

**PEMC MARKET ASSESSMENT HIGHLIGHTS**

- The average demand and the reserve schedule, recorded at 10,113 MW during the week of 13 - 19 Dec 2021, was lower than the previous week at 10,493 MW, lower than the same week last year at 10,815 MW. Various areas were under the ECQ, MECQ or the GCQ.1
- The WESM registered capacity stood at 21,404 MW at the end of the week.
- An average supply margin of 641 MW was observed during the week, which is lower by about 19% relative to the previous week and lower by about 72% in comparison with the same week last year. The supply margin of 58.03 MW observed on 17 December 2021 00:15 was the tightest during the week. The average supply margin was 579.71 MW at peak intervals and 677.31 MW at off-peak intervals.
- The outage capacity averaged at 4,534 MW, higher than last week's 3,743 MW. About 68% of the 4,534 MW involved Coal plants, while in terms of category, about 50% were Forced Outages.
- The average effective supply during the week was 10,753 MW, lower than the 11,281 MW of the previous week and lower than the 13,102 MW during the same week last year. Ramping limitations in generators' offers persisted which caused the lowering of effective supply.
- Average GWAP was recorded at PHP 7,283/MWh from PHP 5,158/MWh last week. This is higher than the PHP 2,904/MWh during the same week last year. Administered prices were used in Visayas during the ERC's declaration of Market Suspension starting 1942H 16 December 2021 and also on Luzon during the MO-initiated Market Intervention from 2215H to 2345H of 16 December 2021
- The secondary price cap was imposed on 617 intervals in Luzon this week
- The top 5 participant groups accounted for about 78% of the offered capacity. The Herfindahl-Hirschman Index (HHI) by participant group indicated a moderately concentrated market based on the registered and offered capacities.
- Based on the effective supply, the top 5 pivotal plants during the week were –

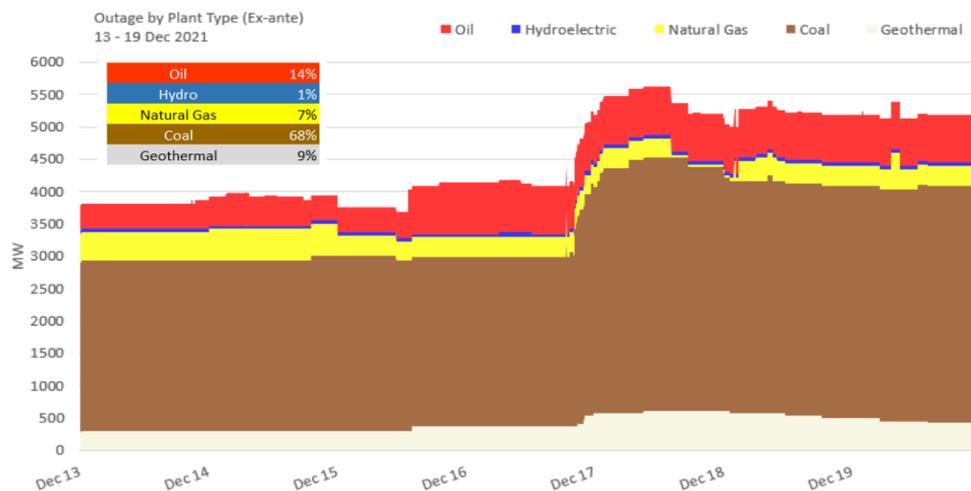
1. STA RITA NGPP (about 66.07% of the time)
2. PAGBILAO CFTPP (about 61.76% of the time)
3. ILIJAN NGPP (about 55.75% of the time)
4. MASINLOC CFTPP (about 49.16% of the time)
5. SMC LIMAY CFTPP (about 38.69% of the time)

The offer pattern analysis showed decrease in coal and hydro plants' offered capacity. The average offer price demonstrated increase in coal and oil-based plants in contrast with hydro plants.

