



# Market Assessment Report for 4<sup>th</sup> Quarter of 2023

---

26 September to 25 December 2023

**MARCH 2024**

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

## Table of Contents

I.	Capacity Profile .....	3
II.	Power Plant Outages .....	4
III.	Demand and Supply Situation.....	7
IV.	Market Price Outcome.....	8
V.	Market Pricing Conditions .....	11
VI.	Residual Supply.....	12
VII.	Pivotal Suppliers .....	13
VIII.	Generator Offer Pattern.....	13
IX.	Capacity Factor .....	16
X.	Generation Mix .....	17
XI.	Market Concentration .....	17
XII.	Spot Exposure .....	19

## List of Figures

Figure 1.	Capacity Profile, 4 <sup>th</sup> Quarter 2023.....	4
Figure 2.	Plant Outage Capacity (by Plant Type), 4 <sup>th</sup> Quarter 2023.....	5
Figure 3.	Plant Outage Capacity (by Outage Category), 4 <sup>th</sup> Quarter 2023 .....	6
Figure 4.	Demand, Supply, Demand plus Reserve Schedule and Supply Margin, 4 <sup>th</sup> Quarter 2023 .....	7
Figure 5.	Market Price Trend vs. Supply Margin, 4 <sup>th</sup> Quarter 2023 .....	9
Figure 6.	Market Price Trend - Luzon, 4 <sup>th</sup> Quarter 2023 .....	9
Figure 7.	Market Price Trend - Visayas, 4 <sup>th</sup> Quarter 2023 .....	10
Figure 8.	Market Price Trend - Mindanao, 4 <sup>th</sup> Quarter 2023.....	10
Figure 9.	Price Distribution, 4 <sup>th</sup> Quarter 2023.....	11
Figure 10.	Market RSI vs. Pivotal Suppliers, 4 <sup>th</sup> Quarter 2023 .....	12
Figure 11.	Top Pivotal Suppliers, 4 <sup>th</sup> Quarter 2023.....	13
Figure 12.	Coal Plants Offer Pattern – 4 <sup>th</sup> Quarter 2023.....	14
Figure 13.	Natural Gas Plants Offer Pattern – 4 <sup>th</sup> Quarter 2023.....	14
Figure 14.	Geothermal Plants Offer Pattern – 4 <sup>th</sup> Quarter 2023.....	15
Figure 15.	Hydro Plants Offer Pattern – 4 <sup>th</sup> Quarter 2023 .....	15
Figure 16.	Oil-based Plants Offer Pattern – 4 <sup>th</sup> Quarter 2023 .....	15
Figure 17.	System Capacity Factor (Registered Capacity vs Actual Generation) – 4 <sup>th</sup> Quarter 2023 .....	16
Figure 17.	Generation Mix (Based on Metered Quantity) – 3 <sup>rd</sup> and 4 <sup>th</sup> Quarter 2023 .....	17
Figure 18.	Market Share by Major Participant Group based on Registered Capacity, Offered Capacity, Actual Generation, 3 <sup>rd</sup> , and 4 <sup>th</sup> Quarter of 2023 .....	18
Figure 19.	Hourly HHI based by Major Participant Grouping, 3 <sup>rd</sup> Quarter 2023.....	19
Figure 20.	Spot Market Exposure, 3 <sup>rd</sup> Quarter 2023 .....	20
Figure 21.	Hourly Profile of Spot Market Exposure, 3 <sup>rd</sup> Quarter 2023.....	20

## List of Tables

Table 1. Capacity Profile, 3 <sup>rd</sup> Quarter, and 4 <sup>th</sup> Quarter 2023 .....	4
Table 2. Capacity Monthly Capacity Profile, 4 <sup>th</sup> Quarter 2023.....	4
Table 3. Outage Summary, 4 <sup>th</sup> Quarter 2023, and 3 <sup>rd</sup> Quarter 2023 .....	5
Table 4. Monthly Outage Summary, 4 <sup>th</sup> Quarter 2023 .....	6
Table 5. Outage Summary, by Outage Category, 4 <sup>th</sup> Quarter 2023, and 3 <sup>rd</sup> Quarter 2023 .....	6
Table 6. Monthly Outage Summary, by Outage Category, 4 <sup>th</sup> Quarter 2023 .....	7
Table 7. Demand and Supply Summary, 3 <sup>rd</sup> Quarter, and 4 <sup>th</sup> Quarter 2023 .....	8
Table 8. Monthly Demand and Supply Summary, 4 <sup>th</sup> Quarter 2023.....	8
Table 9. Market Price Summary, 4 <sup>th</sup> Quarter 2023, and 3 <sup>rd</sup> Quarter 2023 .....	9
Table 10. Monthly Market Price Summary, 4 <sup>th</sup> Quarter 2023 .....	9
Table 11. Monthly Regional Price Summary, 4 <sup>th</sup> Quarter 2023 .....	10
Table 12. Monthly Price Distribution, 4 <sup>th</sup> Quarter 2023 .....	11
Table 13. PEN, PSM, MI and Sec Cap Summary, 4 <sup>th</sup> Quarter 2023 .....	12

## QUARTERLY MARKET ASSESSMENT REPORT

This quarterly report assesses the results of the WESM operations for the Fourth Billing Quarter of 2023, covering the period: 26 September to 25 December 2023, and how the market performed compared with the previous quarter/s of the year.

### I. Capacity Profile

The total WESM registered capacity stood at 27,236.47 MW by the end of the fourth billing quarter of 2023, recording a 733.27 MW increase from 26,503.2 MW on 25 September 2023. The increase was attributed to the entry of the following facilities:

1. Two (2) Biomass facilities
  - i. Libertad Power and Energy Corporation (6 MW)
  - ii. Cotabato Cogen Power Plant (3.4 MW).
2. Coal facility from Mariveles Power Generation Corporation (150 MW)
3. Bac-Man Geothermal Inc. (30.97MW), and
4. Four (4) Solar power plant
  - i. Natures Renewable Energy Development. (NAREDCO) Corporation (115 MW)
  - ii. PV Sinag Power Inc. (75.1 MW)
  - iii. Pavi Green Bataan Renewable Energy, Inc. (16.2 MW), and
  - iv. Santa Cruz Solar Energy Inc. (326.4 MW), was also registered in the market.

Furthermore, two (2) Wind, four (4) Oil, three (3) Hydro, one (1) Geothermal, and three (3) Solar power plants posted changes in their registered capacity, which contributed to the total registered capacity this quarter.

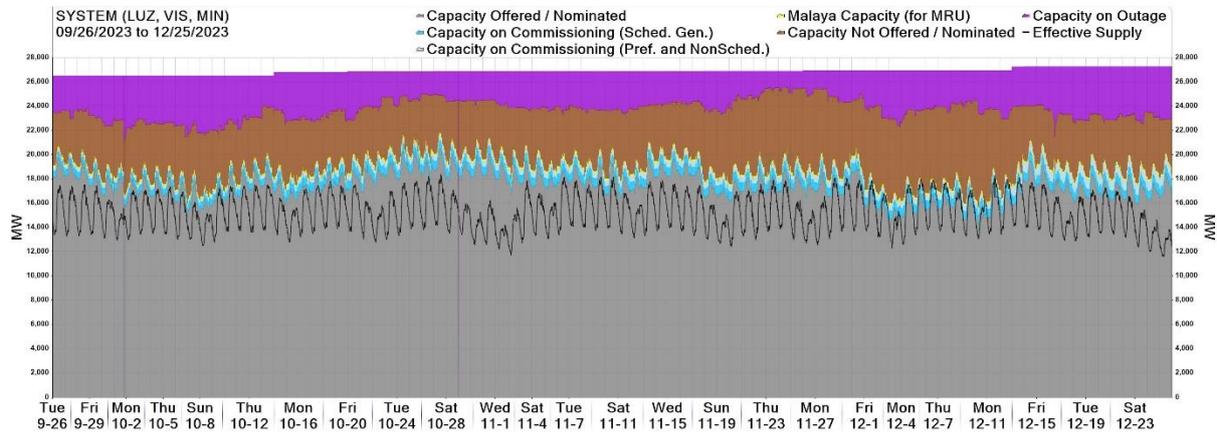
Of the total registered capacity, only 64 percent was offered/nominated in the market, averaging at 17,471 MW during the quarter from 18,194 MW during the third quarter, due to the recategorization of Geothermal power plants as Preferential/Must Dispatch units effectively allowing these generators to only submit real-time available capacities which shall be considered in the WESM optimization. Additionally, about 0.5 percent or an average of 130 MW was the capacity designation for Malaya TPP as Must-Run Unit (MRU)<sup>1</sup>, while 4 percent or an average of 1,165 MW were accounted to the registered capacities of plants which were still undergoing commissioning tests.

The remaining registered capacity was either unavailable due to outage, comprising an average of 3,154 MW or 12 percent of the total registered capacity, or was not offered/nominated in the market<sup>2</sup>, amounting to 4,926 MW or 18 percent of the total registered capacity due to the derating of plants caused by, among other things, technical limitations.

---

<sup>1</sup> Per DOE Department Circular 2014-01-0003, designating the 650-MW Malaya Thermal Plant as a Must-Run Unit in the Wholesale Electricity Spot Market in cases of supply shortfall and to address system security.

<sup>2</sup> Subject to compliance monitoring or investigation for possible non-compliance with the submission of offers under the WESM Rules

**Figure 1. Capacity Profile, 4<sup>th</sup> Quarter 2023**

**Table 1. Capacity Profile, 3<sup>rd</sup> Quarter, and 4<sup>th</sup> Quarter 2023**

	3rd Quarter 2023 (26 Jun to 25 Sep 2023)		4th Quarter 2023 (26 Sep to 25 Dec 2023)		% Average Change
	Average (in MW)	% of RegCap	Average (in MW)	% of RegCap	
Capacity on Outage	2,617	10%	3,154	12%	21%
Capacity Not Offered/Nominated	4,745	18%	4,926	18%	4%
Capacity of Plants on Commissioning	846	3%	1,165	4%	38%
Malaya Capacity (for MRU)	130	0%	130	0%	0%
Capacity Offered/Nominated	18,194	69%	17,471	64%	4%

**Table 2. Monthly Capacity Profile, 4<sup>th</sup> Quarter 2023**

	October 2023 (26 Sep to 25 Oct 2023)		November 2023 (26 Oct to 25 Nov 2023)		December 2023 (26 Nov to 25 Dec 2023)	
	Average (in MW)	% of RegCap	Average (in MW)	% of RegCap	Average (in MW)	% of RegCap
Capacity on Outage	3,549	13%	2,637	10%	2,825	10%
Capacity Not Offered/Nominated	4,392	17%	4,841	18%	4,522	17%
Capacity of Plants on Commissioning	958	4%	1,184	4%	811	3%
Malaya Capacity (for MRU)	130	0%	130	0%	130	0%
Capacity Offered/Nominated	17,599	66%	18,069	66%	18,244	67%
Registered Capacity (by the end of the billing month)	26,845	101%	26,874	99%	27,236	100%

## II. Power Plant Outages

### a. Capacities on Outage by Plant Type

Capacities on Outage plunged by an average of 22 percent in the 4<sup>th</sup> quarter of 2023 or at an average of 3,111 MW. Coal and Hydro plants demonstrated respective increases on their capacity on outage under planned outage category, maximizing the relatively lower demand due to cooler temperature. On another note, Natural gas and Oil-based power plants had observed improvements in the levels of capacities on outage. Coal plants' capacity on outage during this quarter was attributable to the planned outages of SBPL CFTPP (455 MW) from 1-25 December 2023, SCPC unit 3 (150 MW) from 1-19 December, Sual CFTPP unit 1 (647 MW) from 14 October to 20 November 2023, Sual CFTPP unit 1 (647 MW) from 1-23 December 2023.

Hydro plants' capacities on outage was attributed to the planned outage of Angat Aux HEPP units 1-5 (30 MW) from 6 November to 25 December, Angat Main HEPP units 1-4 (200 MW) from 6 November to 25 December, Kalayaan HEPP unit 4 (180 MW) from 4 September to 22 November 12-15 December 2023.

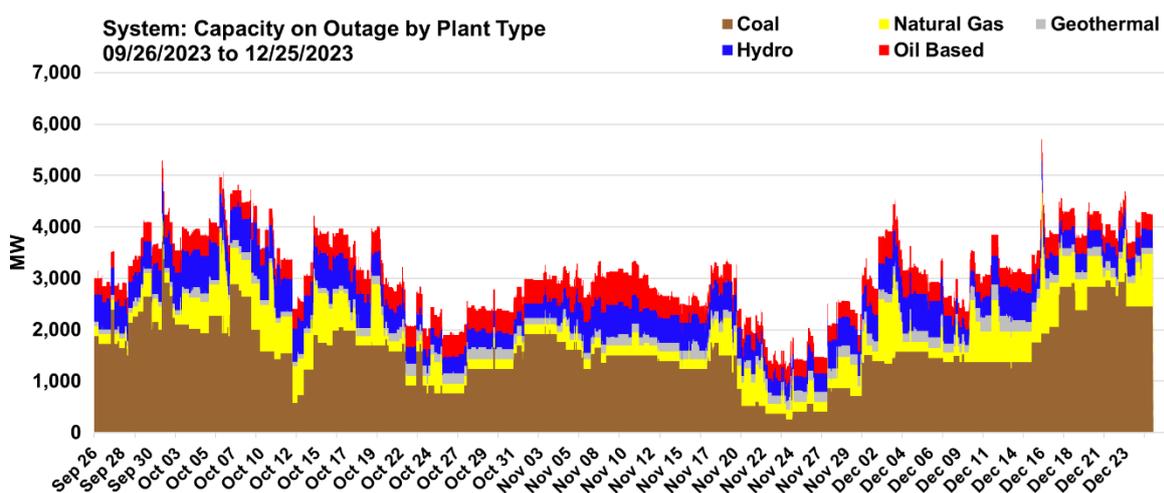
Oil-based plants' capacities on outage averaged at 402 MW due to the forced and maintenance outage of Navotas DPP units from 29 September 2023 until the end of the quarter.

