ANNUAL REPORT

2019

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Sustainable Energy Development Authority (SEDA) Malaysia

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GLOSSARY AND ACRONYMS

AAIBE	Electricity Supplies Industry Trust Account
AT&PA	Acceptance Test & Performance Assessment
ACMV	Air-condition and Mechanical Ventilation
ACE	ASEAN Centre for Energy
APAEC	ASEAN Plan of Action for Energy Cooperation
APUF	Asia Pacific Urban Forum
ADB	Asian Development Bank
AELB	Atomic Energy Licensing Board of Malaysia
BEI	Building Energy Intensity (BEI)
BECO2R	Building Sector Energy Use & Carbon Reporting
BRT	Bus Rapid Transit
BAU	Business As Asual
BCP	Business Continuity Plan
CPPCC	Chinese People's Political Consultative Conference
CFL	Compact Fluorescent Lighting
CAGR	Compound Annual Growth Rate
CASBEE	Comprehensive Assessment System For Built Environment Efficiency
CIDB	Construction Industry Development Board
CIS 20	Construction Industry Standard
CDP	Continuous Development Programme
DAA	Declared Annual Availability
EMEER	Efficient Management of Electrical Energy Regulations
EV	Electric Vehicle
EACG	Energy Audit Conditional Grant
EC	Energy Commission
EECA	Energy Efficiency and Conservation Act
EMA	Energy Market Authority
ESM	Energy Saving Measures
ESCOs	Energy Service Companies
ETI	Energy Transition Index
ESG	Environmental, Social and Governance
ExCo	Executive Committee
EOT	Extension of Time
FMM	Federation of Malaysian Manufacturers
FiT	Feed - in Tariff
GEF	Global Environment Facility
GLBE	Government Lead by Example
GTALCC	Green Technology Application for The Development of Low Carbon Cities

GHG	Greenhouse Gas
GCPV	Grid-Connected Photovoltaic
HRDF	Human Recourse Development Fund
IGES	Institute for Global Environmental Strategies
IPCC	Intergovernmental Panel on Climate Change
IEA	International Energy Agency
IEA PVPS	International Energy Agency Photovoltaic Power Systems Programme
IEC	International Electrotechnical Commission
IGEM	International Green Technology & Eco Products Exhibition & Conference Malaysia
IRENA	International Renewable Energy Agency
ISES	International Sustainable Energy Summit
IMELC	Iskandar Malaysia Eco-Life Challenge
IRDA	Iskandar Regional Development Authority
JASE-W	Japanese Business Alliance for Smart Energy Worldwide
DBKL	Kuala Lumpur City Hall
LSS	Large Scale Solar
LED	Light Emitting Diode
LCCF	Low Carbon Cities Framework
RMK-11	Malaysia Eleventh Plan
MBIPV	Malaysia Building Intergrated Photovoltaic
MUF	Malaysia Urban Forum
MGFT	Malaysian Green Financing Taskforce
MGCC	Malaysian Green Technology and Climate Change Centre
MPOB	Malaysian Palm Oil Board
MOF	Ministry of Finance
MOU	Memorandum of Understanding
KeTSA	Ministry of Energy and Natural Resources
KeTTHA	Ministry of Energy, Green Technology and Water
KPKT	Ministry of Housing and Local Government
MCO	Movement Control Order
NEB	National Energy Balance
NLCCMP	National Low Carbon Cities Masterplan
NOSS	National Occupational Skills Standard
NREPAP	National Renewable Energy Policy and Action Plan
NEM	Net Energy Metering
OGPV	Off-Grid PV
P2P	Peer-To-Peer
PIGCE	Penang International Green Conference and Exhibition

PV	Photovoltaic
PPA	Power Purchase Agreement
PLP	Pusat Latihan Proaktif
PVMS	PV Monitoring System
REEM	Registered Electrical Energy Manager
RPVI	Registered PV Investors.
RPVSP	Registered PV Service Providers
REPPA	Renewable Energy Power Purchase Agreement
RETR	Renewable Energy Transition Roadmap
RE-SSN	Renewable Energy-Sub sector Network
ROI	Return of Investment
SESB	Sabah Electricity Sdn Bhd
SARES	Sarawak Alternative Rural Electrification Scheme
SEB	Sarawak Energy Berhad
SCADA	Supervisory Control and Data Acquisition
SHRDC	Selangor Human Resource Development Centre
TEEAM	The Electrical and Electronic Association of Malaysia
SELCO	Self-Consumption
JASA	Special Affairs Department
SARE	Supply Agreement with Renewable Energy
SE	Sustainable Energy
TNB	Tenaga Nasional Berhad
UBBL	Uniform Building By Law
UNEP SBCI	United Nations Environment Protection Sustainable Building & Climate Initiative
UTM	Universiti Teknologi Malaysia
UiTM	Universiti Teknologi MARA
VBIAF	Value-based Intermediation Financing and Investment Impact Assessment Framework
VRE	Variable Renewable Energy
WTE	Waste-to-Energy
ZEB	Zero Energy Building

CHAIRMAN'S STATEMENT

Chairman's Message

It's my honour to pen my inaugural message in this annual report for 2019. I have just been on board as the Chairman of the Sustainable Energy Development Authority ("the Authority") since 16 April 2020. I would also like to take this opportunity to welcome new Authority Members who joined between April and May 2020.

They are YBhg. Datuk Zurinah binti Pawanteh, YBhg. Datuk Hang Tuah bin Din @ Mohamed Din, YBhg. YB Senator Datuk Hj. Yakubah Khan, YB Dato' Hj. Mohd Salim Shariff @ Mohd Sharif, and YBrs Puan Usha Nandhini Jayaram. Together with the existing Members of the Authority, we look forward to being part of this important national agenda of transitioning the nation towards sustainable energy.

Impact of COVID-19

The year 2020 has been an exceptional year whereby the world faces the same challenges around the same time. There are very few countries that are not affected by the COVID-19 pandemic outbreak. Global economies have come almost to a grinding halt as countries imposed total or partial lockdowns to curb the rapid spread of the pandemic.

This lockdown came with a heavy economic price as companies suffered financial distress and employees experienced pay cut or job losses. This challenge is further exacerbated by the eroding prices of oil which affects oil producing countries like Malaysia. For the first time in history, we witnessed negative prices of crude oil price in late April 2020.

Despite the loom and gloom brought by the pandemic, there is a positive side. According to a recent journal by the Nature Climate Change (May 2020), the daily greenhouse gas (GHG) emissions in April 2020 were comparable to 2006 level and this marked a decrease of 17% in emissions compared to 2019. This improvement in air quality is important as a study by a Harvard research team revealed that an increase of just one part per billion in long-term air pollution exposure is significantly associated with an 8% increase in the COVID-19 mortality rate. So, it seems that Mother Nature has her own way to combat the deadly pandemic.

COVID-19: What have we learned?

I think the more pertinent question we should ask from this costly pandemic outbreak is what have we learned that we can apply within the energy sector? Understanding this is crucial as most economies are still strongly coupled with energy consumption. In May 2020, the International Energy Agency (IEA) released a Renewable Market Update report. Not surprising, COVID-19 may result in a 13% drop in new renewable capacity for 2020. However, the good news is that despite this drop, the IEA acknowledged that renewables have so far shown impressive resilience and may achieve full recovery to the same level as 2019 as early as 2021. This recovery can be catalysed by the governments' allocation of resources which creates a deliberate paradigm shift towards a greener economy.

Economic Stimulus Package

By now, many governments have announced various economic stimulus packages to revive their country's ailing economy and to alleviate financial distress of businesses and individuals who have been impacted by the pandemic outbreak. It is important to note that stimulus packages are costly to implement, hence the packages should be strategically formulated so they address a much more catastrophic curve that the world should be trying to flatten. And that is the climate curve.

The COVID-19 pandemic represents a timely opportunity to reset the priority of government policies, especially energy policies to accelerate energy transition before the window of opportunity to address the 1.5°C global average temperature increase closes. This is echoed in the recent publication of the Energy Transition Index (ETI) 2020 by the World Economic Forum which emphasised that the "rapidly unfolding repercussions of the COVID-19 pandemic across the energy system illustrate the need for resilience – not just in physical infrastructure and cyberspace – but also in energy transition policies, roadmaps and international cooperation mechanisms".

To this effect, I am pleased that the Malaysian Government has included component of renewables in our economic stimulus package. Specifically, 1,400MW of solar photovoltaic (PV) will be awarded by 2020 and this comprises 1,000MW of regulated tendering via the large scale solar (LSS) scheme; 100 MW of net energy metering (NEM) for public buildings and 300MW of NEM for residential, commercial, industrial and agriculture sectors.

This translates to an estimate of RM5 billion private investments and 25,000 jobs. In my home state of Sarawak, I am proud to announce that renewable energy is one of the 14 key pillars of the Economic Strategic Plan 2030 for the state to reboot our economy post the pandemic outbreak. At both the Federal and State levels, I believe the Authority has an important role to facilitate this energy transition agenda.

Energy Transition

For ETI 2020, Malaysia is ranked 38th among 115 countries and maintained the lead in energy transition efforts among developing and emerging Asia. While we have performed very well in certain attributes such as energy access and security, there are still opportunities to improve in areas such as increasing the share of renewables and decreasing the share of coal in the energy mix, reducing pollution related to conventional energy production, introducing the price of pollution and rescinding subsidies for fossil fuel. As at the end of 2018, renewables in Malaysia represent 22.5% of the national installed capacity mix, much of this is contributed by the large hydropower from the state of Sarawak.

However, efforts of the Authority have resulted in increasing shares of other forms of renewables such as solar PV, bioenergy and small hydro through the implementation of the feed-in tariff (FiT) scheme since end of 2011. This scheme was outlined in the National Renewable Energy Policy and Action Plan (NREPAP) which was approved by the Cabinet in April 2010. Hence, the NREPAP underpins the establishment of the Authority and its core functions which include advising the Minister and Government entities on matters with regard to sustainable energy and implementing the FiT scheme. The Authority is cognisant that a new renewable energy roadmap is needed; one that is relevant in its time to shape the future of energy in the country.

RETR 2035

Since March 2018, the Authority has been given the mandate by the then Ministry of Energy, Green Technology and Water (KeTTHA) to develop the Renewable Energy Transition Roadmap (RETR). The RETR is due for publication this year and I understood that the Authority has put in much resources in 2019 to develop the roadmap.

I believe the publication of the RETR in 2020 will be most timely to demonstrate a socially just energy transition towards a more environmentally sustainable future. When an energy transition is socially just, it embodies inclusivity and ensure wealth is equitably distributed.

The RETR supports global trends of renewables such as the deployment of smaller and distributed renewable energy generations which will in turn provide opportunities for participation by individuals, and small to medium enterprises (SMEs).

Importantly, the roadmap represents a cohesive strategic plan for the country to reach a committed RE target by the milestone years of 2025 and 2035. The roadmap will balance the energy trilemma of economic growth, energy security and environmental sustainability. In this post COVID-19 recovery, the Authority believes that the RETR can contribute meaningfully to social economic development by providing green jobs and releasing private capital liquidity.

Shaping the Future of Energy

Besides implementing the FiT, the Authority will continue to support and promote the implementation of the NEM scheme, in particular, the announced allocation under the economic stimulus package. The Authority also has experts in energy efficiency who have been involved in technical facilitation and provision of trainings to private sectors, local authorities and state governments.

The Authority is aware that it has an important role to shape the future of energy in this country and to this end, we are privileged to have a dedicated team at the Authority. On my part, I am fully committed to render my fullest support to the sustainable energy agenda in Malaysia.

Together with the support of the Ministry of Energy and Natural Resources (KeTSA), I strongly believe this mandate on facilitating energy transition for the betterment of future generations can be achieved.

YB Tuan Lukanisman Awang Sauni
Chairman of Authority

CEO'S OPERATIONAL REVIEW

CEO's Message

It's a privilege for me to present the ninth annual report of the Authority. I was appointed as the Chief Executive Officer in January 2019 and this marks my first anniversary in the Authority. It has been a year with much emphasis on the delivery of our mandates and strengthening the governance of the Authority with a restructure of the organisation.

I would also like to take this opportunity to welcome our incoming Chairman YB Tuan Lukanisman Awang Sauni and fellow Authority Members who are appointed as of April 2020. I also wish to thank our outgoing Chairman YB Tuan Wong Kah Woh and fellow Authority members for their invaluable guidance and support throughout their tenure.

Feed-in Tariff & Net Energy Metering

In 2019, the Authority approved 51 applications with a total of 258.95MW under the feed-in tariff (FiT) scheme. While e-bidding for biogas had begun since 2018, this mode of quota award for biogas was continued in 2019 to ensure price efficiency. The success of e-bidding for biogas was extended to small hydro in 2019.

As at end-2019, the cumulative approved capacity of renewables under the FiT was 1,243.60MW. This represented a year-on-year (YoY) growth of 15.60% from 2012 to 2019. The highest YoY growth was from biogas (38.19%), followed by small hydro (23.89%). The high growth rate of both biogas and small hydro was the result of continuous improvement in the FiT schedule.

For instance, the tenure of the renewable energy power purchase agreement (REPPA) for biogas was increased in 2019 to 21 years from 16 years while for small hydro, a new FiT rate was accorded to low head technologies to account for their higher investment cost. In 2019, 88 FiT projects with a total of 55.13 MW achieved commercial operation, contributing to a cumulative total of 630.64MW of projects in operation.

As for the net energy metering (NEM) scheme, 2019 saw a change in policy whereby surplus solar electricity is compensated on a 1-on-1 basis. In 2019, a total of 1,252 applications representing 102.41MW of NEM was approved, bringing the cumulative approved capacity of NEM to 130.21MW. The increase of NEM in 2019 alone was nearly 3.68 times the total capacity approved from 2016 to 2018.

This change in policy highlighted the pivotal role of an effective policy to drive a nascent RE market. In 2019, the Authority continue to have various awareness programmes, including launching a NEM calculator in May to assist the public in estimating their investment costs in solar PV system under the NEM.

As at end of 2019, a cumulative of 891 NEM projects with a total capacity of 37.56MW achieved commercial operation. 2019 also witnessed the introduction of new financing mechanisms for rooftop solar PV such as solar leasing and power purchase agreement (PPA). This financing mechanisms garnered much tractions among the industrial and commercial consumers as there is no upfront cost incurred.

To support this new ecosystem, the Authority established a new directory in 2019 for PV investors and by end-2019, there were 62 Registered PV investors, apart from the established Registered PV Service Providers having 128 companies.

New Initiatives

Apart from the continued efforts of the FiT and NEM programmes, the Authority in October, launched the nation's inaugural pilot run of the peer-to-peer (P2P) energy trading at the International Green Technology & Eco Products Exhibition & Conference Malaysia (IGEM) 2019. Malaysia is the second country among ASEAN countries to testbed this concept of trading surplus solar PV energy produced by prosumers to other electricity consumers.

The P2P energy trading platform was provided by Power Ledger Pty Ltd (Australia) under a memorandum of understanding (MOU) signed during the launch. The pilot run is premised on the concept of sharing economy through a digitalised platform. The sandbox will culminate in a finding report by the end of 2020 which will be submitted to the Ministry of Energy and Natural Resources (KeTSA). The report will include recommendations on the way forward for P2P energy trading in Peninsular Malaysia.

At IGEM 2019, the Authority also signed a MOU with UTM to enhance the scope of energy management support in the university's biogas, biomass and energy management research facilities. The MOU will enable both parties to exchange information in the areas of services and technologies that have proven to benefit the local RE industry.

Capacity Building, Technical Facilitation and Services

The Authority offers technical facilitation and services to our stakeholders which largely comprises of the public sector. Under the Sustainable Energy Low Carbon Building Facilitation Program, by 2019 the Authority facilitated an increasing number of local authorities (such as Kuala Lumpur City Hall, Petaling Jaya City Council, Shah Alam City Council, Sepang Municipal Council, Hang Tuah Jaya Municipal Council, Putrajaya Corporation, and others) through capacity enhancement and facilitation on development of low carbon cities.

The Authority is also involved in a city-to-city collaboration between Kuala Lumpur City Hall and Tokyo Metropolitan Government in which the Authority and UTM represent local technical partners whilst the Institute for Global Environmental Strategies (IGES) represent technical partner from Japan. This facilitation program is funded by the Ministry of Environment Japan.

As a follow through of an earlier memorandum of understanding (MOU) signed in October 2018, the Authority continued its effort in the introduction of Zero Energy Building (ZEB) Facilitation Program. This is the product of a cooperation with the Japanese Business Alliance for Smart Energy Worldwide (JASE-W), an organisation assigned by the Ministry of Economy, Trade and Industry (METI) of Japan to promote and facilitate ZEB Program in Japan and ASEAN countries. Besides that, the Authority continues to provide similar facilitation to States that are collaborating with the Authority. Since inception, the Authority has collaborated with training institutions to carry out trainings in renewable energy. In 2019, 493 individuals were trained of which 95% of the participants were under various trainings for solar PV and the remaining 5% were on the operation and maintenance of biogas power plants.

By end-2019, the Authority has trained a cumulative total of 2,432 participants in solar PV and 112 for non-solar. In 2019, the Authority also initiated the development of a new training module on thermal energy with UTM while University Kuala Lumpur (UniKL) is in the process of adopting the Authority's grid-connected PV training module into their academic engineering syllabus.

The Authority also conducted in-house trainings for energy efficiency. In 2019, nine of such trainings were organised, covering (i) Energy Efficiency in Aircondition and Mechanical Ventilation, (ii) Energy Management and Audit in Buildings, and (iii) Application of Malaysian Standard: Code of Practice on Energy Efficiency and Use of Renewable Energy for Non-Residential Buildings (MS 1525).

Future Readiness

In August 2019, we commissioned a major restructure in the Authority which strategically reallocated human resources in three major departments: Strategic Planning and Communications, Operations and Technical Services, and Corporate Services.

While the core functions of the Strategic Planning and Communications are to formulate future-focused strategies and drives effective communications to our key stakeholders, the Operations and Technical Services cover existing RE market operations such as the FiT and NEM while providing technical facilitations on both renewable energy and energy efficiency.

The Corporate Services encompass the Digital Services, Finance, and Human Resource and Administration divisions. This new organisational structure is envisaged to enhance the readiness of the Authority as we pursue operational excellence and crystalise our thought leadership in the corpus of sustainable energy knowledge.

The Authority invested much of 2019 in developing the Renewable Energy Transition Roadmap (RETR) 2035. The objectives of the RETR are to formulate strategies towards achieving the Government's committed RE target by 2025 and develop possible RE scenarios for 2035.

To this end, we valued the contributions and insights from the RE industry and the various government agencies and utilities, including peer reviews from the International Renewable Energy Agency (IRENA) and the Asian Development Bank (ADB).

The publication of the roadmap this year will be timely to boost the ranking of Malaysia in the World Economic Forum's Energy Transition Index (ETI) for 2021. More importantly, the publication of this roadmap will resonate with the economic recovery of the nation post COVID-19 pandemic outbreak.

Impact of COVID-19

The novel coronavirus was first detected in Wuhan, China at the end of 2019. By the first half of 2020, most parts of the world are inflicted with this pandemic outbreak. Unfortunately, Malaysia is not spared. Nevertheless, the Authority had initiated several improvements in operations which had assisted us in preparing for this pandemic.

In 2019, as part of the on-going improvements in office operations, the Authority has digitalised major parts of the office operations. These include hosting critical applications in the cloud, having an internal video conference facility and fine tuning our business continuity plan (BCP).

Little did we anticipate that such efforts expended in 2019 became a lifeline during the Movement Control Order (MCO) period. As a result of our earlier efforts, there were minimal disruptions in our office operations even though we operated from home.

During the MCO period, the Authority reached out to the various RE sectors via virtual meetings to understand their pain points caused by this partial lockdown and how we could assist them. The Authority also contributed in our small ways to the frontliners and the less fortunate communities.

In terms of our planned event, the Fifth International Sustainable Energy Summit (ISES) which was scheduled for April 20-21 had to be postponed to 2021 to comply with social distancing rules and international travel bans.

In place of physical events, we conducted our inaugural NEM webinar during this MCO period. The result was encouraging. We had over 900 who registered for the webinar which exceeded the webinar limit of 500 with over 110 questions posted during the session.

Trainings also went virtual during this time. Specifically, the Authority conducted three online trainings related to energy efficiency and low carbon programme, and also engaged numerous focus group discussions with key stakeholders such as the relevant Ministries, government agencies, regional and local authorities, including international organisation such as the United Nations Development Programme as well as non-governmental organisations to ensure matters relating to low carbon cities programme are kept in healthy progress.

During this MCO period, the Authority also managed to release the first issue of our tri-annual in-house Sustainable Energy Malaysia (SEM) magazine of which we dedicated this issue to the courageous frontliners.

The Road Ahead

The Corona Pandemic is drastically disturbing everyday life as it also exposes how vulnerable our economies are as attention is drawn to turn towards economic recovery packages or economic stimulus packages. This coupled with the global oil price slump would certainly impact the progress of the much-needed energy transition agenda.

As these aspects are already reshaping attitudes, the new realities would call for different policy approaches that will require broader public rethink on the investments in low carbon systems. By making energy transition agenda an integral part of the wider recovery, we can achieve multiple economic and social objectives in the pursuit of providing a more resilient and sustainable future.

This makes the Authority's role even more critical at a time like this as we help shape the future of energy in our country. On this note, I look forward to a progressive 2020 with a strong support from the Ministry, the Chairman and Authority Members, and my dedicated management team. A special thank you to our local and international stakeholders for your continued support as we journeyed together in the road ahead of us.

YBrs. Ir. Dr. Sanjayan Velautham
Chief Executive Officer

ROLES & FUNCTIONS OF THE AUTHORITY

Background

The Sustainable Energy Development Authority Malaysia ("the Authority") is a statutory body established under the Sustainable Energy Development Authority Act 2011 [Act 726] on 1 September 2011 with the main role of administering and managing the implementation of the Feed-in Tariff (FiT) mechanism mandated under the Renewable Energy Act 2011 [Act 725]. The Authority's core responsibilities are not limited to RE: they also include promoting the use of energy efficient technologies and approaches to reduce energy consumption.

VISION AND MISSION

Vision

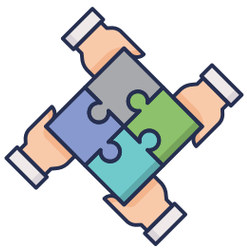
To promote the deployment of sustainable energy (SE) measures as part of the solutions towards achieving energy security and autonomy.

Mission

Ensure SE plays an important role in the nation's economic development and environment conservation

Ensure existing SE programmes are managed prudently and efficiently

Continuously assess new potential SE solutions in partnership with our domestic and international stakeholders to diversify and complement the existing portfolio of our existing SE programmes

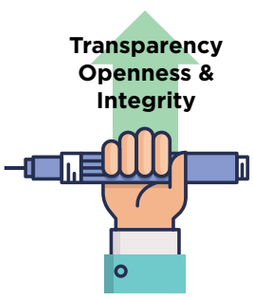


Advocate the public towards accepting responsibility in a paradigm shift towards living sustainably

Core Values

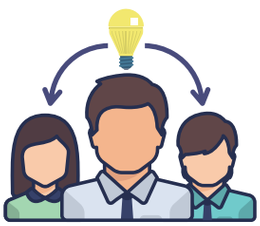
In carrying out our roles and responsibilities to the *rakyat* of Malaysia, the Authority operates within the following core values:

ACCOUNTABILITY
We are responsible to implement the laws related to SE



GOVERNANCE
We carry out our work with transparency, openness, and integrity

EFFICIENCY AND COMPETENCY
We carry out our work within a declared client charter to effectively achieve our goals



HUMAN RESOURCE DEVELOPMENT
We strive to develop a pool of talent for the SE industry to accelerate its growth

UPDATE ON RENEWABLES UNDER THE AUTHORITY

Ir. Dr. Sanjayan Velautham, CEO of the Authority, giving opening remarks by highlighting on sustainable energy updates in one of the briefing sessions during 2019

Feed-in Tariff (FiT)

It has been close to a decade since the Feed-in Tariff (FiT) scheme is being implemented in Malaysia by the Authority in 2011 with the aim of initiating a RE market. Several trends of RE maturation in the domestic market have been observed within this period.

The FiT scheme (enabled by the Renewable Energy Act [Act 725]) is the first effective RE policy in Malaysia. It provides business confidence and security to private investors, developers and bankers in the domestic market whereby:

i. Access to the grid is guaranteed – distribution licensees (such as TNB and SESB) are legally obliged to accept all electricity generated by RE private producers, subject only to safety considerations;

ii. Local approval procedures are outlined and clear;

iii. FiT rates which are sufficient to provide reasonable return of investment (ROI);

iv. Guaranteed payment period of more than 15 years through power purchase agreement (PPA);

v. Adequate degression to promote cost reduction to achieve grid parity;

vi. FiT projects are monitored by the Authority for transparency purposes; and

vii. Compliance to relevant laws is upheld. For instance, the grant of a FiA by the Authority shall not exempt a FiAH from the obligation to comply with all other applicable laws, including the Electricity Supply Act 1990 and its subsidiary legislations.

Solar PV: Beyond FiT scheme

Among the RE generation technologies, solar PV with its global rapid declining cost reached price parity with regulated electricity tariff and has subsequently exited the FiT scheme. Today, almost 100% of solar PV projects approved under the FiT scheme have achieved commercial operations.

Aligning with global PV trend, supported by FiT and NEM schemes, energy compensation from solar PV generation is now being supported by other schemes instead of having to rely on the FiT scheme. The succession to the grid-connected solar PV FiT in Malaysia is the Net Energy Metering (NEM), Self-Consumption (SELCO), and the Large Scale Solar (LSS) schemes.

The solar PV connected at the grid distribution level (usually rooftops) under the NEM and SELCO schemes allow consumers to produce energy primarily for their own use. On the other hand, the LSS allows private investors to invest in renewable energy by building utility-scale solar farm on land or water bodies at both the grid transmission and distribution levels

Malaysia's largest rooftop solar PV project under NEM at 2.5MWp by Goodyear Malaysia Bhd (Source credit: Goodyear Malaysia Bhd)

Progress of Non-Solar Market

The non-solar RE indigenous resources, specifically the biomass, biogas, and small hydro, still require the FiT scheme to support its uptake in domestic RE market. Non-solar projects have longer gestation periods especially small hydro.

Of the non-solar projects, the biomass and small hydro face significant challenges. Biomass is known for challenges in securing long-term feedstock supply while the small hydro is subjected to many and often, lengthy approval processes at various government levels.

Nevertheless, non-solar projects contribute an important role in the RE mix as they have the ability to provide balancing mechanism to solar PV which is intermittent in nature.

Designing Effective RE Policies

What have the Authority learned after years of implementing the FiT and NEM schemes? In developing RE mechanisms, we may not roll out a perfect or ideal mechanism in the first round. However, it is important that the Authority reviews the effectiveness of the mechanism on a regular basis and engages with the RE industry for subsequent improvement.

In January 2014, the early enhancements to the FiT scheme included amending the degression rate of biomass and biogas to zero as this could improve the financial viability of the projects. At the same time, it was also enhanced by increasing the eligibility criteria of bonus incentive for landfill gas.

Subsequently, the Authority noticed an increase especially in the biogas RE take-up rate when improvements such as agricultural waste which includes animal waste as fuel source were made. In 2019, by amending the RE power purchase agreement (REPPA) tenure for biogas from 16 to 21 years has also helped to improve financial sustainability of such projects.

Among the three non-solar RE resources, biogas gains the most traction. This is also attributed to regulatory requirements set by the Malaysian Palm Oil Board (MPOB) which came into effect in January 2014 which mandated new palm oil mills and existing mills (that are undergoing expansion) to include capturing of methane. This also highlighted the importance of inter-ministerial collaboration as RE is at times addressing cross ministerial functions.

The focus of the Authority for 2019 onwards is to continue the competitive e-bidding process for biogas to drive down the energy price; extend REPPA for biomass from 16 to 21 years to improve financial sustainability; and to introduce the categories of high head and low head for small hydro competitive e-bidding.

This is a significant departure of the original FiT scheme which offered a fixed premium rate to the applicants. The move to competitive bidding indicates a gradual move towards price discovery for non-solar projects and better financial efficiency of the RE Fund.

The NEM policy was exemplary in its effectiveness to drive the PV rooftop market beyond the support of the FiT scheme. For example, the compensation of the solar PV energy generated under the NEM 1.0 scheme (2016-2018) was based on the prevailing displaced costs which are much lower than the regulated electricity retail tariff. The take-up rate was very low among the electricity consumers with only 27MW approved as of end-2018.

After a review of the NEM 1.0, in 2019, the mechanism was improved to a "1-on-1" energy offset mechanism, meaning that each 1kWh of energy generated can be used to offset 1kWh of energy consumed. The enhanced NEM 2.0 witnessed over three-fold increase in the take-up rate just within 2019 alone compared with the cumulative capacity approved from 2016 to 2018.

Nevertheless, a close monitoring of the policy performance and the willingness to improve policies are essential to ensure consistent support to an emerging RE market that does not penalise the early movers.

The Renewable Energy Transition Roadmap (RETR) 2035

While the National RE Policy and Action Plan (NREPAP) has been the pivotal RE policy that mandated the implementation of the FiT scheme, it was concluded that a new RE policy is required to continue advance the RE agenda that will facilitate an energy transition towards a cleaner form of power generation. This requirement is timely given that the NREPAP was approved by the Cabinet back in April 2010.

In 2019, the Authority started developing the Renewable Energy Transition Roadmap (RETR) 2035 which developed strategies to achieve the RE target of 20% by 2025 and develop aspirational scenario for 2035.

The scope of the roadmap includes identifying the baseline for RE in Malaysia and the RE resource potential for biogas, biomass, solar PV and small hydro, annual capacity planning for RE, establishing strategies and key actions to achieve the capacity target and scenario and derive the socio-economic impact as a result of the target and scenario.

The RETR is developed within the boundary conditions of addressing the energy trilemma of environmental sustainability, delivering socio-economic benefits to the country and maintaining electricity system stability.

The Authority would like to record our appreciation to many stakeholders who have contributed to the development of the roadmap, including federal ministries (MPI, KPKT), related government agencies (such as the Energy Commission, MPOB, JPSPN, Securities Commission), major power utilities (such as TNB, SEB, SESB), RE industry, and special mention to both Asian Development Bank (ADB) and IRENA for their peer review at the end of the roadmap exercise. The RETR 2035 is scheduled for launching in 2020.

Green Financing

Difficulty in securing financing has impacted the development milestones of some of the non-solar RE projects. This is caused by several factors such as the low awareness of the technical RE knowledge among the financial institutions in Malaysia, the lack of green financing framework, the asymmetric information between the investors and borrowers, and the lack of critical mass of successful projects due to an infant RE market.

Understanding the important role of financing in enabling RE projects, the Authority is honoured to be part of the committee members of the Malaysian Green Financing Taskforce (MGFT) 2019 initiated by the Securities Commission of Malaysia.

The Authority is also a contributor to the RE sectorial Value-based Intermediation Financing and Investment Impact Assessment Framework (VBIAF) Sectoral Guide Working Group 2019 initiated by Bank Negara Malaysia in 2019. The objectives of the MGFT were to resolve operational issues that hinder the availability of affordable green financing and develop an ecosystem that will support the growth of a viable and sustainability green economy.

The Taskforce concluded in July 2019 with eight key recommendations across the process changes, product and strengthening capacity of related stakeholders which will be disclosed in RETR 2035. For the VBIAF, the Authority contributed in the RE sector with key inputs derived from the Renewable Energy Transition Roadmap (RETR) 2035 which the Authority was tasked to develop in 2019.

The RE sectorial VBIAF aims to facilitate the implementation of an impact-based risk management system for assessing the financing and investment activities of Islamic financial institutions in line with their respective VBI commitments. The VBIAF also serves as a reference for other financial institutions intending to incorporate environmental, social and governance (ESG) risk considerations in their own risk management system.

Members of MGFT at final meeting

FEED-IN TARIFF (FIT)

A 5MW solar farm under the FiT programme belonging to Kumpulan Melaka Bhd

Key Statistics and Highlights Of 2019

Quota Awarded in 2019 and List of Successful E-Bidders

In 2019, the allocated quota release was 230MW (60MW for biogas and 170MW for small hydro), however due to price efficiency, this has allowed the Authority to award additional 3.5% more than the allocated quota. In a continued effort to support non-solar RE resources under the FiT scheme, a total of 238.134MW was awarded in 2019 **(Exhibit 1).**

As of end-2019, two tranches of biogas e-bidding quota were awarded – 30.100MW (first e-bidding tranche) and 31.243MW (second e-bidding tranche) – alongside 176.790MW of inaugural small hydro e-bidding quota.

RE Resources	Quota Allocated (MW)	Quota Awarded (MW)	Scheduled Commercial Operation Period	Opening e-Bidding Period	Quota Awarded Date
Biogas 1st e-bidding tranche	30.000	30.101	H1 2022	19 November – 3 December 2018	29 January 2019
Biogas 2nd e-bidding tranche	30.000	31.243	H2 2022	15 – 29 July 2019	30 September 2019
Small Hydro	170.000	176.790	H2 2024	2 – 23 September 2019	24 December 2019
Total	230.000	238.134	N/A	N/A	N/A

Exhibit 1: Table of Quota Awarded in 2019 according to RE Resources

In 2019, the Authority also introduced e-bidding for small hydro RE quota. Its inaugural bidding was held from 2-23 September with applications technically categorised as high and low head applications with different ceiling prices (RM0.26/kWh for high head applications; RM0.2900/kWh for low head applications).

Based on the first small hydro e-bidding exercise, the Authority received 13 high head applications with a median bid price of RM0.2400/kWh and two low head applications with a bid price of RM0.2900/kWh. Details for all the quota awarded in 2019 can be found in **Exhibits 2** and **3** below.

No	RE Resources	Installed Capacity	Bid Tariff (Basic FiT Rate – RM/kWh)
1st biogas e-bidding tranche			
1	RED PALM GAS SDN BHD	2.400	0.2210
2	LADANG RAKYAT TRENGGANU SDN BHD	2.400	0.2234
3	LIZIZ BIOGAS SDN BHD	2.400	0.2490
4	CONCORD BIOTECH SDN BHD	2.400	0.2500
5	CONCORD BIOTECH SDN BHD	2.400	0.2500
6	GREEN BIOGAS SDN BHD	2.400	0.2500
7	GLT MORIB POWER SDN BHD	1.501	0.2599
8	GLT SUSTAINABLE SDN BHD	1.501	0.2599
9	SOLMAX TONGOD BIOENERGY SDN BHD	1.200	0.2610
10	WZS POWERGEN SDN BHD	1.500	0.2614
11	GLT AGRO POWER SDN BHD	0.635	0.2675
12	SRI SENGGORA BIOGAS SDN BHD	1.800	0.2700
13	CENERGI SRI GANDA SDN BHD	2.404	0.2809

No	RE Resources	Installed Capacity	Bid Tariff (Basic FiT Rate – RM/ kWh)
14	CENERGI WEST SDN BHD	1.560	0.2809
15	JANA LANDFILL SDN BHD	3.600	0.2814
	Total Installed Capacity & Median Bid Price	**30.101**	**0.2599**
2nd biogas e-bidding tranche			
1	ASIA POLY BIO GAS SDN BHD	0.500	0.2350
2	GLT BP POWER SDN BHD	3.606	0.2499
3	GLT INTAN POWER SDN BHD	1.501	0.2499
4	BETATECHNIC SDN BHD	2.400	0.2500
5	KIM LOONG POWER SDN BHD	1.800	0.2500
6	SIME DARBY TNBES RENEWABLE ENERGY SDN. BHD	1.560	0.2554
7	LIPP ENGINEERING SDN BHD	1.560	0.2563
8	PROVECTUS BIOENERGY SDN BHD	1.560	0.2595
9	CYPARK SMART TECHNOLOGY SDN BHD	4.000	0.2597
10	ALL PALM POWER KEMASUL SDN BHD	1.600	0.2600
11	KUB-BERJAYA ENERGY SDN BHD	2.000	0.2600
12	MENTARI BIOGAS SDN BHD	2.400	0.2600
13	SARJANA DUTAMAS SDN BHD	0.396	0.2600
14	BELL CENERGI YP SDN BHD	2.400	0.2615
15	CENERGI LANGKAP SDN BHD	1.560	0.2685
16	ALLIANCE CONCORD GREEN SDN BHD	2.400	0.2689
	Total Installed Capacity & Median Bid Price	**31.243**	**0.2596**

Exhibit 2: List of Successful e-bidders for Biogas Quota Awarded in 2019

No	RE Resources	Installed Capacity	Bid Tariff (Basic FiT Rate – RM/ kWh)	Hydro Category
1	KANGSAR HIDRO SDN BHD	27.300	0.2300	High Head
2	KANGSAR HIDRO SDN BHD	11.530	0.2300	High Head
3	SDF HYDRO SDN BHD	9.600	0.2380	High Head
4	KANGSAR HIDRO SDN BHD	7.240	0.2400	High Head
5	KANGSAR HIDRO SDN BHD	3.000	0.2400	High Head
6	KANGSAR HIDRO SDN BHD	3.300	0.2400	High Head
7	KANGSAR HIDRO SDN BHD	7.400	0.2400	High Head
8	WORLDWIDE HYDRO ENERGY SDN BHD	2.200	0.2450	High Head
9	BANJARAN KINTA HYDRO SDN BHD	2.620	0.2550	High Head
10	TOPAZ DIAMOND SDN BHD	3.000	0.2590	High Head
11	CABARAN HIJAU SDN BHD	18.700	0.2599	High Head
12	DENAI DELIMA SDN BHD	12.000	0.2599	High Head
13	SELAT SERASI SDN BHD	13.900	0.2599	High Head
14	BATU BOR HIDRO SDN BHD	30.000	0.3000	Low Head
15	LUBUK PAKU HIDRO SDN BHD	25.000	0.2500	Low Head
	Total Installed Capacity & Median Bid Price	**176.790**	**0.2400 for High Head, 0.2900 for Low head**	

Exhibit 3: List of Successful e-bidders of Small Hydro Quota Awarded in 2019

Did You Know that Bioenergy is considered Carbon Neutral?

As countries expand to meet their electricity demand, the Intergovernmental Panel on Climate Change (IPCC) report entitled Global Warming of 1.5°C (2018) outlines that electricity demand should be met with minimal carbon emissions. The future climate-related risks depend on the rate, peak and duration of warming due to GHG emissions.

The risks are larger if global warming exceeds 1.5°C above pre-industrial levels, especially if the peak temperature is high (e.g. above 2°C). Some impacts may be long-lasting or irreversible such as the loss of some ecosystems.

Therefore, all governments are advised to take mitigating actions by committing to an energy transition plan of replacing fossil fuel power plants with renewables and instituting systemic efficiency in buildings and cities.

Exhibit 4 below illustrates the amount of CO_2 gas emitted when 1kWh of energy is generated from different fuel resources from the lifecycle perspective (Sovacool, 2008). From the global statistics, it is apparent why countries are switching to renewables to meet their decarbonisation committed target.

