



Reserve Market Assessment

05 August 2024 to 25 October 2025

FEBRUARY 2026

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

Document Information Classification: Public

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Executive Summary

The trading of reserves in the WESM is established under EPIRA to support reliable, secure, and affordable electricity supply through a transparent, market-based procurement of ancillary services. It ensures the availability of reserve capacity needed to address contingencies and maintain grid reliability.

Reserve market conditions vary across Luzon, Visayas, and Mindanao due to differences in technology mix, reserve requirements, margins, contracting levels, and spot market participation, resulting in varying reserve prices that signal regional system conditions.

The study is focused on reserve market inputs and outcomes following the relaunch of commercial reserve market operations, covering the August 2024 to October 2025 billing periods. To assess energy price trends, monthly average energy prices are analyzed for Luzon and Visayas from August 2022 to October 2025, and for Mindanao from February 2023 to October 2025.

Reserve adequacy is maintained across Luzon, Visayas, and Mindanao from August 2024 to October 2025, as scheduled reserves are generally aligned with requirements across all months and reserve types. Sufficient supply margins are observed, and no persistent delivery shortfalls are indicated, supporting system reliability throughout the period.

Reserve prices increase as reserve margins tighten and reliance on the spot market rises, following a clear price hierarchy of Regulation, Contingency, and Dispatchable reserves. Regulation prices are consistently highest due to limited offer volumes relative to requirements, resulting in thin headroom even when bilateral contract coverage is present. Luzon exhibits intermediate price levels, with regulation prices remaining elevated despite higher contract coverage due to very tight margins. The Visayas records the highest prices across all products, driven by tight availability and heavy spot dependence, particularly for dispatchable reserves. Mindanao shows low prices for dispatchable and moderate prices for contingency reserves due to ample margins and high contract coverage; however, regulation prices remain high because absolute headroom is limited.

The observed decline in energy spot market prices is not driven solely by the commercial operation of the reserve market. While the reserve market contributes to price moderation, its effects are closely linked to broader market conditions rather than acting independently.

A comprehensive study is recommended to assess the combined influence of other key factors—such as but not limited to supply–demand conditions, the integration of WESM Mindanao, congestion frequency, and the growing share of renewable energy.

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1. Introduction

Pursuant to Section 2 of Republic Act No. 9136 (Electric Power Industry Reform Act of 2001), it is declared as state policy that the quality, reliability, security, and affordability of electric power supply are ensured, and that transparent and reasonable electricity prices are maintained under a regime of free and fair competition. The attainment of these policy objectives is supported through the establishment of the trading of reserves in the WESM, wherein a structured and market-based mechanism for the procurement of ancillary services is implemented to ensure system adequacy and continuous grid reliability. The availability of reserve capacity required to respond to contingencies, demand variability, and generation outages is thereby secured in a transparent and competitive manner consistent with EPIRA.

Ancillary services are provided to keep the power system reliable and to maintain its operation during failures. These services are defined under the Philippine Grid Code as support mechanisms used to protect power quality, reliability, and grid security. System frequency and voltage are maintained through ancillary services, and grid restoration from blackout conditions is ensured. Three major types of ancillary services are recognized: Frequency Control Ancillary Services (FCAS), Reactive Power Support Services, and Black Start Ancillary Services. FCAS are further classified into regulating, contingency, and dispatchable reserves. Only FCAS are procured in the reserve market.

System frequency is maintained through regulating, contingency, and dispatchable reserves. Contingency Reserve is provided by online generators to address sudden capacity losses and must respond within specific time requirements. Dispatchable Reserve is supplied by fast-start units that are synchronized when instructed and used to replenish the contingency reserve. Regulating Reserve is used to manage small and recurring supply–demand imbalances to keep frequency within allowable limits.

The Reserve Market is established as a venue where FCAS are traded to ensure that adequate reserve capacity is made available through competition. It is designed to support system reliability by supplementing the procurement of reserves conducted by the System Operator.

Distinct reserve market conditions are observed in the Luzon, Visayas, and Mindanao regions, as each region is characterized by differing technology mixes of reserve providers, magnitude of reserve requirements, reserve margins, contracted capacities, volume of spot market transactions, and registration types. The interaction of these parameters is reflected in varying reserve prices and reserve trading amounts across regions, through which economic signals are provided, indicative of the situation of reserves of all regions.

In a co-optimized market, energy and reserve prices are linked because both products draw from the same limited generation capacity. They are scheduled simultaneously through a single optimization process that accounts for factors such as resource availability, system demand, and required reserve levels. When capacity is allocated for reserve, that capacity is withheld from energy production, and the same capacity is prevented from being committed concurrently to satisfy both energy and reserve requirements.

In this paper, the reserve market is examined through analysis of Contingency, Dispatchable, Upward Regulation and Downward Regulation market inputs and outcomes of Luzon, Visayas and Mindanao. Varying registration types and technology were also assessed to provide insights on the preference of reserve providers on a particular reserve category to participate in a particular time through visual representations. The historical energy prices are also evaluated to determine the trend considering the timeline of the commercial operations of the reserve market.

2. Objectives of the Study

This study aims to assess the condition of the reserve market by examining market performance across all reserve types and regions through the analysis of market behavior, participation and outcomes. It also examines movements of the prevailing energy price dynamics before and during the commercial operation of the reserve market.

More specifically, the following objectives are pursued:

1. To provide a basic overview of the Reserve Market, where reserve categories, key market features, and operational mechanisms are described. Regulatory developments and significant events leading to the re-launch of the commercial operations of the Reserve Market are discussed to establish the current market framework.
2. To evaluate market inputs and outcomes for Contingency Reserve, Dispatchable Reserve, and Upward and Downward Regulation in the Luzon, Visayas, and Mindanao regions that will provide insights on the viability of market participation.
3. To determine trends in regional energy prices before and during the commercial operations of the Reserve Market. Historical monthly average energy prices are analyzed to identify price movements and potential relationships between energy price behavior and reserve market implementation.

3. Scope and Limitation

The study is focused on reserve market inputs and outcomes covering the period from the relaunch of commercial operations of the reserve market, spanning the August 2024 to October 2025 billing periods. Analysis is conducted for each reserve category by technology and offered price range in each region using aggregated resources per technology. Nodal analysis and plant ownership are not included in the study.

Monthly average energy prices for Luzon and Visayas from August 2022 to October 2025, and for Mindanao from February 2023 to October 2025, are considered in the determination of price trends.

4. Background

Ancillary services (reserves) are provided to ensure that the power system is kept reliable and is maintained in operation whenever a failure occurs. Under the Philippine Grid Code, these services are defined as support services that are used to protect the power quality, reliability, and security of the grid. System frequency and voltage are maintained through ancillary services, and the grid is restored from blackout conditions.

Three types of ancillary services are recognized, namely Frequency Control Ancillary Services (FCAS), Reactive Power Support Services, and Black Start Ancillary Services. FCAS are further classified into regulating reserve, contingency reserve, and dispatchable reserve. FCAS are used to maintain system frequency, which is allowed to deviate from tolerance limits due to unplanned outages, frequent imbalance between load and generation, and intermittent generation from renewable sources. Reactive Power Support Services are provided by generators to supply and absorb reactive power so that power system voltage is maintained within prescribed levels. Black Start Ancillary Services are provided by generators to restore the power system from blackout conditions without the use of feedback power from the grid¹. Only FCAS are procured in the reserve market which are defined below.

Sudden capacity losses caused by the tripping of generating units or transmission lines are addressed by the Contingency Reserve, which is composed of on-line generating units. A fast response is required from generators assigned as contingency reserve to ensure grid reliability and support the restoration of system frequency. The Contingency Reserve is divided into two categories. The Primary Response is delivered by generators operating in free governor mode. The Secondary Response is delivered by generators operating under Automatic Generation Control (AGC) connected to the System Operator's SCADA/EMS or adjusted manually in accordance with the System Operator's instructions. A maximum response time of ten (10) minutes is required to reach full capacity, and the load is sustained for at least thirty (30) minutes. The contingency reserve requirement is defined as the capacity of the most heavily loaded generating unit on-line, including its scheduled reserve, on an hourly basis. The contingency reserve allocation for a single provider is limited to twenty percent (20%) of the total contingency reserve requirement².

Dispatchable Reserve is supplied by generating units with fast-start capability that are synchronized within fifteen (15) minutes following instruction from the System Operator and sustained for at least eight (8) hours. The Contingency Reserve is replenished by the Dispatchable Reserve to ensure preparedness for subsequent contingency events. Dispatchable Reserve providers are maintained offline and are placed on-line only upon instruction from the System Operator. The dispatchable reserve requirement is defined as the capacity of the second most heavily loaded generating unit on-line, including its scheduled reserve³.

Small variations in system frequency resulting from recurring supply–demand imbalances are managed through the Regulating Reserve (Upward and Downward Regulation). System frequency is kept within ± 0.3 Hz of the 60 Hz nominal level. The Regulating Reserve is divided into two categories. Primary Response is delivered by generating units operating in free governor mode, with a response time of up to five (5) seconds and a sustainment period of twenty-five (25) seconds. Secondary Response is supplied by generating units equipped with Automatic Generation Control (AGC) connected to the System Operator's SCADA/EMS or adjusted manually in accordance with the System Operator's directives. The maximum response time is

¹ Advanced Ancillary Service 101, presentation to PEMC

² Briefing on Ancillary Services for Potential AS Providers, NGCP Website

³ Ibid

twenty-five (25) seconds, and the required output is maintained for a minimum of thirty (30) minutes. The required level of regulating reserve is set at four percent (4%) of the hourly forecasted demand.⁴

The Reserve Market is a venue for the trading of frequency control ancillary services (reserves) and as an alternative mechanism for the procurement of reserves aside from the contracting with the system operator. It is designed to support system reliability by ensuring that adequate reserve capacity is made available through a competitive market process.

The Reserve Market has the following key features⁵:

1. Co-optimization of energy and reserves: The demand for energy and the requirements for reserves are simultaneously satisfied in a least-cost manner. This approach ensures that energy and reserve scheduling are efficient, allowing available resources to be optimally allocated between energy and reserve while minimizing overall system costs.
2. Zonal pricing and scheduling: Prices and schedules are determined by the market management system on a zonal or regional basis for all reserve categories. This structure reflects regional system conditions and transmission constraints, and it allows reserve prices and schedules to vary by zone to provide appropriate economic signals for reserve in different areas of the system.
3. Gross scheduling: Schedules are produced to include both the capacities already contracted by the system operator and the capacities to be procured by the system operator, acting as a single buyer, through the Reserve Market. This ensures that the total scheduled capacity reflects the full reserve requirement of the system, regardless of the procurement mechanism used.
4. Must-Offer Rule: Under the current regime, all capacities that are certified to provide reserves are required to submit offers into the Reserve Market. Each certified capacity is permitted to submit an offer to only one reserve category per trading interval.

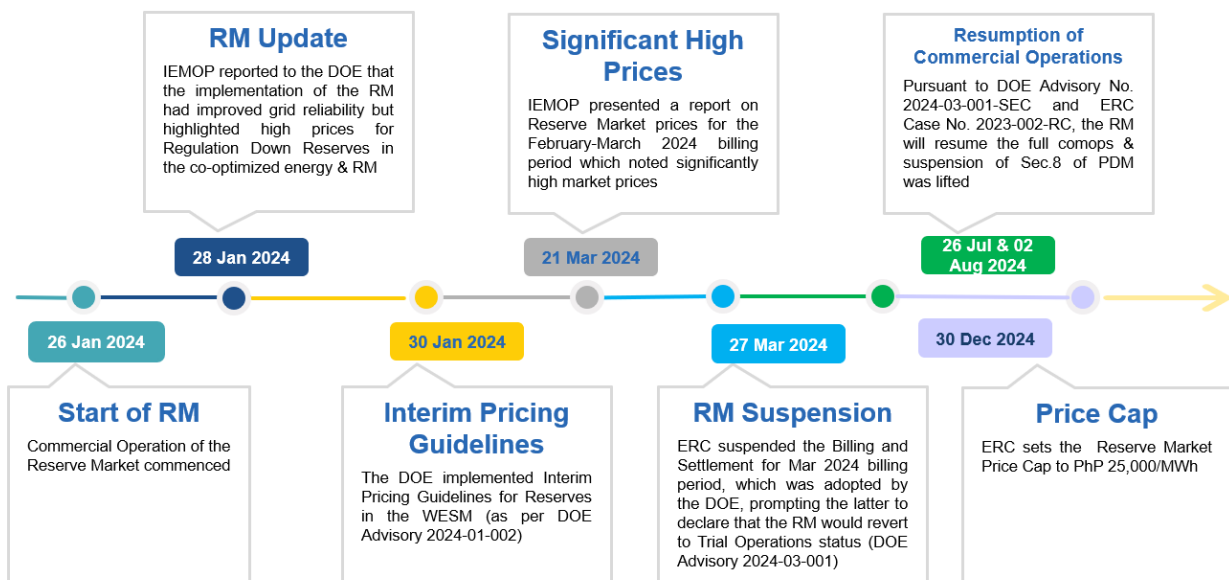


Figure 1. Key Events of the Reserve Market

⁴ Briefing on Ancillary Services for Potential AS Providers, NGCP Website

⁵ Reserve Market Overview Presentation to MSC, IEMOP

A series of key events in the Reserve Market (RM) is presented in the timeline. The commercial operation of the RM commenced on 26 January 2024, marking the start of market activities. Interim Pricing Guidelines for reserves are implemented by the DOE on 30 January 2024.

