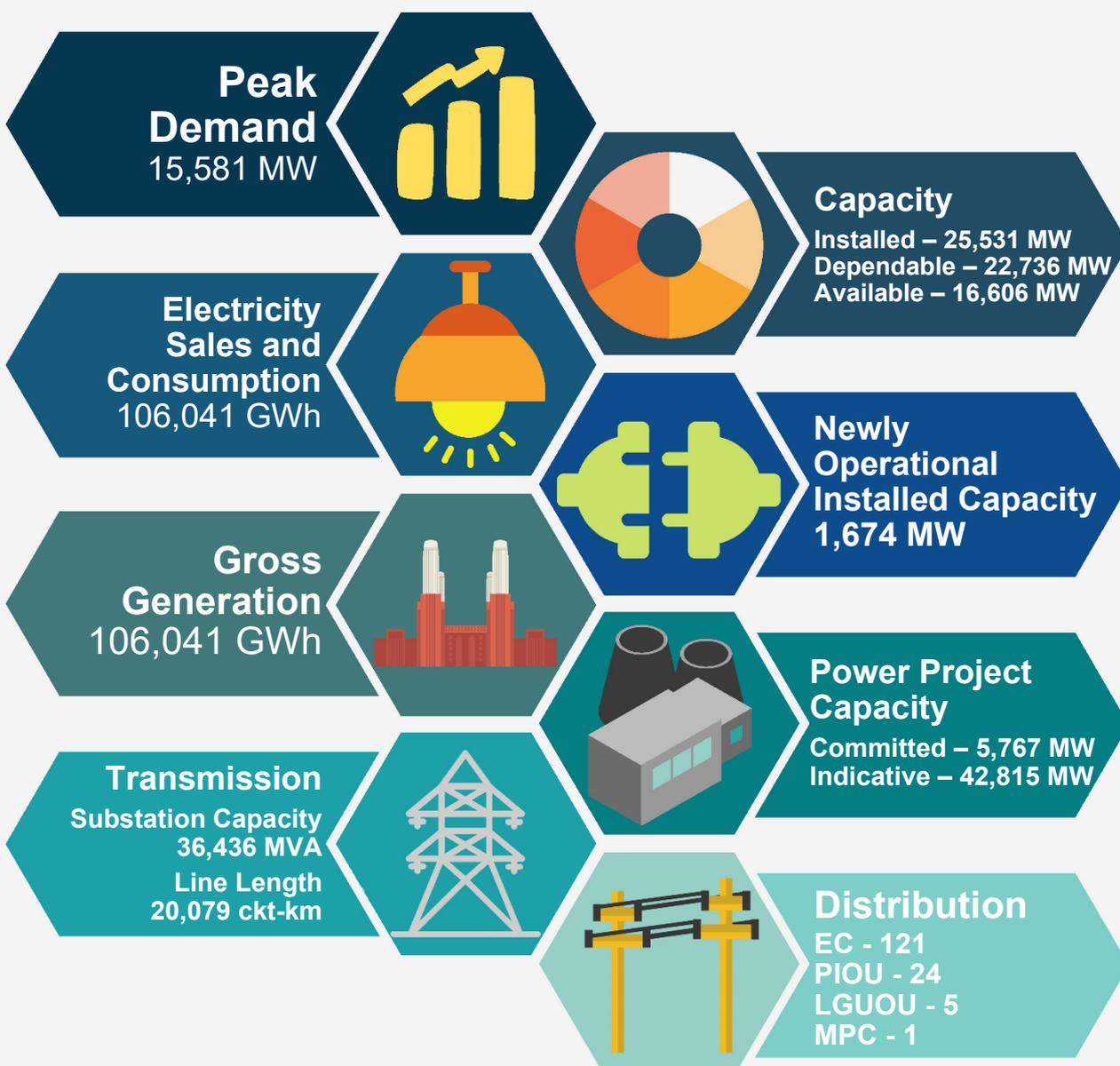


2019 POWER SITUATION REPORT



2019 POWER DEMAND AND SUPPLY HIGHLIGHTS



DEMAND

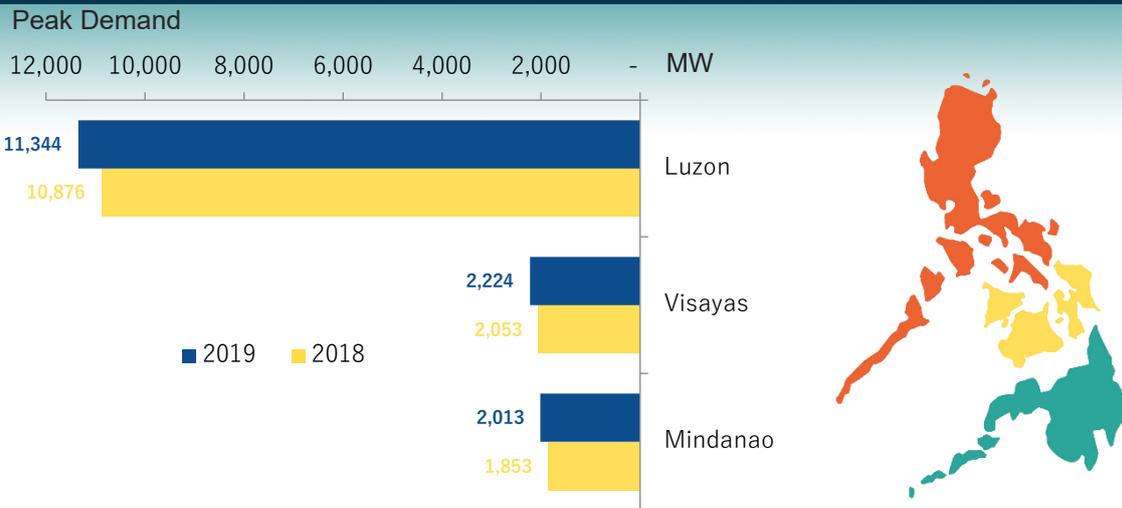
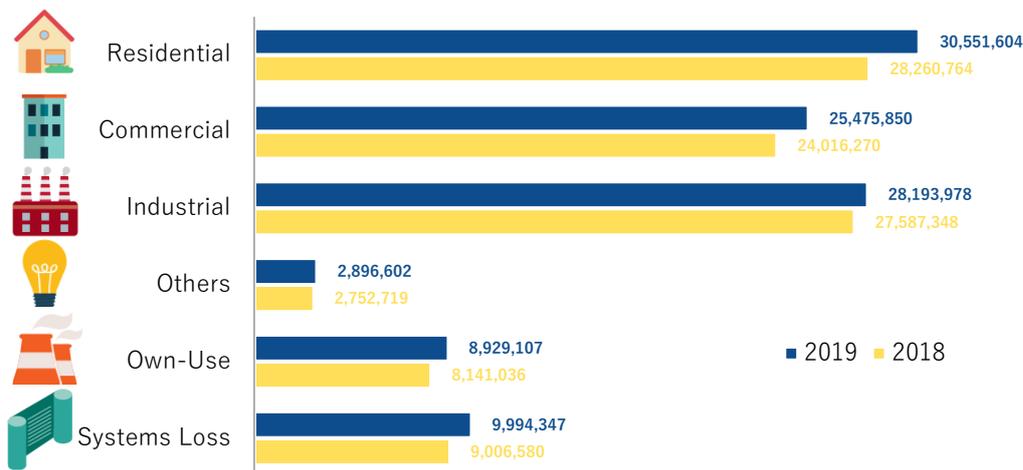


Figure 1. 2018 vs. 2019 Peak Demand per Grid (in MW)

The country's total peak demand¹ in 2019 was recorded at 15,581 MW, which is 799 MW or 5.4% higher than the 14,782 MW in 2018. As recorded by the System Operator, the Luzon grid contributed 11,344 MW or 72.8% of the total demand while Visayas and Mindanao contributed a share of 14.3% (2,224 MW) and 12.9% (2,013 MW), respectively. With reference to year 2018, the peak demand of Luzon increased by 468 MW or 4.3% while Visayas and Mindanao grew by 8.3% and 8.6%, respectively.

ELECTRICITY SALES AND CONSUMPTION

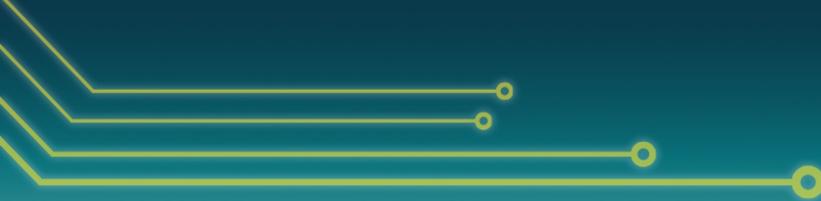


NOTE: *Includes Off-Grid Sales and Consumption (1.4% of the total sales and consumption)
Numbers may not sum up to total due to rounding off.

Figure 2. 2019 vs. 2018 Electricity Sales and Consumption by Sector, Philippines (in MWh)

The Philippines' Gross Domestic Product (GDP) posted a 5.9% full-year growth for 2019, 0.3% below the previous year's GDP, the slowest growth rate in eight years. In the 4th quarter of 2019, the GDP grew by 6.4%, but it was still not enough to meet the

¹ Total non-coincidental peak demand of Luzon, Visayas and Mindanao grids



target economic growth which ranges from 6.0% to 6.5%. Nonetheless, historical data has shown that when the Philippines experienced an expanding economy or a positive GDP growth rate, that expansion was directly proportional to electricity consumption. Therefore, correlating the relationship between the two, a continuous GDP growth entailed a consistently rising demand in electricity.

The total electricity sales and consumption grew by 6.3%, with an absolute level of 106,041 GWh by the end of 2019 from 99,765 GWh of the previous year. As the rate of inflation slowed down to an average of 2.5% in 2019 from a noticeably higher rate of 5.2% in 2018, the country as expected experienced a boost in electricity consumption. The sector with the largest consumption remains to be residential (28.8%) followed by industrial (26.6%) and commercial (24.0%).

The industrial sector is the only sector whose annual growth rate took a downswing from its rapid increase of 7.9% in 2018 down to only 2.2% in 2019. One factor of the decline can be attributed to the slowdown in public construction at the start of 2019 as a result of the delayed approval of the Administration's 2019 budget and the 45-day public works ban due to the 2019 National and Local Elections on 13 May 2019. Likewise, the reduction in public infrastructure spending, hence lagging in construction-related manufactures, and the weaker global economy resulted in a decrease in both volume and value of the manufacturing sector, only improving in the latter part of the year bolstered by the surge in public spending of 54% or ₱100.3 billion in September as state agencies expedited the implementation of major infrastructure projects as part of their catch-up measures. As a result, electricity sales and consumption of the industrial sector went up by 3.8% for the second half of the year.

On the other hand, the growth rate of the residential and commercial sectors remained persistent as the consumption increased by 8.1% and 6.1%, respectively, against last year's growth rate of 5.5% for both sectors due to election-related activities and warmer temperature in the summer months. The continuous rise in global surface temperatures primarily contributed to the uptrend as heat indices hit dangerous levels especially in the months of April, May, and June. Moreover, the El Niño event throughout the year is a likely driver of the variation in consumption especially in households and commercial spaces e.g. an increase in consumption can be attributed to substantial utilization of cooling equipment.

"Others", referring to public buildings, street lights, irrigation, agriculture, and "others not elsewhere classified", continued to post a modest growth rate of 5.2% from 2,753 GWh in 2018 to 2,897 GWh in 2019.

Parallel to the Others sector, the utilities' own-use for office and station use of the power plants, classified in Fig. 2 simply as "Own-Use", grew significantly by 9.7% or 8,929 GWh from a previous diminution of 2.1% between 2018 and 2017. While this year, "Losses" from the generation, transmission, and distribution accounted for 9,994 GWh, the largest growth by sector with a 988 GWh or 11.0% increase from 2018 due to the testing and commissioning of various power plants in the country with total capacities of 2,002 MW (Luzon - 1,035 MW, Visayas - 371 MW and Mindanao - 596 MW).

Table 1. Electricity Sales & Consumption of Distribution Utilities by Grid (in GWh)

TYPE OF DISTRIBUTION UTILITIES	LUZON	VISAYAS	MINDANAO	PHILIPPINES
Private Investors Owned Utilities (PIOU's)				
Residential	15,880	1,360	1,293	18,534
Commercial	19,531	654	604	20,789
Industrial	14,433	2,892	2,257	19,582
Others	196	111	90	397
Total Sales	50,040	5,018	4,244	59,301
Own-Use	65	11	5	81
System Loss	2,925	328	311	3,564
Total	53,030	5,356	4,560	62,946
Electric Cooperatives (EC'S)				
Residential	6,327	2,838	2,853	12,018
Commercial	2,381	1,233	1,073	4,687
Industrial	1,947	952	1,952	4,851
Others	763	455	438	1,657
Total Sales	11,418	5,478	6,317	23,213
Own-Use	23	10	15	48
System Loss	1,408	635	992	3,035
Total	12,849	6,123	7,324	26,295
Non-Utilities/Directly Connected				
Other Services	1,706	503	65	2,274
Plant Station Used	4,379	1,649	1,065	7,094
Transmission Losses	2,389	378	629	3,396
Total Electricity Sales & Consumption (Main Grid)	76,485	14,457	13,631	104,572
Total Electricity Sales & Consumption (Off-Grid)	1,202	93	175	1,470
Total Electricity Sales & Consumption	77,687	14,549	13,805	106,041

NOTE: *Includes Off-Grid Sales

*Includes DCC customers

Source: 2019 Power Statistics

Among the three island groups, Luzon accounted for the highest electricity sales and consumption with a share of 77,687 GWh or 73.3%. Visayas came in next with a share of 14,549 GWh or 13.7% and followed closely by Mindanao with a share of 13,805 GWh or 13.0%. In line with the increase in electricity demand, the energy consumption in Mindanao boomed at a growth rate of 8.1%, followed by Visayas (7.8%) and Luzon (5.7%). Sales and consumption in the Off-Grid areas also grew at a rate of 9.2%, contributing a share of 1,470 GWh or 1.4% of the country's total energy production. The country's total sales in electricity continued to manifest resiliency, garnering

87,118 GWh or a 5.4% growth rate from 2018, dropping just a few notches below last year's growth rate of 6.2%.

In Fig. 3, the Total Sales was divided into four categories according to their utility type: Private Investor Owned Utilities (PIOUs), Electric Cooperatives (ECs), Non-Utilities/Directly Connected Customers (DCC), and Other Services. Accounting for 55.9% of the country's electricity production, PIOUs contributed a total sales of 59,301 GWh, whereas 23,213 GWh or 21.9% was sourced from the ECs' contributions. Non-Utilities and Other Services, which refers to the energy delivered to other generators, were 4,036 GWh (3.8%) and 568 GWh (0.5%), respectively. In Table 1, part of the Other Services included the energy consumed to pump the Kalayaan Power Plant. However, it should be noted that in the Total Sales and Consumption shown in Fig. 2, the actual total sales (comprising of Residential, Commercial, and Others sectors) does not include the energy consumed when pumping but instead was accounted as part of the consumption under Own-Use which is reflected in the latter part of this report.

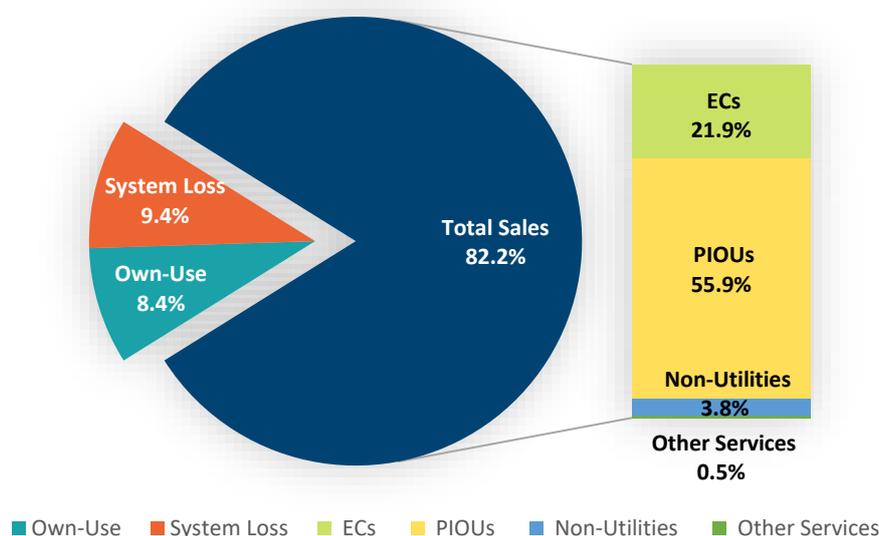


Figure 3. Total Electricity Sales and Consumption by Type Percentage Shares, Philippines

Distribution Utilities (DUs), who operate to deliver electric power to end-users, amounted to 89,242 GWh or 84.2% of the country's total electricity sales and consumption in 2019. In Table 1, the electricity sales and consumption of DUs consisted of 121 ECs and only 23 PIOUs (including entities duly authorized to operate within the economic zones)—but the PIOUs are much larger in customer sales. To illustrate, in 2019, PIOUs are responsible for 70.5% of the total electricity sales and consumption of DUs, utilizing more than 60 million MWh of electricity. Manila Electric Company (MERALCO), the largest privately-owned electric utility, contributed to 48,653 GWh or almost half of the country's total sales and consumption. On the other hand, the Batangas I Electric Cooperative, Inc. (BATELEC I) utilized 1,123 GWh of electricity, the highest sales and consumption among the ECs.

Table 2. 2019 and 2018 Comparative Electricity Sales and Consumption of Distribution Utilities, Philippines (in GWh)

Sales by Sector	2019		2018		Difference	
	GWh	% Share	GWh	% Share	GWh	% Growth
Distribution Utilities (Main Grid)						
Residential	29,837	34.0%	27,611	33.4%	2,225	8.1%
Commercial	25,150	28.65%	23,717	28.71%	1,433	6.0%
Industrial	24,365	27.76%	23,277	28.18%	1,088	4.7%
Others	1,885	2.15%	1,754	2.12%	132	7.5%
Total Sales	81,237	92.55%	76,359	92.44%	4,878	6.4%
Own-Use	127	0.14%	116	0.14%	11	9.1%
System Loss	6,408	7.30%	6,132	7.42%	276	4.5%
Total Consumption	87,772	100%	82,607	100%	5,165	6.3%
Distribution Utilities (Off-Grid)						
Residential	715	48.7%	650	48%	65	10.1%
Commercial	326	22.2%	299	22.22%	26	8.9%
Industrial	68	4.6%	92	6.84%	(24)	-26.4%
Others	169	11.5%	122	9.08%	46	37.8%
Total Sales	1,277	86.9%	1,163	86.40%	114	9.8%
Own-Use	3	0.2%	2	0.18%	0	6.8%
System Loss	190	12.9%	181	13.43%	9	5.2%
Total Consumption	1,470	100.0%	1,346	100%	123	9.2%
Total (Grid + Off-Grid)						
Residential	30,552	34.2%	28,261	33.7%	2,291	8.1%
Commercial	25,476	28.6%	24,016	28.6%	1,460	6.1%
Industrial	24,433	27.4%	23,369	27.8%	1,063	4.6%
Others	2,054	2.3%	1,876	2.2%	178	9.5%
Total Sales	82,514	92.5%	77,522	92.3%	4,992	6.4%
Own-Use	129	0.1%	118	0.1%	11	9.1%
System Loss	6,598	7.4%	6,313	7.5%	285	4.5%
Total Consumption	89,242	100.0%	83,953	100.0%	5,288	6.3%

NOTE: *Includes Off-Grid Sales
 *Excludes DCC customers
 Source: 2019 Power Statistics

In 2019, the peak of the total sales and consumption of DUs occurred in June, recording a 9.3% share which is 852 GWh more than the monthly average of 7,437 GWh. The residential sector remains to have the highest percentage share with a growth rate of 8.1%. The region to obtain the highest DU sales and consumption is the

National Capital Region with a 33.4% share, followed by Region IV-A (19.9%) and Region III (12.0%).

