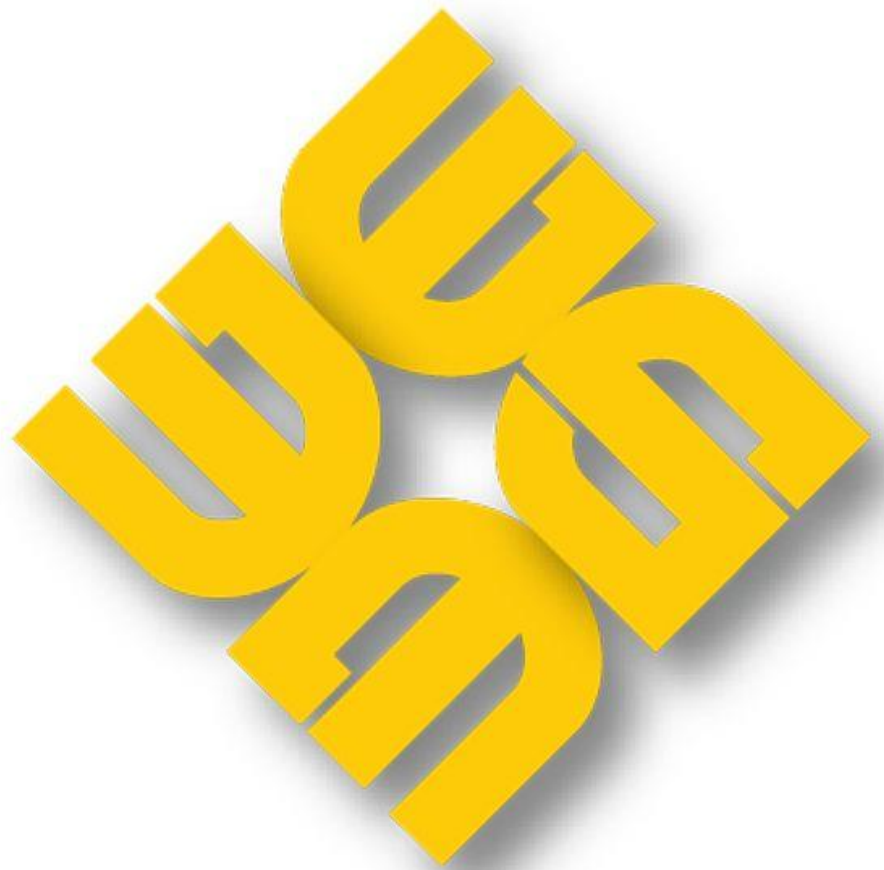


MAG-MMAR-2019-10

MONTHLY MARKET ASSESSMENT REPORT

For the Billing Period 26 September to 25 October 2019



**PHILIPPINE
ELECTRICITY
MARKET
CORPORATION**

**MARKET ASSESSMENT GROUP
(MAG)**

Monthly Market Assessment Report for October 2019 Billing Month

1. Summary

The October billing month was observed to have a narrower supply margin than the last billing month brought about by the increase in demand and high level of outage capacity of power plants. Moreover, the Visayas grid experienced yellow and red alerts due to thinning of reserves caused by multiple plant outages in the region. With the generation deficiency, SO-initiated market interventions were declared on 4 October from 1600H to 1900H.

From 12 to 15 October, the planned Malampaya maintenance program was conducted which affected the 1,200-MW Ilijan NGPP Blocks A and B, 255.7-MW Sta. Rita NGPP unit 2, 265.5-MW Sta. Rita NGPP unit 3, and 420-MW San Gabriel NGPP which rely on natural gas as their fuel.

As a consequence of the foregoing events, the market price for the billing month increased by 97.2 percent to PhP4,219/MWh from PhP2,139/MWh in September.

Market Operator-initiated market intervention for the Luzon and Visayas regions was also declared on 24 October, 0400H and 0500H, due to Market Management System (MMS) stoppage resulting to no RTD Schedule for the said intervals.

2. Market Outcomes

2.1. Capacity Profile

Coal power plants continued to take up majority of the registered capacity mix comprising 42 percent of the total registered capacity or 8,349 MW. Natural gas plants and hydro plants distantly followed at 16 percent and 13 percent, respectively. The increase in registered capacity following the entry of the new 25-MW North Negros Biopower, Inc. biomass plant had contributed minimal increase in the overall share of biomass plants.

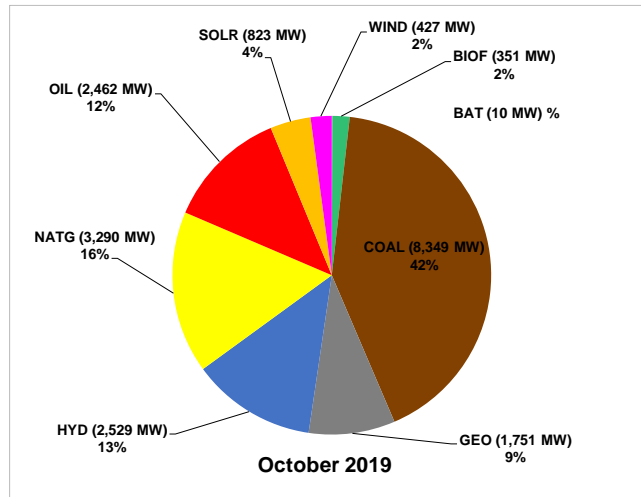


Figure 1. Registered Capacity Mix, October 2019

The WESM registered capacity recorded an increase from 19,967.3 MW to 19,992.3 MW with the registration of 25-MW biomass plant.

