

Market Surveillance Committee Monthly Over-riding Constraints Report

26 February to 25 March 2023

June 2023

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

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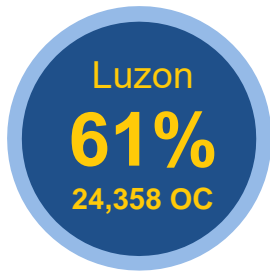
LUZON

VISAYAS

MONTHLY REPORT ON OVER-RIDING CONSTRAINTS

IMPOSITIONS BY CATEGORY AND REGION

39,918 Total Impositions
81% of which were **non-security** limits.

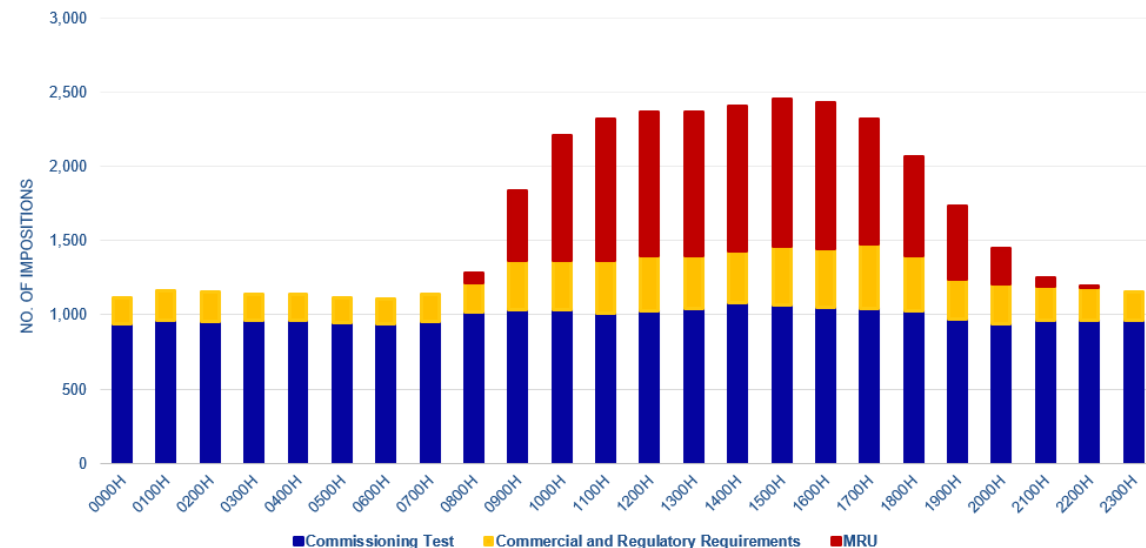


An increase of **81%** in over-riding constraint (OC) impositions was observed during the March 2023 billing period involving **21 Luzon** and **15 Visayas plants**.

Note: Under the Dispatch Protocol Manual Issue 16.0, imposition of over-riding constraints falls into 2 categories – 1) security limit i.e., MRU and other types as may be recommended by SO and 2) non-security limit. Security limit is imposed to address possible threats in system security while non-security limit is related to 1) generating unit limitations, 2) commercial and regulatory requirements, and lastly, 3) conduct of commissioning test of plants.

The monitoring of the over-riding constraints is based on the data and information provided by MO (i.e., real time market results and MMS-input files on security limits) and SO (i.e., SO Data for Market Monitoring).

IMPOSITIONS BY HOUR



Majority of over-riding constraints imposed over a 24-hour period were caused by the conduct of commissioning tests which constituted **60% of the total impositions**. It recorded an almost equal impositions for every hour with slight increase during peak hours due to solar plants' commissioning test.

Commercial and regulatory requirement tests increased during peak hours due to tests conducted by battery energy storage system (BESS) and coal plants. Also, impositions related to Must-Run Units (MRUs) during the same time period were mainly attributable to oil-based plants.

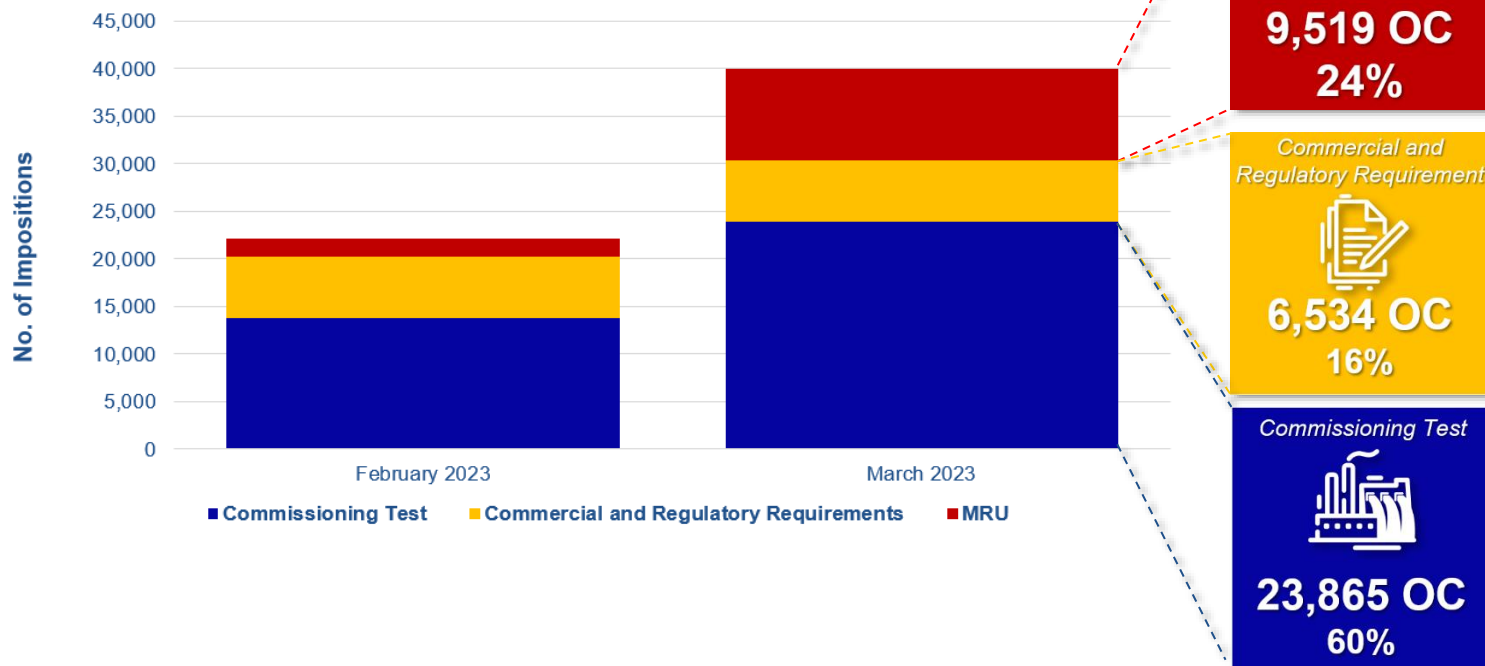
MONTHLY REPORT ON OVER-RIDING CONSTRAINTS

