



# Monthly Market Assessment Report

26 January to 25 February 2021

**MARCH 2021**

This Report is prepared by the  
Philippine Electricity Market Corporation –  
Market Assessment Group for the  
Market Surveillance Committee

## Table of Contents

<b>1. ASSESSMENT OF THE MARKET .....</b>	<b>2</b>
<b>2. MARKET OUTCOME.....</b>	<b>3</b>
<b>2.1 Price.....</b>	<b>3</b>
2.1.1 Price and Supply Margin .....	3
2.1.2 Load Nodal Price Duration Curve.....	6
<b>2.2 Supply.....</b>	<b>8</b>
2.2.1 Outage Capacity.....	8
<b>2.3 System Demand.....</b>	<b>11</b>
<b>3. SPOT TRANSACTIONS .....</b>	<b>13</b>
<b>3.1 Spot Exposure .....</b>	<b>13</b>
3.1.1 Load.....	13
3.1.2 Generator.....	14
<b>3.2 Pivotal Plants .....</b>	<b>18</b>
<b>3.3 Total Trading Amount (TTA) and Spot Quantity Share.....</b>	<b>19</b>

## List of Tables

Table 1. Summary of Pricing Conditions (Ex-ante), January 2021 .....	2
Table 2. System LWAP and Supply Margin, December and January 2016-2021 .....	5
Table 3. Outage Factor by Plant Type and Outage Category, January 2021 .....	9
Table 4. Outage Summary by Outage Category, December 2020 and January 2021 .....	10
Table 5. Outage Summary by Plant Type, December 2020 and January 2021 .....	11

## List of Figures

Figure 1. System LWAP and Supply Margin, January 2016-2021.....	4
Figure 2. Hourly Supply Margin and Price, January 2021.....	6
Figure 3. Hourly Supply Margin and Price, December 2020 .....	6
Figure 4. Load Nodal Price Duration Curve (Peak), December 2020 and January 2021 .....	7
Figure 5. Load Nodal Price Duration Curve (Off-peak), December 2020 and January 2021 .....	7
Figure 6. Capacity Profile, January 2021 .....	8
Figure 7. Outage Capacity by Outage Category, January 2021.....	9
Figure 8. Outage Capacity by Plant Type, January 2021 .....	10
Figure 9. Average Hourly System Demand, December 2020 and January 2021 .....	11
Figure 10. Average Hourly System Demand, January 2020 and 2021 .....	12
Figure 11. Average System Demand, January 2016-2021.....	13
Figure 12. Spot Market Exposure, January 2021 .....	14
Figure 13. Hourly Generator Spot Market Exposure, December 2020 and January 2021.....	14
Figure 14. Daily Generator Spot Market Exposure, January 2021.....	15
Figure 15. Spot Duration Curve, December 2020 and January 2021.....	16
Figure 16. BCQ to MQ Ratio, December 2020 and January 2021 .....	17
Figure 17. Spot Frequency Distribution Table, December 2020 and January 2021 .....	17
Figure 18. Market RSI vs Pivotal Suppliers, January 2021 .....	18
Figure 19. Top Pivotal Plants, January 2021 .....	19
Figure 20. Total Trading Amount and Spot Quantity Share, January 2021 .....	20

## Monthly Market Assessment Report for February 2021 Billing Month

### 1. ASSESSMENT OF THE MARKET

- Normal pricing condition in both the Luzon and Visayas regions consisted about 667 intervals or 90 percent of the total outcomes in February 2021. This was lower than January's monthly percent share of 98 percent in Luzon while the contrary was seen in Visayas with 87 percent last month.
- Price Substitution Methodology (PSM) was applied to 64 intervals or 9 percent of the total outcomes in both regions demonstrating an uptick from previous month's statistics.
  - 57 of the PSM-applied intervals were the result of the constraint in the Samboan – Amlan line 1 that connects the Cebu and Negros islands. Meanwhile, the constraints in the Sucat – Biñan line 3 and Bacolod – Barotac line 1 accounted for the remaining 5 and 2 intervals, respectively.
- Prices with error notices not caused by congestion occurred around 13 intervals or 2 percent of the time.
  - A total of 11 intervals were caused by inappropriate input data which affected both regions' prices and schedules whereas only 2 intervals were due to localized transformer constraints in Paco transformers.
- None of the intervals were imposed with administered prices and secondary price caps this month.

**Table 1. Summary of Pricing Conditions (Ex-ante), February 2021**

Pricing Condition	No. of Intervals			
	Luzon	% of Time	Visayas	% of Time
Normal	667	89.7%	667	89.7%
Congestion	64	8.6%	64	8.6%
Pricing Error Notice	13	1.7%	13	1.7%
Administered Price	0	0%	0	0%
Secondary Cap	0	0%	0	0%
<b>Total</b>	<b>744</b>	<b>100%</b>	<b>744</b>	<b>100%</b>

- Market prices dropped from last month as the declining outage capacity led to improved effective supply. Despite the hampering effects of the on-going community quarantine, system demand followed the increasing trend, although slightly lower than last year, coming into February as the cool dry season ends and the hot dry season commences in the following month.

**Notable Highlight:**

1. *Unusual level of demand*
  - *Observance of low yearly level of demand due to the imposed community quarantine*
2. *High level of outage capacity during the cool dry season*
  - *While outage level took a dip from the highest average last month since 2019, it remained relatively elevated in February*

## 2. MARKET OUTCOME

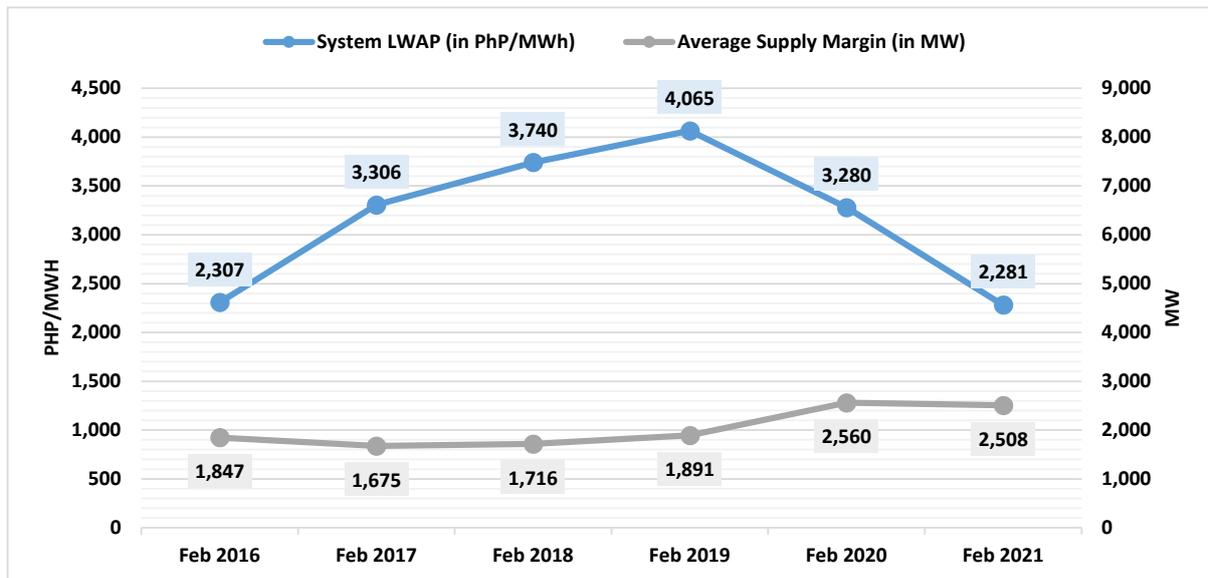
### 2.1 Price<sup>1</sup>

#### 2.1.1 Price and Supply Margin

- On 19 August, the GCQ was reinstated, coming from MECQ declaration from 4 to 18 August, and has since been imposed including in the February billing month. While quarantine protocols continue to be implemented, there were no episodes of price spikes recorded this month as compared with last month.
- Since the implementation of the community quarantine in March 2020, most months had an unusually high level of average monthly supply margin above 2,000 MW leading to low WESM prices.
- At its highest, the level of supply margin reached 4,457 MW on 21 February 2021 at 0400H and, at its lowest, 640 MW on 26 January 2021 at 1800H.
- Historically, highest supply margins are chiefly found within the cool dry season, especially during the December and January billing months, except in 2020 billing year where other months also incurred high average supply margins due to the effect of the community quarantine.
- While similarly comparable in terms of average supply margin, February 2021 resulted to a lower market price than in February 2020.

---

<sup>1</sup> The market prices were represented by the following: (i) ex-ante load weighted average price (LWAP) for trading intervals without pricing error during ex-ante, (ii) ex-post LWAP for trading intervals with pricing error during ex-ante but without pricing error during ex-post, (iii) LWAP based on the market re-run result for trading intervals with pricing error both during ex-ante and ex-post, and (iv) estimated load reference price (ELRP) for trading intervals where the ERC-approved Price Substitution Mechanism (PSM) was applied.



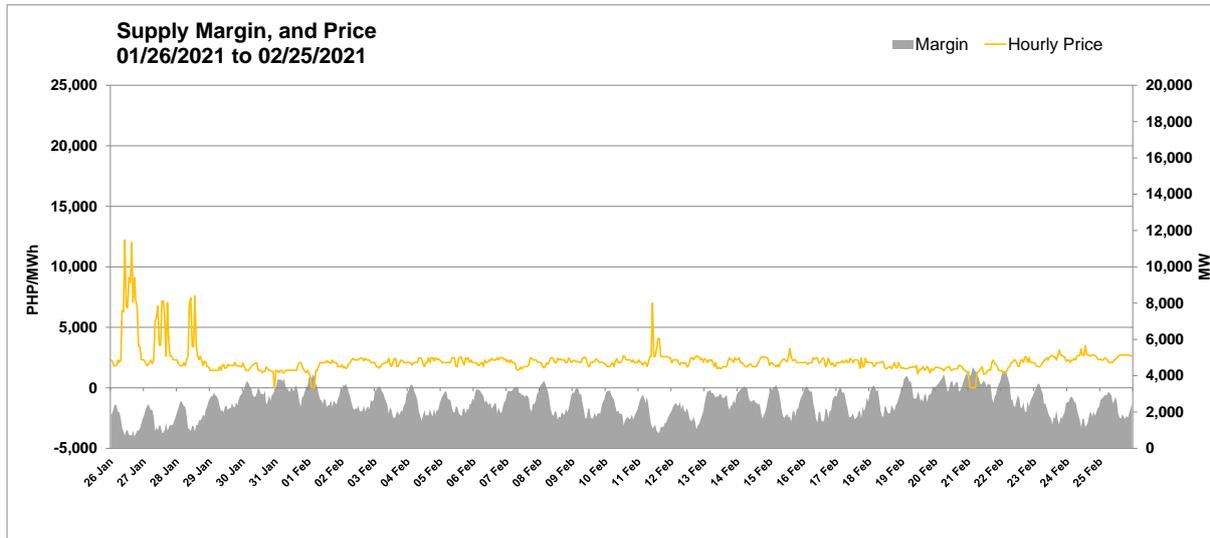
**Figure 1. System LWAP and Supply Margin, February 2016-2021**

- Monthly load weighted average price (LWAP) declined by 17 percent from PHP2,749/MWh in January to PHP2,281/MWh in February.
  - Monthly average peak prices fell by 26 percent from PHP3,520/MWh to PHP2,613/MWh.
  - Monthly average off-peak prices likewise went down by 5 percent from PHP2,062/MWh to PHP1,953/MWh.
- The average supply margin widened by 11 percent from 2,270 MW in January to 2,508 MW in February.
- Compared to past years, the transition of supply margin from January and February in 2021 deviated from the trend as the market experienced a positive change this year owing to the improvement in effective supply despite the increase in system demand.