On 21 March 2024, significantly high prices for the February to March 2024 period are reported by IEMOP. Shortly after, the billing and settlement for March 2024 are suspended by the ERC on 27 March 2024, and the RM is reverted to Trial Operations status as directed by the DOE. The resumption of full commercial operations is then ordered through DOE Advisory 2024-03-001-SEC and ERC Case No. 2023-002-RC, and the market resumption is carried out on 5 August 2024.

To conclude, the price and offer cap is adjusted to 25,000 PHP/MWh from 32,000 PHP/MWh by the ERC on 30 December 2024 which served as the mitigation for very high prices.

5. Reserve Market Analysis

The reserve market is analyzed through the evaluation of registered and offered capacities by technology or plant type, offered capacities by price range, and the summary of each reserve category, including reserve supply and demand, average price, and trading amounts.

All generating units that are certified to provide reserve are required to register their certified capacities per category in the market. Insights on reserve category preference by registration type and technology are visualized in each region through the offered capacities over the covered period.

a. Luzon

i. Contingency Reserve

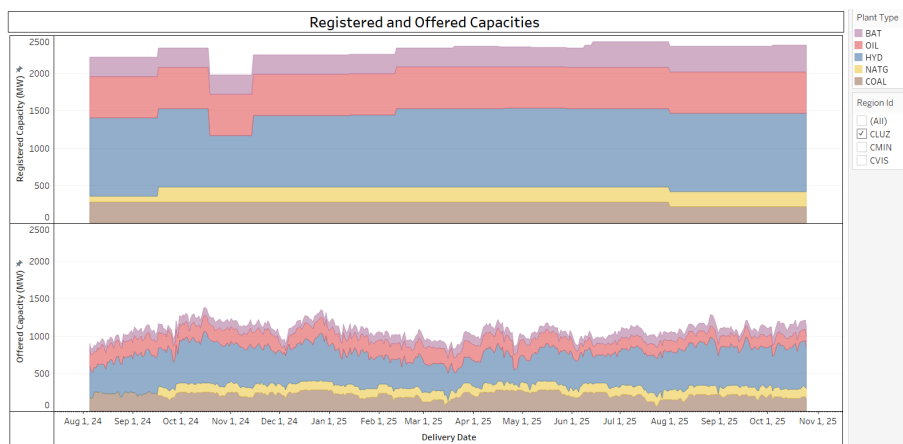


Figure 2. Luzon Contingency Reserve Registered and Offered Capacities by Plant Type

The Luzon contingency reserve’s registered capacity peaked at 2,414 MW in July 2025 and reached a low of 2,068 MW in November 2024, when hydro plants recorded their lowest capacity. Variations in hydro generation largely drive the overall reserve capacity, with the minimum hydro output coinciding with the lowest total contingency reserve registered capacity.

Coal plant capacity declined from 280 MW to 220 MW in August 2025. In contrast, battery energy storage systems (BESS) increased from 259 MW in August 2024 to 356 MW by October 2025, partially offsetting the reduction in coal capacity. Natural gas capacity also expanded, rising from 80 MW in August 2024 to 200 MW in October 2025. Registered capacity from oil-based plants remained stable at 550 MW throughout the period.

As of October 2025, hydro plants accounted for 44% of total contingency reserve registered capacity, followed by oil-based plants at 23%, BESS at 15%, and both coal and natural gas plants at 9% each.

Monthly average total offers ranged from 923 MW to 1,235 MW, peaking in October 2024. Offers were concentrated in hydro and coal plants, with coal achieving the highest ratio of offered to registered capacity. Oil-based plants showed low offered capacity, primarily allocating capacity to other reserve types.

As of October 2025, coal plants led with an 84% offer rate⁶, followed by natural gas at 61% and hydro at 53%. Battery energy storage systems recorded 37%, while oil-based plants had the lowest ratio at 28%. Notably, in the Luzon reserve market, coal plants offered capacity exclusively in the contingency reserve.

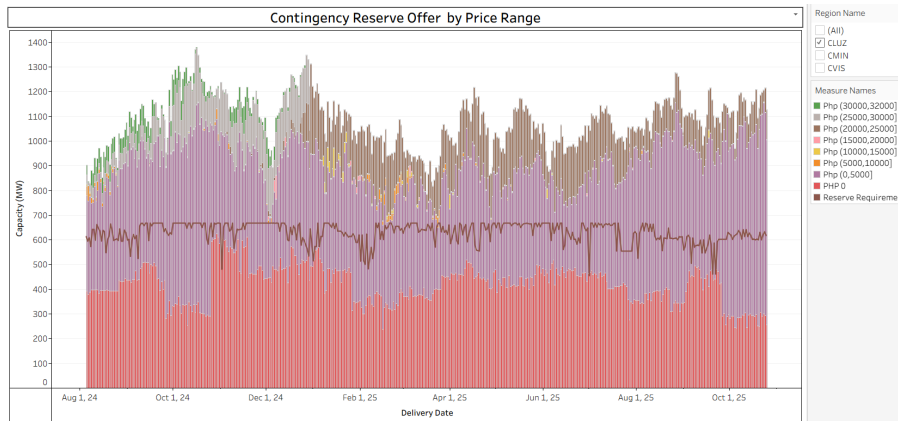


Figure 3. Luzon Contingency Reserve Offered Capacities by Price Range

The Luzon contingency reserve offers are overwhelmingly concentrated at low prices, with approximately 84% offered at or below PHP 10,000, underscoring strong low-price dominance throughout the period. Beginning in early 2025, higher-price activity showed a noticeable shift, with the PHP (20,000–25,000] band emerging as the most expensive segment due to adjustment of the price and offer cap of reserves by the ERC⁷.

Higher-priced bands accounted for a much smaller share, led by the PHP (20,000–25,000] range at 10%, followed by PHP (25,000–30,000] at 4%. The PHP (10,000–20,000] mid band is negligible at 1%, while ultra-high prices of PHP (30,000–32,000] contribute only 1.2% over the entire period.

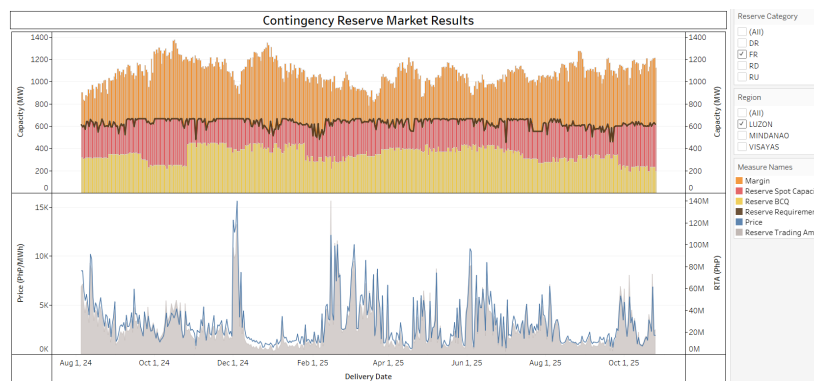


Figure 4. Luzon Contingency Reserve Market Summary

The Luzon contingency reserve has an average supply margin of 451MW, with a requirement of 630MW. The reserve requirement is met at around 100% each month. The scheduled volume is split between contracted and spot quantities, and on average, the mix is led by contracted at 55% of scheduled MW with spot transactions at 45%, indicating that over half of contingency reserve is secured through bilateral

⁶ Note: Offer Rate = Offered Capacity/Registered Capacity

⁷ ERC sets Reserve Market Offer and Price Cap at PHP 25,000/MWh

contracts. The contracted quantities exhibited month-to-month volatility—falling to 38% in October 2024 and 37% in October 2025 and rising to 69% to 63% in November to December 2024 and 66% in June 2025.

Across the period, the average price is PHP3,157/MWh, the highest average price is observed in March 2025 at PHP 5,621/MWh, while the lowest price is posted in January 2025 at PHP 1,392/MWh. Throughout the period, scheduled capacity consistently matches requirements, so system adequacy is maintained, but the margin fluctuates with supply conditions and contracted and spot balance, as reflected by the shifting price levels.

ii. Dispatchable Reserve

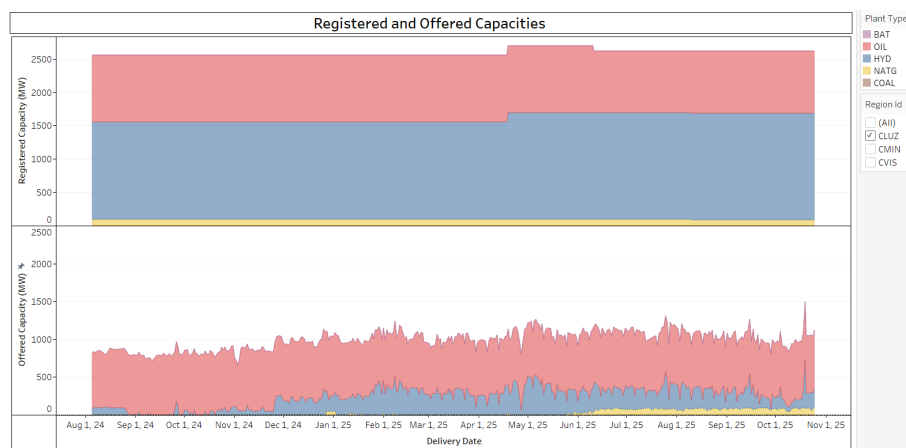


Figure 5. Luzon Dispatchable Reserve Registered and Offered Capacities by Plant Type

Registered capacity is maintained at 2,559 MW from August 2024 to March 2025, after which it increased in April and May 2025 due to additional hydro capacity, before being slightly reduced from June 2025 onward because of lower oil-based capacity. The system offers rate ranges from a low of 31% in September 2024 to a high of 41% in May 2025.

An average offer rate of 38% of available dispatchable reserve capacity is recorded. The highest total offers are observed in May 2025 and June 2025 at 1,094 MW each, followed by August 2025 at 1,089 MW, while the lowest offer level is recorded in September 2024 at 785 MW.

The offer mix is dominated by oil-based plants, which account for approximately 77% of total offers, followed by hydro plants at 21% and natural gas at 2%.

Oil-fired units are considered the primary offered capacity, while hydro offers varied across the months, and natural gas participation is ramped up during mid to late 2025 to provide additional capacity.

In October 2025, a total dispatchable reserve capacity of 2,619 MW is recorded, and 989 MW is offered, giving an offer rate of 38%. Oil-based plants provide the majority of offers at 747 MW followed by hydro plants at 164 MW and natural gas at 78 MW.

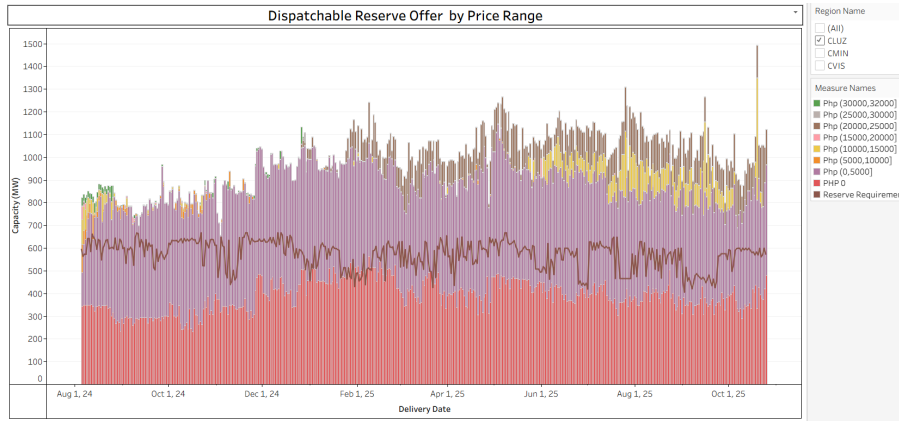


Figure 6. Luzon Dispatchable Reserve Offered Capacities by Price Range

The offered capacity mix in Luzon dispatchable reserve is dominated by the lower than PHP 5,000 offers at 89%, while the PHP 5,000–20,000 band contributed 4% and the greater than PHP 20,000 band contributed 7%.

