



# Monthly Market Assessment Report

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**26 August 2020 to 25 September 2020**

## **OCTOBER 2020**

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

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## Monthly Market Assessment Report for September 2020 Billing Month

### 1. ASSESSMENT OF THE MARKET

- 90 percent of the total market price outcomes in September 2020 was a result of normal pricing condition, lower than last month's monthly percent share of normal intervals at 96 percent.
- The remainder, however, required other forms of pricing methodologies
  - Price Substitution Methodology (PSM) was applied to 25 intervals or 3 percent of the total outcomes (see Table 1 below). The 18 intervals in Luzon and 19 intervals in Visayas or around 73 percent of intervals with congestion were due to the frequent congestion events on Samboan-Amlan line 1 in Visayas. Previously, the Samboan-Amlan line congestion constituted around 243 intervals or 55% of the total 441 intervals with imposition of PSM from Jan to Feb prior to the community quarantine in Mar.
  - Prices with pricing error occurred around 6 percent of the time for Luzon and Visayas of which majority was the result of inappropriate input data affecting Luzon and Visayas' prices and schedules.
- None of the intervals were imposed with administered prices and secondary price caps this month.

**Table 1. Summary of Pricing Conditions (Ex-ante), September 2020**

| Pricing Condition    | No. of Intervals |             |            |             |
|----------------------|------------------|-------------|------------|-------------|
|                      | Luzon            | % of Time   | Visayas    | % of Time   |
| Normal               | 669              | 89.9%       | 671        | 90.2%       |
| Congestion           | 25               | 3.4%        | 26         | 3.5%        |
| Pricing Error Notice | 50               | 6.7%        | 47         | 6.3%        |
| 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> |

- For intervals under normal condition, higher prices were observed at the onset of the month due to low supply and high demand, but subsequently declined as steadier supply was apparent at the tail end of the period.
- While supply was sufficient, it was on a declining monthly trend driven by the recorded increase in total outage level from power plants and capacities not offered. At the same time, the system demand grew upon the return to GCQ last August and ended up with a higher average than last month despite the implementation of community quarantine.

**Notable Highlight:**

1. *Year-on-year level of demand higher than last year*
  - *Observance of higher average demand than last year despite enforcement of community quarantine*
2. *Surge in capacity not offered and outage level of natural gas plants*
  - *SPEX Malampaya gas supply restriction on 28 Aug to 05 Sep*
3. *Occurrence of price spike events at the onset of the billing month*
  - *Price spikes recorded on 28 Aug, 30 Aug, 04 Sep, 05 Sep, 06 Sep, and 07 Sep with most days coinciding with the Malampaya gas restriction event*
  - *Coincidentally, interesting pricing events were recorded on 05 and 07 based on the Supply Margin-Price Index*

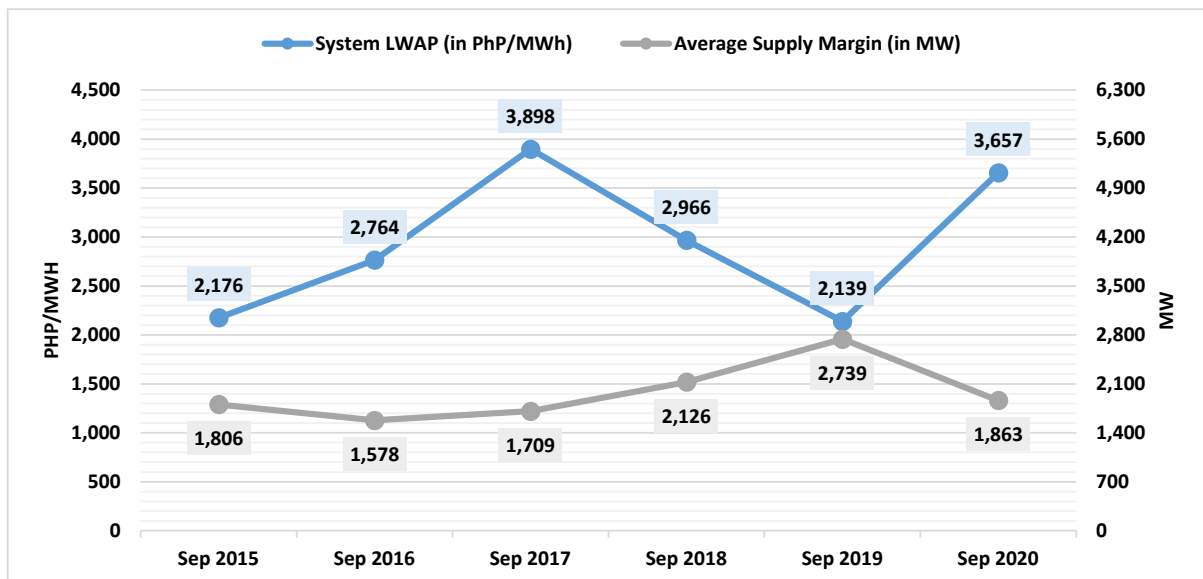
## 2. MARKET OUTCOME

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

#### 2.1.1 Price and Supply Margin

- On 19 August, the GCQ was reinstated and continuously ran throughout the September billing month. Despite implementation of quarantine protocols, there were episodes of price spikes this period, leading to an increase in monthly average price.
- The increase in monthly average price was brought about by high prices during the SPEX Malampaya gas supply restriction which caused deration and outage of natural gas plants relying on the facility for supply on top of the high level of outage from coal plants on the onset of the month.
- Meanwhile, an average supply margin at 1,863 MW for September 2020 was noted to be almost similar to its level in September 2017 with a resulting LWAP not far from this year's price.
- Contrary to last year where September recorded the lowest monthly LWAP for the whole year of 2019, September, this year, ended with the highest monthly LWAP.
- The resulting high prices this September also factored in the increase in demand of electricity upon reinstatement of the GCQ.

<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.



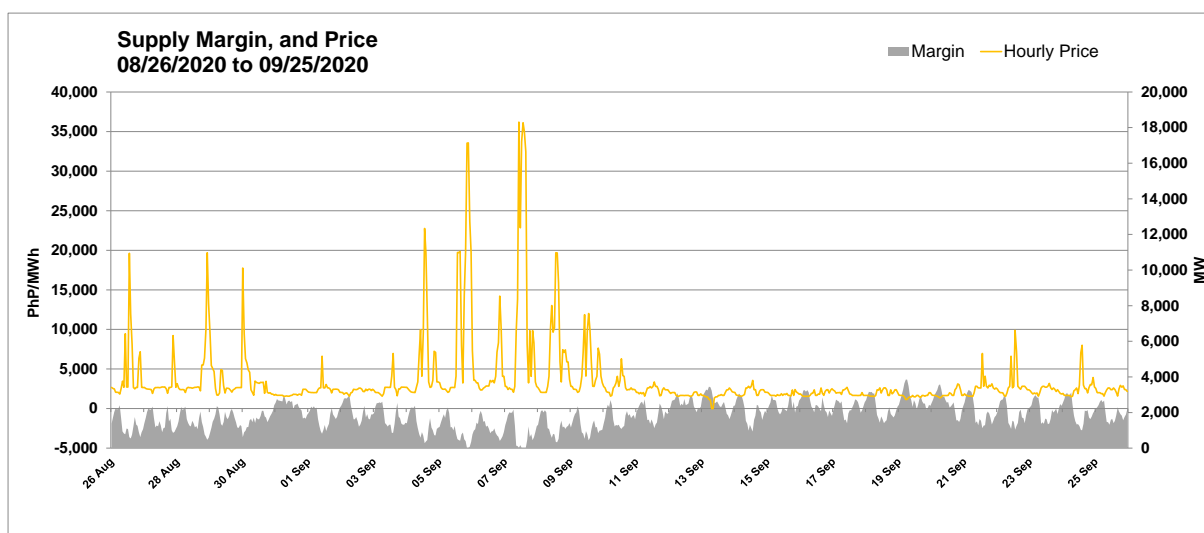
**Figure 1. System LWAP and Supply Margin, September 2015-2020**

- Monthly load weighted average price (LWAP) grew by 81 percent from PhP2,017/MWh in August to PhP3,657/MWh in September.
  - Monthly average peak prices increased by 97 percent from PhP2,298/MWh to PhP4,529/MWh.
  - Monthly average off-peak prices increased by 57 percent from PhP1,761 to PhP2,769/MWh.
- The average supply margin tightened by 30 percent from 2,652 MW in August to 1,863 MW in September.

**Table 2. System LWAP and Supply Margin, August and September 2015-2020**

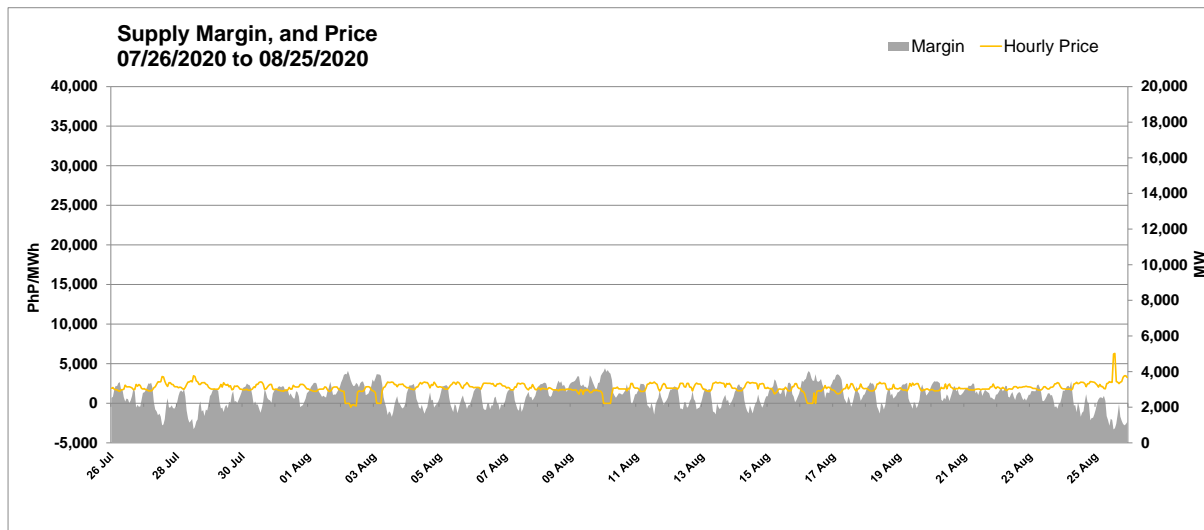
| Year | Month     | Average Supply Margin | % Change in Average Supply Margin | System LWAP | % Change in System LWAP |
|------|-----------|-----------------------|-----------------------------------|-------------|-------------------------|
| 2015 | August    | 1,449                 | 25%                               | 3,729       | -42%                    |
|      | September | 1,806                 |                                   | 2,176       |                         |
| 2016 | August    | 1,202                 | 31%                               | 4,034       | -31%                    |
|      | September | 1,578                 |                                   | 2,764       |                         |
| 2017 | August    | 1,750                 | -2%                               | 3,672       | 6%                      |
|      | September | 1,709                 |                                   | 3,898       |                         |
| 2018 | August    | 2,408                 | -12%                              | 2,713       | 9%                      |
|      | September | 2,126                 |                                   | 2,966       |                         |
| 2019 | August    | 1,982                 | 38%                               | 3,004       | -29%                    |
|      | September | 2,739                 |                                   | 2,139       |                         |
| 2020 | August    | 2,652                 | -30%                              | 2,017       | 81%                     |
|      | September | 1,863                 |                                   | 3,657       |                         |

- Hourly resolution of LWAP recorded the highest level at PhP36,196/MWh on 07 September 2020 1100H as a combined result of the high plant outage reaching 3,555 MW and high level of demand plus reserve schedule at 13,139 MW relative to other days of September.
- Also, occurring on the same date and interval was one of the lowest supply margins for September 2020 at 19 MW.
- About 95 percent of the time, the hourly system LWAP was below the PhP10,000/MWh level.
- During the September billing month, prices in the GCQ period were higher by 78 percent with an average of PhP3,656/MWh as compared to August's average of PhP2,057/MWh.
- Several price spike<sup>2</sup> events were recorded on the following dates:
  - 28 August 2020, 2300H and 2400H
  - 30 August 2020, 0100H
  - 04 September 2020, 1400H
  - 05 September 2020, 2100H-2400H
  - 07 September 2020, 0900H, 1100H-1600H
- The price spike events, in general, coincided with the high level of outages of coal plants in the specified dates and the gas supply restriction of the SPEX Malampaya facility from 28 August to 05 September which curtailed and caused outages of some natural gas plants.