On the other hand, natural gas plants' capacities on outage averaged at 462 MW which were mostly attributable to the forced outages of Ilijan NGPP Block A (200 MW) from 14 October 2023 until the end of quarter and Ilijan NGPP Blocks B2 and B3 (220 MW each) from 2 to 25 December 2023.

The level of capacities on outage was also observed to have generally increased towards the end of the quarter. On a month-on-month observation, the October 2023 billing month had the highest monthly average values at 3,482 MW during the quarter.

*Provided in Appendix A is the list of major plant outages.*

**Figure 2. Plant Outage Capacity (by Plant Type), 4<sup>th</sup> Quarter 2023**



**Table 3. Outage Summary, 4<sup>th</sup> Quarter 2023, and 3<sup>rd</sup> Quarter 2023**

	3rd Quarter 2023 (26 Jun to 25 Sep 2023) in MW			4th Quarter 2023 (26 Sep to 25 Dec 2023) in MW			% Average Change
	Max	Min	Avg	Max	Min	Avg	
Coal	2,452	150	1,083	3,833	256	1,580	46%
Natural Gas	1,456	47	509	2,773	190	462	9.3%
Geothermal	323	90	150	401	90	166	11.1%
Hydro	1,201	139	332	1,045	271	503	51.5%
Oil-based	709	310	419	696	306	402	4.1%

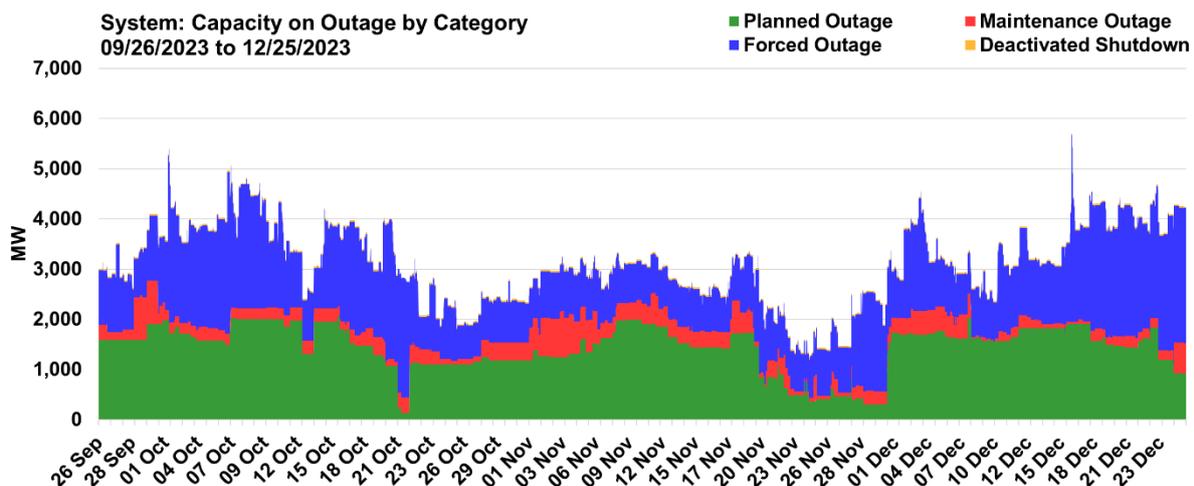
**Table 4. Monthly Outage Summary, 4<sup>th</sup> Quarter 2023**

	October 2023 (26 Sep to 25 Oct 2023) in MW			November 2023 (26 Oct to 25 Nov 2023) in MW			December 2023 (26 Nov to 25 Dec 2023) in MW		
	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg
Coal	3,833	578	1,822	2,064	256	1,253	3,100	405	1,677
Natural Gas	1,721	190	552	975	190	270	2,773	190	570
Geothermal	235	90	127	401	123	175	341	125	196
Hydro	1,045	319	594	678	271	440	773	280	476
Oil-based	487	314	387	696	326	439	527	306	379

## b. Capacities on Outage by Category

Consistent with the discussion above, the high level of capacities on outage this quarter were mostly attributable to planned outages which recorded an average of 1,435 MW. This posted a 52 percent increase compared to the previous quarter's 944 MW. It was observed that planned outages were scheduled during the onset of the rainy season to maximize the anticipated low level of demand during the period.

Meanwhile, forced outages were still prevalent during the 4<sup>th</sup> quarter of the year at 1,346 MW on average, higher than the previous quarter's 1,190 MW.

**Figure 3. Plant Outage Capacity (by Outage Category), 4<sup>th</sup> Quarter 2023**

**Table 5. Outage Summary, by Outage Category, 4<sup>th</sup> Quarter 2023, and 3<sup>rd</sup> Quarter 2023**

	3rd Quarter 2023 (26 Jun to 25 Sep 2023) in MW			4th Quarter 2023 (26 Sep to 25 Dec 2023) in MW			% Average Change
	Max	Min	Avg	Max	Min	Avg	
Planned	1,706	201	944	2,048	129	1,435	52.0%
Maintenance	854	12	268	933	32	300	12%
Forced	2,334	463	1,190	3,738	511	1,346	13%
Deactivated/Shutdown	30	30	30	30	30	30	0%

**Table 6. Monthly Outage Summary, by Outage Category, 4<sup>th</sup> Quarter 2023**

	October 2023 (26 Sep to 25 Oct 2023) in MW			November 2023 (26 Oct to 25 Nov 2023) in MW			December 2023 (26 Nov to 25 Dec 2023) in MW		
	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg
Planned	2,048	129	1,571	1,986	365	1,316	2,035	300	1,423
Maintenance	891	72	282	933	35	379	607	32	236
Forced	3,227	639	1,593	1,691	511	851	3,738	719	1,612
Deactivated/Shutdown	30	30	30	30	30	30	30	30	30

### III. Demand and Supply Situation

System demand decreased by an average of 1.2 percent from 13,327 MW in 3<sup>rd</sup> quarter to 13,170 MW in 4<sup>th</sup> quarter, due to cooler temperatures and the observance of national holidays noted during the period. For the whole quarter, average system demand has a decreasing trend from an average of 13,474 MW in October to 12,932 MW in December 2023.

Meanwhile, the scheduled reserve capacities averaged at 1,092 MW this quarter, an increase from 644 MW last quarter which subsequently resulted in the growth of demand plus reserve schedule capacities to average at 14,262 MW.

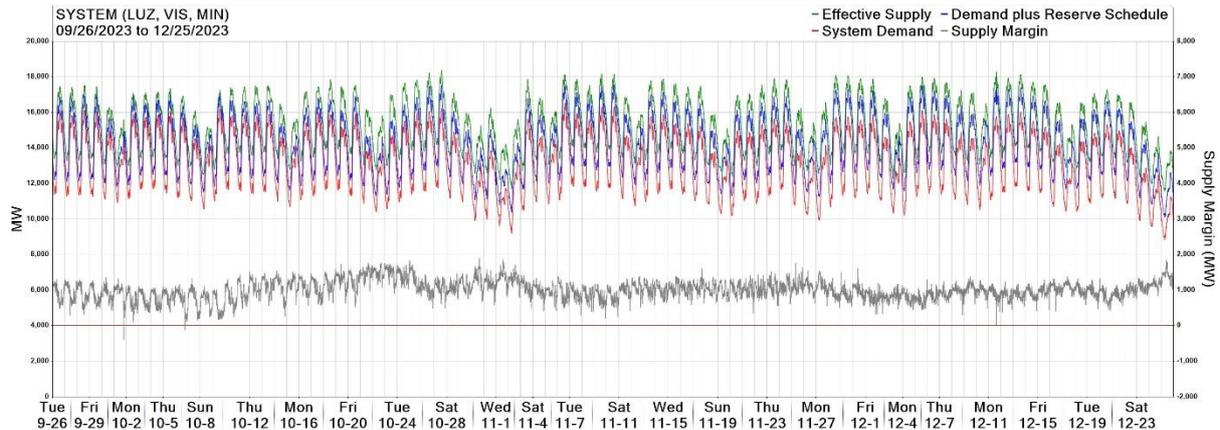
On the other hand, effective supply<sup>3</sup> was lower by 2.1 percent at an average of 15,268 MW coming from 14,948 MW in the third quarter, mainly attributed to the relatively lower levels of capacities on outage and relatively lower levels of ramp limited capacities. Meanwhile, monthly average effective supply remained relatively at the same level throughout the covered billing months, from October to December 2023.

With the resulting effective supply and system demand, quarterly supply margin<sup>4</sup> improved by 3 percent at an average of 1,005 MW this quarter from 977 MW during the third quarter. In addition, low or negative supply margins was brought about by the inappropriate data which led for the the supply to plunge.

**Figure 4. Demand, Supply, Demand plus Reserve Schedule and Supply Margin, 4<sup>th</sup> Quarter 2023**

<sup>3</sup>The system effective supply is equal to the offered capacity of all scheduled generator resources, nominated loading level of non-scheduled generating units and projected output of preferential dispatch generating units adjusted for any security limit and ramp rates. Scheduled output of plants on testing and commissioning, through the imposition of security limit by SO, are accounted for in the effected supply. Likewise included is the scheduled output of Malaya plant when it is called to run as Must Run Unit (MRU).

<sup>4</sup>The supply margin is equal to the effective supply less system demand requirement plus reserve schedule.


**Table 7. Demand and Supply Summary, 3<sup>rd</sup> Quarter, and 4<sup>th</sup> Quarter 2023**

	3rd Quarter 2023 (26 Jun to 25 Sep 2023)			4th Quarter 2023 (26 Sep to 25 Dec 2023)			% Average Change
	Max	Min	Avg	Max	Min	Avg	
System Demand	17,141	9,877	13,327	16,545	8,843	13,170	1%
Reserve Schedule	1,046	227	644	1,669	349	1,092	70%
Demand plus Reserve Schedule	17,879	10,373	13,971	17,564	10,097	14,262	2%
Effective Supply	18,218	11,707	14,948	18,373	11,571	15,268	2%
Supply Margin	1,836	458	977	1,901	395	1,005	3%

Note: The derived values were non-coincidental.

**Table 8. Monthly Demand and Supply Summary, 4<sup>th</sup> Quarter 2023**

	October 2023 (26 Sep to 25 Oct 2023)			November 2023 (26 Oct to 25 Nov 2023)			December 2023 (26 Nov to 25 Dec 2023)		
	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg
System Demand	16,227	10,406	13,474	16,545	9,203	13,106	16,131	8,843	12,932
Reserve Schedule	1,097	421	821	1,485	349	1,124	1,669	524	1,330
Demand plus Reserve Schedule	17,063	11,285	14,296	17,564	10,379	14,230	17,494	10,097	14,262
Effective Supply	17,844	12,493	15,305	18,373	11,704	15,277	18,281	11,571	15,220
Supply Margin	1,842	395	1,009	1,901	205	1,047	1,851	27	959

## IV. Market Price Outcome

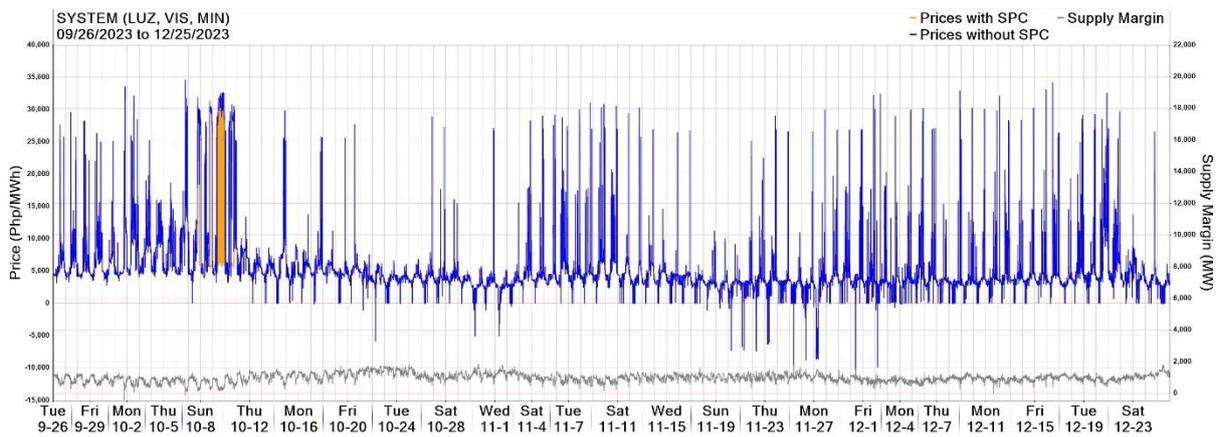
### a. Market Prices

There were noted instances of decreases in the market prices as supply margin improved during the review of the 4<sup>th</sup> quarter as compared to the average supply margin during the second quarter of the year. An average of PhP5,044/MWh was recorded during the quarter, demonstrating a 6.5 percent decrease from PhP5,395/MWh during the third quarter of 2023.

The monthly average prices were also observed to have varying changes from PhP6,595/MWh in October, to PhP4,122/MWh in November, and to PhP4,447/MWh in December. This was mainly driven by the interplay between supply and demand. It was

also noted that during the pumping operation of Kalayaan, surge in the prices were observed throughout the period in review.