Technology	Capacity/configuration/fuel	Estimate (gCO_2e/kWh)
Wind	2.5 MW, offshore	9
Hydroelectric	3.1 MW, reservoir	10
Wind	1.5 MW, onshore	10
Biogas	Anaerobic digestion	11
Hydroelectric	300 kW, run-of-river	13
Solar thermal	80 MW, parabolic trough	13
Biomass	Forest wood Co-combustion with hard coal	14
Biomass	Forest wood steam turbine	22
Biomass	Short rotation forestry Co-combustion with hard coal	23
Biomass	Forest wood reciprocating engine	27
Biomass	Waste wood steam turbine	31
Solar PV	Polycrystalline silicone	32
Biomass	Short rotation forestry steam turbine	35
Geothermal	80 MW, hot dry rock	38
Biomass	Short rotation forestry reciprocating engine	41
Nuclear	Various reactor types	66
Natural gas	Various combined cycle turbines	443
Fuel cell	Hydrogen from gas reforming	664
Diesel	Various generator and turbine types	778
Heavy oil	Various generator and turbine types	778
Coal	Various generator types with scrubbing	960
Coal	Various generator types without scrubbing	1050

Exhibit 4: Comparative CO2 Emissions Estimates based on Lifecycle of Various Electricity Generators (Source: Sovacool, 2008)

[1] Intergovernmental Panel on Climate Change-Global Warming of 1.5 Degrees Celsius: Summary for Policymakers, UNFCCC, 2018

Some renewable energy resources such as bioenergy have negative estimates throughout their lifecycles due to their carbon sequestration ability as indicated in **Exhibits 5** and **6** below. The negative estimates are based on assumptions of avoided GHG emissions from residues and wastes in landfill disposals and co-products.

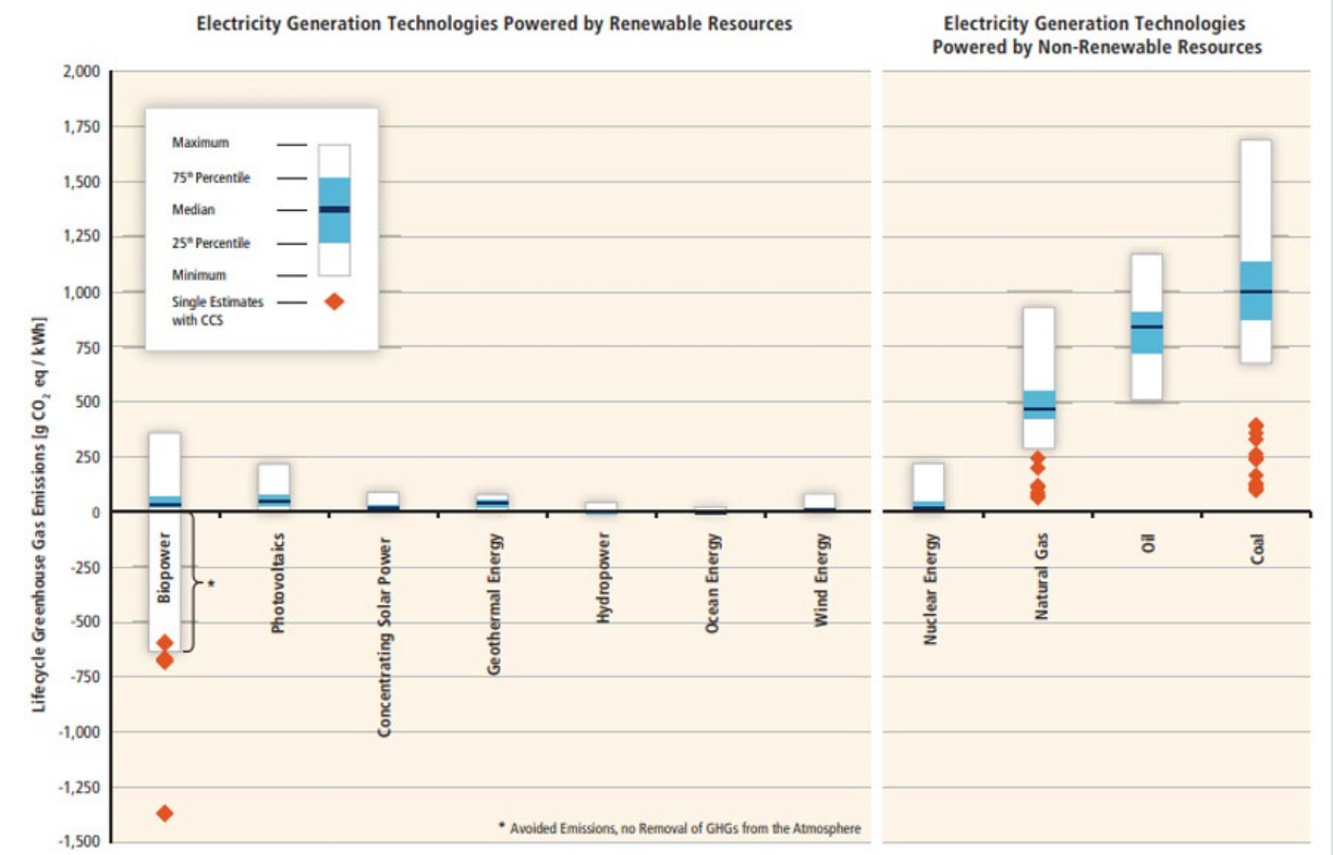


Exhibit 5: Lifecycle of GHG Emissions Against Electricity Generation Technologies (Source: IPCC Report, 2018)

Values	Biopower	Solar		Geothermal Energy	Hydropower	Ocean Energy	Wind Energy	Nuclear Energy	Nuclear Gas	Oil	Coal
		PV	CSP								
Minimum	-633	5	7	6	0	2	2	1	290	510	675
25th percentile	360	29	14	20	3	6	8	8	422	722	877
50th percentile	18	46	22	45	4	8	12	16	469	840	1001
75th percentile	37	80	32	57	7	9	20	45	548	907	1130
Maximum	75	217	89	79	43	23	81	220	930	1170	1689
CCS min	-1368								65		98
CCS max	-594								245		396

Note: CCS = Carbon capture and storage, PV = Photovoltaic, CSP = Concentrating solar power.

Exhibit 6: Detailed Values of GHG Emissions Lifecycle Against Electricity Generation Technologies (Source: IPCC Report, 2018)

From 2010 to 2018, the average Levelised Cost of Energy (LCOE) of solar PV and wind has dropped significantly (in 2018, Solar PV: US$0.085/kWh, wind onshore: US$0.056/kWh, wind offshore: US$0.127/kWh) and these technologies are now able to compete with the average LCOE of coal and gas generation[2].

The LCOE and price efficiency was also observed in Malaysia. This was reflected in some of received bids in LSS 3 (2019) which are lower than average gas generation cost of RM0.2322/kWh.

It is expected by year 2050, 63% of the world's electricity will be generated by these variable renewable energy (VRE) resources (with solar leading the generation at 33%), a significant increase from 2018 which was at 26%. The projected world energy outlook[3] can be found in **Exhibit 7** below.

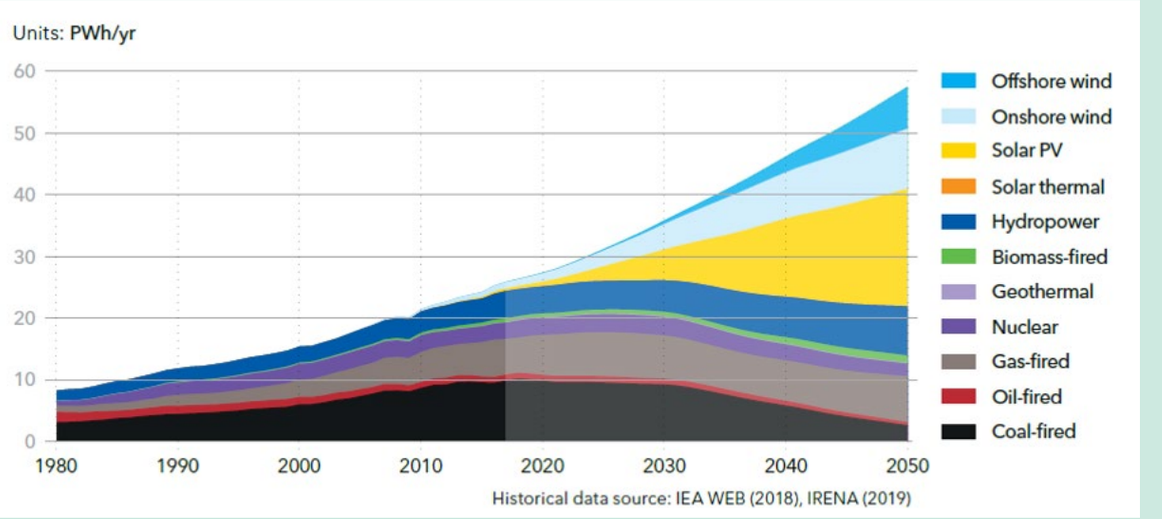


Exhibit 7: World Electricity Generation Projection Till 2050 by Fuels
(Source: Energy Transition Outlook 2019, DNV GL, 2018)

[2] Renewable Power Generation Costs in 2018, IRENA, 2019
[3] Energy Transition Outlook 2019, DNV GL, 2018

RE Resources	No. of Applications	Capacity (MW)
Biogas	31	61.34
Biomass	1	10.00
Small Hydro	17	187.59
Solar PV	2	0.02
Total	**51**	**258.95**

Exhibit 8: Total Number of FiAs and Capacity Approved in 2019

In 2019, the Authority approved 51 FiAs which amounted to 258.95MW (**Exhibit 8**). Although the biogas e-bidding applications were conducted separately in 2018 (30.10 MW) and 2019 (31.24 MW), all e-bidding applications were approved in 2019 after detailed evaluation of their proposed project cashflow models, and technical reports.

Similarly, a significant portion of small hydro FiA applications totalling 176.79 MW was awarded via the e-bidding exercise. The remaining FiA applications were submitted in the previous years and approved in 2019 after detailed evaluation and clarification.

Solar PV applications have progressed beyond the FiT scheme and are now being supported by the NEM scheme. The 0.02 MW approved solar PV applications were individual applications who had surrendered earlier and appealed to reinstate their applications in 2019.

RE Resources	No. of Applications	Capacity (MW)
Biogas	15	32.82
Small Hydro	2	20.00
Solar PV	71	2.31
Total	**88**	**55.13**

Exhibit 9: Total no. of Projects achieving Commercial Operations in 2019

As of end-2019, 88 projects with a total of 55.13MW achieved commercial operation (**Exhibit 9)**. Among the three RE resources, solar PV technology is the easiest to deploy. However, the gestation period for non-solar resources are much longer.

Some of the FiT applications were approved as early in year 2014 and have yet to achieve commercial operation. For instance, there has been no biomass projects that achieved commercial operations in 2019 and instead some have surrendered or being revoked in 2019 while small hydro projects also faced some challenges.

Biomass projects face challenges in securing long-term feedstock supply while the long gestation period for small hydro is due to lengthy approval processes and many permits required by government bodies.

Difficulty in securing financing from the private banks and investors have also hampered the development milestones of the non-solar RE projects. This is partly resulted from low awareness of technical RE knowledge among financial institutions in Malaysia which the Authority has been addressing through constant engagements.

For more information on the engagements in 2019, kindly refer to list of events under the Stakeholders Engagement section.

When approved applications (typically the non-solar RE technology) are unable to meet their milestones, the project developers could apply for an Extension of Time (EOT) to commission the project at a later date.

If they have exhausted their choices, they may choose to surrender their FiAs or their applications may be revoked by the Authority.

In 2019, a total of 337 applications with total capacity of 154.75MW were surrendered and revoked. **Exhibits 10** and 11 detailed the capacities of RE revoked and surrendered in 2019.

RE Resources	No. of Applications Surrendered	Surrendered Capacity (MW)
Biogas	6	12.75
Biomass	4	50.40
Small Hydro	5	71.94
Solar PV	294	3.40
Total	**309**	**138.49**

Exhibit 10: Total number of FiAs and Capacity Surrendered in 2019

RE Resources	No. of Applications Revoked	Revoked Capacity (MW)
Biogas	-	-
Biomass	1	7.00
Small Hydro	1	9.00
Solar PV	26	0.26
Total	**28**	**16.26**

Exhibit 11: Total number of FiAs and Capacity Revoked in 2019

Since the change of FiT schedule for biogas, there has been an increase in the take-up rate. The changes include setting the degression rate to zero; bonus incentive given to the use of all landfill gases which includes agricultural and animal waste; and extension of biogas REPPA tenure from 16 to 21 years.

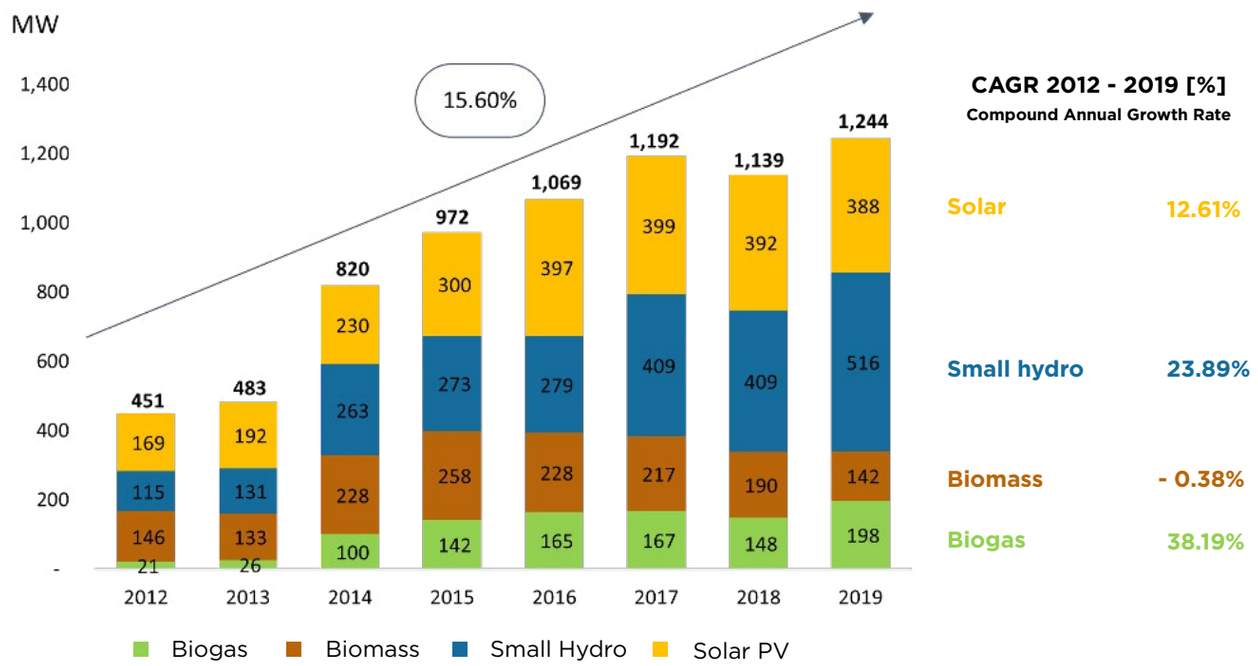
The focus of the Authority for 2019 and beyond is to continue the competitive e-bidding process for biogas to facilitate price discovery; extend biomass REPPA from 16 to 21 years; and to introduce the categories of high head and low head for competitive small hydro e-bidding.

Performance Trend and Highlights

The total approved FiT applications (MW) in Malaysia has grown on a 15.60% on a year-on-year (YoY) basis from 2012 to 2019 – from 451MW to 1,244MW (Exhibit 12). This approved total is net of the revocation and surrendered capacities over the years.

Although the total approved non-solar applications have higher YoY growth rate compared with solar (except biomass), these non-solar applications are more challenging for project developers to meet their proposed milestones, leading to some applications being revoked or surrendered before the plants could commission (a drop in capacity in certain years).

On the other hand, the solar PV applications have contributed consistently to the growth rate and total RE capacity approved under FiT due to its rapid price decline and scalability in technology which afforded adoption by individual households.



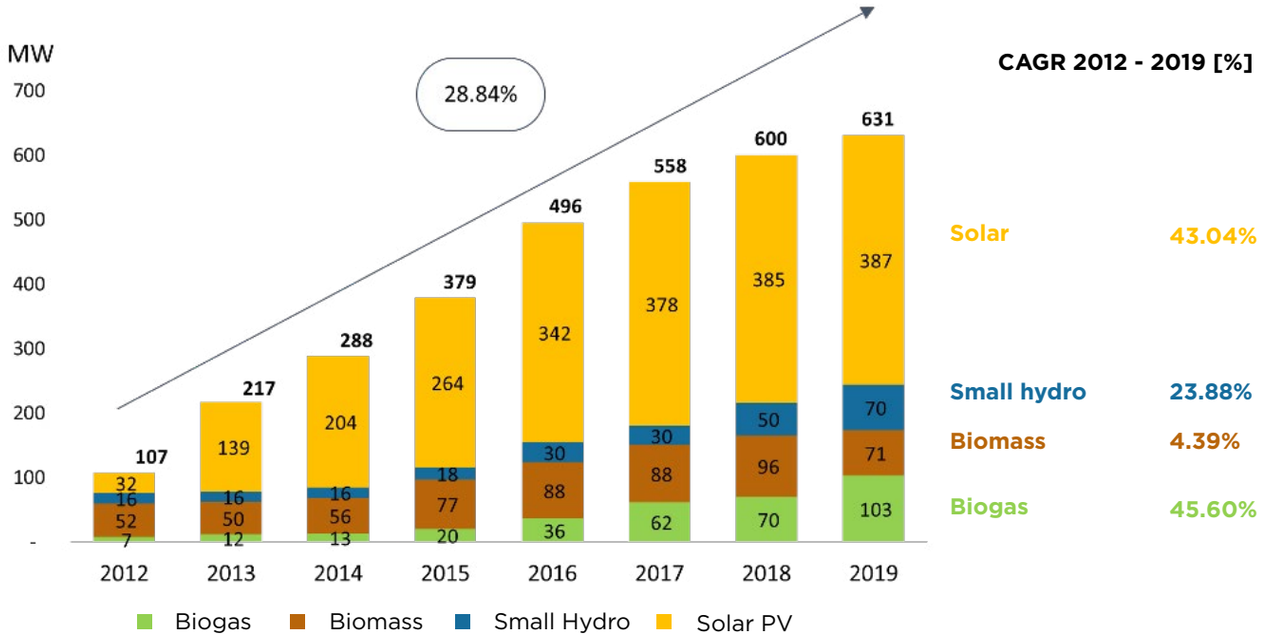
	Year								
Resources	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**CAGR (2012-2019)**
Solar PV	168.98	191.90	230.01	299.58	396.53	398.61	391.83	387.98	12.61%
Small Hydro	115.05	130.99	262.54	273.34	279.14	409.14	408.89	515.54	23.88%
Biomass	146.29	133.49	227.89	257.99	227.99	217.39	189.84	142.44	-0.38%
Biogas	20.53	26.13	99.69	141.53	165.08	166.54	148.47	197.64	38.19%
Total	**450.85**	**482.51**	**820.13**	**972.44**	**1,068.74**	**1,191.69**	**1,139.04**	**1,243.60**	**15.60%**

***Exhibit 12:** Cumulative installed RE capacity (MW) under FiT as end of 2019

*Active applications only: exclude surrendered and revoked applications. Figures in the bar chart rounded off to whole number.

Specifically, from 2012 to 2016, solar PV applications have the highest cumulative approved applications. The first significant drop in the capacity of the total approved solar PV applications was noticed post-2017 when the Authority discontinued quota release for solar PV.

Solar PV applications which have not achieved commercial operations to-date will be revoked by the Authority as they possess very little value due their exposure to degression rate which prompted FiAHs to surrender their solar PV applications.



	Year								
Resources	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**CAGR (2012-2019)**
Solar PV	31.58	138.67	203.86	263.87	341.69	378.41	384.62	386.93	43.04%
Small Hydro	15.70	15.70	15.70	18.30	30.30	30.30	50.30	70.30	23.88%
Biomass	52.30	50.40	55.90	76.70	87.90	87.90	95.55	70.65	4.39%
Biogas	7.41	11.73	12.83	20.23	35.69	61.76	69.94	102.76	45.60%
Total	**106.99**	**216.51**	**288.29**	**379.10**	**495.58**	**558.37**	**600.41**	**630.64**	**28.84%**

***Exhibit 13:** Cumulative installed RE capacity (MW) under FiT as end of 2019

* Active applications only: exclude surrendered and revoked applications. Figures in the chart rounded off to whole number for easy reference

Exhibit 13 illustrates the total installed RE capacity of applications which have achieved commercial operations as of end-2019. Although the total installed RE capacity under FiT has grown on a rate of 28.84% on a year-on-year (YoY) basis from 2012 to 2019 in terms of the absolute comparison, 50.72% (631MW out of 1,244MW) of total approved applications have achieved commercial operations.

As observed on the above graph, only 13.56% (70MW out of 516MW) of the small hydro and slightly more than half of the bioenergy applications have achieved commercial operations as of end-2019.

Nevertheless, almost all approved solar PV applications have achieved commercial operations by end-2019 – a clear indication of ease of deployment of solar PV projects.

The Authority endeavours to continue supporting the non-solar RE resources via various enhancements to the FiT schedule as mentioned in preceding sections. Additionally, the Authority has also started to engage private bankers to bridge the gap on the RE technologies and advocate a green financing framework with the financial regulators in Malaysia.

The lack of affordable financing options has been cited frequently by project developers as one of the main reasons why their projects could not advance to the next level beyond being granted the FiA.

Environmental Impact: Clean Energy Generation

Given its highest capacity installed among all the resources by the end of 2019, the cumulative energy generation from solar PV from 2012 to 2019 was recorded at 2,212.68 GWh or almost 40% of the total cumulative energy generation from the same period for all resources as illustrated in **Exhibit 14**.

However, it should be noted that the capacity factor for solar PV is only on average at 15% as compared with the non-solar resources which has an average capacity factor of 64% and above (at least four times higher than solar).

This explains that although the cumulative biomass' total installed capacity was much lower than the solar PV's, their difference in energy generation was only 512.15GWh (9.23%) for the same period.

	Resources				
Year	**Solar PV**	**Biomass**	**Biogas**	**Small Hydro**	**Total (GWh)**
2012	7.53	104.54	7.56	28.68	148.31
2013	54.42	220.55	23.77	79.05	377.80
2014	194.23	200.16	50.27	69.58	514.23
2015	277.48	246.73	63.34	56.66	644.21
2016	359.37	248.48	107.11	50.28	765.24
2017	424.03	247.21	216.33	75.55	963.12
2018	467.31	226.09	251.78	89.67	1,034.86
2019	428.31	206.76	274.70	190.15	1,099.91
Total (GWh)	**2,212.68**	**1,700.53**	**994.86**	**639.62**	**5,547.68**
% of Total	39.88%	30.65%	17.93%	11.53%	100.00%

***Exhibit 14:** Annual Energy Generation (GWh) from RE Projects (2012-2019)

* FiAHs achieving commercial operations close to year end of 2019 will not have their RE generation captured here. The true generation data for year 2019 will be fully reflective in Annual Report 2020

Based on the total RE generated, the total amount of CO_2 emissions displaced from the conventional fossil fuels plants for the period of 2012-2019 was 3,607,012.81 tonnes.

Corresponding to **Exhibit 15**, solar PV has displaced most of the CO_2 emissions at 41.83%, followed by the biomass, biogas, and small hydro RE resources at 27.66%, 18.47%, and 12.04% respectively.

	Resources				
Year	**Solar PV**	**Biomass**	**Biogas**	**Small Hydro**	**Total (tCO_2)**
2012	5,576.64	57,852.32	5,604.57	19,842.68	88,876.21
2013	40,378.71	119,903.53	17,637.78	54,004.36	231,924.39
2014	135,308.33	109,453.72	35,192.58	45,781.09	325,735.73
2015	190,713.10	140,879.94	41,689.84	37,906.51	411,189.40
2016	244,042.66	146,141.06	71,325.49	34,153.05	495,662.26
2017	286,681.51	152,952.48	143,359.60	50,512.81	633,506.40
2018	316,063.54	140,536.65	167,377.43	60,806.37	684,783.99
2019	290,046.80	129,881.95	184,127.34	131,278.34	735,334.44
Grand total (tCO_2)	**1,508,811.30**	**997,601.65**	**666,314.64**	**434,285.22**	**3,607,012.81**
% of Total	41.83%	27.66%	18.47%	12.04%	100.00%

*__Exhibit 15__: Annual Reduction of CO_2 (tCO_2) Emissions from RE Projects (2012-2019)

* FiAHs achieving commercial operation close to year-end of 2019 will not have their reduction of CO_2 emissions captured here. The complete generation data for year 2019 will be fully reflective in Annual Report 2020. The CO_2 coefficient used is based on grid electricity emission factor for 2012-2014 (https://www.seda.gov.my/statistics-monitoring/co2-avoidance/).

How significant is 3 million tonnes of CO_2 avoided release to the environment? **Exhibit 16** illustrates the magnitude of the impact. It is about the amount of CO_2 that 706,944 passenger vehicles drove in a year or other equivalence.

Exhibit 16: CO_2 emissions reduction – Visualised Positive Impacts to the Environment

Source: United States Environmental Protection Agency, https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator

Audit and site visit activities

a. FiAHs operating less than 35% of Declared Annual Availability ("DAA")

One of the roles of the Authority is to conduct performance audits on the FiAHs to ensure compliance with the conditions of the FiT rules. In 2019, the performance audit includes the check on FiAHs which have achieved less than 35% of the DAA.

The audit was operationalised by actual site visits commencing in 2019. The purpose of this exercise is to ensure all FiAHs are operating in optimum condition without any interruption to the grid system (**Exhibit 17**).

Each FiAH has to comply with Condition (H) of the Feed-in Approval that states the following provisions: "The Feed-in Approval Holder shall ensure that its renewable energy meets annual minimum performance threshold of no less than 35% of the declared annual availability for each year during effective period".

RE Resources	No. of Application	Total Capacity (MW)
Biogas	3	4.300
Biomass	1	7.000
Solar PV	3	0.224
Small Hydro	0	0.000
Total	**7**	**11.524**

Exhibit 17: Number of FiAHs by RE Resources that are Operating less than 35% of DAA in 2019

Findings from the site visit exercise were tabled to the Market Operations Committee Meeting (JKOP) with the non-performing FiAHs instructed to submit their mitigation plan and a quarterly report to the Authority.

The Authority's enforcement officer will monitor the performance of FiAHs' plants from time to time to ensure that plants operate in optimum condition (more than 35% of DAA).

Site visit was conducted at 40kW solar PV Installation on 12 December 2019

Jambatan Kedua Sdn Bhd, Seberang Prai Selatan, Penang

Site visit was conducted at 1.1MW biogas plant on 10 December 2019

Felda Palm Industries Sdn Bhd, Jempol, Negeri Sembilan Darul Khusus

A site visit was conducted at 7MW biomass plant on 2 October 2019

Biofuel Energy Resources Sdn Bhd, Rasa, Selangor Darul Ehsan

Photos from performance audits conducted in 2019

b. FIAHs' Compliance of S02 Bonus Tariff – Use of Building Materials

Another audit performed by the Authority includes inspections on FIAHs' compliance with the S02 Bonus as provided in the "Guidelines of Eligibility for Bonus S02 – Use as Building Material" for solar PV Applications under the Feed-in Tariff (FiT) Mechanism.

These inspections are for solar PV projects that are approved with such bonus qualification. A total of 94 site inspections were conducted by the Authority's enforcement officers in 2019. Out of the 94 sites inspected, 33 sites did not comply with the requirements. As a result of their non-compliance, the S02 Bonus was removed from their FiT rate and the FiAHs were given six months to comply with the requirements.

In addition to that, based on the outcome of the *Mesyuarat Ahli Pihak Berkuasa Pembangunan Tenaga Lestari (PBPTL) Bil. 1/2020 held on 14 January 2020,* it was decided that any appeal for reinstatement of the S02 Bonus will not be entertained after the bonus has been withdrawn the third time.

For the year 2020, the Authority has targeted 55 site visits for capacities of more than 72kW and 17 site visits for capacities greater than 24kW and up to 72kW.

Capacity: 425 kW
Activity: Warehouse

Amazing Paradigm Sdn Bhd, Klang, Selangor Darul Ehsan

Capacity: 425 kW
Activity: Warehouse

Smart Goldenway Sdn Bhd, Petaling Jaya, Selangor Darul Ehsan

Capacity: 135 kW
Activity: Parking Lot

Elegant Group Sdn Bhd, Subang Jaya, Selangor Darul Ehsan

Capacity: 425 kW
Activity: Parking Lot

Leaf Solar Sdn Bhd, Kulim, Kedah Darul Aman

Capacity: 1.0 MW
Activity: Futsal Court

Atlantic Blue Sdn Bhd, Pokok Sena, Kedah Darul Aman

Capacity: 425 kW
Activity: Aquaculture (Tilapia)

Aquaponics Energy Garden Sdn Bhd, Kuala Muda, Kedah Darul Aman

Capacity: 100 kw
Activity: Agriculture (Chili)

Cypark Suria (Pajam) Sdn Bhd, Seremban, Negeri Sembilan Darul Khusus

Audit on PV structures for S02 Bonus compliance

c. Acceptance Test & Performance Assessment (AT&PA) for Biogas Plants under FiT Programme

It is the responsibility of the Authority to ensure that all biogas installations approved are designed and constructed in accordance with prudent utility standards and best practices, while meeting minimum national safety standards for the protection of personnel and equipment.

The Acceptance Test and Performance Assessment (AT&PA) is a task to assess the plant performance in terms of its acceptability, reliability and efficiency prior to plant commissioning. In 2019, 15 biogas plants with a total installed capacity of 33.175MW were commissioned. The details are as below (**Exhibit 18**):

No.	Feed-in Approval Holder	Installed Capacity (MW)	Commercial Operational Date	Location	Source of Fuel
1	Concord Green Energy (Kilang Sawit Keratong)	1.501	7/2/2019	Kota Bahagia, Pahang	POME
2	Concord Green Energy (Kilang Sawit Adela)	1.800	29/6/2019	Kota Tinggi, Johor	POME
3	Concord Green Energy (Kilang Sawit Lok Heng	1.501	29/6/2019	Kota Tinggi, Johor	POME
4	Mistral Engineering Sdn Bhd	4.000	1/6/2019	Sandakan, Sabah	POME
5	KUB-Berjaya Energy Sdn Bhd	4.000	30/7/2019	Bukit Tagar, Selangor	Landfill Gas
6	Anson Oil Industries Sdn Bhd	1.202	8/8/2019	Teluk Intan, Perak	POME
7	Kim Loong Power Sdn Bhd	2.400	17/11/2019	Kota Tinggi, Johor	POME
8	Eng Hong Biogas Sdn Bhd	2.400	23/7/2019	Banting, Selangor	POME
9	Gan Teng Siew Realty Sdn Berhad	1.560	25/7/2019	Rantau, Negeri Sembilan	POME
10	GLT Bio Sdn Bhd	1.200	12/10/2019	Padang Serai, Kedah	POME
11	Cenergi FJP Sdn Bhd	1.501	10/11/2019	Jerantut, Pahang	POME

No.	Feed-in Approval Holder	Installed Capacity (MW)	Commercial Operational Date	Location	Source of Fuel
12	KS Green Energy Sdn Bhd	3.606	2/9/2019	Muar, Johor	POME
13	Future Atlas Sdn Bhd	2.404	3/12/2019	Taiping, Perak	POME
14	Biogas Sulpom Sdn Bhd	2.500	3/12/2019	Dengkil, Selangor	POME
15	Cenergi Tennamaram Sdn. Bhd.	1.600	15/12/2019	Bestari Jaya, Selangor Darul Ehsan	POME

Reference: POME = Palm Oil Mill Effluent

Exhibit 18: List of Biogas Plants Which Have Achieved Commercial Operation in 2019

Discussion during line walk at Concord Green Energy (Kilang Sawit Keratong)

The span for flowmeter reading unit is configured by the equipment supplier during AT&PA test

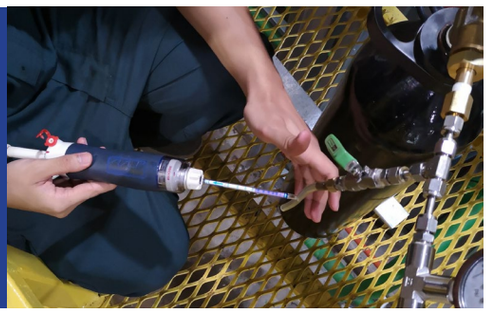
Explanation on plant operation during line walk at Biogas Sulpom Sdn Bhd

AT&PA procedure planning at Gan Teng Siew Realty Sdn Bhd

On-site gas sampling task at GLT Bio Sdn Bhd by accredited lab representatives (ERALab Sdn Bhd)

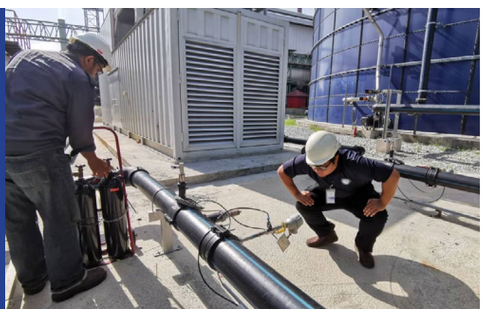
Monitoring plant operation through SCADA during AT&PA

On site gas analysing at KUB-Berjaya Sdn Bhd using Gastec/ Dragger Tube by accredited lab representative (ERALab Sdn Bhd)



Monitoring system's setting and operation during AT&PA

On-site gas flowmeter monitoring during electrical efficiency test at Biogas Sulpom Sdn Bhd to ensure gas flowrate can achieve suitable reading to determine biogas engine efficiency



Overall system of biogas at plant commissioned in 2019

Pictures of AT&PA activities

NET ENERGY METERING (NEM)

2.5MWp by Goodyear Malaysia Bhd under the NEM programme (Source credit: Goodyear Malaysia Bhd)

The Net Energy Metering (NEM) is a solar PV scheme implemented as an organic succession to the Feed-in Tariff (FiT) mechanism. The NEM scheme is intended to promote solar PV rooftop market and one of the strategies is to encourage greater RE deployment as meted out in the 11th Malaysia Eleventh (RMK-11).

The NEM is executed by the Ministry of Energy and Natural Resources (KeTSA) and regulated by the Energy Commission, with the Authority as the Implementing Agency which includes execution of NEM rules. The NEM is an approved 500MW five-year programme implemented since November 2016 and will end by 2020.

NEM 2.0

Effective 1st January 2019, NEM was enhanced by adopting the true net energy metering concept which will allow excess solar PV generated energy to be exported back to the grid on a "one-on-one" offset basis.

This means that every 1kWh of energy exported to the grid will be offset against 1kWh of energy consumed from the grid instead of at the prevailing displaced cost as in the original NEM 1.0.

This enhancement was made as a result of the feedback received from the PV industry on the need to change the concept of NEM from the existing net billing to true net energy metering. As such, this enhancement will help to improve the return of investment of solar PV projects under the NEM scheme while increasing monthly electricity savings.

The quota allocation for NEM is 500 MWac up to year 2020. NEM is divided into four categories which are Domestic/ Residential, Commercial, Industrial and Agriculture.

The revised NEM scheme is currently applicable to Peninsular Malaysia and applicants must be a registered TNB customer.

Key Statistics and Highlights Of 2019

NEM 2.0 is one of the key highlights of RE schemes that are made available in Peninsular Malaysia in 2019. Having evolved beyond the incentivising support of the FiT scheme, the solar PV market in Malaysia is gaining traction especially with the commercial and industrial sectors.

NEM 2.0 has improved from its previous compensation based on displaced cost to a true one-to-one energy offset mechanism which compensates surplus solar energy exported to TNB at the regulated retail electricity tariff.

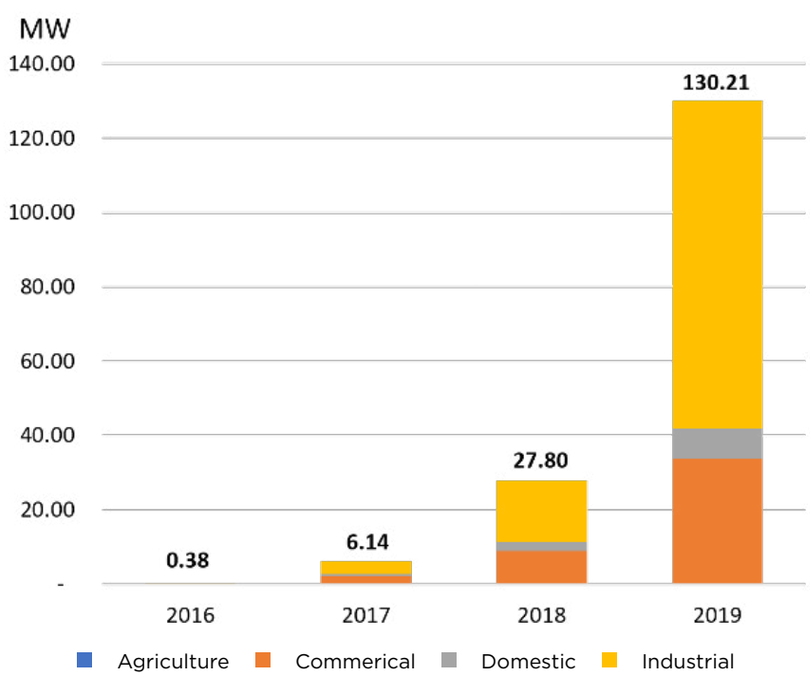
Categories	Year							
	2016		2017		2018		2019	
	No. of applications	Capacity (MW)	No. of applications	Capacity (MW)	No. of applications	Capacity (MW)	No. of applications	Capacity (MW)
Domestic	7	0.03	89	0.58	238	1.76	789	5.81
Commercial	5	0.02	26	2.10	86	6.68	302	24.65
Industrial	1	0.33	11	3.07	57	13.23	157	71.82
Agricultural	-	-	-	-	-	-	4	0.13
Total	**13**	**0.38**	**126**	**5.75**	**381**	**21.67**	**1,252**	**102.41**

*__Exhibit 19__: Annual NEM Applications and Capacity (MW) Approved (2016-2019)

* Active applications only: Exclude surrendered applications

Exhibit 19 shows the total number of NEM applications approved from 2016 to 2019. It can be observed that in 2019 alone, the total approved capacity of NEM 2.0 has increased 3.68 times at 102.40MW compared to NEM 1.0 which had only 27.80MW approved from 2016 to 2018.

This indicated that the right policy mechanism is pivotal to the success of RE adoption. The cumulative figures as of end-2019 are illustrated graphically in **Exhibit 20** to highlight the significance between the two mechanisms.



