

MAG-MMAR-2020-04

MONTHLY MARKET ASSESSMENT REPORT

For the Billing Period 26 March to 25 April 2020



**PHILIPPINE
ELECTRICITY
MARKET
CORPORATION**

**MARKET ASSESSMENT GROUP
(MAG)**

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Monthly Market Assessment Report for April 2020 Billing Month

1. Assessment of the Market

- Majority of the time or 92 percent of the total market price outcomes in April 2020 was a result of normal pricing condition
- The remainder, however, required other forms of pricing methodologies
 - Price Substitution Methodology was applied to a low 8 percent of the outcomes which the majority was due to frequent congestion events on Samboan-Amlan line 1
 - Prices with pricing error occurred around 1 percent of the time as a result of inappropriate input data affecting Luzon and Visayas' prices and schedules
- None of the intervals were imposed with administered prices and secondary price caps

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

Pricing Condition	No. of Intervals			
	Luzon	% of Time	Visayas	% of Time
Normal	682	91.7%	687	92.3%
Congestion	56	7.5%	56	7.5%
Pricing Error Notice	6	0.8%	1	0.1%
Administered Price	0	0%	0	0%
Secondary Cap	0	0%	0	0%
Total	744	100%	744	100%

- For those intervals under normal condition, a significant decline in the price pattern was observed due to the interaction between the supply and demand as a result of the sustained Enhanced Community Quarantine (ECQ) implementation
- Supply situation saw a decline in trend driven by the higher recorded outages this month while demand was consistently low and in opposite trend of usual April months with high demand

Notable Highlight/s:

1. *Unusual decline in the demand and price*
 - *Observance of persistent demand and price depression as a result of the declaration of Enhanced Community Quarantine caused by the Coronavirus Disease 2019 (COVID-19)*

2. Market Outcome

2.1. Price

2.1.1. Price and Supply Margin

- On 15 March, the implementation of the Community Quarantine, and on 17 March, the Enhancement of the Community Quarantine (ECQ) resulted to a further decline in market price which was still evident in the April billing month
- LWAP of April 2020 at PhP1,494/MWh was the lowest recorded monthly price in the previous 5 years (2015-2019) for any month
- A record-breaking average supply margin at 3,402 MW for the month of April was noted to have been the highest recorded supply margin since 2015
- As monthly average supply margin was soaring high, an opposite trend was observed in the average market price in contrast with years past

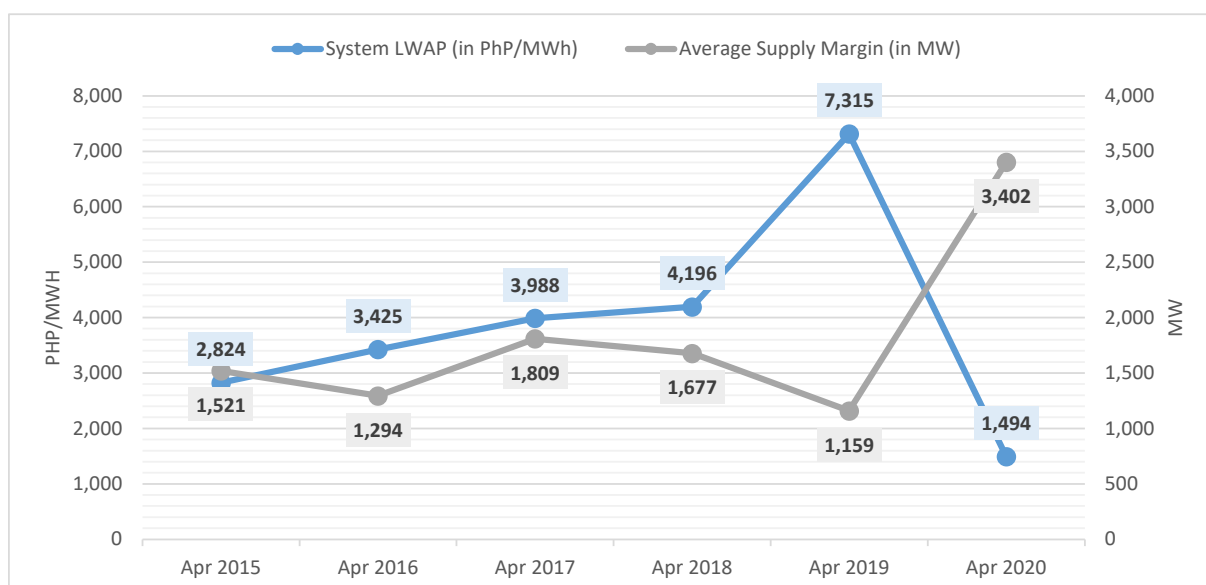


Figure 1. System LWAP and Supply Margin, April 2015-2020

- Monthly load weighted average price (LWAP) decreased by 39% as compared to March
 - Monthly average peak prices decreased by 45% from PhP2,734/MWh to PhP1,511/MWh
 - Monthly average off-peak prices decreased by 31% from PhP2,137 to PhP1,479/MWh
- No price spikes¹ recorded in April 2020 billing month

¹ Market price triggers on price spikes are regularly monitored with thresholds based on the following:

- Cool Dry (26 Nov to 25 Feb) – Peak: PhP21,000/MWh; Off-peak: PhP8,500/MWh
- Hot Dry (26 Feb to 25 May) – Peak: PhP25,000/MWh; Off-peak: PhP16,500/MWh
- Rainy (26 May to 25 Nov) – Peak: PhP20,000/MWh; Off-peak: PhP12,000/MWh

- The uptick in average supply margin, given that previous month was already high to begin with, indicates an unusual level of supply margin during this hot dry season
- The LWAP was seen to have further decreased despite the resulting low and uncommon level of market price in an April billing month
- Average supply margin further widened by 11 percent from 3,057 MW in March 2020 to 3,402 MW in April 2020

Table 2. System LWAP and Supply Margin, Mar and Apr 2015-2020

Year	Month	Average Supply Margin	% Change in Average Supply Margin	System LWAP	% Change in System LWAP
2015	March	1,163	31%	5,114	-45%
	April	1,521		2,824	
2016	March	1,427	-9%	3,296	4%
	April	1,294		3,425	
2017	March	1,508	20%	3,538	13%
	April	1,809		3,988	
2018	March	1,431	17%	5,095	-18%
	April	1,677		4,196	
2019	March	1,644	-30%	5,082	44%
	April	1,159		7,315	
2020	March	3,057	11%	2,447	-39%
	April	3,402		1,494	

- Hourly resolution of supply margin showed the lowest recorded supply margin at 1,161 MW on 25 April 2020 2200H as a result of the high outage reaching 3,525 MW and the slightly increasing level of demand towards the end of the billing month
- Also, occurring on the same date and interval was the highest hourly LWAP recorded in the market for April 2020 at PhP5,410/MWh
- Hourly LWAP pattern over the month was consistently low despite occurrence of the high price on 25 April 2020 22H
- Due to sufficient level of supply to satisfy the demand, prices reached as low as PhP0/MWh on several hours
- On 15 to 21 April, prices were consistent and averaged at PhP1,919/MWh owing to the high outage during the period and high demand relative to the onset of the month

