions, and will also introduce blockchain technologies, energy storage systems, auctioning of renewable energy projects, and a Ministerial Dialogue as possible mechanisms to advance the sustainable energy agenda.

ISES is mooted as part of Strategic Thrust 5 of the National Renewable Energy Policy and Action Plan, which encompasses the promotion of and building awareness on renewable energy. This 4th incarnation of ISES is jointly organised by SEDA and the Ministry of Utilities, Sarawak, co-hosted by KeTTHA and the Sarawak State Government.

For more information on the 4th ISES 2018, visit www.ises.gov.my

Enquiries on the summit can be forwarded to ises@sed.gov.my



2 Moments before the 4th ISES 2018 presentation to Y.Bhg. Tan Sri Datuk Amar Haji Mohamad Morshidi Abdul Ghani (head of the table) at Wisma Bapa Malaysia, Petra Jaya, Kuching.



3 The 4th ISES 2018 working committee with Assistant Minister of Utilities, Y.B. Dr. Hj Abdul Rahman Hj Junaidi (front and centre).



4 The top three Chief Officers of SEDA Malaysia seized the opportunity to be photographed with the Assistant Minister for Utilities, Sarawak, Y.B Dr. Hj. Abdul Rahman Hj. Junaidi (second from right), during the 4th ISES 2018 meeting at Dewan Undangan Negeri Sarawak.



1	2	
3	4	
5	6	7

1. Y.B. Datuk Seri Panglima Dr. Maximus Johnity Ongkili, Minister of Energy, Green Technology and Water (KeTTHA) soft launched the 4th International Sustainable Energy Summit (ISES) 2018, and was accompanied by Y.Bhg. Datuk Seri Ir. Zaini Ujang, Secretary General of KeTTHA, and Y.Bhg. Datuk Dr. Yee Moh Chai, Chairman of SEDA Malaysia.
2. The arrival of Y.B. Datuk Seri Panglima Dr. Maximus Johnity Ongkili, Minister of KeTTHA at the ISES 2018 soft launch booth.
3. Also present were representatives from the Sarawak State Government namely Y.B. Dr. Hj Abdul Rahman Hj. Junaidi, Assistant Minister for Utilities, Sarawak and Y.Bhg. Dato Ir. Alice Jawan, Permanent Secretary of the Ministry of Utilities, Sarawak to commemorate the soft launch of 4th ISES 2018.
4. Y.B. Datuk Seri Panglima Dr. Maximus Johnity Ongkili, Minister of KeTTHA, Y.Bhg. Datuk Seri Ir. Zaini Ujang, Sec-Gen of KeTTHA, and Y.Bhg. Datuk Dr. Yee Moh Chai, Chairman of SEDA Malaysia, holding the ISES 2018 brochures containing beneficial information on the upcoming Summit.
5. A huge crowd explored the ISES 2018 booth during IGEM 2017.
6. Eager students listening to explanations on ISES 2018.
7. One of the SEDA officers explaining the ISES 2018 programme to a couple of expatriates.



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**THIS WOULD NOT
HAVE BEEN POSSIBLE
WITHOUT SEDA,**

says SOLS 24/7's Raj

L-R: SOLS Academy Director Teacher Rous Sarun, SEDA Malaysia CEO Catherine Ridu, J.P. Morgan Managing Director and CEO Steve Clayton, and SOLS 24/7 Founder and CEO Teacher Raj Ridvan Singh at the launch of the Solar Academy.



↑ Fully kitted out in safety gear, the Solar Academy students stop for a group shot before heading to a practical class.



↑ In one of the first Solar Labs in the country, the SOLS Solar Academy students get hands-on instruction and practice working with photovoltaics (PV) technology.

The non-governmental organization (NGO) SOLS 24/7 Malaysia, which launched the country's first-ever Solar Academy, is now generating a stable monthly income of RM1,200-1,400 from the energy produced by the solar photovoltaics (PV) installed on the rooftop of its building.

SOLS 24/7 Founder and CEO Raj Ridvan Singh said that besides the revenue, the solar panels also serve as additional roof coverage so that more students can work under the shaded area.

"This creates a learning environment for students of the Academy to observe how the Feed-in Tariff (FiT) system works," Raj explained.

That framework was made possible with the FiT approval given by the Sustainable Energy Development Authority (SEDA) Malaysia.

FiT allows private and commercial building owners, who install the PV systems on their premises, to produce their own renewable energy (RE) and thereby profiting from it.

They only need to engage with a service provider to seek advice on the costs (including capacity), the energy that can be generated, and the income obtainable.

"We applied to SEDA as soon as we learnt of the benefits and offerings it provides for Community Projects and NGOs to qualify for FiT," Raj shared.

The panels were installed on the highest floor of the NGO's building located in Kuala Lumpur. The area also serves as a classroom and practical facility for students to learn about solar installations.

Raj also mentioned that the panels are able to generate 12kWh of energy per month.

The Solar Academy partnered with Solar NRJ, the service provider, while students from the Academy assisted with the installation.

Raj expressed his gratitude to SEDA for its support in attending the launch of its Academy and its Solar Lab.

The students are also equipped with an intensive one-month solar technician training programme, followed by an internship programme.

SOLS 24/7 established its Solar Academy in 2015 with the aim to provide underprivileged youths aged 17-28 with the technical skills, theoretical knowledge, and practical experiences in the solar industry.

It is the first of its kind in Malaysia dedicated to educating poor youths, with a basic command of English, who come from a household income of less than RM3,000 on solar and renewable energy knowledge and skills for future job placements.

In addition to free training from the Academy, students are also provided with free meals and accommodation during the programme.

It is in line with SOLS 24/7's desire to turn their entire youth development centre into a Green school.

The students are also equipped with an intensive one-month solar technician training programme, followed by an internship programme.

"SEDA has partnered with the Academy for corporate responsibility projects as well as to offer fee exemptions and subsidies for the students. SEDA has also assisted with preparing the students for their tests," said Raj.

It is clear why Malaysia is one of the top 10 producers in the world of solar systems, and there is ample solar energy in the country which will continue to be harnessed.

SPONSORSHIP CATEGORIES

We invite industry players to leverage on the strategically-designed sponsorship packages to optimise the positioning of their brand and its message to their target audience.

PLATINUM

RM 125,000

- 8 summit seats
- Special brand mention in any of the speeches done by respective person*
- Company presentation by MD/CEO before summit starts/during lunch session, duration from 7 minutes onwards*
- Dedicated bunting with title and company logo
- Company logo on stage backdrop
- Company logo on front cover programme book with status
- Company logo in ISES press release/speech paper
- Advertising space in ISES website and hyperlink (size and concept differ accordingly)
- Special blasting in social media (Facebook, Instagram, Twitter), frequency differs
- 6 pages of advertising space in SEDA Malaysia magazine (premium position)**
- 2 pax appreciation dinner invite
- Brief intro about company/top management with 2 pages ads in ISES programme book
- Logo in newspaper ads with title
- Exhibition Space***

DIAMOND

RM 80,000

- 6 summit seats
- Special brand mention in any of the speeches done by respective person*
- Company presentation by MD/CEO before summit starts/during lunch session, duration from 5 minutes onwards*
- Dedicated bunting with title and company logo
- Company logo on stage backdrop
- Company logo on front cover programme book with status
- Company logo in ISES press release/speech paper
- Advertising space in ISES website and hyperlink (size and concept differ accordingly)
- Special blasting in social media (Facebook, Instagram, Twitter), frequency differs
- 4 pages of advertising space in SEDA Malaysia magazine (premium position)**
- 2 pax appreciation dinner invite
- Brief intro about company/top management with 2 pages ads in ISES programme book
- Logo in newspaper ads with title
- Exhibition Space***

Prices stated are inclusive of 6% GST.