**Figure 2. Hourly Supply Margin and Price, September 2020**

<sup>2</sup> Price spike refers to the significant upward movement of prices brought about by high-priced clearing prices breaching the set threshold for peak and off-peak hours in a season. Prices used in the determination of price spikes are subject to validation and are based on the day-after results of the market.



**Figure 3. Hourly Supply Margin and Price, August 2020**

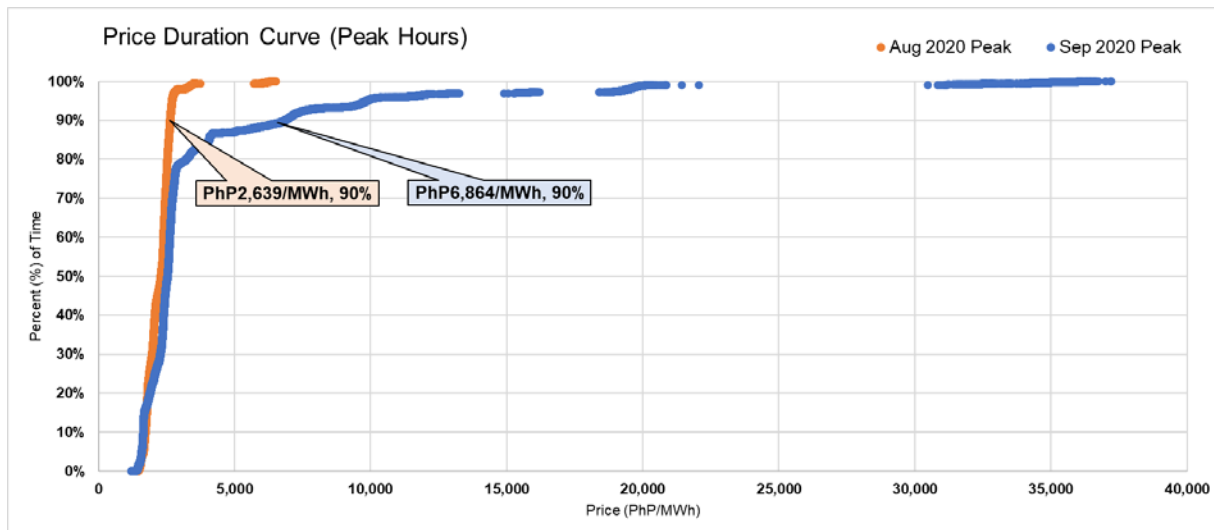
### 2.1.2 Price Duration Curve<sup>3</sup>

- For peak<sup>4</sup> hours, about 90 percent of the load nodal prices fell below PhP6,864/MWh in September and PhP2,639/MWh in August while distribution of prices during the off-peak hours were seen below PhP3,394/MWh in September and PhP2,399/MWh in August in about the same percentage of time.
- Maximum off-peak and peak load nodal price reached PhP41,415/MWh and PhP37,217/MWh in September, respectively.
- Bulk of the peak nodal prices, at around 87 percent, were seen ranging from PhP0/MWh to PhP5,000/MWh while for off-peak nodal prices, this was at 93 percent at the same range.
- Nodal prices reaching above PhP30,000/MWh were evident during off-peak intervals, owing to the price spike events in the market this month.

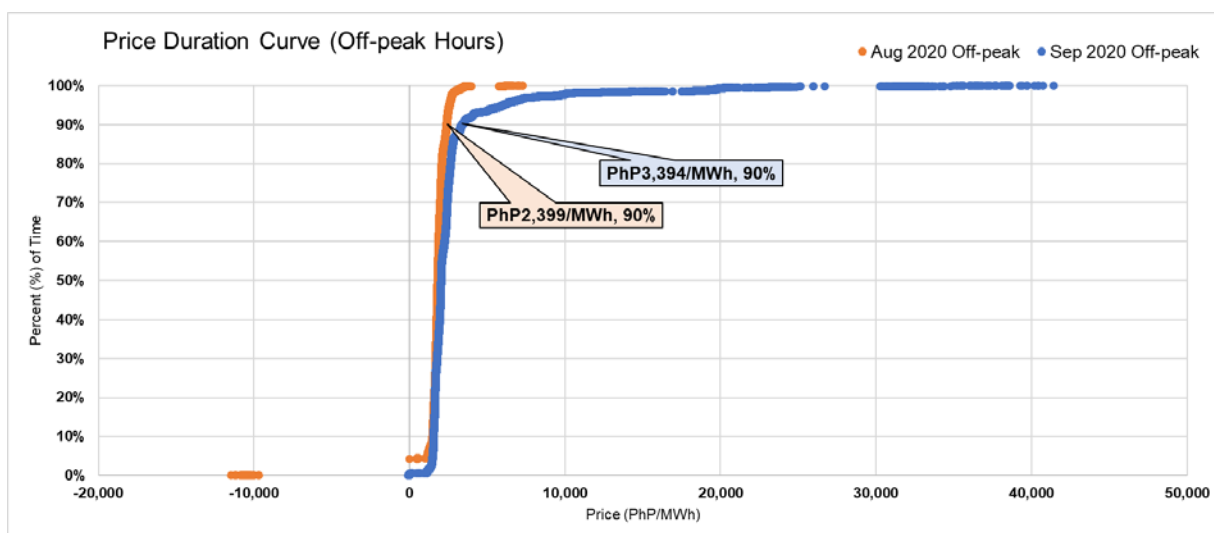
<sup>3</sup> Load nodal prices under normal pricing condition are used.

<sup>4</sup> Peak and off-peak intervals differ between Luzon and Visayas regions.





**Figure 4. Load Nodal Price Duration Curve (Peak), August and September 2020**

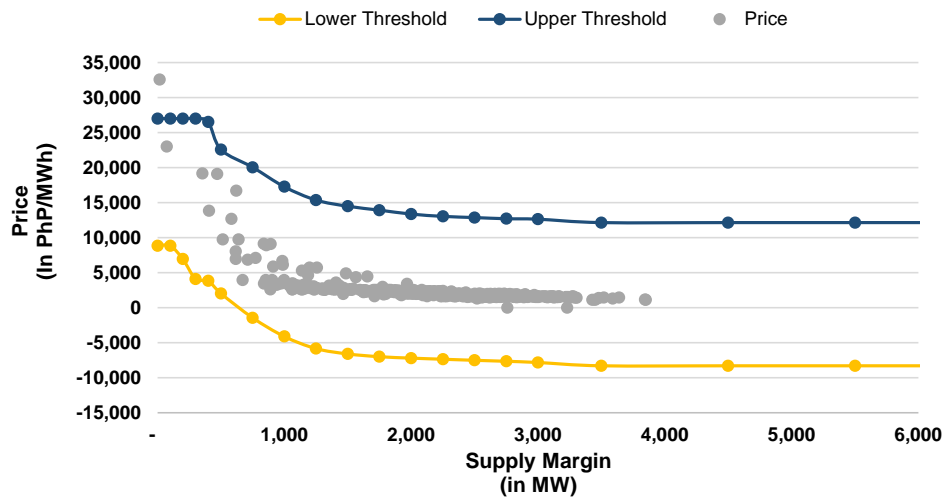


**Figure 5. Load Nodal Price Duration Curve (Off-peak), August and September 2020**

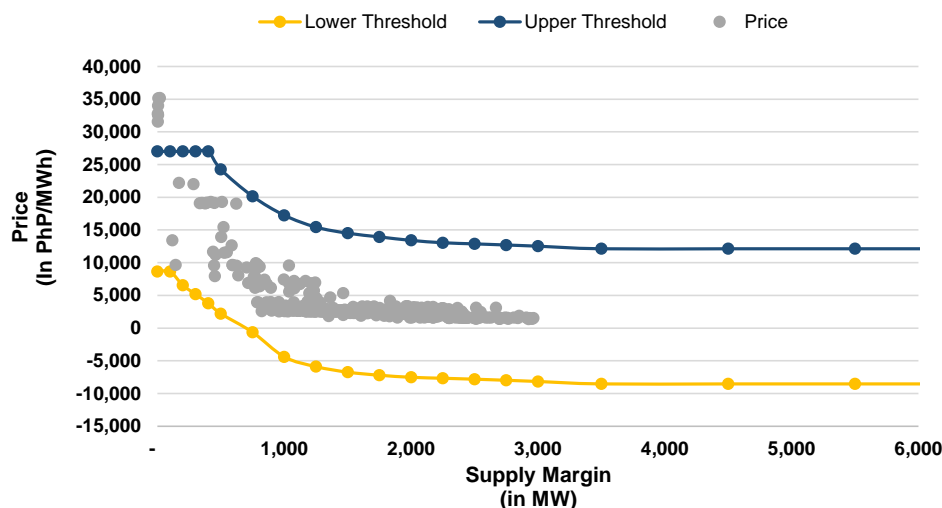
### 2.1.3 Supply Margin-Price Index (SMPI)<sup>5</sup>

- The upper price threshold for the rainy season was breached on 7 intervals, which later in this section will be referred to as interesting pricing events, during the 6 peak hours and 1 off-peak hour of the September billing month. Furthermore, no lower price threshold was breached during the period.
- All the interesting pricing events occurred during a thin supply margin of less than 20 MW.

<sup>5</sup> The supply margin-price index identifies intervals with unusual high or low prices based on the historical relationship of supply margin and price. Prices determined to be outside the bounds of the upper and lower price thresholds for peak and off-peak hours are interesting price points which may require further analysis. Also, price thresholds vary depending on seasonality.



**Figure 6. Supply Margin-Price Index (Off-peak), September 2020**



**Figure 7. Supply Margin-Price Index (Peak), September 2020**

- While these events were evidently driven by the depleting margin, many have resulted from possible changes in the offer pattern of power plants, specifically from generators with a market power to set the price.
- As a summary, provided in the list below are 1 coal, and 13 oil-based generator units who exhibited probable bid splitting behavior and increase in offer pattern while setting the market price at above PhP10,000/MWh for the corresponding intervals when the breach in the threshold occurred.
- Generators in the list are subject to further monitoring based on the defined methodology set by the Market Surveillance Committee (MSC).