**IEMOP MARKET SYSTEMS ADVISORY**

Market Intervention was initiated by the Market Operator on 16 December 2021 on intervals 22:15 to 23:45 resulting from market management system power flow divergence caused by erratic real time data during the passage of Typhoon Odette

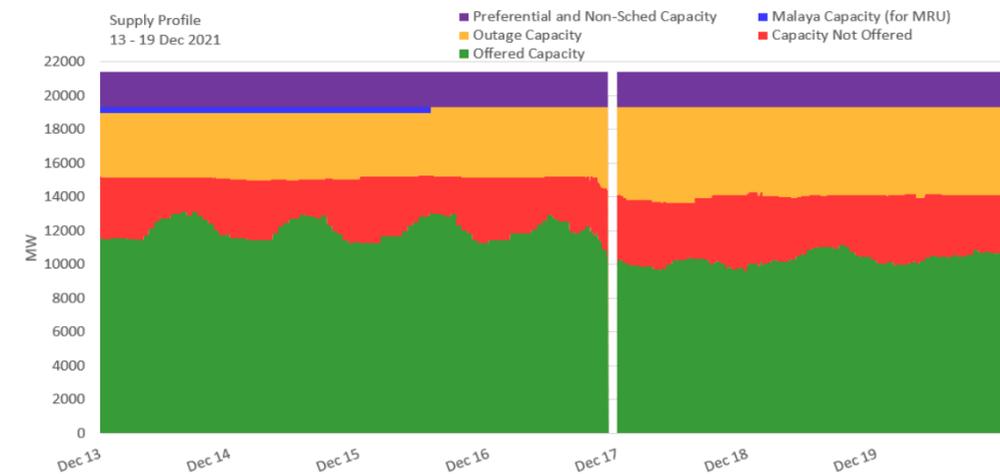
**OUTAGE CAPACITY BY PLANT TYPE**



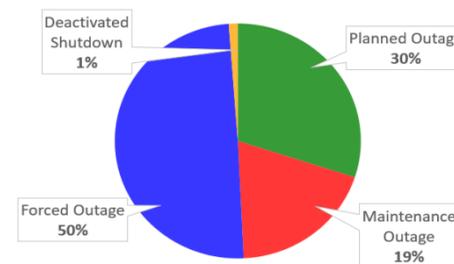
**SUMMARY (PRICE, SUPPLY, DEMAND AND RESERVE SCHEDULE)**

Particulars	13 - 19 Dec 2021	Previous Week (06 - 12 Dec 2021 )	Same Week, Previous Year (07 - 13 Dec 2020)	Percent Change From		
				Previous Week	Same Week, Prev Year	
GWAP (PHP/MWh)	max	31,603.78	31,141.51	13,446.41	1.48%	135.04%
	min.	-9,540.64	-8,855.36	1,575.78	-7.74%	-705.45%
	w. ave.	7,283.08	5,158.32	2,904.08	41.19%	150.79%
Effective Supply (MW)	max	13,278.43	12,888.95	14,292.02	3.02%	-7.09%
	min.	8,547.79	9,203.89	11,982.80	-7.13%	-28.67%
	ave.	10,754.18	11,281.25	13,102.44	-4.67%	-17.92%
System Demand (MW)	max	11,455.64	11,093.37	11,597.17	3.27%	-1.22%
	min.	7,290.50	7,573.88	7,950.05	-3.74%	-8.30%
	ave.	9,293.06	9,531.16	9,674.74	-2.50%	-3.95%
Demand + Reserve Schedule (MW)	max	12,563.28	12,102.99	12,856.07	3.80%	-2.28%
	min.	7,926.50	8,560.88	8,933.32	-7.41%	-11.27%
	ave.	10,113.39	10,492.79	10,814.90	-3.62%	-6.49%
Supply Margin (MW)	max	1,189.90	1,291.62	3,977.85	-7.88%	-70.09%
	min.	58.03	153.60	845.32	-62.22%	-93.14%
	ave.	641.46	788.46	2,287.54	-18.64%	-71.96%