Outage capacity increased by 3 percent from an average of 1,838 MW to 2,408 MW as a result of the outage of several plants. With this, the total offered capacity declined by 2 percent from last month's average of 13,993 MW to 13,538 MW. Meanwhile, about 5 percent or an average of 966 MW was accounted to power plants undergoing testing and commissioning.

The sudden dip in capacity offered on 11 Oct 2300H was explained by the planned outages of 1,200-MW Ilijan NGPP Blocks A and B, 255.7-MW Sta. Rita NGPP unit 2, 265.5-MW Sta. Rita NGPP unit 3, and 420-MW San Gabriel NGPP due to the conduct of the scheduled Malampaya maintenance shutdown.

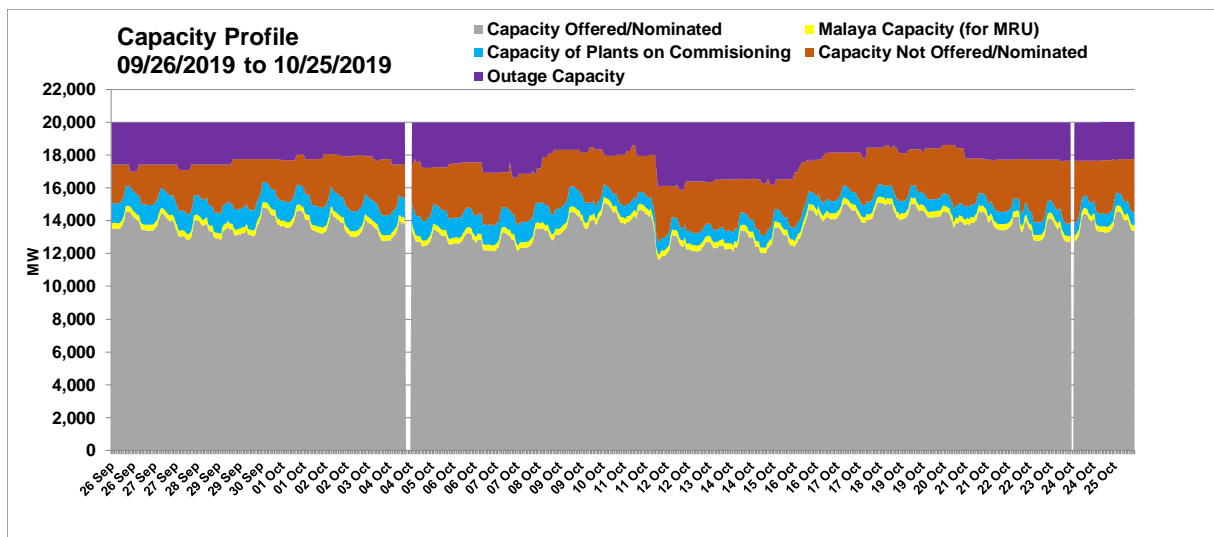


Figure 2. Capacity Profile

Table 1. Monthly Capacity Profile (Ex-ante)

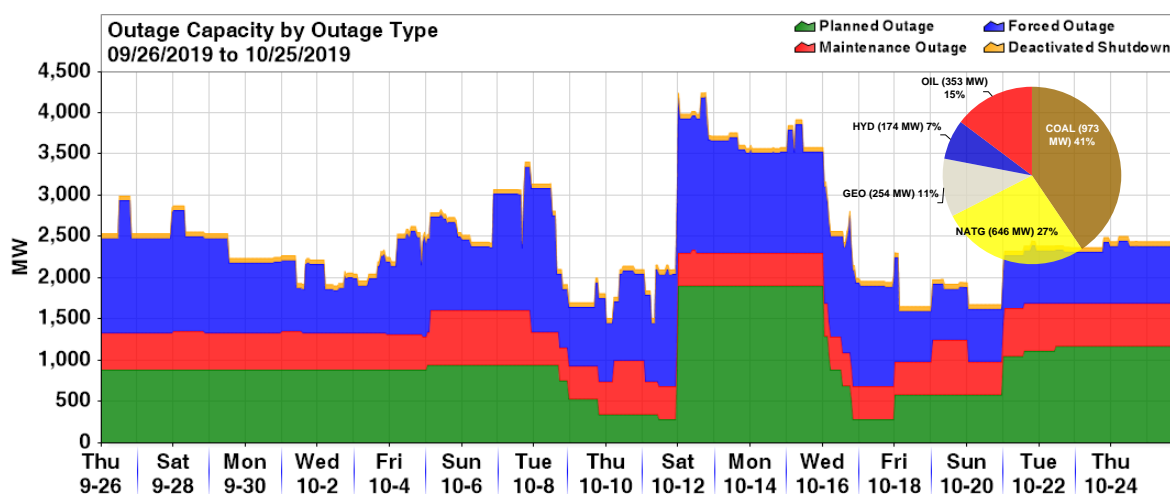
	October 2019		September 2019	
	Average (in MW)	% of RegCap	Average (in MW)	% of RegCap
Outage Capacity	2,408	12%	1,838	9%
Capacity Not Offered/Nominated	2,706	14%	2,509	13%
Capacity of Plants on Commissioning	966	5%	1,270	6%
Malaya Capacity (for MRU)	350	2%	350	2%
Capacity Offered/Nominated	13,538	68%	13,993	70%
Registered Capacity (by the end of the billing month)	19,992		19,967	

