

2020 POWER SITUATION REPORT



2020 POWER DEMAND AND SUPPLY HIGHLIGHTS

PEAK DEMAND
15,282 MW

**ELECTRICITY SALES
AND CONSUMPTION**
101,756 GWh

GROSS GENERATION
101,756 GWh

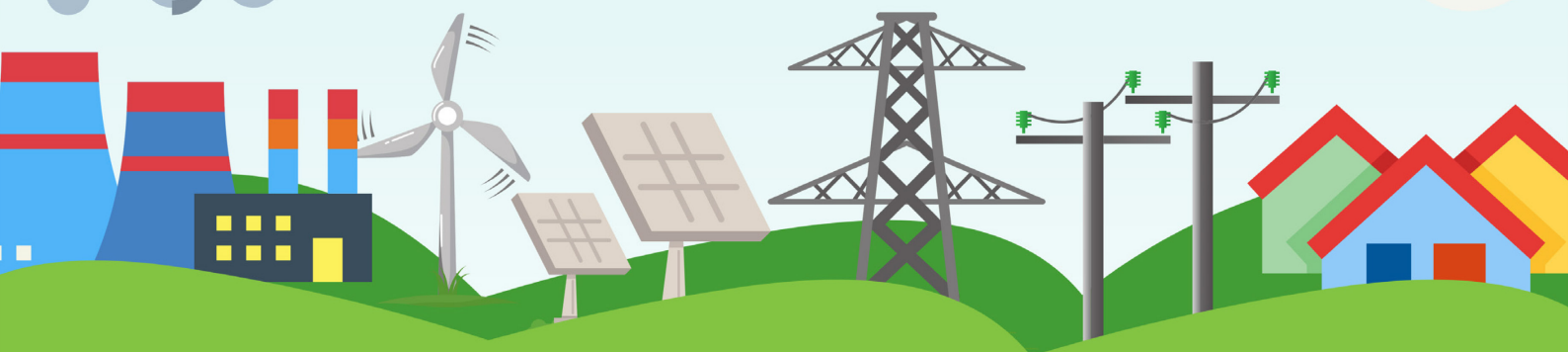
**NEWLY OPERATIONAL
INSTALLED CAPACITY**
655 MW

CAPACITY
Installed: 26,286 MW
Dependable: 23,410 MW

**POWER PROJECT
CAPACITY**
Committed: 8,977 MW
Indicative: 33,399 MW

TRANSMISSION
Substation Capacity:
40,051 MVA
Line Length:
22,111 ckt-km

DISTRIBUTION
EC: 121
PIOU: 24
LGUOU: 5
MPC: 1



PEAK DEMAND

In 2020, the Philippines' total non-coincidental peak demand¹ reached 15,282 MW, which is 299 MW or -1.9% lower than the peak demand in 2019. This decline in demand can be greatly attributed to the effect of COVID-19 pandemic, which put the country under different levels of community quarantine beginning 15 March 2020.

The declaration of community quarantine caused huge economic losses in a number of businesses and commercial establishments, resulting in an evident slowdown in the operations of the commercial and industrial sectors. Additionally, the travel restrictions put in place by the Philippine Government across the entire country limited the movement of the people which further hindered the otherwise expected demand growth.

Among the three main island groups, Luzon had the highest decrease (241 MW) in peak demand. Figure 1 shows the comparison between the recorded peak demand in 2020 and 2019 for Luzon, Visayas, and Mindanao grids.

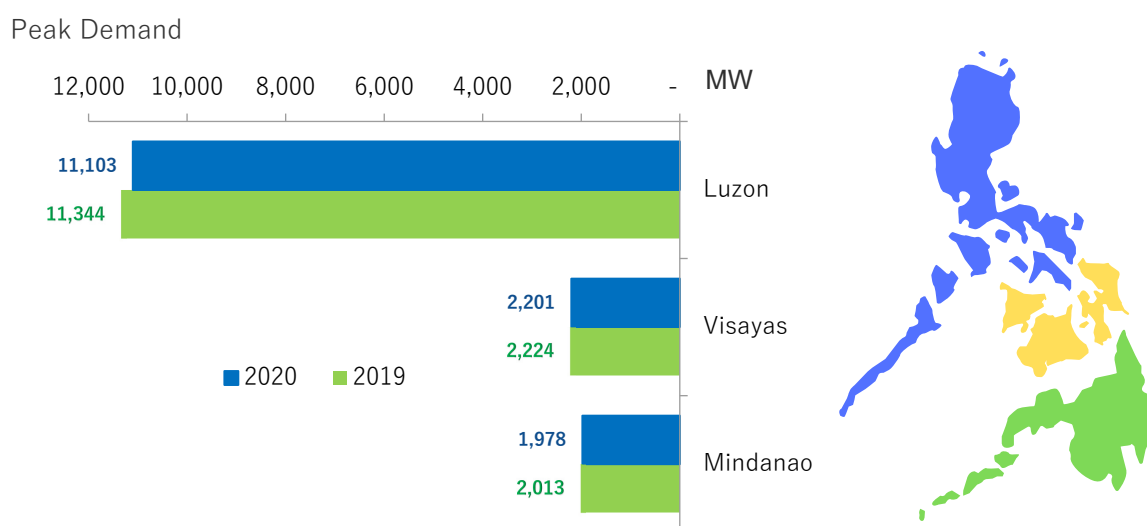


Figure 1. 2020 vs. 2019 Peak Demand per Grid (in MW)

The numerous unforeseeable events have greatly affected the nation's electricity consumption patterns. Despite these challenges, the power sector continued to be steadfast in providing the much needed electricity for the country especially in light of these critical times.

ELECTRICITY SALES AND CONSUMPTION

The Philippines started out the year 2020 with a decline in the Gross Domestic Product (GDP) equivalent to -0.2% in its first quarter, after expanding by 6.7% in the last quarter of 2019. This was marked as the first year-on-year contraction since 1998. Among the economic sectors, one of the biggest contributors to the decline was the

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

industrial sector due to the eruption of Taal volcano in Batangas, temporarily halting several manufacturing activities in different parts of the Luzon region. However, vis-à-vis the markdown in GDP, the country's total electricity consumption still manifested a slight increase from December 2019 to January 2020. This was unlike the recent years wherein the consumption in January is usually lower than December of the previous year. Despite a considerably strong start for the power sector, the early effects of the pandemic had already affected market sentiments across the nation. Figure 2 shows the decline in electricity consumption beginning February to March and reaching its all-time low for the year by the month of April.

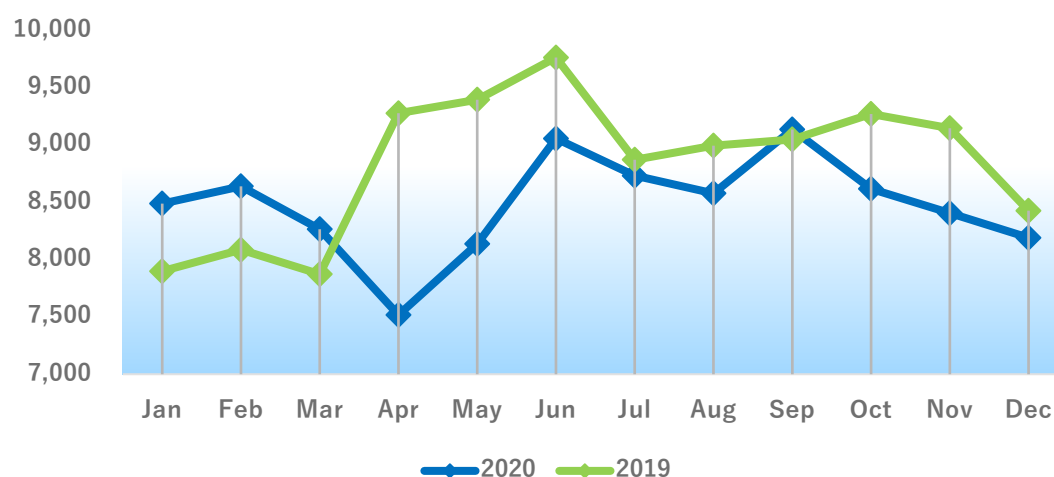
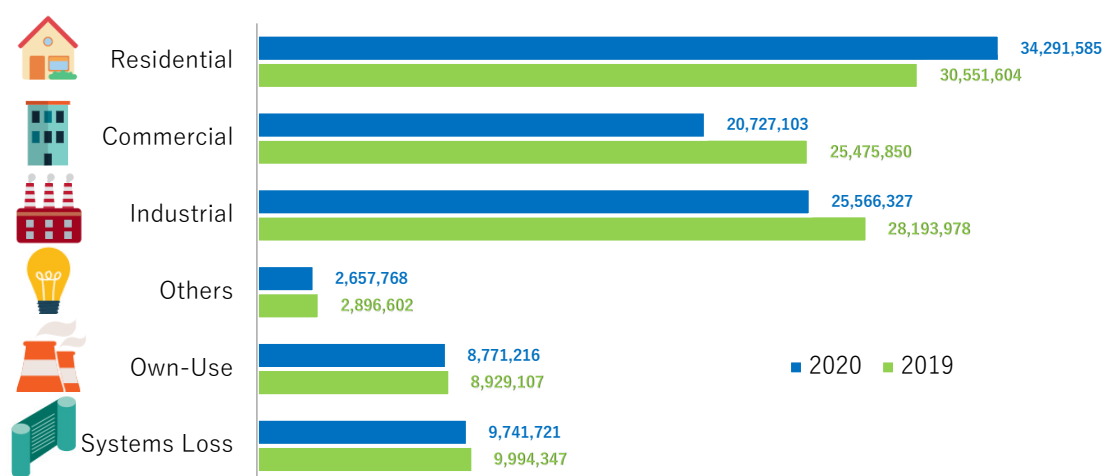


Figure 2. 2020 vs. 2019 Monthly Electricity Sales and Consumption, Philippines (in GWh)

While there are several factors that affect the country's electricity consumption rate, historical data typically displays a proportional relationship with the economy, quantified through the GDP. In the fourth quarter of 2020, the Philippine economy declined by -8.3%, bringing a -9.5% full-year contraction by the end of 2020. Following the plunge in economy, the total electricity consumption also shrunk by -4.0%, posting a figure of 101,756 GWh by the end of 2020 from 106,041 GWh in 2019. As depicted in Figure 3, residential remained the largest electricity consuming sector with a 33.7% share, followed by industrial (25.1%) and commercial (20.4%).



Note: Numbers may not sum up to total due to rounding off

"Others" refer to public buildings, street lights, irrigation, agriculture, and "others not elsewhere classified"

Figure 3. 2020 vs. 2019 Electricity Sales and Consumption by Sector, Philippines (in MWh)

Noticeably, there was a decrease in consumption across all sectors, except -residential which further increased by 12.2%. The recurring imposition of various community quarantine restrictions and physical distancing measures caused a great shift in favor of the residential sector as majority of economic sectors adapt alternative work arrangements and various “new normal” measures. Companies and organizations implemented the work-from-home scheme, online businesses and enterprises flourished, schools shifted to online classes, discussions and events were held virtually, and contactless transactions were widely adopted. All these activities, among others, triggered the sharp increase in electricity consumption in the residential sector.

The commercial and industrial sector, which were heavily affected by the lockdown, garnered the steepest annual decline in power consumption at -18.6% and -9.3%, respectively. The decrease in utilities’ own-use for office and station use of power plants, classified in Figure 3 as “Own-Use”, and “Losses” from the generation, transmission, and distribution, also contributed to the downswing in total electricity consumption. Others not elsewhere classified, or simply categorized as “Others”, posted a -8.2% annual contraction from 2019.

Table 1. 2020 Electricity Sales & Consumption, Philippines (in GWh)

TYPE OF DISTRIBUTION UTILITIES	LUZON	VISAYAS	MINDANAO	PHILIPPINES
Private Investors Owned Utilities (PIOU's)				
Residential	17,981	1,457	1,433	20,871
Commercial	15,623	490	504	16,617
Industrial	12,684	2,411	2,101	17,197
Others	192	82	94	368
Total Sales	46,480	4,440	4,133	55,053
Own-Use	64	7	5	75
System Loss	2,982	372	312	3,665
Total	49,526	4,818	4,449	58,793
Electric Cooperatives (EC'S)				
Residential	7,012	3,173	3,236	13,421
Commercial	2,164	970	976	4,110
Industrial	1,781	942	1,813	4,536
Others	717	458	443	1,617
Total Sales	11,674	5,543	6,468	23,684
Own-Use	23	13	15	51
System Loss	1,401	597	1,053	3,051
Total	13,098	6,153	7,536	26,786
Non-Utilities/Directly Connected				
Other Services	1,381	376	35	1,791
Plant Station Used	4,286	1,683	1,295	7,265

TYPE OF DISTRIBUTION UTILITIES	LUZON	VISAYAS	MINDANAO	PHILIPPINES
Transmission Losses	2,256	387	382	3,025
Total Electricity Sales & Consumption	73,504	14,399	13,852	101,756
Main Grid Electricity Sales & Consumption	72,301	14,307	13,667	100,274
Off-Grid Electricity Sales & Consumption	1,204	93	186	1,482

Note: Including Off-Grid Sales and Consumption

Source: DOE 2020 Power Statistics

Table 2. 2020 and 2019 Comparative Electricity Sales & Consumption per Grid, Philippines (in GWh)

Grid	PHILIPPINES					
	2020		2019		Difference	
	GWh	% Share	GWh	% Share	GWh	% Growth Rate
Luzon	73,504	72.2%	77,687	73.3%	-4,183	-5.4%
Visayas	14,399	14.2%	14,549	13.7%	-150	-1.0%
Mindanao	13,852	13.6%	13,805	13.0%	47	0.3%
Philippines	101,756	100.0%	106,041	100.0%	(4,286)	-4.0%

Note: Including Off-Grid Sales and Consumption

Source: DOE 2020 Power Statistics

Among the three island groups, Luzon comprised the largest share in the Philippines' total electricity consumption at 72.2%, followed by Visayas (14.2%), and Mindanao (13.6%). Similar to the trend in peak demand, Luzon also had the highest year-to-year decline in terms of electricity consumption at -5.4%. This came as no surprise considering that Metro Manila was considered the worst hit region and the epicenter of the COVID-19 outbreak in the Philippines. Visayas also slightly decreased by -1.0%, whereas Mindanao was the only grid to experience a positive, albeit marginal, growth rate of 0.3%.

SUPPLY

INSTALLED AND DEPENDABLE CAPACITY

Despite the delays and restrictions caused by the pandemic, the country's installed capacity still increased by 3.0% following the entry of large coal power plants in Luzon (Masinloc Unit 3) and Mindanao (GNPower Kauswagan Unit 4). Renewable energy facilities, particularly solar and biomass, distributed across the country, also contributed to the growth of installed capacity. Coal-fired power plants continue to dominate the installed capacity mix with a 41.6% share, followed by renewable energy (29.1%), oil-based (16.1%), and natural gas (13.1%).