IMPOSITIONS BY INCIDENT

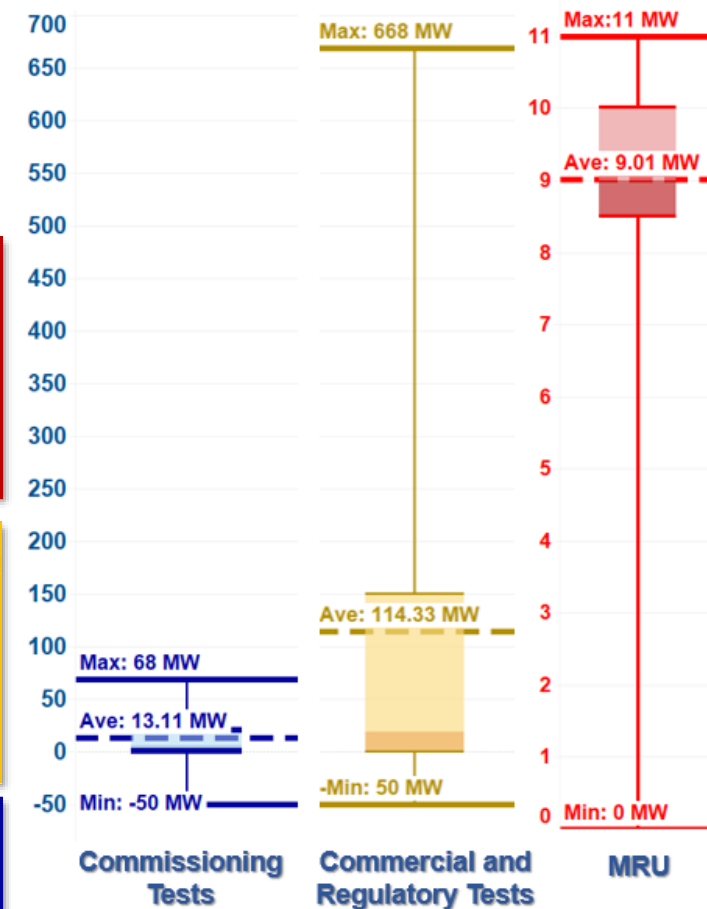
An increase in impositions related to commissioning test was observed following the start of testing period of one (1) BESS and one (1) wind plant. MRU impositions were likewise increased during the period, specifically in the Visayas Region, to address the thermal limit of lines in the area. On the other hand, the number of incidents related to commercial and regulatory requirements (e.g., Ancillary Services Test, Emission test and Grid Compliance Test) also slightly increased.

During the billing period, impositions related to commercial and regulatory requirements were with generators with large capacities. It was, however, noted that despite the high registered capacities of plants, especially coal plants, majority were over-ridden to lower capacities. Meanwhile, commissioning tests were mostly undertaken by renewable energy plants with relatively low registered capacities.

The graph (on the right) shows the scheduled capacities corresponding to the impositions.