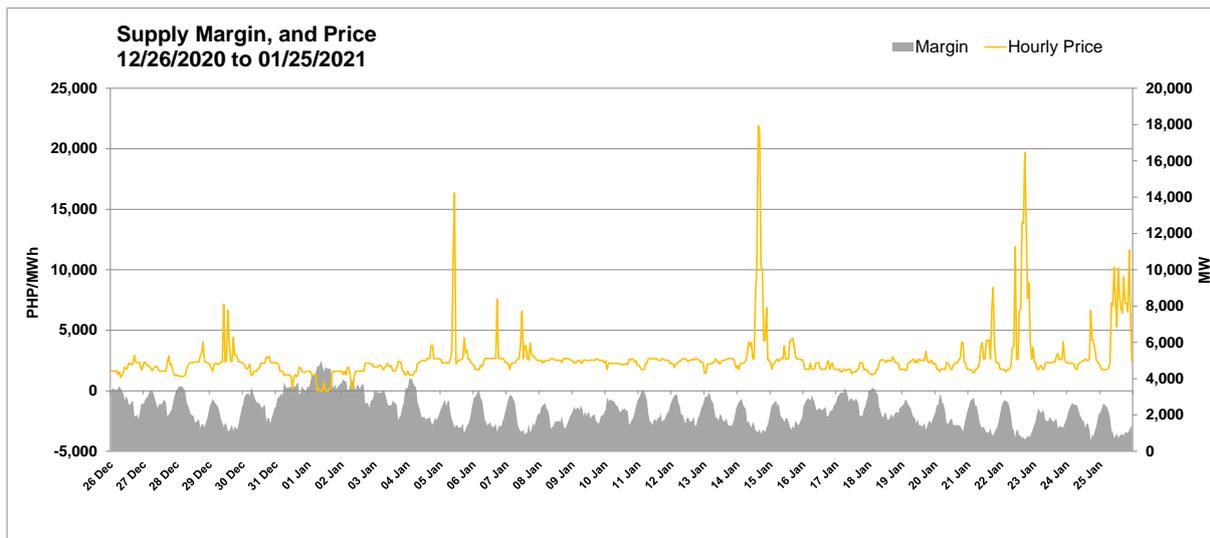
**Table 2. System LWAP and Supply Margin, January and February 2016-2021**

Year	Month	Average Supply Margin	% Change in Average Supply Margin	System LWAP	% Change in System LWAP
2016	January	1,972	-6%	2,046	13%
	February	1,847		2,307	
2017	January	2,842	-41%	1,768	87%
	February	1,675		3,306	
2018	January	2,790	-38%	2,387	57%
	February	1,716		3,740	
2019	January	2,125	-11%	4,725	-14%
	February	1,891		4,065	
2020	January	2,754	-7%	2,956	11%
	February	2,560		3,280	
2021	<b>January</b>	<b>2,270</b>	<b>10%</b>	<b>2,749</b>	<b>-17%</b>
	<b>February</b>	<b>2,508</b>		<b>2,281</b>	

- Hourly resolution of LWAP saw the highest level at PHP12,216/MWh on 26 January 2021 at 1100H due to one of the highest levels of demand plus reserve schedule at 12,233 MW with the effective supply only at 12,930 MW. This interval recorded one of the lowest supply margins for February 2021 at 697 MW.
- About 90 percent of the time, the hourly system LWAP was below the PHP2,607/MWh level.
- Prices during the weekdays averaged at PHP2,436/MWh while during weekends it was at PHP1,806/MWh. Meanwhile, prices during the holidays (Chinese New Year on 12 February, and People Power Anniversary on 25 February) averaged at PHP2,365/MWh.
  - Weekday – Off-peak: PHP1,989/MWh; Peak: PHP2,746/MWh
  - Weekend – Off-peak: PHP1,742/MWh; Peak: PHP1,930/MWh
  - Holiday – Off-peak: PHP2,334/MWh; Peak: PHP2,668/MWh
- The highest average price by interval was noted on 1100H at PHP3,038/MWh and the lowest was on 0400H at PHP1,768/MWh regardless of the day type (i.e. weekday or weekend). Comparing this to last month, the highest and lowest fell on the 1800H interval at PHP4,404/MWh and on 0300H at PHP1,870/MWh, respectively.
- Generally, market prices were consistent except for intervals with few upticks during low supply margin conditions during the onset of the month.



**Figure 2. Hourly Supply Margin and Price, February 2021**



**Figure 3. Hourly Supply Margin and Price, January 2021**

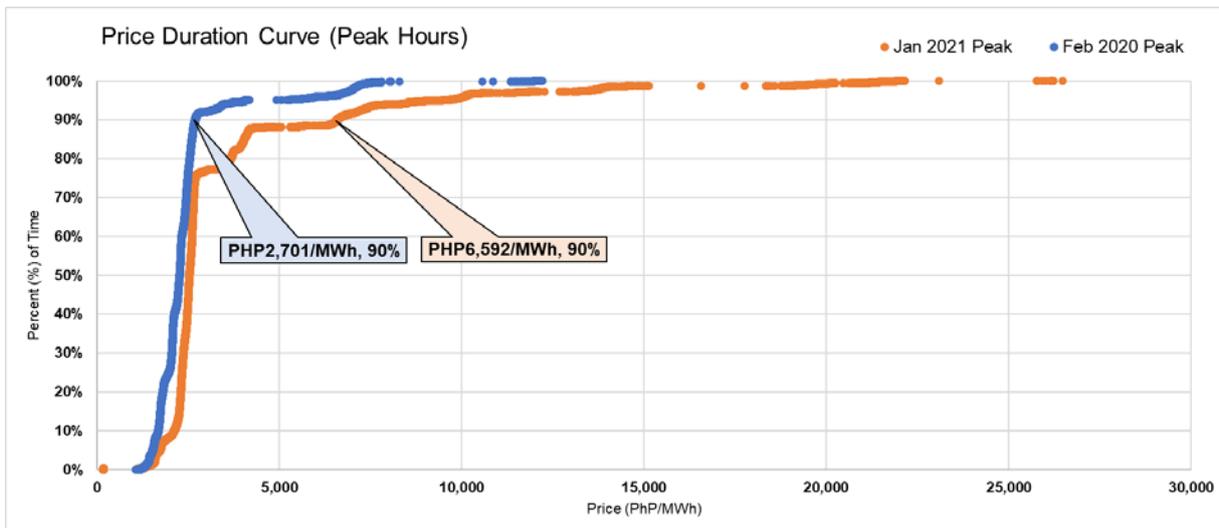
### 2.1.2 Load Nodal Price Duration Curve<sup>2</sup>

- For peak<sup>3</sup> hours, about 90 percent of the load nodal prices fell below PHP2,701/MWh in February and PHP6,592/MWh in January while distribution of prices during the off-peak hours were seen below PHP2,431/MWh in February and PHP2,592/MWh in January in about the same percentage of time.
- Maximum off-peak and peak load nodal price reached PHP32,000/MWh and PHP12,255/MWh in February, respectively. A transformer constraint led to an off-peak nodal price in Visayas to reach PHP32,000/MWh for one interval.

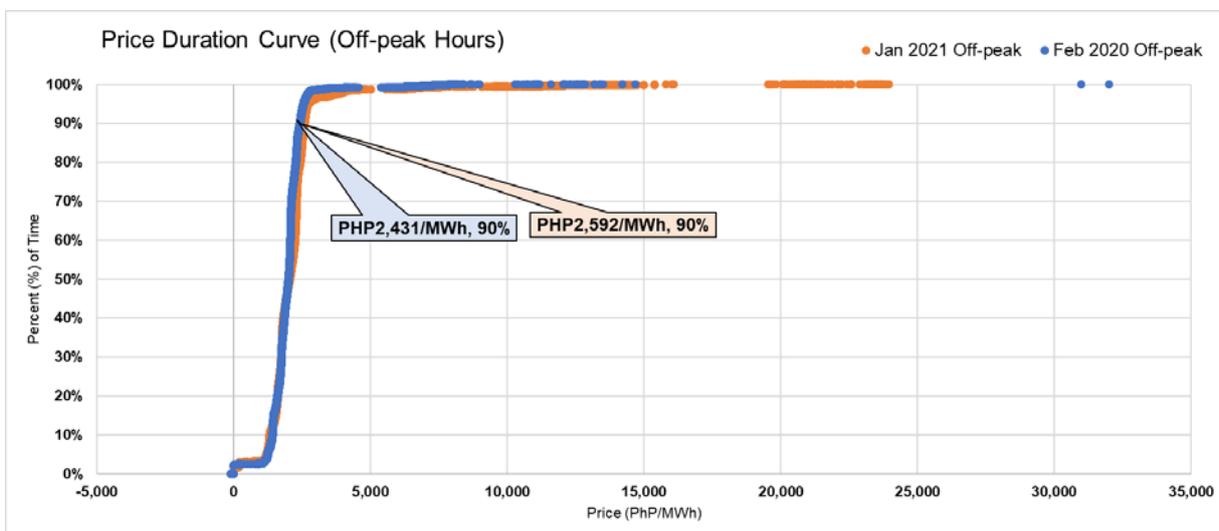
<sup>2</sup> Load nodal RTD prices under normal pricing condition are used.

<sup>3</sup> Peak and off-peak intervals differ between Luzon and Visayas regions.

- Bulk or 69 percent of the peak nodal prices were seen ranging from PhP2,000/MWh to PhP4,000/MWh while 26 percent ranged from PHP0/MWh to PHP2,000/MWh. For off-peak nodal prices, half or 50 percent was at the PHP2,000/MWh to PHP4,000/MWh range while another 47 percent ranged from PHP0/MWh to PHP2,000/MWh.
- Based on the graph below, the February peak price curve notably varied from last month's price curve, demonstrating lower prices this month. Also, there were less frequent occurrence of prices above PhP10,000/MWh this February, leading to a dip in monthly average peak price.
- Meanwhile, monthly comparison of off-peak price duration curves showed an almost identical distribution as last month with the exception of less occurrences of market prices above PHP15,000/MWh.