By the end of 2020, a total of 655 MW of installed capacity was added to the country's power supply. Bulk of the capacity additions were supplied to the grid and equaled to 643 MW, comprising of coal (527 MW), solar (71 MW), oil-based (45 MW), and hydro (0.3 MW). Off-grid areas, on the other hand, added a total of 13 MW installed capacity coming from diesel.

The total installed and dependable capacity is annually updated to reflect newly operational power plants, uprating and derating, mothballed power plants, and power plants operating as own-use due to current line constraints in transmission.

Table 3. 2020 Total Installed and Dependable Capacity per Technology, Philippines (in MW)

Fuel Type	Installed		Dependable	
	2020	2019	2020	2019
Coal	10,944	10,417	10,245	9,743
Oil Based	4,237	4,262	3,054	3,015
Natural Gas	3,453	3,453	3,286	3,286
Renewable Energy	7,653	7,399	6,825	6,691
<i>Geothermal</i>	<i>1,928</i>	<i>1,928</i>	<i>1,753</i>	<i>1,792</i>
<i>Hydro</i>	<i>3,779</i>	<i>3,760</i>	<i>3,527</i>	<i>3,508</i>
<i>Biomass</i>	<i>483</i>	<i>363</i>	<i>285</i>	<i>227</i>
<i>Solar</i>	<i>1,019</i>	<i>921</i>	<i>817</i>	<i>737</i>
<i>Wind</i>	<i>443</i>	<i>427</i>	<i>443</i>	<i>427</i>
TOTAL	26,286	25,531	23,410	22,736
BESS	11	10	11	10

Table 4. 2020 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	17,344	496	17,840	15,645	365	16,010
Visayas	3,814	48	3,863	3,333	36	3,369
Mindanao	4,505	79	4,548	3,976	56	4,031
TOTAL	25,663	623	26,286	22,954	457	23,410

Table 5. 2020 Summary of Newly Operational Capacities per Technology, Philippines (in MW)

Fuel Type	Installed		Dependable	
	2020	2019	2020	2019
Coal	527	1,559	493	1,409
Oil Based*	57	8	49	6
Natural Gas	0	0	0	0
Renewable Energy	71	108	57	74
<i>Geothermal</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>
<i>Hydro</i>	<i>0.3</i>	<i>31</i>	<i>0.1</i>	<i>18</i>
<i>Biomass</i>	<i>0</i>	<i>52</i>	<i>0</i>	<i>36</i>

Fuel Type	Installed		Dependable	
	2020	2019	2020	2019
Solar	71	25	57	20
Wind	0	0	0	0
TOTAL	655	1,674	599	1,489

*13 MW and 8 MW installed and dependable capacity, respectively, from off-grid

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

GENERATION

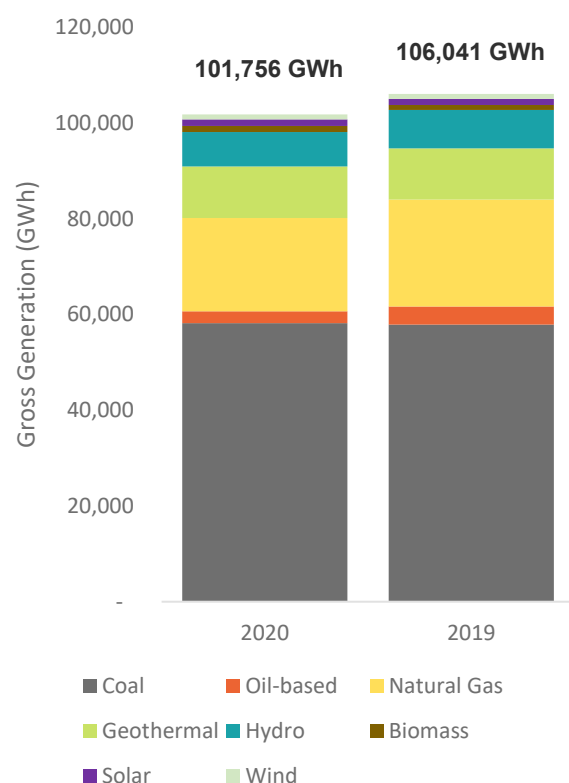


Figure 4. 2020 vs. 2019 Gross Generation (in GWh)

Due to lower demand, the country's gross power generation registered a negative growth at -4.0%, which is equivalent to a 4,286 GWh reduction from 2019 to 2020. Oil-based power generation significantly dropped by 34.1%. Natural gas also seconded with a -12.8% growth, followed by hydro (-10.4%), and wind (-1.5%). In contrast, biomass and solar generation posted a positive growth at 21.2% and 10.2%, respectively. Geothermal and coal generation also increased minimally by 0.6% and 0.5%, respectively. In accordance with the existing power supply agreements and the current market mechanism (e.g. merit order of power plants), the trend in utilization of generation sources shifted as a result of lower peaking requirements and irregularities in consumption patterns attributed with the pandemic.

POWER PROJECTS

To abate the challenges brought by the pandemic and lessen the delays in construction due to community quarantine restrictions in 2020, the DOE aided power generation companies through holding virtual meetings, issuing official identification cards, and facilitating the entry of their foreign experts to the country, among others. Moreover, the DOE continued to encourage the private sector to invest and develop power generation projects and facilities to augment the existing power capacity to meet the demand in the coming years.

Table 6 presents the summary of committed and indicative power projects as of 31 December 2020. About 86% of the total 8,977 MW committed capacity is coming from coal and natural gas, while the remaining 14% is from renewable energy and oil-based power projects. Meanwhile, the total indicative capacity stood at 33,399 MW, largely

comprised of renewable energy (62.0%), coal (21.1%), and natural gas (15.3%). Additionally, with the recent DOE policy issuance on Energy Storage System (ESS), ESS' committed and indicative capacity reached 910 MW and 413 MW, respectively, by the end of 2020.

Table 6. Committed and Indicative Capacities, Philippines, as of 31 December 2020 (in MW)

Fuel Type	Committed			Indicative		
	No. of Proponents	Capacity (MW)	% Share	No. of Proponents	Capacity (MW)	% Share
Coal	6	4,241	47.2	9	7,048	21.1
Oil-Based	4	392	4.4	4	537	1.6
Natural Gas	3	3,500	39.0	3	5,100	15.3
Renewable Energy (RE)	34	844	9.4	132	20,713	62.0
<i>Geothermal</i>	3	140	1.6	3	226	0.7
<i>Hydro</i>	18	144	1.6	60	5,474	16.4
<i>Biomass</i>	4	19	0.2	4	40	0.1
<i>Solar</i>	8	409	4.6	46	10,781	32.3
<i>Wind</i>	1	132	1.5	19	4,192	12.6
TOTAL	47	8,977	100.0	148	33,399	100.0
BESS	7	910		9	413	

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

COVID-19 PANDEMIC IMPACT ON THE ELECTRIC POWER INDUSTRY

PHILIPPINES

The COVID-19 pandemic significantly affected the electric power industry in terms of lower demand, operation of facilities, delays in project implementation due to restriction on the entry of foreign technical experts, among others. Likewise, no disconnection policy and extended payment of electricity bills by consumers were implemented

To ensure unimpeded delivery of energy services, and to provide assistance to Filipinos during these trying times, the following are the issuances made by the DOE:

1. Issuance of COVID-19 Inter-Agency Task Force (IATF) IDs and Rapidpass QR codes allowing cross-province/city travel of essential power sector industry players and stakeholders;
2. Endorsement for foreign workers of the contractor to the Department of Foreign Affairs and Bureau of Quarantine to enter the country;
3. Implementation of the Memorandum from the Office of the Executive Secretary dated 13 March 2020 and ensuring the unimpeded delivery of energy services signed on 14 March 2020;
4. Advisory relative to the extension of the Enhanced Community Quarantine (ECQ) until 30 April 2020 signed on 16 April 2020;
5. Advisory on providing grace period to all power sector bills falling due during the ECQ as extended until 15 May 2020 signed on 7 May 2020;
6. Issuance of Administrative Order 2021-05-0001 and COVID-19 Response Protocol to all energy stakeholders signed on 21 May 2020;
7. Advisory on IDs for movement to work/minimum public health standards signed on 05 August 2020;
8. Advisory to Local Government Units (LGUs) and Philippine National Police (PNP) Units on the travel clearance for the technical personnel of the National Grid Corporation of the Philippines (NGCP) and concerned distribution utilities (DUs) for the restoration of the power system facilities in the Bicol Region which were affected by Typhoons Quinta and Rolly signed on 04 November 2020;
9. Advisory enjoining all DUs to implement no disconnection for lifeline customers signed on 06 February 2021;
10. Advisory for all DUs on ensuring reliable and stable electric power supply during the government's COVID-19 Vaccine Roll-Out Program signed on 16 February 2021; and
11. Advisory for all generation companies on ensuring reliable and stable electric power supply during the Government's COVID-19 Vaccine Roll-Out Program signed on 02 March 2021.

DIFFERENT COMMUNITY QUARANTINE LEVELS IN THE PHILIPPINES



Enhanced Community Quarantine (ECQ)	Modified Enhanced Community Quarantine (MECQ)	General Community Quarantine (GCQ)	Modified General Community Quarantine (MGCQ)
- Movement of all persons will be limited to accessing goods and services from permitted establishments - Permitted activities are limited to health services, utility services, food establishments, and other essential sectors - All other businesses, persons, and activities will be prohibited to operate, work, or be undertaken - No physical gathering outside of residences - Limited public transportation - No face-to-face classes at all levels - Longer curfew hours	- Permitted activities during ECQ will be allowed to operate at full on-site capacity - Select businesses, persons, and activities not permitted to operate during ECQ will be allowed at 50 percent capacity - No physical gathering outside of residences - Individual outdoor exercises will be allowed - Public transportation will be allowed to operate at a capacity - No face-to-face classes at all levels - Curfew still imposed	- Limited movement of all persons but majority of the industries will be allowed to operate up to 50 to 100 percent on-site capacity except for activities with large social gatherings - All construction projects will be permitted - Public transportation will be allowed to operate - No face-to-face classes for basic education and limited in-person classes for higher education and technical vocational education and training - Shortened curfew hours	- More socio-economic activities will be permitted to operate in compliance with minimum public health standards - No face-to-face classes for basic education and limited in-person classes for higher education and technical vocational education and training

Source: IATF Omnibus Guidelines on the Implementation of Community Quarantine in the Philippines, with Amendments as of May 06, 2021

LUZON

**PEAK
DEMAND**
11,103 MW

CAPACITY
Installed:
17,840 MW
Dependable:
16,010 MW

**POWER
PROJECT
CAPACITY***
Committed:
8,344 MW
Indicative:
27,754 MW

**GROSS
GENERATION**
72,419 GWh

**ELECTRICITY
SALES AND
CONSUMPTION**
73,504 GWh

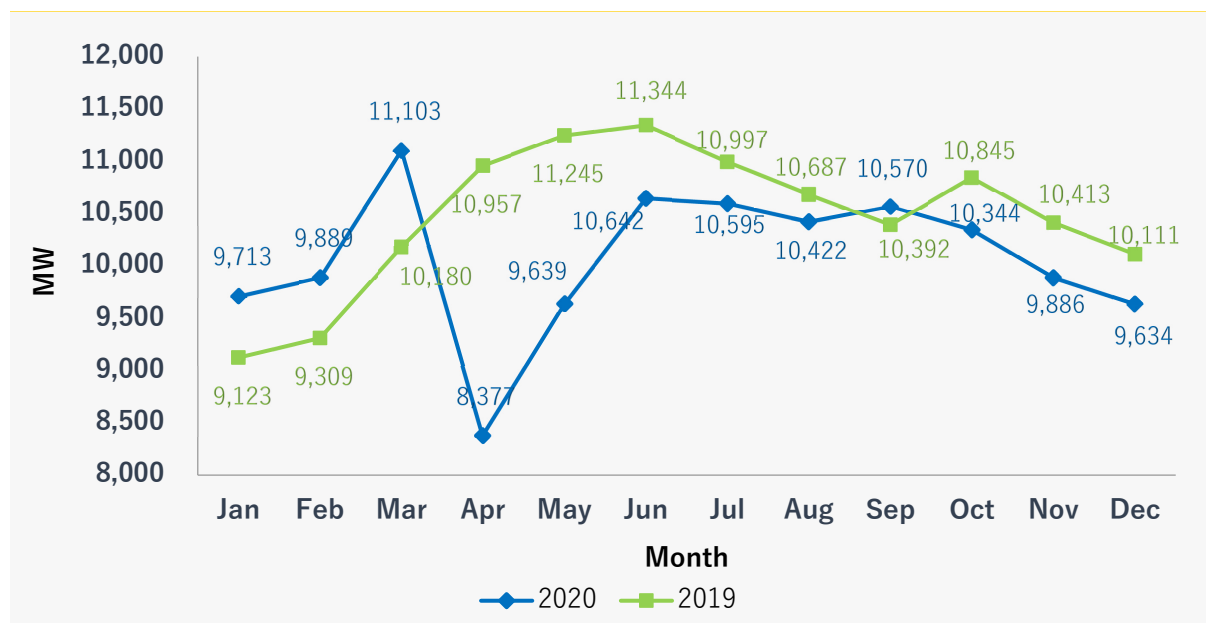
**NEWLY
OPERATIONAL
CAPACITY**
423 MW*

*excluding off-grid generators



Peak Demand and Electricity Consumption

Peak demand and electricity sales values in 2020, on the average, fell below 2019 due to the quarantine restrictions which evidently slowed down economic activities in majority of Luzon. The highest demand for the year occurred on 09 March 2021 at 11,103 MW, just a few days before the first imposition of community quarantine. As shown in Figure 5, the imposition of Luzon-wide ECQ from 15 March to 30 April 2020 led to the occurrence of the all-time low peak demand and electricity consumption for the year at 8,377 MW and 5,314 GWh, respectively, which are both recorded in the month of April. Peak demand and electricity sales began to recover in June as quarantine levels were eased to GCQ and MGCQ.