**Figure 5. Market Price Trend vs. Supply Margin, 4<sup>th</sup> Quarter 2023**



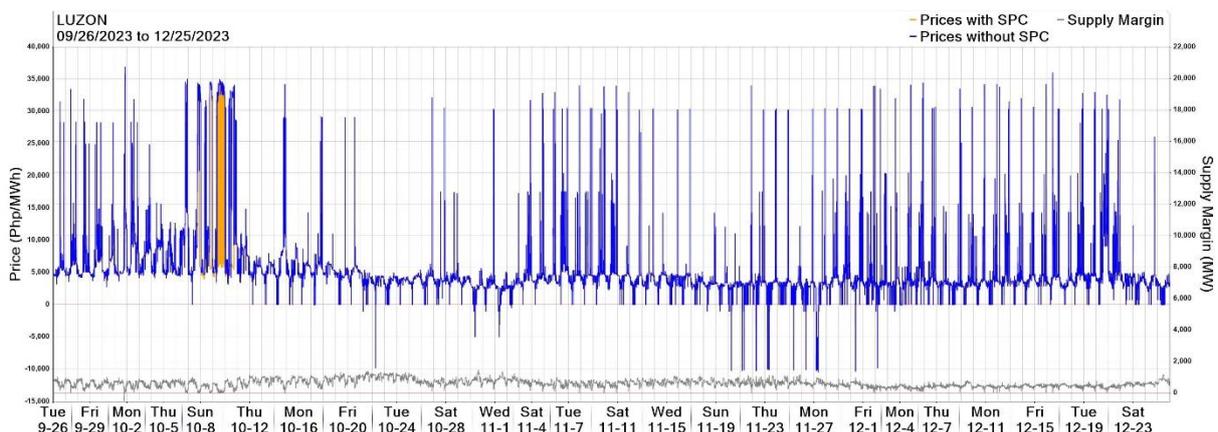
**Table 9. Market Price Summary, 4<sup>th</sup> Quarter 2023, and 3<sup>rd</sup> Quarter 2023**

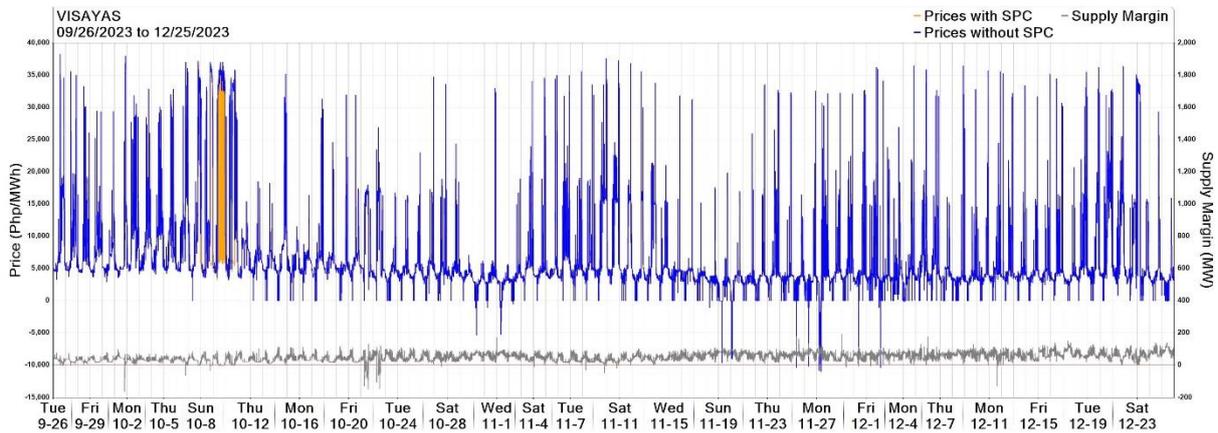
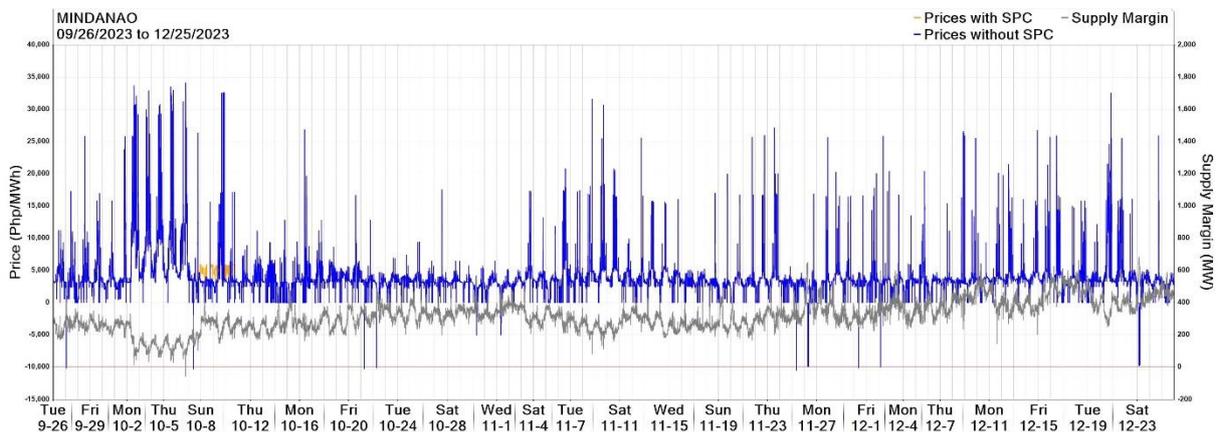
	3rd Quarter 2023 (26 Jun to 25 Sep 2023) in Php/ MWh			4th Quarter 2023 (26 Sep to 25 Dec 2023) in Php/ MWh			% Change		
	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg
System	32,674	-8,460	5,395	34,644	-10,229	5,044	6.0%	20.9%	-6.5%

**Table 10. Monthly Market Price Summary, 4<sup>th</sup> Quarter 2023**

	October 2023 (26 Sep to 25 Oct 2023) in Php/ MWh			November 2023 (26 Oct to 25 Nov 2023) in Php/ MWh			December 2023 (26 Nov to 25 Dec 2023) in Php/ MWh		
	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg
System	34,644	-5,842	6,595	31,107	-10,180	4,122	34,252	-10,229	4,447

**Figure 6. Market Price Trend - Luzon, 4<sup>th</sup> Quarter 2023**



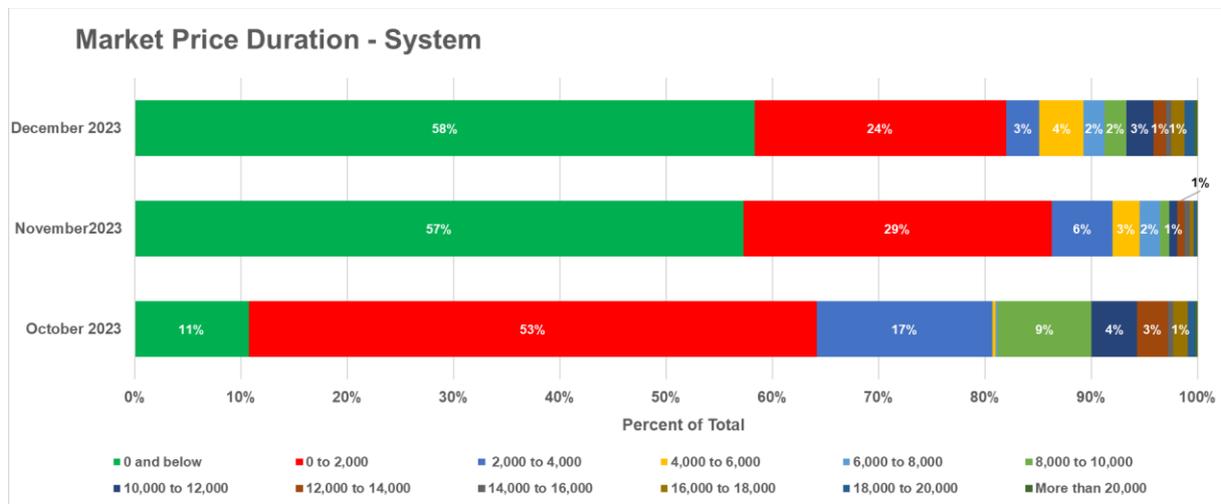
**Figure 7. Market Price Trend - Visayas, 4<sup>th</sup> Quarter 2023**

**Figure 8. Market Price Trend - Mindanao, 4<sup>th</sup> Quarter 2023**

**Table 11. Monthly Regional Price Summary, 4<sup>th</sup> Quarter 2023**

	Luzon in Php/ MWh			Visayas in Php/ MWh			Mindanao in Php/ MWh		
	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg
October 2023	36,954	-9,822	6,703	38,289	-104	7,832	34,142	-10,297	4,727
November 2023	34,033	-10,249	4,000	37,635	-10,362	5,143	31,647	-10,562	3,667
December 2023	36,062	-10,460	4,362	36,483	-10,979	5,535	32,591	-10,128	3,722

## b. Price Distribution

As seen in Figure 9, a noticeable decline was observed in the frequency of prices falling within the Php4,000/MWh to Php6,000/MWh range from November to December

billing months. Consistent in the discussion on the monthly average prices, chunks of the monthly prices in November and December ranged from PhP2,000/MWh to PhP4,000/MWh, contrary to October billing where most of the prices fall in the price range of PhP4,000/MWh to PhP6,000/MWh at 53 percent of the time.

**Figure 9. Price Distribution, 4<sup>th</sup> Quarter 2023**

**Table 12. Monthly Price Distribution, 4<sup>th</sup> Quarter 2023**

Price Range (PhP/MWh)	% Distribution		
	October 2023	November 2023	December 2023
0 and below	0%	3%	4%
0 to 2,000	0%	2%	2%
2,000 to 4,000	11%	57%	58%
4,000 to 6,000	53%	29%	24%
6,000 to 8,000	17%	6%	3%
8,000 to 10,000	9%	0.9%	2.0%
10,000 to 12,000	4%	1%	3%
12,000 to 14,000	1%	0%	1%
14,000 to 16,000	1%	0%	1%
16,000 to 18,000	0%	1%	0%
18,000 to 20,000	0%	0%	0%
More than 20,000	3%	1%	1%

## V. Market Pricing Conditions

System-wide and regional pricing error notices were issued during the 4<sup>th</sup> quarter which were related to inappropriate input data that subsequently affected the generation of prices and schedules. The pricing errors during the subject billing quarter affected 492 system-wide trading intervals. Also, there were 5 regionally affected trading intervals in Visayas and Mindanao.

Meanwhile, due to network constraints, system-wide Price Substitution Methodology (PSM) was applied attributable to the congestion of Mexico-Hermosa Line 2, Bauang-La Trinidad Lines 1&2, Bauang-BPPC line 1, and the San Jose High Voltage transformer equipment.

System-wide market intervention was declared by the Market Operator on 29 October from 1205h to 1210h due to the stoppage of RTD Run arising from the software failure of the Bid Transfer Program to provide complete input data to the MDOM (Market Dispatch Optimization Model). In addition, System Operator-initiated system-wide market interventions on 01 October 2023 from 1914h to 1940h in Luzon region, due to unimplementable RTD brought about by multiple plant tripping incidents.

Finally, secondary cap was not imposed during the November 2023 billing period, while there were system-wide and regional issuances of SPC in October and December 2023 billing periods.

**Table 13. PEN, PSM, MI, and Sec Cap Summary, 4<sup>th</sup> Quarter 2023**

	Luzon						Visayas						Mindanao					
	October 2023		November 2023		December 2023		October 2023		November 2023		December 2023		October 2023		November 2023		December 2023	
	Freq.	% of Time	Freq.	% of Time	Freq.	% of Time	Freq.	% of Time	Freq.	% of Time	Freq.	% of Time	Freq.	% of Time	Freq.	% of Time	Freq.	% of Time
<b>PEN</b>	178	2%	96	1%	218	3%	183	2%	96	1%	218	3%	183	2%	96	1%	218	3%
<b>PSM</b>	26	0%	0	0%	46	1%	26	0%	0	0%	44	1%	26	0%	0	0%	44	1%
<b>SEC</b>	624	7%	0	0%	0	0%	625	7%	0	0%	3	0%	618	7%	0	0%	0	0%
<b>AP</b>	6	0%	2	0%	0	0%	0	0%	2	0%	0	0%	0	0%	2	0%	0	0%

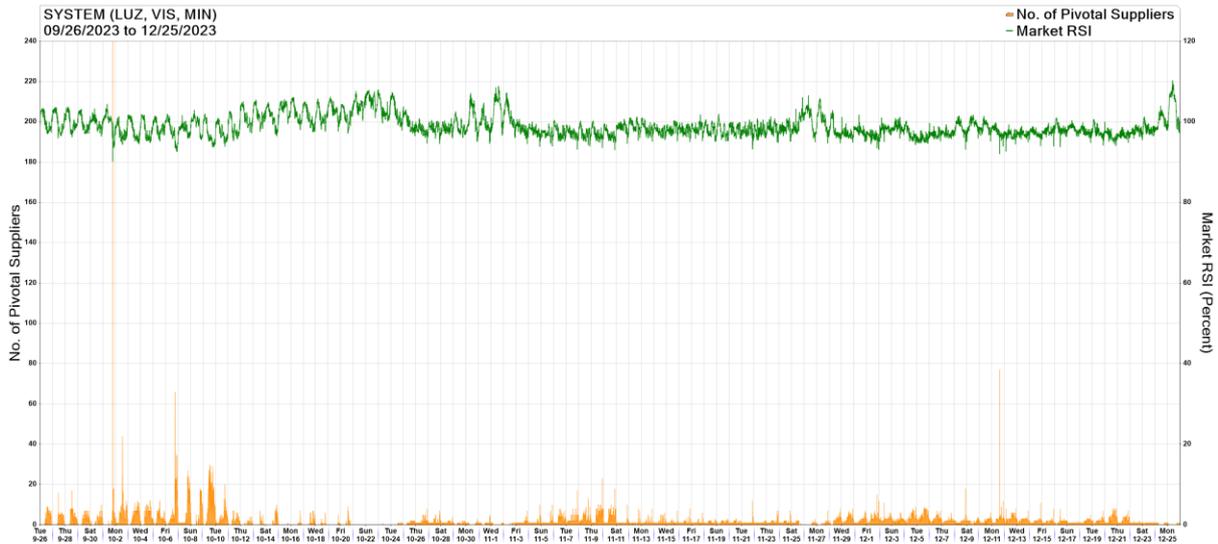
## VI. Residual Supply

The figure below shows the hourly trend of the Market Residual Supply Index (Market RSI)<sup>5</sup> plotted against the number of pivotal supplier/s.

