Market Surveillance Committee
Monthly Market Assessment Report

26 November to 25 December 2022

March 2023

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

MONTHLY MARKET ASSESSMENT REPORT

(26 November – 25 December 2022)

Philippine Electricity Market Corporation

MMAR-2022-12

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ASSESSMENT OF THE MARKET

NOTABLE HIGHLIGHTS

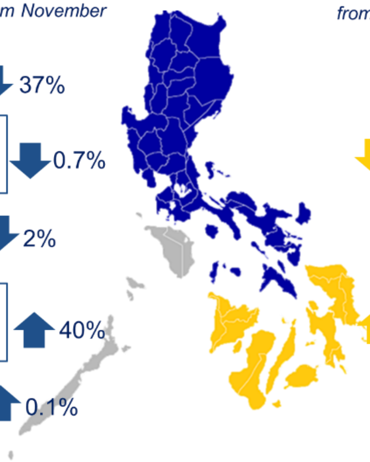
1. **Luzon and Visayas Grids were placed in Red and Yellow Alert levels** due to insufficient operating reserve brought about by forced outages and derated capacities from various power **plants.**
   - **Yellow alert** level: 28 November 2022 (1100H-1700H and 1900H-2100H) and **Red alert** level from 1700H-1800H of the same day.
   - **Yellow alert** level: 01 December 2022 (1400H-2000H)
   - **Yellow alert** level in Luzon Grid: 05 December 2022 (1400H-1600H and 1800H-1900H)
   - **Yellow alert** level in Visayas: 05 December 2022 from (1500H-1700H and 1900H-2100H) and **Red alert** level from 1700H-1800H of the same day.
2. Significant increase in the imposition of secondary price cap.
3. Congestions in transmission lines and transformer equipment resulted from the nature and current design of the transmission system, as well as N-1 contingency impositions by the System Operator (SO). Some notable congestions were as follows:
   - Maasin-Ubay line 1 was congested for 4,778 intervals or equivalent to 73% of the time brought about by the frequent maximization of the line's capacity limit.
   - Samboan-Amlan line 1 was congested for 716 intervals or equivalent to 16% of the time brought about by natural congestions in the line.

SUMMARY OF PRICING CONDITIONS

Pricing error notices (PEN)
- Impositions were due to **inappropriate input data** which affected prices and schedules both for Luzon and Visayas.

Six (6) intervals under Market Intervention (MI)
- On 01 December 2022 at 1025H to 1050H, SO-initiated Market Intervention due to unimplementable RTD schedule.

	LUZON	*from November*	*from November*	VISAYAS
Normal	3,928 intervals (38%)	↓ 37%	↓ 32%	3,610 intervals (42%)
PSM	0 interval (0%)	↓ 0.7%	↓ 0.7%	0 interval (0%)
PEN	44 intervals (1%)	↓ 2%	↓ 1.9%	44 intervals (1%)
SPC	5,292 intervals (61%)	↑ 40%	↑ 35%	4,980 intervals (58%)
AP	6 interval (0.1%)	↑ 0.1%	↑ 0.2%	6 interval (0.1%)



No Price substitution methodology (PSM) impositions noted for the month in review.

Secondary Price Cap (SPC)
- **System-wide:** increased from last month, due to depleted supply margin resulting in high market prices from 26 November to 10 December 2022 and 12-18 December 2022.
- **Regional:** 12 intervals for Visayas and 324 intervals for the Luzon region during those instances when the inter-connection between the grids was unavailable.

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MARKET OUTCOME

EFFECTIVE SUPPLY

11,649
MW
(11,711MW in November)

DEMAND PLUS RESERVE SCHEDULE

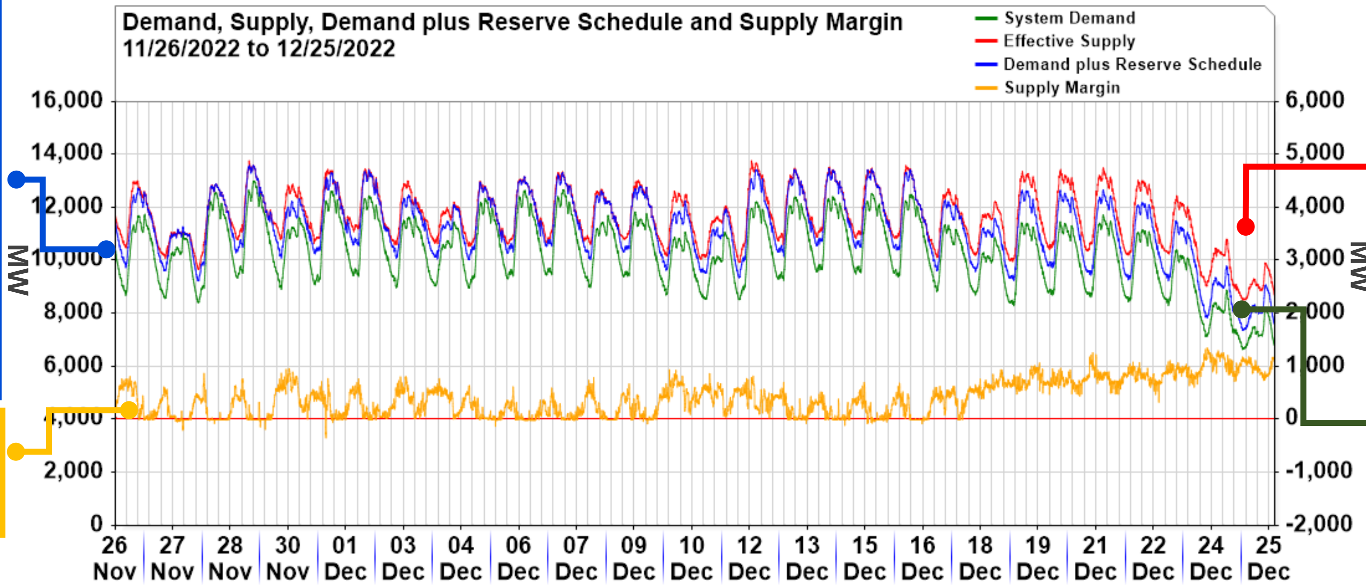
11,233
MW
(11,303MW in November)

SUPPLY MARGIN

416
MW
(408 MW in November)

Demand plus Reserve Schedules
Decreased by an average of 0.6% caused mainly by the **cooler temperature during the rainy and holiday season** which influenced the electricity consumption for the month. A significant drop in demand was seen towards the end of the billing period as it falls on Christmas day when demand is naturally low. Averaged at 11,233 MW as compared to last month's 11,303 MW

Supply Margin improved by 2%, considering the dynamics between supply and demand.