SUPPLY

INSTALLED AND DEPENDABLE CAPACITY

Table 3. 2019 Total Installed and Dependable Capacity per Technology, Philippines (in MW)

Fuel Type	Installed		Dependable	
	2018	2019	2018	2019
Coal	8,844	10,417	8,368	9,743
Oil Based	4,292	4,262	2,995	3,015
Natural Gas	3,453	3,453	3,286	3,286
Renewable Energy	7,227	7,399	6,592	6,691
<i>Geothermal</i>	1,944	1,928	1,770	1,792
<i>Hydro</i>	3,701	3,760	3,473	3,508
<i>Biomass</i>	258	363	182	227
<i>Solar</i>	896	921	740	737
<i>Wind</i>	427	427	427	427
TOTAL	23,815	25,531	21,241	22,736

Table 4. 2019 Total Installed and Dependable Capacity per Grid and Off-Grid, Philippines (in MW)

GRID	Installed			Dependable		
	Grid	Off-grid	Total	Grid	Off-grid	Total
Luzon	16,870	416	17,286	15,261	336	15,598
Visayas	3,770	40	3,809	3,276	30	3,306
Mindanao	4,366	70	4,436	3,780	52	3,832
TOTAL	25,006	526	25,531	22,317	419	22,736

Table 5. 2019 Summary of Newly Operational Capacities per Technology, Philippines (in MW)

Fuel Type	Installed, MW		Dependable	
	2018	2019	2018	2019
Coal	720	1,559	690	1,409
Oil-Based	87	8	83	6
Natural Gas	0	0	0	0
Renewable Energy	126	108	122	74
<i>Geothermal</i>	12	0	12	0
<i>Hydro</i>	80	31	80	18
<i>Biomass</i>	34	52	30	36
<i>Solar</i>	0	25	0	20
<i>Wind</i>	0	0	0	0
TOTAL	934	1,674	894	1,489

The total power supply, in terms of installed capacity, grew by 7.2% from 23,815 MW in 2018 to 25,531 MW in 2019. The 25,006 MW or 97.9% of the total installed capacity

was contributed by the Luzon, Visayas, and Mindanao main grids while 526 MW or 2.1% was contributed by off-grid areas. As shown in Table 5, a total of 1,674 MW new capacities were added to the country's supply in 2019 which include coal-fired (1,559 MW), oil-based (8 MW), hydropower (31 MW), biomass (52 MW), and solar (25 MW) power plants. Share by grid is discussed in a separate section of this report. In terms of share by grid, Luzon contributed additional capacity of 700 MW or 41.8% of the newly installed capacities while added Visayas 371 MW or 22.3% and Mindanao with 602 MW or 35.9%.

GENERATION

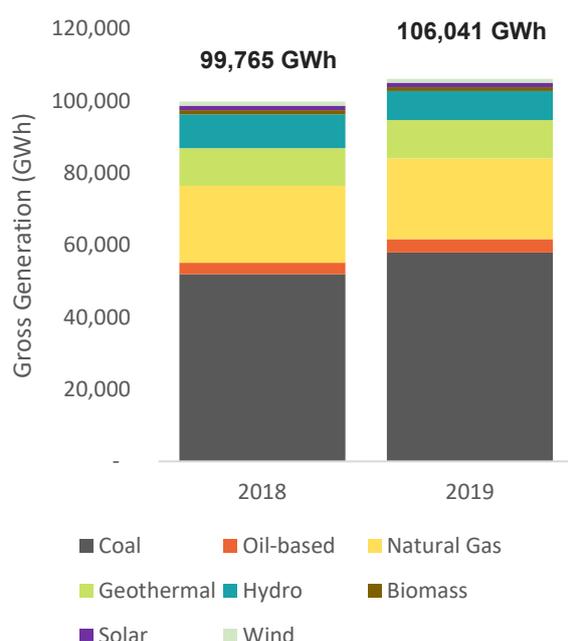


Figure 4. 2018 vs. 2019 Gross Generation, GWh

The 2019 gross generation of the country increased to 106,041 GWh registering a growth of 6.3% from the previous year. Grid generation contributed 98.5% of the mix while off-grid contributed 1.5%. The Luzon grid, being the economic center of the country, contributed the majority of generation at 71.8%. While Visayas and Mindanao grids recorded 15.1% and 13.0% share, respectively. Coal continuously dominated the power mix in 2019 by increasing its share from 52.1% in 2018 to 54.6%. The further increase in coal generation was attributed to the entry of new coal-fired power plants across the country. With the domination of fossil fuels in the mix, renewable energy technologies

decreased its total generation share to 20.8% due to the continuous drop in generation of hydro and limited penetration of other technologies to the mix. Natural gas contributed 21.1% while oil-based plants continuously registered the least contribution in the power mix at single digit growth rate of 3.5%.

POWER PROJECTS

Table 6. Committed and Indicative Capacities, Philippines, as of 31 December 2019 (in MW)

Fuel Type	Committed			Indicative		
	No. of Proponents	Capacity (MW)	% Share	No. of Proponents	Capacity (MW)	% Share
Coal	7	4,126.0	71.5	13	10,463.0	24.4
Oil-Based	3	414.6	7.2	9	2,146.3	5.0
Natural Gas	1	650.0	11.3	9	8,758.0	20.5
Renewable Energy (RE)	20	576.7	10.0	178	21,447.2	50.1

Fuel Type	Committed			Indicative		
	No. of Proponents	Capacity (MW)	% Share	No. of Proponents	Capacity (MW)	% Share
<i>Geothermal</i>	1	50.0	0.9	5	496.0	1.2
<i>Hydro</i>	2	23.1	0.4	68	4,816.6	11.2
<i>Biomass</i>	14	263.6	4.6	20	280.4	0.7
<i>Solar</i>	3	240.0	4.2	67	12,097.8	28.3
<i>Wind</i>	0	0	0	18	3,756.4	8.8
TOTAL	31	5,767.3	100.0	209	42,814.5	100.0
BESS	1	49		15	1,863.5	

NOTE: Numbers may not sum up to total due to rounding off.

To address the increasing demand brought about by economic development, the DOE encourages the private sector to invest in power generation and augment the needed capacity in the power system. As shown in Table 6, capacities from committed power projects reached 5,767 MW by the end of 2019. About 71.5% of these capacities are from coal-fired power projects that will provide baseload capacity in the system in the coming years.

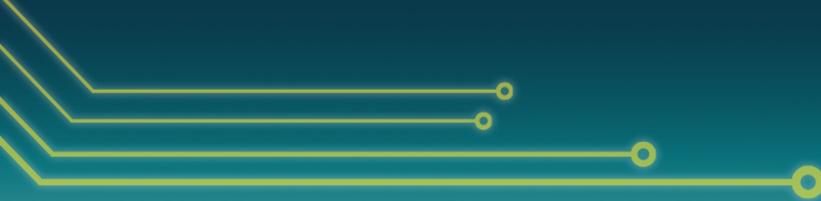
The indicative power projects capacity amounted to 42,815 MW by the end of 2019. Coal-fired power projects contributed 24.4%, while 50.1% is expected to come from renewable energy technologies.

SIGNIFICANT INCIDENTS

LUZON

For 2019, the Luzon grid experienced 46 Yellow Alerts and 16 Red Alerts occurrences. These red and yellow alerts were mainly attributed to the high demand coupled with the mild El Niño condition which further increased the demand and brought down the available capacity of hydroelectric power plants in the grid during the summer months. Other factors that contributed to the issuance of these alerts were the series of unplanned outages, extended outages, and capacity deration of power plants. Furthermore, expected capacity from committed power projects were not able to ease the power situation due to their delayed commissioning and commercial operation, such as the 300 MW Masinloc Expansion and the 150 MW SMC Limay Power Projects. The red alert occurrences resulted in a series of automatic and manual load dropping incidents which led to the implementation of Interruptible Load Program (ILP).

Another notable incident in the Luzon grid was the 6.1 magnitude earthquake that occurred at 5:11 PM of 22 April 2019 with the epicenter located 18 kilometers east of Castillejos, Zambales. After the earthquake, several power plants and some transmission lines in central Luzon tripped leaving Luzon with 10,059 MW available capacity which was insufficient to supply the system demand. Power in the affected areas were immediately restored, however, few power plants were isolated due to sustained transmission line outages and equipment problems in the power plant facilities.



VISAYAS

Visayas grid has been a recipient of a lot of yellow alerts and a few red alerts this 2019, having 186 Yellow alert notices and 10 Red alert notices. These alerts usually occurred in the evening and were amplified on occasions where a significant amount of capacity is unavailable due to plant outages and reduction of output from solar plants. These issuances have been more frequent this year due to increasing demand and the existing transmission line congestions being experienced in the region.

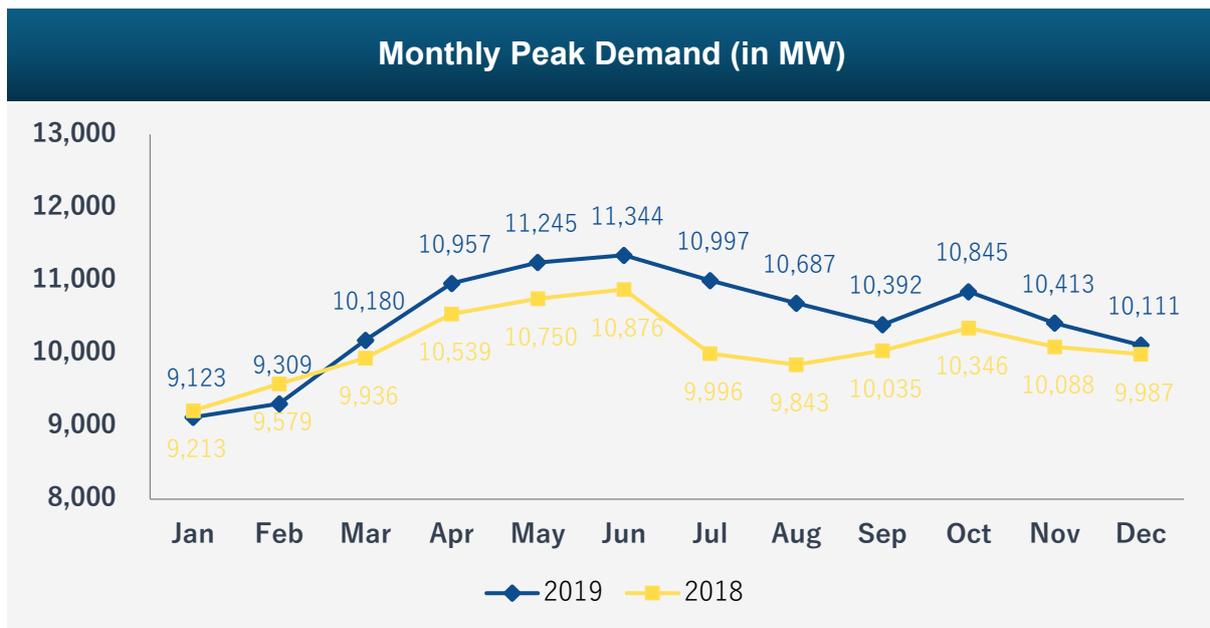
Grid disturbances were also experienced because of power plant and line trippings that resulted in load droppings and momentary power interruptions. One of the issues that is currently being addressed in the Visayas is the availability of operational reserves.

There were a couple of new power plants that went on commercial operation this year and the completion of ongoing transmission projects is expected to alleviate the situation in the grid and help provide the necessary highways where electricity can pass through and be delivered in various parts of the island region.

MINDANAO

Mindanao grid has been known for its over-supply capacity since the addition of coal-fired power plants in the region in 2016. In 2019, there were no recorded yellow and red alerts that disrupted the operation of the Mindanao grid, despite the occurrence of several natural calamities such as earthquakes and typhoons. However, there are still issues on the occurrences of Manual Load Dropping (MLD) in some regions in Mindanao due to the current bilateral dispatch protocol and the absence of the Wholesale Electricity Market (WESM) in the said grid. The mild El Niño resulted in depletion of capacities from Agus-Pulangi Hydroelectric Power Plants while several Distribution Utilities failed to adjust their respective nominations, thus resulting in over-nomination and MLDs. WESM Mindanao is expected to address the issue once it comes online in 2020.

LUZON

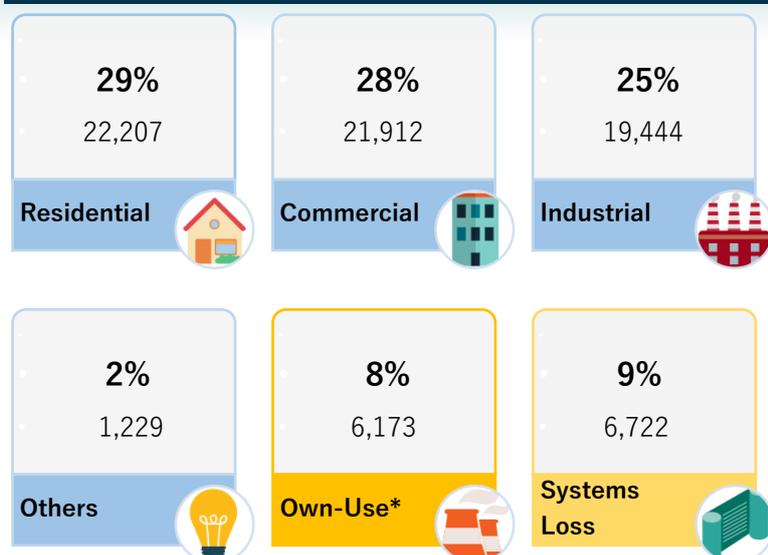


Source: NGCP

Figure 5. 2018 vs. 2019 Peak Demand

The peak demand of the Luzon grid increased to 11,344 MW for 2019, equivalent to 4.3% growth from the 2018 peak demand of 10,876 MW. The peak demand registered by the system operator occurred on 21 June 2019. During the peak interval, a red alert notice was issued and a portion of the demand of the Manila Electric Company (MERALCO) was de-loaded through the Interruptible Load Program (ILP). To capture the actual peak demand of Luzon, the recorded compensable de-loaded ILP participants amounting to 132 MW was added to the system peak demand that resulted in a total of 11,476 MW. With consideration of ILP, the Luzon grid registered an increase of 600 MW or 5.5% from 2018.

Electricity Sales and Consumption (in GWh)



Electricity sales and consumption of Luzon for 2019 reached a total of 77,687 GWh maintaining its growth of 5.7%. The residential sector contributed the most to Luzon's overall growth rate nearly followed by the commercial sector. Luzon's share of the country's total electricity sales and consumption remained the largest at 73.3%.

*Own-Use includes energy consumed in pumping (Kalayaan Power Plant)

Figure 6. 2019 Electricity Sales and Consumption, Luzon

Table 7. Existing Installed and Dependable Capacity, as of 31 December 2019 (in MW)

Fuel Type	Installed		Dependable	
	MW	Percent Share (%)	MW	Percent Share (%)
Coal	6,929	40.1	6,520	41.8
Oil Based	2,585	15.0	1,739	11.1
Natural Gas	3,452	20.0	3,286	21.1
Renewable Energy	4,320	25.0	4,053	26.0
<i>Geothermal</i>	865	5.0	824	5.3
<i>Hydro</i>	2,593	15.0	2,498	16.0
<i>Biomass</i>	164	0.9	105	0.7
<i>Solar</i>	362	2.1	289	1.9
<i>Wind</i>	337	1.9	337	2.2
2019 TOTAL	17,286	100.0	15,598	100.0
BESS	10		10	
2018 TOTAL	16,549		14,973	

NOTE: Numbers may not sum up to total due to rounding off.

Gross Generation (MWh)

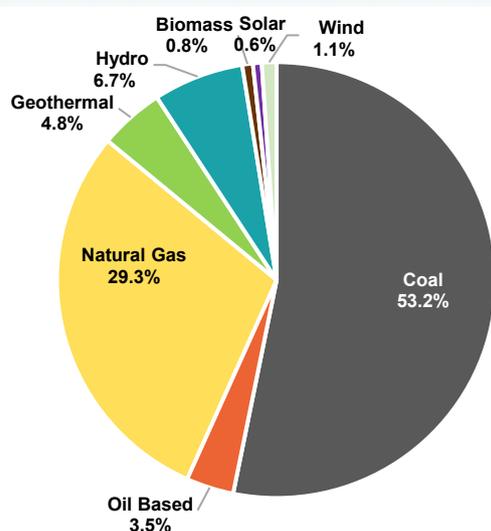


Figure 7. 2019 Gross Generation, Luzon

The 2019 Luzon grid's gross generation reached 76,176 GWh with a growth rate of 4.7%. With the commercial operation of new coal-fired power plants, coal continuously dominated the generation mix with 53.2%. Natural gas generation maintained its share at 29.3%. While renewable energy continued to decrease its share to 14.0% from 16.3% in 2018. The corresponding generation share from geothermal at 4.8%, hydro at 6.7%, biomass at 0.8%, solar at 0.6%, and wind at 1.1%. While oil-based technologies recorded the least share in generation with 3.5%.