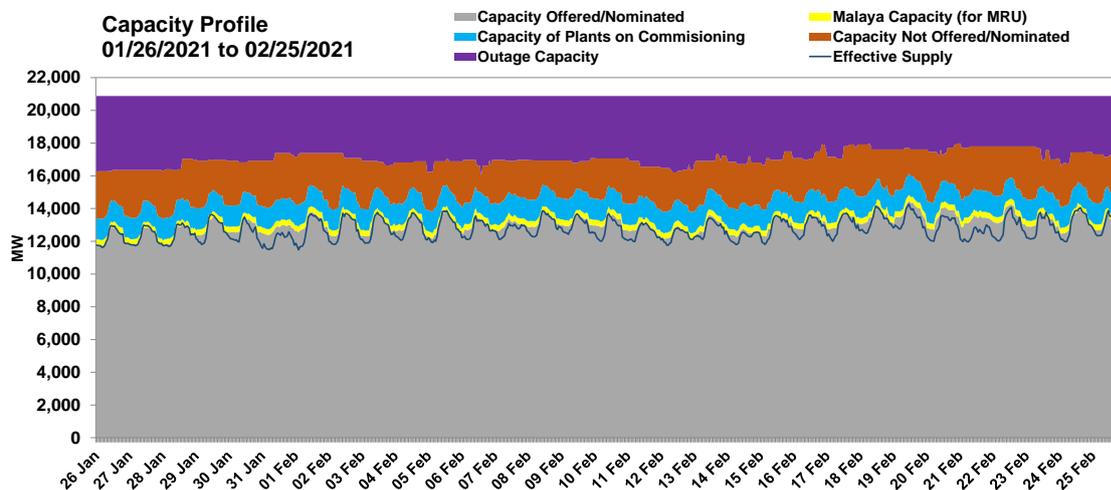
**Figure 4. Load Nodal Price Duration Curve (Peak), January and February 2021**



**Figure 5. Load Nodal Price Duration Curve (Off-peak), January and February 2021**

## 2.2 Supply

- A minimal decrease of 0.2 MW was recorded in the WESM registered capacity from a total of 20,871.57 MW to 20,871.37 MW.
  - The change came from the decline in maximum capacity of Philippine Power and Development Company's Palakpakin and Balugbog HEP from 1.6 MW to 1.5 MW and 1.2 MW to 1.1 MW, respectively, both effective on 24 February 2021.
- Available capacity<sup>4</sup> constituted an average of 14,651 MW or 70 percent of the total registered capacity.
- Capacity not offered comprised an average of 2,418 MW or 12 percent.
- Outage capacity accounted for an average of 3,803 MW or 18 percent.



**Figure 6. Capacity Profile, February 2021**

### 2.2.1 Outage Capacity<sup>5</sup>

- Outage capacity slid by 16 percent from an average of 4,541 MW last month to an average of 3,803 MW this month, which was still considerably high in contrast to most months in 2020 with outage capacities below 3,000 MW.
- Planned outages declined to 641 MW on average or 16 percent of the total outages. Almost three-quarters or about 70 percent was composed of forced outages averaging at 2,739 MW, and maintenance outages at 465 MW or 12 percent of the total outages. Meanwhile, deactivated shutdown accounted for only about 55 MW on average or 1 percent of the outages.
- High level of outage capacity was observed throughout the month which opened at 4,281 MW and closed at a lower level of 3,580 MW.

<sup>4</sup> Available capacity refers to the aggregate of Capacity Offered/Nominated, Malaya Capacity for MRU, and Capacity of Plants on Testing and Commissioning

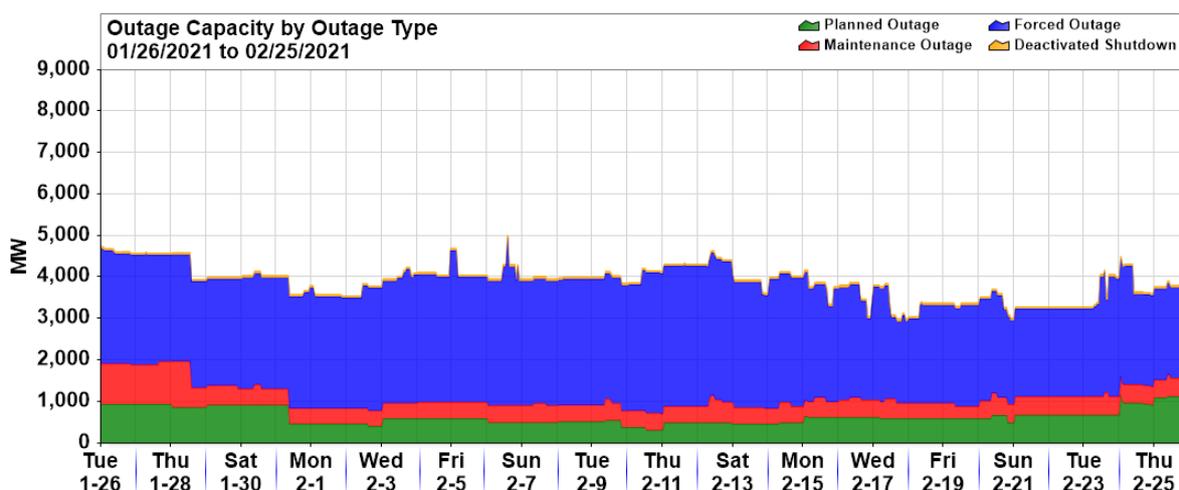
<sup>5</sup> Notable plants on outage are detailed in the Annex

- Coal plants significantly contributed to the level of planned and forced outages while natural gas plants dominated the level of maintenance outages. For deactivated shutdown, geothermal plants remained to be the only plant type accounted.

**Table 3. Outage Factor by Plant Type and Outage Category, February 2021**

Plant Type	Planned Outage (16%)	Forced Outage (70%)	Maintenance Outage (12%)	Deactivated Shutdown (1%)
Coal	40%	68%	26%	0%
Natural Gas	9%	11%	57%	0%
Geothermal	1%	3%	15%	100%
Hydro	34%	7%	3%	0%
Oil-based	17%	12%	0%	0%
<b>TOTAL</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>

- Planned outages level decreased from last month’s 903 MW average to this month’s 641 MW as influenced by outages involving large plants namely QPPL CFTPP, TVI CFTPP unit 2, San Roque HEP units 1 and 2, and Kalayaan HEP unit 3.
- On the other hand, forced outages saw a slight increase in monthly average level from 2,675 MW to 2,739 MW.
- Maintenance outages dropped from last month’s 938 MW to current month’s 465 MW mainly due to the resumption in operations of Sual CFTPP unit 1.
- Total outages were generally above 3,000 MW throughout the month with an increasing trend towards the end due to the outage of Ilijan NGPP unit 2.
- The hourly outage reached a high of 4,915 MW on 06 February at 1500H.

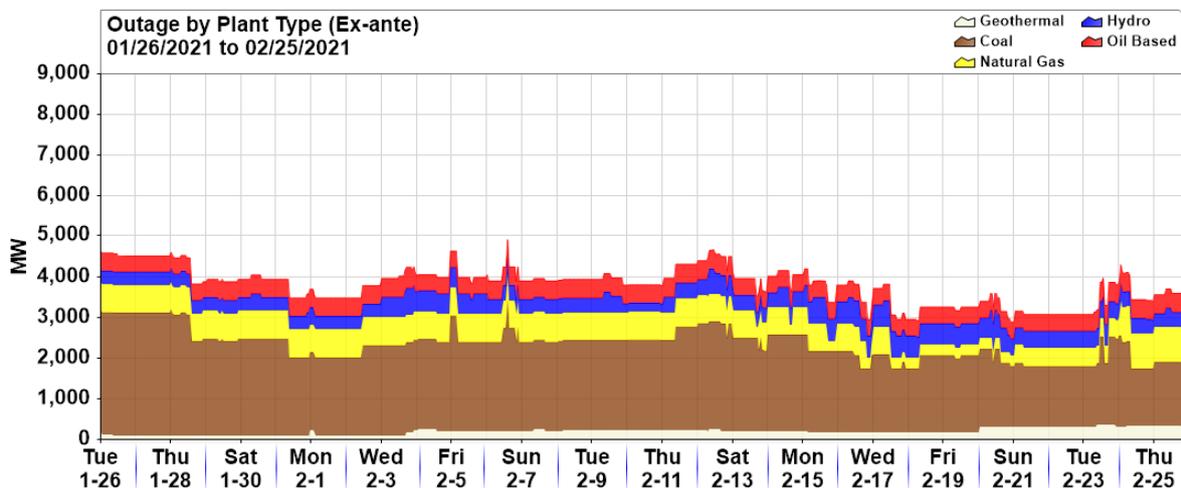


**Figure 7. Outage Capacity by Outage Category, February 2021**

**Table 4. Outage Summary by Outage Category, January and February 2021**

Outage Category	Feb 2021 (in MW)			Jan 2021 (in MW)		
	Max	Min	Average	Max	Min	Average
Planned	1,169	314	641	1,145	312	903
Maintenance	1,113	298	465	1,185	679	938
Forced	4,060	1,968	2,739	3,412	2,319	2,675
Deactivated Shutdown	55	55	55	55	55	55
<b>TOTAL</b>	<b>5,015</b>	<b>2,988</b>	<b>3,899</b>	<b>5,529</b>	<b>3,864</b>	<b>4,572</b>

- In terms of type of power plants, coal generators accounted for more than half of the outages at 56 percent. Natural gas plants ended with 16 percent of the total outages, followed by hydro and oil-based plants with the 11 percent each, respectively, and geothermal plants with the lowest at 5 percent. All plant types except for coal plants noted increases in average outage capacity but was offset by the steep decline in coal plants' outage capacity.
- The February billing month opened with a high level of outage capacity due to the unavailability of the following large generators prior the billing month: forced outages of San Gabriel NGPP (420 MW) since 05 September, Sual CFTPP unit 2 (647 MW) since 16 September, Masinloc CFTPP unit 3 (335 MW) since 24 November, Calaca CFTPP unit 2 (300 MW) since 03 December, and Mariveles CFTPP unit 1 (316 MW) since 08 January; planned outage of Pagbilao 3 CFTPP (420 MW) since 11 December, and QPPL CFTPP (460 MW) since 20 January; maintenance outage of Sta Rita NGPP unit 3 (266 MW) since 19 January.