2.2. Outage Capacity

About 12 percent of the total registered capacity or an average of 2,408 MW was on outage. Majority of these were classified as planned and forced, with almost the same level, averaging at 968 MW and 996 MW or about 39 percent and 40 percent of the total outage capacity, respectively. Maintenance outages, averaging at 479 MW, accounted for 19 percent of the total outage capacity while the remaining 2 percent or an average of 55 MW was on the account of plants on deactivated shutdown.

This month's average outage capacity was 30 percent higher than previous month's average at 1,838 MW.

Based on type of resource, 41 percent or an average of 973 MW was attributable to coal plants namely: the maintenance outage of Mariveles CFTPP unit 1 and forced outages of Masinloc CFTPP unit 3 and SLPGC CFTPP unit 2. Also, it was noted that outage of natural gas plants rose by 119 percent this billing month due to the conduct of Malampaya facility maintenance shutdown from 12 to 15 October which affected 1,200-MW Ilijan NGPP Blocks A and B, 255.7-MW Sta. Rita NGPP unit 2, 265.5-MW Sta. Rita NGPP unit 3, and 420-MW San Gabriel NGPP.

**Figure 3. Outage Capacity by Outage Category**

2.3. Supply and Demand

Average effective supply decreased by 1.3 percent from previous month's 13,894 MW to current month's 13,720 MW level with the outage of major power plants. Meanwhile, demand plus reserve schedule increased by 6 percent to an average of 11,819 MW from last month's 11,154 MW given the higher temperatures recorded this month. Both events effectively brought down the supply margin to an average of 1,901 MW from 2,739 MW in September.

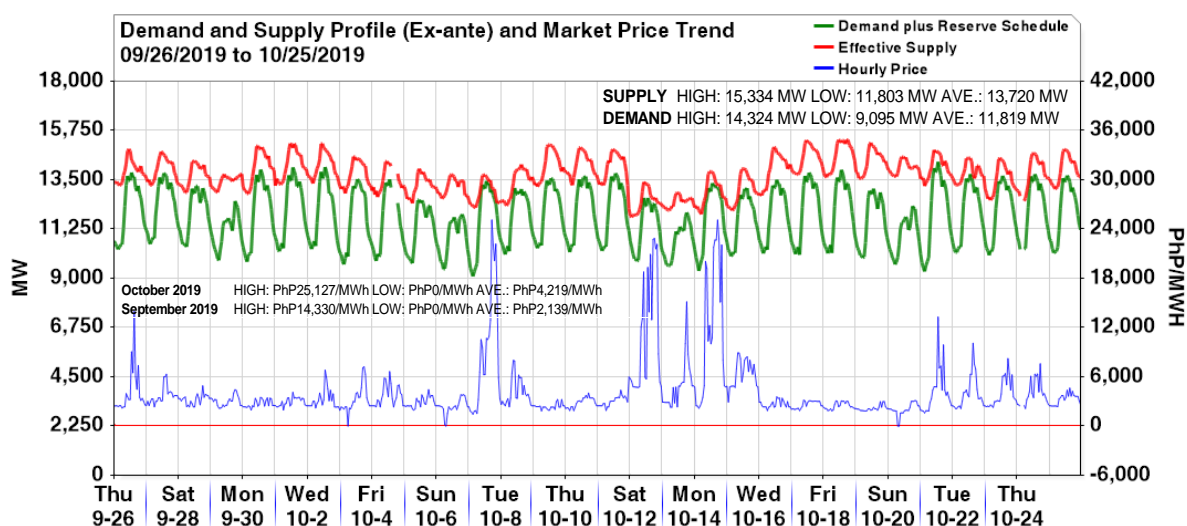


Figure 4. Demand and Supply Profile vs. Market Prices

2.4. Market Prices

Market prices climbed to an average of PhP4,219/MWh this month from previous month's PhP2,139/MWh following the tighter supply margin in the grid.

The resulting high prices manifested in several instances of price spikes caused by the high level of outage from large capacity generating plants. The highest price spike at PhP25,127/MWh which was recorded on 7 Oct at 1800H was due to the forced outages of 647-MW Sual CFTPP unit 1 at 1642H and 335-MW Masinloc CFTPP unit 3 at 1701H. Meanwhile, the price spikes from 12 to 15 Oct were attributable to the thin supply margin caused by the outage of natural gas plants because of the Malampaya maintenance shutdown.

