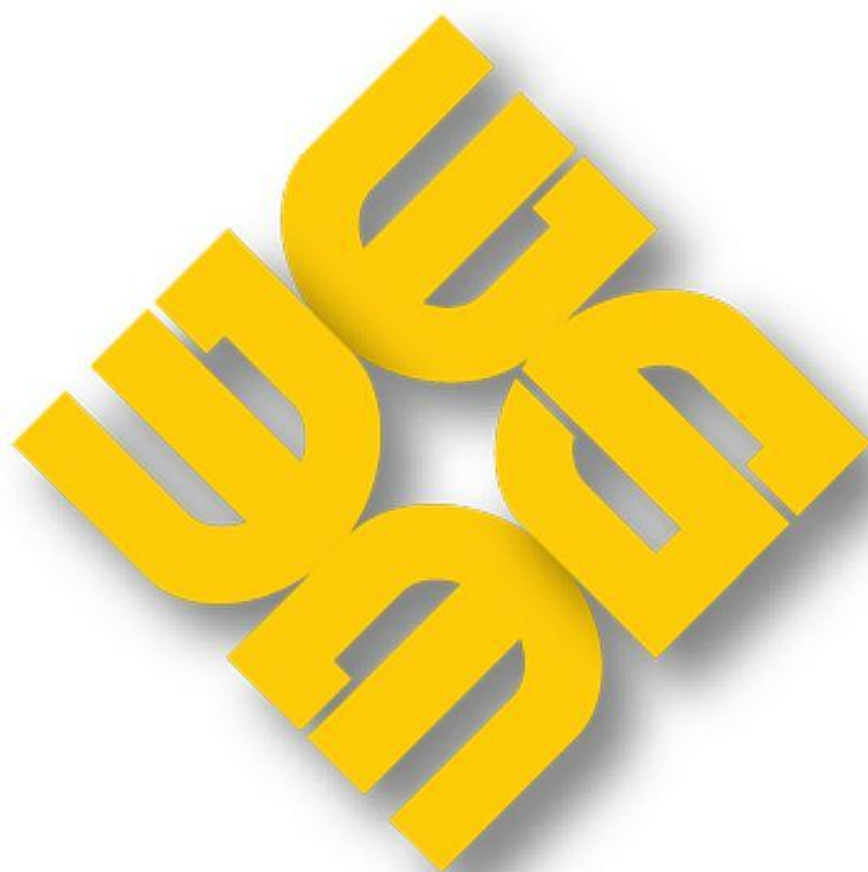


MAG-MMAR-2019-09

MONTHLY MARKET ASSESSMENT REPORT

For the Billing Period 26 August to 25 September 2019



**PHILIPPINE
ELECTRICITY
MARKET
CORPORATION**

**MARKET ASSESSMENT GROUP
(MAG)**

Monthly Market Assessment Report for September 2019 Billing Month

1. Summary

The September billing month saw an improved demand and supply situation. A high number of generators were online which sufficiently supplied the whole system requirement. Meanwhile, electricity demand remained relatively low due to cooler weather.

With the large supply margin, the market prices for the billing month decreased further by 28.8 percent to PhP2,139/MWh from PhP3,004/MWh in August.

2. Market Outcomes

2.1. Capacity Profile

The WESM registered capacity recorded a slight increase from 19,966.67 MW to 19,967.27 MW following the registration of 15-MW Cagayan Biomass Energy Corporation biomass plant and the change in maximum capacity of coal plant Therma Visayas, Inc units 1 and 2 from 176.2 MW to 169 MW each.

Of the said total WESM registered capacity, only about 68 percent or an average of 13,628 MW was offered in the market higher than last month's 12,654 MW.