NEM 1.0: Displaced Cost Mechanism (2016-2018)
Total approved: 27.80MW

NEM 2.0: 1-to-1 Energy Offset Mechansim (2019)
Total approved: 102.41MW

3.68 times increase in take-up rate

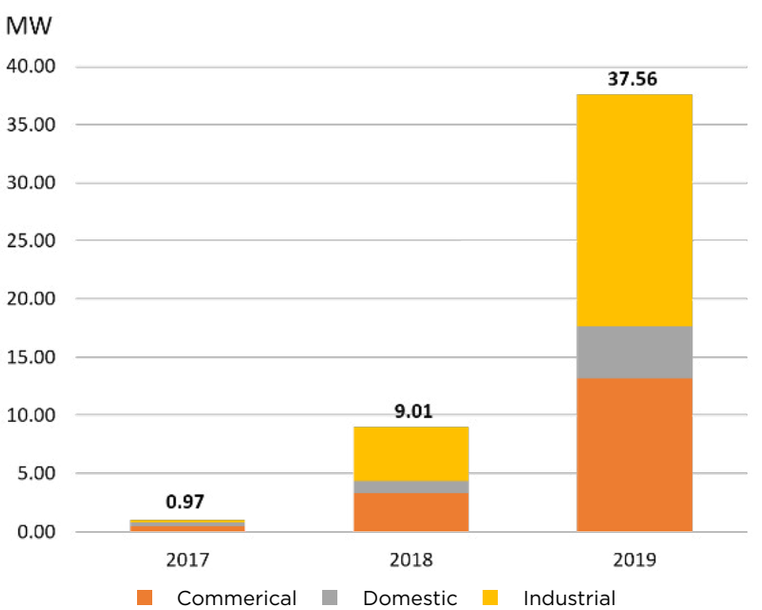
Categories	Year							
	2016		2017		2018		2019	
	No. of applications	Capacity (MW)	No. of applications	Capacity (MW)	No. of applications	Capacity (MW)	No. of applications	Capacity (MW)
Domestic	7	0.03	96	0.61	334	2.37	1,123	8.18
Commercial	5	0.02	31	2.11	117	8.80	419	33.45
Industrial	1	0.33	12	3.41	69	16.63	226	88.45
Agricultural	-	-	-	-	-	-	4	0.13
Total	**13**	**0.38**	**139**	**6.14**	**520**	**27.80**	**1,772**	**130.21**

*__Exhibit 20__: Cumulative NEM Capacity (MW) Approved as of End-2019

* Active applications only: Exclude surrendered applications

Out of the 130.21MW approved applications, close to a third of the applications or 37.56MW have achieved commercial operations as of end-2019 (refer to **Exhibit 21**). Approximately 90% of the installed applications were from the commercial and industrial tariff consumers as many of the applications were in the construction pipeline since 2017.

None of the applications from the agricultural tariff consumer have achieved commercial operations as of end-2019 as this category is newly introduced under the NEM 2.0 scheme.



Categories	Year					
	2017		2018		2019	
	No. of applications	Capacity (MW)	No. of applications	Capacity (MW)	No. of applications	Capacity (MW)
Domestic	46	0.28	150	1.07	608	4.42
Commercial	13	0.49	49	3.29	195	13.20
Industrial	1	0.20	24	4.65	88	19.94
Total	**60**	**0.97**	**223**	**9.01**	**891**	**37.56**

***Exhibit 21:** Cumulative NEM Capacity (MW) Installed as of End-2019

* Active applications only: Exclude surrendered applications

Exhibit 22 shows the breakdown of total awarded capacity by percentage according to purchase options. There are few available options for consumers to own a solar PV system: direct purchase via cash or bank loan (via RPVSPs), solar leasing or power purchase agreement (PPA) offered by RPVIs.

Based on the data collected in 2019, 96.5% of the total approved NEM capacity (130.21MW) was funded by traditional methods of debt financing (bank loan) and outright purchase. Globally, the world is moving towards owning a solar PV system without the high upfront cost via the solar leasing or PPA method. Malaysia is also moving towards the same direction by introducing both new purchasing options in 2019 via the RPVIs.

It was recorded that ~3.5% of total NEM capacity was awarded under the leasing and PPA options. The Authority foresees a rising trend for both leasing and PPA methods to own a solar PV system in the future especially among the commercial and industrial tariff consumers.

Purchase Option	Paradigm	Breakdown of Total Awarded Capacity by % According to Purchase Option*
Bank Loan	Traditional	34.%
Outright/Direct Purchase		62.5%
Solar Leasing	New	3.5
Solar PPA		
Total		**100.00%**

Exhibit 22: Breakdown of Total Awarded Capacity by % According to Purchase Option

* Data is accurate as of end-2019 based on declaration by consumers

Awareness Activities

As part of the on-going efforts to promote NEM awareness, a briefing session on NEM 2.0, solar PV Investor Directory, and Supply Agreement with Renewable Energy (SARE) was held on 18 March 2019 in Putrajaya.

The briefing was attended by more than 300 participants. Besides creating awareness on the newly-enhanced NEM mechanism, the briefing included the various purchase modes available for customers. Outright purchases can be made with cash or through loans.

While outright purchasing model for rooftop solar has been the norm since the start of the NEM scheme, 2019 saw new business models for the behind-the-meter PV applications. These are the solar leasing and power purchase agreement (PPA) models.

The leasing model is much like a car-hire purchase in which the customers pay fixed instalments for a period of time and then they own the PV system at the end of the leasing period. For the PPA model, the customers only pay for the energy generated by the PV system at an agreed rate for a specific period of time.

The benefit of these models is that the agreement can be structured, hence there is zero upfront cost to the customers. To reduce counter-party risk of the PV investors, TNB via its subsidiary, TNBX Sdn Bhd, introduced a new product which included an integrated billing system under SARE.

Exhibit 23 shows a list of awareness programmes on NEM which involved the participation of the Authority as speaker with various stakeholders. These engagements which include the financial institutions, government and private sectors were essential to develop a sustainable eco-system needed to support a nascent solar PV rooftop market.

Programme	Venue	Date	Participants
RE Workshop in Collaboration between the Authority and CIMB	Menara CIMB, Kuala Lumpur	29 January 2019	CIMB's staff
Forum Bandar Hijau Rendah Karbon Putrajaya 2019	Putrajaya	29 January 2019	Government servants; Putrajaya's local residents
MPIA Solar National Roadshow 2019	Georgetown, Penang	2 May 2019	Industry player; public
MPIA Solar National Roadshow 2019	Alor Setar, Kedah	25 June 2019	Industry player; public
Cleantech Solar & FMM Talks	Johor Bahru	28 June 2019	FMM's members
MPIA Solar National Roadshow 2019	Bandaraya Melaka, Melaka	2 July 2019	Industry player; public
Briefing on Green Technology Incentives	Jewels Hotel, Kota Bharu, Kelantan	2 July 2019	Manufacturing and services companies
Briefing on Green Technology Incentives	Grand Puteri Hotel, Kuala Terengganu, Terengganu	3 July 2019	Manufacturing and services companies
IRDA Seminar on Green Energy for Industry Players	Hotel Renaissance Johor	1 August 2019	GTALCC Stakeholders and public
Karnival Minggu Sains Negara	Pustaka Raja Tun Uda, Perbadanan Perpustakaan Awam Selangor (PPAS), Shah Alam	4 August 2019	Public
MPIA Solar National Roadshow 2019	Kuantan, Pahang	20 August 2019	Industry players; electricity consumers
Briefing on Green Technology Incentives organised by MIDA	Klana Resort Seremban	21 August 2019	Manufacturing and services companies
HSBC Smart Financing Roadshow	Penang	5 September 2019	Bankers; financial institutions
HSBC Smart Financing Roadshow	Melaka	12 September 2019	Bankers; financial institutions
HSBC Smart Financing Roadshow	Kuala Lumpur	18 September 2019	Bankers; financial institutions

Programme	Venue	Date	Participants
Seminar on Malaysian Standard: Recommendation for Small RE and Hybrid System & Rural Electrification	Concorde Hotel, Shah Alam	18 September 2019	Industry players
MPIA Solar National Roadshow 2019	Thistle Hotel, Johor Bahru	24 September 2019	Industry player; public
IEM_EETD – SEDA - Sime Darby Seminar	Wisma IEM, Petaling Jaya	1 October 2019	Industry players; IEM members
Malaysia South-South Association (MASSA)	Putrajaya	12 November 2019	MASSA members
Malaysian Rubber Glove Manufacturers Association (MARGMA)	Putrajaya	27 November 2019	MARGMA members
FMM Energy Efficiency & Conservation 2019	Kuala Lumpur	28 November 2019	FMM members

Exhibit 23: List of Speaking Engagements to Promote NEM in 2019

NEM Calculator

On 14 May 2019, the Authority launched a NEM calculator which provided the public a means to estimate their capital investment and the return for their rooftop PV system investment. The calculator provides an estimated solar PV capacity, minimum upfront cost of investment, monthly electricity savings, simple payback and impact on environmental indicators (such as CO_2 emission avoidance).

The calculator is applicable for all NEM categories under TNB customers. If viewers are keen to go for outright purchase, they can click on the outright purchase button, and the website will direct them to a directory of registered PV service providers who carry out PV installations for the viewers.

Alternatively, if viewers are keen to go for leasing or power purchase agreement (or PPA) mode, they can click on the leasing button and the website will bring them to a separate directory of PV investors who can provide such services (see **Exhibit 24**). The NEM Calculator is accessible at **https://services.seda.gov. my/nemcalculator/#/**.

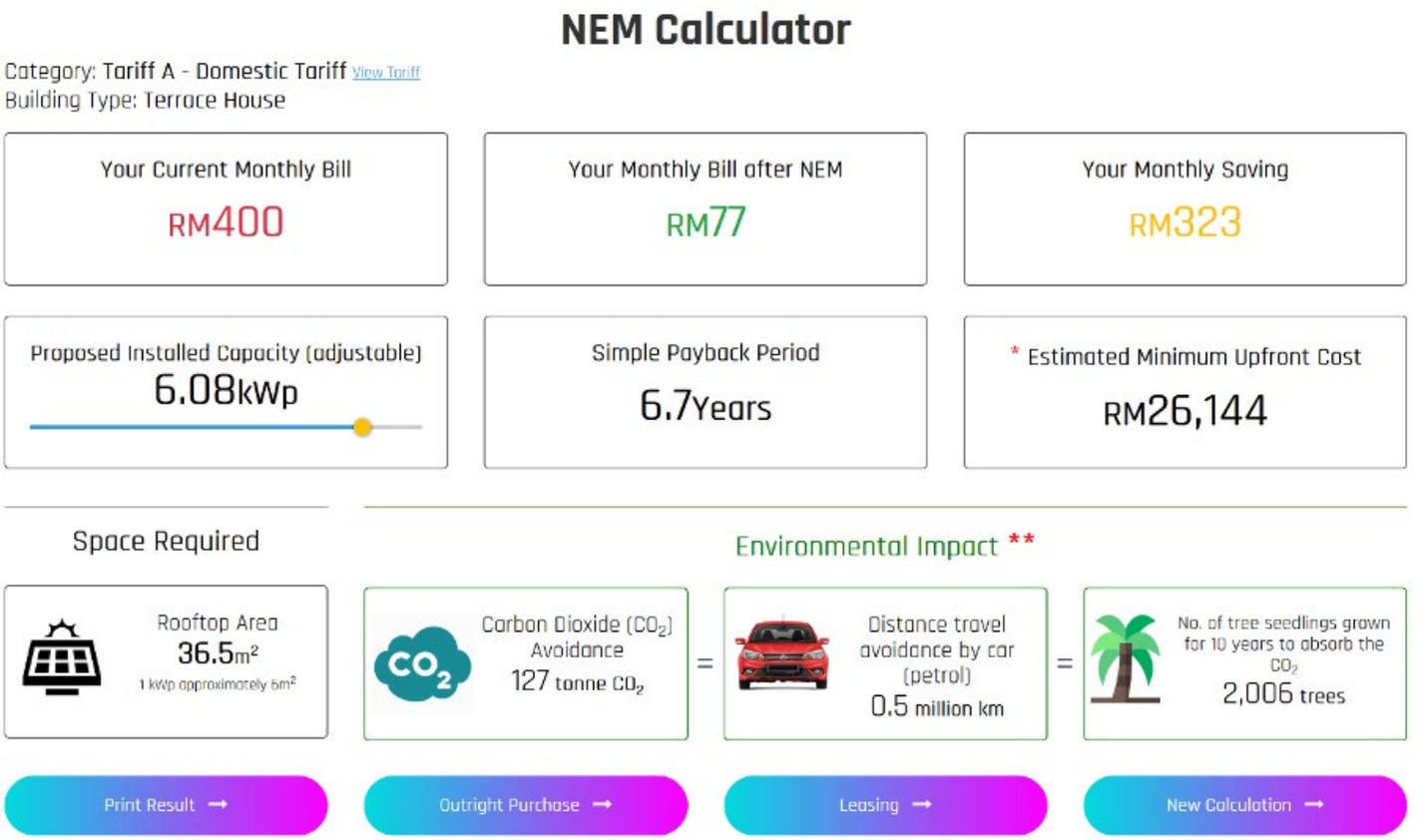


Exhibit 24: Snapshot of the NEM Calculator @ Authority's Website

NEM for Property Developers

In August 2019, the Authority launched a provision for property developers to secure NEM quota for their projects which are new or still under construction. These initiatives are to drive the solar PV market among property developers.

The main requirements set out for the application are as follows:

- Interested property developers must be incorporated in Malaysia and applicable for residential, commercial and industrial types of development;
- Property developer is required to submit the approved Development Order plan by the Local Authority;
- All the applications must be made before 31 December 2020 with proof of development order by the local authority attached as a supporting document;
- The project's allowable time frame is up to a maximum of 30 months from the project's commencement date;
- There is a performance bond that goes with the application;
- The pre-conditions include a requirement for the NEM Assessment Study (NEMAS) to be carried out if the total installed PV capacity exceeds 72kW;
- The NEM application shall be carried out by a Registered PV Service Provider (RPVSP)/Electrical Contractor; and
- The NEM approval holder is under the developer's name. The NEM quota will be allocated based on the developer's project status – Residential, Commercial and Industrial (SME building).

The NEM Quota Reservation for Property Developers Launched in 2019

Registered PV Directories

Part of the Authority's role is to develop a conducive business and sustainable eco-system to support the RE market. In the PV sector, the Authority has established two directories to serve the PV industry.

The Registered PV Service Providers (RPVSP) online directory which was initiated back in 2014 acts as a one-stop information center for interested parties to view the list of RPVSPs recognised by the Authority.

Since then, this directory has established its legitimacy; this was reflected in the widespread acceptance by other government agencies/corporate bodies/organisations who referenced this platform for their tender requirements.

Interested local solar PV companies who are registered with the Companies Commission of Malaysia under the Companies Act 2016 [Act 777] with competent personnel can apply to be an RPVSP.

Once approved, they can participate in projects under the FiT and NEM schemes. In 2019, the Authority recorded 128 companies that were successfully registered via the online RPVSP directory (**Exhibits 25** and **26**).

Starting 2020, all RPVSPs have to go through an interview session as part of the renewal process. The key objectives of this interview session are to explain the new feature of market categorisation (domestic, commercial, industrial, agriculture & others) and the criteria the RPVSPs need to fulfil in order to maintain these categories.

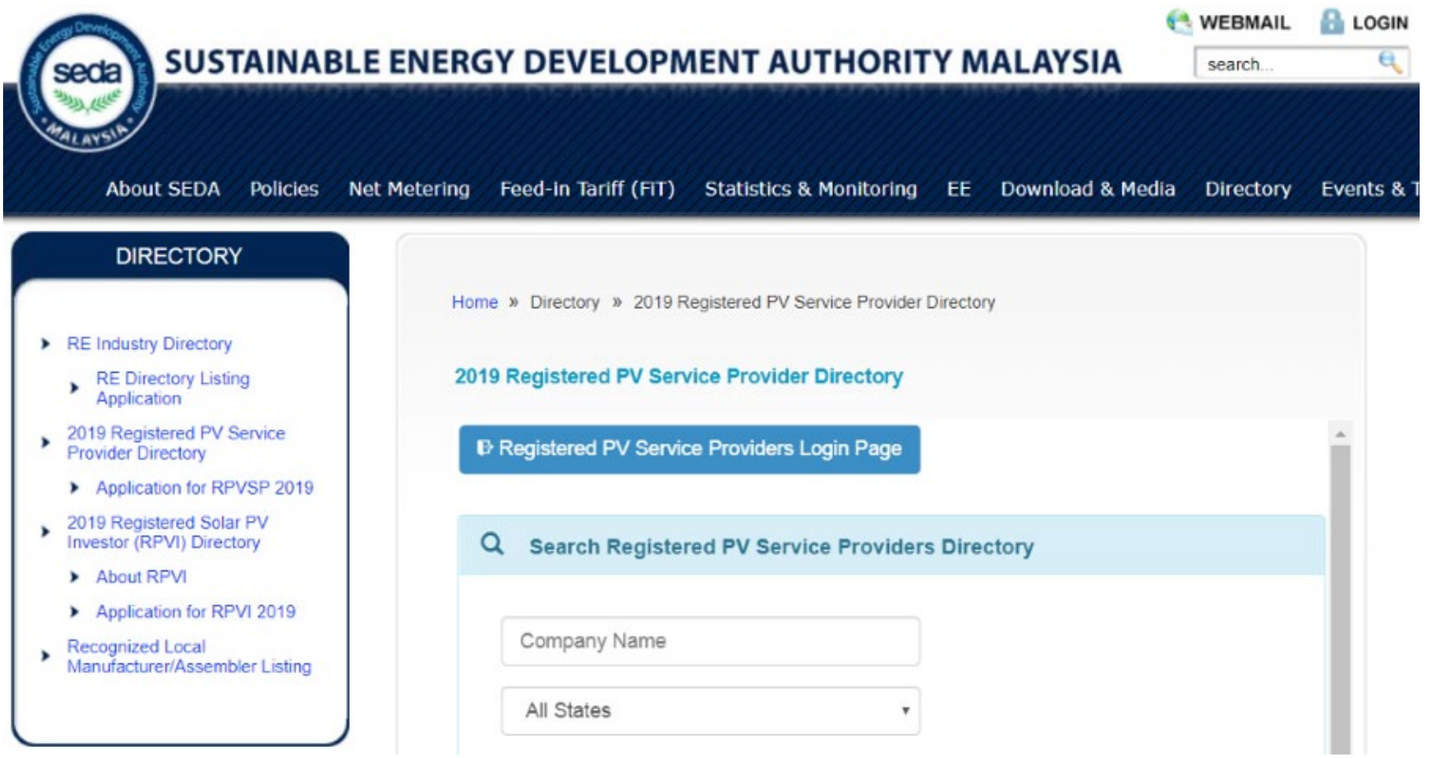


Exhibit 25: Snapshot of the Registered PV Service Providers (RPVSP) Online Directory 2019

Number of Registered PV Service Providers (RPVSPs)

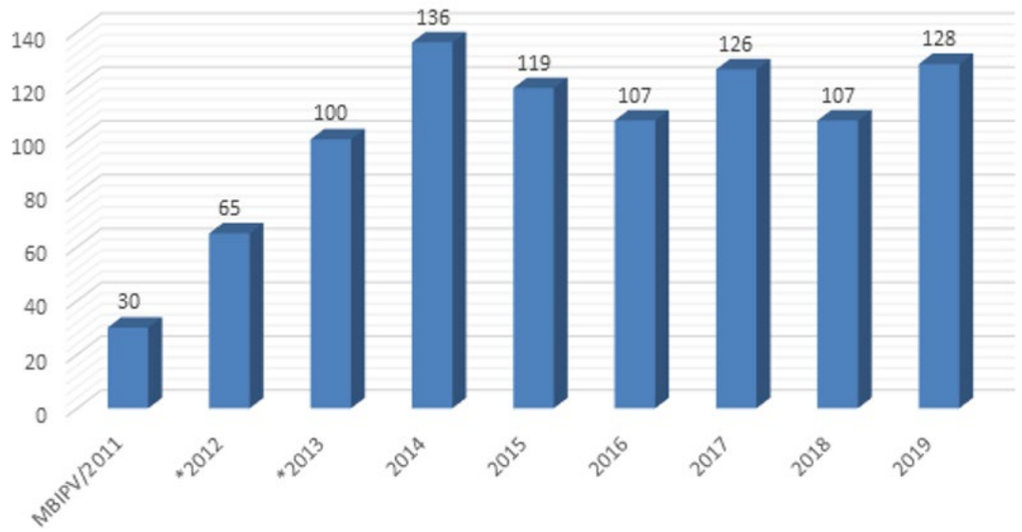


Exhibit 26: Annual Registered PV Service Providers (RPVSPs)

In 2019, the Authority established a new directory for the Registered PV Investors (RPVI). These are the companies which provide solar leasing/PPA options for their customers. This initiative is seen as a new business option for interested companies to invest in solar PV without having to provide upfront capital investment.

As of end-2019, the Authority recorded 62 companies that successfully registered themselves via the online RPVI directory. Monthly payment for solar leasing/PPA can be made either directly by customers to their RPVI or via TNB's integrated billing system incorporating payment from customers to their RPVI through the Supply Agreement for Renewable Energy (SARE) (**Exhibit 27**).

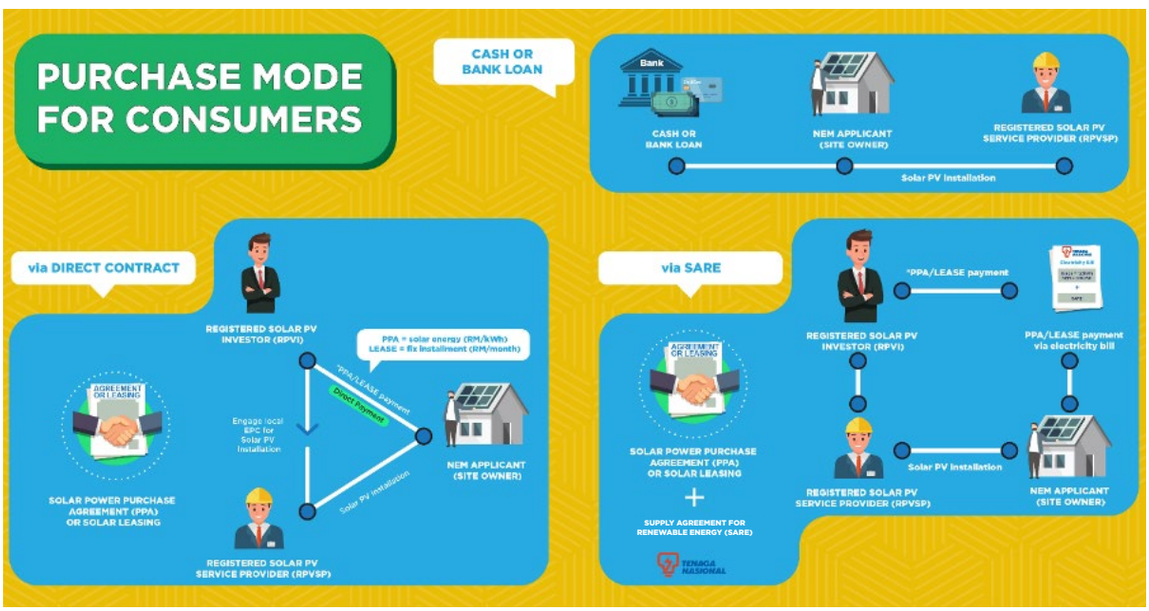
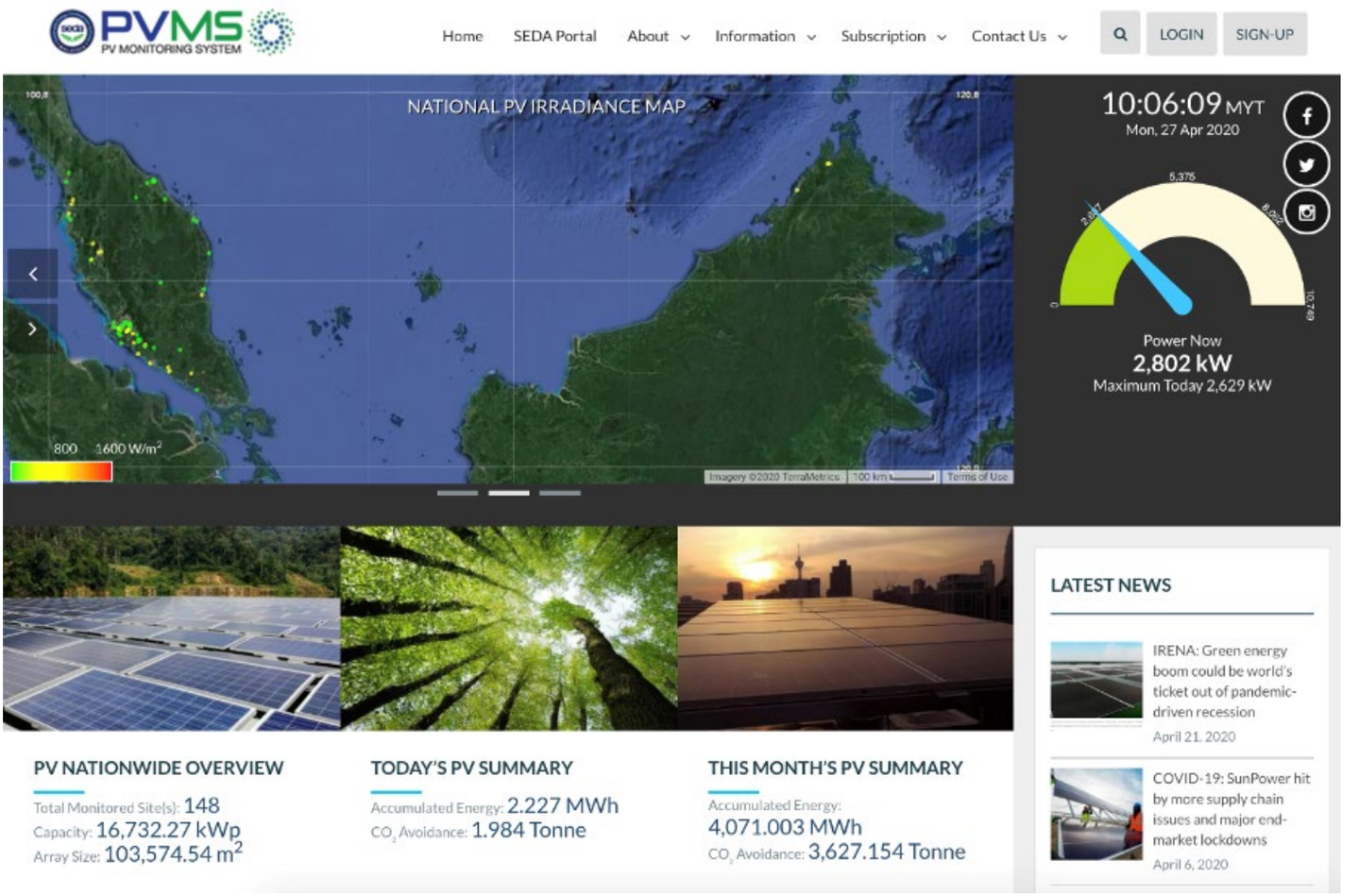


Exhibit 27: Purchase Modes available for NEM

National PV Monitoring System (PVMS)

The National PV Monitoring & Performance Database via PV Monitoring System (PVMS) is an initiative to monitor selected grid-connected solar PV systems for their performance and reliability.

The PVMS was officially launched in October 2018. This PVMS is the first of its kind in ASEAN region where real-time and historical performance database of solar PV installations such as performance ratio, specific yield, weather data (irradiance, PV module temperature, ambient temperature) are made available for public subscription.



Snapshot of the PVMS @ pvms.seda.gov.my

In 2019, an additional 28 grid-connected solar PV systems with total capacity of 813.96kWp were connected to this PVMS (**Exhibit 28**). These 28 systems included the existing 26 installations from the Government Lead by Example (GLBE) project and two new installations from Pangsapuri Rumah Selangorku project and the Authority's office (16kW).

As of 31 December 2019, a total of 148 grid-connected solar PV systems (system sizes of up to 1MW capacity) throughout Malaysia are being monitored. These systems include PV installations on residential, commercial, industrial, community and government buildings. **Exhibits 29** and **30** analysed the breakdown of these 148 sites.

Both the data and system performance analysis are available for subscription at an affordable rate as it is meant to provide PV system performance in Malaysia to interested parties especially researchers from local and international institutions. In 2019 alone, about 54 reports were subscribed by both the systems installers/industry as well as universities/research institutions. The database will become the reference for the good design and practice of PV systems installations in Malaysia.

No.	Site Name	Installed Capacity (kWP)	Building Type	District
1	Perbadanan Putrajaya	24.44	Government	Putrajaya
2	Jabatan Akauntan Negara Malaysia (ANM)	20.28	Government	Putrajaya
3	Kementerian Kewangan	42.64	Government	Putrajaya
4	Jabatan Kastam Diraja Malaysia	40.04	Government	Putrajaya
5	Bahagian Pinjaman Perumahan (LPPSA)	30.16	Government	Putrajaya
6	Kementerian Wilayah Persekutuan	24.44	Government	Putrajaya
7	Jabatan Pendaftaran Negara	20.28	Government	Putrajaya
8	Bahagian Hal Ehwal Undang Undang	48.36	Government	Putrajaya
9	Kementeran Pertanian & Industri Makanan	24.44	Government	Putrajaya
10	Kementerian Belia & Sukan	30.16	Government	Putrajaya
11	Kementerian Tenaga Dan Sumber Asli	30.16	Government	Putrajaya
12	Kementerian Perdagangan Dalam Negeri Dan Hal Ehwal Pengguna	20.28	Government	Putrajaya
13	Kementerian Perusahaan Perladangan dan Komoditi	20.28	Government	Putrajaya
14	Kementerian Sains, Teknologi dan Inovasi	20.28	Government	Putrajaya
15	Jabatan Perkhidmatan Awam	24.44	Government	Putrajaya
16	Jabatan Kerja Raya	20.28	Government	Putrajaya
17	Kementerian Tenaga, Sains, Teknologi, Alam Sekitar & Perubahan Iklim	48.36	Government	Putrajaya
18	Kementerian Pendidikan Malaysia	20.28	Government	Putrajaya
19	Kementerian Kesihatan Malaysia	20.28	Government	Putrajaya
20	Jabatan Kemajuan Islam Malaysia	24.44	Government	Putrajaya

No.	Site Name	Installed Capacity (kWP)	Building Type	District
21	Kementerian Pembangunan Wanita, Keluarga & Masyarakat	20.28	Government	Putrajaya
22	Kementerian Pembangunan Luar Bandar	24.44	Government	Putrajaya
23	Kementerian Perumahan Dan Kerajaan Tempatan	12.48	Government	Putrajaya
24	Kementerian Pelancongan, Seni Dan Budaya	30.16	Government	Putrajaya
25	Institut Kanser Negara	70.40	Hospital	Putrajaya
26	Jabatan Kerja Raya Kuala Lumpur	35.88	Government	Kuala Lumpur
27	Galeria PjH (The Authority's Office)	16.00	Government Agency	Putrajaya
28	Pangsapuri Rumah Selangorku	50.00	Residential	Puchong
	Total	813.96		

Exhibit 28: List of Additional 28 PV Systems Added to PVMS in 2019

Analysis of 148 PV systems being monitored by PVMS:

a. By Category

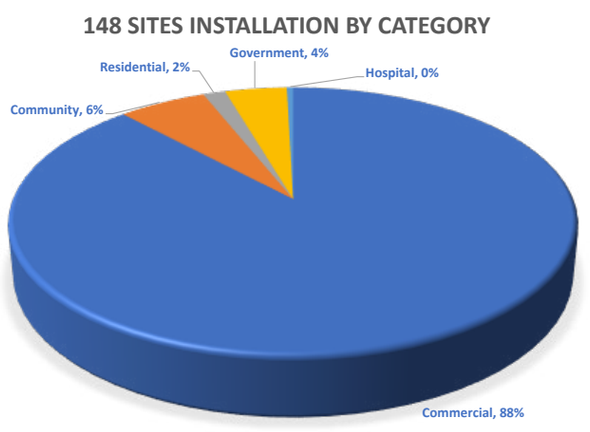


Exhibit 29: Categories of PV Systems Monitored by PVMS

b. By State

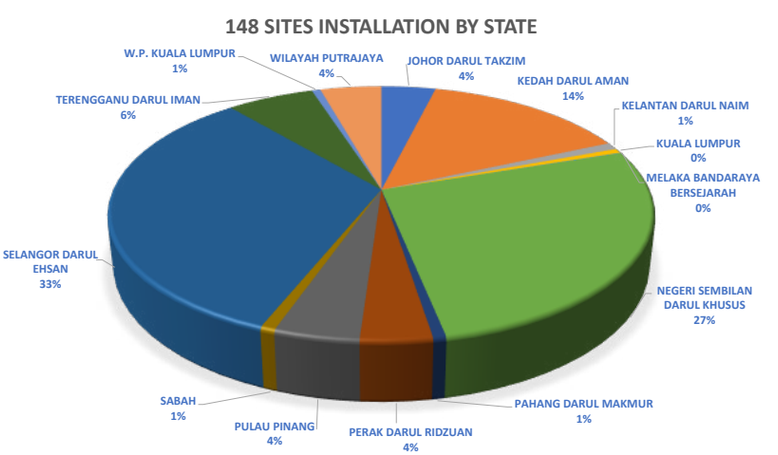


Exhibit 30: Breakdown of PV Capacity Monitored by State under PVMS

TECHNICAL DEVELOPMENT AND FACILITATION

Notable speakers during Seminar on Awareness Toward Zero Energy Building (ZEB) which was held on 28 February 2019

Energy Audit Conditional Grant (EACG) for Commercial Sector (RMK-11)

The Energy Audit Conditional Grant is an energy efficiency (EE) programme under the 11th Malaysia Plan (RMK-11). This programme is supported by grants which were allocated from 2016 until 2018 to commercial building owners/operators to collaborate with local Energy Service Companies (ESCOs) registered with the Energy Commission (EC) to conduct energy audit in their buildings.

This programme is executed by the then-Ministry of Energy, Science, Technology, Environment and Climate Change (MESTECC) with the EC as the Secretariat. The Authority is the implementing agency for the commercial building sector whereby applications for the grant are verified by the Technical Committee which is chaired by the EC and approved by the Steering Committee which is chaired by the then-MESTECC.

A total of RM8 million was channelled in stages for the implementation of the whole programme in accordance with the financial procedure and ceiling allocation approved for the Authority for the three-year quota involving 109 buildings which were under the commercial electricity tariff.

The grant can only be used by the recipients to cover the cost of energy audits of their buildings under the condition that the building owners agree to implement the EE measures recommended in the energy audit report to achieve energy saving efficiency.

The purposes of the programme are:

- To raise awareness for building owners on the importance of performing energy audit as part of EE and sustainability measures. Energy audit is a systematic process to understand how and where energy is used, to explore how to manage it and to identify potential energy savings;
- To ensure that energy savings are achieved through the implementation of energy savings measures proposed in the energy audit report, in accordance with the grant agreement.
- Collection of energy consumption data that can be used as benchmarks and monitoring of national energy consumption patterns.
- Raising awareness of potential energy savings and electricity costs in the commercial sector to further promote energy efficient practices at every level of management.
- In preparation and availability of the owners and management of buildings to emphasise the aspects of energy management efficiently before the Energy Efficiency and Conservation Act is enforced in the future.
- To attract financial institutions to finance energy efficiency projects.

Promotional efforts conducted from time-to-time nationwide between 2016 and 2018 yielded results as reflected in **Exhibit 31**. Most applications are from Kuala Lumpur and Selangor. This is because most commercial energy-intensive buildings are located in the Klang Valley.

Exhibit 32 provides the breakdown of building by sectors that falls under the commercial electricity tariff classification and qualified applicants with monthly electricity consumption of not less than 100,000kWh.

Most of the recipients are from the private hospital, office, mall and education institutional building sector of which some of the installations also fall under the Efficient Management of Electrical Energy Regulations (EMEER) 2008.

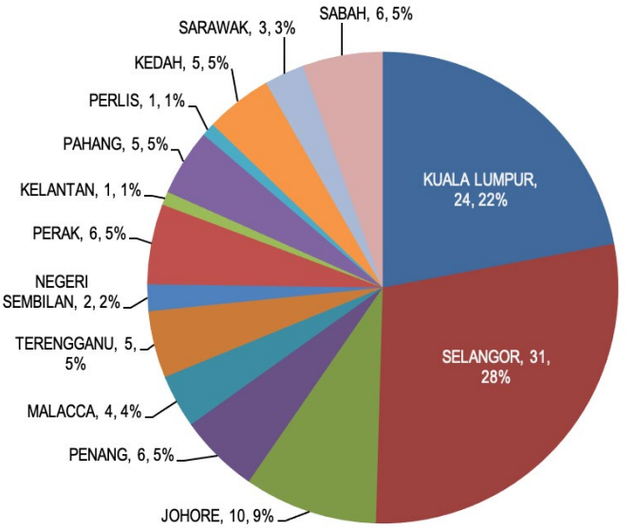


Exhibit 31: Breakdown of EACG Approved by State

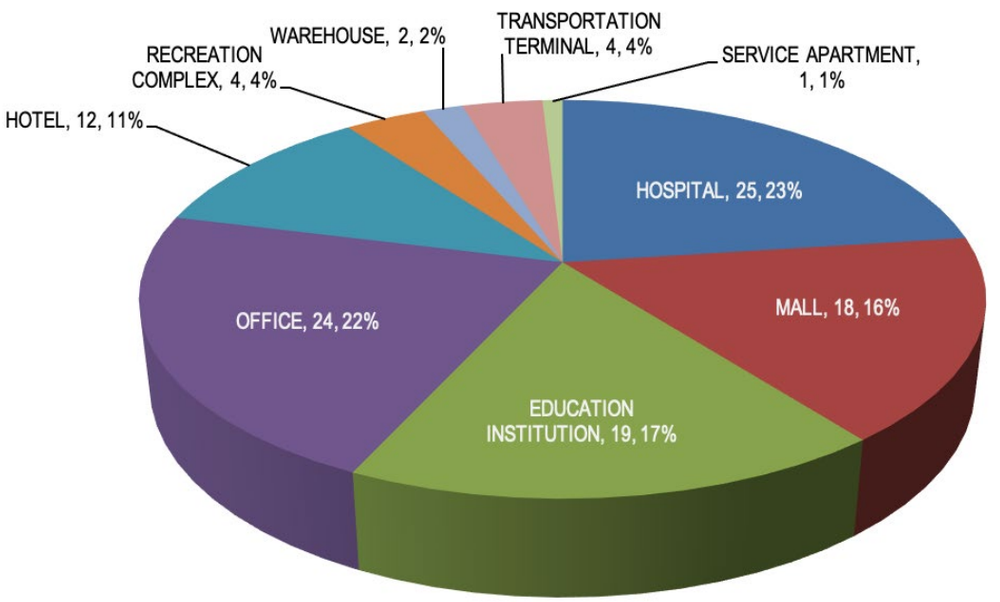


Exhibit 32: Breakdown of Grantees by Sector

In the submitted energy audit report, the energy service companies (ESCO) will propose an action plan for the implementation of a three-year Energy Saving Measures (ESMs) by the building owner in accordance with the terms of the grant.

These ESM are steps that need to be taken to achieve energy savings. The proposed ESMs come at no cost, medium-cost and high-cost in terms of investment requirement to implement them.

Exhibit 33 shows some ESMs which have been implemented on buildings such as retrofitting the lighting system by changing from non-energy efficiency lighting – e.g. Compact Fluorescent Lighting (CFL) – to the high energy efficiency type of lamp such as Light Emitting Diode (LED) which contributes to significant energy savings for large quantities retrofitting. Such ESM can be considered as low/medium-cost implementation.

Operational control usually involves no cost, for example, rescheduling the timing of air-conditioner operation at the most optimal consumption period and temperature setting. The rest is to upgrade energy-inefficient equipment to high energy efficiency equipment that partially requires high cost investment, but nevertheless will provide more benefits in energy and cost savings on the longer term as in the case of an air-conditioner system.

Other ESMs refer to raising awareness among the building management, workers and consumers to put into practice energy efficiency behaviours as well as in the maintenance aspect of equipment and operation of the building which also contribute to energy saving.