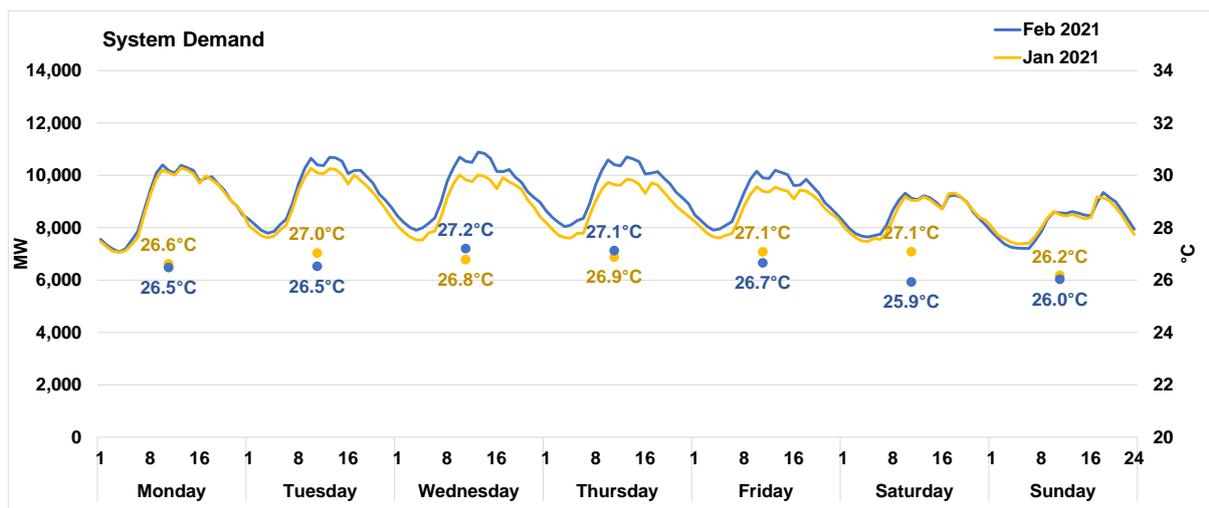

**Figure 8. Outage Capacity by Plant Type, February 2021**

**Table 5. Outage Summary by Plant Type, January and February 2021**

Plant Type	Feb 2021 (in MW)			Jan 2021 (in MW)		
	Max	Min	Average	Max	Min	Average
Coal	3,223	1,405	2,137	3,691	2,527	3,198
Natural Gas	866	266	619	950	420	606
Geothermal	374	107	199	313	127	187
Hydro	694	215	414	360	180	185
Oil-based	517	390	433	407	300	366
<b>TOTAL</b>	<b>4,915</b>	<b>2,887</b>	<b>3,803</b>	<b>5,111</b>	<b>3,884</b>	<b>4,541</b>

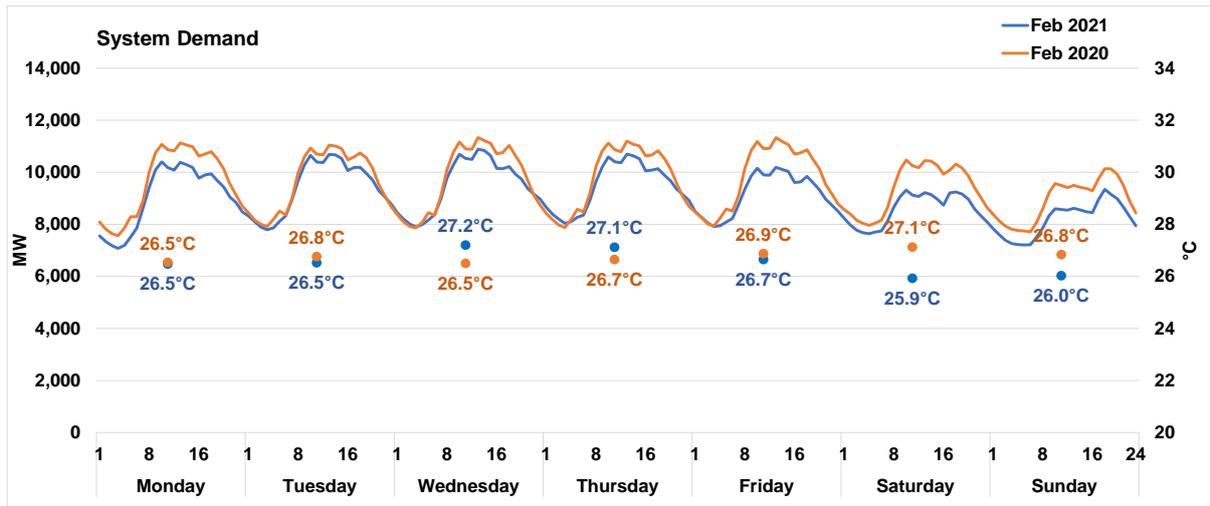
## 2.3 System Demand

- Monthly system demand grew to an average of 9,082 MW, a 4 percent rise from last month's average of 8,737 MW, indicating the onset of the hot dry season.
- Average system demand started to increase after a previous 4-month decline since September 2020.
- In comparison to last month, the average off-peak demand at 8,343 MW this period saw a 4.2 percent ascent whereas a similar increase of 2.5 percent in the average peak demand at 9,974 MW was recorded.
- Maximum system demand in February reached 11,418 MW for peak hours on 24 February, Wednesday at 1500H and 10,413 MW for off-peak hours on 25 February, Thursday (Holiday) at 1500H.
- Minimum system demand in February was at 8,276 MW for peak hours and 6,531 MW for off-peak hours which transpired during 30 January, Saturday at 1700H and 01 February, Monday at 0400H, respectively.


**Figure 9. Average Hourly System Demand, January and February 2021**

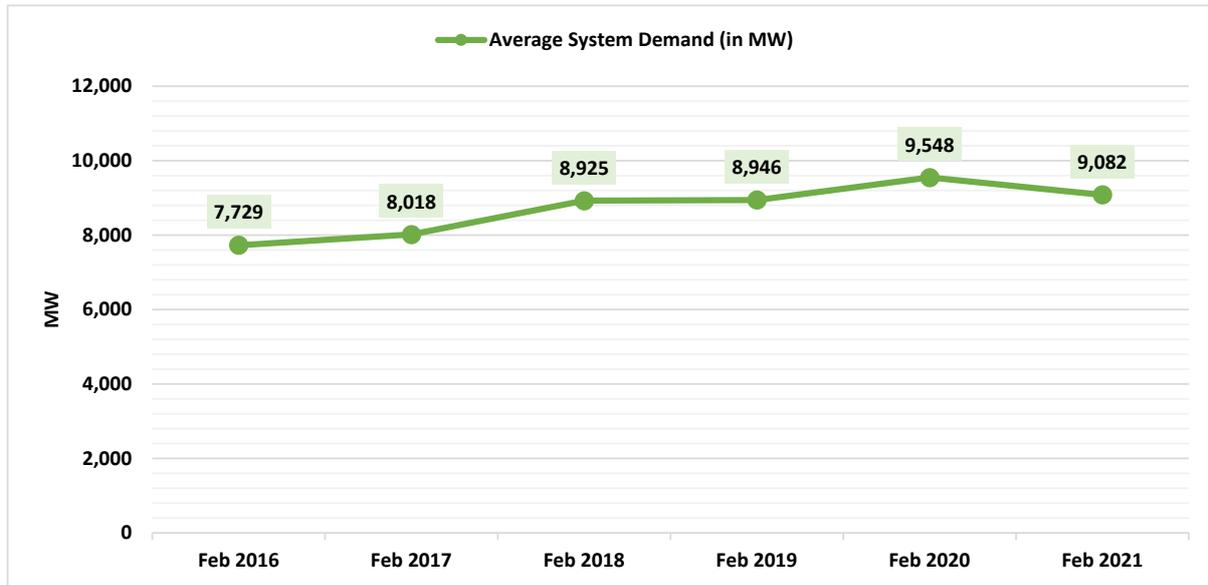
- On a yearly comparison, the demand was down by 5 percent from 9,548 MW in 2020 to 9,082 in 2021, owing to the community quarantine.

- The downturn in average demand was attributable to the 3 percent decrease during off-peak hours from 8,637 MW to 8,348 MW and a likewise decline during the peak hours by 6 percent from last year from 10,661 MW to 9,974 MW.
- The average temperatures per weekday in February were lower most of the days with a notable decline during weekends.



**Figure 10. Average Hourly System Demand, February 2020 and 2021**

- Year 2021 was exempt from the consistent annual pattern of increasing demand every February, which deviant trend was primarily because of the community quarantine period.
- The all-time highest hourly system demand was still on 21 June 2019, 1400H at 13,378 MW.
- Similar with previous billing month under the community quarantine where this year’s average level of demand was lower than the previous year, the February billing month was no different in pattern.



**Figure 11. Average System Demand, February 2016-2021**

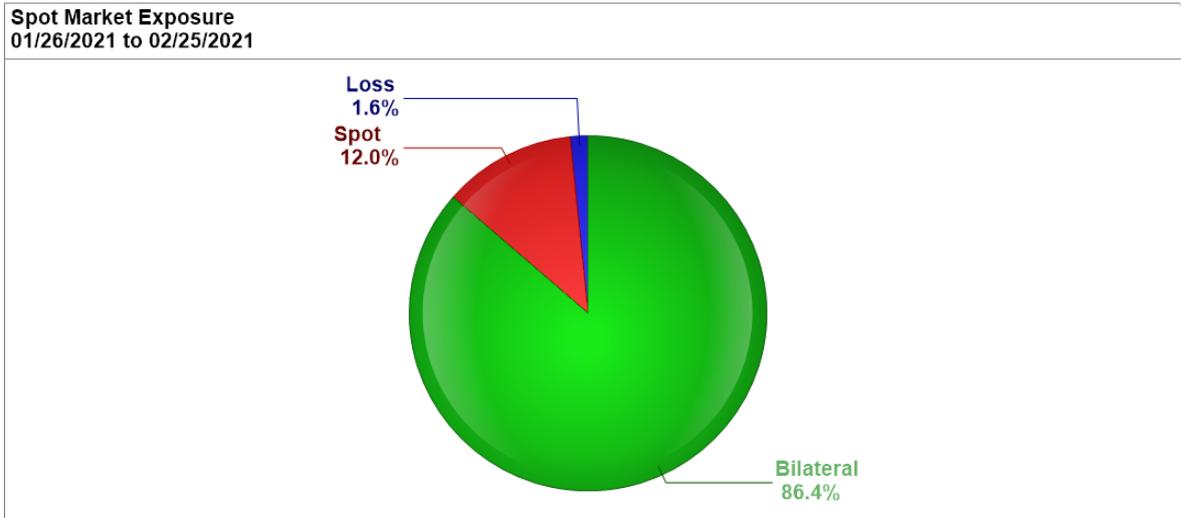
### 3. SPOT TRANSACTIONS

#### 3.1 Spot Exposure

##### 3.1.1 Load

- Spot quantities<sup>6</sup> of load participants in January stood at 12.0 percent of the total metered quantities, a slight increase from last month's 11.5 percent spot exposure, which signaled that consumers had more reliance on the market in sourcing their energy needs despite low prices this month.
- Correspondingly, load quantities accounting for about 86.4 percent of their total consumption, a minimal decline from previous month's figure, were still transacted outside the spot market and were contracted with generators.