Effective Supply

- Decreased by an average of 0.5% or equivalent to an average of 11,649MW from 11,711MW last month.
- Among the noted reasons for the depleted supply were the **higher capacities on outage** this month and the **effects of ramp limited capacities** which are considered in the determination of the effective supply.

System Demand decreased by an average of 1.1% or was noted to be at 10,344 MW from 10,462 MW last month.

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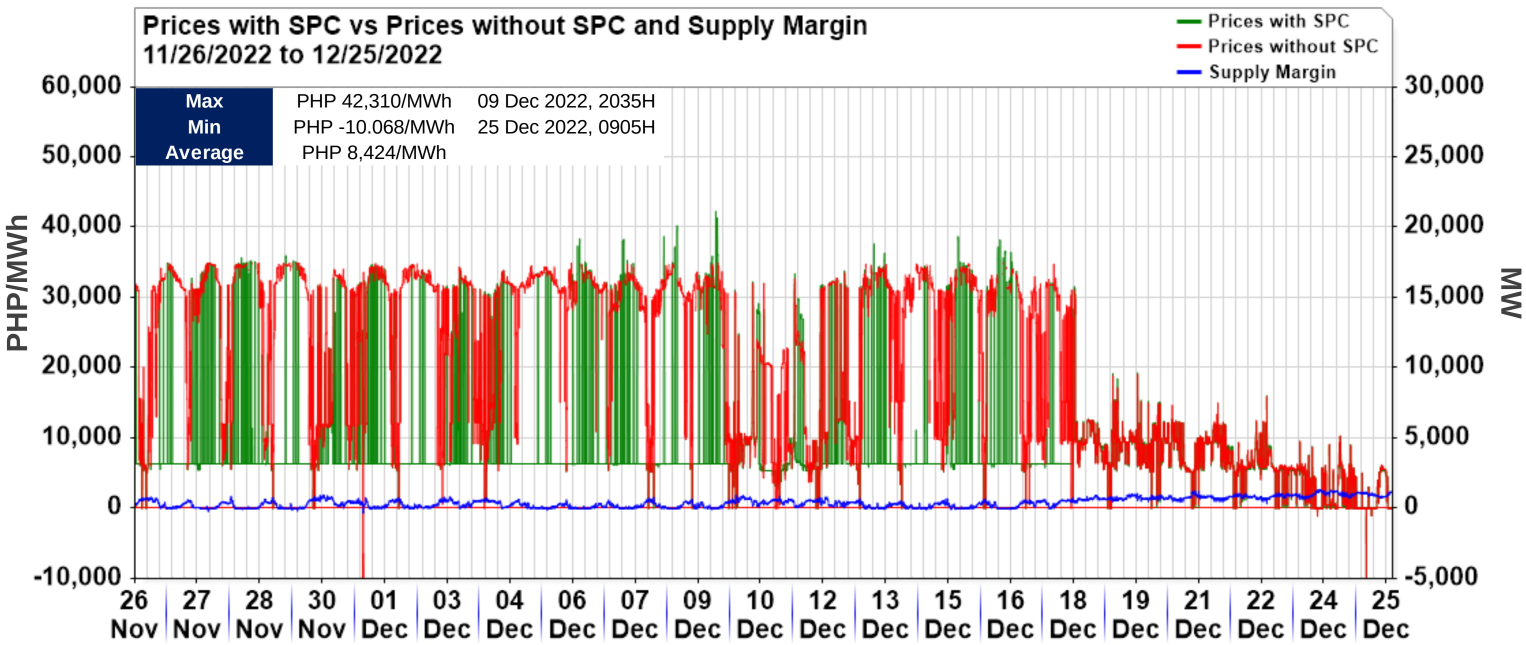
Zone	Average LWAP (PHP/MWh)
NLUZON	8,385.55
MMANILA	8,506.81
SLUZON	8,438.38
LEYTE	8,344.02
CEBU	8,158.92
NEGROS	7,947.38
BOHOL	11,757.40
PANAY	7,908.65

MARKET OUTCOME

Given the dynamics of supply and demand, the level of market prices decreased, on average, by 1.3% or was noted at an average of PHP8,424/MWh from PHP8,531/MWh last month. The estimated monthly average price would have been at PHP20,176/MWh if SPC was not imposed. Year-on-year comparison posted a 35.3% increase from an average price of PHP6,224/MWh last year noting that outages this year were significantly higher than in December 2021, coupled with the expected economic growth, resulting in higher consumption this year and thereby affecting the resulting prices.

Congestion in the Leyte-Bohol interconnection was still persistent due to tight supply situation in the Bohol grid which, in turn, continuously affected the power rates in the Bohol grid causing disparity, as depicted in the table of prices.



PRICE

8,424

PHP/MWh

(PHP8,531/MWh in November)

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MARKET OUTCOME

RAMP LIMITED CAPACITY

2,134

MW

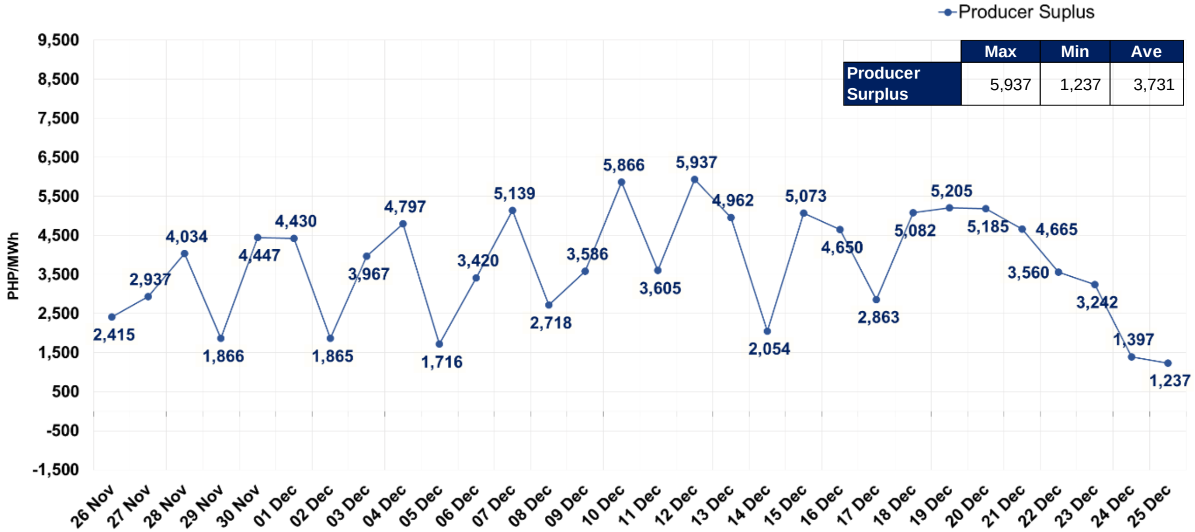
(2,919MW in November)