Source: NGCP

Figure 5. 2020 vs. 2019 Peak Demand, Luzon

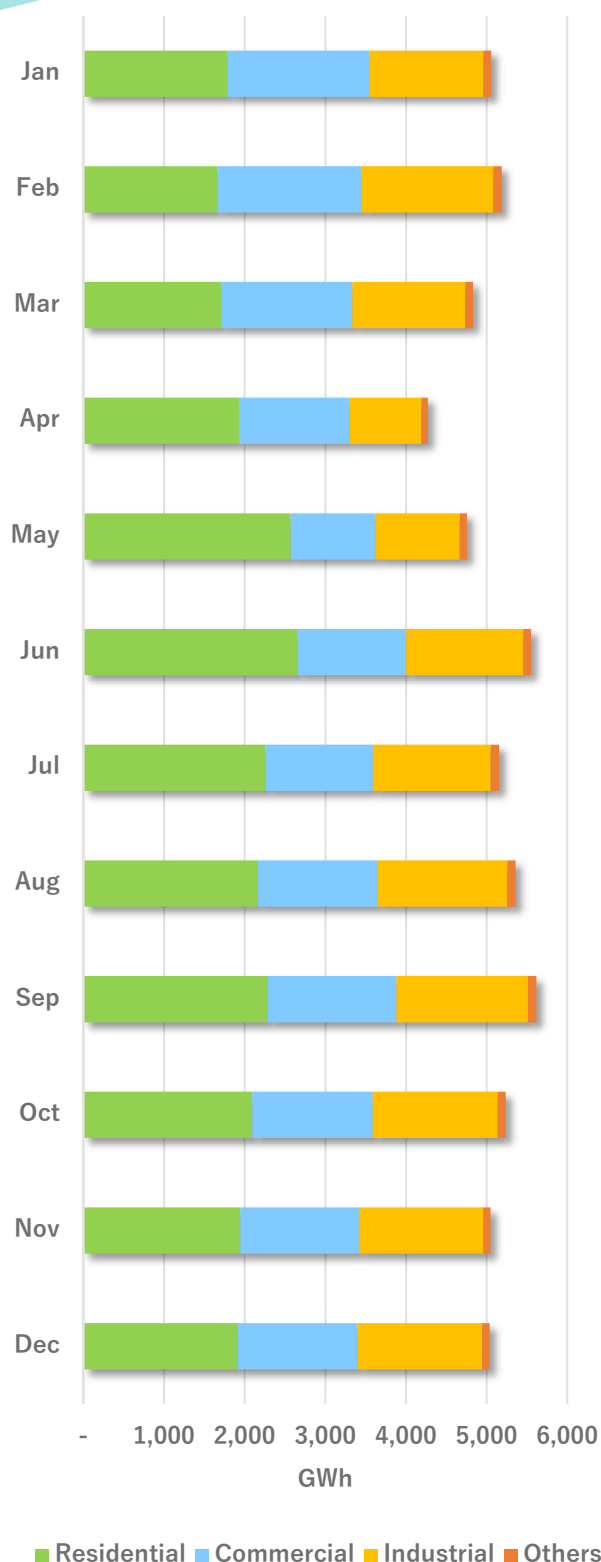
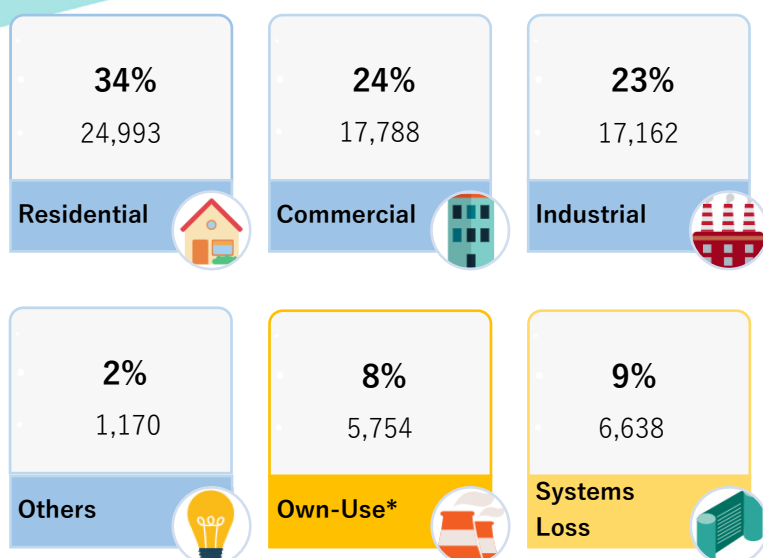


Figure 6. 2020 Monthly Electricity Sales, Luzon

Community Quarantine in Luzon:

- 1 Beginning 15 March 2021, Metro Manila was placed under ECQ. The ECQ declaration was later extended to the entire island of Luzon starting 16 March and lasted until 30 April 2020
- 2 From 01 to 15 May, Metro Manila, Central Luzon, CALABARZON, and identified high-risk areas remained under ECQ, while GCQ was implemented in low-risk to moderate-risk provinces. By 16 May, only Metro Manila and Laguna were placed under MECQ.
- 3 For the entire month of June and July, most of Luzon, including Metro Manila, shifted to GCQ or MGCQ.
- 4 Metro Manila, along with its nearby provinces, was brought back to MECQ from 04 to 18 August due to an increase in COVID-19 cases. On 19 August, the ECQ was lifted and the areas eased back to GCQ.
- 5 Throughout September until December, only Metro Manila and Batangas were placed under GCQ while the rest of Luzon was moved to MGCQ, the most lenient measure of community quarantine.

LUZON



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

Figure 7. 2020 Electricity Sales and Consumption, Luzon (in Percent Share and GWh)

Among the three main grids, Luzon experienced the highest decline in electricity sales and consumption at 4,183 GWh or -5.4% from 2019 to 2020. This is attributed to the significant reduction in commercial and industrial power consumption which obtained negative growth at -19% and -12%, respectively. In contrast, residential consumption rose by 13%, thereby increasing its share in Luzon's total electricity consumption from 29% to 34% in 2020.

Installed and Dependable Capacity

Despite the onset of the pandemic, Luzon's installed capacity managed to grow by 3.2% from 17,286 MW in 2019 to 17,840 MW in 2020, as shown in Table 7. The additional capacity is largely attributed to the increase in coal's capacity by 5.1% brought upon by the entry of the 352 MW coal-fired power plant located Masinloc, Zambales, and the new solar facility located in Conception, Tarlac (Table 8).

Table 7. Existing Installed and Dependable Capacity, as of 31 December 2020 (in MW)

Fuel Type	Installed		Dependable	
	MW	Percent Share (%)	MW	Percent Share (%)
Coal	7,280	40.8	6,855	42.8
Oil Based	2,642	14.8	1,748	10.9
Natural Gas	3,452	19.3	3,286	20.5
Renewable Energy	4,466	25.0	4,121	25.7
Geothermal	865	4.8	769	4.8
Hydro	2,593	14.5	2,499	15.6
Biomass	195	1.1	131	0.8
Solar	460	2.6	369	2.3

Fuel Type	Installed		Dependable	
	MW	Percent Share (%)	MW	Percent Share (%)
Wind	353	2.0	353	2.2
2020 TOTAL	17,840	100.0	16,010	100.0
BESS	11		11	
2019 TOTAL	17,286		15,598	

Note: Including off-grid generators

Source: DOE List of Existing Power Plants as of 31 December 2020

Table 8. 2020 Newly-Operational Power Plants, Luzon

POWER PLANT		CAPACITY, MW		LOCATION	OPERATOR
Facility Name	Subtype	Installed	Dependable	Municipality/ Province	
MASINLOC U3	Super Critical Coal	351.8	335.0	Masinloc, Zambales	Masinloc Power Partners Co. Ltd. (MPPCL)
CONCEPCION 2 SOLAR	Ground Mounted Solar PVs	70.9	56.7	Concepcion, Tarlac	Solar Philippines Tarlac Corporation
CALIBATO	Run-of-River type HEPP	0.3	0.1	San Pablo, Laguna	Philippine Power and Development Company (PHILPODECO)
TOTAL		422.9	391.8		

Note: Excluding off-grid generators

Source: DOE List of Existing Power Plants as of 31 December 2020

Gross Generation

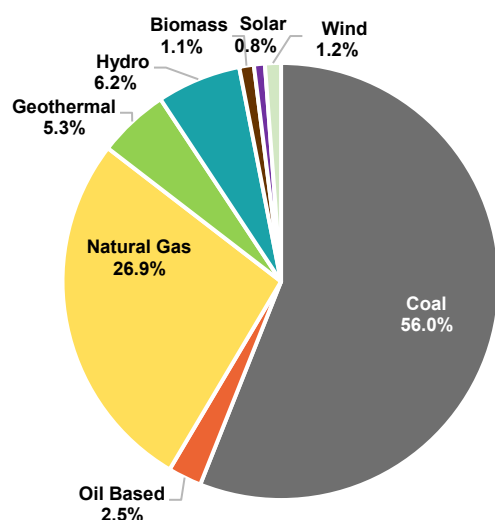


Figure 8. 2020 Gross Generation, Luzon

The Luzon grid's gross generation in 2020 reached 72,419 GWh, which is equivalent to a -4.9% drop from last year. Oil-based power generation was significantly reduced by -32.5%, from 2,674 GWh in 2019 to 1,804 GWh in 2020. Similarly, natural gas production also declined by -12.8% due to lower demand requirements and natural gas restrictions. On the other hand, power generation from coal in 2020 (40,575 GWh) remained steady with only a 0.2% growth, while biomass and solar production increased by 31.7% and 19.2%, respectively. Over the past years, the power generation mix followed a similar trend, with coal and natural gas as the consistent top source of energy in Luzon.

Table 9. Summary of Committed and Indicative Power Projects, as of 31 December 2020 (in MW)

Type of Power Plant	No. of Proponents	Committed Capacity (MW)	% Share	No. of Proponents	Indicative Capacity (MW)	% Share
Coal	4	3,836	46.0	6	5,820	21.0
Oil-Based	2	311	3.7	2	500	1.8
Natural Gas	3	3,500	42.0	3	5,100	18.4
Renewable Energy	25	697	8.3	81	16,334	58.9
Geothermal	2	90	1.1	1	120	0.4
Hydro	12	53	0.6	34	3,830	13.8
Biomass	2	13	0.1	2	22	0.1
Solar	8	409	4.9	32	9,984	36.0
Wind	1	132	1.6	12	2,378	8.6
2020 TOTAL	34	8,344	100.0	92	27,754	100.0
BESS	2	400		5	280	
2019 TOTAL	13	4,654		127	36,218	

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

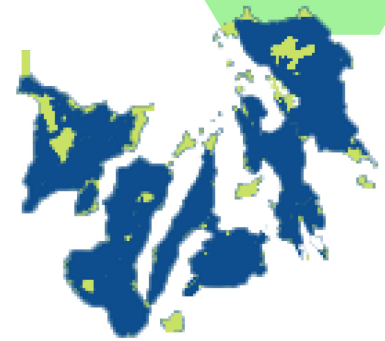
Significant Incidents

In addition to the pandemic, the Luzon grid was hit by a series of natural calamities in 2020 which affected power generation, transmission, and distribution facilities and infrastructures located in several areas, as enumerated below:

- Taal Volcano Eruption, 12 January 2020 – spewed huge amount of ash mostly affecting the CALABARZON region, nearby cities and towns;
- Typhoon Pepito (International name: “Saudel”), 18 to 25 October 2020 – brought a maximum sustained wind at 125 km/h affecting Isabela and Aurora provinces;
- Typhoon Quinta (International name: “Molave”), 22 to 29 October 2020 – brought a maximum sustained wind at 165 km/h affecting the CALABARZON, MIMAROPA, and Bicol Regions;
- Super Typhoon Rolly (International name: “Goni”), 01 to 06 November 2020- brought a maximum sustained wind at 225 km/h severely affecting the CALABARZON and Bicol Regions;
- Typhoon Ulysses (International name: “Vamco”), 10 to 13 November 2020- brought a maximum sustained wind at 155 km/h and heavy rains, which flooded the Cagayan and Isabela areas.

Luzon grid also experienced two (2) yellow alerts on 16 January 2020 and 04 June 2020. The 16 January 2020 yellow alert was caused by both unplanned outages and derated output of power plants due to line constraints. On the other hand, simultaneous occurrences on 04 June 2020 that led to the yellow alert status include the registration of a higher demand due to the mild El Niño phenomenon, the series of unplanned outages, and the output derating of power plants due to the Malampaya gas restriction. Further, the delays in commercial operation of committed power projects, caused by the community quarantine restrictions, contributed to the limited power supply in Luzon.

VISAYAS



**PEAK
DEMAND**
2,201 MW

**GROSS
GENERATION**
15,485 GWh

CAPACITY
Installed:
3,863 MW
Dependable:
3,369 MW

**POWER
PROJECT
CAPACITY**
Committed:
281 MW
Indicative:
3,786 MW

**ELECTRICITY
SALES AND
CONSUMPTION**
14,399 GWh

**NEWLY
OPERATIONAL
CAPACITY**
45 MW*

*excluding off-grid generators

Peak Demand and Electricity Consumption

Similar to Luzon, Visayas's 2020 peak demand and electricity sales began to decline below the 2019 mark during the month of April when several areas in the region were placed under ECQ beginning 06 April 2020. The ECQ was then extended until 15 May 2020 in major economic centers, namely, Cebu and Iloilo provinces, Bacolod City, and Mandaue City. While the rest of the country was placed under GCQ and MGCQ on June 2020, Cebu City remained on ECQ due to the growing number of COVID cases in the city. The highest peak demand recorded in the Visayas grid for 2020 was 2,201 MW which occurred on 01 February 2020, prior to the imposition of the community quarantine restrictions. On the same month, electricity consumption was at its highest, amounting to 1,245 GWh.