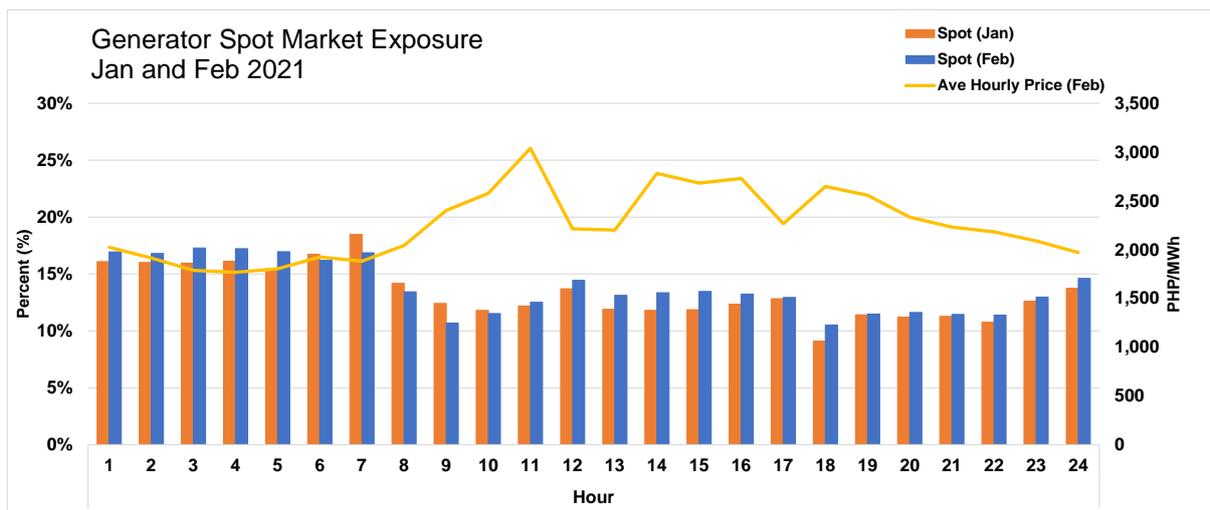
<sup>6</sup> Spot quantity refers to the energy transacted in the market. It is the difference between the metered quantity and the bilateral contract quantity. For generator trading participants, positive spot values indicate energy sold while negative values show energy bought in the market.



**Figure 12. Spot Market Exposure, February 2021**

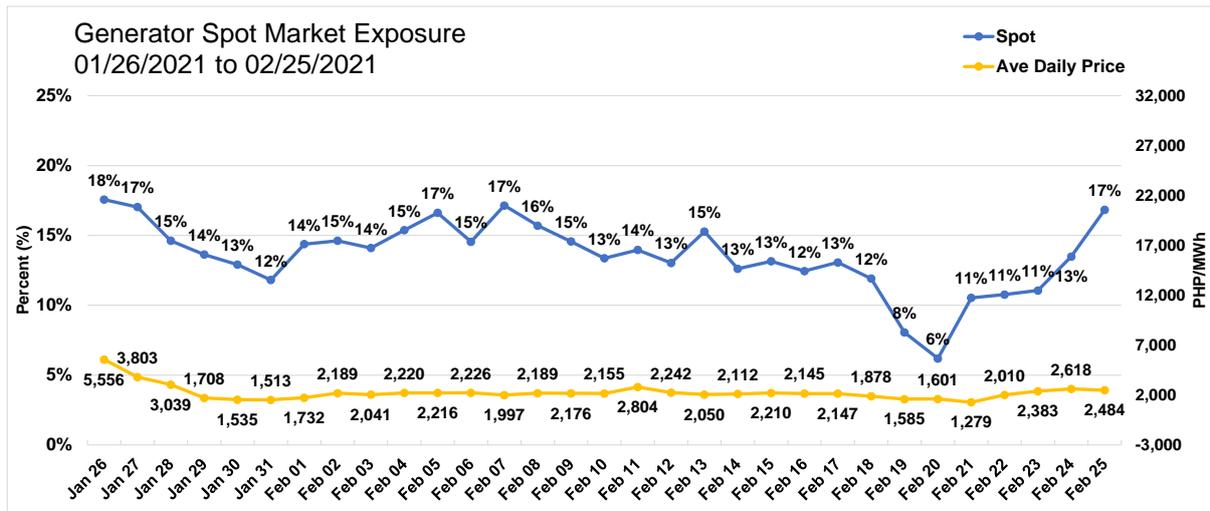
### 3.1.2 Generator

- Average hourly spot exposure of generators was higher in all hours except for 0600H to 1000H.
- Spot exposure in off-peak hours averaged at 15.0 percent, from previous month's 14.8 percent, while it was 12.5 percent, from previous month's 11.8 percent, during peak hours.
- Higher spot percentages were observed during the morning off-peak hours than other intervals, where generally, lower spot prices were evident.



**Figure 13. Hourly Generator Spot Market Exposure, January and February 2021**

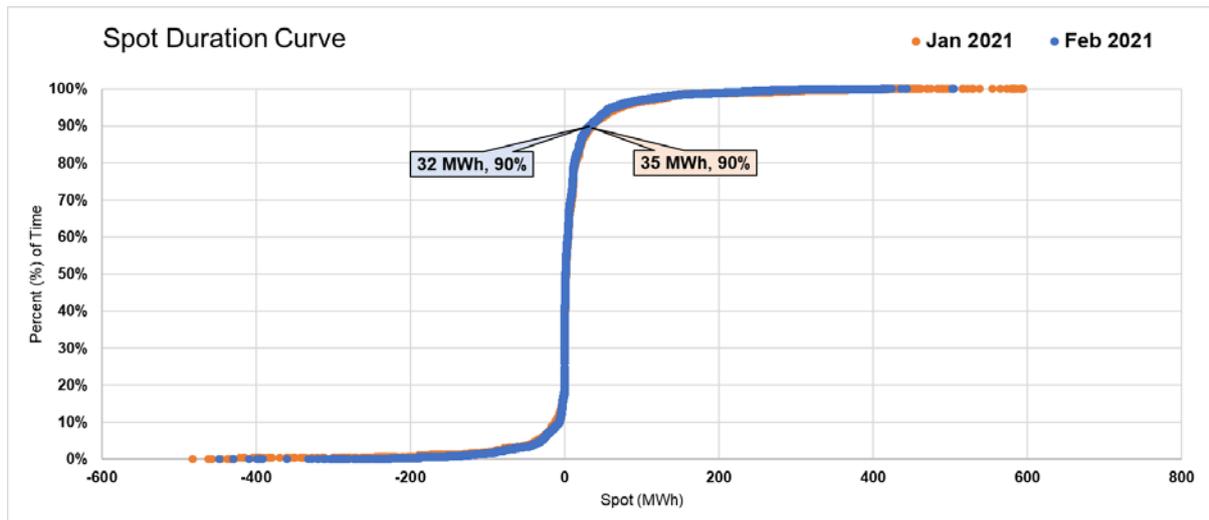
- The highest generator market exposure, at around 18 percent, occurred during the highest daily price on 26 January. The high spot exposure surfaced despite the high level of outage capacity during the onset of the month.
- A low 6 percent generator market exposure was evident on 20 February as several generators sourced energy from the market to serve their bilateral contracts which reduced the total spot quantity sold in the market.



**Figure 14. Daily Generator Spot Market Exposure, February 2021**

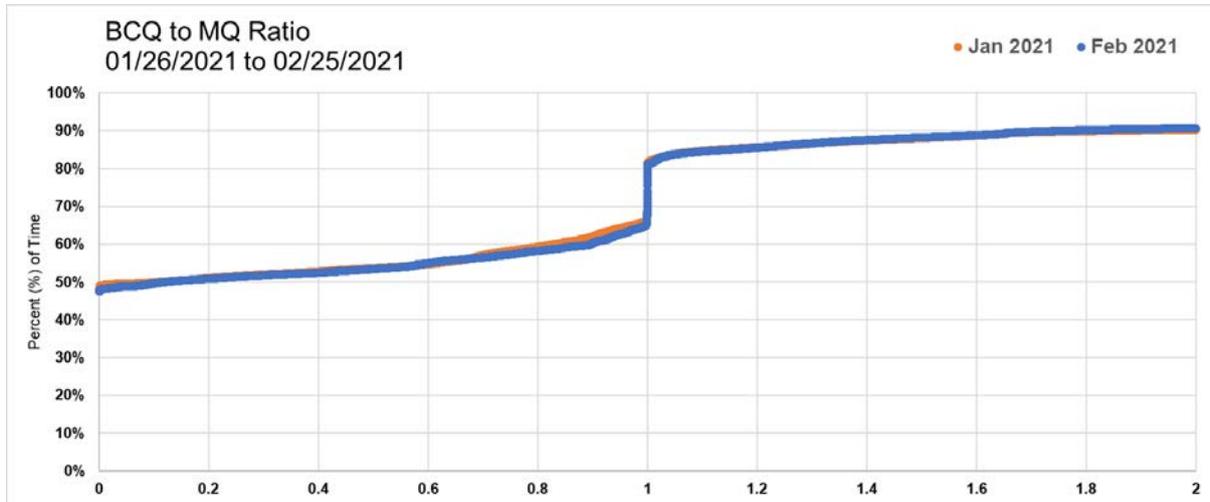
- Based on the spot quantity duration curve<sup>7</sup> of February billing month, hourly spot quantities of generators were 32 MWh or less at about 90 percent of the time with maximum and minimum spot quantities at 505 MWh and -448 MWh, respectively.

<sup>7</sup> The spot duration curve utilizes data on a per generator trading interval, meaning, all the data consisted of spot quantities of every generator per interval for the period considered. Positive spot values indicate quantities sold in the market while negative values are quantities bought.



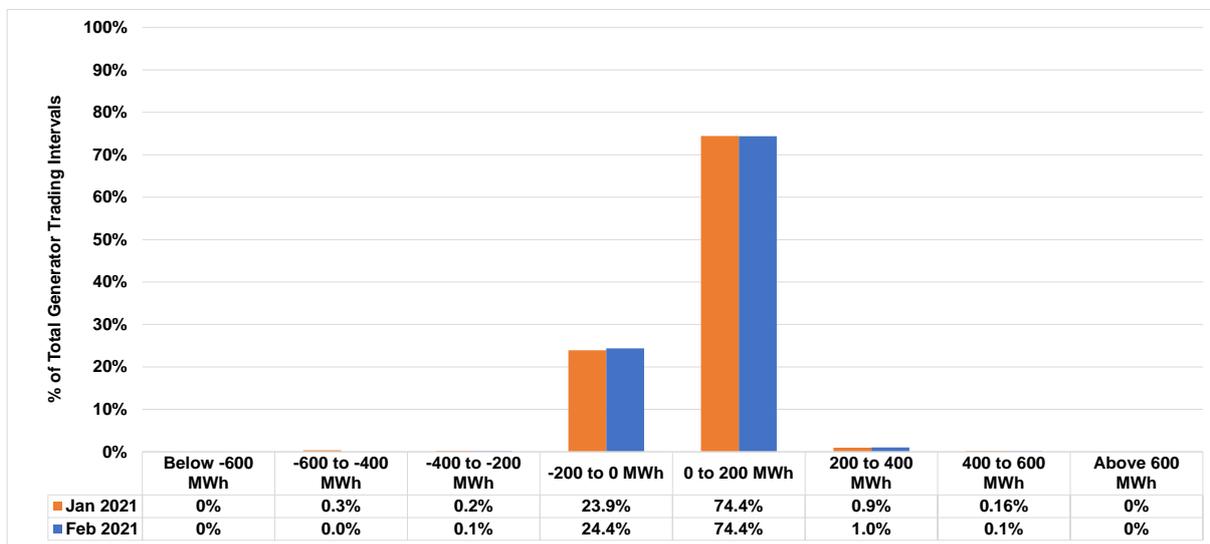
**Figure 15. Spot Duration Curve, January and February 2021**

- The duration curves of both January and February 2021 billing months were almost identical.
- The resulting BCQ to MQ ratio of 0 demonstrates that the entire capacity of generators was being fully sold in the market at around 48 percent of the total generator trading intervals.
- About 16 percent was on the account of partial allocation of BCQ with respect to the generator's MQ.
- Meanwhile, about 17 percent of the total generator trading intervals had a BCQ to MQ ratio of 1 which resulted from all metered quantities being allocated to serve bilateral contract obligations.
- About 9 percent was the result of BCQ being greater than MQ, reaching up to twice the MQ.
- Presence of BCQ/MQ ratios greater than 2 or 200%, consisting about 3% of the total, was the result of very small MQs (<1MWh) as compared to their BCQ, such that dividing by a very small number yields an extremely high number.
- The remaining 7 percent, however, were accounted for by generators which fully bought energy in the market to serve their bilateral contract obligations because of no generated MQ.