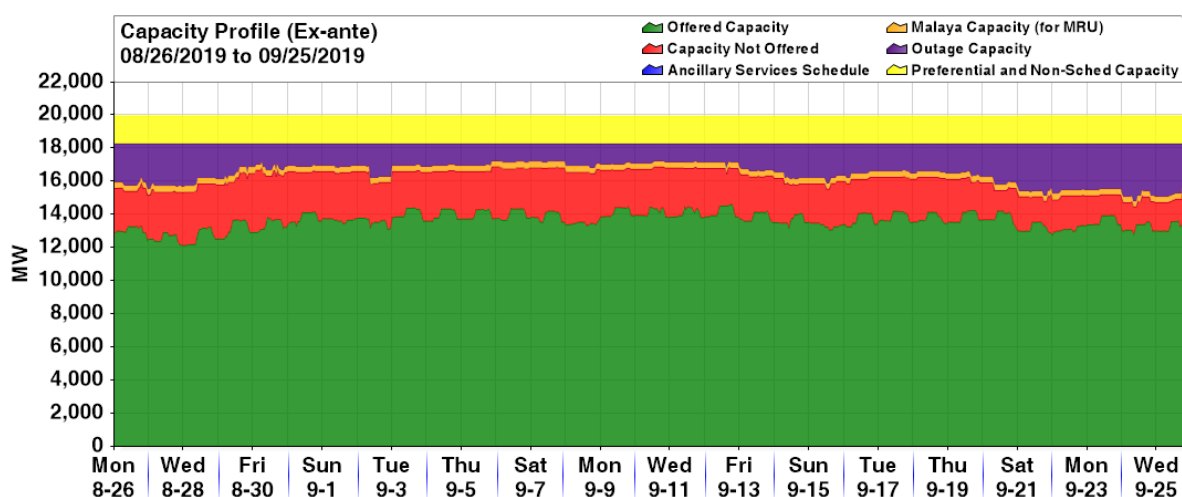


Figure 1. Capacity Profile

	September 2019		August 2019	
	Average (in MW)	% of RegCap	Average (in MW)	% of RegCap
Preferential and Non-Sched Capacity	1,665	8%	1,662	8%
Outage Capacity	1,838	9%	2,652	13%
Malaya Capacity (for MRU)	350	2%	350	2%
Capacity Not Offered	2,480	12%	2,648	13%
Offered Capacity	13,628	68%	12,654	63%
Registered Capacity (by the end of the billing month)	19,967		19,967	

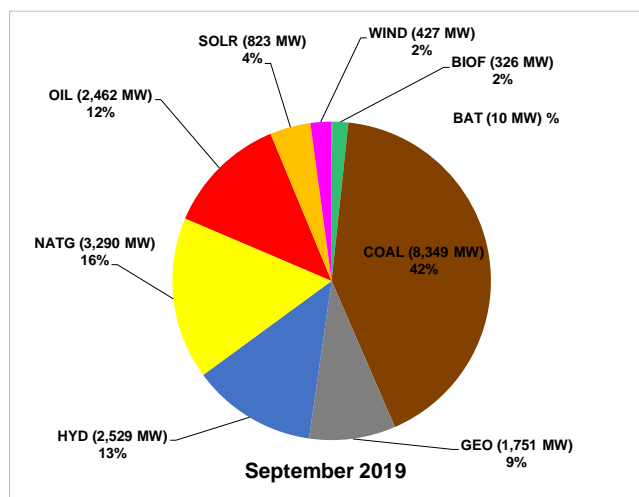


Figure 2. Registered Capacity Mix, September 2019

2.2. Outage Capacity

About 9 percent of the total registered capacity or an average of 1,838 MW were on outage. Bulk of which, at 57 percent, were related to forced outages, averaging at 1,051 MW, while maintenance outages, averaging at 201 MW, accounted for 11 percent of the total outage capacity.

This month's average outage capacity was 30 percent lower than previous month's average posted at 2,652 MW.

Based on type of resource, the bulk of the outage capacity is at 40 percent or an average of 743 MW which was attributable to the planned outage of PCPC CFTPP and forced outage of Masinloc CFTPP unit 3 and SMC Limay CFTPP unit 3.

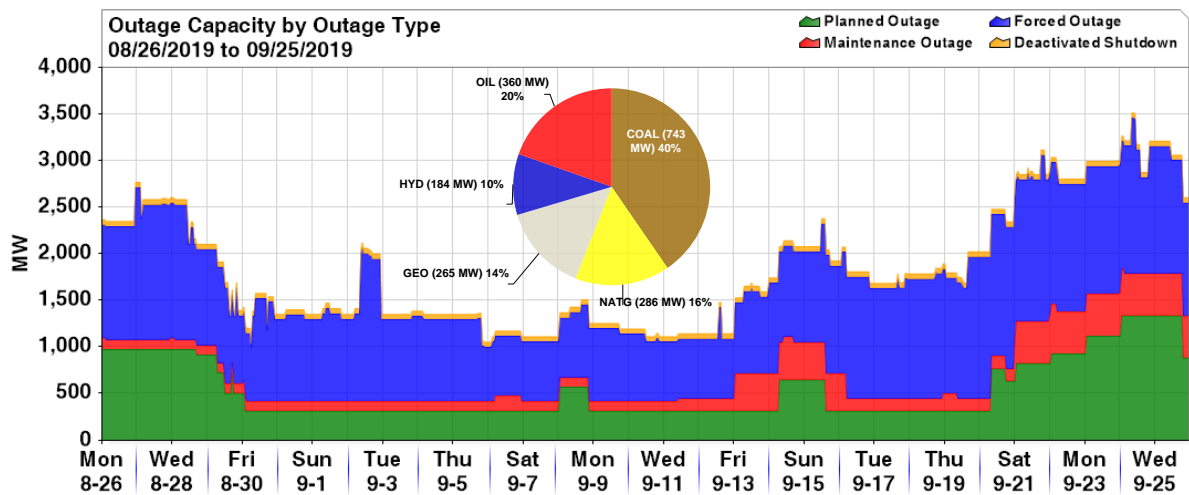


Figure 3. Outage Capacity by Outage Category

2.3. Supply and Demand

Average effective supply increased by 5.4 percent from previous month's 13,187 MW to current month's 13,894 MW level with the resumption of major power plants which went on outage during the previous month. Meanwhile, demand plus reserve schedule decreased by 0.5 percent to an average of 11,154 MW from last month's 11,205 MW as cooler temperatures were sustained this month. This widened the supply margin to an average of 2,739 MW from 1,982 MW in August.