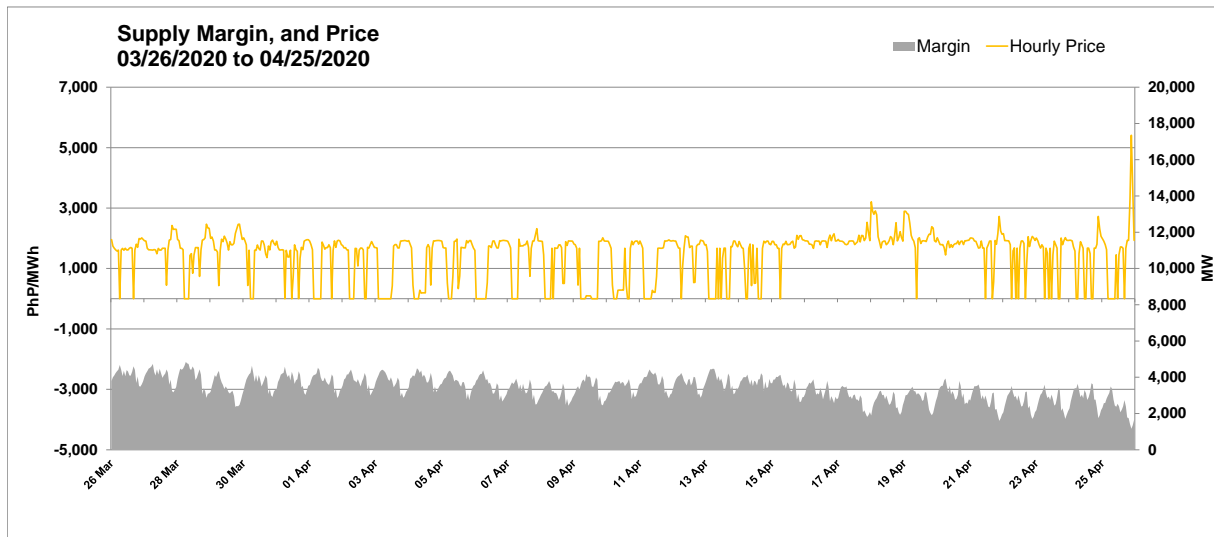


Figure 2. Supply Margin and Price, April 2020

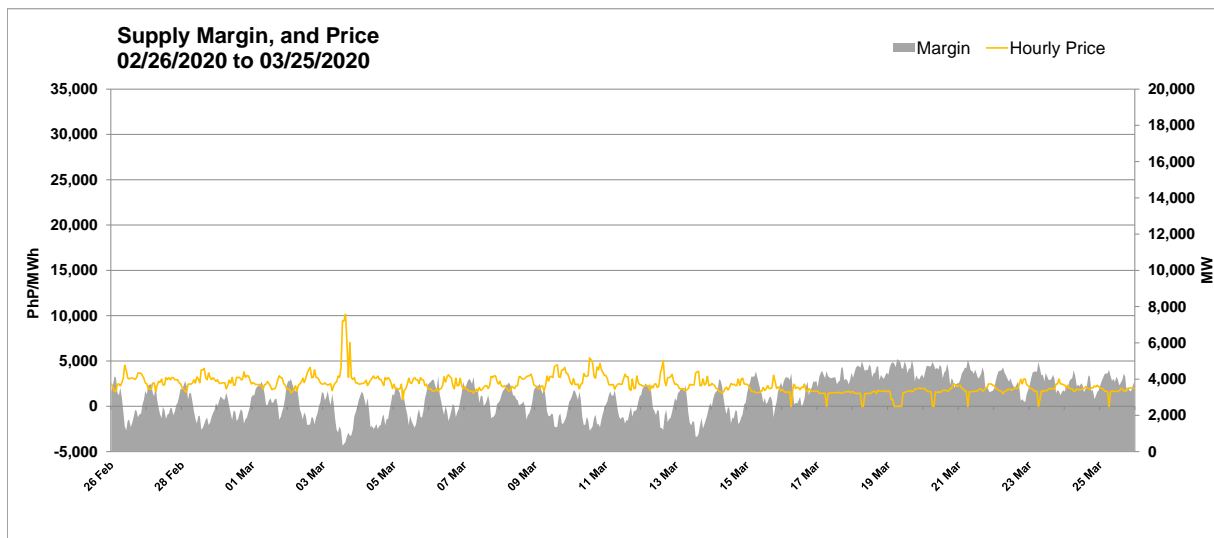


Figure 3. Supply Margin and Price, March 2020

2.1.2. Price Duration Curve²

- For peak and off-peak hours, about 90 percent of the load nodal prices in April fell below PhP2,057/MWh while distribution of prices in March were seen to be below PhP3,426/MWh about the same time percentage.
- High load nodal prices reaching as high as PhP6,396/MWh were evident during hour 22 due to the recorded highest level of outage on 25 April
- Maximum off-peak and peak load nodal price reached PhP6,396/MWh and PhP3,918/MWh in April, respectively

² Nodal prices are subject to change upon final validation of prices

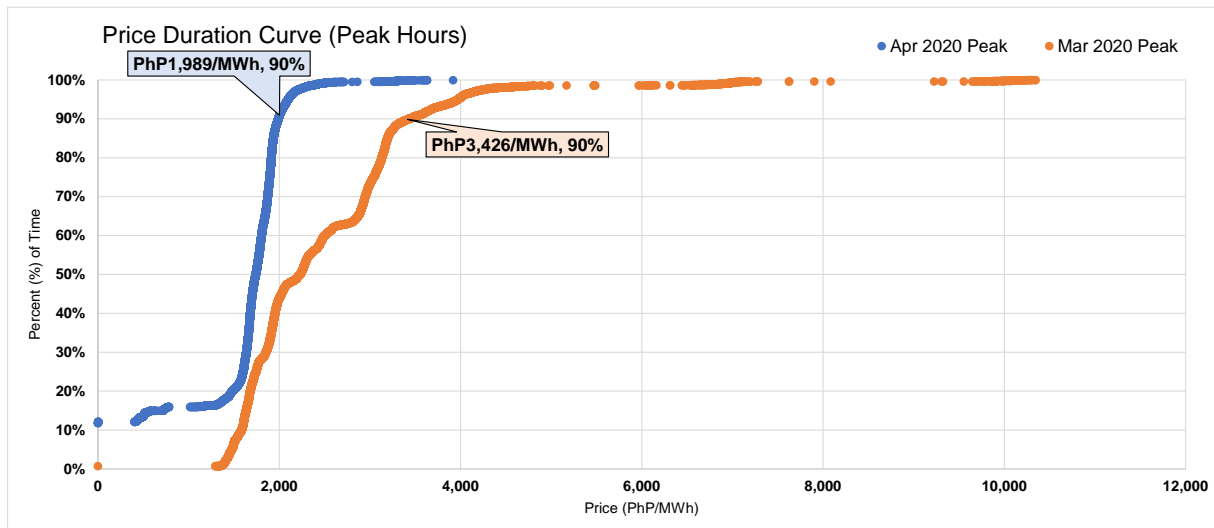


Figure 4. Load Nodal Price Duration Curve (Peak), Apr 2020 and Mar 2020

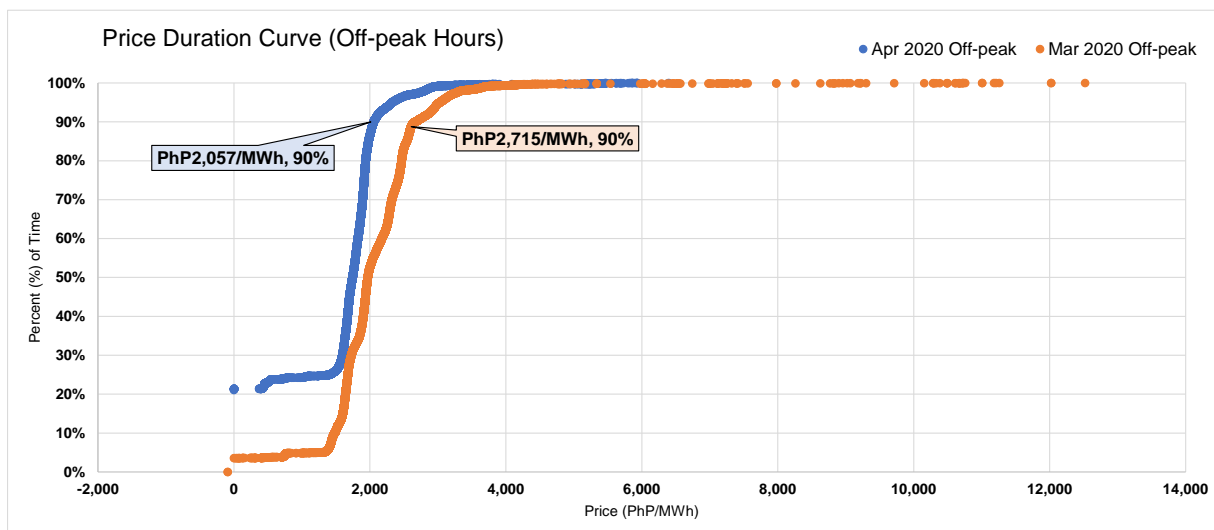


Figure 5. Load Nodal Price Duration Curve (Off-peak), Apr 2020 and Mar 2020

2.2. Supply

- An increase of 20 MW for this month from a total of 20,171.97 MW to 20,191.97 MW was recorded in the WESM registered capacity
 - 20-MW SMCGRP Philippines Energy Storage Co. Ltd. battery plant in Visayas
- Available capacity³ constituted an average of 14,717 MW or 73 percent of the total registered capacity
- Although there was a decrease in available capacity as a consequence of higher outages recorded this month, this coincided with the persistent low demand experienced during ECQ period

