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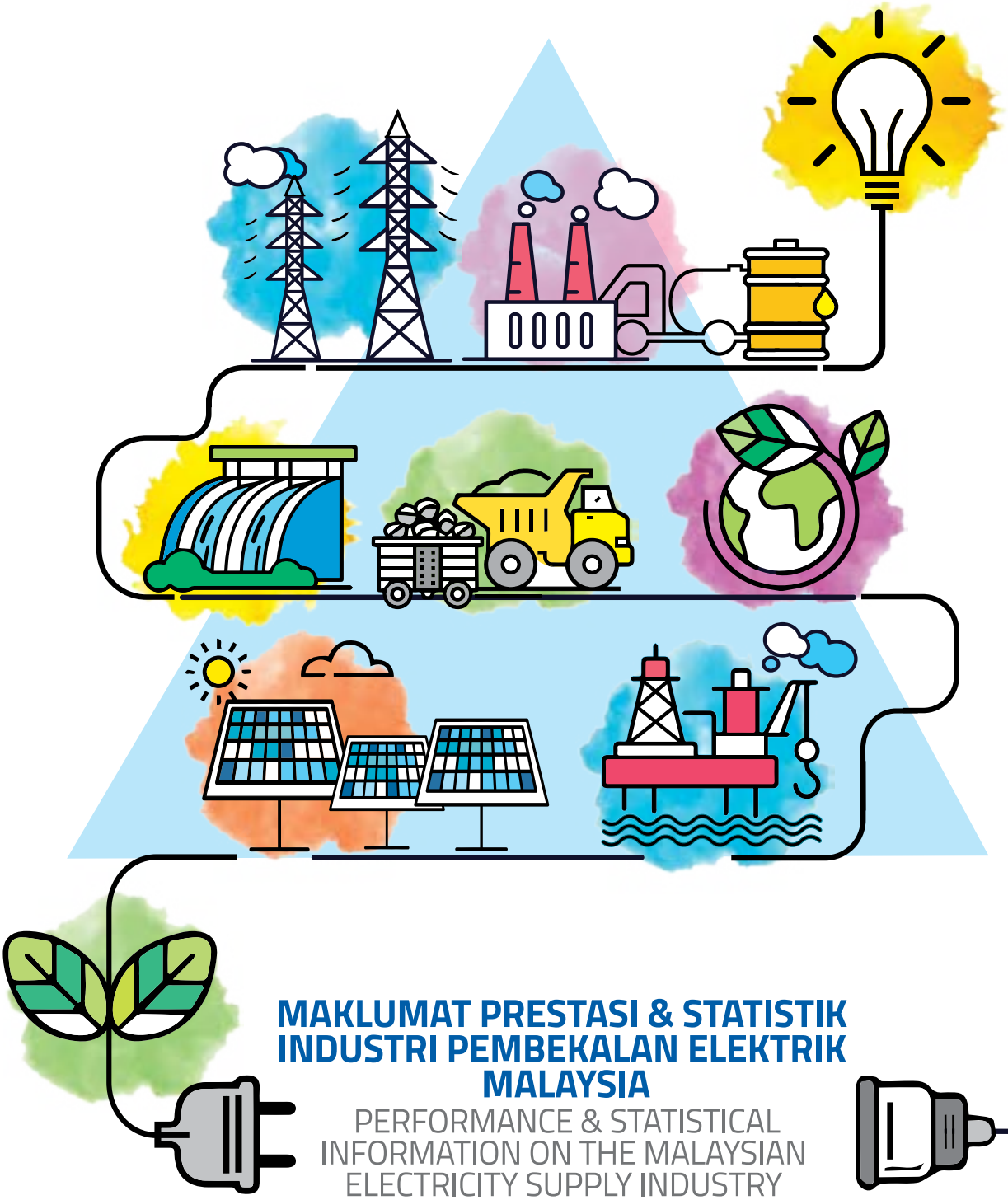

MAKLUMAT PRESTASI & STATISTIK INDUSTRI PEMBEKALAN ELEKTRIK MALAYSIA

PERFORMANCE & STATISTICAL INFORMATION ON THE MALAYSIAN ELECTRICITY SUPPLY INDUSTRY

2019

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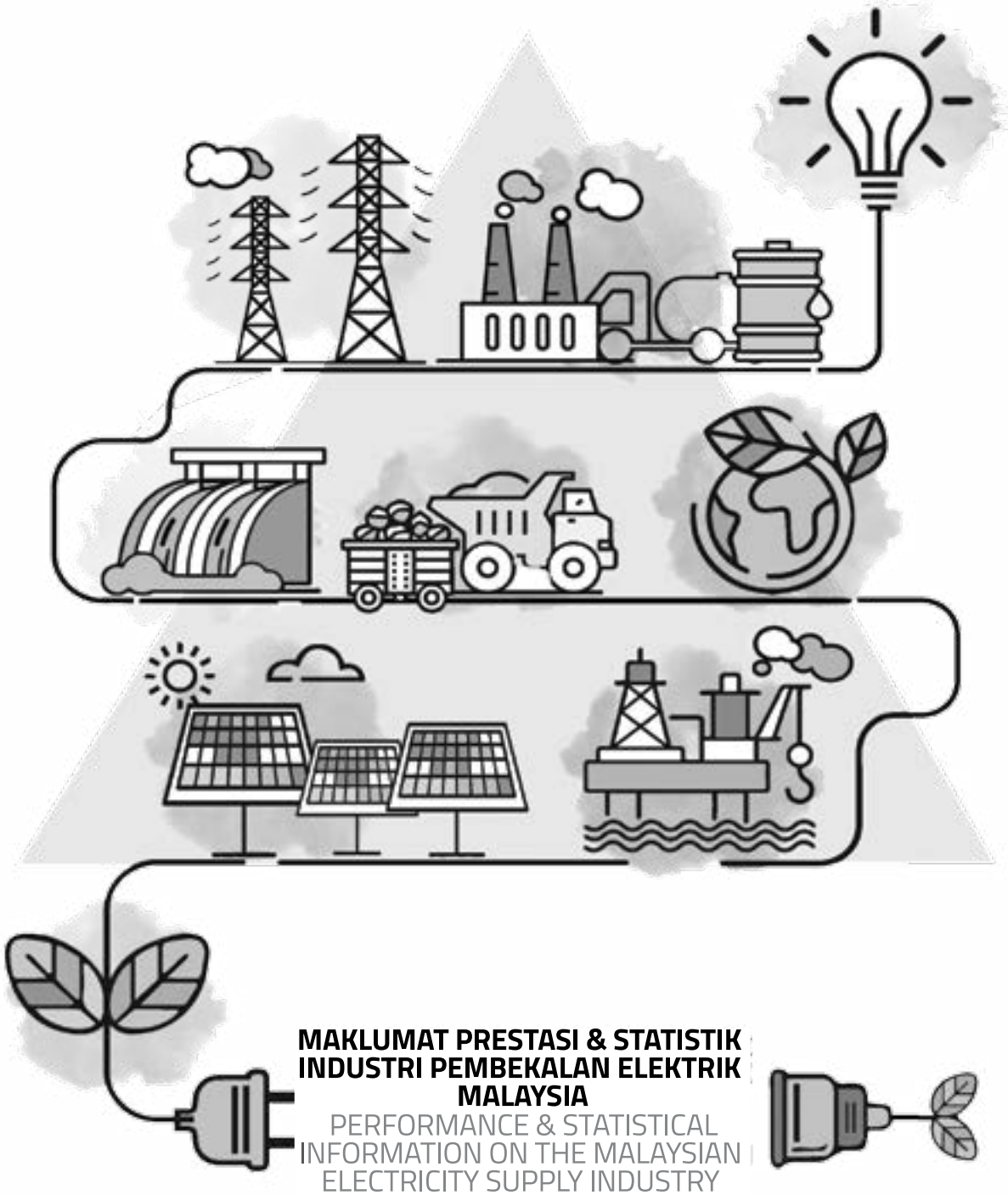

MAKLUMAT PRESTASI & STATISTIK INDUSTRI PEMBEKALAN ELEKTRIK MALAYSIA

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DITERBITKAN OLEH:
PUBLISHED BY:

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ISSN No. : 2289-3741
No. Penerbitan ST • ST Publication No.: ST(P)03/03/2022

DICETAK DI MALAYSIA • PRINTED IN MALAYSIA

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The data and information in this report represent a fair and reasonable overview of the whole electricity supply industry. Every effort has been made to verify, validate, and accurately represent the information in this report, based on the daily, monthly, and yearly reports which were submitted by licensees pursuant to their licence conditions. As for Sarawak, information on the performance and statistics of utility in the state were submitted by Sarawak Energy Berhad (SEB) and the Ministry of Utility Sarawak (KUS) based on request by the Energy Commission.

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Kandungan
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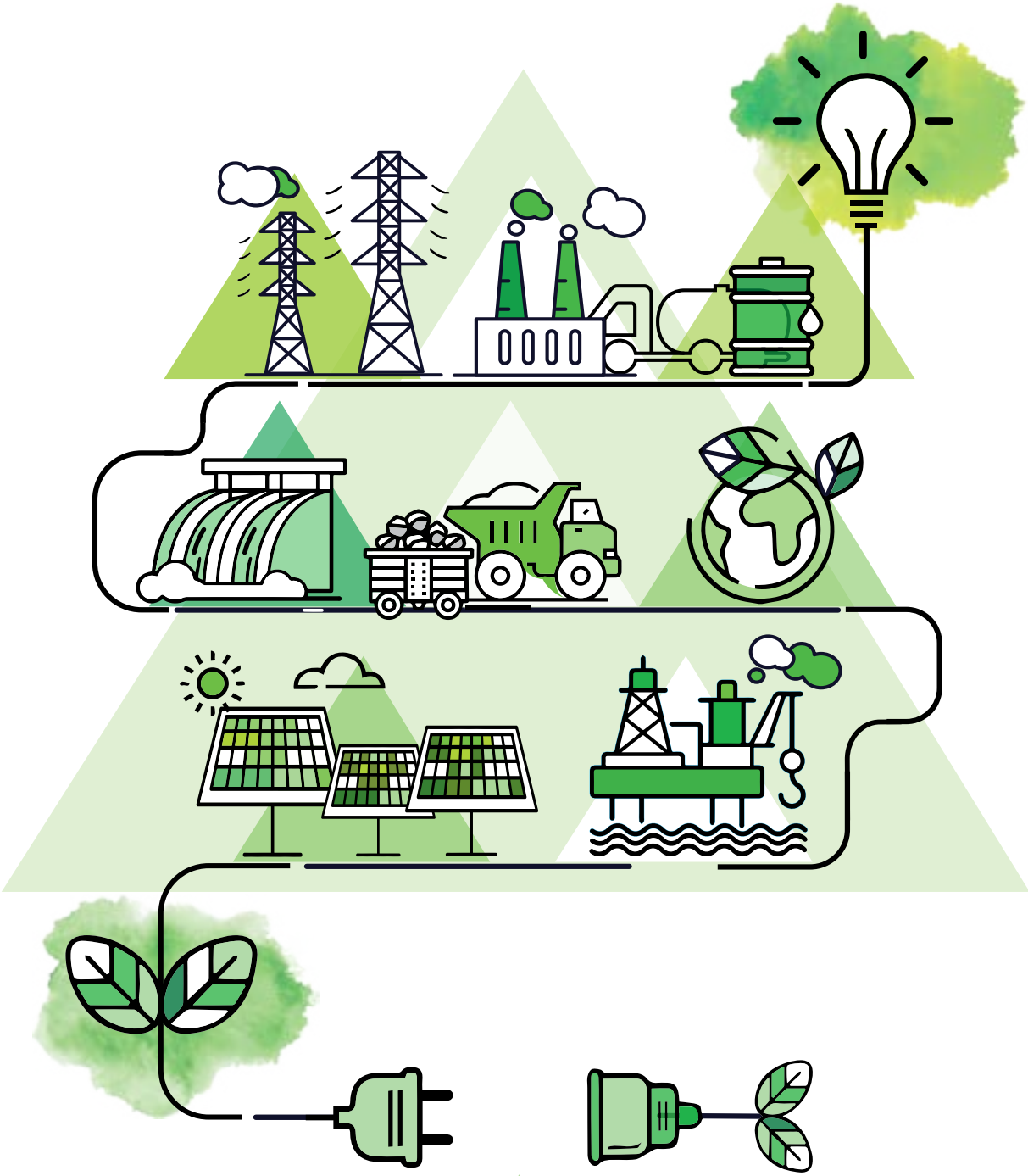
Unit dan Akronim I Units and Acronyms

Unit I Units	
cct-km	kilometer litar I circuit kilometer
GWj I GWh	Gigawatt jam I Gigawatt hour
km	kilometer
kV	kilovolt
MVA	Megavolt Ampere
MW	Megawatt
MWj I MWh	Megawatt jam I Megawatt hour
Akronim I Acronyms	
CAIDI	*Customer Average Interruption Duration Index*
CCGT	Turbin Gas Kitar Padu I Combined Cycle Gas Turbine
Cogen	*Cogeneration*
DE	Enjin Diesel I Diesel Engine
DePUI	*Delivery Point Unreliability Index*
DOSM	Jabatan Perangkaan Malaysia I Department of Statistics Malaysia
EAF	Purata Faktor Ketersediaan Setara Average Equivalent Availability Factor
EFB	Tandan Sawit Kosong I Empty Fruit Bunch
EUOF	Purata Faktor Hentitugas Tidak Berjadual Setara Average Equivalent Unplanned Outage Factor
FiT	*Feed-In Tariff*
GE	Enjin Gas I Gas Engine
IPP	Penjana Bebas I Independent Power Producer
KDNK I GDP	Keluaran Dalam Negara Kasar I Gross Domestic Products
KUS	Kementerian Utiiti Sarawak I Ministry of Utilities Sarawak
LSS	Solar Berskala Besar I Large Scale Solar
MFO	*Medium Fuel Oil*
NEM	*Net Energy Metering*
NUR	N.U.R. Power Sdn. Bhd
OCGT	Turbin Gas Kitar Terbuka I Open Cycle Gas Turbine
OHL	Kabel Talian Atas I Overhead Cable
POME	Efluen Kilang Kelapa Sawit I Palm Oil Mill Effluent
PV	Fotovoltaik I Photovoltaic
SAIDI	*System Average Interruption Duration Index*
SAIFI	*System Average Interruption Frequency Index*
SARFI	*System Average RMS Frequency Index*
SEB	Sarawak Energy Berhad
SEDA	Sustainable Energy Development Authority
Self-Gen	Penjanaan Persendirian I Self-Generation
SESB	Sabah Electricity Sdn. Bhd.
SJ	Stesen Jana Kuasa I Power Station
TBB I RE	Tenaga Boleh Baharu I Renewable Energy
TNB	Tenaga Nasional Berhad
WP	Wilayah Persekutuan I Federal Territory



RINGKASAN EKSEKUTIF
EXECUTIVE SUMMARY

Penerbitan mengenai industri pembekalan elektrik Malaysia ini mengandungi dua (2) bahagian utama iaitu maklumat prestasi dan statistik. Setiap bahagian disusun mengikut tiga (3) kawasan utama iaitu Semenanjung, Sabah dan Sarawak di mana data yang dipaparkan merangkumi sistem penjanaan, sistem penghantaran dan sistem pengagihan elektrik negara. Turut dimuatkan ialah peta lokasi stesen-stesen jana kuasa utama, laporan prestasi tahunan, jadual tarif, harga jualan purata dan kos penjanaan syarikat-syarikat utiliti utama di Malaysia. Bahagian apendiks pula memuatkan senarai pemegang lesen pelbagai kategori, khusus bagi lesen yang dikeluarkan pada 2019.

Semua maklumat yang dipaparkan di dalam penerbitan ini adalah berdasarkan pelaporan oleh pemegang-pemegang lesen di bawah Akta Bekalan Elektrik 1990 (Pindaan 2015).

STATISTIK INDUSTRI PEMBEKALAN ELEKTRIK MALAYSIA

Pada 2019, jumlah kapasiti penjanaan elektrik di Malaysia ialah 36,121.06 MW, merangkumi semua stesen jana kuasa utama yang bersambung dengan grid nasional dan *off-grid*. Dari segi geografi, kapasiti penjanaan elektrik negara terletak di dua (2) kawasan utama iaitu 78% (28,323.91 MW) di Semenanjung dan selebihnya di sebelah Timur Malaysia yang menempatkan negeri Sabah (2,080.62 MW) dan negeri Sarawak (5,716.52 MW). Negeri Sabah dan Sarawak ini terletak di Kepulauan Borneo dan dipisahkan dengan Semenanjung oleh Laut China Selatan. Syarikat utiliti utama bagi Semenanjung ialah Tenaga Nasional Berhad (TNB), bagi negeri Sabah ialah Sabah Electricity Sdn. Bhd. (SESB) dan bagi negeri Sarawak ialah Sarawak Energy Berhad (SEB). Kehendak maksimum yang dicatatkan pada tahun 2019 pula ialah 18,566 MW di Semenanjung, 1,001 MW di Sabah dan 3,777 MW di Sarawak.

Daripada 36,121.06 MW kapasiti penjanaan tersebut, 62% adalah daripada penjana-penjana bebas (IPP), 29% syarikat-syarikat utiliti utama (TNB, SESB, SEB), 4% *cogeneration*, 2% Solar Berskala Besar (LSS), 2% *Feed-In Tariff* (FiT) dan *Net Energy Metering* (NEM), serta 1% penjana-penjana persendirian.

Dari segi campuran sumber tenaga pula, secara keseluruhan, 39.9% daripada kapasiti penjanaan di Malaysia adalah berasaskan gas asli, 36.8% berasaskan arang batu, 21.5% berasaskan tenaga boleh baharu (TBB), 1.6% berasaskan diesel dan 0.2% daripada sumber tenaga lain seperti haba sisa perindustrian. 79% daripada TBB ialah hidroelektrik, diikuti oleh 13% solar dan 8% biojisim/biogas.

Berbanding 2018, terdapat perubahan ketara pada kapasiti penjanaan stesen jana kuasa utama negara pada tahun 2019, di mana industri pembekalan elektrik menyaksikan penamatan operasi dua (2) stesen jana kuasa di Semenanjung. Dua stesen jana kuasa tersebut ialah Stesen Jana Kuasa Turbin Gas Kitar Padu (CCGT) Jambatan Connaught berkapasiti 300 MW dan Stesen Jana Kuasa Turbin Gas Kitar Terbuka (OCGT) Port Dickson

This publication on Malaysia's electricity supply industry contains two (2) main sections namely performance information as well as statistics. Each section is organised according to three (3) main regions that are the Peninsula, Sabah and Sarawak where the data displayed includes the country's electricity generation system, transmission system and distribution system. Also included are the location maps of the main power stations, annual performance reports, tariff schedules, average selling prices and generation costs of the main utility companies in Malaysia. The appendix contains a list of licensees of various categories, specifically for licenses issued in 2019.

The information published is as per reported by the licensees under the Electricity Supply Act 1990 (2015 Amendment).

MALAYSIAN ELECTRICITY SUPPLY INDUSTRY STATISTICS

Malaysia's 2019 installed capacity was 36,121.06 MW, covering the grid-connected and off-grid power stations. Geographically, the recorded installed capacity was spread to two (2) main regions with 78% (28,323.91 MW) in the Peninsula and the remaining in Eastern Malaysia, which consists of the state of Sabah (2,080.62 MW) and Sarawak (5,716.52 MW). The states of Sabah and Sarawak are in the Borneo Islands and are separated from the Peninsula by the South China Sea. The main utility company for the Peninsula is Tenaga Nasional Berhad (TNB), Sabah's is Sabah Electricity Sdn. Bhd. (SESB) and Sarawak's is Sarawak Energy Berhad (SEB). The maximum demand recorded in 2019 was 18,566 MW in the Peninsula, 1,001 MW in Sabah, and 3,777 MW in Sarawak.

Out of the 36,121.06 MW generating capacity, 62% was from the independent power producers (IPP), 29% from the major utility companies (TNB, SESB, SEB), 4% cogeneration, 2% Large Scale Solar (LSS), 2% Feed-In Tariff (FiT) and Net Energy Metering (NEM), as well as 1% from self-generators.

In terms of the energy mix, overall, 39.9% of the generation capacity in Malaysia was from natural gas, 36.8% coal, 21.5% renewable energy (RE), 1.6% diesel and 0.2% from other sources of energy such as industrial waste heat. From the RE, 79% was hydroelectric, followed by 13% solar and 8% biomass/biogas.

Compared to 2018, there was a significant change in the generation capacity of the country's main power stations in 2019, when the electricity supply industry saw the cessation of operations of two (2) power stations in the Peninsula. The two power stations are the 300 MW Connaught Bridge Cubic Gas Turbine Power Station (CCGT) and the 436 MW Port Dickson Power Berhad Open Cycle Gas Turbine (OCGT) Power Station owned by Malakoff Berhad. The Connaught Bridge Power Station, located in the state of Selangor, was built in the 1940s and was the first power station connected to the country's National Grid. Port Dickson Power Berhad Power Station has been operating for more than 24 years before ending its operation on 28 February 2019. Apart from the termination of operations, there was also an increase in installed capacity at the Pengerang Power Station to 600 MW compared to 400 MW in 2018. In Sabah, there was a slight increase in installed capacity when the Stratavest

Power Berhad berkapasiti 436 MW milik Malakoff Berhad. Stesen Jana Kuasa Jambatan Connaught yang terletak di negeri Selangor telah dibina pada tahun 1940-an dan merupakan stesen jana kuasa pertama yang disambungkan ke Grid Nasional negara. Stesen Jana Kuasa Port Dickson Power Berhad pula telah beroperasi selama lebih 24 tahun sebelum menamatkan operasinya pada 28 Februari 2019. Selain penamatan operasi, terdapat juga peningkatan kapasiti terpasang pada Stesen Jana Kuasa Pengerang kepada 600 MW berbanding 400 MW pada tahun 2018. Di Sabah, terdapat sedikit peningkatan kapasiti terpasang apabila Stesen Jana Kuasa Stratavest (diesel) beroperasi semula setelah mengalami *forced outage* sepanjang tahun 2018. Di Sarawak, peningkatan lebih dua kali ganda kapasiti terpasang stesen jana kuasa berasaskan arang batu disumbangkan oleh 624 MW daripada Stesen Jana Kuasa Balingian yang beroperasi secara berperingkat mulai Ogos 2019.

Jumlah penjanaan elektrik pada tahun 2019 ialah 175,502 GWj iaitu 3.5% lebih tinggi berbanding tahun 2018 (2018: 169,529 GWj). Peningkatan ini dilihat sejajar dengan peningkatan jualan elektrik sebanyak 3.2% pada tahun 2019 (149,291.29 GWj) berbanding 2018 (144,640.08 GWj). Bagi penggunaan elektrik dalam negara, terdapat peningkatan dalam semua sektor, dengan peningkatan tertinggi dicatatkan oleh sektor perlombongan (17.4%), diikuti dengan sektor pertanian (7.5%), lampu awam (6.4%), domestik (6.3%), komersial (2.6%) dan peningkatan terendah, dicatatkan oleh sektor industri (1.9%). Dari segi eksport, terdapat sebanyak 12.5% peningkatan dicatatkan (2019: 1,697.26 GWj) berbanding 2018 (2018: 1,509.08 GWj).

Jika dibandingkan mengikut negeri-negeri di Malaysia pula, satu-satunya negeri yang mencatatkan pengurangan penggunaan elektrik pada tahun 2019 ialah Perlis, iaitu 4.4% lebih rendah berbanding 2018 (2019: 749 GWj, 2018: 716 GWj). Pengurangan ini adalah disebabkan oleh jumlah penggunaan elektrik yang 16% lebih rendah dalam sektor industri di negeri tersebut.

PRESTASI INDUSTRI PEMBEKALAN ELEKTRIK MALAYSIA

Untuk memastikan keberterusan bekalan tenaga elektrik kepada pengguna, beberapa indikator telah digunakan untuk mengukur prestasi sistem penjanaan, penghantaran dan pengagihan tenaga elektrik di Malaysia.

Di Semenanjung, purata kecekapan thermal merekodkan penurunan sebanyak 20% hingga 26% di stesen-stesen jana kuasa OCGT dan thermal konvensional IPP. Di samping itu, Purata Faktor Ketersediaan Setara (EAF) mereka juga menurun sekitar 2% hingga 3%. Purata tahap hentitugas akibat *forced and maintenance outages* dan *forced and maintenance deratings* yang diukur menggunakan Faktor Hentitugas Tidak Berjadual Setara (EUOF) telah meningkat secara mendadak pada stesen jana kuasa CCGT TNB (meningkat 205%) dan stesen jana kuasa thermal konvensional IPP (naik 355%). CCGT IPP, OCGT TNB dan stesen jana kuasa arang batu IPP juga mencatatkan peningkatan EUOF sekitar 30% hingga 95%. Berbeza pula dengan stesen jana kuasa OCGT dan hidroelektrik TNB, di mana dua (2) kategori ini mencatatkan prestasi lebih baik apabila tahap hentitugasnya berkurangan sebanyak 18% dan 56% masing-masing pada tahun 2019.

(diesel) Power Station resumed operations after experiencing a forced outage throughout 2018. In Sarawak, a more than 2 -fold increase in the installed capacity of coal-fired power stations was contributed by 624 MW from the Balingian Power Station which operates in stages from August 2019.

In 2019, the total electricity generated was 175,502 GWh which is 3.5% higher than in 2018 (2018: 169,529 GWh). This increase is seen to be in line with a 3.2% increase in electricity sales in 2019 (149,291.29 GWh) compared to 2018 (144,640.08 GWh). For the domestic consumption of electricity, there was an increase in all sectors, with the highest increase recorded by the mining sector (17.4%), followed by the agricultural sector (7.5%), public lighting (6.4%), domestic (6.3%), commercial (2.6%) and the lowest increase, recorded by industrial sector (1.9%). In terms of exports, there was a 12.5% increase recorded (2019: 1,697.26 GWh) compared to 2018 (2018: 1,509.08 GWh).

Among the states in Malaysia, the only state that recorded a reduction in electricity consumption in 2019 was Perlis, which was 4.4% lower compared to 2018 (2019: 749 GWh, 2018: 716 GWh). This reduction is due to the 16% lower total electricity consumption in the industrial sector in the state.

THE PERFORMANCE OF THE MALAYSIAN ELECTRICITY SUPLY INDUSTRY

To ensure the continuity of electricity supply to consumers, several indicators have been used to measure the performance of the electricity generation, transmission, and distribution system in Malaysia.

In the Peninsula, the average thermal efficiency recorded a decrease of 20% to 26% in OCGT and conventional thermal IPP power stations. In addition, their Average Equivalent Availability Factor (EAF) also decreased by around 2% to 3%. The average level of outages due to forced and maintenance outages and forced and maintenance deratings measured using the Equivalent Unscheduled Outage Factor (EUOF) has increased dramatically at TNB CCGT power stations (up 205%) and IPP conventional thermal power stations (up 355%). CCGT IPP, OCGT TNB and IPP coal power stations also recorded an EUOF increase of around 30% to 95%. In contrast to TNB's OCGT and hydroelectric power stations, where these two (2) categories performed better when the level of outages decreased by 18% and 56% respectively in 2019.

In the transmission system, system minutes was at 0.27 minutes, which was 23% better than the previous year. In the past five (5) years, system minutes in 2019 were the lowest ever recorded. System Average Interruption Duration Index (SAIDI) for the distribution system also recorded a reading below the target of 50 minutes which is 48.13 minutes/customer/year. This performance indicator shows an improvement in the security of the electricity supply system in the Peninsula.

In Sabah, the thermal efficiency of SESB and IPP power stations only recorded a 2% to 5% change. The only IPP diesel power station, Stratavest, was not operating throughout 2019 due to a forced outage. The level of availability (EAF) of CCGT and SESB diesel power stations declined by around 20%, while SESB hydroelectric power stations recorded a better EAF at 85%

Bagi sistem penghantaran, minit sistem berada pada 0.27 minit iaitu 23% lebih baik berbanding tahun sebelumnya. Dalam tempoh lima (5) tahun ke belakang, minit sistem pada tahun 2019 ini adalah yang terendah pernah dicatatkan. *System Average Interruption Duration Index* (SAIDI) bagi sistem pengagihan juga mencatatkan bacaan di bawah sasaran 50 minit iaitu 48.13 minit/pelanggan/tahun. Petunjuk prestasi ini menunjukkan peningkatan pada sekuriti sistem pembekalan elektrik di Semenanjung.

Di Sabah, kecekapan thermal bagi stesen-stesen jana kuasa SESB dan IPP hanya mencatatkan perubahan dalam lingkungan 2% hingga 5%. Satu-satunya stesen jana kuasa diesel IPP iaitu Stratavest pula tidak beroperasi sepanjang tahun 2019 akibat *forced outage*. Tahap kesediaan iaitu EAF bagi stesen jana kuasa CCGT dan diesel SESB merosot sekitar 20%, manakala stesen jana kuasa hidroelektrik SESB mencatatkan EAF yang lebih baik pada 85% berbanding hanya 68% pada tahun 2018. Kadar hentitugas bagi stesen jana kuasa diesel meningkat hampir dua (2) kali ganda dan bagi kedua-dua stesen jana kuasa CCGT SESB dan IPP, kadar hentitugas turut meningkat antara 34% hingga 44%. Bagi stesen jana kuasa hidroelektrik, kadar hentitugas yang dicatatkan adalah minimum iaitu sebanyak 7.42% sahaja.

Prestasi sistem penghantaran di Sabah meningkat 75%, di mana sistem minit yang dicatatkan ialah 13.41 minit, berbanding 53.91 minit pada 2018. SAIDI di Sabah ialah 205.31 minit/pelanggan/tahun, sedikit rendah berbanding 267.87 minit/pelanggan/tahun pada 2018. SAIDI pada tahun 2019 juga adalah yang paling rendah dalam tempoh 2015-2019 dan ini menunjukkan inisiatif SESB dalam memberikan perkhidmatan terbaik kepada para pelanggannya. Perkhidmatan yang lebih baik juga dapat dilihat daripada rekod *Customer Average Interruption Duration Index* (CAIDI) tahun 2019, di mana tempoh gangguan bagi setiap pelanggan telah berkurang kepada 29.26 minit/pelanggan terlibat/tahun, berbanding 45.29 minit/pelanggan terlibat/tahun.

Di Sarawak, kecekapan thermal bagi tahun 2015 hingga 2019 dilihat konsisten, kecuali bagi stesen jana kuasa diesel yang menunjukkan pola penurunan sejak 2017. Walaupun demikian, stesen jana kuasa diesel mencatatkan tahap kesediaan (EAF) terbaik di kalangan kategori teknologi penjanaan lain, iaitu 99% pada tahun 2019. Secara keseluruhannya, semua stesen jana kuasa di Sarawak mengalami kurang *forced and maintenance outages* atau *forced and maintenance deratings*. Kadar hentitugas yang dicatatkan juga amat rendah (maksimum 1.26%) kecuali bagi stesen jana kuasa arang batu Mukah yang mengalami penutupan berpanjangan pada tahun 2019 akibat penyenggaraan. Minit sistem penghantaran di Sarawak mencatatkan bacaan 2.11 minit, iaitu yang terendah dalam tempoh 2015 hingga 2019. Jika dibandingkan rekod tahun 2018, minit sistem pada 2019 adalah 73% lebih rendah (2018: 7.9 minit). Sama seperti prestasi di Semenanjung dan Sabah, sistem pengagihan elektrik negeri Sarawak turut mencatatkan SAIDI yang lebih baik iaitu 83.42 minit/pelanggan/tahun (2018: 95.81 minit/pelanggan/tahun). Selain itu, *System Average Interruption Frequency Index* (SAIFI) dan CAIDInya juga berkurangan 11% dan 2% masing-masing.

compared to only 68% in 2018. The outage rate for diesel power stations increased almost double and for both CCGT SESB and IPP power stations, the outage rate also increased between 34% to 44%. For hydroelectric power stations, the rate of outages recorded was minimal at only 7.42%.

The performance of the Sabah transmission system increased by 75%, where the system minutes recorded was 13.41 minutes, compared to 53.91 minutes in 2018. SAIDI in Sabah was 205.31 minutes/customer/year, slightly lower compared to 267.87 minutes/customer/year in 2018. SAIDI in 2019 was also the lowest in the 2015-2019 period and this shows SESB's initiative in providing the best service to its customers. Better service can also be seen from Customer Average Interruption Duration Index (CAIDI)'s 2019 record, where the duration of disruption per customer has reduced to 29.26 minutes/interrupted customer/year, compared to 45.29 minutes/interrupted customer/year.

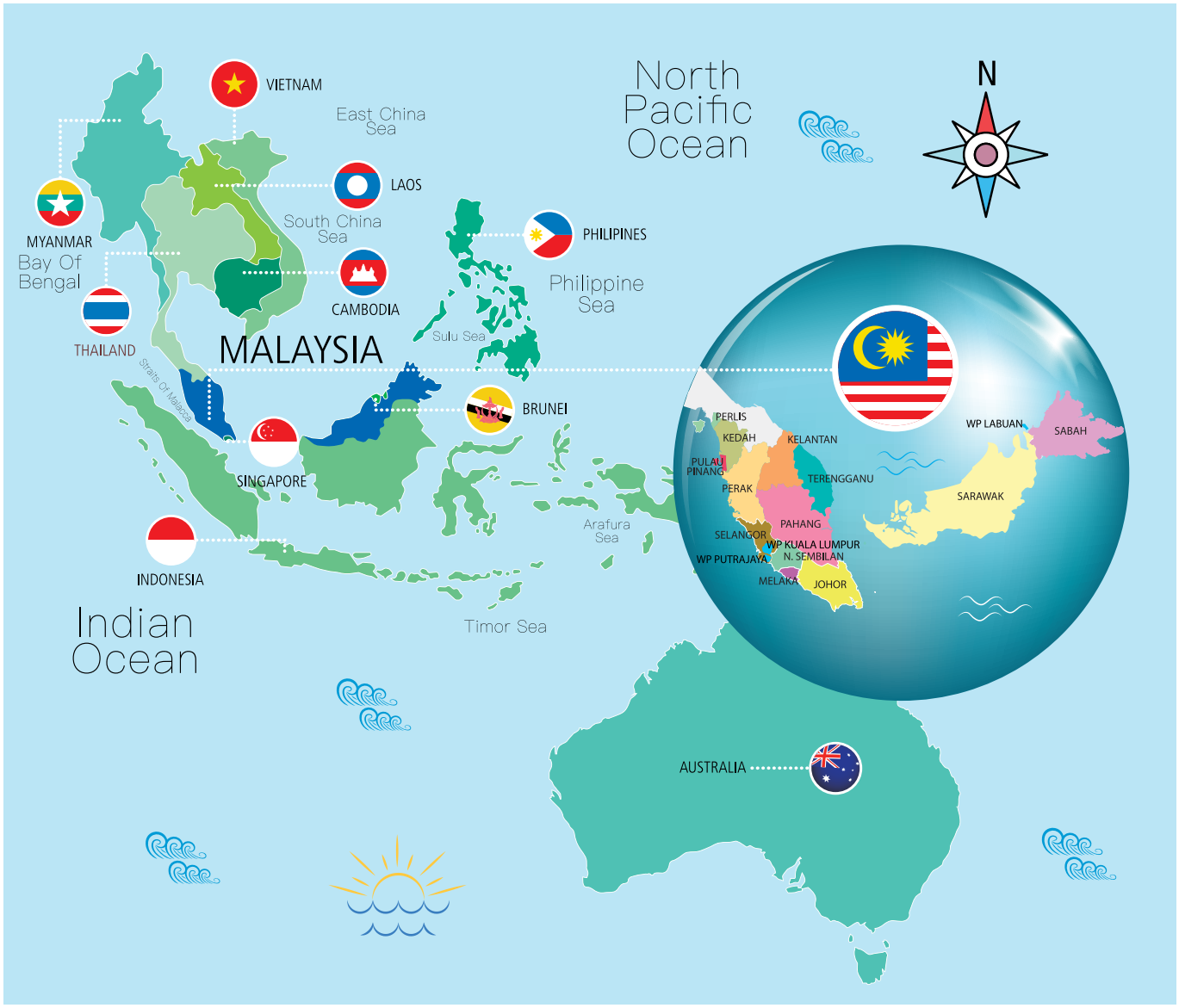
In Sarawak, thermal efficiency for the period of 2015 to 2019 is seen to be consistent, except for diesel power stations which showed a declining pattern since 2017. Despite this, diesel power stations recorded the best level of availability (EAF) among other generation technology categories, which is 99% in 2019. Overall, all power stations in Sarawak experienced less forced and maintenance outages or forced and maintenance deratings. The recorded outage rate is also very low (maximum 1.26%) except for the Mukah coal-fired power station which experienced prolonged closure in 2019 due to maintenance. The transmission system minutes in Sarawak recorded a reading of 2.11 minutes, the lowest in the period of 2015 to 2019. Compared to the 2018 record, the system minutes in 2019 were 73% lower (2018: 7.9 minutes). Like the performance in the Peninsula and Sabah, the Sarawak state electricity distribution system also recorded a better SAIDI of 83.42 minutes/customer/year (2018: 95.81 minutes/customer/year). In addition, its System Average Interruption Frequency Index (SAIFI) and CAIDI also decreased by 11% and 2% respectively.