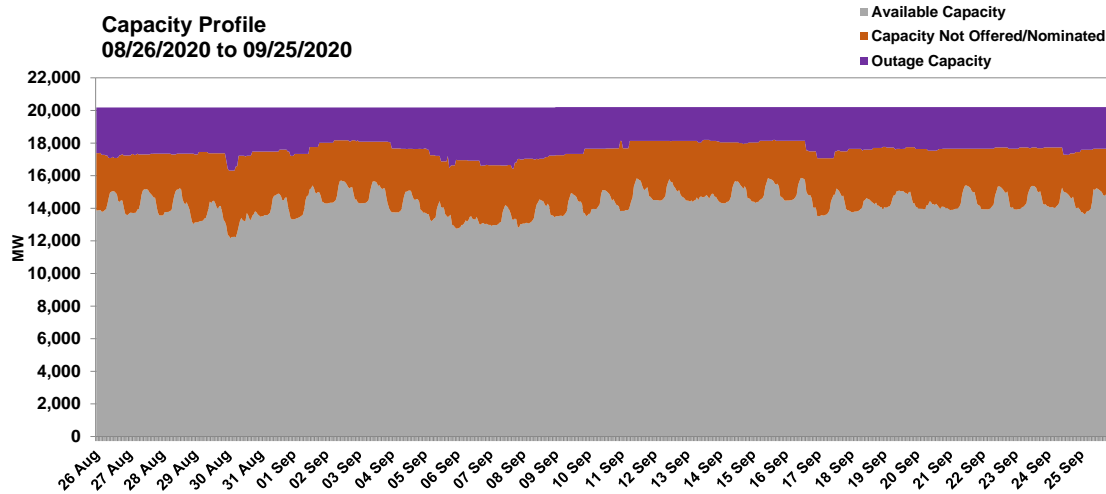
**Table 3. List of Price Setters during the Interesting Pricing Events, September 2020**

| Event   | Generator Unit | Nodal Price (PhP/MWh) | Price Setter (Y/N) | Bid Splitting Behavior (Y/N) | Increase in Offer Pattern (Y/N) |
|---------|----------------|-----------------------|--------------------|------------------------------|---------------------------------|
| Event 1 | Oil A U1       | 33,459                | Y                  | N                            | Y                               |
|         | Oil B U1       | 32,000                | Y                  | N                            | N                               |
|         | Oil B U2       | 32,000                | Y                  | N                            | N                               |
|         | Oil C U1       | 33,242                | Y                  | N                            | N                               |
|         | Oil C U2       | 33,242                | Y                  | N                            | N                               |
| Event 2 | Oil A U1       | 33,571                | Y                  | Y                            | Y                               |
|         | Oil C U1       | 33,276                | Y                  | N                            | N                               |
|         | Oil C U2       | 33,276                | Y                  | N                            | N                               |
|         | Oil D U5       | 33,664                | Y                  | N                            | N                               |
|         | Oil E U1       | 33,495                | Y                  | Y                            | Y                               |
|         | Oil F U1       | 32,853                | Y                  | N                            | Y                               |
| Event 3 | Coal A U1      | 36,115                | Y                  | Y                            | Y                               |
|         | Oil A U1       | 35,816                | Y                  | N                            | Y                               |
|         | Oil D U1       | 32,379                | Y                  | N                            | Y                               |
|         | Oil D U2       | 32,379                | Y                  | N                            | Y                               |
|         | Oil D U3       | 32,379                | Y                  | N                            | Y                               |
|         | Oil D U4       | 32,379                | Y                  | N                            | Y                               |
|         | Oil G U1       | 32,545                | Y                  | Y                            | N                               |
| Event 4 | Coal A U1      | 33,641                | Y                  | Y                            | Y                               |
|         | Oil A U1       | 33,360                | Y                  | N                            | Y                               |
| Event 5 | Oil D U5       | 32,000                | Y                  | N                            | Y                               |
| Event 6 | Oil D U5       | 32,000                | Y                  | N                            | Y                               |
| Event 7 | Oil A U1       | 32,000                | Y                  | N                            | Y                               |
|         | Oil G U1       | 31,007                | Y                  | Y                            | N                               |

## 2.2 Supply

- An increase of 25 MW in the WESM registered capacity was recorded this month from a total of 20,182.47 MW to 20,207.47 MW with the entry of the 25-MW Bataan 2020, Inc. coal plant.
- Available capacity<sup>6</sup> constituted an average of 14,284 MW or 71 percent of the total registered capacity.
- Capacity not offered comprised an average of 3,289 MW or 16 percent.
- Outage capacity accounted for an average of 2,623 MW or 13 percent.

<sup>6</sup> Available capacity refers to the aggregate of Capacity Offered/Nominated, Malaya Capacity for MRU, and Capacity of Plants on Testing and Commissioning



**Figure 8. Capacity Profile, September 2020**

### 2.2.1 Outage Capacity<sup>7</sup>

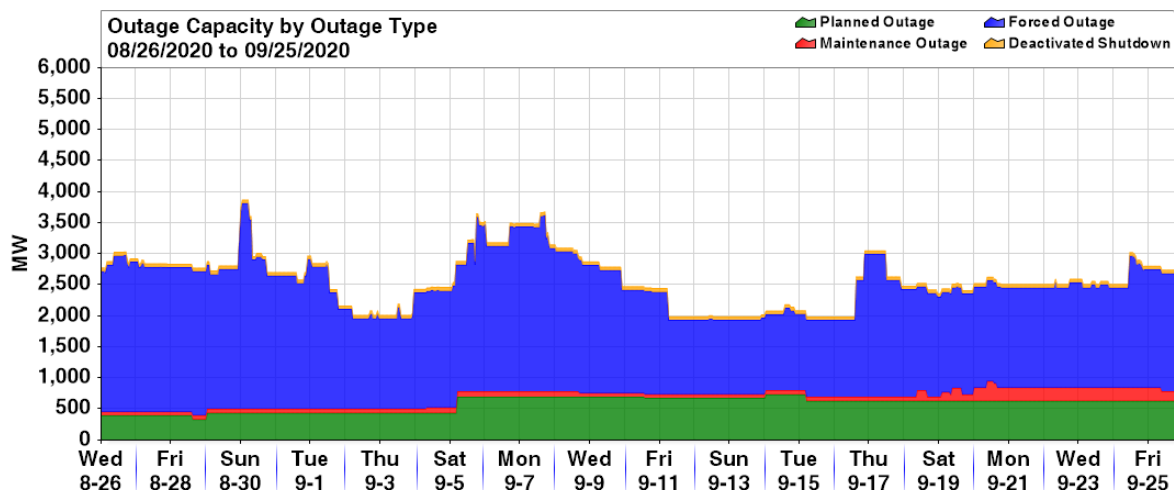
- Outage capacity increased by 18.3 percent from an average of 2,217 MW last month to an average of 2,623 MW this month.
- Planned outages comprised 582 MW on average or 22 percent of the total outages. Majority or about 72 percent was composed of forced outages averaging at 1,856 MW, and maintenance outages at 99 MW or 4 percent of the total outages. Meanwhile, deactivated shutdown accounted for only about 55 MW on average or 2 percent of the outages.
- There was a significant increase in average level of forced outages of natural gas plants this month owing to the gas supply restriction from SPEX Malampaya facility.
- Total outage capacity for the month closed at 2,551 MW, lower than its opening level at 2,801 MW.
- Coal plants majorly contributed to the level of planned and forced outages while geothermal plants in maintenance outages and deactivated shutdown.

**Table 4. Outage Factor by Plant Type and Outage Category, September 2020**

| Plant Type   | Planned Outage<br>(22%) | Forced Outage<br>(72%) | Maintenance<br>Outage<br>(4%) | Deactivated<br>Shutdown<br>(2%) |
|--------------|-------------------------|------------------------|-------------------------------|---------------------------------|
| Coal         | 64%                     | 52%                    | 0%                            | 0%                              |
| Natural Gas  | 30%                     | 18%                    | 0%                            | 0%                              |
| Geothermal   | 2%                      | 11%                    | 93%                           | 100%                            |
| Hydro        | 0%                      | 0%                     | 3%                            | 0%                              |
| Oil-based    | 5%                      | 19%                    | 4%                            | 0%                              |
| <b>TOTAL</b> | <b>100%</b>             | <b>100%</b>            | <b>100%</b>                   | <b>100%</b>                     |

<sup>7</sup> Notable plants on outage are detailed in the Annex

- Planned outages had a 12 percent decline from last month while averaging at 582 MW this month as influenced by the planned outages of Masinloc CFTPP unit 1 (315 MW), and Sta Rita NGPP unit 2 (256 MW).
- Meanwhile, forced outages had a noticeable increase in monthly average level from 1,431 MW to 1,856 MW.
- Aside from the high level of outage at the onset of the month, an increase in level of forced outage was also noted starting 16 September because of the forced outage of Sual CFTPP unit 2 (647 MW).
- Maintenance outages were kept at a low level similar with last month despite an uptick towards the end of the month due to outages from several geothermal and hydro plants.



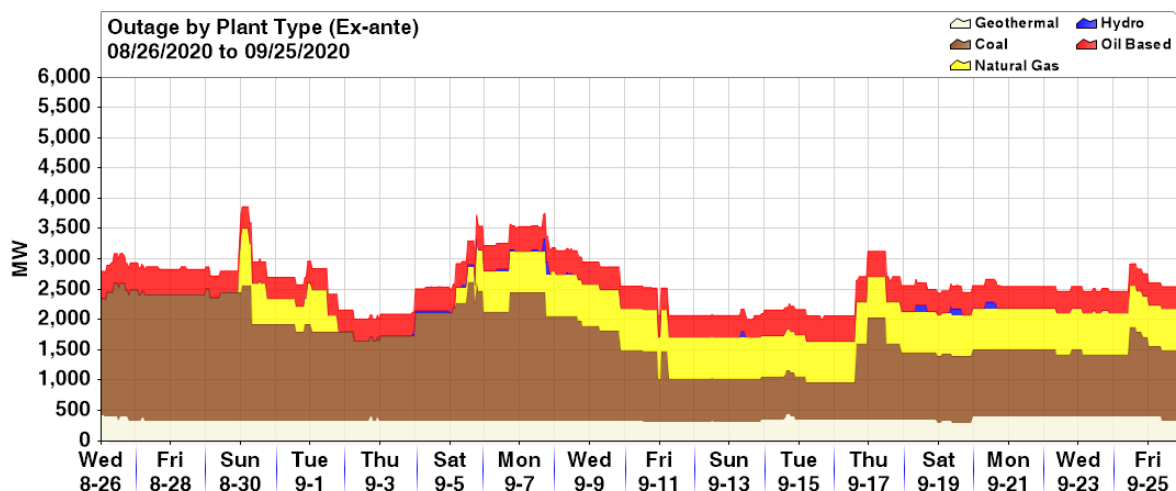
**Figure 9. Outage Capacity by Outage Category, September 2020**

**Table 5. Outage Summary by Outage Category, August and September 2020**

| Outage Category      | Sep 2020<br>(in MW) |              |              | Aug 2020<br>(in MW) |              |              |
|----------------------|---------------------|--------------|--------------|---------------------|--------------|--------------|
|                      | Max                 | Min          | Average      | Max                 | Min          | Average      |
| Planned              | 734                 | 335          | 582          | 737                 | 315          | 660          |
| Maintenance          | 320                 | 63           | 99           | 208                 | 0            | 18           |
| Forced               | 3,314               | 1,196        | 1,856        | 2,263               | 890          | 1,431        |
| Deactivated Shutdown | 55                  | 55           | 55           | 55                  | 55           | 55           |
| <b>TOTAL</b>         | <b>3,870</b>        | <b>1,985</b> | <b>2,592</b> | <b>2,756</b>        | <b>1,562</b> | <b>2,163</b> |

- In terms of type of power plants, coal generators accounted for more than half of the outages at 53 percent. This was followed by natural gas generators at 19 percent. Oil-based plants came in close with 15 percent share while geothermal plants were at 13 percent. Meanwhile, hydro plants came in last with 0.3 percent or with almost no recorded outage this month.