**SUPPLY PROFILE**



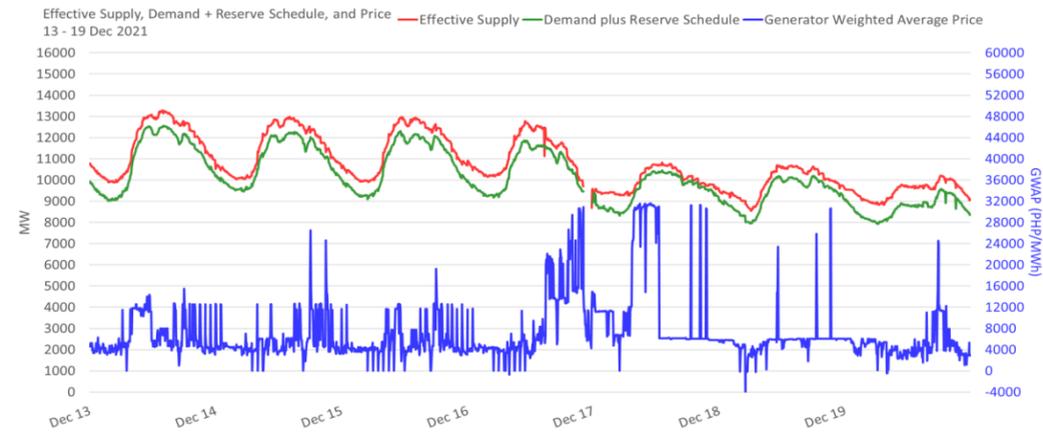
**OUTAGE CAPACITY BY OUTAGE CATEGORY**



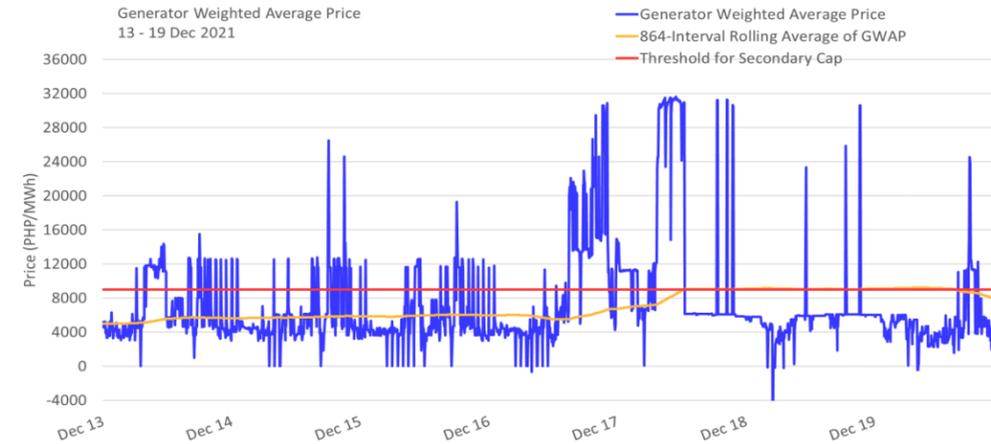
<sup>1</sup> Apayao is the only province under the stricter Alert Level 3. Most of the country is under Alert Level 2 as well for the same time period. Areas under Alert Level 2 from December 1-15:

- Cordillera Administrative Region
- Ilocos Region (Region I)
- Cagayan Valley (Region II)
- Central Luzon (Region III)
- Calabarzon (Region IV-A)
- Mimaropa (Region IV-B)
- Bicol (Region V)
- Western Visayas (Region VI)
- Central Visayas (Region VII)
- Eastern Visayas (Region VIII)
- Zamboanga Peninsula (Region IX)
- Northern Mindanao (Region X)
- Davao Region (Region XI)
- Soccsksargen (Region XII)
- Caraga (Region XIII)
- Bangsamoro Autonomous Region in Muslim Mindanao