All payments for the Summit are to be collected in Ringgit Malaysia (MYR).

Jointly organised by SEDA Malaysia and the Ministry of Utilities Sarawak and co-hosted with the Ministry of Energy, Green Technology and Water (KeTTHA) together with the State Government of Sarawak.

The Summit will be held on the 10th and 11th April 2018 at Pullman Hotels and Resorts, Kuching, Sarawak.

For more details of the summit, please log on to www.ises.gov.my.

By signing the contract of sponsorship, the Sponsor is deemed to have agreed / given permission to the following:

- Logo submission for the purpose of marketing and advertising of the summit.
- The Organiser reserves the right to place the logo in any of the marketing collaterals across various platforms (print, digital, outdoor).
- By virtue of being the Summit owner, the Organiser may use services of third parties.
- The Sponsors will need to submit the required logo and artwork for any of the marketing collaterals usage not later than 10th March 2018, in which failure to do so, logo and advertisement will NOT be placed.

The Organiser reserves the right to change the date and/or venue or to postpone the Summit due to force majeure at its sole discretion.

Once the Participant's registration has been duly processed, there will be NO fee refund to Participant who wishes to withdraw their participation for the Summit for whatever reason.

The Organiser cannot be held responsible for lost, damaged or stolen property during the 2-day Summit.



Sustainable Energy : The Future Is Here

Registration Details

HURRY UP!

Secure your seat today, and gain new insights from industry experts!

Conference Fee

	SINGLE SEAT	PAIR SEAT
EARLY BIRD <small>*Until 9th FEB</small>	RM 388	RM 688
NORMAL	RM 688	RM 1,288
WALK-IN	RM 1,300	RM 2,388

- Refreshment breaks, lunch and afternoon breaks for 2-day

**Registration of 4th ISES 2018 are transferable within an organisation without penalty*

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RM 1,000 PER BOOTH

2-day summit

1 Plugpoint

A table with table cloth and 2 chairs

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GOLD

RM 50,000



- 5 summit seats
- Special brand mention in any of the speeches done by respective person*
- Bunting with title and company logo on sharing basis of 2 companies only
- Corporate video presentation, max 3 minutes*
- Company logo on stage backdrop
- Company logo on front cover programme book with status
- Company logo in ISES press release/speech paper
- Advertising space in ISES website and hyperlink (size and concept differ accordingly)
- Special blasting in social media (Facebook, Instagram, Twitter), frequency differs
- 2 pages of advertising space in SEDA Malaysia magazine (front half position)**
- 2 pax appreciation dinner invite
- Brief intro about company/top management with 1 page ads in ISES programme book
- Logo in newspaper ads with title
- Exhibition Space***

SAPPHIRE

RM 30,000



- 3 summit seats
- Bunting with title and company logo on sharing basis of 2 companies only
- Company logo on stage backdrop
- Company logo inside programme book content
- Advertising space in ISES website and hyperlink (size and concept differ accordingly)
- Special blasting in social media (Facebook, Instagram, Twitter), frequency differs
- 1 page of advertising space in SEDA Malaysia magazine (run on page)
- 1 pax appreciation dinner invite
- Brief intro about company/top management in ISES programme book
- Logo in newspaper ads with title
- Exhibition Space***

TOPAZ

RM 10,000



- 2 summit seats
- Bunting with title and company logo on sharing basis of 4 companies only
- Company logo on stage backdrop
- Company logo inside programme book content
- Advertising space in ISES website and hyperlink (size and concept differ accordingly)
- Special blasting in social media (Facebook, Instagram, Twitter), frequency differs
- Logo in sponsors' column
- Logo in newspaper ads with title
- Exhibition Space***

*** DIMENSION TO BE CONFIRMED
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Y.Bhg. Tan Sri Datuk Seri Mohd Hussin Abd Hamid (Executive Chairman of CGE), Y.Bhg. Datuk Khairuddin Mohd Hussin (CEO of CGE); Abdul Malik Mohd Hussin (Deputy CEO of CGE); witnessed by Catherine Ridu (CEO of SEDA); Ir Akmal Rahimi Abu Samah (COO of SEDA), other SEDA Malaysia officers and a few representatives from the industry during the Contract Signing Ceremony between CGE and Dana Engineering.

CONCORD GREEN ENERGY

Purchases 6 Gas Engines For Biogas Plants At Felda Mills

Concord Green Energy (CGE) inks deal with Dana Engineering for their biogas plants in Pahang and Johor

The biogas projects have seen an investment of RM50 million by CGE as the company will be installing six Jenbacher Type 4 gas engines at four of Felda's palm oil mills.

The gas engines will be supplied by Dana Engineering Sdn Bhd, General Electric's channel partner.

Dana Engineering will also provide full power plant engineering solutions including the installation of the Jenbacher units, engineering support, spare parts supply and overall maintenance of the units.

Dana Engineering is an authorised Malaysian engineering company which distributes and provides services for General Electric's gas engines.

CGE has an agreement with Felda to develop biogas plants under a 16-year build-operate-own agreement.

CGE is purchasing the Jenbacher Type 4 gas engines to generate electricity from palm oil mill effluent (POME) discharged from Felda's palm oil mills.

POME is the by-product of processed crude palm oil which is high in organic content – making it a great source for biogas production.

CGE Chief Executive Officer Datuk Khairuddin Mohd Hussin said that through the encouragement by the government, more and more palm oil mill owners have opted to install biogas plants to manage their palm oil waste.

“The government introduced the Feed-in Tariff (FiT) incentive scheme which is run by Sustainable Energy Development Authority (SEDA) Malaysia.

“So when millers have their biogas systems in place, the millers will be able to generate income as the produce from biogas can be converted into electricity which can then be sold to TNB under a Power Purchase Agreement,” he said.

Khairuddin added that instead of millers discarding waste from their mills, they are now able to convert it into something useful for the nation by generating electricity.

“At the same time, the palm oil mill owners will be able to earn extra income. So that is why we have approached Felda as they have about 69 mills throughout Malaysia and some of their mills are viable to be under the FiT scheme. We can develop these for them,” he explained.

Traditionally, the palm oil effluent will be dumped into ponds and eventually will flow into the rivers where millers must manage the discharge to reduce pollution level.

Khairuddin said that adopting the biogas processes for palm oil is a way of producing renewable energy.

“The Malaysian Palm Oil Board (MPOB) has stated that it is compulsory for all oil palm mills in Malaysia to treat the waste from the mill.

“If millers opt to have biogas plants, it will help them to better manage the parameters required to be met with regard to the discharge of the palm oil effluent,” he reasoned.

He added that currently the project is in its first phase whereby construction works have begun on four of Felda’s ‘green-field’ palm oil mills, two located in Pahang and two in Johor.