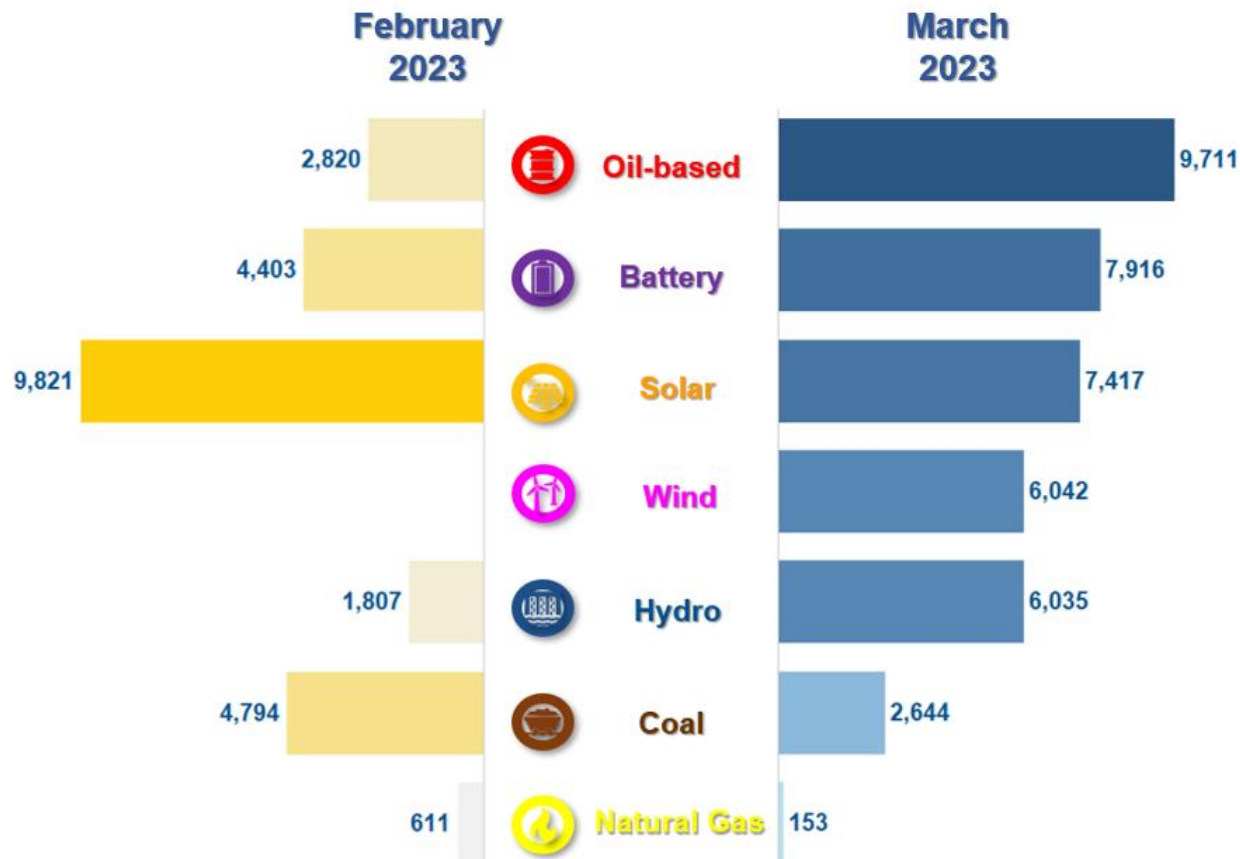


SCHEDULED CAPACITIES (MW)



MONTHLY REPORT ON OVER-RIDING CONSTRAINTS

IMPOSITIONS BY PLANT TYPE

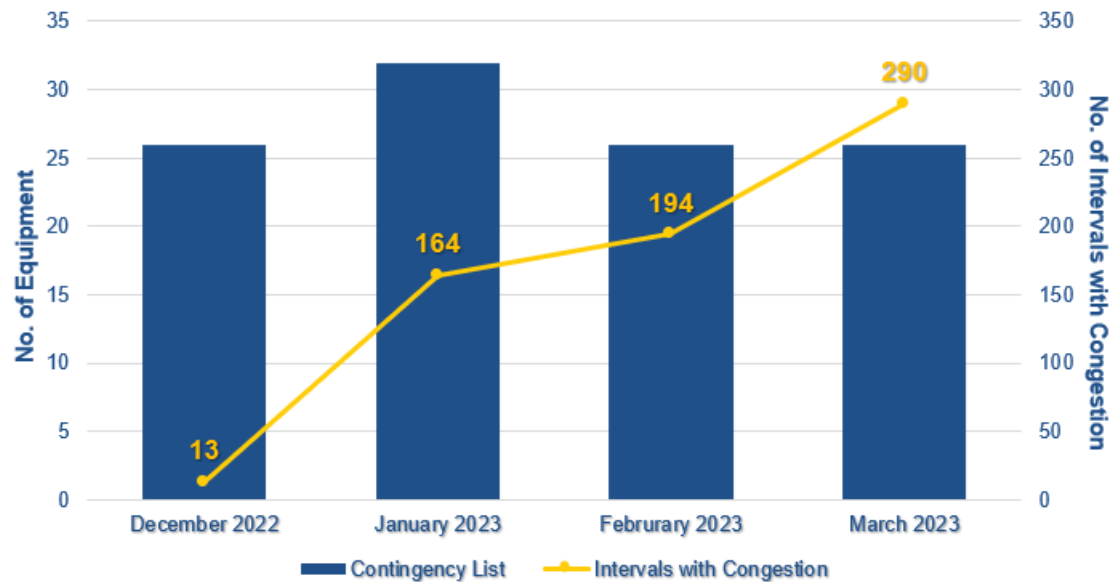


Overall, over-riding constraints impositions for most of plant types increased, while solar, coal, and natural gas plants recorded respective decreases, during the March 2023 billing period. The reasons for the impositions per plant types were as follows:

- Increase in the number of impositions related to **Oil-based** plants was due to MRU impositions to four (4) plants.
- Start of commissioning test of one (1) **BESS** was the reason for the increase in the over-riding constraints for this resource type.
- Despite the extended conduct of commissioning tests, **Solar** plants impositions during the billing period decreased attributable to completion of commissioning test period of one (1) plant.
- Entry of one (1) **Wind** plant undergoing test and commissioning was noted during the billing period.
- Impositions attributable to **Hydro** plants increased, mainly caused by extended validity of commissioning test for one (1) plant.
- A decrease in the number of performance and ancillary service tests undertaken by **Coal** plants caused the decrease in the impositions observed during the billing period.
- Decrease in the number of impositions to **Natural gas** plants was noted due to lesser conduct of net dependable capacity tests.

MONTHLY REPORT ON OVER-RIDING CONSTRAINTS

IMPOSITIONS TO SYSTEM EQUIPMENT

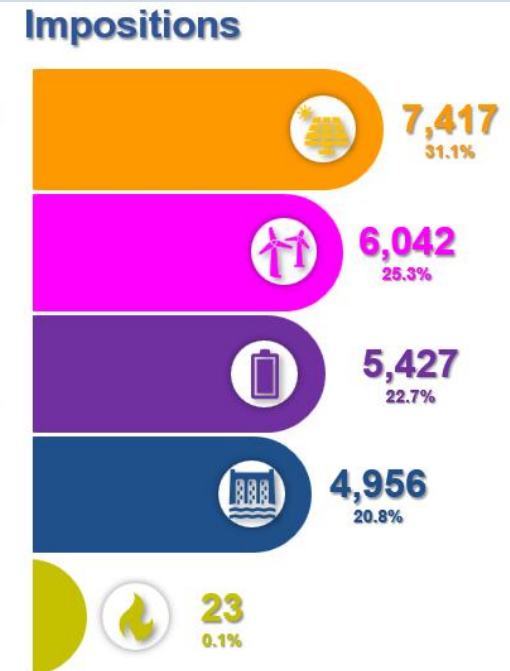
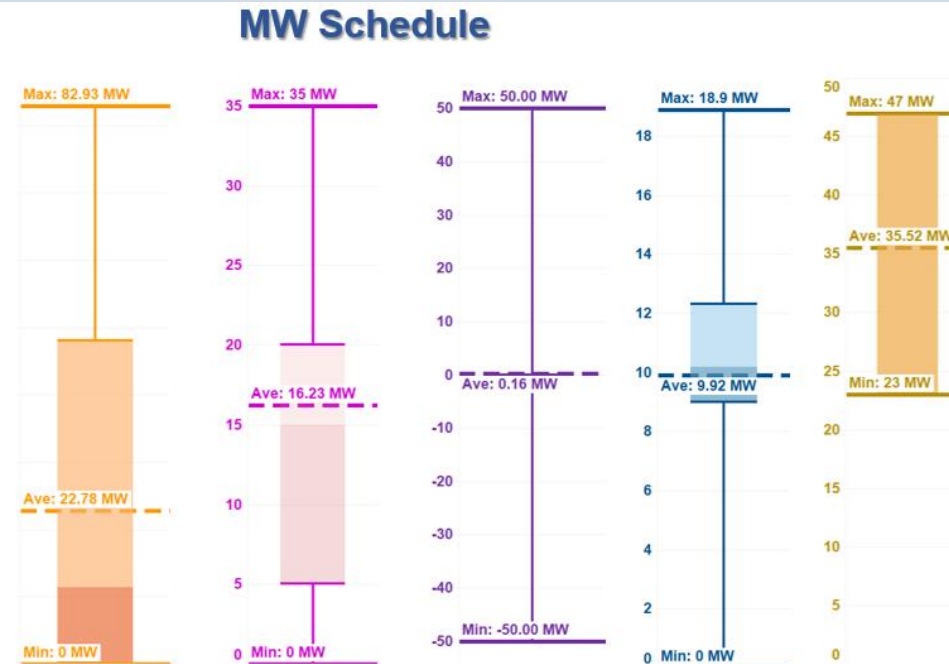