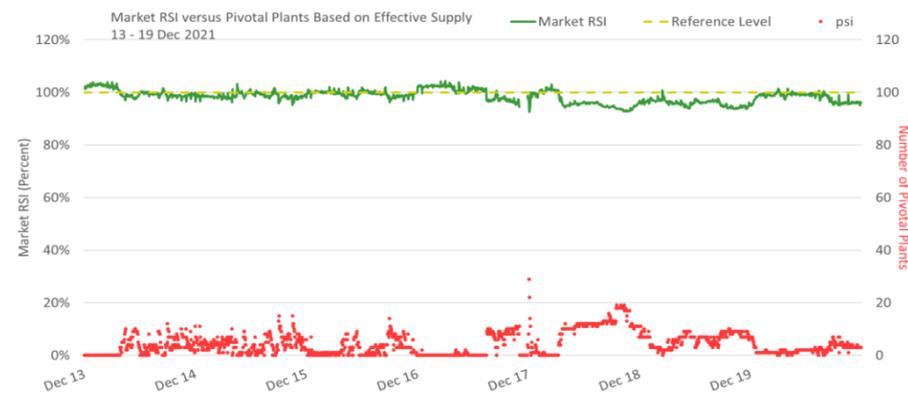
**SUPPLY, DEMAND AND PRICE**



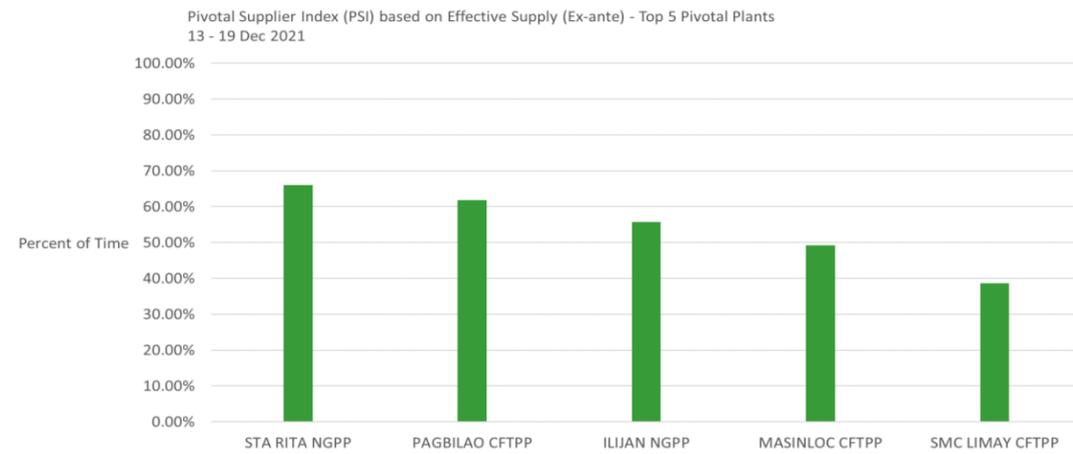