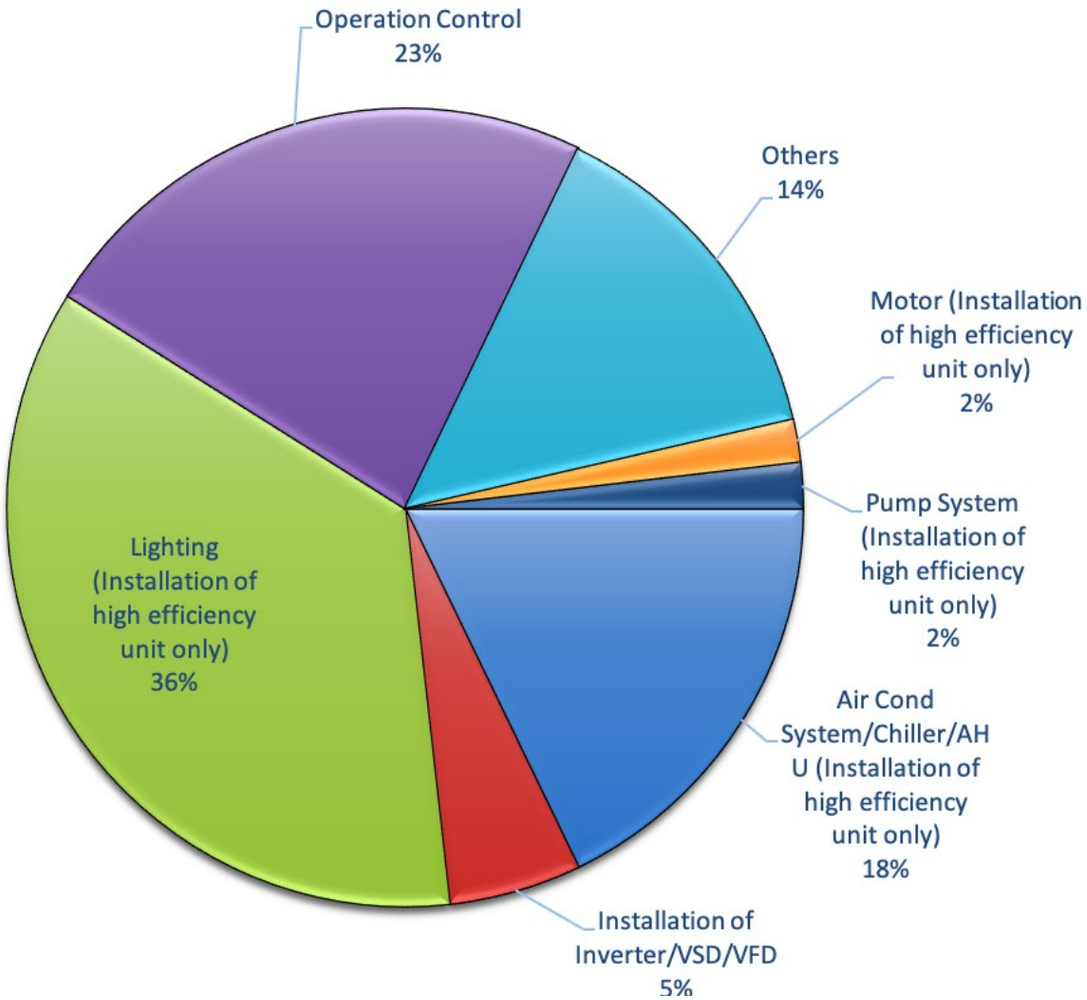


Exhibit 33: Breakdown of Energy Saving Measures (ESM)

Based on the implementation of ESM in 2019, the cumulative energy saving achieved was 42.2GWh based on electricity bills for 87 buildings. The Authority will continue to monitor the implementation of energy savings with the hope that building owners will continue to place emphasis on energy saving.

In appreciating and motivating those who have implemented ESMs and achieved energy savings, The Authority will award Sustainable Energy Low Building Assessment GreenPASS certification to those who demonstrate energy savings achievements.

The GreenPASS assessment certification is a voluntary and free-of-charge initiative by The Authority to motivate sharing of energy savings data and recognise any effort by building owners who have successfully achieved energy reduction through sustainable energy methods.

The assessment is based on the by the Construction Industry Standard (CIS 20) developed by the Construction Industry Development Board (CIDB) in 2014 that leverages the Common Carbon Metric by the United Nations Environment Protection Sustainable Building & Climate Initiative (UNEP-SBCI).

Green Technology Application for The Development of Low Carbon Cities (GTALCC)

The climate crisis is upon us. Cities and local government across the globe are heeding the call to act. With nations working towards the goals of the Paris Climate Agreement 2015, cities' involvement could not be more urgent.

The on-going GTALCC project started in mid-2017 and currently in its final year of implementation. It is expected to be concluded in the second half of 2021. GTALCC is a partnership between the United Nations Development Program (UNDP Malaysia), Global Environment Facility (GEF), Government of Malaysia and then-MESTECC as the lead ministry with the Authority as the project management consultant for implementation. The GTALCC project's main objective is to remove the barrier towards low carbon urban planning and development through policy support, awareness and capacity development, and investment on low carbon solutions for cities.

The total allocation for the project over 5 years is USD4.3 million. For the year 2019, a total of US$628,742.19 was spent on various initiatives and programmes under the three components of policy support for integrated low carbon urban environment, awareness and institutional capacity development and low carbon technology investments in cities.

Another US$279,003.89 was committed for on-going activities that flow into the year 2020. Overall, the GTALCC project organised and participated in a total of 27 events throughout the year 2019. These events include workshops, key stakeholder meetings, focus group discussion, conferences, seminars, forums and exhibitions.

The most notable event was the National Planning Congress 2019 hosted by the City of Putrajaya. The annual congress for town planners in Malaysia was organised by Malaysian Institute of Planners and Putrajaya Corporation.

Visit by His Majesty to the GTALCC's Booth @ National Planning Congress

The GTALCC's booth was graced by His Majesty Seri Paduka Baginda Yang di-Pertuan Agong Al-Sultan Abdullah Ri'ayatuddin Al-Mustafa Billah Shah ibni Almarhum Sultan Haji Ahmad Shah Al-Musta'in Billah, accompanied by YB Minister of Federal Territories, Director General of PLANMalaysia, President of Putrajaya Corporation and President of Malaysian Institute of Planners.

Other key events included the Seventh Asia Pacific Urban Forum (APUF-7) in Penang; the Malaysia Urban Forum (MUF) 2019 in Kuala Lumpur; the 10th International Green Technology & Eco Products Exhibition & Conference Malaysia (IGEM 2019) in Kuala Lumpur; the Penang International Green Conference and Exhibition (PIGCE); the Iskandar Malaysia Eco-Life Challenge (IMELC) 2019 in Johor Bahru; and the National Planning Congress 2019 in Putrajaya.

Additionally, the GTALCC project sponsored and participated as an exhibitor at APUF-7 that was staged at the Setia SPICE Convention Centre in Penang from 15-17 October 2019. The National Project Manager spoke about climate change and the role of cities and city dwellers in reducing their carbon footprint.

GTALCC's Participation at the 7th Asia Pacific Urban Forum

The GTALCC booth was graced by the visit of Minister of Ministry of Housing and Local Government (KPKT), YB Puan Hajah Zuraida Kamaruddin, and YB Phee Bon Poh, Penang State EXCO for State Welfare, Caring Society and Environment.

GTALCC @ the Iskandar Malaysia Eco-Life Challenge (IMELC)

The 2019 edition of the Iskandar Malaysia Eco-Life Challenge (IMELC) was one of the annual events supported by GTALCC since 2017. IMELC is a school awareness programme on energy savings and circular economy jointly organised by Iskandar Regional Development Authority (IRDA) and Universiti Teknologi Malaysia (UTM).

IMELC 2019 garnered the participation of 475 primary schools in Johor involving 47,000 students. The event achieved carbon emission reduction of 908,405 kilograms, RM116,092 of savings from energy and water usage, and RM42,102 of income from recycling and upcycling efforts by school students.

The final competition involved 16 schools and Component Manager 2 was one of the members of the judging panels. Ir. Dr. Sanjayan Velautham, CEO of the Authority, was one of the guests-of-honour during the prize presentation ceremony.

For 2019, a total of 14 dedicated workshops involving 768 participants were held in partnership with cities and the various stakeholders. Gender-wise, male participants totalled 429 while their female counterparts totalled 339.

The monitoring of gender participation is in support of the gender inclusiveness effort in line with UNDP's global agenda.

Workshops led by the GTALCC team

In 2019, the GTALCC project team developed the National Low Carbon Cities Masterplan (NLCCMP). The NLCCMP is developed as a policy framework on low carbon integrated development for all levels of the government.

The Masterplan shall address the barriers to low carbon pathways in Malaysian cities. Several focus group discussions and stakeholder engagements were held throughout the year to solicit input and feedback during the development of this document.

Around 200 participants from various federal ministries, federal agencies, state government, local authorities, professional bodies, think tanks, academicians and NGOs participated in the focus group discussions and stakeholder engagements.

The National Low Carbon Cities Masterplan

Exhibit 34 provides an overview of the 3M approach introduced by the NLCCMP – Measurement, Management and Mitigation – as strategies for cities to transition towards becoming low carbon cities. The strategic framework of the NLCCMP consists of three Key Drivers, three Key Enablers, nine Key Directions and 24 Key Actions.

The focus sectors of the NLCCMP are Spatial Planning and Development, Energy, Transportation and Waste. A total of 33 cities have been identified in this document to achieve carbon neutrality in phases from 2050-2060.

Exhibit 34: The 3M Approach Introduced by NLCCMP

No.	Activities	About the Activity
1	Green Energy for Industry Players	Seminar on green energy for industry players under the Pasir Gudang Transformation Programme.
2	Comprehensive Assessment System For Built Environment Efficiency (CASBEE)	The Comprehensive Assessment System for Built Environment Efficiency (CASBEE) Iskandar Malaysia – Capacity Training and Workshop 2019.
3	Building Energy Monitoring and Reporting System	Iskandar Malaysia and Putrajaya Corporation conducted Building Energy Monitoring and Reporting System Workshop.
4	Uniform Building By-Law (UBBL) 38A	Dialogue Session on Uniform Building By-Law (UBBL) 38A with focus on state government agencies and local authorities.
5	Institutional Framework Study for Low Carbon Cities	The study was completed in December 2019 with recommendations on strategies and actions for strengthening of institutional framework and governance of low carbon cities at local authorities; and strengthening of the position of local authorities as a one-stop centre (OSC) for advisory and as an appraisal body for low carbon cities.
6	Development of Low Carbon Cities Training Curriculum	The Curriculum was completed in December 2019 with the objective of developing the Low Carbon Cities Assessment and Accreditation Panel and preparing a comprehensive training curriculum based on the 'train the trainer' concept for the facilitator, accessor/ verifier based on the current LCCF training module.
7	Facilitate Linkages with International Networks	The project is via UNDP Malaysia which is linked to UNDP Thailand on a similar project. Both teams and Ministerial officials met on the side-lines of the Seventh Asia Pacific Urban Forum 2019 in Penang and discussed the initiatives to-date as well as exchanged ideas on improvements for current programmes on low carbon cities. The project also links with C40 Cities by supporting Kuala Lumpur City Hall (DBKL) in preparing the latter's GHG Inventory and Climate Action Plan. This led to GTALCC being part of the key stakeholder group for C40 Cities works with DBKL.
8	International Bus Rapid Transit (BRT) Peer Reviewer for Iskandar Region Development Authority (IRDA)	The international peer reviewer was appointed in September 2019 to provide recommendations on design considerations into Iskandar Malaysia BRT (IMBRT) for enhanced greenhouse gas emission reduction potential and to achieve the BRT Gold-Standard ranking.
9	Low Carbon Public Transport (Bus): Scaling-up Financing and Viable Business Cases for Cities	Completed in May 2019, a pilot project on low carbon public bus transportation is currently being planned for implementation by using low carbon fuel alternatives on public buses in second quarter of 2020.
10	Study on Scaled-Up Green Technology Incentive Schemes in Target Cities for Households and SMEs	The study was completed in May 2019 with GTALCC having supported four (4) programmes promoting green technology incentives schemes for households in Petaling Jaya and Iskandar Malaysia (including MBPJ's Green Rebate Scheme by co-financing the development of a GHG website for applicants and administrators).
11	Bicycling Concepts to Promote and Enhance Commuting: • Office Shared e-bike Programme • Bike Ramp Installation in Putrajaya	In August 2019, GTALCC rolled out 12 electric pedal assisted bicycles to be used for local councils in Putrajaya and Cyberjaya as part of an office shared bike scheme. This 'lead by example' programme aims to reduce trips taken by cars and motorcycles for short distances or patrol duties; and to address the lack of bike-sharing services in the cities as well as under-utilised bicycle lanes during the weekdays.
12	Putrajaya Waste Minimisation and Management Action Plan	The study for Putrajaya Waste Minimisation & Management Action Plan kickstarted in August 2019 with completion target in February 2020. The outcome of the Action Plan will help Putrajaya reduce 50% of solid waste sent to the landfill by identifying waste generators and recommending the actions needed for potential investment programmes and Waste-to-Energy (WTE) technologies, Waste-to-Wealth and resource recovery initiatives.
13	Pilot for Installation of Electric Vehicle (EV) Charging Stations for Residential Buildings (Strata Title Property)	GTALCC is partnering with Low Carbon Mobility Division of the Malaysian Green Technology and Climate Change Centre (MGCC) to bring down barriers related to installation of EV Chargers for high-rise residential buildings (strata) and preparing cities to receive EV cars in the future.

Exhibit 35 Highlights of Selected GTALCC Activities in 2019

Drafting of Energy Efficiency and Conservation Act (EECA)

The rapid growth of the Malaysian population and national economy have spawned much economic activity especially in the manufacturing and services sectors, thus increasing the demand for energy.

According to National Energy Balance (NEB) 2017, energy demand is reported to increase higher than National GDP at 9.2 % (2016:10.5 %). The ratio of inequality between energy demand and GDP shows that more energy-intensive economic activities are driving the demand growth.

On that note, the then MESTECC has identified the need to strengthen legal frameworks on energy efficiency and conservation to ensure full involvement at all levels of institutions and organisations. Therefore, there is a need to enact the Energy Efficiency and Conservation Act (EECA) as a measure to encourage efficient use of energy.

The Authority was actively involved in drafting of the EECA where it has provided technical and administrative support throughout the process.

i. Regulating the use of energy by large energy consumers in commercial and industrial sectors; and
ii. Monitoring compliance with energy performance standards such as MS1525 to measure and regulating the energy consumption level of a building.

The then MESTECC aims the EECA to be gazetted in 2021. Therefore, the Authority will play its major role on promoting energy efficient practices through technical development and facilitation in sustainable energy, besides working closely with the regulator, Energy Commission.

The Voluntary Sustainable Energy Low Carbon Building Facilitation and Assessment Programme

In line with the sustainable energy development agenda, the Authority provides the Sustainable Energy Low Cabon Building Facilitation to the building sector, especially to states and local governments as well as to public and other government agencies. The technical services (not limited) are:

- Consultancy and project management on Energy Efficiency/Energy Management programme;
- Monitoring and Verification (setting target and annual assessment);
- Development of data collection and online energy monitoring;
- Energy audit and retrofitting programme;
- Low carbon green building design input (new buildings);
- Awareness programme and promotion;
- Data repository on energy and carbon emission from building sectors for local authorities;
- Sustainable Energy Low Carbon Building Assessment GreenPASS;
- Zero Energy Building (ZEB);
- Solar PV Net Energy Metering (NEM); and
- Others including programmes or projects mandated by the government to the Authority.

The Low Carbon Building Facilitation Program is a strategic 'bottom-up approach' sustainable energy program to provide continuous technical support, motivation, and confidence to States and Local Authorities to implement sustainable energy in their state or municipalities, starting with their own assets. The Authority believes by having this initiative it will complement the current 'top-down approach' by the federal government and will able to expedite the implementation of sustainable energy among the states and local authorities, and later the public and industry in Malaysia.

The Sustainable Energy Low Carbon Building Assessment GreenPASS is a voluntary and complimentary service offered to building sector. This program drives a 'win-win situation' to the government especially the local authorities and the building owners. It creates interest and motivation for the building owners to share their energy savings data. This data is very important for the government to monitor the progress of energy and carbon reduction in the building sector. In return, the building owners will receive a certificate of energy and carbon reduction assessment as appreciation of their effort in doing sustainable energy. In most cases, the certification had bring motivation to the building owners to do better. It is aligned to the Authority's portfolio, emphasising on emissions reduction due to operational energy which supports the national GHG reduction programme as well as the national low carbon development programme especially the low carbon cities initiatives by the local authorities.

The Authority's GreenPASS assessment certifications are to give an environmental evaluation of final building performance based on operational energy and CO_2 emissions reduction (or offsetting by renewable energy).

GreenPASS is an assessment system for buildings with a straightforward methodology that is flexible, transparent, easy to implement, consistent and easy to monitor since it is based on actual performance. In addition, it is measurable, recordable, comparable, justifiable and easy to verify. It is a simple and affordable approach that allows building owners and their facility management teams to set building-specific energy consumption benchmarks over time.

The carbon reduction is an indicator of building performance which can be translated into environmental impacts through a diamond rating scheme. It serves as an alternative and step-by-step support platform towards achieving other green building certification (MyCREST, GBI, GreenRE, CASBEE Iskandar, etc) and the ZEB programme.

In fact, GreenPASS which is part of the MyCREST component, provides back-to-back support to the Low Carbon Cities Framework (LCCF) assessment.

What is Sustainable Energy Low Carbon Building Assessment GreenPASS

This assessment programme provides platform to appreciate the sustainable energy low carbon building initiatives by the building owners. It is a principal and outcome base assessment for any type of building (whole complex, single or partial/strata building including residential):

- Single quantitative metric (energy/carbon), simple and affordable assessment approach allows building owners and facilities management teams to set building-specific carbon benchmarks over time.
- The assessment is 100% based on actual energy and carbon emission reduction achieved versus the business as usual (BAU) baseline.
- The carbon emission reduction is an indicator of building performance which can be translated into environmental impacts through a diamond rating scheme. in the diamond rating scheme, the higher the level of achievement the greater the number of diamonds will be awarded. The scheme rates any project from one to six diamonds starting from 1% to 100% carbon reduction.

Program that drives a 'win-win situation' to the government especially the local authorities and the building owners.

i. It creates interest and motivation for the building owners to share to the government their energy savings and carbon reduction data.
ii. In return, the building owners will receive a certificate of energy and carbon reduction assessment as appreciation of their effort in doing sustainable energy.

The initial stage of energy/carbon reduction can be started with basic energy savings initiatives with gradual step-by-step improvement through energy efficiency initiatives to reduce energy consumption (by reducing carbon emission) and later the balance of minimum energy needed to be offset by on-site renewable energy.

As of 2019, 148 buildings in Malaysia have been rated with the GreenPASS assessment ranging from one (1) to four (4) diamonds. Total energy savings amounted to 86,699,610kWh which is equivalent to 59,756 tonnes of carbon emission reduction (see **Exhibit 36**).

Building Registered	Building Approved	Total energy saving (kWh)	Total CO_2 emission reduction (Tonne)
148	94	86,699,610	59,756

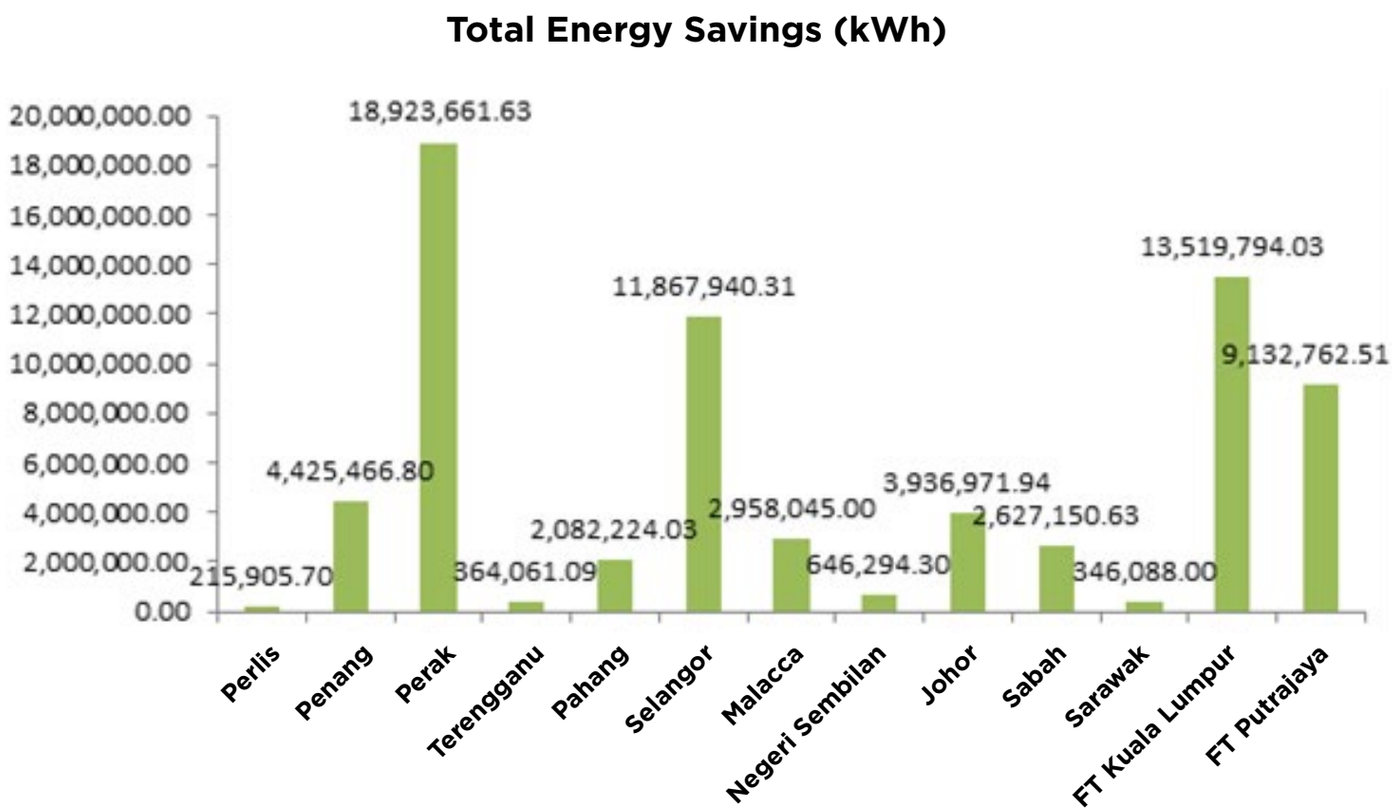


Exhibit 36: Total Energy (kWh) Savings by States Achieved under the GreenPASS Assessment

Technical Cooperation and Facilitation for Government Entities

The Authority also advises few government agencies on the development of their respective energy management and low carbon development initiatives, in addition to other related programmes. This support is in the form of:

i. Speaking engagements and presentation of working papers at conferences/seminars;
ii. Participation in workshops to provide expert advice; and
iii. Membership in key committees.

One of the activities centres around energy management, namely *Klinik Pengurusan Tenaga* with Putrajaya Corporation (PJC) under its Building Sector Energy Use & Carbon Reporting (BECO2R) programme. The services are provided to private and government buildings in Putrajaya that participated in the programme.

The Authority's involvement takes the form of an expert who provides consultation, facilitation and guidance to the participants. The objectives of this activity are to obtain data of the participants' buildings in relation to performance and to review their efforts and achievements on the green energy saving initiatives.

A walkthrough audit is normally conducted during the visit which covers the building's air-conditioning system, lighting system, ventilation system and thermal performance. This is part of incentive programme by PJC to building owners in Putrajaya.

Some of the key activities are:

a. To provide on the job energy management training and walk through audit sessions for commercial, public amenities and apartment buildings in Putrajaya; and
b. Recommendations for improvement including long and short-term measures are provided at the end of each walkthrough sessions.

HUMAN CAPITAL DEVELOPMENT IN SUSTAINABLE ENERGY

As an agency who is spearheading the sustainable energy growth in the country, the Authority alongside its dedicated training partners have been providing comprehensive training in the areas of renewable energy (RE) and energy efficiency (EE) since 2012

As a statutory body that spearheads the sustainable energy agenda in Malaysia, it is the role of the Authority to provide training or other programmes relating to the development of human resources and capacity building in the sustainable energy sector (S15(i) SEDA Act 2011).

In this regard, the Authority has since its inception, developed trainings to cover both the RE and EE sectors.

Renewable Energy Training

Since 2012, the Authority has developed training courses for qualified persons in the solar PV industry such as the Grid-Connected PV Systems Design Course; Grid-Connected PV Systems for Wireman and Chargeman; Grid-Connected PV Systems Installation and Maintenance; and Off-Grid PV Systems Design Course.

Its non-solar trainings include Operation and Maintenance of Biogas Power Plants; and introductory training in Biomass and Small Hydro.

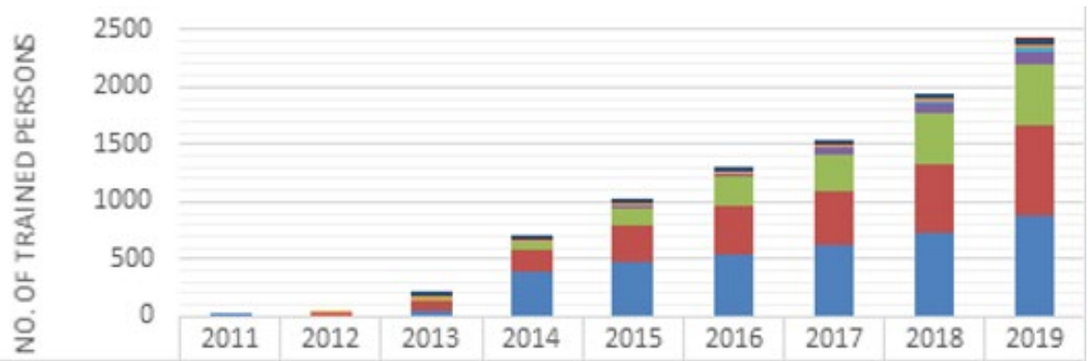
As of end 2019, the Authority has trained 2,432 participants in RE. Grid-Connected PV Systems Design and Grid-Connected PV for Wireman and Chargeman participants show the highest number of cumulative trained persons at 879 and 786 respectively.

This is because the requirement to become one of the Authority's Registered PV Service Provider is for the company to have qualified persons who have obtain qualified person certification.

The cumulative trained participants for Grid-Connected PV Installation and Maintenance is 526. The training institute will usually apply funding from the Human Resource Development Fund (HRDF), Lembaga Zakat (Tithe Board) or the Construction Industry Development Board (CIDB) to support the participants.

The cumulative trained persons for Off-Grid PV Systems Design Course is 109 whereas the Operation and Maintenance of Biogas Power Plant has trained 50 individuals (refer to **Exhibit 37**).

CUMULATIVE TRAINED PARTICIPANTS IN RE (2011-2019)



	2011	2012	2013	2014	2015	2016	2017	2018	2019
GCPV Systems Introductory Training	0	0	0	0	0	0	0	0	20
Small Hydro Introductory Training	0	0	34	34	34	34	34	34	34
Biomass Introductory Training	0	28	28	28	28	28	28	28	28
O&M of Biogas Power Plant	0	0	0	0	0	0	0	25	50
OGPV System Design	0	0	0	0	12	24	58	78	109
GCPV Installation and Maintenance	0	0	20	58	162	247	323	456	526
GCPV for Wireman & Chargeman	0	19	87	199	315	424	466	595	786
GCPV Systems Design	12	12	52	382	476	543	625	723	879

Exhibit 37: List of Cumulative Trained Persons in RE Courses Organised by the Authority

a.Grid-Connected Photovoltaic Systems Design Course

One of the criteria of NEM application is to have the design of the solar PV system endorsed by a qualified person, i.e. a holder of Grid-Connected Photovoltaic (GCPV) Systems Design certificate.

Interested engineers can attend courses organised by the Authority if they wish to be certificate holders. The training module is conducted by two (2) training partners, notably Universiti Teknologi MARA (UiTM) and the Selangor Human Resource Development Centre (SHRDC), both of which are located in Shah Alam, Selangor.

In 2019, a total of 156 participants attended the eight (8)-day training course which encompasses theoretical and practical sessions. Out of the 156 participants, 48 candidates passed the competency examinations and received their certification.

Training in progress @ a Grid-Connected Photovoltaic Systems Design Course

b.Grid-Connected Photovoltaic Systems for Wireman & Chargeman Course

In this course, wiremen and chargemen can learn more about the solar PV installation and components.

The official training partners for this five (5)-day training programme are Universiti Kuala Lumpur-British Malaysia Institute (UniKL BMI), Gombak, Selangor; Universiti Teknikal Malaysia Melaka (UTeM); Akademi Binaan Malaysia (ABM) Wilayah Utara; Kolej Kemahiran Tinggi MARA (KKTM) Pasir Mas in Kelantan; and Institut Kemahiran MARA (IKM) in Kota Kinabalu (to serve the Sabah state).

This training encompasses theoretical and practical sessions which culminated in a competency examination. In 2019, a total of 12 training sessions were conducted by the appointed training institutions, of which 155 out of the 191 participants who attended the sessions passed the assessment.

Training on the Grid-Connected PV Systems for Wireman & Chargeman course

c.Grid-Connected Photovoltaic Systems Installation and Maintenance

Training for the Grid-Connected PV Systems Installation & Maintenance course

The structure of this four (4)-month training course comprises of two (2) months of theoretical classes and two (2) months of industrial training.

The Authority collaborated with SHRDC; ABM Wilayah Utara; the Terengganu Skills Development Centre (TESDEC); Kedah Industrial Skills and Management Development Centre (KISMEC); UniKL BMI and the German Malaysian Institute (GMI) to conduct this training.

The training programme focused on the method of installation and maintenance of solar PV, guidelines and practices of occupational health and safety precautions that are needed to be emphasised to the workers.

In 2019, a total of 55 out of 70 participants passed the examination for this training and were awarded qualified persons certificate.

d.Off-Grid Photovoltaic Systems Design Course

This ten (10)-day course encompasses theoretical and practical sessions of designing as well as installing off-grid PV (OGPV) systems which are suitable at remote areas (which are far from the national grid).

The training is conducted at UiTM and Pusat Latihan Proaktif (PLP) Sarawak as the official training institutions.

Since there is a demand for this course, the Authority conducted four (4) classes in 2019 which were attended by 31 participants. Most of the participants were from Sarawak where there are significantly more rural electrifications projects, especially solar hybrid systems to be installed in the state.

Training for the Off-Grid Photovoltaic Systems Design course

e.Operation and Maintenance of Biogas Power Plants

The Authority, in collaboration with Universiti Tenaga Nasional (UNITEN), has developed a training module for the Operations and Maintenance (O&M) for Biogas Power Plants.

This training module is developed together with the industry players based on curriculum competency which is recognised as levels 2 and 3 for the target group by the National Occupational Skills Standard (NOSS) for Anaerobic Digester Biogas Plant.

The Authority developed this course due to the high demand of biogas FiT projects. As such, there is a need to have professionally trained and competent personnel to operate and maintain these biogas power plants to ensure that the plants can perform optimally through the entire REPPA tenure.

UNITEN conducted one (1) session in 2019 with 25 participants, of which 20 passed the examination and workplace assessment.

Training on the Operation and Maintenance of Biogas Power Plants course

f. Awareness trainings: Introduction to Grid-Connected Photovoltaic (PV) System

The Authority has also conducted a two (2)-day training on Introduction to Grid-Connected Photovoltaic (PV) System. This course is relevant to those without any technical qualification who wish to learn and understand how a grid-connected PV system works and its applications.

The first session was held in collaboration with the Fire and Rescue Department's headquarters in Putrajaya from 12-13 February 2019 as an awareness training for its staff with the aim of establishing and incorporating the training module into the department's training syllabus.

This is in line with realisation that with the number of solar PV system installation being on the rise, there is a need to look into the aspect of fire handling at premises with such system installed.

Given that there have also been many requests from non-PV practitioners, another training was conducted at the Authority's office in Putrajaya on 6-7 August 2019. The event was attended by 20 participants with various educational background, especially researchers and lecturers (technical and non-technical).

In-house training on the Introduction to Grid-Connected PV course

Energy Efficiency Training

One of the key functions of the Authority is to promote, stimulate, facilitate and develop sustainable energy that also includes energy efficiency (EE).

As of end-2019, the Authority has conducted nine training sessions on EE. These training programmes were part of the efforts to facilitate and provide support for the implementation of EE and low carbon building programmes.

Additionally, the trainings serve to improve knowledge as well as to address the human capital needs in the area of EE in Malaysia. The Authority currently has the following training modules:

i. Application of Malaysian Standard: Code of Practice on Energy Efficiency and Use of Renewable Energy for Non-Residential Buildings (MS 1525);
ii. Energy Efficiency in Air-condition and Mechanical Ventilation (ACMV) Management;
iii. Energy Audit in Buildings; and
iv. Energy Management in Buildings

The target groups for the trainings are mainly government officials, especially those who are involved in the management or supervision of technical and building facilities, as well as officers in local authorities involved in energy management and EE, including those involved in the new development planning and renovation of existing buildings (see Exhibit 38). The trainings are also open to members of the private sector who wish to improve their capabilities or enhance the knowledge of their staff.

The implementation of these training programme is essential to pave the way for the commencement of training sessions related to EE and energy management offered by the government.

Trainings conducted by the Authority are dedicated to the development of capacity and knowledge of energy management in buildings; principles and application of energy efficiency criteria set out by the Malaysian Standard MS 1525; and more efficient procedures in building energy audits or energy management system for air conditioning and mechanical ventilation (ACMV).

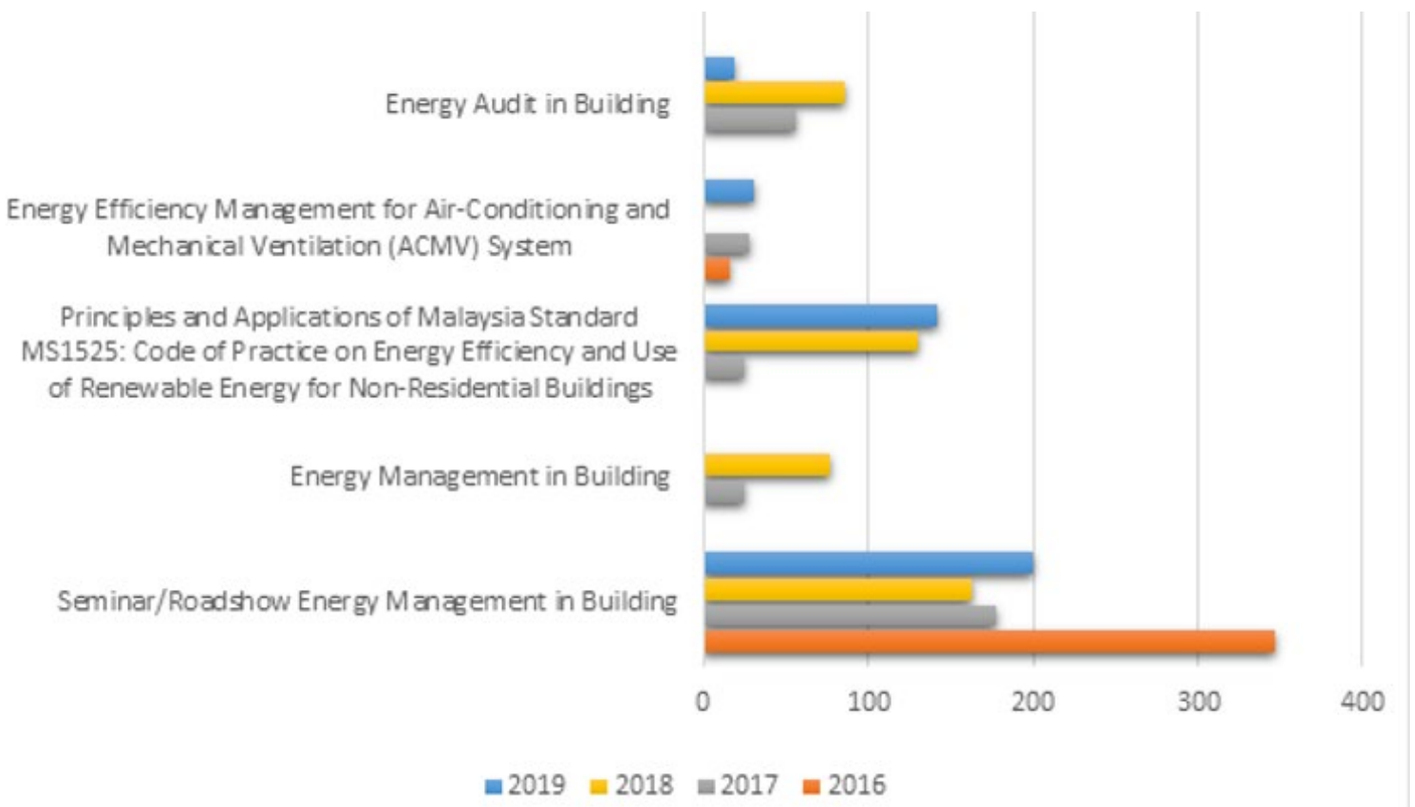


Exhibit 38: Cumulative Trained Persons Under Energy Management & Energy Efficiency Trainings

Energy conservation has gained much attention in many countries in the last few years, including Malaysia. Better energy conservation and management is starting to take place in the industry.

This trend can be seen in the number of attended participants in 2019, and demand on this related EM & EE training has doubled over the year. By now, the Authority is recognised as an established training provider on EM and EE, in part due to the legitimacy conferred by the Energy Commission.

For instance, all EM and EE trainings conducted by the Authority are eligible for Continuous Development Programme (CDP) points for Registered Electrical Energy Manager (REEM) with the Energy Commission.

The Authority is also actively involved in collaboration with stakeholders to organise in-house trainings customised to suit the stakeholders' needs and interest.

Participants who attended a training session on energy management in Air-condition and Mechanical Ventilation (ACMV)

An interactive session during the ACMV training

Joint Training Seminar on "Application of Malaysian Standard: Code of Practice on Energy Efficiency and Use of Renewable Energy for Non-Residential Buildings (MS 1525)" with Standards Malaysia

In 2019, the Authority collaborated with Standards Malaysia to organise a training seminar on MS 1525 which covered three main regions, namely Kuala Lumpur (central region), Johor Bharu (southern region) and Penang (northern region).

The main objectives of this training are to provide awareness and understanding on the matters relating to MS 1525 among users and building owners, and to expose stakeholders with the latest amendment of the document which are :

a. Improvement to description on passive design strategies especially daylighting, façade design and renewable energy;
b. New figures for horizontal and vertical projection of shading coefficients;
c. Replacement of figure for egg crate shading coefficient with tables
d. ACMV outdoor design wet bulb temperature is revised; and
e. Introduction to Building Energy Intensity (BEI) benchmark in Clause 10.

Joint Training on Application of MS 1525 with Standards Malaysia

Seminar on Awareness Toward Zero Energy Building (ZEB)

According to United Nations Environment's Global Status Report 2019 for Buildings and Construction, both sectors accounted for the largest share of final energy use at 36% and energy and process-related CO2 emissions at 39% in 2018.

In 2018, global emissions from buildings increased 2%. Growth was driven by strong floor space and population expansions that led to a 1% increase in energy consumption.

Based on this fact, some countries with the Low Carbon City programme choose to implement energy efficient low carbon building initiatives to reduce their carbon emissions.

The development of the ZEB building is the most suitable for that purpose. To meet this requirement, a standard ISO/TC205 which is related to ZEB is being developed internationally.