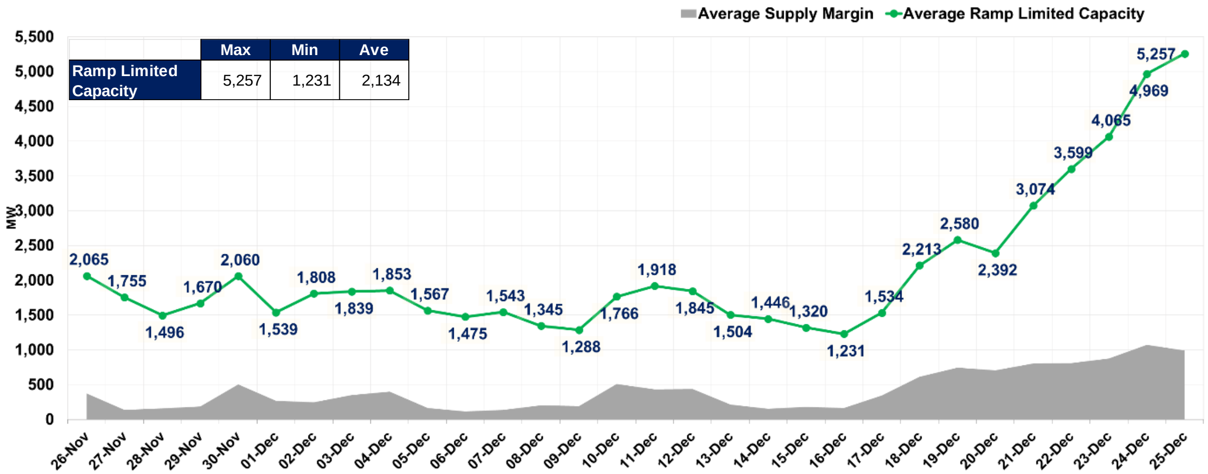
PRODUCER SURPLUS

3,731

PHP/MWh

(PHP4,307/MWh in November)





Producer/generator surplus, averaged at PHP3,731/MWh this month from PHP4,307/MWh last month. This is an average of 13% decrease as compared to November 2022 as affected by the changes in offered prices and resulting prices in the market**.** Offers from Coal and Hydro power plants had the most significant changes in its offer pattern which contributed to the aforementioned changes.

For the month of December, **ramp-limited capacities** decreased by an average of 27% from an average of 2,919 MW last month to 2,134 MW this month which may be affected by the behavior in submitting ramp rates that are considered in the optimization of the market.

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CAPACITY PROFILE

The WESM's registered capacity recorded changes in December 2022 from 21,790.7 MW to 21,830.7 MW due to the net registration changes from the following plant:

Status	Market Participant Name	Market Trading Node	Plant Type	Pmax (MW) New	Change (MW)
New	Universal Power Solutions, Inc.	04ORMOC_BAT	Battery	40	40
				TOTAL	47.2

COAL 9,693 MW (44%)

NATURAL GAS 3,286 MW (15%)

OIL-BASED 2,287 MW (10%)

HYDRO 2,584 MW (12%)

GEOTHERMAL 1,651 MW (8%)

SOLAR 1,208 MW (6%)

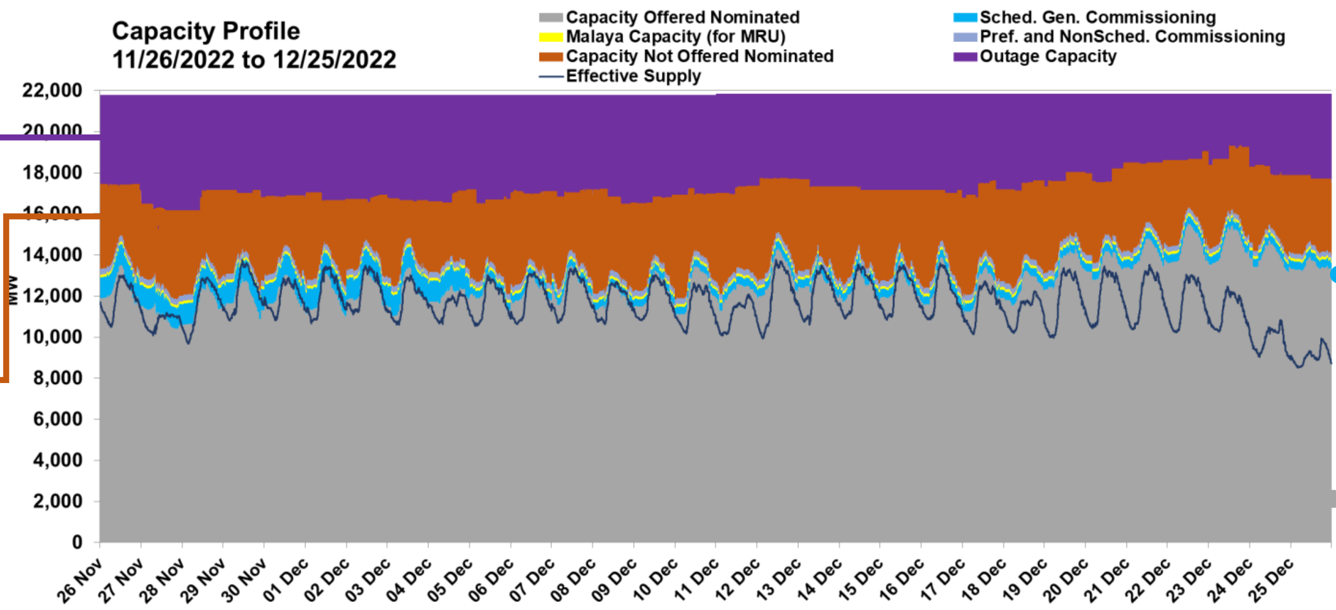
BIOMASS 385 MW (2%)

WIND 428 MW (2%)

BATTERY 310 MW (1%)

Capacity on Outage (21% of Registered Capacity) increased by 21%, which was mostly due to the increase in outages from Coal power plants under forced and maintenance outage categories.