³ Available capacity refers to the aggregate of Capacity Offered/Nominated, Malaya Capacity for MRU, and Capacity of Plants on Testing and Commissioning

- Capacity not offered comprised an average of 2,831 MW or 14 percent
- Outage capacity accounted for an average of 2,630 MW or 13 percent

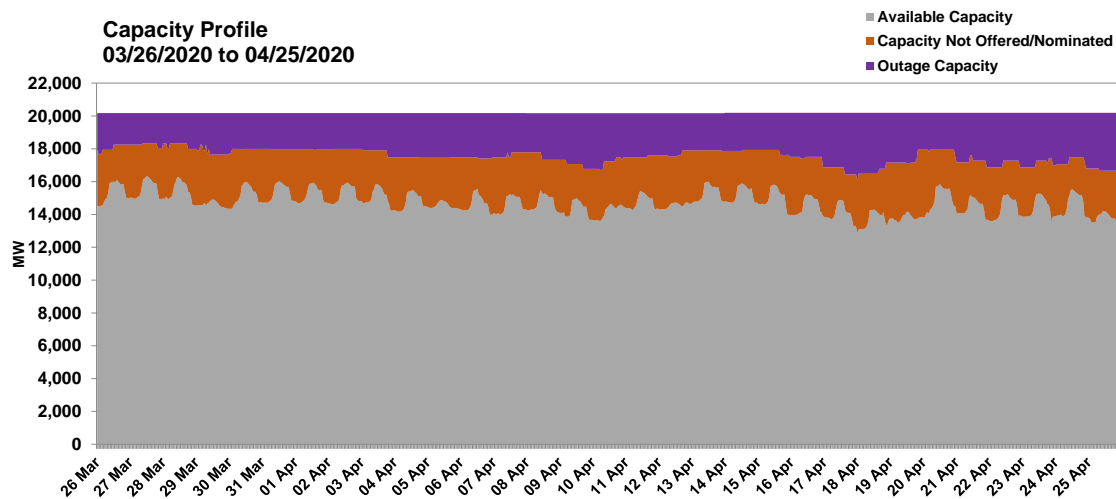


Figure 6. Capacity Profile, April 2020

2.2.1. Outage Capacity⁴

- Outage capacity significantly increased by 35 percent from an average of 1,952 MW last month to an average of 2,630 MW this month
- Planned outages comprised only 300 MW or 11 percent of the total outages, majority or about 84 percent was composed of forced outages averaging at 2,253 MW, and maintenance outages constituted 85 MW or 3 percent of the total outages. Meanwhile, deactivated shutdown accounted for only about 55 MW or 2 percent of the outages.

Table 3. Outage Factor by Plant Type and Outage Category, Apr 2020

Plant Type	Planned Outage	Forced Outage	Maintenance Outage	Deactivated Shutdown
Coal	100%	73%	91%	
Natural Gas		3%	9%	
Geothermal		10.96%		100%
Hydro		0%		
Oil-based		13%		
TOTAL	100%	100%	100%	100%

- Planned outages had a noticeable decline of about 36 percent in line with the low level of scheduled outage during the summer months
- Level of planned outages was also observed to be consistent throughout the April billing month at around 300 MW, owing to the outages of SLPGC CFTPP unit 2 (150 MW) and SMC CFTPP unit 3 (150 MW)

⁴ Notable plants on outage are detailed in the Annex

- Similar with the planned outages, maintenance outages were stable at an average of 85 MW
- Level of total outages was on an uptrend towards the end of the billing period, closing with 3,390 MW from its opening level of 2,316 MW

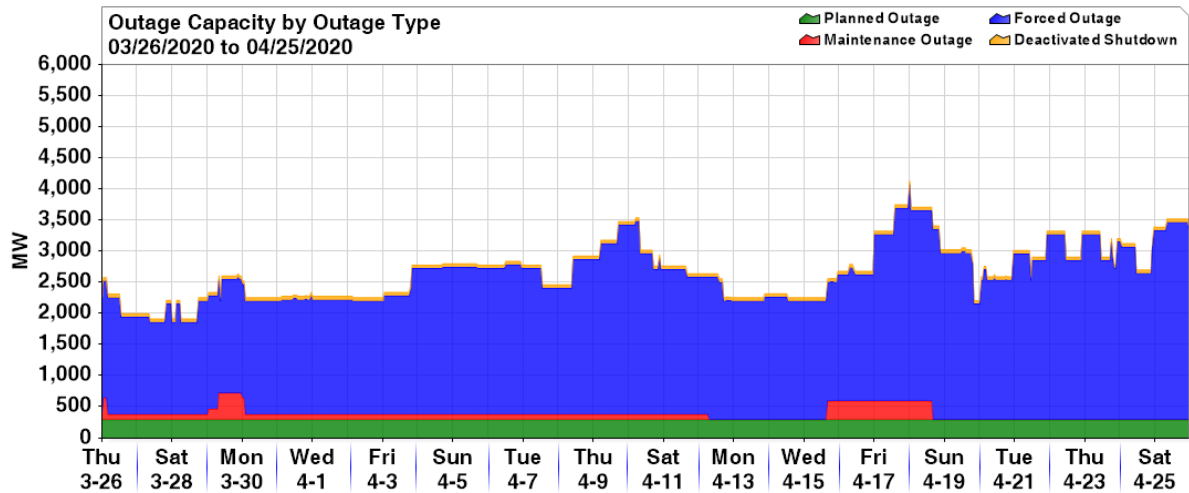


Figure 7. Outage Capacity by Outage Category, April 2020

Table 4. Outage Summary by Outage Category, Apr 2020 and Mar 2020

Outage Category	April 2020 (in MW)			March 2020 (in MW)		
	Max	Min	Average	Max	Min	Average
Planned	300	300	300	1,072	150	469
Maintenance	430	0	85	187	82	83
Forced	3,475	1,479	2,253	2,829	863	1,364
Deactivated Shutdown	55	55	55	55	55	55

- In terms of type of power plants, coal generators accounted for the highest percentage of outage at 74 percent with a corresponding 70 percent increase from last month's average outage, followed by oil-based and geothermal generators at 11 percent. Natural gas came after at 3 percent while hydro plants posted almost no outage despite the observance of hot dry season this billing month
- Though natural gas plants have the second highest share of registered capacity, they posted a low level of outage of about an average of 76 MW this month
- San Gabriel NGPP's short episodic forced outages from 20 to 24 April did not significantly affect the total outages of natural gas plants since they were only episodic and short
- Majority of the average outage of oil-based plants at about 302 MW this month consisted of the prolonged outage of Malaya TPP unit 1 at 300 MW due to problems in the unit generator since 03 May 2019
- Geothermal plants recorded a minimal increase in outage of about 3 percent coming into April