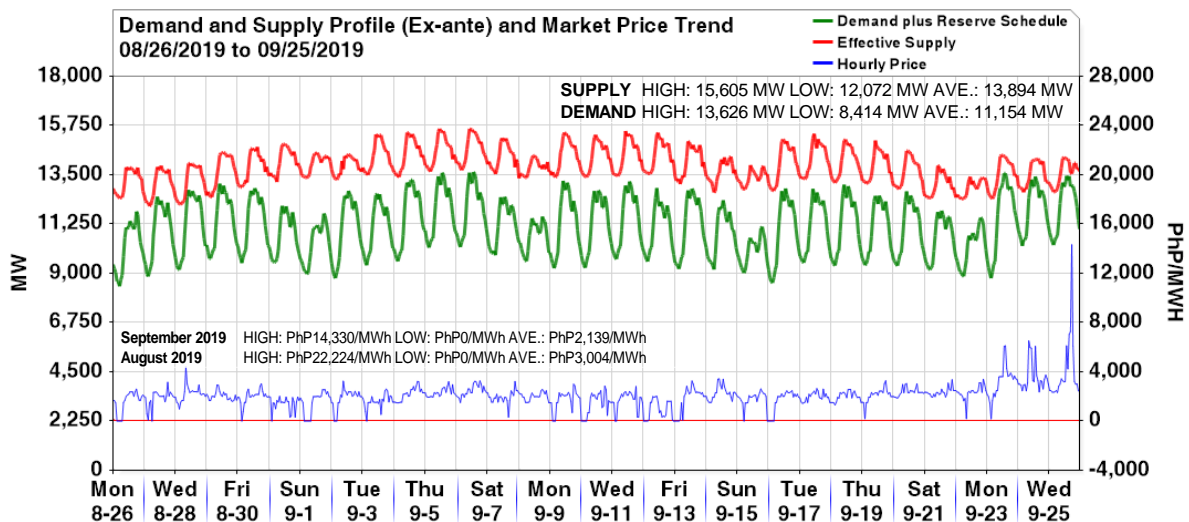


Figure 4. Demand and Supply Profile vs. Market Prices

2.4. Market Prices

Market prices continued to go down at an average of PhP2,139/MWh this month from previous month's PhP3,004/MWh following the better supply and

demand condition. This recorded the lowest average price for the year 2019 as of September billing month.

There was only one instance during the month that the price spiked to Php14,330/MWh on 25 Sep 1800H due to a narrow supply margin caused by the planned outages of 600-MW NGPP Ilijan unit 1 starting 21 Sep and 335-MW Masinloc CFTPP unit 3 on 24 Sep.

3. Structural Competition Indices

3.1. Pivotal Plants

The market RSI fell below the 100-percent mark in 4 percent of the time in the September billing month from 16.4 percent in August, indicating the less frequent presence of pivotal suppliers during the period as a result of the wider supply margin this month. Most frequent pivotal suppliers during the billing month were Sual CFTPP, Sta. Rita NGPP and Pagbilao CFTPP.