3. Structural Competition Indices

3.1. Pivotal Plants

The market RSI fell below the 100-percent mark in 24 percent of the time in the October billing month from 4 percent in September, indicating the more frequent presence of pivotal suppliers during the period as a result of the narrower supply margin this month. Most frequent pivotal suppliers during the billing month were Sta. Rita NGPP, Sual CFTPP and Ilijan CFTPP.

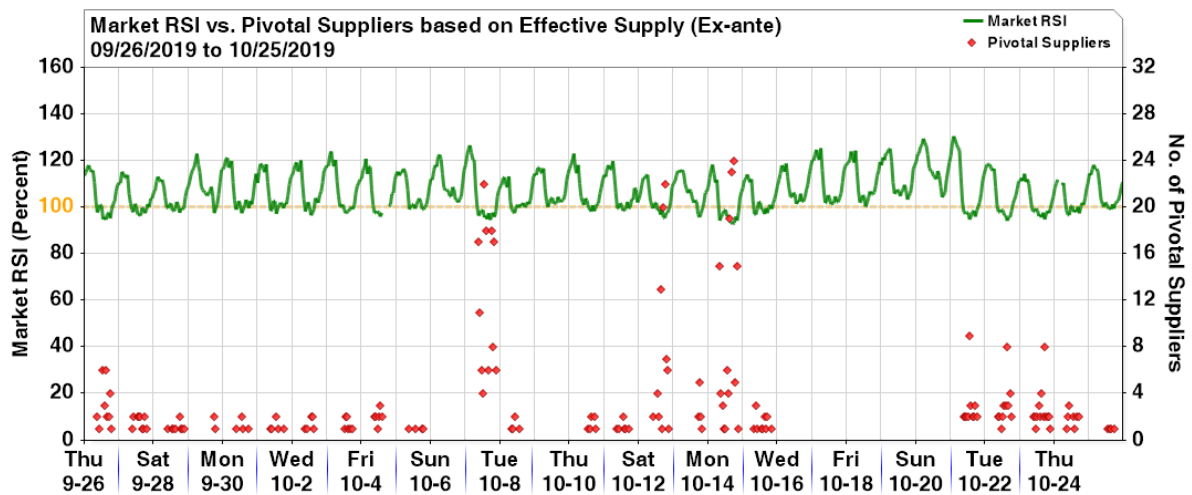


Figure 5. Market RSI vs. Pivotal Suppliers

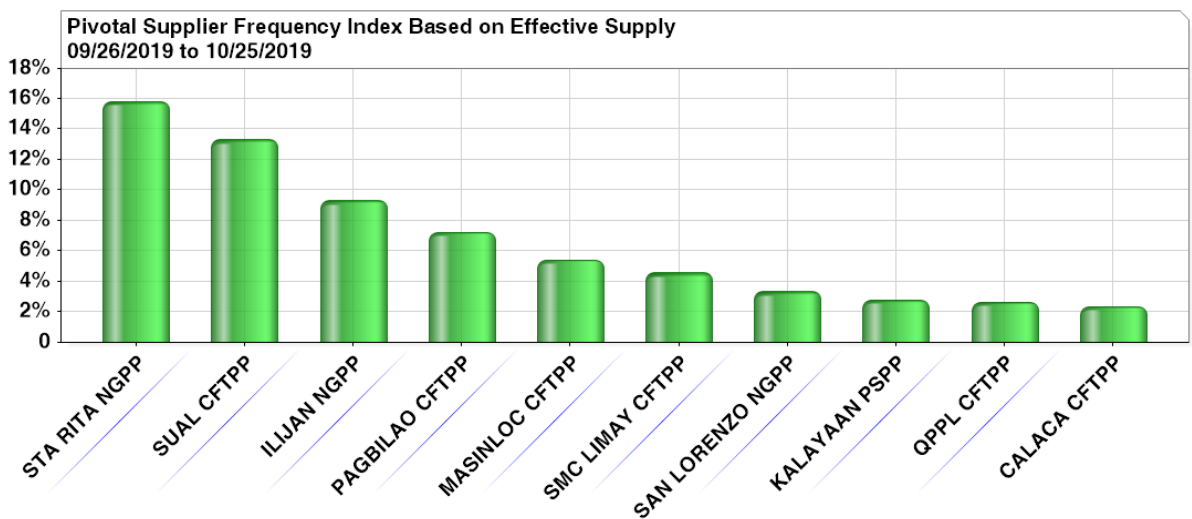


Figure 6. Top Pivotal Plants

3.2. Market Concentration

San Miguel Corporation (SMC), Aboitiz Power (AP), First Gen Corporation (FGC) and Power Sector Asset and Liabilities Management (PSALM) continued to dominate the market with their combined market share comprising of 69.1 percent of the total registered capacity in the WESM. SMC held the top spot at 24.2 percent followed by AP at 19.8 percent, FGC came in third at 14.4 percent and lastly, PSALM at 10.6 percent.