- The September billing month began with high coal outages due to the previous month's forced outages of Sual CFTPP unit 1 (647 MW), and SBPL CFTPP (455 MW) and the planned outage of Masinloc CFTPP unit 1 (315 MW) since July 2020.
- The declining supply was further aggravated by the SPEX Malampaya restriction which caused the deration and outage of natural gas plants. Further, the forced outage of San Gabriel NGPP (420 MW) coincided with the scheduled outage of Sta Rita NGPP unit 2 (256 MW) on 05 September causing prices to soar from 05 to 07 September.
- Average outage level of hydro plants was further maintained at a low level attributing to the short outages from Ambuklao HEP units 1-3 (105 MW), and Kalayaan PSPP unit 4 (180 MW).
- Majority of the outage of oil-based plants at about 387 MW this month consisted of the prolonged forced outage of Malaya TPP unit 1 (300 MW) due to problems in the unit generator since 03 May 2019, and the forced outage of Limay CCGT unit 6 (60 MW) starting 19 July 2020.
- Geothermal plants continuously recorded low level of outages with a slight increase at the end of the month caused by the maintenance outage of Palinpinon GPP 1 (112.5 MW)



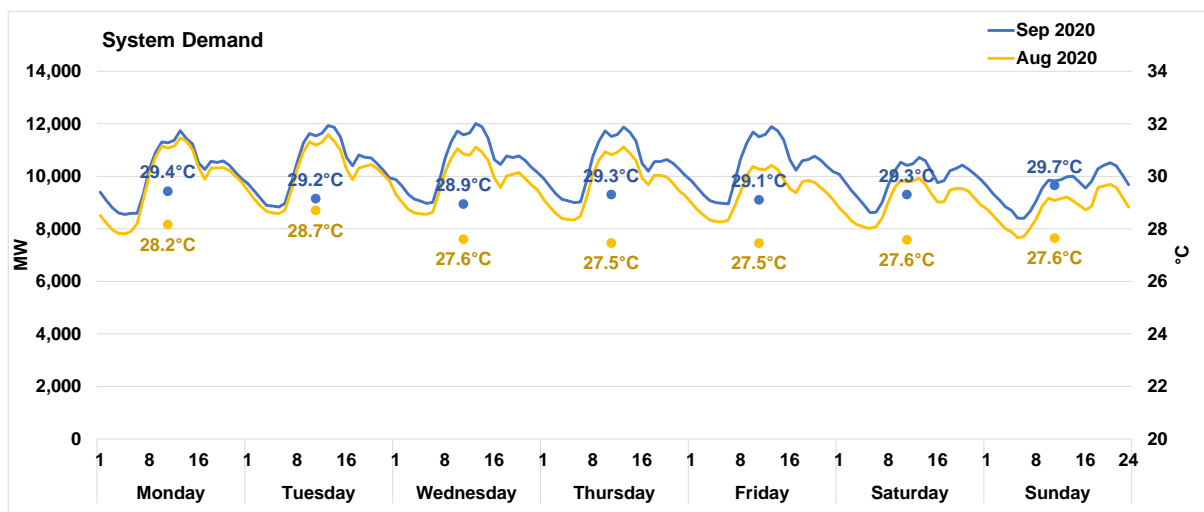
**Figure 10. Outage Capacity by Plant Type, September 2020**

**Table 6. Outage Summary by Plant Type, August and September 2020**

| Plant Type   | Sep 2020<br>(in MW) |              |              | Aug 2020<br>(in MW) |              |              |
|--------------|---------------------|--------------|--------------|---------------------|--------------|--------------|
|              | Max                 | Min          | Average      | Max                 | Min          | Average      |
| Coal         | 2,289               | 609          | 1,379        | 1,927               | 928          | 1,435        |
| Natural Gas  | 940                 | 0            | 497          | 0                   | 0            | 0            |
| Geothermal   | 452                 | 294          | 352          | 461                 | 254          | 282          |
| Hydro        | 215                 | 0            | 8            | 263                 | 0            | 106          |
| Oil-based    | 489                 | 307          | 387          | 457                 | 360          | 394          |
| <b>TOTAL</b> | <b>3,870</b>        | <b>2,009</b> | <b>2,623</b> | <b>2,781</b>        | <b>1,690</b> | <b>2,217</b> |

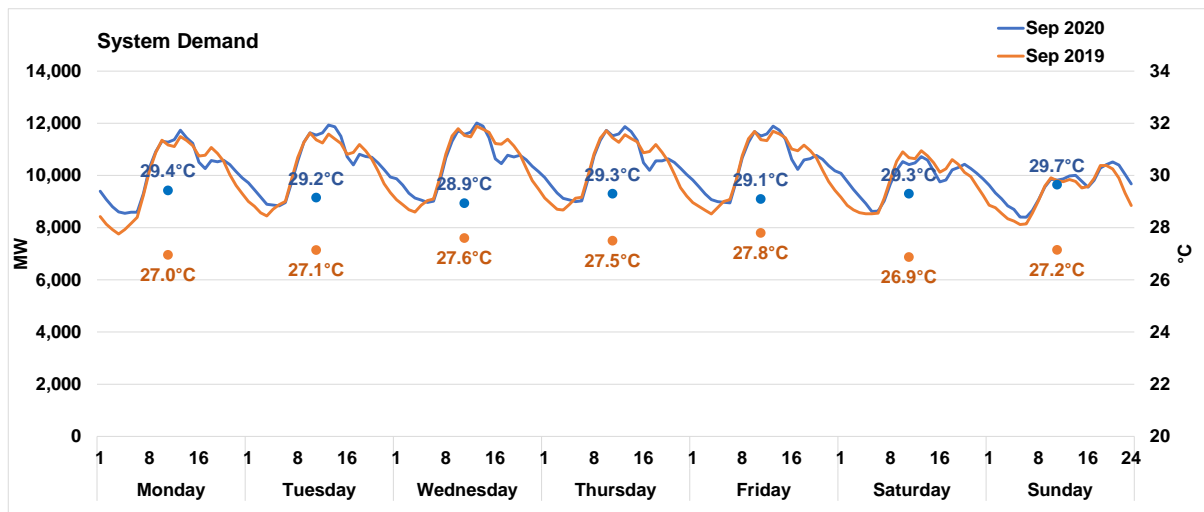
## 2.3 System Demand

- Monthly system demand climbed to an average of 10,214 MW with hotter recorded temperatures compared to last month. This was a 7.2 percent growth from last month's average of 9,524 MW.
- In comparison to last month, the average off-peak demand at 9,509 MW this month saw a 7.3 percent increase as well as a 6.2 percent rise in the average peak demand recorded at 11,015 MW.
- Maximum system demand in September reached 12,533 MW for peak hours on 08 September and 11,164 MW for off-peak hours on 04 September.
- Minimum system demand in September was at 9,258 MW for peak hours and 7,765 MW for off-peak hours which transpired on 19 September and 31 August, respectively.
- For the year 2020, the highest recorded hourly system demand was on 10 March 2020, 1400H at 13,162 MW, prior the enforcement of the community quarantine on 15 March 2020.
- Average temperatures on all weekdays were notably higher than last month.



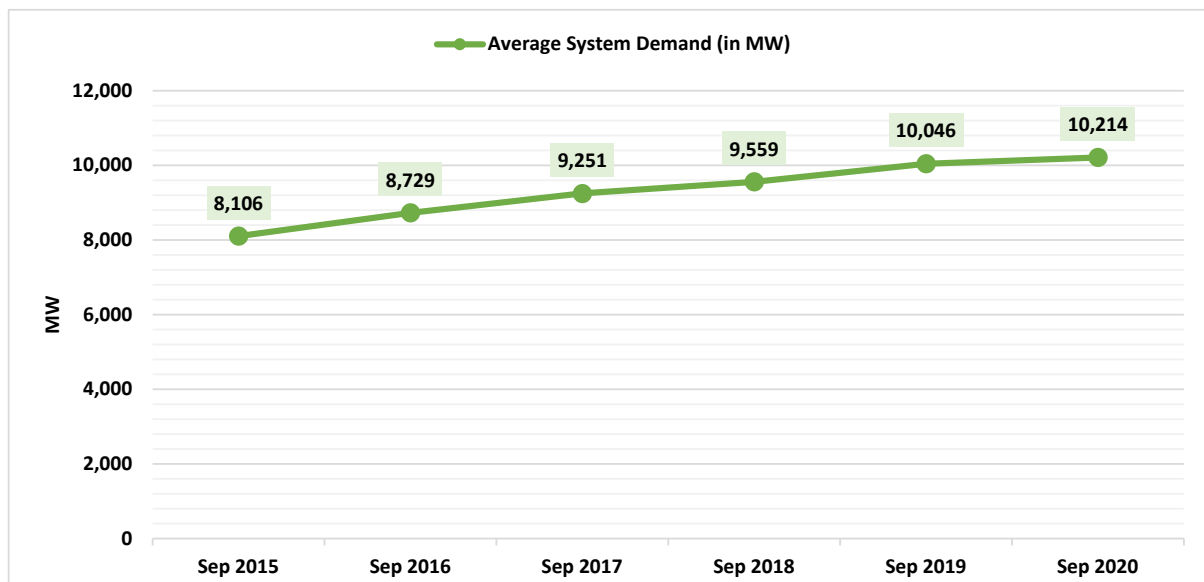
**Figure 11. Average Hourly System Demand, August and September 2020**

- The September 2020 billing month was the first instance during the community quarantine that the average system demand was higher than its last year's average.
- The demand was up by 1.7 percent from 10,046 MW in September 2019 to 10,214 MW in September 2020.
- The growth in average demand was attributable to the 3.3 percent increase during off-peak hours from 9,205 MW to 9,509 MW. On the other hand, the peak hours were observed to be lower than last year by 1.2 percent from 11,147 MW to 11,015 MW.
- The average temperatures per weekday in September this year were significantly higher than last year.



**Figure 12. Average Hourly System Demand, September 2019 and 2020**

- Despite the notable reduction in demand for the past few months with the community quarantine, September 2020 remained consistent with the yearly pattern of increase in demand.
- Considering the previous 5 years, the highest hourly system demand was recorded on 21 June 2019, 1400H at 13,378 MW.