Capacity NOT Offered/Nominated (17% of Registered Capacity) increased by an average of 5.7% or from an average of 3,521 MW last month to 3,722 MW this month attributable to market system and resource constraints.



Malaya Capacity as MRU (1% of Registered Capacity) retained its level at 130 MW.

Capacities under Testing and Commissioning (4% of Registered Capacity) decreased from 1,227 MW last month to 857 MW this month.

Capacities Offered/Nominated (58% of Registered Capacity) decreased by an average of 3.3% or was noted at 12,590 MW as compared to last month's 13,026 MW.

Note: *Capacities not offered are further subject to validation and assessment of the PEMC-Enforcement and Compliance Office (ECO)*

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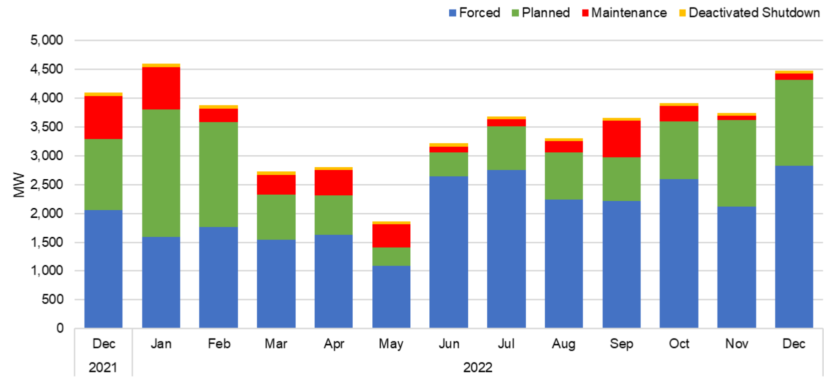
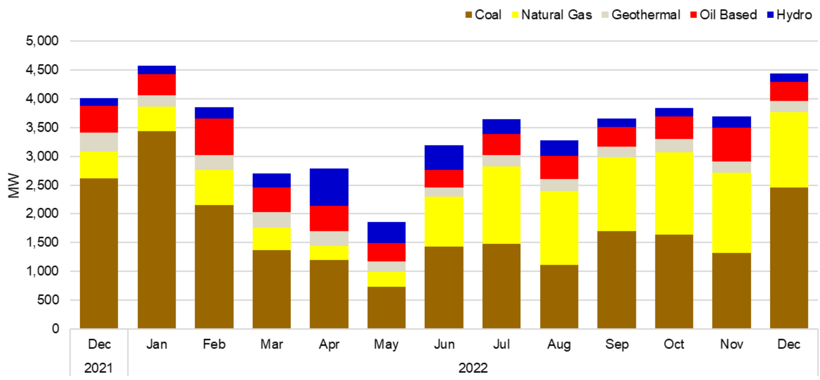
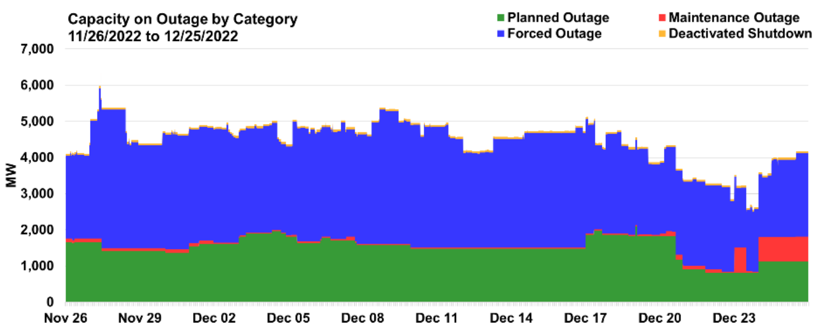
CAPACITY PROFILE

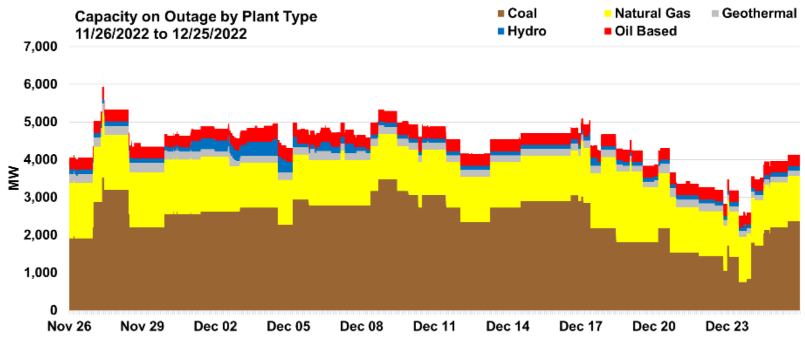
CAPACITY ON OUTAGE BY CATEGORY



CAPACITY ON OUTAGE BY PLANT TYPE







The December 2022 billing month opened with a relatively high level of capacities on outage at around 4,000MW. Outage levels continued to increase to as high as 6,000 MW on 27 November 2022 due to forced outages from large Coal and Natural gas power plants.

The recorded average capacities on outage were mainly due to forced outages of power plants due to technical issues of the plants and with the various transmission line outage leading for the involved plants to be placed under this category. As the month ended, the outage level was at about an average of 4,000 MW.

Note: *The comprehensive information on plant outages in all categories is shown in Annex A, for convenience and reference.*

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MARKET TRANSACTIONS

BILATERAL CONTRACT QUANTITIES

84.2%

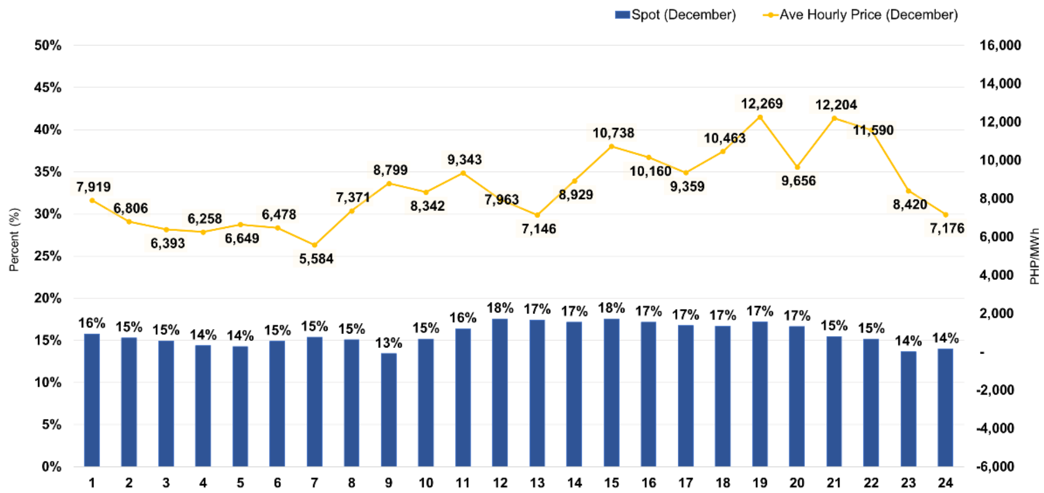
(86.2% in November)