Malaysia Sepintas Lalu | Malaysia at A Glance

	2015	2016	2017	2018	2019
Penduduk (Juta)[1] **Population (Million)[1]**					
Jumlah Total	31.2	31.6	32.0	32.4	32.5
Lelaki Male	16.1	16.3	16.5	16.7	16.8
Perempuan Female	15.1	15.3	15.5	15.7	15.7
KDNK[2] **GDP[2]**					
KDNK pada Harga Semasa (RM juta) GDP at Current Prices (RM million)	1,176,941	1,249,698	1,372,310	1,447,451	1,510,693
KDNK Pada Harga Malar 2015 (RM juta) GDP at Constant 2015 Prices (RM million)	1,176,941	1,229,312	1,300,769	1,362,815	1,421,454
Perubahan Tahunan (%) Annual Change (%)	5.1	4.5	5.7	4.7	4.3
Guna Tenaga[2] **Employment[2]**					
Tenaga Buruh ('000 orang) Labour Force ('000 person)	14,518.0	14,667.8	14,980.1	15,280.3	15,581.6
Kadar Pengangguran (%) Unemployment Rate (%)	3.1	3.4	3.4	3.3	3.3

Rujukan:
Reference:
[1]Press Release : Current Population Estimates, Malaysia, 2020, Department of Statistics Malaysia (DOSM)
[2]Rates & Statistics Bank Negara Malaysia

Peta Malaysia I Map of Malaysia



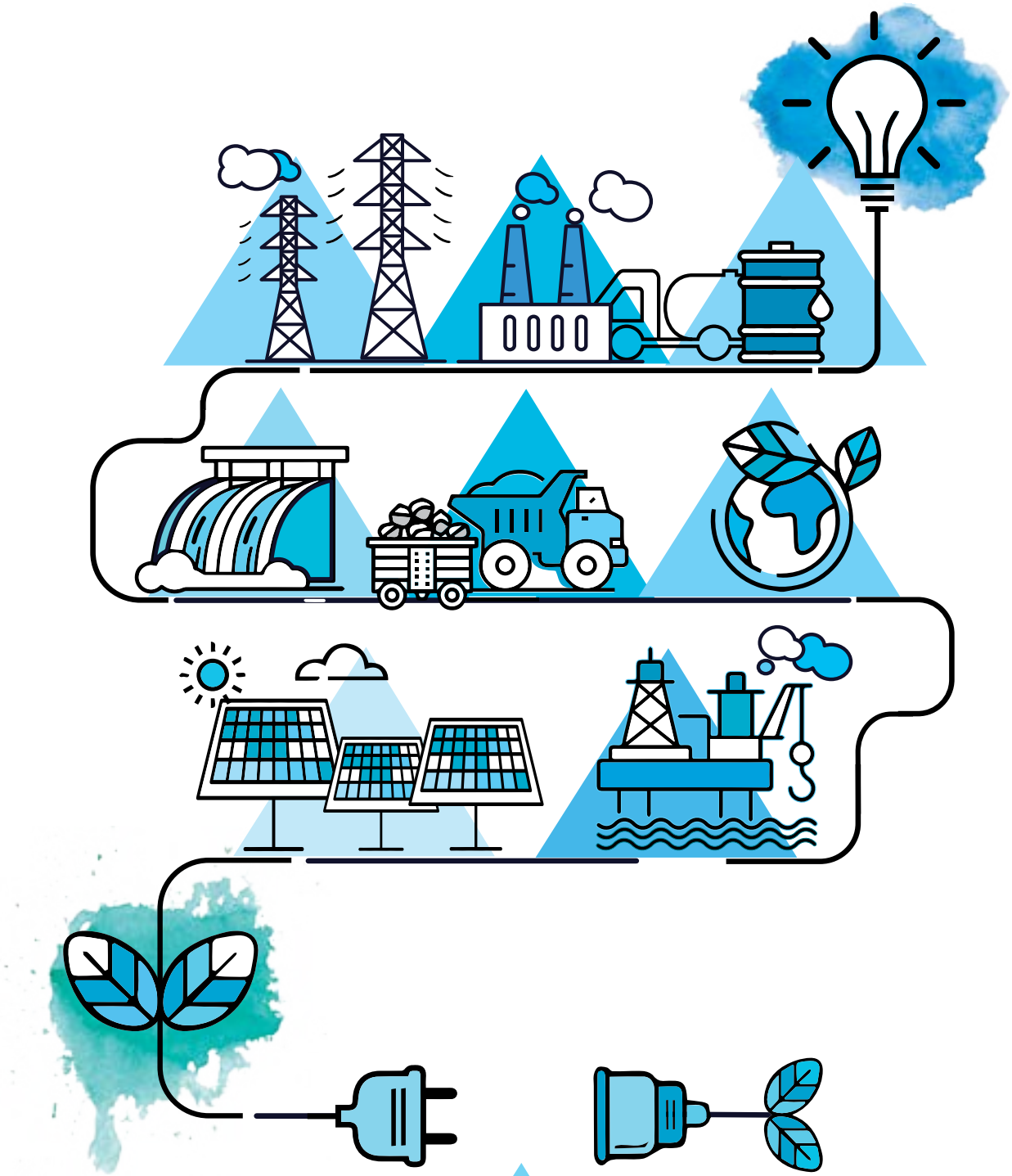
Negeri-negeri di Malaysia:
States in Malaysia:

1. Kedah
2. Perlis
3. Pulau Pinang
4. Perak
5. Kelantan
6. Terengganu
7. Pahang
8. Selangor
9. Negeri Sembilan
10. WP Kuala Lumpur*
11. WP Putrajaya*
12. Melaka
13. Johor
14. Sarawak
15. Sabah
16. WP Labuan*

Keluasan I Area
330,534 km²

Rujukan I Reference:
Buku Maklumat Perangkaan Malaysia 2019, Jabatan Perangkaan Malaysia
Malaysia Statistical Handbook 2019, Department of Statistics Malaysia (DOSM)

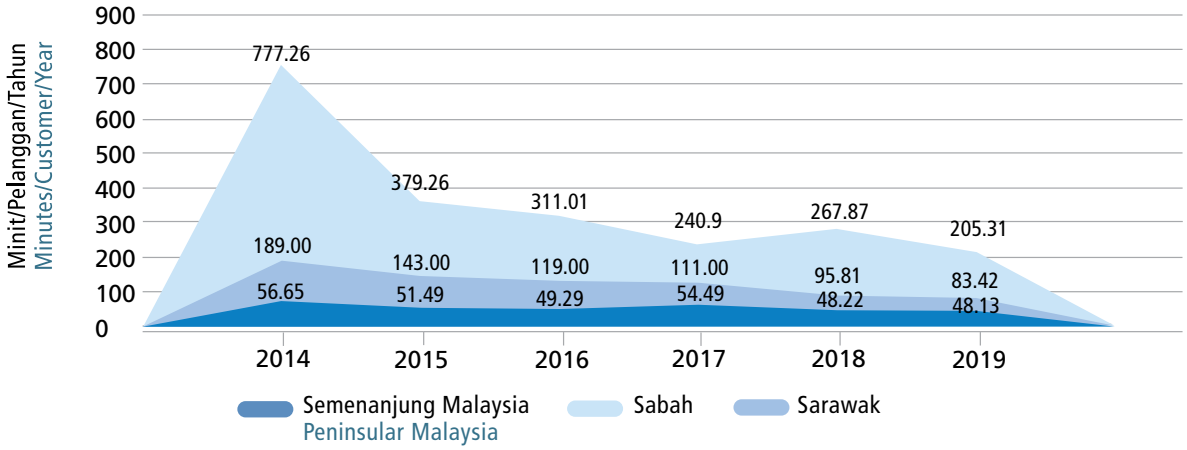
Nota:
Notes:
* Wilayah Persekutuan
* Federal Territory



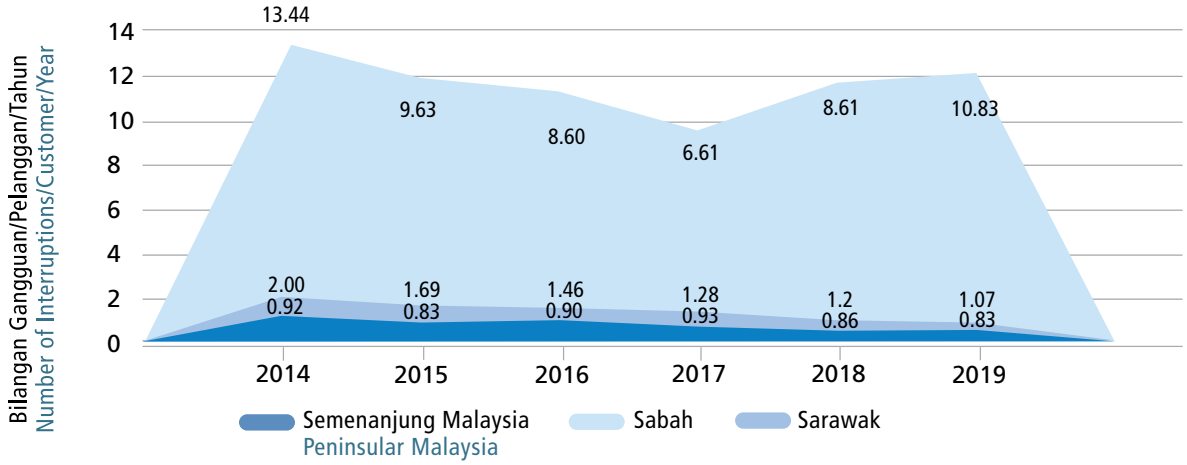
RINGKASAN
SUMMARY

SAIDI, SAIFI & CAIDI

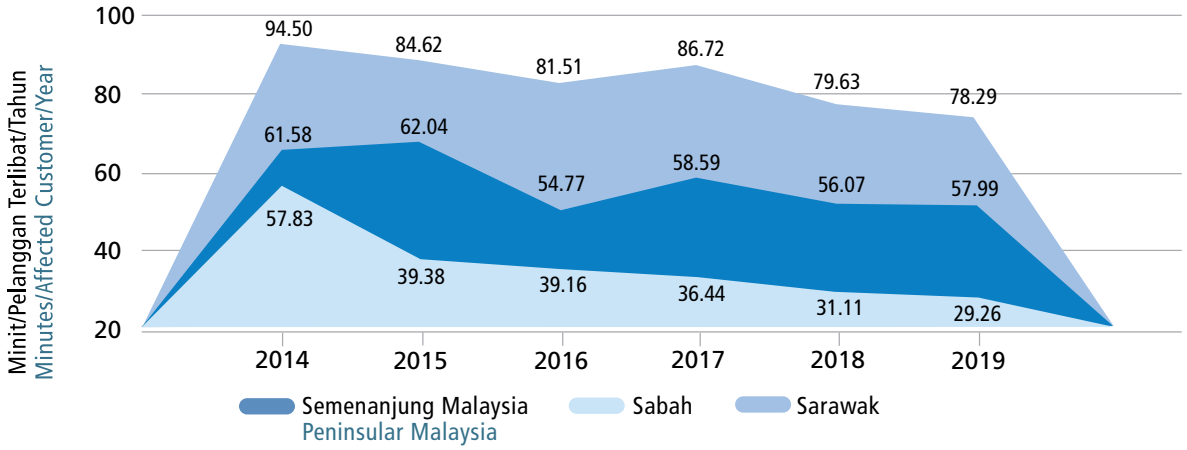
SAIDI, 2014-2019



SAIFI, 2014-2019

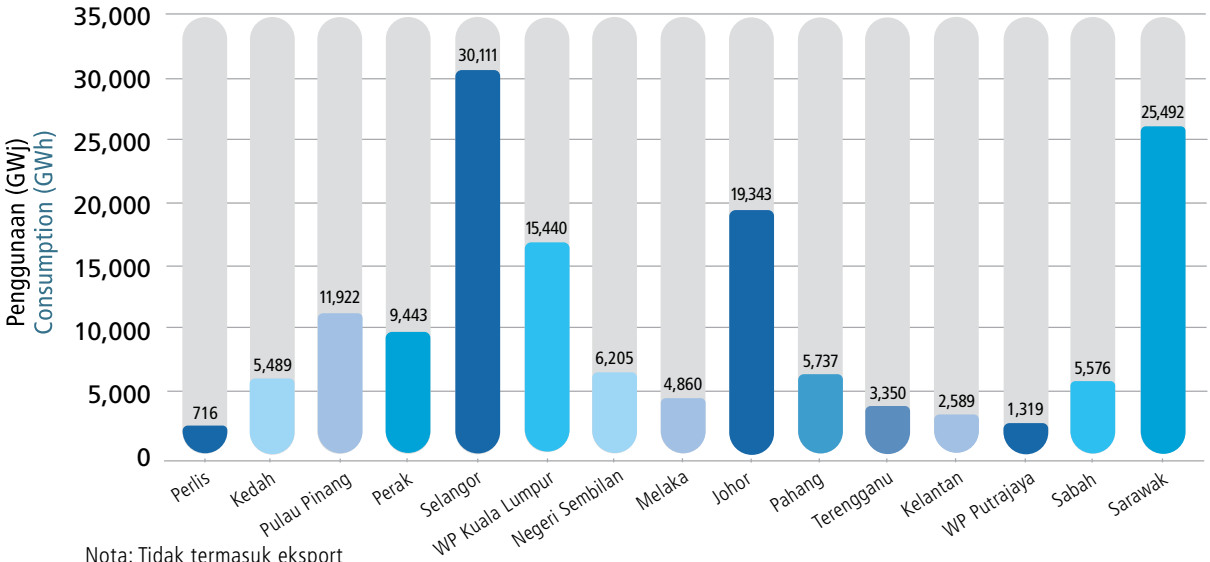


CAIDI, 2014-2019



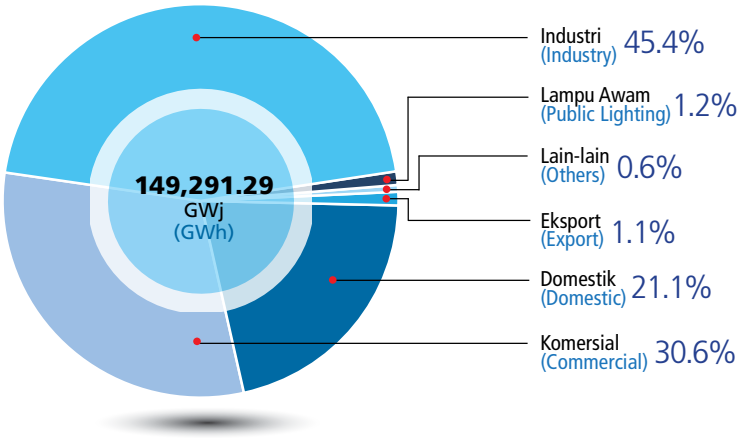
Penggunaan Elektrik di Malaysia
Electricity Consumption in Malaysia

Penggunaan Elektrik mengikut Negeri, 2019
Electricity Consumption by State, 2019

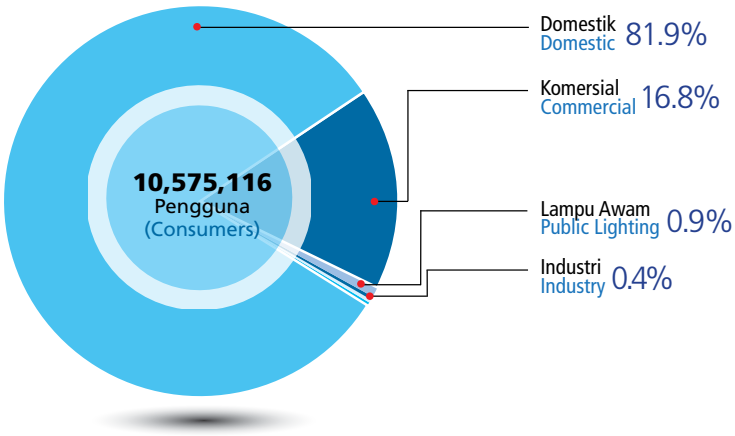


Nota: Tidak termasuk eksport
Notes: Excluding export

Penggunaan Elektrik mengikut Sektor, 2019
Electricity Consumption by Sector, 2019



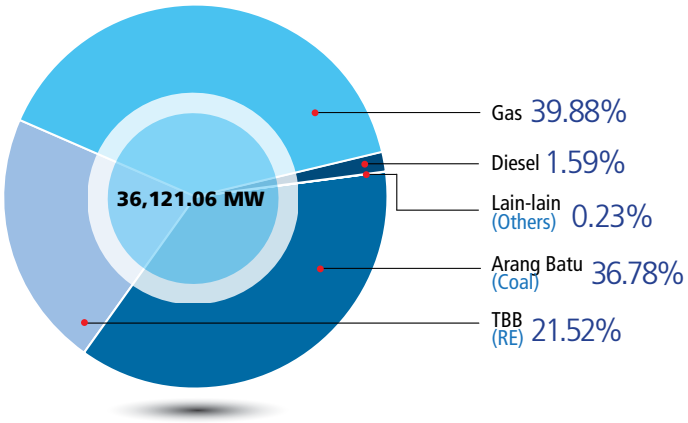
Bilangan Pengguna mengikut Sektor, 2019
Number of Consumers by Sector, 2019



Nota:
Notes:
Lain-lain: Perlombongan, Pertanian, Unit Percuma dan Eksport (SEB sahaja)
Others: Mining, Agriculture, Free Units and Export (SEB only)

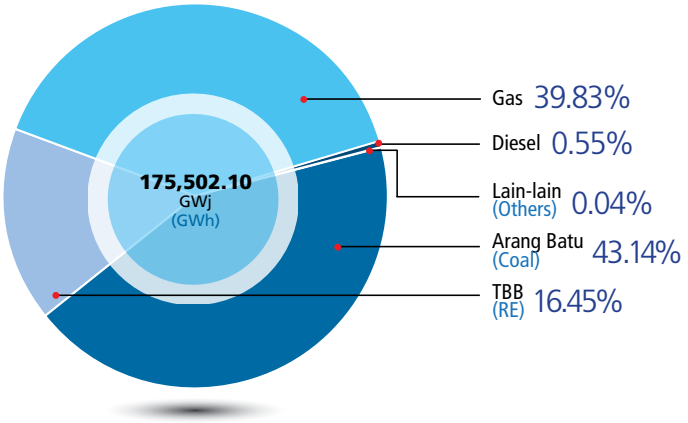
Kapasiti Terpasang mengikut Sumber Tenaga
Installed Capacity by Energy Source

Kapasiti Terpasang (MW), 2019
Installed Capacity (MW), 2019



Penjanaan Elektrik mengikut Sumber Tenaga
Electricity Generation by Energy Source

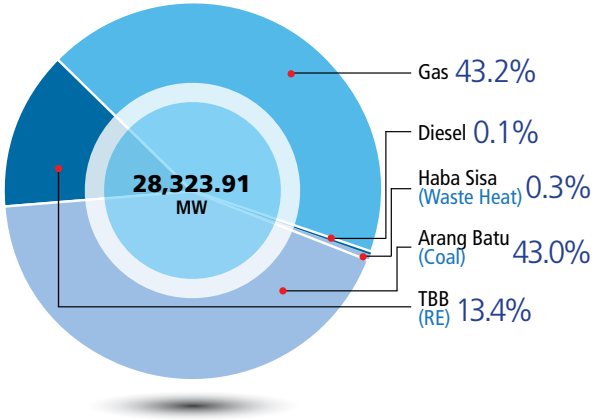
Penjanaan (GWj), 2019
Generation (GWh), 2019

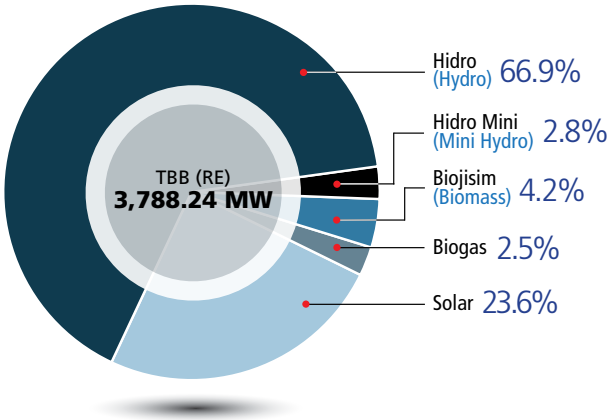


Nota:
Notes:
1. Termasuk kapasiti daripada stesen jana kuasa yang bersambung di peringkat pengagihan dan *off-grid*.
   Including the capacity of distribution level and off-grid power plants.
2. Lain-lain adalah terdiri daripada haba sisa proses perindustrian dan sumber tenaga bukan TBB.
   Others consist of industrial process waste heat and other non-RE sources.

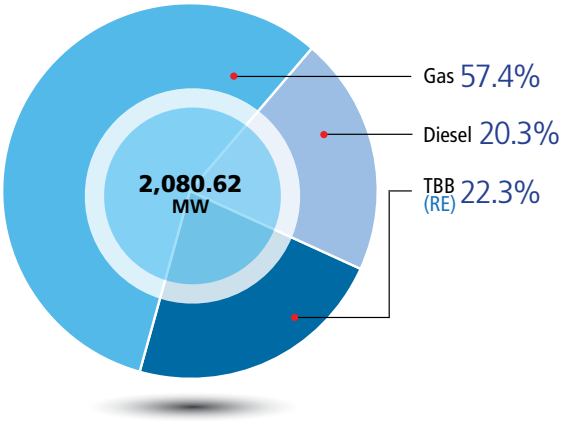
Kapasiti Terpasang mengikut Kawasan dan Sumber Tenaga, 2019
Installed Capacity by Region and Energy Source, 2019

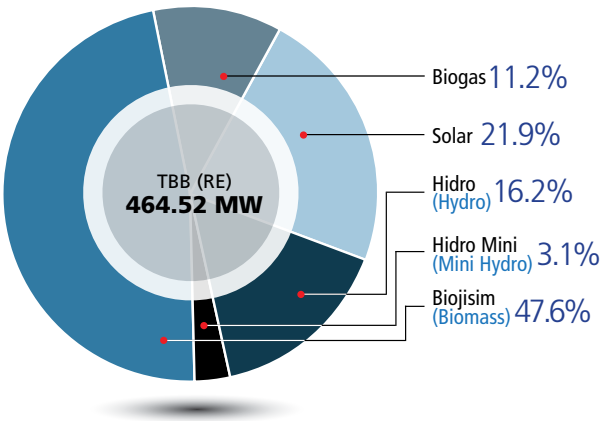
Semenanjung Malaysia
Peninsular Malaysia



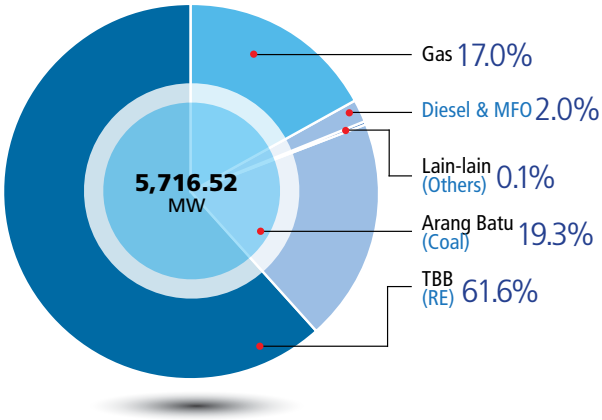


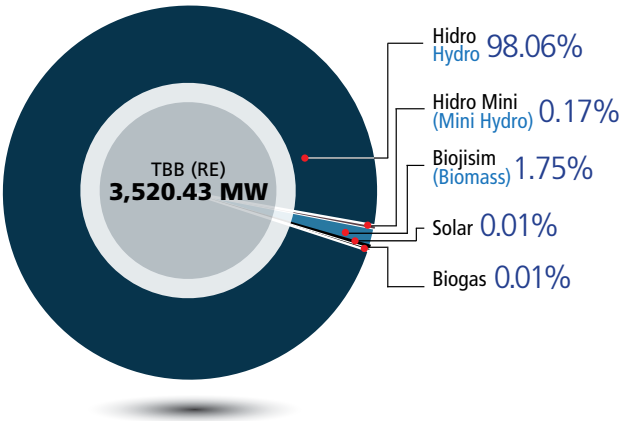
Sabah





Sarawak

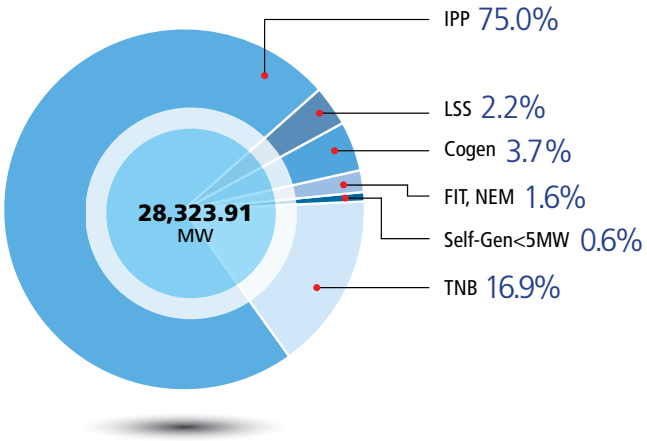




Nota:
Notes:
1. Termasuk kapasiti daripada stesen jana kuasa yang bersambung di peringkat pengagihan dan *off-grid*.
   Including the capacity of distribution level and off-grid power plants.
2. Lain-lain adalah terdiri daripada haba sisa proses perindustrian dan sumber tenaga bukan TBB.
   Others consist of industrial process waste heat and other non-RE sources.

Kapasiti Terpasang mengikut Kawasan dan Kategori Penjana, 2019
Installed Capacity by Region and Producer Category, 2019

Semenanjung Malaysia
Peninsular Malaysia



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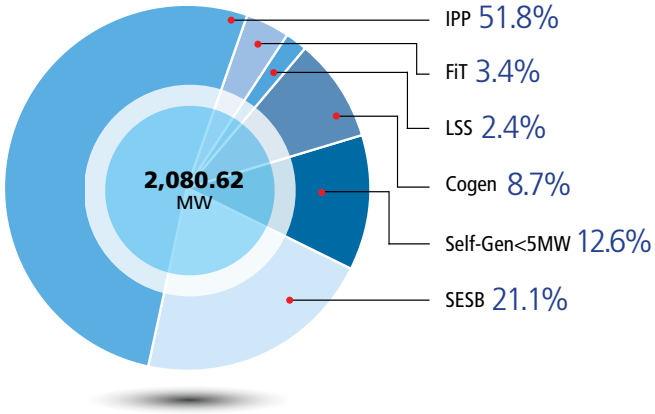
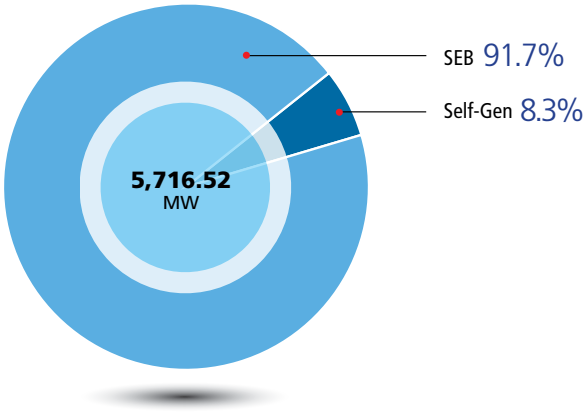


Sarawak



Nota:
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1. Termasuk kapasiti daripada stesen jana kuasa yang bersambung di peringkat pengagihan dan *off-grid*.
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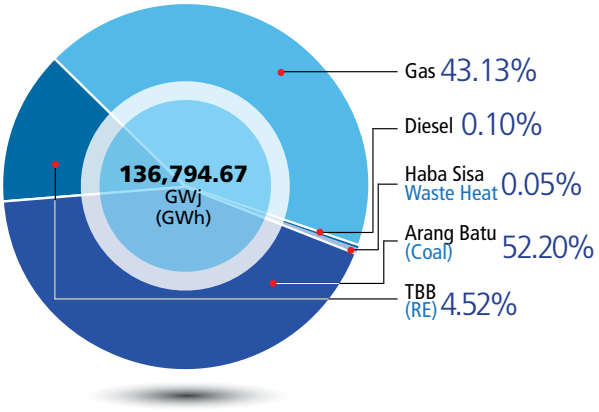
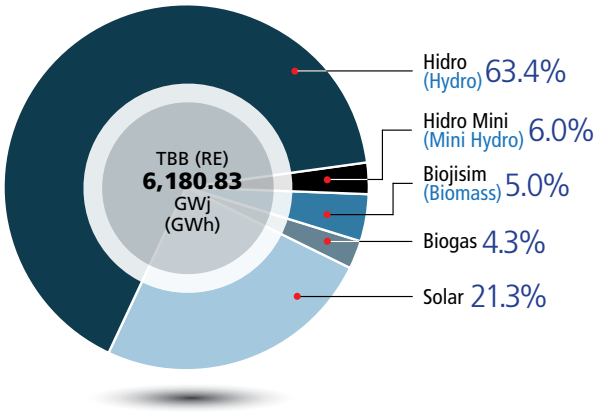
   Others consist of industrial process waste heat and other non-RE sources.

Penjanaan mengikut Kawasan dan Sumber Tenaga, 2019
Generation by Region and Energy Source, 2019

Semenanjung Malaysia
Peninsular Malaysia





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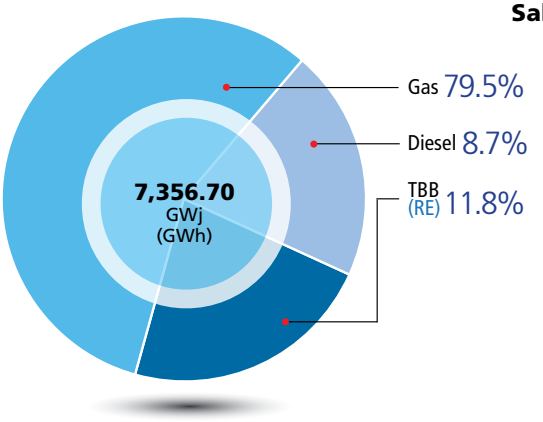

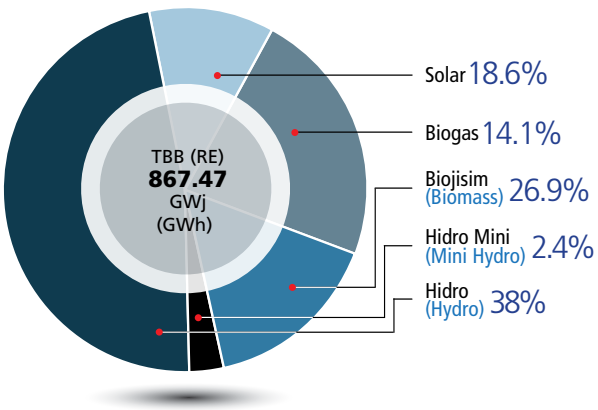

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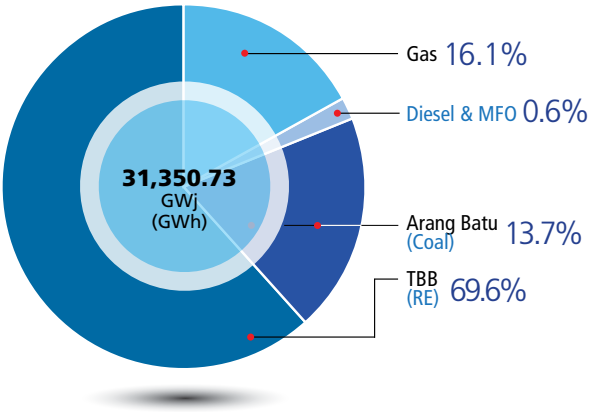

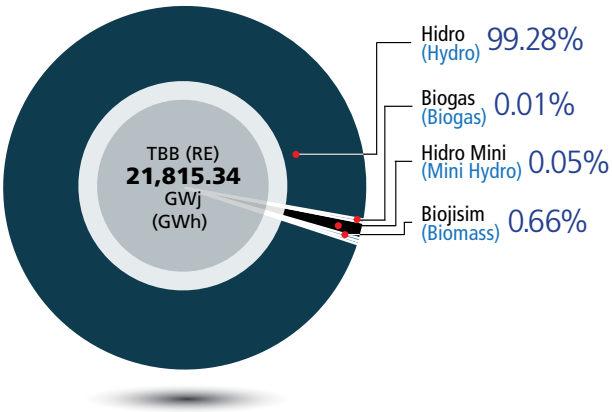

Nota:
Notes:

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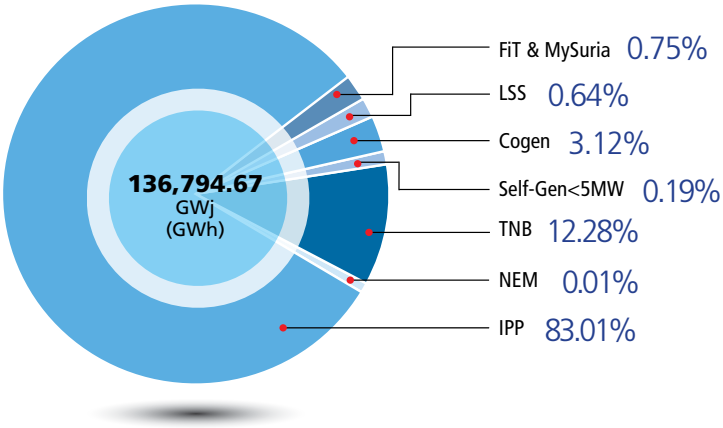
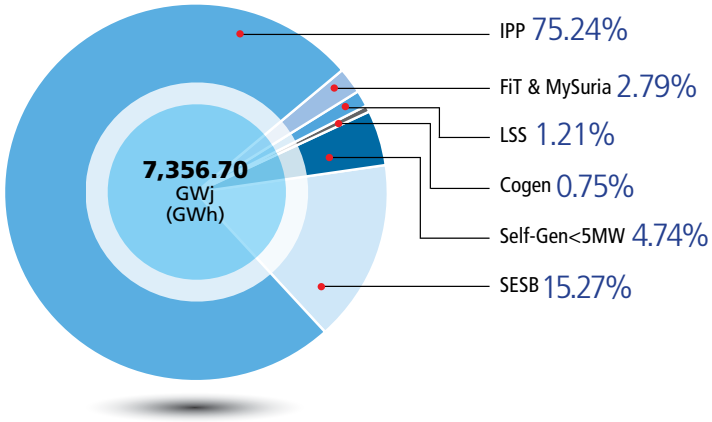
   Including the capacity of distribution level and off-grid power plants.
2. Lain-lain adalah terdiri daripada haba sisa proses perindustrian dan sumber tenaga bukan TBB.
   Others consist of industrial process waste heat and other non-RE sources.

Penjanaan mengikut Kawasan dan Kategori Penjana, 2019
Generation by Region and Producer Category, 2019

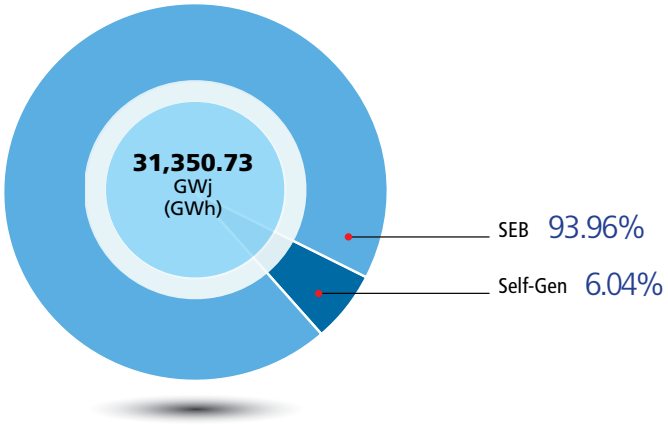
Semenanjung Malaysia
Peninsular Malaysia

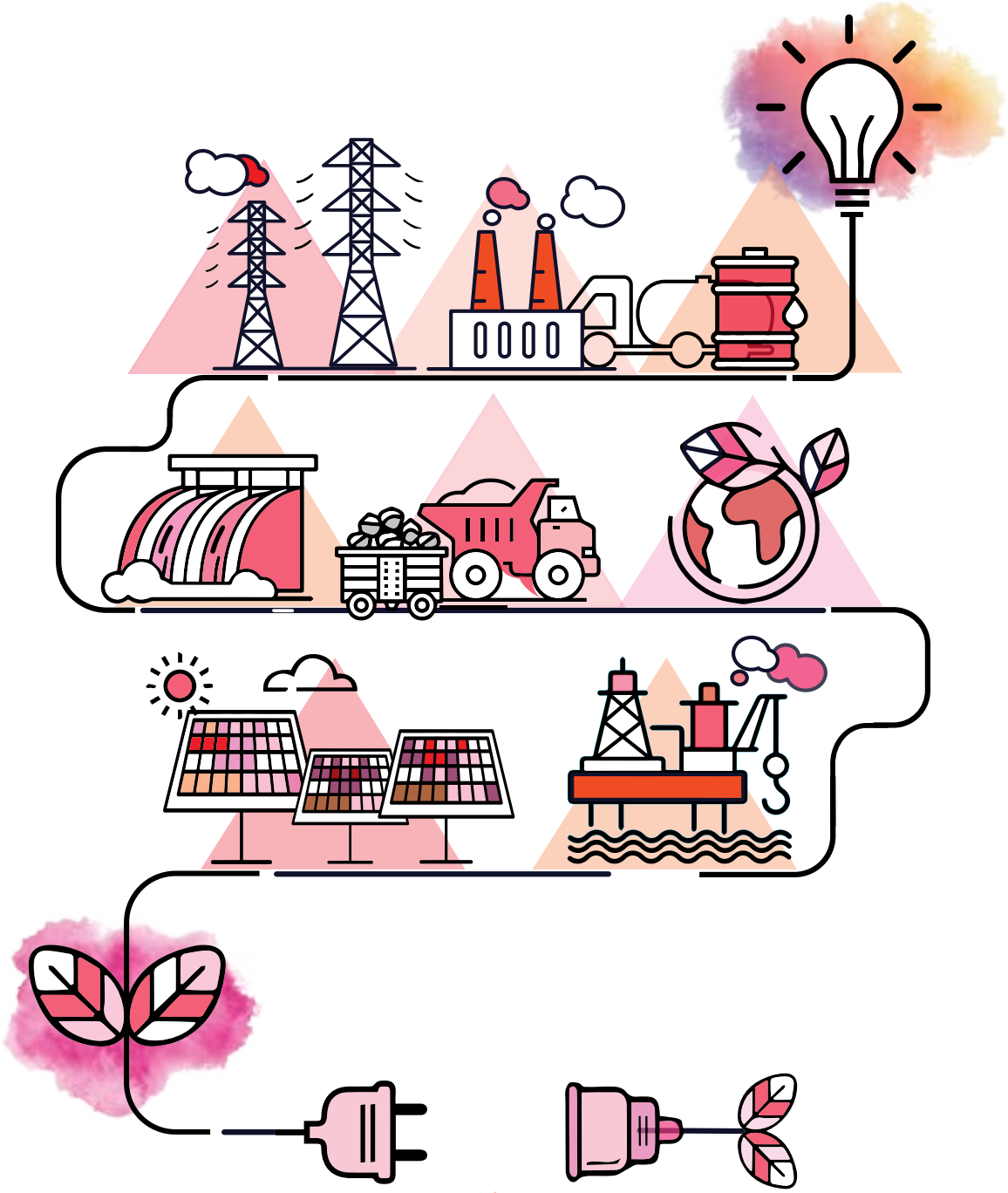


Sabah



Sarawak

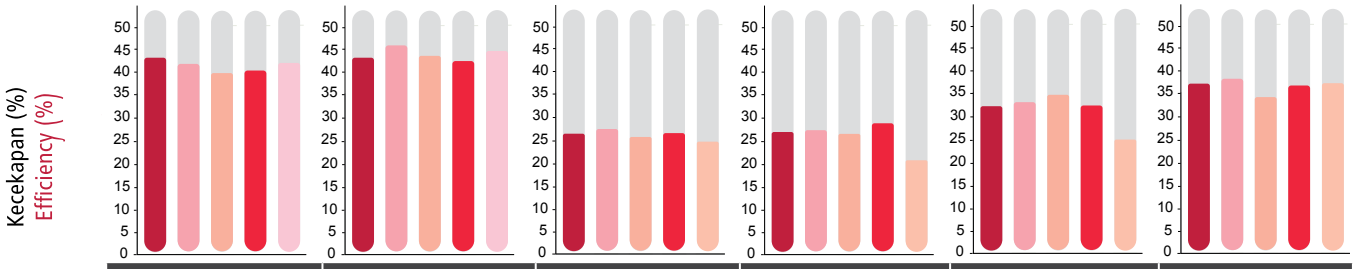




PRESTASI PEMBEKALAN ELEKTRIK DI SEMENANJUNG MALAYSIA
ELECTRICITY SUPPLY PERFORMANCE IN PENINSULAR MALAYSIA

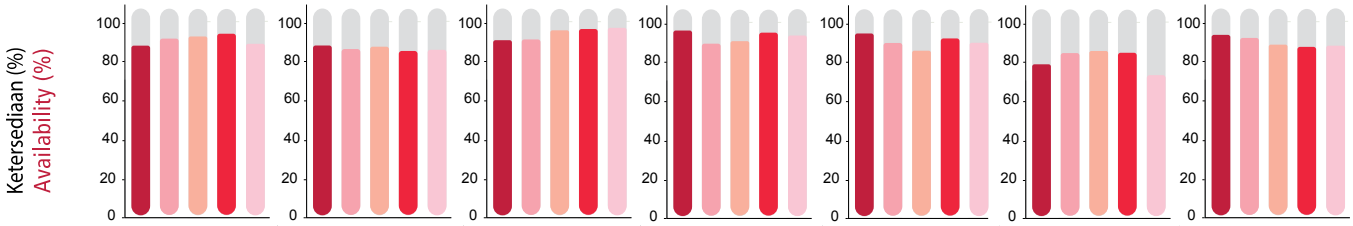
Prestasi Sistem Penjanaan di Semenanjung Malaysia
Generation System Performance in Peninsular Malaysia

Carta 1: Purata Kecekapan Thermal Stesen Jana Kuasa TNB dan IPP
Chart 1: Average Thermal Efficiency of TNB and IPP Power Plants



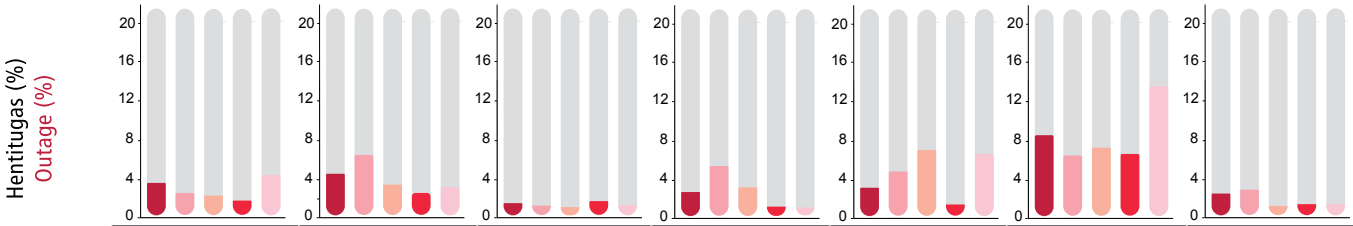
	CCGT TNB	CCGT IPP	OCGT TNB	OCGT IPP	Thermal Conventional IPP	Arang Batu *(Coal)* IPP
2015	43.14	44.24	26.23	26.61	32.52	35.65
2016	41.49	45.65	26.55	26.82	32.83	36.21
2017	39.34	44.74	25.88	26.50	34.52	34.51
2018	39.67	43.42	26.19	28.75	32.56	35.45
2019	42.86	45.47	24.66	22.80	24.05	35.62

Carta 2: EAF Stesen Jana Kuasa TNB dan IPP
Chart 2: EAF of TNB and IPP Power Plants



	CCGT TNB	CCGT IPP	OCGT TNB	OCGT IPP	Thermal Conventional IPP	Arang Batu *(Coal)* IPP	Hidro *(Hydro)* TNB
2015	86.15	88.41	91.11	96.45	94.43	79.92	92.52
2016	89.85	88.05	92.36	91.07	90.68	82.28	89.95
2017	91.41	88.21	95.09	91.21	86.37	82.64	89.29
2018	93.82	87.64	96.09	96.78	93.95	82.05	89.27
2019	87.49	87.94	96.97	94.98	90.82	77.90	89.47

Carta 3: EUOF Stesen Jana Kuasa TNB dan IPP
Chart 3: EUOF of TNB and IPP Power Plants



	CCGT TNB	CCGT IPP	OCGT TNB	OCGT IPP	Thermal Conventional IPP	Arang Batu *(Coal)* IPP	Hidro *(Hydro)* TNB
2015	3.60	4.79	5.47	2.42	3.02	8.04	2.09
2016	2.85	6.50	7.09	5.95	4.26	6.85	2.98
2017	2.27	3.78	0.15	3.39	6.63	7.13	1.20
2018	1.52	2.55	0.55	0.29	1.41	6.95	1.33
2019	4.63	3.32	1.07	0.24	6.41	13.00	0.59

Prestasi Sistem Penghantaran di Semenanjung Malaysia
Transmission System Performance in Peninsular Malaysia

Jadual 1: Pelantikan Sistem Penghantaran TNB dengan Kehilangan Beban Sebanyak 50 MW dan ke Atas
Table 1: TNB Transmission System Trippings with Load Loss of 50 MW and Above

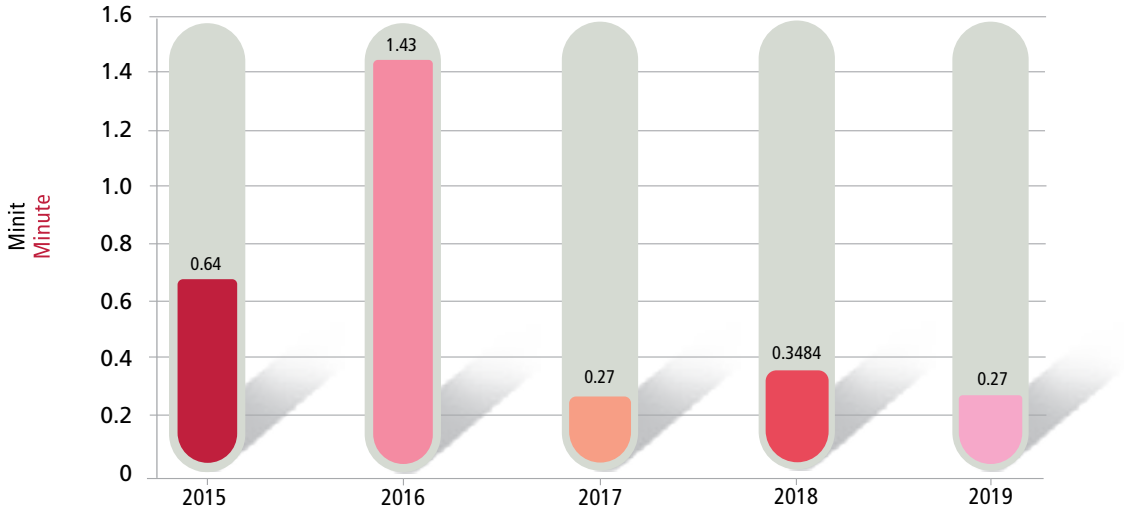
Petunjuk Indicator	2015	2016	2017	2018	2019
Bilangan Pelantikan tanpa Lucutan Beban Number of Trippings without Load Shedding	1	3	1	5	2
Tenaga yang Tidak Dibekalkan Semasa Pelantikan (MWj) Unsupplied Energy During Trippings (MWh)	-	344.85	40.30	35.05	45.78
Bilangan Pelantikan dengan Lucutan Beban Number of Trippings with Load Shedding	1	1	-	-	-
Tenaga yang Tidak Dibekalkan Semasa Lucutan Beban (MWj) Unsupplied Energy During Load Shedding (MWh)	67.60	425.00	-	-	-

Jadual 2: Pelantikan Bulanan Sistem Penghantaran TNB dengan Kehilangan Beban 50 MW dan ke Atas
Table 2: TNB Monthly Transmission System Trippings with Load Loss of 50 MW and Above

	2019											
Petunjuk Indicator	Jan Jan	Feb Feb	Mac Mar	Apr Apr	Mei May	Jun June	Jul July	Ogos Aug	Sep Sept	Okt Oct	Nov Nov	Dis Dec
Bilangan Pelantikan tanpa Lucutan Beban Number of Trippings without Load Shedding	0	0	0	0	0	0	0	1	1	0	0	0
Bilangan Pelantikan dengan Lucutan Beban Number of Trippings with Load Shedding	0	0	0	0	0	0	0	0	0	0	0	0
Kehilangan Beban Maksimum (MW) Maximum Load Losses (MW)	0	0	0	0	0	0	0	98.00	69.00	0	0	0
Tenaga yang Tidak Dibekalkan Semasa Pelantikan (MWj) Unsupplied Energy During Trippings (MWh)	0	0	0	0	0	0	0	40.03	5.75	0	0	0
Purata Tenaga Tidak Dibekalkan Setiap Pelantikan (MWj) Average Unsupplied Energy During Trippings (MWh)	0	0	0	0	0	0	0	40.03	5.75	0	0	0
Purata Tempoh Setiap Pelantikan (Minit) Average Duration per Tripping (Minutes)	0	0	0	0	0	0	0	25.30	5.00	0	0	0
Tenaga Tidak Dibekalkan Semasa Lucutan Beban (MWj) Unsupplied Energy During Load Shedding (MWh)	0	0	0	0	0	0	0	0	0	0	0	0

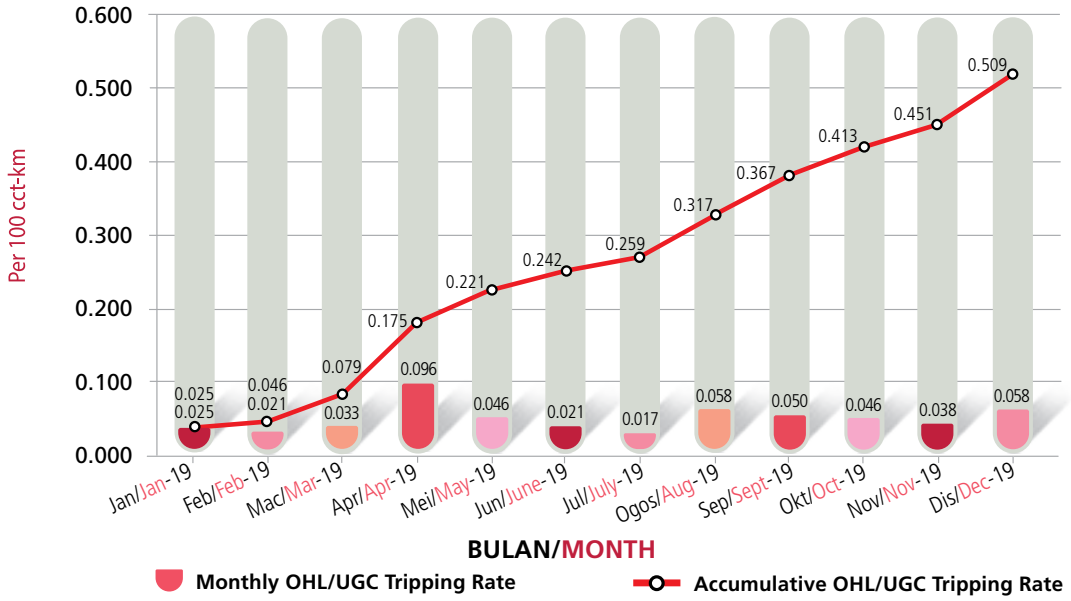
Prestasi Sistem Penghantaran di Semenanjung Malaysia
Transmission System Performance in Peninsular Malaysia

Carta 4: DePUI - Minit Sistem TNB
Chart 4: DePUI – TNB System Minutes



Nota:
Notes:
2015-2017: Tahun Kewangan / Financial Year
2018-2019: Tahun Kalendar / Calendar Year

Carta 5: Insiden Pelantikan Bulanan TNB Bagi Talian / Kabel per 100 cct-km di Semenanjung Malaysia
Chart 5: TNB Monthly Tripping Incidents for Lines / Cables per 100 cct-km in Peninsular Malaysia

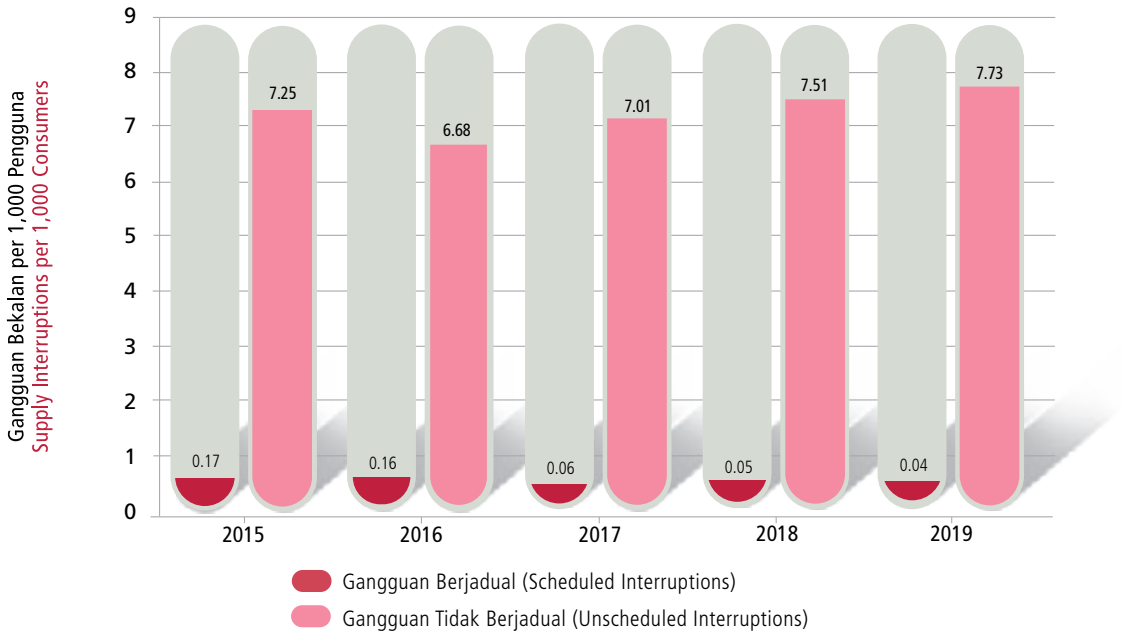


Nota:
Notes:
Data tahun kewangan yang diperolehi daripada Laporan Syarat Lesen 25(4) TNB *(Transmission Reliability Standard)* FY2019.
Financial year data obtained from License Condition 25(4) TNB (Transmission Reliability Standard) FY2019.