From August to December 2024, capacities are almost entirely concentrated in the lower than PHP 5,000 level at 96–99% of the offered capacity. In early 2025, the greater than PHP 20,000 volumes begin to emerge, first appeared in January and increasing materially in March, continued till the end of the covered period.

A tightening of the offered price in 2025 is indicated by the data, and it is driven by a reallocation from the PHP (0–5,000] band to the band greater than PHP 20,000 band, while the PHP 0 offered capacity is kept stable.

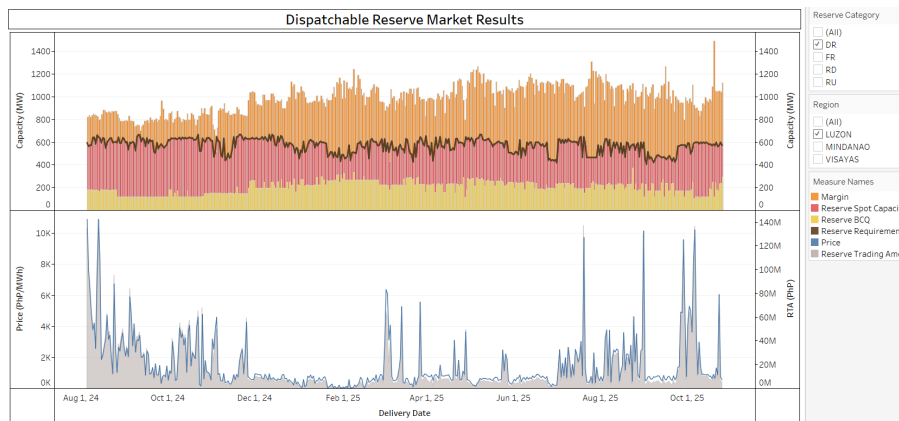


Figure 7. Luzon Dispatchable Reserve Market Summary

The average reserve requirement of 571 MW in Luzon dispatchable reserve has a corresponding average offered capacity of 985 MW. Nearly full requirement coverage is consistently achieved. A higher margin in 2025 is observed, and it is associated with higher offered capacities and relatively lower reserve requirements.

The scheduled capacity mix is characterized by a rising share of contracted quantities in the total scheduled volume, increasing from 26% in 2024 to 41% in 2025, while the share of spot quantities is reduced accordingly. The lowest contracted quantities share, at about 20%, is recorded in September 2024, and the highest, at about 52%, is recorded in February 2025. Overall, the contracted quantities share is 36% of the total scheduled capacities. Prices and trading amounts are varied widely over the period, with an average

price of PHP 1,493/MWh. A peak monthly price of PHP 4,766/MWh is recorded in August 2024, while the lowest price of PHP 289/MWh is recorded in February 2025.

Higher prices and trading amounts are observed during months with higher spot exposure, such as August 2024 and October 2025, while lower prices are observed when higher contracted capacity shares are present, particularly in early 2025.

iii. Downward Regulation Reserve

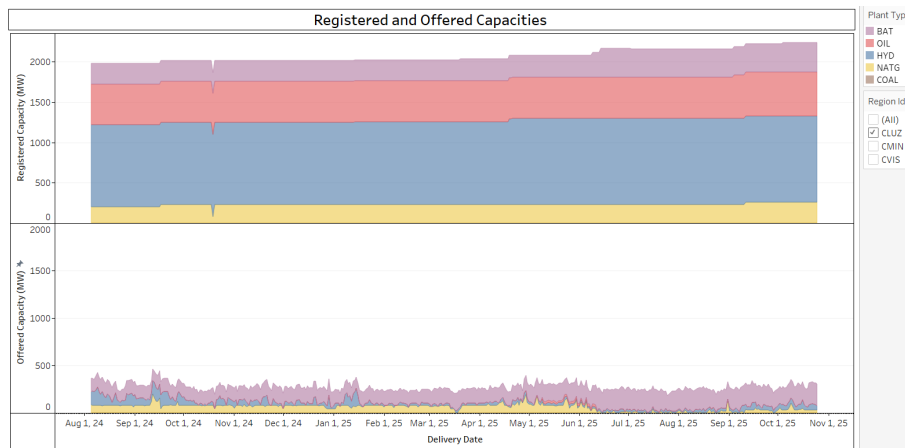
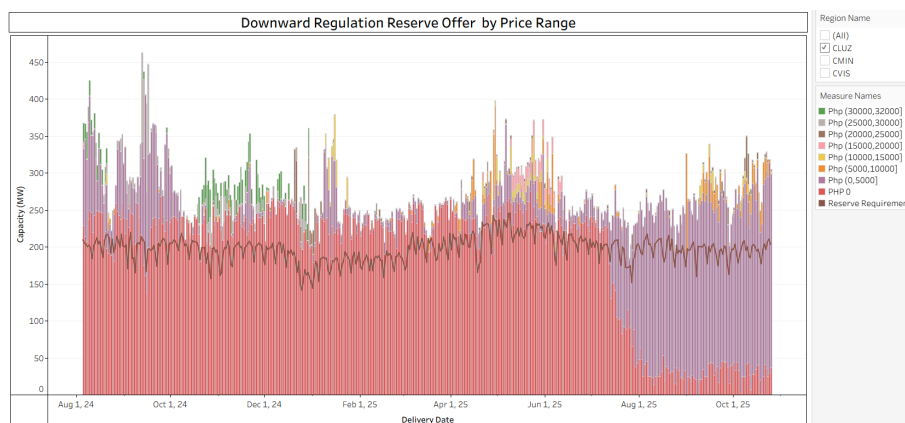


Figure 8. Luzon Downward Regulation Reserve Registered and Offered Capacities by Plant Type

Luzon downward regulation coverage is anchored by battery energy storage system (BESS). Registered capacity is increased from 259 MW in August 2024 to 367 MW in October 2025, and offered capacity is raised from 141 MW to a peak of 216 MW in July 2025 before a slight reduction to 199 MW in October 2025 is recorded. Across the period, a moderate offer ratio around 54–64% of registered is maintained.

Hydro capability is kept largely in reserve rather than offered. Although more than 1,000 MW is registered, only 103 MW is offered in August 2024, and lower offerings of 30 MW in December 2024 and 18–20 MW in February to July 2025 are observed, before a modest recovery to 53 MW in October 2025 is posted. As a result, less than 10% of registered hydro capacity is typically offered for downward regulation.

Thermal participation is minimized. Natural gas registered capacity is increased from 200 MW to 260 MW, but offered capacity is tapered from 79–101 MW through May 2025 to 41 MW in June 2025 and 9 MW in July to August 2025, with only a partial lift to 35 MW by October 2025 being shown. Oil units are registered at more than 500 MW but with only brief, small offerings.



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Figure 9. Luzon Downward Regulation Reserve Offered Capacities by Price Range

The total offered capacity is kept within a moderate band in the covered period, with a high of 334 MW in September 2024 and a low of 237 MW in February 2025. A softening from late 2024 into early 2025 is followed by a brief broadening in mid-2025 and then a recovery into late 2025. The mix is dominated by the lowest price bands throughout the horizon, as 95% of capacity in August 2024 to July 2025 and 94% in August 2025 to October 2025 is contributed by PHP 0 and below plus PHP (0–5,000].

A structural shift in composition is observed starting August 2025, when capacity is reallocated from PHP 0 and below toward PHP (0–5,000]. The PHP 0 and below band averages 227 MW per month before August 2025 but only 32 MW after, this is coincided with the decrease in contracted quantities, while PHP (0–5,000] averages 33 MW before August 2025 and 223 MW after.

The offered capacity is shown to be anchored at the low end while the offered prices gradually increased by the post August 2025 tilt toward PHP (0–5,000]. Price offers above PHP 20,000 are used sparingly and are largely absent in late 2025.

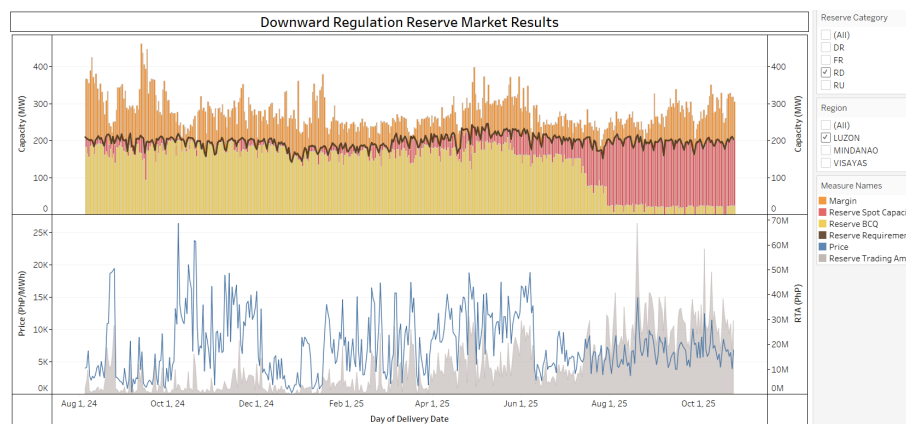


Figure 10. Luzon Downward Regulation Reserve Market Summary

Reserve adequacy is maintained throughout the period as offered capacity exceeds requirement in all months. Margins are compressed progressively from 123 to 136 MW in August to September 2024 to 47 to 63 MW in August to September 2025, before a partial recovery to 92 MW is posted in October 2025.

A shift in the contracting mix is observed. Contracted quantities are reduced from 174 MW at 87% BCQ in August 2024 to 19 MW at 10% BCQ by October 2025 due to declining contracted quantities from the battery energy storage resources (BESS). As a result, scheduling remains met while procurement risk is transferred from bilateral contracts to the spot transactions. For the whole period, contracted quantities share is 70% of the total scheduled capacity.

Price behavior is mixed but generally elevated through 2025. The price is eased in September 2024 at PHP 2,833/MWh after August 2024 at PHP 7,339/MWh, then increased again across February to May 2025 at PHP 8,390/MWh to PHP 11,686/MWh before moderating to PHP 6,229/MWh to PHP 7,120/MWh in July to October 2025. Despite this late moderation, settlement exposure is increased materially because larger spot volumes are carried. Overall, the average price of PHP 7,637/MWh is recorded during the covered period.

Reserve trading amounts (RTA) are escalated as spot reliance rises. The sharpest lift is recorded in August to October 2025, despite mid-range price levels, because spot quantities dominate the scheduled mix. Downward regulation adequacy is preserved and schedules are delivered, while cost exposure is shifted from contracted volumes to spot procurement and higher spot trading amounts are incurred in the late 2025 horizon.

iv. Upward Regulation Reserve

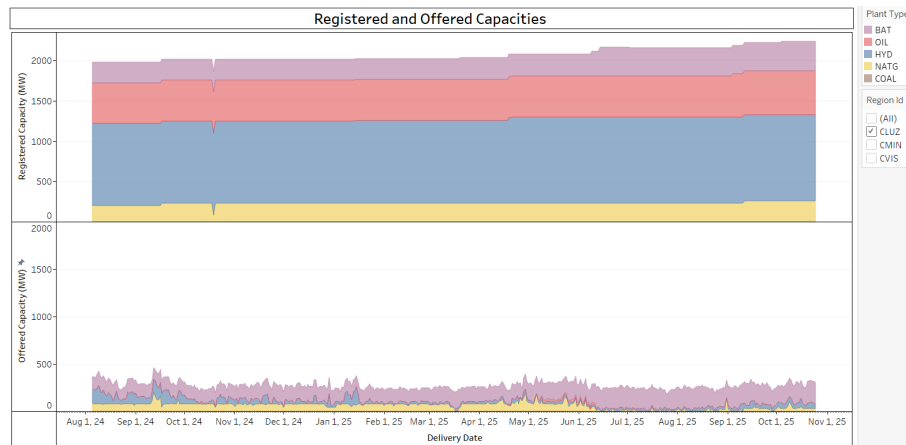


Figure 11. Luzon Upward Regulation Reserve Registered and Offered Capacities by Plant Type

A modest expansion in registered capacity is recorded across Luzon upward regulation. Battery energy storage system capacity is increased from 259 MW to 367 MW, natural gas capacity is raised from 200 MW to 260 MW, hydro capacity is lifted from 1,019 MW to 1,066 MW, and oil-based capacity is increased from 504 MW to 543 MW.