“The six Jenbacher Type 4 gas engines will be also set up at the four palm oil mills and will take about 10 months to completely deliver and install them. So we are expecting for the gas engines to start commercial operations by October 2018,” Khairuddin revealed.

In regard to financial support, he shared that they have received financial backing from Bumiputera Agenda Steering Unit (TERAJU), Malaysian Investment Development Authority (MIDA), Malaysian Bioeconomy Development Corporation, Malaysian Green Technology Corporation (MGTC), Malaysia Debt Ventures Berhad (MDV), and Hong Leong Bank Berhad.

Meanwhile, with CGE’s biogas initiatives, SEDA Chief Executive Officer Catherine Ridu said the project would help with the deployment of more renewable energy into the electrical grid.

“The biogas from the palm oil effluent where methane gas is produced will not only generate renewable and sustainable energy, but will also help mitigate climate change,” she reasoned.

She added that despite these being minute steps, it would eventually contribute greatly to the cause of protecting the environment.

“Concurrently, it has provided renewable energy developers and players with a way to properly manage waste and even convert waste into wealth,” she concluded.

“...millers will also be able to generate income as the produce from biogas can be converted into electricity...”



BREAKING THE BARRIERS TO CLEAN URBANISATION

Malaysia is one of the most rapidly urbanising countries in Asia, with more than 72% of the population living in urban areas (as of the 2010 Census) and a growing annual population rate of more than 1.8%.

It also cannot be denied that Malaysia's greenhouse gas (GHG) emission levels are relatively high compared to other countries in the region that are at similar stages of development. More than half of these emission sources correlate directly with urban settings, specifically electricity (up to 26% of GHG emissions), transportation (16%), and solid waste (12%).

The Green Technology Application for the Development of Low Carbon Cities (GTALCC) project was recently implemented officially in mid-2017 as one of the steps towards achieving environmental and economic sustainability. Its main objective is to facilitate low carbon initiatives in at least five Malaysian cities while showcasing a clear and cohesive approach to low carbon development.

The driving strategy behind the Project is to remove the barriers that Malaysian cities face when attempting to adopt green technologies for low carbon green development. This strategy is executed through three components.

Firstly, focus is given to the strengthening of planning and development policies, standards and guidelines regarding low carbon integrated urban development, and local capacities to implement central Government policies. From this component, it is expected that major cities implement and adopt integrated low carbon urban development plans and/or programmes. This component will eventually lead to clear direction and mandatory guidelines to local authorities, policy makers, project developers, and others on low carbon integrated urban development.

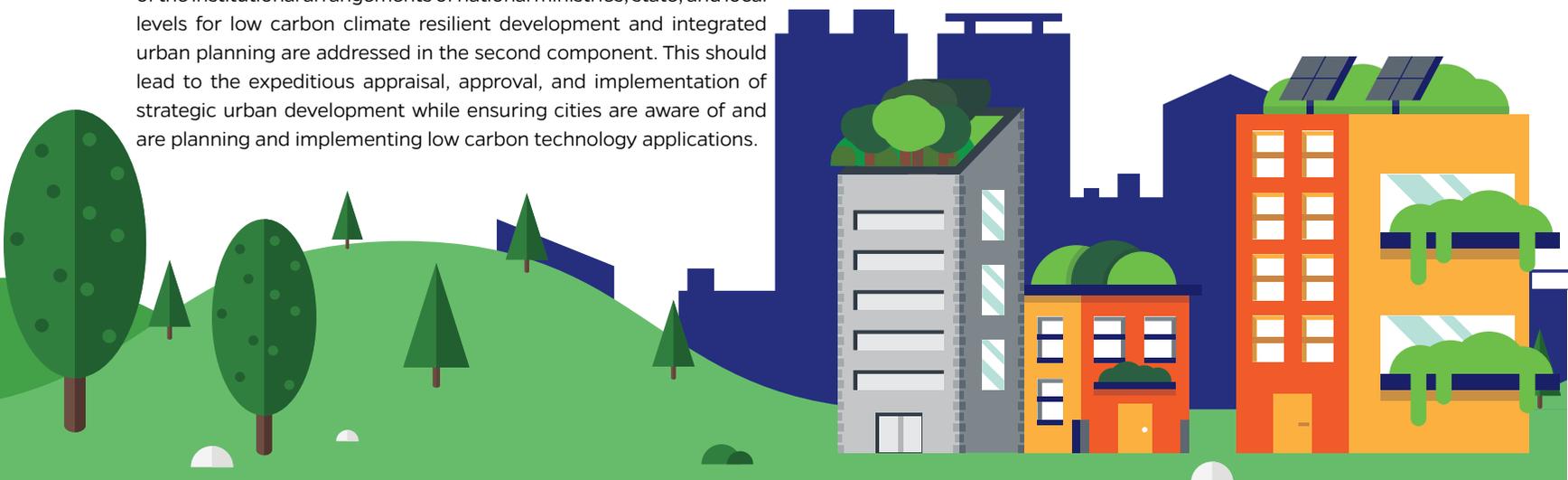
A lack of awareness and technical capacity, along with the bolstering of the institutional arrangements of national ministries, state, and local levels for low carbon climate resilient development and integrated urban planning are addressed in the second component. This should lead to the expeditious appraisal, approval, and implementation of strategic urban development while ensuring cities are aware of and are planning and implementing low carbon technology applications.

“...strengthening of planning and development policies, standards and guidelines regarding low carbon integrated urban development...”

Lastly, the third component takes on the obstacles to accessing investments in green technologies for integrated urban development. Financing and incentive mechanisms should encourage investments, and more importantly concrete investment activities will be directly supported to lock down these investments. An increased investment in low carbon technology applications in cities is expected from this component, in addition to more low carbon projects being implemented in Malaysian cities.

The GTALCC project is implemented over five years in Cyberjaya, Iskandar Malaysia, Melaka, Petaling Jaya, and Putrajaya. It is expected to generate direct GHG emission reductions of 346,442 tCO₂eq by End of Project, and 2,152,032 tCO₂eq over the lifetime of the Project's investment.

Application of the Project is made possible through the United Nations Development Programme (UNDP) framework, based on activities that directly support the goals of the 10th Malaysia Plan. Both UNDP and the Global Environment Facility (GEF) are providing guidelines and continuous support for the GTALCC project. The Ministry of Energy, Green Technology and Water (KeTTHA) is the Project's executing agency, with the Sustainable Energy Development Authority (SEDA) Malaysia being the implementing agency.





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

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

WHAT is **GTALCC**?

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

WHO is involved?



OBJECTIVES

To support the low carbon cities program.

Removing all barriers to integrate low carbon urban planning and development.

To generate GHG emission reductions of 346,442 ton CO₂eq by the end of project.



Calendar of events

The final strategic thrust under the National Renewable Energy Policy and Action Plan (NREPAP) relates to developing awareness programme so 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 that include engagement with stakeholders through seminars/workshops, open days, exhibitions, collaboration with NGO partners as well as international liaisons through meetings and seminars attended.