Table 8. Newly Operational Capacities, as of 31 December 2019 (in MW)

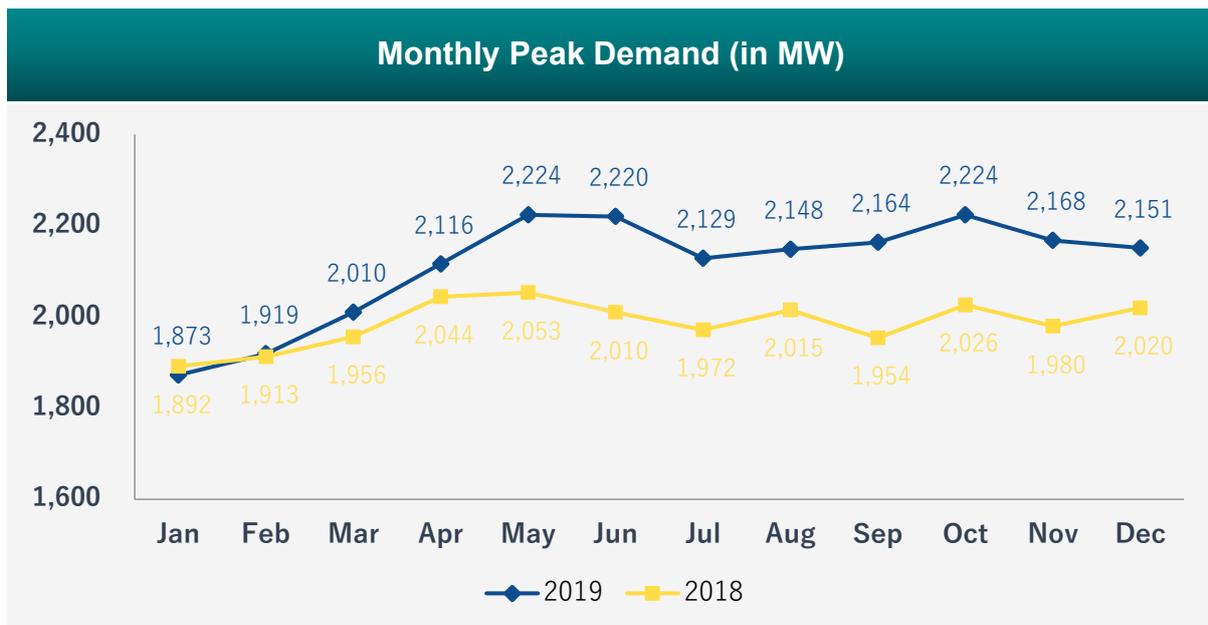
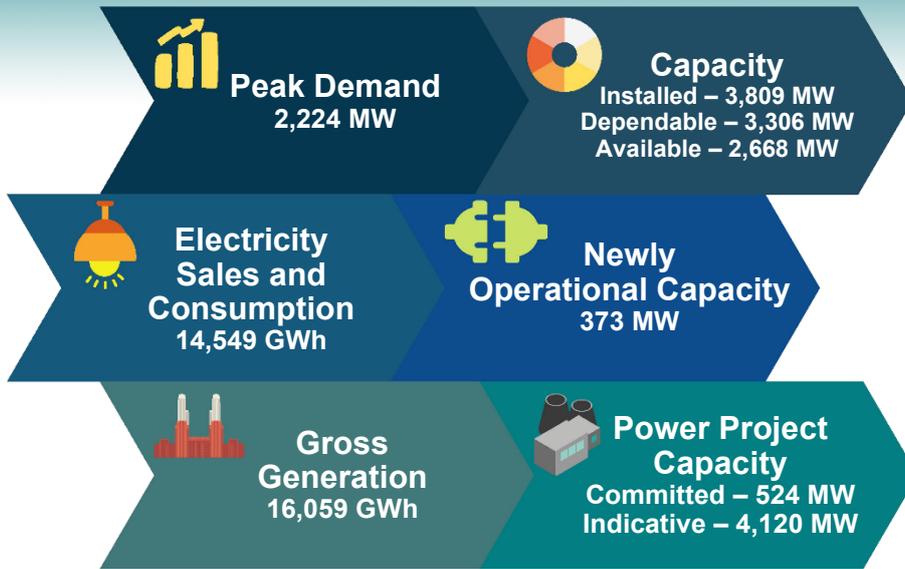
Power Plant Facility Name	Capacity (MW)		Owner/ Operator	Commercial Operation Date
	Installed	Dependable		
Coal	650.0	590.0		
SBPL	500	455	San Buenaventura Power Ltd. (SBPL)	Oct-2019
SCPC U4	150	135	SMC Consolidated Power Corporation (SCPC)	Jul-2019
Hydro	22.6	9.5		
La Trinidad	20.4	8.5	Hydro Electric Development Corporation (HEDCOR), Inc.	Jul-2019
Majayjay	2.2	1	Majayjay Hydropower Company, Inc.	May-2019
Biomass	27.0	24.3		
CBEC	15	13.5	Cagayan Biomass Energy Corporation (CBEC)	Oct-2019
G2REC	12	10.8	Grass Gold Renewable Energy Corporation (G2REC)	Dec-2019
2019 TOTAL	699.6	623.8		
2018 TOTAL	660.0	636.0		

Table 9. Summary of Committed and Indicative Power Projects, as of 31 December 2019 (in MW)

Type of Power Plant	No. of Proponents	Committed Capacity (MW)	% Share	No. of Proponents	Indicative Capacity (MW)	% Share
Coal	4	3,436.0	73.8	9	8,935.0	24.7
Oil-Based	1	300.0	6.4	5	2,016.0	5.6
Natural Gas	1	650.0	14.0	8	8,620.0	23.8
Renewable Energy	7	268.0	5.8	103	16,647.0	46.0
<i>Geothermal</i>	0	0	0	3	390.0	1.1
<i>Hydro</i>	0	0	0	39	3,505.1	9.7
<i>Biomass</i>	5	53.0	1.1	10	129.0	0.4
<i>Solar</i>	2	215.0	4.6	42	10,584.5	29.2
<i>Wind</i>	0	0	0	9	2,038.4	5.6
2019 TOTAL	13	4,654.0	100.0	127	36,218.0	100.0
BESS				8	1,090	
2018 TOTAL	19	4,775.0		92	26,805.0	

NOTE: Numbers may not sum to total due to rounding off.

VISAYAS



Source: NGCP

Figure 8. 2018 vs. 2019 Peak Demand, Visayas

Visayas grid registered a peak demand of 2,224 MW in 2019, showing a growth of 8.3% from the previous year. This is the second straight year that the peak demand of Visayas occurred during the second quarter compared to prior years where the peak demand happened in the fourth quarter.

Electricity Sales and Consumption (in GWh)



In 2019, the electricity sales and consumption of the Visayas Grid grew to 14,549 GWh at a rate of 7.8%. In the previous years, a 4.3% growth rate was posted in 2018 and 5.0% in 2017. The boost in demand for electricity production can be attributed to the robust economic activities in major provinces, especially in Central Visayas which accounted for more than half of the energy consumption in

the grid. Visayan Electric Company, Inc. (VECO), which serves the cities of Cebu, Mandaue, Talisay, Naga, and four municipalities of the greater part of Metro Cebu, contributed 3,714 GWh of electricity, a 10% increase in last year's consumption and making them the second largest distribution utility in the Philippines in terms of electricity sales.

Table 10. Existing Installed and Dependable Capacity, as of 31 December 2019 (in MW)

Fuel Type	Installed		Dependable	
	MW	Percent Share (%)	MW	Percent Share (%)
Coal	1,399	36.7	1,349	40.8
Oil Based	742	19.5	505	15.3
Natural Gas	1	0.0	0	0.0
Renewable Energy	1,667	43.8	1,452	43.9
<i>Geothermal</i>	955	25.1	865	26.2
<i>Hydro</i>	19	0.5	19	0.6
<i>Biomass</i>	127	3.3	97	2.9
<i>Solar</i>	476	12.5	381	11.5
<i>Wind</i>	90	2.4	90	2.7
2019 TOTAL	3,809	100.0	3,306	100.0
2018 TOTAL	3,450		3,000	

NOTE: Numbers may not sum up to total due to rounding off.

Gross Generation (MWh)

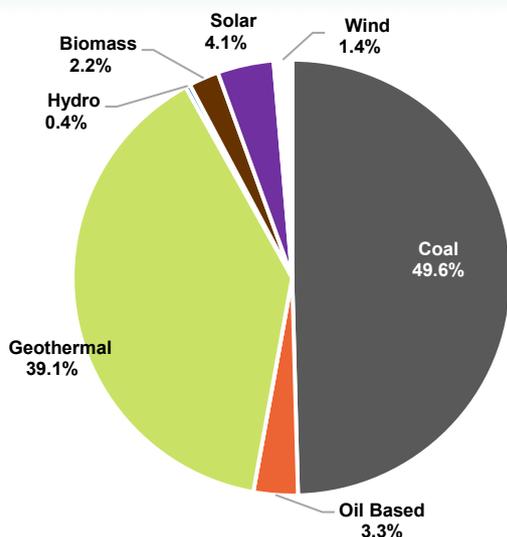


Figure 10. 2019 Gross Generation, Visayas

Power plants within the Visayas grid registered 16,059 GWh of gross generation in 2019. The region continued to remain as the renewable energy dominated grid in the country with 47.2% share of generation coming from renewable energy technologies with corresponding shares of geothermal at 39.1%, solar at 4.1%, biomass at 2.2%, wind at 1.4%, and hydro at 0.4%. For the fossil-based power plants, coal generation increased and still is the largest producer at 49.6% with the entry of new coal-fired power plants while oil-based plants had a share of 3.3%.

Table 11. Newly Operational Capacities, as of 31 December 2019 (in MW)

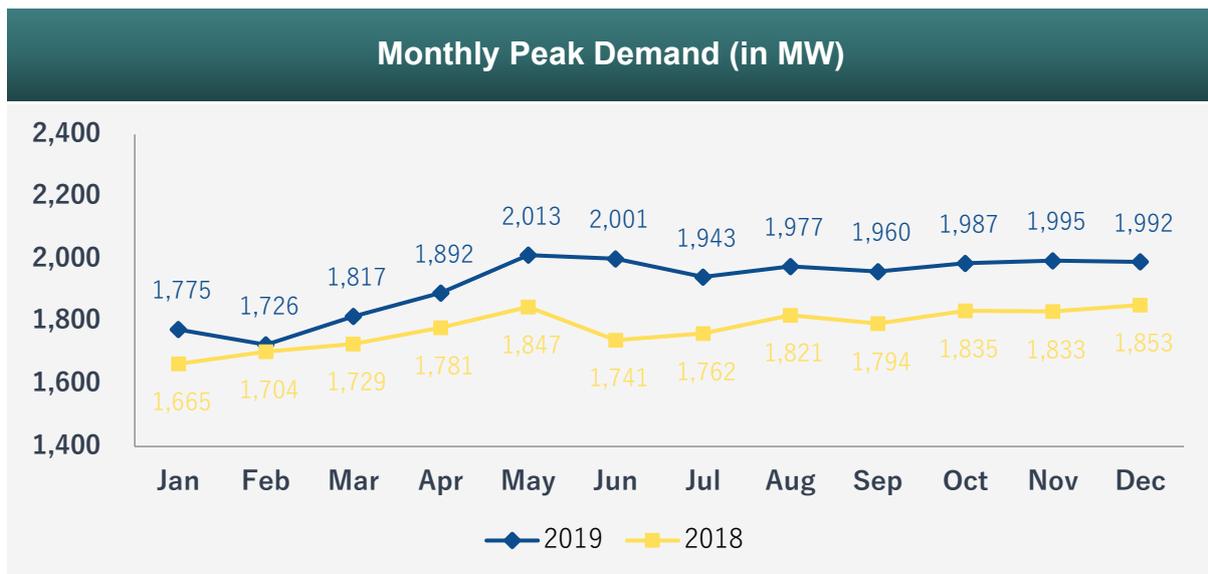
Power Plant Facility Name	Capacity (MW)		Owner/ Operator	Commercial Operation Date
	Installed	Dependable		
Coal	340.0	300.0		
TVI U1	170	150	Therma Visayas, Inc. (TVI)	Apr-2019
TVI U2	170	150	Therma Visayas, Inc. (TVI)	Sep-2019
Diesel	8.0	6.4		
Calumangan	8	6.4	Central Negros Power Reliability, Inc. (CENPRI)	Mar-2019
Biomass	25.0	12.0		
CAB	25	12	Central Azucarera de Bais (CAB)	Nov-2019
2019 TOTAL	373.0	318.4		
2018 TOTAL	0.0	0.0		

Table 12. Summary of Committed and Indicative Power Projects, as of 31 December 2019 (in MW)

Type of Power Plant	No. of Proponents	Committed Capacity (MW)	% Share	No. of Proponents	Indicative Capacity (MW)	% Share
Coal	1	135.0	25.7	1	600.0	14.6
Oil-Based	2	114.6	21.9	4	124.4	3.0
Natural Gas	0	0	0	1	138.0	3.3
Renewable Energy	10	274.7	52.4	36	3,357.5	79.1
<i>Geothermal</i>	1	50.0	9.5	1	76.0	1.8
<i>Hydro</i>	2	23.1	4.4	13	728.2	17.7
<i>Biomass</i>	7	201.6	38.5	3	32.0	0.8
<i>Solar</i>	0	0	0	11	703.3	17.1
<i>Wind</i>	0	0	0	8	1,718.0	41.7
2019 TOTAL	13	524.3	100.0	42	4,119.9	100.0
BESS				4	363.5	
2018 TOTAL	14	766.0		40	3,903.0	

NOTE: Numbers may not sum up to total due to rounding off.

MINDANAO



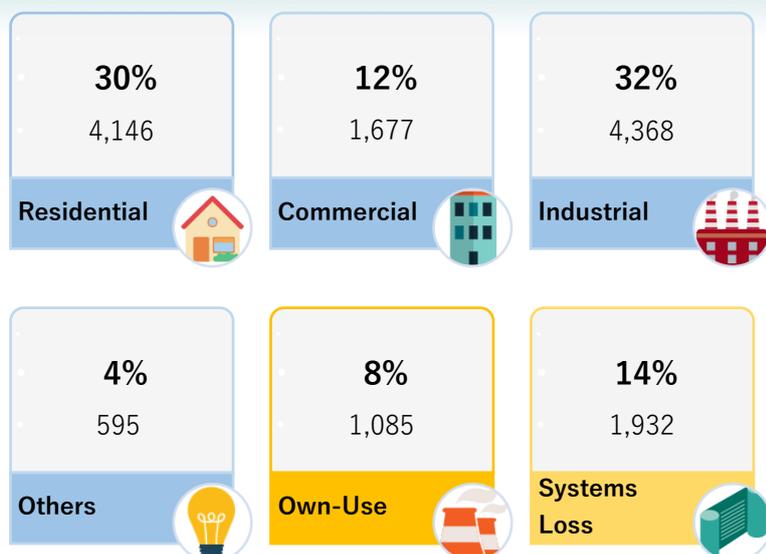
Source: NGCP

Figure 11. 2018 vs. 2019 Peak Demand, Mindanao

The Mindanao grid reached its peak demand of 2,013 MW on 8 May 2019 with an 8.6% growth rate from 2018. The security of supply in Mindanao opens up great demand opportunities in all of its regions. The supply side clearly shows readiness to massive infrastructure projects brought about by the Build, Build, Build Program of the government and various investments in the private sector. Significantly, having the highest reserve margin among the three grids, Mindanao imposes a lot of promise in grid modernization in the upcoming commercial operation of WESM Mindanao and Mindanao-Visayas Interconnection Project.

MINDANAO

Electricity Sales and Consumption (in GWh)



The Mindanao grid recorded 13,805 GWh of electricity sales and consumption. On a per grid basis, the sustained accelerated growth in Mindanao resulted in an 8.1% increase in 2019, relatively in pace with year-ago rate of 8.2%. The Davao Region contributed the most share with 33.3% in total electricity sales and consumption while Zamboanga Peninsula, Northern Mindanao, SOCCSKSARGEN, Caraga,

Figure 12. 2019 Electricity Sales and Consumption, Mindanao and Bangsamoro Autonomous Region in Muslim Mindanao (BARMM) contributed 12.0%, 24.6%, 18.0%, 9.0%, and 3.1%, respectively.

Table 13. Existing Installed and Dependable Capacity, as of 31 December 2019 (in MW)

Fuel Type	Installed		Dependable	
	MW	Percent Share (%)	MW	Percent Share (%)
Coal	2,089	47.1	1,874	48.9
Oil Based	936	21.1	771	20.1
Natural Gas	0	0.0	0	0.0
Renewable Energy	1,412	31.8	1,186	31.0
<i>Geothermal</i>	108	2.4	103	2.7
<i>Hydro</i>	1,147	25.9	991	25.9
<i>Biomass</i>	73	1.6	25	0.7
<i>Solar</i>	84	1.9	67	1.7
<i>Wind</i>	0	0.0	0	0.0
2019 TOTAL	4,436	100.0	3,832	100.0
2018 TOTAL	3,815		3,269	

NOTE: Numbers may not sum up to total due to rounding off.

Gross Generation (GWh)

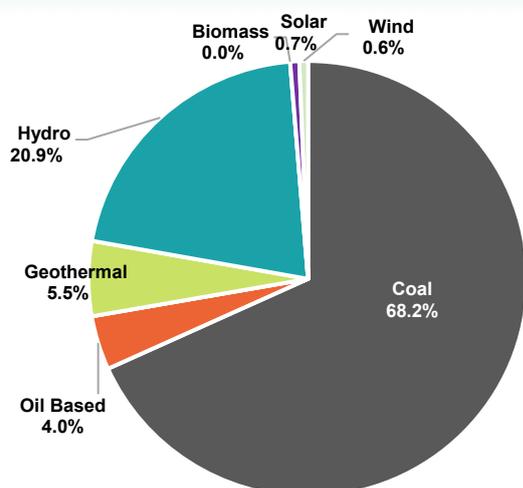


Figure 13. 2019 Gross Generation, Mindanao

The Mindanao gross generation amounted to 13,805 GWh for 2019. Coal further increased its share in the mix at 68.2% due to the addition of 3x150 MW GNPk Coal and 119 MW SEC Coal Expansion Unit. This increase is expected to continue when the 150 MW GNPk Unit 4 comes online by 2020. Meanwhile, renewable energy sources contributed 27.7% share, comprising geothermal (5.5%), hydro (20.9%), biomass (0.7%), and solar (0.6%). Similar to the Luzon and Visayas grids, oil-based plants provided the least contribution at 4.0%.

Table 14. Newly Operational Capacities, as of 31 December 2019 (in MW)

Power Plant Facility Name	Capacity (MW)		Owner/ Operator	Commercial Operation Date
	Installed	Dependable		
Coal	568.5	519.0		
GNPower Kauswagan U1	150	138	GNPower Kauswagan Ltd. Co. (GNPK)	May-2019
GNPower Kauswagan U2	150	138	GNPower Kauswagan Ltd. Co. (GNPK)	Dec-2019
GNPower Kauswagan U3	150	138	GNPower Kauswagan Ltd. Co. (GNPK)	Dec-2019
SEC U2	118.5	105	Sarangani Energy Corporation (SEC)	Oct-2019
Hydro	8.0	8.0		
Asiga	8	8	Asiga Green Energy Corporation (AGEC)	May-2019
Solar	25.0	20.0		
ADGI	25	20	Astronergy Development Gensan, Inc. (ADGI)	Dec-2019
2019 TOTAL	601.5	547.0		
2018 TOTAL	274.1	257.3		

Table 15. Summary of Committed and Indicative Power Projects, as of 31 December 2019

Type of Power Plant	No. of Proponents	Committed Capacity (MW)	% Share	No. of Proponents	Indicative Capacity (MW)	% Share
Coal	2	555.0	94.2	3	928.0	37.5
Oil-Based	0	0	0	1	5.9	0.2
Natural Gas	0	0	0	0	0	0
Renewable Energy	3	34.0	5.8	38	1,542.7	62.3
<i>Geothermal</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>1</i>	<i>30.0</i>	<i>1.2</i>
<i>Hydro</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>13</i>	<i>583.3</i>	<i>23.6</i>
<i>Biomass</i>	<i>2</i>	<i>9.0</i>	<i>1.5</i>	<i>7</i>	<i>119.4</i>	<i>4.8</i>
<i>Solar</i>	<i>1</i>	<i>25.0</i>	<i>4.2</i>	<i>17</i>	<i>810.0</i>	<i>32.7</i>
<i>Wind</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>
2019 TOTAL	5	589.0	100.0	47	2,476.6	100.0
BESS	1	49.0		3	410.0	
2018 TOTAL	11	788.0		41	2,491.0	

NOTE: Numbers may not sum to total due to rounding off.