26 equipment were observed to have been imposed with N-1 contingency during the March 2023 billing period which have contributed to congestions for **290 intervals** and is **higher** compared with the previous billing period. Subsequently, these congestions have triggered the imposition of **Price Substitution Methodology (PSM)** for **220 intervals**.

Contingency List
230kV Bauang-La Trinidad Line 1
230kV Bauang-La Trinidad Line 2
230kV Binga-La Trinidad Line 1
230kV Binga-La Trinidad Line 2
230kV Concepcion-Mexico Line 1
230kV Concepcion-Mexico Line 2
Nagsaag_EHV_Transformer 1
Nagsaag_EHV_Transformer 2
Kadampat_EHV_Transformer 1
Kadampat_EHV_Transformer 2
Kadampat_EHV_Transformer 3
Kadampat_EHV_Transformer 4
230kV San Manuel-Concepcion Line 1
230kV San Manuel-Concepcion Line 2
230kV Sucat-Binan Line 1
230kV Sucat-Binan Line 2
230kV Sucat-Binan Line 3
230kV Sucat-Binan Line 4
230kV Binan-Dasmarinas Line 1
230kV Binan-Dasmarinas Line 2
230kV Calamba-Binan Line 1
230kV Calamba-Binan Line 2
230kV Makban-Calamba Line 1
230kV Makban-Calamba Line 2
230kV Makban-Lumban Line 1
230kV Makban-Lumban Line 2

MONTHLY REPORT ON OVER-RIDING CONSTRAINTS

PLANTS ON COMMISSIONING TEST



For March 2023, there was an observed **increase in the number of impositions of over-riding constraints** related to **commissioning tests**, logging a total of **23,865 impositions** with an average scheduled capacity of **12.72 MW**. Majority of these impositions were attributable to solar plants, followed by wind, BESS, and hydro plants, with a small share from a natural gas plant.

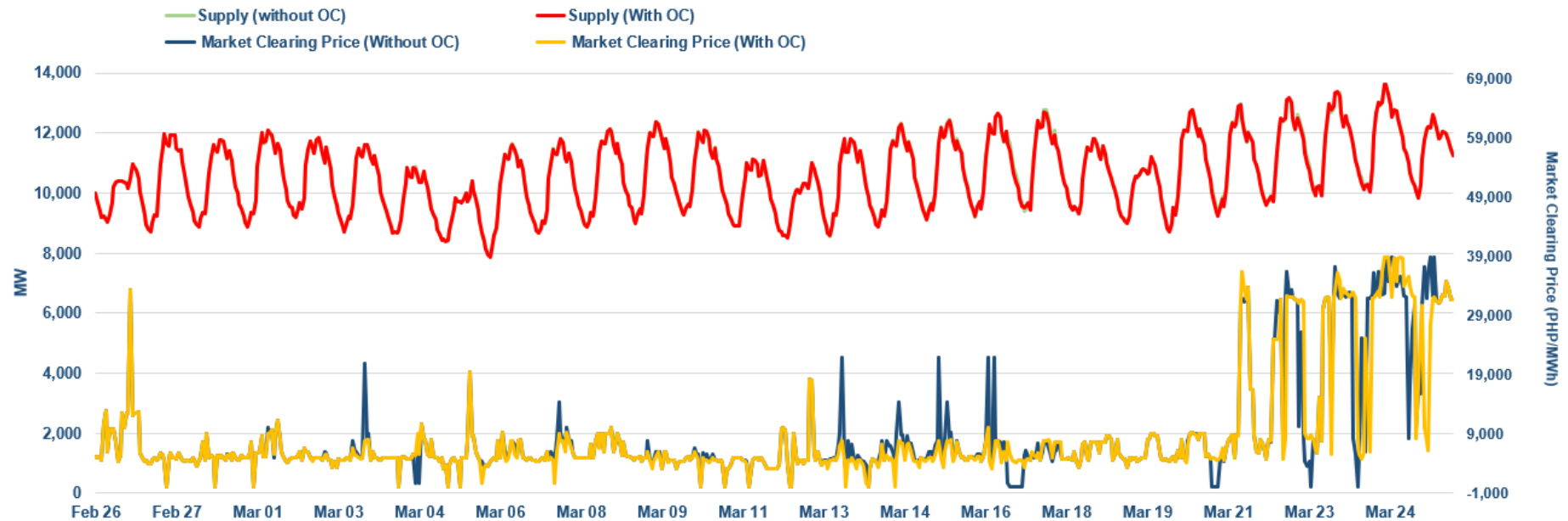
Based on the updates provided by the Independent Electricity Market Operator of the Philippines (IEMOP) and the System Operator as of 11 April 2023, the following were the updates on the **status of power plants under commissioning tests**:

- **1 solar plant** completed its commissioning test while another **2 plants** have **extended commissioning tests**.
- **1 wind plant** and **1 BESS** recently **participated** in the market and **started** their respective **commissioning test** periods.
- **1 hydro plant** has **extended its commissioning test**.
- **1 natural gas plant** conducted **commissioning test period** as part of its rehabilitation.