SPOT EXPOSURES

15.8%

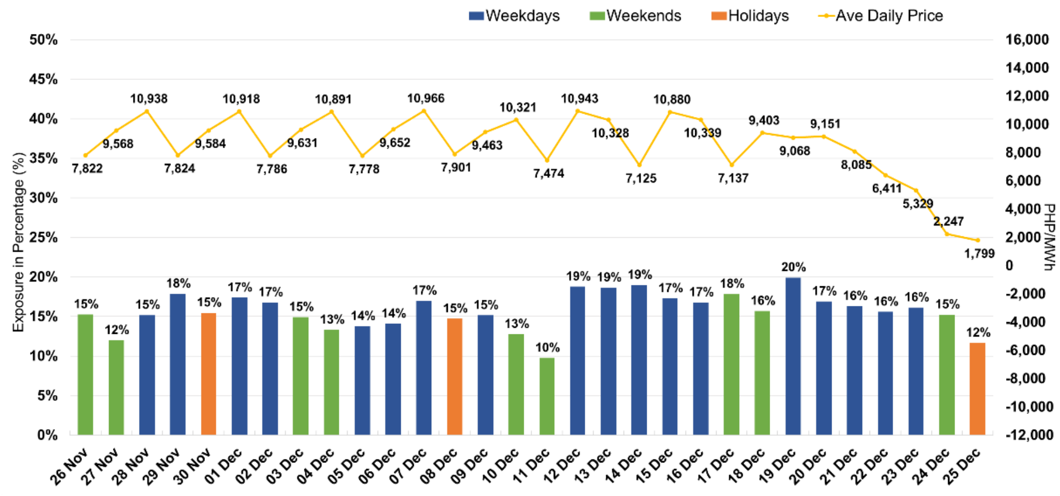
(13.8% in November)

HOURLY SPOT



Total spot quantities of generator participants in December posted an average of 14.7% during off-peak hours and 16.8% during peak hours.

DAILY SPOT



Spot exposures during weekdays averaged at 16.6% while it was 13.9% during the weekends.

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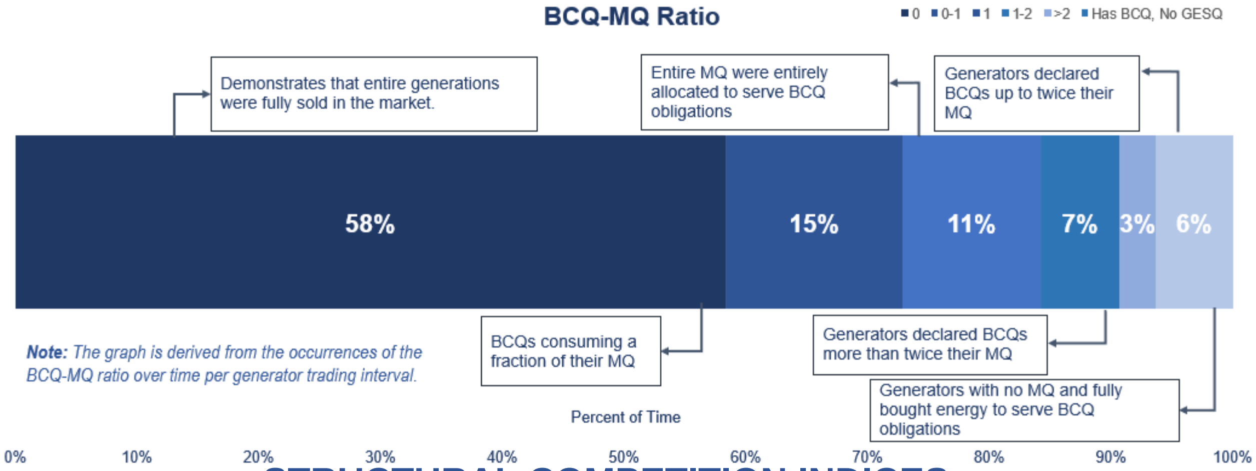
MARKET TRANSACTIONS

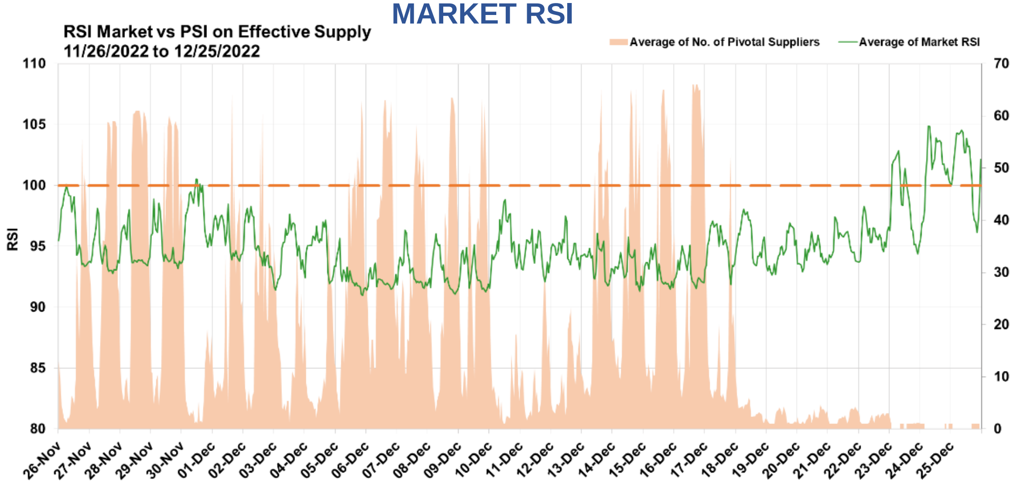
BCQ-MQ Ratio



Note: *The graph is derived from the occurrences of the BCQ-MQ ratio over time per generator trading interval.*