During the period, the market resulted in RSIs ranging from 90.2% to 108.6% and averaging 98.9%. The average market prices for intervals with RSI below 100% was PHP5,578/MWh, while those with RSIs above 100 was at PHP4,038/MWh indicating ample supply during intervals with high RSI values.

**Figure 10. Market RSI vs. Pivotal Suppliers, 4<sup>th</sup> Quarter 2023**

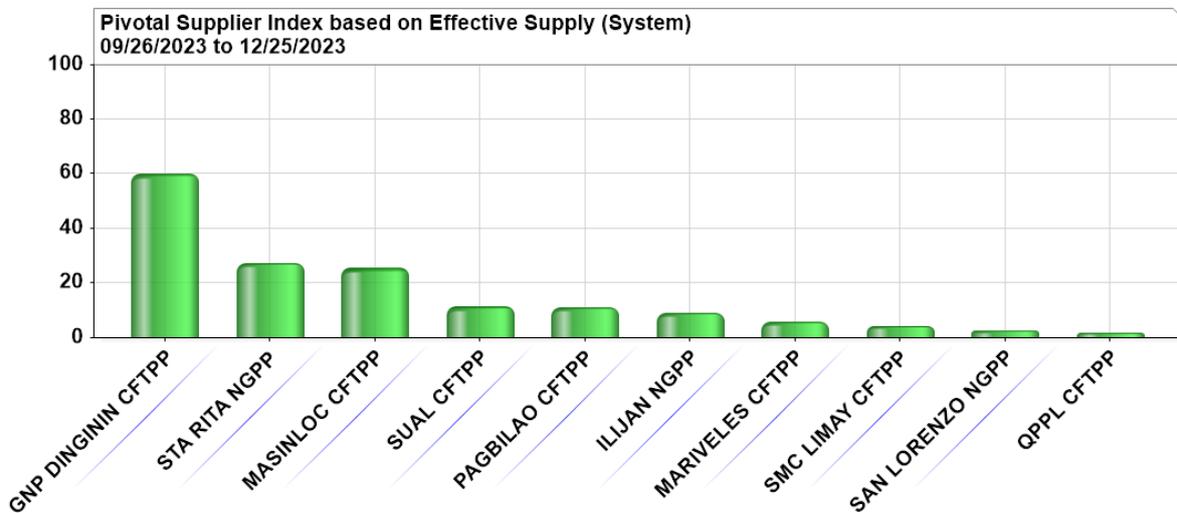
<sup>5</sup> For a generator, the Residual Supply Index (RSI) is a dynamic continuous index measured as ratio of the available generation without that generator to the total generation required to supply the demand. The Market RSI is measured as the lowest RSI among all generators in the market. A Market RSI less 100% indicates the presence of pivotal generator/s or supplier/s.



## VII. Pivotal Suppliers<sup>6</sup>

Provided in Figure 11 are the top pivotal suppliers in the market during the billing quarter, which was led by GNP Dinginin CFTPP, Sual CFTPP, Sta. Rita NGPP, Masinloc CFTPP, Mariveles CFTPP, and Pagbilao CFTPP. In line with the RSI discussion above, the presence of pivotal suppliers was observed this quarter totaling to 41,351 generator-trading intervals.

Figure 11. Top Pivotal Suppliers, 4<sup>th</sup> Quarter 2023



## VIII. Generator Offer Pattern

<sup>6</sup> The Pivotal Supply Index (PSI) measures how critical a particular generator is in meeting the total demand at a particular time. It is a binary variable (1 for pivotal and 0 for not pivotal) which measures the frequency that a generating is pivotal for a particular period.

Coal plants offered almost half of their entire capacity, around 46.2 percent, at PhP0/MWh to PhP32,000/MWh, about 30 percent of which were offered at PhP2,500/MWh to PhP5,000/MWh, and the remaining 16.2 percent were offered at PhP5,000/MWh and above, as depicted in Figure 12.

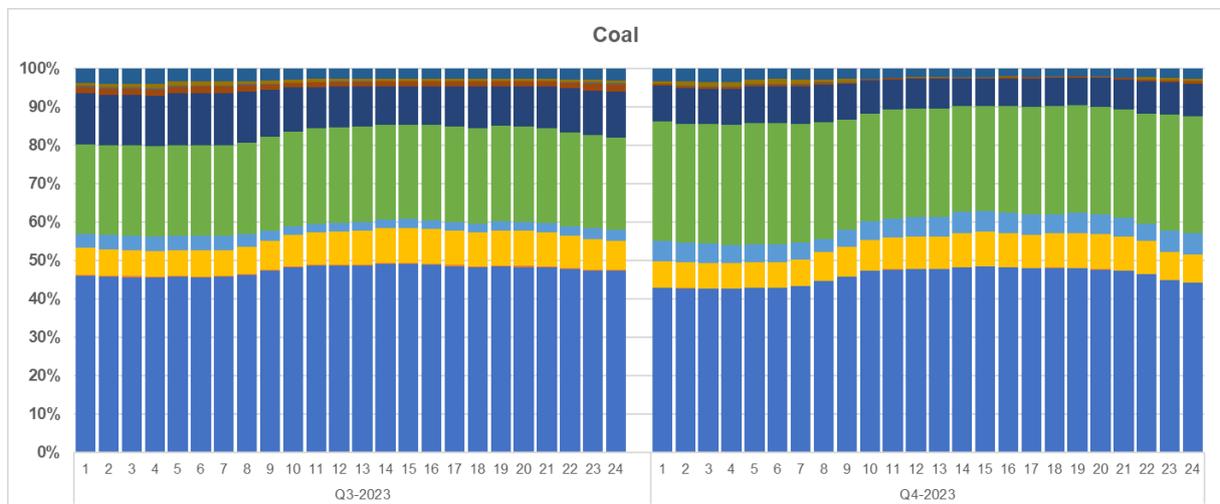
From the submitted offers from Coal power plants, only around 61 percent were scheduled for dispatch in the system .

It may be noted that geothermal plants had the highest dispatched capacities in the WESM, noting that most of the geothermal power plants are now categorized as preferential power plants – this only means that nominated capacities from these plants would be assured of dispatch and would not need to participate in the competitive side of the market.

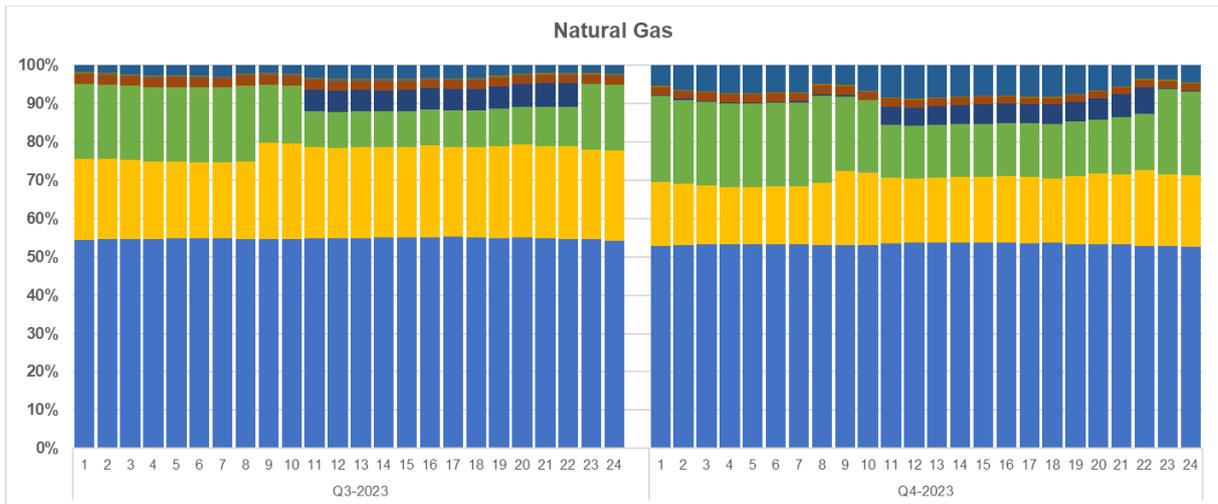
On another note, Natural gas power plants had lower-priced offers. About 70.4 percent of Natural gas offered capacity were offered at PhP0/MWh and below while the remaining 29.6 percent were priced at PhP0/MWh to PhP32,000/MWh, as seen in Figure 13.

For the hydro power plants, there were no notable changes in the offer behavior of these plants during the quarter in review. While oil-based plants consistently offered their available capacities at the higher spectrum of offered prices.

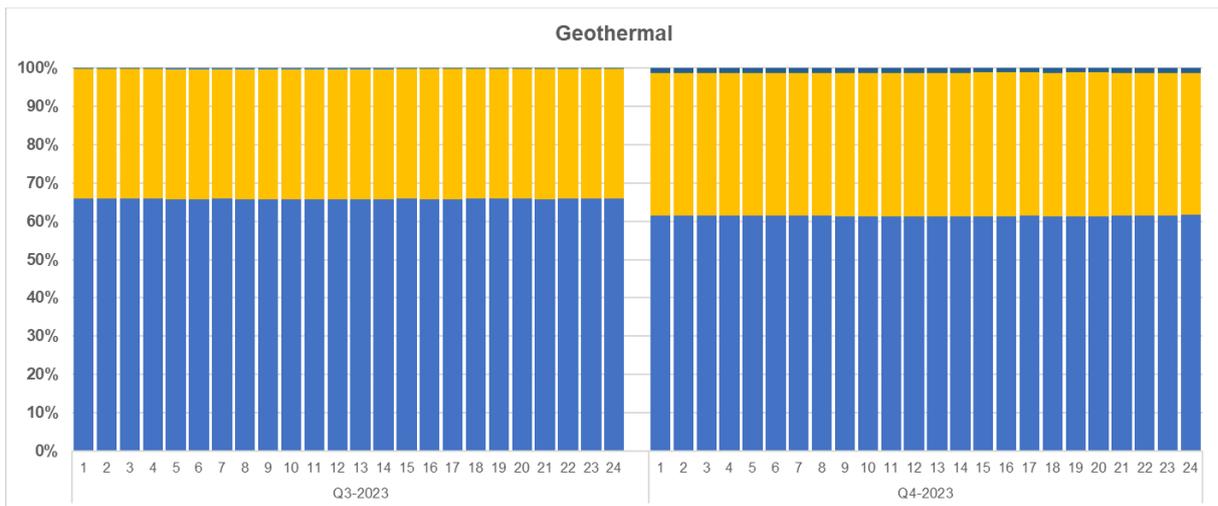
**Figure 12. Coal Plants Offer Pattern – 4<sup>th</sup> Quarter 2023**



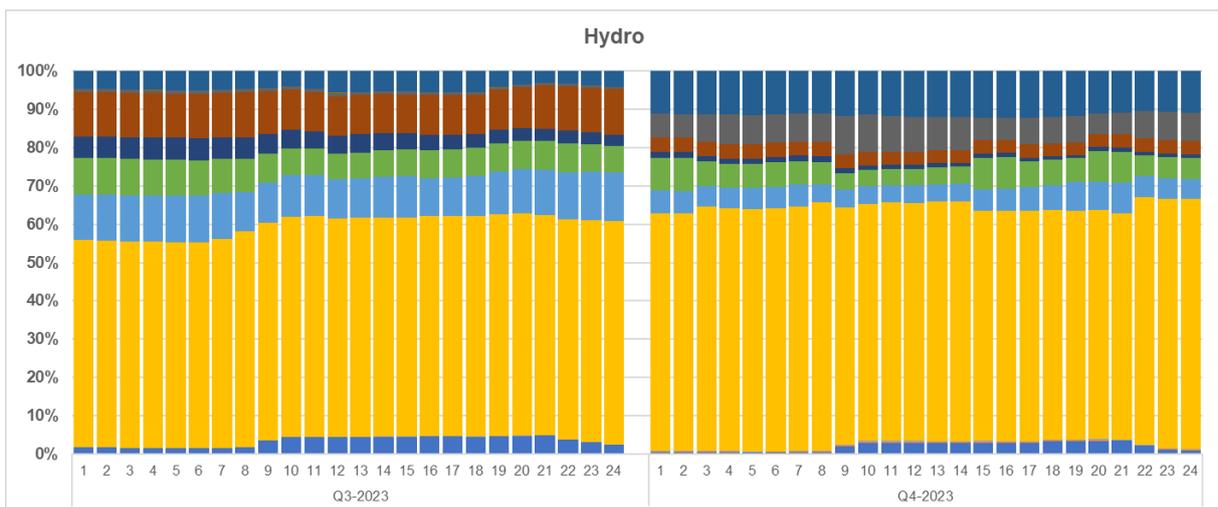
**Figure 13. Natural Gas Plants Offer Pattern – 4<sup>th</sup> Quarter 2023**