**Figure 16. BCQ to MQ Ratio, January and February 2021**

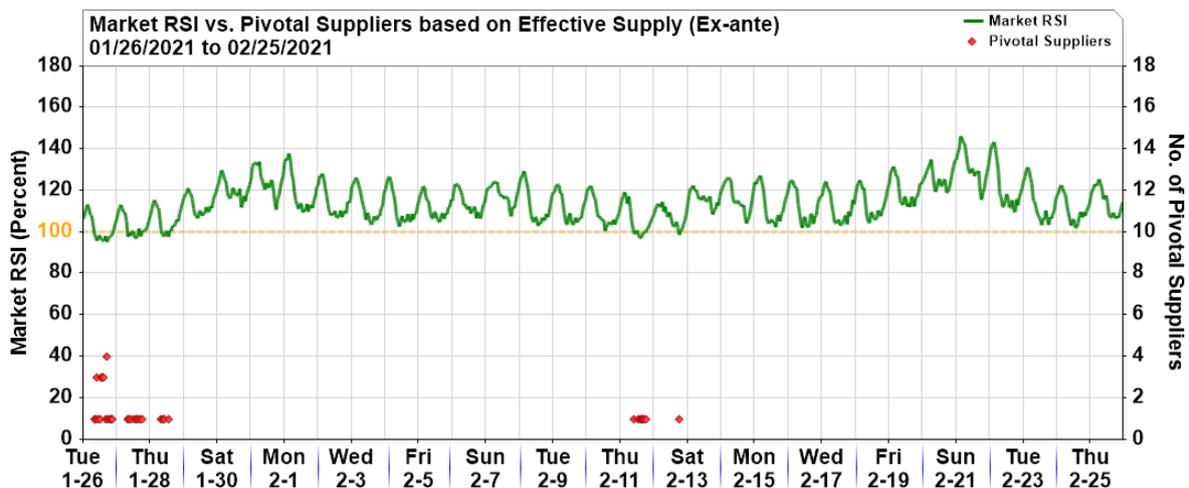
- Generator spot quantities for January and February 2021 billing months were much more concentrated within the -200 MWh to 200 MWh range.
- About 75.5 percent of the total generator spot transactions in February, the same in January, was on the account of energy being sold in the market (positive MWh quantity).



**Figure 17. Spot Frequency Distribution Table, January and February 2021**

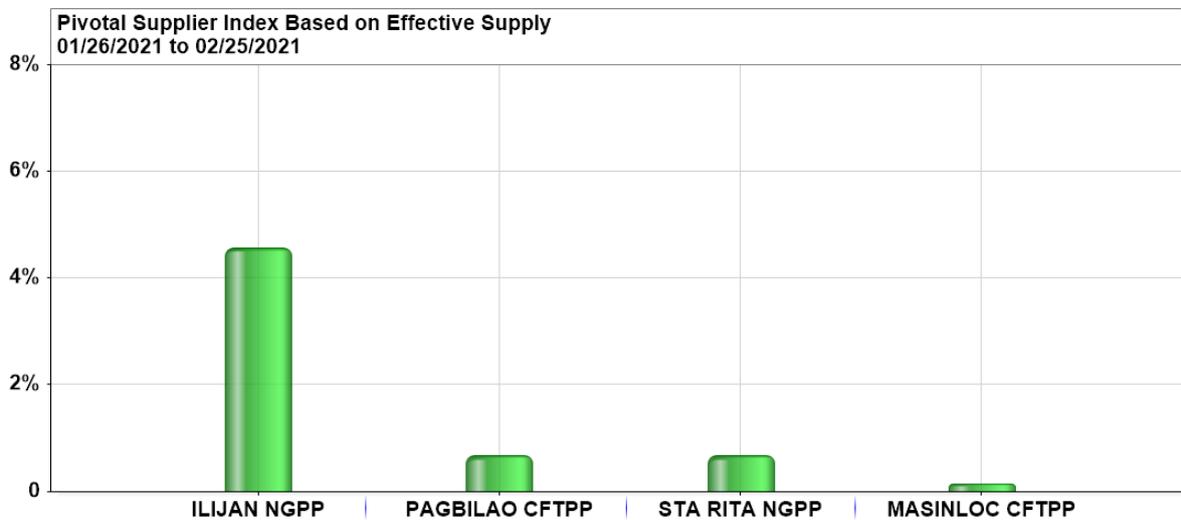
### 3.2 Pivotal<sup>8</sup> Plants

- Out of the 744 trading intervals in February 2021 billing month, only 34 intervals had a Residual Supply Index (RSI) below the 100 percent mark from 62 intervals in January, indicating the less frequent presence of pivotal suppliers.
- The presence of pivotal suppliers was more evident in intervals with low supply margin as a result of high outages occurring during high demand.
- The market resulted in an average RSI of 114 percent indicating that supply was still generally abundant to satisfy the demand.
- The average market prices for intervals with RSI below 100 percent was PHP6,148/MWh while those with RSI above 100 was PHP2,065/MWh
- A total of four (4) power plants were pivotal during the period with all of which coming from Luzon.
- During the February billing month, the market resulted in an RSI ranging from 95 to 146.



**Figure 18. Market RSI vs Pivotal Suppliers, February 2021**

<sup>8</sup> The Pivotal Supply Index (PSI) measures how critical a generator is in meeting the total demand at a time. It is a binary variable (1 for pivotal and 0 for not pivotal) which measures the frequency that a generating unit is pivotal for a period.

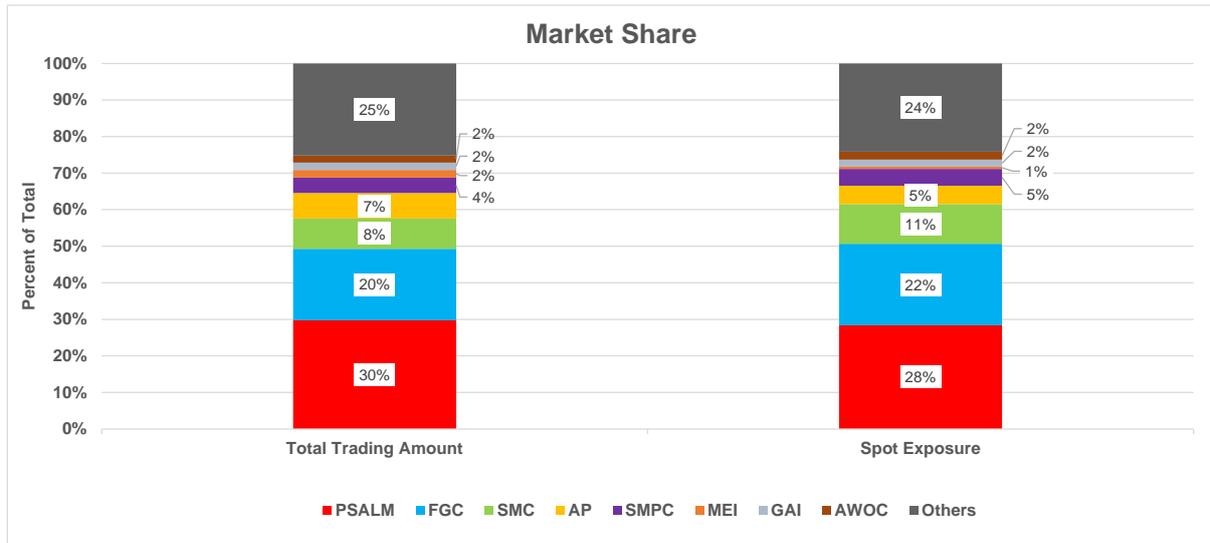


**Figure 19. Top Pivotal Plants, February 2021**

### 3.3 Total Trading Amount (TTA)<sup>9</sup> and Spot Quantity Share

- Power Sector Assets and Liabilities and Management (PSALM) maintained its top spot this month, recording the highest TTA share of sellers in the market with approximately 30 percent, despite posting a decrease from previous month's 40 percent. First Gen Corporation (FGC) joined the list this month with a 20 percent TTA share. Similarly, San Miguel Corporation (SMC) saw an increase in ranking as its 8 percent TTA share secured its third spot. The top 3 sellers noted a cumulative 58 percent share during the billing month.
- The top 3 highest TTA shares also had incurred the highest spot shares at around 28 percent for PSALM, 22 percent for FGC, and 11 percent for SMC.
- On the other hand, Aboitiz Power Corporation (AP), at fourth place, dropped two spots at a much lower share of 7 percent for TTA and 5 percent spot share coming from previous month's 21 percent TTA and spot share.
- Semirara Mining and Power Corporation (SMPC) and Alternergy Wind One Corporation (AWOC) similarly experienced 2-spot drops to fifth and eighth place in TTA share, respectively.
- Meanwhile, Gregorio Araneta, Inc. (GAI) remained in seventh place with a 2 percent TTA and spot share.
- Similar with FGC, Millennium Energy, Inc. (MEI) joined the top list, placing at sixth place with a 2 percent TTA share and a 1 percent spot share.
- Meanwhile, four major participant groups registered negative TTAs which resulted from being net buyers in the spot market.