19 august 2017

Tenom, Sabah

Jelajah YaHijau Programme

SEDA Malaysia had a great time at the Jelajah YaHijau Programme in Tenom, Sabah while promoting and sharing knowledge on renewable energy in Malaysia. The event was officiated by YB Datuk Seri Panglima Dr Maximus Johnity Ongkili, Minister of KeTTHA, and accompanied by YB Datuk Seri Panglima Radin Malleh, Sabah Minister of Rural Development, Catherine Ridu, CEO of SEDA Malaysia, and Amin Abdullah, CEO of YaHijau.



21 august 2017

Kuching, Sarawak



Courtesy Call to the Chief Minister of Sarawak for ISES 2018

Chief Minister of Sarawak Y.A.B. Datuk Patinggi Datuk Amar Abang Haji Abdul Rahman Zohari Openg was visited by an entourage comprising of Minister of Energy, Green Technology and Water (KeTTHA) Y.B. Datuk Seri Panglima Dr. Maximus Johnity Ongkili, KeTTHA Deputy Minister Datuk Seri Dr. James Dawos Mamit, Assistant Minister for Utilities, Sarawak Y.B. Dr. Hj. Abdul Rahman Hj. Junaidi, SEDA Malaysia CEO Catherine Ridu, and others as a courtesy call regarding ISES 2018. The fourth incarnation of the Summit is organised by SEDA and the Ministry of Utilities, Sarawak while KeTTHA and the Sarawak State Government are co-hosts to the event.

24 august 2017

Wilayah Persekutuan Labuan

TN50 Dialogue Session with YBM KeTTHA

SEDA Malaysia co-organised the TN50 Dialogue Session, which took place in Wilayah Persekutuan Labuan, with Datuk Seri Panglima Dr Maximus Johnity Ongkili, Minister of KeTTHA.



11 september 2017

Sunway Resort Hotel & Spa, Selangor

National Clean Energy Forum

Some snippets taken from the National Clean Energy Forum 2017 held at The Sunway Resort Hotel & Spa, Selangor. SEDA Malaysia was represented by Dr Wei-nee Chen, Chief Corporate Officer, as one of the speakers who spoke on the Roles of Blockchain Technology in the Future of Electricity. This Forum served as a catalyst for the development of a sustainable and competitive energy sector in Malaysia.



14 september 2017

Kuala Langat, Selangor

Ceremony for TNB's 50MW Large Scale Solar (LSS) Project

Tenaga Nasional Berhad (TNB) held a groundbreaking ceremony for its 50MW Large Scale Solar (LSS) project in Kuala Langat, Selangor, the first of its kind in the country. The event was graced by Ministry of Energy, Green Technology and Water Secretary-General, Datuk Seri Ir. Dr. Zaini Ujang. SEDA Malaysia was represented by CEO Catherine Ridu who aspires to pursue an active role in supporting RE generation in Malaysia.



16 september 2017

Keningau, Sabah

Jelajah YaHijau Programme

SEDA Malaysia participated in the two-day Jelajah YaHijau Programme in Keningau, Sabah, organised in conjunction with the Gegar Keningau Festival and Malaysia Day 2017. The ceremony was officiated by Tan Sri Datuk Seri Panglima Joseph Pairin Kitingan, Deputy Chief Minister of Sabah. Also present were Datuk Seri Panglima Dr Maximus Johnity Ongkili, Minister of KETTHA, and other local leaders of Keningau.



25 september 2017

Dorsett Hotel, Putrajaya

Updates on Solar PV Programmes in Malaysia

SEDA Malaysia organised a workshop for "Updates on Solar PV Programmes in Malaysia" which took place at the Dorsett Hotel in Putrajaya. Participants who attended the workshop had the opportunity to be presented with insider info from the industry experts who provided content for the workshop.



2-4 october 2017

Kota Kinabalu, Sabah

Seminar on Scaling Renewable Energy in Sabah

Catherine Ridu, Chief Executive Officer of SEDA Malaysia and Steve Anthony Lojuntin, Head of the Energy Demand Management Unit (HEDMU) participated in a seminar on scaling renewable energy in Sabah. They shared information regarding SEDA and its roles to support Sabah's aspiration for developing renewable energy, and subsequently contributing significantly to both the state's and nation's transformations into a high value-added economy.



11-13 october 2017

Kuala Lumpur Convention Centre

IGEM

SEDA Malaysia, as per usual practice, staffed a booth at the International Greentech & Eco Products Exhibition and Conference (IGEM) 2017 from 11-13 October at the Kuala Lumpur Convention Centre. Many exhibition visitors flocked to SEDA Malaysia's educational displays and had the opportunity to chat with employees on the future of sustainable energy in Malaysia.



17 october 2017

Pekan, Pahang

Sri Jelutong Biogas Power Plant

SEDA Malaysia witnessed the launching ceremony of the Sri Jelutong Biogas Power Plant by Cenergi SEA Sdn Bhd and Tanah Makmur Berhad. The ceremony was officiated by Duli Yang Maha Mulia Pemangku Raja Pahang in the Pekan District, Pahang.



19-20 october 2017

Kuching, Sarawak

International Biomass Conference Malaysia 2017

At least 900 delegates from around the globe attended the International Biomass Conference Malaysia (IBCM) 2017, held this year in Kuching, Sarawak. SEDA Malaysia was represented by CEO Catherine Ridu who was one of the panellists during a knowledge-sharing session that aimed to help participants gain a better understanding on SEDA.



23-26 october 2017

Singapore

Singapore International Energy Week (SIEW) 2017

SIEW is an annual week-long energy event bringing together policy makers, industry CEOs, and international organisations. The distinguished assembly of movers and shakers included the Minister of Energy, Green Technology and Water Y.B. Datuk Seri Panglima Dr. Maximus Johnity Ongkili, who was accompanied by SEDA Malaysia's Chairman Y.Bhg. Datuk Dr. Yee Moh Chai and CEO Catherine Ridu.



12 november 2017

Kota Marudu, Sabah

Kota Marudu Carnival

The SEDA Malaysia team travelled to Padang Pekan, Kota Marudu to commemorate the Kota Marudu Festival 2017. Together with other KeTTHA agencies, SEDA Malaysia took the opportunity to introduce the locals to SEDA Malaysia and sustainable energy.

A few snapshots were taken during the Festival, including photos of SEDA Malaysia's Chairman, Datuk Dr Yee Moh Chai and YaHijau's Chief Executive Officer, Amin Abdullah visiting SEDA Malaysia's booth.



12 november 2017

Telupid, Sabah

Jelajah YaHijau Programme

A lively atmosphere was documented during the sharing of information on SEDA Malaysia and knowledge on sustainable energy at the "Program Jelajah YaHijau Sabah Siri 4: Telupid" in Sabah. SEDA Malaysia also extends its deepest gratitude to YB Datuk Seri Panglima Dr Maximus Johnity Ongkili for visiting SEDA Malaysia's booth during the Programme.



13-14 november 2017

Kota Kinabalu, Sabah

Renewable Energy & Greentech Sabah (REGTech) 2017

The inaugural Renewable Energy & GreenTech Sabah (REGTech) 2017 Conference and Exhibition was created to serve as a platform where advocates of renewable energy and green technology come together to share information on the challenges facing the industry and to discuss opportunities and solutions as well as education for advancing Sabah's renewable energy and green technology sector. Y.Bhg. Datuk Dr. Yee Moh Chai, Chairman of SEDA Malaysia had the honour of delivering the closing speech for the end of the Conference.