The ZEB programme is a global initiative involving the development of super energy efficient buildings that are integrated with renewable energy applications. These applications are now actively promoted by the EU, Japan, Singapore and countries committed to energy and carbon reduction.

Most of these countries are targeting:

- New public buildings for ZEB categories by 2020; and
- New public and private buildings (on average) for ZEB categories by 2030.

Similar to the EU countries, the Japanese Government through its Ministry of Economy, Trade and Industry (METI) is committed to the implementation of ZEB for new public buildings by 2020 and for private buildings by 2030.

As Japan has economic, technical and energy cooperation with the ASEAN countries, the Japanese Government is of the opinion that a standard ZEB programme in terms of definitions and d methodologies should be established for adoption.

For that purpose, METI has mandated the Energy Conservation Center Japan (ECCJ) and the Japanese Business Alliance for Energy Smart Worldwide (JASE-W) to promote and support ZEB development in ASEAN countries. Support provided are in terms of facilitation, capacity building and technical trainings.

Alliance for Energy Smart Worldwide (JASE-W) to promote and support ZEB development in ASEAN countries. Support provided are in terms of facilitation, capacity building and technical trainings.

The ZEB programe became a reality in Malaysia following the signing of an MOU agreement between the Authority and Japanese Business Alliance for Smart Energy Worldwide (JASE-W) in October 2018. The high commitment and interest shown by JASE-W is also a catalyst for the implementation of the programme.

1. Objectives

Disseminate and promote the ZEB and ZEB Series Concept that include:

- Support for development of standard methodology of ZEB in Malaysia, which aligning with current ASEAN – Japan ZEB promotion initiatives; and
- Promotion, capacity building, awareness and training.

2. The Participants

This seminar aims to provide basic understanding and knowledge encompassing the foundation of energy conservation and energy efficiency.

It is targeted for both government and private sectors:

i. Government institutions which are related to the planning, development and governance in building sector; and
ii. Private companies comprising developers, consultants and building professionals.

A total of 136 participants from various organisations attended the session.

Visit to the Authority's office prior to the training seminar

Visit to Energy Commission office prior to the training seminar

3. Date

The seminar was held on 28 February 2019.

Opening Speech by the CEO of the Authority, Ir. Dr. Sanjayan Velautham

Greetings by Economic Councellor, Mr. Hideto Nakajma, the Japanese Embassy, Kuala Lumpur, Malaysia

Keynote speech by Mr Wong Tin Song, Under Secretary of Energy Efficiency of the then Ministry of Energy, Science, Technology, Environment & Climate Change (MESTECC)

THE AUTHORITY LEAD BY EXAMPLE IN EE & RE

Site visit of the 16kW solar PV system on the rooftop of Galeria PjH in Putrajaya which houses the Authority's headquarters.

The Authority as the one of the agencies which is responsible for providing technical facilitation as well as promoting sustainable energy in Malaysia has initiated energy management at its headquarters in Putrajaya.

The initiative was started in 2015 by leveraging the Authority's in-house expertise. Various energy management initiatives undertaken by the Authority succeeded in achieving a Building Energy Index (BEI) of between 61 and 82kWh/m2/year compared to 200 and 300kWh/m2/year for a typical office building in Malaysia (with electricity bill ≈ RM2,000/month).

This translated to savings of almost 47,000kWh per year (at least RM24,000 per annum) with avoidance of 32 tonnes of carbon emissions annually. A summary of the BEI achievement by year is tabulated in **Exhibit 39.**

Exhibit 39: The Summary of BEI Achievement for the Authority's Headquarters with Energy Reduction of 25% over the 2015 Baseline

Energy management measures should not be viewed as an expense, but as an investment with utility savings that add up over the service life of the building.

By doing so, the Authority managed to achieve a significant savings in electricity bills throughout the year in comparison with other conventional buildings in Malaysia.

Moreover, the savings will only increase over time as energy prices may rise in Malaysia. The yearly continuous decreasing trend of electricity bill is reflected in **Exhibit 40.**

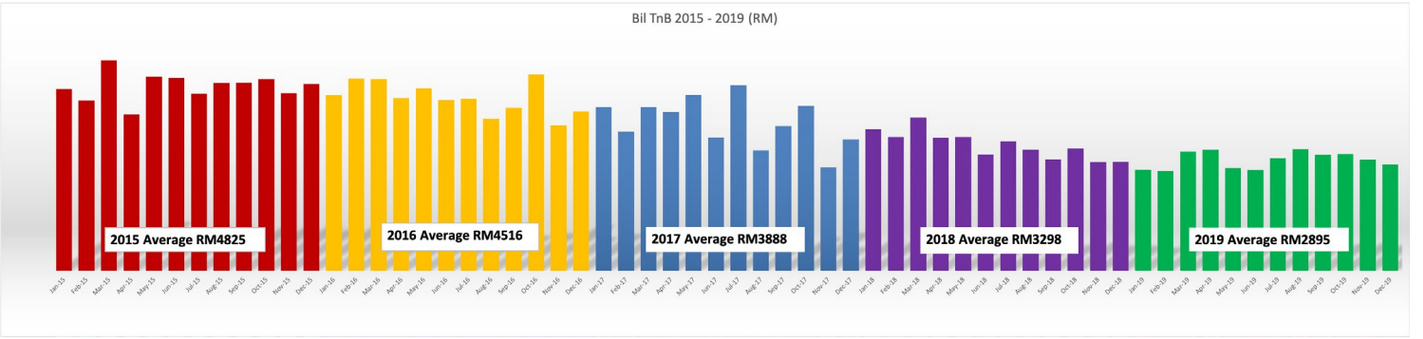


Exhibit 40: Trend of Electricity bills of the Authority (2015-2019)

Some of the initiatives taken by the Authority are:

No Cost Measures:

a. The formation of energy management (EM) committee that is a part of the Authority's Jawatankuasa Keselamatan, Kesihatan Pekerjaan dan Pengurusan Tenaga (JKPPT) which subsequently led to the formation of Energy Management Policy in the Authority;
b. Continuous energy management awareness programme to the Authority's staff that include in-house talk on energy management; frequent dissemination of information on energy saving in office; and initiative as simple as EE savings tips;
c. Group mapping of lighting switches for all office areas;
d. Scheduled in-house energy audit by an appointed staff;
e. Energy Management awareness signs and labels for office appliances and behaviour;
f. Temperature setting of air-conditioning to 24°C; and
g. Energy management practices such as switching off the lighting, air-conditioning and other office equipment during lunch hour.

Low Cost Measures:

a. Delamping, LED lights replacement and installation of pull cord light by stages;
b. Installation of online power monitoring system to understand the pattern and a real time data on energy consumption;
c. The gradual replacement of faulty conventional air conditioning units to those which run on the inverter system; and
d. Installation of motion sensors in areas of lesser use (printing room and walkway).

Medium and High Cost Measures:

a. Installation of energy efficient split air-conditioning units for low functional area (dining room, meeting room and auditorium);
b. Procurement of energy efficient office equipment (laptop, printer and pantry appliances); and
c. Installation of 16 kWp solar PV system at the rooftop of the Authority's office.

16 kWp Solar PV System @ the Authority's Office

Since the Authority's establishment in 2011, it has granted approvals to more than 10,000 renewable energy installations in Malaysia. It is therefore timely for the Authority to lead by example through the installation of a solar PV system at its headquarter located in Putrajaya.

In 2019, the Authority installed a 16kW solar PV system on the rooftop of Galeria PjH. This PV system is connected to the PVMS managed by the Authority.

More importantly, this PV project will be part of the Authority's on-site training facility by providing online data for analysis and opportunity to showcase PV for office application to visitors and training participants.

No.	Installation	Description
1	Module fotovolta suria	o 400Wp x 40 units of Mono-crystalline Class II PERC Half-Cell Module • Each module has 72 cells o Nominal efficiency is 19.5% o 4 strings configuration with 10 solar panels per string. • Manufacturer : JA Solar.
2	Inverter	• One (1) unit of 15kVA Multi-MPPT String Inverter from Sungrow • Efficiency at nominal power is 98.6%
3	Weather Station	• One (1) unit of Rainwise Pvmet200 weather station • Can capture windspeed, irradiation and module temperature data
4	Zero Export Energy	• One (1) unit of Weidmuller zero energy meter
5	Solar PV Data Logger	• One (1) unit of Solar-Log 1200 from Solar Log

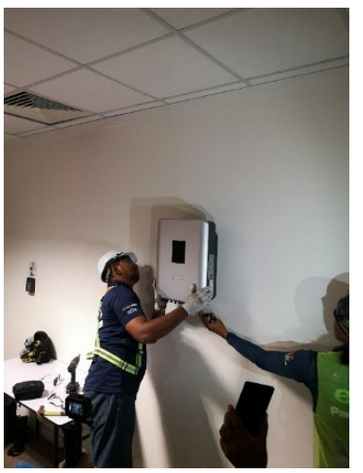
Exhibit 41: Technical Specifications of the Authority's 16kW Solar PV System

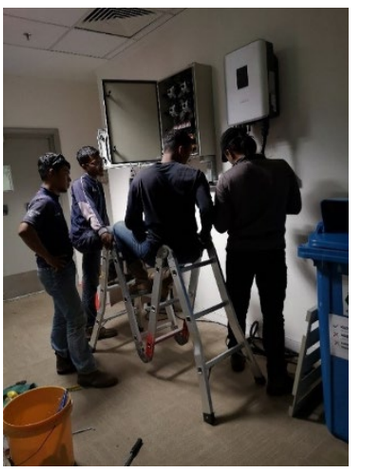
The PV project for the Authority started on 1 October 2019 and was successfully commissioned on 31 December 2019. The total installed capacity is 16kWp with the energy generated is connected to the Authority's Main Distribution Board (**Exhibit 41**).

The solar PV system is installed based on a self-consumption (SELCO) basis as the bulk meter of the building could not support NEM implementation. In future, this restriction should be addressed so buildings with bulk meter can participate in the NEM scheme.

It is estimated that the 16kWp solar PV system could generate about 19,200kWh/year with about 13,324.8kg of annual CO2 avoidance.

An aerial view of the Authority's 16 KW Solar PV System Installation





Installation process by appointed contractor, ERS Energy Sdn Bhd, leading to completion of the Authority's 16kW solar PV system

INTERNATIONAL LIAISONS

Since the Authority's inception, international and regional liaisons are crucial networking platforms to discuss with various experts on matters pertaining to sustainable energy. This section lists all international and regional meetings participated by the Authority.

The Malaysian delegation at IRENA's 17th Council Meeting

17th Council Meeting of the International Renewable Energy Agency (IRENA)

The 17th Council Meeting of the IRENA was held in Abu Dhabi from 25-26 June 2019.

Few highlights of the meeting include the presentation on programmes and studies on the renewables conducted by IRENA, the development of renewable energy in selected countries and its impact to the climate change mitigation initiatives and Sustainable Development Goal (SDG).

During the meeting, member countries agreed that the studies conducted by IRENA have provided invaluable inputs on the best practices and data for renewable energy policy development.

A strategic and sound renewable energy policy plays an important role to the growth of renewable energy and will boost confidence for more investment to be made in renewable energy projects.

The meeting hall of IRENA's 17th Council Meeting

Snapshot of IRENA's 17th Council Meeting in session

International Energy Agency Photovoltaic Power Systems Programme (IEA PVPS)

Malaysia has been a member of the IEA PVPS since October 2008. In July 2018, the main representative of the Executive Committee (EXCO) of Malaysia was transferred to the Authority.

In 2019, the Authority attended the 54th IEA PVPS EXCO meeting which was held from 14-15 November 2019 in Santiago, Chile.

Among the items discussed were updates of each task activities, the future PV market and drivers, digitalisation that will underpin the energy transition, the issues and challenges, and solutions and potential solutions to address intermittency that will help to scale solar PV market and industry.

The meeting also highlighted the emerging trend of green hydrogen technology that has been piloted in a few countries (e.g. Chile, South Korea and Spain).

In addition to the Authority's role as an EXCO member, it is also an active member of Task 1: Strategic PV Analysis & Outreach, while Sarawak Energy Bhd (SEB) is a member of Task 18: Off-Grid and Edge-of-Grid Photovoltaic Systems.

The 54th IEA PVPS Executive Committee (ExCo) meeting

26th Annual Meeting of the ASEAN Renewable Energy-Sub sector Network (RE-SSN)

The 26th Annual Meeting of the ASEAN RE-SSN was held on 24 May 2019 in Da Nang, Vietnam with Malaysia which was represented by the Authority chairing the meeting (Note: Malaysia is the coordinator for the ASEAN RE-SSN).

The meeting discussed the updates of renewable energy development and cooperation among the ASEAN Member States (AMS).

Based on current gap on ASEAN RE development, it was suggested that the AMS be divided into two (2) categories:

i. Frontrunners (countries which are implementing the support mechanism for RE and in early phase of RE grid integration); and
ii. Newcomers (countries with no RE policy to support the implementation of RE projects and lack of financial and data availability).

The meeting emphasised on innovative solutions to close the gap such as the digitalisation initiative in the form of blockchain technologies. The RE-SSN also recommended to maintain the ASEAN aspirational RE target of 23% in total primary energy supply (TPES) by 2025.

Group photo @ 26th RE-SSN Meeting, Danang Vietnam

37th ASEAN Ministers on Energy Meeting (AMEM)

The 37th AMEM was held on 4 September 2019 in Bangkok, Thailand and was chaired by H.E. Sontirat Sontijirawong, the Thai Minister for Energy.

The meeting stressed the need for ASEAN to confront its energy challenges together by enhancing partnerships and innovations towards sustainable development and energy security.

ASEAN countries need to enhance energy corporation such as multilateral electricity from the electricity power trade and bolstering efforts in RE and EE or sustainable activities and initiatives.

The meeting also highlighted and looked forward to the completion of some major ASEAN energy planning documents that will accelerate ASEAN energy cooperation such as the ASEAN Economic Community Blueprint 2025, ASEAN Plan of Action for Energy Cooperation (APAEC) Phase II and ASEAN Energy Outlook 6.

ASEAN Energy Awards

The Authority as the country coordinator for the ASEAN Energy Awards – RE category was appointed as the Chair of the ASEAN Energy Awards for the RE category since 2012. In 2019, the Authority invited and facilitated six submissions for Malaysia as in the exhibit below:

No.	Category	Sub- Category	Candidate	Project
1	On-Grid	National Grid (maximum of 2 submissions)	Cypark Resources Sdn Bhd	Grid Connected Floating Solar System on the Water Retention Dam, Empangan Ulu Sepri, Negeri Sembilan under the Authority's FiT Programme
			Mattan Engineering Sdn Bhd	Rural Electrification from Renewable Energy (Biogas) for the Umas Community in Tawau, Sabah
2	Off-Grid	Power (maximum of 2 submissions)	Centre for Renewable Energy, Faculty of Engineering, Universiti Malaysia Sarawak (UNIMAS)	Development of Micro Hydro Project for Kampung Assum, Padawan, Sarawak
			Sarawak Energy Berhad	Sarawak Alternative Rural Electrification Scheme (SARES)
3	Special Submission (maximum of 1 submission)		SIRIM Bhd	Compressed Bio-Natural Gas (CBG) for Green Mobility and Power Generation in Oil Palm Industry
4	Off-Grid	Thermal (maximum of 2 submissions)		No submission
5	Co-generation (maximum 1 submission)	Thermal (maximum of 2 submissions)		
6	Biofuel (maximum 2 submission)			

Exhibit 42: List of Submissions under the ASEAN Energy Awards 2019 – RE Category

From these submissions, Malaysia won five prizes in the ASEAN Renewable Energy Awards 2019 as shown by **Exhibit 43:**

No.	Category	Awards	Project
1	Off-Grid (Power)	Winner	Development of Micro Hydro Project for Kampung Assum, Padawan, Sarawak.
2		1st Runner-up	Sarawak Alternative Rural Electrification Scheme (SARES)
3	On-Grid (National Grid)	1st Runner-up	Building Integrated Solar PV with Agriculture and Aquaculture Activities (Mushroom Farm and Fish Farming); Solar Project (1MWp) with 11Kv Distribution to TNB in Chembong, Negeri Sembilan
4	On-Grid (Local)	2nd Runner-up	Rural Electrification from Renewable Energy Biogas for UMAS Community
5	Special Submission	Winner	Compressed Bio-natural Gas (CBG) for Green Mobility and Power Generation in Oil Palm Industry

Exhibit 43: List of Winners at the ASEAN Energy Awards 2019 – RE Category

APEC Energy Working Group (EWG) Meeting

The Authority's representative attended the 57th APEC EWG in Manila, Philippines on 23-24 May 2019. The EWG's function incorporates guidance from APEC Economic Leaders, Ministers and Energy Ministers to form a solid foundation for APEC energy cooperation.

The EWG has a well-established structure that includes two research centres – the Asia Pacific Energy Research Centre (APERC) and APEC Sustainable Energy Centre (APSEC); two task force, namely the Low Carbon Model Town Task Force (LCMTTF) and Energy Resiliency Task Force (ERTF); and four expert groups – Expert Group on Clean Fossil Energy (EGCFE), Expert Group on Energy Efficiency & Conservation (EGEEC), Expert Group on Energy Data &Analysis (EGEDA) and Expert Group on New and Renewable Energy Technologies (EGNRET).

The EWG has established partnership with international energy cooperation to seek broader exposure on energy issues. Current EWG guests are the International Energy Agency (IEA), the World Energy Council (WEC), and the International Copper Association (ICA).

Malaysia will be hosting the APEC meeting in 2020 which is organised by the Ministry of International Trade and Industry. The Authority has proposed the topic or theme of Policy Dialogue for the 58th and 59th EWG Meetings which is "Renewable Energy Transition for Sustainable Growth".

Participants of the 57th APEC EWG Meeting in Manila, Philippines

53rd APEC Expert Group on New & Renewable Energy Technology (EGNRET) Meeting

The 53rd APEC EGNRET meeting was held on 22-25 October 2019 in Seoul, South Korea. The mission of the EGNRET is to facilitate the increasing usage of new and renewable energy technologies in the APEC region.

The activities of the EGNRET will be directed towards meeting the energy challenges identified by APEC Leaders and Energy Ministers. In addition, the EGNRET will develop and implement projects that will contribute to the EWG's objectives and strategic initiatives.

The Authority's participation by representing Malaysia benefits the country's EGNRET projects and activities, especially in knowledge development and establishing network with experts, academicians and stakeholders.

Participants of the 53rd APEC EGNRET Meeting in Seoul, South Korea

Annual Meeting of the World Economic Forum's (WEF) Global Future Councils

The Authority has been a member of the World Economic Forum's (WEF) Global Future Council (GFC) on Energy Technologies since 2018. There are 41 Global Future Councils (GFCs) comprising of 700 members.

Each November, the WEF hosts an annual meeting of the GFCs to formulate the agenda for WEF that takes place annually in Davos, Switzerland in January of the following year.

Within the realm of Energy Technologies, the GFC team has monthly virtual meetings to update on the progress of activities committed by the members and insights on progress of energy transition in each country member.

GFC members for Energy Technologies

Other International Engagements

Throughout 2019, the Authority was also invited by local, regional and international organisations to various relevant workshops/meetings/seminars to discuss various aspects of sustainable energy.

Below is the list of the various engagements participated by the Authority in 2019:

No.	Events	Date	Venue
1	APEC Workshop on Quality Electric Power Infrastructure	20 January 2019	Tokyo, Japan
2	Special Senior Officer Meeting on Energy (SOME)	21 January 2019	Chiang Mai, Thailand
3	The 6th ASEAN Energy Outlook (AEO6) Working Meeting on Data	11-15 February 2019	Yogyakarta, Indonesia
4	Courtesy Visit by Asian Photovoltaic Industry Association (APVIA) to the Authority's office	17 May 2019	Putrajaya, Malaysia
5	Regional Workshop on Accelerating Renewable Energy Investments in Southeast Asia	20-21 May 2019	Da Nang, Vietnam
6	12th Meeting of Asia Solar Energy Forum and 2019 Asia Clean Energy Forum	16 June 2019	Manila, Philippines
7	37th ASEAN Senior Officials Meeting on Energy and Associated Meeting	24-25 June 2019	Bangkok, Thailand
8	Electricity Roundtable Singapore	30 July 2019	Singapore
9	Workshop on the Path to Inclusive Energy Transition in the APEC Region	5-6 August 2019	Taipei, Taiwan
10	Briefing on 7th Edition of APEC Energy Demand and Supply Outlook Roadshow	20 August 2019	Putrajaya, Malaysia
11	IRENA Innovation Day	4-5 September 2019	Bangkok, Thailand
12	The Asia Pacific Renewable Energy Market Summit	7 September 2019	Taipei, Taiwan
13	Courtesy visit the delegation of the Public Service Institute of Nigeria to then-MESTECC	20 September 2019	Putrajaya, Malaysia
14	Cambodian Government Courtesy Visit to the Authority's office	20 September 2019	Putrajaya, Malaysia
15	Korea International Renewable Energy Conference (KIREC) 2019	22 -26 October 2019	Seoul, South Korea
16	Guangxi Delegation courtesy visit to then-MESTECC	25 October 2019	Putrajaya, Malaysia
17	Jeonnam Technopark (JNTP) Courtesy Visit to the Authority	25 October 2019	Putrajaya, Malaysia
18	Singapore International Energy Week (SIEW) 2019	30 October 2019	Singapore
19	ASEAN-Japan Microgrid Workshop 2019	4-9 November 2019	Tokyo, Japan
20	ASEAN Power System Operators Workshop 2019	12-14 November 2019	Penang, Malaysia
21	Network Meeting for Transitions Towards ZEB in ASEAN +3	25-28 November 2019	Manila, Philippines

Exhibit 44: Lists of International Engagements Participated by the Authority in 2019

STAKEHOLDERS ENGAGEMENT

Excited school children trying out the virtual reality devices during the National Science Week 2019 organised by the Authority. The Authority is in-charge of promoting public participation and improving public awareness on matters relating to sustainable energy in the country

One of the Authority's role is to implement measures to promote public participation and to improve public awareness on matters relating to sustainable energy.

In this regard, the Authority is tasked to strategically develop and implement RE awareness programmes in order to create greater acceptance and participation among the general public and private sector.

Most of the communication activities are digitised (such as the Sustainable Energy Malaysia magazine, advertisements, media releases, events, related news articles and announcements) that can be found in the Authority's official portal at www.seda.gov.my or www.ises.gov.my.

The Authorities hallmark communication platform is the International Sustainable Energy Summit (ISES) which is organised on a biennial basis. Locally, the Authority organises workshops, seminars and briefing to educate the public and raising awareness on sustainable energy.

2019 has indeed been a busy year for the Authority as it organised 49 briefing sessions and participated in more than 20 roadshows (involving external events and stakeholders).

1) INTERNATIONAL GREEN TECHNOLOGY & ECO PRODUCTS EXHIBITION & CONFERENCE MALAYSIA (IGEM) 2019

IGEM is the biggest flagship event organised annually by the then MESTECC to create a platform for solution providers and green businesses to tap into the fast-expanding ASEAN market.

During IGEM 2019, the highlight activities for the Authority included:

a) Launching of Malaysia's First Pilot Run of the Peer-To-Peer (P2P) Energy Trading

On 9 October 2019, Malaysia signals to the global energy fraternity that the country is moving towards greater adoption of digitalisation in its quest to facilitate energy transition.

At IGEM 2019 which is the 10th edition of the green technology showcase, the Authority launched the pilot run of the peer-to-peer (P2P) energy trading. The P2P energy trading allows PV prosumers to sell excess solar energy to other electricity consumers of TNB.

The pilot run of the P2P energy trading is part of the strategies identified under the Renewable Energy Transition Roadmap (RETR) to scale up solar PV rooftop market. P2P energy trading is regarded as one of the latest global trends to promote front-of-meter (FTM) business model for solar PV.

In the ASEAN region, Thailand is the first country that trialed the P2P energy trading while Malaysia is the second country in the region to do so. Other countries into P2P energy trading includes Australia, the United States, Japan, South Korea, India, and various European nations such a Austria, Belgium, France and Switzerland.

Back home, the Authority is implementing an eight-month pilot P2P project (see **Exhibit 45**) that will allow prosumers and consumers to leverage on arbitrage opportunities from different tariff categories.

Specifically, the P2P energy trading supports the new initiatives under the Malaysian Electricity Supply Industry (MESI) 2.0 by:

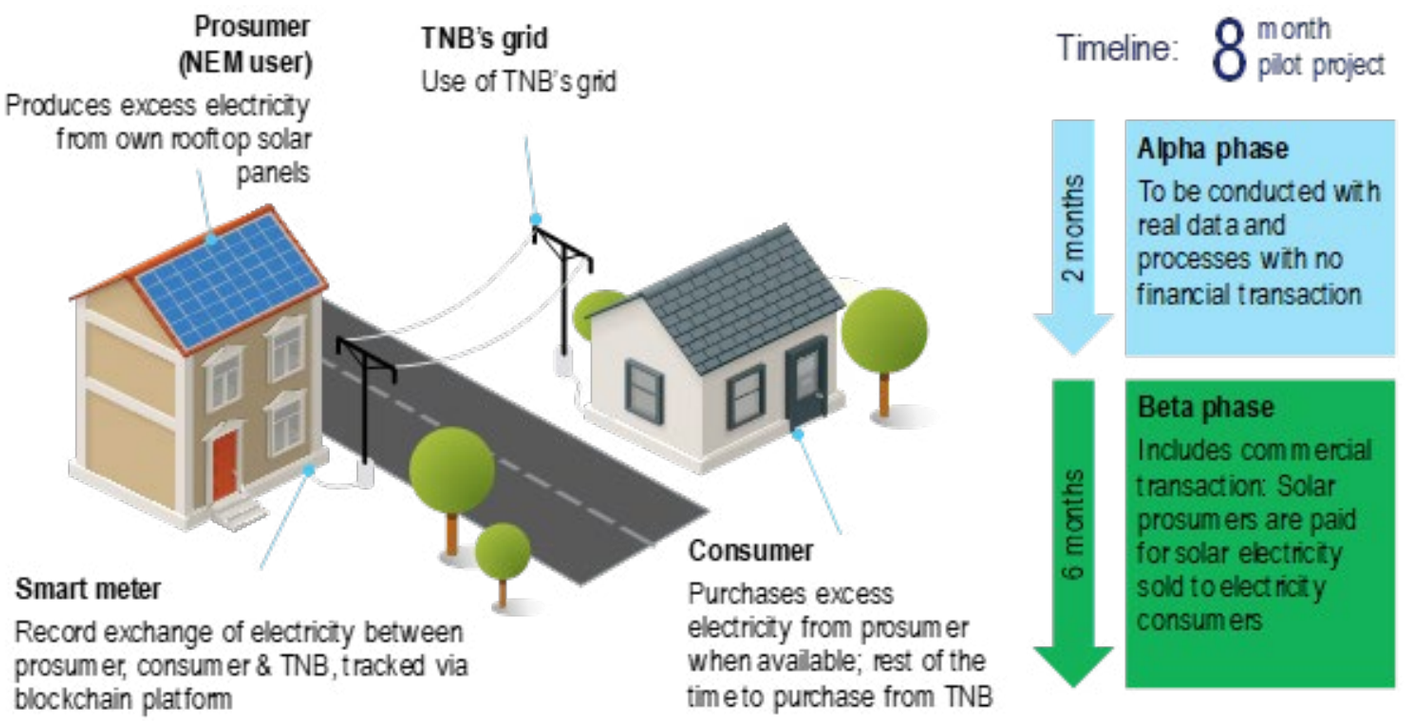


Exhibit 45: Concept of the Pilot P2P Project in Malaysia

The objectives of the pilot run of the P2P energy trading project operating under a regulatory sandbox are to:

- Simulate energy trading patterns between prosumers and consumers;
- Evaluate technical and financial impact of P2P energy trading;
- Identify regulatory changes required to facilitate nationwide P2P adoption; and
- Identify enablers that will encourage the participation of Prosumers and Consumers.

The regulatory sandbox is approved by the Energy Commission. Under the sandbox, NEM prosumers can take part in this pilot run by selling their export solar energy to another consumers of TNB.

For the purpose of the pilot run, the Energy Commission has approved an interim network charge of RM0.063/kWh for the traded electricity. Under the pilot run, any untraded solar energy will be accepted by TNB at zero cost.

The pilot run is divided into two phases: alpha and beta run. The alpha phase is to conduct a proof of concept and test the technical operability of the P2P energy trading platform with the prosumers and consumers' smart meters. The beta run will involve commercial transactions between the prosumers and consumers.

More information on the pilot run of the P2P energy trading can be accessed via https://www.seda.gov.my/2019/10/malaysias-1st-pilot-run-of-peer-to-peer-p2p-energy-trading/.

The Launching of The Country's First Pilot P2P Energy Trading

b) MOU between the Authority and Power Ledger, Platform Provider for the P2P Energy Trading Pilot Run

The Authority also signed a memorandum of understanding (MOU) with Power Ledger Pty Ltd of Australia in conjunction with the launching of Malaysia's first pilot run of a peer-to-peer (P2P) energy trading at IGEM 2019.

The MOU was exchanged between Ir. Dr. Sanjayan Velautham, CEO of the Authority, with Mr. Vinod Tiwari who is the Power Ledger's Head of Business Development & Sales.

Power Ledger is the provider of the P2P energy trading platform which is developed on blockchain technology. Blockchain technology has gained much attention in recent years with the benefits of the decentralised and trustworthiness nature of technology which include immutability of data, transparency, and traceability of transactions.

Outside of its Australia's base, Power Ledger's international client profiles include Austria, France, India, Italy, Japan, Thailand and the United States.

MOU exchange between the Authority and Power Ledger

Earlier in September 2019, as part of capacity building for the Malaysian P2P team, the Authority organised a technical mission trip to Western Australia to learn more of the P2P energy trading models from electricity retailers which have adopted Power Ledger's P2P energy trading platform.

The Malaysian delegates comprised members from the then-MESTECC, Energy Commission, TNB and the Authority.

Malaysian delegation on the P2P Mission Trip to Western Australia which was facilitated by Power Ledger

c) MOU between the Authority and UTM to Advance the Renewable Energy and Energy Efficiency Agenda

During IGEM 2019, the Authority also signed a MoU with Universiti Teknologi Malaysia (UTM). The Authority will be working with UTM through a renewed MoU with the enhancement of the scope of energy management as UTM is an appropriate institution with full expertise and facilities in biogas, biomass and energy management. Given the global developments in energy management and energy efficiency, the Authority believes capacity building in this area should be taken as a step forward in collaboration with stakeholders especially UTM. Ir. Dr. Sanjayan Velautham, CEO of the Authority exchanged MOU documents with Prof. Dr. Shamsul Sahibuddin, Pro-Vice Chancellor Universiti Teknologi Malaysia.

MOU between the Authority and UTM

2) NATIONAL SCIENCE WEEK (NSW)- SELANGOR

The NSW has become an annual event since 2018. Filled with various activities related to science, technology and innovation, the NSW is an ideal platform to raise public awareness on the importance of science and technology on a society's well-being and national progress.

Hence, the theme Science for Well-Being was aptly selected to convey the message on the major role played by science and technology in the realm of socio-economy and environmental sustainability.

In rolling out the second phase of the Selangor level NSW, the then MESTECC Minister YB Puan Yeo Bee Yin noted that the Authority's selection to spearhead NSW 2019 was apt given the Ministry's quest to leverage NSW celebration as a platform to encourage the proliferation of renewable energy (RE) in Malaysia.

The Authority played a pivotal role in the Selangor level NSW 2019 as the event's implementing agency in partnership with the Selangor State Government, the Selangor Public Library Corporation (SPLC) and the Malaysian Association of Creativity and Innovation (MACRI).

On its part, SPLC has been supportive of the government's aspiration to empower the dependency on RE. Through the Net Energy Metering (NEM) scheme implemented by the Authority, SPLC's building is also retrofitted with a solar PV system with an installed capacity of 507.3kW.

Various interesting and interactive programmes were implemented during the second phase of the Selangor level NSW including a water rocket competition for primary and secondary schools, drone race, perfume making & forensics, STEM (science, technology, engineering and mathematics) robotic competition, video shows, creative's VR (virtual reality) Learning and Science, Engineering & Aerospace, among others.

To further spark the concept of "Science is Fun", the Authority, MACRI and the Selangor Education Department conducted a study tour during which pupils visited RE power plants. Earlier during the first phase, around 10 schools in Selangor were selected to participate in a similar study tour to gain insight into RE projects on a hands-on basis.

The Selangor State Level National Science Week 2019 which was spearheaded by the Authority

3) SEDA EXPERIENTAL LEARNING TOUR

The Authority has come out with an ingenious way to reach out to secondary school students by initiating an Experiential Learning Tours-cum-Video Competition. This is designed to promote greater awareness and appreciation of sustainable energy generation among them.

Held in conjunction with the Selangor State level NSW 2019, the event was also aimed at promoting a better understanding of science, technology and innovation among school children. It was made possible with the support from feed-in approval holders (FiAHs) under the feed-in tariff (FiT) scheme.

SEDA's Experiential Learning Tour

Participating schools were given a 'video challenge' to produce a short video clip in which pupils innovatively share their observations, understanding and experience gained at the renewable energy (RE) power plants.

A total of 10 schools participated in the study tour programme from 19 July to 7 August 2019 which involved visits to renewable energy sites within the Klang Valley and neighbouring Negri Sembilan.

A total of 426 pupils participated in the visits to seven renewable sites while another 1,468 students took part in the video preview session and had an opportunity to vote for the best videos.

The students produced in total 103 videos – along with photographs and experiences of their study tours – which have been archived in a dedicated website https://sedalearningtourvideos.simdif.com/page-562341.html.

The highlight of the study tour-cum-video competition was the prize presentation ceremony to the winners and watching the winning videos.

4) NET ENERGY METERING ROADSHOWS ORGANISED BY THE MALAYSIAN PHOTOVOLTAIC INDUSTRY ASSOCIATION (MPIA)

In 2019, the MPIA organised a total of five roadshows to provide NEM awareness during which the Authority was invited to contribute as speaker.

The final leg of the nationwide roadshow concluded in Johor by having attracted over 110 participants from various facets of the industry.

The Authority in support of the NEM roadshows organised by MPIA

The four other previous roadshows were held in Penang, Alor Setar, Melaka and Kuantan whereby they also attracted a good turnout.

These five states are deemed as among the highly active economic centres with a considerable number of residential, commercial and industrial buildings that could benefit most from solar PV rooftop investments.

During the roadshows, the industry players were being briefed by the Authority's officers on the benefits of solar PV installation on commercial and industrial rooftops, including the available incentives provided by the government.

Additionally, representatives from MPIA and supporting agencies such as the Authority, the Malaysian Investment Development Authority (MIDA) and the Energy Commission also spoke on NEM applications, procedures and requirements of the related schemes and incentives, risk and return of investments and licensing process, among others.

The roadshows were designed in such a way that participants could get accurate and direct information.

INSIGHTFUL EXCHANGE WITH KOREANS

22 January

Delegation from Korean Hydro & Nuclear Power Co visited the Authority's office. There was insightful exchange of information, particularly on RE updates from both countries.

DESIGNING THE FUTURE OF THAILAND'S POWER SECTOR

24 January

A forum was jointly organised by the Ministry of Energy, Thailand and Asian Development Bank (ADB) where the Authority's Chief Strategic Officer Dr Wei-nee Chen was invited to chair the session on "Business Models and Innovations in Renewable Energy".

MESTECC OPEN DAY

28 January

The Authority's CEO Ir. Dr. Sanjayan Velautham listening to the voice of youth who visited the Authority's booth at the then MESTECC Open Day.

SPECIAL WORKSHOP FOR FIREMEN

12 February

The Authority organised a Grid Connected Photovoltaic System (GCPV) workshop at the Putrajaya Fire and Rescue Department.

TNB DELEGATION VISITS TO THE AUTHORITY'S OFFICE

15 February

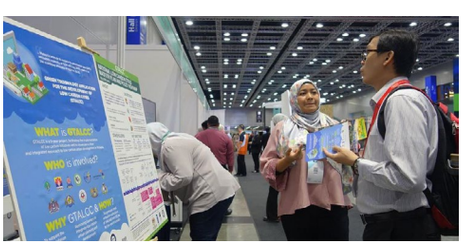
The Retail Division of TNB visited the Authority's office. There was a useful exchange of ideas on sustainable energy development between both parties.

COURTESY CALL BY SMALL HYDRO PLAYERS

18 February

The Malaysia Small Hydro Industry Association (MASHIA) made a courtesy call on the Authority.

EVENT PARTNER AT MALAYSIA URBAN FORUM



18-19 February

The Authority which was the Event Partner of the Malaysia Urban Forum 2019 set up an exhibition booth at the event held at the KLCC, Kuala Lumpur.

LEARNING MORE ABOUT NET ENERGY METERING

26 February

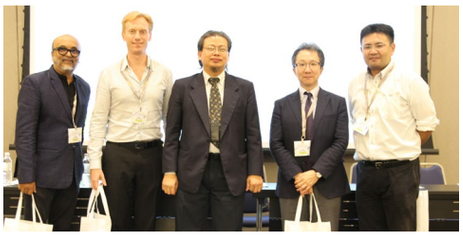
The Authority set up a booth at "*Forum Bandar Hijau Rendah Karbon 2019*" hosted by the Putrajaya Corporation whereby the public can enhance their knowledge on the NEM programme.

PROMOTING SOLAR PV INSURANCE FOR SERVICE PROVIDERS

28 February

The Authority teamed up with Allianz Malaysia and Anora Agency to promote solar PV insurance for service providers at Anora & the Malaysian Photovoltaic Industry Association's (MPIA) Open Day. The Authority's Director of Strategic Communications Mr. Roslan Ali delivered a welcome speech.

AWARENESS TOWARDS ZERO ENERGY BUILDING (ZEB)



28 February

A huge crowd turned up at the seminar on Awareness towards ZEB which was jointly organised by the Authority and JASE-W.

VISIT TO OFF-GRID SOLAR PROJECT

13 March

The Authority and Times-Lite Electrical Engineering Sdn Bhd visited the off-grid solar project at Perkampungan Orang Asli Sungai Relang in Gombak, Selangor.

CLEAN ENERGY COLLABORATION (CEC)

15-16 March

Organised by NGOs such as the SAVE Rivers Network, PACOS Trust & the Indigenous Peoples Network of Malaysia, the event was held in Kuching, Sarawak. The Authority's Chief Strategic Officer Dr Wei-nee Chen made a presentation on the RE status in Malaysia.

BRIEFING SESSION ON NEM PROGRAMME

18 March

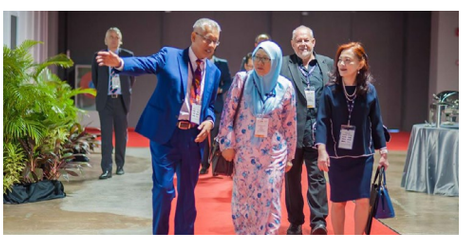
The Authority organised an awareness briefing session was on the NEM programme, Solar PV Investor Directory and SARE.

ASEAN SUPER 8

19 March

The Authority participated in the ASEAN Super 8 event held at MITEC, Kuala Lumpur where a booth was set up to provide updates on Malaysia's sustainable energy development.