Generally, the scheduled capacities imposed to plants undergoing commissioning tests were noted to be less than their registered capacity.

MONTHLY REPORT ON OVER-RIDING CONSTRAINTS

PRICE IMPACT ON THE MARKET



Note:

The simulation is assumed to be unconstrained.

OC imposed with Commissioning Tests were not altered due to their restriction to submit offers through MMS.

Date of Imposition	Plant Type
Mar 1 - 2, Mar 12 - 24	Coal
Mar 2 - 7, Mar 14 - 24	Hydro
Mar 04 & 17	Natural Gas
Feb 27 - Mar 25	Oil - based

The effects may vary based on the offers of the over-ridden plants. It may be observed that when Hydro and Oil-based plants were imposed with over-riding constraints, there was an observed decrease in the resulting market prices, at an average of **PHP395/MWh**. Looking at the effects in terms of the supply, there was an observed decrease due to the scheduling of subject plants to lower levels of operations than being dispatched at their available capacities. However, it may also be noted that when coal plants' offers are over-ridden, market prices tend to increase brought about by the dispatch of plants with higher offer prices considering that the former have lower prices. Though there may be instances that OC impositions caused a decrease on the resulting market prices based on the simulation, it does not reflect the true cost of generation.

	MCP (PHP/MWh)	Supply (MW)
Difference		
Minimum	-27,431.95	-218.00
Average	395.00	-18.65
Maximum	30,041.26	132.03



MANDANA

MONTHLY REPORT ON OVER-RIDING CONSTRAINTS

IMPOSITIONS BY CATEGORY

10,460
Total Impositions
58% of which were **security** limit.

10,961 OC impositions for
February 2023
4.6% decrease

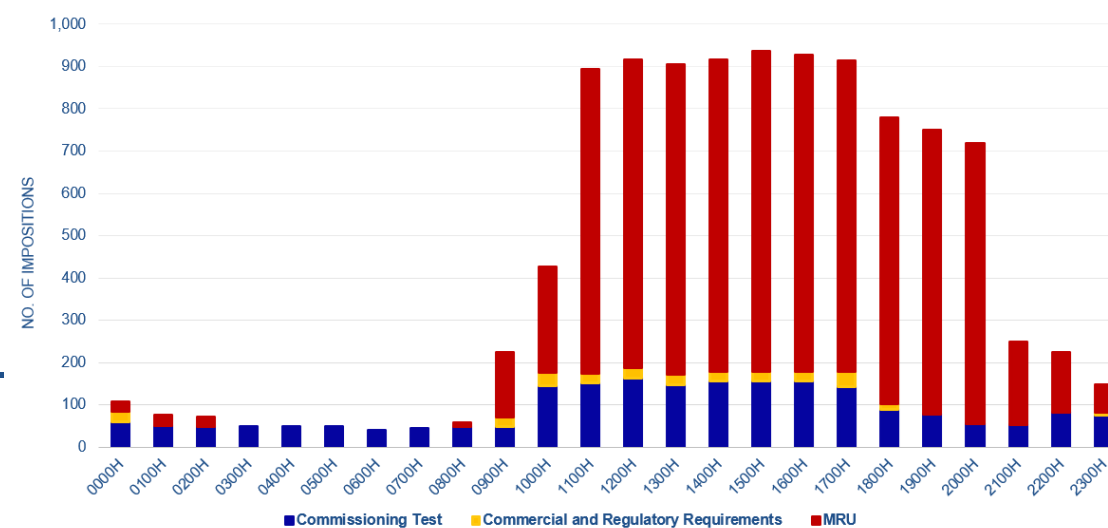


During the March 2023 billing month, it was observed that the Mindanao region has had 10,460 over-riding constraints impositions, a 4.6 percent decrease from the previous month.

Note: Under the Dispatch Protocol Manual Issue 16.0, imposition of over-riding constraints falls into 2 categories – 1) security limit i.e., MRU and other types as may be recommended by SO and 2) non-security limit. Security limit is imposed to address possible threats in system security while non-security limit is related to 1) generating unit limitations, 2) commercial and regulatory requirements, and lastly, 3) conduct of commissioning test of plants.

The monitoring of the over-riding constraints is based on the data and information provided by MO (i.e., real time market results and MMS-input files on security limits) and SO (i.e., SO Data for Market Monitoring).

IMPOSITIONS BY HOUR



Majority of over-riding constraints imposed over a 24-hour period in Mindanao were for **Must-Run Units (MRUs)** imposed to power plants constituting **77% of the total impositions**.

It can be observed that majority of the impositions, may it be non-security or security limits, were imposed during peak hours when the demand is high.