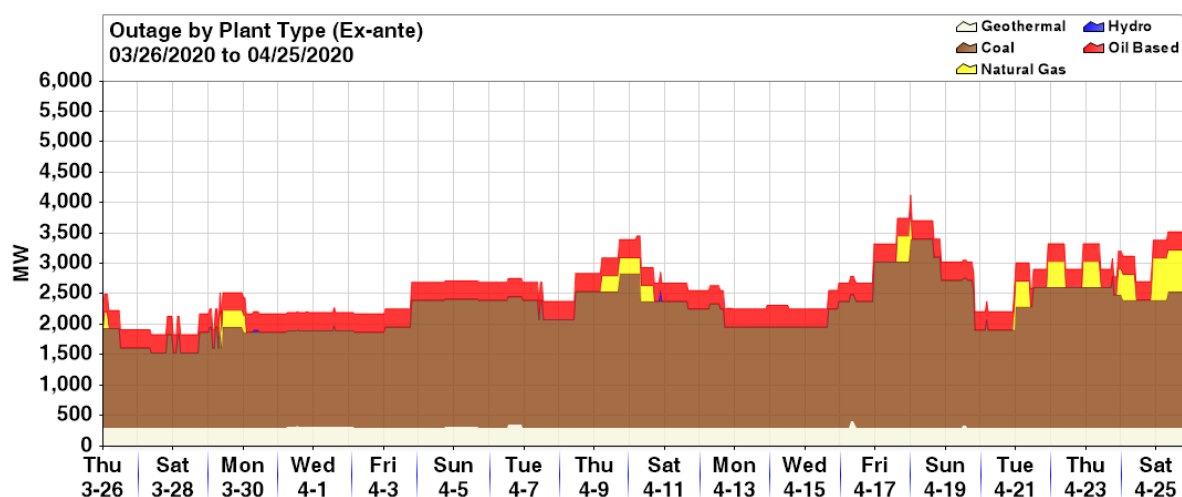


Figure 8. Outage Capacity by Plant Type, April 2020

Table 5. Outage Summary by Plant Type, Apr 2020 and Mar 2020

Plant Type	April 2020 (in MW)			March 2020 (in MW)		
	Max	Min	Average	Max	Min	Average
Coal	3,112	1,236	1,951	2,295	510	1,151
Natural Gas	684	0	76	790	0	40
Geothermal	411	298	301	427	258	292
Hydro	180	0	0.4	500	0	141
Oil-based	360	300	302	428	300	328

2.3. Demand

- A decrease of about 15.4 percent was observed throughout the billing period in view of the impact of the ECQ in the electricity demand
- In comparison to last month, average off-peak demand decreased by 12.3 percent while average peak demand decreased by 17.7 percent
- Maximum system demand in April reached 10,044 MW for peak hours and 9,851 MW for off-peak hours which both was recorded on 22 April
- Minimum system demand in April reached 7,334 MW for peak hours and 6,638 MW for off-peak hours which occurred on 28 March and 11 April, respectively
- It can be observed that during the ECQ period this April, the afternoon peak hours is similar in level of demand with the evening peak hours contrary to normal days where the afternoon peak is much higher than evening peak
- Average temperature for the month was higher as the country is midway through the hot dry season

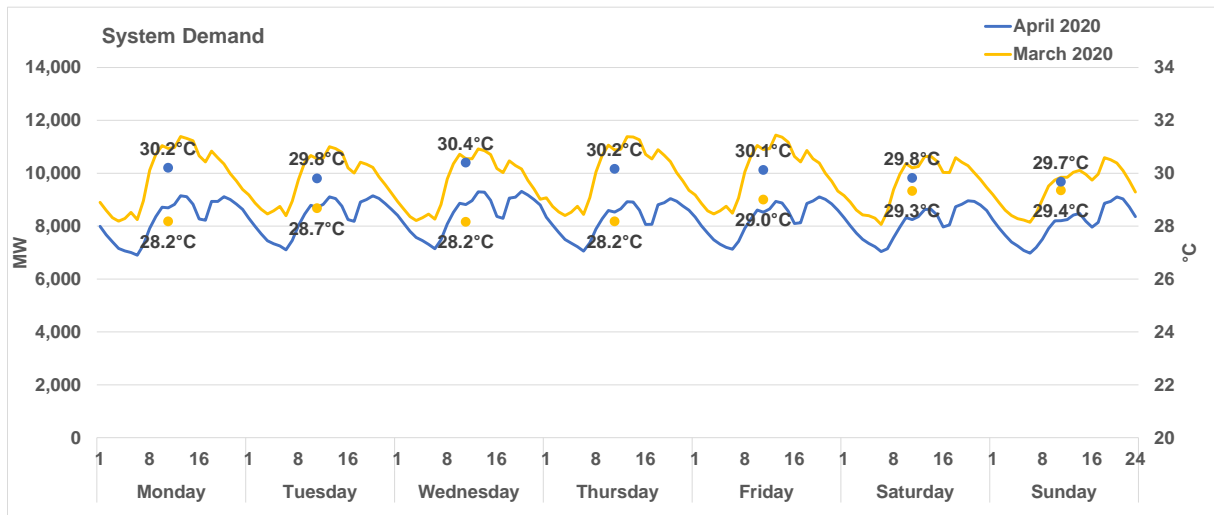


Figure 9. Average Hourly System Demand, Apr 2020 and Mar 2020

- Comparing to previous year, the average system demand had an opposite trend with a remarkable decline by 19.8 percent from 10,294 MW in April 2019 to 8,256 MW in April 2020
- Similarly, the year-on-year trend had a decrease in average system demand by 17.6 percent during off-peak hours and 22.6 percent during peak hours
- The average temperature this month was almost of the same level as last year's

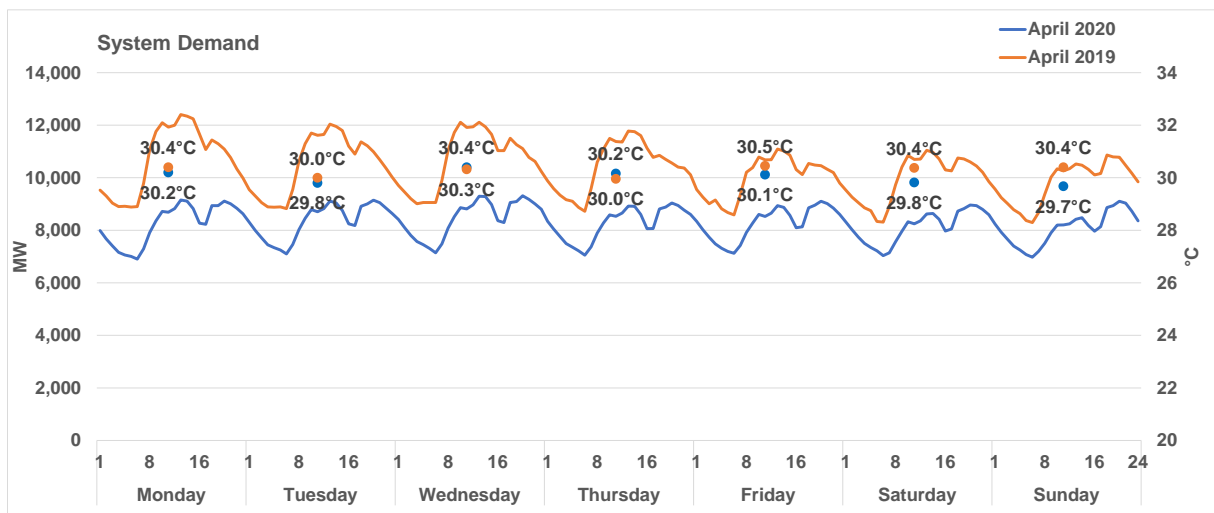


Figure 10. Average Hourly System Demand, Apr 2020 and Apr 2019

- Over the years of April, the increasing trend of demand was noticed to have declined on 2020 because of the ECQ
- Even though the demand in April 2020 was comparable to the demand in April 2015, the resulting market price was lower as more power generators with relatively low offers or with more addition of non-contestable quantities had come in the market during the 5-year gap