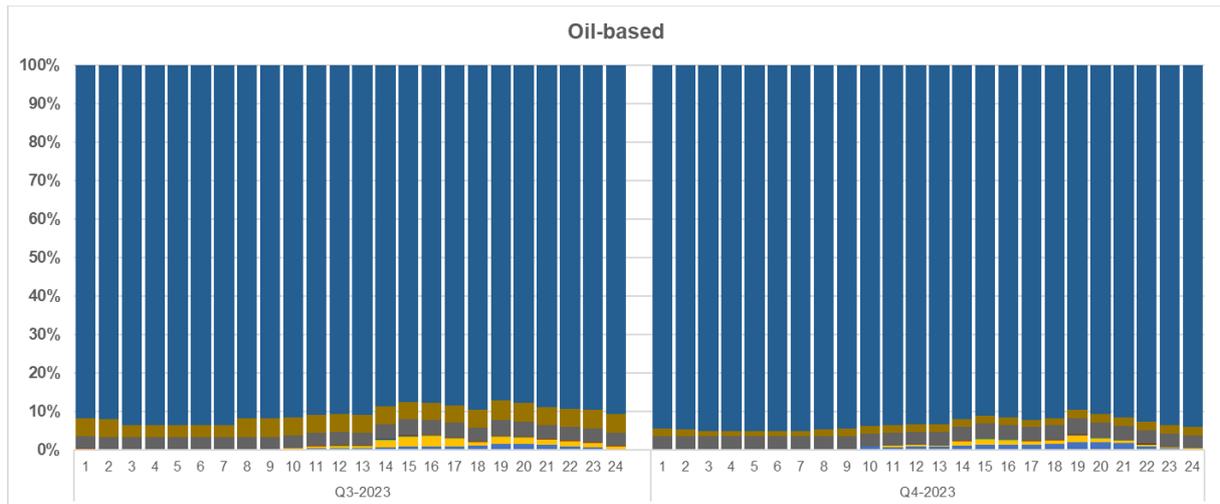
**Figure 14. Geothermal Plants Offer Pattern – 4<sup>th</sup> Quarter 2023**



**Figure 15. Hydro Plants Offer Pattern – 4<sup>th</sup> Quarter 2023**



**Figure 16. Oil-based Plants Offer Pattern – 4<sup>th</sup> Quarter 2023**



■ -10,000 to -7,500 ■ -7,500 to -5,000 ■ -5,000 to -2,500 ■ -2,500 to 0 ■ 0 to 2,500 ■ 2,500 to 5000  
 ■ 5,000 to 7,500 ■ 7,500 to 10,000 ■ 10,000 to 12,500 ■ 12,500 to 15,000 ■ 15,000 above

**IX. Capacity Factor**

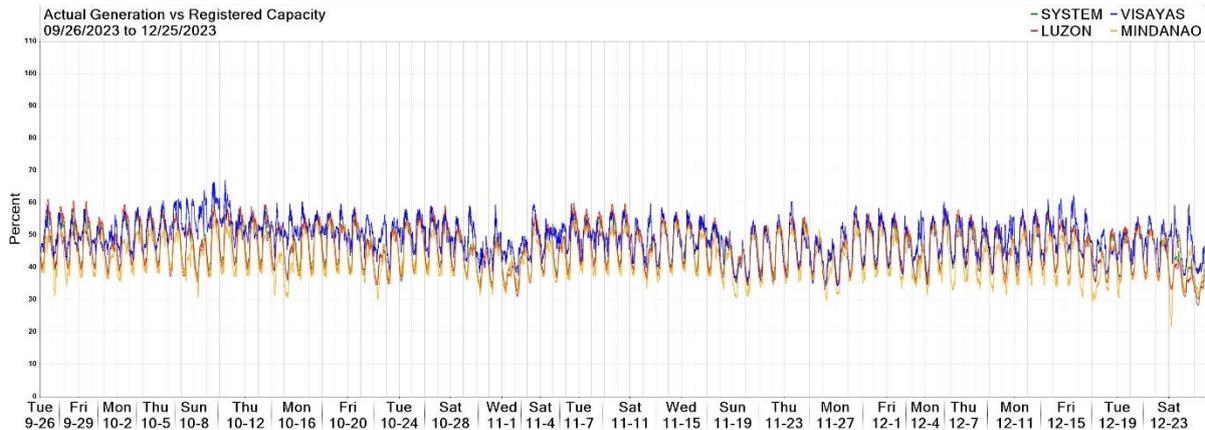
Capacity Factor during the quarter period ranged from 46.9 to 65.4 percent in peak hours while it was 38.6 to 59.2 percent in off-peak hours. As anticipated, the highest utilization was seen during weekdays where the demand is relatively high.

Additionally, in terms of utilization per plant category, Geothermal power plants were observed with the highest utilization during the quarter when measured in terms of their metered quantity vs registered capacity, among WESM resource types with capacity factor reaching 65.7 percent for the whole period of 4<sup>th</sup> quarter of 2023. Natural gas plants followed with capacity factor of 64.2 percent. Coal plants came next reaching 60.7 percent, while Hydro power plants’ utilization was observed to become lower on the last quarter of the year as compared to the third quarter due to its scheduled planned outage, which were mostly scheduled during this season, reaching only 31.8 percent. Oil-based plants had the lowest utilization with only 3.2 percent due to its consistent high-priced offers and its characteristic as peaking plants. Also, Hydro and Oil-based power plants were mostly scheduled as reserve, taking into account the pumping operations of Kalayaan during off-peak hours.

Meanwhile, biomass plants’ capacity factors were recorded at 30.8 percent utilization rate, wind plants’ capacity factors were recorded a high level of utilization among the preferential must-dispatch power plants with 38.1 percent of utilization, capitalizing on the vast available wind energy brought about by the Amihan. On the other hand, there was a noted relatively lower utilization from solar plants due to its natural low dependable capacity.

Lastly, battery energy storage facilities in the WESM, posted a lower capacity factor, ranging from 3.9 percent, related to its charging characteristics as part of its normal operation.

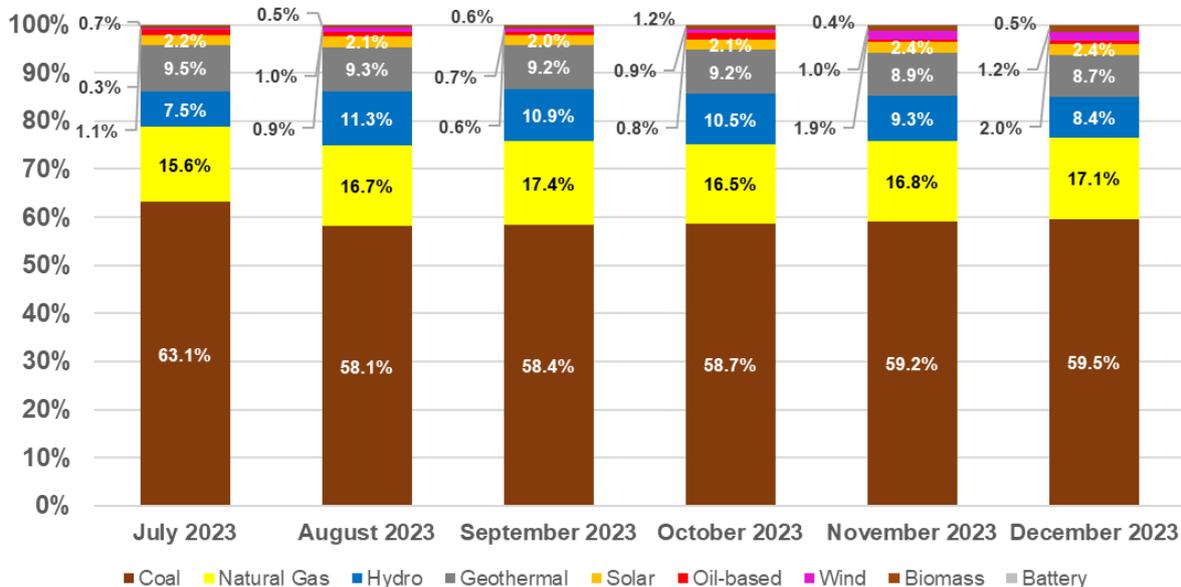
**Figure 17. System Capacity Factor (Registered Capacity vs Actual Generation) – 4<sup>th</sup> Quarter 2023**



**X. Generation Mix**

Coal plants consistently contributed the largest chunk of the generation in all the observed monthly billing periods ranging from 58.7 percent to 59.5 percent demonstrating the country’s reliance on this type of resource. This is followed by Natural gas plants comprising about 16.5 to 17.1 percent of the generation mix. Hydro plants and geothermal plants came next accounting for 8.4 percent to 10.5 percent and 8.7 percent to 9.2 percent, respectively. Oil-based plants’ contribution was the lowest at 0.5 percent to 1.2 percent. Meanwhile, the contribution of preferential and must-dispatch generating units ranged from 0.9 to 2.4 percent.

**Figure 18. Generation Mix (Based on Metered Quantity) – 3<sup>rd</sup> and 4<sup>th</sup> Quarter 2023**



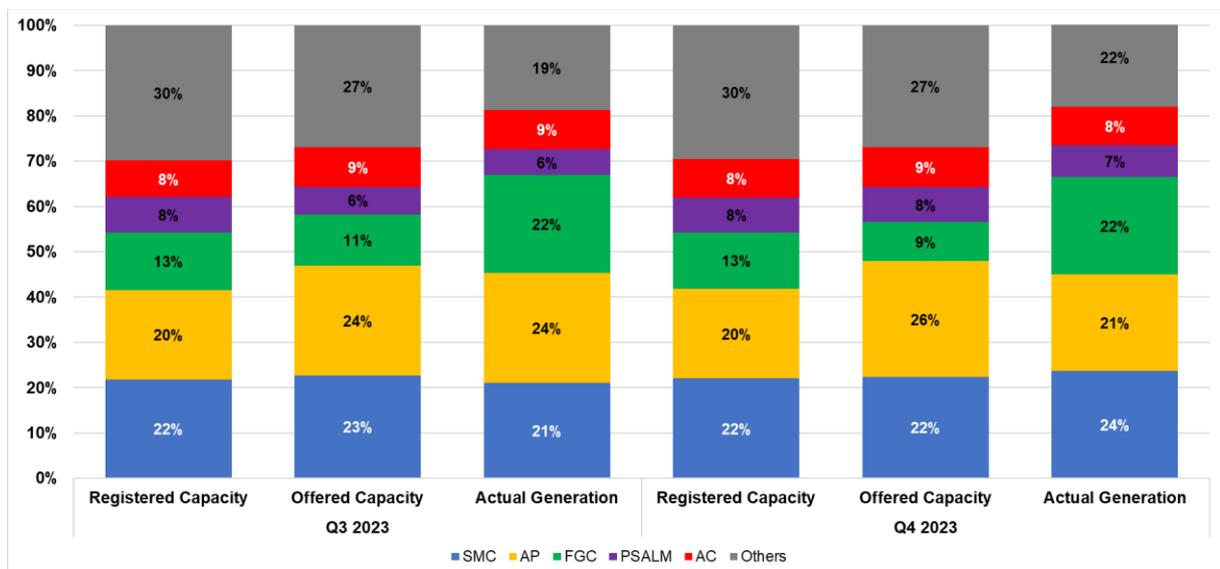
**XI. Market Concentration**

### a. Market Share

The integrated Luzon, Visayas, and Mindanao market remained to be dominated by five (5) major participant groups based on registered capacity led by San Miguel Corporation (SMC) with a market share of 22 percent throughout the billing quarter. Aboitiz Power Corporation (AP) came in next with a market share of about 20 percent followed by First Gen Corporation (FGC), Ayala Corporation (AC) and Power Sector Assets and Liabilities Management (PSALM) at 13 percent, 8 percent, and 8 percent, respectively.

It may be noted that higher market shares were recorded for AP at 26 percent when based on offered capacity while it was only 21 percent when based on actual generation. In contrast, SMC's comparison of offered capacity vs actual generation was observed to have lower offered capacity at 22 percent while it had a 24 percent share in actual generation.

**Figure 19. Market Share by Major Participant Group based on Registered Capacity, Offered Capacity, Actual Generation, 3<sup>rd</sup> and 4<sup>th</sup> Quarter of 2023**



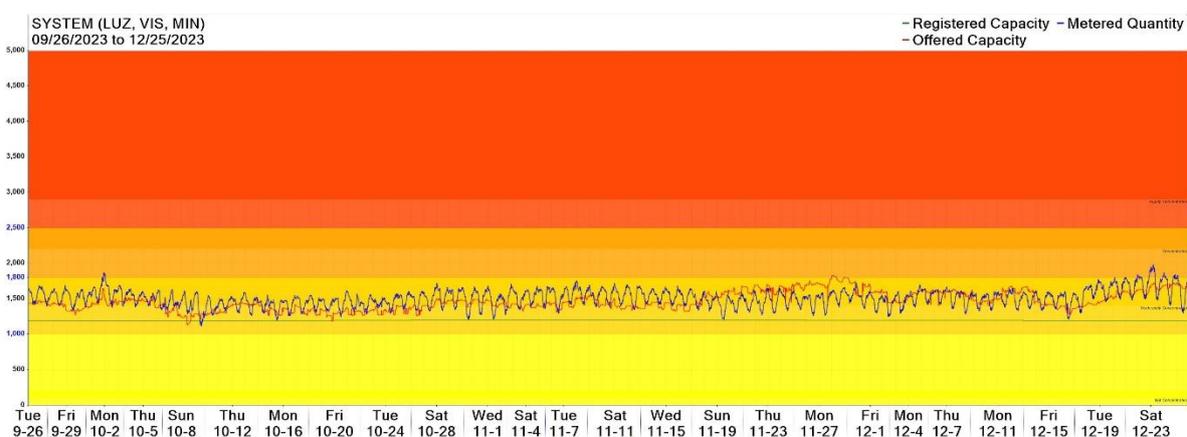
### b. Herfindahl-Hirschman Index (HHI)

The Herfindahl-Hirschman Index (HHI)<sup>7</sup> by major participant grouping indicated a moderately concentrated market during the last quarter of 2023 in terms of registered

<sup>7</sup> The HHI measures the degree of market concentration, taking into account the relative size and distribution of participants in the monitored market. It is calculated as the sum of squares of the participant's market share. The following are the widely-used HHI screening numbers: the HHI approaches zero when the market has very large number of participants with each having a relatively small market share. In contrary, the HHI increases as the number of participants in the market decreases, and the disparity in the market shares among the participants increases. The

capacity. In terms of offered capacity, the market was moderately concentrated 99 percent of the time, brought about by the effects of changes in the availability of generators which subsequently affected the resulting market share. Based on metered quantity, the market is also moderately concentrated 98 percent of the time. Three (3) major participant groups have consistently covered more than 50% of the MQ shares which were due to their frequent dispatch and subsequently affected the resulting market concentration. It was also observed that on Market Intervention events, offered capacity, and actual generation is concentrated.