ASEAN SUPER 8 PV CONFERENCE 2019



20 March

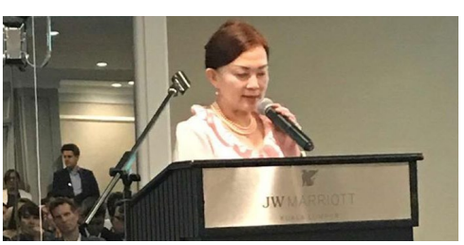
The Authority was invited by the Malaysian PV Industry Association (MPIA) to make a presentation on the status of solar PV in Malaysia and trends driving the global PV market.

VISIT BY THE GLOBAL INSTITUTE FOR TOMORROW

29 March

The Authority was visited by participants of the Malaysia Young Leaders Programme of the Global Institute for Tomorrow. The programme involves acquiring knowledge with regard to SE.

NORDIC SEMINAR DAY



11 April

The Authority was invited by the Embassy of Denmark to talk on the Status of Malaysia's RE in Kuala Lumpur. Its Chief Strategic Officer Dr. Wei-nee Chen shared her views on the latest release of the Energy Transition Index 2019 by the World Economic Forum.

REACHING OUT THROUGH TV2

22 April

The Authority's CEO Ir. Dr. Sanjayan Velautham as well as departmental heads were interviewed on TV2 pertaining to a green technology-related documentary. The programme featured SE updates and highlighted the Authority's key roles, latest plans and developments.

THE AUTHORITY'S 2019 TEAM BUILDING

28 April

The Authority organised a two-day team building event at Genting Highlands.

VISIT BY THE BELGIAN RENEWABLE ENERGY GROUP

30 April

A delegation from the Belgian Renewable Energy Group visited the Authority and expressed keenness to explore RE investments in Malaysia.

NEW WEBSITE AND NEM CALCULATOR LAUNCHED

14 May

The then MESTECC Minister YB Puan Yeo Bee Yin launched the Authority's new microsite on RE and Net Energy Metering (NEM) calculator.

AN INSIGHTFUL INTERVIEW WITH ASTRO AWANI

30 May

The Authority's CEO Ir. Dr. Sanjayan Velautham and former Deputy Secretary General (Natural Resources) Dato' Dr Nadzri Yahaya were interviewed on Let's Talk with Sharaad Kuttan on Astro Awani. The insightful talk show focused on Sustainable Energy updates and the Authority's key role and latest plans.

DONATING BLOOD AND LEARNING ABOUT SE

18 June

The Authority organised the *Jom Amalkan Hidup Sihat* programme where the public could donate blood and learn more about SE at the same time.

A DIALOGUE FOR BETTER COLLABORATION

22 June

The Authority held a dialogue session with the Institution of Engineers Malaysia's Engineering Education Technical Division and The Electrical and Electronics Association of Malaysia (TEEAM) aimed at fostering a stronger collaboration in sustainable energy.

REACHING OUT TO THE BANKING COMMUNITY

26 June

In reaching out to bankers, the Authority was one of the speakers who shared an overview on Malaysia's Renewable Energy sector at Sasana Kijang, Bank Negara Malaysia (BNM). The event was jointly organised by BNM and the World Bank.

MALAYSIA-TAIWAN SMART CITY & GREEN TECHNOLOGY FORUM

5 July

The Authority was invited by the Taiwan External Trade Development Council (TAITRA) to make a presentation on the status of RE in Malaysia.

UPDATES ON SE PROGRAMMES THROUGH TRAXXFM

10 July

The Authority was featured on TRAXXfm with its Chief Strategic Officer Dr Wei-nee Chen and Director of Technical Facilitation and Services division Mr Steve Anthony Lojuntin sharing updates on Malaysia's RE and EE respectively with listeners.

USEFUL EXCHANGE OF IDEAS WITH SINGAPORE'S EMA

10 July

The Authority had the honour of welcoming delegates from Singapore's Energy Market Authority (EMA). There was a useful exchange of insights and experiences between both countries.

MAYBANK ENGAGES IN GREENING EFFOTS

11 July

The Authority and Maybank engaged on the topic of renewables and the importance of financial institutions in realising a common sustainable future for Malaysians. The Authority hopes that this "greening" effort with the financial institutions would continue to snowball and flourish.

CURRENT UPDATES ON RE FOR SABAH

18 July

Mr. Frederick Wong from the Authority 's Sabah Branch office briefed the crowd on current RE updates and latest programmes during the IEM-SESB seminar entitled "Towards Generation Optimisation, Challenges and Opportunities for Sustainable Hydropower Development in Sabah".

ENGAGEMENT SESSION ON RENEWABLE ENERGY PROGRAMMES

25 July

The Authority in collaboration with the Penang Institute conducted an engagement session on Renewable Energy programmes (focusing on NEM) presented by Senior Director of Strategic Planning Division Ms. Azah Ahmad.

ANNOUNCEMENT OF NEM FOR PROPERTY DEVELOPERS

2 August

The Authority's then Chairman YB Wong Kah Woh announced at a media conference that property developers will be allowed to reserve a NEM quota for their new projects.

LEARNING MORE ABOUT SOLAR PV PROJECTS

13 August

Malaysia's RE capability has drawn attention from the Asian Development Bank and Nepal. A delegation visited the Authority to learn more on solar PV projects in Malaysia.

SWISS RE'S ASIA INFRASTRUCTURE CONFERENCE

23 August

Invited by Swiss Re, the Authority's Chief Strategic Officer Dr Wei-nee Chen made a presentation on the status of RE in Malaysia @ Grand Hyatt Kuala Lumpur.

POWERGEN ASIA 2019

3 September

The Authority was invited to contribute ideas at a forum on "Major Drivers of Renewables in ASEAN" @ MITEC.

PRESENTATION ON MALAYSIA'S PILOT P2P ENERGY TRADING

4 September

The Authority's Director of Digital Services Mr Hazril Izan Bahari was invited to a forum discussion which touched on Malaysia's pilot P2P energy trading at the ASEAN Energy Business Forum in Bangkok which was jointly organised by the ASEAN Centre for Energy (ACE) and International Renewable Energy Agency (IRENA).

ENGAGEMENT SESSION ON RE PROGRAMMES @ PETALING JAYA

4 September

The Authority conducted an engagement session on Renewable Energy programmes (focusing on NEM) which took place at Petaling Jaya.

BRIEFING ON RE PROGRAMMES

22 September

"Save & Earn from Solar" dialogue session at Subang Jaya, Selangor. The event graced by Subang Jaya State Assemblywoman YB Michelle Ng has enabled attendees to know better ways of saving via the NEM programme.

DIALOGUE SESSION ON RENEWABLE ENERGY PROGRAMMES

4 October

The Authority has an insightful dialogue session with the RE Industry stakeholders in Kota Kinabalu, Sabah. One of the objectives of this event is to gather feedback from the industry players in Sabah with regard to RE-related matters.

FRUITFUL DISCUSSIONS WITH CHINESE DELEGATION

21 October

MESTECC and the Authority welcomed HE Mr. Zhang Baoshun, Deputy Chairman of Population, Resources and Environment Committee, Chinese People's Political Consultative Conference (CPPCC) and his delegation to Putrajaya. Fruitful discussions were held on best practices in managing environmental pollution and energy issues.

KNOWLEDGE EXCHANGE BETWEEN BRUNEI AND MALAYSIA

25 October

The Authority has the honour receiving a delegation from Brunei (Department of Energy and Department of Environment, Parks and Recreation) who is keen to learn about Malaysia's RE policy and programmes.

WORKSHOP ON INVESTMENT OPPORTUNITIES AND INCENTIVES

25 October

The Authority's officers briefed participants at a workshop entitled "Green Accord Initiative Award Kick-Off: Building Energy Monitoring and Reporting System, UNIDO-MAESTA Investment Opportunity and Incentives in Green Tech Workshop" in Johor Bahru.

WORLD GOVERNMENT SUMMIT IN DUBAI

6 November

Chief Strategic Officer Dr Wei-nee Chen represented the Authority under the invitation of the Government of UAE to present a paper on the status of energy transition in Malaysia.

KING GETS BRIEFING ON THE AUTHORITY'S INITIATIVES

11 November

The Authority was honoured to have His Majesty Seri Paduka Baginda Yang di-Pertuan Agong Al-Sultan Abdullah Ri'ayatuddin Al-Mustafa Billah Shah at its booth during the National Planning Congress 2019 at Kompleks Perbadanan Putrajaya. The Authority briefed His Majesty on its initiatives and the green technology application for the development of low carbon cities project.

GREEN ENERGY FORUM

27 November

Organised by MalaysiaKini in collaboration with Universiti Tenaga Nasional (UNITEN), the Authority was invited to speak on the subject of "Setting Renewable Energy Standards" during the event.

ENERGY EFFICIENCY & CONSERVATION CONFERENCE2019: LIBERALIZATION & DECARBONIZATION OF ENERGY SUPPLY

28 November

Organised by Federation of Malaysian Manufacturers (FMM), the Authority was invited to provide insights on the energy transition in Malaysia during the event themed Liberalisation & Decarbonisation of Energy Supply.

IFN GREEN & SUSTAINABLE FINANCE FORUM 2019

3 December

Chief Strategic Officer of the Authority Dr. Wei-nee Chen was interviewed by Puan Hatini Mat Husin, Senior Director/Head (Debt Markets) of Affin Hwang Capital, during the event staged in Kuala Lumpur.

ENGAGEMENT SESSION ON RENEWABLE ENERGY PROGRAMMES

8 December

The Authority conducted an engagement session on RE programmes (focusing on NEM) in Muar, Johor. The event was graced by YB Puan Yeo Bee Yin, the then Minister of MESTECC. She was accompanied by YB Rajiv Rishyakaran, the then Member of the Authority and the Authority's CEO Ir. Dr. Sanjayan Velautham. The engagement session was attended by the public, government officials and industry players.

SUSTAINABLE AND RENEWABLE ENERGY FORUM (SAREF)

10 - 11 December

The Authority's CEO Ir. Dr. Sanjayan Velautham who was one of the panelists in the "Energy Leaders' Forum" session, shared his views on Malaysia's RE policies and the Authority's involvement in the RE sector with participants. The inaugural event organised by Sarawak Energy in collaboration with the Ministry of Utilities Sarawak took place in Kuching, Sarawak.

CORPORATE

AUTHORITY MEMBERS

YB TUAN LUKANISMAN AWANG SAUNI
Chairman

YB Tuan Lukanisman Awang Sauni was appointed as the Chairman of the Authority on 16th April 2020. Currently, he is the Member of Parliament for the Sibuti constituency.

His key focuses encompass issues such as dilapidated schools; Malaysia Agreement 1963; Parliament reform; youth agenda; rural development; digital economy; science & technology; technical and vocational education and training (TVET); and science policies.

YB Tuan Lukanisman graduated with a Bachelor of Science in Policy and Management in Science & Technology from the University of Malaya. He was born into a mixed family of Melanau and Chinese in Miri – which is dubbed the "Oil Town" – on the northern region of Sarawak.

YB Tuan Lukanisman began his career as a Parliamentary Information Officer with the Special Affairs Department (JASA) of the then Ministry of Information and Multimedia. He ended his service as the Divisional Head of the Department.

He is also a Member of the Young Caucus Parliament in which he organises awareness talks on young voices and leadership awareness for parliamentary reforms.

YB Tuan Lukanisman was conferred numerous awards namely, Pingat Johan Bintang Kenyalang (JBK) by Tuan Yang Terutama Negeri Sarawak in 2019; Pingat Ahli Bintang Kenyalang (ABK) by Tuan Yang Terutama Negeri Sarawak in 2016; and Excellent Service Award (APC) for the years 2010, 2012 and 2015. YB Tuan Lukanisman is also strongly committed to social works and is actively bidding for the Niah Cave to be recognised as one of UNESCO's World Heritage site.

AUTHORITY MEMBERS

YBHG. DATUK ZURINAH PAWANTEH

YBhg. Datuk Zurinah binti Pawanteh was appointed as an Authority Member on 3rd April 2020. Currently, she is the Secretary-General for the Ministry of Energy and Natural Resources (KeTSA).

She attended the Texas Tech University in the United States where she received a Bachelor Degree in Science. She entered the Administrative and Diplomatic Service in 1989 prior to pursuing her Master of Business Administration (MBA) at the Universiti Teknologi MARA (UiTM) in 2005.

Previously, YBhg. Datuk Zurinah was the Secretary-General for the Ministry of Water, Land and Natural Resources and Ministry of Primary Industries.

She has in-depth knowledge and proficiency in the government machinery as she has also served in numerous ministries and government departments, namely the Ministry of Plantation Industries and Commodities; Economic Planning Unit; Department of Women, Family and Community Development; and the Ministry of Human Resources.

AUTHORITY MEMBERS

YBHG. DATIN NIK ROSLINI RAJA ISMAIL

YBhg. Datin Nik Roslini Raja Ismail was appointed as an Authority Member on 15th May 2019.

She attended the University of Exeter, United Kingdom where she received a Bachelor Degree in Social Sciences with (Hons) in Accounting. She joined the Administrative and Diplomatic Service before pursuing her Master of Business Administration (MBA) from the International Islamic University of Malaysia.

Presently, she is the Deputy Under Secretary of the Government Policy & Accreditation Sector of the Government Procurement Division under the Ministry of Finance, a post she has held since 2016. YBhg. Datin Nik Roslini has in depth knowledge and proficiency in government financial management which is accumulated through her experiences serving the Ministry of Finance (MoF) since 1996.

Aside from MoF, she served as a board member of numerous organisations, namely, Johor Port Berhad, Keretapi Tanah Melayu Berhad (KTMB), Indah Water Konsortium Sdn. Bhd. (IWK), Perbadanan Nasional Berhad (PNS), Boustead Naval Shipyard Sdn. Bhd. (BNS), Universiti Sains Islam Malaysia (USIM) and Amanah Ikhtiar Malaysia (AIM) as well as an alternate member to Malaysia Airport Holdings Berhad (MAHB) board. Currently, she also sits as a board member of Padiberas Nasional Bhd (BERNAS) and an alternate member to the Employees Provident Fund (EPF) board.

AUTHORITY MEMBERS

YBHG. DATUK IR. AHMAD FAUZI HASAN

Datuk Ir. Ahmad Fauzi bin Hasan is a professional engineer with 41 years of industry regulatory experience. He has wide experience in performance-based regulation of the energy sector and high-risk industries based on good international practices for ensuring energy supply industry performance in aspects of security, reliability, safety, sustainability, economy and service quality.

Datuk Ir. Ahmad Fauzi bin Hasan was Chief Executive Officer of the Energy Commission from 2010 until 2017 and its Chairman from 2018 until 2020. He was also Chairman of the Atomic Energy Licensing Board from 2017 until January 2020, Member of the Sustainable Energy Development Authority since 2017 (as acting Chairman from 2018 until 2019) and Member of the Board of Trustees of Malaysia Programme Office for Power Electricity Reform from 2019 until 2020.

He is a Fellow of the Institution of Engineers Malaysia, former President of the International Electrotechnical Commission National Committee of Malaysia from 2011 until 2017 and former Executive Committee Member of the East Asia Pacific Infrastructure Regulatory Forum.

He is a recipient of the "ASEAN Excellence in Energy Management by Individual Awards" during the 35th ASEAN Ministers on Energy Meeting in 2017 and the National Standards Award which was awarded by the Ministry of Science, Technology and Innovation in 2005.

Datuk Ir. Ahmad Fauzi received his Bachelor's Degree in Mechanical Engineering from University of Manchester Institute of Science and Technology, England in 1978 and Master's Degree in Engineering from University of Michigan, United States in 1983. He has also attended advanced management programmes at Asian Institute of Management and INTAN as well as public utility regulation and strategy programme at University of Florida.

AUTHORITY MEMBERS

YBRS. MR. TOISIN GANTOR

YBrs. Mr. Toisin Gantor was appointed as the Member of the Authority Malaysia on 15th May 2019. He graduated from the National University of Malaysia in 1989 with a Bachelor Degree in Political Science. He entered the Administrative and Diplomatic Service in 1992, and received a Master of Business Administration (MBA) from the National University of Malaysia in 2001. YBrs. Mr. Toisin is currently the Deputy Secretary-General (Strategic Planning & Management) in the Ministry of Plantation Industries and Commodities (MPIC). He has served various ministries and agencies, which include the Ministry of Health, the Malaysian Maritime Enforcement Agency, the Public Service Department, and the Ministry of Finance.

YBrs. Mr. Toisin attended various professional training programmes, notably RSOG Senior Leadership Programme: Policy Leadership and Strategic Change, Cambridge University, United Kingdom. Kursus Kepimpinan dan Pengurusan Utama (INTAN); and the Premier Executive Advanced Development Programme "The Peak" Canberra, Australia.

He is currently a board member of few organisations, namely the Federal Agricultural Marketing Authority (FAMA) and The Malaysian Standards and Accreditation Council.

AUTHORITY MEMBERS

YBHG. DATUK HANG TUAH BIN DIN @ MOHAMED DIN

YBhg. Datuk Hang Tuah bin Din @ Mohamed Din was appointed as the Member of the Authority on 1st May 2020.

He holds an Executive Masters in Integrated Construction Project Management from Universiti Malaysia Pahang (UMP). He commenced his career in the electrical and telecommunication industry which has spanned more than 30 years.

YBhg. Datuk Hang Tuah is also involved in the manufacturing of Prestressed Spun Concrete Poles for the electrical, communications and railway sectors. He was the founder and former President of the Association of Malay Electrical Contractor Malaysia.

On the political front, YBhg. Datuk Hang Tuah held the post of Chief Secretary for the Welfare Bureau of UMNO Malaysia and is currently the Division Head for UMNO Gopeng in Perak.

During his early days, YBhg. Datuk Hang Tuah was actively involved in youth and student movements. He had also previously led many humanitarian missions domestically and abroad.

AUTHORITY MEMBERS

YB SENATOR DATUK HJ. YAKUBAH KHAN

YB Senator Datuk Hj. Yakubah Khan was appointed as Member of SEDA on 1 May 2020.

Currently, he is the Director for Julang Bernas Sdn Bhd, a company based in Kota Kinabalu Sabah, and an Authority Member for LBS Sdn Bhd in Kuala Lumpur.

YB Senator Datuk Hj. Yakubah was conferred numerous awards, namely Panglima Gemilang Darjah Kinabalu (PGDK) in 2016; Ahli Setia Darjah Kinabalu (ASDK) in 2010; and Ahli Darjah Kinabalu (ADK) in 2004 by the Tuan Yang Terutama Negeri Sabah.

YB Senator Datuk Hj. Yakubah was the previous Deputy Chairman for TEKUN Nasional. He was also a Board Member for ESPEK Plantation Sdn Bhd, a subsidiary of RISDA Holdings Sdn. Bhd for a period of five years.

During his tenure with TEKUN Nasional, YB Senator Datuk Hj. Yakubah was responsible to manage networking relationships with respective funders, partners and vendors through liaison between organisations and affiliates.

AUTHORITY MEMBERS

YB DATO' HJ MOHD SALIM SHARIFF@ MOHD SHARIF

YB Dato' Haji Mohd Salim Sharif @ Mohd Sharif was appointed as an Authority Member on 1st May 2020.

He earned an Executive Bachelor of Leadership Management in 2017 from University College of Agroscience Malaysia (UCAM). YB Dato' Haji Mohd Salim also obtained his Diploma in Agriculture from Institut Pertanian Malaysia in 1986 and a Certificate in Farm Management from MARDI in 1987.

On the political front, YB Dato' Haji Salim held the position of Member of Dewan Negara from 21st April 2014 until 21 April 2018. He was also the Senior Private Secretary to then- Deputy Minister of Education from 2009 until 2013, the Chief Special Officer to the Minister of Education from 2006 until 2009 and the Political Secretary for then-Federal Territories Minister from the year 2004 until 2005. He was also the Council Member for Jempol District of Negeri Sembilan from 1998 until 2004.

YB Dato' Haji Mohd Salim currently holds the position as the Chairman of Rubber Industry Smallholders Development Authority (RISDA) under the Ministry of Rural Development. Other posts which he previously held included being the Board Member for TH Travel Sdn. Bhd. (2016-2019), Chairman of RISDA Estate Sdn. Bhd (2015-2018) and Chairman of RISDA Bina Sdn. Bhd. (2014-2015).

YB Dato' Haji Mohd Salim was conferred numerous awards namely; Darjah Setia Bakti Negeri Sembilan (DBNS), Jasa Pendamai (JP), Pingat Jasa Kebaktian (PJK) and Ahli Negeri Sembilan (ANS)

AUTHORITY MEMBERS

YBRS. PN. USHA NANDHINI JAYARAM

YBrs. Puan S. J Usha Nandhini was appointed as an Authority Member on 1st May 2020.

She attended University of Malaya where she received a B.A (Hons) in History/ Anthropology & Sociology in 1996. She then obtained her LL.B (Hons) from University of London in 2000 and pursued the Certificate in Legal Practice (CLP) from University of Malaya in 2001.

YBrs. Puan S. J Usha Nandhini has held several positions namely in the legal and academic front; Editor, Lecturer, Director & Trainer and Technical Advisor (TAC) in few organisations.

On the political front, YBrs. Puan S. J Usha Nandhini currently holds the position as the National Women Leader of the Malaysian Indian Congress (MIC). She has served as an Ahli Dewan Negara (Senator) from 2008 to 2011. She has also been tasked to head Malaysian delegates in a few international events namely; as the Head of the Malaysian Delegation to the Youth Commonwealth Conference in Pakistan (2005), Head of the Malaysian Parliament Delegation to the AIPA Conference on MDG5 – The Role of Women Parliamentarians in Phnom Penh, Cambodia (2011), representing Malaysia at the Human & Civil Rights Seminar in Germany (2003) and a member of Inter Parliamentary Union (IPU) delegation to Geneva (2010).

Pn. S. J Usha Nandhini also is currently a trustee in Board of Trustees of Maju Institute of Educational Development (MIED)

AUTHORITY MEMBERS

YBRS. IR. DR. SANJAYAN VELAUTHAM

Chief Executive Officer of the Authority

YBrs. Ir. Dr. Sanjayan Velautham was appointed as Chief Executive Officer of the Authority effective of 9th January 2019.

He has more than 30 years of experience in the industry, international organisation, an academia and research institutes. He is a professional engineer (P.Eng.) with a doctoral degree in Engineering and a Senior Member at the Institution of Engineers, Malaysia. He is also an Advisory Board Member for the Asia Pacific Energy Research Centre (APERC), Japan and an Adjunct Professor at the Universiti Teknologi Malaysia (UTM). He maintains a mix of appointments and engagements in several countries within the Asia-Pacific region and beyond, working with decision makers in government, academia, industry and civil society.

Prior to his present appointment he was the Executive Director of the ASEAN Centre for Energy in Indonesia. He had started his career at Tenaga Nasional Bhd. (TNB) in Malaysia within the Power Generations Division, including several years as an Assoc. Prof. at UTM. He had moved to Singapore in 2008 initially as the Deputy Director with the Agency of Science, Technology and Research (A*STAR), and then with General Electric as Region Manager for the Power Generation Services business. He had also served as the National Project Manager for the United Nations Development Programme's (UNDP Malaysia) BioGen Project.

Ir. Dr. Sanjayan has authored several publications in international journals/ books and subject modules particularly in the field of energy. His interest among others is to continue to engage in the strategy and policy research related to sustainable energy development within the region.

The Authority wishes to thank the following Members who have cessed their tenure in 2020. We valued their contributions through their guidance and support they have rendered to the Authority throughout their tenure of service.

Name	Role	Cessation Date
YBhg. Tan Sri Datuk Ir. (Dr) Hj Ahmad Zaidee Laidin	Authority Member	31st January 2020
YBrs Mr. Asdirhyme Abdul Rasib	Authority Member	18th February 2020
YBhg. Datuk Ir. Dr. Siti Hamisah Tapsir	Authority Member	3rd April 2020
YB Tuan Wong Kah Woh	Chairman	16th April 2020
YB Tuan Rajiv A/L Rishyakaran	Authority Member	16th April 2020
YBrs. Mr Abdul Razib Dawood	Authority Member	16th April 2020

Exhibit 46: List of Authority Members' Cessation of Office (Chronological order)

MANAGEMENT TEAM

YBRS. IR. DR. SANJAYAN VELAUTHAM
Chief Executive Officer

YBrs. Ir. Dr. Sanjayan Velautham was appointed as Chief Executive Officer of the Authority effective of 9th January 2019.

He has more than 30 years of experience in the industry, international organisation, an academia and research institutes. He is a professional engineer (P.Eng.) with a doctoral degree in Engineering and a Senior Member at the Institution of Engineers, Malaysia. He is also an Advisory Board Member for the Asia Pacific Energy Research Centre (APERC), Japan and an Adjunct Professor at the Universiti Teknologi Malaysia (UTM). He maintains a mix of appointments and engagements in several countries within the Asia-Pacific region and beyond, working with decision makers in government, academia, industry and civil society.

Prior to his present appointment he was the Executive Director of the ASEAN Centre for Energy in Indonesia. He had started his career at Tenaga Nasional Bhd. (TNB) in Malaysia within the Power Generations Division, including several years as an Assoc. Prof. at UTM. He had moved to Singapore in 2008 initially as the Deputy Director with the Agency of Science, Technology and Research (A*STAR), and then with General Electric as Region Manager for the Power Generation Services business. He had also served as the National Project Manager for the United Nations Development Programme's (UNDP Malaysia) BioGen Project.

Ir. Dr. Sanjayan has authored several publications in international journals/ books and subject modules particularly in the field of energy. His interest among others is to continue to engage in the strategy and policy research related to sustainable energy development within the region.

YBRS. TS. DR. WEI-NEE CHEN
Chief Strategic Officer

YBrs. Ts. Dr. Chen was appointed as Chief Corporate Officer of the Authority on 1st October 2011. She was the Acting Chief Executive Officer (CEO) of the Authority from 2nd August 2018 until 8th January 2019. On 1st August 2019, YBrs. Ts. Dr. Chen was appointed as the Chief Strategic Officer of the Authority. Ts. Dr. Wei-nee Chen holds a Bachelor Degree in Computer Science from the University of Canterbury, Christchurch, New Zealand, a Master of Business Administration from Universiti Tun Abdul Razak, and a Doctor of Business Administration from Universiti Kebangsaan Malaysia. Prior to returning to Malaysia, Ts. Dr. Wei-nee was in New Zealand for 14 years serving in the banking, insurance, freezing, and health industries in various cities in New Zealand.

From 2005-2010, Ts. Dr. Wei-nee served in the capacity of a Technical Advisor in the Malaysia Building Integrated Photovoltaic (MBIPV) Project; a project administered by the Ministry of Energy, Green Technology and Water Malaysia with support from Global Environment Facility through United Nations Development Program. Her role in the MBIPV project was to spearhead the awareness and capacity development of grid-connected solar PV systems in the country. From January 2011 to September 2011, Ts. Dr. Wei-nee was a member of interim the Authority under the same Ministry. Ts. Dr Wei-nee was involved in the development of subsidiary legislations under the Renewable Energy Act 2011 [Act 725], the ICT framework of the e-FiT online system, and strategising the communications on the Feed-in Tariff.

She is also the Malaysian representative for Task 1 (Strategic PV Analysis & Outreach) and alternate Executive Committee member in the International Energy Agency Photovoltaic Power Systems Programme (IEA PVPS). Ts. Dr Wei-nee is a climate change advocator focusing on sustainable energy strategies to mitigate climate change and its negative impact. From 2015-2016, she was actively involved in the Practitioners Dialogue on Climate Investments organised by Deutsche Gesellschaft für Internationale Zusammenarbeit GmbH (GIZ). Specifically in 2016, she contributed as an Advisor to the Working Group on Implementing Climate Resilience Measures in Industry. Ts. Dr Wei-nee has been a member of the World Economic Forum's Global Future Councils on Energy Technologies since 2018.

MANAGEMENT TEAM

Ts Azah Ahmad
Senior Director of Strategic Planning

Ts Steve Anthony Lojuntin
Director of Technical Development And Facilitation

Zafina Ahmad
Director of Finance

Roslan Ali @ Hassan
Director of Strategic Communications

Ts Hazril Izan Bahari
Director of Digital Services

Nor Radhiha Mohd Ali
Head of Internal Audit Unit

Rosma Wati Tahir
Head of Special Unit

Mazliana Mazlan
Legal Advisor

Koh Keng Sen
Acting Director of Market Operations

Sazlinda Ayu Arshad
Acting Director of Human Resource & Administration

AUTHORITY MEETINGS

Meeting Number	Date
1/2019	31st January2019
2/2019	28th February 2019
3/2019	28th March 2019
4/2019	28th May 2019
5/2019	18th July 2019
Special Board Meeting 1/2019	29th August 2019
6/2019	12th September 2019
7/2019	19th September 2019
8/2019	14th November 2019

Exhibit 47: Schedule of Authority Meetings in 2019

NEW ORGANISATIONAL STRUCTURE

2019 has witnessed an organisation restructuring exercise which was completed on 1st August 2019. The restructuring was to achieve operational excellence and crystalizing our expertise on the corpus of sustainable energy knowledge.

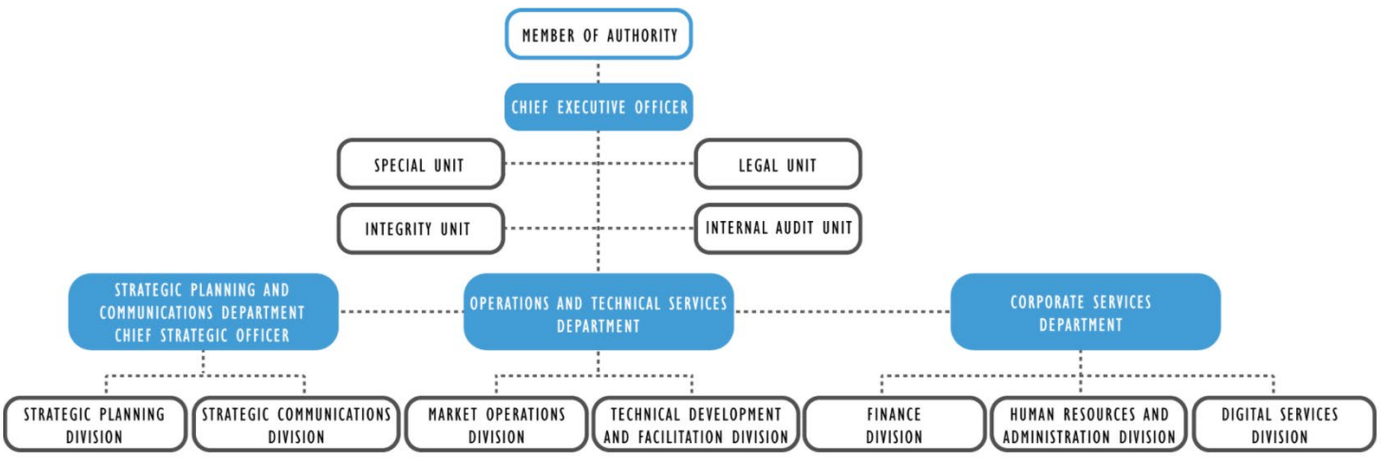


Exhibit 48: New Organisational Structure effective August 2019

ORGANISATIONAL CHANGES

The organisational changes are as follows:

NEW DEPARTMENT / DIVISION		
A	**OPERATIONS AND TECHNICAL SERVICES DEPARTMENT (OTS)**	
	Feed-in Tariff Division (FiT) Division, Renewable Energy Technology Division (RET) and Energy Demand Management (EDM) unit are merged to two (2) new Divisions under a new Operations and Technical Services Department (OTS)	
	a. Market Operations Division (MO) • Implement, manage and monitor the Feed-in Tariff (FiT) and Net Energy Metering (NEM) mechanisms. • Implement initiatives to support the development and creation of a conducive environment for the RE industry such as a suite of directories for PV service providers, PV investors, and local manufacturers.	**b. Technical Development and Facilitation Division (TDF)** • Implement service-related functions in significant areas of sustainable energy (Renewable Energy (RE) & Energy Efficiency (EE) including technical facilitation, supporting low carbon programmes, and industrial support systems. • Implement and undertake capacity development and upskilling programme that meet the needs and requirements of stakeholders (government, industry and the public).
B	**STRATEGIC PLANNING AND COMMUNICATIONS DEPARTMENT (SPC)**	
	Given the significance of our re-organisation exercise, key initiatives and strategies needs in the Authority, we have established a new department, **STRATEGIC PLANNING AND COMMUNICATIONS DEPARTMENT (SPC)** which consists of two (2) Divisions – Strategic Planning (SP) and Strategic Communications (SC) to focus on developing strategic directions and communications to our key stakeholders.	
	a. Strategic Planning Division (SP) • Develop strategic plans towards achieving the Authority's goals; • Conduct or organize research, evaluation and advisory services. Collect, analyse and publish information, statistics and factors affecting or relating to sustainable energy development, and disseminate such information to Government Entities, the public and investors investing in sustainable energy; and • Advise and recommend (to relevant Ministries and Government Entities) on strategies to facilitate energy transition towards greater decarbonisation of the electricity system.	**b. Strategic Communications Division (SC)** • To strategise and develop action plans that most effectively and efficiently communicate the Authority's goals to our key stakeholders. • This includes increasing awareness of the roles and importance of sustainable energy while transforming the Malaysian paradigm to adopt greater deployment of sustainable energy in Malaysia.
C	**CORPORATE SERVICES DEPARTMENT**	
	To enhance the capacity of support divisions, three key divisions are aligned and re-positioned under a new **CORPORATE SERVICES DEPARTMENT**. While Finance (FI) Division and Human Resource and Administrative (HRA) Division remain unchanged, Information and Communication Technology (ICT) has been renamed to Digital Services (DS) Division to reflect a more relevant role. DS will continue to digitalize office operations and enhance the digital infrastructure while HRA will focus on crystalizing the Authority as thought leadership in the corpus of sustainable energy knowledge. Finance will pursue `strengthening of financial governance and prudential management of both the Authority and RE Fund.	

The organisation will continue to be supported by the Special Unit (SU), Legal Unit (LU), Internal Audit (AU) and Integrity Unit (IU) under the CEO's office. With this realignment exercise, the Authority believes it has given a chance to refresh its core competencies. The changes as outlined in **Exhibit 48** help to deliver the Authority's goal is to fulfil our role as a thought leader and authority in the fields of sustainable energy and advise the Minister and relevant Government entities on such matters.

2019 FINANCIAL ANALYSIS

FINANCIAL REVIEW

Building momentum from the previous year, the Authority continues to strive for its long-term goal of promoting the deployment of sustainable energy measures in the nation's economic development and environment conservation. The change in policy for the NEM program and the FiT e-bidding during the year had also helped to generate reasonable income for the Authority and subsequently contribute towards financial sustainability of the Authority to carry on its duties as mandated by the Renewable Energy Act 2011 (Act 725) and SEDA Act 2011 (Act 726).

The Authority is however cautious of the current economic climate of the global economy which is affected by the Covid-19 pandemic. With that in mind, the Authority will endeavour to achieve its financial sustainability with prudent measures without compromising in efficiency and effectiveness of its deliverables.

5 Years Financial Performance

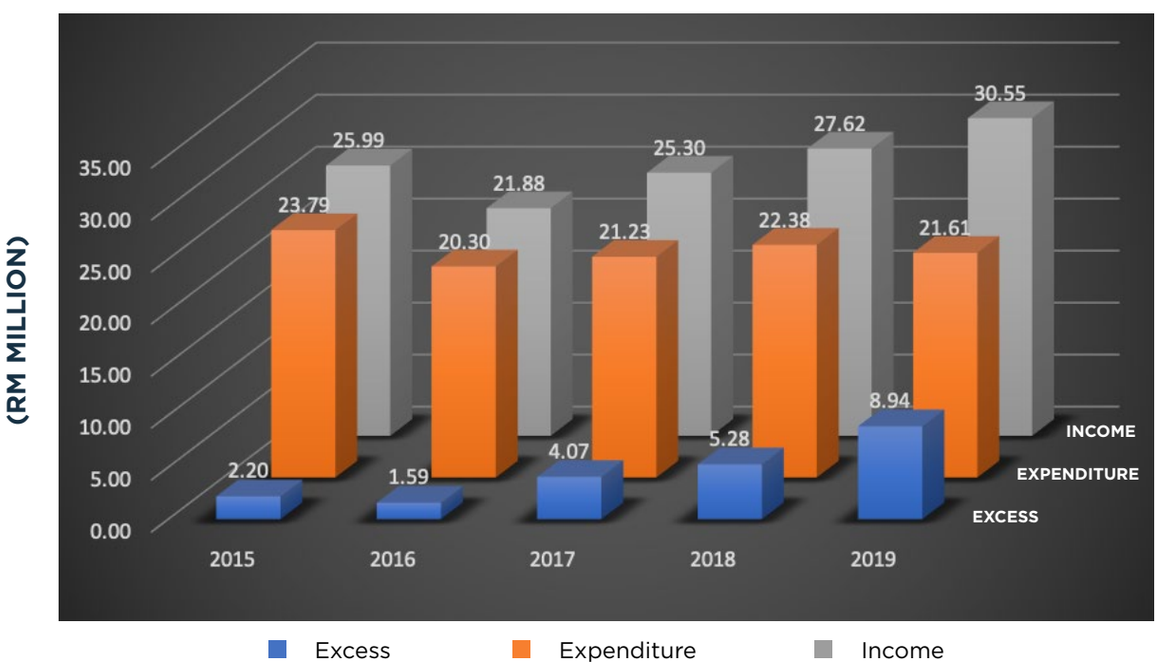


Exhibit 49: The Authority's five years financial performance

DETAILED FINANCIAL ANALYSIS

Income & Expenditure Statement

In 2019, the excess of income over expenditure for the Authority increased to RM8.9 million (2018 : RM5.3 million) due to the higher income recorded of RM30.5 million in 2019 as compared to RM27.6 million in 2018. This represents a 10.5% increment of the total income of the Authority. Included in the income figures are the development fund settlement, administrative fee as well as hibah and profits from fixed deposits and short-term money markets investments. Meanwhile, a total of RM21.6 million was spent on emoluments, grant expenditures and administrative expenses in 2019 (2018 : 22.3 million or 3.3% reduction).

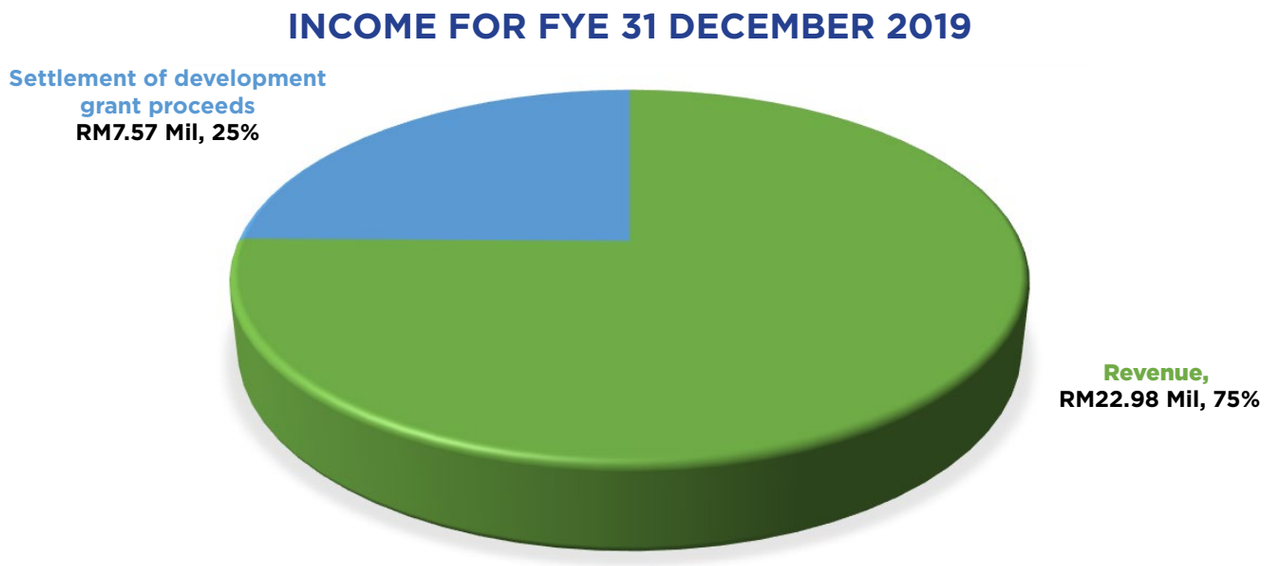


Exhibit 50: The Authority's Income as of 31st December 2019

Revenue

For the financial year ended 31st December 2019, the Authority registered a higher revenue of RM23.0 million representing a 13.4% increase (2018 : RM20.3 million) on account of the income received from FiT e-bidding fee which was first implemented in 2019 (RM2.4 million), other income received from services rendered of RM1.1 million (2018 : Nil) and increase in the NEM application fee by RM1.1 million.