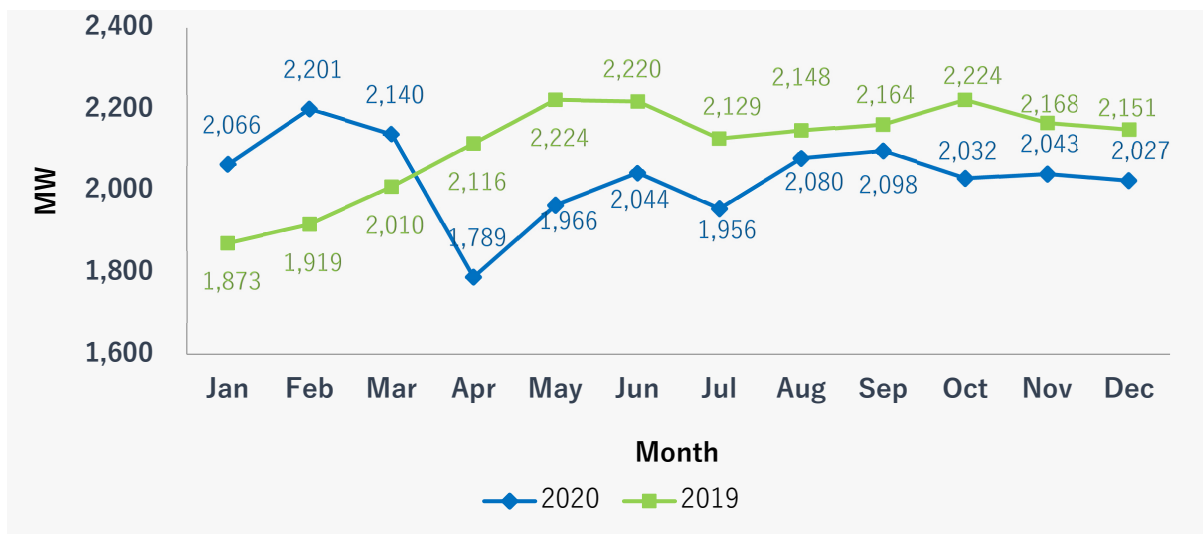


Figure 9. 2020 vs. 2019 Peak Demand, Visayas

Source: NGCP

VISAYAS

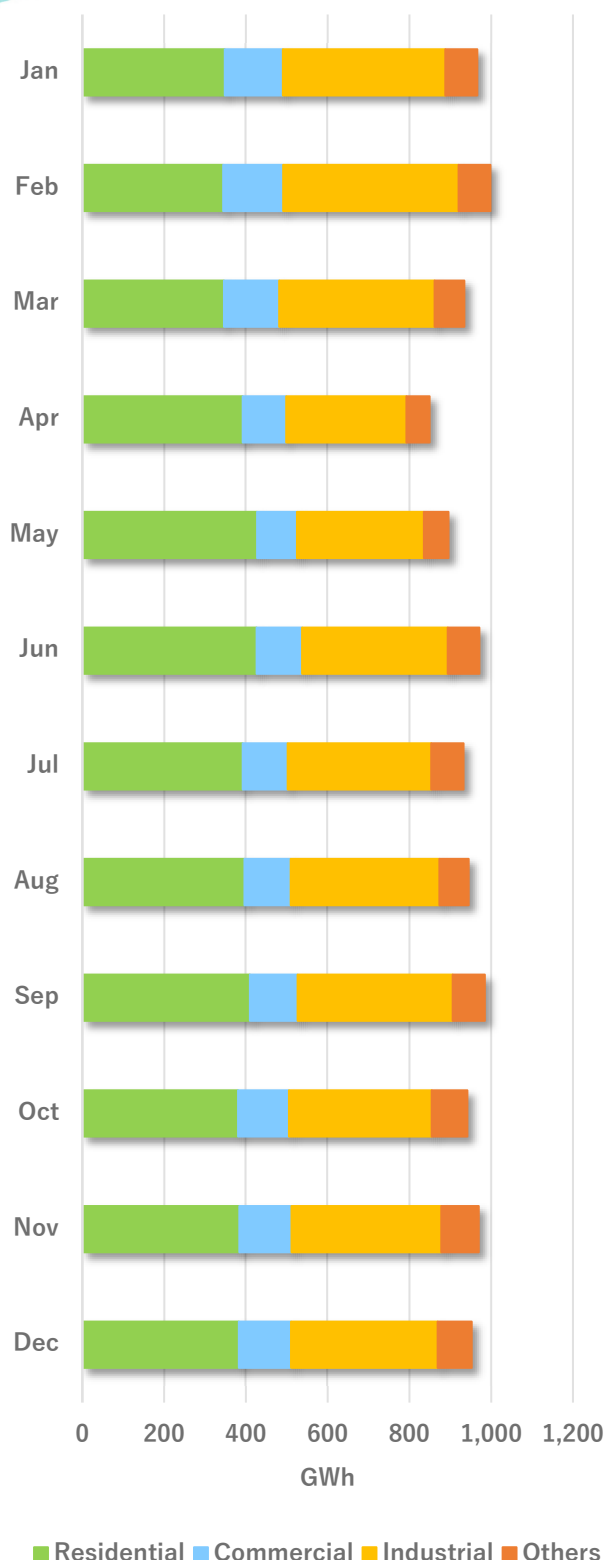


Figure 10. 2020 Monthly Electricity Sales, Visayas

Community Quarantine in Visayas:

- 1 Beginning 06 April 2021, the region of Western Visayas and the provinces of Samar, Biliran, Cebu, Negros Oriental, and the municipality of Catarman in Northern Samar were placed under ECQ.
- 2 From 01 to 15 May, Iloilo, Cebu province, Bacolod and other identified high-risk areas remained under ECQ while GCQ was implemented in low-risk to moderate-risk provinces. By 16 to 31 May, only Cebu City and Mandaue City were placed under ECQ.
- 3 For the entire month of June, majority of Visayas transitioned to MGCQ. However, on 16 June, Cebu City was placed again under ECQ and Talisay City under MECQ.
- 4 On 01 July, only Cebu City remained under ECQ while the rest of Visayas were placed under GCQ or MGCQ. On 15 July, Cebu City eased to MECQ.
- 5 For the month of August, most of Visayas were placed under GCQ or MGCQ except for identified high risk areas which were placed under ECQ or MECQ.
- 6 Throughout September until December, only Bacolod and Tacloban were under GCQ while the rest of Visayas was moved to MGCQ, the most lenient measure.

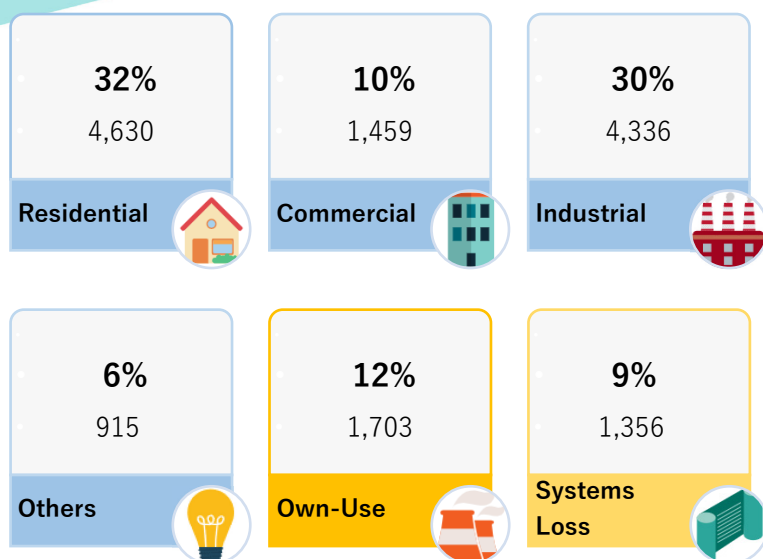


Figure 11. 2020 Electricity Sales and Consumption, Visayas (in Percent Share and GWh)

Electricity consumption in Visayas slightly decreased to 14,399 GWh in 2020, which is -1.0% lower compared to 2019. Commercial was the most severely hit sector, with the highest decline of -22.7% in electricity sales from 2019 to 2020. However, the decline was counteracted with the increase in residential sales by 10.3% from 4,198 GWh in 2019 to 4,630 GWh in 2020. Thus, residential became the largest energy-consuming sector in Visayas for 2020, comprising a 32% share in the grid's consumption.

Installed and Dependable Capacity

Compared to Luzon and Mindanao, the capacity growth in Visayas was limited over the years. In 2020, the total installed capacity only increased by 1.4% due to the entry of TPVI Diesel Power Plant (45 MW) as shown in Table 11. Moreover, the increase in capacity in Visayas from 3,369 MW in 2019 to 3,863 MW in 2020 was also due to newly added entries in the List of Existing Power Plants such as Biomass power plants which have been operating for own-use due to current transmission line constraints.

Table 10. Existing Installed and Dependable Capacity, as of 31 December 2020 (in MW)

Fuel Type	Installed		Dependable	
	MW	Percent Share (%)	MW	Percent Share (%)
Coal	1,399	36.2	1,349	40.1
Oil Based	705	18.2	516	15.3
Natural Gas	1	0.0	0	0.0
Renewable Energy	1,757	45.5	1,503	44.6
Geothermal	955	24.7	881	26.2
Hydro	21	0.5	20	0.6

Fuel Type	Installed		Dependable	
	MW	Percent Share (%)	MW	Percent Share (%)
<i>Biomass</i>	216	5.6	131	3.9
<i>Solar</i>	476	12.3	381	11.3
<i>Wind</i>	90	2.3	90	2.7
2020 TOTAL	3,863	100.0	3,369	100.0
2019 TOTAL	3,809		3,306	

Note: Including off-grid generators

Source: DOE List of Existing Power Plants as of 31 December 2020

Table 11. 2020 Newly-Operational Power Plants, Luzon

POWER PLANT		CAPACITY, MW		LOCATION	OPERATOR
Facility Name	Subtype	Installed	Dependable	Municipality/ Province	
TPVI DPP	Bunker/ Diesel Internal Combustion Engine	44.6	40.7	Naga, Cebu	Therma Power Visayas, Inc.
TOTAL		44.6	40.7		

Note: Excluding off-grid generators

Source: DOE List of Existing Power Plants as of 31 December 2020

Gross Generation

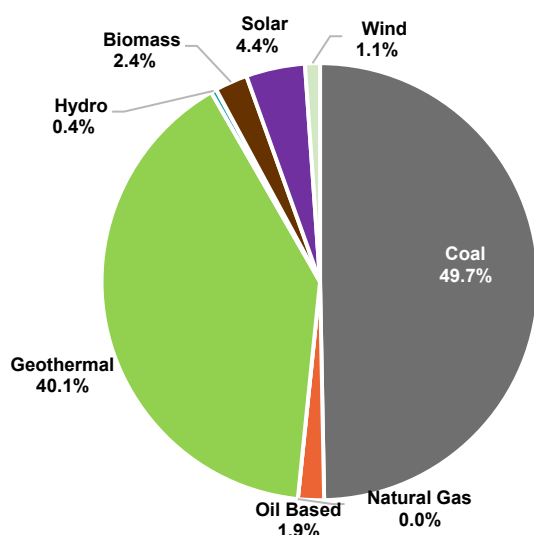


Figure 12. 2020 Gross Generation, Visayas

Power plants in Visayas generated a total of 15,485 GWh of electricity in 2020. As a result of the lower demand due to the pandemic, there has been a -3.6% year-on-year reduction in gross power generation from 2019. Most of the plants, including major energy sources (coal, geothermal) experienced a decline, while several renewable plants (hydro, biomass, solar) increased in gross generation. Notably, oil-based electricity production massively dropped by 43.2% from 524 GWh in 2019 to 298 GWh in 2020 due to the subsequent lower peaking requirements. Among the three grids, Visayas had the largest share of power generation from RE at 48.4%.

Table 12. Summary of Committed and Indicative Power Projects, as of 31 December 2020 (in MW)

Type of Power Plant	No. of Proponents	Committed Capacity (MW)	% Share	No. of Proponents	Indicative Capacity (MW)	% Share
Coal	1	135	48.0	1	600	15.8
Oil-Based	1	70	24.9	2	37	1.0
Natural Gas	0	0	0.0	0	0	0.0
Renewable Energy	4	76	27.1	27	3,148	83.2
Geothermal	1	50	17.8	1	76	2.0
Hydro	2	23	8.2	12	790	20.9
Biomass	1	3	1.1	1	8	0.2
Solar	0	0	0.0	6	461	12.2
Wind	0	0	0.0	7	1,814	47.9
2020 TOTAL	6	281	100.0	30	3,786	100.0
BESS	3	270		2	64	
2019 TOTAL	13	524		42	4,120	

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

Significant Incidents

There were five (5) yellow alerts recorded in the Visayas grid that occurred on the following dates: 28 January 2020, 07 September 2020, 21 October 2020, 22 October 2020, and 23 October 2020. These were mostly triggered by capacity reserves being below the system reserve requirement due to forced outages of power plants. Moreover, the only red alert for the year was issued on 24 September 2020 when a massive power outage transpired in Negros and Panay Islands due to the failure of a power circuit breaker at Sta. Barbara substation in Iloilo.

Another significant incident happened on 03 July 2020 wherein an explosion in Power Barge 102 caused an oil spillage into the waters of Iloilo City. The incident has since been resolved by the responsible power generating company, as coordinated with the concerned agencies and local government units, to ensure that any adverse effects have been mitigated. A few grid disturbances were also experienced due to power plant and line trippings which resulted in load dropping incidents and momentary power interruptions.