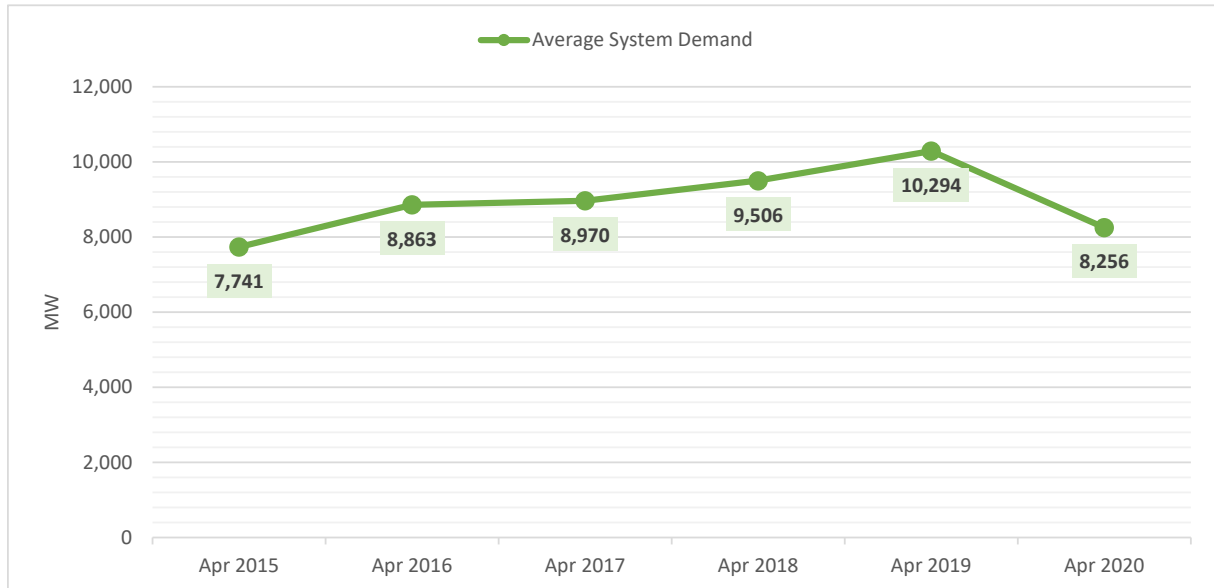


Figure 11. Average System Demand, April 2015-2020

3. Spot Transactions

3.1. Spot Exposure

- Spot quantities⁵ in April stood at 11 percent of the total metered quantities, lower than last month's 12.5 percent spot exposure.
- Spot exposure in off-peak hours averaged at 14 percent while it was 11 percent at peak hours.

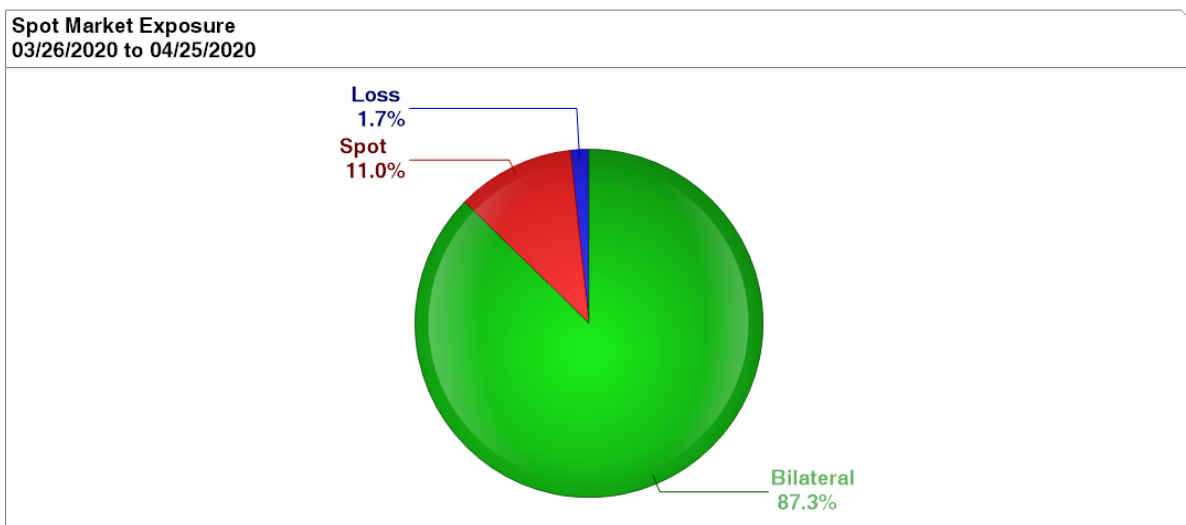


Figure 12. Spot Market Exposure, April 2020

⁵ Spot quantity refers to the energy transacted in the market. It is the difference between the metered quantity and the bilateral contract quantity. For generator trading participants, positive spot values indicate energy sold while negative values show energy bought in the market

- Spot exposure further saw a decline in trend as more generators were sourcing revenues from BCQ rather than selling in the market when prices were in a downtrend.

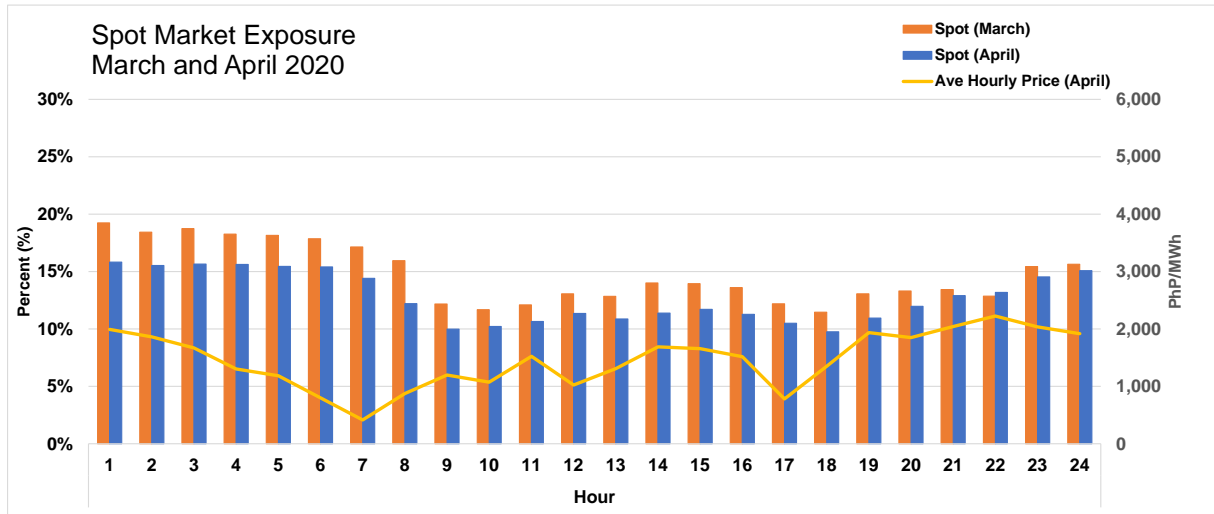


Figure 13. Hourly Spot Market Exposure, April 2020

- Based on the spot duration curve⁶ of April billing month, spot quantities fell below 32 MWh at about 90 percent of the time with maximum and minimum spot quantities at 405 MWh and -417 MWh, respectively.

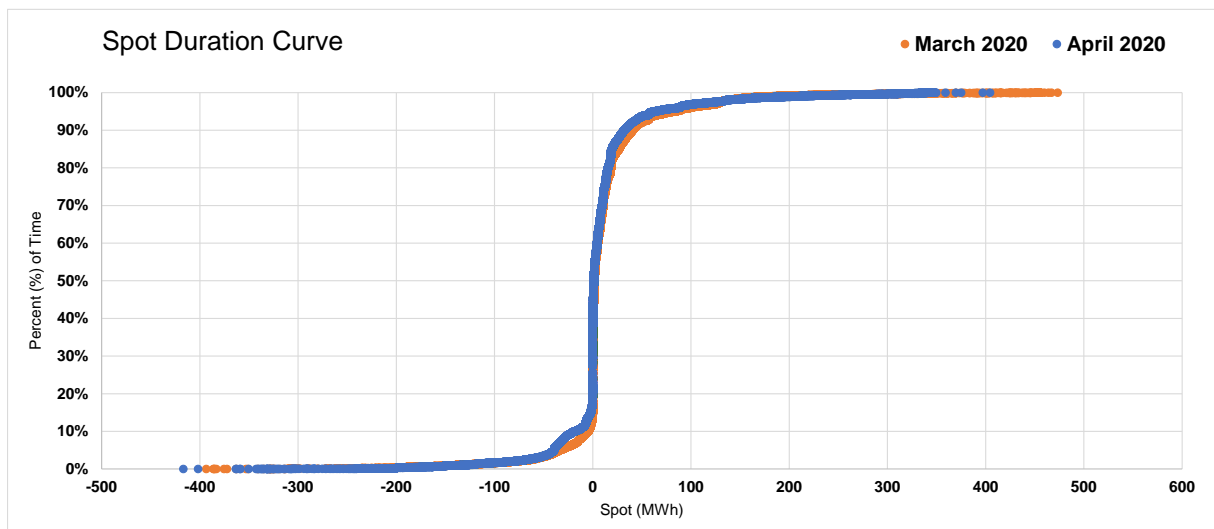


Figure 14. Spot Duration Curve, April 2020

⁶ The spot duration curve utilizes data on a per generator trading interval, meaning, all the data consisted of spot quantities of every generator per interval for the period considered