**GENERATOR WEIGHTED AVERAGE PRICE**



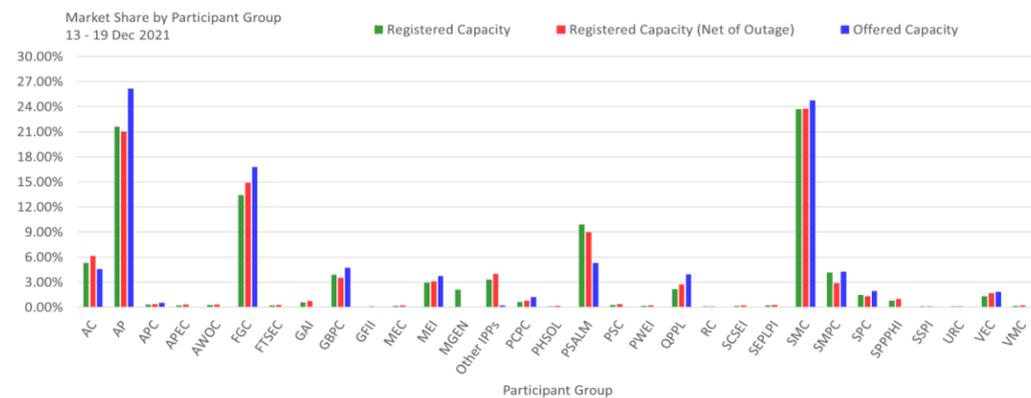
**MARKET RSI VS PIVOTAL PLANTS**