MINDANAO

**PEAK
DEMAND**
1,978 MW

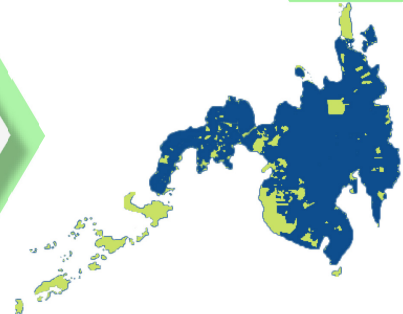
**GROSS
GENERATION**
13,852 GWh

CAPACITY
Installed:
4,584 MW
Dependable:
4,031 MW

**POWER
PROJECT
CAPACITY**
Committed:
352 MW
Indicative:
1,859 MW

**ELECTRICITY
SALES AND
CONSUMPTION**
13,852 GWh

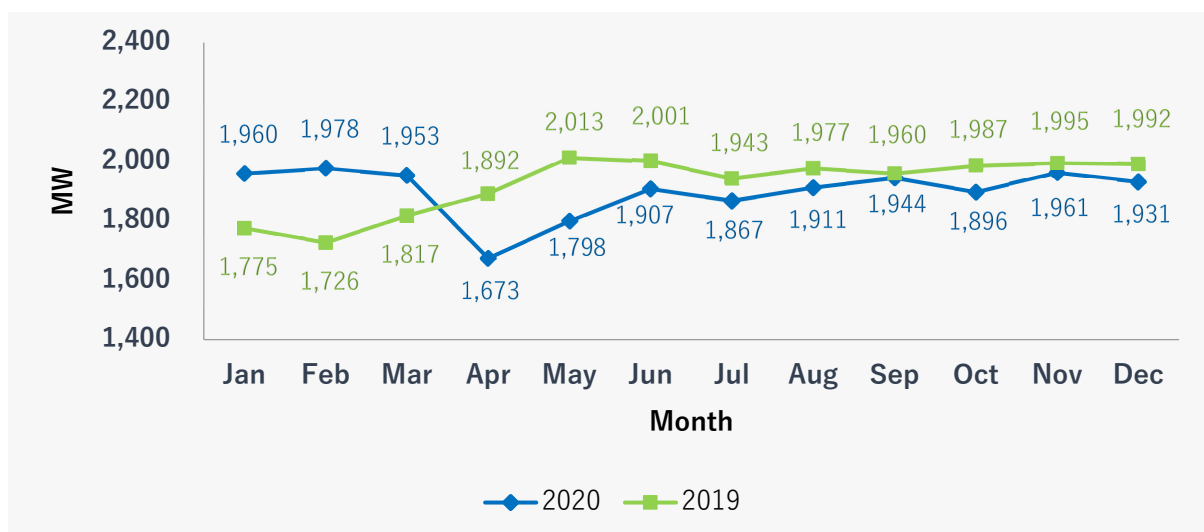
**NEWLY
OPERATIONAL
CAPACITY**
175 MW*



*excluding off-grid generators

Peak Demand and Electricity Consumption

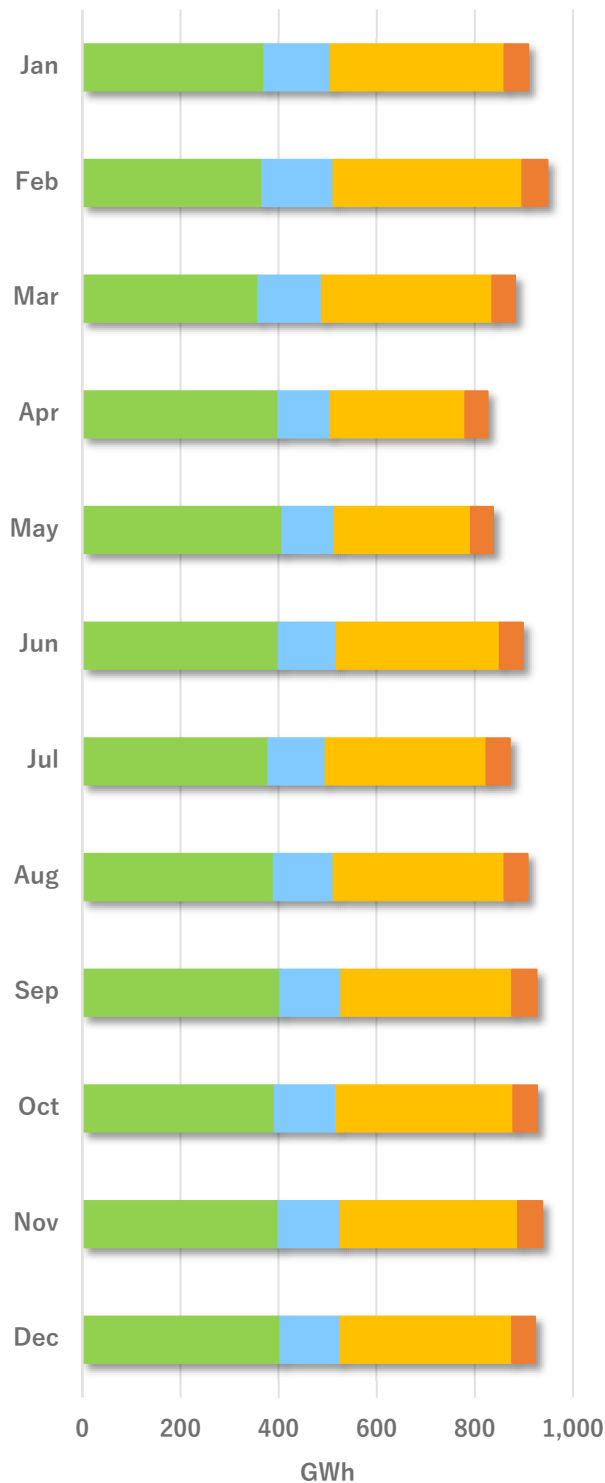
The Mindanao grid reached its peak demand of 1,978 MW on 28 January 2020 which is a -1.8% contraction from 2019. On 15 March 2020, Davao City first declared the imposition of a GCQ. However, by April, more stringent measures were deemed necessary to control the transmission of COVID-19. Nearby areas with increasing number of cases also imposed ECQ, resulting in an evident dip in peak demand and electricity consumption. For the year 2020, the months of April and May displayed the lowest figures in both these parameters, an abnormality considering historical data has shown that this period is when electricity demand is often at its highest. Generally, the impact of COVID-19 and declaration of community quarantine in terms of demand and consumption in Mindanao is much less than that of the Luzon and Visayas grid as the strict quarantine was relaxed earlier than in other key economic areas of the country.



Source: NGCP

Figure 13. 2020 vs. 2019 Peak Demand, Mindanao

MINDANAO



■ Residential ■ Commercial ■ Industrial ■ Others

Figure 14. 2020 Monthly Electricity Sales, Mindanao

Community Quarantine in Mindanao:

1

On 15 March 2020, Davao City, the center of economic activities in Mindanao, was placed under GCQ. The whole Davao region was later upgraded to ECQ on 04 April. Similarly, several localities also imposed community quarantine measures due to the surfacing of new COVID-19 cases. By 06 April, CARAGA Region, Zamboanga Peninsula, Camiguin, Bukidnon, Sultan Kudarat, Lanao del Sur, Lanao del Norte, Cotabato, South Cotabato, and Tawi-Tawi were all placed under ECQ.

2

From 01 to 15 May, identified high-risk areas including Davao City remained under ECQ, while GCQ was imposed in all other areas of Mindanao.

3

Starting 16 May, Mindanao transitioned to MGCQ or GCQ which lasted until December, except for several identified high risk areas.

4

In September, MECQ was declared in Iligan and Lanao Del Sur from 01 to 30 September and 08 to 30 September, respectively.

5

The implementation of MECQ in Lanao Del Sur, including Marawi, was extended until the end of October.

MINDANAO

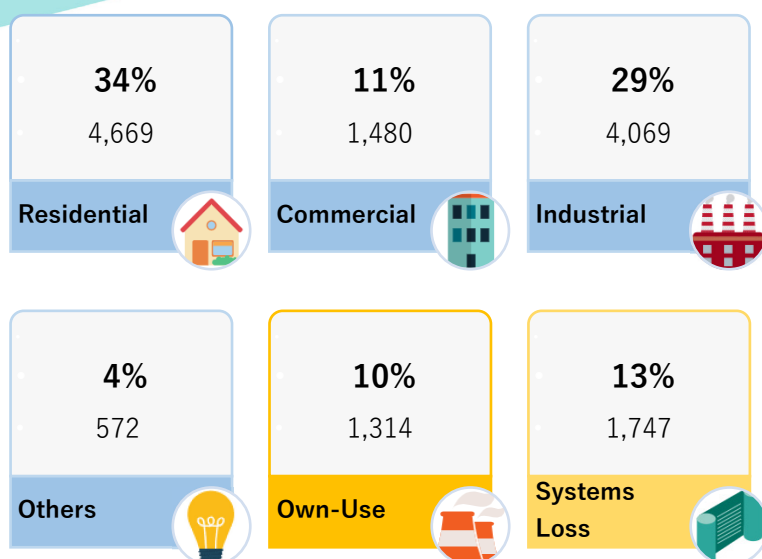


Figure 15. 2020 Electricity Sales and Consumption, Mindanao, (in Percent Share and GWh)

The Mindanao grid recorded a 13,852 GWh electricity consumption for 2020, a mere 0.3% growth rate from 2019. Among the three grids, only Mindanao exhibited a positive increment from the previous year. Unsurprisingly, the restrictions put in place boosted an annual growth of 12.6% in residential, thereby increasing the annual share of the sector from 30.0% in 2019 to 33.7% in 2020. All remaining sectors plummeted with the exception of “Own-Use” which increased by 21.1% due to the entry of new power plants in late 2019 and 2020, contributing to the station use of power plants under this category.

Installed and Dependable Capacity

Mindanao remained to have the highest reserve margin among the three grids, totaling to 4,584 MW of installed capacity and 4,031 MW of dependable capacity. This is a 3.3% increase from last year, mainly due to the entry of coal-fired power plants with a total installed capacity of 175 MW as shown in Table 14. Moreover, there was an increase in installed capacity for hydro and a decrease for oil-based based on the annual updating of the DOE List of Existing Power Plants, factors of which were highlighted in the earlier section of the report. The security of supply in Mindanao reflects the readiness of its regions for more economic investments and opportunities. Furthermore, with the ongoing development of the Wholesale Electricity Spot Market (WESM) Mindanao and the Mindanao-Visayas Interconnection Project (MVIP), Mindanao will be able to share its capacity with Visayas, and consequently, Luzon in the near future.

**Table 13. Existing Installed and Dependable Capacity,
as of 31 December 2020 (in MW)**

Fuel Type	Installed		Dependable	
	MW	Percent Share (%)	MW	Percent Share (%)
Coal	2,264	49.4	2,041	50.6
Oil Based	889	19.4	790	19.6
Natural Gas	0	0.0	0	0.0
Renewable Energy	1,430	31.2	1,201	29.8
<i>Geothermal</i>	<i>108</i>	<i>2.4</i>	<i>103</i>	<i>2.6</i>
<i>Hydro</i>	<i>1,165</i>	<i>25.4</i>	<i>1,007</i>	<i>25.0</i>
<i>Biomass</i>	<i>73</i>	<i>1.6</i>	<i>23</i>	<i>0.6</i>
<i>Solar</i>	<i>84</i>	<i>1.8</i>	<i>67</i>	<i>1.7</i>
<i>Wind</i>	<i>0</i>	<i>0.0</i>	<i>0</i>	<i>0.0</i>
2020 TOTAL	4,584	100.0	4,031	100.0
2019 TOTAL	4,436		3,832	

Note: Including off-grid generators

Source: DOE List of Existing Power Plants

Table 14. 2020 Newly-Operational Power Plants, Mindanao

POWER PLANT		CAPACITY, MW		LOCATION	OPERATOR
Facility Name	Subtype	Installed	Dependable	Municipality/ Province	
GNPOWER KAUSAWAGAN U4	Circulating Fluidized Bed (CFB) Coal	150.0	138.0	Kauswagan, Lanao Del Norte	GNPower Kauswagan Ltd. Co.
PSPE	Circulating Fluidized Bed (CFB) Coal	25.0	20.0	Brgy. Kiwalan, Iligan City, Lanao Del Norte	Powersource Philippines Energy Inc. (PSPE)
TOTAL		175.0	158.0		

Note: Excluding off-grid generators

Source: DOE List of Existing Power Plants

Gross Generation

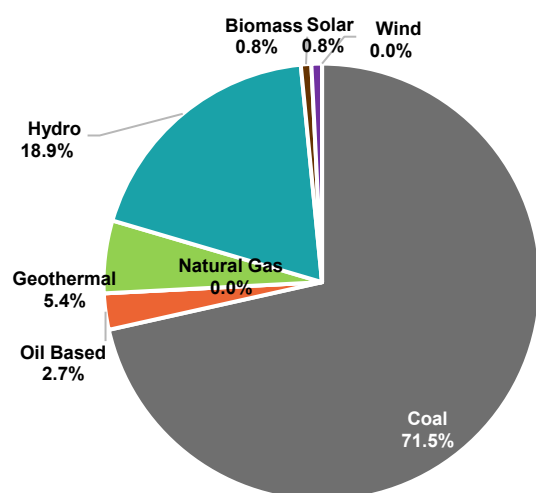


Figure 16. 2020 Gross Generation, Mindanao

The Mindanao gross generation amounted to 13,852 GWh in 2020, slightly increasing by 0.3% from 2019. Coal further increased its share at 71.5% from a 68.2% share in the previous year. The largest decline in the mix is from oil-based sources as the peaking requirements further declined due to the impact of the pandemic and the oversupply of registered capacities in the grid. Furthermore, renewable energy sources also declined by 6.6% but still contributed a hefty share of 25.8% in the gross generation mix, comprising of geothermal (5.4%), hydro (18.9%), biomass (0.8%), and solar (0.8%). The growth in supply is expected to continue as outlined in Table 15.

Table 15. Summary of Committed and Indicative Power Projects, as of 31 December 2020

Type of Power Plant	No. of Proponents	Committed Capacity (MW)	% Share	No. of Proponents	Indicative Capacity (MW)	% Share
Coal	1	270	76.6	2	628	33.8
Oil-Based	1	11	3.1	0	0	0.0
Natural Gas	0	0	0.0	0	0	0.0
Renewable Energy	5	71	20.2	24	1,231	66.2
Geothermal	0	0	0.0	1	30	1.6
Hydro	4	68	19.4	14	854	45.9
Biomass	1	3	0.9	1	10	0.5
Solar	0	0	0.0	8	337	18.1
Wind	0	0	0.0	0	0	0.0
2020 TOTAL	7	352	100.0	26	1,859	100.0
BESS	2	240		2	69	
2019 TOTAL	5	589		47	2,477	

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

Significant Incidents

A number of natural calamities, such as earthquakes and typhoons, affected various transmission and distribution facilities in Mindanao. Fortunately, there were no recorded yellow and red alert occurrences in 2020 due to the current oversupply situation in the region. The COVID-19 pandemic and country-wide community quarantine restrictions brought significant demand reduction and prompted numerous power plants to be put on reserve shutdown. The pandemic also caused a series of delays in the target completion dated of the MVIP and the commercial operation of WESM Mindanao. These key projects are envisioned to address the current oversupply situation and frequent manual load dropping incidents caused by the over/under nomination of customers under the current dispatch protocol in Mindanao.

TRANSMISSION

GRID PROFILE

As of December 2020, a total of 40,051 MVA substation capacities and 22,111 circuit-kilometers (ckt-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, 2019 vs. 2020

Total Substation Capacity (MVA)		
	2019	2020
Philippines	36,436	40,051
• Luzon	28,021	28,656
• Visayas	4,884	5,954
• Mindanao	3,531	5,441
Total Transmission Line Length (Ckt-km)		
	2019	2020
Philippines	20,079	22,111
• Luzon	9,227	10,033
• Visayas	5,299	5,379
• Mindanao	5,553	6,700

Source: 2021-2040 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 as shown below:

Table 17. Summary of Installed Capacitor Banks and Shunt Reactors, 2020

	CAPACITOR BANK (MVAR)	SHUNT REACTOR (MVAR)
Philippines	3,262	1,723.23
Luzon	2,613	1,080
Visayas	275	545
Mindanao	375	99

TRANSMISSION PROJECTS COMPLETED

For 2019 to 2020, twenty-seven (27) main grid projects were completed and energized by NGCP, totalling to 351.5 ckt-km Transmission Lines, and 4,100 MVA and 1,707.5 MVAR of substation capacity. These projects were intended to facilitate the entry of generation capacities, addresses load growth, and improve system reliability.