<sup>9</sup> The Total Trading Amount (TTA) refers to the amount of revenue from spot market transactions excluding quantities that are declared by the generators as covered by bilateral power supply contracts, which are settled outside the WESM



**Figure 20. Total Trading Amount and Spot Quantity Share, February 2021**

# Annex A. List of Major Plant Outages

Region	Plant Type	Plant/ Unit Name	Capacity (MW)	Date Out	Date In	Duration (Days)	Outage Type	Remarks	Date Commissioned/ Commercial Operation
LUZON	GEO	Makban 6	55	04/11/2013 22:44			Deactivated Shutdown	Conducted gas compressor test	Apr 1979
LUZON	OIL	Malaya 1	300	05/03/2019 18:21			Forced Outage	Motorization of unit generator caused by the non-opening of phase B of PCB 8-05CB08MAL	Aug 1975
VISAYAS	COAL	TPC Sangi 1	60	12/17/2019 6:05			Forced Outage	Generator differential trip	Dec 2013
VISAYAS	GEO	Upper Mahiao 3	32	07/22/2020 17:01			Maintenance Outage	Trip with Loss of Excitation. Economic Shutdown	Jul 1997
LUZON	NATG	San Gabriel	420	09/05/2020 17:14	02/15/2021 16:38	162.98	Forced Outage	Tripped at 211MW load. System Frequency is 59.401hz.	Mar 2016
LUZON	COAL	Sual 2	647	09/16/2020 14:45			Forced Outage	Tripped due to high turbine vibration	Oct 1999
LUZON	GEO	Makban 8	20	11/14/2020 8:24	01/26/2021 8:04	72.99	Forced Outage	Defective cooling tower fan	Apr 1979
LUZON	COAL	Masinloc 3	335	11/24/2020 20:20	02/16/2021 14:15	83.75	Forced Outage	Excitation Trouble	Mar 2019
LUZON	HYD	Kalayaan 4	180	11/27/2020 22:01			Forced Outage	Excessive Oil Leak at Pothead conductors.	May 2004
LUZON	COAL	Calaca 2	300	12/03/2020 9:01			Forced Outage	Generator stator earth fault	Sep 1984
LUZON	COAL	Sual 1	647	12/18/2020 23:34	01/28/2021 13:58	40.60	Maintenance Outage	To rectify erratic movement of HP turbine governing valve of HPGV 1	Oct 1999
LUZON	OIL	Limay 8	90	01/04/2021 0:01			Planned Outage	Maintenance Outage until 03 February 2021	Dec 1994
LUZON	COAL	GN Power 1	316	01/08/2021 18:26			Forced Outage	Boiler tube leak.	May 2013
LUZON	COAL	ANDA 1	72	01/09/2021 0:01	01/28/2021 0:31	19.02	Planned Outage	Maintenance Outage until 29 January 2021.(GOP).	Apr 2015
VISAYAS	GEO	PGPP1 Unit 1	37.5	01/18/2021 3:08	01/26/2021 2:58	7.99	Forced Outage	Auto-tripped due to Condenser Vacuum very low	Aug 1983
LUZON	NATG	Sta. Rita 3	265.5	01/19/2021 4:39			Maintenance Outage	Maintenance Outage	Oct 2001
LUZON	COAL	QPPL	460	01/20/2021 13:57	01/31/2021 8:15	10.76	Planned Outage	Maintenance Outage until 30 January 2021.	May 2000
VISAYAS	COAL	TPC Sangi 2	85	01/22/2021 19:18	01/27/2021 15:42	4.85	Forced Outage	TPC SANGI UNIT 1 (DG4) EMERGENCY CUT-OUT DUE TO HIGH STATOR WINDING TEMPERATURE	Dec 2013
VISAYAS	COAL	THVI 2	169	01/24/2021 20:13	02/24/2021 1:30	30.22	Planned Outage	ANNUAL PMS	Dec 2017
LUZON	HYD	San Roque 1	145	01/25/2021 0:01	02/06/2021 0:01	12.00	Planned Outage	Maintenance Outage until 05 February 2021.(GOP)	May 2003
VISAYAS	GEO	PGPP1 Unit 2	37.5	01/25/2021 0:06	01/26/2021 20:56	1.87	Maintenance Outage	Offline to conduct corrective maintenance	Aug 1983
LUZON	OIL	Limay 3	60	01/25/2021 23:44	01/26/2021 9:21	0.40	Forced Outage	Diesel leak at combustor	May 1993
VISAYAS	OIL	TPVI 2	6.7	01/26/2021 14:50			Forced Outage	EMERGENCY CUT-OUT DUE TO INJECTION PUMP PROBLEM	Aug 1977
LUZON	HYD	Ambuklao 1	35	01/27/2021 6:50	01/27/2021 7:53	0.04	Forced Outage	Broken Shear Pin	Dec 1956
VISAYAS	COAL	TPC Sangi 2	85	01/27/2021 15:43	01/29/2021 21:07	2.22	Maintenance Outage	ON GOING TESTING	Dec 2013
VISAYAS	COAL	PEDC 2	83.7	01/28/2021 0:54	02/19/2021 7:06	22.26	Maintenance Outage	Annual PMS	Apr 2011
LUZON	OIL	Limay 2	60	01/29/2021 0:01	02/02/2021 14:08	4.59	Planned Outage	Maintenance Outage until 04 February 2021.(GOP)	May 1993
VISAYAS	COAL	TPC Sangi 2	85	01/29/2021 21:08			Forced Outage	EMERGENCY CUT-OUT DUE TO OIL LEAK AT BEARING 4	Dec 2013
VISAYAS	GEO	PGPP1 Unit 3	37.5	01/30/2021 0:09	02/01/2021 20:42	2.86	Forced Outage	Offline due to emergency shutdown.	Aug 1983
LUZON	HYD	Ambuklao 1	35	01/30/2021 8:01	01/30/2021 13:53	0.24	Maintenance Outage	Decommissioning of Ambuklao-Ambuklao HEPP 230KV tie line back-up protection(OCR) and replacement of panel.	Dec 1956
LUZON	HYD	Ambuklao 2	35	01/30/2021 8:01	01/30/2021 13:53	0.24	Maintenance Outage	Decommissioning of Ambuklao-Ambuklao HEPP 230KV tie line back-up protection(OCR) and replacement of panel.	Dec 1956
LUZON	HYD	Ambuklao 3	35	01/30/2021 8:01	01/30/2021 13:54	0.25	Maintenance Outage	Decommissioning of Ambuklao-Ambuklao HEPP 230KV tie line back-up protection(OCR) and replacement of panel.	Dec 1956
LUZON	HYD	Magat 2	97	01/31/2021 18:51	02/01/2021 1:45	0.29	Forced Outage	Rotor earth fault.	Aug 1983
LUZON	GEO	Bacman 1	60	01/31/2021 22:32	02/01/2021 2:52	0.18	Forced Outage	Affected by Daraga-Ligao 69kV Line tripping.	Sep 1993
LUZON	GEO	Bacman 2	60	01/31/2021 22:32	02/01/2021 1:37	0.13	Forced Outage	Affected by Daraga-Ligao 69kV Line tripping.	Sep 1993
LUZON	COAL	Calaca 1	300	02/02/2021 10:26	02/13/2021 19:05	11.36	Forced Outage	Boiler tube leak.	Sep 1984
LUZON	HYD	Kalayaan 3	180	02/03/2021 0:01	02/09/2021 19:42	6.82	Planned Outage	Maintenance Outage until 10 February 2021	May 2004
LUZON	OIL	Limay 6	60	02/03/2021 10:28	02/03/2021 20:03	0.40	Forced Outage	Main Fuel Pump Oil Leak	Dec 1994
LUZON	HYD	San Roque 3	145	02/03/2021 14:07	02/03/2021 19:04	0.21	Forced Outage	Tripped at 116MW	May 2003
VISAYAS	GEO	Malitbog 2	72	02/03/2021 16:14	02/04/2021 13:54	0.90	Forced Outage	Under assessment	Jul 1997
LUZON	GEO	Makban 2	63.2	02/03/2021 21:30			Forced Outage	Steam diverted to Makban 1	Apr 1979
VISAYAS	GEO	PGPP2 Unit 3	20	02/04/2021 0:05	02/10/2021 22:04	6.92	Maintenance Outage	Offline to conduct cleaning of first stage turbine blades	Aug 1983
LUZON	COAL	Sual 1	647	02/04/2021 22:43	02/05/2021 3:52	0.21	Forced Outage	Cooling Water System trouble. Turbine side	Oct 1999
LUZON	OIL	Limay 5	60	02/06/2021 0:03	02/10/2021 12:08	4.50	Planned Outage	Maintenance Outage until 16 February 2021	Dec 1994
LUZON	COAL	Masinloc 2	344	02/06/2021 10:53	02/06/2021 19:54	0.38	Forced Outage	Turbine tripped	Jun 1998
LUZON	HYD	Ambuklao 1	35	02/06/2021 12:59	02/06/2021 14:22	0.06	Forced Outage	Tripped due to broken shear pin	Dec 1956
LUZON	COAL	GNP Dinginin 1	668	02/06/2021 13:46	02/06/2021 14:27	0.03	Forced Outage	Tripped. On commissioning Test	#N/A
LUZON	COAL	Masinloc 2	344	02/06/2021 20:05	02/06/2021 21:07	0.04	Forced Outage	Tripped due to turbine windage high temperature	Jun 1998
LUZON	GEO	Tiwi 6	57	02/07/2021 7:52	02/07/2021 16:39	0.37	Maintenance Outage	Maintenance Outage	Jan 1979
LUZON	GEO	MGPP 1	20	02/08/2021 0:39	02/15/2021 3:29	7.12	Planned Outage	Maintenance Outage until 15 February 2021	Dec 2013
LUZON	GEO	Bacman 3	20	02/08/2021 3:08	02/12/2021 6:18	4.13	Forced Outage	Affected by the tripping of Bacman-Cawayan 230KV Line (Costumer owned)	Sep 1993
LUZON	HYD	Binga 1	35	02/09/2021 8:11	02/09/2021 13:20	0.21	Maintenance Outage	Installation of stop plugs to prevent back flow relative to the Maintenance outage of Binga U3.	Jan 1960
LUZON	HYD	Binga 2	35	02/09/2021 8:11	02/09/2021 12:09	0.17	Maintenance Outage	Installation of stop plugs to prevent back flow relative to the Maintenance outage of Binga U3.	Jan 1960
LUZON	HYD	Binga 3	35	02/09/2021 8:11	02/12/2021 23:39	3.64	Planned Outage	Maintenance Outage until 14 February 2021	Jan 1960
LUZON	HYD	Binga 4	35	02/09/2021 8:11	02/09/2021 12:09	0.17	Maintenance Outage	Installation of stop plugs to prevent back flow relative to the Maintenance outage of Binga U3.	Jan 1960
LUZON	GEO	MGPP 2	12	02/10/2021 0:28	02/13/2021 21:14	3.87	Maintenance Outage	Maintenance Outage	Dec 2017
LUZON	COAL	Masinloc 2	344	02/10/2021 9:43	02/12/2021 23:32	2.58	Forced Outage	ON EMERGENCY SD DUE TO GEN. TRANSFORMER TROUBLE	Jun 1998
LUZON	HYD	Kalayaan 2	180	02/11/2021 0:01	02/20/2021 19:37	9.82	Planned Outage	Maintenance Outage until 14 February 2021	Aug 1982
VISAYAS	GEO	PGPP1 Unit 2	37.5	02/11/2021 14:29	02/11/2021 15:34	0.05	Forced Outage	Ongoing assessment on the cause of tripping.	Aug 1983
LUZON	GEO	Tiwi 5	57	02/12/2021 7:01	02/12/2021 16:14	0.38	Maintenance Outage	Affected by the shutdown of Tiwi 5 Main Transformer in relation to commissioning of Tiwi C PCB 8-01CB24TWC	Jan 1979
LUZON	HYD	Ambuklao 1	35	02/12/2021 7:01	02/13/2021 0:19	0.72	Maintenance Outage	Affected by the shutdown of Ambuklao-Ambuklao HEPP 230kV Tie Line(RECLASSIFIED FROM FORCE. OMC OUTAGE)	Dec 1956
LUZON	HYD	Ambuklao 2	35	02/12/2021 7:01	02/13/2021 0:19	0.72	Maintenance Outage	Affected by the shutdown of Ambuklao-Ambuklao HEPP 230kV Tie Line(RECLASSIFIED FROM FORCE. OMC OUTAGE)	Dec 1956
LUZON	HYD	Ambuklao 3	35	02/12/2021 7:01	02/13/2021 0:19	0.72	Maintenance Outage	Affected by the shutdown of Ambuklao-Ambuklao HEPP 230kV Tie Line(RECLASSIFIED FROM FORCE. OMC OUTAGE)	Dec 1956
VISAYAS	OIL	TPC Carmen 3	10	02/12/2021 7:58	02/13/2021 21:01	1.54	Forced Outage	UNIT TRIPPED DUE TO HIGH INTENSITY OF OIL MIST	Mar 1979
LUZON	HYD	Binga 1	35	02/12/2021 8:09	02/12/2021 11:06	0.12	Maintenance Outage	Stop logs or draft tube gates installation and removal as part of Unit 3 APM to ensure or have safe working area.	Jan 1960
LUZON	HYD	Binga 2	35	02/12/2021 8:09	02/12/2021 11:06	0.12	Maintenance Outage	Stop logs or draft tube gates installation and removal as part of Unit 3 APM to ensure or have safe working area.	Jan 1960
LUZON	HYD	Binga 3	35	02/12/2021 8:09	02/12/2021 11:06	0.12	Maintenance Outage	Stop logs or draft tube gates installation and removal as part of Unit 3 APM to ensure or have safe working area.	Jan 1960
LUZON	OIL	Limay 5	60	02/12/2021 8:40	02/12/2021 12:05	0.14	Forced Outage	Scheduled NGCP switchyard activity at BCCPP Bay 88	Dec 1994
VISAYAS	OIL	TPC Carmen 4	10	02/12/2021 9:47			Forced Outage	TRIPPED DUE TO LOW ENGINE LO PRESSURE	Mar 1979
LUZON	COAL	Pagbilao 2	382	02/14/2021 0:49	02/15/2021 3:18	1.10	Forced Outage	Repair of Boiler Submersible Flight Conveyor	Mar 1996
LUZON	HYD	Binga 1	35	02/14/2021 7:21	02/14/2021 15:35	0.33	Maintenance Outage	Trash rack cleaning of power intake.	Jan 1960
LUZON	HYD	Binga 2	35	02/14/2021 7:21	02/17/2021 4:27	2.88	Planned Outage	APM activity.	Jan 1960
LUZON	HYD	Binga 3	35	02/14/2021 7:21	02/14/2021 15:15	0.33	Maintenance Outage	Trash rack cleaning of power intake.	Jan 1960
LUZON	HYD	Binga 4	35	02/14/2021 7:21	02/14/2021 15:15	0.33	Maintenance Outage	Trash rack cleaning of power intake.	Jan 1960
LUZON	HYD	San Roque 2	145	02/15/2021 0:01			Planned Outage	Maintenance Outage until 26 February 2021	May 2003
LUZON	HYD	Binga 1	35	02/15/2021 7:29	02/15/2021 15:18	0.33	Maintenance Outage	Trash rack cleaning at the power.intake.	Jan 1960
LUZON	HYD	Binga 3	35	02/15/2021 7:29	02/15/2021 15:18	0.33	Maintenance Outage	Trash rack cleaning at the power.intake.	Jan 1960
LUZON	HYD	Binga 4	35	02/15/2021 7:29	02/15/2021 15:18	0.33	Maintenance Outage	Trash rack cleaning at the power.intake.	Jan 1960
VISAYAS	OIL	Bohol 3	4.2	02/15/2021 9:19	02/15/2021 12:12	0.12	Forced Outage	Tripped due to raw water circulating pump defective.	Sep 1978
LUZON	NATG	San Gabriel	420	02/15/2021 20:58	02/16/2021 19:03	0.92	Forced Outage	Boiler Feed Water Pump Trouble	Mar 2016
LUZON	HYD	Binga 4	35	02/16/2021 0:01	02/17/2021 15:51	1.66	Maintenance Outage	APM activity.	Jan 1960
LUZON	HYD	Binga 1	35	02/16/2021 7:03	02/16/2021 15:51	0.37	Maintenance Outage	Installation of stop plugs to prevent back flow relative to the Maintenance outage of Binga U2.	Jan 1960
LUZON	HYD	Binga 3	35	02/16/2021 7:03	02/16/2021 15:51	0.37	Maintenance Outage	Installation of stop plugs to prevent back flow relative to the Maintenance outage of Binga U2.	Jan 1960
LUZON	COAL	Masinloc 3	335	02/16/2021 22:23	02/17/2021 11:02	0.53	Forced Outage	Turbine tripped due to LP Exhaust temperature high.	Mar 2019
LUZON	NATG	San Gabriel	420	02/16/2021 23:05	02/17/2021 10:23	0.47	Forced Outage	Boiler tripped.	Mar 2016
VISAYAS	GEO	Mahanagdong B1	5	02/16/2021 23:17	02/17/2021 13:54	0.61	Forced Outage	due to generator breaker phase A thermal anomaly	Jul 1997
LUZON	HYD	Binga 1	35	02/17/2021 7:03	02/17/2021 15:51	0.37	Maintenance Outage	APM activity.	Jan 1960
LUZON	HYD	Binga 3	35	02/17/2021 7:03	02/17/2021 15:51	0.37	Maintenance Outage	APM activity.	Jan 1960
LUZON	COAL	SMC 4	150	02/17/2021 19:23	02/17/2021 21:30	0.09	Forced Outage	High steam drum level	Sep 2018