The offered capacity mix is led by BESS through the period. BESS offers are ramped from 141 MW to a peak of 216 MW in July 2025, and a slight easing to 199 MW is then observed by October 2025. Higher offer ratio is thus implied for BESS, as about 61% of registered capacity is offered in July 2025 and about 54% is offered in October 2025. Stable participation is therefore shown by BESS, and the segment's role as the principal source of offers is maintained.

Hydro offers are kept low relative to the large, registered base. Offers of 103–59 MW are posted from August 2024 to January 2025, sharper reductions to 18–20 MW are then recorded in February to July 2025, and a partial recovery to 53 MW is registered by October 2025. Given registered hydro capacity of 1,019–1,066 MW, very low utilization is implied in several months. As a result, hydro is positioned as a secondary contributor to the offered stack despite its dominant registered footprint.

Mixed signals are shown by natural gas and oil-based plants. Natural gas' offers are raised to 102 MW in May 2025, are reduced sharply to 9 MW in July to August 2025, and are slightly restored to 35 MW by October 2025, so a pronounced decline in Natural gas utilization is indicated after mid-2025. Oil-based plants' offers are mostly withheld, as 0 MW is posted in most months with small injections in May to August 2025, even as registered oil-based capacity is increased to 543 MW by October 2025. Overall, the portfolio is anchored by BESS offers, while hydro, natural gas, and oil-based are used sparingly.

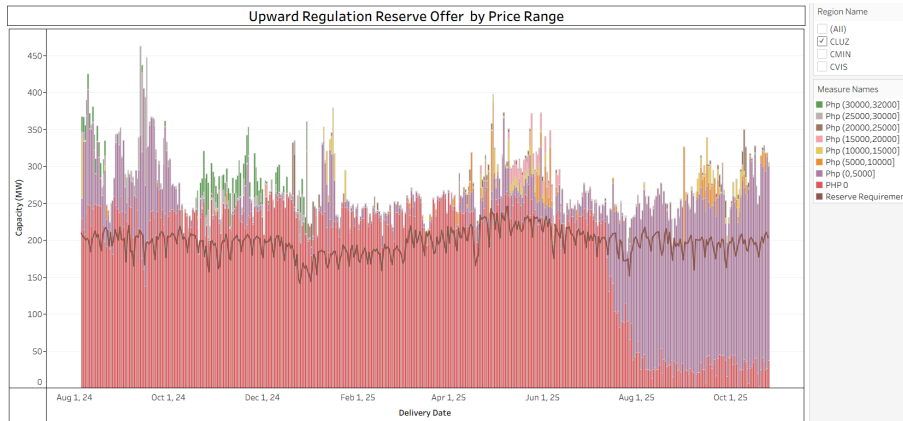


Figure 12. Luzon Upward Regulation Reserve Offered Capacities by Price Range

The total offered capacity (MW) is kept within a moderate band in the covered period, with a high of 334 MW in September 2024 and a low of 237 MW in February 2025. A softening from late 2024 into early 2025 is followed by a brief broadening in mid-2025 and then a recovery into late 2025. The mix is dominated by the lowest price bands throughout the horizon, as 95% of capacity in August 2024 to July 2025 and 94% in August 2025 to October 2025 is contributed by PHP 0 and below plus PHP (0–5,000].

A structural shift in composition is observed starting August 2025, when capacity is reallocated from PHP 0 and below toward PHP (0–5,000]. The PHP 0 and below band averages 227 MW per month before August 2025 but only 32 MW after, this is coincided with the decrease in contracted quantities, as shown in Figure 13, while PHP (0–5,000] averages 33 MW before August 2025 and 223 MW after.

The offered capacity is shown to be anchored at the low end while the offered prices gradually increased by the post August 2025 tilt toward PHP (0–5,000]. Price offers above PHP 20,000 are used sparingly and are largely absent in late 2025.

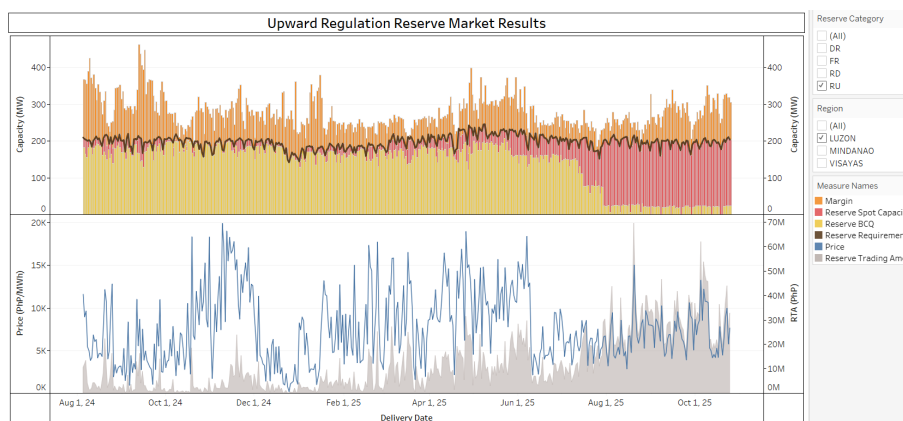


Figure 13. Luzon Upward Regulation Reserve Market Summary

Supply and scheduling are kept stable across the horizon. Average offered capacity averaged at 276 MW and requirements are almost fully scheduled as a 99% scheduling rate is maintained. Through January 2025, scheduled capacity is largely carried by contracted quantities, as an average 92% contracted quantities share and 8% spot share are posted; from August 2025 onward, a regime change is observed as the contracted quantities share falls to 11% due to declining contracted quantities from the battery energy storage resources (BESS). For the whole period, contracted quantities share is 70% of the total scheduled capacity.

Price and revenue signals are mixed while market exposure is raised. Overall, the average price of PHP7,635/MWh is recorded for the whole covered period. Prices averaged PHP6,802/MWh early (August to January), PHP8,760/MWh in the mid-period (February to July), and PHP6,982/MWh late (August to October), so administered price levels remain moderate even as contracting coverage is reduced. In contrast, spot trading amounts is escalated as spot reliance increases. Taken together, a steady supply posture is maintained, but settlement exposure is shifted from bilateral coverage to spot transactions, and higher trading amounts are therefore incurred in late 2025.

b. Visayas

i. Contingency Reserve

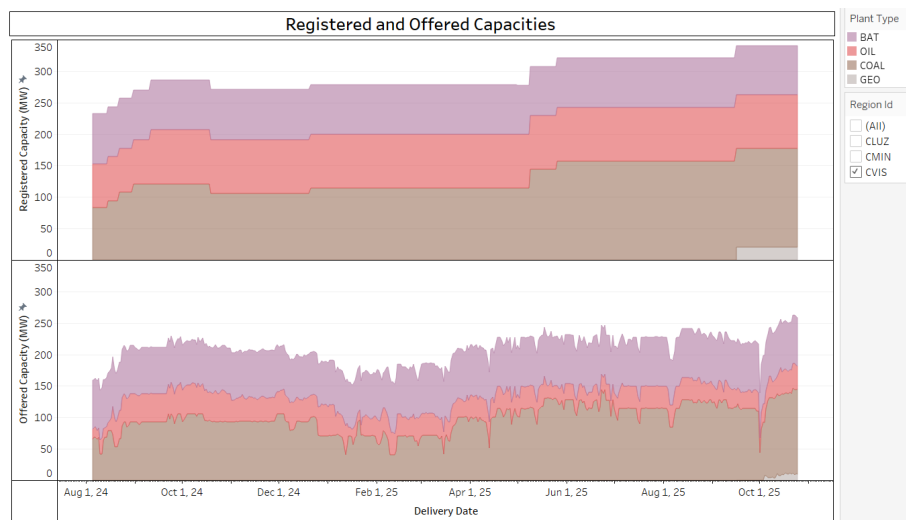


Figure 14. Visayas Contingency Reserve Registered and Offered Capacities by Plant Type

The average offer rate of 71% of the registered capacity is recorded throughout the covered period. The highest offer rate of 77% is recorded in October 2024, while the lowest rate of 62% is observed in February 2025. As more than half of the registered capacity in the contingency reserve are also registered in the regulation reserve service.

Monthly total offers peak in October 2025 at 234 MW and reached a trough in August 2024 at 173 MW. Across the period, system capacity is increased from 241 MW in August 2024 to 341 MW in October 2025, mainly through coal capacity expansions and a late geothermal addition.

Capacities from coal plants are identified as the dominant plant type in the offered capacity observed in 12 out of 15 months and a total share of 47% of the offered capacity. Battery energy storage resources account for 36% of total offers and are consistently operated near registered capacity, with a high average offer rate of 96%.

Oil-based plants contribute 17% of total offers but are characterized by variable participation with an average offer rate of 41% recorded. Geothermal resources are introduced late in the period and contribute only 0.2% of total offers, with a limited impact observed.

Volatility is present, with the largest month-on-month offered capacity increase of 39 MW recorded in September 2024, and the largest decline of 28 MW observed in January 2025.

In October 2025, an average registered capacity of 341 MW is recorded from which 234 MW of contingency reserve is offered. Registered capacity from coal plants accounted for 46% of the capacity and is observed with higher 50% of the total offered capacity. Battery energy storage resources are at 23% of the registered

capacity and shown to have 33% of the offered capacity. Oil resources represented 25% of the registered capacity yet deliver only 14% of offers, reflecting variable participation, while geothermal resources remain minor in both registered and offered capacity.

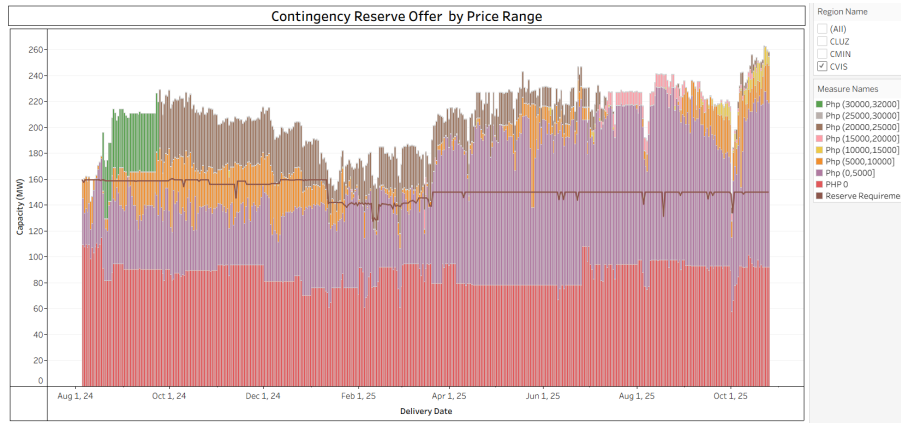


Figure 15. Visayas Contingency Reserve Offered Capacities by Price Range

Offered capacity is concentrated in the lowest price bands, with most volume being placed in PHP 0 and below and PHP (0–5,000]. The PHP (5,000–10,000] band is expanded steadily, rising from 45 MW in August 2024 to 120 MW in June 2025 and staying above 100 MW through October 2025. The PHP 0 and below band is kept sizable but stable, moving between 74–99MW, with a dip in January 2025 at 74 MW and a recovery to 90MW by July to August 2025.

The PHP (20,000–25,000] band is reduced from a peak of 45 MW in October 2024 to 0 by August to September 2025, with only 4 MW appearing in October 2025. Mid-tiers are introduced cautiously: PHP (10,000–15,000] grows from low single digits to 23 MW by October 2025, while PHP (15,000–20,000] remains minimal and reaches 8 MW only in October 2025.