Table 18. Transmission Grid Projects Completed, 2020

Project Name/Components	MVA	MVAR	Ckt-km	Date of Completion/ Energization
LUZON				
1. Hermosa–Floridablanca 69 kV Transmission Line	-	-	17	Feb 2019
2. San Jose 500 kV Substation (4th Bank)	750	-	-	Apr 2019
3. North Luzon Substation Upgrading Project 1 – Malaya Substation	300	-	-	Oct 2019
4. 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)		25		Sep 2019
• Laoag Susbtation (Shunt Reactor)				
• Laoag Substation (Capacitor Banks)				
	50	Sep 2019		
5. Luzon Voltage Improvement Project 4, Stage 1	-	200	-	Apr 2019
		200		Apr 2019

Project Name/Components	MVA	MVAR	Ckt-km	Date of Completion/ Energization
• Biñan Substation (Capacitor Bank 3 & 4) • Dasmariñas Substation (Capacitor Bank 3 & 4)				
6. Tower Structure Upgrading of Bicol Transmission Facilities (formerly Permanent Restoration Works of Toppled Towers by Typhoon Nina) • Naga–Tiwi C Transmission Line 2 (36 Towers)	-	-	-	Apr 2019
7. Luzon Voltage Improvement Project 3 • Mexico Substation	-	100	-	Mar 2020
8. Luzon Voltage Improvement Project 3 • Mexico Substation	-	200	-	Aug 2020
9. San Jose–Quezon 230 kV Line 3	-	-	19.50	Nov 2020
10. San Manuel–Nagsaag 230 kV Substation and Tie Line	600	-	0.60	Dec 2020
VISAYAS				
11. Visayas Voltage Improvement Project, Stage 1 • Compostela Substation • Corella Substation	- -	40 15	- -	Dec 2019 Dec 2019
12. Visayas Substation Reliability Project 1 • Maasin Substation	50	-	-	Feb 2020
13. Bagolibas Substation	50	-	-	Mar 2020

Project Name/Components	MVA	MVAR	Ckt-km	Date of Completion/ Energization
14.Visayas Voltage Improvement Project				
• Cebu Substation	-	40	-	Mar 2020
15.San Carlos-Guihulngan Transmission Line	-	-	58	Aug 2020
16.New Naga Substation (Colon Substation)	100	-	-	Dec 2020
MINDANAO				
17.Matanao–Toril–Bunawan 230kV Transmission Line	-	-	38	Dec 2019
18.Mindanao 230 kV Backbone, Stage 1				
• Bunawan Substation	600	-	-	Oct 2019
• Toril Substation	600			Nov 2019
• Culaman Substation	50			Dec 2019
19.Balo-i–Kauswagan–Aurora 230 kV Substation Phase 1	300	-	-	Jun 2019
20.Mindanao 230 kV Backbone, Stage 2				
• Villanueva Substation	600	-	-	Nov 2019
• Villanueva Substation (Shunt Reactor)	-	70	-	Sep 2019
21.Mindanao Substation Reliability Project 1				
• Maco Substation (Capacitor Bank 3)	-	7.5	-	Oct 2019
• Nabunturan (Capacitor Bank 5)	-	7.5	-	Oct 2019
22.Mindanao Substation Upgrading Project 1				
• Pitogo Substation (Capacitor Banks 3 & 4)	-	15	-	Dec 2019
• Butuan Substation (Capacitor Banks 4 & 5)	-	22.5	-	Oct 2019
• Placer Substation (Capacitor Banks 2 & 3)	-	15	-	Oct 2019
• San Francisco Substation (Capacitor Banks 1, 2, & 3)	-	22.5	-	Oct 2019
• Gen. Santos Substation (Capacitor Bank 4)	-	7.5	-	Oct 2019
• Tacurong Substation (Capacitor Bank 4)	-	7.5	-	Nov 2019

Project Name/Components	MVA	MVAR	Ckt-km	Date of Completion/ Energization
23.Matanao-Toril 230 kV Transmission Line	-	-	38	Jan 2020
24.Sultan Kudarat (Nuling) Substation Capacitor	-	15	-	Jul 2020
25.Butuan–Placer Transmission Line Project Schedule I & II	-	-	96.40	Oct 2020
26.Toril–Bunawan Transmission Line Project	-	-	84	Nov 2020
27.Mindanao Substation Upgrading Project				
• Placer Substation	100	-	-	Dec 2020
Total	4,100	1,707.5	351.5	27 Projects

TRANSMISSION PROJECTS AFFECTED BY THE COVID-19 PANDEMIC

At the height of the nationwide community quarantine, NGCP was constrained to temporarily suspend its construction projects to ensure compliance with health and safety regulations. The list below shows the affected transmission projects by the COVID-19 pandemic with their respective changes in Expected Time of Completion (ETC) based on TDP 2020-2040 and TDP 2021-2040.

Table 19. Transmission Projects with Changes in ETC due to COVID-19

Project Name	ETC from TDP 2020 – 2040	ETC from TDP 2021 – 2040	Remarks
LUZON			
San Jose–Angat 115 kV Line Upgrading	Jun 2020	Jun 2021	Implementation affected by COVID-19
Tiwi Substation Upgrading	Jun 2020	Dec 2021	Implementation affected by COVID-19
Calamba 230 kV Substation	Jun 2020	Mar 2021	Implementation affected by COVID-19 and remaining ROW issue
Mariveles–Hermosa 500 kV Transmission Line	Dec 2020	Oct 2021	Implementation affected by COVID-19 and remaining ROW issue
North Luzon Substation Upgrading Project	Nov 2020	Mar 2021	Implementation affected by COVID-19
Luzon PCB Replacement	Dec 2020	Mar 2021	Implementation affected by COVID-19
Luzon Voltage Improvement Project 3	Jun 2022	Mar 2021	Implementation affected by COVID-19
Hermosa–San Jose 500 kV Transmission Line	Mar 2021	Dec 2021	Implementation affected by COVID-19 and remaining ROW issue
Pagbilao 500 kV Substation	Mar 2021	Mar 2022	Implementation affected by COVID-19 and remaining ROW issue
Navotas 230 kV Substation	May 2021	Dec 2023	Implementation affected by COVID-19 and ROW issue
Tuguegarao–Lal-lo 230 kV Transmission Line	May 2021	Mar 2022	Implementation affected by ROW issue and COVID-19 that causes travel restrictions on foreign experts

Project Name	ETC from TDP 2020 – 2040	ETC from TDP 2021 – 2040	Remarks
Taguig 500 kV Substation	Jun 2021	Dec 2023	Implementation affected by COVID-19
Antipolo 230 kV Substation	Aug 2021	Apr 2022	Implementation affected by COVID-19
Ambuklao–Binga 230 kV Transmission Line Upgrading	Nov 2021	Dec 2023	Implementation affected by COVID-19 and ROW issue
Binga–San Manuel 230 kV Transmission Line Stage 1 & 2	Nov 2021	Dec 2023	Implementation affected by COVID-19 and ROW issue
Tuy 500/230 kV Substation Project (Stage 1)	Dec 2021	Mar 2023	Implementation affected by COVID-19 and ROW issue
South Luzon 230 kV Substation Upgrading Project	Dec 2021	Sep 2021	Implementation affected by COVID-19
Eastern Albay 69 kV Line Stage 2	Sep 2022	Oct 2023	Implementation affected by COVID-19
North Luzon Substation Upgrading 2	Dec 2021	Oct 2022	Implementation affected by COVID-19
Pinili 230 kV Substation	Mar 2022	May 2023	Implementation affected by COVID-19 and ROW issue
Concepcion–Sta. Ignacia 69 kV Transmission Line	Apr 2022	Aug 2022	Implementation affected by COVID-19
Nagsaag–Tumana 69 kV Transmission Line	Apr 2022	Aug 2022	Implementation affected by COVID-19
Marilao 500 kV Substation	Oct 2022	Jul 2023	Implementation affected by COVID-19 and ROW issue
Abuyog 230 kV Substation	Nov 2023	Feb 2024	Implementation affected by COVID-19
VISAYAS			
Cebu–Negros–Panay 230 kV Backbone Stage 1	Dec 2020	Apr 2021	Implementation affected by COVID-19 and ROW issue

Project Name	ETC from TDP 2020 – 2040	ETC from TDP 2021 – 2040	Remarks
Panitan–Nabas 138 kV Transmission Line 2 Project	Dec 2020	May 2021	Implementation affected by COVID-19
Visayas Substation Reliability Project II	Jun 2020	Jun 2021	Implementation affected by COVID-19
Sta. Rita–Quinapondan 69 kV Transmission Line	Dec 2020	Jun 2021	Implementation affected by COVID-19
Tagbilaran 69 kV Substation Project	Dec 2020	Sep 2021	Implementation affected by COVID-19
Naga (Visayas) Substation Upgrading Project	Dec 2020	Dec 2021	Implementation affected by COVID-19
Cebu–Negros–Panay 230 kV Backbone Project - Stage 3	Dec 2021	Dec 2022	Implementation affected by COVID-19 and ROW issue
Cebu–Lapu–Lapu 230 kV Transmission Line Project	Dec 2021	Dec 2023	Implementation affected by COVID-19 and ROW issue
Nabas–Caticlan–Boracay Transmission Line Project	May 2021	Jun 2022	Implementation affected by COVID-19, ROW issue and DPWH Permit issue
Permanent Restoration of Colon–Samboan 138 kV Lines 1 and 2 affected by Landslide	Oct 2020	Jun 2021	Implementation affected by COVID-19 and ROW issue
MINDANAO			
Mindanao–Visayas Interconnection Project (MVIP)	Dec 2020	Dec 2022	Implementation affected by COVID-19 and ROW issue; further delayed due to damaged fiber-optic cable
Mindanao Substation Upgrading Project (MSUP)	Dec 2021	Jun 2022	Implementation affected by COVID-19
Mindanao Substation Rehabilitation Project (MSRP)	Dec 2021	Jun 2022	Implementation affected by COVID-19

PROPOSED TRANSMISSION NETWORK OUTLOOK FOR 2040

TRANSMISSION MASTER PLAN

1 Bolo to Laoag 500kV Backbone (Apr 2028)

- 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 (Dec 2025)

Stage 1: Castillejos-Hermosa 500kV T/L (June 2021)

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

Stage 2: Castillejos-Bolo 500 kV T/L (Dec 2025)

- 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 (Feb 2029)

- 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 (Apr 2028)

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

7 Luzon-Visayas 230kV AC Interconnection (Dec 2040)

- Aims to provide Samar Island an alternate power source.

8 Palawan-Mindoro Interconnection Project-PMIP (Feb 2028)

- 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.

9 Mindoro-Panay 230kV Interconnection (Dec 2040)

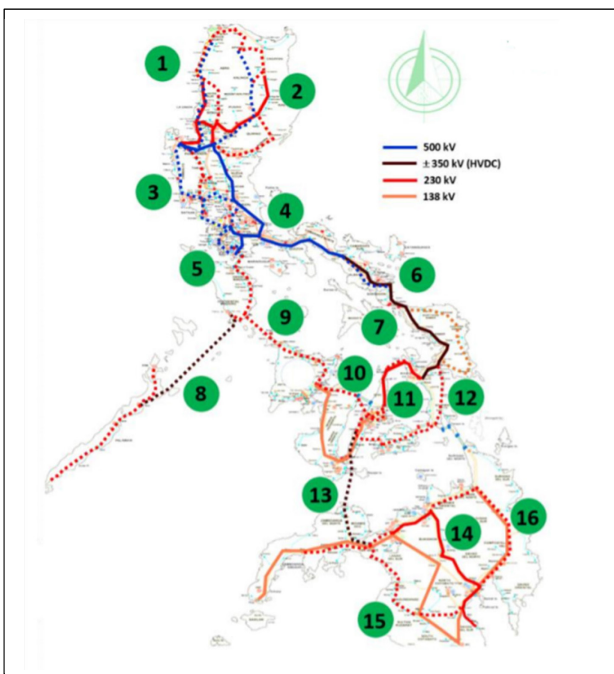
- To accommodates the power generation in Luzon and Visayas

10 Cebu-Negros-Panay 230kV Backbone (Dec 2022)

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

11 Metro Cebu Backbone Loop (Dec 2040)

- To ensure adequate supply facilities in the long term.



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

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

13 Mindanao-Visayas Interconnection (Dec 2021)

- 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.

14 Mindanao 230kV Backbone (Completed)

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

15 Southwestern Mindanao 230kV Transmission Backbone (Dec 2030)

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

16 Eastern Mindanao 230kV Transmission Backbone (Aug 2027)

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

SIGNIFICANT INCIDENTS

Several incidents in 2020 resulted in multiple power interruptions in the grid. Below are some of the notable reported significant incidents.

Table 20. Significant Incidents

Date	Nature of Incident	Probable Cause	Action/s Taken
12 January 2020	Multiple Tripping: Binan - Calaca 230kV Line; Calaca - Sta.Rosa 230kV Line	Line fault due to Taal Volcano eruption	Switching and restoration of lines.
12 January 2020	Multiple Tripping: Dasmarinas-Ilijan 500kV Line, Tayabas-Dasmarinas 500kV Line, San Jose-Tayabas 500kV Line 2, 4x600MVA Dasmarinas Transformers	Line fault due to Taal Volcano eruption	Switching and restoration of lines.
13 January 2020	Multiple Tripping: Calaca-Sta Rita 230 kV Lines 1 & 2	Line fault due to reported ash fall and rain shower in Sta Rita plant area	Switchyard inspection and lines patrol
24 January 2020	Multiple tripping of Dasmariñas-Amadeo 230kV L1, Calaca-Amadeo 230kV L2 & Calaca-Amadeo 230kV L1	Affected by the ash fall from the Taal Volcano eruption accompanied by sudden rain around the area.	Reduced generation of Group 1 plants for N-1 compliance of Batangas-San Lorenzo 230kV L1 & L2
15 February 2020	Multiple transmission line tripping and equipment: San Juan (Kalayaan) - Lumban 230kV lines 1 & 2 tripped	Fault along the line	Switchyard inspection and lines patrol
18 February 2020	System integrity protection scheme (SIPS) activation in Negros sub grid	Customers line tripping.	Assessed the tripping of line and gathered data for re-dispatch. Reduce Negros and Panay grid generation to restore affected plants by SIPS.

Date	Nature of Incident	Probable Cause	Action/s Taken
24 March 2020	Multiple critical Transmission Equipment Tripping; Aurora-NagaMin 138kV Line 2, NagaMin SS 50MVA Transformer no. 1 & NagaMin SS SVC.	Cut conductor of NagaMin-Sirawai 69kV Line	Restored
08 April 2020	Multiple Trippings: Mexico 230kV Bus A, 100MVAR Capacitor C-07, Mexico-Quezon 230kV Line tripped at Mexico side only and Mexico 300MVA Power Transformer Bank 1 tripped at high side only.	Power Circuit Breaker 8CB04(8XCO7MEX) of 100MVAR Capacitor C-07 with Bushing Insulator phase A flash-over(explosion).	Attempted to restore the affected line once with clearance
19 May 2020	Bohol Sub Grid Isolation.	Equipment tripping.	Isolated 7-01CB24 and energized thru 7-01CB08 and 7-01CB04.
04 July 2020	Tripping of 230kV Compostela - Daanbantayan	Due to rainshower / lightning & thunderstorm.	Coordinate with ACC/ SS /Plants restoration of affected Lines/Substation/Plants. Under assessment.
13 July 2020	138kV Panitan - Nabas T/L tripped	Bad weather rain shower/lightning & thunderstorm	Coordinate with ACC & substation personnel on duty for restoration of line and plant tripping.
13 July 2020	138kV Colon - Calung-calung T/L Line 1 & 2 tripped	Bad weather rain shower/lightning & thunderstorm	Coordinate with substation personnel on duty for restoration of line tripping.
06 August 2020	Negros-Panay submarine cable tripping	Bacolod indication of tripped A, and tripped B	Assign frequency marshal in Panay and regulate voltage in Bacolod substation.
02 September 2020	Forced Outage of Baloi-Aurora 138kV Line	Line to Ground Fault	Restored the line as relay indication warrants.