TRANSMISSION

GRID PROFILE

As of December 2019, a total of 36,436 MVA substation capacities and 20,079 circuit-km are accounted for in the transmission assets being managed by NGCP. Table 16 below shows the summary of existing facilities.

Table 16. Summary of Existing Facilities, 2018 vs. 2019

Total Substation Capacity (MVA)		
	2018	2019
Philippines	34,852	36,436
• Luzon	26,598	28,021
• Visayas	4,874	4,884
• Mindanao	3,380	3,531
Total Transmission Line Length (CKT-KM)		
	2018	2019
Philippines	20,505	20,079
• Luzon	9,447	9,227
• Visayas	5,379	5,299
• Mindanao	5,679	5,553

Source: 2020-2040 TDP

To ensure that voltages across the network are within the levels prescribed in the Philippine Grid Code, capacitor banks and shunt reactors have been installed in appropriate locations in different parts of the grid with summary shown in Table 17:

Table 17. Summary of Installed Capacitor Banks and Shunt Reactors, 2019

	CAPACITOR BANK (MVAR)*	SHUNT REACTOR (MVAR)
Philippines	2,564	1,758
Luzon	2,013	1,160
Visayas	267	575
Mindanao	285	23

TRANSMISSION PROJECTS COMPLETED

For 2019, 13 main grid projects were completed and energized by NGCP, of which accumulated by a total of 55ckt-km Transmission Line, 3,200MVA and 1352.5MVAR of substation capacity. These projects were intended to facilitate entry of generation capacities, load growth, and system reliability.

Table 18. Transmission Grid Projects Completed, 2019

Project Name/Components	MVA	MVAR	CKT-KM	Date of Completion/Energization
Luzon Leg				
Hermosa–Floridablanca 69 kV Transmission Line	-	-	17	Feb 2019
San Jose 500 kV Substation (4th Bank)	750	-	-	Apr 2019
North Luzon Substation Upgrading Project 1 – Malaya Substation	300	-	-	Oct 2019
Luzon Voltage Improvement Project 3, Stage 1		50		Mar 2019
• Cabanatuan Substation (Capacitor Bank 2)		50		Oct 2019
• Cabanatuan Substation (Capacitor Bank 1)		25		Mar 2019
• Tuguegarao Substation (Capacitor Bank 1)		200		Mar 2019
• San Jose Substation (Capacitors Banks 5 & 6)	-	200	-	Apr 2019
• Mexico Substation (Capacitor Banks 3 & 7)		25		Aug 2019
• Tuguegarao Substation (Power Shunt Reactor)		90		Aug 2019
• Nagsaag Substation (Shunt Reactor)		7.5		Sep 2019
• Bantay Substation (Capacitor Bank)				
• Laoag Substation (Shunt Reactor)		25		Sep 2019
• Laoag Substation (Capacitor Banks)		50		Sep 2019
Luzon Voltage Improvement Project 4, Stage 1		200		Apr 2019
• Biñan Substation (Capacitor Bank 3 & 4)	-	200	-	Apr 2019

Project Name/Components	MVA	MVAR	CKT-KM	Date of Completion/Energization
<ul style="list-style-type: none"> Dasmariñas Substation (Capacitor Bank 3 & 4) 				
Tower Structure Upgrading of Bicol Transmission Facilities (formerly Permanent Restoration Works of Toppled Towers by Typhoon Nina)	-	-	-	Apr 2019
<ul style="list-style-type: none"> Naga–Tiwi C Transmission Line 2 (36 Towers) 				
Visayas Leg				
Visayas Voltage Improvement Project, Stage 1				
<ul style="list-style-type: none"> Compostela Substation Corella Substation 	-	40 15	-	Dec 2019 Dec 2019
Mindanao Leg				
Matanao–Toril–Bunawan 230kV Transmission Line	-	-	38	Dec 2019
Mindanao 230 kV Backbone, Stage 1				
<ul style="list-style-type: none"> Bunawan Substation Toril Substation Culaman Substation 	600 600 50	-	-	Oct 2019 Nov 2019 Dec 2019
Balo-i–Kauswagan–Aurora 230 kV Substation Phase 1	300	-	-	Jun 2019
Mindanao 230 kV Backbone, Stage 2				
<ul style="list-style-type: none"> Villanueva Substation Villanueva Substation (Shunt Reactor) 	600 -	- 70	- -	Nov 2019 Sep 2019
Mindanao Substation Reliability Project 1				
<ul style="list-style-type: none"> Maco Substation (Capacitor Bank 3) Nabunturan (Capacitor Bank 5) 	-	7.5 7.5	-	Oct 2019 Oct 2019
Mindanao Substation Upgrading Project 1				
<ul style="list-style-type: none"> Pitogo Substation (Capacitor Banks 3 & 4) Butuan Substation (Capacitor Banks 4 & 5) 	-	15 22.5 15	-	Dec 2019 Oct 2019 Oct 2019
	-	22.5	-	Oct 2019

Project Name/Components	MVA	MVAR	CKT-KM	Date of Completion/ Energization
<ul style="list-style-type: none"> Placer Substation (Capacitor Banks 2 & 3) 	-	7.5	-	Oct 2019
<ul style="list-style-type: none"> San Francisco Substation (Capacitor Banks 1, 2, & 3) 	-	7.5	-	Nov 2019
<ul style="list-style-type: none"> Gen. Santos Substation (Capacitor Bank 4) 				
<ul style="list-style-type: none"> Tacurong Substation (Capacitor Bank 4) 				
Total	3,200	1,352.5	55	13 Projects

MAJOR COMMITTED PLANTS AND ASSOCIATED TRANSMISSION PROJECTS

The following tables and maps show the list of major committed plants on the grid and the associated transmission projects that will accommodate their entry:

Luzon Grid

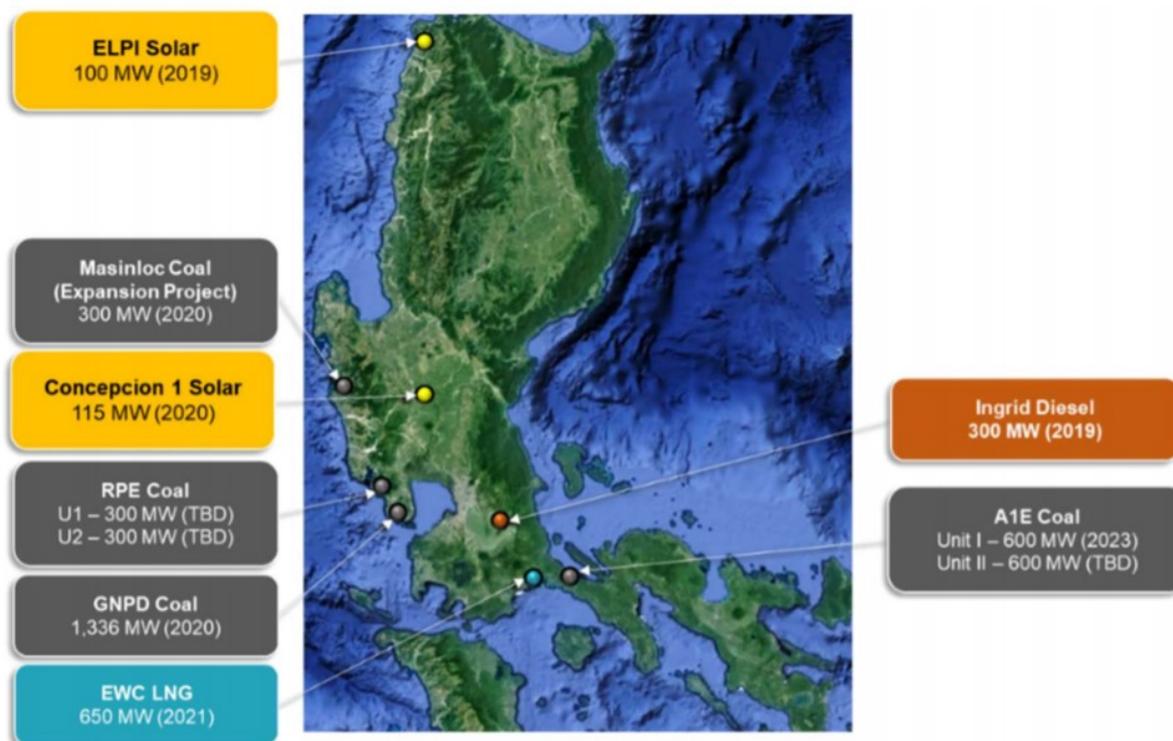


Figure 14. Luzon Generation Capacity Addition (Committed Power Plants)

Table 19. Luzon Power Generation Projects as of December 2019 with Associated Transmission Projects

Based on DOE List of Private Sector Initiated Power Projects as of December 2019			Based on Transmission Development Plan 2020-2040		
Proposed Major Power Plants	Capacity (MW)	Comm. Year	Connection Point	Associated Transmission Project	ETC*
COAL					
Masinloc Expansion Project*	300	Q1 2020	Masinloc 230 kV Switchyard	San Manuel–Nagsaag 230 kV Transmission Line	Mar 2021
RPEI Coal-Fired Power Project*	600	Unit I 2020	Hermosa 230 kV Substation (Initial Connection) Castillejos 230 kV Substation	Western 500 kV Backbone (Stage 1)	Jun 2021

Based on DOE List of Private Sector Initiated Power Projects as of December 2019

Based on Transmission Development Plan 2020-2040

Proposed Major Power Plants	Capacity (MW)	Comm. Year	Connection Point	Associated Transmission Project	ETC*
		Unit II 2021	(Permanent Connection)		
GNPower Dinginin 2 x 660 MW Supercritical Coal-Fired Power Project*	1336	2020	Mariveles 500 kV Substation	Mariveles–Hermosa 500 kV Transmission Line Project Hermosa–San Jose 500 kV Transmission Line Project	Dec 2020 Mar 2021
A1E Coal-Fired Power Project*	1200	Unit 1 early Q4 2023 Unit 2 TBD	Pagbilao 500 kV Substation	Pagbilao 500 kV Substation Pagbilao–Tayabas 500 kV Transmission Line Project	Mar 2021 Jul 2023
OIL-BASED					
Ingrid Pililla Diesel Power Plant*	300	Dec 2019	Malaya 230 kV Substation	None	2020
NATURAL GAS					
EWC CCGT Power Plant *	650	Dec 2021	Pagbilao 230 kV Substation	Pagbilao 500 kV Substation	Mar 2021
SOLAR					
ELPI Pasuquin Solar Power Plant Project*	100	Dec 2019	Laoag 115 kV Substation	None	N/A
Concepcion 1 Solar Power Project*	115	Dec 2020	Concepcion 69 kV Substation	None	N/A
BIOMASS					
GGREC Napier Grass- Fired Biomass Power Plant*	12	Aug 2019	Cabanatuan 69 kV Substation	None	N/A
Isabela La Suerte Rice Husk-Fired	5	Nov 2019	ISELCO II San Manuel 13.2 kV feeder	None	N/A
VSGPC Multi-Feedstock Biomass Power Plant Project*	6	Nov 2019	Cabanatuan 69 kV Substation	None	N/A
Cleangreen Energy Biomass Power Plant Project*	12	Nov 2019	Hermosa 69 kV Substation	None	N/A
Green Innovations Biomass Power Plant*	18	Nov 2019	Gamu 69 kV Substation	None	N/A

NOTE: Commissioning year for each power plant is still subject to update.

* - with SIS

Visayas Grid

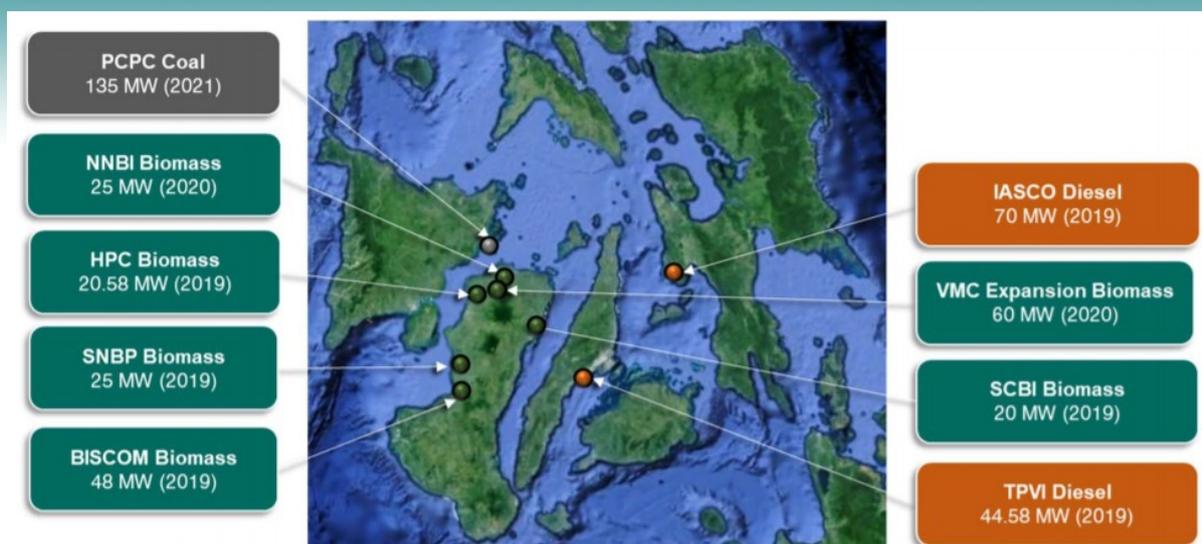


Figure 15. Visayas Generation Capacity Addition (Committed Power Plants)

Table 20. Visayas Power Generation Projects as of December 2019 with Associated Transmission Projects

Based on DOE List of Private Sector Initiated Power Projects as of December 2019			Based on Transmission Development Plan 2020-2040		
Proposed Major Power Plants	Capacity (MW)	Comm. Year	Connection Point	Associated Transmission Project	ETC
COAL					
Palm Concepcion Coal-Fired Power Project*	135	Dec 2021	Direct connection to Concepcion Substation	Eastern Panay Transmission Line Project	Completed
OIL-BASED					
Isabel Modular Diesel Ancillary Service Power Project*	70	Dec 2019	Interim: Cutin along Isabel–Pasar 138 kV Line 2 Final: Direct connection to Isabel Substation	No grid reinforcement required Cebu–Leyte 230 kV Interconnection Line 3 and 4	N/A Mar 2025
TPVI DieselFired Power Plant*	44.58	Nov 2019	Existing connection at NGCP’s Naga 138 kV Substation	No grid reinforcement required	N/A
BIOMASS					
BISCOM Cogeneration Power Plant*	48	Oct 2019	Tap connection along Kabankalan– La	CNP 230 kV Backbone Stage 3	Dec 2021

Based on DOE List of Private Sector Initiated Power Projects as of December 2019			Based on Transmission Development Plan 2020-2040		
Proposed Major Power Plants	Capacity (MW)	Comm. Year	Connection Point	Associated Transmission Project	ETC
			Castellana 69 kV line		
SNBI Cane trash-Fired Biomass Power Project *	25	Oct 2019	Tap connection along Bacolod–San Enrique 69 kV line	CNP 230 kV Backbone Stage 3	Dec 2021
NNBI Biomass Power Plant Project*	25	Nov 2019	Direct connection to NGCP’s 69 kV Cadiz Substation or tap connection along Cadiz-Victorias 69 kV line	CNP 230 kV Backbone Stage 3	Dec 2021
VMC Cogeneration Power Project *	60	Jan 2021	Tap connection along Cadiz-Victorias 69kV line	CNP 230 kV Backbone Stage 3	Dec 2021
SCBI Multi-Feedstock Biomass Power Project *	20	Nov 2019	Tap connection along Cadiz–San Carlos 69 kV line	CNP 230 kV Backbone Stage 3	Dec 2021
HPC Cogeneration Power Plant Project*	20.58	Dec 2019	Tap connection along Cadiz–Silay 69 kV line	No grid reinforcement required	N/A

NOTE: Commissioning year for each power plant is still subject to update.

Mindanao Grid

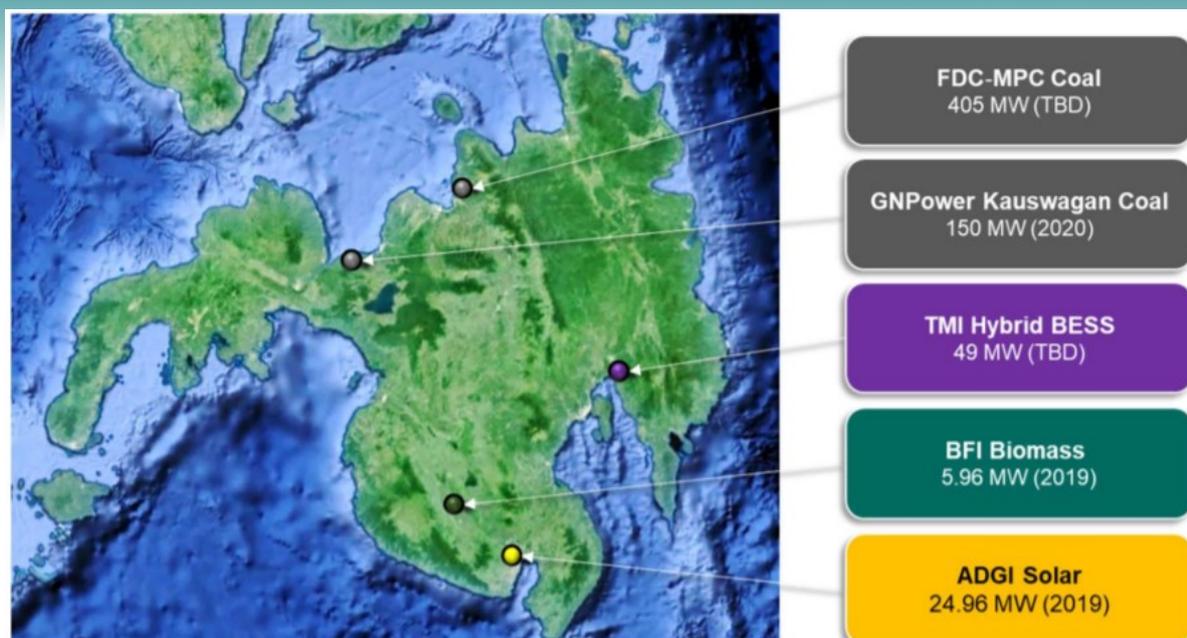


Figure 16. Mindanao Generation Capacity Addition (Committed Power Plants)

Table 21. Mindanao Power Generation Projects as of August 2018 with Associated Transmission Projects

Based on DOE List of Private Sector Initiated Power Projects as of August 2018			Based on Transmission Development Plan 2019-2040		
Proposed Major Power Plants	Cap. (MW)	Comm. Year	Connection Point	Associated Transmission Project	ETC
COAL					
GNPower Kauswagan Clean Coal-Fired Power Plant*	150	Q1 2020	Kauswagan Substation	Balo-I – Kauswagan 230 kV Transmission Line Project	Completed
FDC- MPC CFB Coal- Fired Power Plant	405	TBD	Villanueva Substation	Villanueva– Kinamlutan 230 kV T/L and Opol S/S Bus-in Project	Jan 2025
SOLAR					
ADGI GenSan Solar Power Project*	24.96	Dec 2019	General Santos Substation	Embedded Generation -No Transmission Reinforcement Required	N/A

Based on DOE List of Private Sector Initiated Power Projects as of August 2018

Based on Transmission Development Plan 2019-2040

Proposed Major Power Plants	Cap. (MW)	Comm. Year	Connection Point	Associated Transmission Project	ETC
BIOMASS					
PTCI Rice Husk-Fired Biomass Cogeneration Facility	3	Jun 2019	Sultan Kudarat Substation	Embedded Generation -No Transmission Reinforcement Required	N/A
BFI Biogas Power Project	5.96	Nov 2019	SOCOTECO I's 69 kV SubTransmission on Line	Embedded Generation -No Transmission Reinforcement Required	N/A

NOTE: Commissioning year for each power plant is still subject to update.
* - with SIS

PROPOSED TRANSMISSION NETWORK OUTLOOK FOR 2040

1 Bolo to Laoag 500kV Backbone (July 2025)

- To support the entry of large generation capacity in La Union and Mountain Province and to accommodate the additional wind farm project in Ilocos Area.