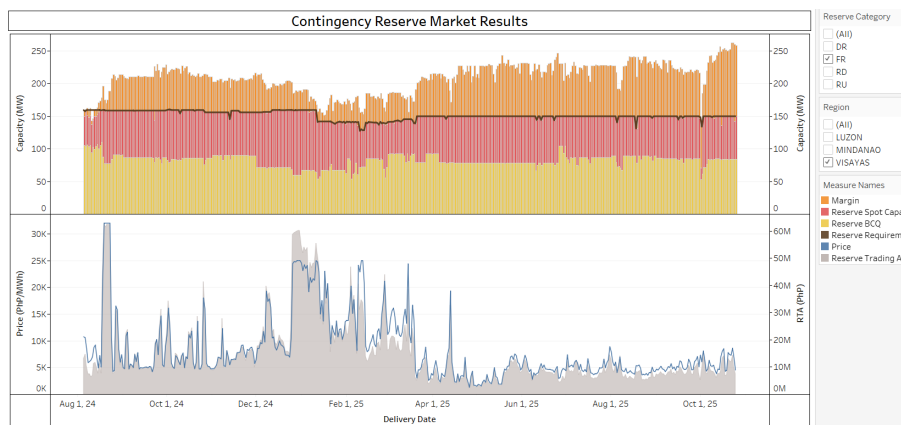


Figure 16. Visayas Contingency Reserve Market Summary

For Visayas contingency reserve from August 2024 to October 2025, an average margin of 37% or 58 MW is achieved while reserve requirement of 152 MW is met at 99% of the time. The scheduled volume is split between contracted and spot quantities, and on average the scheduled quantity is composed of contracted quantities at 55% of scheduled capacity with spot at 45%, indicating that majority of the scheduled contingency reserve is secured through bilateral contracts.

Clear month-to-month differences are observed. The highest price is posted in January 2025 at PHP 20,221/MWh and the lowest price is posted in May 2025 PHP 3,158/MWh, showing a wide price dispersion is indicated through 2025. The average price is set at PHP 8,320/MWh for the covered period.

Contracted quantities percentage also varies: the largest contracted quantities share is observed in August 2024 at 62%, whereas the smallest share is observed in January 2025 at 43%, when spot quantities correspondingly expand.

ii. Dispatchable Reserve

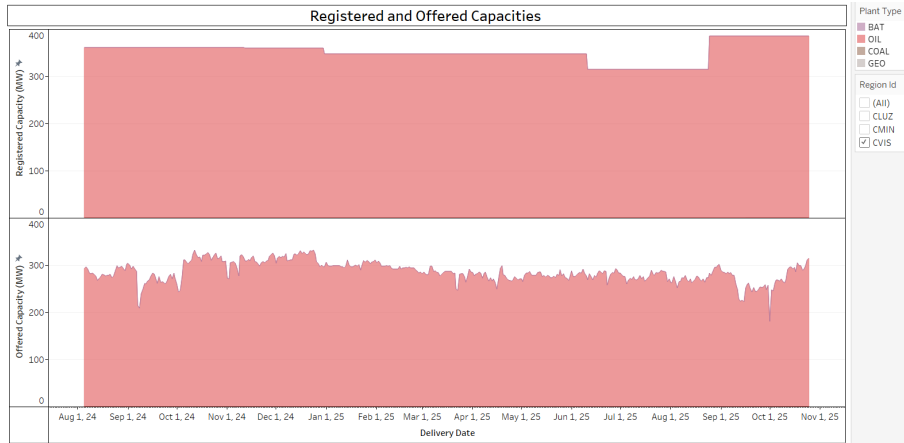


Figure 17. Visayas Dispatchable Reserve Registered and Offered Capacities by Plant Type

The Visayas dispatchable reserve is anchored solely by oil-based units. Oil registered capacity is held near 360 MW through December 2024, is reduced through August 2025 to 317 MW, and is then raised to 385 MW in September to October 2025. Offered oil capacity is maintained, with a gradual easing from 320 MW in December 2024 to 271 MW by August 2025, before a slight rebound to 275 MW in October 2025.

Offer intensity relative to registered capacity is kept high for most months, with at least 78% being offered in August to December 2024 and at least 79% being offered in January to August 2025. A step-change is introduced in September to October 2025, when registered capacity is increased to 385 MW while offered capacity is held at 265–275 MW, so the offer ratio is compressed to about 69–71%.

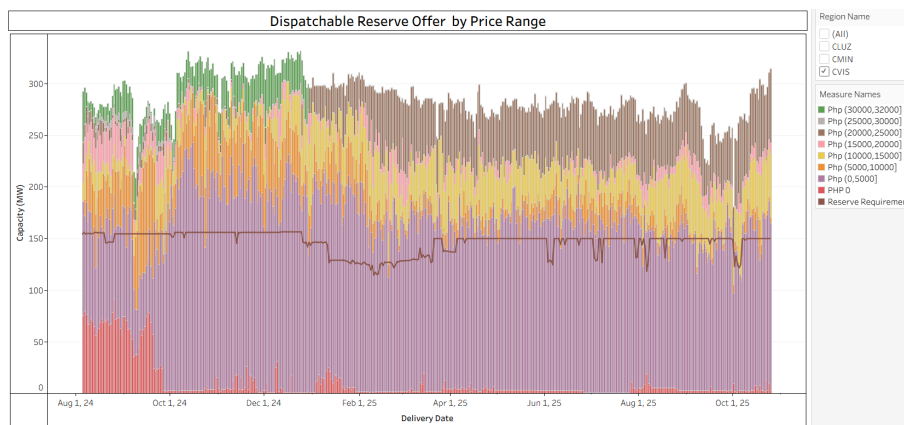


Figure 18. Visayas Dispatchable Reserve Offered Capacities by Price Range

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Offered capacity is dominated by PHP (0–5,000], which is raised to 193 MW in October 2024 and 197 MW in November 2024, and is kept within 145–170 MW during February to October 2025. The PHP 0 and below band is deemphasized, as 70 MW in August 2024 and 55 in September 2024 are brought down to 1–6 MW across 2025.

Through 2025, the PHP (5,000–10,000] band is softened from 38–62 MW in August to September 2024 to 8–23 MW by March to July 2025 and is held near 9 MW by October 2025. Mid-price offered capacity is expanded: PHP (10,000–15,000] is lifted from 13–30 MW in 2024 to 38–46 MW in March to September 2025, while PHP (20,000–25,000] is increased from 2–11 MW in 2024 to 49–61 MW from February to October 2025.

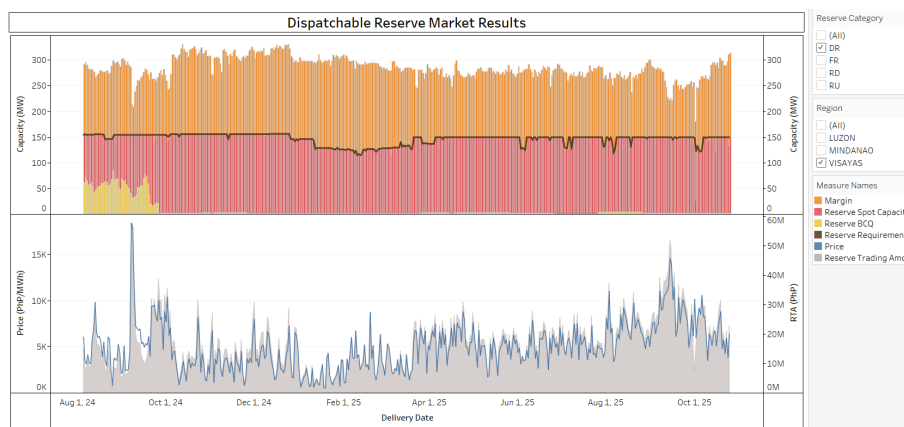


Figure 19. Visayas Dispatchable Reserve Market Summary

For Visayas dispatchable reserve from August 2024 to October 2025, the average margin at 49% or 139 MW is achieved while the reserve requirement of 148 MW is met at 99% of the time. The scheduled volume is split overwhelmingly toward the market: spot transactions accounted for 95% of scheduled quantities on average while the contracted quantities is at 5%, so the dispatchable reserve transactions is shown to be primarily spot-driven.

The average price of PHP 5,011/MWh is recorded for the whole period. The highest price is posted in September 2025 at PHP 8,661/MWh, while the lowest price is posted in January 2025 at PHP 2,138/MWh; Scheduled quantities composition varies widely: the largest contracted quantities share is observed in August 2024 at 39%, whereas the smallest is observed in July 2025 at nearly 0%, when scheduled capacity is mostly through spot transactions. Throughout the window, requirements are consistently met, but the dominance of spot transactions and the variability price indicate that dispatchable reserve procurement in the Visayas is characterized by high spot transaction and moderate price volatility.

iii. Downward Regulation Reserve

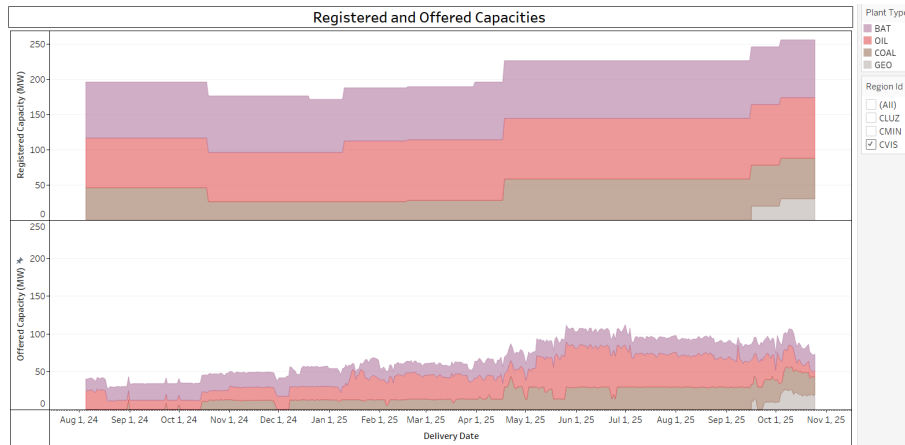


Figure 20. Visayas Downward Regulation Reserve Registered and Offered Capacities by Plant Type

Registered BESS capacity is held near 80–82 MW after a brief dip to 76 MW in January to March 2025, while offered capacity is maintained around 16–24 MW through December 2024 and is normalized at 22 MW from April 2025 to October 2025.

Oil based support is expanded materially through mid-2025 and is then tapered. Registered oil-based capacity is raised from 70 MW to 86 MW by January 2025, and offered capacity is increased from 12 to 20 MW in August to December 2024 to 31 MW in February to March 2025, with a peak of 55 MW in June 2025. After this ramp, offers are reduced to 39 MW in August to September 2025 and are further eased to 21 MW by October 2025.

Coal and geothermal roles are introduced and are strengthened over time. Registered coal capacity is raised from to 58 MW by May 2025 and offers are progressed from 0–4 MW in August to October 2024 to 23–30 MW in May to August 2025, before a slight easing to 28 MW in October 2025 is recorded. Geothermal participation is added in the late period, as 6 MW registered and 2 MW offered capacity in September 2025 and expanded to 27 MW registered and 19 MW offered in October 2025.

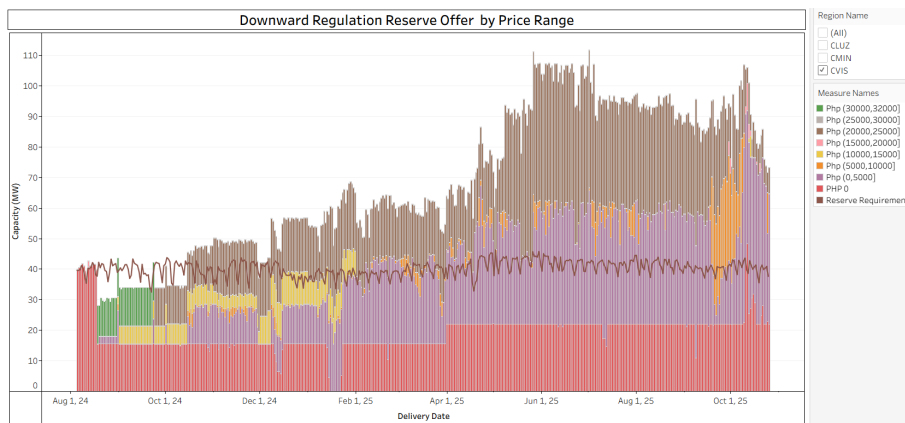


Figure 21. Visayas Downward Regulation Reserve Offered Capacities by Price Range

Offered capacity is expanded materially over the horizon and is shifted toward lower price bands. Total monthly offers are raised from 35–40 MW in August to Oct 2024 to 50 to 60 MW by December 2024 to March 2025, then a peak of monthly average of 105 MW is reached in June 2025 before a normalization to 89–94 MW is recorded by September to October 2025. The PHP 0 tranche is reduced from 31 MW in August

2024 to 11 MW in January 2025, then a steady 21–25 MW is carried from April to October 2025. The PHP (0–5,000] tranche is progressively increased from 1 MW in August 2024 to 36–38 MW by June to October 2025, so a larger share of volume is positioned at very low prices.