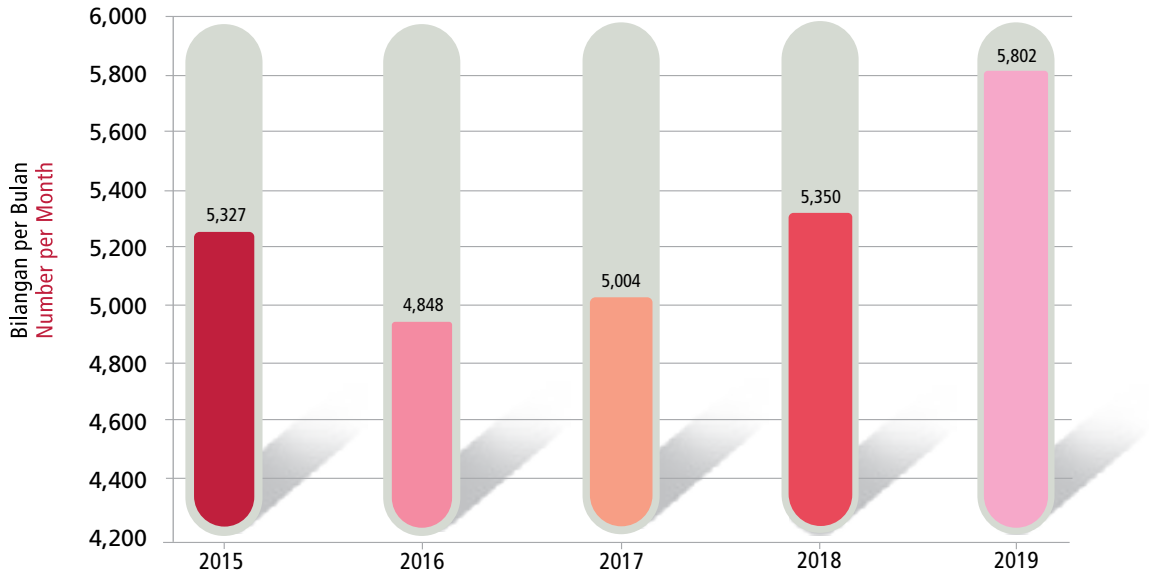
Prestasi Sistem Pengagihan di Semenanjung Malaysia
Transmission System Performance in Peninsular Malaysia

GANGGUAN BEKALAN ELEKTRIK
ELECTRICITY SUPPLY INTERRUPTION

Carta 6: Gangguan Bekalan Elektrik per 1,000 Pengguna
Chart 6: Electricity Supply Interruptions per 1,000 Consumers

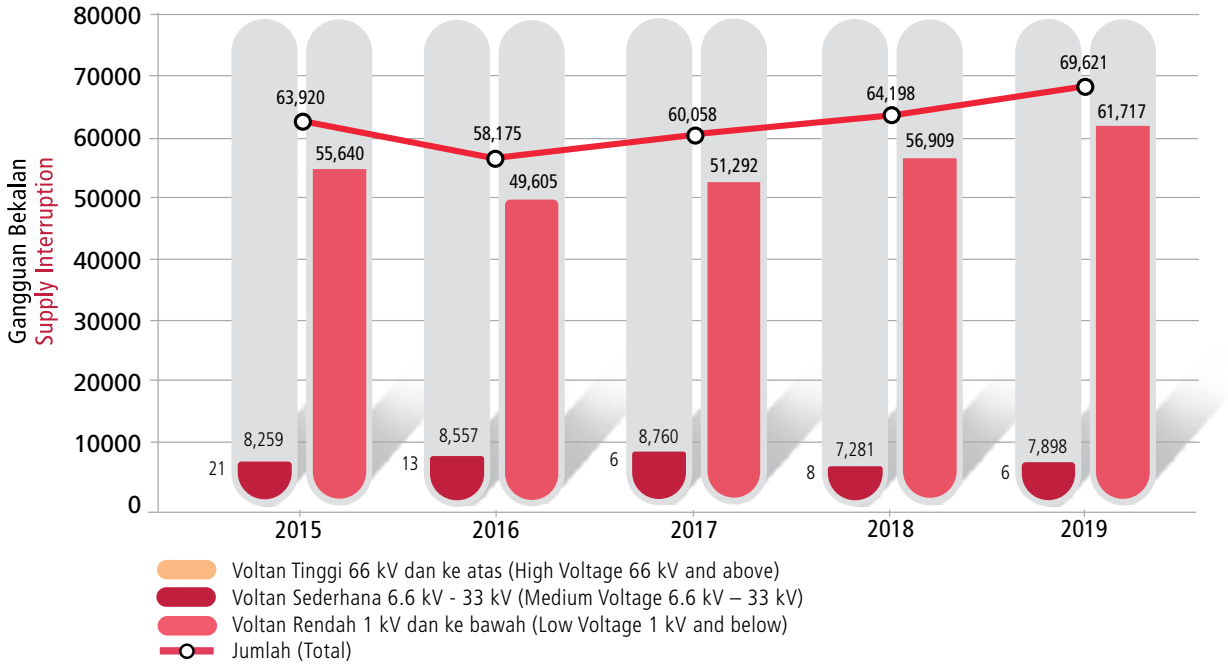


Carta 7: Purata Gangguan Bekalan Elektrik Bulanan
Chart 7: Monthly Average Electricity Supply Interruptions



Prestasi Sistem Pengagihan di Semenanjung Malaysia
Distribution System Performance in Peninsular Malaysia

Carta 8: Gangguan Bekalan Elektrik mengikut Tahap Voltan
Chart 8: Electricity Supply Interruptions by Voltage Level



Jadual 3: Gangguan Bekalan Elektrik mengikut Negeri
Table 3: Electricity Supply Interruptions by States

Negeri State	2015	2016	2017	2018	2019
Johor	8,354	7,649	6,509	4,839	4,793
Kedah	3,799	3,999	4,715	3,751	4,249
Kelantan	5,781	3,832	4,135	4,401	5,602
WP Kuala Lumpur	9,470	8,779	6,685	8,713	9,335
Melaka	1,694	1,458	717	917	654
Negeri Sembilan	5,226	4,784	4,078	2,750	2,604
Pulau Pinang	3,815	3,348	3,221	2,899	4,327
Pahang	4,971	5,874	9,761	9,016	7,298
Perak	6,601	5,538	7,458	7,608	9,560
Perlis	465	343	513	699	1088
WP Putrajaya & Cyberjaya	25	13	16	14	4
Selangor	12,268	11,332	10,163	15,132	15,993
Terengganu	1,451	1,226	2,087	3,459	4,114
Jumlah Total	**63,920**	**58,175**	**60,058**	**64,198**	**69,621**

Prestasi Sistem Pengagihan di Semenanjung Malaysia
Distribution System Performance in Peninsular Malaysia

Jadual 4: Bilangan Gangguan Bekalan Elektrik
Table 4: Number of Electricity Supply Interruptions

Bilangan Number	2015	2016	2017	2018	2019
Gangguan Tidak Berjadual Unscheduled Interruptions	62,420	56,775	59,560	63,784	69,251
Gangguan Berjadual Scheduled Interruptions	1,500	1,400	498	414	370
Jumlah Total	**63,920**	**58,175**	**60,058**	**64,198**	**69,621**

Jadual 5: Gangguan Bekalan Elektrik Tidak Berjadual mengikut Jenis Gangguan (Tidak Termasuk Gangguan Voltan Tinggi)
Table 5: Number of Unscheduled Electricity Supply Interruptions by Type of Interruptions (Excluding High Voltage Interruptions)

Kategori Category	2015	2016	2017	2018	2019
Alat Ubah Transformer	77	61	30	37	42
Auto Reclose	10	4	211	1	0
Banjir Flood	3	28	68	23	422
Feeder pillar	3,127	3,139	1,970	2,382	3,049
Fius Fuse	3,369	4,103	2,109	2,737	4,045
Haiwan Animal	1,195	905	537	409	641
Insulating Piercing Connectors (IPC)	18,075	16,292	14,976	24,808	24,124
Jumper	8	18	7	6	3
Kabel Cable	3,810	3,205	2,819	2,703	3,590
Konduktor Conductor	8,368	7,140	7,710	9,362	11,646
Kotak Fius Fuse Box	5,604	5,420	3,975	4,164	4,522
Lain-lain Others	134	49	6163	33	199
Null	96	205	885	0	50
Pautan Link	36	26	28	67	109
Penamatan Termination	275	262	93	108	509
Penebat Insulator	11	14	4	6	11
Peralatan Suis Switchgear	107	93	65	39	26
Pihak Ketiga Third Party	3,644	3,375	3,323	3,463	3,530
Pokok Tree	7,689	6,240	7,215	6,391	6,348
Relay	14	9	7	4	13
Ribut Storm	370	174	98	78	161
Sambungan Joint	4,066	4,099	4,650	4,279	3,603
Tiang Pole	1,704	1,427	1,722	2,414	2,225
Ubahtika Transient	86	76	43	78	40
Vandalisme Vandalism	521	399	846	184	337
Jumlah Total	**62,399**	**56,763**	**59,554**	**63,776**	**69,245**

Prestasi Sistem Pengagihan di Semenanjung Malaysia
Distribution System Performance in Peninsular Malaysia

SAIDI, SAIFI & CAIDI

Jadual 6: SAIDI mengikut Tahap Voltan
Table 6: SAIDI by Voltage Level

Tahap Voltan Voltage Level	Minit/Pelanggan/Tahun Minutes/Customer/Year				
	2015	2016	2017	2018	2019
Voltan Tinggi (66 kV dan ke atas) High Voltage (66 Kv and Above)	1.05	0.38	0.36	0.03	0.00
Voltan Sederhana (6.6 kV – 33 kV) Medium Voltage (6.6 kV – 33 kV)	47.78	46.46	51.78	46.02	45.51
Voltan Rendah (1 kV dan ke bawah) Low Voltage (1 kV and below)	2.66	2.45	2.35	2.17	2.62
Jumlah Total	**51.49**	**49.29**	**54.49**	**48.22**	**48.13**

Jadual 7: SAIDI mengikut Negeri
Table 7: SAIDI by State

Negeri State	Minit/Pelanggan/Tahun Minutes/Customer/Year				
	2015	2016	2017	2018	2019
Johor	58.98	49.39	56.04	41.73	41.91
Kedah	57.42	60.82	82.51	73.3	65.76
Kelantan	56.18	67.90	59.34	49.91	39.33
WP Kuala Lumpur	32.36	32.39	41.01	28.59	26.68
Melaka	42.48	38.04	42.62	18.59	21.99
Negeri Sembilan	56.86	51.03	35.56	57.37	37.58
Pahang	62.61	57.22	51.30	46.01	60.84
Perak	51.64	46.23	52.83	43.89	43.26
Perlis	34.09	35.98	144.10	56.67	61.72
Pulau Pinang	54.49	51.05	58.12	78.66	89.34
WP Putrajaya & Cyberjaya	0.63	0.13	0.55	0.73	0.04
Selangor	50.74	54.67	52.34	64.77	61.55
Terengganu	41.46	39.65	42.82	36.67	30.70
Semenanjung Malaysia Peninsular Malaysia	**51.49**	**49.29**	**54.49**	**48.22**	**48.13**

Prestasi Sistem Pengagihan di Semenanjung Malaysia
Distribution System Performance in Peninsular Malaysia

Jadual 8: SAIFI mengikut Tahap Voltan
Table 8: SAIFI by Voltage Level

Tahap Voltan Voltage Level	Bilangan Gangguan/Pelanggan/Tahun Number of interruptions/Customer/Year				
	2015	2016	2017	2018	2019
Voltan Tinggi (66 kV dan ke atas) High Voltage (66 kV and above)	0.02	0.02	0.00	0.00	0.00
Voltan Sederhana (6.6 kV – 33 kV) Medium Voltage (6.6 kV – 33 kV)	0.79	0.87	0.93	0.86	0.83
Voltan Rendah (1 kV dan ke bawah) Low Voltage (1 kV and below)	0.02	0.01	0.00	0.00	0.00
Jumlah Total	**0.83**	**0.90**	**0.93**	**0.86**	**0.83**

Jadual 9: SAIFI mengikut Negeri
Table 9: SAIFI by State

Negeri State	Bilangan Gangguan/Pelanggan/Tahun Number of Interruptions/Customer/Year				
	2015	2016	2017	2018	2019
Johor	0.70	0.70	0.55	0.63	0.75
Kedah	1.20	1.40	1.19	1.26	1.22
Kelantan	1.25	1.45	1.53	1.47	1.02
WP Kuala Lumpur	0.48	0.57	0.61	0.46	0.43
Melaka	0.58	0.64	0.55	0.28	0.44
Negeri Sembilan	0.77	0.78	0.44	0.77	0.51
Pahang	1.44	1.56	1.39	0.65	0.82
Perak	0.80	0.94	0.71	1.41	1.48
Perlis	0.46	0.57	2.32	0.79	1.02
Pulau Pinang	0.83	0.82	0.69	1.68	1.37
WP Putrajaya & Cyberjaya	0.01	0.15	0.00	0.09	0.00
Selangor	0.74	0.84	0.60	0.94	0.76
Terengganu	0.87	1.01	1.10	1.00	0.93
Semenanjung Malaysia Peninsular Malaysia	**0.83**	**0.90**	**0.93**	**0.86**	**0.83**

Jadual 10: CAIDI mengikut Tahap Voltan
Table 10: CAIDI by Voltage Level

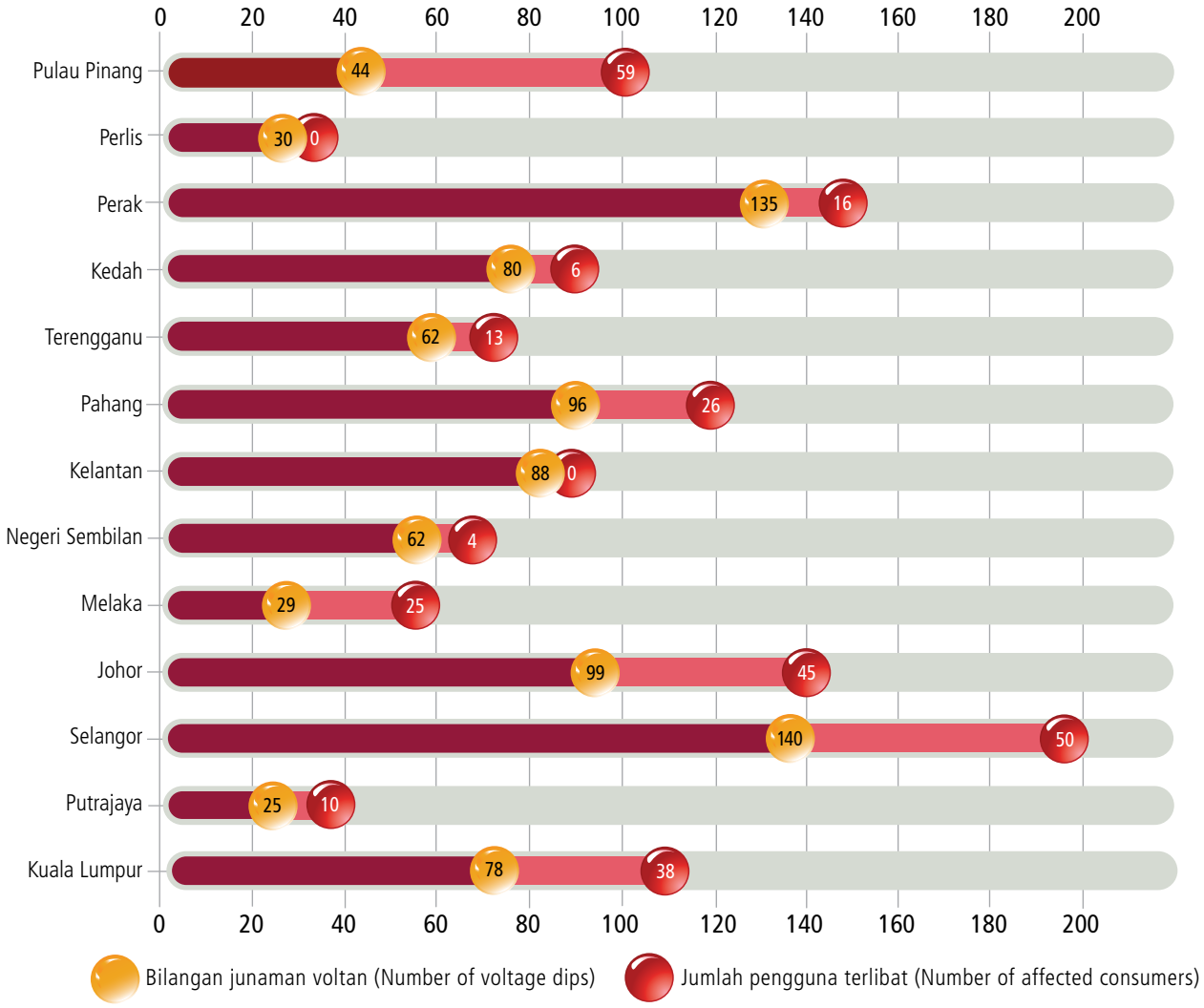
Tahap Voltan Voltage Level	Bilangan Gangguan/Pelanggan/Tahun Number of interruptions/Customer/Year				
	2015	2016	2017	2018	2019
Voltan Tinggi (66 kV dan ke atas) High Voltage (66 kV and above)	52.50	19.00	0.00	0.00	0.00
Voltan Sederhana (6.6 kV – 33 kV) Medium Voltage (6.6 kV – 33 kV)	60.48	53.40	55.68	55.68	54.83
Voltan Rendah (1 kV dan ke bawah) Low Voltage (1 kV and below)	133.0	245.0	0.00	0.00	0.00
Jumlah/Total	**62.04**	**54.77**	**58.59**	**56.07**	**57.99**

Jadual 11: CAIDI mengikut Negeri
Table 11: CAIDI by State

Negeri State	Bilangan Gangguan/Pelanggan/Tahun Number of Interruptions/Customer/Year				
	2015	2016	2017	2018	2019
Johor	84.26	70.56	101.89	66.24	55.88
Kedah	47.85	43.44	69.33	58.17	53.90
Kelantan	44.94	46.83	38.78	33.95	38.56
WP Kuala Lumpur	67.42	56.82	67.23	62.15	62.05
Melaka	73.24	59.44	77.50	66.39	49.98
Negeri Sembilan	73.84	65.42	80.81	74.51	73.69
Pahang	65.65	62.26	84.23	31.13	74.20
Perak	43.48	36.68	36.91	71.73	29.23
Perlis	64.55	49.18	74.41	46.82	60.51
Pulau Pinang	74.11	63.12	62.11	70.78	65.21
WP Putrajaya & Cyberjaya	63.00	0.87	0.00	8.11	0.00
Selangor	68.57	65.08	87.23	68.9	80.99
Terengganu	47.66	39.26	42.39	36.67	33.01
Semenanjung Malaysia Peninsular Malaysia	**62.04**	**54.77**	**58.99**	**56.07**	**57.99**

KUALITI PEMBEKALAN ELEKTRIK
ELECTRICITY SUPPLY QUALITY

Carta 9: Kejadian Junaman Voltan mengikut Negeri dan Bilangan Pengguna yang Terlibat
Chart 9: Voltage Dip Incidents by State and Number of Consumers Involved



Nota:
Notes:
Jumlah bilangan kejadian junaman voltan bukan hasil tambah bilangan jumlah junaman voltan bagi setiap negeri kerana terdapat kejadian yang sama dirakamkan di beberapa negeri.
The total number of occurrences of voltage dips is not summarised by the number of voltage dips in each state as there are similar events recorded in some states.

Prestasi Sistem Pengagihan di Semenanjung Malaysia
Distribution System Performance in Peninsular Malaysia

Jadual 12: Bilangan Pengguna Terlibat dengan Insiden Junaman Voltan mengikut Negeri
Table 12: Number of Consumers Involved in Voltage Dip Incidents by State

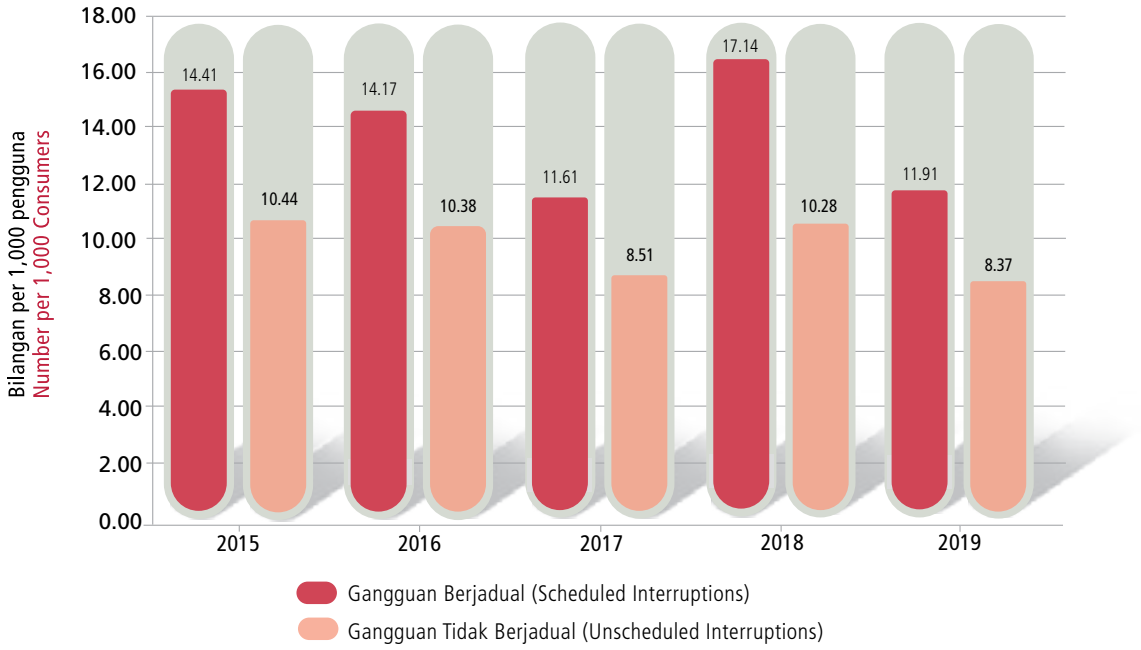
Negeri State	2015	2016	2017	2018	2019
Johor	17	12	35	59	45
Kedah	11	7	2	5	6
Kelantan	0	0	2	0	0
Melaka	9	5	17	21	25
Negeri Sembilan	16	23	10	26	4
Pahang	4	5	11	25	26
Perak	20	14	20	23	16
Perlis	0	0	0	0	0
Pulau Pinang	64	51	57	74	59
Selangor	36	34	28	67	50
Terengganu	1	0	7	14	13
WP Kuala Lumpur	26	22	25	40	38
WP Putrajaya & Cyberjaya	5	4	2	11	10
Jumlah Total	**209**	**177**	**216**	**365**	**292**

Jadual 13: SARFI
Table 13: SARFI

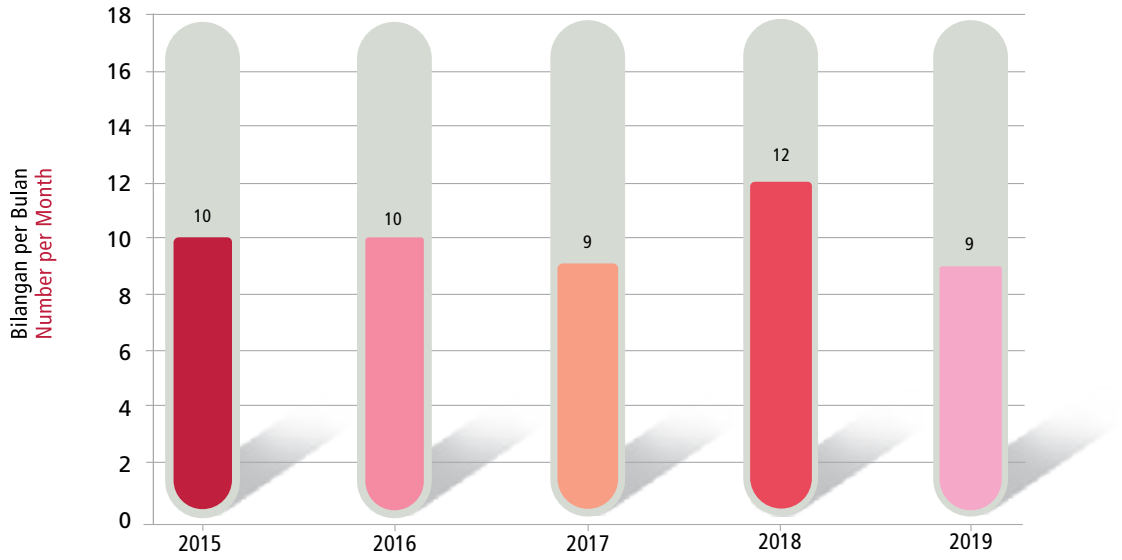
Sistem TNB TNB System	2015			2016			2017			2018			2019		
	SARFI 90	SARFI 80	SARFI 70	SARFI 90	SARFI 80	SARFI 70	SARFI 90	SARFI 80	SARFI 70	SARFI 90	SARFI 80	SARFI 70	SARFI 90	SARFI 80	SARFI 70
11 kV	6.19	3.40	2.13	6.05	3.48	2.03	5.54	3.15	2.03	13.40	4.46	2.01	13.60	3.67	1.73
22 kV	6.86	4.36	3.14	6.00	3.86	3.43	6.71	3.00	2.43	18.93	5.71	1.93	12.87	4.80	1.73
33 kV	7.05	2.97	1.55	6.86	2.80	1.36	5.30	2.29	1.08	16.34	4.35	1.31	14.04	3.28	0.89
Sistem Keseluruhan Overall System	**5.70**	**3.01**	**1.88**	**5.84**	**2.97**	**1.80**	**4.99**	**2.50**	**1.52**	**1.34**	**0.36**	**0.16**	**13.73**	**3.60**	**1.38**

Prestasi Sistem Pengagihan NUR Distribution Sdn. Bhd.
Distribution System Performance of NUR Distribution Sdn. Bhd.

Carta 10: Gangguan Bekalan Elektrik per 1,000 Pengguna
Chart 10: Electricity Supply Interruptions per 1,000 Consumers



Carta 11: Purata Gangguan Bekalan Elektrik Bulanan
Chart 11: Monthly Average of Electricity Supply Interruptions

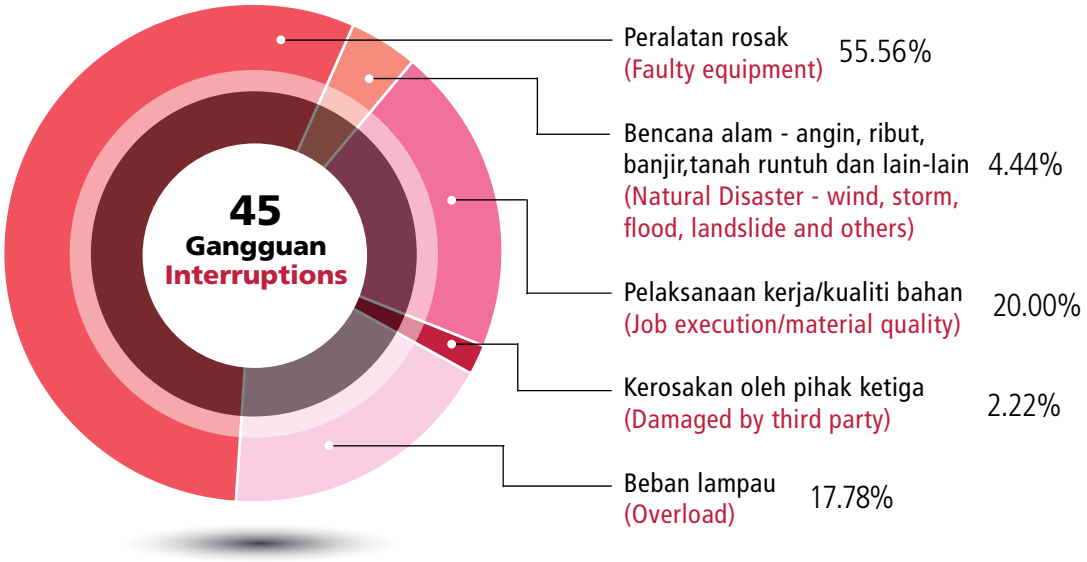


Prestasi Sistem Pengagihan NUR Distribution Sdn. Bhd.
Distribution System Performance of NUR Distribution Sdn. Bhd.

Jadual 14: Bilangan Gangguan Bekalan Elektrik
Table 14: Number of Electricity Supply Interruptions

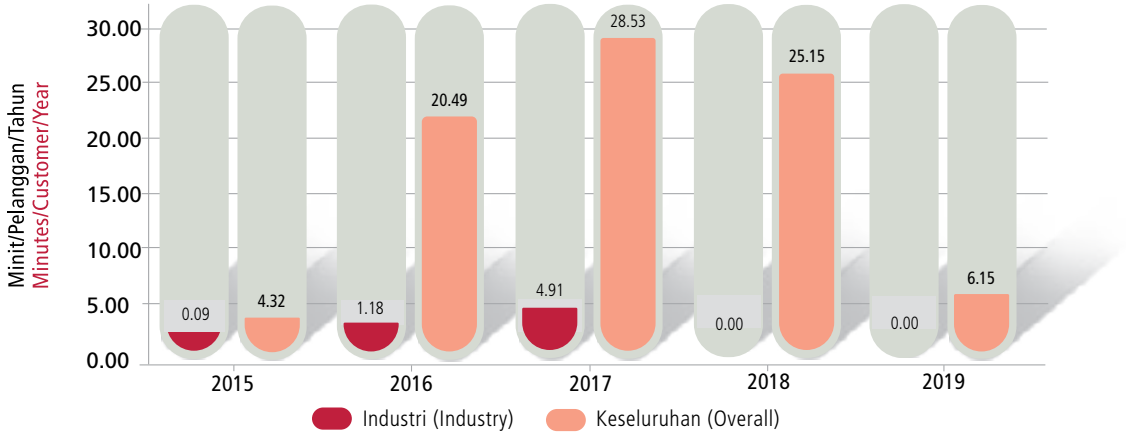
Bilangan Number	2015	2016	2017	2018	2019
Gangguan Tidak Berjadual Unscheduled Interruptions	50	52	44	54	45
Gangguan Berjadual Scheduled Interruptions	69	71	60	90	64
Jumlah Total	**119**	**123**	**104**	**144**	**109**

Carta 12: Gangguan Bekalan Elektrik Tidak Berjadual mengikut Jenis Gangguan
Chart 12: Unscheduled Supply Interruption by Type of Interruptions

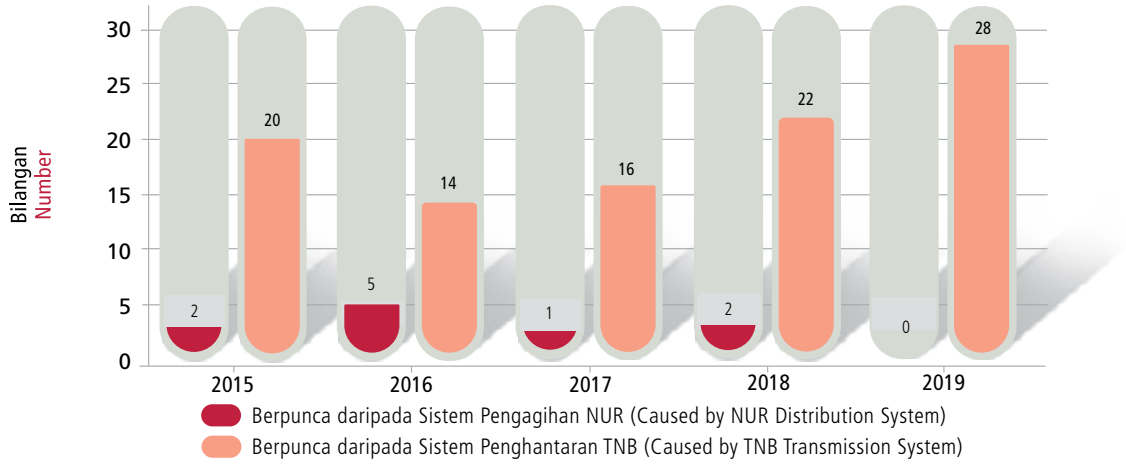


Prestasi Sistem Pengagihan NUR Distribution Sdn. Bhd.
Distribution System Performance of NUR Distribution Sdn. Bhd.