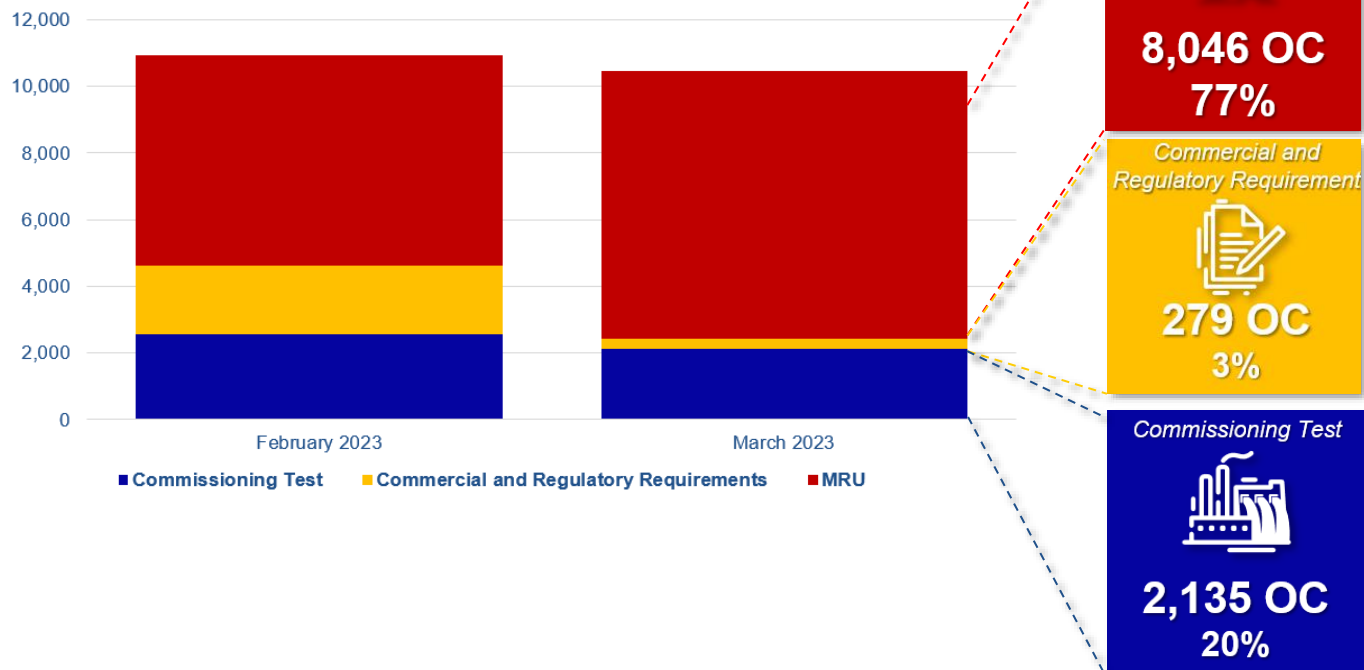
MONTHLY REPORT ON OVER-RIDING CONSTRAINTS

IMPOSITIONS BY INCIDENT

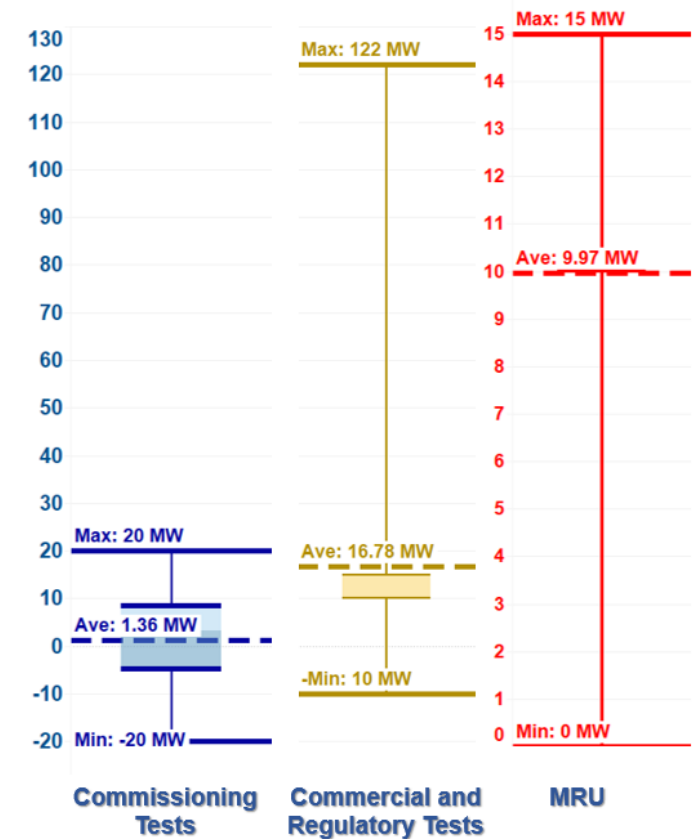
Most of the over-riding constraints in Mindanao was due to MRU impositions to address the system voltage requirement in the region. Commercial and regulatory requirements tests conducted were attributed to the capacity, performance, and grid compliance tests. For plants under commissioning tests, it was noted that only two (2) plants were imposed under this category.

Incidents related to commercial and regulatory requirements were imposed on plants with large capacities, specifically coal plant, which had greater market impact than impositions for commissioning tests. It was however noted that despite the large capacities of plants, majority were over-ridden to smaller capacities. Meanwhile, commissioning tests were mostly undertaken by renewable energy plants with relatively lower capacities.

The graph shows the scheduled capacities corresponding to the aforementioned impositions.

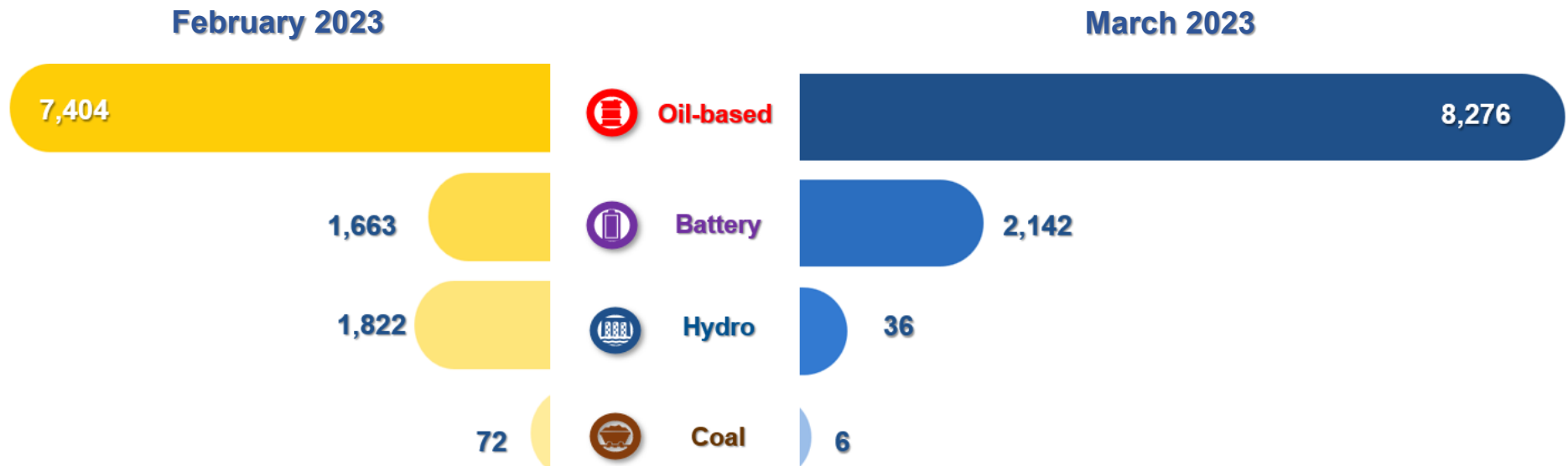


SCHEDULED CAPACITIES



MONTHLY REPORT ON OVER-RIDING CONSTRAINTS

IMPOSITIONS BY PLANT TYPE



Majority of the impositions in the Mindanao region were attributable to oil-based plants, followed by BESS, with hydro and coal plants having a small share in the total impositions. The following were the reasons for the impositions per plant types:

- Impositions to Oil-based plants were related to the dispatch of generators as MRUs in order address the system voltage requirement of the region.
- Conduct of commissioning test was the reason for impositions related to one (1) BESS energy storage system and one (1) Hydro plant during the billing period.
- Impositions related to Coal plants were due to the conduct of emission tests.

MONTHLY REPORT ON OVER-RIDING CONSTRAINTS

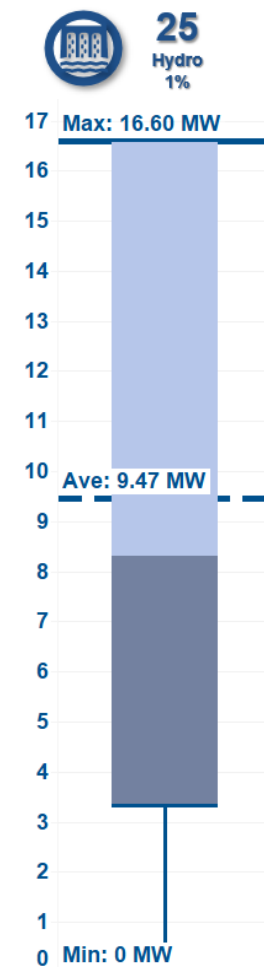
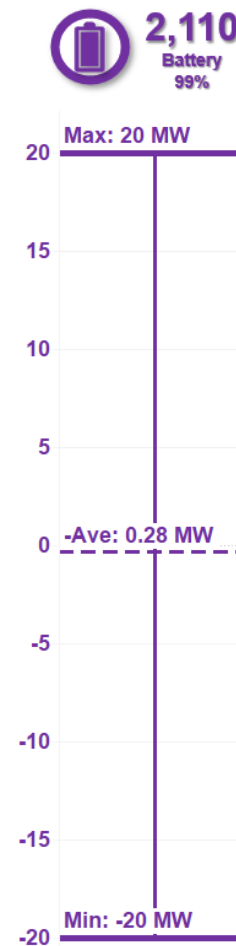
PLANTS ON COMMISSIONING TEST

A total of **2,135 over-riding constraints impositions** was observed related to **commissioning tests**, with an average scheduled capacity of **-0.17 MW**.

Majority of impositions related to commissioning tests were attributable to BESS.

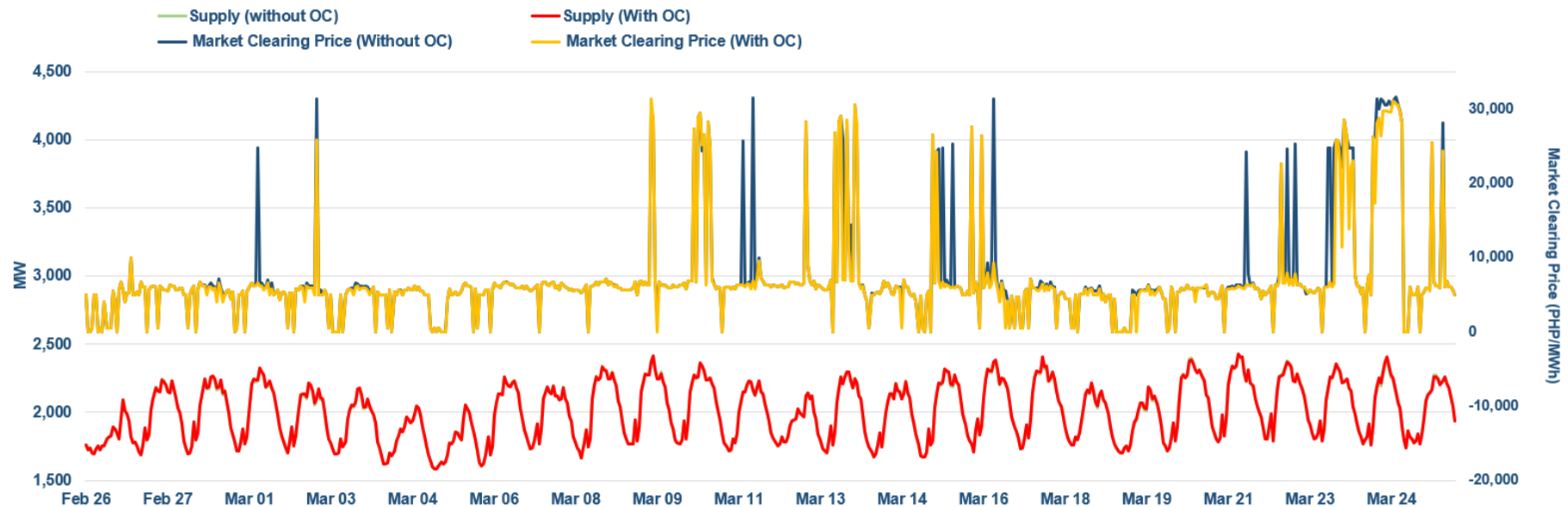
Based on the updates provided by the Independent Electricity Market Operator of the Philippines (IEMOP) and the System Operator as of 11 April 2023, both the **one (1) battery energy storage facility** and **one (1) hydro plant** are currently conducting their respective commissioning tests.

Generally, the scheduled capacities imposed to plants undergoing commissioning tests were noted to be less than their registered capacities.



MONTHLY REPORT ON OVER-RIDING CONSTRAINTS

PRICE IMPACT ON THE MARKET



Note:

The simulation is assumed to be unconstrained.

OC imposed with Commissioning Tests are not altered due to their restriction to submit through MMS.