A rebalancing away from high-price tranches is registered after 2024. Mid-price reliance via PHP (10,000–15,000] is prominent in September to December 2024 with 5 to 9MW and is then wound down to 0 MW after February 2025. The PHP (20,000–25,000] tranche becomes the main price offer through 2025, rising from 17–20 MW in November 2024 to January 2025 to 45 MW at the June 2025 peak, before a taper to 14 MW is recorded by October 2025; meanwhile, PHP (5,000–10,000] grows gradually to 11 MW by October 2025. Overall, the supply curve is flattened and is carried at lower offers through late 2025, as high-price exposure is reduced and volumes are concentrated in PHP (0–5,000] and PHP (20,000–25,000] bands earlier in the year, then increasingly in the lower bands toward year-end.

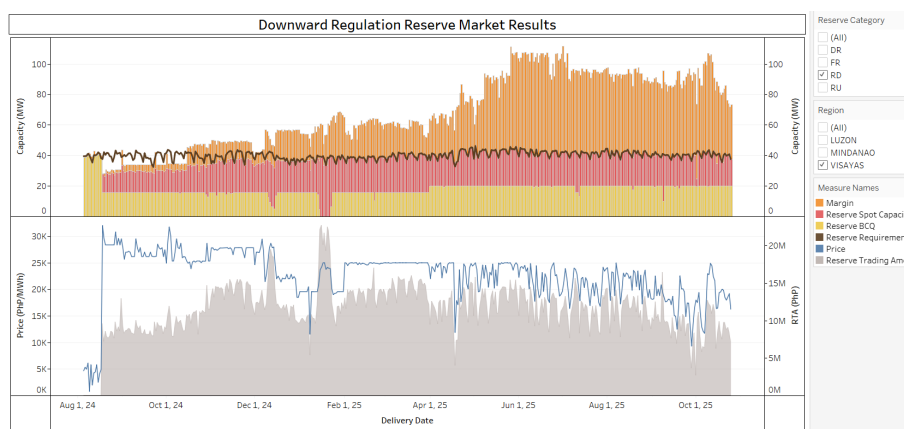


Figure 22. Visayas Downward Regulation Reserve Market Summary

Reserve adequacy is maintained across the period, as offered capacity generally exceeds requirement after late-2024. In August 2024, a near-tight condition is recorded with average offered capacity of 37 MW against the requirement of 40 MW; yet schedules are kept close to requirement at 35 MW. From January to June 2025, headroom is widened as monthly average offers are raised from 57 MW to 104 MW and margins are expanded from 20 MW to 62 MW, while schedules are held at 37 to 42 MW. By July to October 2025, adequacy is sustained with offers of 89 to 98 MW and schedules aligned at 40 MW.

The contracting mix is shifted toward a more balanced stance. In August 2024, bilateral contracting is maximized with contracted quantity at 30 MW around 83% of the scheduled capacity and spot quantity is limited to 5 MW. Through September to December 2024, bilateral contracted quantities are reduced to 15 MW and spot quantities are increased to 18 MW. During 2025, bilateral coverage is held at 18 MW while spot quantity averaged at 22 MW resulting in 45% BCQ with the system operator and a consistently diversified schedule mix profile. For the covered period, 47% of the scheduled capacity are from contracted quantities.

Price behavior is softened over time. An average price of PHP 24,005/MWh is recorded in 2024, PHP 21,741/MWh is recorded in 2025, and PHP 22,689/MWh is recorded overall. A steady downtrend is recorded in September 2025, reaching PHP 17,848/MWh by October 2025.

Monthly trading amounts is increased in October to November 2024, and similar magnitudes are carried into January to March 2025 as volumes are maintained and prices remain firm. As prices ease and a balanced contracted/spot share is retained, trading amount is reduced progressively by October 2025.

iv. Upward Regulation Reserve

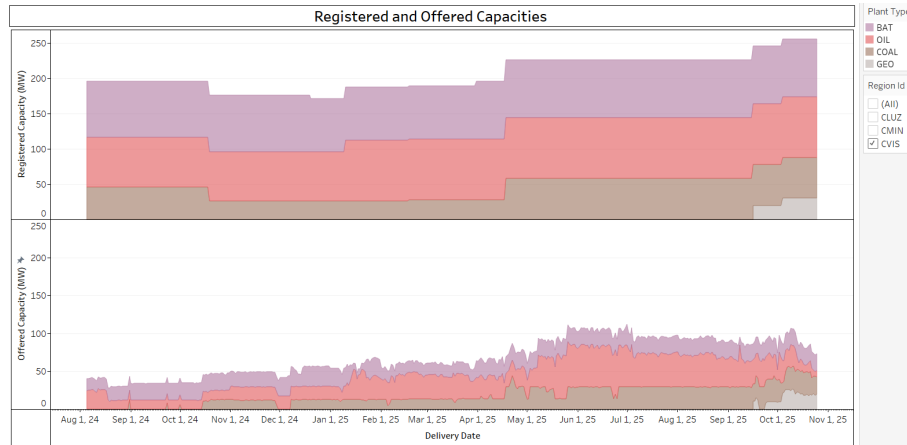


Figure 23. Visayas Upward Regulation Reserve Registered and Offered Capacities by Plant Type

Registered BESS capacity is held near 80–82 MW after a brief dip to 76 MW in January to March 2025, while offered capacity is maintained around 16–24 MW through December 2024 and is normalized at 22 MW from April 2025 to October 2025.

Oil based support is expanded materially through mid-2025 and is then tapered. Registered oil-based capacity is raised from 70 MW to 86 MW by January 2025, and offered capacity is increased from 12 to 20 MW in August to December 2024 to 31 MW in February to March 2025, with a peak of 55 MW in June 2025. After this ramp, offers are reduced to 39 MW in August to September 2025 and are further eased to 21 MW by October 2025.

Coal and geothermal roles are introduced and are strengthened over time. Registered coal capacity is raised from 58 MW by May 2025 and offers are progressed from 0–4 MW in August to October 2024 to 23–30 MW in May to August 2025, before a slight easing to 28 MW in October 2025 is recorded. Geothermal participation is added in the late period, as 6 MW registered and 2 MW offered capacity in September 2025 and expanded to 27 MW registered and 19 MW offered in October 2025.

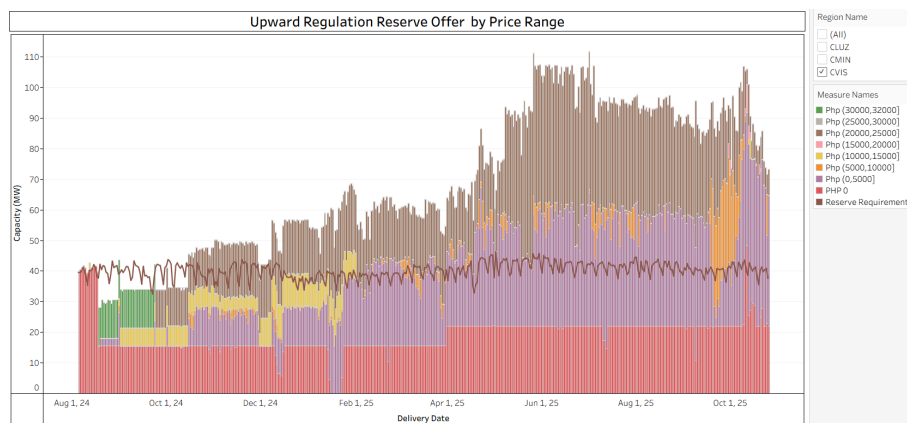


Figure 24. Visayas Upward Regulation Reserve Offered Capacities by Price Range

Offered capacity is expanded materially over the horizon and is shifted toward lower price bands. Total monthly offers are raised from 35 MW to 40 MW in August to Oct 2024 to 50 to 60 MW by December 2024 to

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March 2025, then a peak of 105 MW is reached in June 2025 before a normalization to 89 MW to 94 MW is recorded by September to October 2025. The PHP 0 tranche is reduced from 31 MW in August 2024 to 11 MW in January 2025, then a steady 21–25 MW is carried from April to October 2025. The PHP (0–5,000] tranche is progressively increased from 1 MW in August 2024 to 36–38 MW by June to October 2025, so a larger share of volume is positioned at very low prices.

A rebalancing away from high-price tranches is registered after 2024. Mid-price reliance via PHP (10,000–15,000] is prominent in September to December 2024 (5–9 MW) and is then wound down to 0 MW after February 2025. The PHP (20,000–25,000] tranche becomes the main price offer through 2025, rising from 17–20 MW in November 2024–January 2025 to 45 MW at the June 2025 peak, before a taper to 14 MW is recorded by October 2025; meanwhile, PHP (5,000–10,000] grows gradually to 11 MW by October 2025. Overall, the supply curve is flattened and is carried at lower offers through late 2025, as high-price exposure is reduced and volumes are concentrated in PHP 0–5,000 and PHP 20,000–25,000 bands earlier in the year, then increasingly in the lower bands toward year-end.

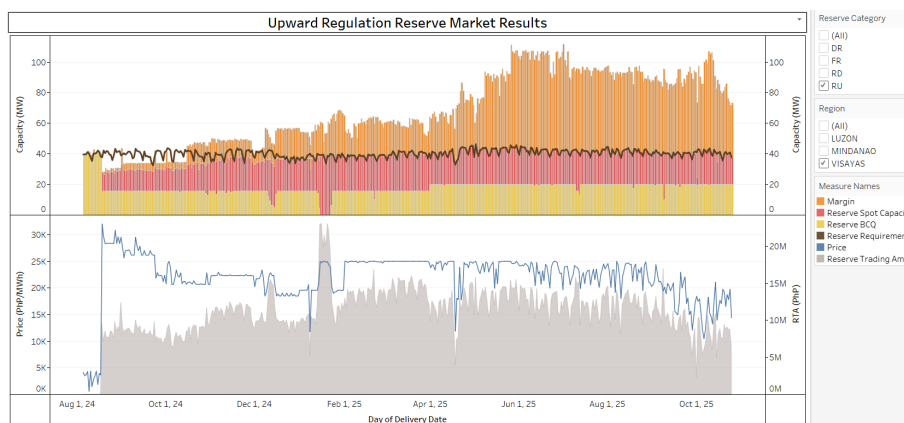


Figure 25. Visayas Upward Regulation Reserve Market Summary

Supply adequacy is strengthened over the period. Offered capacity is raised from 37 MW in August 2024 to a peak of 104 MW in June 2025, then a decline to 92 MW is carried into October 2025. Reserve requirement is 40 MW, so wide headroom is created as offers expand.

Scheduling is improved after early shortfalls. From August 2024 to January 2025, scheduled volumes are kept 5 to 10 MW below requirements, but from February 2025 onward the schedule is matched to requirement at 38 to 42 MW.

The procurement mix is shifted and then stabilized. Contracted quantities are reduced from 30 MW in August 2024 to 11 MW in January 2025, while spot quantities increased from 5 MW to 25 MW by January to March 2025. From May to October 2025, a balanced split is maintained with about 20 to 22 MW each for contracted and spot, and contracted quantities share is held near 47 to 51% after a low of 31% in January 2025. For the covered period, 47% of the scheduled capacity are from contracted quantities.

Price and reserve trading amount conditions are eased across 2025. The price is elevated in September 2024 and March to May 2025 then it is softened by October 2025, with the average of PHP 22,016/MWh for the whole period. Total reserve trading amount is increased March 2025 on stronger scheduling and prices, then it is tapered by October 2025 as prices and volumes are normalized.

c. Mindanao
i. Contingency Reserve

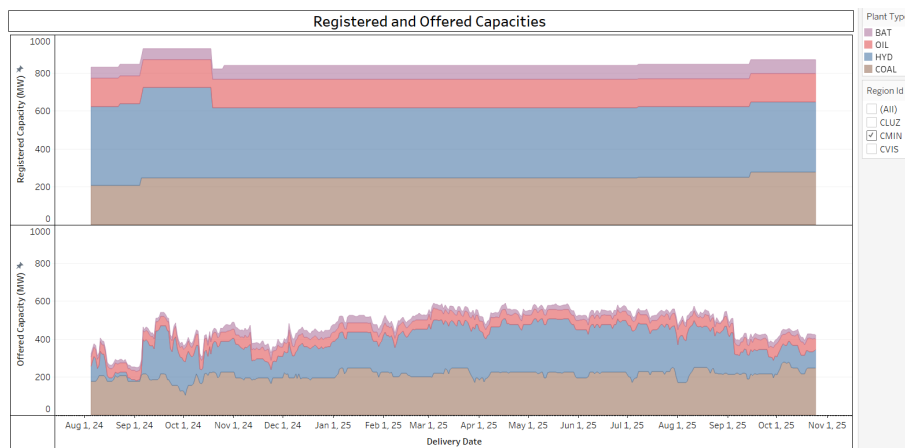


Figure 26. Mindanao Contingency Reserve Registered and Offered Capacities by Plant Type

The Mindanao contingency reserve across August 2024 to October 2025 is characterized by a large and stable registration base while a rising offered profile is posted. 851 MW of contingency reserve capacity per month is registered on average and 474 MW is offered, so an average offer rate of 56% is recorded. The highest registered total is observed in October 2024 is 902 MW and the lowest in August 2024 with 831 MW, while the highest offered capacity is posted in May 2025 at 566 MW and the lowest in August 2024 at 317 MW.