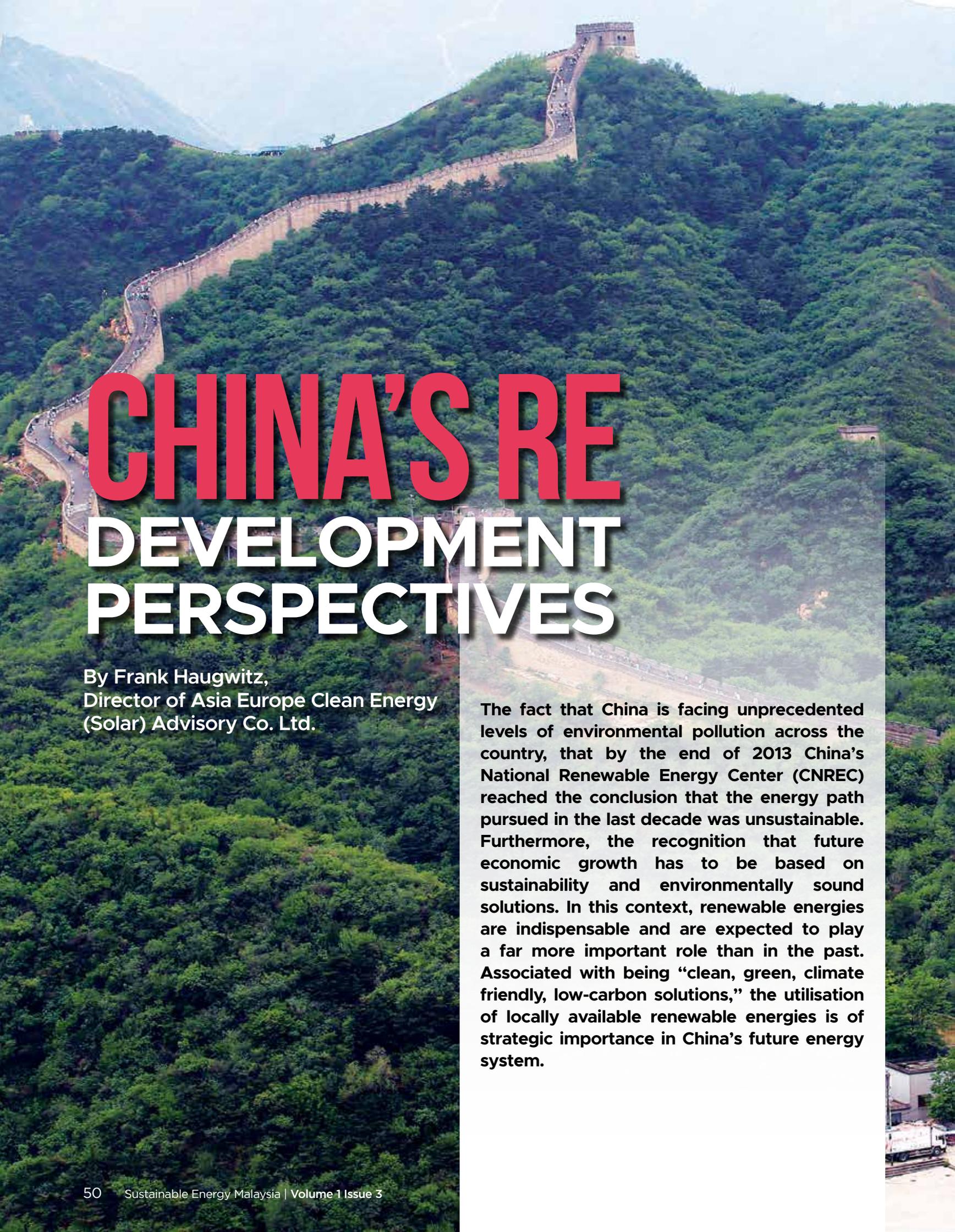
27 november 2017

Melbourne, Australia

IEA PVPS Meeting

The International Energy Agency (IEA) Photovoltaic Power Systems Programme (PVPS) is one of the collaborative R&D Agreements established within IEA. Since the Programme's establishment in 1993, PVPS participants have been conducting a variety of joint projects in the application of photovoltaic conversion of solar energy into electricity. This time around, the meeting was attended by Catherine Ridu, CEO of SEDA Malaysia in Melbourne, Australia.





CHINA'S RE DEVELOPMENT PERSPECTIVES

By Frank Haugwitz,
Director of Asia Europe Clean Energy
(Solar) Advisory Co. Ltd.

The fact that China is facing unprecedented levels of environmental pollution across the country, that by the end of 2013 China's National Renewable Energy Center (CNREC) reached the conclusion that the energy path pursued in the last decade was unsustainable. Furthermore, the recognition that future economic growth has to be based on sustainability and environmentally sound solutions. In this context, renewable energies are indispensable and are expected to play a far more important role than in the past. Associated with being "clean, green, climate friendly, low-carbon solutions," the utilisation of locally available renewable energies is of strategic importance in China's future energy system.

In this context, in an attempt to address China's nationwide prevailing air pollution in March 2013 the National Development and Reform Commission (NDRC) approved an "Air Pollution Prevention Plan 2014-2017." Released early May 2014, the focus of this plan is China's power sector and numerous targets e.g. emission reduction, grid extension, coal consumption, etc. among others were set. Accordingly, this Plan stipulates the following:



Hydropower Capacity
330GW



Wind Power Capacity
150GW



Solar Photovoltaic
70GW
(35GW utility + 35GW distributed power)



Biomass
70 Mio Tonnes
of standard coal equivalent

Today, China's ambitions are clear to increase the share of renewables in its energy mix in the longer term. Drivers are manifold – energy security and independence, energy conservation, environmental protection, and reduction of greenhouse gas emissions among others. Against this background, in the summer of 2014 China's current president Xi Jinping called for an 'energy revolution' and a growing share of renewables is part of that grand strategy. Early 2017, China announced to invest up to two trillion USD into renewable energies till the end of the ongoing 13th Five-Year-Plan (2016-2020).

China's National Energy Administration (NEA) officially released its 13th Five-Year-Plan (2016-2020) for Solar Development on December 16, 2016. The Plan stipulates targets, measures, regulatory issues, challenges, and focal areas and reconfirms e.g. the 110 GW solar target, split into 105GW of solar PV and 5GW of Concentrating Solar Power (CSP) which was already included in China's "Power Sector Reform Plan" released later in October 2016. The Plan re-confirms further that by the end of 2020 the total installed solar PV power generation capacity will exceed 105GW, which therefore is considered a minimum target. Selected highlights of the Plan are below:

13th Five-Year-Plan (2016-2020) for Solar Development

- By 2020: 105 GW (PV) and 5GW (CSP) – No Sub-Target for Distributed Generation
- 11 Target Regions identified for "GW – Deployment"
- 4 Target Regions identified for "GW – Deployment including 13 West-East Transmission Corridors"
- 2 Target Regions identified for "Transmission"
- FIT levels expected to drop by more than 50% compared to 2015 levels by 2020, then at Grid Parity
- FIT levels for CSP expected to drop from current RMB 1.15/kWh to RMB 0.8/kWh by 2020