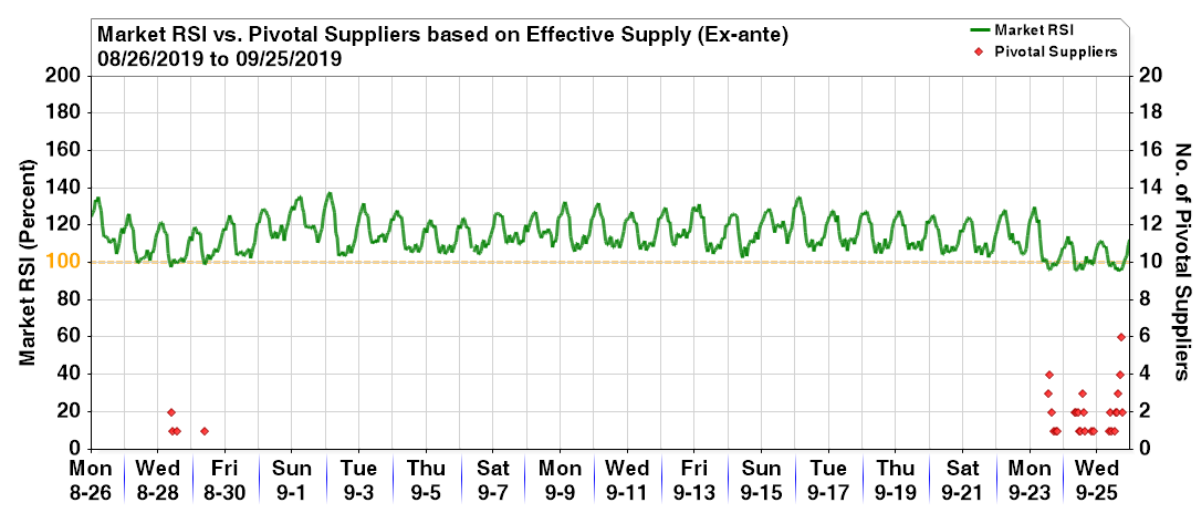


Figure 5. Market RSI vs. Pivotal Suppliers

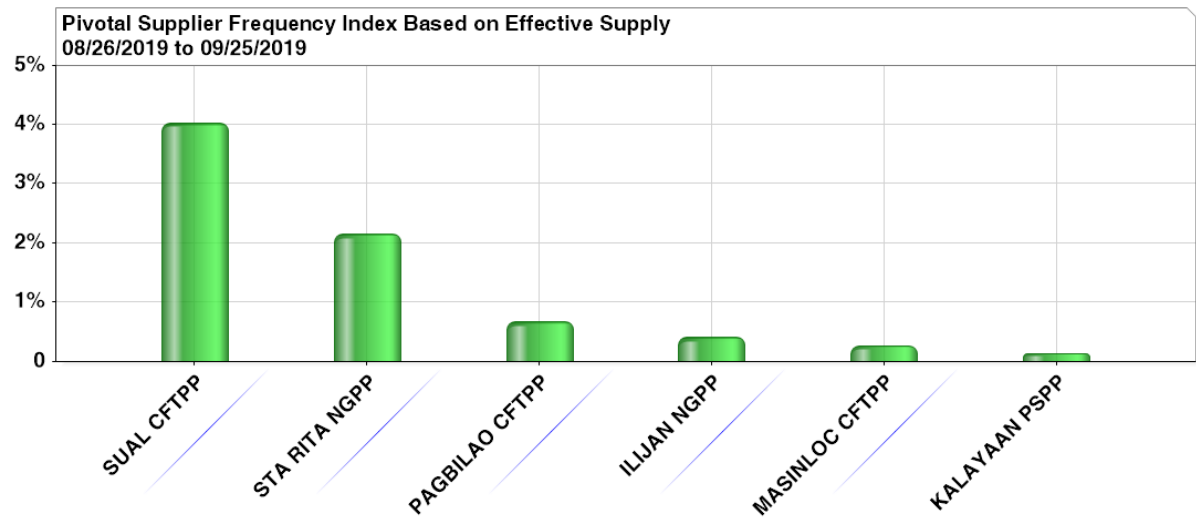


Figure 6. Top Pivotal Plants

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 19.9 percent, FGC came in third at 14.4 percent and lastly, PSALM at 10.6 percent.

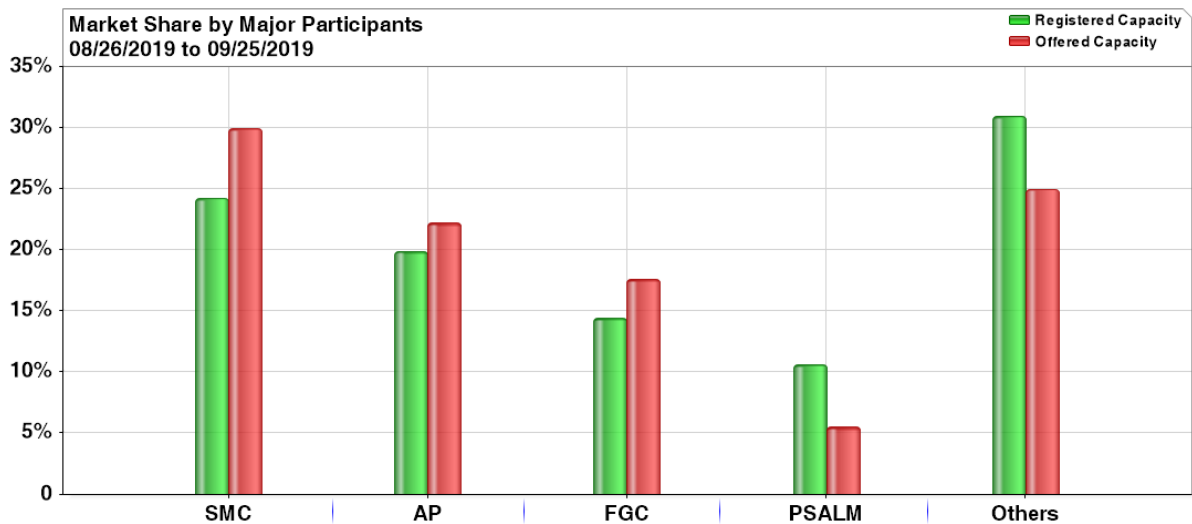


Figure 7. Market Share

The market share of SMC based on offered capacity was recorded at 29.9 percent. This was a 3.7 percent increase from its previous 26.2 percent share. Meanwhile, AP and FGC recorded a decline in market shares from 23.7 percent and 19 percent to 22 percent and 17.8 percent, respectively. Accordingly, the Herfindahl-Hirschman Index (HHI) calculated based on offered capacity by major participants' grouping indicated a concentrated market for 56 percent of the time and moderately concentrated market for 44 percent.