On the other hand, the income received from hibah as well as profit from fixed deposits and short-term money market investment decreased by 9.5% as the Authority was unable to make new investment in the year 2019 pending the approval from the Ministry of Finance (MOF). The approval from the MOF was subsequently obtained by the Authority for new investments to be placed at approved financial institutions through their letter dated 7th February 2020.

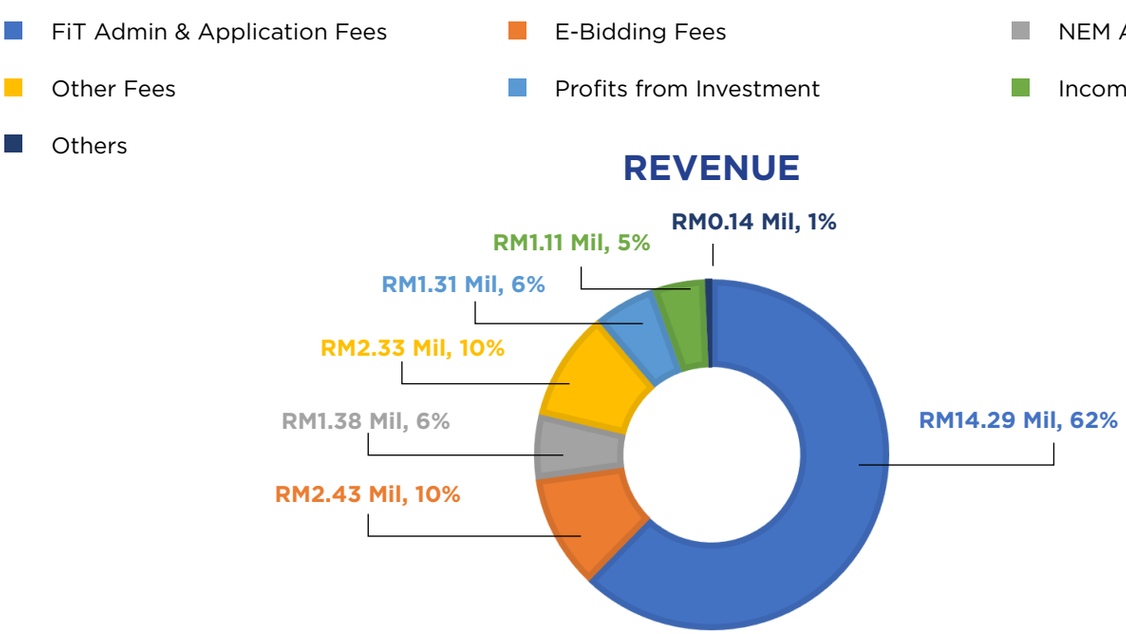


Exhibit 51: The Authority's Revenue as of 31st December 2019

Expenditure

A total of RM21.6 million was expensed out in 2019 representing a 3.2% decrease in total expenditure as compared to RM22.3 million in 2018. Out of the total expenditure, RM7.1 million or 32.6% was for the expenses of various development grants. Meanwhile, employee-related costs remained as the Authority's biggest expenditure item in 2019 at RM9.4 million, representing 43.3% of total expenditure. Other significant expenditures are the administrative expenses that include rental and supplies & consumables of RM1.9 million and RM1.7 million respectively.

Expenditures as of 31st December 2019

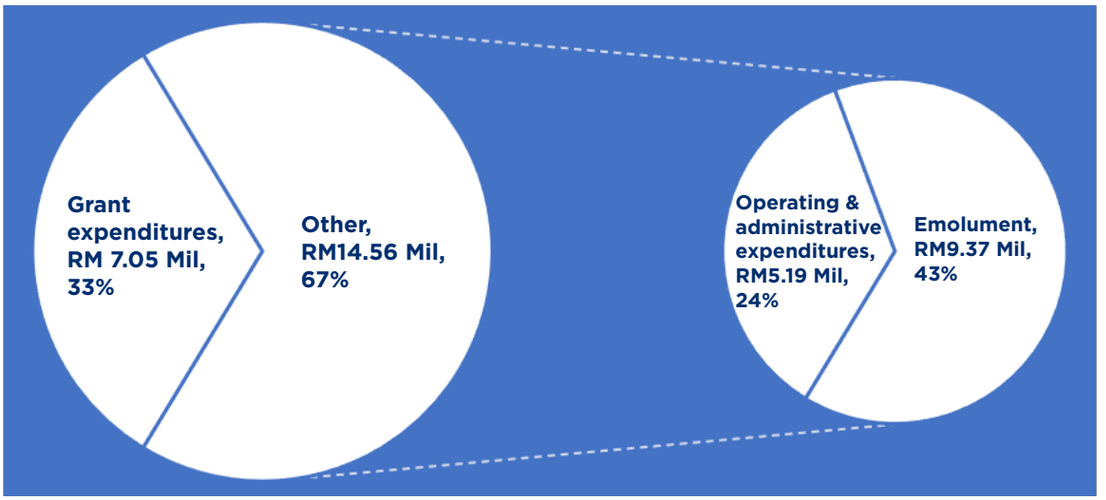


Exhibit 52: The Authority's Expenditures as of 31st December 2019

Grants Received

The Authority received a total of RM4.3 million of development grants for various development programmes for its implementation. These grants are classified as Special Fund reported under the Statement of Financial Position item in which its expenses will only be amortised upon expenditure of the fund. The graph below shows the percentage breakdown of grants received in 2019.

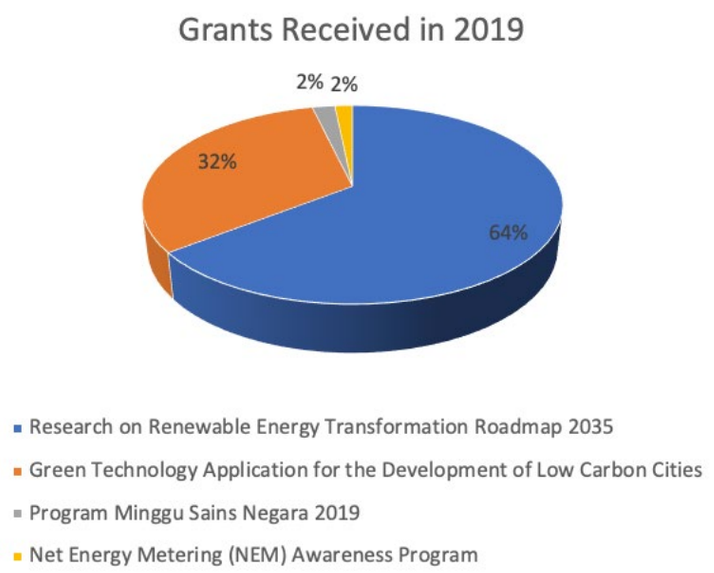


Exhibit 53: Grants Received by the Authority for the year 2019

Statement of Financial Position

Cash and cash equivalents are generally the cash balances maintained in the bank as the Authority had not made any new investment placements in the approved financial institutions in 2019 pending the approval from the MOF.

As at 31st December 2019, **recoverable tax** stood at RM0.2 million mainly due to the Goods and Services Tax receivable from the Royal Malaysian Customs Department.

Included in **receivables, deposits and prepayments** are account receivables of RM5.6 million 52% of which were due to invoices issued for the claims from Dana Akaun Amanah Industri Bekalan Elektrik (AAIBE) while the remaining in relations to receivables with respect to administration fee from the Recovery of Moneys (RoM) of the Renewable Fund (RE Fund) and technical facilitation activities by the Authority with limited credit risk.

Fixed assets value decreased by 8% due to the annual depreciation. Major asset purchases during the year was on the SAGA compliance accounting system costing RM0.17 million, various software systems totalling RM0.14 million and motor vehicle of RM0.13 million.

Payables and accruals consist of contractual obligations under the operating fund as well as e-bidding application fees and deposits for FiT applications.

Recorded as **long-term benefits** is Golden Handshake (GHS) captured as at year end amounted to RM0.03 million based on total annual leave accumulated in lieu of cash to be paid to eligible employees upon retirement. The GHS scheme has only been implemented as at the end of 2019 based on approval for the Minister on 30th January 2019.

The **Special Fund** is mainly reserved for contractual obligations carried out under Section 25(b) of the Renewable Energy Act 2011 (Act 725) as well as various grants managed by the Authority for activities related to sustainable energy. The fund is utilised in accordance to its respective terms of reference, consistent with the strategies and initiatives as outlined by the Authority's key performance indicators.

FINANCIAL STATEMENT 2019

SIJIL KETUA AUDIT NEGARA
MENGENAI PENYATA KEWANGAN
PIHAK BERKUASA PEMBANGUNAN TENAGA LESTARI MALAYSIA
BAGI TAHUN BERAKHIR 31 DISEMBER 2019

Sijil Mengenai Pengauditan Penyata Kewangan

Pendapat

Saya telah mengaudit Penyata Kewangan Pihak Berkuasa Pembangunan Tenaga Lestari Malaysia yang merangkumi Penyata Kedudukan Kewangan pada 31 Disember 2019 dan Penyata Prestasi Kewangan, Penyata Perubahan Aset Bersih serta Penyata Aliran Tunai bagi tahun berakhir pada tarikh tersebut dan nota kepada penyata kewangan termasuklah ringkasan polisi perakaunan yang signifikan seperti yang dinyatakan pada muka surat 1 hingga 29.

Pada pendapat saya, penyata kewangan ini memberikan gambaran yang benar dan saksama mengenai kedudukan kewangan Pihak Berkuasa Pembangunan Tenaga Lestari Malaysia pada 31 Disember 2019 dan prestasi kewangan serta aliran tunai bagi tahun berakhir pada tarikh tersebut selaras dengan Piawaian Perakaunan Sektor Awam Malaysia (MPSAS) dan Akta Pihak Berkuasa Pembangunan Tenaga Lestari 2011 (Akta 726).

Asas Kepada Pendapat

Pengauditan telah dilaksanakan berdasarkan Akta Audit 1957 dan *International Standards of Supreme Audit Institutions*. Tanggungjawab saya dihuraikan selanjutnya di perenggan Tanggungjawab Juruaudit Terhadap Pengauditan Penyata Kewangan dalam sijil ini. Saya percaya bahawa bukti audit yang diperoleh adalah mencukupi dan bersesuaian untuk dijadikan asas kepada pendapat saya.

Kebebasan dan Tanggungjawab Etika Lain

Saya adalah bebas daripada Pihak Berkuasa Pembangunan Tenaga Lestari Malaysia dan telah memenuhi tanggungjawab etika lain berdasarkan *International Standards of Supreme Audit Institutions*.

Maklumat Lain Selain Daripada Penyata Kewangan dan Sijil Juruaudit Mengenainya

Anggota Pihak Berkuasa bertanggungjawab terhadap maklumat lain dalam Laporan Tahunan. Pendapat saya terhadap Penyata Kewangan Pihak Berkuasa Pembangunan Tenaga Lestari Malaysia tidak meliputi maklumat lain selain daripada Penyata Kewangan dan Sijil Juruaudit mengenainya dan saya tidak menyatakan sebarang bentuk kesimpulan jaminan mengenainya.

Tanggungjawab Anggota Pihak Berkuasa Terhadap Penyata Kewangan

Anggota Pihak Berkuasa bertanggungjawab terhadap penyediaan Penyata Kewangan Pihak Berkuasa Pembangunan Tenaga Lestari Malaysia yang memberi gambaran benar dan saksama selaras dengan Piawaian Perakaunan Sektor Awam Malaysia (MPSAS) dan Akta Pihak Berkuasa Pembangunan Tenaga Lestari 2011 (Akta 726). Anggota Pihak Berkuasa juga bertanggungjawab terhadap penetapan kawalan dalaman yang perlu bagi membolehkan penyediaan Penyata Kewangan Pihak Berkuasa Pembangunan Tenaga Lestari Malaysia yang bebas daripada salah nyata yang ketara, sama ada disebabkan fraud atau kesilapan.

Semasa penyediaan Penyata Kewangan Pihak Berkuasa Pembangunan Tenaga Lestari Malaysia, Anggota Pihak Berkuasa bertanggungjawab untuk menilai keupayaan Pihak Berkuasa Pembangunan Tenaga Lestari Malaysia untuk beroperasi sebagai satu usaha berterusan, mendedahkannya jika berkaitan serta menggunakannya sebagai asas perakaunan.

Tanggungjawab Juruaudit Terhadap Pengauditan Penyata Kewangan

Objektif saya adalah untuk memperoleh keyakinan yang munasabah sama ada Penyata Kewangan Pihak Berkuasa Pembangunan Tenaga Lestari Malaysia secara keseluruhannya adalah bebas daripada salah nyata yang ketara, sama ada disebabkan fraud atau kesilapan, dan mengeluarkan Sijil Juruaudit yang merangkumi pendapat saya. Jaminan yang munasabah adalah satu tahap jaminan yang tinggi, tetapi bukan satu jaminan bahawa audit yang dijalankan mengikut *International Standards of Supreme Audit Institutions* akan sentiasa mengesan salah nyata yang ketara apabila ia wujud. Salah nyata boleh wujud daripada fraud atau kesilapan dan dianggap ketara sama ada secara individu atau agregat

sekiranya boleh dijangkakan dengan munasabah untuk mempengaruhi keputusan ekonomi yang dibuat oleh pengguna berdasarkan penyata kewangan ini.

Sebagai sebahagian daripada pengauditan mengikut *International Standards of Supreme Audit Institutions*, saya menggunakan pertimbangan profesional dan mengekalkan keraguan profesional sepanjang pengauditan. Saya juga:

a. Mengenal pasti dan menilai risiko salah nyata ketara dalam Penyata Kewangan Pihak Berkuasa Pembangunan Tenaga Lestari Malaysia, sama ada disebabkan fraud atau kesilapan, merangka dan melaksanakan prosedur audit yang responsif terhadap risiko berkenaan serta mendapatkan bukti audit yang mencukupi dan bersesuaian untuk memberikan asas kepada pendapat saya. Risiko untuk tidak mengesan salah nyata ketara akibat daripada fraud adalah lebih tinggi daripada kesilapan kerana fraud mungkin melibatkan pakatan, pemalsuan, ketinggalan yang disengajakan, representasi yang salah, atau mengatasi kawalan dalaman.

b. Memahami kawalan dalaman yang relevan untuk merangka prosedur audit yang bersesuaian tetapi bukan untuk menyatakan pendapat mengenai keberkesanan kawalan dalaman Pihak Berkuasa Pembangunan Tenaga Lestari Malaysia.

c. Menilai kesesuaian dasar perakaunan yang diguna pakai kemunasabahan anggaran perakaunan dan pendedahan yang berkaitan oleh Anggota Pihak Berkuasa.

d. Membuat kesimpulan terhadap kesesuaian penggunaan asas perakaunan untuk usaha berterusan oleh Anggota Pihak Berkuasa dan berdasarkan bukti audit yang diperoleh, sama ada wujudnya ketidakpastian ketara yang berkaitan dengan peristiwa atau keadaan yang mungkin menimbulkan keraguan yang signifikan terhadap keupayaan Pihak Berkuasa Pembangunan Tenaga Lestari Malaysia sebagai satu usaha berterusan. Jika saya membuat kesimpulan bahawa ketidakpastian ketara wujud, saya perlu melaporkan dalam Sijil Juruaudit terhadap pendedahan yang berkaitan dalam Penyata Kewangan Pihak Berkuasa Pembangunan Tenaga Lestari Malaysia atau, jika pendedahan tersebut tidak mencukupi, pendapat saya akan diubah. Kesimpulan saya dibuat berdasarkan bukti audit yang diperoleh sehingga tarikh Sijil Juruaudit.

e. Menilai sama ada keseluruhan persembahan termasuk pendedahan Penyata Kewangan Pihak Berkuasa Pembangunan Tenaga Lestari Malaysia memberi gambaran yang saksama.

Saya telah berkomunikasi dengan Pihak Berkuasa Pembangunan Tenaga Lestari Malaysia, antaranya mengenai skop dan tempoh pengauditan yang dirancang serta penemuan audit yang signifikan, termasuk kelemahan kawalan dalaman yang dikenal pasti semasa pengauditan.

Hal-hal Lain

Sijil ini dibuat untuk Anggota Pihak Berkuasa berdasarkan Akta Pihak Berkuasa Pembangunan Tenaga Lestari 2011 (Akta 726) dan bukan untuk tujuan lain. Saya tidak bertanggungjawab terhadap pihak lain bagi kandungan sijil ini.

(MOHD NASRI BIN MOHD NASIR)
b.p. KETUA AUDIT NEGARA
PUTRAJAYA
21 OKTOBER 2020

PIHAK BERKUASA PEMBANGUNAN TENAGA LESTARI MALAYSIA

PENYATA PENGERUSI DAN SEORANG ANGGOTA PIHAK BERKUASA PEMBANGUNAN TENAGA LESTARI MALAYSIA

Kami, Lukanisman Bin Awang Sauni dan Ir. Dr. Sanjayan Velautham yang merupakan Pengerusi dan salah seorang Anggota Pihak Berkuasa Pembangunan Tenaga Lestari Malaysia (SEDA Malaysia) dengan ini menyatakan bahawa, pada pendapat Anggota SEDA Malaysia, Penyata Kewangan yang mengandungi Penyata Kedudukan Kewangan, Penyata Prestasi Kewangan, Penyata Perubahan Aset Bersih, Penyata Aliran Tunai dan Penyata Prestasi Bajet yang berikut ini berserta dengan nota-nota kepada Penyata Kewangan di dalamnya, adalah disediakan untuk menunjukkan pandangan yang benar dan saksama berkenaan kedudukan Pihak Berkuasa Pembangunan Tenaga Lestari Malaysia pada 31 Disember 2019 dan hasil kendaliannya serta perubahan kedudukan kewangannya bagi tahun berakhir pada tarikh tersebut.

Bagi pihak Anggota Pihak Berkuasa Pembangunan Tenaga Lestari Malaysia:

.....
LUKANISMAN BIN AWANG SAUNI
Pengerusi

Tarikh: 19 OCT 2020

Tempat: SEDA Malaysia
Presint 4, Putrajaya

.....
IR DR SANJAYAN VELAUTHAM
Ketua Pegawai Eksekutif

Tarikh: 19 OCT 2020

Tempat: SEDA Malaysia
Presint 4, Putrajaya

PIHAK BERKUASA PEMBANGUNAN TENAGA LESTARI MALAYSIA

PENGAKUAN OLEH PEGAWAI UTAMA YANG BERTANGGUNGJAWAB KE ATAS PENGURUSAN KEWANGAN PIHAK BERKUASA PEMBANGUNAN TENAGA LESTARI MALAYSIA

Saya, Zafina Binti Ahmad , pegawai utama yang bertanggungjawab ke atas pengurusan kewangan dan rekod-rekod perakaunan Pihak Berkuasa Pembangunan Tenaga Lestari Malaysia, dengan ikhlasnya mengakui bahawa Penyata Kedudukan Kewangan, Penyata Prestasi Kewangan, Penyata Perubahan Aset Bersih, Penyata Aliran Tunai dan Penyata Prestasi Bajet dalam kedudukan kewangan yang berikut ini berserta dengan nota-nota kepada Penyata Kewangan di dalamnya mengikut sebaik-baik pengetahuan dan kepercayaan saya, adalah betul dan saya membuat ikrar ini dengan sebenarnya mempercayai bahawa ia adalah benar dan atas kehendak-kehendak Akta Akuan Berkanun 1960.

Sebenarnya dan sesungguhnya)
diakui oleh penama di atas)
di PUTRAJAYA WILAYAH PERSEKUTUAN
pada 19 OCT 2020

.....

ZAFINA BINTI AHMAD
750505-08-6560
PENGARAH KEWANGAN

Di hadapan saya :

PESURUHJAYA SUMPAH
732
MOHD YUSRI ISMAIL
1.10.2018 - 31.12.2020
MALAYSIA

.....

PESURUHJAYA SUMPAH

D-3-2 Ayer@8, Jalan P8U,
Presint 8,
62250 Putrajaya

PENYATA KEDUDUKAN KEWANGAN PADA 31 DISEMBER 2019

	NOTA	2019 RM	Dinyatakan Semula 2018 RM
ASET			
Aset Semasa			
Tunai Dan Kesetaraan Tunai	**3**	72,206,586	2,884,412,813
Cukai Dan Pindahan Boleh Pulih	**4**	178,819	1,103,920
Urus Niaga Pertukaran Belum Terima	**5**	5,622,173	210,888,334
Jumlah Aset Semasa		**78,007,578**	**3,096,405,067**
Aset Bukan Semasa			
Hartanah, Kelengkapan Dan Peralatan	**6**	477,542	392,668
Aset Tak Ketara	**7**	1,489,660	1,746,222
Jumlah Aset Bukan Semasa		**1,967,202**	**2,138,890**
Jumlah Aset		**79,974,780**	**3,098,543,957**
LIABILITI			
Liabiliti Semasa			
Urus Niaga Pertukaran Belum Bayar	**8**	7,903,878	127,912,134
Jumlah Liabiliti Semasa		**7,903,878**	**127,912,134**
Liabiliti Bukan Semasa			
Manfaat Jangka Panjang		27,791	-
Kumpulan Wang Khas	**9**	27,834,796	2,935,365,294
Jumlah Liabiliti Bukan Semasa		**27,862,587**	**2,935,365,294**
Jumlah Liabiliti		**35,766,465**	**3,063,277,428**
Aset Bersih		**44,208,315**	**35,266,529**
ASET BERSIH			
Lebihan Terkumpul		44,208,315	35,266,529
Jumlah Aset Bersih		**44,208,315**	**35,266,529**

Nota yang terdapat pada muka surat 133-154 merupakan sebahagian daripada penyata kewangan ini dan hendaklah dibaca bersama-sama.

PENYATA PRESTASI KEWANGAN BAGI TAHUN BERAKHIR 31 DISEMBER 2019

	NOTA	2019 RM	Dinyatakan Semula 2018 RM
Hasil			
Urus Niaga Pertukaran	**10**	22,979,811	20,257,186
Urus Niaga Bukan Pertukaran	**11**	7,571,987	7,366,929
Jumlah Hasil		**30,551,798**	**27,624,115**
Belanja			
Anggota Pengurusan Utama	**12**	269,044	238,107
Upah, Gaji Dan Manfaat Pekerja	**13**	9,368,723	9,740,288
Bekalan Dan Bahan Guna Habis	**14**	1,758,650	2,448,254
Belanja Sewaan		1,989,056	1,984,644
Belanja Susut Nilai Dan Pelunasan	**15**	795,957	849,759
Pembaikan Dan Penyelenggaraan Hartanah, Kelengkapan Dan Peralatan		258,353	323,267
Geran Dan Pindahan Bayaran Lain	**16**	7,053,413	6,745,788
Bayaran Lain	**17**	116,816	18,250
Jumlah Belanja		**21,610,012**	**22,348,357**
Lebihan Bagi Tahun Sebelum Cukai		**8,941,786**	**5,275,758**
Tolak : Cukai	**18**	**-**	**-**
Lebihan Bagi Tahun Selepas Cukai		**8,941,786**	**5,275,758**
Dipegang Oleh:			
SEDA Malaysia		8,941,786	5,275,758
		8,941,786	**5,275,758**

Nota yang terdapat pada muka surat 133-154 merupakan sebahagian daripada penyata kewangan ini dan hendaklah dibaca bersama-sama.

PENYATA PERUBAHAN ASET BERSIH BAGI TAHUN BERAKHIR 31 DISEMBER 2019

Seperti yang dinyatakan semula	Lebihan Terkumpul RM	Jumlah Aset Bersih RM
Baki Pada 1 Januari 2018	**29,990,771**	**29,990,771**
Lebihan Bagi Tahun Selepas Cukai	6,069,096	6,069,096
Pelarasan yang dinyatakan semula	(793,338)	(793,338)
Baki Seperti Pada 31 Disember 2018	**35,266,529**	**35,266,529**
Lebihan Bagi Tahun Selepas Cukai	8,941,786	8,941,786
Baki Seperti Pada 31 Disember 2019	**44,208,315**	**44,208,315**

Nota yang terdapat pada muka surat 133-154 merupakan sebahagian daripada penyata kewangan ini dan hendaklah dibaca bersama-sama.

PENYATA ALIRAN TUNAI BAGI TAHUN BERAKHIR 31 DISEMBER 2019

	NOTA	2019 RM	Dinyatakan Semula 2018 RM
ALIRAN TUNAI DARIPADA AKTIVITI OPERASI			
Terimaan			
Jualan Barang Dan Perkhidmatan		21,672,571	18,812,419
Geran		7,571,987	7,366,929
Faedah Diterima		1,307,240	1,444,767
Terimaan Kumpulan Wang Khas		1,161,011,815	813,457,147
Terimaan Lain		86,247,484	(17,588,667)
Bayaran			
Kos Pekerja		(9,637,767)	(9,978,395)
Pembekal		(1,758,650)	(2,448,254)
Bayaran Kumpulan Wang Khas		(4,069,090,283)	(523,548,322)
Bayaran Lain		(10,213,595)	(9,921,708)
Aliran Tunai Bersih Daripada Aktiviti Operasi	**19**	**(2,812,889,198)**	**277,595,916**
ALIRAN TUNAI DARIPADA AKTIVITI PELABURAN			
Pembelian Hartanah, Kelengkapan Dan Peralatan		(624,269)	(374,088)
Terimaan Daripada Jualan Pelaburan		1,307,240	1,444,767
Aliran Tunai Bersih Daripada Aktiviti Pelaburan		**682,971**	**1,070,679**
Peningkatan Dalam Tunai Dan Kesetaraan Tunai		(2,812,206,227)	278,666,595
Tunai Dan Kesetaraan Tunai Pada Awal Tahun		2,884,412,813	2,605,746,218
Tunai Dan Kesetaraan Tunai Pada Akhir Tahun		**72,206,586**	**2,884,412,813**

Nota yang terdapat pada muka surat 133-154 merupakan sebahagian daripada penyata kewangan ini dan hendaklah dibaca bersama-sama.

PENYATA PRESTASI BAJET BAGI TAHUN BERAKHIR 31 DISEMBER 2019

MENGURUS	2019			Dinyatakan Semula 2018		
	Anggaran Asal	Sebenar		Anggaran Asal	Sebenar	
TERIMAAN	**RM**	**RM**	**%**	**RM**	**RM**	**%**
Pelbagai Pendapatan	17,680,000	22,979,811	129.98	18,766,000	20,257,186	107.95
Lain-Lain Hasil	-	7,571,987	-	-	7,366,929	-
Jumlah Terimaan	**17,680,000**	**30,551,798**	**172.80**	**18,766,000**	**27,624,115**	**147.20**
BAYARAN						
Emolumen	10,629,100	9,637,767	90.67	9,261,490	9,978,395	107.74
Bekalan Dan Perkhidmatan	6,214,900	4,006,059	64.46	7,889,510	4,756,165	60.28
Aset	646,000	624,269	96.64	1,056,000	374,088	35.43
Pemberian Dan Kenaan Bayaran Tetap	20,000	28,830	144.15	20,000	-	-
Perbelanjaan Lain	20,000	883,943	4,419.72	30,000	868,009	2,893.36
Jumlah Bayaran	**17,530,000**	**15,180,868**	**86.60**	**18,257,000**	**15,976,657**	**87.51**
LEBIHAN BERSIH	**150,000**	**15,370,930**	**10,247.29**	**509,000**	**11,647,458**	**2,288.30**

Nota yang terdapat pada muka surat 133-154 merupakan sebahagian daripada penyata kewangan ini dan hendaklah dibaca bersama-sama.

PENYATA PRESTASI BAJET BAGI TAHUN BERAKHIR 31 DISEMBER 2019 (sambungan)

PEMBANGUNAN	Dinyatakan Semula Pada 01.01.2019 RM	Amaun Sebenar RM	Pada 31.12.2019 RM
TERIMAAN			
Pemberian Kerajaan	117,812,719	4,330,336	122,143,055
Jumlah Terimaan	**117,812,719**	**4,330,336**	**122,143,055**
BAYARAN			
Geran Kementerian Tenaga, Teknologi Hijau Dan Air	10,062,902	312,520	10,375,422
Geran Program *MySuria*	59,008	25,555	84,563
Geran *MySuria* (Bonus FiT)	4,863,000	1,137,000	6,000,000
Geran Program *Malaysian Building Integrated Photovoltaic* (MBIPV)	2,055,468	77,027	2,132,495
Geran *Government Lead By Example* (GLBE)	5,768,454	53,905	5,822,359
Geran *Government of Selangor System PV – Kampung Orang Asli*	42,541	333,129	375,670
Geran *Government of Selangor – Rumah Selangorku*	71,755	123,181	194,936
Geran Program *Energy Month*	306,030	300,000	606,030
Geran *Energy Audit For Commercial Under RMK-11*	4,694,872	881,448	5,576,320
Geran Program Pengurusan Bangunan Cekap Tenaga di Bangunan Kerajaan Negeri Selangor	281,919	297	282,216
Geran Program *Upskilling Workforce for OGE*	2,792,631	35,900	2,828,531
Geran Program *Sustainability Achieved Via Energy Efficiency* (SAVE)	39,138,403	298,818	39,437,221
Geran Pembangunan *Enhancement of E-FiT System*	345,669	206,053	551,722
Geran Pembangunan *Development of ICT System*	2,511,448	-	2,511,448
Geran Pembangunan *Wind Mapping*	1,760,350	55,025	1,815,375
Geran Pembangunan *Geotherma*	2,900,000	-	2,900,000
Geran *PV Data Monitoring*	4,437,395	799,161	5,236,556
Geran *International Sustainable Energy Summit (ISES)*	350,000	-	350,000
Geran *Net Energy Metering (NEM) Awareness Program*	55,739	94,395	150,134
Geran *Research On The Future Of Energy In Malaysia*	-	1,784,649	1,784,649
Geran *TNB ROM Enhancement*	40,000	298,648	338,648
Geran Pelan Komunikasi FiT	1,665,856	160,234	1,826,090
Geran Program Minggu Sains Negara 2019	-	76,855	76,855

PENYATA PRESTASI BAJET BAGI TAHUN BERAKHIR 31 DISEMBER 2019 (sambungan)

PEMBANGUNAN	Dinyatakan Semula Pada 01.01.2019 RM	Amaun Sebenar RM	Pada 31.12.2019 RM
BAYARAN			
Geran *Low Carbon ICT*	71,907	30,160	102,067
Geran *Green Technology Application for the Development of Low Carbon Cities*	1,199,447	2,039,901	3,239,348
Geran *Building Sector Energy Efficiency Project*	82,300	52,100	134,400
Jumlah Bayaran	**85,557,094**	**9,175,961**	**94,733,055**
LEBIHAN BERSIH	**32,255,625**	**(4,845,625)**	**27,410,000**

Nota yang terdapat pada muka surat 133-154 merupakan sebahagian daripada penyata kewangan ini dan hendaklah dibaca bersama-sama.

NOTA AKAUN KEPADA PENYATA KEWANGAN BAGI TAHUN BERAKHIR 31 DISEMBER 2019

1. ASAS PENYEDIAAN

(a) Maklumat Am

Pihak Berkuasa Pembangunan Tenaga Lestari Malaysia (SEDA Malaysia) ditubuhkan dengan berkuatkuasanya Akta Pihak Berkuasa Pembangunan Tenaga Lestari 2011 [Akta 726] pada 1 September 2011.

Objektif utama penubuhan SEDA Malaysia adalah untuk melaksanakan fungsi-fungsi perbadanan Pihak Berkuasa selaras dengan kehendak Akta Pihak Berkuasa Pembangunan Tenaga Lestari 2011 [Akta 726].

Anggota SEDA Malaysia dilantik oleh Menteri Tenaga, Sains, Teknologi, Alam Sekitar dan Perubahan Iklim. Anggota SEDA Malaysia terdiri daripada seorang (1) Pengerusi, dua (2) wakil Kerajaan Persekutuan, tiga (3) orang anggota lain dan Ketua Pegawai Eksekutif.

Anggota Pihak Berkuasa Pembangunan Tenaga Lestari Malaysia yang masih berkhidmat sejak tarikh akhir Penyata Kewangan ini adalah seperti berikut:

Anggota SEDA Malaysia yang masih kekal bagi tahun 2019:
Datuk Ir. Ahmad Fauzi Bin Hasan – Pemangku Pengerusi (tamat perkhidmatan sebagai Pemangku Pengerusi pada 30 Jun 2019)
Tan Sri Dato' Academician (Dr.) Ts. Hj. Ahmad Zaidee Bin Laidin
YB Rajiv A/L Rishyakaran

Anggota baharu yang dilantik pada tahun 2019:
YBrs. Asdirhyme Bin Abdul Rasib (dilantik pada 15 Januari 2019)
YBhg. Datin Nik Roslini Binti Raja Ismail (dilantik pada 15 Mei 2019)
YBrs. Toisin Gantor (dilantik pada 15 Mei 2019)
YBrs. Abdul Razib Bin Dawood (dilantik pada 15 Mei 2019)
YB Wong Kah Woh – Pengerusi (dilantik pada 1 Julai 2019)
YBrs. Ir. Dr. Sanjayan A/L K.V. Velautham (dilantik pada 9 Januari 2019)

Anggota yang tamat perkhidmatan pada tahun 2019:
En. Chan Cheu Leong (tamat perkhidmatan pada 31 Januari 2019)
YBrs. Ravi A/L Muthayah (tamat perkhidmatan pada 14 Mei 2019)

Sejak akhir tahun kewangan yang lepas, tiada Anggota Pihak Berkuasa Pembangunan Tenaga Lestari Malaysia menerima atau layak menerima sebarang manfaat (selain daripada Elaun Anggota seperti yang ditunjukkan di dalam Penyata Kewangan, *rujuk **Nota 12***) seperti yang termaktub di dalam Akta Pihak Berkuasa Pembangunan Tenaga Lestari 2011 [Akta 726].

Berdasarkan kepada Seksyen 37 Akta Pihak Berkuasa Pembangunan Tenaga Lestari 2011 [Akta 726], tahun kewangan SEDA Malaysia hendaklah bermula pada 1 Januari

dan berakhir pada 31 Disember setiap tahun. Tempoh perakaunan SEDA Malaysia bagi tahun 2019 bermula dari 1 Januari 2019 sehingga 31 Disember 2019.

Penyata Kewangan Pihak Berkuasa Pembangunan Tenaga Lestari Malaysia bagi tahun berakhir 31 Disember 2019 telah dibentang dan dan diperakukan di Mesyuarat Jawatankuasa Kewangan Pihak Berkuasa Pembangunan Tenaga Lestari Malaysia Bil. 01/2020 pada 7 September 2020 dan juga diluluskan melalui Ketetapan Tanpa Mesyuarat Anggota Pihak Berkuasa Pembangunan Tenaga Lestari Malaysia (Secara Edaran) Bil. 4/2020 pada 15 Oktober 2020.

(b) Penyata Pematuhan

Penyata Kewangan disediakan pada Asas Akruan.

Penyata Kewangan ini telah disediakan berdasarkan kepada Piawaian Perakaunan Sektor Awam Malaysia (MPSAS).

Penyata Kewangan ini telah disediakan mengikut asas akruan menurut kelaziman Kos Sejarah kecuali seperti yang didedahkan di Dasar Perakaunan.

Peristiwa Selepas Tarikh Pelaporan ialah peristiwa yang memuaskan atau sebaliknya, yang berlaku antara tarikh pelaporan dengan tarikh apabila Penyata Kewangan diterbitkan.

(c) Pertimbangan Dan Anggaran

Penyediaan Penyata Kewangan memerlukan pertimbangan, anggaran dan andaian yang memberi kesan kepada penggunaan dasar dan amaun bagi Aset, Liabiliti, Hasil dan Belanja yang dilaporkan.

Anggaran dan andaian yang digunakan akan disemak secara berterusan. Semakan semula kepada anggaran perakaunan akan diiktiraf dalam tempoh anggaran tersebut disemak, jika semakan semula hanya memberi kesan kepada tempoh tersebut, atau dalam tempoh semakan dan tempoh masa hadapan sekiranya semakan semula memberi kesan kepada tempoh semasa dan masa yang akan datang.

2. DASAR PERAKAUNAN

Dasar perakaunan yang berikut diamalkan oleh SEDA Malaysia:

(a) Asas Perakaunan

SEDA Malaysia telah memilih untuk menggunapakai piawaian perakaunan MPSAS bagi pelaporan penyata kewangan bermula tahun 2018 seperti yang telah diluluskan oleh Jabatan Akauntan Negara Malaysia.

(i) Pemakaian MPSAS

MPSAS yang diguna pakai oleh SEDA Malaysia adalah seperti berikut:

MPSAS 1	-	*Presentation of Financial Statements*
MPSAS 2	-	*Cash Flow Statements*
MPSAS 3	-	*Accounting Policies, Changes in Accounting Estimates and Errors*

MPSAS 4 - *The Effect of Changes in Foreign Exchange Rates*
MPSAS 9 - *Revenue From Exchange Transactions*
MPSAS 14 - *Events After The Reporting Date*
MPSAS 17 - *Property, Plant and Equipment*
MPSAS 19 - *Provisions, Contingent Liabilities and Contingent Assets*
MPSAS 20 - *Related Party Disclosures*
MPSAS 22 - *Disclosure of Financial Information*
MPSAS 23 - *Revenue From Non-Exchange Transactions (Taxes and Transfers)*
MPSAS 24 - *Presentation of Budget Information in Financial Statements*
MPSAS 25 - *Employee Benefits*
MPSAS 26 - *Impairment of Cash-Generating Assets*
MPSAS 28 - *Financial Instruments: Presentation*
MPSAS 29 - *Financial Instruments: Recognition and Measurement*
MPSAS 30 - *Financial Instruments: Disclosure*
MPSAS 31 - *Intangible Assets*

(b) Pengiktirafan Pendapatan

(i) Pemberian Daripada Kerajaan

Pemberian daripada kerajaan bagi projek pembangunan diiktiraf apabila diterima dan akan dilunas sebagai belanja susut nilai bagi aset yang dibeli atau diperolehi serta belanja operasi yang tidak dipermodalkan.

(ii) Pendapatan Perkhidmatan

Pendapatan perkhidmatan terdiri daripada kutipan fi yang kena dibayar kepada SEDA Malaysia sebagaimana yang diperuntukkan di bawah Akta Pihak Berkuasa Pembangunan Tenaga Lestari 2011 [Akta 726]. Pendapatan ini diambilkira apabila fi yang kena dibayar dikenakan dan diterima.