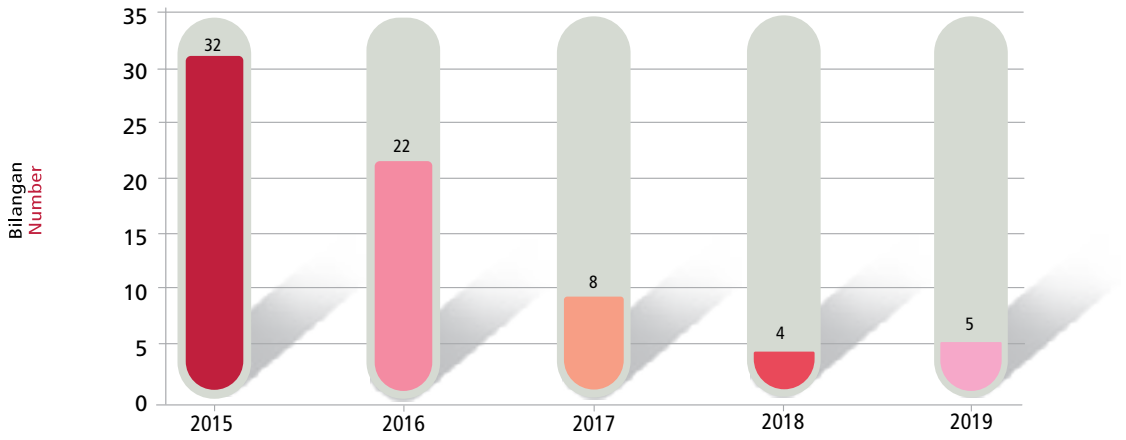
Carta 13: SAIDI
Chart 13: SAIDI

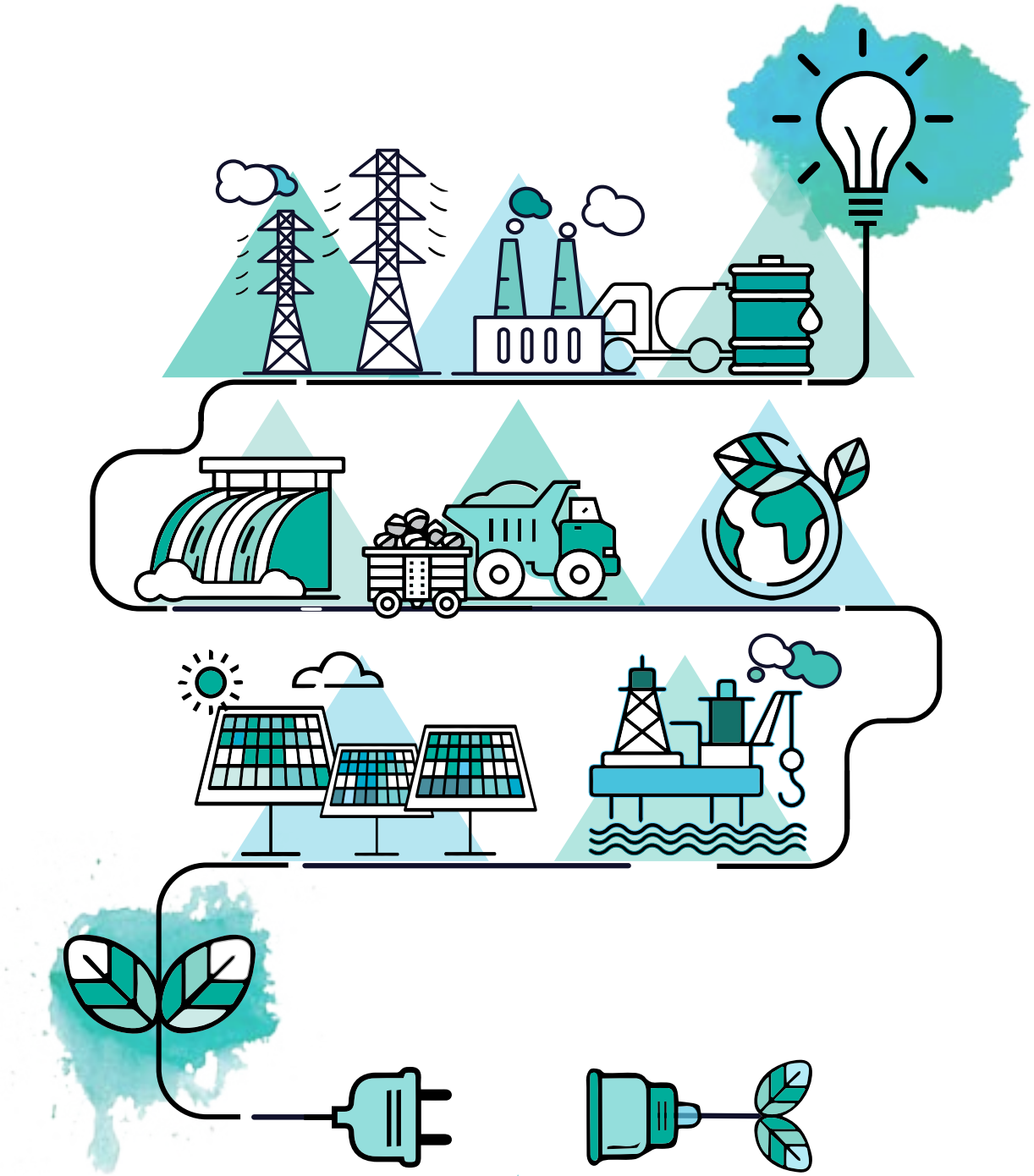


Carta 14: Kejadian Junaman Voltan yang Dilaporkan di Kulim Hi-Tech Park (KHTP)
Chart 14: Voltage Dips Incidents Reported in Kulim Hi-Tech Park (KHTP)



Carta 15: Bilangan Pengguna Terlibat dengan Insiden Junaman Voltan
Chart 15: Number of Consumers Involved in Voltage Dip Incidents

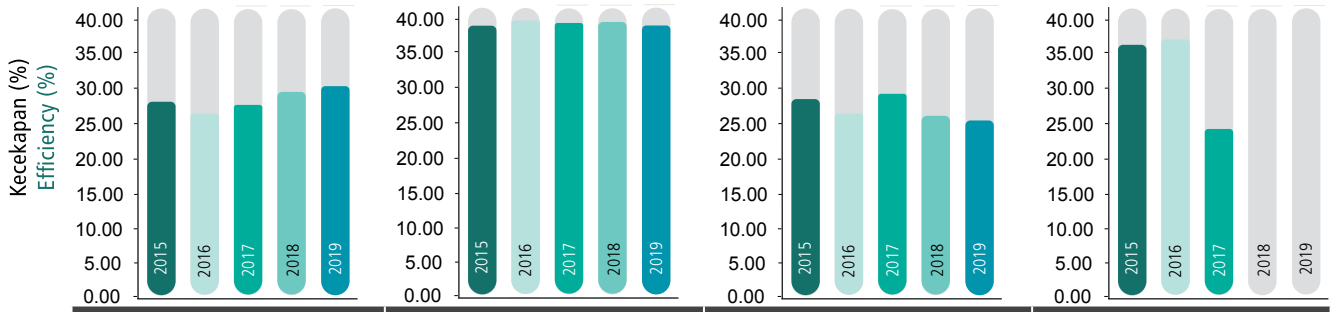




PRESTASI PEMBEKALAN ELEKTRIK DI SABAH
ELECTRICITY SUPPLY PERFORMANCE IN SABAH

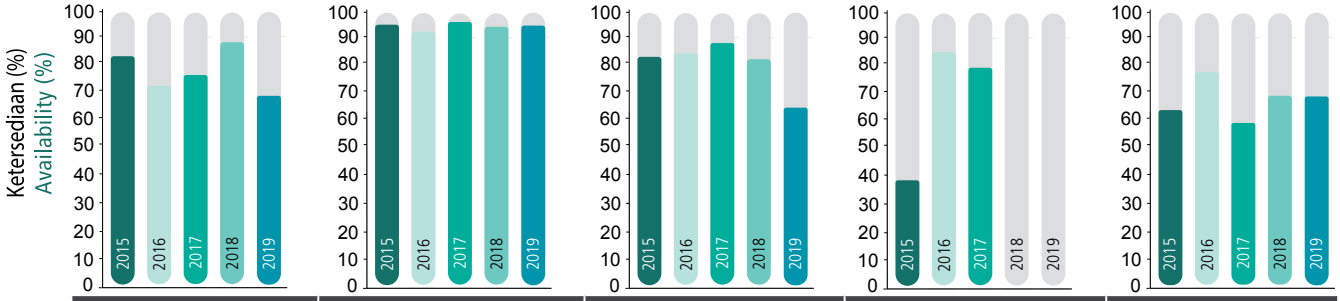
Prestasi Sistem Penjanaan di Sabah
Generation System Performance in Sabah

Carta 16: Purata Kecekapan Thermal Stesen Jana Kuasa SESB dan IPP
Chart 16: Average Thermal Efficiency of SESB and IPP Power Plants



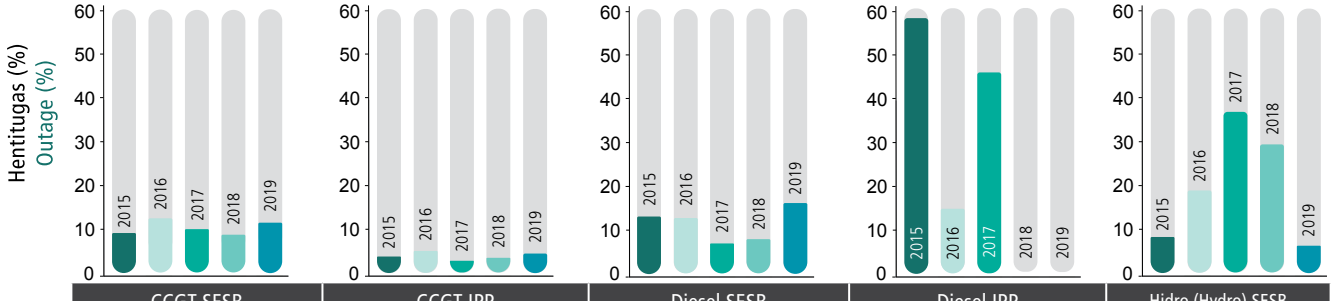
	CCGT SESB	CCGT IPP	Diesel SESB	Diesel IPP
2015	27.70	38.54	27.47	36.13
2016	25.75	39.22	26.97	36.66
2017	26.27	38.98	28.01	24.35
2018	29.06	39.46	26.75	0.00
2019	30.63	38.72	25.56	0.00

Carta 17: EAF Stesen Jana Kuasa SESB dan IPP
Chart 17: EAF of SESB and IPP Power Plants



	CCGT SESB	CCGT IPP	Diesel SESB	Diesel IPP	Hidro (Hydro) SESB
2015	80.36	94.10	82.37	39.46	62.69
2016	71.70	92.55	83.14	84.08	67.05
2017	75.52	95.71	88.79	79.56	59.98
2018	88.00	93.43	81.11	0.00	68.46
2019	68.99	95.20	64.40	0.00	85.28

Carta 18: EUOF Stesen Jana Kuasa SESB dan IPP
Chart 18: EUOF of SESB and IPP Power Plants



	CCGT SESB	CCGT IPP	Diesel SESB	Diesel IPP	Hidro (Hydro) SESB
2015	9.42	2.05	11.55	59.56	8.17
2016	12.27	2.74	11.31	14.79	19.23
2017	10.00	1.55	7.62	45.16	37.16
2018	8.82	1.89	8.66	0.00	29.16
2019	11.79	2.73	16.20	0.00	7.42

Nota untuk semua carta di atas: / Notes for all charts above:

1. Sehingga 2019, satu-satunya stesen jana kuasa diesel IPP di bawah tempoh lesen adalah Stratavest, tetapi ia tidak beroperasi sepanjang tahun disebabkan oleh *forced outage*.
   As of 2019, the only IPP diesel power plant under the license period was Stratavest, which was not in operation throughout the year due to forced outage.
2. Stesen jana kuasa diesel Serudong telah tamat operasi pada Disember 2017.
   Serudong diesel power station ended operations in December 2017.

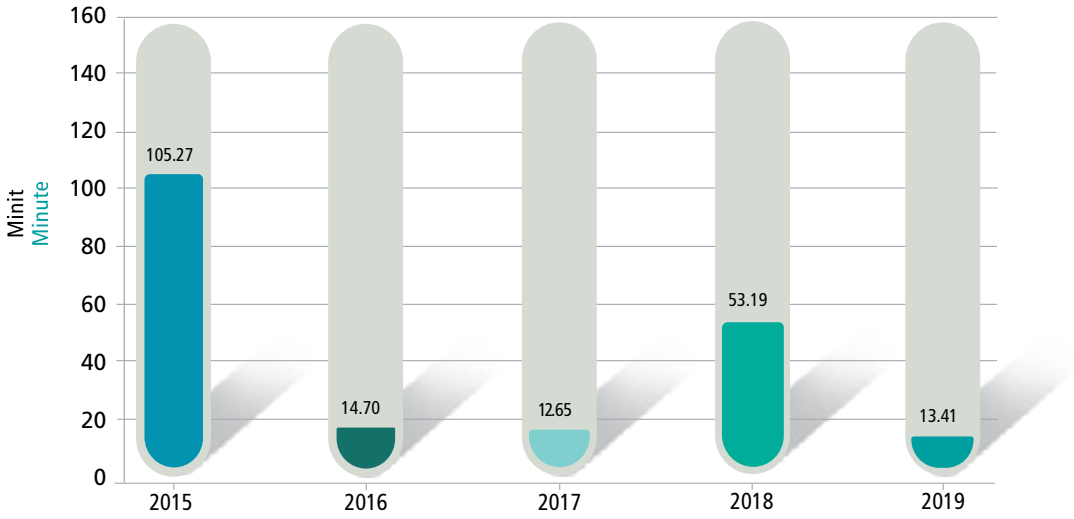
Prestasi Sistem Penghantaran di Sabah
Transmission System Performance in Sabah

Jadual 15: Pelantikan Sistem Penghantaran dengan Kehilangan Beban Sebanyak 50 MW dan ke atas
Table 15: Transmission System Trippings with Load Loss of 50 MW and above

Petunjuk Indicator	2019											
	Jan Jan	Feb Feb	Mac Mar	Apr Apr	Mei May	Jun June	Jul July	Ogos Aug	Sep Sept	Okt Oct	Nov Nov	Dis Dec
Bilangan Pelantikan tanpa Lucutan Beban Number of Trippings without Load Shedding	-	1	-	-	1	-	-	-	-	-	-	-
Bilangan Pelantikan dengan Lucutan Beban Number of Trippings with Load Shedding	-	-	-	-	-	-	-	-	-	-	-	-
Kehilangan Beban Maksimum (MW) Maximum Load Losses (MW)	-	144.94	-	-	56.43	-	-	-	-	-	-	-
Tenaga yang Tidak Dibekalkan Semasa Pelantikan (MWj) Unsupplied Energy During Trippings (MWh)	-	93.13	-	-	22.57	-	-	-	-	-	-	-
Purata Tenaga yang Tidak Dibekalkan Semasa Pelantikan (MWj) Average Unsupplied Energy During Trippings (MWh)	-	-	-	-	-	-	-	-	-	-	-	-
Purata Tempoh Setiap Pelantikan (Minit) Average Duration per Tripping (Minutes)	-	-	-	-	-	-	-	-	-	-	-	-
Tenaga Tidak Dibekalkan Semasa Lucutan Beban (MWj) Unsupplied Energy During Load Shedding (MWh)	-	-	-	-	-	-	-	-	-	-	-	-

Prestasi Sistem Penghantaran di Sabah
Transmission System Performance in Sabah

Carta 19: DePUI - Minit Sistem
Chart 19: DePUI - System Minutes



Jadual 16: Insiden Pelantikan bagi Talian/Kabel per 100 cct-km mengikut Tahap Voltan
Table 16: Tripping Incidents for Lines/Cables per 100 cct-km by Voltage Level

Kategori Category	Voltan Voltage	2015	2016	2017	2018	2019
Dengan Kehilangan Beban With Load Loss	275kV	0.000	0.000	0.000	0.669	0.000
	132kV	0.925	0.154	0.618	0.551	0.480
	66kV	0.000	3.175	3.175	3.175	3.501
Tanpa Kehilangan Beban Without Load Loss	275kV	3.044	1.373	1.338	0.502	1.337
	132kV	2.406	1.367	1.081	1.302	0.480
	66kV	0.000	10.582	1.058	6.679	9.335

Nota:
Notes:

* Pengiraan untuk tahun 2019 adalah berdasarkan kepada data Bahagian Penghantaran yang telah diluluskan oleh Pengurus Besar Penghantaran pada 20 Disember 2019 dan 6 November 2019 (data ditandatangani oleh Ketua Jurutera Perlindungan Penghantaran bagi pihak Pengurus Besar Penghantaran).
The calculations for 2019 were based on the Transmission Division data which was approved by the Shipping General Manager on 20 December 2019 and 6 November 2019 (data signed by the Chief Transmission Protection Engineer on behalf of the General Manager of Transmission).

* Bilangan pelantikan bagi setiap 100 litar km

$$= \frac{\text{(Jumlah bilangan pelantikan talian penghantaran mengikut voltan) X 100 km}}{\text{(Jumlah litar km bagi setiap kategori)}}$$

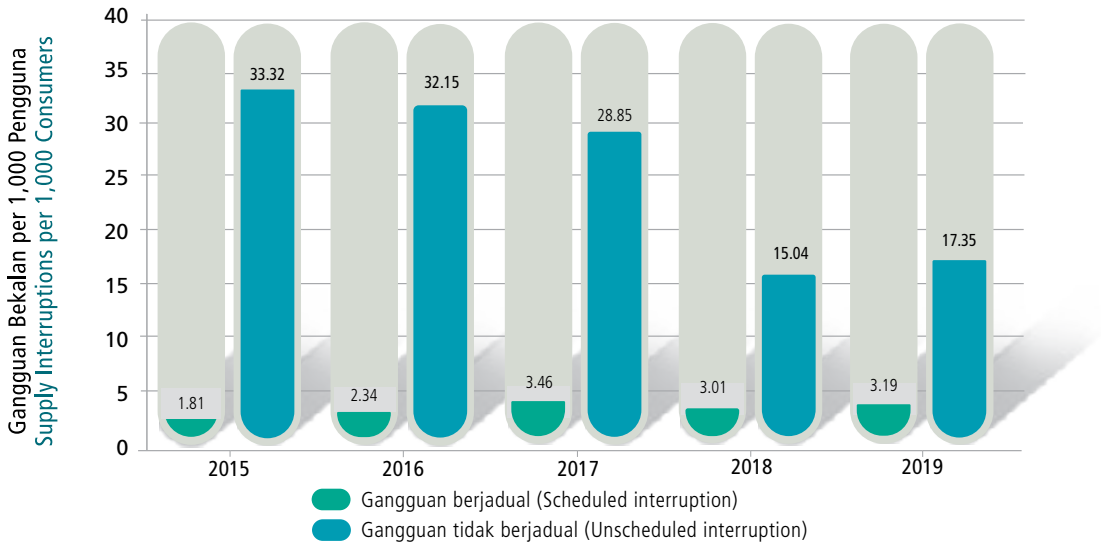
Number of tripping per 100 km circuit

$$= \frac{\text{(Total number of transmission line tripping by voltage) X 100 km}}{\text{(Number of km circuits for each category)}}$$

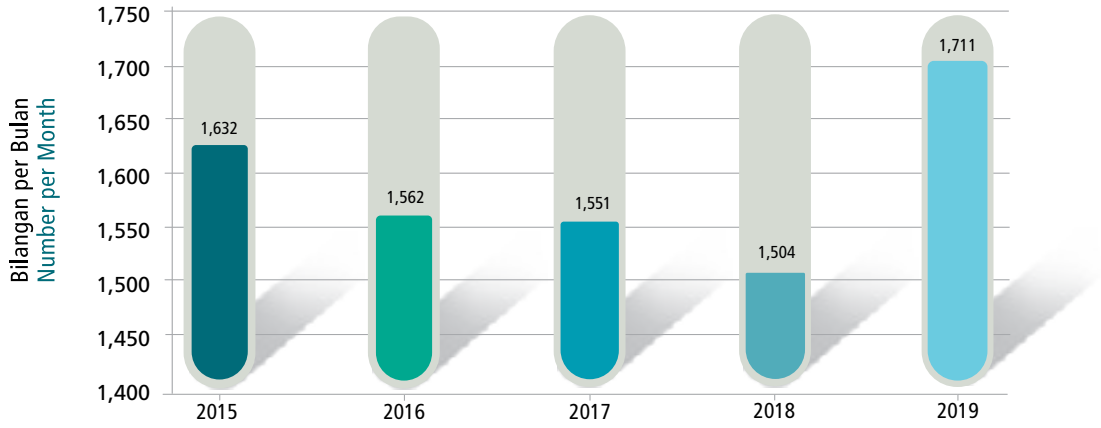
Prestasi Sistem Pengagihan di Sabah
Distribution System Performance in Sabah

GANGGUAN BEKALAN ELEKTRIK
ELECTRICITY SUPPLY INTERRUPTION

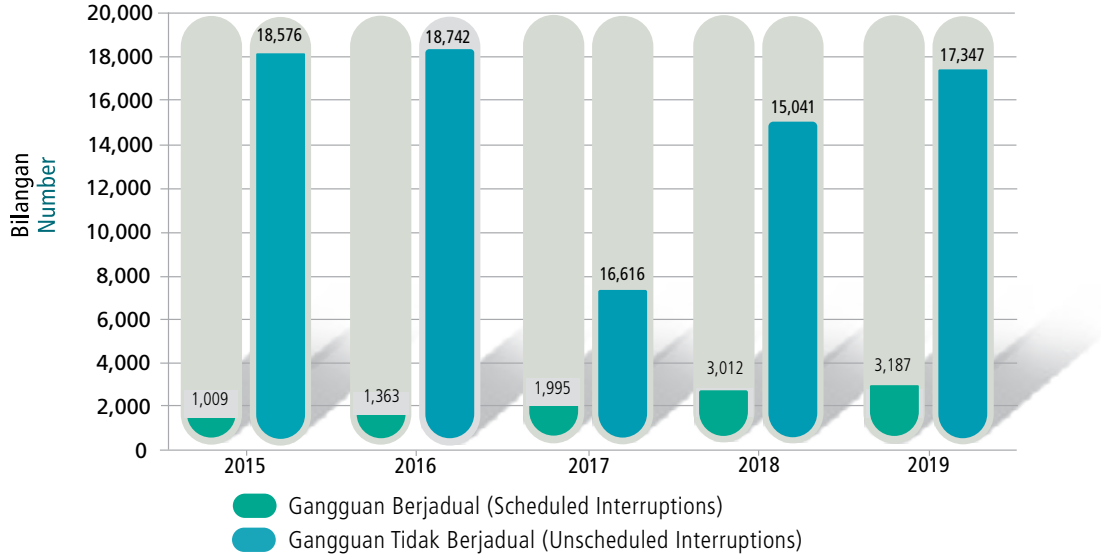
Carta 20: Gangguan Bekalan Elektrik per 1,000 Pengguna
Chart 20: Electricity Supply Interruptions per 1,000 Consumers



Carta 21: Purata Gangguan Bekalan Elektrik Bulanan
Chart 21: Monthly Average Electricity Supply Interruptions



Carta 22: Bilangan Gangguan Bekalan Elektrik
Chart 22: Number of Electricity Supply Interruptions



Prestasi Sistem Pengagihan di Sabah
Distribution System Performance in Sabah

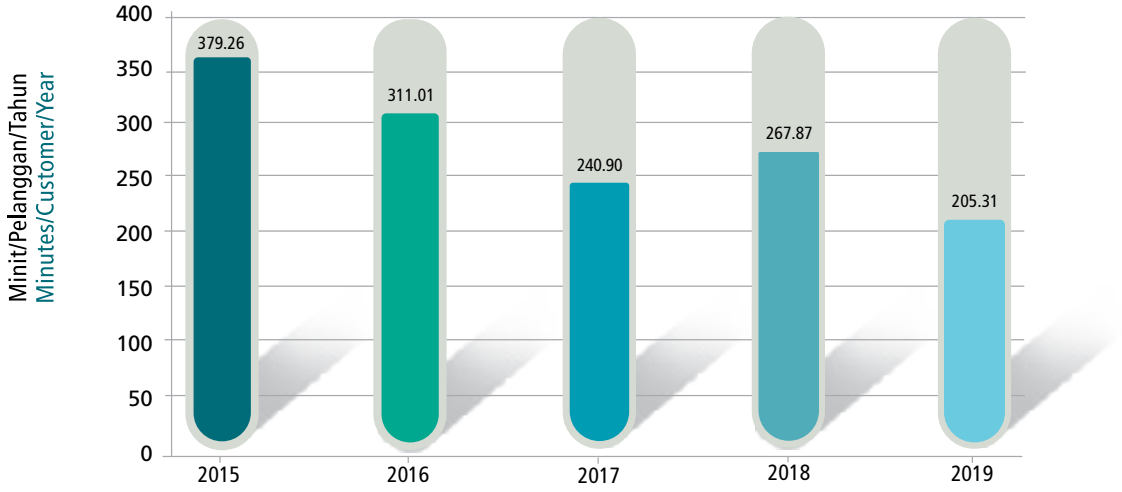
Jadual 17: Gangguan Bekalan Elektrik Tidak Berjadual
Table 17: Unscheduled Electricity Supply Interruptions

Jenis Gangguan Type of Interruptions	2015	2016	2017	2018	2019
Banjir Flood	7	3	163	0	0
Beban Lampau Overload	2,209	2,929	3,018	3,050	2,272
Binatang Animal	1,171	977	1,017	1,445	1,960
Hubungan Tidak Baik Poor Contact	3,168	2,959	2,182	2,033	2,727
Cuaca Buruk (Angin, Ribut, Petir) Bad Weather (Wind, Storm, Lightning)	1,415	1,191	1,048	428	1,168
Disebabkan oleh Pihak Lain (Kena Langgar, Khianat, Kena Curi dan Penyambungan Haram) Caused by Other Parties (Hit, Treachery, Theft and Illegal Connection)	1,742	2,195	1,394	246	1,217
Kabel Cable	483	474	462	796	884
Kebakaran Fire	25	64	24	44	60
Kena Guard Wire/Kendur Touched with Guard Wire/Sagging	837	792	499	708	1,011
Kerosakan Peralatan Faulty Equipment	71	82	43	0	0
Kualiti Barang Quality of Material	94	83	63	152	298
Lain-Lain (Tiada Data, Tiada Operasi, Tiada Bekalan) Others (Unavailable Data, Shut Down, No Supply)	2,275	2,968	1,652	1,452	627
Lanjut Usia/Reput Old/Decayed	1,111	595	490	675	802
Pencawang Substation	495	441	426	0	0
Pokok Tree	3,185	2,370	3,038	3,246	3,694
Tanah Runtuh Landslide	33	22	34	0	0
Tidak Diketahui Unknown	0	0	0	0	0
Ubahtika Transient	255	597	1,063	1,948	627
Jumlah Total	**18,576**	**18,742**	**16,616**	**16,223**	**17,347**

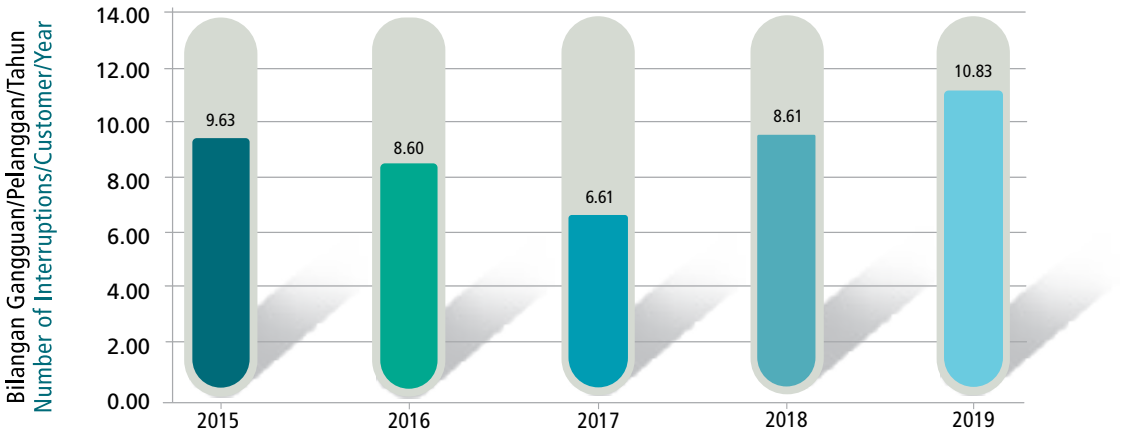
Prestasi Sistem Pengagihan di Sabah
Distribution System Performance in Sabah

SAIDI, SAIFI & CAIDI

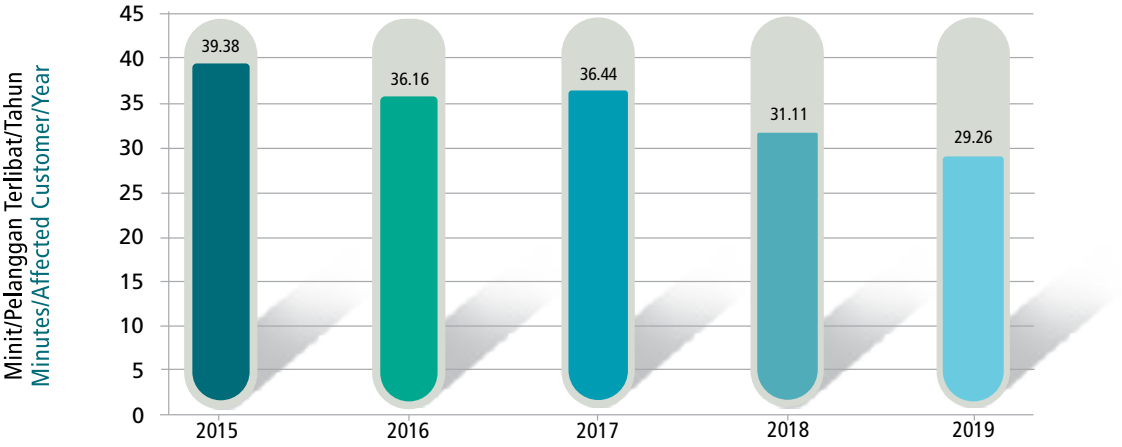
Carta 23: SAIDI
Chart 23: SAIDI

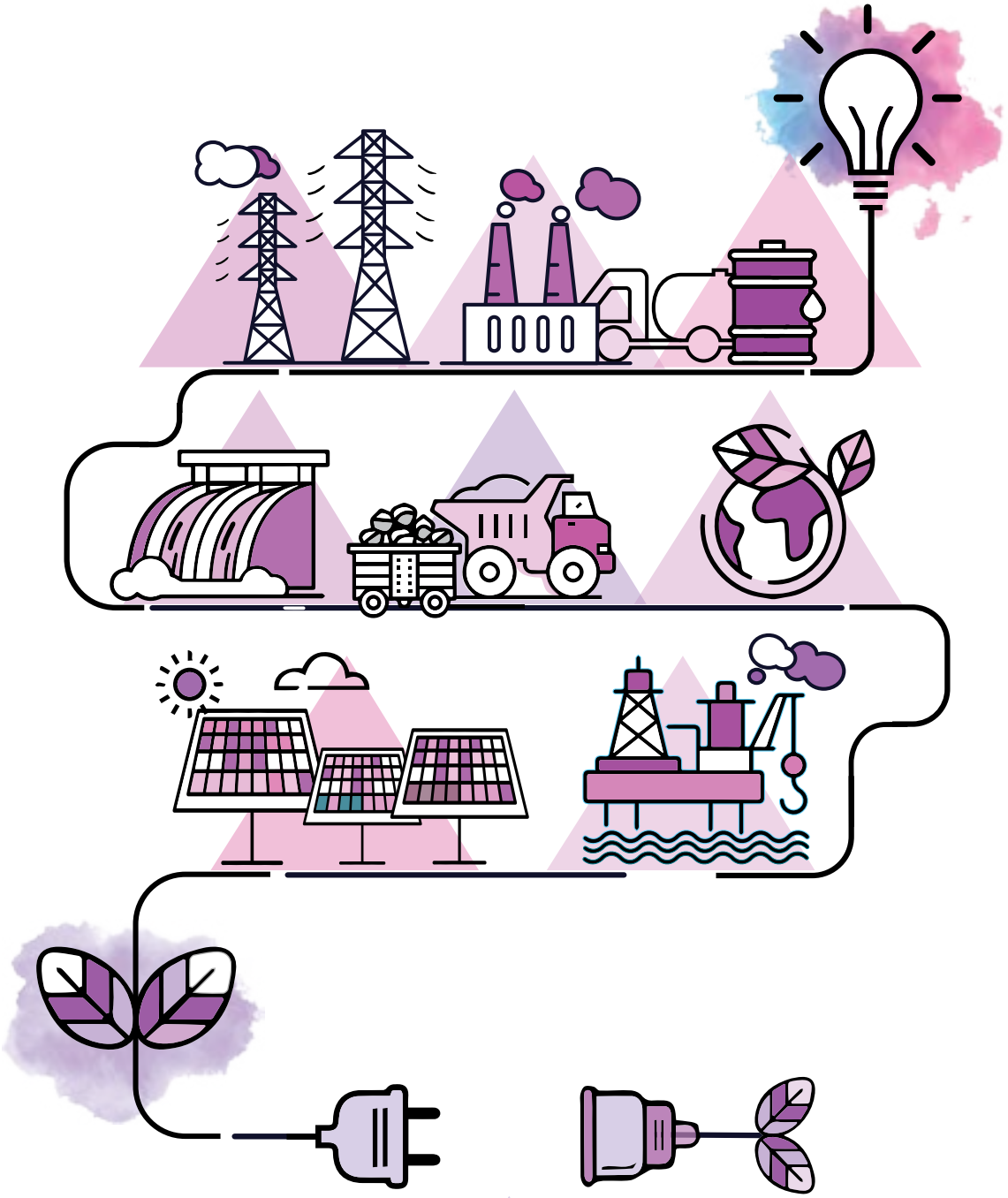


Carta 24: SAIFI
Chart 24: SAIFI



Carta 25: CAIDI
Chart 25: CAIDI

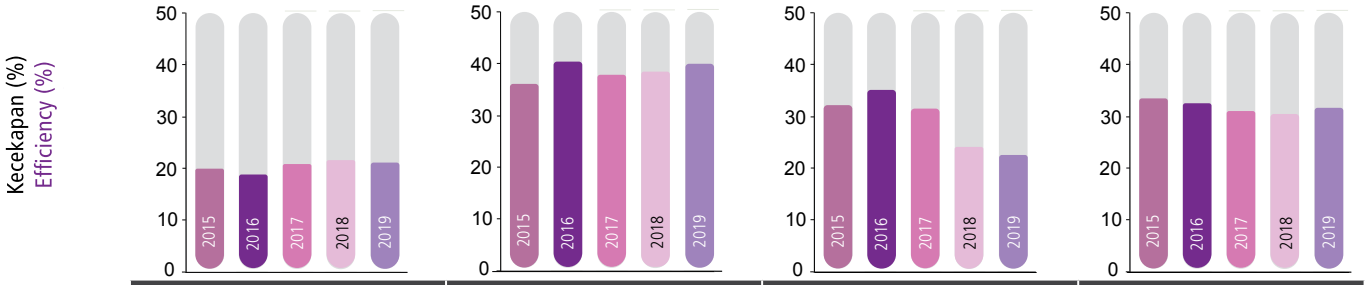




PRESTASI PEMBEKALAN ELEKTRIK DI SARAWAK
ELECTRICITY SUPPLY PERFORMANCE IN SARAWAK

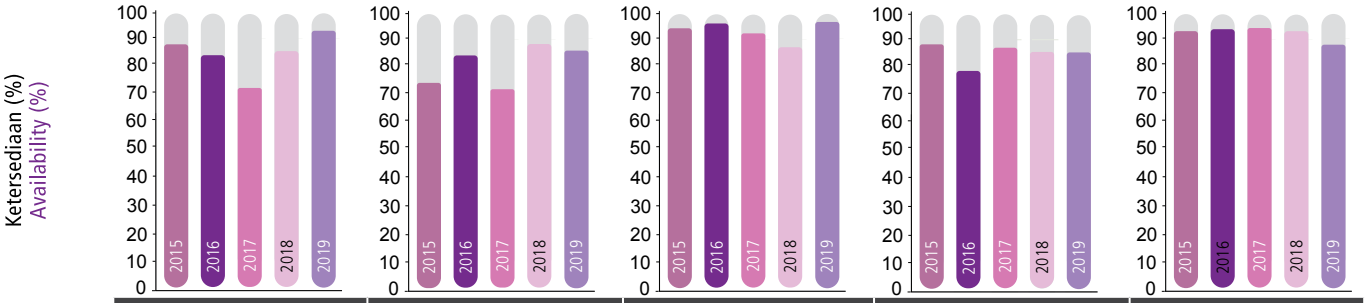
Prestasi Sistem Penjanaan di Sarawak
Generation System Performance in Sarawak

Carta 26: Purata Kecekapan Thermal Stesen Jana Kuasa SEB
Carta 26: Average Thermal Efficiency of SEB Power Plants



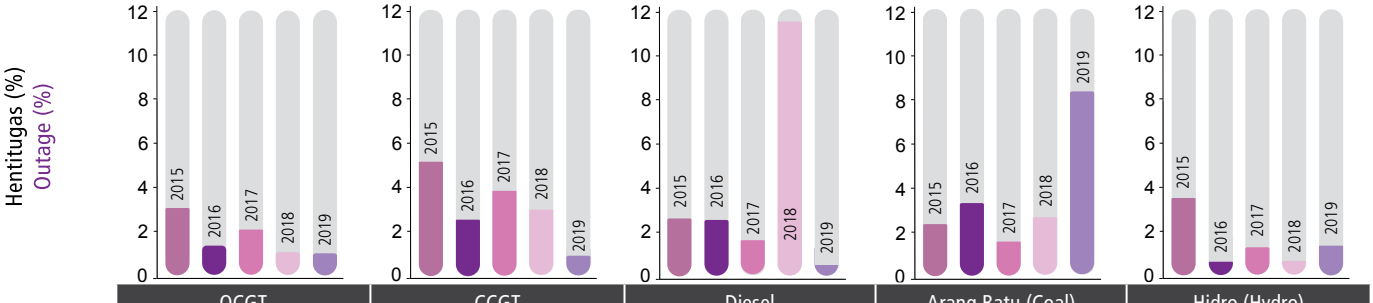
	OCGT	CCGT	Diesel	Arang Batu (Coal)
2015	19.92	36.54	32.36	33.93
2016	19.11	40.90	35.12	31.46
2017	20.92	38.22	31.19	30.87
2018	21.80	38.59	24.05	30.30
2019	21.25	40.25	22.14	31.36

Carta 27: EAF Stesen Jana Kuasa SEB
Chart 27: EAF of SEB Power Plants



	OCGT	CCGT	Diesel	Arang Batu (Coal)	Hidro (Hydro)
2015	87.64	73.25	94.00	86.67	93.37
2016	83.50	82.53	98.05	78.07	94.44
2017	81.53	71.88	92.24	85.64	94.52
2018	84.57	88.61	87.12	85.47	93.47
2019	92.29	88.25	99.06	84.46	88.68

Carta 28: Purata Kadar Hentitugas Tidak Berjadual (FOR) Stesen Jana Kuasa SEB
Chart 28: Forced Outage Rate (FOR) of SEB Power Plants



	OCGT	CCGT	Diesel	Arang Batu (Coal)	Hidro (Hydro)
2015	3.06	5.22	0.92	2.61	3.21
2016	1.11	2.58	0.45	3.51	0.21
2017	2.16	3.98	1.93	1.87	0.88
2018	0.23	0.33	11.85	2.52	0.25
2019	0.34	0.97	0.18	8.15	1.26

Nota: Notes:

1) Pada 2019, stesen jana kuasa diesel Tun Abdul Rahman berada dalam mod sedia. Maka, FOR tidak termasuk stesen jana kuasa ini.
In 2019, Tun Abdul Rahman diesel plant was on standby mode. Thus, the efficiency was not representative.

2) Pada 2019, Mukah Power Generation (Unit 1) mengalami penutupan berpanjangan akibat penyenggaraan.
In 2019, Mukah Power Generation (Unit 1) experienced prolong maintenance shutdown.

Prestasi Sistem Penghantaran di Sarawak
Generation System Performance in Sarawak

Jadual 18: Petunjuk Prestasi Sistem Penghantaran SEB
Table 18: Transmission System Performance Indicators SEB

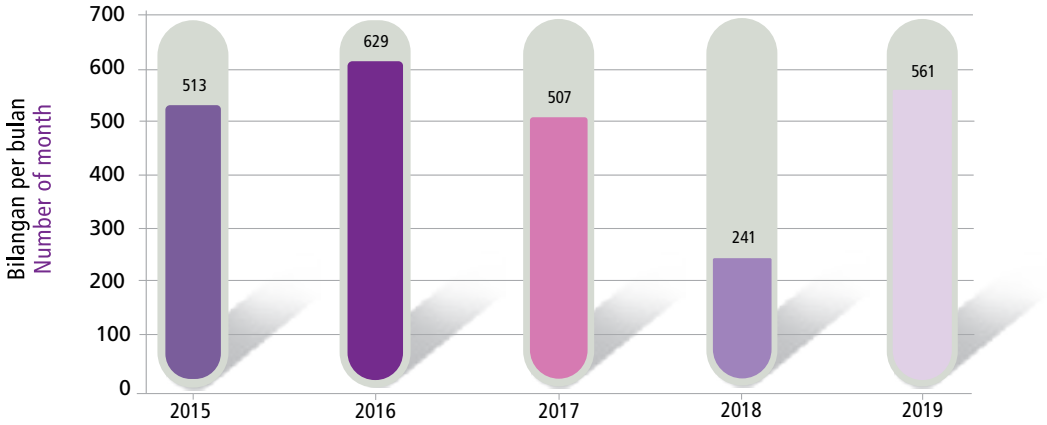
Petunjuk Indicator	2019											
	Jan Jan	Feb Feb	Mac Mar	Apr Apr	Mei May	Jun June	Jul July	Ogos Aug	Sep Sept	Okt Oct	Nov Nov	Dis Dec
Bilangan Pelantikan Number of Trippings	-	1	-	-	-	-	1	-	-	-	-	-
Kehilangan Beban Maksimum (MW) Maximum Load Losses (MW)	-	87.90	-	-	-	-	55.00	-	-	-	-	-
Tenaga yang Tidak Dibekalkan Semasa Pelantikan (MWj) Unsupplied Energy During Trippings (MWh)	-	62.98	-	-	-	-	11.92	-	-	-	-	-
Purata Tenaga Tidak Dibekalkan Setiap Pelantikan (MWj) Average Unsupplied Energy During Trippings (MWh)	-	62.98	-	-	-	-	11.92	-	-	-	-	-
Purata Tempoh Setiap Pelantikan (Minit) Average Duration per Tripping (Minutes)	-	43	-	-	-	-	13	-	-	-	-	-
Bilangan Lucutan Beban Number of Load Shedding	-	-	1	-	-	-	-	-	-	-	-	-
Tenaga Tidak Dibekalkan Semasa Lucutan Beban (MWj) Unsupplied Energy During Load Shedding (MWh)	-	-	139.37	-	-	-	-	-	-	-	-	-

Carta 29: DePUI - Minit Sistem SEB (Tahun Kewangan)
Chart 29: DePUI - System Minutes of SEB (Financial Year)

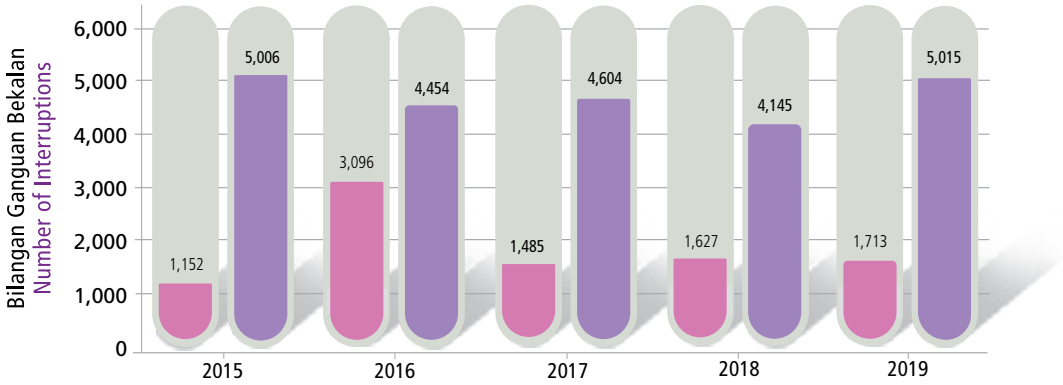
Prestasi Sistem Pengagihan di Sarawak
Distribution System Performance in Sarawak

GANGGUAN BEKALAN ELEKTRIK
ELECTRICITY SUPPLY INTERRUPTIONS

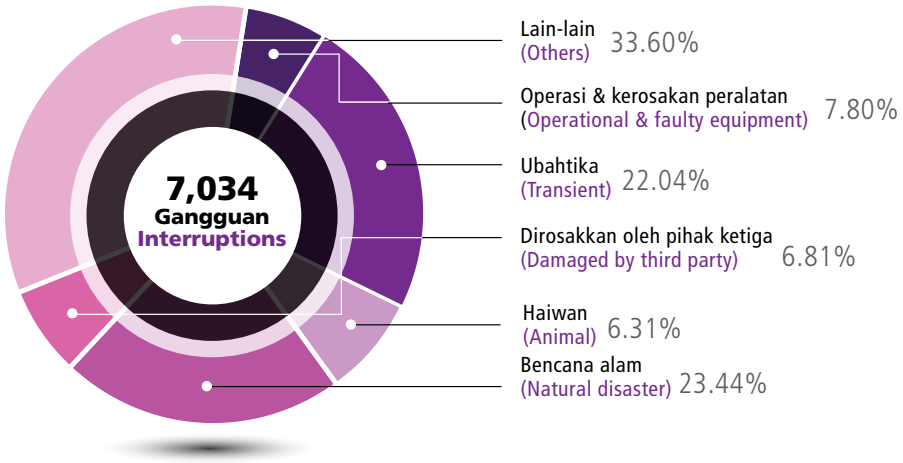
Carta 30: Purata Gangguan Bekalan Elektrik Bulanan
Chart 30: Monthly Average Electricity Supply Interruptions



Carta 31: Bilangan Gangguan Bekalan Elektrik
Chart 31: Number of Electricity Supply Interruptions



Carta 32: Punca-Punca Gangguan Bekalan Elektrik
Chart 32: Causes of Power Outages