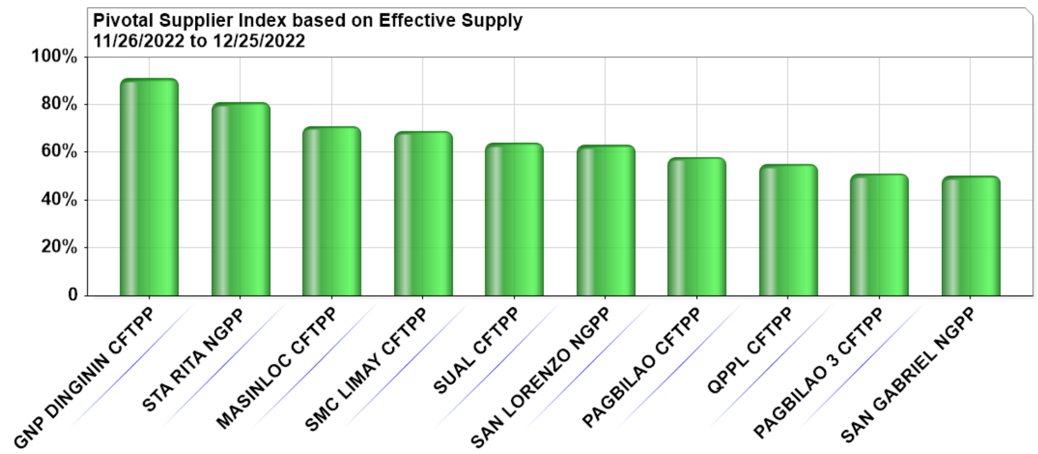
STRUCTURAL COMPETITION INDICES

MARKET RSI



- The market Residual Supply Index (RSI) was below the 100% mark for about 92.9% of the time this month compared to about 96.2% last month, signifying the presence of pivotal plants.
- During the December 2022 billing month, the market resulted in RSIs ranging from 91% to 104.9% and averaged at 95.1%. The average market prices for intervals with RSI below 100% was PHP9,038/MWh but would have been at an average price of PHP20,872/MWh if SPC was not imposed, while those with RSIs above 100 had recorded average price of PHP3,088/MWh which would have been PHP3,239/MWh without the imposition of SPC.

PIVOTAL PLANTS



- A total of 163 power plants were pivotal during the period from 157 last month, with 69% or 112 plants coming from the Luzon region and 51 plants from the Visayas region.
- The noted decrease in effective supply still translated to a low RSI and high number of pivotal suppliers per dispatch interval.

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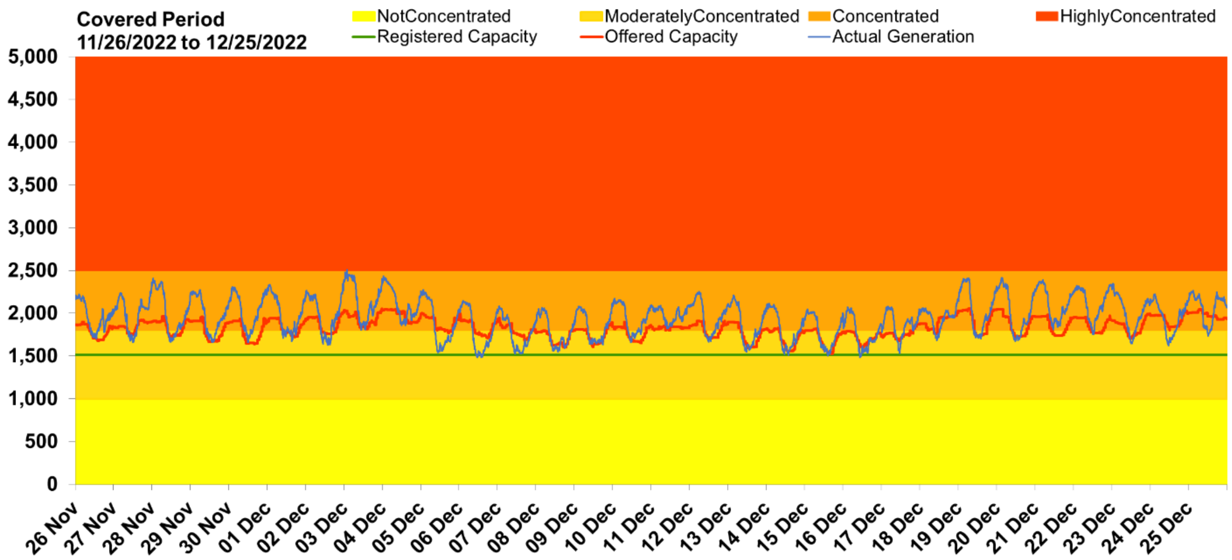
MARKET CONCENTRATION, ENERGY TRADING AMOUNT (ETA), AND SPOT EXPOSURE

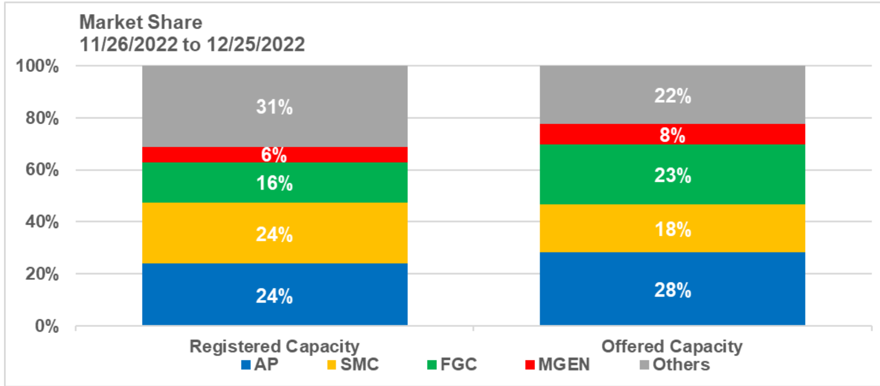
MARKET HHI



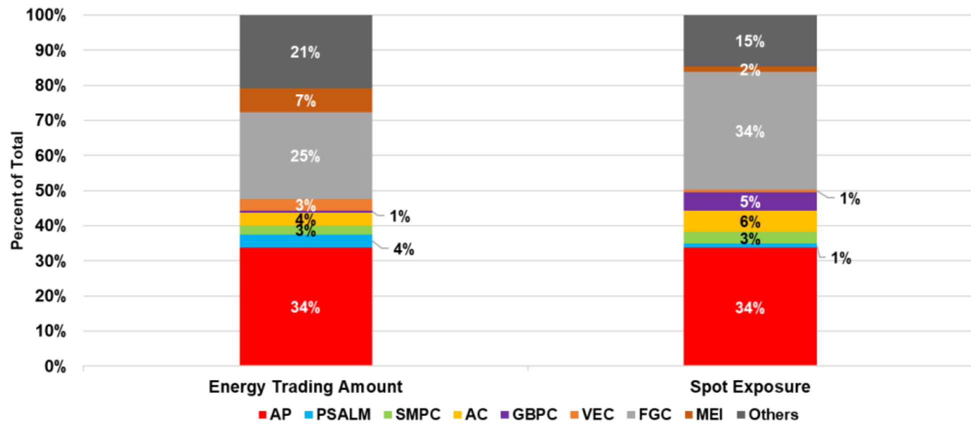
Herfindahl-Hirschman Index (HHI), by major participant grouping