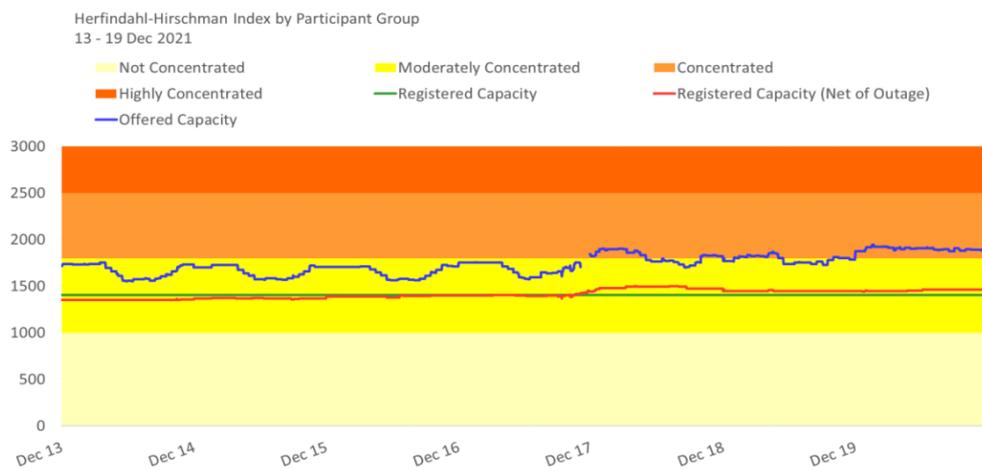
**PSI**



**MARKET SHARE**



**HERFINDAHL-HIRSCHMAN INDEX**

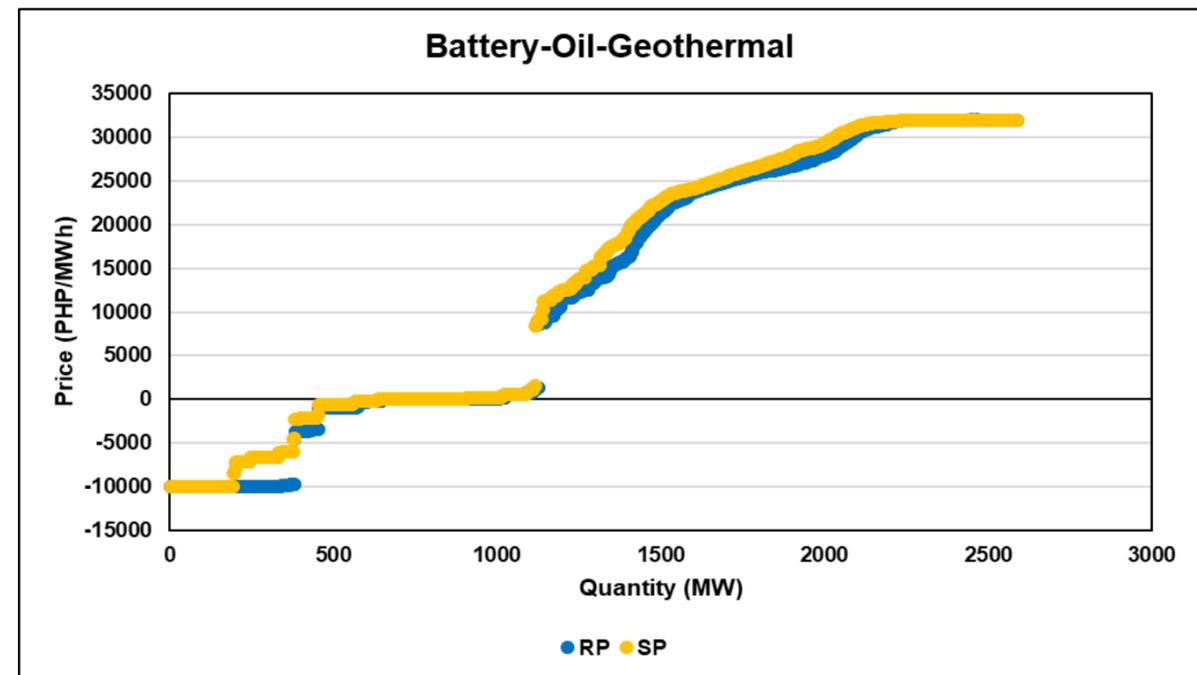