Date	Nature of Incident	Probable Cause	Action/s Taken
06 September 2020	Multiple Trippings: Mexico-Quezon 230kV Line 1 tripped and Mexico 300MVA Power Transformer Bank 1 tripped.	Flash-over (exploded) on Mexico PCB 8-01CB24MEX.	Isolated the Mexico PCB 8-01CB24MEX. Energization of Mexico 300MVA Transformer Bank 1
14 September 2020	138kV Bus 1 tripping affecting 69kv 50MVA TR#3&4	Breaker explosion/damaged	After clearance given from MTD personnel, immediately restored affected equipment and customer loads.
21 September 2020	Forced outage of Baloi-Aurora 138kV line	Line to Ground Fault	Restored the line as relay indication warrants.
21 September 2020	Forced outage of Jasaan-Nasipit 138kV line	Line to Ground Fault	Restored the line as relay indication warrants.
20 September 2020	Trippings of Nagamin-Zamboanga 138kV Line 2	Double line to ground fault	Energized back the tripped line
23 September 2020	Multiple Transmission Facility Tripping: San Manuel – Binga 230kV Lines 1 & 2	Single line-to-ground fault	Coordinated for the retrieval of relay indications and administered the restoration of the affected transmission lines.
14 October 2020	Forced outage of Agus5 – Aurora 138kV line	Line to Ground Fault	Restored the line as relay indication warrants.
20 October 2020	Tripping of Makban B-C 230kV line	Contractor breaching safe clearance	Restored
11 November 2020	Multiple Trippings: Naga-Daraga 230kV Line; Isolation of Bacman Geothermal Plant(91MW); Three(3) Feeders at Daraga Substation	Single Line to Ground Fault, phase A.	Instructed respective plant and substations for the opening of corresponding circuit breakers.
11 November 2020	Multiple Transmission line, Equipment, Load and Generator Outages during the passage of typhoon “ULYSSES”	Passage of Typhoon “ULYSSES”	SO performed redispatch, generation shedding and restoration of tripped lines and equipment.

Date	Nature of Incident	Probable Cause	Action/s Taken
16 November 2020	Forced outage of Aurora-Polanco 138kV line 1 and 2	Double line to ground fault	Energized the lines and power transformer
26 November 2020	Agus5-Aurora 138kV Line tripped followed by severe voltage swing	Single Line to Ground Fault	Test energized and successfully restored
30 December 2020	Simultaneous tripping of 138kV Isabel-Pasar Line 1 and 138kV Isabel-Philphos Line 2	Reported lightning strike by Philphos personnel.	Coordinated with Line Engineer and PASAR and PHILPHOS personnel for clearance to energize the respective lines. Line Engineer gave clearance to test energize

DISTRIBUTION

There are one-hundred fifty-one (151) distribution utilities (DUs) in the country, comprised of one hundred twenty-one (121) 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.

On 29 February 2020, MORE Electric and Power Corporation (MEPC) started its operation as the new DU in Iloilo City², pursuant to Republic Act No. 11212, "An Act Granting MEPC a Franchise to Establish, Operate, and Maintain for Commercial Purposes and in the Public Interest, a Distribution System for the Conveyance of Electric Power to the End-Users in the City of Iloilo, Province of Iloilo, and Ensuring the Continuous and Uninterrupted Supply of Electricity in the Franchise Area".

Based on the 2020-2029 Distribution Development Plan (DDP), the DUs registered a total of 31.7 million captive customer connections in 2019. Majority are residential customers comprising about 92% of the total customers, while the remaining are from the commercial, industrial, and others sectors.

Table 21. 2019 Captive Customer Connections, in million

Category	Luzon	Visayas	Mindanao	Total
Residential	18.82	3.61	6.66	29.09
Commercial	1.45	0.18	0.40	2.04
Industrial	0.05	0.01	0.03	0.09
Others	0.19	0.08	0.17	0.45
Total	20.52	3.88	7.27	31.67

To cater the projected growth in their respective franchise areas, the DUs have implemented various capital expenditure projects including electrification, network and non-network projects, among others. As of 2019, a total of 5,112 ckt-km of sub-transmission facilities, 109,135 ckt-km of distribution facilities, and 38,871 MVA of substation capacities were completed and added to the existing network.

Table 22. 2019 Capital Expenditure Projects

CAPITAL EXPENDITURE PROJECTS		
LUZON		
Subtransmission Facilities	ckt-km	4,460
Distribution Facilities	ckt-km	74,247
Substation Capacities	MVA	37,044
VISAYAS		
Subtransmission Facilities	ckt-km	220
Distribution Facilities	ckt-km	13,038
Substation Capacities	MVA	417

² Iloilo City was formerly under the franchise of Panay Electric Company, Inc.

MINDANAO		
Subtransmission Facilities	ckt-km	431
Distribution Facilities	ckt-km	21,849
Substation Capacities	MVA	1,410

Source: 2020-2029 Distribution Development Plan

The COVID-19 pandemic situation also contributed to the delays in the target completion dates of the Competitive Selection Process (CSP) of a number of DUs due to the following: a) restrictions on face to face meetings/gatherings of the Third Party Bids and Awards Committee (TPBAC), the TPBAC-Technical Working Group and Secretariat; b) limited capacity on venue of face to face meetings; and c) travel restrictions imposed by LGUs due to the community quarantine levels.

The DOE advised the DUs to conduct the CSP through available online platforms to push through with the CSP activities. As of 2020, four (4) DUs have issued the Notice of Award (NOA) to the winning bidders, one (1) DU is anticipated to sign the PSA with the winning bidder, and ten (10) DUs are currently conducting CSPs as shown in Table 23 and 24 below:

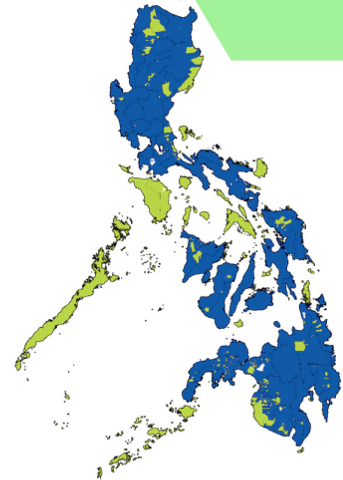
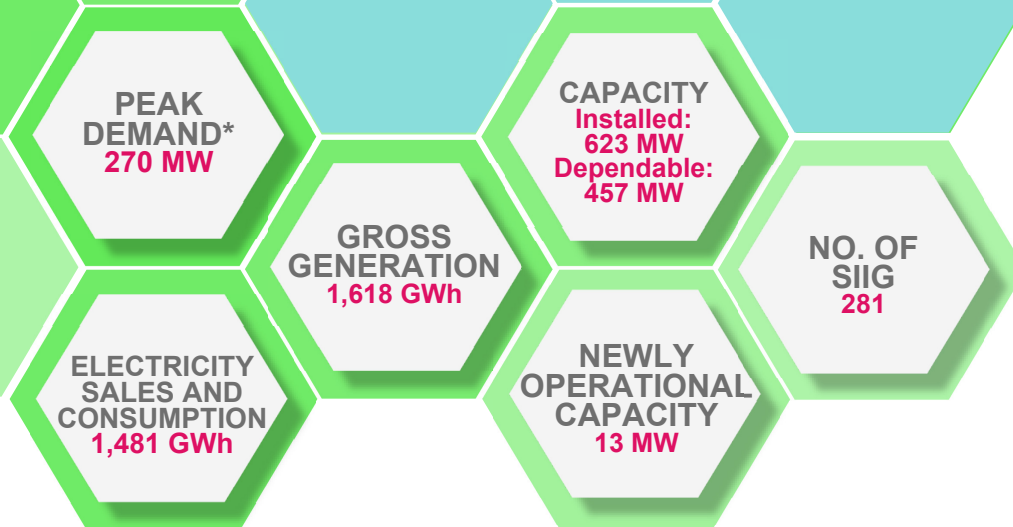
Table 23. DUs with CSP conducted in 2020

No.	DUs	Capacity	Period	Winning Genco	Technology Offered	Remarks
1	FBPC	10 MW escalating up to 15 MW Baseload and Mid-merit	10 years from January 2021 – January 2031	AP Renewables, Inc.	Renewable Energy (Geothermal)	With NOA dated 09 September 2020
2	NEECO II – A1	33 MW escalating up to 41 MW baseload/ mid-merit	5 years	AP Renewables, Inc.	Renewable Energy	With invitation letter dated 11 December 2020 to the DOE to attend the PSA signing between NEECO II – A1 and APRI
3	CEDC	20 MW Baseload	10 years	SEM-Calaca Power Coporation	Conventional	With NOA dated 19 October 2020
4	CEDC	25 MW mid-merit	5 years	Strategic Power Development Corporation	Conventional	With NOA dated 19 October 2020
5	PELCO I	15 MW RPS	10 years	Bac-Man Geothermal, Inc.	Renewable Energy	With NOA dated 04 March 2020

Table 24. DUs with on-going CSPs in 2020

No.	DUs	Capacity	Period
1	PELCO II	15 MW peaking	15 years
2	PELCO II	40 MW baseload	10 years
3	NEECO I	3 MW	5 years
4	QUIRELCO	15 MW	5 years
5	FBPC	10 MW escalating to 15 MW baseload	10 years upon ERC approval
6	CAGELCO II	10 MW Lot 1 15 MW Lot 2	26 December 2022 – 25 December 2037
7	One Bohol Power	50 to 82 MW Aggregated	2024 to 2033
8	LEZ	9 MW (minimum of 3 MW baseload, intermediate, and peaking)	5 years
9	SEZ	10 MW (5 MW short term and 5 MW long term)	5 years
10	MERALCO	1,800 MW (net) new baseload	20 years

OFF-GRID AND MISSIONARY ELECTRIFICATION



*Subject to change based on the availability of data

Electricity Sales and Consumption

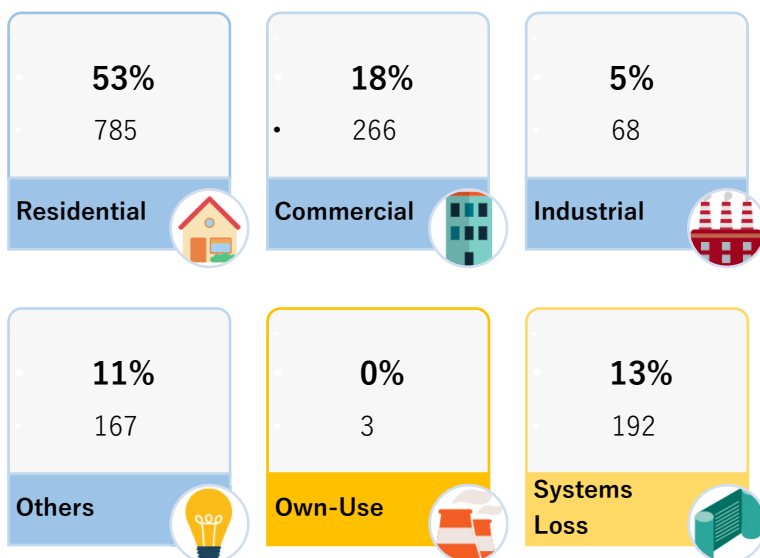


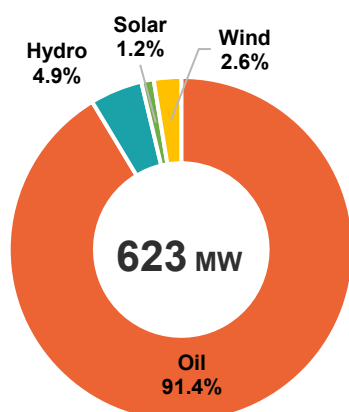
Figure 17. 2020 Electricity Sales and Consumption, Off-Grid, (in Percent Share and GWh)

Off-grid areas in the Philippines recorded a total electricity sales and consumption of 1,481 GWh, only a 0.8% increase from the previous year's consumption of 1,470 GWh. The pandemic had severely affected the commercial sector in off-grid areas which garnered a -18.2% decline from 2019. Meanwhile residential remains to have the highest percentage share with 53% or 785 GWh, equivalent to a 9.8% increase from 2019.

Capacity and Generation

The total installed capacity in 281 small island and isolated grids (SIIGs) increased by 18.5% from 526 MW in 2019 to 623 MW in 2020. The 18.5% increase can be attributed to the additional capacity of the existing New Power Providers (NPP) and the National Power Corporation (NPC) Small Power Utilities Group. On the other hand, off-grid generation slightly decreased from 1,623 GWh in 2019 to 1,618 GWh in 2020.

Installed Capacity



Gross Generation

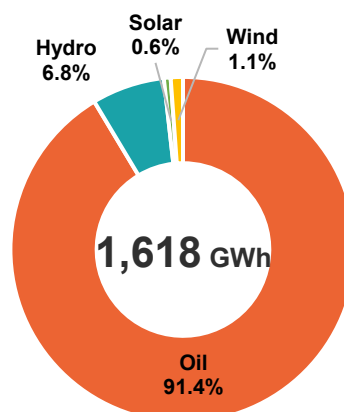


Figure 18. 2020 Off-Grid Installed Capacity and Generation

The year 2019 to 2020 showed 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.