- Generator spot quantities for March and April billing months were much more concentrated on the -200 MWh to 200 MWh range
- Majority or about 73 percent of the generator transactions in the market in April were positive which indicated energy sold in the market.
- Lower generator spot exposure corresponded to an increase in generator trading intervals in the -200 MWh to 0 MWh range this month which translated to generators buying in the spot market with resulting low prices
- Last month's March billing period was observed to have a similar trend wherein most of the spot quantities are sold in the market

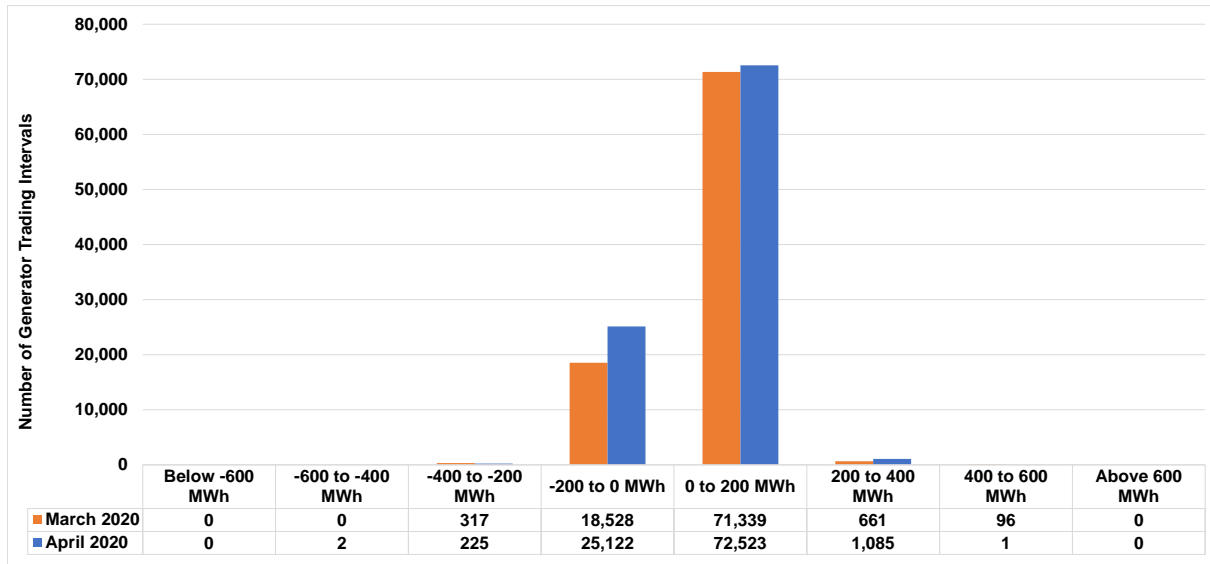


Figure 15. Frequency Distribution Table, April 2020

3.2. Pivotal⁷ Plants

- Only one interval had a Residual Supply Index⁸ (RSI) below the 100 percent mark from 21 intervals in April indicating better supply-demand situation
- This instance occurred during the lowest recorded supply margin for the month on 25 April 2020 2200H with Sual CFTPP being the only pivotal plant
- Additionally, during the ECQ, the market resulted to an RSI as high as 148 percent indicating that supply was abundant to satisfy the demand

⁷ The Pivotal Supply Index (PSI) measures how critical a generator is in meeting the total demand at a time. It is a binary variable (1 for pivotal and 0 for not pivotal) which measures the frequency that a generating is pivotal for a period.

⁸ The Residual Supply Index (RSI) measures the ratio of the available generation without a generator to the total generation required (including operational reserve) to supply the demand. RSI also determines whether there are pivotal suppliers in an interval. An RSI below 100 indicates the presence of pivotal plants.

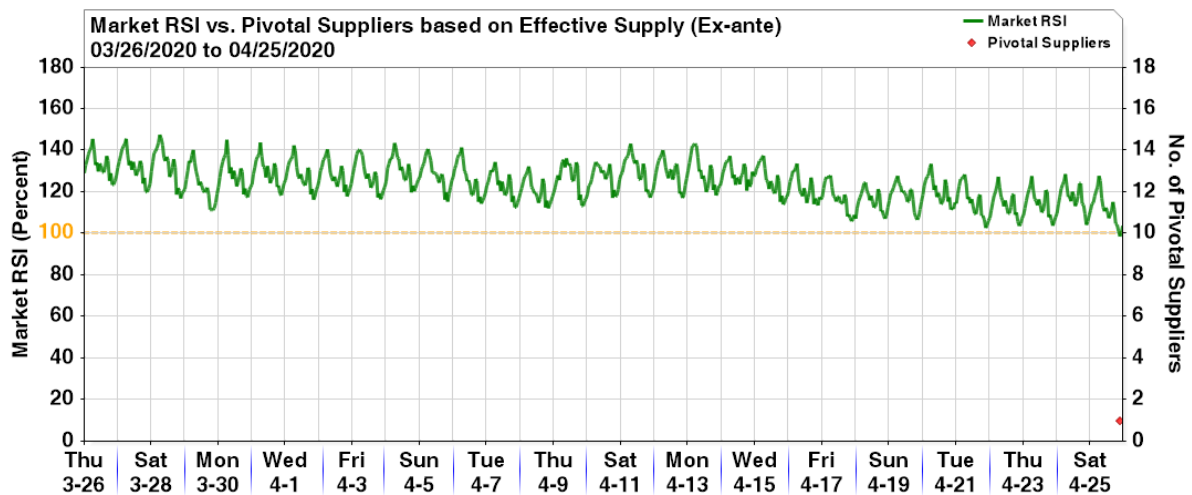


Figure 16. Market RSI vs Pivotal Suppliers, April 2020

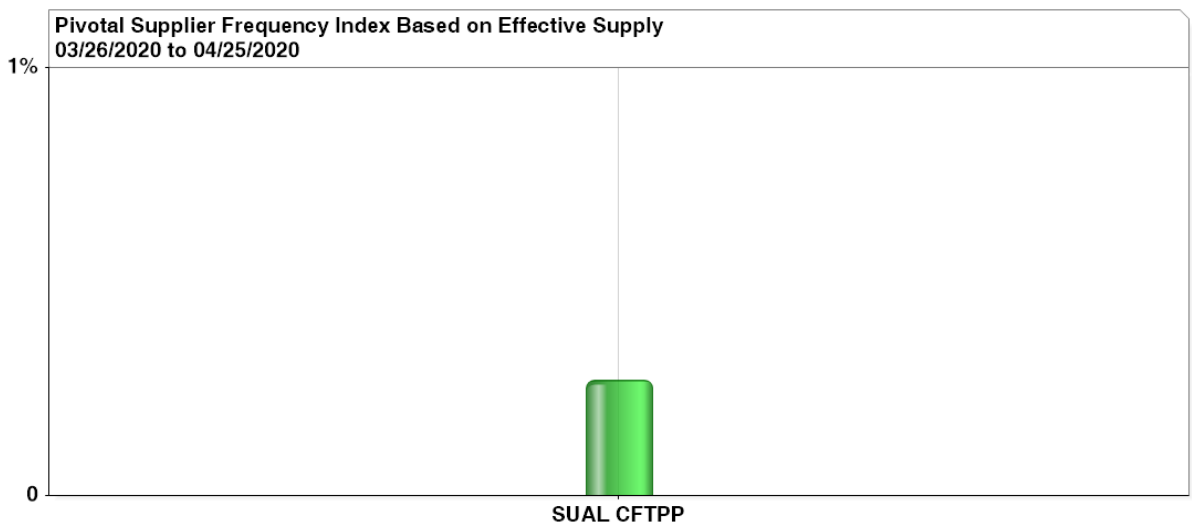


Figure 17. Top Pivotal Plants, April 2020

3.3. Total Trading Amount⁹ (TTA) Share

- First Gen Corporation (FGC), Power Sector Assets and Liabilities Management Corporation (PSALM), and Millennium Energy, Inc. (MEI) still held the highest TTA share of top sellers in the market with approximately 21.6 percent, 16.8 percent, and 13.5 percent, respectively, or a cumulative 51.8 percent of the entire TTA of generators selling in the market during the billing month
- Likewise, FGC and PSALM had the highest spot exposure share, with FGC having the highest at around 25.2 percent, followed by PSALM at 19.7 percent
- Even though MEI had only 7.5 percent of share in terms of spot exposure, it held the 3rd spot in terms of TTA