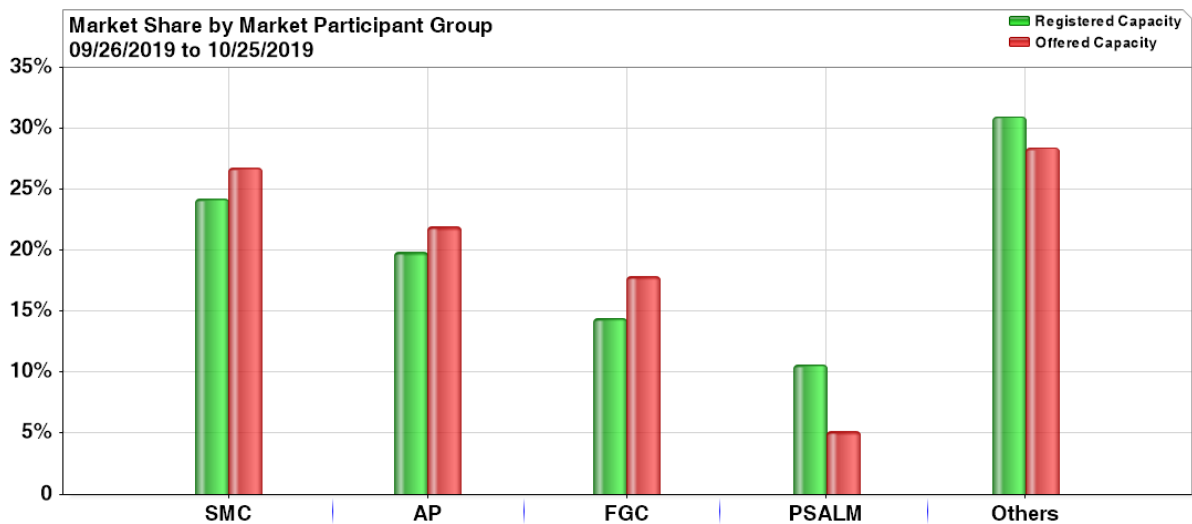


Figure 7. Market Share

The market share of SMC based on offered capacity was recorded at 26.7 percent. This was a 3.2 percent decrease from its previous 29.9 percent share. AP also recorded a decline from 22.2 percent to 21.9 percent. Meanwhile, FGC recorded an increase in market share from 17.6 percent to 17.8 percent. Accordingly, the Herfindahl-Hirschman Index (HHI) calculated based on offered capacity by major participants' grouping indicated a concentrated market for 6 percent of the time, moderately concentrated market for 93 percent, and not concentrated market for 1 percent of the time.

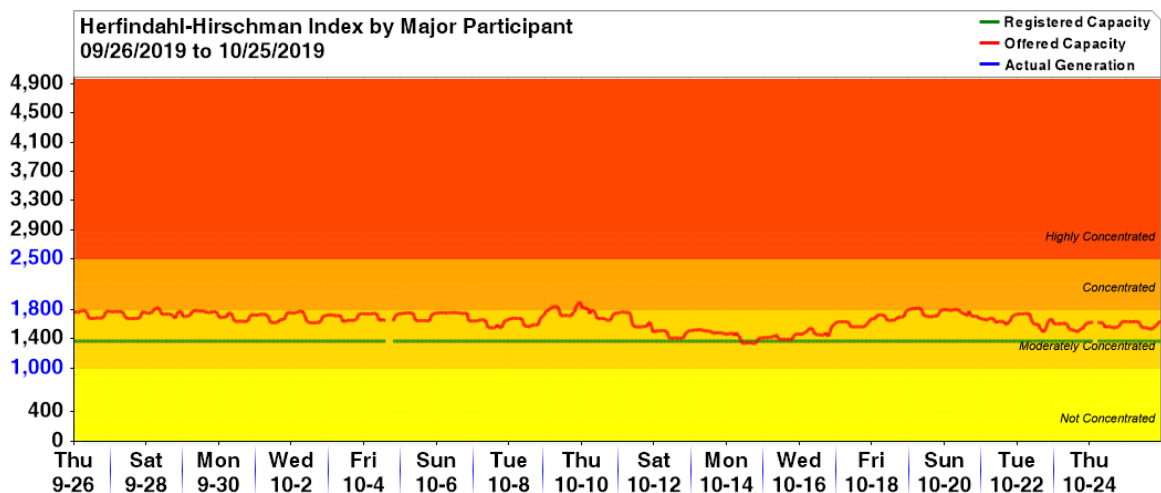


Figure 8. Hourly HHI based on Major Participant Grouping

4. Spot Exposure

Spot market transactions comprised only about 14.6 percent of the total metered quantities, considering that majority of the total energy injected into the grid was covered by bilateral contracts at about 83.4 percent.