2 Nagsaag to Kabugao 500kV Backbone (Dec 2035)

- To harness the bulk hydro generation capacities in the upstream of Apayao and consideration to the full wind power generation potential in North Luzon.

3 Western Luzon 500kV Backbone (June 2025)

Stage 1: Castillejos-Hermosa 500kV T/L (June 2020)

- To develop a 500 kV western corridor that will accommodate the bulk generation in Zambales area.

Stage 2: Castillejos-Bolo 500 kV T/L (Aug 2024)

- To provide additional transmission line capacity and increase system reliability through N-2 contingency for the 500 kV backbone in Luzon.

4 Metro Manila 500kV Backbone Loop (Sept 2021)

- To provide additional transmission line capacity and accommodate demand growth in the load center of Luzon.

5 Batangas-Mindoro Interconnection (Dec 2024)

- To provide additional transmission line capacity and accommodate demand growth in the load center of Luzon.

6 Luzon-Visayas Bipolar Operation (Dec 2030)

- To accommodate additional generation, import and export to the Visayas Grid

7 Palawan-Mindoro Interconnection Project-PMIP (Dec 2024)

- To provide the Mainland Palawan a more reliable supply of power and to address the power quality issues which result to frequent blackouts experienced by customers. The project is also in support to the government's direction of interconnecting off-grid areas into the main grid.

8 Cebu-Negros-Panay 230kV Backbone (Dec 2020)

Stage 1: Negros-Panay Interconnection (Dec 2019)

- To increase transfer capacity of the existing corridor and maintain the N-1 contingency provision.

Stage 2: Cebu Substation

- To ensure the effective full generation dispatch of the entry of a new power plant.

Stage 3: Negros-Cebu Interconnection

- To accommodate the transmission of excess power from Panay and Negros Islands towards the rest of the Visayas Grid and possibly Luzon Grid.

9 Metro Cebu Backbone Loop (Dec 2040)

- To ensure adequate supply facilities in the long term.

TRANSMISSION MASTER PLAN

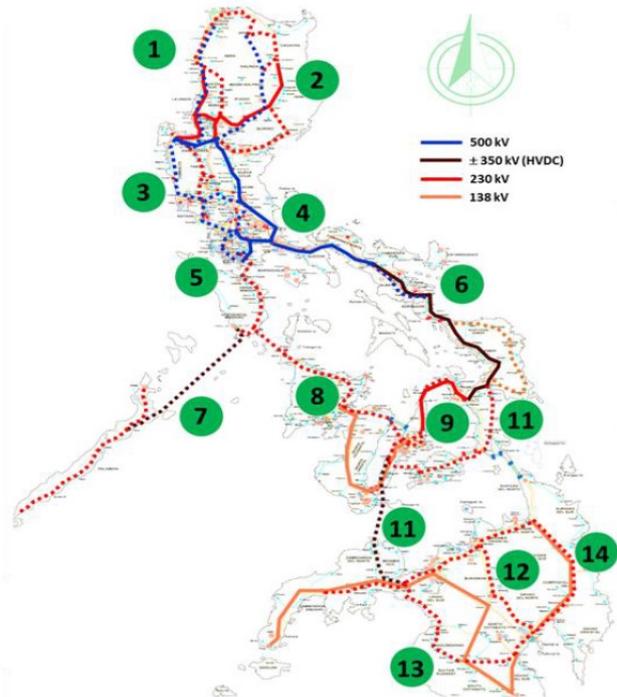


Figure 17. Proposed Transmission Master Plan

10 Cebu-Bohol-Leyte 230kV Backbone (Dec 2035)

- To significantly boost the supply reliability to support load growth.

11 Mindanao-Visayas Interconnection (Dec 2020)

- To boost the development of the country's electricity market to include the Mindanao Grid.
- To provide benefit to the system in terms of added supply security, improved system reliability and improvement in the quality of power supply.

12 Mindanao 230kV Backbone (Dec 2019)

- To increase transfer capacity of the existing corridor and maintain the N-1 contingency provision.

13 Western Mindanao 230kV Transmission Backbone (Dec 2040)

- To obtain power flow reliability in Maguindanao and Zamboanga Peninsula.

14 Eastern Mindanao 230kV Transmission Backbone (Jan 2025)

- To entail reinforcement of existing single circuit lines and extension of needed lines mainly in CARAGA and Davao Oriental.

SIGNIFICANT INCIDENTS

Several incidents caused multiple power interruptions in the Grid in 2019.

- 20 January 2019, attributed to heavy flooding brought by the entry of Typhoon Amang which caused outage to below transmission line:

Table 22. Transmission Outages due to Typhoon Amang

Transmission Line	Duration (hrs)	Frequency
San Francisco – Tandag 69 kV	4.19	1

- 02 December 2019, attributed to heavy flooding brought by the entry of Typhoon Tisoy which caused outages on the following:

Table 23. Transmission Outages due to Typhoon Tisoy

Transmission Line	Duration (hrs)	Frequency
Borongan - Quinapondan 69 kV Line	2.75	1
Calbayog-Bliss 69 kV Line	46.03	1
Calbayog-Palanas-Allen-Lao-ang 69 kV L	39.90	1
Daraga-Bacman 230 kV L1	339.60	2
Daraga-Bacman 230 kV L2	326.22	1
Daraga-Naga 230 kV L1	322.93	1
Daraga-Tiwi A 230 kV L	257.73	1
Dasma-Abubot-Rosario 115 kV L	1.77	2
Dingle-Calinog 69 kV L (CO)	1.53	1
Dolores-Malaya 230 kV L1	0.25	1
Gumaca-Labo 230 kV L2	132.83	1
Labo-Gumaca 230 kV L1	22.47	1
Labo-Naga 230 kV L1	61.80	1
Lumban-Gumaca 230 kV L1	177.62	3
Naga-Tayabas 230 kV L1	0.77	1
Naga-Tayabas 230 kV L2	18.87	3
Naga-Tiwi A 230 kV L	366.42	1
Naga-Tiwi C 230 kV L1	622.05	1
Ormoc-Lemon-Tolosa-San Isidro 69 kV Line	21.98	2
Pagbilao-Tayabas 230 kV L2	1.70	2
Paranas-Borongan-Quinapondan 69 kV L	16.57	1
San Jose-Tayabas 500 kV L2	0.27	1
Tayabas-Naga 230 kV L1	62.57	1

- 24 December 2019 due to the entry of Typhoon Ursula that caused 15 trippings on the following transmission lines:

Table 24. Transmission outages due to Typhoon Ursula

Transmission Line	Duration (hrs)	Frequency
Avon-Caticlan 69 kV L (CO)	135.48	1
Babatngon-Apitong-Arado 69 kV Line	40.50	1
Caticlan-Malay 69kV L	112.08	1
Concepcion-Sara-Estancia 69 kV Line	8.78	1
Dingle-Calinog 69 kV L (CO)	0.22	1
Malay 69/13.2 kV T1 (30MVA)	0.32	1
Miag-ao-Tigbauan 69 kV Line	13.37	1
Ormoc-Lemon-Tolosa-San Isidro 69 kV Line	0.05	1
Panit-an-Altavas 69 kV L	0.00	1
Panit-an-Circuit 124 69 kV Tie Line (CO)	5.55	1
Panit-an-Roxas 69 kV L	17.00	1
Panit-an-Sara 69 kV Line	0.00	1
San Jose - Bugasong - SUWECO 69 kV L	7.77	1
San Jose-Hamtic 69 kV L	2.82	2

DISTRIBUTION

There are one-hundred fifty-one (151) distribution utilities (DUs) in the country, of which one-hundred twenty-one (121) are Electric Cooperatives, twenty-four (24) Privately-Owned Distribution Utilities including entities duly authorized to operate within the economic zones, five (5) local government unit owned and operated utilities, and one (1) Multi-Purpose Cooperative.

To ensure the reliability and security of power supply, DUs have implemented various capital expenditure projects including electrification, network and non-network projects. As of 2019, a total of 7,160 ckt-km of sub-transmission lines, 186,017 ckt-km of distribution lines and 28,563 MVA substation capacities were completed. Table 25 shows the actual completed projects of DUs per grid:

Table 25. 2019 Capital Expenditure Projects

CAPITAL EXPENDITURE PROJECTS		
Luzon		
Subtransmission Facilities	ckt-km	4,005
Distribution Facilities	ckt-km	83,576
Substation Capacities	MVA	21,976
Visayas		
Subtransmission Facilities	ckt-km	1,051
Distribution Facilities	ckt-km	38,479
Substation Capacities	MVA	2,783
Mindanao		
Subtransmission Facilities	ckt-km	2,104
Distribution Facilities	ckt-km	63,962
Substation Capacities	MVA	3,804

Source: 2019-2028 Distribution Development Plan

The following figures are the one-page infographic profiles of the DUs per region which features the regional supply and demand outlook and annual average growth rate of peak demand over the ten-year planning period. It also shows the actual and forecasted energy requirements of the DUs and the 2018 actual number of customers per sector: residential, commercial, industrial, and others. Also, the completed (as of 2019) and planned capital expenditures projects are also presented.

NOTE:

1. All data and information contained in the one-page infographic profile were sourced from the 2019-2028 Distribution Development Plan of the DUs.
2. DUs without submission are marked with (*).
3. Data of Supply and Demand, Number of Customers, Energy Sales, Electricity Purchased, System Loss and Capital Expenditure Projects may not add up to totals due to rounding off numbers.

NATIONAL CAPITAL REGION (NCR)



Figure 18. One-Page Infographic Profile of DUs - NCR

CORDILLERA ADMINISTRATIVE REGION (CAR)