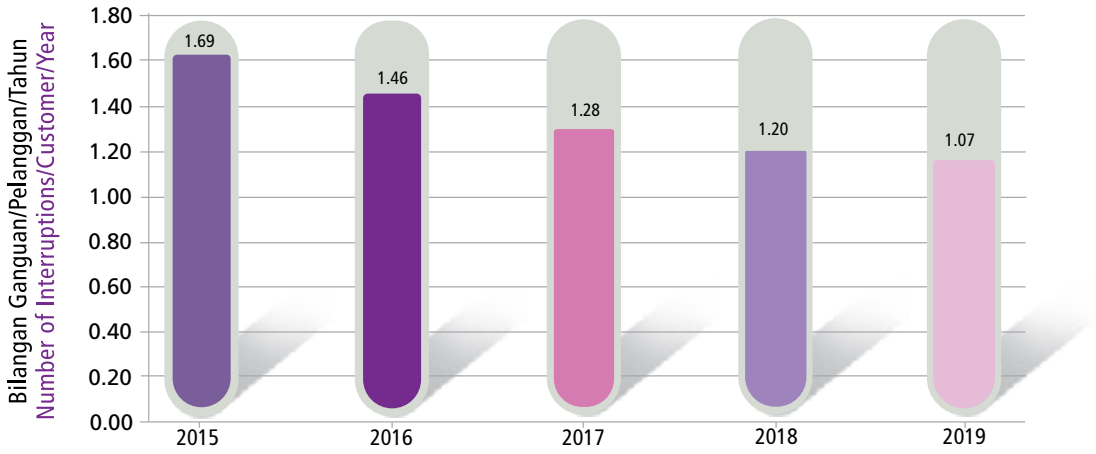


Prestasi Sistem Pengagihan di Sarawak
Distribution System Performance in Sarawak

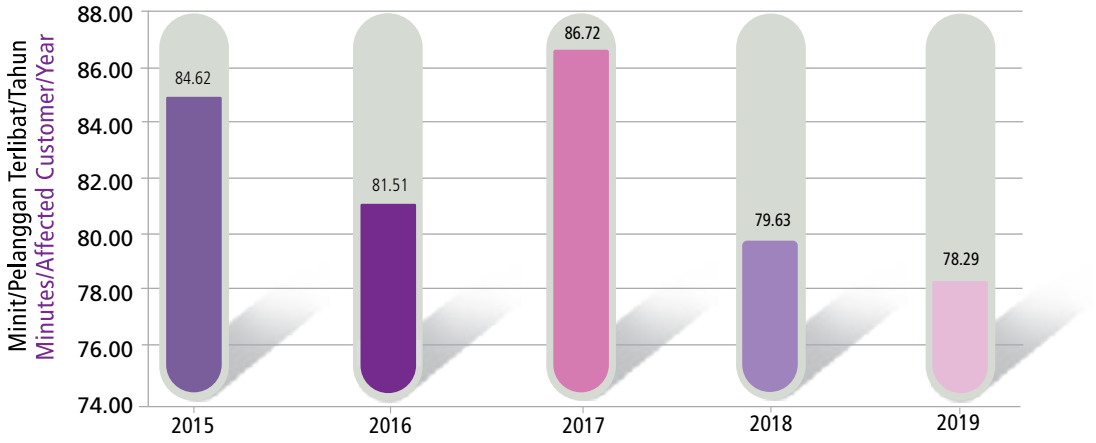
SAIDI, SAIFI & CAIDI SEB

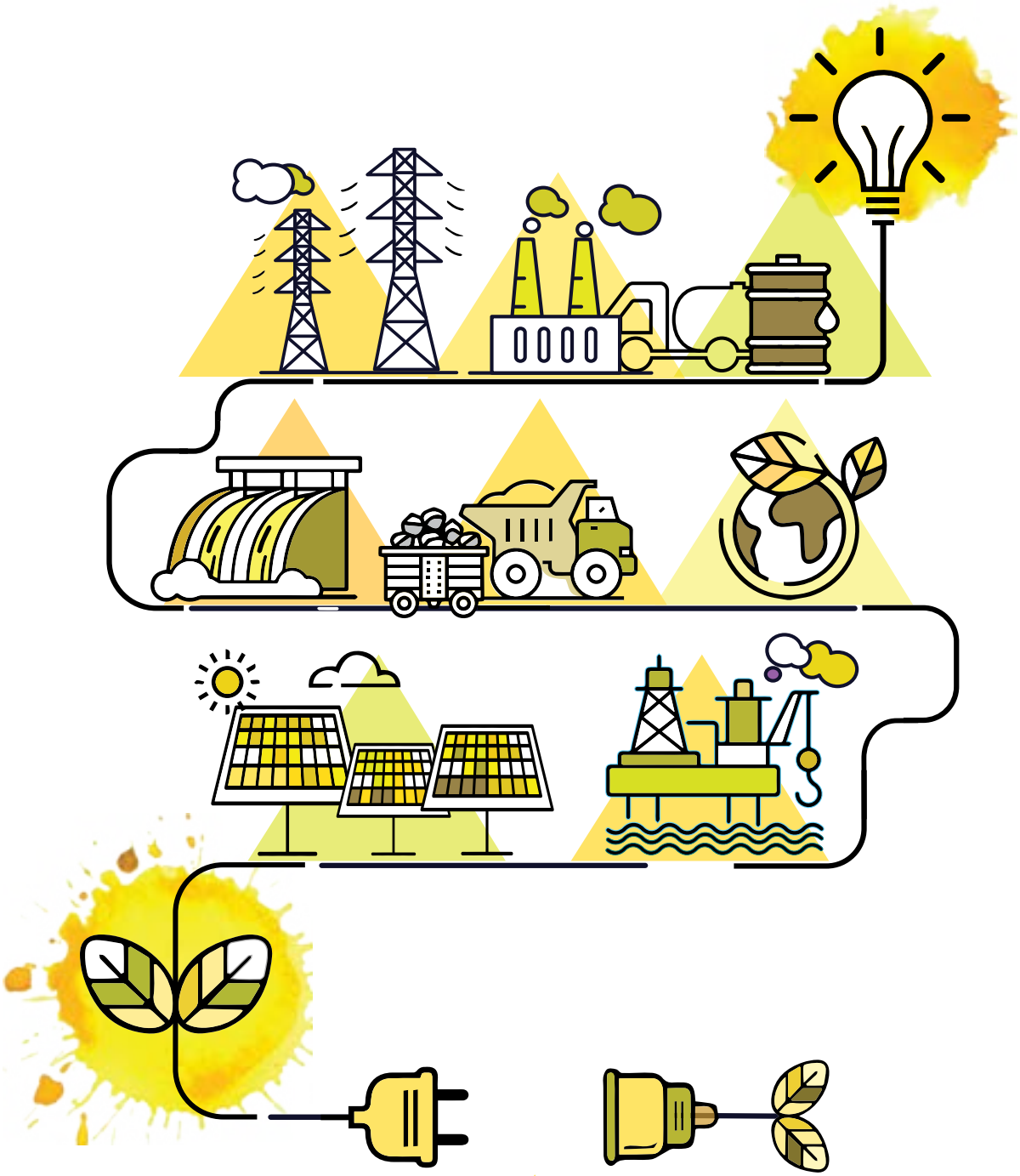
Carta 33: SAIDI
Chart 33: SAIDI

Carta 34: SAIFI
Chart 34: SAIFI



Carta 35: CAIDI
Chart 35: CAIDI





MAKLUMAT INDUSTRI PEMBEKALAN ELEKRIK DI SEMENANJUNG MALAYSIA

INFORMATION ON THE ELECTRICITY SUPPLY INDUSTRY IN PENINSULAR MALAYSIA

Jadual 19: Maklumat Utama Prestasi TNB
Table 19: Key Information on the TNB Performance

Petunjuk Indicator	Unit	2015	2016	2017	2018	2019
Kehendak Maksimum Maximum Demand	MW	16,822	17,788	17,790	18,338	18,566[1]
Jumlah Unit Penjanaan[2] Total Units Generated[2]	GWj GWh	27,374	24,046	22,239	17,827	16,792
Jumlah Unit Jualan[3] Total Units Sold[3]	GWj GWh	105,562	110,199	110,567	113,469	116,525
Hasil Jualan Elektrik Sales Revenue of Electricity	RM Juta RM Million	41,646	43,583	43,703	45,029	46,487
Kapasiti Terpasang[4] Installed Capacity[4]	MW	6,299	6,107	5,066	5,066	4,786
Jumlah Kakitangan[5] Number of Employees[5]	Orang Person	29,602	28,807	27,990	28,371	28,825
Hasil Jualan Elektrik per Kakitangan Sales Revenue of Electricity per Employee	RM Juta/Kakitangan RM Million/Employee	1.41	1.51	1.56	1.59	1.61
Unit Jualan per Kakitangan Units Sold per Employee	GWj/Kakitangan GWh/Employee	3.57	3.83	3.95	4.00	4.04
Kapasiti Terpasang per Kakitangan Installed Capacity per Employee	MW/Kakitangan MW/Employee	0.21	0.21	0.18	0.18	0.17
Jumlah Unit Pembelian[6] Total Purchased Units[6]	GWj GWh	87,816	97,839	99,899	108,912	112,899
Jumlah Unit yang Dieksport Total Exported Units	GWj GWh	3.00	0.74	4.81	0.08	0.26
Jumlah Unit yang Diimport Total Imported Units	GWj GWh	13.00	30.00	7.41	19.98	40.58

Nota:
Notes:
1. [1]18 April 2019
2. [2]Penjanaan oleh stesen jana kuasa TNB yang bersambung di talian penghantaran, tidak termasuk IPP.
   [2]Units generated by TNB power plants connected at transmission level, excluding IPP.
3. [3]Tidak termasuk eksport.
   [3]Excluding export.
4. [4]Kapasiti terpasang bagi stesen jana kuasa TNB yang bersambung di talian penghantaran, tidak termasuk IPP.
   [4]Installed capacity of TNB power plants connected at transmission level, excluding IPP.
5. [5]Tidak termasuk anak syarikat milik penuh TNB dan anak syarikat dengan pemilikan majoriti.
   [5]Excuding TNB wholly-owned subsidiaries and TNB majority-owned subsidiaries.
6. [6]Unit yang dibeli daripada IPP.
   [6]Units purchased from IPP.

Jadual 20: Kapasiti Terpasang (MW) & Kebolehdapatan Keseluruhan TNB
Table 20: TNB Installed Capacity (MW) & Overall Availability

Sumber Tenaga Energy Source	2015	2016	2017	2018	2019
Hidro Hydro	2,149	2,529	2,536	2,536	2,556
Gas Asli Natural Gas	4,150	3,578	2,530	2,530	2,230
Jumlah **Total**	**6,299**	**6,107**	**5,066**	**5,066**	**4,786**
Kebolehdapatan Keseluruhan Overall Availability	89.9%	94.78%	91.37%	91.77%	91.31%

Nota:
Notes:
Kapasiti terpasang bagi stesen jana kuasa TNB yang bersambung di talian penghantaran, tidak termasuk IPP.
Installed capacity of TNB power plants connected at transmission level, excluding IPP.

Jadual 21: Campuran Penjanaan TNB (GWj)
Table 21: TNB Generation Mix (GWh)

Sumber Tenaga Energy Source	2015	2016	2017	2018	2019
Hidro Hydro	5,007	3,838	7,089	4,915	3,919
Gas Asli Natural Gas	22,367	20,208	15,149	12,911	12,816
MFO/Diesel/Distillate	-	1	2	-	0.43
Jumlah **Total**	**27,374**	**24,046**	**22,239**	**17,827**	**16,735**

Nota:
Notes:
Penjanaan oleh stesen jana kuasa TNB yang bersambung di talian penghantaran, tidak termasuk IPP.
Units generated by TNB power plants connected at transmission level, excluding IPP.

Jadual 22: Bilangan Pengguna TNB
Table 22: Number of TNB Consumers

Tahun Year	2015	2016	2017	2018	2019
Domestik Domestic	6,920,122	6,984,368	7,181,846	7,378,425	7,553,229
Komersial Commercial	1,475,306	1,453,804	1,510,341	1,553,607	1,575,198
Industri Industry	27,672	28,320	28,867	29,749	30,520
Lampu Awam Public Lighting	65,888	67,944	70,402	72,554	75,463
Perlombongan Mining	28	34	38	45	53
Pertanian Agriculture	1,627	1,850	2,112	2,228	2,326
Unit Percuma Free Units	2,414	2,530	2,559	2,589	2,622
Jumlah **Total**	**8,493,057**	**8,538,850**	**8,796,165**	**9,039,197**	**9,239,411**

Nota:
Notes:
Unit Percuma merupakan bekalan elektrik yang tidak dikenakan bayaran bil bulanan. Premis yang layak merupakan premis-premis TNB termasuk bangunan pejabat, rumah kelab, kuarters, pencawang masuk utama, pencawang pembahagian utama dan pencawang elektrik.
Free Units refer to electricity provided for free without being charged for monthly bill payments. Eligible premises are TNB premises including office buildings, clubhouse, quarters, main substations, transmission substations and distribution substations.

Jadual 23: Jualan Tenaga Elektrik TNB (GWj)
Table 23: TNB Electricity Sales (GWh)

Tahun Year	2015	2016	2017	2018	2019
Domestik Domestic	23,231	25,745	24,828	25,522	27,267
Komersial Commercial	36,645	39,447	39,086	39,265	40,428
Industri Industry	43,754	42,977	44,457	46,440	46,403
Lampu Awam Public Lighting	1,357	1,374	1,482	1,476	1,590
Perlombongan Mining	105	113	131	149	175
Pertanian Agriculture	467	543	583	617	663
Eksport Export	3.00	0.74	4.81	0.08	0.26
Jumlah Total	**105,562**	**110,199**	**110,572**	**113,469**	**116,526**

Jadual 24: Penggunaan Tenaga Elektrik (GWj) mengikut Negeri di Semenanjung Malaysia
Table 24: Electricity Consumption (GWh) by States in Peninsular Malaysia

Negeri State	2015	2016	2017	2018	2019
Perlis	763	790	750	749	716
Kedah	5,002	5,040	5,235	5,415	5,489
Pulau Pinang	10,903	11,375	11,425	11,862	11,922
Perak	8,516	9,057	8,936	9,149	9,443
Selangor	28,152	29,269	28,853	29,613	30,111
WP Kuala Lumpur	14,470	15,196	15,186	15,072	15,440
Negeri Sembilan	5,762	5,938	5,979	6,047	6,205
Melaka	4,311	4,486	4,625	4,643	4,860
Johor	16,737	17,527	17,807	18,546	19,343
Pahang	4,776	5,052	5,187	5,581	5,737
Terengganu	2,876	2,763	2,953	3,079	3,350
Kelantan	2,099	2,352	2,375	2,449	2,589
WP Putrajaya	1,192	1,353	1,258	1,266	1,319
Jumlah Total	**105,560**	**110,198**	**110,567**	**113,469**	**116,525**

Jadual 25: Sistem Penghantaran TNB
Table 25: TNB Transmission System

Tahun Year	2015	2016	2017	2018	2019
Talian & Kabel Sistem Penghantaran **Transmission System Lines & Cables**					
500 kV (cct-km)	722	784	784	1,628	1,886
275 kV (cct-km)	9,517	9,518	9,637	9,047	9,597
132 kV (cct-km)	12,151	12,175	12,420	12,407	12,482
Pencawang Penghantaran **Transmission Substations**					
Bilangan Number	419	427	439	443	457
Keupayaan (MVA) Capacity (MVA)	103,545	104,780	109,210	115,120	121,590

Jadual 26: Sistem Pengagihan TNB
Table 26: TNB Distribution System

Tahun Year	2015	2016	2017	2018	2019
Talian & Kabel Sistem Pengagihan[1] **Distribution System Lines & Cables[1]**					
Talian Atas (km) Overhead Lines (km)	532,403	532,403	339,793	352,565	366,568
Kabel Bawah Tanah (km) Underground Cables (km)	697,159	697,159	305,464	307,474	316,439
Pencawang Pengagihan **Distribution Substations**					
Bilangan Number	74,417	74,417	79,450	81,327	83,467
Keupayaan (MVA) Capacity (MVA)	131,465	131,465	111,842	114,089	117,436

Nota:
Notes:
Data tahun 2017 dan ke atas ialah data selepas *data cleansing* dijalankan.
Data for 2017 and above is data after data cleansing exercise.

Jadual 27: Kapasiti Terpasang di Semenanjung Malaysia, 2019
Table 27: Peninsular Malaysia Installed Capacity, 2019

	Stesen Jana Kuasa Power Station		Sumber Tenaga Energy Source	Kapasiti Terpasang (MW) Installed Capacity (MW)	TAAC (MW)
TNB	SJ Temenggor	SKIM SUNGAI PERAK SUNGAI PERAK SCHEME	Hidro Hydro	348.00	341.80
	SJ Bersia		Hidro Hydro	72.00	72.00
	SJ Kenering		Hidro Hydro	120.00	118.54
	SJ Chenderoh		Hidro Hydro	40.50	39.19
	SJ Sg Piah (Lower & Upper)		Hidro Hydro	68.60	68.60
	SJ Pergau		Hidro Hydro	600.00	600.00
	SJ Kenyir		Hidro Hydro	400.00	400.00
	SJ Sultan Yussuf (Jor)		Hidro Hydro	100.00	100.00
	SJ Sultan Idris (Woh)		Hidro Hydro	150.00	150.00
	SJ Hulu Terengganu		Hidro Hydro	250.00	265.00
	SJ Tembat		Hidro Hydro	15.00	
	SJ Ulu Jelai		Hidro Hydro	372.00	372.00
	SJ Putrajaya		Gas asli Natural gas-OCGT	252.00	249.00
	SJ Sultan Ismail		Gas asli Natural gas-CCGT	257.00	257.00
	SJ Gelugor		Gas asli Natural gas-CCGT	310.00	310.00
	SJ Tuanku Jaafar		Gas asli Natural gas-CCGT	1,411.00	1,411.00
	SJ Jambatan Connaught		Gas asli Natural gas-CCGT	0.00	0.00
	SJ Hidro mini[d] Mini hydro power stations[d]		Hidro mini Mini Hydro	20.36	
			Jumlah **Total**	**4,786.46**	**4,754.13**

Jadual 27: Kapasiti Terpasang di Semenanjung Malaysia, 2019
Table 27: Peninsular Malaysia Installed Capacity, 2019

	Stesen Jana Kuasa Power Station	Sumber Tenaga Energy Source	Kapasiti Terpasang (MW) Installed Capacity (MW)	TAAC (MW)
IPP	GB3 Sdn. Bhd.	Gas asli Natural gas-CCGT	640.00	640.00
	Kuala Langat Power Plant Sdn. Bhd.	Gas asli Natural gas-CCGT	675.00	675.00
	Pahlawan Power Berhad	Gas asli Natural gas-CCGT	322.00	322.00
	Panglima Power Berhad	Gas asli Natural gas-CCGT	720.00	720.00
	Prai Power Sdn. Bhd.	Gas asli Natural gas-CCGT	350.00	341.20
	Segari Energy Ventures Sdn. Bhd.	Gas asli Natural gas-CCGT	1,303.00	1,303.00
	Teknologi Tenaga Perlis Consortium Sdn. Bhd.	Gas asli Natural gas-CCGT	650.00	650.00
	YTL Power Generation Sdn. Bhd. (Paka)	Gas asli Natural gas-CCGT	585.00	585.00
	Pengerang Power Sdn. Bhd.	Gas asli Natural gas-Cogen	600.00	600.00
	Port Dickson Power Berhad	Gas asli Natural gas-OCGT	0.00	0.00
	Powertek Berhad	Gas asli Natural gas-OCGT	434.00	434.00
	TNB Pasir Gudang Energy Sdn. Bhd.	Gas asli Natural gas-CCGT	275.00	275.00
	TNB Connaught Bridge Sdn. Bhd.	Gas asli Natural gas-CCGT	375.00	375.00
	TNB Prai Sdn. Bhd.	Gas asli Natural gas-CCGT	1,071.43	1,071.43
	Kapar Energy Ventures Sdn. Bhd. (KEV) – GF1	Gas asli Natural gas-OCGT	600.00	578.00
	KEV – GF4	Gas asli Natural gas- Thermal konvensional Conventional thermal	220.00	191.86
	KEV - GF2	Arang batu Coal- Thermal	600.00	600.00
	KEV – GF3	Arang batu Coal- Thermal	1,000.00	937.50
	Jimah Energy Ventures Sdn. Bhd.	Arang batu Coal- Thermal	1,400.00	1,400.00
	Tanjung Bin Power Sdn. Bhd.	Arang batu Coal- Thermal	2,100.00	2,100.00
	Tanjung Bin Energy Sdn. Bhd.	Arang batu Coal- Thermal	1,000.00	1,000.00
	TNB Janamanjung Sdn. Bhd.	Arang batu Coal- Thermal	3,080.00	3,080.00
	TNB Manjung Five Sdn. Bhd.	Arang batu Coal- Thermal	1,000.00	1,000.00
	Jimah East Sdn Bhd	Arang batu Coal- Thermal	2,000.00	2,000.00
	NUR Generation Sdn. Bhd.[d]	Gas asli Natural gas- CCGT	220.00	
	Musteq Hydro Sdn. Bhd.[d]	Hidro mini Mini hydro	20.00	
		Jumlah **Total**	**21,240.43**	**20,878.99**
		Jumlah Besar (TNB + IPP) **Grand Total (TNB + IPP)**	**26,026.89**	**25,633.12**

Jadual 27: Kapasiti Terpasang di Semenanjung Malaysia, 2019
Table 27: Peninsular Malaysia Installed Capacity, 2019

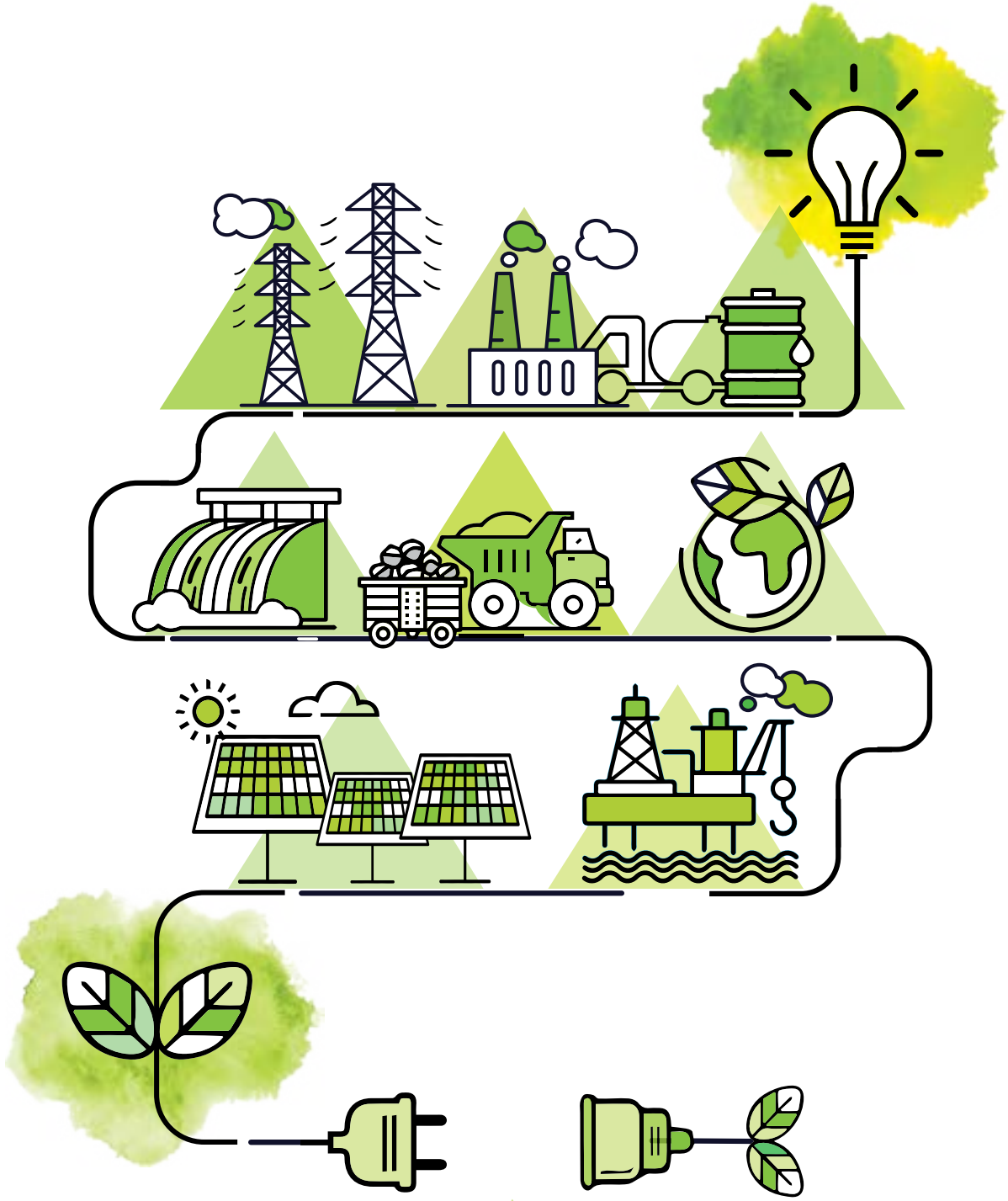
	Kategori Category	Sumber Tenaga Energy Source	Kapasiti Terpasang (MW) Installed Capacity (MW)
LAIN-LAIN (OTHERS)	FiT[d] & MySuria[d]	Biogas	93.16
		Biojisim Biomass	44.85
		Hidro Mini Mini Hydro	63.80
		Solar	240.08
		Jumlah Total	**441.89**
	Solar (Lesen TBB bukan FiT) Solar (Non-FiT RE Licence)	Solar	0.14
		Jumlah Total	**0.14**
	Cogen Awam[d] Public Cogen[d]	Gas Asli Natural Gas	441.63**
		Haba Sisa Proses Perindustrian Industrial Process Waste Heat	7.00
		Jumlah Total	**448.63**
	Cogen Persendirian[s] Private Cogen[s]	Gas Asli Natural Gas	504.27
		Haba Sisa Proses Perindustrian Industrial Process Waste Heat	72.00
		Biojisim Biomass	12.41
		Jumlah Total	**588.68**
	LSS	>30 MW	433.92
		<30 MW	180.96
		Jumlah Total	**614.88**
	NEM[d]	Solar[d]	31.27
		Jumlah Total	**31.27**
	Self-Gen <5 MW[s]	Gas Asli Natural Gas	20.94
		Diesel	39.40
		Biojisim Biomass	100.60
		Biogas	0.40
		Solar	8.06
		Hidro Mini Mini Hydro	2.13
		Jumlah Total	**171.53**
		Jumlah Besar (Lain-lain) Grand Total (Others)	**2,297.02**
		TNB + IPP + Lain-Lain TNB + IPP + Others	**28,232.91**

Nota:
Notes:
1. TAAC: *Tested Annual Available Capacity*
2. [d]Bersambung di peringkat pengagihan. I [d]Connected at the distribution level.
3. *MySuria merupakan satu program usahasama antara KeTTHA, MOF dan kerajaan negeri yang dilaksanakan oleh SEDA Malaysia untuk meningkatkan kedudukan sosio-ekonomi rakyat B40 melalui Teknologi Hijau. Panel solar fotovolta (PV) berkapasiti 3 kW dipasang di rumah rakyat B40 untuk menjana tenaga elektrik dan seterusnya dijual kepada PLP melalui Perjanjian Pembelian Kuasa Tenaga Boleh Baharu (REPPA) selama 10 tahun.
MySuria is a joint venture program between KeTTHA, MOF and the state government implemented by SEDA Malaysia to improve the socio-economic position of the people of B40 through Green Technology. Photovoltaic (PV) solar panels with a capacity of 3 kW are installed in B40 people's houses to generate electricity and subsequently sold to PLP through a 10-year Renewable Energy Purchase Agreement (REPPA)
4.** Termasuk 100 MW yang bersambung di peringkat penghantaran.
** Including 100 MW connected at the transmission level.
5. [s] Menjana elektrik untuk kegunaan sendiri I [s]Generates electricity for self consumption

Jadual 28: Penjanaan Elektrik mengikut Sumber Tenaga di Semenanjung Malaysia, 2019 (GWj)
Table 28: Peninsular Malaysia Electricity Generation by Energy Source, 2019 (GWh)

Penjana Generator	Sumber Tenaga Energy Source									
	Arang Batu Coal	Gas Asli Natural Gas	Diesel/ MFO/ Distillate	TBB RE					Haba Sisa[3] Waste Heat[3]	Jumlah Total
				Hidro Hydro	Hidro Mini Mini Hydro	Biojisim Biomass	Biogas	Solar		
TNB	-	12,815.88	0.43	3,918.57	56.82	-	-	-	-	**16,791.71**
IPP	71,404.20	41,955.47	97.95	-	96.28	-	-	-	-	**113,553.89**
Cogen Awam Public Cogen	-	3,162.88	-	-	-	-	-	-	0.002	**3,162.88**
Cogen Persendirian Private Cogen	-	1,026.19	1.17	-	-	13.8	-	-	66.94	**1,108.10**
FiT & MySuria[1]	-	-	-	-	213.98	128.81	265.81	417.91		**1,026.51**
Solar (Lesen TBB bukan FiT) Solar (Non-FiT RE Licence)	-	-	-	-	-	-	-	0.12	-	**0.12**
LSS >30 MW	-	-	-	-	-	-	-	697.09	-	**697.09**
LSS <30 MW	-	-	-	-	-	-	-	182.57	-	**182.57**
NEM	-	-	-	-	-	-	-	7.08	-	**7.08**
Self-Gen<5 MW[2]	-	41.00	41.72	-	5.13	165.54	0.17	11.14	-	**264.70**
Jumlah Total	**71,404.20**	**59,001.42**	**141.28**	**3,918.57**	**372.20**	**308.15**	**265.98**	**1,315.91**	**66.94**	**136,794.67**

Nota:
Notes:
1. [1]Sumber: SEDA
   [1]Source: SEDA
2. [2]Sumber: Pejabat-pejabat Kawasan ST
   [2]Source: ST Regional Offices
3. [3]Haba sisa proses perindustrian
   [3]Industrial process waste heat
4. Data ini adalah termasuk penjanaan oleh stesen jana kuasa yang bersambung di talian pengagihan dan *off-grid*.
   These data include generation by power plants connected at the distribution level and off-grid.



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Jadual 29: Maklumat Utama Prestasi SESB
Table 29: Key Information on SESB Performance

Petunjuk Indicator	Unit	2015	2016	2017	2018	2019
Kehendak Maksimum Maximum Demand	MW	914	945	938	955	1,001
Jumlah Unit Penjanaan Total Units Generated	GWj GWh	1,071	875	919	1,033	1,124
Jumlah Unit Jualan Total Units Sold	GWj GWh	5,109	5,188	5,173	5,345	5,576
Hasil Jualan Elektrik Sales Revenue of Electricity	RM Juta RM Million	1,668	1,734	1,723	1,830	1,913
Kapasiti Penjanaan Boleh Harap Dependable Generation Capacity	MW	328	331	319	328	328
Jumlah Kakitangan Number of Employees	Orang Person	3,096	3,282	3,260	3,179	3,180
Hasil Jualan Elektrik per Kakitangan Sales Revenue of Electricity per Employee	RM Juta/Kakitangan RM Million/Employee	0.54	0.53	0.53	0.58	0.60
Unit Jualan per Kakitangan Units Sold per Employee	GWj/Kakitangan GWh/Employee	1.65	1.58	1.59	1.68	1.75
Kapasiti Boleh Harap per Kakitangan Dependable Capacity per Employee	MW/Kakitangan MW/Employee	0.11	0.10	0.10	0.10	0.10
Jumlah Unit Pembelian[2] Total Purchased Units[2]	GWj GWh	4,881	5,152	5,063	5,382	5,597
Jumlah Unit yang Dieksport Total Exported Units	GWj GWh	-	-	-	-	-
Jumlah Unit yang Diimport Total Imported Units	GWj GWh	-	-	-	-	-

Nota:
Notes:
1. [1]15 September 2019
2. [2]Unit yang dibeli daripada IPP.
   [2]Units purchased from the IPPs.

Jadual 30: Kapasiti Penjanaan Boleh Harap (MW) & Ketersediaan Keseluruhan SESB
Table 30: SESB Dependable Capacity (MW) & Overall Availability

Sumber Tenaga Energy Source	2015	2016	2017	2018	2019
Hidro & Hidro Mini Hydro & Mini Hydro	72.2	78.2	74.6	74.6	79.9
Gas Asli Natural Gas	104.5	104.5	103.4	103.4	103.4
Diesel/MFO	150.9	147.9	141.1	150.1	149.7
Jumlah Total	**327.6**	**330.6**	**319.1**	**328.1**	**328.0**
Kebolehdapatan Keseluruhan Overall Availability	78.00%	73.96%	83.81%	79.19%	69.51%

Nota:
Notes:
Kapasiti boleh harap bagi stesen jana kuasa SESB yang bersambung di talian penghantaran, kecuali Melawa Mobile Gen Set yang hanya diguna pakai semasa kerja penutupan berjadual atau tidak berjadual.
Dependable capacity of SESB power plants connected at the transmission level, except Melawa Mobile Gen Set which is used for planned or emergency shut down.

Jadual 31: Penjanaan SESB (GWj)
Table 31: SESB Generation (GWh)

Sumber Tenaga Energy Source	2015	2016	2017	2018	2019
Hidro & Hidro Mini Hydro & Mini Hydro	271.92	255.74	309.78	354.55	337.78
Gas Asli Natural Gas	417.62	389.62	409.93	417.37	384.83
Diesel	381.35	229.88	199.47	260.67	311.25
Jumlah Total	**1,070.89**	**875.24**	**919.18**	**1,032.60**	**1,033.87**

Nota:
Notes:
Penjanaan oleh stesen jana kuasa SESB yang bersambung di talian penghantaran, termasuk Melawa Mobile Gen Set.
Units generated by the SESB power plants connected at transmission level, including Melawa Mobile Gen Set.

Jadual 32: Bilangan Pengguna SESB
Table 32: Number of SESB Consumers

Sektor Sector	2015	2016	2017	2018	2019
Domestik Domestic	460,321	478,049	491,809	505,239	519,308
Komersial Commercial	85,581	90,510	93,738	96,167	98,479
Industri Industry	2,756	1,545	1,550	1,589	1,598
Lampu Awam Public Lighting	5,596	5,906	6,061	6,129	6,335
Jumlah Total	**554,254**	**576,010**	**593,158**	**609,124**	**625,720**

Jadual 33: Jualan Tenaga Elektrik SESB (GWj)
Table 33: SESB Electricity Sales (GWh)

Sektor Sector	2015	2016	2017	2018	2019
Domestik Domestic	1,618	1,761	1,721	1,774	1,863
Komersial Commercial	2,256	2,352	2,324	2,377	2,490
Industri Industry	1,171	1,101	1,055	1,118	1,147
Lampu Awam Public Lighting	64	70	72	77	76
Jumlah Total	**5,109**	**5,284**	**5,173**	**5,345**	**5,576**

Jadual 34: Sistem Penghantaran SESB
Table 34: SESB Transmission System

Tahun Year	2015	2016	2017	2018	2019
Talian & Kabel Sistem Penghantaran **Transmission System Lines & Cables**					
275 kV (km)	493	598	598	598	598
132 kV (km)	1,921	2,076	2,075	2,180	2,217
66 kV (km)	119	119	119	110	103
Pencawang Penghantaran **Transmission Substations**					
Bilangan Number	41	42	44	45	46
Keupayaan (MVA) Capacity (MVA)	4,513	4,995	4,984	5,049	5,489

Jadual 35: Sistem Pengagihan SESB
Table 35: SESB Distribution System

Tahun Year	2015	2016	2017	2018	2019
Talian & Kabel Sistem Pengagihan **Distribution System Lines & Cables**					
Talian Atas (km)[1] Overhead Lines (km)[1]	9,350	9,394	9,848	9,465	10,048
Kabel Bawah Tanah (km)[1,2] Underground Cables (km)[1,2]	2,272	2,272	662	1,109	1,616
Pencawang Pengagihan **Distribution Substations**					
Bilangan Number	6,762	7,382	7,382	7,957	8,597
Keupayaan (MVA) Capacity (MVA)	4,294	5,969	5,969	5,441	6,091

Nota:
Notes:
1. [1] Sistem 11 kV dan 33 kV sahaja
   [1] 11 kV and 33 kV system only
2. [2] Data Tahun Kewangan SESB
   [2] SESB Financial Year Data

Jadual 36: Kapasiti Terpasang dan Kapasiti Boleh Harap di Sabah, 2019
Table 36: Sabah Installed and Dependable Capacity, 2019

	Stesen Jana Kuasa Power Station	Sumber Tenaga Energy Source	Kapasiti Terpasang (MW) Installed Capacity (MW)	Kapasiti Boleh Harap (MW) Dependable Capacity (MW)
SESB	SJ Tenom Pangi	Hidro Hydro	75.00	72.55
	Hidro mini Mini hydro Merotai	Hidro mini Mini hydro	1.00	0.50
	Hidro mini Mini hydro Bombalai	Hidro mini Mini hydro	1.00	0.80
	Hidro mini Mini hydro Melangkap	Hidro mini Mini hydro	1.00	0.00
	Hidro mini Mini hydro Sayap	Hidro mini Mini hydro	1.00	1.00
	SJ Melawa	Diesel/MFO - DE	0.00	0.00
	SJ Tawau	Diesel/MFO - DE	44.00	21.75
	SJ Patau-Patau	Gas - CCGT	112.00	103.40
	SJ Kubota	Diesel/MFO - DE	64.00	64.00
	SJ Batu Sapi, Sandakan	Diesel/MFO - DE	20.00	17.40
	SJ Sandakan	Diesel/MFO - DE	38.00	36.00
	SJ Labuk Canopy	Diesel/MFO - DE	0.00	0.00
	Tawau Canopy - Minor Station	Diesel/MFO - DE	14.55	10.56
	Hidro Mini Mini Hydro Kiau[d]	Hidro mini Mini hydro	0.35	0.00
	Hidro Mini Mini Hydro Carabau[d]	Hidro mini Mini hydro	2.00	1.80
	Hidro Mini Mini Hydro Naradau[d]	Hidro mini Mini hydro	1.76	1.20
	Ranau - Minor Station[o]	Diesel/MFO - DE	35.22	24.13
	Telupid - Minor Station[o]	Diesel/MFO - DE		
	Stesen-stesen Pedalaman[o] Rural Stations[o]	Diesel/MFO - DE	5.12	4.68
		Solar - Solar Hybrid	23.15	21.50
	Jumlah SESB SESB Total		**439.15**	**381.27**

	Stesen Jana Kuasa Power Station	Sumber Tenaga Energy Source	Kapasiti Terpasang (MW) Installed Capacity (MW)	Kapasiti Boleh Harap (MW) Dependable Capacity (MW)
IPP	Ranhill Powertron Sdn Bhd (Teluk Salut)	Gas - CCGT	208.64	190.00
	Sepanggar Bay Power Corporation	Gas - CCGT	113.80	100.00
	Powertron II (Rugading)	Gas - CCGT	214.80	190.00
	Kimanis Power Sdn Bhd	Gas - CCGT	367.20	285.00
	SPR Energy (M) Sdn Bhd	Gas - CCGT	108.20	100.00
	Staratavest Sdn Bhd (Libaran)	Diesel/MFO - DE	64.40	30.00
	Jumlah IPP IPP Total		**1,077.04**	**895.00**

Jadual 36: Kapasiti Terpasang dan Kapasiti Boleh Harap di Sabah, 2019
Table 36: Sabah Installed and Dependable Capacity, 2019

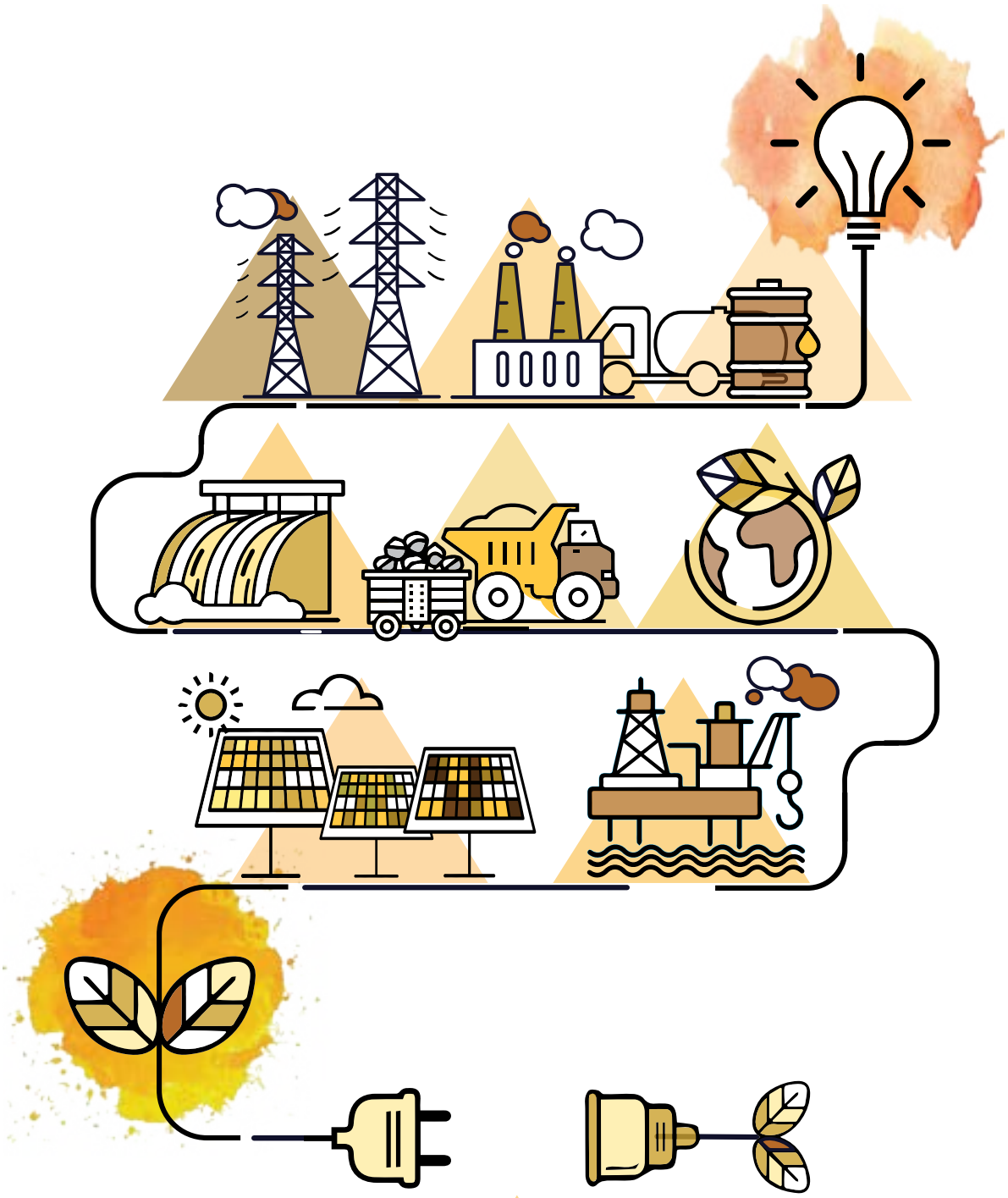
	Kategori Category	Sumber Tenaga Energy Source	Kapasiti Terpasang (MW) Installed Capacity (MW)
LAIN-LAIN (OTHERS)	Cogen Awam[d] Public Cogen[d]	Biojisim Biomass	29.20
		Jumlah Total	**29.20**
	Cogen Persendirian[s] Private Cogen[s]	Gas	65.00
		Biojisim Biomass	87.00
		Jumlah Total	**152.00**
	FiT[d]	Biojisim Biomass	25.80
		Biogas	9.60
		Hidro mini Mini hydro	6.50
		Solar	28.66
		Jumlah Total	**70.55**
	LSS	LSS>30MW	48.00
		LSS<30MW[d]	2.00
		Jumlah Total	**50.00**
	Self-Gen <5 MW[s]	Gas	3.90
		Diesel	137.28
		Biojisim Biomass	78.96
		Biogas	42.54
		Jumlah Total	**262.68**
		Jumlah Lain-lain **Total Others**	**564.43**
		SESB + IPP + Lain-lain **SESB + IPP + Others**	**2,080.62**

Nota:
Notes:
1. Melawa Mobile Gen Set tidak termasuk dalam perjumlahan kapasiti terpasang dan kapasiti boleh harap kerana hanya diguna pakai semasa kerja penutupan berjadual atau tidak berjadual.
   Melawa Mobile Gen Set are not installed in the system but used for planned or emergency shutdown.
2. Bersambung di peringkat pengagihan.
   Connected at the distribution level.
3. [d]Off-grid
4. Menjana elektrik untuk kegunaan sendiri
   [s]Generates electricity for self consumption

Jadual 37: Penjanaan Elektrik mengikut Sumber Tenaga di Sabah, 2019 (GWj)
Table 37: Sabah Electricity Generation by Energy Source, 2019 (GWh)

Penjana Generator	Sumber Tenaga Energy Source							
	Gas Asli Natural Gas	Diesel/ MFO/ Distillate	TBB RE					Jumlah Total
			Hidro Hydro	Hidro Mini Mini Hydro	Biojisim Biomass	Biogas	Solar	
SESB	384.83	376.81	329.56	14.36	-	-	18.03	**1,123.59**
IPP	5,452.57	82.73	-	-	-	-	-	**5,535.30**
Cogen Awam Public Cogen	-	2.83	-	-	31.13	-	-	**33.96**
Cogen Persendirian Private Cogen	0.34	2.55	-	-	17.94	-	-	**20.83**
FiT & MySuria[1]	-	-	-	6.63	96.40	48.48	53.99	**205.50**
LSS	-	-	-	-	-	-	89.19	**89.19**
Self-Gen<5 MW[2]	8.42	178.15	-	-	87.60	74.16	-	**348.33**
Jumlah Total	**5,846.16**	**643.07**	**329.56**	**20.99**	**233.07**	**122.64**	**161.21**	**7,356.70**
	79.47%	**8.74%**	**4.48%**	**0.29%**	**3.17%**	**1.67%**	**2.19%**	**100.00%**

Nota:
Notes:
1. [1]Sumber: SEDA
   [1]Source: SEDA
2. [2]Sumber: Pejabat-pejabat Kawasan ST
   [2]Source: ST Regional Offices
3. Data ini adalah termasuk penjanaan oleh stesen jana kuasa yang bersambung di talian pengagihan dan *off-grid*.
   These data include generation by power plants connected at the distribution level dan off-grid.