**Figure 13. Average System Demand, September 2015-2020**

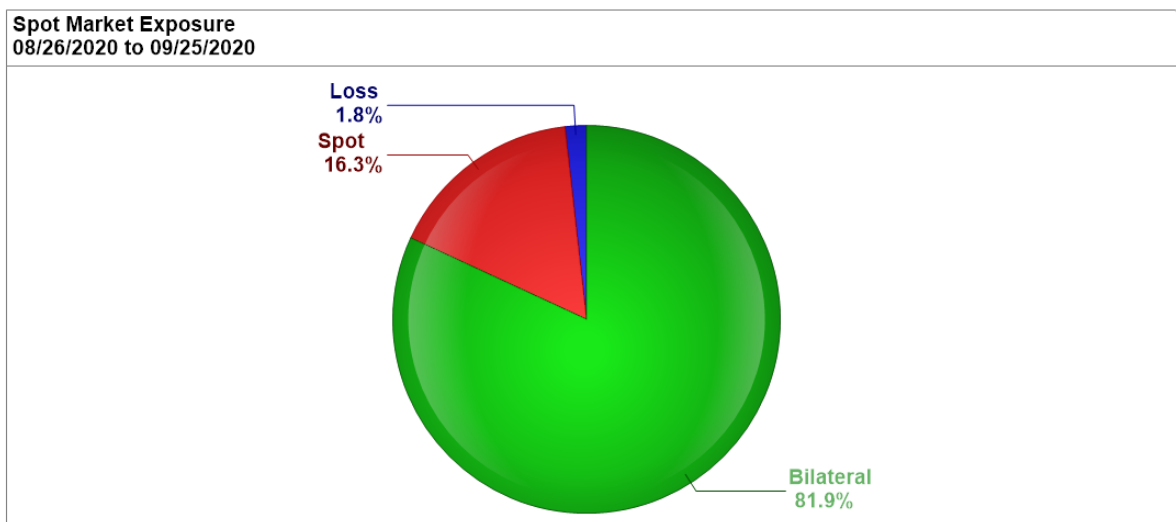


### 3. SPOT TRANSACTIONS

#### 3.1 Spot Exposure

##### 3.1.1 Load

- Spot quantities<sup>8</sup> of load participants in September stood at 16.3 percent of the total metered quantities, higher than last month's 12.3 percent spot exposure, which signaled that consumers had more reliance on the market in sourcing their energy needs.
- Most of the load quantities at around 81.9 percent of their total consumption, a reduction from last month's 86.0 percent, were still transacted outside the spot market and were contracted with generators.

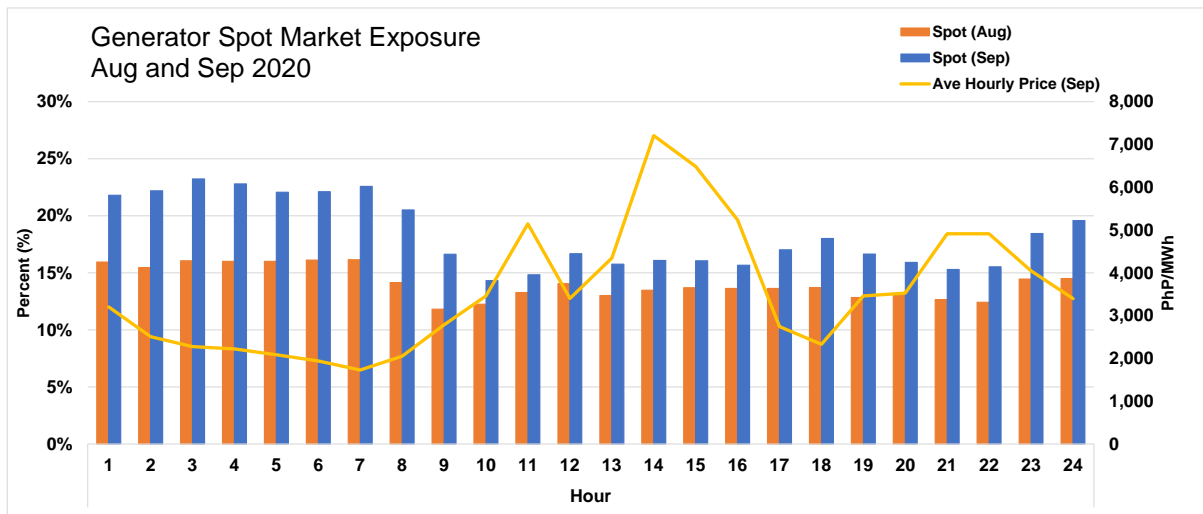


**Figure 14. Spot Market Exposure, September 2020**

##### 3.1.2 Generator

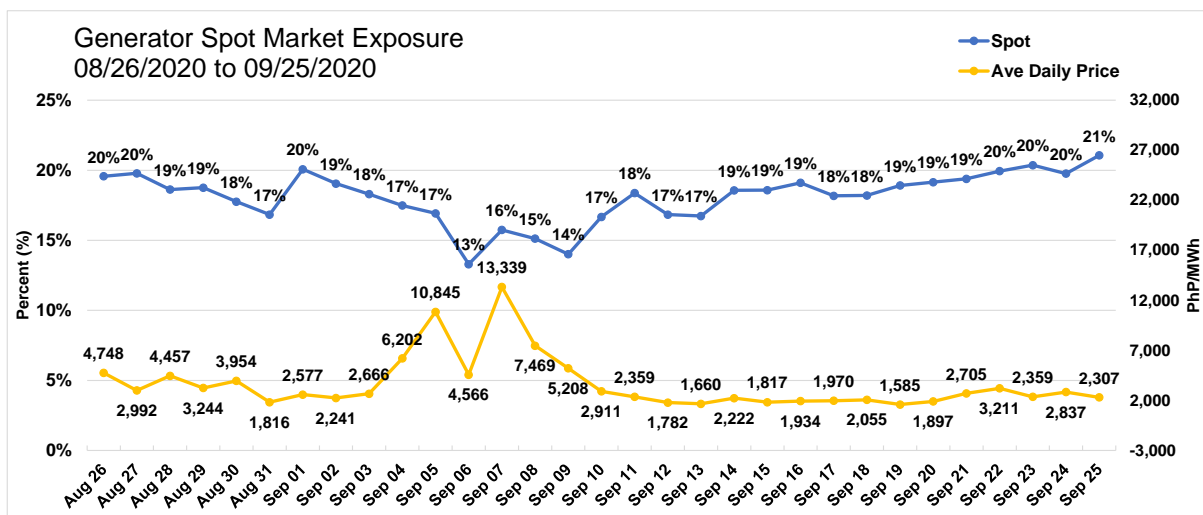
- With the increasing demand and declining level of BCQs than last month, average hourly spot exposure of generators resulted to a significant rise in percentage share in all hours.
- Spot exposure in off-peak hours averaged at 20 percent while it was 16 percent during peak hours. Both exposures in off-peak and peak hours were higher than last month's 15 percent and 13 percent, respectively.
- Higher increases were observed during the morning off-peak hours.

<sup>8</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 15. Hourly Generator Spot Market Exposure, August and September 2020**

- Despite the general higher spot exposure from generators and an overall higher market prices this month, the high spot exposures were evident during days with low prices while the opposite was seen during days with high prices.
- With this, consumers were more exposed in low prices of the period.

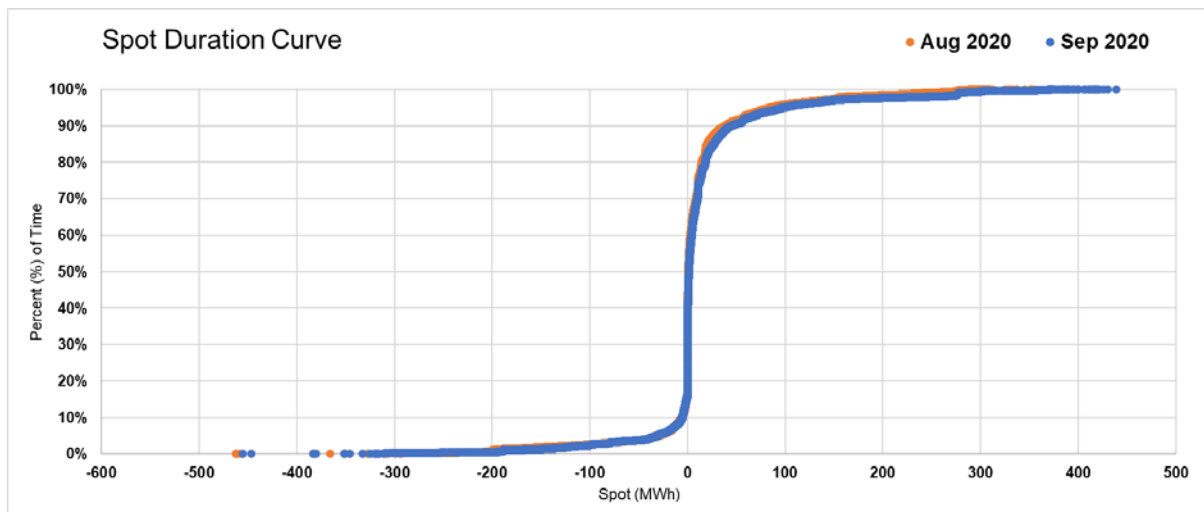


**Figure 16. Daily Generator Spot Market Exposure, September 2020**

- Based on the spot quantity duration curve<sup>9</sup> of September billing month, hourly spot quantities of generators were 46 MWh or less at about 90 percent of the time with maximum and minimum spot quantities at 439 MWh and -455 MWh, respectively.

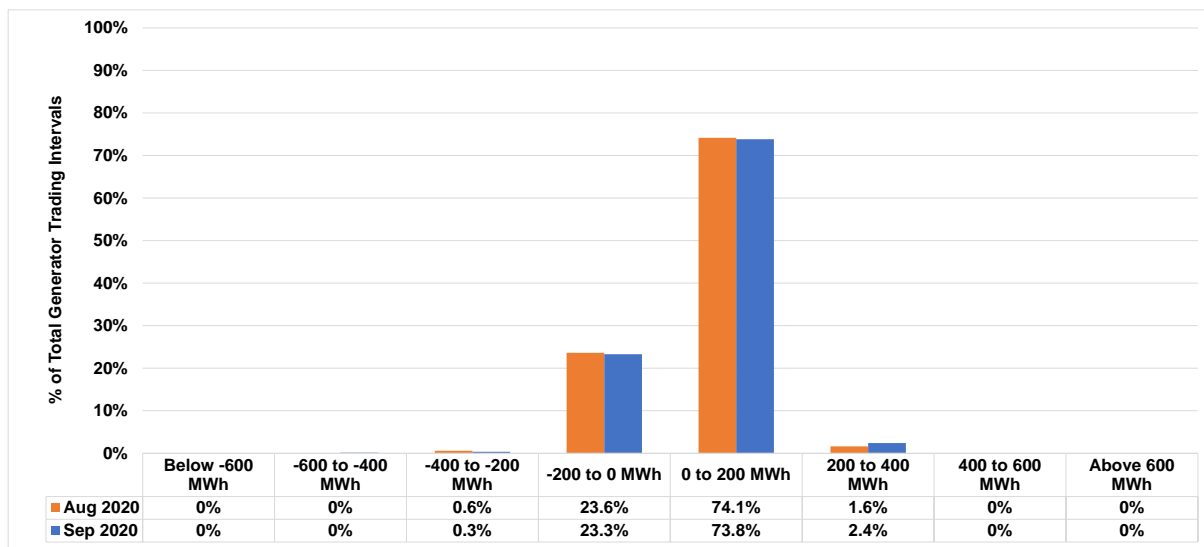
<sup>9</sup> The spot duration curve utilizes data on a per generator trading interval, meaning, all the data consisted of spot quantities of every generator per interval for the period considered. Positive spot values indicate quantities sold in the market while negative values are quantities bought.