(iii) Pendapatan Faedah Dan Hibah

Pendapatan faedah dan hibah diiktiraf berasaskan akruan.

(c) Belanja Am

Belanja diiktiraf dalam tempoh ia berlaku dan dikenakan.

(d) Hartanah, Kelengkapan Dan Peralatan

Semua hartanah, kelengkapan dan peralatan dinyatakan pada kos ditolak susut nilai terkumpul dan kerugian kemerosotan. Kos termasuk perbelanjaan yang berkaitan terus dengan perolehan sesuatu aset berkenaan. Semua pembaikan dan penyelenggaraan akan diiktiraf sebagai perbelanjaan dan dikira dalam Penyata Prestasi Kewangan dalam tempoh kewangan di mana ianya ditanggung.

Nilai baki dan tempoh jangka hayat kegunaan harta, kelengkapan dan peralatan akan dikaji dan diselaraskan, jika perlu, pada tarikh pelaporan.

Keuntungan atau kerugian daripada pelupusan hartanah, kelengkapan dan peralatan adalah perbezaan antara hasil pelupusan bersih dan amaun bawaan bagi hartanah, kelengkapan dan peralatan, dan didedahkan dalam Penyata Prestasi Kewangan.
Susut Nilai

Susut nilai bagi hartanah, kelengkapan dan peralatan dikira berdasarkan kaedah asas garis lurus ke atas anggaran jangka masa guna aset berkenaan.

Kadar tahunan susut nilai adalah seperti berikut:

Kategori Aset	Kadar susut nilai (%)	Usia guna (Tahun)
Perabot, kelengkapan dan ubahsuai	20	Lima (5)
Komputer dan sistem aplikasi	33 1/3	Tiga (3)
Kenderaan bermotor	20	Lima (5)
Elektronik	20	Lima (5)

(e) Aset Tak Ketara

Aset tak ketara adalah terdiri daripada sistem perisian *E-FiT*, sistem perisian Pengurusan Rekod Berkomputer (*FingerTips)*, Sistem *SAGA,* sistem *MicroSoft 365* dan sistem *Attendance* yang dinyatakan pada kos. Kos adalah termasuk perbelanjaan yang berkaitan terus dengan perolehan sistem perisian.

Semua pembaikan dan penyelenggaraan akan diiktiraf sebagai perbelanjaan dan dikira dalam Penyata Prestasi Kewangan dalam tempoh kewangan di mana ianya ditanggung.

Tempoh jangka hayat Aset Tak Ketara ditentukan tidak melebihi sepuluh (10) tahun.

(f) Rosot Nilai Aset Bukan Kewangan

Nilai bawaan hartanah, kelengkapan dan peralatan disemak semula untuk menentukan sama ada terdapatnya sebarang petunjuk kemerosotan. Kemerosotan diukur dengan membandingkan nilai bawaan aset dengan jumlah boleh diperolehi semula. Kerugian kemerosotan diiktiraf sebagai perbelanjaan dalam Penyata Prestasi Kewangan dengan serta merta.

Peningkatan jumlah boleh diperolehi semula aset yang berikutnya dianggap sebagai penerbalikan kerugian kemerosotan sebelum ini dan diiktiraf sehingga tahap nilai bawaan aset yang akan ditentukan (bersih daripada pelunasan dan susut nilai) sekiranya tiada kerugian kemerosotan diiktiraf. Penerbalikan diiktiraf dalam Penyata Prestasi Kewangan dengan serta merta.

Aset bukan kewangan yang tertakluk kepada pelunasan akan disemak untuk penjejasan apabila peristiwa atau berlaku perubahan pada keadaan yang menunjukkan nilai dibawa berkemungkinan tidak akan diperolehi.

(g) Urus Niaga Pertukaran Belum Terima

Urus Niaga Pertukaran Belum Terima dinyatakan pada kos. Hutang ragu akan diperuntukkan bagi hutang yang tidak berbayar melebihi tempoh satu (1) tahun.

(h) Tunai Dan Kesetaraan Tunai

Tunai Dan Kesetaraan Tunai terdiri daripada wang di tangan, baki di bank, akaun simpanan tetap dan pelaburan jangka pendek bertujuan untuk menghadapi keperluan kecairan.

(i) Urus Niaga Pertukaran Belum Bayar

Urus Niaga Pertukaran Belum Bayar dinyatakan pada kos yang menyamai nilai saksama ganjaran yang dibayar pada masa hadapan untuk barangan dan perkhidmatan yang diberi.

(j) Manfaat Pekerja

(i) Manfaat Jangka Pendek

Gaji, bonus dan lain-lain faedah yang diterima oleh pekerja diiktiraf sebagai perbelanjaan dalam tempoh di mana perkhidmatan berkaitan diberikan oleh pekerja SEDA Malaysia.

(ii) Manfaat Jangka Panjang

Pengumpulan jangka panjang ganjaran ketidakhadiran seperti cuti tahunan berbayar akan diambil kira apabila perkhidmatan telah diberikan oleh pekerja yang mana telah meningkatkan hak mereka ke atas ganjaran ketidakhadiran di masa hadapan.

Pengiraan Gantian Cuti Rehat (GCR) SEDA Malaysia dikira dengan menggunakan kaedah *projected unit credit* di mana ia melibatkan beberapa andaian seperti gaji akhir di gred jawatan tanpa mengambil kira kenaikan pangkat serta jumlah maksima GCR yang dikumpul dan baki tempoh perkhidmatan sebelum bersara. Pengiraan ini diperolehi selepas mendiskaunkan jumlah pembayaran GCR dengan menggunakan kadar diskaun tertentu.

(iii) Pelan Sumbangan Tetap

Menurut peruntukan perundangan, Badan Berkanun di Malaysia perlu membayar caruman kepada Pertubuhan Keselamatan Sosial, Kumpulan Wang Amanah Persaraan dan Kumpulan Wang Simpanan Pekerja. Perbelanjaan tersebut diiktiraf sebagai perbelanjaan semasa di dalam Penyata Prestasi Kewangan apabila ianya tertanggung.

(k) Pelaburan

Pelaburan hanya dibuat dalam bentuk Pasaran Wang Jangka Pendek dan Akaun Simpanan Tetap serta tempoh pelaburan tidak melebihi dua belas (12) bulan bagi memastikan kecairan aliran tunai SEDA Malaysia dan Kumpulan Wang Tenaga Boleh Baharu.

(l) Cukai

SEDA Malaysia telah diberi pengecualian Cukai Pendapatan ke atas semua pendapatan kecuali dividen untuk tempoh tiga (3) tahun bermula dari tahun taksiran 2017 sehingga tahun taksiran 2019.

(m) Tukaran Wang Asing

Urusniaga yang dibuat dengan menggunakan mata wang asing telah ditukarkan kepada Ringgit Malaysia dengan kadar yang ditetapkan pada masa urusniaga dibuat.

(n) Rosot Nilai Aset Kewangan

Pada akhir setiap tempoh pelaporan, SEDA Malaysia akan menilai sama ada terdapat sebarang bukti objektif bahawa aset kewangan perlu untuk dirosot nilai. Bukti objektif termasuk:

i) Kesukaran kewangan yang ketara oleh peminjam;
ii) Pembayaran tertunggak;
iii) Kemungkinan bahawa peminjam akan muflis; atau
iv) Data yang menunjukkan bahawa terdapat penurunan di dalam anggaran aliran tunai masa depan.

Bagi kategori aset kewangan yang diukur pada kos dilunaskan, jika tiada bukti objektif wujud bagi individu yang ketara, maka semua aset dalam kumpulan yang mempunyai ciri-ciri risiko yang serupa tidak kira sama ada ia ketara atau tidak, akan dinilai secara kolektif untuk menentukan sama ada ia perlu dibuat rosot nilai.

Kerugian rosot nilai, berhubung dengan aset kewangan yang diukur pada kos dilunaskan, diukur sebagai perbezaan di antara nilai dibawa aset berkenaan dan nilai semasa anggaran aliran tunai yang didiskaunkan pada kadar faedah berkesan yang asal. Nilai dibawa aset tersebut akan dikurangkan melalui penggunaan akaun elaun. Sebarang kerugian rosot nilai diiktiraf dalam penyata prestasi kewangan dengan serta-merta. Jika, dalam tempoh kemudiannya, sebarang amaun kerugian rosot nilai menurun, kerugian rosot nilai yang diiktiraf sebelumnya akan dibalikkan secara langsung dalam akaun elaun. Pembalikkan ini diiktiraf dalam penyata prestasi kewangan dengan serta-merta.

(o) Peruntukan-Peruntukan

Peruntukan merujuk kepada obligasi perundangan atau komitmen konstruktif berpunca daripada peristiwa lampau yang ada kecenderungan berlakunya aliran keluar sumber ekonomi atau potensi perkhidmatan untuk melunaskan obligasi tersebut. Anggaran jumlah aliran keluar tersebut mestilah boleh dibuat dengan objektif.

Bagi obligasi atau komitmen yang diperuntukan pembayaran balik (diinsurankan), pembayaran balik tersebut akan diiktiraf sebagai aset yang berasingan dengan syarat pembayaran balik tersebut benar-benar dapat dipastikan.

Peruntukan-peruntukan ini akan dikaji semula pada setiap tarikh penyata kedudukan kewangan dan diselaraskan untuk menggambarkan anggaran semasa yang terbaik. Di mana kesan nilai semasa wang adalah material, jumlah peruntukan adalah nilai kini perbelanjaan yang dijangka akan diperlukan untuk menyelesaikan obligasi tersebut.

3. TUNAI DAN KESETARAAN TUNAI

Tunai dan Kesetaraan Tunai pada akhir tahun kewangan terdiri daripada:

	2019 RM	2018 RM
Tunai Di Tangan	6	2,384
Tunai Di Bank	72,206,580	101,410,429
Deposit Jangka Pendek:		
- Bank Berlesen	-	233,000,000
Simpanan Tetap:		
- Bank Berlesen	-	2,550,000,000
	72,206,586	**2,884,412,813**

Deposit Jangka Pendek dibuat untuk pelbagai tempoh antara satu (1) minggu sehingga tiga (3) minggu bergantung kepada keperluan tunai segera SEDA Malaysia, dan memperoleh faedah pada Kadar Deposit Jangka Pendek. Kadar Faedah yang diterima adalah pada kadar di antara 2.95% sehingga 3.45% setahun (2018: di antara 2.95% sehingga 3.45% setahun).

Simpanan Tetap dibuat untuk pelbagai tempoh antara tiga (3) bulan sehingga dua belas (12) bulan bergantung kepada keperluan tunai segera SEDA Malaysia, dan memperoleh faedah pada Kadar Simpanan Tetap. Kadar Faedah yang diterima adalah pada kadar di antara 4.00% sehingga 4.30% setahun (2018: di antara 4.00% sehingga 4.30% setahun).

4. CUKAI DAN PINDAHAN BOLEH PULIH

	2019 RM	2018 RM
Semasa		
Cukai Boleh Pulih	**178,819**	**1,103,920**

SEDA Malaysia tidak memegang apa-apa cagaran atau peningkatan kredit atas penghutang yang melebihi tempoh. Semua boleh pulih daripada Cukai dan Pindahan adalah dalam Ringgit Malaysia.

Analisis pengumuran Cukai Boleh Pulih adalah seperti berikut:

	2019 RM	2018 RM
Kurang dari 6 bulan	-	238,491
6 bulan hingga 1 tahun	-	181,228
1 tahun hingga 3 tahun	178,819	684,201
	178,819	**1,103,920**

5. URUS NIAGA PERTUKARAN BELUM TERIMA

	2019 RM	Seperti yang dinyatakan semula 2018 RM
Semasa		
Akaun Belum Terima	5,360,672	188,445,424
Peruntukan Hutang Ragu	(7,957)	-
Pendahuluan Kakitangan	14,237	4,100
Faedah Belum Terima	-	22,206,060
Deposit Dan Prabayar	255,221	232,750
	5,622,173	**210,888,334**

(a) Akaun Belum Terima

Akaun Belum Terima tidak dikenakan faedah dan secara umumnya tempoh yang terlibat ialah dari 30 hari ke 12 bulan (2018: dari 30 hari ke 12 bulan). Akaun Belum Terima diiktiraf pada Nilai Saksama semasa pengiktirafan awal. Amaun dijangka boleh pulih dalam masa dua belas (12) bulan, akan diiktiraf pada amaun invois asal. Jika tidak, ia akan diiktiraf pada Nilai Kini amaun invois asal. Akaun Belum Terima didenominasi dalam Ringgit Malaysia. Analisis pengumuran Akaun Belum Terima (pada Amaun Kasar) adalah seperti berikut:

	2019 RM	Seperti yang dinyatakan semula 2018 RM
Tidak melebihi tempoh dan tidak terjejas	-	61,990,993
1 hingga 3 bulan	3,413,762	124,758,023
3 hingga 6 bulan	1,524,852	1,689,250
6 hingga 12 bulan	-	7,158
Lebih 12 bulan	422,058	-
	5,360,672	**188,445,424**

Penumpuan Risiko Kredit adalah terhad dan ianya tidak dilakukan.

(b) Pendahuluan Kakitangan

Pecahan pada akhir tahun kewangan adalah seperti berikut:

	2019 RM	2018 RM
Pendahuluan Kakitangan	**14,237**	**4,100**

Risiko Kredit ke atas Pendahuluan Kakitangan adalah kecil kerana amaun yang tertunggak boleh dipulihkan secara bulanan melalui potongan gaji.

6. HARTANAH, KELENGKAPAN DAN PERALATAN

	Perabot, Kelengkapan Dan Ubahsuai	Komputer Dan Sistem Aplikasi	Kenderaan Bermotor	Elektronik	Jumlah
	RM	RM	RM	RM	RM
Kos					
Pada 1 Januari 2019	3,893,768	2,735,977	1,040,624	133,503	7,803,872
Tambahan	87,078	82,270	133,802	-	303,150
Pelupusan	(14,328)	(80,061)	(169,835)	-	(264,224)
Pada 31 Disember 2019	**3,966,518**	**2,738,186**	**1,004,591**	**133,503**	**7,842,798**
Susut Nilai Terkumpul					
Pada 1 Januari 2019	3,740,874	2,615,587	952,591	102,152	7,411,204
Tambahan	78,617	70,544	51,449	17,666	218,276
Pelupusan	(14,328)	(80,061)	(169,835)	-	(264,224)
Pada 31 Disember 2019	**3,805,163**	**2,606,070**	**834,205**	**119,818**	**7,365,256**
Nilai Buku Bersih	**161,355**	**132,116**	**170,386**	**13,685**	**477,542**

Seperti yang dinyatakan semula	Perabot, Kelengkapan Dan Ubahsuai	Komputer Dan Sistem Aplikasi	Kenderaan Bermotor	Elektronik	Jumlah
	RM	RM	RM	RM	RM
Kos					
Pada 1 Januari 2018	3,827,549	2,692,369	1,040,624	124,058	7,684,600
Pelarasan	(1)	-	-	-	(1)
Tambahan	66,220	43,608	-	9,445	119,273
Pada 31 Disember 2018	**3,893,768**	**2,735,977**	**1,040,624**	**133,503**	**7,803,872**
Susut Nilai Terkumpul					
Pada 1 Januari 2018	3,621,757	2,505,852	892,353	80,770	7,100,732
Pelarasan	(213)	(307)	(5)	(8)	(533)
Tambahan	119,330	110,042	60,243	21,390	311,005
Pada 31 Disember 2018	**3,740,874**	**2,615,587**	**952,591**	**102,152**	**7,411,204**
Nilai Buku Bersih	**152,894**	**120,390**	**88,033**	**31,351**	**392,668**

7. ASET TAK KETARA

	2019 RM	Seperti yang dinyatakan semula 2018 RM
Kos		
Pada 1 Januari	5,583,550	5,328,735
Tambahan	321,119	254,815
Pada 31 Disember	**5,904,669**	**5,583,550**

	2019 RM	Seperti yang dinyatakan semula 2018 RM
Pelunasan Terkumpul Dan Kerugian Penjejasan Terkumpul		
Pada 1 Januari	3,837,328	3,298,041
Tambahan	59,108	20,714
Pelunasan	518,573	518,573
Pada 31 Disember	**4,415,009**	**3,837,328**
Nilai Buku Bersih	**1,489,660**	**1,746,222**

8. URUS NIAGA PERTUKARAN BELUM BAYAR

	2019 RM	Seperti yang dinyatakan semula 2018 RM
Akaun Belum Bayar	6,316,740	126,553,044
Terakru	1,587,138	1,359,090
	7,903,878	**127,912,134**

Akaun Belum Bayar dan Belum Bayar Lain adalah tidak dikenakan faedah dan pada kebiasaannya diselesaikan atas terma 30 hari.

(a) Akaun Belum Bayar

Akaun Belum Bayar didenominasi dalam Ringgit Malaysia. Analisis pengumuran Akaun Belum Bayar (pada Amaun Kasar) adalah seperti berikut:

	2019 RM	Seperti yang dinyatakan semula 2018 RM
Tidak melebihi tempoh dan tidak terjejas	-	36,716,617
1 hingga 3 bulan	4,386,521	89,819,226
3 hingga 6 bulan	1,236,391	-
6 hingga 12 bulan	152,010	17,201
Lebih 12 bulan	541,818	-
	6,316,740	**126,553,044**

Penumpuan Risiko Kredit adalah terhad dan ianya tidak dilakukan.

9. KUMPULAN WANG KHAS

	Kumpulan Wang Tenaga Boleh Baharu	Kumpulan Wang Pembangunan	Jumlah
	RM	RM	RM
Pada 1 Januari 2019	2,903,109,669	32,255,625	2,935,365,294
Caruman Kerajaan Dalam Dana Yang Dipegang	-	9,358,675	9,358,675
Terimaan	1,152,201,407	-	1,152,201,407
Penggunaan Dana Yang Dipegang	(4,054,886,280)	(14,204,300)	(4,069,090,580)
Pada 31 Disember 2019	**424,796**	**27,410,000**	**27,834,796**
Seperti yang dinyatakan semula			
Pada 1 Januari 2018	2,614,411,017	31,071,953	2,645,482,970
Caruman Kerajaan Dalam Dana Yang Dipegang	-	14,644,433	14,644,433
Terimaan	798,826,215	-	798,826,215
Penggunaan Dana Yang Dipegang	(510,127,563)	(13,460,761)	(523,588,324)
Pada 31 Disember 2018	**2,903,109,669**	**32,255,625**	**2,935,365,294**

SEDA Malaysia telah menyediakan satu Laporan Tahunan yang merangkumi maklumat Kumpulan Wang SEDA Malaysia (KWSM) dan Kumpulan Wang Tenaga Boleh Baharu (KWTBB) mulai tahun 2011 hingga 2018. Penyata Kewangan SEDA Malaysia tahun 2018 adalah termasuk maklumat KWTBB yang telah diaudit.

Pada 22 Julai 2019, Jabatan Audit Negara (JAN) telah mengarahkan supaya SEDA Malaysia menyediakan dua (2) set penyata kewangan iaitu Penyata Kewangan KWTBB di bawah Akta Tenaga Boleh Baharu 2011 [Akta 725] dan Penyata Kewangan SEDA Malaysia di bawah Akta Pihak Berkuasa Pembangunan Tenaga Lestari 2011 [Akta 726] mulai tahun 2019. Pihak JAN telah mengeluarkan Laporan Ketua Audit Negara Tanpa Teguran untuk Penyata Kewangan SEDA Malaysia Tahun 2018.

	2019 RM	2018 RM
Tunai Dan Kesetaraan Tunai	(2,822,797,502)	2,822,797,502
Cukai Dan Pindahan Boleh Pulih	(906,220)	906,220
Urus Niaga Pertukaran Belum Terima	(204,110,468)	204,110,468
Urus Niaga Pertukaran Belum Bayar	3,028,238,986	(124,704,521)
	424,796	**2,903,109,669**

10. URUS NIAGA PERTUKARAN

Pendapatan yang diterima oleh SEDA Malaysia adalah wang yang didapati daripada fi yang dibayar kepada SEDA Malaysia, yuran latihan yang dianjurkan, jualan borang serta buku latihan, faedah simpanan pasaran wang jangka pendek, hibah bank seperti yang diperuntukkan di bawah Akta Pihak Berkuasa Pembanguna Tenaga Lestari 2011 [Akta 726] dan Akta Tenaga Boleh Baharu 2011 [Akta 725].

	2019 RM	Seperti yang dinyatakan semula 2018 RM
Fi Pentadbiran Tarif Galakan (FiT)	14,138,675	14,541,512
Fi Permohonan Dan Pemprosesan Tarif Galakan (FiT)	153,290	773,446
Fi *E-Bidding* Pemegang Tarif Galakan	2,427,340	-
Fi Permohonan Dan Pemprosesan *Net Energy Metering* (NEM)	1,380,471	248,852
Fi Permohonan *MySuria*	-	22,264
Lain-Lain Fi	2,326,487	-
Fi Pendaftaran *Renewable Energy Industry*	-	468,575
Yuran Latihan Yang Dianjurkan Oleh SEDA Malaysia	-	2,365,020
Jualan Buku Latihan, Dokumen Tender Dan Iklan	29,982	176,951
Lain-Lain Hasil Dari Perkhidmatan Yang Diberi	1,105,001	-
Faedah Diterima Daripada Pelaburan	1,106,707	1,374,736
Hibah Bank	200,533	70,031
Lain-Lain Hasil Bukan Cukai	109,480	215,799
Hasil Dari Jualan Aset	1,845	-
	22,979,811	**20,257,186**

11. URUS NIAGA BUKAN PERTUKARAN

Merupakan hasil pelunasan Geran Kumpulan Wang Pembangunan.

	2019 RM	Seperti yang dinyatakan semula 2018 RM
Geran Kementerian Tenaga, Teknologi Hijau Dan Air	312,520	344,144
Geran Program *MySuria*	21,291	36,781
Geran Program *Malaysian Building Integrated Photovoltaic* (MBIPV)	77,027	140,305
Geran *Government Lead By Example* (GLBE)	53,905	73,953
Geran *Government of Selangor System PV – Kampung Orang Asli*	333,129	42,541
Geran *Government of Selangor – Rumah Selangorku*	123,180	71,755
Geran *Energy Audit For Commercial Under RMK-11*	881,448	2,338,074
Geran Program Pengurusan Bangunan Cekap Tenaga di Bangunan Kerajaan Negeri Selangor	297	52,081
Geran Program *Upskilling Workforce for OGE*	35,900	65,100
Geran Program *Sustainability Achieved Via Energy Efficiency* (SAVE)	298,818	56,393
Geran Pembangunan *Development of ICT System*	-	14,497
Geran Pembangunan *Enhancement of E-FiT System*	206,054	206,053
Geran Pembangunan *Wind Mapping*	55,025	100,000
Geran Pembangunan *Geotherma*	-	59,617
Geran *PV Data Monitoring*	799,161	2,771,342
Geran *Net Energy Metering (NEM) Awareness Program*	94,395	55,739
Geran *Research On The Future Of Energy In Malaysia*	1,784,649	-
Geran *TNB ROM Enhancement*	238,648	40,000
Geran Pelan Komunikasi FiT	57,524	-
Geran Program Minggu Sains Negara 2019	76,855	
Geran *Low Carbon ICT*	30,160	19,200
Geran *Green Technology Application for the Development of Low Carbon Cities*	2,039,901	864,554
Geran *Building Sector Energy Efficiency Project*	52,100	14,800
	7,571,987	**7,366,929**

12. ANGGOTA PENGURUSAN UTAMA

Anggota pengurusan utama adalah mereka yang mempunyai kuasa dan tanggungjawab untuk perancangan, arahan dan kawalan ke atas aktiviti SEDA Malaysia sama ada secara langsung atau tidak langsung.

Bilangan anggota pengurusan utama SEDA Malaysia ialah 12 orang (2018: 13 orang)

Pembayaran untuk anggota pengurusan utama adalah seperti berikut:

	2019 RM	2018 RM
Jumlah ganjaran	**269,044**	**238,107**

13. UPAH, GAJI DAN MANFAAT PEKERJA

	2019 RM	Seperti yang dinyatakan semula 2018 RM
Gaji Dan Upah	7,571,846	7,282,758
Elaun/Manfaat Tetap	-	739,730
Sumbangan Berkanun Untuk Kakitangan	1,471,148	1,092,081
Bayaran Lebih Masa	61,270	44,429
Manfaat Kewangan Lain	264,459	581,290
	9,368,723	**9,740,288**

Upah, Gaji dan Manfaat Pekerja yang diterima oleh kakitangan SEDA Malaysia adalah seperti yang termaktub di dalam Akta Pihak Berkuasa Pembangunan Tenaga Lestari 2011 [Akta 726].

Gaji dan upah adalah termasuk pembayaran kepada Ketua Pegawai Eksekutif dan Pemangku Ketua Pegawai Eksekutif.

Jumlah kakitangan SEDA Malaysia ialah 77 orang (2018: 84 orang). Berikut adalah kumpulan perkhidmatan di SEDA Malaysia:

	2019	2018
Pengurus Kanan (M1 – M2)	2	1
Pengurusan Pertengahan (E1 – E6)	17	9
Eksekutif (E7 – E12)	30	43
Sokongan (S1 – S9)	28	31
	77	**84**

14. BEKALAN DAN BAHAN GUNA HABIS

	2019 RM	Seperti yang dinyatakan semula 2018 RM
Perbelanjaan Perjalanan Dan Sara Hidup	339,159	455,840
Perhubungan Dan Utiliti	129,371	210,648
Bahan-Bahan Makanan Dan Minuman	47,651	56,021
Bekalan Bahan Mentah Dan Bahan-Bahan Untuk Penyelenggaraan Dan Pembaikan	22,833	21,608
Bekalan Dan Bahan Lain	432,194	687,383
Perkhidmatan Ikhtisas Dan Perkhidmatan Lain Dan Hospitaliti	787,442	1,016,754
	1,758,650	**2,448,254**

15. BELANJA SUSUT NILAI DAN PELUNASAN

	2019 RM	Seperti yang dinyatakan semula 2018 RM
Belanja Susut Nilai		
Perabot, Kelengkapan Dan Ubahsuai	78,617	90,183
Komputer Dan Sistem Aplikasi	70,544	109,735
Kenderaan Bermotor	51,449	60,238
Elektronik	17,666	18,692
Sistem *FingerTips*	14,300	14,300
Sistem SAGA	23,960	5,783
Sistem Email	12,141	631
Sistem *MicroSoft 365*	8,380	-
Sistem *Attendance*	327	-
Jumlah Belanja Susut Nilai	**277,384**	**299,562**
Pelunasan Hartanah, Kelengkapan Dan Peralatan	-	31,624
Pelunasan Aset Tak Ketara	518,573	518,573
Jumlah Susut Nilai Dan Pelunasan	**795,957**	**849,759**

16. GERAN DAN PINDAHAN BAYARAN LAIN

Merupakan belanja pelunasan Geran Kumpulan Wang Pembangunan.

	2019 RM	Seperti yang dinyatakan semula 2018 RM
Geran Program *MySuria*	21,291	36,781
Geran Program *Malaysian Building Integrated Photovoltaic* (MBIPV)	77,027	140,305
Geran *Government Lead By Example* (GLBE)	53,905	73,953
Geran *Government of Selangor System PV – Kampung Orang Asli*	333,129	42,541
Geran *Government of Selangor – Rumah Selangorku*	123,180	71,755
Geran *Energy Audit For Commercial Under RMK-11*	881,448	2,338,074
Geran Program Pengurusan Bangunan Cekap Tenaga di Bangunan Kerajaan Negeri Selangor	297	52,081
Geran Program *Upskilling Workforce for OGE*	35,900	65,100
Geran Program *Sustainability Achieved Via Energy Efficiency* (SAVE)	298,818	56,393
Geran Pembangunan *Wind Mapping*	55,025	100,000
Geran Pembangunan *Geotherma*	-	3,170
Geran *PV Data Monitoring*	799,161	-
Geran *Net Energy Metering (NEM) Awareness Program*	94,395	55,739
Geran *Research On The Future Of Energy In Malaysia*	1,784,649	-
Geran *TNB ROM Enhancement*	238,648	40,000
Geran Pelan Komunikasi FiT	57,524	-
Geran Program Minggu Sains Negara 2019	76,855	-
Geran *Low Carbon ICT*	30,160	19,200
Geran *Green Technology Application for the Development of Low Carbon Cities*	2,039,901	864,554
Geran *Building Sector Energy Efficiency Project*	52,100	14,800
	7,053,413	**6,745,788**

17. BAYARAN LAIN

	2019 RM	2018 RM
Sumbangan	1,039	-
Manfaat Jangka Panjang	27,791	-
Caj Bank	16,606	18,250
Duti Setem	14,945	-
Cukai Jualan	48,478	-
Hapuskira Hutang Lapuk	7,957	-
	116,816	**18,250**

18. CUKAI

Pada 11 Januari 2018, Kementerian Kewangan telah meluluskan permohonan SEDA Malaysia berhubung pengecualian cukai pendapatan tahunan. SEDA Malaysia telah diberi pengecualian cukai pendapatan bagi tahun taksiran 2017 sehingga 2019 bagi semua pendapatan kecuali dividen.

19. ALIRAN TUNAI BERSIH DARIPADA AKTIVITI OPERASI

	2019 RM	Seperti yang dinyatakan semula 2018 RM
Lebihan Bagi Tahun Kewangan	8,941,786	5,275,758
Pelarasan Untuk:		
Susut Nilai Untuk Hartanah, Kelengkapan Dan Peralatan	795,957	849,759
Hasil Faedah	(1,307,240)	(1,444,767)
Perubahan Dalam Belum Terima	206,841,999	(8,936,169)
Perubahan Dalam Belum Bayar	(120,083,232)	(8,057,490)
Perubahan Dalam Kumpulan Wang Khas	(2,908,078,468)	289,908,825
Aliran Tunai Bersih Daripada Aktiviti Operasi	**(2,812,889,198)**	**277,595,916**

20. OBJEKTIF DAN POLISI PENGURUSAN RISIKO KEWANGAN

Objektif Dan Polisi Pengurusan Risiko Kewangan

Polisi pengurusan risiko kewangan SEDA Malaysia adalah untuk memastikan sumber kewangan yang mencukupi bagi perbelanjaan operasi SEDA Malaysia sementara menguruskan risiko kewangannya, termasuk risiko kredit, risiko kadar faedah, risiko kecairan dan aliran tunai.

(a) Risiko Kredit

SEDA Malaysia mengamalkan polisi iaitu tunai dan setara tunai disimpan hanya di bank dan institusi kewangan berlesen.

(b) Risiko Kadar Faedah

SEDA Malaysia tidak terdedah kepada risiko kadar faedah kerana tidak mempunyai aset jangka panjang yang menanggung faedah atau hutang yang menanggung faedah.

(c) Risiko Kecairan Dan Aliran Tunai

SEDA Malaysia tidak memiliki profil hutang dan memiliki wang tunai yang cukup untuk memenuhi keperluan semua modal kerja. Selain daripada itu, SEDA Malaysia juga

menguruskan dengan teliti urusan keluar masuk tunai dan juga urusan pembayaran pemiutang.

21. PERISTIWA SELEPAS TARIKH PELAPORAN

a) Merujuk kepada laporan dari Tenaga Nasional Berhad (TNB) mengenai status tuntutan Mendapatkan Wang pada 6 Januari 2020, hanya RM523 ribu sahaja jumlah kos Mendapatkan Wang yang masih belum dituntut oleh pihak TNB.

Peristiwa di atas tidak melibatkan apa-apa perubahan kepada Penyata Kedudukan Kewangan SEDA Malaysia pada 31 Disember 2019 sehingga tarikh Penyata Kewangan ini dibentangkan.

Di dalam caj pentadbiran SEDA Malaysia bagi tahun 2019, adalah termasuk caj pentadbiran yang diterima bagi tahun 2012 hingga 2018. Ini berlaku kerana terdapat kelewatan tuntutan *Recovery of Money* (RoM) oleh Tenaga Nasional Berhad dan Sabah Electricity Sdn Bhd.

Tahun	TNB (RM)	SESB (RM)	Jumlah (RM)
2013	4,264	-	4,264
2014	11,705	91	11,796
2015	30,793	1,177	31,970
2016	193,461	427	193,888
2017	146,654	1,343	147,997
2018	933,757	39,653	973,410
Jumlah	**1,320,634**	**42,691**	**1,363,325**

b) Pada 16 Mac 2020, Kerajaan Malaysia telah mengumumkan Perintah Kawalan Pergerakan (PKP) di seluruh negara untuk membendung penyebaran Covid-19 di Malaysia di bawah Akta Pencegahan dan Pengawalan Penyakit Jangkitan 1988 dan Akta Polis 1987.

Sebelum penyata kewangan ini dikeluarkan, pihak Berkuasa telah mempertimbangkan kesan wabak Covid-19 di Malaysia yang telah mempengaruhi kedudukan kewangan, prestasi kewangan dan aliran tunai SEDA Malaysia pada tarikh pelaporan (iaitu pada 31 Disember 2019).

Pengurusan telah membuat kesimpulan bahawa kesan peristiwa penyesuaian Covid-19 tidak mempengaruhi nilai saksama aset bersih, liabiliti bersih dan aset bukan kewangan termasuk klasifikasi item semasa dan bukan semasa kerana selepas akhir tahun.

22. ANGKA PERBANDINGAN

Angka-angka perbandingan bagi tahun lepas telah disusun semula di mana perlu supaya selaras dengan angka yang telah dibentangkan tahun ini.

PENYATA KEDUDUKAN KEWANGAN

	Seperti yang dinyatakan semula 2018 RM	Seperti yang dilaporkan terdahulu 2018 RM
Aset Semasa		
Akaun Belum Terima	188,445,424	188,276,051
Aset Bukan Semasa		
Hartanah, Kelengkapan Dan Peralatan		

Seperti yang dinyatakan semula	**Perabot, Kelengkapan Dan Ubahsuai**	**Komputer Dan Sistem Aplikasi**	**Kenderaan Bermotor**	**Elektronik**	**Jumlah**
	RM	**RM**	**RM**	**RM**	**RM**
Kos					
Pada 1 Januari 2018	3,827,549	2,692,369	1,040,624	124,058	7,684,600
Pelarasan	(1)	-	-	-	(1)
Tambahan	66,220	43,608	-	9,445	119,273
Pada 31 Disember 2018	**3,893,768**	**2,735,977**	**1,040,624**	**133,503**	**7,803,872**
Susut Nilai Terkumpul					
Pada 1 Januari 2018	3,621,757	2,505,852	892,353	80,770	7,100,732
Pelarasan	(213)	(307)	(5)	(8)	(533)
Tambahan	119,330	110,042	60,243	21,390	311,005
Pada 31 Disember 2018	**3,740,874**	**2,615,587**	**952,591**	**102,152**	**7,411,204**
Nilai Buku Bersih	**152,894**	**120,390**	**88,033**	**31,351**	**392,668**

Seperti yang dilaporkan terdahulu	**Perabot, Kelengkapan Dan Ubahsuai**	**Komputer Dan Sistem Aplikasi**	**Kenderaan Bermotor**	**Elektronik**	**Jumlah**
	RM	**RM**	**RM**	**RM**	**RM**
Kos					
Pada 1 Januari 2018	3,827,549	2,692,369	1,040,624	124,058	7,684,600
Tambahan	66,220	43,608	-	9,445	119,273
Pada 31 Disember 2018	**3,893,769**	**2,735,977**	**1,040,624**	**133,503**	**7,803,873**
Susut Nilai Terkumpul					
Pada 1 Januari 2018	3,621,757	2,505,852	892,353	80,770	7,100,732
Tambahan	119,330	110,042	60,243	21,390	311,005
Pada 31 Disember 2018	**3,741,087**	**2,615,894**	**952,596**	**102,160**	**7,411,737**
Nilai Buku Bersih	**152,682**	**120,083**	**88,028**	**31,343**	**392,136**

	Seperti yang dinyatakan semula 2018 RM	Seperti yang dilaporkan terdahulu 2018 RM
Liabiliti Semasa		
Akaun Belum Bayar	126,553,044	126,513,044
Terakru	1,359,090	409,347
Liabiliti Bukan Semasa		
Kumpulan Wang Khas		

	Kumpulan Wang Tenaga Boleh Baharu	Kumpulan Wang Pembangunan	Jumlah
	RM	RM	RM
Seperti yang dinyatakan semula			
Pada 1 Januari 2018	2,614,411,017	31,071,953	2,645,482,970
Caruman Kerajaan Dalam Dana Yang Dipegang	-	14,644,433	14,644,433
Terimaan	798,826,215	-	798,826,215
Penggunaan Dana Yang Dipegang	(510,127,563)	(13,460,761)	(523,588,324)
Pada 31 Disember 2018	**2,903,109,669**	**32,255,625**	**2,935,365,294**
Seperti yang dilaporkan terdahulu			
Pada 1 Januari 2018	2,614,411,017	31,071,953	2,645,482,970
Caruman Kerajaan Dalam Dana Yang Dipegang	-	14,630,932	14,630,932
Terimaan	798,826,215	-	798,826,215
Penggunaan Dana Yang Dipegang	(510,127,563)	(13,420,760)	(523,548,323)
Pada 31 Disember 2018	**2,903,109,669**	**32,282,125**	**2,935,391,794**

	Seperti yang dinyatakan semula 2018 RM	Seperti yang dilaporkan terdahulu 2018 RM
Aset Bersih		
Lebihan Terkumpul	35,266,529	36,059,867

PENYATA PRESTASI KEWANGAN

	Seperti yang dinyatakan semula 2018 RM	Seperti yang dilaporkan terdahulu 2018 RM
Urus Niaga Pertukaran		
Fi Permohonan Dan Pemprosesan Tarif Galakan (FiT)	773,446	773,447
Yuran Latihan Yang Dianjurkan Oleh SEDA Malaysia	2,365,020	2,235,647
Lain-Lain Hasil Bukan Cukai	215,779	175,799
Urus Niaga Bukan Pertukaran		
Geran Energy Audit For Commercial Under RMK-11	2,338,074	2,298,074
Upah, Gaji Dan Manfaat Pekerja		
Gaji Dan Upah	7,282,758	6,279,279
Bekalan Dan Bahan Guna Habis		
Bekalan Dan Bahan Lain	687,383	698,129
Perkhidmatan Ikhtisas Dan Perkhidmatan Lain Dan Hospitaliti	1,016,754	1,046,245
Belanja Susut Nilai Dan Pelunasan		
Belanja Susut Nilai – Perabot, Kelengkapan Dan Ubahsuai	90,183	90,396
Belanja Susut Nilai – Komputer Dan Sistem Aplikasi	109,735	110,042
Belanja Susut Nilai – Kenderaan Bermotor	60,238	60,243
Belanja Susut Nilai – Elektronik	18,692	18,700
Geran Dan Pindahan Bayaran Lain		
Geran *Energy Audit For Commercial Under RMK-11*	2,338,074	2,298,074

PENYATA ALIRAN TUNAI

Aliran Tunai Bersih Daripada Aktiviti Operasi

	Seperti yang dinyatakan semula 2018 RM	Seperti yang dilaporkan terdahulu 2018 RM
Lebihan Bagi Tahun Kewangan	5,275,758	6,069,096
Susut Nilai Untuk Hartanah, Kelengkapan Dan Peralatan	849,759	850,292
Perubahan Dalam Belum Terima	(8,936,169)	(9,730,039)
Perubahan Dalam Kumpulan Wang Khas	289,908,825	289,908,824

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