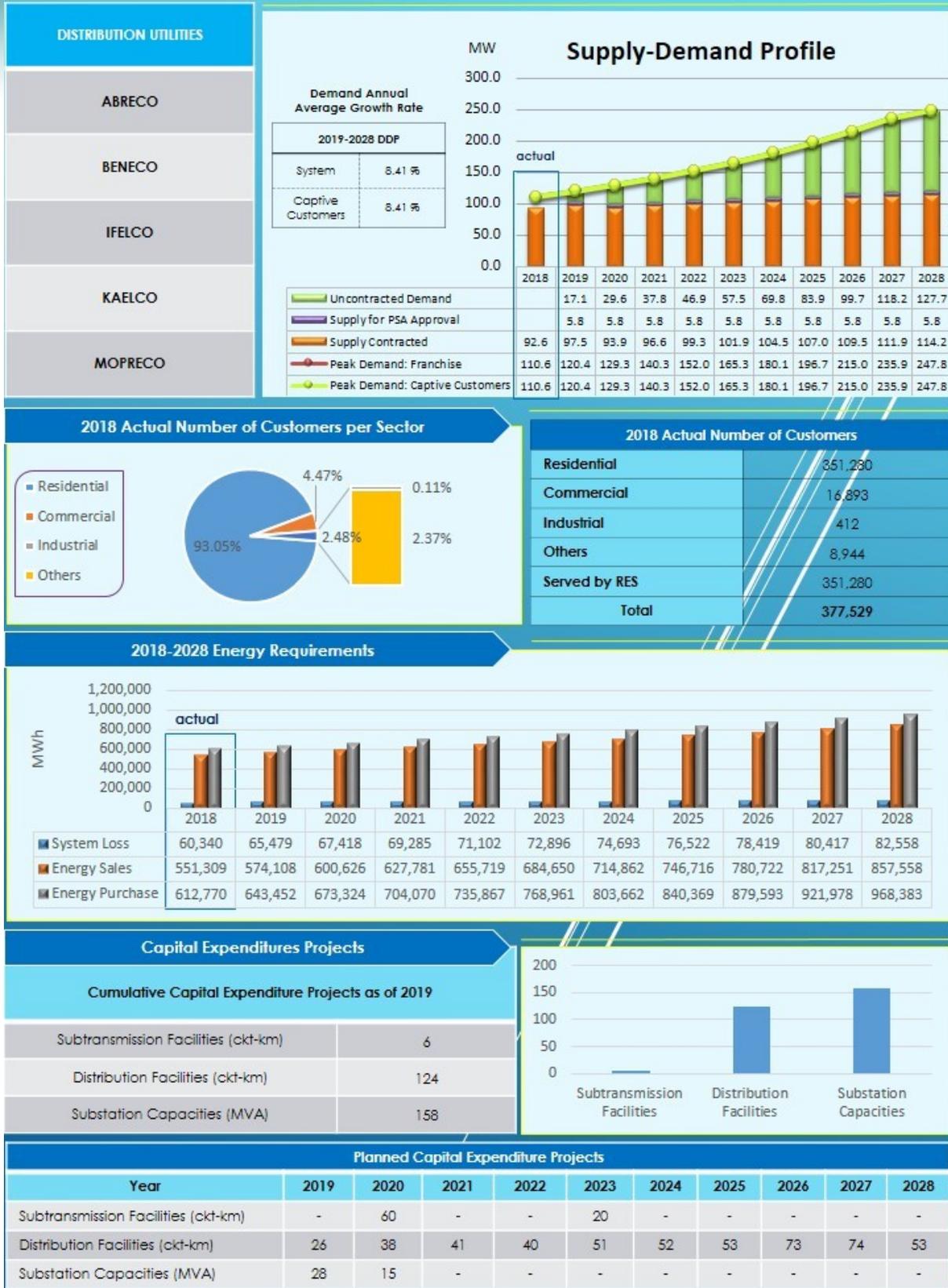


Figure 19. One-Page Infographic Profile of DUs - CAR

REGION I – ILOCOS REGION

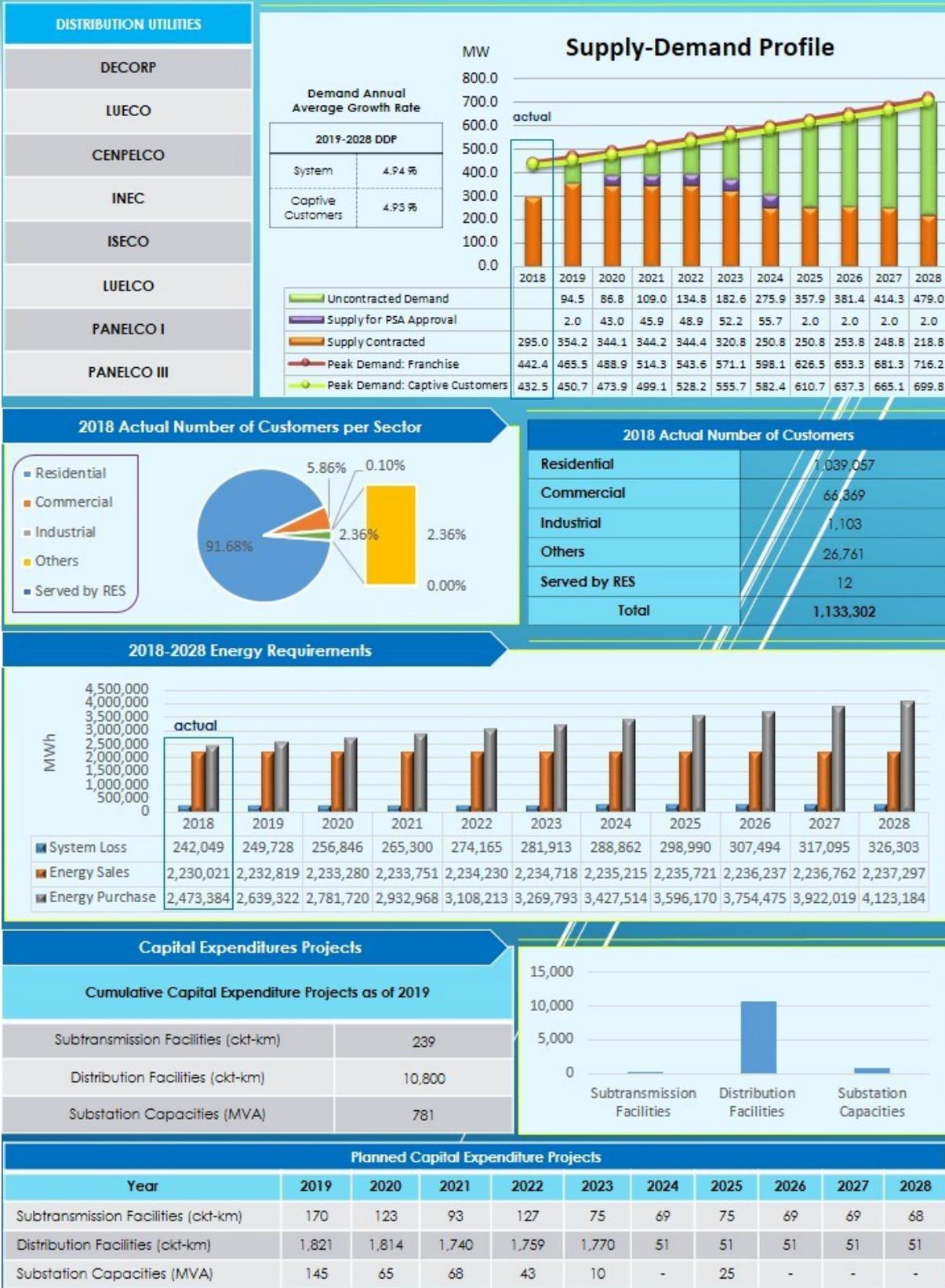


Figure 20. One-Page Infographic Profile of DUs – Region I

REGION II – CAGAYAN VALLEY

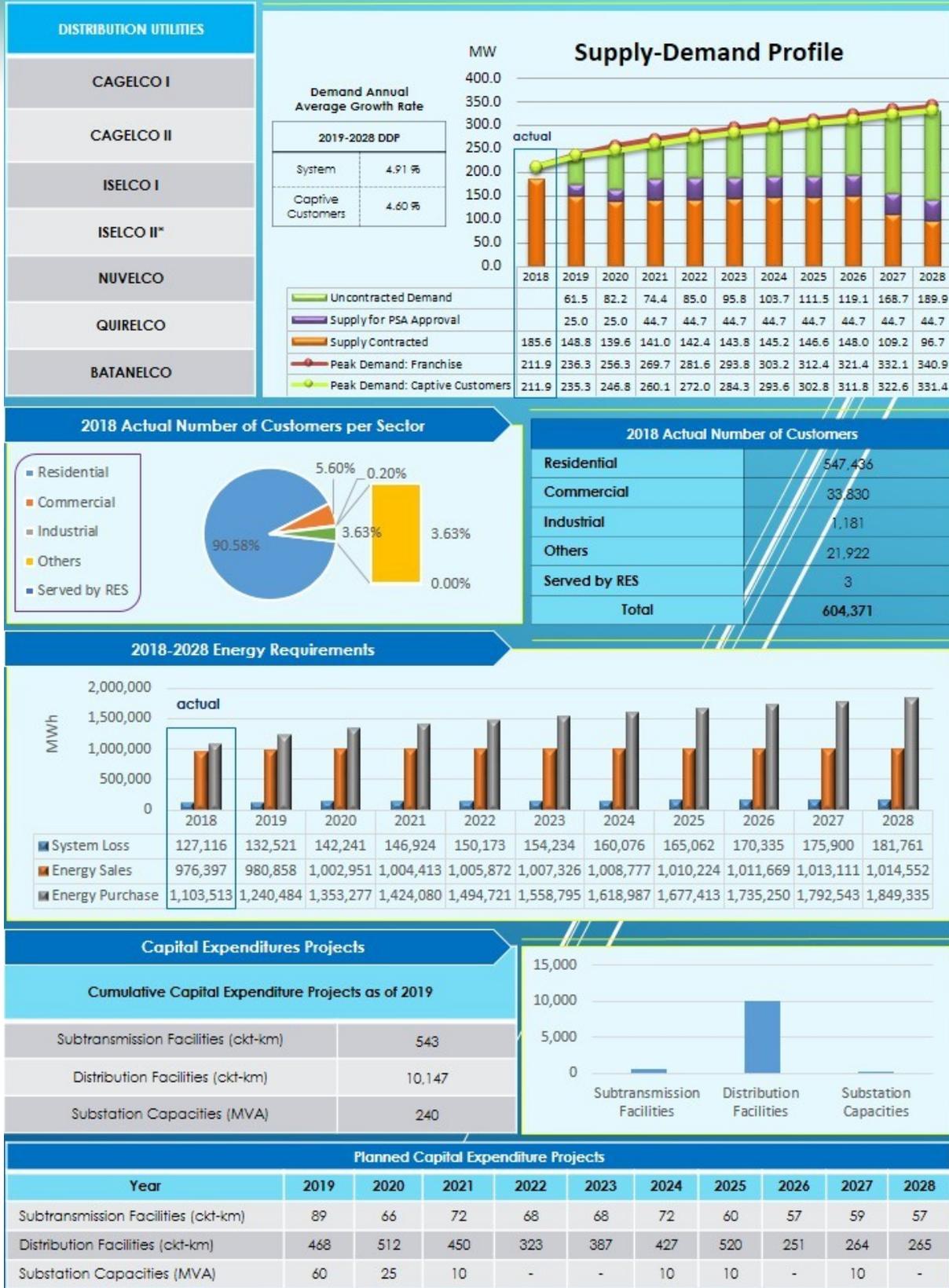


Figure 21. One-Page Infographic Profile of DUs – Region II

REGION III – CENTRAL LUZON

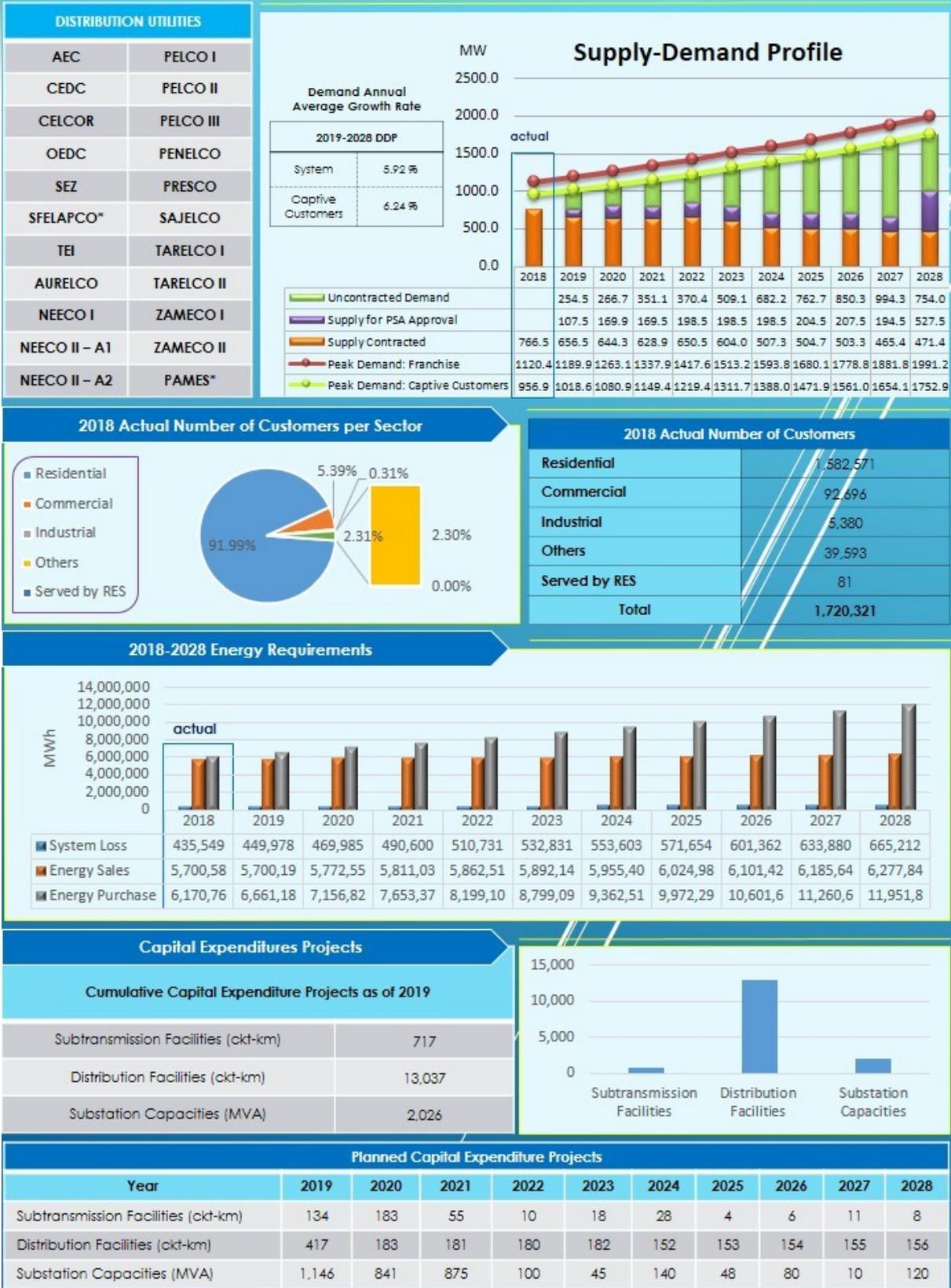


Figure 22. One-Page Infographic Profile of DUs – Region III

REGION IV-A – CALABARZON

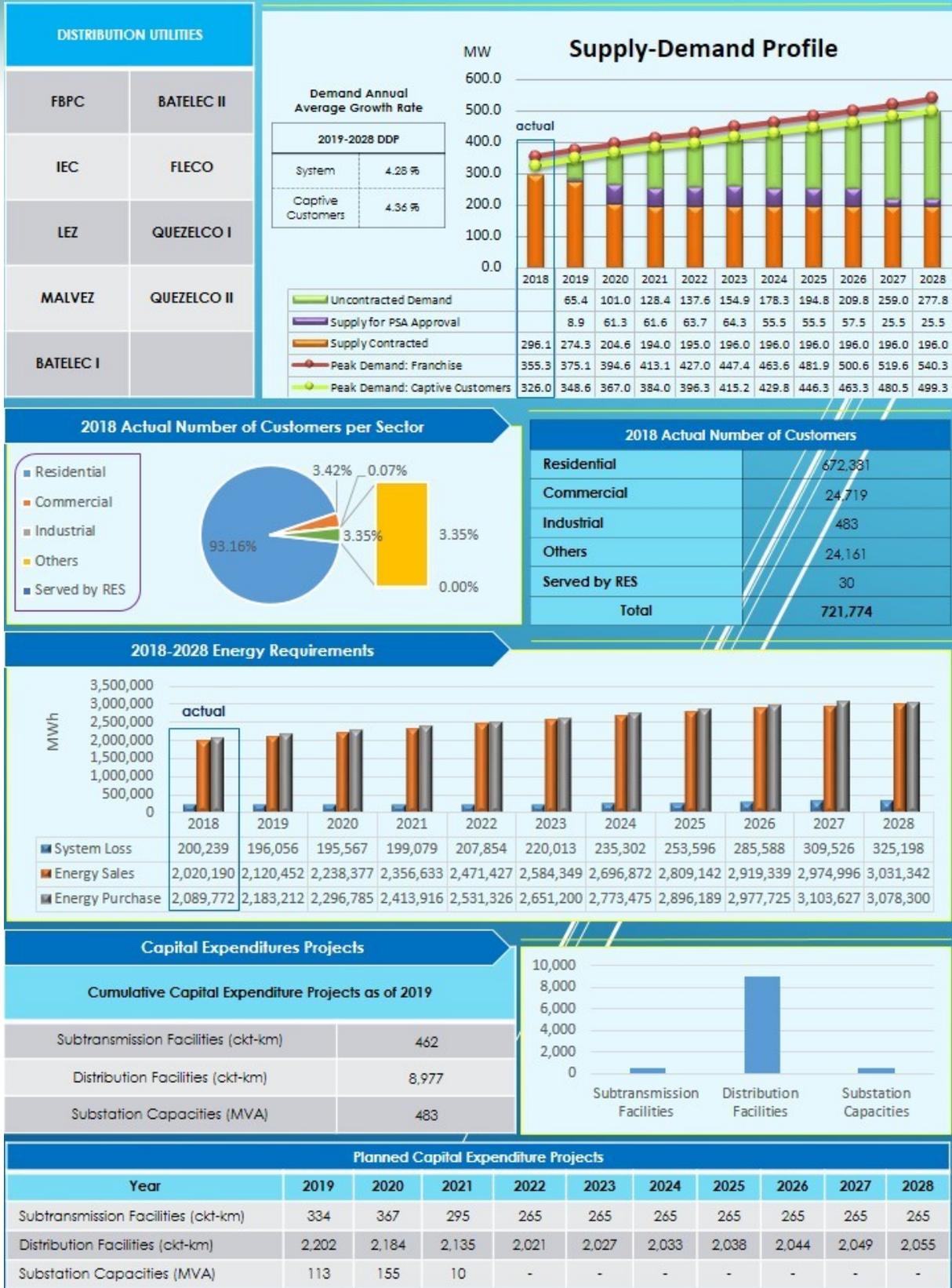


Figure 23. One-Page Infographic Profile of DUs – Region IV-A

REGION IV-B – MIMAROPA



Figure 24. One-Page Infographic Profile of DUs – Region IV-B

REGION V – BICOL REGION



Figure 25. One-Page Infographic Profile of DUs – Region V

REGION VI – WESTERN VISAYAS



Figure 26. One-Page Infographic Profile of DUs – Region VI

REGION VII – CENTRAL VISAYAS



Figure 27. One-Page Infographic Profile of DUs – Region VII

REGION VIII – EASTERN VISAYAS



Figure 28. One-Page Infographic Profile of DUs – Region VIII

REGION IX – ZAMBOANGA PENINSULA



Figure 29. One-Page Infographic Profile of DUs – Region IX

REGION X – NORTHERN MINDANAO

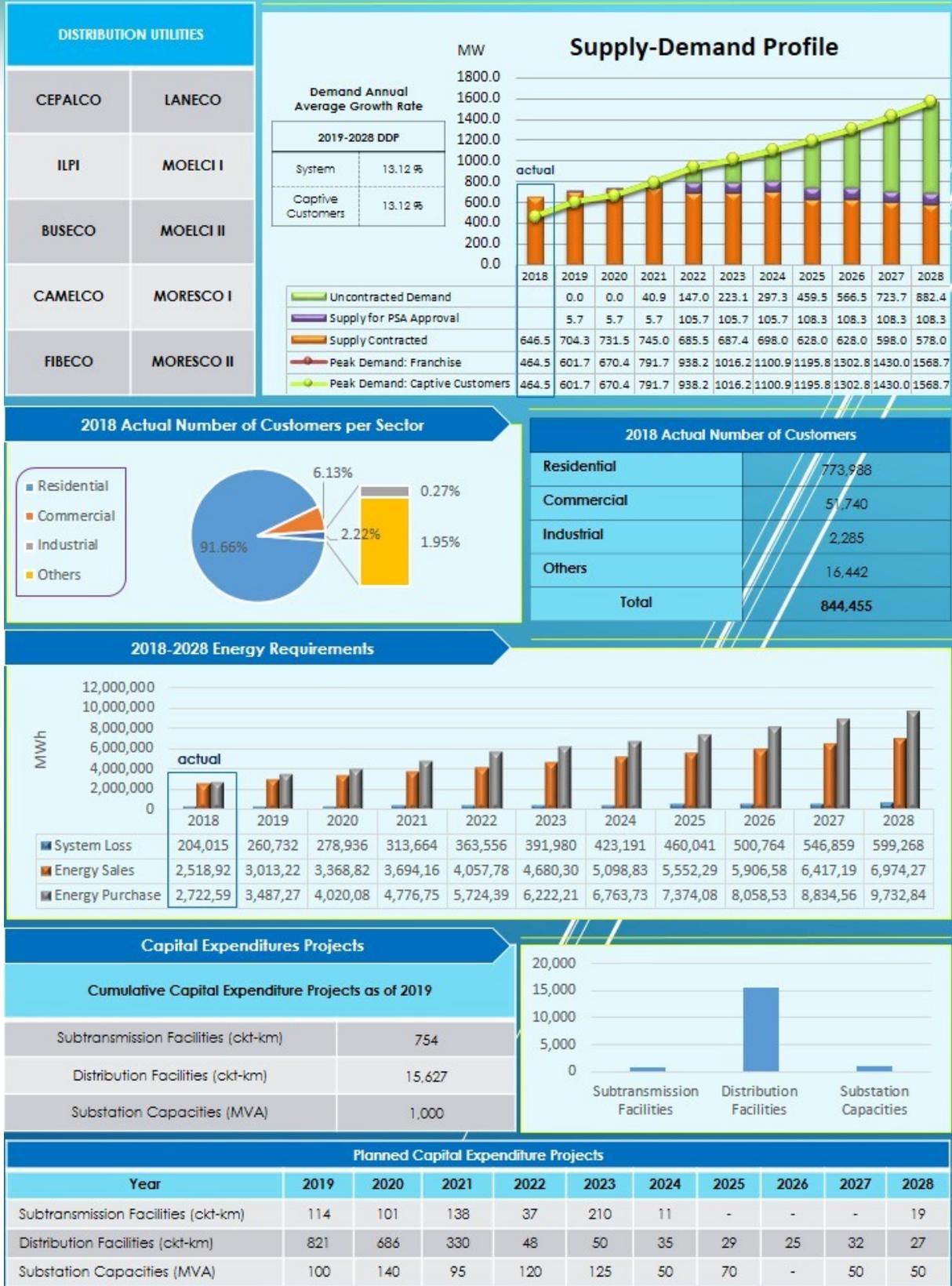


Figure 30. One-Page Infographic Profile of DUs – Region X

REGION XI – DAVAO REGION

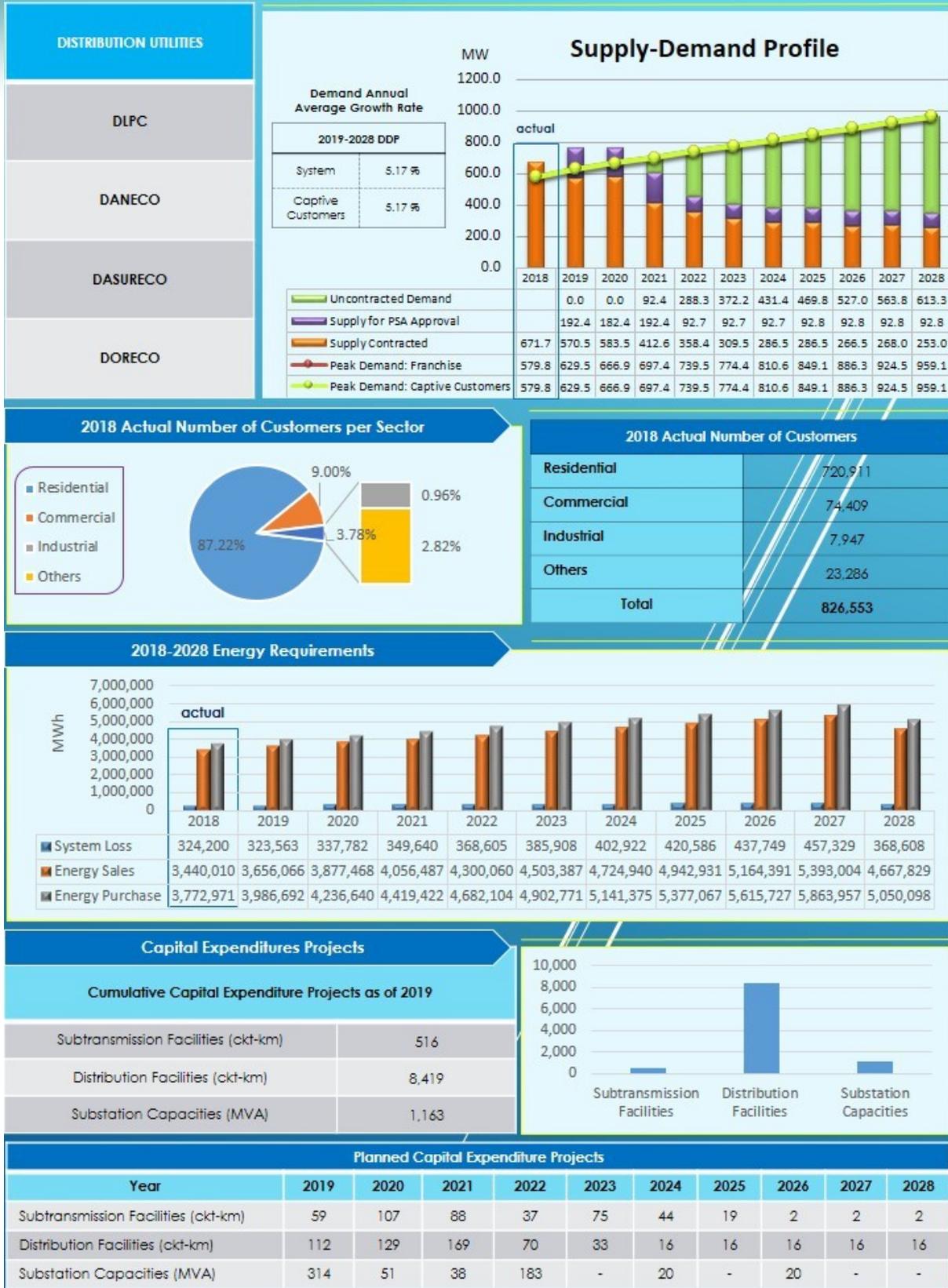


Figure 31. One-Page Infographic Profile of DUs – Region XI

REGION XII - SOCCSKSARGEN

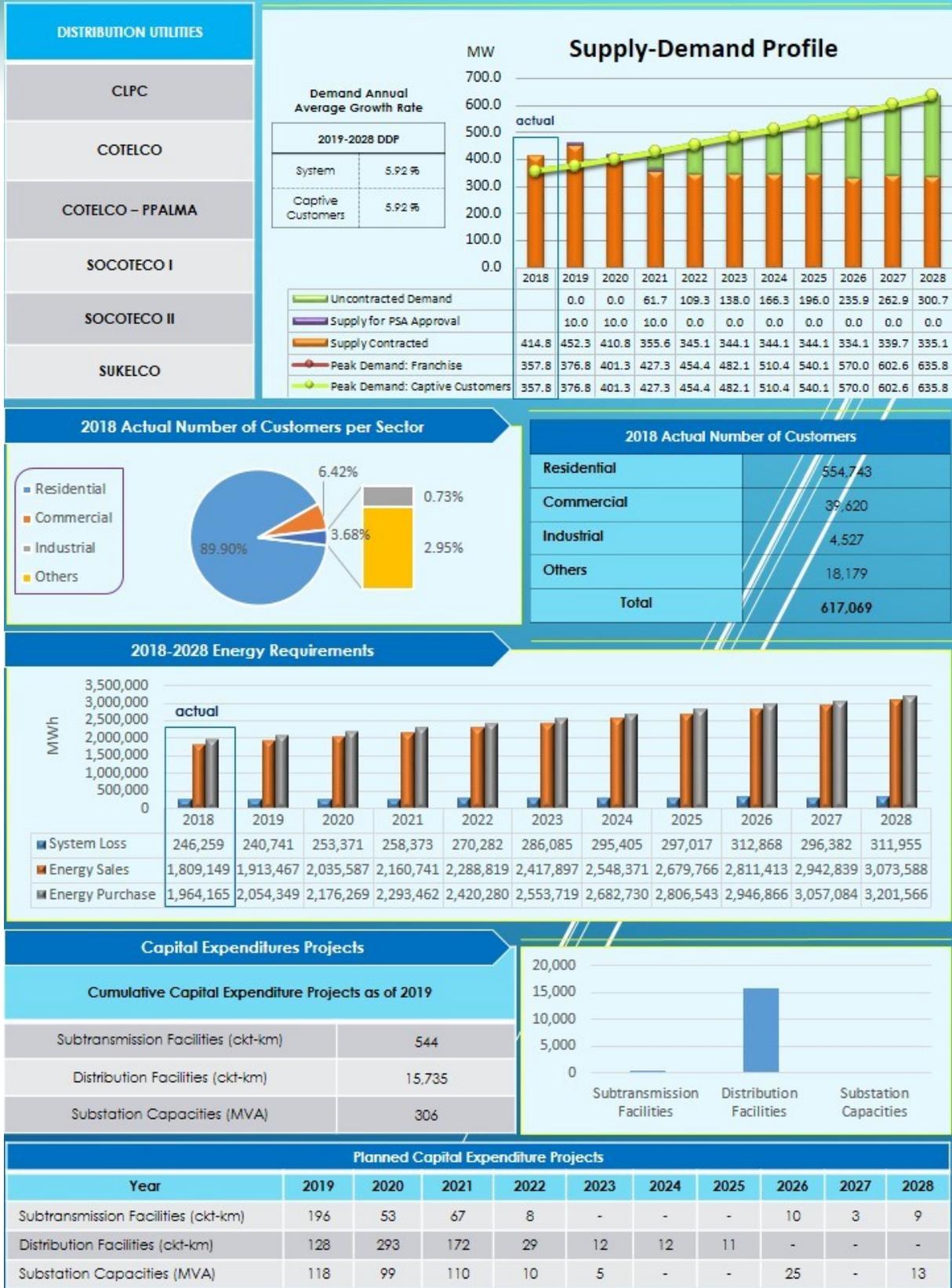


Figure 32. One-Page Infographic Profile of DUs – Region XII

REGION XIII – CARAGA ADMINISTRATIVE REGION

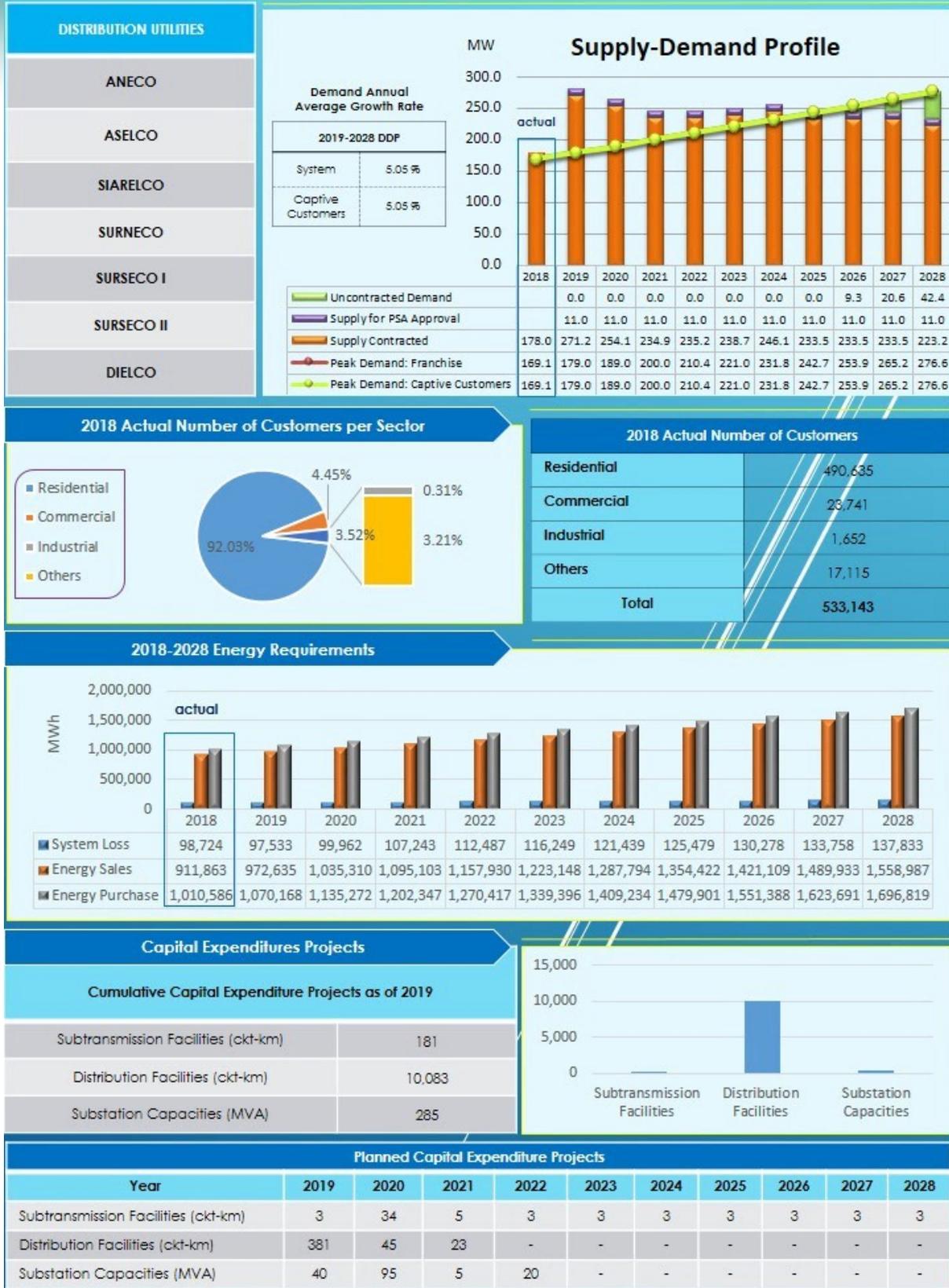


Figure 33. One-Page Infographic Profile of DUs – Region XIII