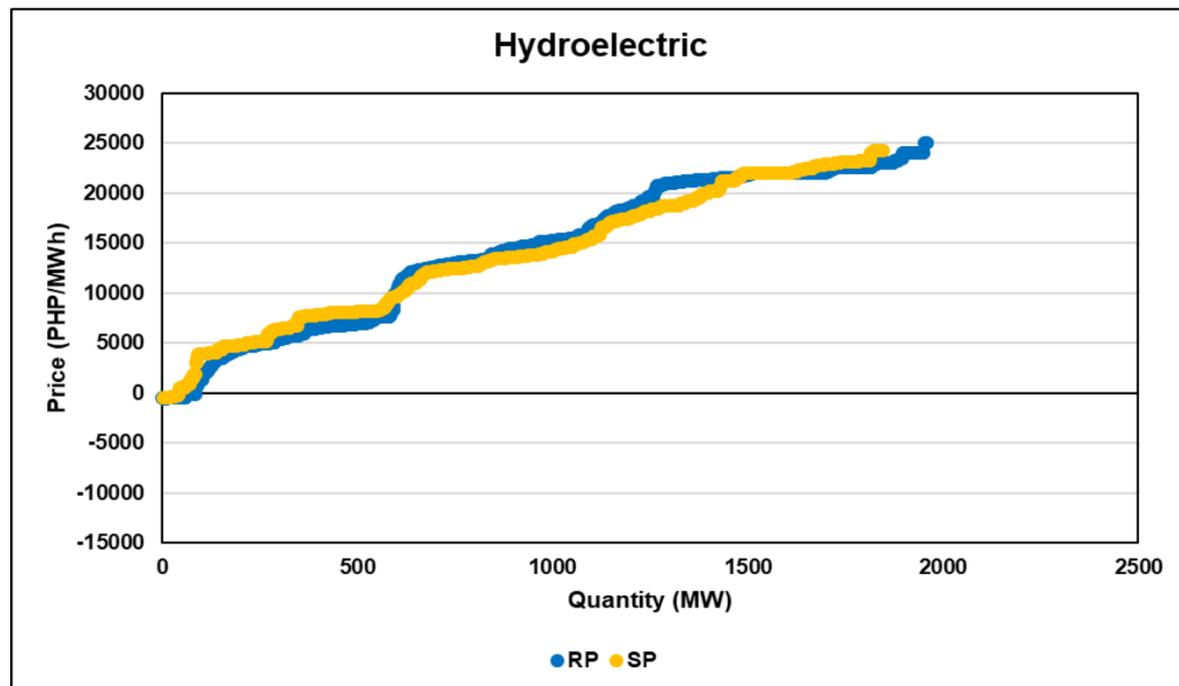
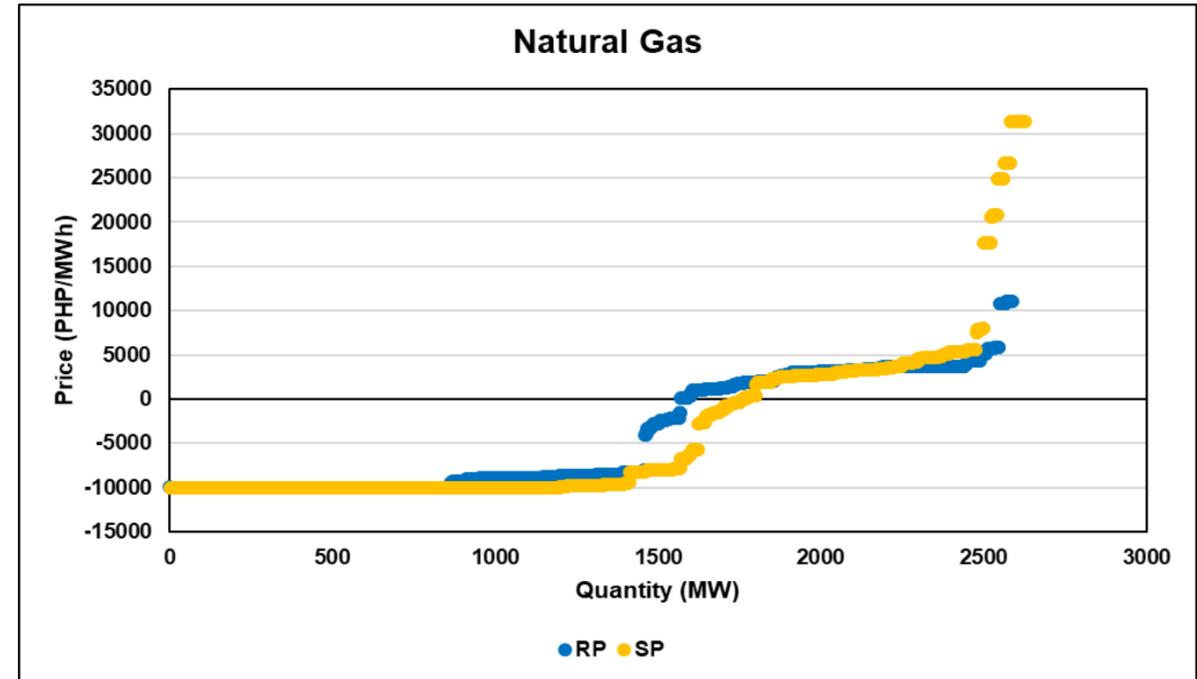
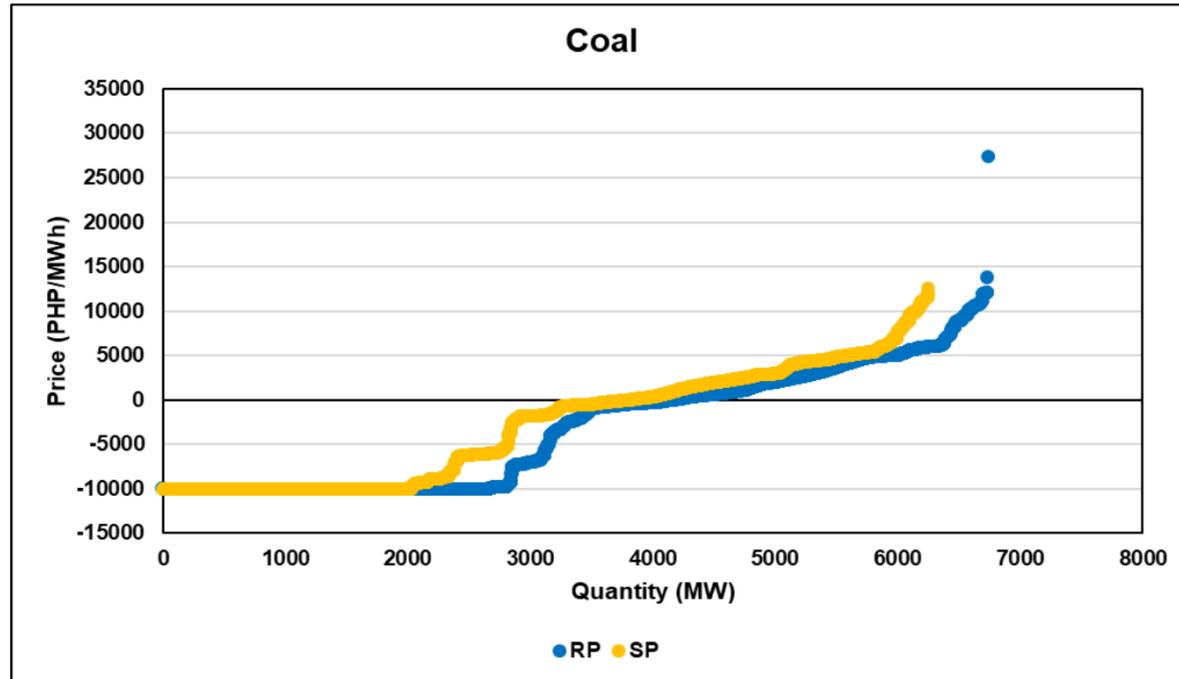