A nearly flat registration trend is indicated, whereas an uptrend is estimated for offered capacity, so that the 2024 offered average of 394 MW is increased to 514 MW in 2025, even as the registered capacity average eases slightly from 862 MW to 845 MW.

A clear technology composition is shown, led by coal and hydro, with oil-based and battery energy storage resources providing supplemental volumes. On averages across the period, registrations of 246 MW (coal), 385 MW (hydro), 148 MW (oil-based), and 72 MW (BESS) are carried, and offers of 212 MW (coal), 184 MW (hydro), 52 MW (oil-based), and 25 MW (BESS) are provided.

Distinct monthly dynamics are recorded by technology. Hydro offers expand from 57 MW in August 2024 to a 271 MW peak in May 2025 and are then tapered to 99 MW by October 2025. Coal offers are sustained within a narrow band and are gradually raised from 181 MW to 199 MW in late 2024 to 213 MW to 241 MW by October 2025. Oil-based offers remain steady near 49–55 MW, with a mild uplift observed into 58 MW in August to October 2025. BESS offers are lifted with the registration step-up to 75 MW in November 2024, after which a gradual easing toward 23–26 MW through 2025 is posted. Taken together, the contingency reserve stack is shown to pivot from a coal-led offered profile in 2024 toward a more balanced coal-plus-hydro composition in 2025, while overall offered capacity is steadily increased and offered against registrations is improved.

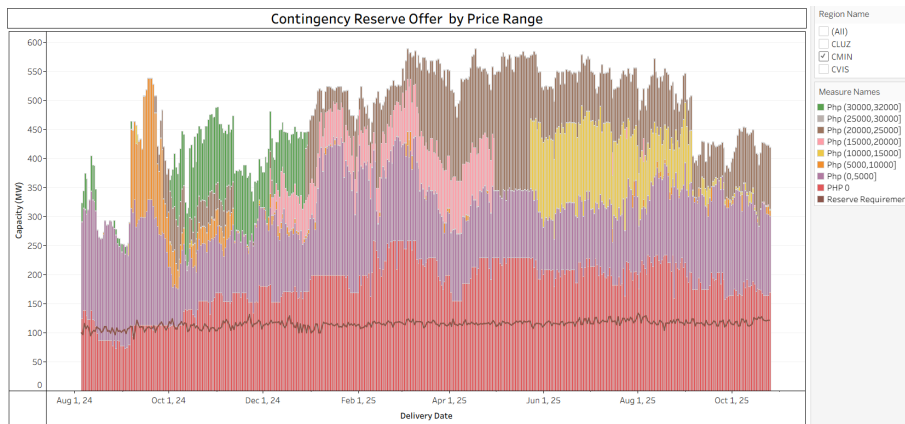


Figure 27. Mindanao Contingency Reserve Offered Capacities by Price Range

Offered capacity is concentrated in the lowest price tiers and is maintained as the base of the mix. Across August 2024 to October 2025, the PHP 0 and below and PHP (0–5,000] bands are kept high, averaged at 180MW and 138 MW, respectively, a large volume of low-priced offers is present in each month. The middle and upper bands are then layered on top of this base as conditions change.

In late 2024, a divided posture is observed. A sizable high-price tail in PHP (30,000–32,000] is carried at 94 MW, while initial mid-tier is introduced in PHP (20,000–25,000] at 27 MW and PHP (15,000–20,000] at 39 MW in December 2024.

From January 2025, the profile is reconfigured toward mid-price bands, as the price offer cap is lowered to PHP 25,000/MWh in the end of December 2024. The PHP (20,000–25,000] is expanded sharply peaking at 199MW in May. A wave in PHP (10,000–15,000] is also recorded at 139 MW in June to July 2025, then went down to 5 MW in October, so upward price offers are observed in mid-2025 and is gradually eased into the last quarter of the covered period.

By September to October 2025, the mix is moderated. Low-price capacity remains sizable at 182 MW for PHP 0; 151 MW in PHP (0–5,000]), while the PHP (20,000–25,000] is held at 75 MW. Overall, offered capacity is dominated by persistent low-price volumes, while mid-price bands are also visible in 2025.

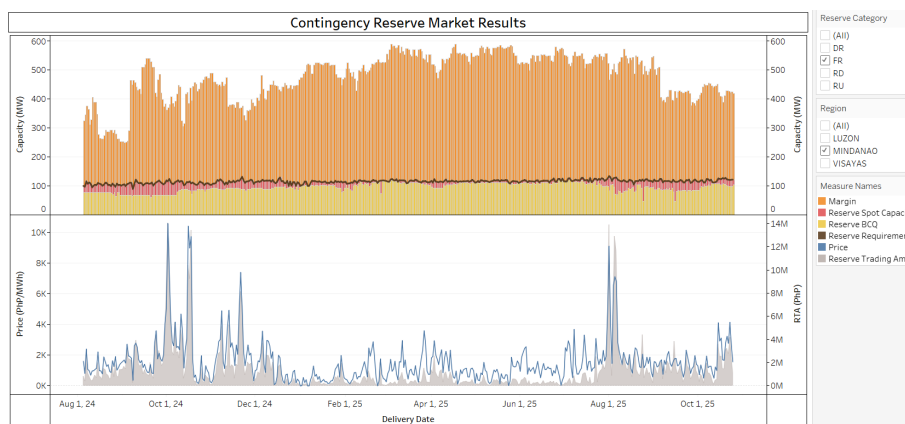


Figure 28. Mindanao Contingency Reserve Market Summary

During the covered period, an average supply margin rate of 76% or 362 MW is achieved while the reserve requirement of 115 MW is met at 100% for Mindanao contingency reserve.

A strongly contracted quantities-led delivery is recorded. On average, contracted quantity accounted for 83% of scheduled quantity and spot transactions accounts for 17%, so most quantities are procured through

bilateral contracts. The largest contracted share is posted in March 2025 96%, while the smallest is posted in September 2024 at 64% when spot transaction is relatively higher.

Contingency reserve margin fluctuates at high levels; the lowest margin is recorded in August 2024 at 67%, and the highest margin is recorded in May 2025 at 79%, reflecting persistent oversupply as large margins are maintained against comparatively smaller requirement.

Price and duration dynamics vary through the window. The average price is set at PHP 1,570/MWh for the covered period. The highest price is observed in October 2024 PHP 3,521/MWh and the lowest price is observed in January 2025 at PHP 429/MWh. Taken together, a system that is consistently adequate, strongly contract-weighted, and generally low-priced is described for Mindanao contingency reserve over the period.

ii. Dispatchable Reserve

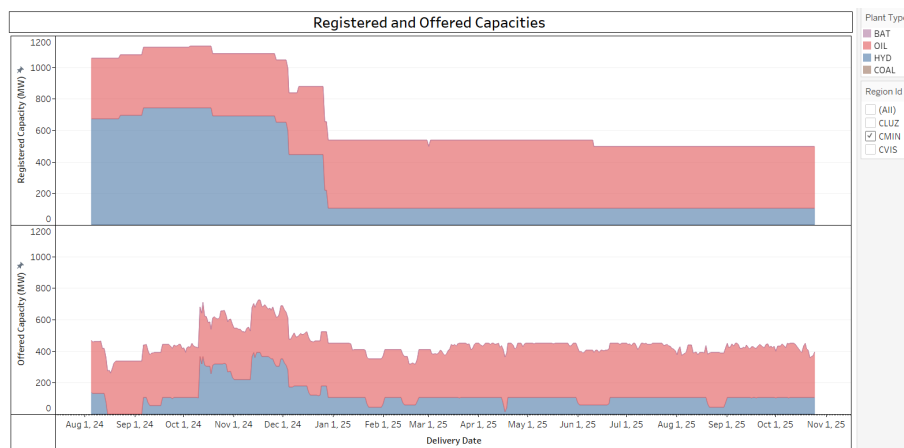


Figure 29. Mindanao Dispatchable Reserve Registered and Offered Capacities by Plant Type

The Mindanao dispatchable reserve from August 2024 to October 2025 is composed of hydro and oil-based resources. An average 702 MW of registered capacity is carried each month, and 444 MW is offered, with an average offer rate of 69%.

The highest registered capacity is recorded in October 2024 at 1,121 MW and the lowest in July 2025 at 499 MW, while the highest offered capacity is seen in November 2024 at 619 MW and the lowest in August 2024 at 375 MW. Year over year, average registered capacity is reduced from 1,060 MW in 2024 to 523 MW in 2025, and average offered capacity eases from 488 MW in 2024 to 422 MW in 2025.

Hydro registration is stepped up from 677MW to 730 MW in August to October 2024 down to 692 MW in November, 507 MW in December, 123 MW in January 2025, and finally 105 MW from February 2025 onward. This downward trend is caused by end of accreditation validity of several hydro plants. Despite the registration's downward trend, offers remain present: 166 MW average are posted across August to December 2024, then 97 MW in 2025.

Oil based dispatchable reserve capacity is kept consistently registered in the range of 384MW to 435 MW and is offered steadily at 314 to 345 MW per month, with higher average offer rate of 80%.

Across the full period, cumulative offers are dominated by oil-based plants as compared with hydro, even though total registrations are split between oil and hydro; overall, about 63% of registered dispatchable reserve capacity is offered when the two technologies are combined.

In 2024, monthly offered in dispatchable reserve is contributed 66% by oil and 34% by hydro whereas in 2025 the mix shifts to 77% oil and 23% hydro, as hydro registration settles at 105 MW and oil-based maintains

stable offerings. By month, the system therefore is seen to transition from a registration-heavy hydro with high late-2024 offers to a stable oil-based--led offering profile in 2025, while total offered dispatchable reserve is held near the 400 MW range despite a substantial reduction in registered capacity.

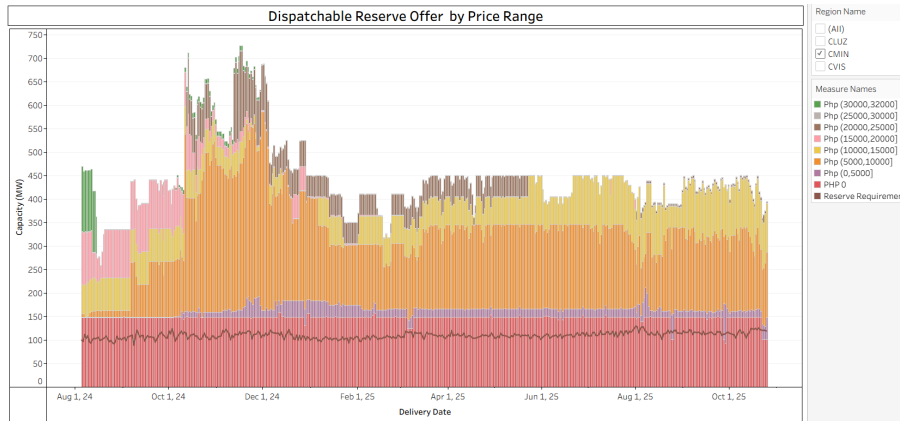
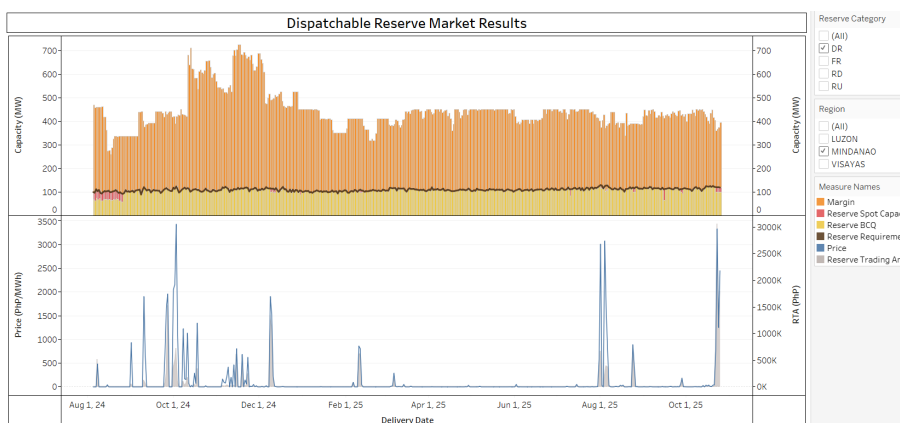


Figure 30. Mindanao Dispatchable Reserve Offered Capacities by Price Range

Offered capacity is anchored by PHP 0 and below, which averaged at 148 MW across all months. In August to December 2024, a split posture is maintained: sizable low-price volumes are paired with a visible high-price tail in PHP (30,000–32,000], at the same time, mid-to-upper tiers are introduced: PHP (20,000–25,000] is carried at 37MW to 65 MW in October to December 2024, while PHP (5,000–10,000] is expanded sharply from 11 MW in August 2024 to 321 MW by November 2024.