BANGSAMORO AUTONOMOUS REGION IN MUSLIM MINDANAO (BARMM)

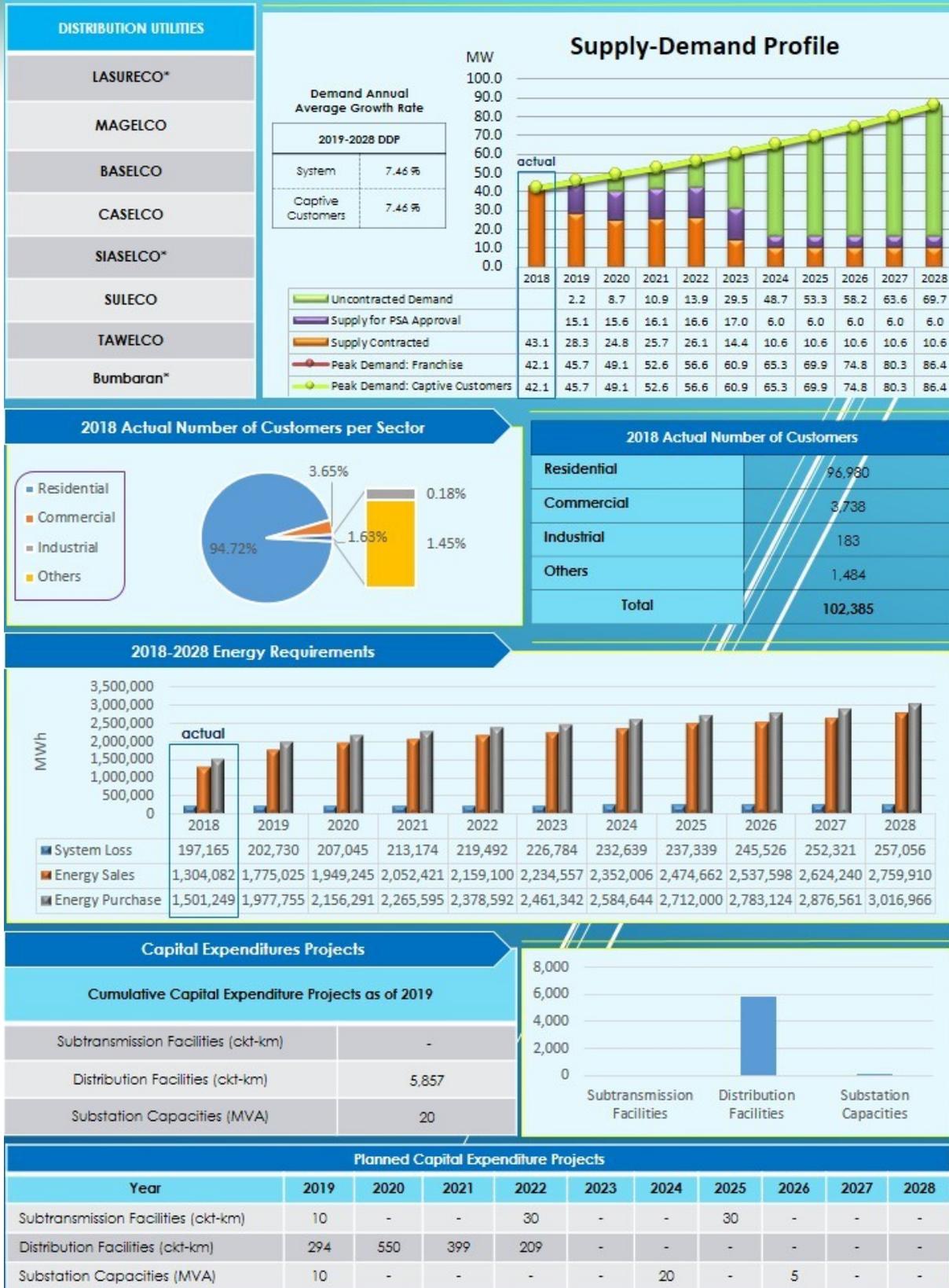
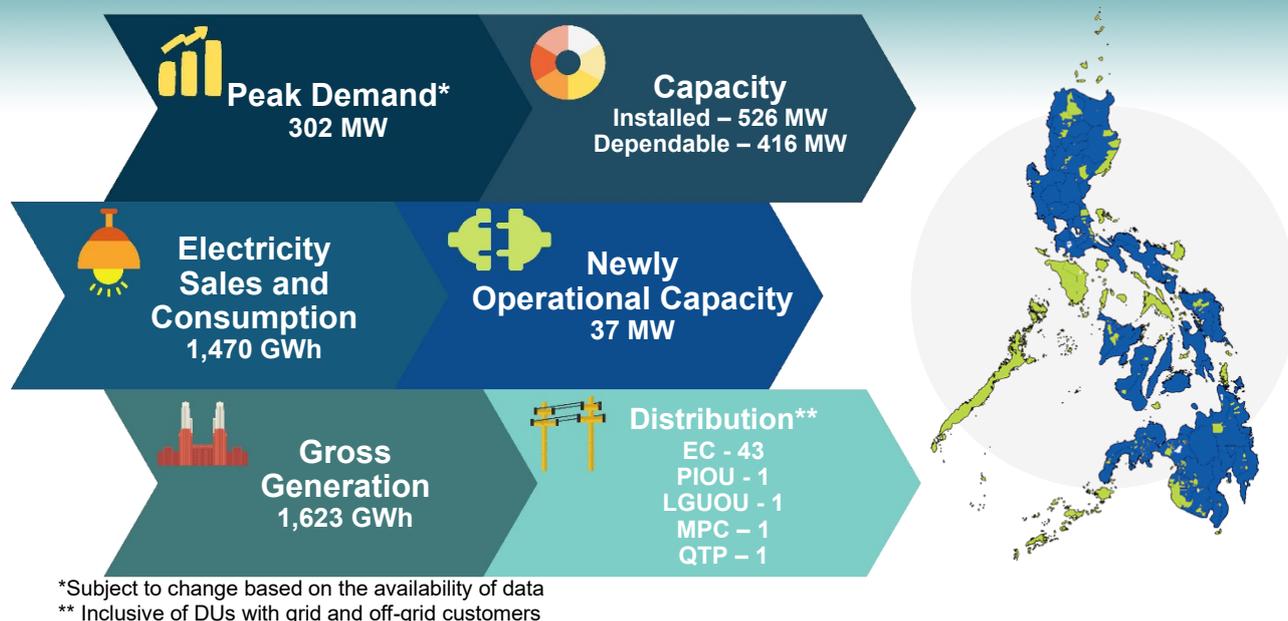
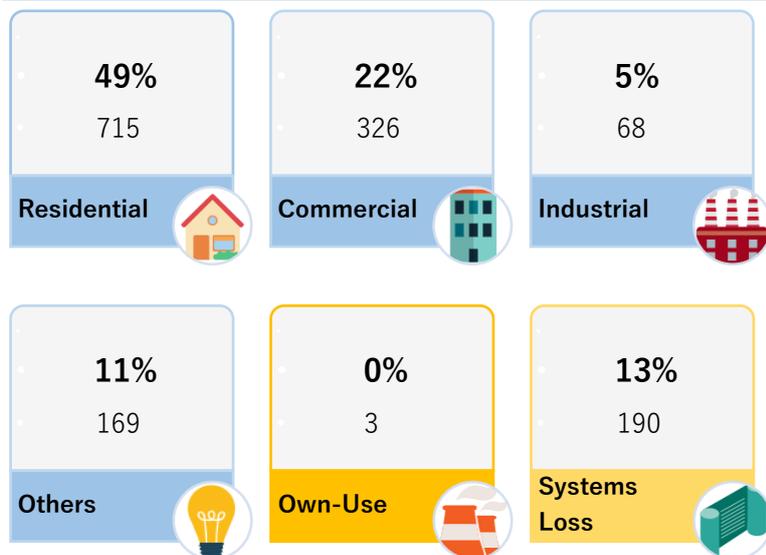


Figure 34. One-Page Infographic Profile of DUs – BARMM

OFF-GRID AND MISSIONARY ELECTRIFICATION



Electricity Sales and Consumption (in GWh)



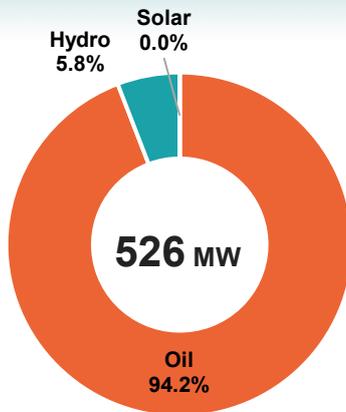
Off-grid areas in the Philippines recorded a total electricity sales and consumption of 1470 GWh, a 9.2% increase from the previous year's consumption of 1,346 GWh. The residential sector remains to have the highest percentage share of 49% or 715 GWh, and followed by the commercial sector with a share of 22% or 326 GWh.

Figure 35. 2019 Electricity Sales and Consumption, Off-Grid

Gross Generation (GWh)

The total installed capacity in 279 small island and isolated grids (SIIGs) decreased by 2.5% from 568 MW in 2018 to 526 MW in 2019. The 7.4% decrease can be attributed to the decommissioning of aging generating units as well as the reduction of rental capacities of the Small Power Utilities Group of the National Power Corporation (NPC-SPUG). On the other hand, off-grid generation increased from 1,492 GWh in 2018 to 1,623 GWh in 2019 (8.8%).

Installed Capacity



Gross Generation

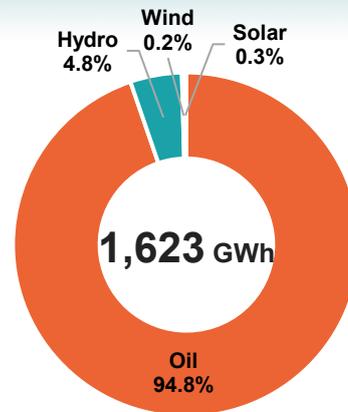


Figure 36. 2019 Off-Grid Installed Capacity² and Generation

The year 2019 saw a more diversified capacity and generation mix due to the commercial operation of wind and solar power plants in Oriental Mindoro and Tablas Island, respectively. Further, a new power provider, Renesons Energy Polillo, Inc., started its commercial operation of its diesel power plant in Polillo Island in 2019.