Date of Imposition	Plant Type
Mar 14	Coal
Mar 10	Hydro
Feb 27 - Mar 25	Oil - based

When Hydro and Oil-based plants were imposed with over-riding constraints, there was an observed decrease in the resulting market prices that yielded an average price difference of PHP 2,188/MWh. Looking at the effect of impositions to the supply, a supply difference averaging at 2.53 MW was likewise noted. The variability in supply difference is attributed to the offer behavior of the plants being imposed with over-riding constraints. Though there may be instances that OC impositions caused a decrease on the resulting market prices based on the simulation, it does not reflect the true cost of generation.

Difference	MCP (PHP/MWh)	Supply (MW)
Minimum	-1,966.30	-14.00
Average	2,188.45	2.53
Maximum	24,604.73	22.00

MONTHLY REPORT ON OVER-RIDING CONSTRAINTS

ANNEX A. LIST OF PLANTS WITH OVER-RIDING CONSTRAINTS¹

Plant/Unit Name	Plant Type	Registered Capacity (MW) ²
LUZON		
Arayat-Mexico Solar Power Plant Project Phase 2	Solar	30.9
Balaoi and Caunayan Wind Power Project Phase 1	Wind	80
Binga Hydroelectric Power Plant - Unit 1	Hydro	35
Binga Hydroelectric Power Plant - Unit 2	Hydro	35
Binga Hydroelectric Power Plant - Unit 3	Hydro	35
Binga Hydroelectric Power Plant - Unit 4	Hydro	35
Concepcion Battery Energy Storage System	Battery	60
Currimao 2 Solar Power Plant	Solar	68.7
GNPower Dinginin Coal Plant - Unit 1	Coal	668
Lamiao Battery Energy Storage System (BESS)	Battery	20
BCCPP Battery Energy Storage System (BESS)	Battery	40
Magat Hydroelectric Power Plant Unit 1	Hydro	97
Magat Hydroelectric Power Plant Unit 3	Hydro	97
Mariveles Coal-Fired Power Plant 2	Coal	316
AES Masinloc Advancion Energy Storage Array	Battery	10
Masinloc Coal-Fired Thermal Power Plant Unit 1	Coal	315
NIA Baligatan Hydro Electric Power Plant	Hydro	6

¹ In accordance with the Market Operator Information Disclosure and Confidentiality (MO IDC) Manual Issue 7.0

² As of 02 June 2023

MONTHLY REPORT ON OVER-RIDING CONSTRAINTS

Plant/Unit Name	Plant Type	Registered Capacity (MW) ²
San Gabriel Avion Natural Gas-Fired Power Plant Unit 1	Natural Gas	47.2
Pagbilao 3 Power Plant	Coal	420
Sta. Rita Natural Gas Power Plant 2	Natural Gas	255.7
Sta. Rita Natural Gas Power Plant 3	Natural Gas	265.5
Arayat-Mexico Solar Power Plant Project Phase 2	Solar	30.9
Balaoi and Caunayan Wind Power Project Phase 1	Wind	80
Binga Hydroelectric Power Plant - Unit 1	Hydro	35
Binga Hydroelectric Power Plant - Unit 2	Hydro	35
Binga Hydroelectric Power Plant - Unit 3	Hydro	35
Binga Hydroelectric Power Plant - Unit 4	Hydro	35
VISAYAS		
Ormoc Battery Energy Storage System	Battery	40
EAUC Bunker C-Fired Power Plant Unit 1	Oil-Based	11.5
EAUC Bunker C-Fired Power Plant Unit 2	Oil-Based	11
EAUC Bunker C-Fired Power Plant Unit 3	Oil-Based	11.5
EAUC Bunker C-Fired Power Plant Unit 4	Oil-Based	11.5
KSPC Coal Fired Thermal Power Plant Unit 1	Coal	103
KSPC Coal Fired Thermal Power Plant Unit 2	Coal	103
Circulating Fluidized Bed (CFB) Coal-Fired Power Plant (CFPP)	Coal	135
PEDC Coal-Fired Thermal Power Plant Unit 1	Coal	83.7
PEDC Coal-Fired Thermal Power Plant Unit 2	Coal	83.7
PEDC Unit 3 Circulating Fluidized Bed Power Plant	Coal	150

MONTHLY REPORT ON OVER-RIDING CONSTRAINTS

Plant/Unit Name	Plant Type	Registered Capacity (MW) ²
Power Barge 101- Unit 1	Oil-Based	6
Power Barge 101- Unit 3	Oil-Based	6
Power Barge 101- Unit 4	Oil-Based	6
Timbaban Hydro Power Plant	Run-of River Hydro	18.9
MINDANAO		
Misamis Occidental Bunker C-Fired Diesel Power Plant 3	Oil-Based	15.5
Bunker-C Fired Diesel Power Plant Unit 1	Oil-Based	10.7
Bunker-C Fired Diesel Power Plant Unit 3	Oil-Based	10.7
Bunker-C Fired Diesel Power Plant Unit 4	Oil-Based	10.7
Bunker-C Fired Diesel Power Plant Unit 5	Oil-Based	10.7
Bunker-C Fired Diesel Power Plant Unit 7	Oil-Based	10.7
Bunker-C Fired Diesel Power Plant Unit 8	Oil-Based	10.7
Bunker-C Fired Diesel Power Plant Unit 9	Oil-Based	10.7
Bunker-C Fired Diesel Power Plant Unit 10	Oil-Based	10.7
Agus VII Hydroelectric Power Plant Unit 1	Hydro	26.1
FDCMPC Circulating Fluidized Bed (CFB) Coal Thermal Power Plant (CTPP) Unit 1	Coal	135
Jasaan Battery Energy Storage System	Battery	20
Lake Mainit Hydroelectric Power Plant	Hydro	24.9
Mobile 2 Bunker C-Fired Power Plant Unit 1	Oil-Based	50
Mobile 2 Bunker C-Fired Power Plant Unit 2	Oil-Based	50
Maco Battery Energy Storage System (BESS)	Battery	20

MONTHLY REPORT ON OVER-RIDING CONSTRAINTS

Plant/Unit Name	Plant Type	Registered Capacity (MW) ²
Malita Battery Energy Storage System (BESS)	Battery	20