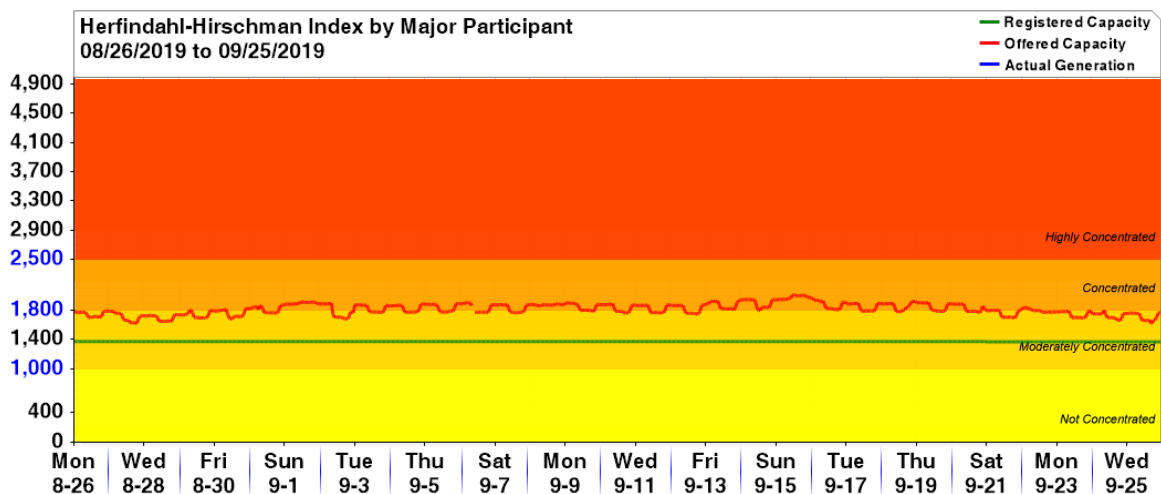


Figure 8. Hourly HHI based on Major Participant Grouping

4. Spot Exposure

Spot market transactions comprised only about 14.7 percent of the total metered quantities, considering that majority of the total energy injected into the grid was covered by bilateral contracts at about 83.2 percent.