**Figure 20. Hourly HHI based by Major Participant Grouping, 3rd Quarter 2023**



## XII. Spot Exposure

Spot market transaction of generator-trading participants during the quarter ranged from approximately 15.9 percent to 27.9 percent, from only 10-15 percent of spot quantities prior to the commercial operation of the 5-minute market. Although the majority of the total energy injected into the grid was covered by bilateral contracts, almost 30 percent of the total generation were sourced in the spot market which is very evident on the latter part of the year. This case was mostly affected by the expired contracts of the generators with Distribution Utilities. However, despite both the Suppliers and Distribution Utilities exploring ways to obtain contracts through Competitive Selection Process (CSP), some Distribution Utilities were still forced to enter into an Emergency Power Supply Agreements (EPSAs) or source electricity from the WESM.

---

following are the widely-used HHI screening numbers: (1) when HHI is less than 1,000 the market is not concentrated; (2) in the range of 1,000 to 1,800 the market is moderately concentrated; (3) greater than 1,800 to 2,500 the market is concentrated; and (4) greater than 2,500 the market is highly concentrated and signals lack of competition in the market.

**Figure 21. Spot Market Exposure, 3rd Quarter 2023**

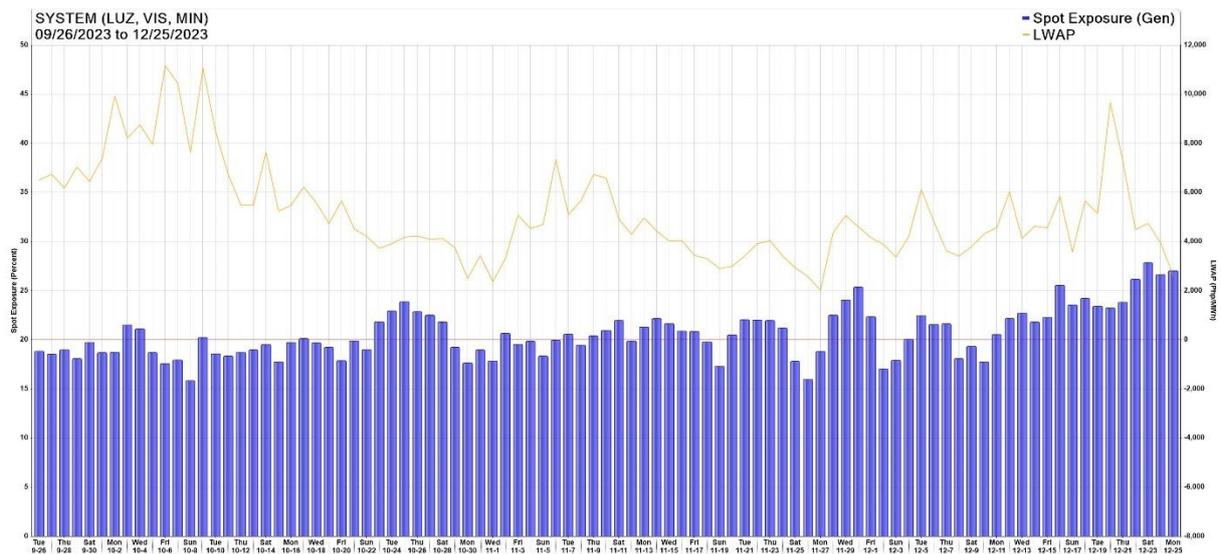
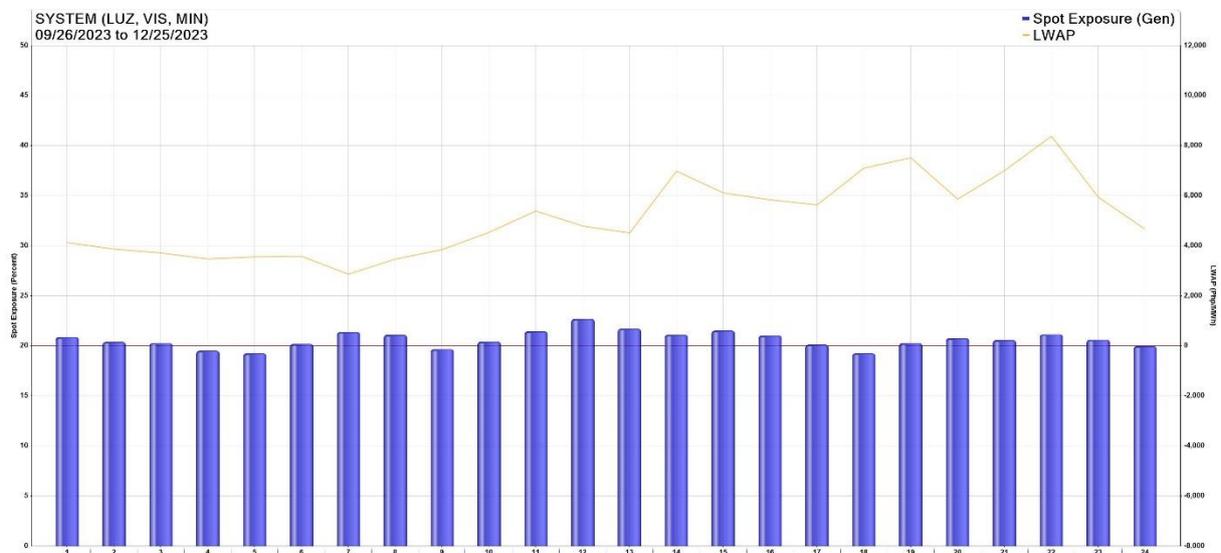


Figure 21 shows the hourly profile of the spot exposure plotted against average hourly price. Relatively higher average spot exposure was noted during the peak hours, particularly from 1100h-1400h and 1800h-2200h, both belonging to the peak hours.