Spot Market Exposure
09/26/2019 to 10/25/2019

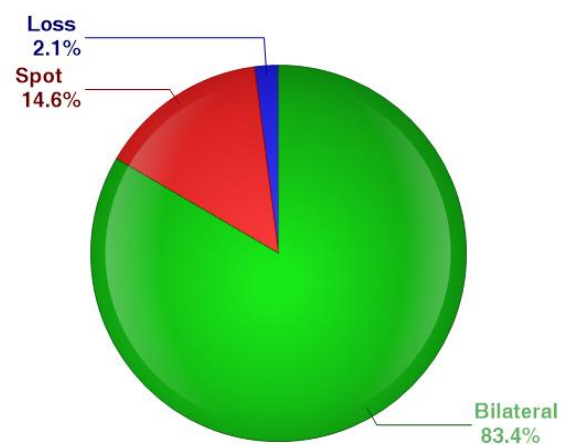


Figure 9. Spot Market Exposure

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/ Commercial 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
VISAYAS	GEO	Upper Mahiao 2	32	09/03/2018 6:01			Forced Outage	Tripped	Jul 1997
LUZON	OIL	SLPGC 4	25	11/22/2018 11:56			Maintenance Outage	On extended maintenance shutdown until 24 April 2019	Mar 2018
LUZON	GEO	Tiwi 1	59	11/29/2018 13:31	10/22/2019 10:31	326.88	Maintenance Outage	Maintenance Outage	Jan 1979
LUZON	GEO	Makban 5	55	02/08/2019 16:08			Forced Outage	Low Steam Supply. Divert Steam Supply to unit 3	Apr 1979
VISAYAS	OIL	PB102 Unit 1	6	04/28/2019 18:16			Forced Outage	Internal fault	Apr 1981
LUZON	OIL	Malaya 1	300	05/03/2019 18:21			Forced Outage	Declared unavailable due to motorization of unit generator caused by the non-open	Aug 1975
LUZON	GEO	Makban 7	20	07/06/2019 6:12	10/03/2019 21:45	89.65	Maintenance Outage	Maintenance Outage	Apr 1979
VISAYAS	SOLR	San Carlos Sun	46.8	07/13/2019 6:24	10/25/2019 4:12	103.91	Forced Outage	Affected by maintenance of 138KV Bacolod-Cadiz TL and APMS of Cadiz 50MVA TR1	Mar 2016
LUZON	HYD	Kalayaan 3	180	08/01/2019 0:01	10/20/2019 23:56	81.00	Planned Outage	Planned Outage until 19 October 2019(GOMP).	May 2004
LUZON	NATG	Avion 1	50.3	08/16/2019 0:01	10/23/2019 22:47	68.95	Forced Outage	Gas turbine trouble	Aug 2016
LUZON	NATG	Avion 2	50.3	08/16/2019 0:01			Forced Outage	Gas turbine trouble	Aug 2016
VISAYAS	GEO	Upper Mahiao 3	32	09/11/2019 9:11	10/04/2019 21:56	23.53	Maintenance Outage	To rectify Turbine bearing vibrations	Jul 1997
LUZON	COAL	Calaca 1	300	09/15/2019 11:53	09/29/2019 12:18	14.02	Forced Outage	Boiler tube leak	Sep 1984
LUZON	COAL	GN Power 1	316	09/20/2019 23:18			Maintenance Outage	To facilitate correction of governor valves	May 2013
LUZON	NATG	Ilijan A2	190	09/21/2019 0:36	10/09/2019 18:39	18.75	Planned Outage	Maintenance Outage until 19 October 2019	Jun 2002
VISAYAS	COAL	Kepeco Salcon 1	103	09/22/2019 0:57			Planned Outage	APMS	Nov 2010
LUZON	NATG	Ilijan A1	190	09/23/2019 0:46	10/08/2019 16:10	15.64	Planned Outage	Maintenance Outage until 06 October 2019	Jun 2002
LUZON	NATG	Ilijan A3	220	09/24/2019 0:35	10/08/2019 22:15	14.90	Planned Outage	Maintenance Outage	Jun 2002
LUZON	COAL	Masinloc 3	335	09/24/2019 19:35	10/01/2019 9:52	6.60	Forced Outage	Steam leak at Main Steam Line	
LUZON	COAL	SBPL	455	09/26/2019 11:49	09/26/2019 19:01	0.30	Forced Outage	Tripped due to main transformer trouble (sudden pressure relief trip). On commissi	Oct 2019
VISAYAS	BIOF	URC 1	40	09/26/2019 23:19	09/29/2019 16:13	2.70	Forced Outage	Offline due to boiler problem	Jan 2015
LUZON	COAL	GN Power 2	316	09/27/2019 22:15	09/28/2019 7:07	0.37	Forced Outage	Initial report from plant - main fuel trip	May 2013
LUZON	COAL	Calaca 1	300	10/01/2019 15:36	10/02/2019 4:42	0.55	Forced Outage	Tripped at 230MW load	Sep 1984
VISAYAS	COAL	TPC Sangi 1	60	10/02/2019 17:24	10/08/2019 14:25	5.88	Forced Outage	Affected by tripping of 138kv Colon - Toledo Calungcalung Line	Oct 2015
VISAYAS	COAL	TPC Sangi 2	85	10/02/2019 17:24	10/03/2019 2:09	0.36	Forced Outage	Affected by tripping of 138kv Colon - Toledo -Calungcalung Line	Oct 2015
VISAYAS	COAL	TPC Sangi 2	85	10/03/2019 9:44	10/06/2019 5:08	2.81	Forced Outage	Emergency Cut-out due to Furnace Temperature Low	Oct 2015