- Additionally, all generator spot quantities bought and sold in the market per interval did not exceed 500MWh.



**Figure 17. Spot Duration Curve, August and September 2020**

- Generator spot quantities for August and September billing months were still much more concentrated on the -200 MWh to 200 MWh range while noting an increase in the 200 MWh to 400 MWh range.
- About 76 percent of the total generator spot transactions in September, same with last month, was on the account of energy being sold in the market (positive MWh quantity). Last month's August billing period was observed to have a similar trend wherein most of the generator spot quantities were sold in the market instead of being bought.



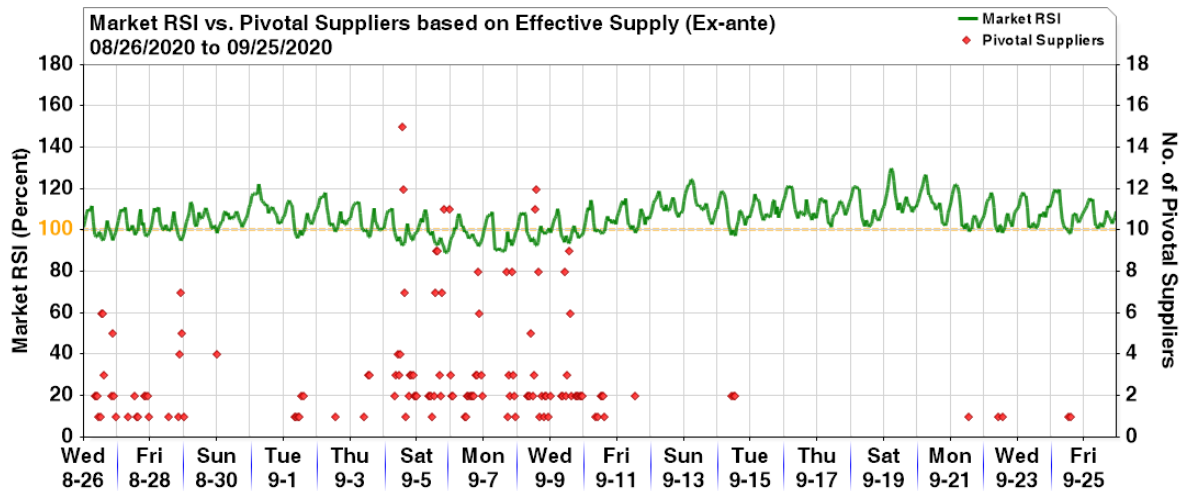
**Figure 18. Spot Frequency Distribution Table, August and September 2020**

### 3.2 Pivotal<sup>10</sup> Plants

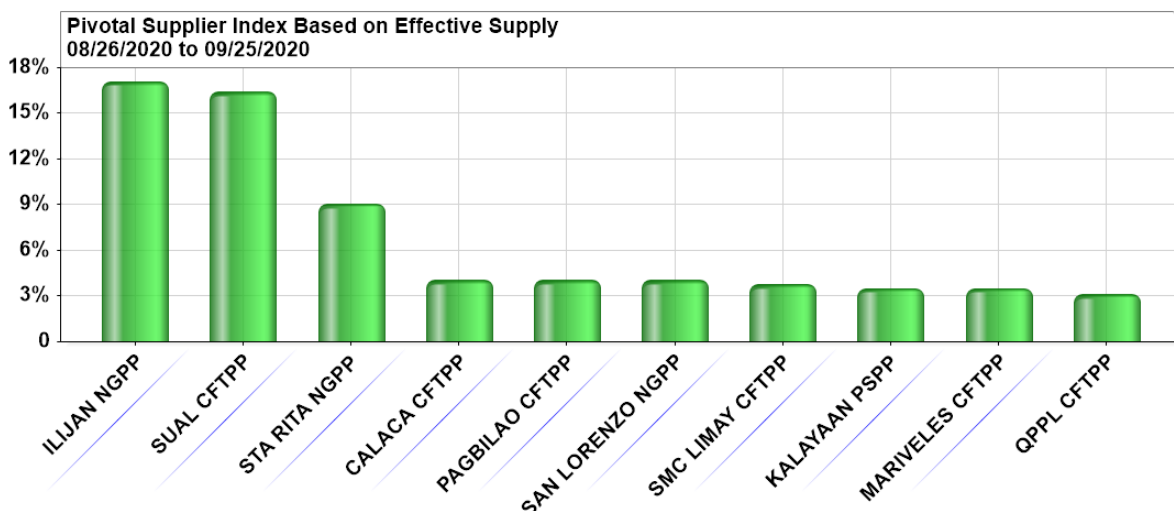
- Out of the 744 intervals in September 2020 billing month, 147 intervals had a Residual Supply Index<sup>11</sup> (RSI) below the 100 percent mark from 15 intervals in August, indicating the more frequent presence of pivotal suppliers.
- Majority of these instances occurred during the onset of the month where the market experienced tighter supply margin with the increasing outage capacity and demand.
- The market resulted in an average RSI of 106 percent indicating that supply was still generally abundant to satisfy the demand.
- Intervals with RSI below 100 percent had an LWAP of Php8,696/MWh while those with RSI above 100 resulted in a lower LWAP of Php2,262/MWh.
- Joining the list of pivotal suppliers this billing month were Calaca CFTPP, San Lorenzo NGPP, SMC Limay CFTPP, Kalayaan PSPP, Mariveles CFTPP, and QPPL CFTPP alongside last month's top 3 on list with Ilijan NGPP, Sual CFTPP, and Sta. Rita NGPP.
- During the September billing month, the market resulted in an RSI ranging from 89 to 130 percent.

<sup>10</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.

<sup>11</sup> The Residual Supply Index (RSI) measures the ratio of the available generation without a generator to the total generation required (including operational reserve) to supply the demand. RSI also determines whether there are pivotal suppliers in an interval. An RSI below 100 indicates the presence of pivotal plants.



**Figure 19. Market RSI vs Pivotal Suppliers, September 2020**



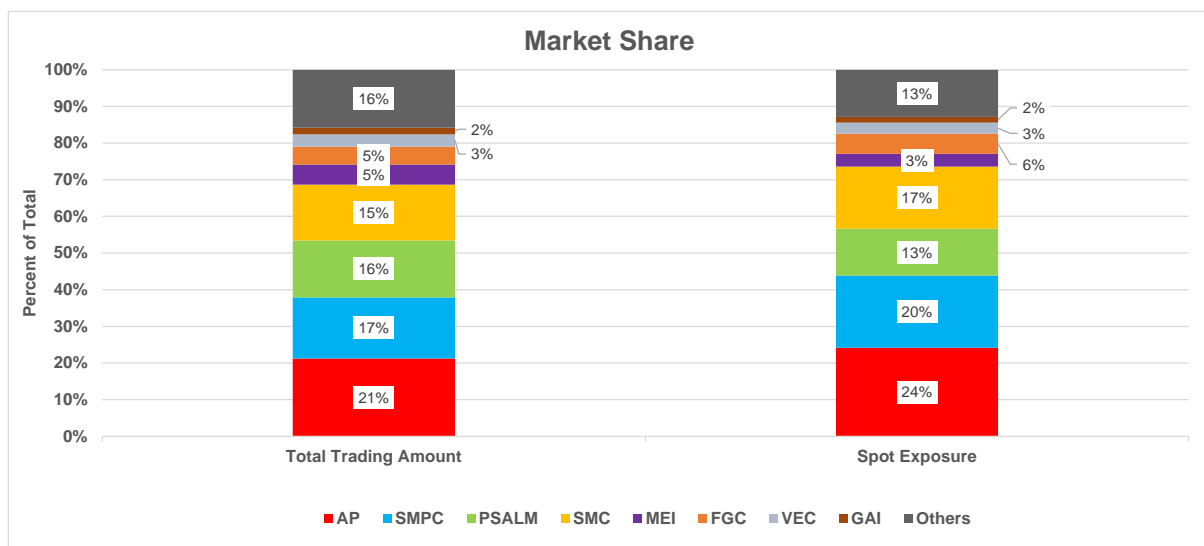
**Figure 20. Top Pivotal Plants, September 2020**

### 3.3 Total Trading Amount (TTA)<sup>12</sup> Share

- Aboitiz Power (AP) led the list this month, recording the highest TTA share of sellers in the market with approximately 21.2 percent. Semirara Mining and Power Corporation (SMPC), from consistently holding the top spot for the past 2 months, followed at second with 16.6 percent. The top 2 sellers noted a cumulative 37.9 percent share during the billing month. Power Sector Assets and Liabilities and Management (PSALM) declined to third in the list, coming from last month's second with 16 percent.

<sup>12</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

- Meanwhile, AP and SMPC also had the highest spot share at around 24.2 percent and 19.7 percent, respectively, with San Miguel Corporation (SMC) coming in third this time in spot share with 15.3 percent.
- SMC was down to 4th spot in terms of TTA share and this month.
- First Gen Corporation (FGC) experienced decline in rank based on TTA while Millennium Energy, Inc. (MEI) and Vivant Energy Corporation (VEC) were up by 4 and 2 spots, respectively.
- Global Business Power Corporation (GBPC) was off the top 8 list as a result of posting a lower TTA this month as Gregorio Araneta, Inc. (GAI) took its spot.
- Meanwhile, 5 generator trading participants registered negative TTAs which resulted from being net buyers in the spot market.