**Figure 22. Hourly Profile of Spot Market Exposure, 3rd Quarter 2023**



## Appendix A. Major Plant Outages

Plant Type	Plant/ Unit Name	Capacity (MW)	Date Out	Date In	Duration (Days)	Outage Type	Remarks
<b>Luzon</b>							
BIOF	IPower 2	10.8	07/05/2023 19:31			Forced Outage	Unplanned shutdown due to ash system problem.
BIOF	IPower 2	10.8	06/25/2023 16:01	07/04/2023 8:27	9	Forced Outage	To repair main de-ashing screw conveyor.
BIOF	IPower 1	10.8	06/25/2023 16:01	07/04/2023 8:27	9	Forced Outage	To repair main de-ashing screw conveyor
COAL	Sual 1	647	07/13/2023 23:33	07/21/2023 10:54	7	Maintenance Outage	On maintenance outage until July 22, 2023.
COAL	Masinloc 2	344	07/07/2023 23:24			Planned Outage	Planned Outage until July 28, 2023.
COAL	Pagbilao 1	382	07/01/2023 0:42			Planned Outage	On Planned Outage until July 30, 2023.
COAL	SLPGC 1	150	06/17/2023 12:03			Forced Outage	Tripped from 90MW load. Turbine trip due to axial displacement high.
GEO	Bacman 3	19.2	07/25/2023 15:16			Forced Outage	Affected by the outage of Bacman 230kV Bus 2.
GEO	Tiwi 1	60	11/30/2021 18:32			Forced Outage	Steam supply diverted to Unit 2.
GEO	MGPP 2	12	06/23/2023 8:01	06/28/2023 16:18	5	Maintenance Outage	Relocation of MGI's TL and stub poles affected by SLEX-TR4 construction.
GEO	MGPP 1	20	06/23/2023 8:01	06/28/2023 20:45	6	Maintenance Outage	Relocation of MGI's TL and stub poles affected by SLEX-TR4 construction.
GEO	Makban 6	30	04/11/2013 22:44			Deactivated Shutdown	Conducted Gas compressor test.
HYD	Caliraya 2	14	07/24/2023 8:00			Planned Outage	Planned outage until July 28, 2023.
HYD	Caliraya 1	14	07/24/2023 8:00			Planned Outage	Planned outage until July 28, 2023.
HYD	San Roque 2	145	06/26/2023 0:41	07/08/2023 0:01	12	Planned Outage	Planned Outage until July 26, 2023.
HYD	Angat M 4	50	02/14/2022 0:00			Planned Outage	Planned outage.
HYD	Angat M 3	190	11/02/2021 8:15			Forced Outage	Draw-out of Main Unit 3 generator breaker.
NATG	Ilijan B1	190	07/15/2023 9:26			Forced Outage	Tripped by Generator earth fault protection
NATG	Sta. Rita 1	257.3	07/14/2023 23:15	07/17/2023 3:44	2	Planned Outage	Planned outage until July 16, 2023.
NATG	Sta. Rita 4	264	07/07/2023 23:48	07/10/2023 15:28	3	Planned Outage	Planned Outage until July 9, 2023.
NATG	Sta. Rita 3	265.5	07/07/2023 23:26	07/10/2023 11:03	2	Planned Outage	Planned Outage until July 9, 2023.
NATG	San Lorenzo 2	265	06/30/2023 23:51	07/03/2023 0:11	2	Planned Outage	On Planned Outage until July 2, 2023.
NATG	San Lorenzo 1	265	06/30/2023 22:45	07/03/2023 1:02	2	Planned Outage	Planned outage until July 2, 2023.
NATG	Ilijan B2	190	06/08/2023 14:40	07/17/2023 11:26	39	Forced Outage	Emergency shutdown due to Blade Path Temperature auto stop.
OIL	TMO Unit 2	51.5	07/19/2023 0:01			Planned Outage	Annual Switchyard PMS until July 26, 2023.
OIL	TMO Unit 1	63.8	07/12/2023 0:01	07/21/2023 0:00	9	Planned Outage	Planned outage until 2359H of July 20, 2023.
OIL	Malaya 2	130	07/10/2023 11:32	07/14/2023 8:11	4	Forced Outage	The unit tripped from 307MW load.
OIL	SLPGC 4	25	02/10/2022 18:07			Forced Outage	Due to low turbine lube oil supply. IEMOP deregistration effective on August 25, 2022.
OIL	SLPGC 3	25	01/22/2022 21:39			Forced Outage	Declared unavailable due to turbine lube oil sump metal chips detected. IEMOP deregistration effective on August 25, 2022.
OIL	Malaya 1	300	05/03/2019 18:21			Forced Outage	Declared unavailable due to motorization of unit generator caused by the non-opening of phase B of PCB 8-05CB08MAL.
WIND	Caparispisan 1	81	07/07/2023 6:17			Maintenance Outage	Affected by the planned outage of Laoag-Pagudpud(NLREC) Wind Farm 115kV line.
WIND	BWPC	80	07/06/2023 6:04			Maintenance Outage	Maintenance until July 30, 2023
WIND	AWOC 1	53.6	06/26/2023 5:42	06/30/2023 9:33	4	Planned Outage	APMT.
BIOF	G2REC	10.8	08/18/2023 10:30	08/22/2023 11:19	4	Forced Outage	Emergency shutdown due to feeding system problem.
BIOF	IPower 2	10.8	07/05/2023 19:31			Forced Outage	Unplanned shutdown due to ash system problem.
BIOF	CBEC	13.5	07/24/2023 0:01	08/18/2023 10:44	25	Planned Outage	Planned outage until August 7, 2023.
COAL	SMC 1	150	08/10/2023 4:01			Planned Outage	Planned Outage until September 24, 2023.
COAL	Pagbilao 2	382	08/05/2023 0:56			Planned Outage	On planned outage until September 03, 2023.
COAL	SMC 3	150	08/04/2023 4:58	08/09/2023 9:43	5	Forced Outage	Unplanned outage due to main steam line excessive leak.
COAL	Masinloc 3	335	07/30/2023 5:22	08/15/2023 18:17	17	Forced Outage	Emergency shutdown due to coal reclaiming constraints brought by strong winds and heavy rains that poses safety issues.
COAL	MPGC U1	150	07/26/2023 23:57	08/12/2023 5:18	16	Maintenance Outage	Testing and commissioning until July 31, 2023.
COAL	SLTEC 1	122	07/26/2023 0:30			Planned Outage	Planned outage until September 4, 2023.
COAL	SLPGC 1	150	06/17/2023 12:03	08/16/2023 0:45	60	Forced Outage	Tripped from 90MW load. Turbine trip due to axial displacement high.
COAL	Pagbilao 1	382	07/01/2023 0:42	07/27/2023 10:24	26	Planned Outage	On Planned Outage until July 30, 2023.
COAL	Masinloc 2	344	07/07/2023 23:24	07/31/2023 4:03	23	Planned Outage	Planned Outage until July 28, 2023. Extended Outage until July 30, 2023.
GEO	Makban 7	20	08/22/2023 17:57			Forced Outage	MAKBAN D UNIT 7 SHUTDOWN DUE TO HIGH TURBINE VIBRATION
GEO	Bacman 1	60	08/10/2023 6:10	08/14/2023 17:00	4	Planned Outage	On planned outage until August 15, 2023.
GEO	Makban 1	57	08/05/2023 1:50			Maintenance Outage	Generator unit overhaul.
GEO	Tiwi 1	60	11/30/2021 18:32			Forced Outage	Steam supply diverted to Unit 2.
GEO	Makban 6	30	04/11/2013 22:44			Deactivated Shutdown	Conducted Gas compressor test.
HYD	Caliraya 2	14	07/24/2023 8:00	07/28/2023 21:06	5	Planned Outage	Planned outage until July 28, 2023.
HYD	Caliraya 1	14	07/24/2023 8:00	07/28/2023 21:06	5	Planned Outage	Planned outage until July 28, 2023.
HYD	Angat M 4	50	02/14/2022 0:00			Planned Outage	Planned outage.
HYD	Angat M 3	50	11/02/2021 8:15			Forced Outage	Draw-out of Main Unit 3 generator breaker.
NATG	Sta. Rita 2	255.7	08/25/2023 23:42			Planned Outage	On planned outage until August 30, 2023.
NATG	Ilijan B2	190	08/23/2023 21:37			Forced Outage	Shutdown due to gas optimization.
NATG	Ilijan B3	220	08/23/2023 21:15			Forced Outage	Shutdown due to gas optimization.
NATG	Avion 1	47.2	08/21/2023 0:00	08/24/2023 22:37	4	Planned Outage	Planned outage until August 25, 2023.
NATG	Avion 2	45.8	08/20/2023 0:01	08/23/2023 11:18	3	Planned Outage	Planned outage until August 30, 2023.
NATG	Sta. Rita 4	264	08/18/2023 21:43	08/22/2023 23:43	4	Maintenance Outage	On maintenance outage until August 23, 2023 to conduct inspection of cooling water intake pipe from seawater to check possible blockage of debris inside the pipe.
NATG	Sta. Rita 3	265.5	08/18/2023 20:42	08/23/2023 3:39	4	Maintenance Outage	On maintenance outage until August 23, 2023 to conduct inspection of cooling water intake pipe from seawater to check possible blockage of debris inside the pipe.
NATG	San Gabriel	420	08/11/2023 23:37	08/15/2023 0:17	3	Planned Outage	Planned Outage until August 14, 2023.
NATG	Ilijan A1	190	08/10/2023 15:20	08/22/2023 4:11	12	Forced Outage	Tripped due to gas supply pressure problem.
NATG	Sta. Rita 1	257.3	08/10/2023 7:12	08/13/2023 13:25	3	Forced Outage	Tripped due to GT protection activation while ongoing changeover.
NATG	Ilijan B3	220	08/04/2023 0:51	08/07/2023 0:56	3	Forced Outage	Tripped due to loss of gas supply.
NATG	Ilijan B2	190	08/04/2023 0:32	08/06/2023 23:24	3	Forced Outage	Tripped due to loss of gas supply.
NATG	Ilijan A3	220	08/04/2023 0:32	08/07/2023 5:41	3	Forced Outage	Tripped due to loss of gas supply.
NATG	Ilijan A2	190	08/04/2023 0:32	08/07/2023 3:43	3	Forced Outage	Tripped due to loss of gas supply.
NATG	Ilijan A1	190	08/04/2023 0:32	08/07/2023 15:00	4	Forced Outage	Tripped due to loss of gas supply.
NATG	Ilijan B1	190	07/15/2023 9:26			Forced Outage	Tripped by Generator earth fault protection
OIL	Ingrid 6	28	08/14/2023 21:05	08/18/2023 16:37	4	Maintenance Outage	Affected by the planned outage of Malaya-Ingrid 230kV line 2 until 2359H of August 20, 2023.
OIL	Ingrid 5	22	08/14/2023 21:05	08/18/2023 16:37	4	Maintenance Outage	Affected by the planned outage of Malaya-Ingrid 230kV line 2 until 2359H of August 20, 2023.
OIL	Ingrid 4	28	08/14/2023 21:05	08/18/2023 16:37	4	Maintenance Outage	Affected by the planned outage of Malaya-Ingrid 230kV line 2 until 2359H of August 20, 2023.
OIL	Ingrid 3	22	08/14/2023 21:05	08/18/2023 16:37	4	Maintenance Outage	Affected by the planned outage of Malaya-Ingrid 230kV line 2 until 2359H of August 20, 2023.
OIL	Ingrid 2	22	08/14/2023 21:05	08/18/2023 16:37	4	Maintenance Outage	Affected by the planned outage of Malaya-Ingrid 230kV line 2 until 2359H of August 20, 2023.
OIL	Ingrid 1	28	08/14/2023 21:05	08/18/2023 16:37	4	Maintenance Outage	Affected by the planned outage of Malaya-Ingrid 230kV line 2 until 2359H of August 20, 2023.(RECLASSIFIED FROM FORCE / OMC OUTAGE)
OIL	Limay 6	60	08/10/2023 15:32	08/14/2023 23:30	4	Forced Outage	Declared unavailable due to rotor bearing failure
OIL	Limay 3	60	08/07/2023 0:01			Planned Outage	To conduct C-inspection (Major Overhauling) until September 20, 2023.
OIL	Limay 5	60	08/05/2023 0:01	08/11/2023 21:08	7	Planned Outage	On planned outage until August 14, 2023.
OIL	TMO Unit 2	51.5	07/19/2023 0:01	07/27/2023 0:00	8	Planned Outage	Annual Switchyard PMS until July 26, 2023
OIL	SLPGC 4	25	02/10/2022 18:07			Forced Outage	Due to low turbine lube oil supply. IEMOP deregistration effective on August 25, 2022.
OIL	SLPGC 3	25	01/22/2022 21:39			Forced Outage	Declared unavailable due to turbine lube oil sump metal chips detected. IEMOP deregistration effective on August 25, 2022.
OIL	Malaya 1	300	05/03/2019 18:21			Forced Outage	Declared unavailable due to motorization of unit generator caused by the non-opening of phase B of PCB 8-05CB08MAL.
WIND	Caparispisan 1	81	07/07/2023 6:17	07/27/2023 17:55	20	Maintenance Outage	Affected by the planned outage of Laoag-Pagudpud(NLREC) Wind Farm 115kV line.
WIND	BWPC	80	07/06/2023 6:04	07/31/2023 12:02	25	Maintenance Outage	Maintenance until July 30, 2023
BIOF	G2REC	10.8	09/07/2023 16:45	09/20/2023 7:00	13	Forced Outage	IDF Problem.
BIOF	IPower 1	10.8	09/02/2023 0:01	09/09/2023 8:01	7	Forced Outage	Fuel System problem
BIOF	GIFT	12	08/28/2023 0:06	09/02/2023 18:00	6	Maintenance Outage	Maintenance Outage
BIOF	IPower 2	10.8	07/05/2023 19:31			Forced Outage	Unplanned shutdown due to ash system problem.
COAL	GNP Dinginin 1	668	09/21/2023 0:12			Planned Outage	Planned outage until October 14, 2023.
COAL	SLPGC 1	150	09/20/2023 13:09			Forced Outage	Emergency shutdown due to coal coking at boiler.
COAL	SLPGC 2	149.6	09/16/2023 23:47			Forced Outage	Unplanned outage due to coal coking.
COAL	QPPL	460	09/12/2023 2:02	09/16/2023 4:32	4	Forced Outage	Unplanned outage due to economizer tube leak.
COAL	SMC 1	150	08/10/2023 4:01	09/22/2023 3:25	43	Planned Outage	Planned Outage until September 24, 2023.
COAL	SLTEC 1	122	07/26/2023 0:30	08/31/2023 3:59	36	Planned Outage	Planned outage until September 4, 2023.
COAL	Pagbilao 2	382	08/05/2023 0:56	08/30/2023 2:22	25	Planned Outage	On planned outage until September 03, 2023.
GEO	Tiwi 1	60	11/30/2021 18:32			Forced Outage	Steam supply diverted to Unit 2.
GEO	Makban 7	20	08/22/2023 17:57	09/16/2023 18:44	25	Forced Outage	MAKBAN D UNIT 7 SHUTDOWN DUE TO HIGH TURBINE VIBRATION
GEO	Makban 6	30	04/11/2013 22:44			Deactivated Shutdown	Conducted Gas compressor test.