- Based on Offered Capacity: **moderately concentrated market** for 41% of the time (3,523 intervals) this month from 58% of the time last month, and **concentrated market** for 59% of the time or for 5,117 intervals.
  - This was brought about by the effects of **changes in the availability of generators** which subsequently affected the resulting market shares.
- Based on Metered Quantities: **moderately concentrated market** for 28.1% of the time (2,426 intervals) and **concentrated market** for 71.9% of the time or for 6,212 intervals. Three (3) major participant groups have consistently covered more than 50% of the MQ shares which were due to their frequent dispatch, mostly covered by BCQ, and subsequently affected the resulting market concentration.
- Based on Registered Capacity: **moderately concentrated market** for the whole month of December 2022.

MARKET SHARE



Aboitiz Power (AP), San Miguel Corporation (SMC), First Gen Corporation (FGC), and Meralco PowerGen Corporation (MGEN) dominated the market with their combined market shares comprising 69% of the total registered capacities in the WESM. The shares of the major participant remained similarly close to last month.



The top 3 participants with highest shares in terms of ETA and spot exposure comprised about 65% of the total shares in both measures. This may also indicate high level of market concentration that affects market competition.

DEFINITIONS, REFERENCES, AND INTERPRETATION

- **Pricing Error Notice (PEN)**
  - a pricing algorithm in the market and are categorized according to cause, as either Network congestion pricing errors or non-congestion pricing errors. Pricing error notice shall be issued only for the market run where the pricing error is determined by the Market Operator to have occurred.

- **Secondary Price Cap (SPC)**
  - a preventive mitigating measure instituted by the ERC to avoid excessive high market prices through its imposition on succeeding intervals, upon breach of PHP9,000/MWh Rolling Average of the generator-weighted average price (GWAP) for a running period of 3 days or 864 5-minute intervals. In this case, market prices are capped at PHP6,245/MWh.

- **Administered Price (AP)**
  - administered price determination methodology which shall be implemented by the Market Operator to impose administered prices on dispatch intervals under market suspension or market intervention.
  - administered price shall be established by the Market Operator in accordance with guiding principles as set forth by the WESM rules.

- **Generator/Producer Surplus**
  - represents the difference between the price a generator receives and their willingness to sell for each quantity.
  - daily average price of the producer/generator surplus is derived from the daily weighted average price of all the generator trading participants during peak and off-peak hours. Increase and decrease in the daily weighted average price depend on the generator schedule per dispatch interval

- **Pivotal Suppliers**
  - The market measures how critical a particular generator is in meeting the total demand at a particular time, taking into consideration the variables that change dynamically, mainly demand (energy withdrawn), required spinning (or operational) reserve and generation availability.

- **Price Substitution Methodology (PSM)**
  - a pricing algorithm that shall be implemented in all the regions where the WESM is in operation. In cases where a region/s has no interconnection with other regions, or has no exchange of power with other regions, this region/s shall be separately assessed for the application of the price substitution methodology.
  - The price substitution methodology shall apply to a *dispatch interval* when the trigger factor exceeds the threshold, which shall be set at 0.2, subject to annual review.
  - The dispatch schedules arrived at in the original (constrained) market solution for the relevant dispatch interval will stand and will be the basis for dispatch by the System Operator irrespective of the results of the unconstrained solution. Redispatch of generation units will be implemented by the System Operator in accordance with relevant provisions of the WESM Rules and Market Manuals, the Philippine Grid Code and other relevant rules, regulations, issuances, guidelines, and procedures.

- **Ramp Limited Capacity**
  - generator restricted capacities due to the plants' intrinsic ramp rates.
  - Ramp rate is essentially the speed at which a generator can increase (ramp up) or decrease (ramp down) generation. Generating units have different characteristics, making some more suited to supplying certain needed functions.

- **Energy Trading Amount**
  - The energy trading amount for a trading participant and settlement interval shall be determined using the final energy dispatch prices for that node, the gross energy settlement quantities, and bilateral contract quantities for that node in the dispatch intervals within the same settlement interval.

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Annex A. List of Major Plant Outages