**Figure 21. Total Trading Amount and Spot Exposure Share, September 2020**

## 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/ Commerical Operation |
|---------|------------|------------------|---------------|------------------|------------------|-----------------|----------------------|--|---|
| LUZON   | GEO        | Makban 6         | 55            | 04/11/2013 22:44 |                  |                 | Deactivated Shutdown | Conducted gas compressor test  | Apr 1979                                |
| VISAYAS | GEO        | PGPP2 Unit 4     | 20            | 06/27/2014 6:07  |                  |                 | Forced Outage        | Steam being utilized by Nasulo plant   | Aug 1983                                |
| LUZON   | GEO        | Makban 5         | 55            | 02/08/2019 16:08 | 09/14/2020 20:59 | 584.20          | Forced Outage        | Low Steam Supply. Divert Steam Supply to unit 3                                      | 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 8-05CB08M | Aug 1975                                |
| VISAYAS | COAL       | TPC Sangi 1      | 60            | 12/17/2019 6:05  |                  |                 | Forced Outage        | Generator differential trip  | Dec 2013                                |
| LUZON   | GEO        | Tiwi 1           | 60            | 05/27/2020 0:02  |                  |                 | Forced Outage        | Low steam supply. Divert steam supply to unit 2                                      | Jan 1979                                |
| LUZON   | OIL        | Limay 6          | 60            | 07/19/2020 9:06  | 09/18/2020 8:56  | 60.99           | Forced Outage        | Generator excitation problem   | Dec 1994                                |
| LUZON   | COAL       | Masinloc 1       | 315           | 07/20/2020 12:59 |                  |                 | Planned Outage       | Maintenance Outage until 13 September 2020   | Jun 1998                                |
| VISAYAS | GEO        | Upper Mahiao 4   | 32            | 07/27/2020 0:15  |                  |                 | Forced Outage        | Emergency repair due to steam leak   | Jul 1997                                |
| LUZON   | COAL       | SLPGC 2          | 150           | 08/05/2020 16:46 | 09/02/2020 4:48  | 27.50           | Forced Outage        | Boiler tube leak.  | Jan 2015                                |
| VISAYAS | GEO        | Upper Mahiao 2   | 32            | 08/06/2020 1:08  |                  |                 | Forced Outage        | Turbine over speed failure   | Jul 1997                                |
| LUZON   | COAL       | SLPGC 1          | 150           | 08/15/2020 18:59 | 09/17/2020 21:07 | 33.09           | Forced Outage        | Boiler tube leak.  | Jan 2015                                |
| LUZON   | GEO        | Makban 2         | 63.2          | 08/19/2020 3:27  | 09/25/2020 8:47  | 37.22           | Maintenance Outage   | Unit main transformer maintenance.   | Apr 1979                                |
| LUZON   | COAL       | SMC 3            | 150           | 08/19/2020 10:18 | 08/29/2020 2:04  | 9.66            | Forced Outage        | Boiler evaporator leak.  | Nov 2017                                |
| LUZON   | OIL        | Limay 7          | 60            | 08/22/2020 0:01  | 08/28/2020 14:01 | 6.58            | Planned Outage       | On maintenance outage until 28 Aug 2020.   | Dec 1994                                |
| LUZON   | GEO        | Bacman 3         | 20            | 08/22/2020 0:05  | 09/10/2020 13:16 | 19.55           | Planned Outage       | Maintenance Outage until 09 September 2020(RECLASSIFIED FROM FORCE. OMC OUTAG        | Sep 1993                                |
| VISAYAS | GEO        | Malitbog 2       | 72            | 08/24/2020 15:28 | 08/26/2020 18:23 | 2.12            | Forced Outage        | Under assessment.  | Jul 1997                                |
| LUZON   | COAL       | Sual 1           | 647           | 08/24/2020 20:28 | 08/30/2020 7:51  | 5.47            | Forced Outage        | Boiler tube leak.  | Oct 1999                                |
| LUZON   | COAL       | SBPL             | 455           | 08/25/2020 17:17 | 09/11/2020 5:23  | 16.50           | Forced Outage        | Condenser tube leak.   | Apr 2019                                |
| VISAYAS | GEO        | PGPP2 Unit 1     | 20            | 08/25/2020 17:24 | 08/26/2020 2:05  | 0.36            | Forced Outage        | Ongoing investigation on the cause of tripping.                                      | Aug 1983                                |
| LUZON   | COAL       | SLTEC 1          | 121           | 08/26/2020 3:47  | 08/26/2020 17:55 | 0.59            | Forced Outage        | Tripped due to high bearing temperature.   | Sep 2014                                |
| LUZON   | COAL       | SMC 2            | 150           | 08/26/2020 8:30  | 09/05/2020 19:23 | 10.45           | Forced Outage        | Tripped due to high furnace pressure.  | Mar 2017                                |
| VISAYAS | OIL        | TPVI 3           | 6.8           | 08/26/2020 15:25 | 08/27/2020 21:24 | 1.25            | Forced Outage        | EMERGENCY CUT-OUT UNIT DUE TO FUEL LEAK AT CYLINDER B1                               | Aug 1977                                |
| VISAYAS | COAL       | CEDC 3           | 82            | 08/26/2020 19:39 | 08/27/2020 1:41  | 0.25            | Forced Outage        | TRIPPED  | Jan 2011                                |
| LUZON   | GEO        | Bacman 2         | 60            | 08/27/2020 3:41  | 08/27/2020 5:34  | 0.08            | Forced Outage        | Tripping of hot well pump  | Sep 1993                                |
| VISAYAS | GEO        | Mahanagdong A2   | 5             | 08/27/2020 16:25 | 08/27/2020 17:40 | 0.05            | Forced Outage        | Under assessment   | Jul 1997                                |
| VISAYAS | COAL       | Keppo Salcon 2   | 103           | 08/29/2020 0:02  | 09/15/2020 4:26  | 17.18           | Planned Outage       | UNIT CUT-OUT FROM THE SYSTEM TO FACILITATE ANNUAL PMS                                | Mar 2011                                |
| VISAYAS | COAL       | CEDC 2           | 82            | 08/29/2020 8:54  | 09/08/2020 15:25 | 10.27           | Forced Outage        | POSSIBLE BOILER TUBE LEAK  | Jun 2010                                |
| LUZON   | NATG       | San Gabriel      | 420           | 08/29/2020 22:04 | 09/01/2020 12:27 | 2.60            | Forced Outage        | Emergency shutdown. affected by SPEX natural gas restriction.                        | Mar 2016                                |
| LUZON   | NATG       | Sta. Rita 2      | 255.7         | 08/29/2020 23:10 | 08/30/2020 17:50 | 0.78            | Forced Outage        | Emergency shutdown. affected by SPEX natural gas restriction.                        | Jun 2000                                |
| LUZON   | NATG       | Sta. Rita 4      | 264           | 08/29/2020 23:58 | 08/30/2020 5:28  | 0.23            | Forced Outage        | Emergency shutdown. affected by SPEX natural gas restriction.                        | Oct 2001                                |
| LUZON   | COAL       | SLTEC 1          | 121           | 08/30/2020 0:26  | 08/31/2020 14:25 | 1.58            | Forced Outage        | Boiler tube leak.  | Sep 2014                                |
| LUZON   | NATG       | Avion 2          | 50.3          | 08/30/2020 10:56 | 08/30/2020 14:03 | 0.13            | Forced Outage        | Tripped due to low fuel pressure.  | Aug 2015                                |
| LUZON   | COAL       | SLTEC 1          | 121           | 08/31/2020 19:25 | 09/01/2020 0:21  | 0.21            | Forced Outage        | Drum level low   | Sep 2014                                |
| LUZON   | NATG       | Sta. Rita 3      | 265.5         | 08/31/2020 21:04 | 09/01/2020 18:35 | 0.90            | Forced Outage        | Fault at GT Controller   | Oct 2001                                |
| LUZON   | HYD        | Ambuklao 1       | 35            | 09/01/2020 10:28 | 09/01/2020 11:56 | 0.06            | Forced Outage        | Turbine shear pin failure  | Dec 1956                                |
| VISAYAS | GEO        | Malitbog 1       | 72            | 09/02/2020 16:32 | 09/02/2020 18:34 | 0.08            | Forced Outage        | Under assessment.  | Jul 1997                                |
| VISAYAS | GEO        | Malitbog 1       | 72            | 09/02/2020 21:50 | 09/02/2020 22:17 | 0.02            | Forced Outage        | Under assessment.  | Jul 1997                                |
| LUZON   | HYD        | Kalayaan 4       | 180           | 09/03/2020 11:14 | 09/03/2020 13:15 | 0.08            | Forced Outage        | Tripped with 160MW load.   | May 2004                                |
| LUZON   | HYD        | Ambuklao 3       | 35            | 09/03/2020 21:06 | 09/08/2020 12:08 | 4.63            | Forced Outage        | Inspection at the downstream Trash Rack Elevation.                                   | Dec 1956                                |
| LUZON   | COAL       | Pagbilao 2       | 382           | 09/03/2020 22:29 | 09/07/2020 17:17 | 3.78            | Forced Outage        | Boiler Tube Leak.  | Mar 1996                                |
| LUZON   | OIL        | SLPGC 4          | 25            | 09/04/2020 7:01  | 09/08/2020 16:45 | 4.41            | Maintenance Outage   | Maintenance outage.  | Mar 2017                                |
| VISAYAS | OIL        | TPVI 4           | 6.8           | 09/04/2020 10:46 | 09/04/2020 16:33 | 0.24            | Forced Outage        | TRIPPED. GEN. PROBLEM  | Aug 1977                                |
| VISAYAS | OIL        | TPVI 6           | 6.8           | 09/04/2020 10:50 | 09/04/2020 12:28 | 0.07            | Forced Outage        | TRIPPED. GEN. PROBLEM  | Aug 1977                                |
| VISAYAS | OIL        | TPVI 6           | 6.8           | 09/04/2020 14:25 | 09/06/2020 18:37 | 2.17            | Forced Outage        | GENERATOR PROBLEM  | Aug 1977                                |
| VISAYAS | COAL       | CEDC 3           | 82            | 09/05/2020 1:03  | 09/09/2020 6:54  | 4.24            | Forced Outage        | COAL CONVEYING PROBLEM   | Jan 2011                                |
| LUZON   | NATG       | Sta. Rita 2      | 255.7         | 09/05/2020 3:05  | 09/05/2020 4:01  | 0.04            | Forced Outage        | Tripped while on the process of fuel change-over from natural gas to oil.            | Jun 2000                                |
| VISAYAS | COAL       | CEDC 1           | 82            | 09/05/2020 3:24  | 09/08/2020 18:55 | 3.65            | Forced Outage        | COAL CONVEYING PROBLEM   | Apr 2010                                |
| LUZON   | NATG       | Sta. Rita 2      | 255.7         | 09/05/2020 4:02  |                  |                 | Planned Outage       | On planned outage.   | Jun 2000                                |
| LUZON   | COAL       | Masinloc 2       | 344           | 09/05/2020 11:01 | 09/05/2020 16:04 | 0.21            | Forced Outage        | Tripped at 247MW load. System Frequency is 59.359hz.                                 | Jun 1998                                |
| VISAYAS | OIL        | TPVI 4           | 6.8           | 09/05/2020 14:08 | 09/05/2020 18:15 | 0.17            | Forced Outage        | MANUALLY CUT-OUT DUE TO OIL LEAK   | Aug 1977                                |
| LUZON   | NATG       | San Gabriel      | 420           | 09/05/2020 17:14 |                  |                 | Forced Outage        | Tripped at 211MW load. System Frequency is 59.401hz.                                 | Mar 2016                                |