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Jadual 37: Maklumat Utama Prestasi SEB
Table 37: Key Information on SEB Performance

Petunjuk Indicator	Unit	2015	2016	2017	2018	2019
Kehendak Maksimum Maximum Demand	MW	2,288	3,040	3,302	3,504	3,777
Jumlah Unit Penjanaan Total Units Generated	GWj GWh	7,913	10,144	25,580[1]	27,177	29,457
Jumlah Unit Jualan Total Units Sold	GWj GWh	14,038	19,943	22,557	24,316	25,492
Hasil Jualan Elektrik Sales Revenue of Electricity	RM Juta RM Million	2,911	4,140	4,707	5,266	5,585
Kapasiti Terpasang Installed Capacity	MW	2,241	2,262	4,641[1]	4,641	5,204
Jumlah Kakitangan Number of Employees	orang person	4,307	4,468	4,713	4,841	5,207
Hasil Jualan Elektrik per Kakitangan Sales Revenue of Electricity per Employee	RM Juta/Kakitangan RM Million/Employee	0.676	0.927	0.999	1.088	1.073
Unit Jualan per Kakitangan Units Sold per Employee	GWj/Kakitangan GWh/Employee	3.26	4.77	4.79	5.33	5.20
Kapasiti Terpasang per Kakitangan Installed Capacity per Employee	MW/Kakitangan MW/Employee	0.52	0.51	0.48[2]	0.96	1.00
Jumlah Unit Pembelian Total Purchased Units	GWj GWh	7,721	12,158	-	-	-
Jumlah Unit Eksport Total Exported Units	GWj GWh	-	684	1,119	1,509	1,697
Jumlah Unit Import Total Imported Units	GWj GWh	-	-	-	-	-

Nota:
Notes:
1. [1]Pemilikan Bakun Hydro mulai suku ke-3 2017.
   [1]Acquisition of Bakun Hydro in Q3 2017.
2. [2]Dikira berdasarkan kapasiti terpasang SEB sebanyak 2,241 MW.
   [2]Calculated based on 2,241 MW installed capacity of SEB.

Jadual 38: Kapasiti Terpasang SEB (MW)
Table 38: SEB's Installed Capacity (MW)

Sumber Tenaga Energy Source	2015	2016	2017	2018	2019
Hidro Hydro	1,052	1,054	3,452[1]	3,452[2]	3,542[2]
Gas Asli Natural Gas	595	615	595	595	584
Arang Batu Coal	480	480	480	480	1,104
Diesel	114	114	114	114	64[3]
Jumlah Total	**2,241**	**2,262**	**4,641**	**4,641**	**5,204**

Nota:
Notes:
1. [1] Pemilikan Bakun Hidro pada suku ke-3 2017.
   [1] Acquisition of Bakun Hydro in Q3 2017.
2. [2] Termasuk Stesen Jana Kuasa Batang Ai, Murum dan Bakun.
   [2] Inclusive of Batang Ai, Murum and Bakun power stations.
3. [3] Data diesel tidak termasuk Stesen Jana Kuasa Limbang & Lawas.
   [3] Diesel figure does not include Limbang & Lawas Power Station.

Jadual 39: Jualan Tenaga Elektrik SEB (GWj)
Table 39: SEB Electricity Sales (GWh)

Sektor Sector	2015	2016	2017	2018	2019
Domestik Domestic	1,940	2,102	2,149	2,368	2,401
Komersial Commercial	2,390	2,512	2,562	2,857	2,753
Industri Industry	9,619	15,252	17,758	18,981	20,234
Lampu Awam Public Lighting	89	77	88	110	104
Eksport Export	-	684	1,119	1,509	1,697
Jumlah Total	**14,038**	**20,627**	**23,675**	**25,825**	**27,189**

Jadual 40: Bilangan Pengguna SEB
Table 40: Number of SEB Consumers

Sektor Sector	2015	2016	2017	2018	2019
Domestik Domestic	533,153	536,466	554,467	568,712	583,613
Komersial Commercial	92,067	91,454	93,627	96,416	99,774
Industri Industry	1,025	1,022	1,051	1,066	1,059
Lampu Awam Public Lighting	11,185	9,457	10,040	10,491	11,146
Eksport Export	-	4	4	4	4
Jumlah Total	**637,430**	**638,403**	**659,189**	**676,689**	**695,596**

Jadual 41: Sistem Penghantaran SEB
Table 41: SEB Transmission system

Tahun Year	2015	2016	2017	2018	2019
Talian & Kabel Sistem Penghantaran **Transmission System Lines & Cables**					
500 kV (km)	-	-	754	753	753
275 kV (km)	1,204.0	1,331.0	2,761.5	2,810.3	3,068.4
132 kV (km)	384.0	388.0	826.3	840.4	916.2
66 kV (km)	-	-	-	-	-
Pencawang Penghantaran **Transmission Substations**					
Bilangan Number	28	30	33	37	42
Keupayaan (MVA) Capacity (MVA)	6,359.6	7,239.6	8,809.1	10,246.0	10,726.0

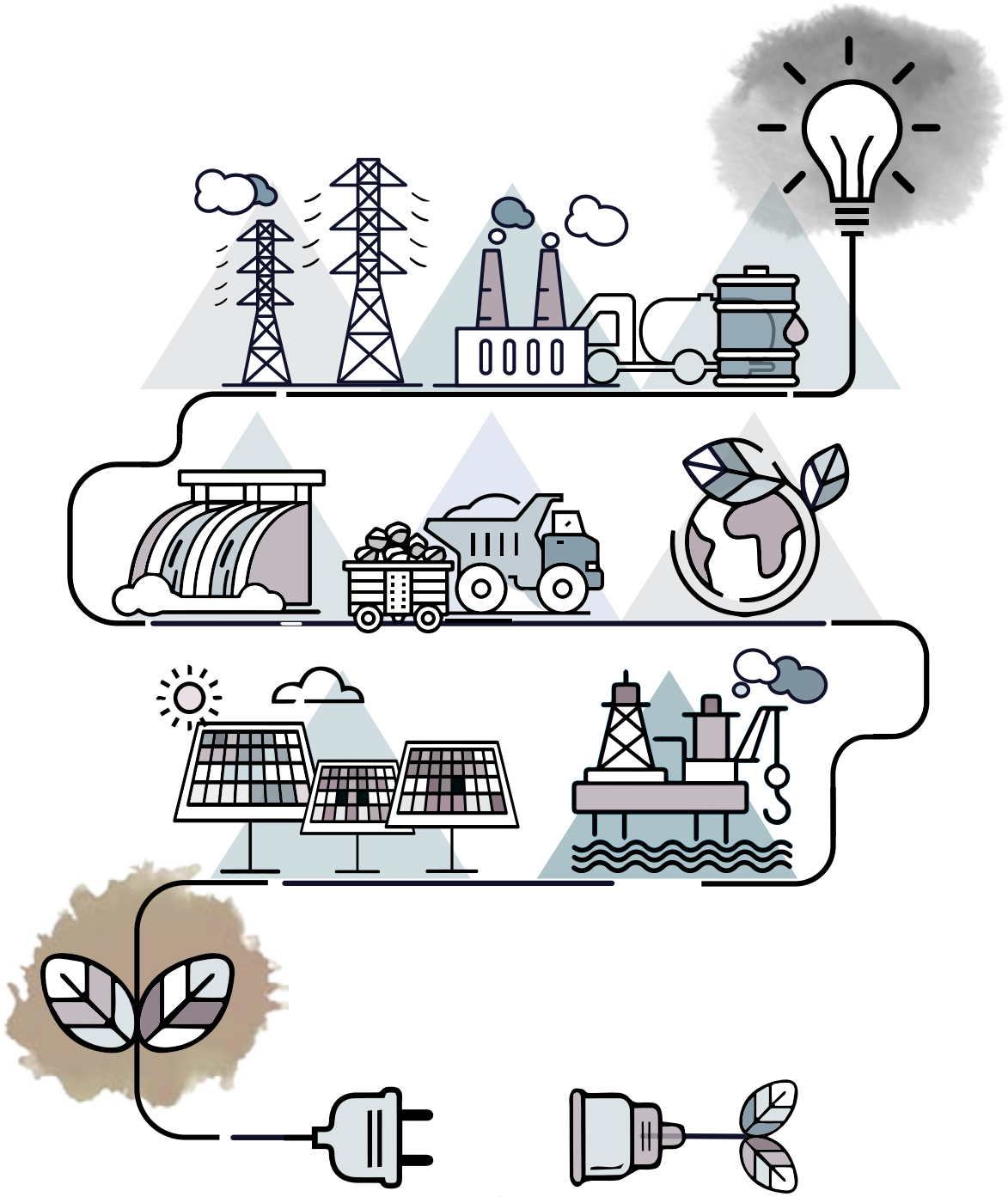
Jadual 42: Sistem Pengagihan SEB
Table 42: SEB Distribution System

Tahun Year	2015	2016	2017	2018	2019
Talian & Kabel Sistem Pengagihan **Distribution System Lines & Cables**					
Talian Atas (km) Overhead Lines (km)	24,031	24,681	11,998	26,236	26,850
Kabel Bawah Tanah (km) Underground Cables (km)	7,688	8,122	5,175	8,769	9,098
Pencawang Pengagihan **Distribution Substations**					
Bilangan Number	11,435	12,522	13,076	13,824	13,544
Keupayaan (MVA) Capacity (MVA)	4,339	8,735	9,061	9,600	5,940

Jadual 43: Kapasiti dan Penjanaan Elektrik di Sarawak, 2019
Table 43: Sarawak Capacity and Electricity Generation, 2019

Penjana Generator	Sumber Tenaga Energy Source	Kapasiti Terpasang (MW) Installed Capacity (MW)	Kapasiti Tersedia Available Capacity (MW)	Penjanaan (GWj) Generation (GWh)
SEB	Arang Batu Coal	1,103.9	1,001.0	4,300.6
	Diesel	97.5	91.8	173.4
	Gas Asli Natural Gas	58.6	571.5	3,313.2
	Hidro Hydro	3,452.0	3,438.0	21,658.10
	Solar	0.1	0.1	0.1
	Hidro Mini Mini Hydro	6.0	6.0	11.2
	Hidro Mikro Micro Hydro	0.2	0.2	11.2
	Jumlah Total	**5,243.2**	**5,108.5**	**29,456.5**
Cogen	Gas Asli Natural Gas	389.0	389.0	1,735.4
	Jumlah Total	**389.0**	**389.0**	**1,735.4**
Self-Gen	Diesel/MFO	17.0	15.1	7.6
	Biojisim Biomass	61.7	57.0	144.3
	Biogas	0.5	0.5	1.7
	Lain-lain bukan TBB Others non-RE	5.05	5.1	5.3
	Jumlah Total	**84.3**	**77.7**	**158.8**
Jumlah Besar Grand Total		**5,716.5**	**5,575.2**	**31,350.7**

Nota:
Notes:
Termasuk semua stesen jana kuasa yang bersambung di peringkat penghantaran, pengagihan dan *off-grid*.
Includes all power plants connected at the transmission, distribution, and off-grid levels.



PETA LOKASI STESEN JANA KUASA UTAMA DAN SISTEM GRID

LOCATION MAPS OF MAJOR POWER STATIONS AND GRID SYSTEMS

Peta 1: Lokasi Stesen Jana Kuasa Utama di Semenanjung Malaysia
Map 1: Location of Major Power Stations in Peninsular Malaysia

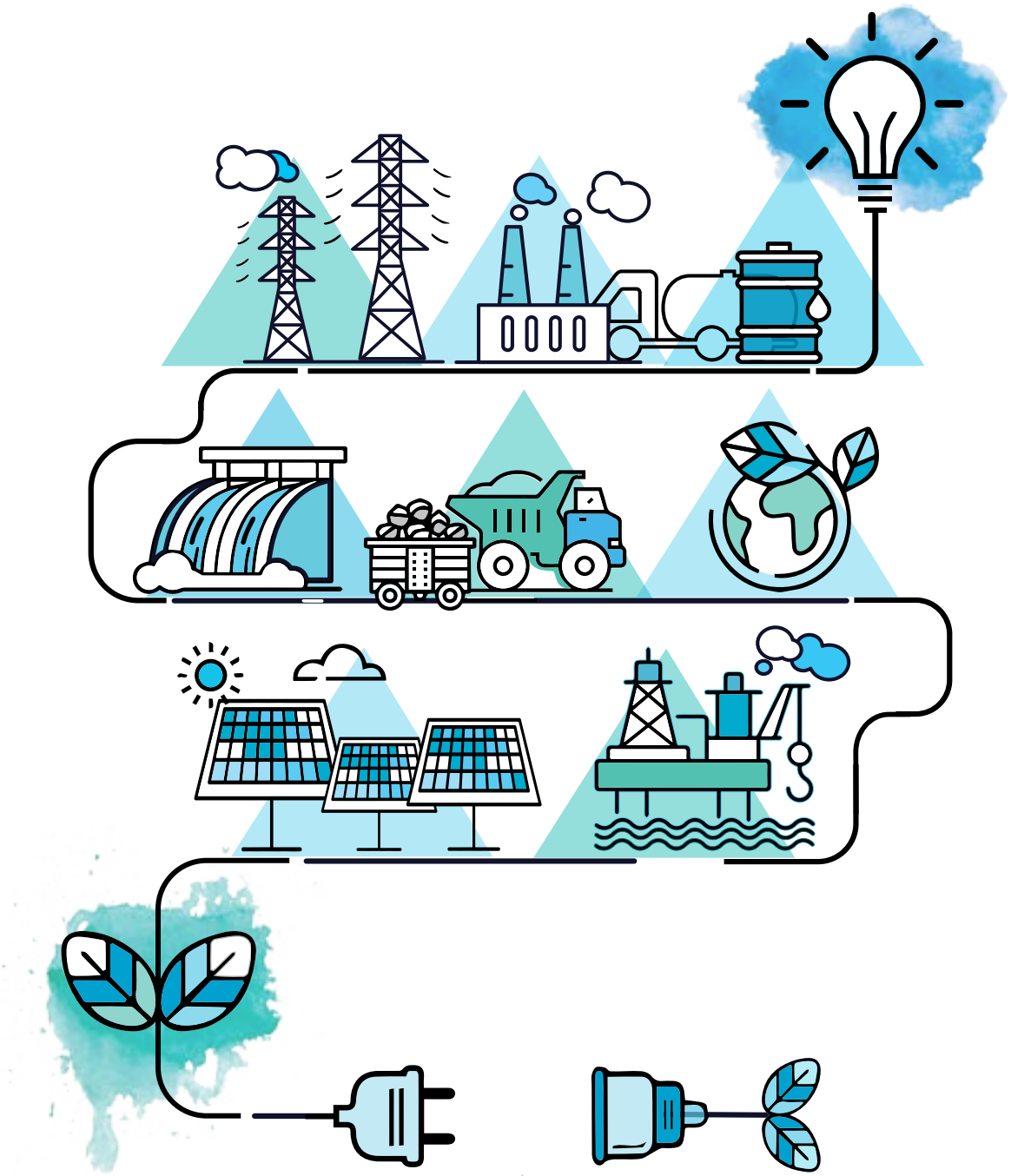
Diolah daripada sumber:
Adapted from source: Regulatory Economics Dept, TNB

Peta 2: Sistem Penghantaran Elektrik di Semenanjung Malaysia
Map 2: Electricity Transmission System in Peninsular Malaysia

Sumber:
Source: TNB

Peta 3: Lokasi Stesen Jana Kuasa Utama dan Sistem Grid di Sabah
Map 3: Location of Major Power Stations and Grid System in Sabah

Peta 4: Lokasi Stesen Jana Kuasa Utama di Sarawak
Map 4: Location of Major Power Stations in Sarawak



APENDIKS
APPENDIX

Apendiks 1: Laporan Prestasi TNB – Guaranteed Service Level (GSL)
Appendix 1: TNB's Performance Report - Guaranteed Service Level (GSL)

Item	Item Details	Service Ind	Service Defination	Service Standard	Service Details	Putrajaya	Perlis	Kedah	Pulau Pinang	Perak	Selangor	Melaka	Pahang	Terengganu	Kuala Lumpur	Negeri Sembilan	Johor	Kelantan	Total Case/Total Penalty %
GSL 1 (Note: Jan - Sept)	Availability of Supply	Number of unplanned interruptions experienced by a consumer within the administration of Bandaraya Kuala Lumpur, Putrajaya and Other Areas	Total Service connection	4-5 per year		4	94	558	552	958	1751	212	700	296	787	359	1378	391	8,040
			Total Service connection not comply		RM 50/not comply	0	0	0	0	0	0	0	0	0	0	0	0	0	-
			Total Penalty (RM)			0	0	0	0	0	0	0	0	0	0	0	0	0	-
					Compliance	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
GSL 2 (Note: Jan - Dec19)	Availability of Supply	Time taken to restore electricity supply following outage caused by minor distribution network fault	Total Service connection	4 hour - MV with feedback		4	96	540	540	930	1761	198	706	292	778	353	1390	392	7,980
			Total Service connection not comply		RM 50/not comply	0	0	20	16	41	81	3	25	1	32	14	77	10	320
			Total Penalty (RM)			0	0	221,800	452,130	452,570	1,816,530	41,190	517,700	4,000	484,350	282,196	1,148,700	146,100	5,567,266
					Compliance	100.00%	100.00%	96.30%	97.04%	95.59%	95.40%	98.48%	96.46%	99.66%	95.89%	96.03%	94.46%	97.45%	95.99%
GSL 3 (Note: Jan - Dec19)	Providing Supply	Time taken to implement service connection (OVERHEAD LINE) requiring low voltage cable installation work	Total service connection	5 working days		3	963	5,383	1,937	5,819	6,179	1,700	3,640	4,477	1,525	1,733	6,593	6,718	46,670
			Total service connection																
			Total Penalty (RM)		Compliance	3	3	3	3	3	3	3	3	3	3	3	3	3	3

Item	Item Details	Service Ind	Service Defination	Service Standard	Service Details	Putrajaya	Perlis	Kedah	Pulau Pinang	Perak	Selangor	Melaka	Pahang	Terengganu	Kuala Lumpur	Negeri Sembilan	Johor	Kelantan	Total Case/Total Penalty %
GSL 1 (Note: Jan - Sept)	Availability of Supply	Time taken to implement service connection (Underground line) requiring low voltage cable installation work	Total Service connection	14 working days		31	23	127	145	182	799	109	151	148	746	100	501	233	3,,265
			Total Service connection not comply		RM 50/not comply	0	5	26	1	11	0	2	16	1	21	3	32	1	119
			Total Penalty (RM)			119	119	119	119	119	119	119	119	119	119	119	119	119	119
					Compliance	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
GSL 4 (Jan - Dec 19)	Providing Supply	Time taken to connect new electricity supply for individual domestic low voltage consumer	Total Service connection	3 working days		26	26	26	26	26	26	26	26	26	26	26	26	26	26
			Total Service connection not comply		RM 50/not comply	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			Total Penalty (RM)			3 working	3 working	3 work	3 work	3 work	3 work	3 work	3 work	3 work	3 work	3 work	3 work	3 work	3 work
					Compliance	3 work	3 work	3 work	3 work	3 work	3 work	3 work	3 work	3 work	3 work	3 work	3 work	3 work	3 work
GSL 5 (Jan - Dec 19)	Cuctomer Contract	Disconnection of supply according to the applicable legislation or disconnection procedures	Total disconnection	No complaint		26	26	26	26	26	26	26	26	26	26	26	26	26	26
			Total service connection not completed in 5 working days		RM 100/ not comply														
			Total Penalty (RM)																
					Compliance	100.00%	100.00%	3 work	3 work	3 work	3 work	3 work	3 work	3 work	3 work	3 work	3 work	3 work	3 work
Total Potential Penalty in RM for GSL 1,2,3,4,5 according to states					3 work	3 work	3 work	3 work	3 work	3 work									

Penambahbaikan yang telah diambil tindakan dalam pelaporan Q4
a. Pelaporan daripada TOMS dan LGBnet (as it sehingga sistem baharu yang sesuai bagi perlaksanaan auto-rebat dibangunkan)
b. GSL 3 dan GSL 4 dalam proses pemuktamadan pembangunan sistem dan memuat-turun CPA Dashboard (sebagai makluman)
c. Pelaporan daripada WEBI (pada Q4, digunakan *summary report* bagi mendapatkan jumlah rebat berbayar melibatkan GSL 5 sepanjang tahun 2019)

Apendiks 2: Laporan Prestasi TNB – Minimum Service Level (MSL)
Appendix 2: TNB's Performance Report - Minimum Service Level (MSL)

Item	Item Details	Service Ind.	Service Defination	Service Standard	Service Details	Putrajaya	Perlis	Kedah	Pulau Pinang	Perak	Selangor	Melaka	Pahang	Terengganu	Kuala Lumpur	Negeri Sembilan	Johor	Kelantan	Total/ Avg %
1	Availability of Supply	1a	Minimum duration of notice for planned/schedule interruption of electricity supply	> 2 days	Total notices served	84	31	1459	773	2691	6277	1515	2424	858	1726	1040	3602	434	22914
					Total notices served more than 2 days before planned/schedule interruption	82	28	1440	754	2593	6218	1489	2337	845	1702	1032	3519	405	22444
					% Compliance	97.62%	90.32%	98.70%	97.54%	96.36%	99.06%	98.28%	96.41%	98.48%	98.61%	99.23%	97.70%	93.32%	97.95%
2	Quality of Supply	1b	Upon request, time taken to provide initial information to consumer who report on electricity interruption	< 1 hour	Total requests from consumers	305	305	305	305	305	305	305	305	305	305	305	305	305	3965
					RM 50/not comply	304	304	304	304	304	304	304	304	304	304	304	304	304	3952
					% Compliance	99.67%	99.67%	99.67%	99.67%	99.67%	99.67%	99.67%	99.67%	99.67%	99.67%	99.67%	99.67%	99.67%	99.67%
	Cuctomer Contract	2a	Time taken to rectify voltage complaint or limit violation and to correct voltage complaint which requires network reinforcement	< 180 days	Total complaints received	2	7	43	43	73	171	36	23	20	64	36	104	31	653
					Total complaints solved less than 180 days	2	7	42	42	70	164	30	22	20	62	35	103	28	627
					% Compliance	100.00%	100.00%	97.67%	97.67%	95.89%	95.91%	83.33%	95.65%	100.00%	96.88%	97.22%	99.04%	90.32%	96.02%
		2b	Time taken to complete investigation of overvoltage incident from complaint receipt date (data availability for Q3 dan Q4)	< 30 working days	Total complaints received	6	5	384	222	285	713	53	184	123	230	51	295	144	2695
					Total complaints solved less than 30 working days	2	5	77	170	50	194	39	173	121	177	15	89	138	1250
					% Compliance	33.33%	100.00%	20.05%	76.58%	17.54%	27.21%	73.58%	94.02%	98.37%	76.96%	29.41%	30.17%	95.83%	46.38%

Item	Item Details	Service Ind.	Service Defination	Service Standard	Service Details	Putrajaya	Perlis	Kedah	Pulau Pinang	Perak	Selangor	Melaka	Pahang	Terengganu	Kuala Lumpur	Negeri Sembilan	Johor	Kelantan	Total/ Avg %
		2c	Time taken to provide a complete report of voltage sag incident from complaints received date	< 14 days	Total complaints received	37	N/A	16	114	28	129	88	26	51	100	4	113	N/A	706
					Total complaints solved less than 14 days	14	N/A	4	65	11	57	71	24	8	28	1	39	N/A	322
					% Compliance	37.84%	N/A	25.00%	57.02%	39.29%	44.19%	80.68%	92.31%	15.69%	28.00%	25.00%	34.51%	N/A	45.61%
3	Providing Supply	3a	Time taken to inform the developer of the connection charges to be paid upon receipt of complete application	For supply up to 22kV :not more than 30 days | For supply of 33kV : not more than 60 days	Total	31	15	133	189	201	636	86	112	59	205	140	491	60	2358
					Total Non Comply	0	0	0	0	1	2	0	3	0	1	0	1	0	8
					% Compliance	100.00%	100.00%	100.00%	100.00%	99.50%	99.69%	100.00%	97.32%	100.00%	99.51%	100.00%	99.80%	100.00%	99.66%
		3b	Time taken to implement electrification scheme requiring new substation after connection charges paid, way leave obtained and successful taking over of substation building by TNB	For supply up to 22kV : not more than 60 days | For supply of 33kV with cable installation of not more than 5km | For KL, Putrajaya area :not more than 180 days | other areas : not more than 120 days	Total no. of projects given supply	23	2	29	87	78	465	70	46	5	122	79	261	42	1309
					Total no. of projects given supply less than 120 days	23	2	28	81	75	455	70	40	5	119	78	254	41	1271
					% Compliance	100.00%	100.00%	95.65%	98.08%	94.12%	95.80%	100.00%	94.74%	50.00%	98.63%	95.92%	96.18%	93.33%	97.10%
		3c	Waiting time at site for appointment to connect electricity supply (Unavoidable occurrence must be followed up by returning call in not less than 1 hour before the appointment time)	< 1 hour	Total appointments made	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Item	Item Details	Service Ind.	Service Defination	Service Standard	Service Details	Putrajaya	Perlis	Kedah	Pulau Pinang	Perak	Selangor	Melaka	Pahang	Terengganu	Kuala Lumpur	Negeri Sembilan	Johor	Kelantan	Total/Avg %
					Total appointments met in not less than 1 hour of appointement date	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
					% Compliance	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
4	Customer Contact	4a	Time taken to reply to written complaint	< 7 working days	Total written enquiries/ complaints received	222	168	1466	2733	2423	13421	2542	1408	503	10019	1902	7208	1285	45300
					Total written enquiries/com-plaints replied less than 7 working days	204	148	1411	2375	2266	12066	2040	1262	480	8860	1625	6736	1239	40712
					% Compliance	91.89%	88.10%	96.25%	86.90%	93.52%	89.90%	80.25%	89.63%	95.43%	88.43%	85.44%	93.45%	96.42%	89.87%
		4b	Actual perfor-mance queing time at customer service counter	< 15 minutes	Total customers served	12110	8658	70596	113137	108703	272735	80013	92045	40065	229351	70878	199700	43823	1341814
					Total customers served less than 20 minutes	10464	8471	69709	112784	106374	265455	75382	88887	38247	221479	70573	175555	43004	1286384
					% Compliance	86.41%	97.84%	98.74%	99.69%	97.86%	97.33%	94.21%	96.57%	95.46%	96.57%	99.57%	87.91%	98.13%	95.87%
		4c	Time taken by customer service officer at CMC 15454 to pick up ringing telephone	90% calls answered within 30 seconds	Total incoming calls received	2437806	2437806	2437806	2437806	2437806	2437806	2437806	2437806	2437806	2437806	2437806	2437806	2437806	31691478
					Total incoming calls answered less than 30 seconds	1944493	1944493	1944493	1944493	1944493	1944493	1944493	1944493	1944493	1944493	1944493	1944493	1944493	25278409
					% Compliance	79.76%	79.76%	79.76%	79.76%	79.76%	79.76%	79.76%	79.76%	79.76%	79.76%	79.76%	79.76%	79.76%	79.76%
5	Metering Services	5a	problem upon official notification /request by the customer (appointment, visit, testing,etc)	< 2 working days	No. of appointments, visit, testing completed	24	6	24	42	36	525	13	23	3	209	53	173	26	1157
					No. of appointments, visit, testing completed less than 2 working days	6	5	17	19	22	200	7	11	2	115	24	128	8	564
					% Compliance	25.00%	83.33%	70.83%	45.24%	61.11%	38.10%	53.85%	47.83%	66.67%	55.02%	45.28%	73.99%	30.77%	48.75%

Item	Item Details	Service Ind.	Service Defination	Service Standard	Service Details	Putrajaya	Perlis	Kedah	Pulau Pinang	Perak	Selangor	Melaka	Pahang	Terengganu	Kuala Lumpur	Negeri Sembilan	Johor	Kelantan	Total/ Avg %
		5b	Time taken to respond to metering problem or dispute upon official notification/ request by customer (replace, relocate, etc)	< 3 working days	No. of meter replacement/ relocation completed	59	9	50	44	62	248	23	21	8	56	27	163	17	787
					No. of meter replacement/ relocation completed less than 3 working days	58	9	50	42	62	244	23	21	8	55	27	161	17	777
					% Compliance	98.31%	100.00%	100.00%	95.45%	100.00%	98.39%	100.00%	100.00%	100.00%	98.21%	100.00%	98.77%	100.00%	98.73%
		5c	Time interval between successive rendering of bill(s)	1 month	Total no. of customers (OPC)	748186	1039311	8258410	8234241	11132238	23544377	4166986	6295302	4461499	14738467	5509262	16691454	5832024	110651757
					Total no. of billed customers	733122	1016729	8110129	8095502	11006009	23013399	4124830	6220308	4416368	14516581	5391362	16503496	5692931	108840766
					% Compliance	97.99%	97.83%	98.20%	98.32%	98.87%	97.74%	98.99%	98.81%	98.99%	98.49%	97.86%	98.87%	97.62%	98.36%
					Average% Compliance	80.60%	94.74%	83.12%	87.07%	82.58%	81.75%	87.89%	90.98%	84.50%	85.75%	81.11%	83.83%	89.60%	94.24%

Apendiks 3: Laporan prestasi NUR Distribution Sdn. Bhd. (NUR)
Appendix 3: Performance report of NUR Distribution Sdn. Bhd. (NUR)

Item	Criteria	Details	Agreed Targets	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total in 2020	No. meeting target in 2020	% meeting target in 2020
1	**Connection of Supply**	Applied for 1a & 1b	Not less than 1 day Only after all condition meet such as contribution paid, form complete, G & H, etc)															
1a		Change of tenant	Not more than 1 working day	8	3	4	0	0	10	30	1	17	6	1	8	88	88	100.00
1b		New Connection Low Voltage Individual Application -	Not more than 1 working day	9	4	2	0	1	3	4	3	1	1	2	6	36	36	100.00
1c (i)		New connection - Low Voltage Bulk application and housing schemes. Refers to a large number of houses or building in a single development. EC do not agree to reduce the target.	Not more than 1 week (Meter only)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	NA
1c (ii)		LV commercial industrial supply (Meter only - CT Type)	Connection within 2 weeks	0	0	0	0	0	0	0	0	0	0	0	0	1	1	100.00
1c (iii)		LV supply - LV cable and meter	Contribution charge and Security deposit: Within 2 months from receipt and payment of.	0	0	1	0	0	1	0	1	0	0	1	0	4	4	100.00
1c (iv)		LV supply requiring new substation	Contribution Charge: Within 120 days from receipt and payment of Security deposit: Within 45 days of substation building handover.	0	0	0	0	0	0	0	0	0	0	0	0	00	0	NA
1c (v)		11kV or 33kV supply	Within 10 months of submission and contribution payment / or sooner as agreed. Also Within 45 days of substation building handover.	1	0	0	0	0	0	0	0	1	0	1	0	3	3	100.00
1c (vi)		132kV supply	Within 18 months of submission and customer contribution	0	0	0	0	0	0	0	0	0	0	0	0	0	0	N/A
2	**Restoration of supply after interruption**	Calls to be answered within 30 seconds. Follow up with return call is required only when NUR unable to inform customers that action is taken.																
2a		Complaint through telephone: At normal hours will be attended within 30 seconds Re - contact consumer within 10 minutes if cannot provide info immediately.	30 seconds to answer the telephone. A technician will be sent immediately. When this is not possible, the customer will be called back with information. Note : In NUR's case, the response is always by stating a technician will be sent immediately.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	NA
2b		Supply interruption complaint: Consumer who launch a complain, will be given a report number.	Consumer will be given a number. No. of customers is small and No. of interruption is very small and easily managed. To assume as complying. Note :TCS - Trouble Call System is required to implement this accordingly.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	NA
2c		Time to restore *Minor fault which results in interruption of Electricity supply that can be quickly restored *Minor - such as due to the operation of fuse or the tripping of a circuit breaker resulting from overload	Within 90 minutes	3	0	0	3	1	1	5	0	0	0	0	0	16	13	81.25

Item	Criteria	Details	Agreed Targets	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total in 2020	No. meeting target in 2020	% meeting target in 2020
2d		Time to restore *Major fault which results in interruption of Electricity supply that requires substantial time to restore *Major such as due to switchgear failure or cable fault	Within 12 hours	2	3	3	1	2	2	3	3	6	7	4	3	39	37	94.87
3	**Supply re-connection after disconnection for non-payment**	Consumer who paid the bill, supply to be re-connect on the same day.	Payment before 14:00 hour the re-connection will be done on the same day.	80	104	0	0	0	0	18	0	0	0	0	0	202	202	100.00
4	**Supply interruptions, which are planned / schedule.**	Applied for 4a & 4b																
4a		Interruption scheduled for Industrial consumers	Notice of 7 days will be given before schedule of interruptions	3	17	18	1	4	7	6	6	6	12	9	8	97	93	95.88
4b		Interruption scheduled for Industrial consumers	Discussion with individual consumer on their manufacturing plans and the shut down is scheduled to meet their requirements. Note: In exceptional cases, where essential work is planned ,minimum one month notice will be given.	2	2	0	2	5	2	0	3	0	3	1	4	24	22	91.67
5	**Meter reading**	Estimated Reading	Estimated reading for domestic consumers : 1.Must not exceed 3 consecutive months 2.The estimated reading must also be based on the prorated / average consumable of the 3 previuos months. Note: Notice will be given to the domestic consumers to inform if the estimated reading is exceeding 3 consecutive months.	0	0	1	1	0	0	0	0	0	0	0	0	2	2	100.00
6	**Enquiries from consumers**	Respond time for queries	i) Written - 5 days from receipt of written complaint ii) Telephone - 30 seconds and 24 hours. (for follow up) iii) Cash counter - 30 seconds and 24 hours.	4	12	4	2	5	64	31	12	5	10	4	5	158	158	100.00
7	**Service Counter**	Waiting Time	Waiting time should not exceed 10 minutes	0	0	0	0	0	0	0	0	0	0	0	0	0	0	NA
8	**Appointment for meter accuracy determination**	Upon request, days taken to do meter testing	2 working days	0	1	21	0	13	1	0	0	0	0	0	0	36	36	100.00
9	**Meter replacement**	Applied for 9a & 9b	Upon request and if found necessary (days taken to replace the meter)															
9a		Domestic consumers	2 working days	1	2	1	0	3	1	2	0	0	2	0	1	13	13	100.00
9b		LV commercial /LV Industrial/ 11kV / 33kV / 132kV	5 working days - To confirma the defect. Note: subject to agreement on shut down of supply.	0	4	0	0	0	0	2	1	0	2	0	0	9	9	100.00
10	**Appointment with consumers**	Meeting with Customers	Meeting the appointment time. Note: If meeting is cancelled , a follow up appointment will be scheduled immediately within 1 working day from the earlier date in order to notify consumer as soon as posible .	2	5	4	5	5	7	6	1	1	2	5	8	51	51	100.00

Item	Criteria	Details	Agreed Targets	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total in 2020	No. meeting target in 2020	% meeting target in 2020
11	**Security Deposits**	NUR explanation that minimum deposit is required forsmall supplies is accepted by EC. EC proposal is acceptable for cash deposit. BG's will be reduced upon renewal.	Deposit will be returned to consumers after 6 months. Note : Only return when the prorated average consumption is exceeded 2 months and not less than the minimum amount.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	NA
11a		Interest on Deposits	2.5% to be rebated at the end of the year.	5237	0	0	0	0	0	0	0	0	0	0	0	5237	5237	100.00
12	**Refund of consumer deposits**	Refund the deposit to consumers upon receiving complete documentations.	Within 1 month	17	7	11	0	2	13	15	27	27	10	7	13	149	149	100.00
13	**Collection**	Upon Proof of payment received Note : NUR would request longer date line to allow any cheque payment to be cleared by the bank to comply with bank procedure	Upon Proof of payment received Note : NUR would request longer date line to allow any cheque payment to be cleared by the bank to comply with bank procedure	3522	3282	3095	2797	3719	3445	3566	3372	3165	1811	2131	2518	36423	36423	100.00
14	**Disconnection of supply (safety, theft etc)**	Applied to 14a, 14b & 14c																
14a		Disconnection due to installation which are considered very dangerous and disconnection could not be delayed.	No notice will given (immediate disconnection)	0	0	0	0	0	0	0	26	26	26	26	26	26	0	NA
14b		In any unsafe particular situation and likely source of danger to consumers, disconnection will be an immediate. Any other situation besides this, NUR will advise consumers that disconnection would be carried out in the specific time.	Immediate disconnection	0	0	0	0	0	0	0	0	0	0	0	0	00	0	NA
14c		1. Disconnections due to other reasons than 14a &14b above, which are allowed.. 2. Duration and timing , which are NOT allow to proceed with disconnection work: i) Before weekend or Public Holidays ii) On Weekend or Public Holidays. iii) After 12 noon on working days.	7 working days notice	0	0	0	0	0	0	0	0	0	0	0	0	0	0	NA
15	**Special consumers who face problems in paying bills**	This criterion applies to disabled or elderly consumers. Note : A register of disable or immobile consumers will be needed.	NUR will make special arrangement or collect fromconsumers premises.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	NA
16	**Voltage outside standard**	Applied for 16a, 16b & 16c																
16a		Where no capital work on network is required	1 day	0	0	0	0	0	0	0	0	0	0	0	0	0	0	NA
16b		Where supply interruption is required but no network enhancement work needed	8 days (Notify interruption 7 days)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	NA
16c		Where network enhancement work is required	3 months	0	0	0	0	0	0	0	0	0	0	0	0	0	0	NA
17	**New / Increase of supply application reply**	Applied for 17a, 17b, 17c & 17d.	Written reply of application including date supply will be available and connection charges will be forwarded to consumers															
17a		No substation required	1 week	0	0	1	0	0	1	0	1	0	0	2	0	5	5	100.00
17b		New upgrade substation required Note : This is to allow time for design work and obtaining of prices from contractors.	1 month	0	0	0	0	0	0	0	0	0	0	0	1	1	1	100.00

Item	Criteria	Details	Agreed Targets	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total in 2020	No. meeting target in 2020	% meeting target in 2020
17c		LV commercial /LV Industrial/ 11kV / 33kV Note : This to allow time for design work and obtaining of prices from contractors.	1 month	0	0	0	0	1	0	0	1	1	1	0	0	4	4	100.00
17d		132kV	Within 3 months	0	0	0	0	0	0	0	0	0	0	0	0	0	0	NA
18	**Transferring of meter location upon consumer request / Meter transfer**	Depends on new location and work required	3 working days	1	0	1	1	0	0	4	1	3	3	1	1	16	16	100.00
19	**Education of Energy Efficiency**	Any form of media and medium	1. Will be available at NUR Customer Service Centre at Kulim Hi-Tech Park. 2. Seminars will also be conducted through Consumer Committees in line with the license.	0	0	1	0	0	1	1	0	0	0	0	1	4	4	100.00
20	**Power Quality improvement**	Applicable for 20a and 20b																
20a		Domestic consumers	NUR shall advise and guide consumers in the quality of supply and all power quality related issues.	0	0	0	0	0	1	1	0	1	0	0	0	3	3	100.00
20b		LV commercial /LV Industrial/ 11kV / 33kV / 132kV	Power Quality meeting with all major customers on Quarterly basis.	2	5	4	5	5	6	5	1	0	2	5	8	48	48	100.00

Apendiks 4: Laporan Prestasi Sabah Electricity Sdn. Bhd. (SESB) bagi Tahun Kewangan 2019 (Januari - Disember 2019)
Appendix 4: Performance Report of Sabah Electricity Sdn. Bhd. (SESB) for Financial Year 2019 (January - December 2019)