## Annex A. List of Major Plant Outages

Region	Plant Type	Plant/ Unit Name	Capacity (MW)	Date Out	Date In	Duration (Days)	Outage Type	Remarks	Date Commissioned/ Commercial Operation
LUZON	GEO	Makban 1	63.2	02/17/2021 23:11			Forced Outage	Steam supply diverted to Unit 2.	Apr 1979
LUZON	COAL	Masinloc 3	335	02/18/2021 7:43	02/20/2021 16:07	2.35	Forced Outage	DUE TO ESP BOILER FEED PUMP SUCTION STRAINER LEAK	Mar 2019
LUZON	HYD	Ambuklao 2	35	02/18/2021 8:29	02/18/2021 9:44		Forced Outage	Broken shearpin.	Dec 1956
VISAYAS	COAL	PEDC 2	83.7	02/19/2021 11:43	02/20/2021 21:24		Forced Outage	due to furnace trouble	Apr 2011
VISAYAS	GEO	Malitbog 3	72	02/20/2021 0:22			Maintenance Outage	EDC-Leyte A MBPP Unit 3 plant shutdown for PMS	Jul 1997
VISAYAS	GEO	Malitbog 1	72	02/20/2021 0:25			Maintenance Outage	EDC-Leyte A MBPP Unit 1 plant shutdown for PMS	Jul 1997
LUZON	HYD	Botocan 1	10	02/20/2021 8:01	02/24/2021 16:11		Planned Outage	Inspection of common equipment and auxiliaries	Jan 1947
LUZON	HYD	Botocan 2	10	02/20/2021 8:01	02/24/2021 16:11		Planned Outage	Inspection of common equipment and auxiliaries	Jan 1947
LUZON	HYD	Caliraya 1	14	02/20/2021 8:01	02/24/2021 21:09		Planned Outage	Inspection of turbine head cover and of common equipment and auxiliaries	Oct 2002
LUZON	HYD	Caliraya 2	14	02/20/2021 8:01	02/24/2021 21:10		Planned Outage	Inspection of turbine head cover and of common equipment and auxiliaries	Oct 2002
LUZON	HYD	Binga 1	35	02/20/2021 8:03	02/24/2021 2:05		Planned Outage	Maintenance Outage until 24 February 2021	Jan 1960
LUZON	HYD	Binga 2	35	02/20/2021 8:03	02/20/2021 12:45		Maintenance Outage	Installation of stop plugs relative to MO of U1	Jan 1960
LUZON	HYD	Binga 3	35	02/20/2021 8:03	02/20/2021 12:46		Maintenance Outage	Installation of stop plugs relative to MO of U1	Jan 1960
LUZON	HYD	Binga 4	35	02/20/2021 8:03	02/20/2021 12:46		Maintenance Outage	Installation of stop plugs relative to MO of U1	Jan 1960
VISAYAS	COAL	CEDC 3	82	02/21/2021 0:29			Forced Outage	TO CONDUCT REPAIR OF COAL FEEDER	Jan 2011
LUZON	NATG	Ilijan B1	190	02/21/2021 0:32			Planned Outage	Maintenance Outage until 09 March 2021	Jun 2002
LUZON	OIL	Limay 3	60	02/23/2021 6:42			Forced Outage	Failed start-up. Blow-off valve air leak.	May 1993
LUZON	GEO	Bacman 1	60	02/23/2021 8:51	02/23/2021 21:12		Forced Outage	High winding temperature	Sep 1993
LUZON	COAL	GNP Dinginin 1	668	02/23/2021 10:01	02/23/2021 14:09		Forced Outage	High vibration of generator bearing 5. On commissioning Test	#N/A
LUZON	HYD	Binga 2	35	02/23/2021 13:02	02/23/2021 16:46		Maintenance Outage	Removal of stop plugs	Jan 1960
LUZON	HYD	Binga 3	35	02/23/2021 13:02	02/23/2021 16:47		Maintenance Outage	Removal of stop plugs	Jan 1960
LUZON	HYD	Binga 4	35	02/23/2021 13:02	02/23/2021 16:48		Maintenance Outage	Removal of stop plugs	Jan 1960
LUZON	COAL	GNP Dinginin 1	668	02/23/2021 16:56	02/24/2021 9:54		Forced Outage	High vibration of generator bearing 5. On commissioning Test	#N/A
LUZON	NATG	Ilijan B3	220	02/24/2021 0:34			Planned Outage	Planned Outage (GOP)	Jun 2002
LUZON	NATG	Ilijan B2	190	02/24/2021 0:47			Planned Outage	Planned Outage(GOP).	Jun 2002
VISAYAS	COAL	CEDC 1	82	02/24/2021 0:52			Planned Outage	UNIT SHUTDOWN TO FACILITATE ANUAL PMS UNTIL 17 MARCH 2021	Apr 2010
VISAYAS	GEO	PGPP2 Unit 2	20	02/24/2021 3:08	02/25/2021 18:13		Forced Outage	Auto-tripped due to electrical fault indication.	Aug 1983
VISAYAS	COAL	THVI 1	169	02/24/2021 23:32			Planned Outage	UNIT TRIPPED DURING RAMPING DOWN TO ZERO LOAD (RTD is 0) WITH INDICATION. TURBINE HP EXHAUST TEMPERATURE HIGH HIGH. SCHEDULE FOR PMS PER GOP FROM 25 FEBRUARY 2021 (0001H) TO 21 MARCH 2021 (2400H)	Dec 2017
LUZON	HYD	Binga 1	35	02/25/2021 8:01	02/25/2021 10:50		Maintenance Outage	Total plant shutdown to provide safe clearance on maintenance activities on Unit 4	Jan 1960
LUZON	HYD	Binga 2	35	02/25/2021 8:01	02/25/2021 10:50		Maintenance Outage	Total plant shutdown to provide safe clearance on maintenance activities on Unit 4	Jan 1960
LUZON	HYD	Binga 3	35	02/25/2021 8:01	02/25/2021 10:50		Maintenance Outage	Total plant shutdown to provide safe clearance on maintenance activities on Unit 4	Jan 1960
LUZON	HYD	Binga 4	35	02/25/2021 8:01			Planned Outage	Planned outage(GOP).	Jan 1960