- Technology Benchmarks set for Cell (Poly/Mono) Efficiency Levels to be reached by 2020
- Focal Area: Distributed Generation – multiple measures identified to stimulate demand
- Focal Area: Top-Runner Programme, Poverty Alleviation Programme, Agro-PV, RE-Hybrid Projects
- Focal Area: Solar Thermal for "Hot Water, District Heating and Cooling" 800 Mio m² by 2020
- Focal Area: Comprehensive Industrial Strengthening – Pursue Go Global Strategy (Up & Downstream)
- By 2020 the PV Industry has created 7 Mio jobs

The Plan no longer contains a specific target for distributed generation (DG), contrary to the October 2016 announcement where a 60-GW target was communicated. In light of today's ~25GW of DG, a 2.5-fold increase in the coming three years seems feasible. Overall, DG does enjoy a very prominent position in the released Plan. In this context, e.g. no less than 100 DG demonstration zones shall be set up across the country, and within each zone 50% of existing buildings and 80% of all to be built buildings shall deploy roof-top systems. At the same time new business models shall be created and designed to stimulate demand in the DG segment.

Against this background, China is home to ~1500 so-called "industrial development zones" covering ~10.000 km² and an earlier conducted investigation estimated the rooftop potential of ~80GW, which from a quantitative perspective is undoubtedly sufficient. Despite the obvious potential, AECEA learned that on average five to seven commercial/industrial roofs out of 10 investigated by developers are structurally not feasible and therefore will not allow installation of a rooftop system. Hence, the lead time to successfully identifying a proper roof is significant.



↑ Haugwitz is an independent solar energy consultant known for his insights on the workings of the Chinese solar market. He is highly regarded as an expert on doing business in China and advises foreign entities on solar market developments there.

Introduced in 2015, the competitive bidding mechanism based "Top-Runner-Program" expanded from initially 1GW in Datong/Shanxi Province to 5.5GW across multiple provinces last year and 8-10GW in 2017. As anticipated, the "Top-Runner-Program" remains a prominent feature of China's domestic market landscape in future given the results of a number of conducted provincial "Top-Runner-Program" tender schemes leading to fairly low levels of bids, i.e. significantly lower than last year's FIT.

According to the Plan the FiTs are expected to drop by more than 50% compared to 2015 levels by 2020, thus achieving grid parity. Taking the recent decision regarding the reduced FiT effective January 1, 2017 into account, the Plan implies that future FiT reductions between 2018 through 2020 will be lesser. Finally, the wording within the Plan equally suggests that perhaps no FiTs will be granted beyond 2020, if grid parity indeed will have been realised.

In light of China's concerted efforts to achieve a "relatively well-off society" by 2020, the so-called "Poverty Alleviation Projects" featuring 3-5kW of solar PV systems for low-income households (RMB 3000/a) across hundreds of counties witnessed the approval of 5.1GW during summer of 2016 and another 8GW in early 2017. Demand for such systems is expected to remain strong throughout the 13th FYP period given 2.8 Mio eligible households. The Plan equally stresses so-called "Agro-PV Projects," i.e. greenhouses and fish-ponds using solar PV for power generation and so-called "Renewable Energy Hybrid Systems," depending on the locally available renewable energy resources to simply combine them. China is home to a significant number of hydro/PV or wind/PV projects already. Against this background, China's State Grain Administration announced to implement the installation of 1GW of rooftop systems on its grain warehouses across the country by 2020.



↑ *Haugwitz is a frequent speaker at international conferences and has been the Head of Intersolar's global conference development since 2010. He is also the elected Vice-Chairman of the Renewable Energy Working Group of the European Chamber of Commerce in China since March 2013.*

Home to the largest solar PV manufacturing industry and being the largest PV market, China is aiming at the bigger picture of the solar industry. In this context, the Plan very prominent features solar thermal applications, i.e. solar water heaters and commercial/industrial heating and cooling. According to the Plan, in the remaining three years the combined area for solar thermal applications shall double to 800 Mio m² by 2020. Equally bullish is the NEA in promoting the development of an indigenous CSP industry, in order to realise the 5GW target set for 2020. The promotion of a local CSP industry and the deployment of 5GW is driven by a number of reasons e.g. using CSP for base load purposes, through scaling-up production capacities to bring down the cost, hence being in the position to create and meet the demand outside of China.

“The Plan equally stresses so-called ‘Agro-PV Projects,’ i.e. greenhouses and fish-ponds using solar PV for power generation and so-called ‘Renewable Energy Hybrid Systems,’ depending on the locally available renewable energy resources to simply combine them.”

2016 was the first year of the 13th Five-Year-Plan (2016-2020) period and has witnessed record installations amounting to 34.24GW, representing 126% growth year over year (YoY). The cumulative installed capacity reached 77.42GW which increased by 81% YoY. 2017, the second year of the 13th Five-Year-Plan, show no signs of slowing down in the Chinese solar PV market dynamics according to AECEA. In particular, the new FiT reductions between 13-19% ensured demand remained strong until June 30, 2017. Against this background, according to official data released by China's National Energy Administration (NEA), in the 1H/2017 in total 24.4GW were added and in July alone another 10.52GW were installed. Overall, between January and July 2017 China installed 34.92GW, thus exceeding last year's 34.54GW by ~380MW. Consequently, by the end of July, China was home to a total of 112.34GW and therefore already exceeded its 13th Five-Year-Plan (2016-2020) target of 105GW solar PV by ~7GW or ~7%. According to AECEA, the estimation for 2017 is up to 50GW or possibly even beyond.

Interestingly, if the added solar PV power generation capacities are being compared with nuclear, hydro, wind, and thermal power, respectively 1.09GW, 6.69GW, 7.3GW and 18.84GW were added during January-July 2017, undoubtedly PV with 34.92GW stands out and therefore plays an increasingly significant role in China's energy mix.

On July 28, 2017 China's NEA released a detailed "guide" regarding the implementation of the 13th Five-Year-Plan (2016-2020) for Renewable Energy with an emphasis on the 2017-2020 period. Accordingly, the annual installation targets for solar PV between 2017 and 2020 are between 22.4GW and 21.1GW and includes an annual 8GW top-runner target as well. Installation targets have been set for each province for every year until 2020.

In total, during the 2017-2020 period ~86.5GW shall be installed, i.e. by the end of 2020 China could be home to ~190-200GW. The target of 60GW of distributed solar PV generation stipulated in the 13th Five-Year-Plan for the Power Sector will in, AECEA's opinion, be realised. To date, ~25GW are considered distributed solar PV and by the end of 2020, according to AECEA's estimate, may reach 55-60GW. Consequently, by 2020 China's total installed solar PV power generation capacity may reach approximately up to 245-250GW.

Overall, since 2010, the share of renewables in China's power mix has increased by 8%, while coal decreased by 11%. Last year, 65% of the China's power was still generated by burning coal. However, energy-related emissions have stagnated since 2013.