		Kadar Semasa 2019 (Jan 19 - Dis 19)
1	**Penyambungan Bekalan Elektrik**	
	Selepas Kontrak Ditandatangani	
1.1	PENUKARAN PENGGUNA	
1.1.1	Bilangan permohonan	15,861
1.1.2	Bilangan permohonan yang disambung dalam dalam tempoh tidak lebih daripada 1 hari bekerja dari tarikh temujanji pengujian pemasangan	15,861
1.1.3	Peratus permohonan yang disambung dalam tempoh tidak lebih daripada 1 hari bekerja dari tarikh temujanji pengujian pemasangan	100.00%
1.2	BEKALAN BARU VOLTAN RENDAH (PERMOHONAN INDIVIDU)	
1.2.1	Bilangan permohonan	24302
1.2.2	Bilangan permohonan yang disambung dalam tempoh tidak lebih daripada 2 hari bekerja dari tarikh temujanji pengujian pemasangan	23622
1.2.3	Peratus permohonan yang disambung dalam tempoh tidak lebih daripada 2 hari bekerja dari tarikh temujanji pengujian pemasangan	97.20%
1.3	BEKALAN BARU VOLTAN RENDAH (PERMOHONAN PUKAL DAN SKIM PERUMAHAN)	
1.3.1	Bilangan permohonan	3632
1.3.2	Bilangan permohonan yang disambung dalam tempoh tidak lebih daripada 2 minggu dari tarikh temujanji pengujian pemasangan	3630
1.3.3	Peratus permohonan yang disambung dalam tempoh tidak lebih daripada 2 minggu dari tarikh temujanji pengujian pemasangan	99.94%
2	**Pemulihan Semua Bekalan Selepas Gangguan**	
2.1	Bilangan pengguna yang melapor kepada SESB	243131
2.2	Bilangan pengguna yang mana maklumat tidak dapat diberikan pada masa itu dihubungi semula dalam tempoh 15 minit	240701
2.3	Bilangan pengguna yang diberi nombor aduan	243131
2.4	Bilangan kerosakan kecil	47685
2.5	Bilangan kerosakan kecil yang dipulihkan dalam tempoh 2 jam	46747
2.6	Bilangan kerosakan besar	5593
2.7	Bilangan kerosakan besar yang dipulihkan dalam tempoh 12 jam	5590
2.8	Peratus bilangan pengguna yang mana maklumat tidak dapat diberikan pada masa itu dihubungi semula dalam tempoh 15 minit	99.00%
2.9	Peratus bilangan pengguna yang diberi nombor aduan	100.00%
2.10	Peratus kerosakan kecil yang dipulihkan dalam tempoh 2 jam	98.03%
2.11	Peratus kerosakan besar yang dipulihkan dalam tempoh 12 jam	99.95%

		Tahun Kewangan 2019 (Jan 19 - Dis 19)
3	**Penyambungan Bekalan Elektrik Yang Di Potong**	
3.1	Bilangan pemotongan bekalan	257464
3.2	Bilangan pengguna yang mana bekalannya dipotong menjelaskan semua bayaran sebelum 1.00 tengahari pada hari yang sama	165974
3.3	Bilangan pengguna yang mana telah menjelaskan semua bayaran sebelum pukul 1.00 tengahari mendapat bekalansemula pada hari yang sama	165038
3.4	Peratus pengguna yang mana telah menjelaskan semua bayaran sebelum pukul 1.00 tengahari mendapat bekalan semula pada hari yang sama	99.44%
4	**Ganguan Bekalan Yang Dirancang/Berjadual**	
4.1	GANGGUAN BERJADUAL	
4.1.1	Bilangan gangguan berjadual	1167
4.1.2	Bilangan pengguna terlibat	309646
4.1.3	Bilangan pengguna terlibat yang diberikan notis atau cara-cara yang sesuai sekurang-kurangnya 7 hari sebelum gangguan	309645
4.1.4	Peratus bilangan pengguna terlibat yang diberikan notis atau cara-cara yang sesuai sekurang-kurangnya 7 hari sebelum gangguan	99.99%
4.2	RANCANGAN GANGGUAN BERJADUAL	
4.2.1	Bilangan rancangan gangguan berjadual tahunan/bulanan	1029
4.2.2	Bilangan pengguna besar yang dijangka terlibat	128965
4.2.3	Bilangan pengguna besar yang dijangka terlibat yang dimaklunkan mengenai rancangan gangguan berjadual tahunan/bulanan	128965
4.2.4	Peratus bilangan pengguna besar yang dijangka terlibat yang dimaklumkan mengenai rancangan gangguan berjadual tersebut	100.00%
5	**Bacaan Meter**	
5.1	Bilangan pengguna domestik yang mana bacaan meter dibuat secara anggaran melebihi 3 bulan berturut-turut	57518
5.2	Bilangan pengguna domestik yang mana bacaan meter dibuat secara anggaran melebihi 3 bulan berturut-turut dberi notis	57386
5.3	Peratus bilangan pengguna domestik yang mana bacaan meter dibuat secara anggaran melebihi 3 bulan berturut-turut diberi notis	99.77%
6	**Pertanyaan Daripada Pengguna**	
6.1	PERTANYAAN BERTULIS	
6.1.1	Bilangan pertanyaan bertulis yang diterima daripada pelanggan	965
6.1.2	Bilangan pertanyaan bertulis yang diterima daripada pelanggan yang dijawab dalam tempoh 5 hari bekerja dari tarikh penerimaan	905
6.1.3	Peratus bilangan pertanyaan bertulis yang diterima daripada pelanggan yang dijawab dalam tempoh 5 hari bekerja dari tarikh penerimaan	93.78%
6.2	PERTANYAAN MELALUI TELEFON	
6.2.1	Bilangan pertanyaan melalui telefon yang diterima daripada pelanggan	96767
6.2.2	Bilangan pelanggan yang mana pertanyaannya tidak dapat diselesaikan pada masa itu juga dihubungi semula dalam tempoh 24 jam	96701
6.2.3	Peratus bilangan pelanggan yang mana pertanyaannya tidak dapat diselesaikan pada masa itu juga dihubungi semula dalam tempoh 24 jam	99.93%
6.3	PERTANYAAN DI KAUNTER	
6.3.1	Bilangan pengguna yang membuat pertanyaan di kaunter	247075
6.3.2	Bilangan pengguna yang mana pertanyaannya tidak dapat diselesaikan pada masa itu juga dapat dihubungi semula dalam tempoh 24 jam	246123
6.3.3	Bilangan pengguna yang mana pertanyaannya tidak dapat diselesaikan pada masa itu juga tidak dapat dihubungi semula dalam tempoh 24 jam	74421
6.3.4	Peratus bilangan pengguna yang mana pertanyaannya tidak dapat diselesaikan pada masa itu juga dapat dihubungi semula dalam tempoh 24 jam	99.61%

		Tahun Kewangan 2019 (Jan 19 - Dis 19)
7	**Perkhidmatan Kaunter**	
7.1	Bilangan pengguna yang mendapatkan sebarang perkhidmatan di kaunter	651700
7.2	Bilangan pengguna yang mana masa menunggu tidak melebihi 15 minit	646513
7.3	Peratus bilangan pengguna yang mana masa menunggu tidak melebihi 15 minit	99.20%
8	**Temujanji Untuk Pengujian Meter**	
8.1	Bilangan temujanji untuk ujian kejituan meter	1484
8.2	Bilangan pengujian meter yang dibuat dalam tempoh 2 hari bekerja	1453
8.3	Peratus bilangan pengujian meter yang dibuat dalam tempoh 2 hari bekerja	97.91%
9	**Penukaran Meter**	
9.1	Bilangan permohonan yang didapati perlu membuat penukaran meter	3130
9.2	Bilangan penukaran yang dibuat dalam tempoh 2 hari bekerja dari tarikh permohonan dibuat	3115
9.3	Peratus bilangan penukaran yang dibuat dalam tempoh 2 hari bekerja dari tarikh permohonan dibuat	99.52%
10	**Temujanji Denggan Pengguna**	
10.1	Bilangan temujanji dengan pengguna yang dibuat di luar SESB	1900
10.2	Bilangan temujanji dengan pengguna yang mana pihak SESB sampai tidak lewat dari masa yang dijanjikan	1869
10.3	Peratus bilangan temujanji dengan pengguna yang mana pihak SESB sampai tidak lewat dari masa yang dijanjikan	98.37%
10.4	Bilangan temujanji yang perlu ditangguhkan	41
10.5	Bilangan temujanji susulan yang mana dibuat dalam tempoh 1 hari bekerja dari tarikh tangguhan dibuat	41
10.6	Peratus bilangan temujanji susulan yang mana dibuat dalam tempoh 1 hari bekerja dari tarikh tangguhan dibuat	100.00%
11	**Cagaran**	
11.1	Bilangan pengguna yang mana selepas 6 bulan didapati cagaran melebihi 2 bulan purata penggunaan	9217
11.2	Bilangan pengguna yang mana dipulangkan lebihan cagarannya	1020
11.3	Peratus bilangan pengguna yang mana dipulangkan lebihan cagarannya	11.07%
12	**Pemulangan Wang Cagaran Pengguna**	
12.1	Bilangan pengguna yang memajukan segala dokumen yang diperlukan bagi tujuan pemulangan wang cagaran	9294
12.2	Bilangan pengguna yang mana wang cagarannya telah dipulangkan dalam tempoh 1 bulan selepas penyerahan segala dokumen yang diperlukan	9294
12.3	Peratus bilangan pengguna yang mana wang cagarannya telah dipulangkan dalam tempoh 1 bulan selepas penyerahan segala dokumen yang diperlukan	100.00%
13	**Pungutan**	
13.1	Bilangan pengguna yang membayar melalui pos	178294
13.2	Bilangan pengguna yang diberi pengesahan pembayaran dalam tempoh 2 hari selepas pembayaran dibuat	178294
13.3	Peratus bilangan pengguna yang diberi pengesahan pembayaran dalam tempoh 2 hari selepas pembayaran dibuat	100.00%

14	**Pemotongan Bekalan**	
14.1	DENGAN NOTIS 24 JAM	
14.1. 11	Bilangan pemotongan akibat pepasangan membahayakan	4659
14.1.2	Bilangan pemotongan akibat disyaki berlaku kecurian elektrik	72
14.1.3	Bilangan pemotongan akibat meter elektrik dirosakkan	3
14.2		
14.2.1	Bilangan pemotongan akibat kegagalan membayar bil selepas 30 hari dari tarikh bil dan 7 hari bekerja notis pemotongan	172506
14.2.2	Bilangan pemotongan akibat kegagalan membayar cagaran tambahan selepas 7 hari tuntutan dibuat	5230
14.2.3	Bilangan pemotongan tanpa notis akibat pepasangan yang amat membahayakan dan tidak boleh dilengahkan	1583
15	**Pengguna Khas Yang Menghadapi Masalah Membayar Bil Elektrik**	
15.1	Bilangan pengguna cacat yang merayu mengelakkan pemotongan	5
15.2	Bilangan pengguna lanjut usia yang merayu mengelakkan pemotongan	197
15.3	Bilangan pengguna cacat yang dibantu dalam urusan pembayaran bil	434
15.4	Bilangan pengguna lanjut usia yang dibantu dalam urusan pembayaran bil	675
16	**Masalah Voltan Diluar Tahap Diisytiharkan**	
16.1	TIDAK MEMERLUKAN PENGUKUHAN SISTEM	
16.1.1	Bilangan aduan	383
16.1.2	Bilangan aduan yang diselesaikan dalam tempoh 2 hari dari tarikh aduan dibuat	383
16.1.3	Peratus bilangan aduan yang diselesaikan dalam tempoh 2 hari dari tarikh aduan dibuat	100.00%
16.2	MEMERLUKAN PENGUKUHAN SISTEM	
16.2.1	Bilangan aduan	15
16.2.2	Bilangan aduan yang diselesaikan dalam tempoh 3 bulani dari tarikh aduan dibuat	15
16.2.3	Peratus bilangan aduan yang diselesaikan dalam tempoh 3 bulan dari tarikh aduan dibuat	100.00%
17	**Jawapan Kepada Pemohonan Bekalan Baru/Peningkatan Bekalan**	
	Jawapan kepada pemohonan bekalan termasuk tarikh bekalan akan diberi dan anggaran caj sambungan akan dikemukakan kepada pelanggan secara bertulis	
17.1	TIDAK MEMERLUKAN PENCAWANG BARU	
17.1.1	Bilangan permohonan	568
17.1.2	Bilangan permohonan yang dijawap dalam masa 1 minggu dari tarikh permohonan dibuat	568
17.1.3	Peratus bilangan permohonan yang dijawap dalam masa 1 minggu dari tarikh permohonan dibuat	100.00%
17.2	MEMERLUKAN PENCAWANG BARU	
17.2.1	Bilangan permohonan	34
17.2.2	Bilangan permohonan yang dijawap dalam masa 2 minggu dari permohonan yang dibuat	34
17.2.3	Peratus bilangan permohonan yang dijawap dalam masa 2 minggu dari permoho-nan yang dibuat	100.00%

		Tahun Kewangan 2019 (Jan 19 - Dis 19)
18	**Permohonan Memindahkan Lokasi Meter Oleh Pengguna**	
18.1	Bilangan permohonan memindahkan lokasi meter oleh pengguna	19
18.2	Bilangan permohonan memindahkan lokasi meter oleh pengguna yang dirasakan perlu dan sesuai	14
18.3	Bilangan permohonan yang perlu dan dirasakan sesuai yang diselesaikan dalam tempoh 3 hari bekerja	14
18.4	Peratus bilangan permohonan yang perlu dan dirasakan sesuai yang diselesaikan dalam tempoh 3 hari bekerja	100.00%
19	**Pendidikan Pengguna Mengenai Cara Penggunaan Elektrik Dengan Cekap Dan Selamat**	
19.1	Bilangan program pendidikan pengguna mengenai cara penggunaan elektrik dengan cekap dan selamat dan cara untuk mengelakkan kemalangan elektrik, termasuk aktiviti berdekatan pepasangan dan talian elektrik yang dijalankan	23
20	**Peningkatan Kualiti Bekalan**	
20.1	Bilangan aktiviti-aktiviti berkaitan peningkatan kualiti bekalan elektrik.	59
Purata		**96%**

Apendiks 5: Tarif-tarif Elektrik TNB Berkuatkuasa 1 Januari 2014
Appendix 5: TNB Electricity Tariffs Effective from 1 January 2014

Bil. No.	Kategori Tarif Tariff Category	Unit	Kadar Semasa Current Rate
1	**Tarif A - Tarif Kediaman** **Tariff A - Domestic**		
	200 kWj pertama (1-200 kWj) sebulan For the first 200 kWh (1-200 kWh) per month	sen/kWj sen/kWh	21.80
	100 kWj berikutnya (201-300 kWj) sebulan For the next 100 kWh (201-300 kWh) per month	sen/kWj sen/kWh	33.40
	300 kWj berikutnya (301-600 kWj) sebulan For the next 300 kWh (301-600 kWh) per month	sen/kWj sen/kWh	51.60
	300 kWj berikutnya (601-900 kWj) sebulan For the next 300 kWh (601-900 kWh) per month	sen/kWj sen/kWh	54.60
	Setiap kWj berikutnya (901 kWj ke atas) sebulan For the next kWh (901 and above) per month	sen/kWj sen/kWh	57.10
	Caj minimum bulanan Minimum monthly charge	RM	3.00
2	**Tarif B – Tarif Perdagangan Voltan Rendah** **Tariff B – Low Voltage Commercial Tariff**		
	200 kWj pertama (1-200 kWj) sebulan For the first 200 kWh (1-200 kWh) per month	sen/kWj sen/kWh	43.50
	Setiap kWj berikutnya (201 kWj ke atas) sebulan For the next kWh (201 kWh and above) per month	sen/kWj sen/kWh	50.90
	Caj minimum bulanan Minimum monthly charge	RM	7.20
3	**Tarif C1 – Tarif Perdagangan Am Voltan Sederhana** **Tariff C1 – Medium Voltage General Commercial Tariff**		
	Bagi setiap kilowatt kehendak maksimum sebulan For each kilowatt of maximum demand per month	RM/kW	30.30
	Bagi semua kWj For all kWh	sen/kWj sen/kWh	21.80
	Caj minimum bulanan Minimum monthly charge	RM	600.00
4	**Tarif C2 – Tarif Perdagangan Puncak/Luar Puncak Voltan Sederhana** **Tariff C2 – Medium Voltage Peak/Off-Peak Commercial Tariff**		
	Bagi setiap kilowatt kehendak maksimum sebulan dalam tempoh puncak For each kilowatt of maximum demand per month during the peak period	RM/kWj	45.10
	Bagi semua kWj dalam tempoh puncak For all kWh during the peak period	sen/kWj sen/kWh	36.50
	Bagi semua kWj dalam tempoh luar puncak For all kWh during the off-peak period	sen/kWj sen/kWh	22.40
	Caj minimum bulanan Minimum monthly charge	RM	600.00
5	**Tarif D – Tarif Perindustrian Voltan Rendah** **Tariff D – Low Voltage Industrial Tariff**		
	200 kWj pertama (1-200 kWj) sebulan For the first 200 kWh (1-200 kWh) per month	sen/kWj sen/kWh	38.00
	Setiap kWj berikutnya (201 kWj ke atas) sebulan For the next (201 and above) per month	sen/kWj sen/kWh	44.10
	Caj minimum bulanan Minimum monthly charge	RM	7.20
6	**Tarif E1 – Tarif Perindustrian Am Voltan Sederhana** **Tariff E1 – Medium Voltage General Industrial Tariff**		
	Bagi setiap kilowatt kehendak maksimum sebulan For each kilowatt of maximum demand per month	RM/kW	29.60
	Bagi semua kWj For all kWh	sen/kWj sen/kWh	33.70
	Caj minimum bulanan Minimum monthly charge	RM	600.00

Bil. No.	Kategori Tarif Tariff Category	Unit	Kadar Semasa Current Rate
	Tarif E1s – Tarif Perindustrian Khas (untuk pengguna yang layak sahaja) **Tariff E1s – Special Industrial Tariff (for qualified consumers only)**		
	Bagi setiap kilowatt kehendak maksimum sebulan For each kilowatt of maximum demand per month	RM/kW	23.70
	Bagi semua kWj For all kWh	sen/kWj sen/kWh	33.60
	Caj minimum bulanan Minimum monthly charge	RM	600.00
7	**Tarif E2 – Tarif Perindustrian Puncak/Luar Puncak Voltan Sederhana** **Tariff E2 – Medium Voltage Peak/Off-Peak Industrial Tariff**		
	Bagi setiap kilowatt kehendak maksimum sebulan dalam tempoh puncak For each kilowatt of maximum demand per month during the peak period	sen/kWj sen/kWh	37.00
	Bagi semua kWj dalam tempoh puncak puncak For all kWh during the peak period	sen/kWj sen/kWh	35.50
	Bagi semua kWj dalam tempoh luar puncak For all kWh during the off- peak period	sen/kWj sen/kWh	21.90
	Caj minimum bulanan Minimum monthly charge	RM	600.00
	Tarif E2s – Tarif Perindustrian Khas (untuk pengguna yang layak sahaja) **Tariff E2s – Special Industrial Tariff (for qualified consumers only)**		
	Bagi setiap kilowatt kehendak maksimum sebulan dalam tempoh puncak For each kilowatt of maximum demand per month during the peak period	RM/kW	32.90
	Bagi semua kWj dalam tempoh puncak For all kWh during the peak period	sen/kWj sen/kWh	33.60
	Bagi semua kWj dalam tempoh luar puncak For all kWh during the off- peak period	sen/kWj sen/kWh	19.10
	Caj minimum bulanan Minimum monthly charge	RM	600.00
8	**Tarif E3 – Tarif Perindustrian Puncak/Luar Puncak Voltan Tinggi** **Tariff E3 – High Voltage Peak/Off-Peak Industrial Tariff**		
	Bagi setiap kilowatt kehendak maksimum sebulan dalam tempoh puncak For each kilowatt of maximum demand per month during the peak period	RM/kW	35.50
	Bagi semua kWj dalam tempoh puncak For all kWh during the peak period	sen/kWj sen/kWh	33.70
	Bagi semua kWj dalam tempoh luar puncak For all kWh during the off- peak period	sen/kWj sen/kWh	20.20
	Caj minimum bulanan Minimum monthly charge	RM	600.00
	Tarif E3s – Tarif Perindustrian Khas (untuk pengguna yang layak sahaja) **Tariff E3s – Special Industrial Tariff (for qualified consumers only)**		
	Bagi setiap kilowatt kehendak maksimum sebulan dalam tempoh puncak For each kilowatt of maximum demand per month during the peak period	RM/kW	29.00
	Bagi semua kWj dalam tempoh puncak For all kWh during the peak period	sen/kWj sen/kWh	31.70
	Bagi semua kWj dalam tempoh luar puncak For all kWh during the off- peak period	sen/kWj sen/kWh	17.50
	Caj minimum bulanan Minimum monthly charge	RM	600.00
9	**Tarif F – Tarif Perlombongan Voltan Rendah** **Tariff F – Low Voltage Mining Tariff**		
	Bagi semua kWj For all kWh	sen/kWj sen/kWh	38.10
	Caj minimum bulanan Minimum monthly charge	RM	120.00
10	**Tarif F1 – Tarif Perlombongan Am Voltan Sederhana** **Tariff F1 – Medium Voltage General Mining Tariff**		
	Bagi setiap kilowatt kehendak maksimum sebulan For each kilowatt of maximum demand per month	RM/kW	21.10

Bil. No.	Kategori Tarif Tariff Category	Unit	Kadar Semasa Current Rate
	Bagi semua kWj For all kWh	sen/kWj sen/kWh	31.30
	Caj minimum bulanan Minimum monthly charge	RM	120.00
11	**Tarif F2 – Tarif Perlombongan Puncak/Luar Puncak Voltan Sederhana** **Tariff F2– Medium Volatge Peak/Off-Peak Mining Tariff**		
	Bagi setiap kilowatt kehendak maksimum sebulan dalam tempoh puncak For each kilowatt of maximum demand per month during the peak period	RM/kW	29.80
	Bagi semua kWj dalam tempoh puncak For all kWh during the peak period	sen/kWj sen/kWh	31.30
	Bagi semua kWj dalam tempoh luar puncak For all kWh during the off- peak period	sen/kWj sen/kWh	17.20
	Caj minimum bulanan Minimum monthly charge	RM	120.00
12	**Tarif G – Tarif Lampu Jalanraya** **Tariff G – Street Lighting Tariff**		
	Bagi semua kWj (termasuk senggaraan) For all kWh (including maintenance)	sen/kWj sen/kWh	30.50
	Bagi semua kWj (tidak termasuk senggaraan) For all kWh (excluding maintenance)	sen/kWj sen/kWh	19.20
	Caj minimum bulanan Minimum monthly charge	RM	7.20
13	**Tarif G1 – Tarif Lampu Neon & Lampu Limpah** **Tariff G1 – Neon & Floodlight Tariff**		
	Bagi semua kWj For all kWh	sen/kWj sen/kWh	20.80
	Caj minimum bulanan Minimum monthly charge	RM	7.20
14	**Tarif H - Tarif Pertanian Spesifik Voltan Rendah** **Tariff H – Low Voltage Specific Agriculture Tariff**		
	200 kWj pertama (1-200 kWj) sebulan For the first 200 kWh (1-200 kWh) per month	sen/kWj sen/kWh	39.00
	Setiap kWj berikutnya (201 kWj ke atas) sebulan For the next kWh (201 kWh and above) per month	sen/kWj sen/kWh	47.20
	Caj minimum bulanan Minimum monthly charge	RM	7.20
15	**Tarif H1 – Tarif Pertanian Spesifik Am Voltan Sederhana** **Tariff H1 – Medium Voltage General Specific Agriculture Tariff**		
	Bagi setiap kilowatt kehendak maksimum sebulan For each kilowatt of maximum demand per month	RM/kW	30.30
	Bagi semua kWj For all kW	sen/kWj sen/kWh	35.10
	Caj minimum bulanan Minimum monthly charge	RM	600.00
16	**Tarif H2 – Tarif Pertanian Spesifik Puncak/Luar Puncak Voltan Sederhana** **Tariff H2 - Medium Voltage Peak/Off-peak Specific Agriculture Tariff**		
	Bagi setiap kilowatt kehendak maksimum sebulan dalam tempoh puncak For each kilowatt of maximum demand per month during the peak period	RM/kW	40.80
	Bagi semua kWj dalam tempoh puncak For all kWh during the peak period	sen/kWj sen/kWh	21.80
	Bagi semua kWj dalam tempoh luar puncak For all kWh during the off- peak period	sen/kWj sen/kWh	22.40
	Caj minimum bulanan Minimum monthly charge	RM	600.00

Apendiks 6: Tarif-tarif Elektrik TNB untuk Top-Up dan Standby (Cogenerator Sahaja)
Appendix 6: TNB Electricity Tariffs for Top-Up and Standby (Cogenerators Only)

Bil. No.	Kategori Tarif Tariff Category	Unit	Top-up	Standby
1	**Tarif C1 – Perdagangan Am Voltan Sederhana** **Tariff C1 – Medium Voltage General Commercial Tariff**			
	Bagi setiap kilowatt kehendak maksimum sebulan For each kilowatt of maximum demand per month	RM/kW	30.30	14.00
	Bagi semua kWj For all kWh	sen/kWj sen/kWh	36.50	
2	**Tarif C2 – Perdagangan Puncak/Luar Puncak Voltan Sederhana** **Tariff C2– Medium Voltage Peak/Off Peak Commercial Tariff**			
	Bagi setiap kilowatt kehendak maksimum sebulan dalam tempoh puncak For each kilowatt of maximum demand per month during the peak period	RM/kW	45.10	14.00
	Bagi semua kWj dalam tempoh puncak For all kWh during the peak period	sen/kWj sen/kWh	36.50	
	Bagi semua kWj dalam tempoh luar puncak For all kWh during the off- peak period	sen/kWj sen/kWh	22.40	
3	**Tarif E1 – Perindustrian Am Voltan Sederhana** **Tariff E1 – Medium Voltage General Industrial Tariff**			
	Bagi setiap kilowatt kehendak maksimum sebulan For each kilowatt of maximum demand per month	RM/kW	29.60	14.00
	Bagi semua kWj For all kWh	sen/kWj sen/kWh	33.70	
4	**Tarif E2 – Perindustrian Puncak/Luar Puncak Voltan Sederhana** **Tariff E2 – Medium Voltage Peak/Off-Peak Industrial Tariff**			
	Bagi setiap kilowatt kehendak maksimum sebulan dalam tempoh puncak For each kilowatt of maximum demand per month during the peak period	RM/kW	37.00	14.00
	Bagi semua kWj dalam tempoh puncak For all kWh during the peak period	sen/kWj sen/kWh	35.50	
	Bagi semua kWj dalam tempoh luar puncak For all kWh during the off- peak period	sen/kWj sen/kWh	21.90	
5	**Tarif E3 – Perindustrian Puncak/Luar Puncak Voltan Tinggi** **Tariff E3 – High Voltage Peak/Off-Peak Industrial Tariff**			
	Bagi setiap kilowatt kehendak maksimum sebulan dalam tempoh puncak For each kilowatt of maximum demand per month during the peak period	RM/kW	35.50	12.00
	Bagi semua kWj dalam tempoh puncak For all kWh during the peak period	sen/kWj sen/kWh	33.70	
	Bagi semua kWj dalam tempoh luar puncak For all kWh during the off-peak period	sen/kWj sen/kWh	20.20	
6	**Tarif F1 – Perlombongan Am Voltan Sederhana** **Tariff F1 - Medium Voltage General Mining Tariff**			
	Bagi setiap kilowatt kehendak maksimum sebulan For each kilowatt of maximum demand per month	RM/kW	21.10	14.00
	Bagi semua kWj For all kWh	sen/kWj sen/kW	31.30	
7	**Tarif F2 – Perlombongan Puncak/Luar Puncak Voltan Sederhana** **Tariff F2 – Medium Voltage Peak/Off-Peak Mining Tariff**			
	Bagi setiap kilowatt kehendak maksimum sebulan dalam tempoh puncak For each kilowatt of maximum demand per month during the peak period	RM/kW	29.80	14.00
	Bagi semua kWj dalam tempoh puncak For all kWh during the peak period	sen/kWj sen/kWh	31.30	
	Bagi semua kWj dalam tempoh luar puncak For all kWh during the off-peak period	sen/kWj sen/kWh	17.20	

Apendiks 6: Tarif-tarif Elektrik TNB untuk Top-Up dan Standby (Cogenerator Sahaja)
Appendix 6: TNB Electricity Tariffs for Top-Up and Standby (Cogenerators Only)

Bil. No.	Kategori Tarif Tariff Category	Unit	Top-up	Standby
8	**Tarif H1 – Tarif Pertanian Spesifik Am Voltan Sederhana** **Tariff H1 – Medium Voltage Specific General Agriculture Tariff**			
	Bagi setiap kilowatt kehendak maksimum sebulan For each kilowatt of maximum demand per month	RM/kW	30.30	14.00
	Bagi semua kWj For all kWh	sen/kWj sen/kWh	35.10	
9	**Tarif H2 – Tarif Pertanian Spesifik Am Puncak/Luar Puncak** **Tariff H1 – Medium Voltage Specific General Agriculture Tariff**			
	Bagi setiap kilowatt kehendak maksimum sebulan dalam tempoh puncak For each kilowatt of maximum demand per month during the peak period	RM/kW	40.80	14.00
	Bagi semua kWj dalam tempoh puncak For all kWh during the peak period	sen/kWj sen/kWh	36.50	
	Bagi semua kWj dalam tempoh luar puncak For all kWh during the off-peak period	RM	22.40	

a) Semua pengguna cogen baharu dan pengguna cogen sedia ada yang berhasrat untuk menukar kepada kadar Standby yang baru ini.
All new cogen customers and existing cogen customers who wish to migrate to this new Standby rate.

b) Bagi pengguna cogen sedia ada yang berhasrat untuk mengekalkan kadar Standby (Firm dan Non-Firm) yang lama, kadar Standby (Firm dan Non-Firm) yang lama bersama-sama kadar Top-up yang baru (bermula 1 Januari 2014) akan digunapakai.
For existing cogen customer who wishes to maintain previous Standby (Firm and Non-Firm) rates, the rate is applicable together with the new Top-Up rate (as of 1 January 2014)

c) Kutipan 1.6% FiT akan dikenakan ke atas bil elektrik bulanan pengguna (kecuali pengguna Domestik yang menggunakan sehingga 300 kWj sebulan) berkuatkuasa mulai 1 Januari 2014.
Effective starting from 1 January 2014, 1% FiT for Renewable Energy Resources Fund (RE) is imposed on consumers' monthly electric bill (except for domestic consumers with consumption not exceeding 300 kWh per month)

Apendiks 7: Tarif-tarif Elektrik Sabah Electricity Sdn. Bhd. (SESB) & WP Labuan (Berkuatkuasa 1 Januari 2014)

Appendix 7: Sabah Electricity Sdn. Bhd. (SESB) & Federal Teritory of Labuan Electricity Tariffs (Effective from 1 January 2014)

Bil. No.	Kategori Tarif Tariff Category	Unit	Kadar Semasa Current Rate
1	**Tarif DM – Tarif Kediaman Tariff DM – Domestic Tariff**		
	100 kWj pertama (1-100 kWj) sebulan For the first 100 kWh (1-100 kWh) per month	sen/kWj sen/kWh	17.50
	100 kWj berikutnya (101-200 kWj) sebulan For the next 100 kWh (101-200 kWh) per month	sen/kWj sen/kWh	18.50
	300 kWj berikutnya (201-300 kWj) sebulanj For the next 300 kWh (201-300 kWh) per month	sen/kWj sen/kWh	33.00
	200 kWj berikutnya (301-500 kWj) sebulan For the next 200 kWh (301-500 kWh) per month	sen/kWj sen/kWh	44.50
	500 kWj berikutnya (501-1000 kWj) sebulan For the next 500 kWh (501-1000 kWh) per month	sen/kWj sen/kWh	45.00
	Setiap kWj berikutnya (1001 kWj ke atas) sebulan For the next kWh (1001 kWh and above) per month	sen/kWj sen/kWh	47.00
	Caj minimum bulanan Minimum monthly charge	RM	5.00
2	**Tarif CM1 – Tarif Perdagangan Voltan Rendah Tariff CM1 – Low Voltage Commercial Tariff**		
	200 kWj pertama (1-200 kWj) sebulan For the first 200 kWh (1-200 kWh) per month	sen/kWj sen/kWh	38.50
	Setiap kWj berikutnya (201 kWj ke atas) sebulan For the next kWh (201 kWh and above) per month	sen/kWj sen/kWh	39.50
	Caj minimum bulanan Minimum monthly charge	RM	15.00
3	**Tarif CM2 – Perdagangan Am Voltan Sederhana Tariff CM2 – Medium Voltage General Commercial Tariff**		
	Bagi setiap kilowatt kehendak maksimum sebulan For each kilowatt of maximum demand per month	RM/kW	23.20
	Bagi semua kWj For all kWh	sen/kWj sen/kWh	32.40
	Caj minimum bulanan Minimum monthly charge	RM	1,000.00
4	**Tarif CM3 – Tarif Perdagangan Tariff CM3 – Commercial Tariff**		
	Puncak/Luar Puncak Voltan Sederhana Medium Voltage Peak/Off Peak Commercial		
	Bagi setiap kilowatt kehendak maksimum sebulan dalam tempoh puncak For each kilowatt of maximum demand per month during the peak period	RM/kW	32.60
	Bagi semua kWj dalam tempoh puncak For all kWh during the peak period	sen/kWj sen/kWh	32.40
	Bagi semua kWj dalam tempoh luar puncak For all kWh during the off-peak period	sen/kWj sen/kWh	19.50
	Caj minimum bulanan Minimum monthly charge	RM	1,000.00
5	**Tarif ID1 – Tarif Perindustrian Voltan Rendah Tariff ID1 – Low Voltage Industrial Tariff**		
	Bagi semua kWj For all kWh	sen/kWj sen/kWh	37.6
	Caj minimum bulanan Minimum monthly charge	RM	15.00

Bil. No.	Kategori Tarif Tariff Category	Unit	Kadar Semasa Current Rate
6	**Tarif ID2 – Tarif Perindustrian Am Voltan Sederhana** **Tariff ID2 - Medium Voltage Industrial Tariff**		
	Bagi setiap kilowatt kehendak maksimum sebulan dalam tempoh puncak For each kilowatt of maximum demand per month during the peak period	RM/kW	21.75
	Bagi semua kWj For all kWh	sen/kWj sen/kWh	26.80
	Caj minimum bulanan Minimum monthly charge	RM	RM1,000.00
7	**Tarif ID3 – Tarif Perindustrian Puncak/Luar Puncak Voltan Sederhana** **Tariff ID3 – Medium Voltage Peak/Off Peak Industrial**		
	Bagi setiap kilowatt kehendak maksimum sebulan dalam tempoh puncak For each kilowatt of maximum demand per month during the peak period	RM/kW	28.00
	Bagi semua kWj dalam tempoh puncak For all kWh during the peak period	sen/kWj sen/kWh	28.60
	Bagi semua kWj dalam tempoh luar puncak For all kWh during the off-peak period	sen/kWj sen/kWh	18.00
	Caj minimum bulanan Minimum monthly charge	RM	1,000.00
8	**Tarif PL – Tarif Lampu Jalanraya** **Tariff PL – Public Lighting**		
	Bagi semua kWj (Tidak termasuk senggaraan For all kWh (excluding maintenance)	sen/kWj sen/kWh	20.30
	Bagi semua kWj (termasuk senggaraan) For all kWh (including maintenance)	sen/kWj sen/kWh	36.30
	Caj minimum bulanan Minimum monthly charge	RM	15.00

Apendiks 8: Tarif-Tarif Elektrik Sarawak Energy Berhad (SEB)
Appendix 8: Sarawak Energy Berhad (SEB) Electricity Tariffs

Kategori Tarif Tariff Category	Kadar per unit Rate per unit
Tarif C1 - Komersial **Tariff C1 - Commercial**	
1 - 100 unit	20.0 sen
1 - 200 unit	24.0 sen
1 - 300 unit	26.0 sen
1 - 400 unit	28.0 sen
1 - 500 unit	30.0 sen
1 – 3,000 unit	31.5 sen
1 – 10,000 unit	32.0 sen
1 – 20,000 unit	31.0 sen
1- Melebihi 20,000 unitj 1 - Above 20,000 units	30.0 sen
Caj minimum bulanan Minimum monthly charge	RM10.00
Tarif C2 - Kehendak Perdagangan **Tariff C2 - Commercial Demand**	
Semua penggunaan All consumption	24.5 sen
Bagi setiap kilowatt kehendak maksimum sebulan For each kilowatt of maximum demand per month	RM16.00
Caj minimum bulanan Minimum monthly charge	RM 16.00 per kilowatt x Kehendak Bil RM 16.00 per kilowatt x Billing Demand
Tarif C3 - Kehendak Waktu Puncak / Bukan Waktu Puncak Perdagangan **Tariff C3 - Commercial Peak/Off-Peak Demand**	
Bagi setiap unit waktu puncak For each unit during the peak period	24.5 sen
Bagi setiap unit bukan waktu puncak For each unit during the off-peak period	13.9 sen
Bagi setiap kilowatt kehendak maksimum sebulan semasa waktu puncak For each kilowatt of maximum demand per month during the peak period	RM20.00
Caj minimum bulanan Minimum monthly charge	RM 20.00 per kilowatt x Kehendak Bil RM 20.00 per kilowatt x Billing Demand
Tarif D - Domestik **Tariff D - Domestic**	
Bagi 1 hingga 100 unit sebulan 1 to 100 units per month	18 sen
Bagi 1 hingga 150 unit sebulan For 1 to 150 units per month	18 sen
Bagi 1 hingga 200 unit sebulan For 1 to 200 units per month	22 sen
Bagi 1 hingga 300 unit sebulan For 1 to 300 units per month	25 sen
Bagi 1 hingga 400 unit sebulan For 1 to 400 units per month	27 sen
Bagi 1 hingga 500 unit sebulan For 1 to 500 units per month	29.5 sen
Bagi 1 hingga 700 unit sebulan For 1 to 700 units per month	30 sen
Bagi 1 hingga 800 unit sebulan For 1 to 800 units per month	30.5 sen

Kategori Tarif Tariff Category	Kadar per unit Rate per unit
Tarif D - Domestik **Tariff D - Domestic**	
Bagi 1 hingga 1,300 unit sebulan For 1 to 1,300 units per month	31 sen
Bagi 1 hingga 100 unit sebulan For above 1,300 units per month	31.5 sen
Caj minimum bulanan Minimum monthly charge	RM 5.00
TARIF I1 - Perindustrian **TARIFF I1 - Industrial**	
1- 100 unit	24.0 sen
1– 3,000 unit For all kWh during the peak period	25.0 sen
1- melebihi 3,000 unit 1 - Above 3,000 units	26.0 sen
Caj minimum bulanan Minimum monthly charge	RM10.00
Tarif I2 - Kehendak Perindustrian **Tariff I2 - Industrial Demand**	
Semua penggunaan All consumption	21.7 sen
Bagi setiap kilowatt kehendak maksimum sebulan For each kilowatt of maximum demand per month	RM16.00
Caj minimum bulanan Minimum monthly charge	RM 16.00 per kilowatt x Kehendak Bil RM 16.00 per kilowatt x Billing Demand
Tarif I3 - Kehendak Waktu Puncak/Bukan Waktu Puncak Perindustrian **Tariff I3 - Industrial Peak/Off-Peak Demand**	
Bagi setiap unit waktu puncak For each unit during the peak period	22.9 sen
Bagi setiap unit bukan waktu puncak For each unit during the off-peak period	13.9 sen
Bagi setiap kilowatt kehendak maksimum sebulan semasa waktu puncak For each kilowatt of maximum demand per month during the peak period	RM20.00
Caj minimum bulanan Minimum monthly charge	RM 20.00 per kilowatt x Kehendak Bil RM 20.00 per kilowatt x Billing Demand
Tarif PL - Lampu Awam **Tariff PL - Public Lighting**	
Bagi setiap unit For each unit	47 sen
Caj minimum bulanan Minimum monthly charge	RM10.00

Apendiks 9: Harga Jualan Purata Syarikat Utiliti Kuasa Utama mengikut Sektor
Appendix 9: Average Selling Prices of Major Power Utility Companies by Sectors

Syarikat Company	Harga Jualan Purata (sen/kWj) Average Selling Prices (sen/kWh)						
	2013	2014	2015	2016	2017	2018	2019
TNB							
Domestik Domestic	29.15	32.28	32.67	33.21	32.87	33.09	33.74
Komersial Commercial	40.76	47.10	47.68	46.76	47.16	47.28	47.20
Industri Industrial	31.00	35.88	36.56	37.13	36.97	37.30	37.62
Perlombongan Mining	20.55	23.99	25.00	25.34	25.07	24.61	24.07
Lampu Awam Public Lighting	21.55	25.06	25.49	25.57	25.53	25.57	25.13
Pertanian Agriculture	39.35	45.29	45.86	45.78	45.54	45.69	45.98
Green Tariff							8.00
Purata Average	**33.87**	**38.86**	**39.45**	**39.55**	**39.53**	**39.68**	**39.89**
SESB							
Domestik Domestic	25.30	29.32	29.14	28.86	28.39	29.11	29.60
Komersial Commercial	33.59	39.25	37.63	38.21	38.26	39.19	39.38
Industri Industrial	28.81	32.90	30.80	31.36	31.09	31.36	31.58
Lampu Awam Public Lighting	18.75	23.31	22.54	23.09	23.27	24.61	25.14
Purata Average	**29.60**	**34.31**	**33.13**	**33.41**	**33.30**	**34.00**	**34.31**
SESB (Pelanggan *Regulated Tariff* Sahaja I Regulated Tariff Customers Only)							
Domestik Domestic	31.30	31.30	28.25	28.30	28.21	28.27	28.47
Komersial Commercial	32.00	32.00	31.72	30.53	30.54	30.50	30.65
Industri Industrial	25.10	25.10	24.48	24.15	23.86	23.69	24.16
Lampu Awam Public Lighting	47.10	47.10	n/a	47.12	47.18	47.17	47.20
Purata Average	**29.90**	**29.80**	**28.50**	**28.20**	**28.04**	**27.96**	**28.22**

Apendiks 10: Kos Penjanaan TNB
Appendix 10: TNB's Generation Costs

Kos Penjanaan (sen/kWj) Generation Costs (sen/kWh)	2015/2016	2016/2017	Sep-Dec 2017	2018	2019
(a) Penjanaan Sendiri Own Generation	20.65	22.62	22.31	26.91	29.39
(b) Elektrik Dibeli Purchased Electricity	20.01	23.02	24.87	25.72	25.61
(c) Kos Keseluruhan (a) & (b) Overall Cost (a) & (b)	**20.15**	**22.95**	**24.43**	**25.89**	**26.09**

Nota:
Notes:
1. Data Tahun Kewangan
   Financial Year data
2. Kos (kapasiti, tenaga) / Jumlah Penjanaan Tenaga (bagi IPP, menggunakan syarat yang termaktub dalam PPA/SLA).
   Cost (capacity, energy)/ Total Units Generated (for IPP, based on condition stipulated in PPA/SLA).
3. Disebabkan perubahan dalam tahun laporan fiskal TNB kepada berakhir 31 Disember 2017 berbanding 31 Ogos 2017 sebelum ini, terdapat tahun kewangan yang singkat bermula dari 1 September 2017 hingga 31 Disember 2017, yang meliputi tempoh empat bulan. Selepas itu, tahun kewangan kumpulan itu telah kembali kepada dua belas bulan yang berakhir 31 Disember 2018.
   Due to the change in TNB's fiscal reporting year end to 31 December 2017 compared to 31 August 2017 before this, a short financial year commenced from 1 September 2017 to 31 December 2017, covering a period of four months. Thereafter, the financial year of the group has reverted to twelve months ending 31 December 2018.