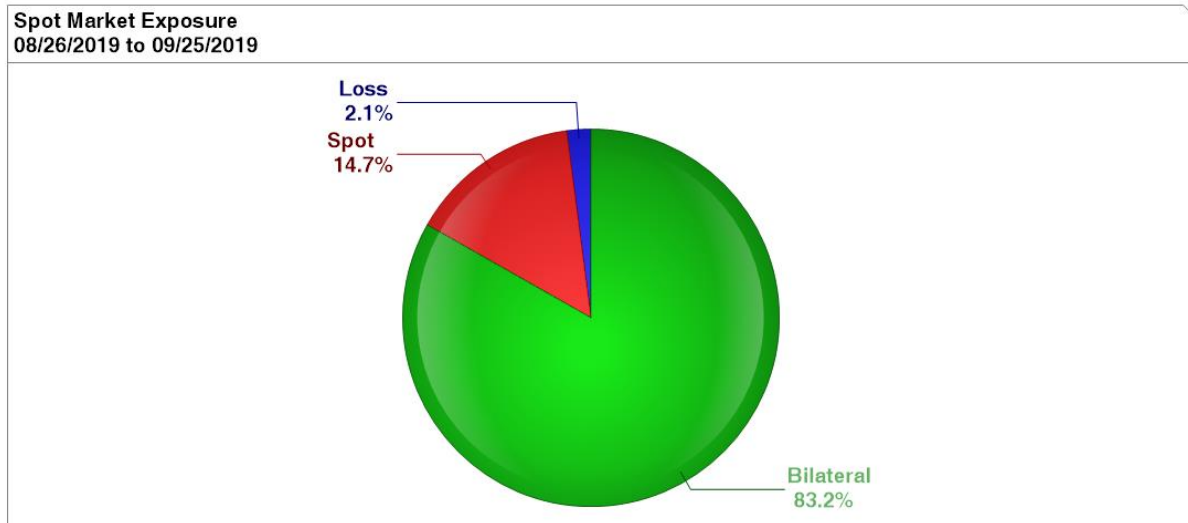


Figure 9. Spot Market Exposure

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			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	BIOF	URC 1	40	04/28/2019 0:53	09/17/2019 11:26	142.44	Forced Outage	Offline due to Boiler problem	Jan 2015
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			Maintenance Outage	Maintenance Outage	Apr 1979
VISAYAS	SOLR	San Carlos Sun	46.8	07/13/2019 6:24			Forced Outage	Affected by maintenance of 138KV Bacolod-Cadiz TL and APMS of Cadiz 50MVA TR1	Mar 2016
VISAYAS	COAL	TPC Sangi 1	60	07/21/2019 10:46			Forced Outage	Affected by Carcon L12 tripping	Oct 2015
LUZON	NATG	Ilijan B1	190	07/25/2019 0:41	08/29/2019 6:14	35.23	Planned Outage	Maintenance Outage till 28 August 2019	Jun 2002
LUZON	NATG	Ilijan B3	220	07/28/2019 0:24	08/29/2019 11:32	32.46	Planned Outage	Maintenance Outage until 28 August 2019	Jun 2002
LUZON	NATG	Ilijan B2	190	07/28/2019 0:37	08/30/2019 1:41	33.04	Planned Outage	Maintenance Outage till 31 August 2019	Jun 2002
LUZON	HYD	Kalayaan 3	180	08/01/2019 0:01			Planned Outage	Planned Outage until 19 October 2019(GOMP).	May 2004
LUZON	NATG	Avion 1	50.3	08/16/2019 0:01			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	Mahanagdong A2	5	08/16/2019 8:22			Forced Outage	Emergency shutdown	Jul 1997
LUZON	COAL	Masinloc 3	335	08/17/2019 12:58	08/27/2019 2:29	9.56	Forced Outage	Emergency Shutdown. Under Commissioning Test	
LUZON	COAL	Calaca 1	300	08/23/2019 3:42	08/29/2019 14:40	6.46	Forced Outage	Tripped at 65MW load. System frequency at 59.82hz	Sep 1984
LUZON	OIL	Limay 2	60	08/24/2019 0:01	08/28/2019 16:11	4.67	Planned Outage	Planned Outage until 30 August 2019	May 1993
VISAYAS	COAL	PALM 1	135	08/24/2019 0:01	09/20/2019 17:01	27.71	Planned Outage	PMS. ETR -- 9.22.2019 at 2400H	Aug 2016
VISAYAS	GEO	PGPP2 Unit 3	20	08/25/2019 22:05	08/26/2019 2:06	0.17	Maintenance Outage	Offline due to upgrading of turbine control system	Aug 1983
VISAYAS	SOLR	Silay	20	08/26/2019 16:42	08/26/2019 17:22	0.03	Forced Outage	Isolated due to tripping of 69KV Bacolod-Silay Sub TL	Apr 2016
LUZON	NATG	San Gabriel	420	08/26/2019 22:36	08/28/2019 10:18	1.49	Forced Outage	Restriction of Natural Gas Fuel Supply from SPEx Malampaya	Jul 2016
VISAYAS	BIOF	SCBE	8.3	08/27/2019 1:14	08/27/2019 11:10	0.41	Forced Outage	Affected by tripping of 13.8KV NONECO line	Feb 2009
LUZON	COAL	SMC 1	150	08/27/2019 3:22	08/30/2019 5:11	3.08	Forced Outage	Low furnace temperature	May 2017
VISAYAS	OIL	PDP3 C	12	08/27/2019 16:30	08/27/2019 20:05	0.15	Forced Outage	Tripped due to high Torsional Vibration	Mar 2005
VISAYAS	GEO	PGPP2 Unit 1	20	08/27/2019 22:05	08/28/2019 1:02	0.12	Maintenance Outage	Upgrade firmware for the turbine protection and replace leaking diaphragm valve	Aug 1983
LUZON	HYD	Kalayaan 2	180	08/28/2019 12:58	08/28/2019 14:15	0.05	Forced Outage	Tripped due to main transformer trouble	Aug 1982
LUZON	NATG	Ilijan B3	220	08/29/2019 16:29	08/29/2019 17:25	0.04	Planned Outage	Conducted Mechanical Overspeed Test as part of their Maintenance Outage	Jun 2002
LUZON	COAL	Calaca 1	300	08/29/2019 19:16	08/29/2019 20:15	0.04	Forced Outage	Shutdown as part of their Commissioning Test after Overhauling	Sep 1984
VISAYAS	GEO	PGPP1 Unit 2	37.5	08/30/2019 0:04	08/30/2019 2:42	0.11	Maintenance Outage	Offline to conduct replacement of ACLE Card of AVR	
LUZON	COAL	Masinloc 3	335	08/30/2019 6:07	08/30/2019 16:56	0.45	Forced Outage	On Commissioning Test	
LUZON	NATG	Ilijan B1	190	08/30/2019 8:52	08/30/2019 21:27	0.52	Forced Outage	High temperature at disc cavity	Jun 2002
LUZON	COAL	Calaca 1	300	08/30/2019 17:32	09/05/2019 19:53	6.10	Forced Outage	Instrument air pressure trouble	Sep 1984