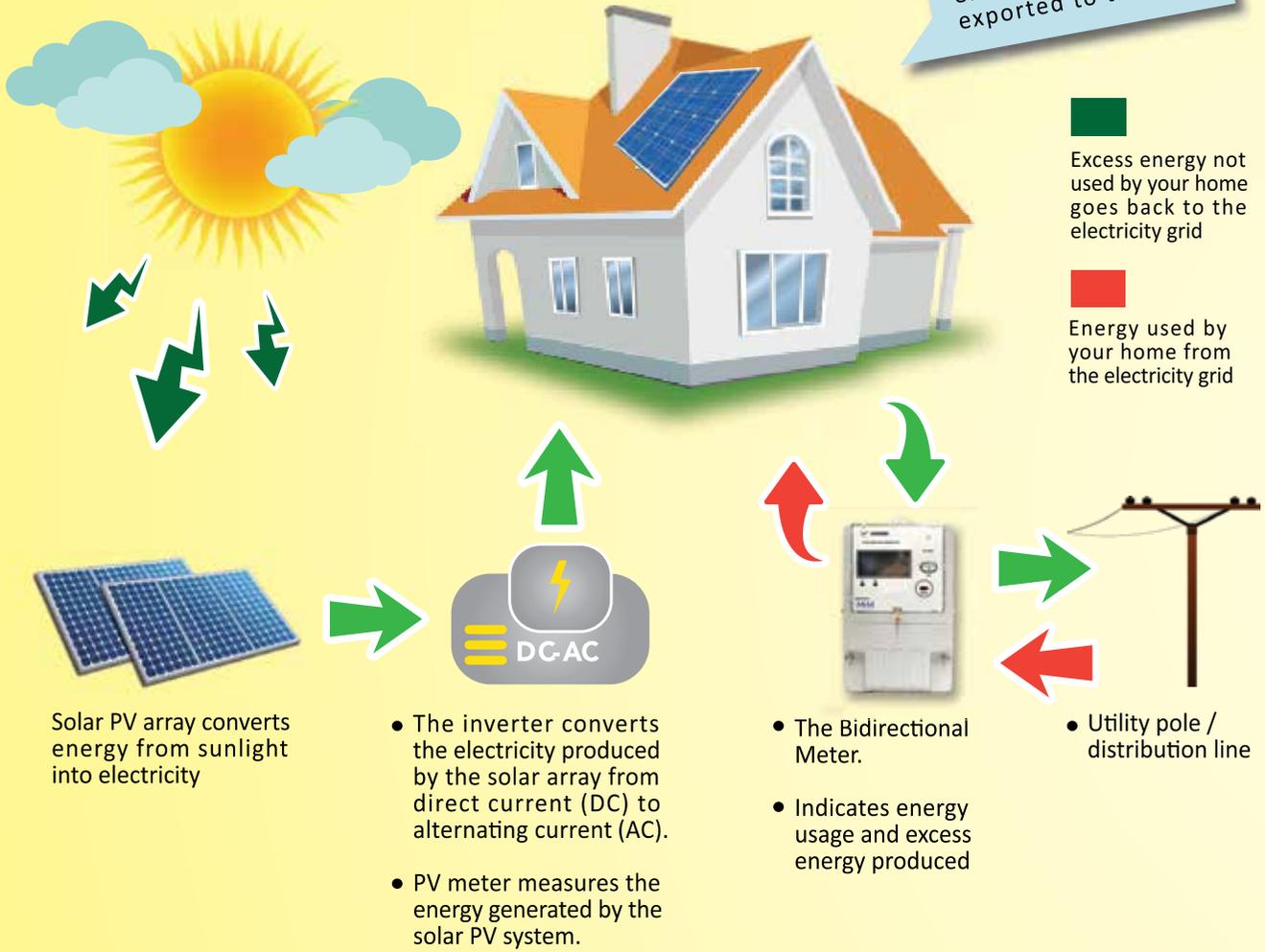


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Chile: An Exemplary Country in Energy Transition

Chile will always be remembered as the first country in the world that broke the record set by a Masdar Consortium for a bid price of USD 2.99 per kWh for an 800-MW solar PV of utility scale in Dubai. In August 2016, Chile announced the lowest bid price of USD 2.91 per kWh for a 120-MW solar PV utility scale in the Atacama Desert, a price without any government subsidy. This plant should be operational five years after awarded.

In October 2017, Chile, the latest country member to the Photovoltaic Power Systems Programme under the International Energy Agency (IEA PVPS), hosted the 29th Task 1 Meeting in Antofagasta. The Task 1 of the IEA PVPS is about Strategic PV Analysis and Outreach (www.iea-pvps.org) and Malaysia has been a member of the IEA PVPS since October 2008. Dr Wei-nee Chen, Chief Corporate Officer of SEDA Malaysia cum Main Malaysian Representative of the IEA PVPS Task 1, attended the meeting hosted by Chile recently. Here, she provides a report on the impressive progress by Chile in their energy transition.

Wind Farms in the Atacama Desert.