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

- This month's list was joined by Alternergy Wind One Corporation (AWOC), bumping off San Miguel Corporation (SMC) from last month

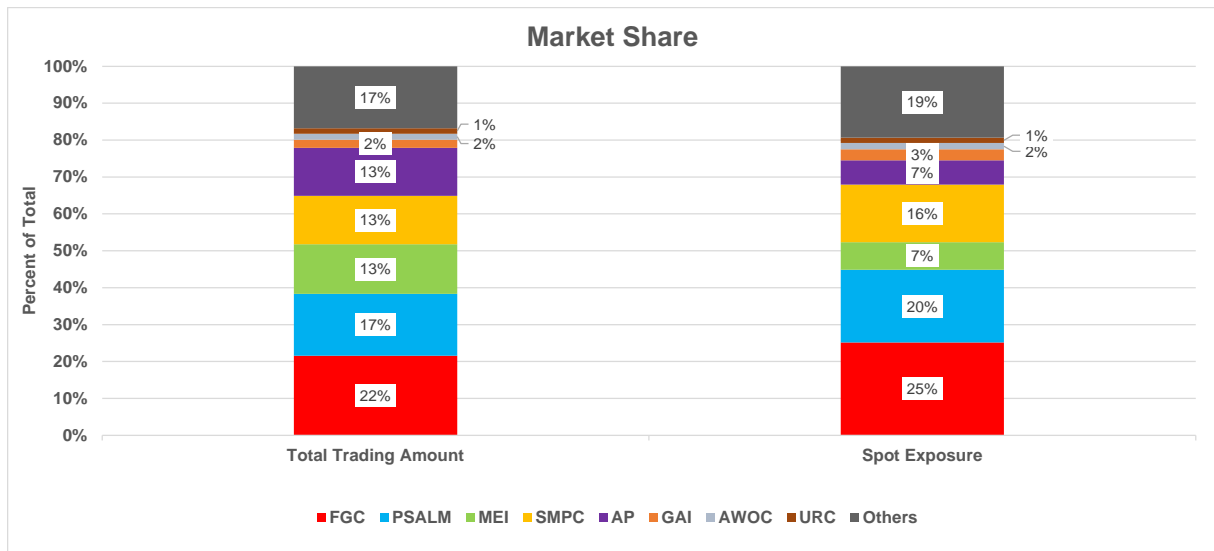


Figure 18. Total Trading Amount and Spot Exposure Share, April 2020

Annex A. List of Major Plant Outages

Region	Plant Type	Plant/ Unit Name	Capacity (MW)	Date Out	Date In	Duration (Days)	Outage Type	Remarks	Date Commissioned/ Commerical Operation
LUZON	GEO	Makban 6	55	04/11/2013 22:44			Deactivated Shutdown	Conducted gas compressor test	Apr 1979
VISAYAS	GEO	PGPP2 Unit 4	20	06/27/2014 6:07			Forced Outage	Steam being utilized by Nasulo plant	Aug 1983
LUZON	GEO	Makban 5	55	02/08/2019 16:08			Forced Outage	Low Steam Supply. Divert Steam Supply to unit 3	Apr 1979
LUZON	OIL	Malaya 1	300	05/03/2019 18:21			Forced Outage	Motorization of unit generator caused by the non-opening of phase B of PCB 8-05CB08M	Aug 1975
LUZON	GEO	Tiwi 1	59	10/31/2019 23:54			Forced Outage	Low steam supply. Divert steam supply to unit 2	Jan 1979
VISAYAS	COAL	TPC Sangi 1	60	12/17/2019 6:05			Forced Outage	Generator differential trip	Dec 2013
VISAYAS	COAL	CEDC 2	82	12/21/2019 8:53	04/12/2020 6:29	112.90	Maintenance Outage	SAF motor replacement	Jun 2010
VISAYAS	GEO	Mahanagdong A1	5	02/04/2020 0:11			Forced Outage	Annual PMS of 230kV bus bar.	Jul 1997
VISAYAS	GEO	Upper Mahiao 2	32	02/14/2020 16:04			Forced Outage	cut-in to the system	Jul 1997
LUZON	COAL	SLPGC 2	150	02/19/2020 23:57			Planned Outage	Maintenance outage.	Jan 2015
LUZON	COAL	SMC 3	150	03/10/2020 23:35			Planned Outage	Maintenance outage.	Nov 2017
LUZON	GEO	Makban 7	20	03/13/2020 22:04			Forced Outage	Affected by the tripping of Bay-Makban 230kV L1 and L2	Apr 1979
LUZON	GEO	Makban 8	20	03/13/2020 22:04			Forced Outage	Affected by the tripping of Bay-Makban 230kV L1 and L2	Apr 1979
LUZON	COAL	SMC 4	150	03/19/2020 23:07			Forced Outage	Repair of ESP Transformer	Sep 2018
LUZON	COAL	GN Power 2	316	03/21/2020 0:14	03/26/2020 4:07	5.16	Forced Outage	Emergency Shutdown to perform Trim Balancing of LP Turbine	May 2013
VISAYAS	COAL	THW 2	169	03/23/2020 15:54	04/19/2020 18:30	27.11	Forced Outage	EMERGENCY CUT-OUT. TO CONDUCT INSPECTION OF ALL COAL CILO	Dec 2017
VISAYAS	COAL	PEDC 2	83.7	03/23/2020 17:31	03/27/2020 8:46	3.64	Forced Outage	Internal trouble	Apr 2011
LUZON	COAL	SLPGC 1	150	03/23/2020 17:44			Forced Outage	Tripped due to boiler tube leak	Jan 2015
VISAYAS	GEO	Upper Mahiao 3	32	03/24/2020 0:11			Forced Outage	Reserved shutdown	Jul 1997
LUZON	COAL	Masinloc 3	335	03/24/2020 0:34			Forced Outage	To facilitate repair on HP heater and Induced draft fan. On commissioning test	Mar 2019
LUZON	COAL	ANDA 1	72	03/25/2020 1:15			Forced Outage	Emergency shutdown due to furnace trouble.	Apr 2015
LUZON	NATG	Sta. Rita 3	265.5	03/26/2020 0:35	03/26/2020 3:47	0.13	Maintenance Outage	Generator Module card control system repair	Oct 2001
LUZON	COAL	GN Power 2	316	03/26/2020 4:09	03/26/2020 12:28	0.35	Forced Outage	Tripped at 12MW load.	May 2013
LUZON	COAL	Calaca 2	300	03/27/2020 19:40	03/27/2020 23:05	0.14	Forced Outage	High turbine vibration	Sep 1984
LUZON	COAL	Calaca 2	300	03/28/2020 2:21	03/28/2020 5:52	0.15	Forced Outage	Main stop valve leak.	Sep 1984
LUZON	COAL	Masinloc 2	344	03/28/2020 17:41	03/29/2020 8:59	0.64	Forced Outage	Master Fuel Control System trouble.	Jun 1998
VISAYAS	COAL	CEDC 1	82	03/29/2020 0:53	03/29/2020 23:14	0.93	Maintenance Outage	To rectify the defective high pressure heater 1 pressure relief valve	Apr 2010
LUZON	NATG	Sta. Rita 3	265.5	03/29/2020 7:43	03/30/2020 1:15	0.73	Maintenance Outage	Compressor Washing	Oct 2001
LUZON	COAL	Masinloc 2	344	03/29/2020 9:27			Forced Outage	Tripped at 70MW load. Turbine protection actuated	Jun 1998
LUZON	HYD	Ambuklao 1	35	03/29/2020 20:51	03/29/2020 21:41	0.03	Forced Outage	Tripped at 21MW load as CR.	Dec 1956
VISAYAS	GEO	PGPP2 Unit 2	20	03/31/2020 2:16	03/31/2020 5:47	0.15	Forced Outage	PGPP2 SOG2 (15.77MW) auto-tripped at due to hot well pump trouble.	Aug 1983
VISAYAS	GEO	PGPP2 Unit 2	20	03/31/2020 5:55	03/31/2020 13:47	0.33	Forced Outage	Auto-tripped. ongoing investigation on the cause of tripping	Aug 1983
LUZON	GEO	Bacman 3	20	03/31/2020 10:24	04/02/2020 3:20	1.71	Forced Outage	Tripped from 20MW load.	Sep 1993
VISAYAS	OIL	TPC Carmen 3	10	03/31/2020 18:29	03/31/2020 20:29	0.08	Forced Outage	UNIT CUT-IN PER ASPA DISPATCH	Mar 1979
LUZON	GEO	Makban 3	63	03/31/2020 22:12	03/31/2020 23:17	0.05	Forced Outage	Loss of steam supply	Apr 1979
VISAYAS	COAL	CEDC 1	82	04/03/2020 0:19	04/24/2020 0:10	20.99	Forced Outage	UNIT TRIPPED. UNDER ASSESSMENT	Apr 2010