| LUZON   | COAL       | Masinloc 2       | 344           | 09/05/2020 17:18 | 09/06/2020 0:47  | 0.31            | Forced Outage        | Tripped at 95MW load. System Frequency is 59.92hz.                                   | Jun 1998                                |
| VISAYAS | OIL        | TPVI 3           | 6.8           | 09/05/2020 19:16 | 09/05/2020 21:06 | 0.08            | Forced Outage        | DUE TO STEAM CIRCULATING PUMP PROBLEM  | Aug 1977                                |
| VISAYAS | OIL        | TPVI 1           | 6.8           | 09/05/2020 19:17 | 09/05/2020 20:35 | 0.05            | Forced Outage        | DUE TO STEAM CIRCULATING PUMP PROBLEM  | Aug 1977                                |
| VISAYAS | OIL        | TPVI 5           | 6.8           | 09/05/2020 19:17 | 09/05/2020 20:31 | 0.05            | Forced Outage        | DUE TO STEAM CIRCULATING PUMP PROBLEM  | Aug 1977                                |
| LUZON   | OIL        | Republic 1       | 5.5           | 09/05/2020 20:01 | 09/10/2020 18:01 | 4.92            | Forced Outage        | Heavy fuel leak at booster pump of fuel booster unit                                 | Jun 2014                                |
| LUZON   | OIL        | Republic 2       | 5.5           | 09/05/2020 20:01 | 09/10/2020 18:01 | 4.92            | Forced Outage        | Heavy fuel leak at booster pump of fuel booster unit                                 | Jun 2014                                |
| VISAYAS | OIL        | TPVI 1           | 6.8           | 09/05/2020 23:31 | 09/06/2020 19:25 | 0.83            | Forced Outage        | DUE TO LOW STEAM PRESSURE  | Aug 1977                                |
| VISAYAS | OIL        | TPVI 3           | 6.8           | 09/05/2020 23:31 | 09/06/2020 19:18 | 0.82            | Forced Outage        | DUE TO LOW STEAM PRESSURE  | Aug 1977                                |
| VISAYAS | OIL        | TPVI 5           | 6.8           | 09/05/2020 23:31 |                  |                 | Forced Outage        | DUE TO LOW STEAM PRESSURE  | Aug 1977                                |
| LUZON   | COAL       | GN Power 2       | 316           | 09/06/2020 16:29 | 09/09/2020 21:13 | 3.20            | Forced Outage        | Induced Draft Fan (IDF) trouble.   | May 2013                                |
| VISAYAS | OIL        | TPVI 3           | 6.8           | 09/06/2020 20:25 | 09/07/2020 9:36  | 0.55            | Forced Outage        | Steam Circulating Pump Problem   | Aug 1977                                |
| VISAYAS | OIL        | TPVI 1           | 6.8           | 09/06/2020 20:26 | 09/07/2020 9:28  | 0.54            | Forced Outage        | Steam Circulating Pump Problem   | Aug 1977                                |
| VISAYAS | OIL        | TPVI 3           | 6.8           | 09/07/2020 10:39 | 09/07/2020 20:20 | 0.40            | Forced Outage        | GAS LEAK at CYLINDER A3  | Aug 1977                                |
| LUZON   | HYD        | Kalayaan 4       | 180           | 09/07/2020 13:20 | 09/07/2020 19:13 | 0.25            | Forced Outage        | Circulating Water System(CWS) trouble.   | May 2004                                |
| VISAYAS | OIL        | TPVI 6           | 6.8           | 09/07/2020 15:45 | 09/07/2020 20:42 | 0.21            | Forced Outage        | HFO FUEL SEPARATOR PROBLEM   | Aug 1977                                |
| VISAYAS | OIL        | TPVI 1           | 6.8           | 09/07/2020 16:36 | 09/07/2020 20:19 | 0.15            | Forced Outage        | STEAM CIRCULATING PUMP PROBLEM   | Aug 1977                                |
| LUZON   | NATG       | Avion 1          | 50.3          | 09/07/2020 18:04 | 09/08/2020 0:22  | 0.26            | Forced Outage        | Starting failure.  | Aug 2013                                |
| VISAYAS | GEO        | PGPP2 Unit 2     | 20            | 09/12/2020 9:45  | 09/12/2020 12:38 | 0.12            | Forced Outage        | Auto-tripped due to generator problem.   | Aug 1983                                |
| VISAYAS | GEO        | Upper Mahiao 1   | 32            | 09/13/2020 21:16 |                  |                 | Forced Outage        | Voltage regulation offline trip  | Jul 1997                                |
| LUZON   | OIL        | Limay 3          | 60            | 09/14/2020 0:01  |                  |                 | Planned Outage       | Maintenance Outage until 28 October 2020   | May 1993                                |
| LUZON   | GEO        | Makban 4         | 63.2          | 09/14/2020 13:09 | 09/18/2020 22:04 | 4.37            | Forced Outage        | Unit Transformer Differential  | Apr 1979                                |
| LUZON   | GEO        | Makban 7         | 20            | 09/14/2020 13:09 | 09/14/2020 17:53 | 0.20            | Forced Outage        | Emergency shutdown of Plant D at 31MW. CT-metering problem                           | Apr 1979                                |
| LUZON   | GEO        | Makban 8         | 20            | 09/14/2020 13:09 | 09/14/2020 17:53 | 0.20            | Forced Outage        | Emergency shutdown of Plant D at 31MW. CT-metering problem                           | Apr 1979                                |
| LUZON   | COAL       | Sual 2           | 647           | 09/16/2020 14:45 |                  |                 | Forced Outage        | Tripped due to high turbine vibration  | Oct 1999                                |
| LUZON   | COAL       | Pagbilao 3       | 420           | 09/16/2020 20:56 | 09/17/2020 11:39 | 0.61            | Forced Outage        | Instrument air trouble   | Jul 2017                                |
| LUZON   | HYD        | Ambuklao 3       | 35            | 09/18/2020 8:05  | 09/18/2020 15:29 | 0.31            | Maintenance Outage   | Maintenance outage until 1600H   | Dec 1956                                |
| LUZON   | HYD        | Ambuklao 2       | 35            | 09/18/2020 8:09  | 09/18/2020 15:29 | 0.31            | Maintenance Outage   | Maintenance outage until 1600H   | Dec 1956                                |
| LUZON   | HYD        | Ambuklao 1       | 35            | 09/18/2020 8:11  | 09/18/2020 15:29 | 0.30            | Maintenance Outage   | Maintenance outage until 1600H   | Dec 1956                                |
| VISAYAS | GEO        | Leyte 1          | 41            | 09/19/2020 1:58  | 09/19/2020 7:40  | 0.24            | Maintenance Outage   | Corrective maintenance. data gathering for the high vibration (0200H-0600H)          | Jun 1983                                |
| VISAYAS | GEO        | Leyte 2          | 39.3          | 09/19/2020 1:58  |                  |                 | Maintenance Outage   | Corrective maintenance. data gathering for the high vibration (0200H-0600H)          | Jun 1983                                |
| VISAYAS | OIL        | PDPP3 E          | 12            | 09/19/2020 7:54  | 09/20/2020 18:19 | 1.43            | Forced Outage        | Internal trouble   | Mar 2005                                |
| LUZON   | HYD        | Ambuklao 2       | 35            | 09/19/2020 8:04  | 09/19/2020 15:52 | 0.33            | Maintenance Outage   | Maintenance Outage.  | Dec 1956                                |
| LUZON   | HYD        | Ambuklao 3       | 35            | 09/19/2020 8:04  | 09/19/2020 15:53 | 0.33            | Maintenance Outage   | Maintenance Outage.  | Dec 1956                                |
| LUZON   | HYD        | Ambuklao 1       | 35            | 09/19/2020 8:05  | 09/19/2020 15:52 | 0.32            | Maintenance Outage   | Maintenance Outage.  | Dec 1956                                |
| VISAYAS | OIL        | PDPP3 G          | 13            | 09/19/2020 11:58 | 09/19/2020 13:07 | 0.05            | Forced Outage        | Internal trouble   | Mar 2005                                |
| VISAYAS | GEO        | PGPP1 Unit 2     | 37.5          | 09/19/2020 23:40 |                  |                 | Maintenance Outage   | Offline due to scheduled maintenance.  | Aug 1983                                |
| VISAYAS | GEO        | PGPP1 Unit 1     | 37.5          | 09/19/2020 23:47 |                  |                 | Maintenance Outage   | Offline due to scheduled maintenance.  | Aug 1983                                |
| VISAYAS | GEO        | PGPP1 Unit 3     | 37.5          | 09/19/2020 23:48 |                  |                 | Maintenance Outage   | Offline due to scheduled maintenance.  | Aug 1983                                |
| LUZON   | HYD        | Ambuklao 2       | 35            | 09/20/2020 8:03  | 09/20/2020 15:51 | 0.32            | Maintenance Outage   | Maintenance Outage.  | Dec 1956                                |
| LUZON   | HYD        | Ambuklao 3       | 35            | 09/20/2020 8:03  | 09/20/2020 15:50 | 0.32            | Maintenance Outage   | Maintenance Outage.  | Dec 1956                                |
| LUZON   | HYD        | Ambuklao 1       | 35            | 09/20/2020 8:04  | 09/20/2020 13:58 | 0.25            | Maintenance Outage   | Maintenance Outage.  | Dec 1956                                |
| VISAYAS | COAL       | PEDC 1           | 83.7          | 09/22/2020 7:11  | 09/22/2020 8:47  | 0.07            | Forced Outage        | Furnace pressure high  | Nov 2010                                |
| VISAYAS | COAL       | PEDC 1           | 83.7          | 09/22/2020 17:59 | 09/23/2020 2:24  | 0.35            | Forced Outage        | leaking steam valve  | Nov 2010                                |
| LUZON   | NATG       | Avion 2          | 50.3          | 09/23/2020 8:24  | 09/23/2020 11:06 | 0.11            | Forced Outage        | Liquid fuel drain valve problem  | Aug 2015                                |
| LUZON   | NATG       | Avion 2          | 50.3          | 09/23/2020 14:25 | 09/23/2020 20:44 | 0.26            | Forced Outage        | Liquid fuel drain valve problem  | Aug 2015                                |
| VISAYAS | COAL       | PALM 1           | 135           | 09/24/2020 10:13 |                  |                 | Forced Outage        | Affected by heavy fluctuation  | Mar 2016                                |
| VISAYAS | COAL       | PEDC 1           | 83.7          | 09/24/2020 10:13 | 09/24/2020 15:42 | 0.23            | Forced Outage        | Affected by heavy fluctuation  | Nov 2010                                |
| VISAYAS | COAL       | PEDC 2           | 83.7          | 09/24/2020 10:13 | 09/24/2020 19:32 | 0.39            | Forced Outage        | Affected by heavy fluctuation  | Apr 2011                                |
| VISAYAS | COAL       | PEDC 3           | 150           | 09/24/2020 10:13 | 09/25/2020 22:51 | 1.53            | Forced Outage        | Affected by heavy fluctuation  | Aug 2016                                |
| VISAYAS | GEO        | PGPP2 Unit 1     | 20            | 09/24/2020 10:13 | 09/24/2020 13:11 | 0.12            | Forced Outage        | Auto-tripped during occurrence of grid disturbance                                   | Aug 1983                                |
| VISAYAS | GEO        | PGPP2 Unit 2     | 20            | 09/24/2020 10:13 | 09/24/2020 14:06 | 0.16            | Forced Outage        | Auto-tripped during occurrence of grid disturbance                                   | Aug 1983                                |
| VISAYAS | GEO        | PGPP2 Unit 3     | 20            | 09/24/2020 10:13 | 09/24/2020 14:44 | 0.19            | Forced Outage        | Auto-tripped during occurrence of grid disturbance                                   | Aug 1983                                |
| VISAYAS | OIL        | Bohol 4          | 4             | 09/24/2020 13:4  |                  |                 |                      |  |   |