LUZON	COAL	SLPGC 2	150	10/03/2019 15:02	10/13/2019 15:07	10.00	Forced Outage	Unplanned outage due to boiler tube leak	Jul 2016
LUZON	COAL	ANDA 1	72	10/03/2019 17:35	10/03/2019 20:59	0.14	Forced Outage	Affected by the multiple tripping of 69kV feeders at Mexico Substation.(RECLASSIFIED	Sep 2016
LUZON	COAL	APEC 1	52	10/03/2019 17:35	10/04/2019 0:09	0.27	Forced Outage	Affected by the multiple tripping of 69kV feeders at Mexico Substation	Jul 2006
LUZON	COAL	Masinloc 3	335	10/04/2019 4:13	10/04/2019 20:24	0.67	Forced Outage	Tripped at 335MW load. Turbine tripped indication. On Commissioning Test	
VISAYAS	GEO	PGPP1 Unit 1	37.5	10/04/2019 12:41			Forced Outage	Auto-tripped, ongoing investigation on cause of tripping	
VISAYAS	COAL	CEDC 3	82	10/04/2019 21:46	10/04/2019 23:12	0.06	Forced Outage	Affected by Tripping of 138KV Colon - Calungcalung line 1 and 2	Jan 2011
LUZON	COAL	SMC 1	150	10/04/2019 22:33	10/05/2019 20:03	0.90	Forced Outage	Coal feeder replacement	May 2017
LUZON	OIL	Limay 7	60	10/05/2019 0:01	10/11/2019 10:38	6.44	Planned Outage	Maintenance Outage until 11 October 2019	Dec 1994
LUZON	NATG	Sta. Rita 4	264	10/05/2019 2:36	10/07/2019 21:26	2.78	Maintenance Outage	Maintenance Outage until 07 October 2019	Oct 2001
LUZON	COAL	Sual 1	647	10/06/2019 20:22	10/07/2019 15:03	0.78	Forced Outage	Turbine External Trip	Oct 1999
LUZON	COAL	Sual 1	647	10/07/2019 16:42	10/08/2019 14:06	0.89	Forced Outage	Condenser tube leak	Oct 1999
LUZON	COAL	Masinloc 3	335	10/07/2019 17:01	10/08/2019 11:45	0.78	Forced Outage	Excessive leak at economizer inlet pipe	
VISAYAS	GEO	Mahanagdong B1	5	10/08/2019 10:54	10/13/2019 1:59	4.63	Forced Outage	Condenser level high	Jul 1997
LUZON	NATG	Ilijan A1	190	10/08/2019 16:36	10/08/2019 18:09	0.06	Forced Outage	Tripped at 16MW load	Jun 2002
VISAYAS	OIL	PB102 Unit 4	6	10/08/2019 19:40			Forced Outage	Internal trouble	Apr 1981
LUZON	COAL	Calaca 1	300	10/09/2019 16:42	10/09/2019 23:02	0.26	Forced Outage	Excitation system trouble	Sep 1984
LUZON	NATG	Sta. Rita 1	257.3	10/10/2019 4:40	10/11/2019 1:27	0.87	Maintenance Outage	Maintenance Outage	Jun 2000
LUZON	COAL	Masinloc 3	335	10/10/2019 8:49	10/11/2019 5:34	0.86	Forced Outage	Unit on commissioning test	
LUZON	COAL	Sual 1	647	10/11/2019 8:37	10/18/2019 2:46	6.76	Forced Outage	Condenser tube leak	Oct 1999
VISAYAS	OIL	Bohol 3	4.2	10/11/2019 19:26	10/16/2019 19:13	4.99	Forced Outage	Emergency out due to fuel oil leak	Sep 1978
LUZON	NATG	Ilijan B2	190	10/11/2019 22:24	10/16/2019 12:02	4.57	Planned Outage	SPEX-Malampaya on Planned Outage until 12 Oct. 2019.(RECLASSIFIED FROM FORCE	Jun 2002
LUZON	NATG	Ilijan B3	220	10/11/2019 22:38	10/16/2019 19:57	4.89	Planned Outage	SPEX-Malampaya on Planned Outage until 15 Oct. 2019.(RECLASSIFIED FROM FORCE	Jun 2002
LUZON	NATG	Sta. Rita 2	255.7	10/11/2019 22:38	10/12/2019 0:27	0.08	Forced Outage	Tripped at 115MW load. On Fuel change-over	Jun 2000
LUZON	NATG	Ilijan B1	190	10/11/2019 22:50	10/16/2019 18:28	4.82	Planned Outage	SPEX-Malampaya on Planned Outage until 15 Oct. 2019.(RECLASSIFIED FROM FORCE	Jun 2002
LUZON	NATG	Ilijan A1	190	10/11/2019 23:27	10/16/2019 0:41	4.05	Planned Outage	SPEX-Malampaya on Planned Outage until 15 Oct. 2019.(RECLASSIFIED FROM FORCE	Jun 2002
LUZON	NATG	Sta. Rita 3	265.5	10/12/2019 23:34	10/12/2019 19:25	0.83	Forced Outage	Tripped at 226MW load. On Fuel change-over.	Oct 2001