## Appendix A. Major Plant Outages

Plant Type	Plant/ Unit Name	Capacity (MW)	Date Out	Date In	Duration (Days)	Outage Type	Remarks
<b>Luzon</b>							
GEO	Makban 1	57	08/05/2023 1:50	09/14/2023 6:38	40	Maintenance Outage	Generator unit overhaul.
HYD	Kalayaan 4	180	09/04/2023 0:01			Planned Outage	Planned outage until November 24 2023.
HYD	Masway	12	08/27/2023 19:30	09/10/2023 15:17	14	Forced Outage	Cut-off of NIA IDR due to heavy rain in down stream area.
HYD	Angat M 4	50	02/14/2022 0:00			Planned Outage	Planned outage.
HYD	Angat M 3	50	11/02/2021 8:15			Forced Outage	Draw-out of Main Unit 3 generator breaker.
NATG	San Gabriel	420	09/18/2023 20:54	09/24/2023 20:09	6	Forced Outage	Gas restriction
NATG	Ilijan B2	190	09/08/2023 17:10	09/17/2023 19:52	9	Forced Outage	Emergency shutdown due to fuel gas supply restriction.
NATG	Sia Rita 2	255.7	08/25/2023 23:42	08/31/2023 4:21	5	Planned Outage	On planned outage until August 30 2023.
NATG	Ilijan B3	220	08/23/2023 21:15	09/17/2023 23:13	25	Forced Outage	Shutdown due to gas optimization.
NATG	Ilijan B2	190	08/23/2023 21:37	09/08/2023 16:22	16	Forced Outage	Shutdown due to gas optimization.
NATG	Ilijan B1	190	07/15/2023 9:26			Forced Outage	Tripped by Generator earth fault protection
OL	Limay 7	60	09/16/2023 0:01	09/19/2023 17:00	4	Planned Outage	To conduct Hot Gas Path Inspection and other pending works on unit.
OL	TMO Unit 2	51.5	09/11/2023 0:00	09/23/2023 0:00	12	Maintenance Outage	Maintenance outage.
OL	SLPGC 4	25	02/10/2022 18:07			Forced Outage	Due to low turbine lube oil supply. IEMOP deregistration effective on August 25 2022.
OL	SLPGC 3	25	01/22/2022 21:39			Forced Outage	Declared unavailable due to turbine lube oil sump metal chips detected. IEMOP deregistration effective on August 25 2022.
OL	Malaya 1	300	05/03/2019 18:21			Forced Outage	Declared unavailable due to motorization of unit generator caused by the non-opening of phase B of PCB 8-05CB08MAL
OL	Limay 3	60	08/07/2023 0:01	09/21/2023 0:00	45	Planned Outage	To conduct C-inspection (Major Overhauling) until September 20 2023.
OL	Limay 1	60	08/26/2023 0:01	09/01/2023 19:58	7	Planned Outage	Planned Outage Hot Gas Path inspection
<b>Visayas</b>							
BAT	Kabankalan Bat	20	04/19/2023 15:26	07/07/2023 8:15	79	Forced Outage	Auto-tripped due to Damaged 13.8kV PCB
COAL	TPC-Sangi 1	82	06/24/2023 0:03	06/26/2023 16:09	3	Forced Outage	Cut-out to facilitate boiler tube leak problem
GEO	Mahanagdong A1	5	07/16/2023 1:29	07/21/2023 1:23	5	Planned Outage	Annual PMS ETC July 18 2023
GEO	Mahanagdong B1	5	07/16/2023 0:18	07/22/2023 16:46	7	Planned Outage	Annual PMS ETC July 18 2023
GEO	Mahanagdong A2	5	07/13/2023 2:04			Maintenance Outage	PMS
GEO	Malibog 1	72	07/04/2023 5:03	07/10/2023 23:48	7	Forced Outage	Control Valve Deviation Problem
GEO	Malibog 2	72	01/21/2023 0:13	06/29/2023 1:09	159	Maintenance Outage	CUT OUT
GEO	Mahanagdong A1	5	05/05/2023 12:34	07/08/2023 5:59	64	Forced Outage	Due to over frequency
HYD	THC	15.9	07/16/2023 15:15	07/19/2023 8:20	3	Forced Outage	Auto-shutdown due to temperature winding very high.
HYD	THC	15.9	07/11/2023 4:34	07/13/2023 7:47	2	Forced Outage	Auto-shutdown due to very high temperature winding. Change over to Unit 3.
OL	PB104 Unit 1	7	07/07/2023 0:05	07/11/2023 0:00	4	Maintenance Outage	6000 RH PMS
WIND	SLWind	54	07/05/2023 8:18			Maintenance Outage	Conducted preventive maintenance
COAL	Keppo Salcon 1	103	08/02/2023 0:01			Planned Outage	APMS
GEO	PGPP1 Unit 1	37.5	08/11/2023 0:01			Maintenance Outage	Shutdown due to PMS.
GEO	Leyte 3	40.2	08/04/2023 0:30	08/08/2023 20:30	5	Maintenance Outage	5-day scheduled PMS
GEO	PGPP1 Unit 3	35.5	08/03/2023 13:08	08/10/2023 7:18	7	Forced Outage	Emergency shutdown to conduct turbine rotor replacement/inspection due to increasing bearing vibration.
GEO	Mahanagdong A2	5	07/13/2023 2:04	08/17/2023 21:15	36	Maintenance Outage	PMS
HYD	THC	15.2	08/22/2023 14:08			Forced Outage	Affected by the tripping of 69kV Taft feeder
HYD	THC	15.2	07/27/2023 7:07	07/29/2023 11:17	2	Forced Outage	Tripped due to undervoltage activation.
BIOF	HPCO	9.5	09/25/2023 7:00			Maintenance Outage	Offline weekly maintenance.
COAL	PALM 1	135	09/22/2023 17:44			Forced Outage	transformer tripped
COAL	CEDC 1	82	09/19/2023 14:33	09/22/2023 16:02	3	Forced Outage	EMERGENCY CUT-OUT DUE TO POSSIBLE BOILER TUBE LEAK
COAL	Keppo Salcon 2	103	09/16/2023 0:01			Planned Outage	Manually shutdown for scheduled APMS Duration 40 Days
COAL	CEDC 2	82	09/04/2023 0:21			Planned Outage	AMPS - Conduct of Major Turbine Overhaul(MOH) in accordance with the Approved 2023 GOMP Harmonization
COAL	Keppo Salcon 1	103	08/02/2023 0:01	09/06/2023 9:22	35	Planned Outage	APMS
GEO	PGPP1 Unit 2	37.47	09/14/2023 0:01			Maintenance Outage	Planned maintenance
GEO	PGPP1 Unit 1	37.5	08/11/2023 0:01	09/07/2023 6:12	27	Maintenance Outage	Shutdown due to PMS.
HYD	THC	15.2	09/09/2023 13:55	09/16/2023 12:01	7	Forced Outage	Tripped due to activation of high vibrations.
OL	TPC Carmen 2	10	09/25/2023 13:59			Forced Outage	Manually shutdown due to fuel linkage intermediate shaft
OL	TPC Carmen 2	10	09/11/2023 15:51	09/15/2023 9:07	4	Forced Outage	Manually shutdown due to inspection of piston on cylinder #11 due to suspected cut-off piston rings
OL	TPC Carmen 4	10	09/04/2023 11:36	09/08/2023 0:02	4	Forced Outage	AUTO-TRIPPED DUE TO LUBE OIL PRESSURE LOW
OL	CPCC 7	6.5	09/02/2023 0:02	09/16/2023 13:16	15	Planned Outage	Preventive Maintenance ECD September 19 2023
<b>Mindanao</b>							
BIOF	LSK U1	15	07/10/2023 0:01			Forced Outage	Shutdown-OMC.ETC August 9 2023.
BIOF	LSK U2	15	07/10/2023 0:01			Maintenance Outage	PMS (GOMP), ETC July 17 2023.
COAL	STE U2	116	07/20/2023 0:00			Maintenance Outage	For PMS(GOMP), ETC August 6 2023
COAL	STE U1	116	07/04/2023 0:00			Maintenance Outage	PMS(GOMP) ETC July 31 2023.
COAL	GNPK U3	151.3	07/01/2023 16:22	07/07/2023 10:55	6	Forced Outage	Forced Outage. Indication Boiler tube leak. ETC July 7 2023.
HYD	PG4 U2	75	07/11/2023 8:00	07/14/2023 18:29	3	Maintenance Outage	PMS (Non-GOMP), ETC July 15 2023.
HYD	AG2 U3	60	07/07/2023 8:21	07/22/2023 13:27	15	Maintenance Outage	Planned Outage. PMS-GOMP. ETC July 23 2023.
HYD	AG6 U4	25	07/03/2023 8:01			Maintenance Outage	Planned Outage. PMS(Non-GOMP). ETC August 1 2023.
HYD	AG7 U2	15	07/01/2023 9:08	07/19/2023 9:57	18	Maintenance Outage	PMS(GOMP), ETC July 20 2023.
HYD	PG4 U3	75	06/24/2023 8:00	06/27/2023 20:31	4	Maintenance Outage	PMS(Non-GOMP) starting 06/24/2023 0800H unit was on forced outage prior. ETC 06/28/2023.
HYD	AG6 U1	31.5	05/24/2023 16:50			Forced Outage	Emergency shutdown due to governor oil pump failure. Unplanned Outage
OL	KET U1	7.8	07/15/2023 13:00	07/18/2023 9:00	3	Maintenance Outage	Planned outage to facilitate replacement of unit's smokestack. ETC July 17 2023.
OL	WMPFC Unit 4	10.7	05/01/2023 21:59			Forced Outage	Tripped due to generator earth fault. Unplanned Outage. ETC October 20 2023.
BIOF	14TACUR	6	08/16/2023 17:30	08/19/2023 10:54	3	Forced Outage	Emergency shutdown due to evaporator leak. No ETC
BIOF	LSK U1	15	07/18/2023 0:00	08/09/2023 12:01	23	Forced Outage	The extended shutdown is due to the Outside Management Control (OMC) lack of fuel supply. ETC August 9 2023.
BIOF	LSK U1	15	07/18/2023 0:00	08/09/2023 12:01	23	Forced Outage	Shutdown-OMC.ETC August 9 2023.
COAL	STE U1	116	08/25/2023 5:50			Forced Outage	Forced outage due to boiler fouling. No ETC.
COAL	STE U2	116	08/23/2023 13:00			Forced Outage	Forced Outage due to fouling of boiler. No ETC.
COAL	DCPP Unit 2	150	08/22/2023 0:22			Maintenance Outage	Planned Outage. PMS ETC 10/01/2023 2359H
COAL	MCC U1	55	07/27/2023 21:59	08/05/2023 10:20	9	Forced Outage	Emergency shutdown due to coal feeder problem.
COAL	STE U2	116	07/20/2023 0:00	08/06/2023 23:59	18	Planned Outage	For PMS(GOMP), ETC August 6 2023
COAL	STE U1	116	07/04/2023 0:00	08/01/2023 8:03	28	Planned Outage	PMS(GOMP) ETC July 31 2023.
HYD	AG2 U1	60	08/25/2023 9:05			Maintenance Outage	PMS(Non-GOMP), ETC August 27 2023.
HYD	AG6 U5	43.8	08/22/2023 9:02	08/24/2023 15:03	2	Planned Outage	PMS (GOMP), ETC August 29 2023 2359H.
HYD	AG6 U4	25	08/18/2023 9:04	08/21/2023 16:07	3	Planned Outage	PMS(GOMP), ETC August 21 2023.
HYD	PG4 U3	75	08/08/2023 0:02			Planned Outage	PMS (GOMP), ETC 08/30/2023
HYD	AG2 U3	60	08/04/2023 8:07	08/06/2023 16:24	2	Forced Outage	Emergency shutdown due to Flush Over of Main Disconnection Switch. (Unplanned Outage)
HYD	AG1 U2	35	08/01/2023 9:23			Planned Outage	PMS (GOMP), ETC October 19 2023
HYD	AG6 U4	25	07/03/2023 8:01	07/28/2023 15:07	25	Maintenance Outage	Planned Outage. PMS(Non-GOMP). ETC August 1 2023.
HYD	AG6 U1	31.5	05/24/2023 16:50			Forced Outage	Emergency shutdown due to governor oil pump failure. Unplanned Outage. No ETC.
OL	WMPFC Unit 9	10.7	08/21/2023 10:07	08/24/2023 12:30	3	Forced Outage	Forced outage due to continuous surging turbo charger. ETC 08/24/2023 1700H
OL	TM1 U2	50	08/16/2023 0:01	08/18/2023 16:00	3	Planned Outage	PMS (GOMP), ETC 08.18.2023
OL	NBPC 1	5	08/10/2023 0:00			Forced Outage	DG02 on extended PMS undergoing repair and maintenance due to charge air cooler contaminated of water. No ETC.
OL	NBPC 1	5	08/10/2023 0:00			Forced Outage	Extended PMS (Non-GOMP), ETC None.
OL	TM1 U1	49	08/07/2023 0:01	08/14/2023 22:00	8	Planned Outage	PMS (GOMP), ETC 08/15/2023 2359H.
OL	NBPC 1	5	08/07/2023 0:00	08/10/2023 0:00	3	Maintenance Outage	PMS(Non-GOMP), ETC August 9, 2023.

## Appendix A. Major Plant Outages

Plant Type	Plant/ Unit Name	Capacity (MW)	Date Out	Date In	Duration (Days)	Outage Type	Remarks
<b>Mindanao</b>							
OIL	WMPC Unit 10	10.7	07/31/2023 8:50	08/16/2023 10:00	16	Forced Outage	Tripped due to waterleak. Unplanned Outage. No ETC.
OIL	WMPC Unit 4	10.7	05/01/2023 21:59			Forced Outage	Tripped due to generator earth fault. Unplanned Outage. ETC October 20 2023.
SOLR	ADG U0	20	08/17/2023 19:42			Forced Outage	Unable to generate due to damage main switchgear at line 1 to replace feeder cable of line 1. Unplanned Outage. No ETC.
BAT	MACO BAT1	20	09/25/2023 10:30			Forced Outage	Unplanned Outage. Root-cause under investigation.
BAT	JASAAN BAT1	20	09/18/2023 11:45	09/23/2023 14:40	5	Maintenance Outage	Maintenance Outage
COAL	GNPK U1	151.9	09/20/2023 10:21			Maintenance Outage	Planned Outage. (PMS) ETC 10/30/2023 2359H.
COAL	GNPK U1	151.9	09/20/2023 0:01			Maintenance Outage	Planned Outage. (PMS) ETC 10/30/2023 2359H.
COAL	GNPK U4	151	09/18/2023 21:56	09/23/2023 5:30	4	Forced Outage	Forced Outage due to UCB Triggered Off Signal (Tentative Indication). No ETC
COAL	STE U2	116	09/18/2023 8:35	09/25/2023 14:03	7	Forced Outage	Emergency shutdown due to tube leak. (Unplanned Outage). No ETC.
COAL	FMP U3	135	09/17/2023 22:15			Maintenance Outage	PMS (GOMP). ETC October 02 2023.
COAL	DCPP Unit 1	151.4	09/17/2023 0:25			Maintenance Outage	PMS (GOMP). ETC October 11 2023.
COAL	STE U1	116	09/12/2023 10:19	09/17/2023 14:13	5	Forced Outage	Emergency shutdown due to Boiler Fouling. ETC Sept 21 2023
COAL	STE U2	116	09/11/2023 18:45	09/16/2023 14:12	5	Forced Outage	Emergency shutdown due to Boiler Fouling. ETC Sept 20 2023
COAL	FMP U2	135	09/05/2023 10:52	09/11/2023 0:01	6	Forced Outage	Emergency maintenance re: tube leak at boiler backpass. ETC: 12-Sep-2023
COAL	MCC U2	55	09/01/2023 0:01	09/11/2023 23:48	11	Maintenance Outage	PMS (Non-GOMP). ETC September 20 2023
COAL	STE U2	116	08/23/2023 13:00	09/01/2023 4:11	9	Forced Outage	Forced Outage due to fouling of boiler. No ETC.
COAL	STE U1	116	08/25/2023 5:50	09/02/2023 17:35	8	Forced Outage	Forced outage due to boiler fouling. No ETC.
COAL	FMP U1	135	08/28/2023 0:01	09/08/2023 18:10	14	Maintenance Outage	PMS (GOMP). ETC September 9 2023
COAL	DCPP Unit 2	150	08/22/2023 0:22			Maintenance Outage	Planned Outage. PMS ETC 10/01/2023 2359H
HYD	AG6 U1	31.5	09/23/2023 18:49			Forced Outage	Shutdown. Repair of governor oil pump not yet resolved. Note Forced outage since 05/24/2023 1650. Closed at 09/23/2023 1511H for test run of governor.
HYD	PG4 U3	75	09/18/2023 8:02	09/23/2023 7:51	5	Maintenance Outage	PMS (Non-GOMP). ETC September 23 2023.
HYD	AG4 U1	52.7	09/15/2023 11:00	09/19/2023 9:02	4	Forced Outage	Emergency shutdown due to frequent governor hunting.
HYD	PG4 U1	75	09/05/2023 0:02	09/07/2023 20:54	3	Maintenance Outage	PMS (Non-GOMP). ETC: September 8 2023
HYD	AG2 U1	60	09/02/2023 14:45	09/11/2023 14:24	9	Forced Outage	Tripped due to high temperature of turbine guide bearing (Unplanned Outage).
HYD	PG4 U2	75	09/02/2023 0:01	09/04/2023 12:15	3	Forced Outage	Emergency shutdown due to low water inflow.
HYD	AG4 U1	52.7	08/28/2023 8:05	09/15/2023 8:59	18	Maintenance Outage	Planned Outage (GOMP). ETC: September 29 2023.
HYD	PG4 U3	75	08/08/2023 0:02	08/30/2023 15:39	23	Maintenance Outage	PMS (GOMP). ETC 08/30/2023
HYD	AG6 U1	31.5	05/24/2023 16:50	09/21/2023 9:15	120	Forced Outage	Emergency shutdown due to governor oil pump failure. Unplanned Outage. No ETC.
HYD	AG2 U1	60	08/25/2023 9:05	08/27/2023 16:38	2	Maintenance Outage	PMS(Non-GOMP). ETC August 27 2023.
HYD	AG1 U2	35	08/01/2023 9:23			Maintenance Outage	PMS (GOMP). ETC October 19 2023
OIL	WMPC Unit 4	10.2	05/01/2023 21:59			Forced Outage	Tripped due to generator earth fault. Unplanned Outage. ETC October 20 2023.
OIL	KEP U2	7.8	08/29/2023 13:01	08/31/2023 13:00	2	Forced Outage	Forced Outage due to Smoke Stop replacement. ETC August 31 2023.
OIL	WMPC Unit 4	10.7	05/01/2023 21:59			Forced Outage	Tripped due to generator earth fault. Unplanned Outage. ETC October 20 2023.
OIL	NBPC 1	5	08/10/2023 0:00	08/31/2023 13:00	22	Forced Outage	DG02 on extended PMS undergoing repair and maintenance due to charge air cooler contaminated of water. No ETC.
SOLR	NVVOGTSE1	5	09/25/2023 9:13			Forced Outage	Affected by SOCOTECO 1 substation failure (Outside management control outage).
SOLR	ADG U0	20	08/17/2023 19:42			Forced Outage	Unable to generate due to damage main switchgear at line 1 to replace feeder cable of line 1. Unplanned Outage. No ETC.