VISAYAS	GEO	Nasulo	48.3	08/31/2019 5:17	08/31/2019 18:53	0.57	Forced Outage	Offline to conduct rectification of inconsistency of valve response with respect to fre	Sep 2014
LUZON	GEO	Bacman 1	60	09/01/2019 6:36	09/01/2019 7:11	0.02	Forced Outage	Turbine vibration trouble	Sep 1993
LUZON	GEO	Bacman 1	60	09/01/2019 7:20	09/01/2019 11:17	0.16	Forced Outage	Turbine vibration trouble	Sep 1993
LUZON	GEO	Tiwi 5	57	09/01/2019 8:20	09/01/2019 9:47	0.06	Forced Outage	Emergency shutdown requested by Tiwi C to facilitate troubleshooting of gross gene	Jan 1979
LUZON	OIL	Limay 5	60	09/01/2019 9:16	09/01/2019 20:00	0.45	Forced Outage	Servo valve trouble	Dec 1994
LUZON	GEO	Bacman 1	60	09/02/2019 4:41	09/02/2019 10:55	0.26	Forced Outage	Tripped at 48MW load	Sep 1993
LUZON	COAL	Sual 2	647	09/02/2019 8:40	09/02/2019 22:11	0.56	Forced Outage	Tripped at 480MW load. Generator stator cooling water level low.	Oct 1999
LUZON	OIL	Limay 5	60	09/02/2019 9:21	09/02/2019 14:42	0.22	Forced Outage	Fuel or water drain valve problem	Dec 1994
VISAYAS	GEO	PGPP1 Unit 2	37.5	09/02/2019 14:21	09/02/2019 16:49	0.10	Forced Outage	Auto-tripped due to condenser vacuum low	
LUZON	HYD	Binga 2	35	09/03/2019 19:00	09/04/2019 3:05	0.34	Forced Outage	Generator breaker troble	Jan 1960
VISAYAS	OIL	PDP3 C	12	09/05/2019 16:31	09/05/2019 21:29	0.21	Forced Outage	AUTO TRIPPED (High torsional vibration)	Mar 2005
LUZON	OIL	Limay 1	60	09/06/2019 2:53	09/13/2019 17:01	7.59	Forced Outage	Affected by the tripping of Unit 1 Main Transformer.	May 1993
LUZON	GEO	Bacman 1	60	09/06/2019 4:12	09/06/2019 22:24	0.76	Maintenance Outage	Maintenance Outage	Sep 1993
LUZON	NATG	Sta. Rita 2	255.7	09/08/2019 0:32	09/08/2019 20:31	0.83	Planned Outage	GT off line compressor washing	Jun 2000
LUZON	OIL	Limay 5	60	09/08/2019 7:51	09/09/2019 17:01	1.38	Forced Outage	Blow-Off valve not opening	Dec 1994
VISAYAS	COAL	CEDC 3	82	09/08/2019 15:57	09/10/2019 11:56	1.83	Forced Outage	AFFECTED BY LINE TRIPPING. 138KV CEDC-MAGDUGO LINE. LI is 56MW	Jan 2011
LUZON	HYD	Ambuklao 2	35	09/10/2019 18:47	09/10/2019 20:17	0.06	Forced Outage	Tripped due to broken shear pin	Dec 1956
VISAYAS	GEO	Upper Mahiao 3	32	09/11/2019 9:11			Maintenance Outage	To rectify Turbine bearing vibrations	Jul 1997
LUZON	COAL	Masinloc 3	335	09/12/2019 13:24	09/12/2019 15:43	0.10	Forced Outage	Tripped at 216MW. On Commissioning Test.System Frequency is 59.43hz	
VISAYAS	BIOF	FFHC	13	09/12/2019 14:30	09/12/2019 16:54	0.10	Forced Outage	Isolated from the grid. affected by tripping of CENECOs Mt. View SS 10MVA transfor	Feb 2009
LUZON	COAL	SLTEC 1	121	09/13/2019 0:33	09/15/2019 17:56	2.72	Forced Outage	Tripped at 5MW while on the process of lowering load for shutdown(Unplanned Out	Apr 2015
LUZON	NATG	Sta. Rita 3	265.5	09/13/2019 0:42	09/16/2019 4:07	3.14	Maintenance Outage	Compressor washing and rectification of steam and lube oil leak	Oct 2001
LUZON	COAL	SLTEC 2	122.9	09/13/2019 6:54	09/16/2019 20:17	3.56	Forced Outage	Correction of hotspot at 8A - 08D503CLC of Calaca Substation.(RECLASSIFIED FROM F	Feb 2016
LUZON	HYD	Ambuklao 2	35	09/13/2019 11:08	09/13/2019 12:15	0.05	Forced Outage	Tripped at 30MW load. As Ancillary provider (CR-non firm).	Dec 1956
VISAYAS	BIOF	URC 2	40	09/13/2019 21:18	09/16/2019 10:30	2.55	Maintenance Outage	Offline after trial run	Jan 2015
LUZON	COAL	SLPGC 2	150	09/13/2019 23:59	09/21/2019 12:22	7.93	Forced Outage	Emergency Shutdown for Repair of Air Pre-heater Tube Leak	Jul 2016
LUZON	COAL	Masinloc 3	335	09/14/2019 6:35	09/15/2019 14:10	1.32	Planned Outage	Conducted Load Rejection Test at 335MW	
LUZON	GEO	Makban 3	63	09/14/2019 9:06	09/14/2019 16:40	0.32	Maintenance Outage	Was shutdown for correction of hotspot at DS 8-01D525MKB	Apr 1979
LUZON	COAL	Calaca 1	300	09/15/2019 11:53			Forced Outage	Boiler tube leak	Sep 1984
LUZON	COAL	SMC 3	150	09/16/2019 1:11	09/25/2019 10:25	9.38	Forced Outage	Suspected Boiler Tube Leak	Mar 2018