LUZON	NATG	Ilijan A3	220	10/11/2019 23:45	10/16/2019 3:25	4.15	Planned Outage	SPEX-Malampaya on Planned Outage until 15 Oct 2019.(RECLASSIFIED FROM FORCE.	Jun 2002
LUZON	NATG	Ilijan A2	190	10/11/2019 23:54	10/16/2019 4:25	4.19	Planned Outage	SPEX-Malampaya on Planned Outage until 15 Oct 2019.(RECLASSIFIED FROM FORCE.	Jun 2002
LUZON	NATG	San Gabriel	420	10/11/2019 23:55	10/16/2019 0:02	4.00	Planned Outage	SPEX-Malampaya on Planned Outage until 15 Oct 2019.(RECLASSIFIED FROM FORCE.	Jul 2016
LUZON	NATG	Sta. Rita 1	257.3	10/12/2019 14:17	10/12/2019 18:30	0.18	Forced Outage	Cleaning of clogged fuel oil filter	Jun 2000
VISAYAS	GEO	Mahanagdong B1	5	10/13/2019 13:10	10/18/2019 0:27	4.47	Forced Outage	Cut in back at 1310H	Jul 1997
VISAYAS	OIL	PDP3 H	13	10/14/2019 19:01	10/17/2019 17:18	2.93	Forced Outage	Internal trouble	Mar 2005
LUZON	NATG	Sta. Rita 3	265.5	10/15/2019 0:48	10/15/2019 4:25	0.15	Forced Outage	To facilitate cleaning of Suction filter for fuel oil injection pump	Oct 2001
LUZON	COAL	Masinloc 3	335	10/15/2019 5:59	10/15/2019 10:01	0.17	Forced Outage	Tripped due to high thrust bearing temperature. ALD occured at Meralco and NGCP feeders. Lowest frequency is	
LUZON	NATG	Ilijan A1	190	10/16/2019 0:41	10/16/2019 2:03	0.06	Forced Outage	Turbine tripped	Jun 2002
LUZON	NATG	Ilijan B2	190	10/16/2019 12:06	10/16/2019 13:52	0.07	Forced Outage	GT Blade hot temperature (high).	Jun 2002
LUZON	NATG	Ilijan B2	190	10/16/2019 15:54	10/16/2019 21:06	0.22	Forced Outage	Tripped at 50MW load.	Jun 2002
LUZON	NATG	Ilijan A1	190	10/16/2019 17:07	10/16/2019 18:30	0.06	Forced Outage	Tripped at 97MW load.	Jun 2002
VISAYAS	COAL	TPC Sangi 1	60	10/17/2019 22:15			Forced Outage	Boiler tube leak	Oct 2015
LUZON	COAL	Calaca 2	300	10/17/2019 23:49			Planned Outage	Maintenance Outage until 02 March 2020	Sep 1984
LUZON	NATG	Sta. Rita 4	264	10/19/2019 0:42	10/19/2019 19:25	0.78	Maintenance Outage	Maintenance Outage until 20 Oct 2019	Oct 2001
VISAYAS	OIL	PB101 Unit 1	6	10/19/2019 18:54	10/21/2019 19:26	2.02	Forced Outage	Affected by line tripping	1978
VISAYAS	OIL	PB101 Unit 2	6	10/19/2019 18:54	10/22/2019 16:22	2.89	Forced Outage	Affected by line tripping	1978
VISAYAS	OIL	PB102 Unit 2	6	10/19/2019 18:54	10/22/2019 16:31	2.90	Forced Outage	Affected by line tripping	Apr 1981
VISAYAS	OIL	PB102 Unit 3	6	10/19/2019 18:54	10/22/2019 16:26	2.90	Forced Outage	Affected by line tripping	Apr 1981
LUZON	COAL	Sual 2	647	10/20/2019 23:48			Planned Outage	Maintenance Outage until 11.17.2019 (2400H)	Oct 1999
LUZON	HYD	Kalayaan 1	180	10/21/2019 0:01	10/25/2019 19:13	4.80	Maintenance Outage	Maintenance Outage until 25 October 2019	Aug 1982
LUZON	GEO	Makban 1	63	10/21/2019 13:56			Planned Outage	Annual Overhauling	Apr 1979
VISAYAS	BIOF	FFHC	13	10/21/2019 14:05	10/23/2019 15:01	2.04	Maintenance Outage	Offline due to weekly maintenance	Feb 2009
LUZON	HYD	Maris 1	3.8	10/21/2019 14:40			Maintenance Outage	Maintenance outage-non GOP	
LUZON	HYD	Maris 2	3.8	10/21/2019 14:54			Maintenance Outage	Maintenance outage-non GOP	
VISAYAS	GEO	Mahanagdong B1	5	10/21/2019 21:14			Forced Outage	To correct AVR problem	Jul 1997
LUZON	GEO	Tiwi 2	59	10/22/2019 10:32			Planned Outage	To give way to the shutdown of PCBs 81TW8.124	Jan 1979
LUZON	COAL	SLTEC 1	121	10/23/2019 18:25			Forced Outage	Boiler tube leak	Apr 2015