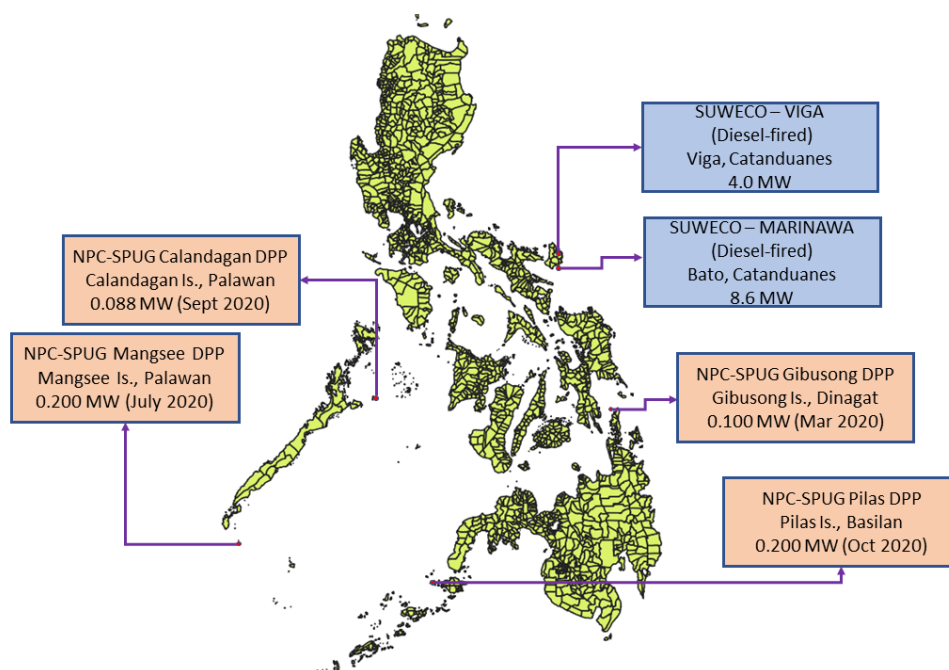


Figure 19. New Power Plants in Off-Grid Areas

As part of the program towards total electrification, NPC provided power generation service to four (4) new areas³ in 2020. Further, NPC also increased its service level in various areas. Even with the developments in off-grid electrification, there was still a reduction in electricity demand from 302 MW in 2019 to 270 MW in 2020 because of the COVID-19 pandemic.

³ Note: 0.088 MW Calandagan, 0.2 Mangsee, and 0.2 MW Pilas NPC-SPUG DPPs were not included in the 2020 capacity mix.

Table 25. Off-Grid Demand per Service Hours, 2019 vs. 2020

Service Hours	2020		2019	
	No. of SIIGs	Demand, MW	No. of SIIGs	Demand, MW
5	134	1	134	1
8	49	2	48	3
12-16	11	2	20	5
24	87	266	77	293
TOTAL	281	270	279	302

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

MAJOR POLICIES ISSUED IN 2020 RELATED TO GENERATION, TRANSMISSION AND DISTRIBUTION

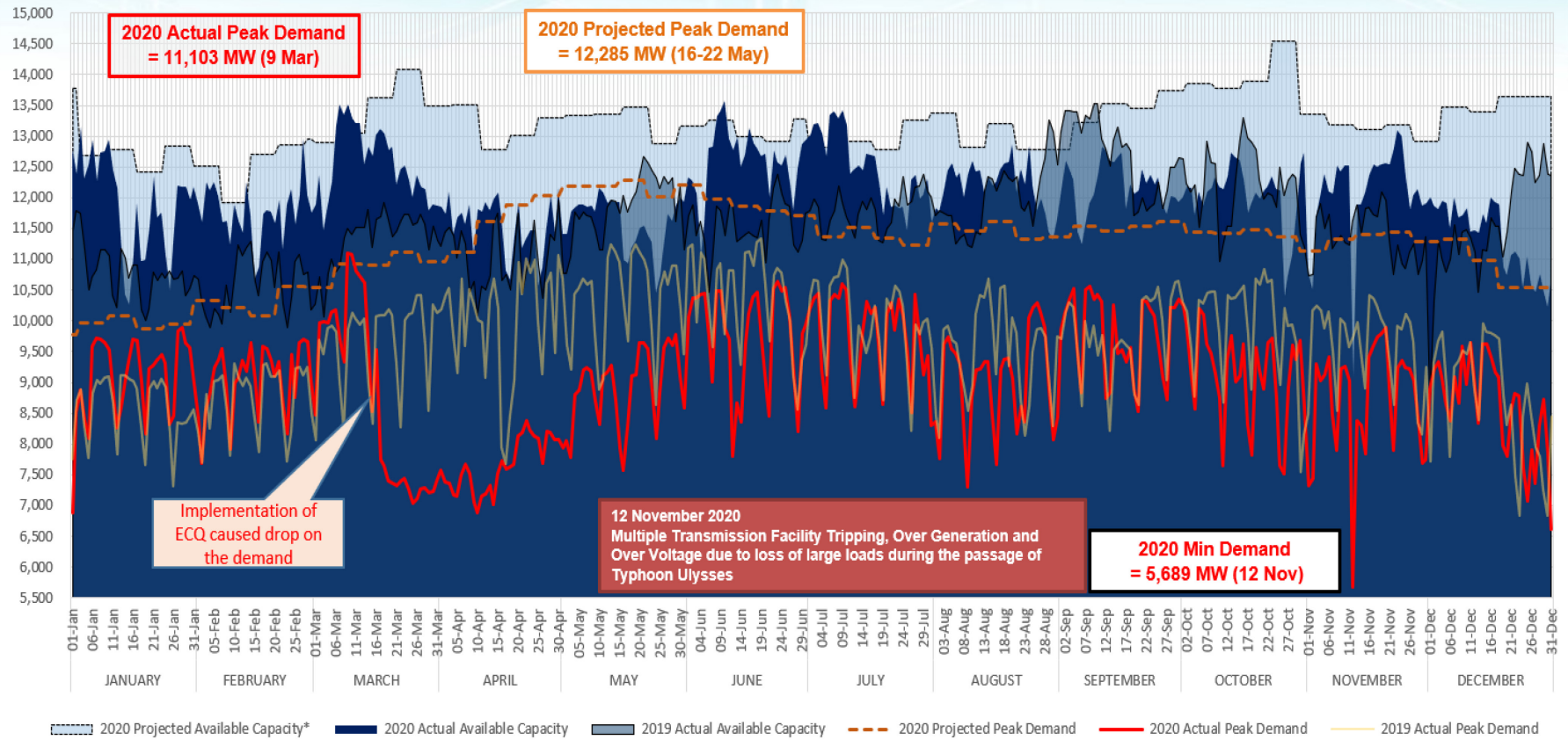
Table 26. List of Department Circulars and Advisory Issued in 2020

DEPARTMENT CIRCULAR NUMBER	TITLE	DATE OF ISSUANCE	OBJECTIVE
DC2020-02-0004	Providing Guidelines on the Planned Outage Schedules of Power Plants and Transmission Facilities and the Public Posting of the Grid Operating and Maintenance Program	02/06/2020	Ensure energy security, and enhance transparency, fairness and accountability in the operation of generation and transmission systems and distribution facilities
DC2020-02-0002	The Implementing Rules and Regulations of Republic Act 11361 or Otherwise known as the “Anti-Obstruction of Power Lines Act”	02/06/2020	Ensure the uninterrupted conveyance of electricity from generating plants to end-users
DC2020-05-0011	Supplementing Department Circular No. DC2019-12-0018 by Including the National Transmission Corporation in the Membership of the Ancillary Services - Technical Working Group	05/11/2020	Designating TRANSCO as additional member of the Ancillary Services – Technical Working Group
DOE-AGC-20005580	Advisory on the Moratorium of Endorsements for Greenfield Coal-Fired Power Projects in line with Improving the Sustainability of the Philippines’ Electric Power Industry	12/22/2020	Improve energy sustainability, reliability, and flexibility by increasing the RE share in the energy mix, promoting new technologies, increasing system flexibility, and adhering to higher environmental standard

ANNEX 1

Luzon 2020 Demand-Supply Situation

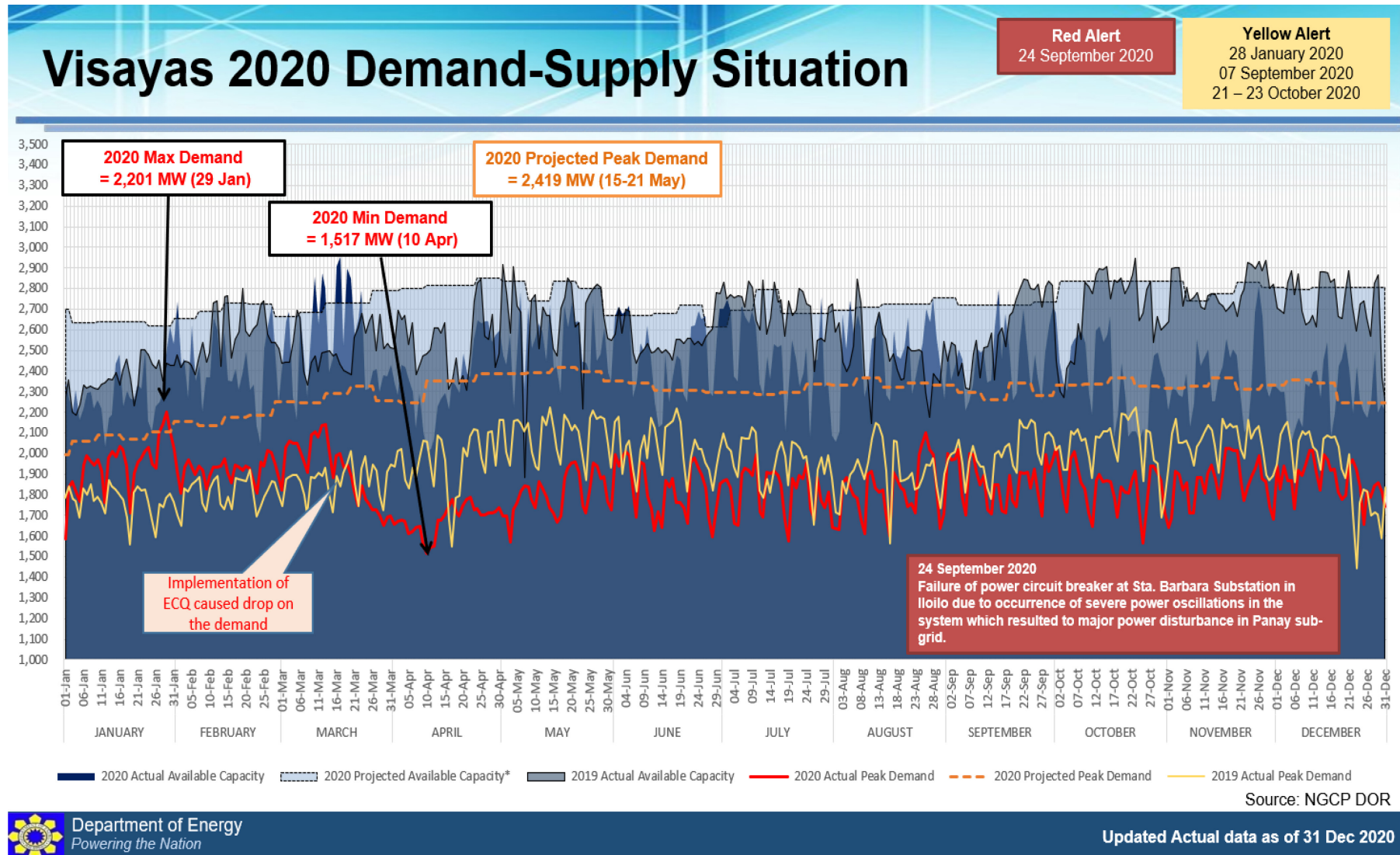
Yellow Alert
16 January 2020
04 June 2020



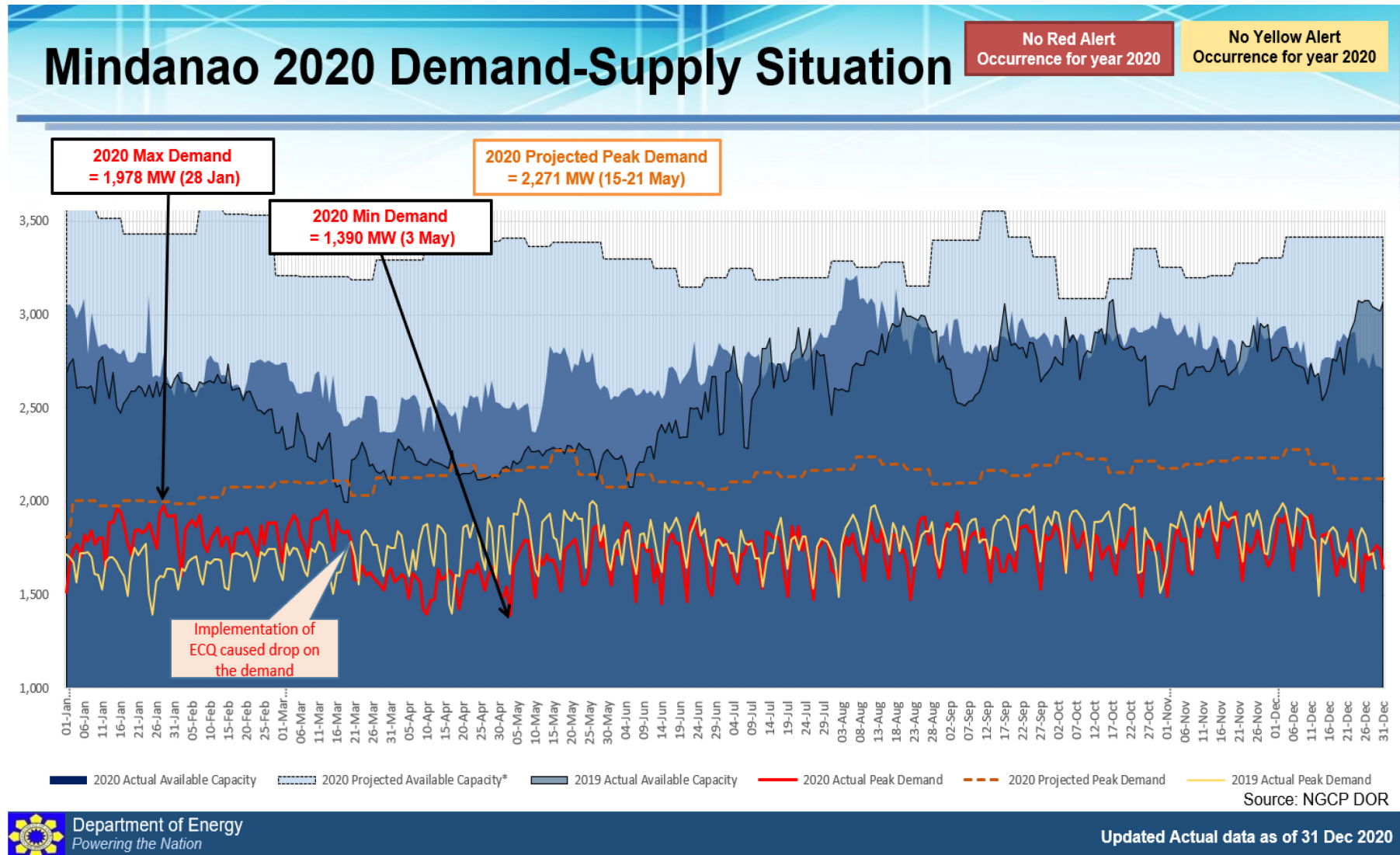
* Projected Available Capacity with HVDC, Malaya, TMO and MEI

Source: NGCP DOR

ANNEX 2



ANNEX 3



Prepared by the
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