LUZON	COAL	SLTEC 2	122.9	04/03/2020 18:25	04/11/2020 15:51	7.89	Forced Outage	Steam leak at superheater attemperator	Aug 2015
LUZON	COAL	GN Power 2	316	04/03/2020 19:22	04/07/2020 12:34	3.72	Forced Outage	Induce Draft Fan - A inlet vane problem.	May 2013
LUZON	GEO	Bacman 3	20	04/04/2020 16:45	04/05/2020 16:25	0.99	Forced Outage	Tripped due to high bearing temperature	Sep 1993
LUZON	GEO	Bacman 1	60	04/06/2020 11:19	04/06/2020 22:04	0.45	Forced Outage	Circulating water inlet valve trouble	Sep 1993
LUZON	COAL	QPPL	460	04/08/2020 9:47	04/10/2020 7:29	1.90	Forced Outage	Primary Air Heater expansion bellow trouble.	May 2000
LUZON	NATG	Sta. Rita 2	255.7	04/09/2020 4:52	04/10/2020 16:44	1.49	Forced Outage	Rectification of GT fuel Gas control valve.	Jun 2000
LUZON	COAL	Calaca 2	300	04/09/2020 16:38	04/12/2020 16:13	2.98	Forced Outage	To facilitate turbine balancing	Sep 1984
LUZON	OIL	Limay 5	60	04/10/2020 4:07	04/10/2020 7:56	0.16	Forced Outage	Declared unavailable due to TAT 5 replacement.	Dec 1994
LUZON	HYD	Kalayaan 4	180	04/10/2020 20:11	04/10/2020 21:10	0.04	Forced Outage	Tripped as pump due to high temperature of turbine guide bearing.	May 2004
VISAYAS	COAL	CEDC 2	82	04/12/2020 6:29	04/12/2020 13:34	0.30	Forced Outage	Under assessment	Jun 2010
VISAYAS	OIL	PB102 Unit 1	6	04/12/2020 18:55	04/12/2020 19:10	0.01	Forced Outage	Tripped	Apr 1981
VISAYAS	OIL	PB102 Unit 2	6	04/12/2020 18:55	04/12/2020 22:35	0.15	Forced Outage	Tripped	Apr 1981
LUZON	OIL	Limay 5	60	04/13/2020 20:01	04/14/2020 12:42	0.70	Forced Outage	Failed start-up due to fuel servo-valve malfunction	Dec 1994
LUZON	COAL	Calaca 2	300	04/15/2020 15:43	04/18/2020 15:48	3.00	Maintenance Outage	Turbine maintenane scheduled repair.	Sep 1984
VISAYAS	OIL	PB101 Unit 2	6	04/15/2020 17:46	04/15/2020 20:11	0.10	Forced Outage	FO - charge air cooler temp high	Jan 1978
LUZON	COAL	SLTEC 1	121	04/15/2020 22:35	04/23/2020 19:12	7.86	Forced Outage	Coal feeder problem	Sep 2014
VISAYAS	GEO	PGPP1 Unit 1	37.5	04/16/2020 6:34	04/16/2020 9:48	0.13	Forced Outage	Auto-tripped due to steam problem	Aug 1983
VISAYAS	GEO	PGPP1 Unit 2	37.5	04/16/2020 6:34	04/16/2020 10:14	0.15	Forced Outage	Auto-tripped due to steam problem	Aug 1983
VISAYAS	GEO	PGPP1 Unit 3	37.5	04/16/2020 6:34	04/16/2020 9:31	0.12	Forced Outage	Auto-tripped due to steam problem	Aug 1983
LUZON	COAL	Sual 2	647	04/16/2020 23:36	04/19/2020 19:22	2.82	Forced Outage	Condenser tube leak	Oct 1999
LUZON	NATG	San Gabriel	420	04/17/2020 13:42	04/18/2020 0:01	0.43	Forced Outage	Tripped due to gas turbine combustion instability	Mar 2016
LUZON	COAL	Pagbilao 1	382	04/17/2020 23:15	04/18/2020 20:08	0.87	Forced Outage	Unit Transformer protection actuated.(Initial Information)	Mar 1996
VISAYAS	GEO	Upper Mahiao 4	32	04/19/2020 11:36	04/19/2020 14:56	0.14	Forced Outage	125VDC Supply Failure Alarm Activation	Jul 1997
LUZON	COAL	Pagbilao 1	382	04/20/2020 0:55			Forced Outage	To facilitate ESP repair	Mar 1996
VISAYAS	COAL	THW 2	169	04/20/2020 2:54	04/20/2020 4:26	0.06	Forced Outage	Turbine protection trip	Dec 2017
LUZON	HYD	Ambuklao 2	35	04/20/2020 9:33	04/20/2020 10:59	0.06	Forced Outage	Broken shear pin	Dec 1956
LUZON	HYD	Masiway	12	04/20/2020 17:56	04/20/2020 18:45	0.03	Forced Outage	Affected by the tripping of Cabanatuan-Fatima 69kV L at 1756H	Jan 1981
LUZON	GEO	Makban Ormat 1	3	04/20/2020 21:18	04/20/2020 22:29	0.05	Forced Outage	Affected by the voltage dip brought by the tripping of Tayabas-Dasmarinas 500kV line	Apr 1979
LUZON	GEO	Makban Ormat 2	3	04/20/2020 21:18	04/20/2020 22:29	0.05	Forced Outage	Affected by the voltage dip brought by the tripping of Tayabas-Dasmarinas 500kV line	Apr 1979
LUZON	NATG	San Gabriel	420	04/20/2020 22:18	04/21/2020 10:14	0.50	Forced Outage	Tripped while on the process of shutdown.	Mar 2016
LUZON	COAL	Masinloc 1	315	04/21/2020 11:45			Forced Outage	Boiler Tube Leak	Jun 1998
LUZON	NATG	San Gabriel	420	04/21/2020 21:40	04/22/2020 10:05	0.52	Forced Outage	Gas supply restriction	Mar 2016
LUZON	NATG	San Gabriel	420	04/22/2020 21:50	04/23/2020 10:10	0.51	Forced Outage	Gas supply restriction	Mar 2016
LUZON	COAL	Calaca 2	300	04/23/2020 17:32	04/23/2020 18:35	0.04	Forced Outage	Low pressure turbine exhaust problem	Sep 1984
LUZON	NATG	San Gabriel	420	04/23/2020 21:54	04/24/2020 10:07	0.51	Forced Outage	Gas supply restriction	Mar 2016
LUZON	NATG	San Gabriel	420	04/24/2020 21:45			Forced Outage	Gas supply restriction	Mar 2016
LUZON	NATG	Sta. Rita 4	264	04/24/2020 22:37			Forced Outage	Cleaning of Fuel gas control valve.	Oct 2001
VISAYAS	COAL	PALM 1	135	04/25/2020 7:03	04/25/2020 22:38	0.65	Forced Outage	Auto-tripped(51.0MW)	Mar 2016