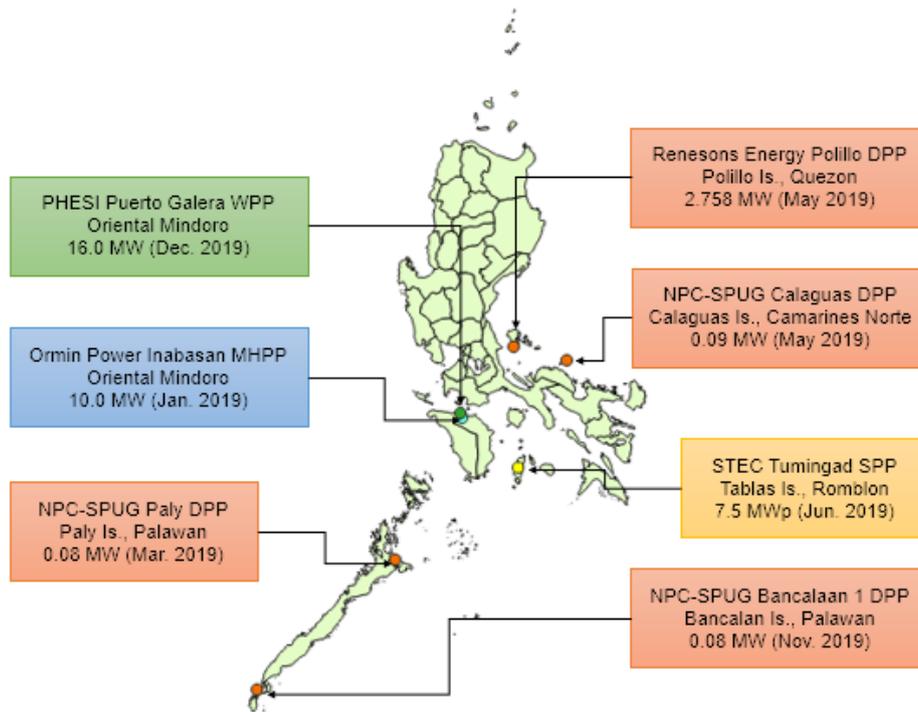


Figure 37. New Power Plants in Off-Grid Areas (Luzon)

As part of the program towards total electrification, NPC-SPUG provided power generation service to three (3) new areas in 2019. Further, NPC-SPUG also increased its service level in various areas. These developments in off-grid electrification, among others, contributed to the increase in electricity demand from 277 MW in 2018 to 302 MW in 2019.

² Note: 16 MW PHESI wind power plant and 7.5MWp STEC solar power plant were not included in the 2019 capacity mix.

Table 26. Off-Grid Demand per Service Hours, 2018 vs. 2019

Service Hours	2018		2019	
	No. of SIIGs	Demand, MW	No. of SIIGs	Demand, MW
5	135	1	134	1
8	49	2	48	3
12-16	29	7	20	5
24	64	266	77	293
TOTAL	277	277	279	302

NOTE: Numbers may not sum up to total due to rounding off.

MAJOR POLICIES ISSUED IN 2019 RELATED TO GENERATION, TRANSMISSION AND DISTRIBUTION

Table 27. List of Department Circular Issued in 2019

DEPARTMENT CIRCULAR NUMBER	TITLE	DATE OF ISSUANCE	OBJECTIVE
DC2019-01-0001	Prescribing the Omnibus Guidelines on Enhancing Off-Grid Power Development and Operation	01/25/2019	To prescribe an omnibus set of guidelines that incorporate and interrelate all existing and new policies and strategies for achieving quality, reliable, affordability, security, stability, efficiency and accountability of electric power services in off-grid areas
DC2019-02-0003	Providing for the Framework Governing the Operations of Embedded Generators	02/08/2019	To issue, adopt, and promulgate a framework governing the operations of embedded generators pursuant to its authority and mandate under EPIRA and its Implementing Rules and Regulations (IRR), and after due consideration of the inputs from various stakeholders.
DC2019-05-0007	Rules and Regulations Implementing Republic Act No. 11234 (Energy Virtual One-Stop Shop Act)	05/28/2019	To issue, adopt, and promulgate implementing rules and regulations of Republic Act No. 11234 (Energy Virtual One-Stop Shop Act).
DC2019-06-0010	Prescribing the Administrative Operating Guidelines for the Availment and Utilization of Financial Benefits by the Indigenous Cultural Communities/Indigenous Peoples pursuant to the DOE Department Circular No. DC2018-03-0005	06/14/2019	To adopt and promulgate administrative operating guidelines for the availment and utilization of Financial Benefits by the Host ICCs/IPs in compliance with DC2018-03-005 in relation to DC2018-08-0021.
DC2019-07-0011	Amending Various Issuances on the Implementation of the Retail Competition and Open Access (RCOA)	07/29/2019	To issue, adopt, and promulgate policies for the continuous development and implementation of RCOA as embodied in the EPIRA.

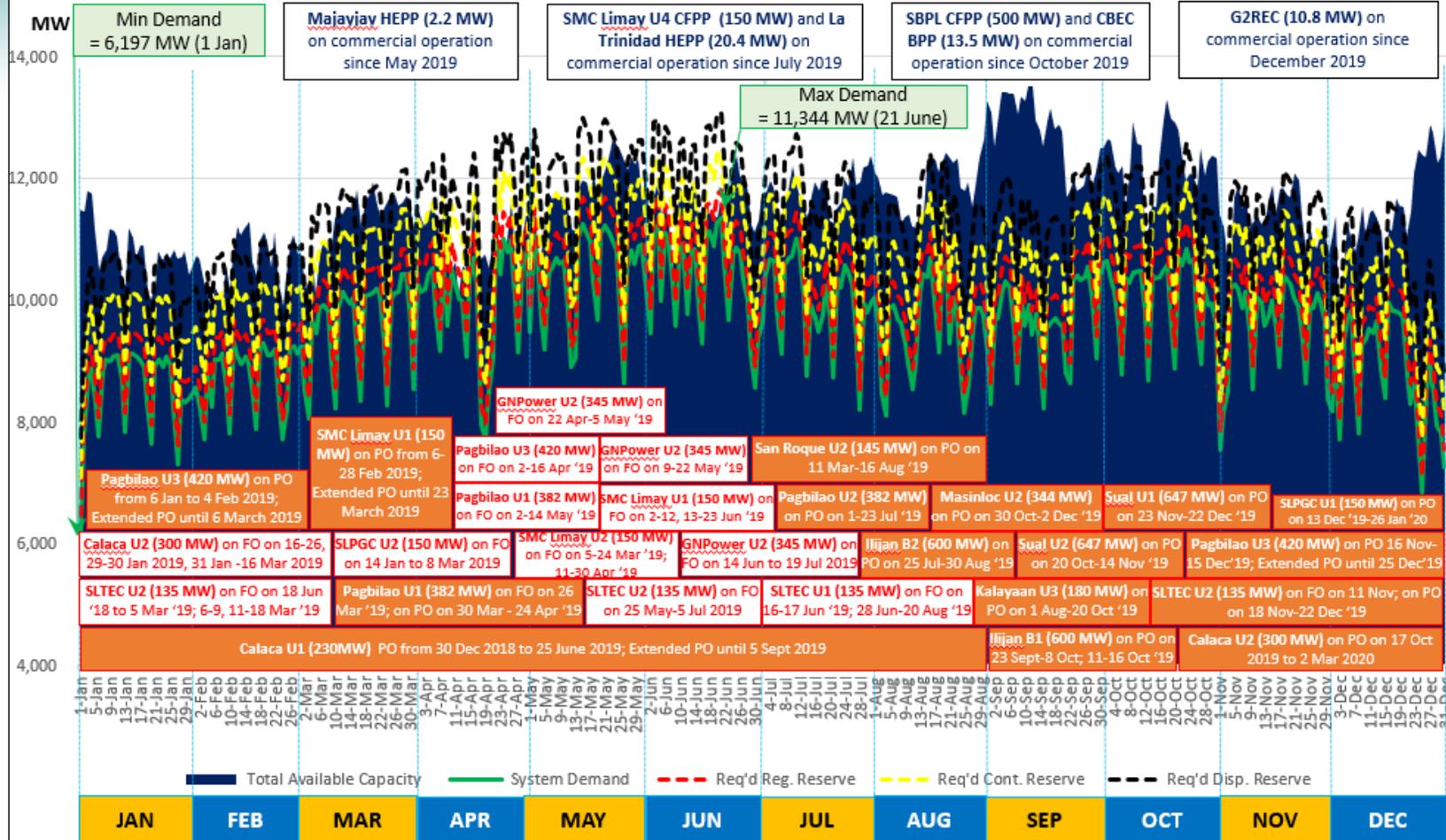
DEPARTMENT CIRCULAR NUMBER	TITLE	DATE OF ISSUANCE	OBJECTIVE
DC2019-08-0012	Providing a Framework for Energy Storage System in the Electric Power Industry	08/01/2019	To issue, adopt, and promulgate a framework for Energy Storage System in the Electric Power Industry.
DC2019-11-0015	Prescribing Revised Guidelines for Qualified Third Party	11/22/2019	To update and revise the existing guidelines on the participation of qualified third parties to provide a policy and regulatory environment that is more conducive to the participation of the private section and to meet the total electrification target of the Government
DC2019-12-0016	Promulgating the Renewable Energy Market Rules	12/04/2019	To issue, adopt, and promulgate Renewable Energy Market (REM) Rules to all electric industry participants in Luzon, Visayas, and Mindanao, both in the On-Grid and Off-Grid Areas.
DC2019-12-0017	Adopting Further Amendments to the Wholesale Electricity Spot Market (WESM) Rules and Market Manual on Guidelines on Significant Variations In and Between Trading Intervals to Refine Publication Procedures	12/04/2019	To adopt, issue, and promulgate amendments to the WESM Rules and WESM Guidelines on Significant Variations In and Between Trading Intervals to Refine Publication Procedures.
DC2019-12-0018	Adopting a General Framework Governing the Provision and Utilization of Ancillary Services in the Grid	12/04/2019	To issue, adopt, and promulgate policies governing the provision and utilization of Ancillary Services in the Grid.

Luzon Demand-Supply Situation

01 January – 31 December 2019

Yellow Alert Occurrence: 46

Red Alert Occurrence: 16



Source: National Grid Corporation of the Philippines (NGCP) Daily Operations Reports and Significant Incident Reports



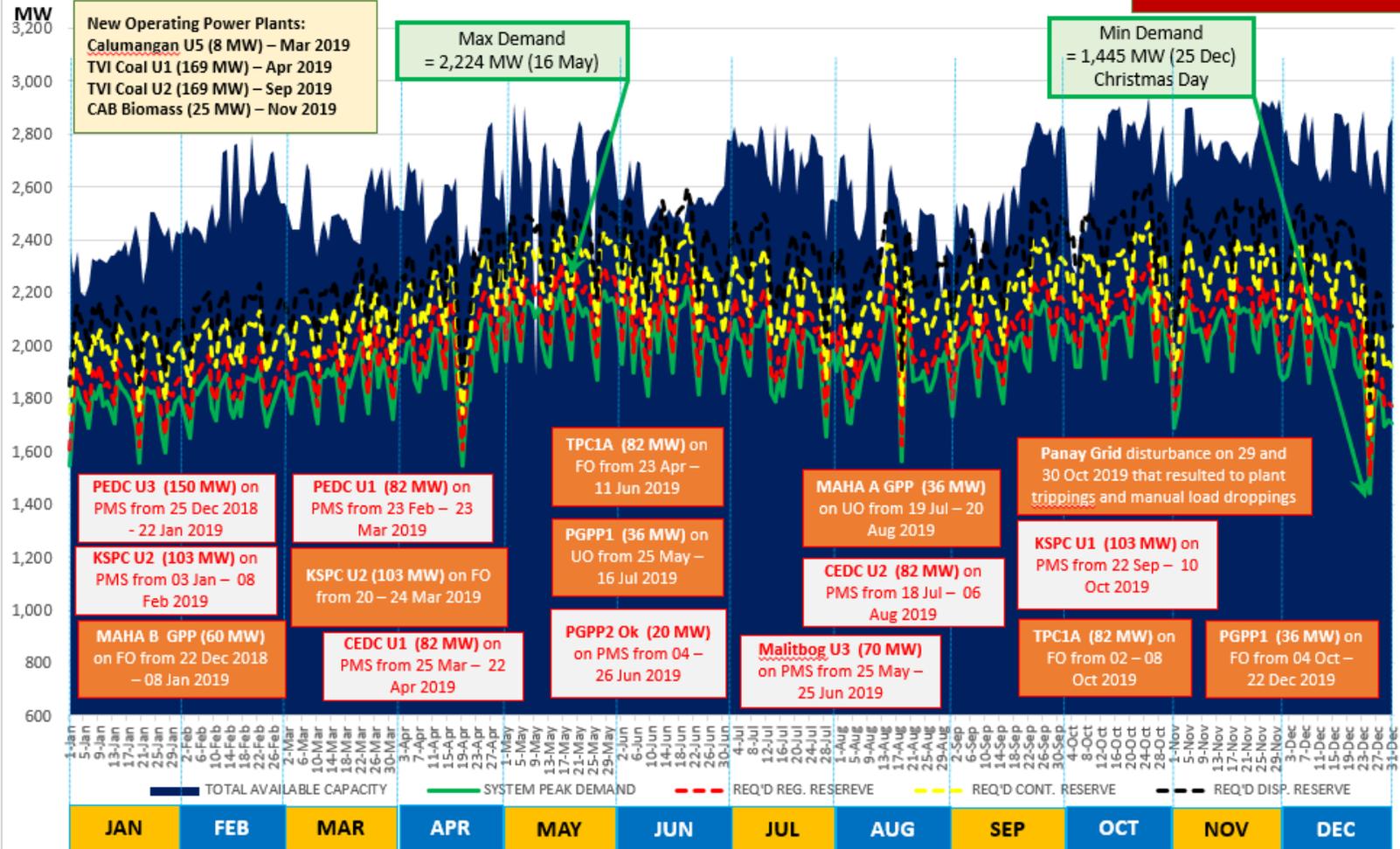
Note: FO – Forced Outage / UO – Unplanned Outage / PMS – Planned Maintenance Shutdown

ANNEX 2

Visayas Demand-Supply Situation

01 January – 31 December 2019

Yellow Alert Occurrences: 186
Red Alert Occurrences: 10



Source: National Grid Corporation of the Philippines (NGCP) Daily Operations Reports and Significant Incident Reports

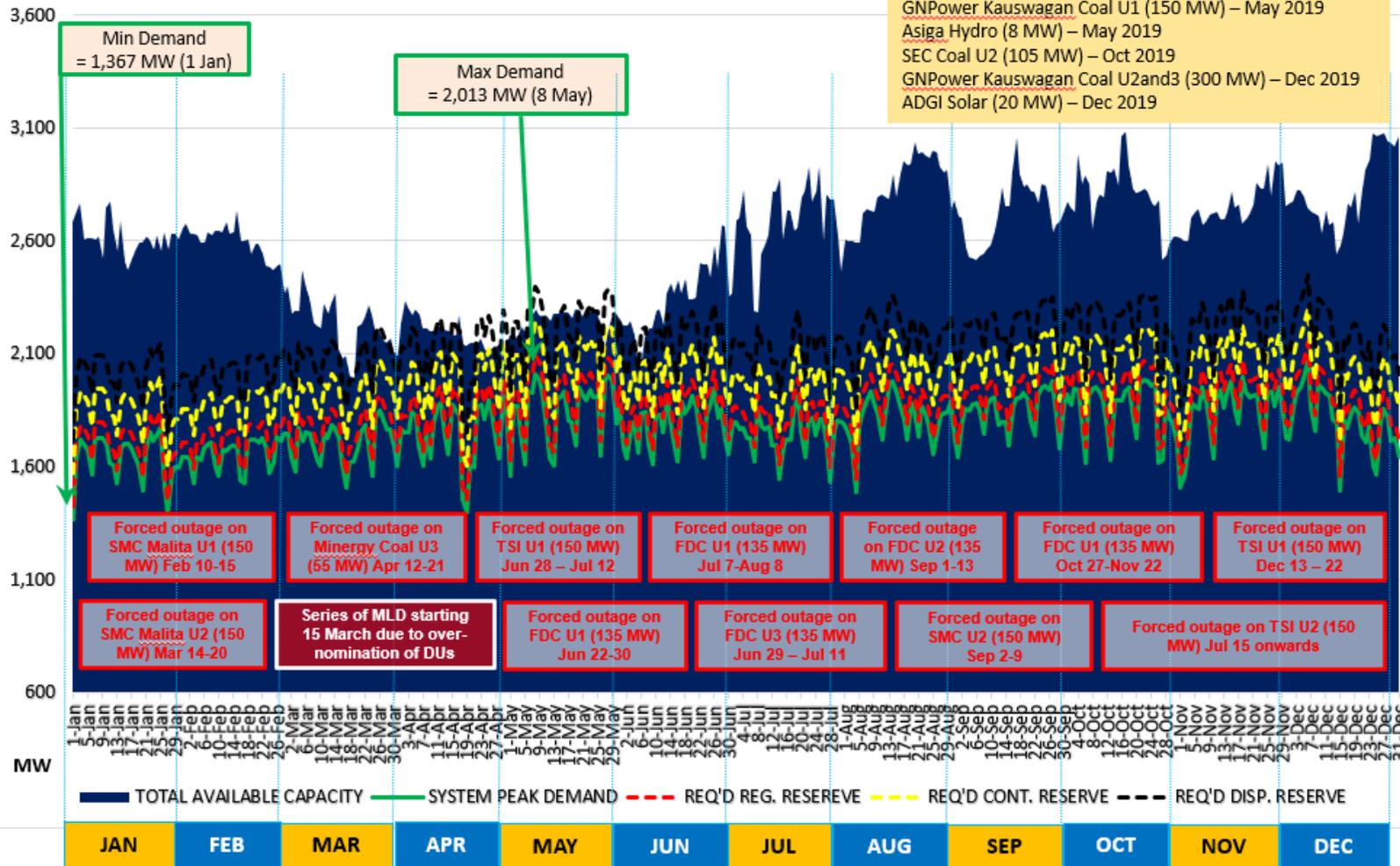


Department of Energy
Empowering the Filipinos

Note:
FO – Forced Outage / UO – Unplanned Outage / PMS – Planned Maintenance Shutdown

Mindanao Demand-Supply Situation

01 January – 31 December 2019



Source: National Grid Corporation of the Philippines (NGCP) Daily Operations Report



Department of Energy
Empowering the Filipinos

Note:
FO – Forced Outage / PMS – Planned Maintenance Shutdown

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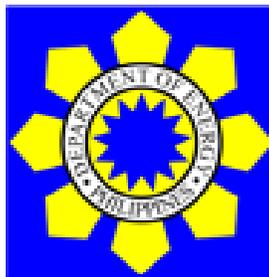
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