**OFFER PATTERN ANALYSIS**

**Legend**

RP: Reference Offer Price – the week of 06-12 Dec 2021 was used as a control for the comparison with the subject price

SP: Subject Offer Price – the week of 13-19 Dec 2021



**GLOSSARY OF TERMS**

**HERFINDAHL-HIRSCHMAN INDEX (HHI)** - is a commonly accepted measure of market concentration that takes into account the relative size and distribution of participants in the market. The HHI is a number between 0 and 10,000, which is calculated as the sum of squares of the participant's market share. 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 following are the widely used HHI screening numbers: (1) less than 1,000 - not concentrated; (2) 1,000 to 1,800 - moderately concentrated; (3) greater than 1,800 - concentrated; and (4) greater than 2,500 - highly concentrated.

The HHI is calculated using the (i) registered capacity, (ii) registered capacity net of outage, (iii) offered capacity, (iv) metered quantity, and (v) spot transaction (metered quantity net of bilateral contract declarations).

**MARKET RESIDUAL SUPPLY INDEX (Market RSI)** - The RSI is a dynamic continuous index measured as ratio of the available generation without a generator to the total generation required to supply the demand. The RSI is measured for each generator. The greater the RSI of a generator, the less will be its potential ability to exercise market power and manipulate prices, as there will be sufficient capacity from the other generators. In contrary, the lower the RSI, the greater the market power of a generator (and its potential benefit of exercising market power), as the market is strongly dependent on its availability to be able to fully supply the demand. In particular, a RSI greater than 100% for a generator means that the remaining generators can cover the demand, and in principle that generator cannot manipulate market price. On the other hand, a RSI less than 100% means that the generator is pivotal in supplying the demand.

The RSI for the whole market (Market RSI) is measured as the lowest RSI among all the generators in the market. A Market RSI less than 100% indicates the presence of pivotal generator/s.

**PRICE SETTING FREQUENCY INDEX (PSFI)** - A generator trading node is considered as a price setter when its last accepted offer price is between 95% to 100% of its nodal price. A generating plant is considered as price setter if at least one of its trading nodes was price setter in a given trading hour. The price setters are determined from: (i) ex-ante for trading intervals without pricing error during ex-ante, (ii) ex-post with pricing error during ex-ante but without pricing error during ex-post, (iii) market re-run results for trading intervals with pricing error both in ex-ante and ex-post, and (iv) trading intervals where the price substitution methodology (PSM) was applied. For trading intervals affected by PSM, the unconstrained marginal plants are considered price setters. Further, in instances of regional price separation, price setters are determined separately for each region.

**MARKET SHARE** - The fraction of the total capacity or energy that a company or related group owns or controls in the market.

**PIVOTAL SUPPLIER INDEX (PSI)** - The pivotal supplier index is a binary variable (1 for pivotal and 0 for not pivotal) for each generator. The index identifies whether a generator is pivotal in supplying the demand. The PSI is calculated as the percentage of time that a generator is pivotal in a period (i.e. monthly).

**CAPACITY FACTOR** - The index assesses the performance of the generators in the market. A high capacity factor indicates the high utilization of the generators.

**CAPACITY PROFILE** - The hourly factors affecting supply, which include, among others, the offered capacity, outage capacity and ancillary services schedule.

**MAJOR PARTICIPANT GROUP** - The grouping of generators by ownership or control.

**REGISTERED CAPACITY** - The capacity registered by a generator with WESM.

**REGISTERED CAPACITY (NET OF OUTAGE)** - The capacity registered by a generator with WESM less capacity on outage.

**OFFERED CAPACITY** - The hourly offer to supply electricity submitted by a generator.

**METERED QUANTITY** - The hourly quantity of electricity generated by a generator.

**SPOT TRANSACTION** - The hourly quantity of electricity sold to the market by a generator net of bilateal contract declaration accounted for in the settlement.

**ANCILLARY SERVICES SCHEDULES** - The hourly quantity scheduled by the System Operator to provide regulating, contingency and dispatchable reserves.

**EFFECTIVE SUPPLY** - The hourly 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 provided by the System Operator and other constraints considered during MMS simulation such as generator offered ramp rates. Scheduled output of plants on testing and commissioning through the imposition of security limit by SO and scheduled output of Malaya plant when it is called to run as Must Run Unit (MRU) are likewise accounted for in the effective supply.

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