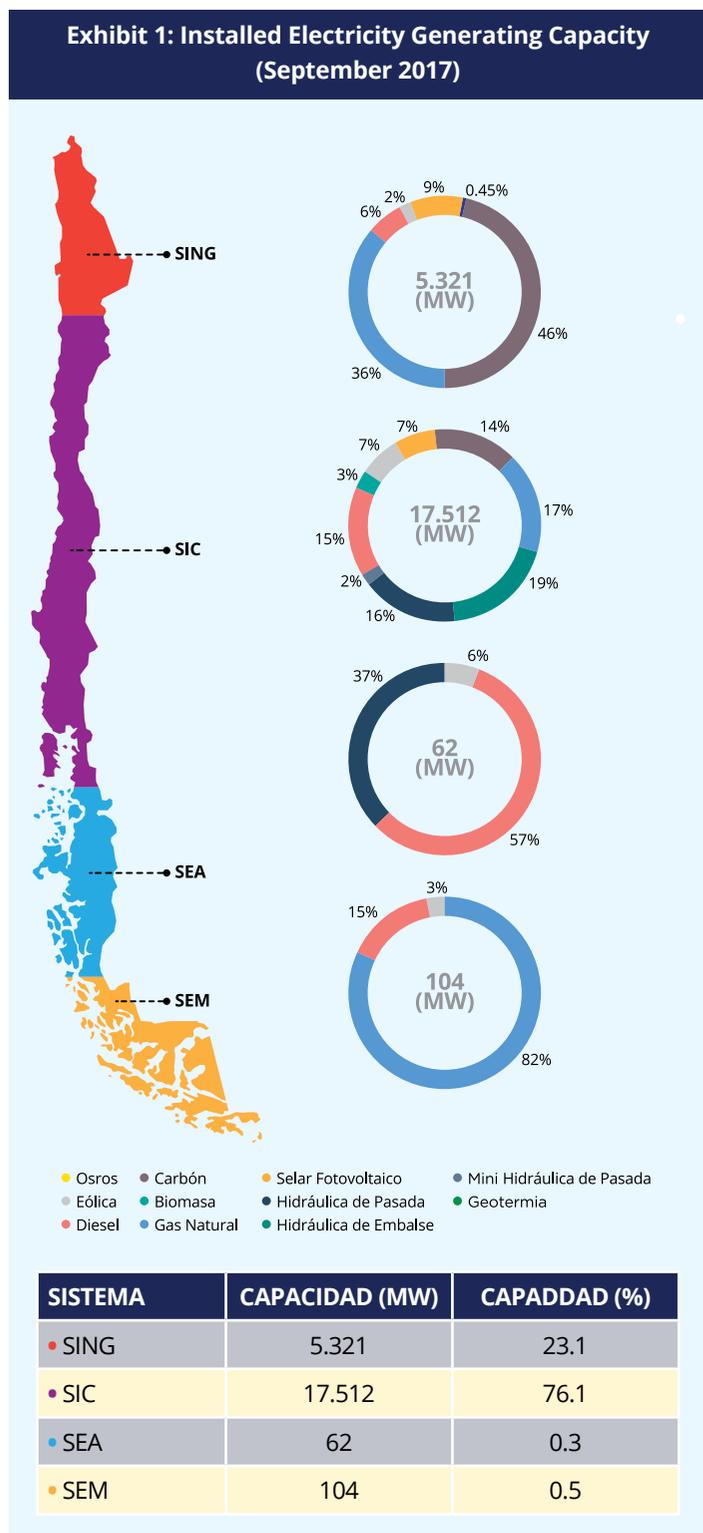


↑ *Participating members at the 49th IEA PVPS Task 1 Meeting, Antofagasta, Chile.*

Chile is a country blessed with abundant solar, wind, and hydro potential. In fact, northern Chile has one of the world's highest solar irradiation (up to 3,800kWh/m²) and it has been estimated that the technical potential of solar energy in the Atacama Desert is sufficient to provide 30% of the total electricity consumption in South America! With the glaciers in the south comes an abundance of hydro, abundant wind along the long and narrow coastal shores of Chile, and pockets of geothermal resources. The current total electricity capacity is around 23,000MW (see exhibit 1).

The total installed PV capacity is approximately 1,780MW and by next year, 3,000MW. The total approved PV capacity is 14,000MW. Other renewable installations are wind: 1,300MW, biomass: 463MW, hydro: 405MW, and geothermal: 24MW.

Strong Government Commitment to 100% RE: Although the country is somewhat of a late comer to the renewable energy (RE) scene, the Chilean government has pledged 20% RE by 2025 and 100% by 2040. Chile is targeting the levelised cost of energy (LCoE) for solar PV to reach USD 2.50 per kWh by 2025, however at this juncture, this target will be attained well before 2025. The government is investing USD 12 million in a 10-year programme helmed by the Atacama Module and System Technology Center (AtaMoS-TeC) in which the government will form a consortium with private companies to innovate RE technologies. RE technology providers include National Renewable Energy ISC Konstanz and Fraunhofer, both of Germany, and innovation is not limited to PV technologies. One such technology is the development of energy storage system, especially lithium-ion, as lithium is mined locally in Northern Chile. Lithium is a much coveted commodity and Chile is the world's largest producer (76,000 tonnes, 2016). Other than R&D, AtaMoS-TeC will strengthen human capacity development in the industry, local suppliers, and entrepreneurs.



Credit: Solar Energy Research Center of Chile

Strategic Vision of the AtaMoS-TeC



Source: AtaMoS-TeC

Besides the huge number of solar and wind tenders by the Chilean government, running in parallel are tenders to upgrade the transmission grid. The existing transmission backbone cannot handle the massive solar and wind injection and the government is calling for tender to increase the transmission capacity. Like in many jurisdictions, the transmission system operators (TSOs) cannot decline the interconnection unless it is due to technical reasons.

Strengthening the Energy Balancing Market: The electricity market in Chile has been liberalised for the past 20 years; this includes the transmission and distribution grid networks. There have been times when there was so much variable RE (solar and wind) that it sent wholesale electricity prices spiralling down. However, unlike in the European market where wholesale electricity prices are allowed to go negative, in Chile the system has been set to a floor price of zero, meaning the electricity is free. To address the self-cannibalising impact of increasing RE, at the moment, Chile either curtails the excess renewable energy or taps into their small energy balancing market. The current energy balancing market is via hydro in the south and cross-border electricity trading with Argentina (200MW) and Peru (450MW). The government is exploring new ways of harnessing the excess variable renewable energy (especially solar in the Atacama Desert), and energy storage is an important solution. One of them is the production of hydrogen which can be fuel for transportation leveraging on the existing infrastructure available. Besides the strengthening of the energy balancing market, Chile is also into micro grid (MG) development which will enable the creation of virtual power plants (VPPs) by integrating large numbers of distributed RE systems, allowing these plants to be managed as an aggregate whole. Energy storage systems will also be components of the MG allowing peer-to-peer energy trading. It is envisaged that the MG be part of the larger grid network, but if disaster should happen such as tsunamis and earthquakes - which Chile is prone to - the MG can take over and allow electricity to flow within its jurisdiction.

Chile is one of the early recipients of the Green Climate Fund (GCF), approved in June 2016 with a loan of USD 49 million for a USD 265 million project value towards a 143-MW solar PV park in the Atacama Desert. The project, 'Climate Action and Solar Energy Development Programme in the Tarapacá Region in Chile,' will supply low cost, clean, and renewable energy to coal-fired or liquified natural gas (LNG) generated power. This project is expected to lead to "many more large scale PV Projects" given the high solar irradiation in northern Chile (source: www.greenclimate.fund).



IEA PVPS Members at the JAMA Solar PV Power Plant, Atacama Desert.

JAMA Solar PV Project

This solar farm is located in the city of Calama, in the Atacama Desert of northern Chile. The total installed capacity is 52MW (first phase: 30MW, second phase: 22MW). The first phase achieved commercial operation on September 24, 2016. In Chile, the capacity factor of solar PV systems are reported to be 26% and the JAMA solar PV systems are on a single axle tracking system. Their capacity factor is reported to be as high as 45% with modules from Jinko Solar (305W).

There are several challenges faced in this project, they include:

- Desert dust accumulating on PV modules, reducing the system's yield. So far, the only method to clean the PV modules is by water as the robotic dry cleaning is not effective in removing the dust. The PV modules need cleaning every two months and each cleaning cycle takes 15 days. Water is scarce in the desert and obtained via expensive desalination (water is also unsubsidised). Chilean R&D is researching on the innovative ways to remove desert dust without using water;
- Wind spout giving rise to more dust; also, it is difficult to create strong foundations to hold down the PV mounting structures;
- The desert condition is extremely dry with a high UV exposure, a harsh working environment for people constructing and later on, manning the system. It is challenging to hire subcontractors willing to transport and to work in the desert;
- Possible accelerated degradation of PV cells (browning), encapsulations, silicon gels, cables, others by high ultraviolet and infrared exposures which may reduce the lifespan of the PV systems;
- Human capital – lack of experience and technical qualifications.

Nevertheless, the challenges have been addressed and solutions are under research. Solar PV installations are important to address climate change, in which Chile as a country is also vulnerable to its impact.



52MW of Solar PV Systems on Single Axle Tracking System, JAMA Solar PV Project.

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Merry Christmas & A Happy New Year 2018

From the Management and Staff of
Sustainable Energy Development Authority (SEDA) Malaysia



Solar PV



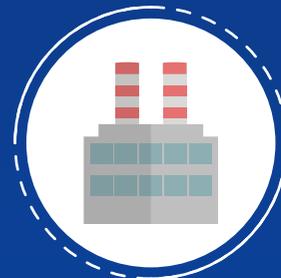
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