Apendiks 11: Kos Penjanaan Sabah Electricity Sdn. Bhd. (SESB)
Appendix 11: Generation Cost of Sabah Electricity Sdn. Bhd. (SESB)

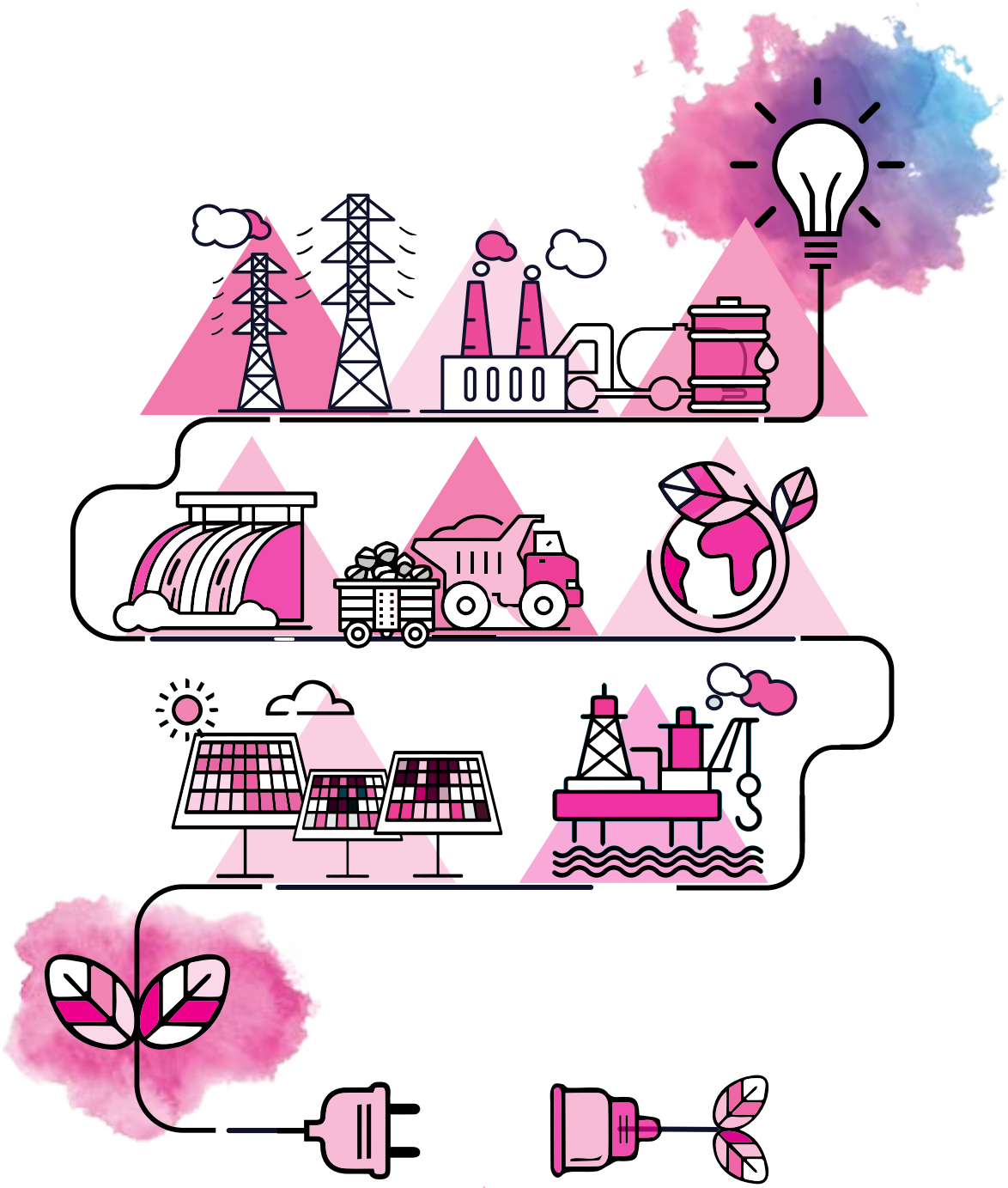
Kos Penjanaan (sen/kWj) Generation Costs (sen/kWh)	2015	2016	2017	2018	2019
(a) Penjanaan Sendiri Own Generation	50.27	35.32	37.03	39.17	41.66
(b) Elektrik Dibeli Purchased Electricity	23.01	21.23	20.73	19.36	19.90
(c) Kos Keseluruhan (a) & (b) Overall Cost (a) & (b)	**28.09**	**23.52**	**23.23**	**22.76**	**23.51**

Nota:
Notes:
Kos penjanaan di atas adalah berdasarkan harga pasaran bagi bahan api diesel & MFO, harga pembelian tenaga bagi LSS manakala TBB di bawah skim FiT adalah dengan subsidi daripada KWTBB (SEDA). Harga gas bagi Sabah & WP Labuan adalah pada RM6.40/MMBtu.
The above generation costs are based on market prices for diesel & MFO, energy purchase price for LSS, while RE under the FiT scheme is subsidized by KWTBB (SEDA). Gas prices for Sabah & Federal Territory of Labuan is at RM6.40/MMBtu.

Apendiks 12: Kos Penjanaan Sarawak Energy Berhad (SEB)
Appendix 12: Generation Costs of Sarawak Energy Berhad (SEB)

Kos Penjanaan (sen/kWj) Generation Costs (sen/kWh)	2015	2016	2017	2018	2019
(a) Penjanaan Sendiri Own Generation	13.10[1]	5.99[1]	3.58	2.70	2.74
(b) Elektrik Dibeli Purchased Electricity	11.80[2]	10.47[2]	7.83	0	0
(c) Kos Keseluruhan (a) & (b) Overall Cost (a) & (b)	**11.90[3]**	**8.42[3]**	**4.83**	**2.70**	**2.74**

Nota:
Notes:
1. [1]Kos Sumber Tenaga SESCO | [1]Energy Source Cost of SESCO
2. [2]Kos Pembelian Tenaga | [2]Power Purchase Cost
3. [3]Purata Kos Sumber Tenaga | [3]Average Energy Source Cost
4. Kos penjanaan (sen/kWj) terdiri daripada kos bahan bakar daripada gas, arang batu dan diesel serta pembayaran royalti air untuk penjanaan hidro.
   Generation costs (sen/kWh) consists of fuel costs from gas, coal and diesel as well as the water royalty payment for hydro generation.
5. Berkuatkuasa 1 Ogos 2017, tiada lagi elektrik yang dibeli, oleh itu kos purata pembelian kuasa berkurangan kepada 7.8 sen/kWh pada tahun 2017.
   Effective 1 Aug 2017, there is no more purchased electricity, hence the average cost of power purchase reduced to 7.8 sen/kWh in year 2017.
6. Penjanaan yang tidak bersambung dengan grid dikecualikan daripada kos penjanaan untuk tahun 2017 dan berikutnya.
   Non-grid generation is excluded from the generation cost for year 2017 and onwards.



PEMEGANG LESEN
LICENSEES

Pemegang Lesen | Licensees

Apendiks 13: Penjana-penjana Bebas (IPP)
Appendix 13: Independent Power Producers (IPP)

GB3 Sdn. Bhd.
Mukim Pengkalan Baharu
Daerah Manjung, Perak

Jimah East Power Sdn. Bhd.
PT8387, PT8388, PT8389, PT8390
dan PT8392, Mukim Jimah,
Daerah Port Dickson,
71960 Negeri Sembilan

Jimah Energy Ventures Sdn. Bhd.
PT 7308 dan PT 7309,
Mukim Jimah Port Dickson,
Negeri Sembilan

Kapar Energy Ventures Sdn. Bhd.
H.S.(D)27997, P.T 13310,
H.S.(D)71648 P.T 39670
dan H.S.(D)83937 P.T 42930,
Mukim Kapar Daerah Klang,
Selangor

Kuala Langat Power Plant Sdn. Bhd.
Lot 7090, Mukim Tanjung 12
Kuala Langat, 42700 Banting,
Selangor

Musteq Hydro Sdn. Bhd.
Stesen Jana Kuasa Hidro Elektrik
Sungai Kenerong Kelantan

NUR Generation Sdn. Bhd.
Kulim Hi Tech Industrial Park
Mukim of Padang China, Kedah

Pahlawan Power Sdn. Bhd.
Lot 2191, Mukim Tanjong Kling
Daerah Melaka Tengah, Melaka

Panglima Power Sdn. Bhd.
Mukim Sungei Baru Ilir
Daerah Alor Gajah, Melaka

Pengerang Power Sdn. Bhd.
Plot 46 dan di dalam Persempadanan
Pengerang Integrated Complex
(PIC), Mukim Pengerang,
Daerah Kota Tinggi, 81600 Johor

Port Dickson Power Berhad
Lot 134006, 13407, 13408, 13409,
13411, 13412, 13414, 13415,
13416, PT483, PT484,
Jalan Seremban,
Mukim Pekan Port Dickson
Daerah Port Dickson,
71000 Negeri Sembilan

Powertek Berhad
Lot 7001 Mukim Sungei Baru Ilir
Daerah Alor Gajah 78200 Melaka

Prai Power Sdn. Bhd.
LMS No: 00186 Daerah Seberang
Perai Tengah, 13700 Pulau Pinang

Stratavest Sdn. Bhd.
Tingkat 15, Amcorp Tower,
Amcorp Trade Centre
No. 18, Jalan Persiaran Barat,
46050 Selangor

Kimanis Power Sdn. Bhd.
Kimanis Power Plant, Office Building,
KM 48Kg. Batu Pungit, Papar,
89607 Kimanis, Sabah

Ranhill Powertron II Sdn. Bhd.
Lot 35 (IZ4) IZ4
Kota Kinabalu Industrial Park (KKIP)
88460 Kota Kinabalu, Sabah

Ranhill Powertron Sdn. Bhd.
Lot 3, KKIP Selatan IZ3
Kota Kinabalu Industrial Park (KKIP)
88460 Kota Kinabalu, Sabah

Teknologi Tenaga Perlis Consortium Sdn. Bhd.
Kuala Sungai Baru Perlis

Tenaga Nasional Berhad (TNB)
Ulu Jelai,
Sebahagian Mukim Hulu Telom
Daerah Cameron Highlands,
Pahang

Tenaga Nasional Berhad (TNB)
Sebahagian Mukim Hulu Terengganu
Daerah Hulu Terengganu, Terengganu

TNB Connaught Bridge Sdn. Bhd.
Sebahagian Lot PT 20176
Mukim Klang Daerah Klang
41990 Selangor

TNB Janamanjung Sdn. Bhd.
Telok Penchalang, Lekir
Daerah Manjung, Perak

TNB Janamanjung Sdn. Bhd. (4)
No. Lot 43195,
Sebahagian 43196
dan Sebahagian 43197,
Mukim Sitiawan,
Daerah Manjung, Perak

TNB Manjung Five Sdn. Bhd.
Lot 43195, 43196 dan 43197 Sitiawan
Manjung 32040, Perak

TNB Pasir Gudang Energy Sdn. Bhd.
Lot PT 204356 Mukim Plentong
Daerah Pasir Gudang, 81700 Johor

TNB Prai Sdn. Bhd.
PT 10, PT 11 dan PT 13 Bandar Prai
Seberang Perai Tengah
13600 Pulau Pinang

YTL Power Generation Sdn. Bhd.
Lot PT 2467, Mukim Kuala Paka
Daerah Dungun, 23100 Terengganu

Segari Energy Ventures Sdn. Bhd.
Lot PT0006325, PT0006356,
PT0006327 PT0006328, PT0006329
Mukim Pengkalan Baru
Daerah Manjung 34900 Perak

Southern Power Generation Sdn. Bhd
Sebahagian Lot 1363,
Lot 1372-1390, Lot 1959,
Lot 195179, MLO 6232
dan MLO 6022,
Mukim Plentong,
Daerah Johor Bahru,
80000 Johor

Tanjung Bin Energy Sdn. Bhd.
Lot 1770, 1771, 1773, 1851,
1858, 1859
Mukim Serkat, Daerah Pontian,
Johor

Tanjung Bin Power Sdn. Bhd.
PTD 1769, 1770, 1771, 1772 dan 1773
Mukim Serkat Daerah Pontian, Johor

Sepangar Bay Power Corporation Sdn. Bhd.
Suite 2A-12-1, Blok 2A, Level 12,
Plaza Sentral, Jalan Stesen Sentral 5
50470 WP Kuala Lumpur

SPR Energy (M) Sdn. Bhd.
No. 1.01, 1st Floor Wisma E&C,
No. 2 Lorong Dungun Kiri,
Damansara Heights,
50490 WP Kuala Lumpur

Apendiks 14: Lesen Tenaga Boleh Baharu (TBB) yang Dikeluarkan, 2019
Appendix 14: Renewable Energy (RE) Licences Issued, 2019

Bil. No	Pemegang Lesen & Lokasi Pepasangan Licensee & Insallation Location	Jenis Loji Plant Type	Bahan Api Fuel	Kapasiti (MW) Capacity (MW)	Tempoh Lesen Licence Duration	
					Dari From	Hingga Until
1	ANSON OIL INDUSTRIES SDN. BHD. Hilir Perak, Perak	PV Modul	Solar	1.2	12/2/2019	11/2/2035
2	CENERGI CHERSONESE SDN BHD Kerian, Perak	SJ Biogas	Biogas	1.2	30/12/2019	29/12/2035
3	CENERGI FJP SDN BHD Jerantut, Pahang	SJ Biogas	Biogas	1.59	30/9/2019	29/9/2035
4	CENERGI TENNAMARAM SDN BHD Kuala Selangor, Selangor	SJ Biogas	Biogas	1.56	30/9/2019	29/9/2019
5	CLEANTECH SOLAR (MALAYSIA) SDN BHD Seremban, Negeri Sembilan	PV Modul	Solar	1.8135	16/12/2019	15/12/2040
6	CLEANTECH SOLAR (MALAYSIA) SDN.BHD Seremban, Negeri Sembilan	PV Modul	Solar	0.3458	5/12/2019	4/12/2040
7	ENG HONG BIOGAS SDN BHD Banting Selangor	SJ Biogas	Biogas	2.4	23/1/2019	22/1/2035
8	FUTURE ATLAS SDN BHD Matang, Perak	PV Modul	Solar	2.4	8/5/2019	7/5/2040
9	KUASA AMAN SDN BHD Kuala Muda, Kedah	PV Modul	Solar	0.18	12/2/2019	11/2/2040
10	KUB-BERJAYA ENERGY SDN. BHD. Hulu Selangor, Selangor	PV Modul	Solar	6.32	13/2/2019	12/2/2035
10	PSB ENERGY SDN BHD Timor Laut, Pulau Pinang	PV Modul	Solar	1.5048	27/11/2019	26/11/2040
12	RANGKAIAN ILTIZAM SDN BHD Pasir Mas, Kelantan	SJ Biogas	Biogas	0.6	19/9/2019	18/9/2035
13	RANGKAIAN ILTIZAM SDN BHD Pasir Mas, Kelantan	SJ Biogas	Biogas	0.6	19/9/2019	18/9/2035

Apendiks 15: Lesen Cogen Awam yang Dikeluarkan, 2019
Appendix 15: Public Cogen Licences Issued, 2019

Bil. No	Pemegang Lesen & Lokasi Pepasangan Licensee & Insallation Location	Jenis Loji Plant Type	Bahan Api Fuel	Kapasiti (MW) Capacity (MW)	Tempoh Lesen Licence Duration	
					Dari From	Hingga Until
1	GAS DISTRICT COOLING (KLIA) Sepang, Selangor	GE	Gas	40	1/3/2019	29/2/2020
2	KONPRO INDUSTRIES SDN BHD Seremban, Negeri Sembilan	SJ Biogas	Biogas	1.87	26/9/2019	25/9/2029
3	MERU ONE SDN.BHD Kapar, Selangor	CCGT	Gas	2	12/6/2019	11/6/2029
4	PETRONAS GAS BERHAD Kerteh, Terengganu	CCGT	Gas	210	28/5/2019	27/5/2040
5	PETRONAS GAS BERHAD Kuantan, Pahang	CCGT	Gas	140	30/9/2019	29/9/2040

Apendiks 16: Lesen Cogen Persendirian yang Dikeluarkan, 2019
Appendix 16: Private Cogen Licences Issued, 2019

Bil. No.	Pemegang Lesen & Lokasi Pepasangan Licensee & Insallation Location	Jenis Loji Plant Type	Bahan Api Fuel	Kapasiti (MW) Capacity (MW)	Tempoh Lesen Licence Duration	
					Dari From	Hingga Until
1	EASTERN STEEL SDN BHD Kemaman, Terengganu	Turbin stim Steam turbine	Haba sisa Waste heat	60	19/7/2019	18/7/2029
2	GULA PADANG TERAP SDN BHD Alor Setar, Kedah	DE, Turbin stim Steam turbine	Gas	10.5	14/11/2019	13/11/2029
3	GULA PADANG TERAP SDN. BHD. Padang Serai, Kedah	DE, Turbin stim Steam turbine	Gas	11.49	24/11/2009	23/11/2019
4	HARTALEGA NGC SDN BHD Sepang, Selangor	GE	Gas	16	18/3/2019	17/3/2029
5	LOTTE CHEMICAL TITAN (M) SDN. BHD. Johor Bahru, Johor	Turbin Stim Steam turbine	Gas	45.26	13/6/2019	12/6/2029
6	MEWAH-OILS SDN. BHD. Klang, Selangor	Turbin stim Steam turbine	Gas	6.5	23/7/2019	22/7/2029
7	MEWAHOLEO INDUSTRIES SDN BHD Johor Bahru, Johor	Turbin stim Steam turbine	Gas	5.6	24/10/2019	23/10/2029
8	SABAH FOREST INDUSTRIES SDN BHD Sipitang, Sabah	Turbin stim Steam turbine	Gas	79.5	8/1/2019	7/1/2024

Apendiks 20: Lesen Solar Berskala Besar (LSS) yang Dikeluarkan, 2019
Appendix 20: Large-Scale Solar (LSS) Licences Issued, 2019

Bil. No	Pemegang Lesen & Lokasi Pepasangan Licensee & Insallation Location	Kapasiti (MW) Capacity (MW)	Tempoh Lesen Licence Duration	
			Dari From	Hingga Until
1	ASIA MERANTI SOLAR (KAMPAR) SDN. BHD. Parit Buntar, Perak	12.5664	7/10/2019	6/10/2040
2	ASIA MERANTI SOLAR (KAMUNTING) SDN. BHD. Parit Buntar, Perak	12.566	12/6/2019	11/6/2040
3	ASIA MERANTI SOLAR (KINTA) SDN. BHD. Kinta, Perak	12.5664	9/10/2019	8/10/2040
4	EDRA SOLAR SDN. BHD. Kuala Ketil, Kedah	58.5	15/1/2019	14/1/2040
5	FAIRVIEW EQUITY PROJECT (KLUANG) SDN BHD Kluang, Johor	12.834	25/10/2019	24/10/2040
6	FAIRVIEW EQUITY PROJECT (MERSING) SDN BHD Kluang, Johor	6.8	25/10/2019	24/10/2040
7	JENTAYU SOLAR SDN. BHD. Pokok Sena, Kedah	8.405	19/9/2019	18/9/2040
8	KENYIR GUNKUL SOLAR SDN BHD Dungun, Terengganu	36.56	13/12/2019	12/12/2040
9	LEADER SOLAR ENERGY II SDN BHD Kota Kuala Muda, Kedah	29.371	5/12/2019	4/12/2040
10	QUANTUM SOLAR PARK (MELAKA) SDN BHD Jasin, Melaka	66	9/1/2019	8/1/2040
11	QUANTUM SOLAR PARK (TERENGGANU) SDN BHD Marang, Terengganu	66	9/1/2019	9/1/2040
12	RE GEBENG SDN BHD Kuantan, Pahang	38.891	25/11/2019	24/11/2040
13	WD SOLAR SDN. BHD Kuala Langat, Selangor	12.566	29/11/2019	28/11/2040
14	ZEC SOLAR SDN. BHD. Kota Tinggi, Johor	36	31/1/2019	31/1/2040

Apendiks 22: Lesen Net Energy Metering (NEM) yang Dikeluarkan, 2019
Appendix 22: Net Energy Metering (NEM) Licences Issued, 2019

Bil. No.	Pemegang Lesen & Lokasi Pepasangan Licensee & Insallation Location	Kapasiti (MW) Capacity (MW)	Tempoh Lesen Licence Duration	
			Dari From	Hingga Until
1	99 SPEED MART SDN. BHD. Klang, Selangor	0.0969	17/12/2019	16/12/2040
2	99 SPEED MART SDN. BHD. Klang, Selangor	0.08398	27/11/2019	26/11/2040
3	99 SPEED MART SDN. BHD. Batu Pahat Johor	0.1001	7/5/2019	6/5/2040
4	ACME FERRITE PRODUCTS SDN. BHD. Kinta, Perak	1.12365	31/12/2019	30/12/2040
5	AGRICULTURAL CHEMICALS (M) SDN BHD Perai, Pulau Pinang	0.41184	27/12/2019	26/12/2040
6	ASIA FILE PRODUCTS SDN. BHD. Barat Daya Pulau Pinang	0.38505	17/5/2019	16/5/2040
7	ASIA POLY INDUSTRIAL SDN BHD Kelana Jaya Selangor	0.52932	18/12/2019	17/12/2040
8	BAGAN PRINTERS SDN. BHD. Seberang Prai Utara Pulau Pinang	0.42032	17/12/2019	16/12/2040
9	BAN CHUAN SENG RICE OIL & MILLS SDN BHD Seberang Perai Utara Pulau Pinang	0.62345	14/6/2019	13/6/2040
10	BAN CHUAN SENG RICE OIL & MILLS SDN BHD Seberang Perai Utara Pulau Pinang	0.377	14/6/2019	13/6/2040
11	BANDAR ECO-SETIA SDN.BHD. Shah Alam Selangor	0.13825	29/11/2019	28/11/2040
12	BIZLINK TECHNOLOGY (S.E.A) SDN BHD Seberang Prai Pulau Pinang	0.29835	23/8/2019	22/8/2040
13	BUTTERWORTH ICEWORKS SDN. BHD. Seberang Prai Pulau Pinang	0.466125	6/12/2019	5/12/2040
14	CANON ELECTRONICS MALAYSIA SDN BHD Seberang Prerai Tengah Pulau Pinang	0.22815	30/5/2019	29/5/2040
15	CEW SIN PLASTIC PIPE SDN. BHD. Kinta Perak	1.54725	3/12/2019	2/12/2040
16	CHANTIKA KELANG BERAS SDN BHD Kota Setar Kedah	0.28628	14/6/2019	13/6/2040
17	CHANTIKA KELANG BERAS SDN BHD Kota Setar Kedah	0.51952	29/10/2019	28/10/2040
18	CHEK HUP SDN BHD Ulu Kinta Perak	0.36927	3/12/2019	2/12/2040
19	CHUAN SIN SDN. BHD. Matang Perak	0.72	6/12/2019	5/12/2040
20	CHUNG HWA HIGH SCHOOL Muar Johor	0.25008	20/11/2019	19/11/2040
21	CK PACKAGING & MARKETING SDN BHD Johor	0.25641	5/12/2019	4/12/2040
22	CLEANTECH SOLAR (MALAYSIA) SDN BHD Baling Kedah	0.90025	28/11/2019	27/12/2040
23	CLPG PACKAGING INDUSTRIES SDN BHD Seberang Prai Pulau Pinang	0.31968	20/11/2019	19/11/2040
24	COMFORT RUBBER GLOVES INDUSTRIES SDN BHD Taiping Perak	0.55132	23/12/2019	22/12/2040
25	CONQUEST ELECTRONICS SDN BHD Kedah	0.23052	14/6/2019	13/6/2040

Bil. No.	Pemegang Lesen & Lokasi Pepasangan Licensee & Insallation Location	Kapasiti (MW) Capacity (MW)	Tempoh Lesen Licence Duration	
			Dari From	Hingga Until
26	DAIKIN MALAYSIA SDN. BHD. Sungai Buloh Selangor	2.0146	6/12/2019	5/12/2040
27	DINXINGS (M) SDN BHD Yan Kedah	0.221	18/10/2019	17/10/2040
28	ECONSAVE CASH & CARRY (HA) SDN BHD Klang Selangor	0.37222	26/6/2019	25/6/2040
29	ECONSAVE CASH & CARRY (KJW) SDN BHD Klang Selangor	0.43364	26/11/2019	25/11/2040
30	ECONSAVE CASH & CARRY (SN) SDN BHD Senai Johor	0.7005	12/2/2019	11/2/2040
31	ELSOFT SYSTEMS SDN BHD Barat Daya Pulau Pinang	0.231	15/4/2019	14/4/2040
32	ELSOFT SYSTEMS SDN BHD Barat Daya Pulau Pinang	0.35442	27/5/2019	26/5/2040
33	EMAS KERAJANG SDN. BHD. Padang Besar Perlis	0.21125	16/4/2019	15/4/2040
34	EMHART GLASS SDN BHD Ulu Tiram Johor	0.28425	6/5/2019	5/5/2040
35	FAVELLE FAVCO CRANES (M) SDN BHD Negeri Sembilan	0.561	28/8/2019	27/8/2040
36	FEC CABLES (M) SDN. BHD. Selangor	0.606	12/2/2019	11/2/2040
37	FERO MALTECH (M) SDN BHD Kota Bharu Kelantan	0.2628	14/8/2019	13/8/2040
38	FIMA CORPORATION BERHAD Kuala Lumpur	0.18506	4/12/2019	3/12/2040
39	FOUNDPAC TECHNOLOGIES SDN BHD Bayan Lepas Pulau Pinang	0.16566	17/12/2019	16/12/2040
40	GEOHAN EQUIPMENT SDN BHD Hulu Selangor Selangor	0.1001	13/2/2019	12/2/2040
41	GLOBALINK METAL STAMPING SDN BHD Hulu Langat Selangor	0.230315	6/5/2019	5/5/2040
42	GOODYEAR MALAYSIA BERHAD Shah Alam Selangor	2.505	17/10/2019	16/10/2040
43	GS PAPERBOARD & PACKAGING SDN BHD Perai Pulau Pinang	0.9983	17/10/2019	16/10/2040
44	HCS REALTY SDN BHD Yan Kedah	0.1	20/11/2019	19/11/2040
45	HOCK KIM CONCRETE SDN BHD Senai Johor	0.81765	17/12/2019	16/12/2040
46	HUP SUN MARINE PRODUCTS SDN BHD Kamunting Perak	0.143	13/6/2019	12/6/2040
47	HWA EIK TRADING (KEDAH) SDN BHD Alor Setar Kedah	0.10385	25/3/2019	24/3/2040
48	HYTECH ENGINEERING INDUSTRIES SDN BHD Seremban Negeri Sembilan	0.48378	14/6/2019	13/6/2040
49	INFINITE CAPACITY SDN BHD Bandar Baharu Kedah	0.147375	17/12/2019	16/12/2040
50	INFINITE CAPACITY SDN BHD Bandar Baharu Kedah	0.26025	28/3/2019	27/3/2040
51	INNOVANS PALM INDUSTRIES SDN BHD Klang Selangor	0.8052	17/12/2019	16/12/2040

Bil. No.	Pemegang Lesen & Lokasi Pepasangan Licensee & Insallation Location	Kapasiti (MW) Capacity (MW)	Tempoh Lesen Licence Duration	
			Dari From	Hingga Until
52	ITG ELECTRONICS SDN BHD Johor Bahru Johor	0.2984	17/12/2019	16/12/2040
53	JUBIN BMS (1990) SDN. BHD. Johor Bahru Johor	0.188	13/6/2019	12/6/2040
54	KEWPUMP (M) SDN.BHD Kinta Perak	0.20085	25/3/2019	24/3/2040
55	KIAN HON TYRES SDN BHD Seberang Perai Selatan Pulau Pinang	0.42009	14/6/2019	13/6/2040
56	KILANG BERAS BAN SENG SDN. BHD. Alor Setar Kedah	0.39963	17/12/2019	16/12/2040
57	KILANG BERAS PEK CHOO KEOK SDN BHD Kedah	0.624	28/3/2019	27/3/2040
58	KILANG BERAS PEK CHOO KEOK SENDIRIAN BHD Kedah	0.62456	17/12/2019	16/12/2040
59	KILANG BERAS SERI MERBOK SDN. BHD. Alor Setar Kedah	0.62456	17/12/2019	16/12/2040
60	KK FAMILY MART SDN BHD Seremban Negeri Sembilan	0.12464	10/6/2019	9/6/2040
61	KK FAMILY MART SDN BHD Seremban Negeri Sembilan	0.12464	10/6/2019	9/6/2040
62	KK FAMILY MART SDN BHD Seremban Negeri Sembilan	0.08284	10/6/2019	9/6/2040
63	LB ALUMINIUM BERHAD Ulu Langat Selangor	1.00566	29/11/2019	28/11/2040
64	LE NAM MEGASHEET SDN BHD Seberang Perai Tengah Pulau Pinang	0.26044	14/6/2019	13/6/2040
65	LEE THIAN SOO REALTY SDN BHD Petaling Selangor	0.123	13/6/2019	12/6/2040
66	LKL ADVANCE METALTECH SDN BHD Seri Kembangan Selangor	0.12469	3/10/2019	2/10/2040
67	M & S FOOD INDUSTRIES SDN BHD Kinta Perak	0.1106	4/12/2019	3/12/2040
68	MEGA LABEL (MALAYSIA) SDN BHD Batu Pahat Johor	0.40572	3/6/2019	2/6/2040
69	MENG SENG ENTERPRISE SDN. BHD. Seberang Prai Pulau Pinang	0.124	17/10/2019	16/10/2040
70	NAM YANG INTERNATIONAL SDN BHD Perai Pulau Pinang	0.18282	17/10/2019	16/10/2040
71	NCT PROPERTIES SDN BHD Puchong Selangor	0.189	17/10/2019	16/10/2040
72	NEW STAR FOOD INDUSTRIES SDN BHD Johor	0.486	27/12/2019	26/12/2040
73	NGEE MING SHOE MANUFACTURERS SDN BHD Seri Kembangan Selangor	0.15	6/9/2019	5/9/2040
74	NORIPHARMA SDN BHD Klang Selangor	0.61425	21/11/2019	20/11/2040
75	PADINI HOLDINGS BERHAD Shah Alam Selangor	0.28	7/2/2019	6/2/2040
76	PADINI HOLDINGS BERHAD Shah Alam Selangor	0.34	7/2/2019	6/2/2040
77	PAHANG PHARMACY SDN BHD Klang Selangor	0.371	23/12/2019	22/12/2040

Bil. No.	Pemegang Lesen & Lokasi Pepasangan Licensee & Insallation Location	Kapasiti (MW) Capacity (MW)	Tempoh Lesen Licence Duration	
			Dari From	Hingga Until
78	PAHANG PHARMACY SDN BHD Klang Selangor	0.250125	23/12/2019	22/12/2040
79	PETRONAS GAS BERHAD Negeri Sembilan	0.143	26/11/2019	25/11/2040
80	PETRONAS RESEARCH SDN BHD Sepang Selangor	21.80	22/8/2019	21/8/2040
81	PIAU KEE LIVE & FROZEN SEAFOODS SDN BHD Kuala Lumpur	0.6305	12/7/2019	11/7/2040
82	PLATINUM PHASE SDN BHD Sungai Petani Kedah	0.18426	9/10/2019	8/10/2040
83	PMI COTTON INDUSTRIIES SDN BHD Selangor	0.33	9/5/2019	8/5/2040
84	PMI COTTON INDUSTRIIES SDN BHD Hulu Langat Selangor	0.162	9/5/2019	8/5/2040
85	PMI COTTON INDUSTRIIES SDN BHD Perai Pulau Pinang	0.216	9/5/2019	8/5/2040
86	PWF FARMS SDN BHD Kulim Pulau Pinang	0.3105	14/6/2019	13/6/2040
87	PWF FARMS SDN BHD Seberang Perai Tengah Kedah	0.13317	14/6/2019	13/6/2040
88	QL FISHMEAL SDN BHD Hutan Melintang Perak	0.23805	20/11/2019	19/11/2040
89	QL FOODS SDN BHD Hilir Perak Perak	0.7344	4/3/2019	3/3/2040
90	RESINTECH PLASTICS (M) SDN BHD Kuala Langat Selangor	0.25944	29/4/2019	28/4/2040
91	RICHTER RUBBER TECHNOLOGY SDN BHD Kedah	0.12006	24/12/2019	23/12/2040
92	SALUTICA ALLIED SOLUTIONS SDN. BHD. Kinta Perak	0.586	17/10/2019	16/10/2040
93	SAMA KEBEL SDN BHD Gombak Selangor	0.6996	13/3/2019	12/3/2040
94	SCT INDUSTRIES (M) SDN BHD Seremban Negeri Sembilan	0.10238	19/6/2019	18/6/2040
95	SEGI UNIVERSITY SDN BHD Petaling Jaya Selangor	0.3	14/6/2019	13/6/2040
96	SING CHUAN AIK TRANSPORT SDN BHD Plentong Johor	0.62676	27/5/2019	26/5/2040
97	SUNSURIA CITY SDN BHD Sepang Selangor	0.11	17/12/2019	16/12/2040
98	SUPREME RICE MILL SDN BHD Kedah	0.299805	14/6/2019	13/6/2040
99	SYARIKAT PERUSAHAAN JOOI BERSAUDARA SDN. BHD. Perai Pulau Pinang	0.8125	17/10/2019	16/10/2040
100	SYARIKAT WEN KEN DRUG SDN.BHD. Johor	0.324375	17/12/2019	16/12/2040
101	T.H HIN HOME TECH SDN BHD Perai, Pulau Pinang	0.37356	14/5/2019	13/5/2040
102	TACOPLAST INDUSTRIES SDN BHD Seberang Prai Pulau Pinang	0.13328	18/3/2019	17/3/2040
103	TANJUNG RATNA SDN BHD Simpang Ampat Melaka	0.4158	15/4/2019	14/4/2040

Bil. No.	Pemegang Lesen & Lokasi Pepasangan Licensee & Insallation Location	Kapasiti (MW) Capacity (MW)	Tempoh Lesen Licence Duration	
			Dari From	Hingga Until
104	TEO SENG FEEDMILL SDN BHD Muar, Johor	0.48975	14/6/2019	13/6/2040
105	TEX CYCLE (P2) SDN BHD Klang Selangor	0.31892	24/12/2019	23/12/2040
106	TG POWER WRAP SDN. BHD. Kedah	0.75525	17/12/2019	16/12/2040
107	TGSH PLASTIC INDUSTRIES SDN. BHD. Kota Kuala Muda Kedah	0.6225	17/12/2019	16/12/2040
108	TGSH PLASTIC INDUSTRIES SDN. BHD. Kota Kuala Muda Kedah	0.507	17/12/2019	16/12/2040
109	THUNDER PRINT SDN BHD Sungai Petani Kedah	0.42108	6/12/2019	5/12/2040
110	THUNDER PRINT SDN BHD Sungai Petani Kedah	0.32373	6/12/2019	5/12/2040
111	TKC AURUM MANUFACTURING SDN BHD Pulau Pinang	0.1368	14/6/2019	13/6/2040
112	TLS FITNESS CENTER SDN. BHD Petaling Jaya Selangor	0.1444	25/10/2019	24/10/2040
113	TM KAY FERTILIZERS SDN BHD Klang Selangor	0.60532	2/12/2019	1/12/2040
114	TOA PAINT (MALAYSIA) SDN BHD Seremban Negeri Sembilan	0.242725	4/12/2019	3/12/2040
115	TONG HEER FASTERNERS CO SDN BHD Georgetown Pulau Pinang	1.9973	12/2/2019	13/2/2040
116	TOP THERMO MFG(MALAYSIA) SDN. BHD. Klang Selangor	0.49985	8/10/2019	7/10/2040
117	TS PLASTICS SDN. BHD Kinta Perak	0.51414	3/12/2019	2/12/2040
118	UNIQUE LUXURY SDN BHD Alor Setar Kedah	0.425	21/11/2019	20/11/2040
119	WATERTEC (MALAYSIA) SDN BHD Shah Alam Selangor	0.405	14/5/2019	13/5/2040
120	WEI DAT STEEL WIRE SDN BHD Kinta Perak	0.999735	26/6/2019	25/6/2040
121	WEI DAT STEEL WIRE SDN BHD Kinta Perak	0.519395	26/6/2019	25/6/2040
122	WEI DAT STEEL WIRE SDN BHD Kinta Perak	2.175525	26/6/2019	25/6/2040
123	YEW LEE PACIFIC MANUFACTURER SDN. BHD. Kinta Perak	0.11286	17/10/2019	16/10/2040
124	ZIRCO-BLAST SDN BHD Selangor	0.0765	17/12/2019	16/12/2040

Apendiks 24: Lesen New Enhanced Dispatch Arrangement (NEDA) yang Dikeluarkan, 2019
Apendiks 24: Lesen New Enhanced Dispatch Arrangement (NEDA) yang Dikeluarkan, 2019

Bil. No.	Pemegang Lesen & Lokasi Pepasangan Licensee & Insallation Location	Bahan Api Fuel	Jenis Stesen Jana Kuasa Power Station Type	Kapasiti (MW) Capacity (MW)	Tempoh Lesen Licence Duration	
					Dari From	Hingga Until
1	PETRONAS CHEMICALS FERTILISER KEDAH Kuala Muda, Kedah	Cogen	Gas	8	12/8/2016	11/8/2031

Apendiks 25: Lesen Pengagihan Elektrik yang Dikeluarkan, 2019
Appendix 25: Electricity Distribution Licences Issued, 2019

Bil. No.	Pemegang Lesen & Lokasi Pepasangan Licensee & Insallation Location	Tempoh Lesen Licence Duration	
		Dari From	Hingga Until
1	BORNEO MANAGEMENT CORPORATION SDN. BHD. Kota Kinabalu Sabah	23/1/2019	22/1/2023
2	BRONZE TOWERS SDN BHD Kuantan Pahang	1/8/2019	31/7/2029
3	ECO BOTANIC SDN BHD Johor Bahru Johor	18/11/2019	17/11/2029
4	ECO SANCTUARY SDN BHD Kuala Langat Selangor	29/3/2019	28/3/2029
5	FAIRVIEW VALLEY SDN. BHD. Kuala Lumpur	21/2/2019	20/2/2029
6	GAMUDA LAND (KEMUNING) SDN BHD. Shah Alam Selangor	19/12/2019	18/12/2029
7	GAS DISTRICT COOLING (M) SDN BHD Kuala Lumpur	17/10/2019	16/10/2040
8	GCH RETAIL (M) SDN BHD Klang Selangor	17/7/2019	16/7/2029
9	GCH RETAIL (M) SDN. BHD Johor Bahru Johor	7/1/2019	6/1/2029
10	GCH RETAIL (M) SDN.BHD. Shah Alam Selangor	17/7/2019	16/7/2029
11	GCH RETAIL (MALAYSIA) SDN BHD Ulu Kelang Selangor	16/5/2019	15/5/2029
12	GCH RETAIL (MALAYSIA) SDN BHD Johor Bahru Johor	14/11/2019	13/11/2029
13	GCH RETAIL (MALAYSIA) SDN. BHD. Petaling Jaya Selangor	12/2/2019	11/2/2029
14	GOLD COAST MORIB INTERNATIONAL RESORT SDN. BHD. Banting Selangor	17/10/2019	16/10/2029
15	HAP SENG REALTY (AUTOHAUS) SDN. BHD. Kuala Lumpur	21/10/2019	20/10/2029
16	HOTEL EQUATORIAL (M) SDN BHD Kuala Lumpur	26/3/2019	25/3/2029
17	IMAN IKHLAS (M) SDN BHD Sungai Petani Kedah	12/2/2019	11/2/2029
18	K.K.I.P. POWER SDN BHD Kota Kinabalu Sabah	24/7/2019	23/7/2040
19	KEJURUTERAAN WYT SDN BHD Kota Kinabalu Sabah	23/1/2019	22/1/2029

Bil. No.	Pemegang Lesen & Lokasi Pepasangan Licensee & Insallation Location	Tempoh Lesen Licence Duration	
		Dari From	Hingga Until
20	KSL CITY MANAGEMENT SDN.BHD. Selangor	17/12/2019	16/12/2029
21	LIANBANG VENTURES SDN BHD Melaka Tengah Melaka	24/4/2019	23/4/2029
22	MAKAMEWAH SDN BHD Kota Kinabalu Sabah	6/12/2019	5/12/2029
23	MALAYSIA AIRPORTS (SEPANG) SDN BHD Sepang Selangor	10/7/2019	9/7/2039
24	MESAUTILITY SDN BHD Seremban Negeri Sembilan	26/6/2019	25/6/2029
25	MID VALLEY CITY ENERGY SDN BHD Plentong Johor	15/1/2019	14/1/2029
26	MTRUSTEE BERHAD Petaling Jaya Selangor	2/1/2019	1/1/2029
27	N JAYA SDN BHD Kuala Lumpur	21/2/2019	20/2/2029
28	NOVA LAGENDA SDN BHD Kuala Lumpur	23/10/2019	22/10/2029
29	PARKLAND RESIDENCE SDN BHD Melaka Tengah Melaka	27/3/2019	26/3/2029
30	PERMODALAN NASIONAL BERHAD Kuala Lumpur	14/6/2019	13/6/2029
31	PINNACLE TREND SDN BHD Kuala Lumpur	23/8/2019	22/8/2029
32	PMINT URUS SDN BHD Kuala Terengganu Terengganu	3/7/2019	2/7/2029
33	PROJEK IMPIANA SDN.BHD. Melaka Tengah Melaka	19/4/2019	18/4/2029
34	REAL ENERGY SDN.BHD Sandakan Sabah	25/1/2019	24/1/2029
35	TESCO STORES (M) SDN BHD Pasir Gudang Johor	25/10/2019	24/10/2029
36	TRUSVEST SDN. BHD Sipitang Sabah	11/10/2019	10/10/2029
37	UOA ASSET MANAGEMENT SDN. BHD. Kuala Lumpur	21/2/2019	20/2/2029

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