VISAYAS	BIOF	URC 2	40	09/16/2019 23:48	09/23/2019 9:29	6.40	Forced Outage	Offline after test run	Jan 2015
VISAYAS	BIOF	URC 1	40	09/17/2019 11:59	09/24/2019 22:46	7.45	Forced Outage	Offline. Line clearing along their line. Under test run	Jan 2015
VISAYAS	OIL	Bohol 3	4.2	09/17/2019 13:28	09/18/2019 18:05	1.19	Forced Outage	Auto tripped. for maintenance check up.	Sep 1978
LUZON	HYD	Magat 2	97	09/17/2019 15:33	09/17/2019 16:09	0.03	Forced Outage	IH rafter problem	Aug 1983
VISAYAS	BIOF	FFHC	13	09/17/2019 16:12	09/17/2019 19:14	0.13	Forced Outage	Offline due to boiler problem	Feb 2009
VISAYAS	OIL	Bohol 1	4	09/17/2019 16:36	09/17/2019 22:10	0.23	Forced Outage	Emergency cut-out due to tripping of lube oil radiator fan and high exhaust gas temp	Sep 1978
LUZON	HYD	Magat 2	97	09/17/2019 20:12			Forced Outage	IH rafter problem	Aug 1983
LUZON	OIL	Limay 1	60	09/18/2019 17:12	09/19/2019 11:05	0.75	Forced Outage	Ectitation trouble	May 1993
VISAYAS	OIL	Bohol 2	4	09/18/2019 17:55	09/24/2019 9:34	5.65	Forced Outage	Emergency cut out due to excessive fuel oil leak	Sep 1978
VISAYAS	GEO	Nasulo	48.3	09/18/2019 22:09	09/19/2019 8:14	0.42	Maintenance Outage	Offline due to calibration and testing of governor controller	Sep 2014
VISAYAS	GEO	Nasulo	48.3	09/19/2019 11:06	09/19/2019 12:40	0.07	Forced Outage	Emergency offline due to troubleshooting of woodward governor	Sep 2014
LUZON	COAL	Masinloc 3	335	09/19/2019 15:00	09/24/2019 10:54	4.83	Forced Outage	Repair of HP heater 7 Bypass MOV. On Commissioning Test	
LUZON	COAL	SBPL	455	09/20/2019 7:04	09/25/2019 18:01	5.46	Planned Outage	Commissioning Test	Oct 2019
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			Planned Outage	Maintenance Outage until 19 October 2019	Jun 2002
LUZON	HYD	Ambuklao 2	35	09/21/2019 1:13	09/21/2019 2:31	0.05	Forced Outage	Tripped due to broken shear pin	Dec 1956
LUZON	COAL	ANDA 1	72	09/21/2019 8:52	09/21/2019 9:44	0.04	Forced Outage	Actuation of differential relay due to fault along thier line (topple tree)	Sep 2016
LUZON	HYD	Binga 2	35	09/21/2019 10:58	09/21/2019 12:27	0.06	Forced Outage	Tripped due to transformer oil level low	Jan 1960
LUZON	NATG	San Lorenzo 1	264.8	09/21/2019 17:18	09/21/2019 20:46	0.14	Forced Outage	Tripped due to pilot gas control valve trouble	Sep 2002
LUZON	COAL	SLPGC 2	150	09/21/2019 22:59	09/22/2019 5:10	0.26	Forced Outage	Tripped at 10MW load during load stabilization from start-up. Due to HP Turbine Diff	Jul 2016
VISAYAS	COAL	CEDC 3	82	09/21/2019 23:55	09/22/2019 4:29	0.19	Maintenance Outage	MANUALLY CUT-OUT FOR REPLACEMENT OF TURBINE GOVERNOR ACTUATOR	Jan 2011
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			Planned Outage	Maintenance Outage until 06 October 2019	Jun 2002
VISAYAS	BIOF	FFHC	13	09/23/2019 2:05	09/24/2019 5:09	1.13	Maintenance Outage	Offline due to weekly maintenance	Feb 2009
VISAYAS	OIL	PDP3 G	13	09/23/2019 22:37	09/24/2019 2:31	0.16	Maintenance Outage	Test and Commissioning	Mar 2005
VISAYAS	GEO	PGPP1 Unit 3	37.5	09/24/2019 0:14	09/24/2019 2:46	0.11	Maintenance Outage	Offline due to replacement of AVR ACLE Card	
LUZON	NATG	Ilijan A3	220	09/24/2019 0:35			Planned Outage	Maintenance Outage	Jun 2002
LUZON	COAL	Calaca 2	300	09/24/2019 7:29	09/24/2019 13:51	0.27	Forced Outage	High turbine vibration	Sep 1984
VISAYAS	BIOF	URC 2	40	09/24/2019 17:15	09/24/2019 19:12	0.08	Forced Outage	Affected by emergency shutdown of Mabinay 30MVA TR.	Jan 2015
LUZON	COAL	Masinloc 3	335	09/24/2019 19:35			Forced Outage	Steam leak at Main Steam Line	
VISAYAS	BIOF	URC 1	40	09/24/2019 22:46	09/25/2019 22:12	0.98	Forced Outage	Emergency offline due to Boiler problem	Jan 2015
VISAYAS	BIOF	URC 2	40	09/24/2019 23:24	09/25/2019 1:21	0.08	Forced Outage	Offline due to Boiler problem	Jan 2015