Plant Type	Plant/ Unit Name	Capacity (MW)	Date Out	Date In	Duration (Days)	Outage Type	Remarks
Luzon							
NATG	San Lorenzo 2	265	12/25/2022 23:50			Planned Outage	Planned Outage.
COAL	SMC 1	150	12/24/2022 18:26			Forced Outage	Unplanned outage due to suspected reheater tube leak.
COAL	Masinloc 3	335	12/24/2022 11:40			Forced Outage	Tripped due to feed water transmitter problem.
COAL	Sual 1	647	12/23/2022 23:44			Maintenance Outage	Maintenance outage until December 28 2022 to repair boiler tube leak.
COAL	Masinloc 1	315	12/23/2022 23:40			Planned Outage	Planned outage until February 21 2023.
COAL	Pagbilao 1	382	12/20/2022 3:52	12/22/2022 20:17	3	Forced Outage	Generator Protection trip.
COAL	SLTEC 2	124	12/17/2022 0:18			Planned Outage	On planned outage until January 31 2023.
COAL	Pagbilao 1	382	12/13/2022 6:33	12/18/2022 10:40	5	Forced Outage	Condenser tube leak
COAL	Pagbilao 1	382	12/08/2022 8:49	12/12/2022 1:20	4	Forced Outage	Emergency shutdown due to suspected boiler tube leak.
COAL	GNP Dinginin 2	668	12/05/2022 3:59	12/17/2022 9:20	12	Forced Outage	Unplanned shutdown due to submersible scrapper conveyor hopper slag and clinker blockage.
GEO	Makban 9	20	12/03/2022 1:01	12/18/2022 17:21	16	Planned Outage	Planned Outage.
GEO	Makban 10	20	12/03/2022 1:01	12/18/2022 17:21	16	Planned Outage	Planned Outage.
OIL	Limay 2	60	12/03/2022 0:01	12/07/2022 16:25	5	Planned Outage	Planned Outage.
COAL	ANDA 1	72	12/01/2022 9:30			Planned Outage	Planned Outage.
HYD	Kalayaan 4	180	12/01/2022 0:00	12/05/2022 8:20	4	Planned Outage	On planned outage until December 5 2022.
COAL	Masinloc 3	335	11/29/2022 21:48	12/10/2022 7:46	10	Forced Outage	Emergency shutdown due to boiler tube leak.
NATG	Sta. Rita 2	255.7	11/27/2022 6:51	12/02/2022 13:41	5	Forced Outage	Autotripped due to gas turbine protection problem.
COAL	Calaca 2	300	11/26/2022 22:52	12/23/2022 2:03	26	Forced Outage	Emergency shutdown due to high generator vibration
GEO	Tiwi 1	60	11/30/2021 18:32			Forced Outage	Steam supply diverted to Unit 2.
COAL	Sual 2	647	11/18/2022 23:39	12/20/2022 15:27	32	Planned Outage	Planned Outage
NATG	Sta. Rita 4	264	11/12/2022 0:05	11/27/2022 10:49	15	Planned Outage	Planned Outage.
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.
COAL	SBPL	455	11/25/2022 11:52	12/04/2022 13:28	9	Forced Outage	Corrective maintenance on Turbine HP bypass valves A & B
OIL	MGTPP	85	09/29/2021 16:52			Forced Outage	Tripped from 14MW due to turbine bearing shaft vibration. IEMOP deregistration effective December 25 2021.
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
GEO	Makban 6	55	04/11/2013 22:44			Deactivated Shutdown	Conducted Gas compressor test.
GEO	Makban 1	57	11/21/2022 7:16	12/01/2022 23:09	11	Maintenance Outage	On Maintenance Outage until November 30 2022.
NATG	Ilijan B3	220	06/05/2022 0:00			Forced Outage	End of Cooperation Period of Ilijan NGPP.
NATG	Ilijan B2	190	06/05/2022 0:00			Forced Outage	End of Cooperation Period of Ilijan NGPP.
NATG	Ilijan B1	190	05/02/2022 20:08			Forced Outage	End of Cooperation Period of Ilijan NGPP.
NATG	Ilijan A3	220	06/04/2022 22:42			Forced Outage	End of Cooperation Period of Ilijan NGPP.
NATG	Ilijan A2	190	06/04/2022 19:45			Forced Outage	End of Cooperation Period of Ilijan NGPP.
NATG	Ilijan A1	190	06/04/2022 22:53			Forced Outage	End of Cooperation Period of Ilijan NGPP.
COAL	GN Power 2	316	10/15/2022 0:17			Planned Outage	General maintenance outage.
HYD	Caliraya 1	14	11/14/2022 16:45	12/01/2022 1:47	16	Forced Outage	Unplanned shutdown due to high vibration.
COAL	Calaca 1	240	10/01/2022 4:46			Planned Outage	Planned Outage Correction of burner and replacement of boiler tube
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.
HYD	Angat A 1	6	08/22/2022 8:01			Planned Outage	Planned Outage until April 21 2023
Visayas							
COAL	THVI 1	169	12/25/2022 11:44			Forced Outage	Unit tripped due to steam drum level high-high
BIOF	FFHC	9	12/25/2022 11:32			Maintenance Outage	Offline due to weekly maintenance.
BIOF	HPCO	3	12/25/2022 1:40			Maintenance Outage	Offline due to weekly maintenance.
OIL	TPVI 1	6.7	12/17/2022 21:00			Forced Outage	EMERGENCY CUT-OUT DUE TO HEAVY WATER LEAK AT CHARGE-AIR COOLING WATER RETURN PIPELINE
COAL	THVI 1	169	12/14/2022 12:33	12/17/2022 2:15	3	Forced Outage	UNIT CUT-OUT FROM THE SYSTEM DUE TO INTERCEPT CONTROL VALVE NO. 2 (ICV2) PROBLEM
BIOF	South Negros	25	12/12/2022 17:41			Forced Outage	Offline due to unavailability of bagasse.
GEO	Leyte 3	40.2	11/22/2022 0:31	12/10/2022 16:32	19	Maintenance Outage	MAINTENANCE DERATING
OIL	TPVI 1	6.7	12/06/2022 21:54	12/17/2022 19:12	11	Forced Outage	Heavy water leak
BIOF	San Carlos Bio	20	12/04/2022 5:27	12/12/2022 9:57	8	Forced Outage	Offline due to Boiler problem.
COAL	Kepco Salcon 2	103	12/03/2022 0:01	12/21/2022 20:20	19	Planned Outage	Manually cut-out for APMS
BIOF	South Negros	25	12/02/2022 17:14	12/09/2022 18:14	7	Forced Outage	Offline with Vibrated grate overload indication.
OIL	Bohol 2	4	11/27/2022 20:43	12/03/2022 7:46	5	Forced Outage	Heavy smoke at crankcase door.
GEO	Leyte 1	41	11/26/2022 0:27	11/30/2022 0:53	4	Planned Outage	PMS ETC Nov 30 2022
BIOF	VMC	2.5	03/13/2022 9:38			Maintenance Outage	Offline due to weekly maintenance.
GEO	Upper Mahiao 2	32	11/23/2022 9:50			Maintenance Outage	Emergency shutdown due to problem in control valve
OIL	TPVI 5	6.8	11/14/2022 18:44	12/16/2022 15:29	32	Forced Outage	UNIT TRIPPED
OIL	TPVI 3	6.8	10/12/2022 0:11			Forced Outage	UNIT TRIPPED DUE TO ERRATIC MAIN BEARING NO. 7 SUDDEN HIGH TEMPERATURE INDICATION
BIOF	South Negros	25	11/25/2022 8:18	11/30/2022 8:51	5	Forced Outage	Offline due to main steam temp. very low
BIOF	San Carlos Bio	20	11/04/2022 16:31	12/01/2022 17:21	27	Forced Outage	Isolate from the grid due to emergency shutdown of 69KV Cadiz-San Carlos Sub TL (CO).
COAL	PEDC 3	150	11/24/2022 3:08	12/05/2022 19:58	12	Forced Outage	Possible tube leak
COAL	Kepco Salcon 1	103	11/19/2022 0:00	12/10/2022 22:05	22	Planned Outage	Manually Shutdown for APMS-GOMP

Notes:
1. *List of Major Plant Outages includes all generating units with capacities above 10MW located in Luzon and above 5MW for plants located in Visayas.*
2. *Outages with duration of 1 day and below were not included in the list of Major Plant Outages*
3. *Daily outages with drastic effects to the market are monitored through separate indices*