Beginning January 2025, the mix is reconfigured toward mid-price bands, and the highest tier is discontinued. The PHP (30,000–32,000] band is removed⁸, while PHP (20,000–25,000] is stepped down from 46 MW in January 2025 to 5 MW afterwards. In contrast, mid-tier emphasis is increased in volume: PHP (5,000–10,000] averaged at 159 MW for 2025, and PHP (10,000–15,000] is lifted from 52 MW in January to May to 95 MW in June to October.

Through mid-to-late 2025, further normalization is observed. The PHP (15,000–20,000] band is reduced, and PHP (20,000–25,000] is kept at 5 MW, so upper-tier exposure is minimized. Low-price offered capacity remains stable with 149 MW in PHP 0 and below, while a measured build-up in PHP (10,000–15,000], with 95 MW in June to October is observed.



⁸ ERC order on Reserve Offer and Price Cap

Figure 31. Mindanao Dispatchable Reserve Market Summary

For Mindanao dispatchable reserve, from August 2024 to October 2025, an average margin of 75% or 335 MW is achieved while the reserve requirement of 110 MW is met 100% of the time. The scheduled volume is shown to be almost entirely contracted: on average, contracted quantities account for 97% of scheduled capacity while spot quantities accounts for 3%, so dispatchable reserve transactions is dominated by bilateral contracts throughout the period.

Across the window, the average price is PHP 114/MWh. Distinct month-to-month patterns are observed. The highest price is posted October 2024 at PHP 564/MWh, while the lowest price is posted in January 2025 PHP 0.2/MWh, low price conditions are evidenced across much of 2025.

Contract composition varies, but contracted quantities reach almost 100% of scheduled capacity in several months, the smallest contracted quantities share is observed in August 2024 at 65%, when spot market transaction is relatively higher. The dispatchable reserve margin is relatively high; the best margin is achieved in November 2024 at 506 MW or 82% while the lowest margin is realized in August 2025 at 71% at 286 MW, Through all months, system adequacy is maintained as scheduled quantities meet or marginally exceeds requirements, and the generally, the dispatchable reserve landscape in Mindanao is characterized by strong contract reliance, minimal spot exposure, and very low prices.

iii. Downward Regulation Reserve

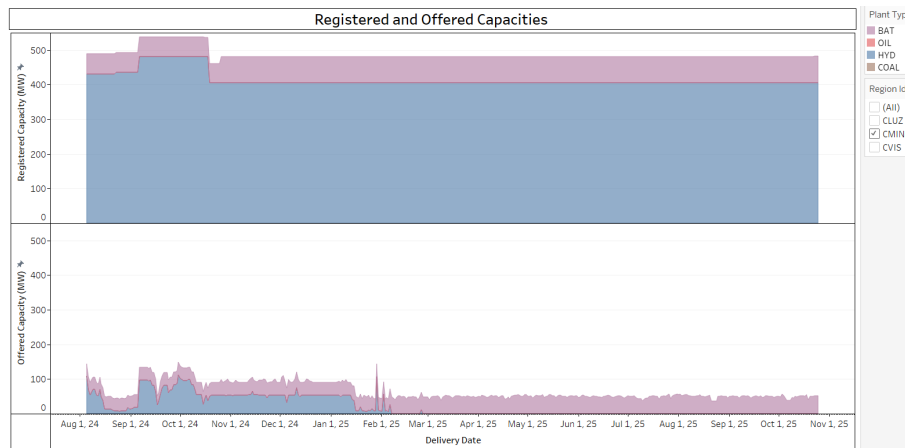


Figure 32. Mindanao Downward Regulation Reserve Registered and Offered Capacities by Plant Type

BESS capacity is positioned as the primary source of downward and upward regulation in Mindanao. Registered BAT capacity is raised from 58 MW August to October 2024 to 76 MW from November 2024 onward, and offered capacity is increased from 38 MW in 2024 to 52 MW in May 2025 before a slight easing to 49 MW by September 2025 is recorded.

Hydro participation is progressively scaled back. Although hydro registered capacity is held high at 465 MW through September, then 406 MW, thereafter, offered capacity is reduced from 55 MW in August to January 2025 to 9 MW in February 2025, and it is then brought down to 0 MW afterwards. This is due to the shifting of offers of hydro reserve provider from regulation to contingency reserve.

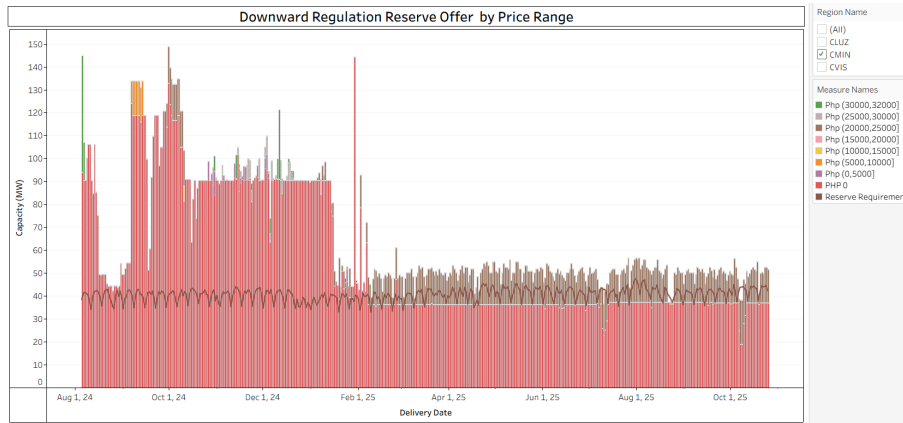


Figure 33. Mindanao Downward Regulation Reserve Offered Capacities by Price Range

A clear redistribution of price-bin counts is observed for Mindanao from August 2024 to October 2025. In 2024, the distribution is dominated by PHP 0, with an average of 95% of monthly observations, while small but visible tails are observed in higher-priced offers. In 2025, the decrease in offered capacity is accompanied by a reduction in PHP 0 price offers to 76%, while the share of other price bins is increased to 24% from 5% in 2024.

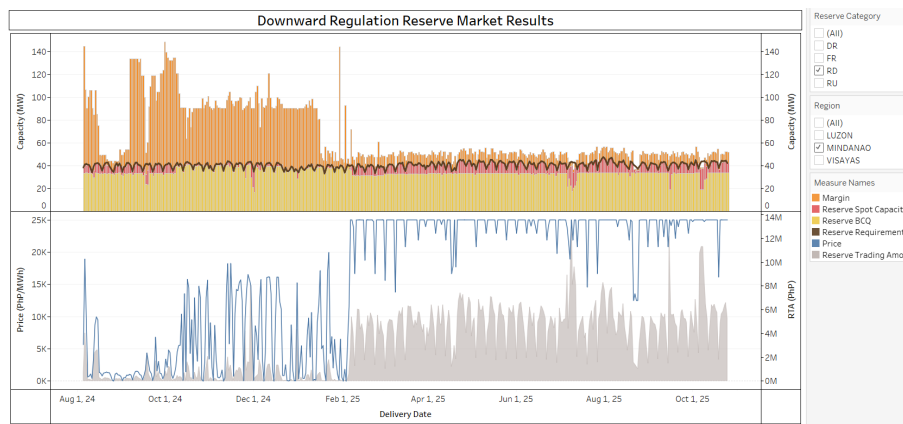


Figure 34. Mindanao Downward Regulation Reserve Market Summary

Reserve adequacy is maintained throughout the period, as offered capacity is kept above requirement in every month. In 2024, offers around 92 MW are set against requirements of 40 MW, and schedules are matched closely at 40 MW. In 2025, adequacy is still ensured, but headroom is narrowed; margins are compressed from 39 MW to 55 MW in late-2024 to 8 MW to 10 MW by March to October 2025, while schedules continue to be aligned with requirements at 38MW to 42 MW.

The contracting mix is held conservative. Contracted quantities are kept near 31MW to 38 MW, and BCQ percentage is maintained at 84% to 97% in August to December 2024, then is eased to 77% to 88% during 2025, and 84% for the whole period. Spot transactions are kept limited, as spot quantities remain within 1MW to 10 MW even when margins tighten; thus, most scheduled volumes are covered by bilateral contracts with system operator, and exposure to the spot market is contained.

A step-up in reserve prices is recorded in 2025. The price is posted at relatively low levels in 2024 at PHP 5,241/MWh and is then lifted sharply from February 2025 onward to a higher plateau of PHP 16,550/MWh to PHP 24,618/MWh through October 2025. Overall, the average price is recorded at PHP 16,424/MWh for the whole period.

Settlement is increased accordingly. Monthly trading amount is kept low from August to December 2024, then is raised during February to October 2025 as higher prices are absorbed while scheduled volumes remain steady. In summary, Mindanao RD is operated with reliable adequacy and high bilateral coverage, while spot trading amount is driven mainly by the post-January 2025 price regime rather than by changes in scheduled quantities or spot dependence.

iv. Upward Regulation Reserve

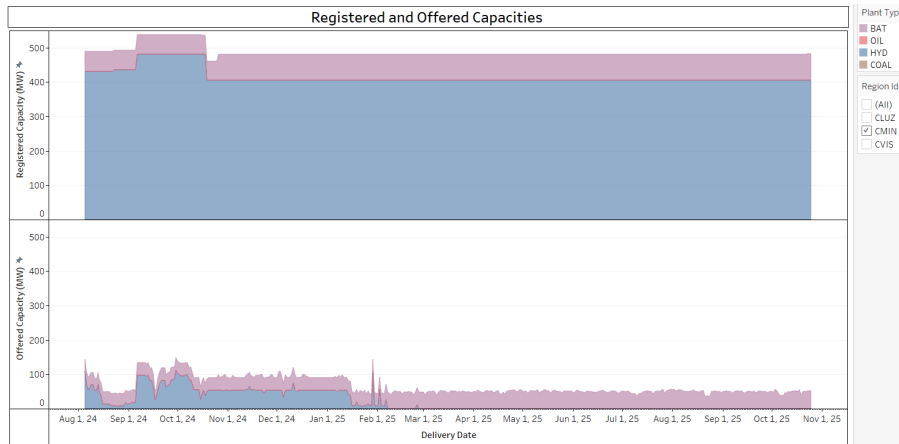


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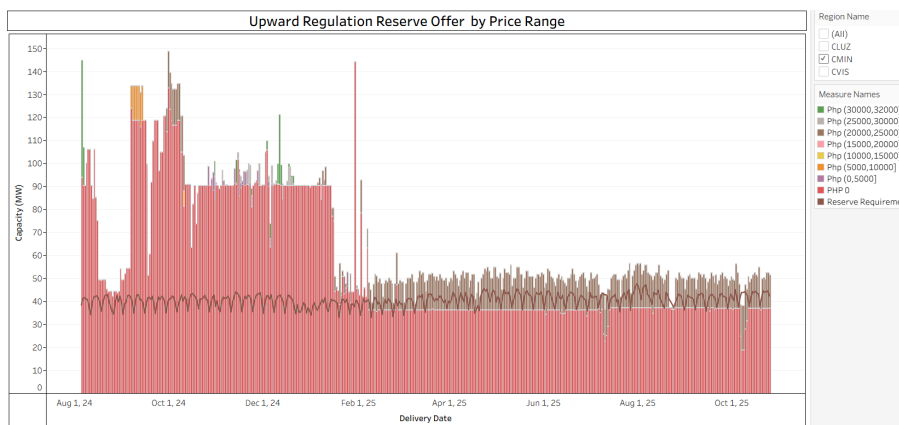


Figure 36. Mindanao Upward Regulation Reserve Offered Capacities by Price Range

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by a reduction in PHP 0 price offers to 76%, while the share of other price bins is increased to 24% from 5% in 2024.

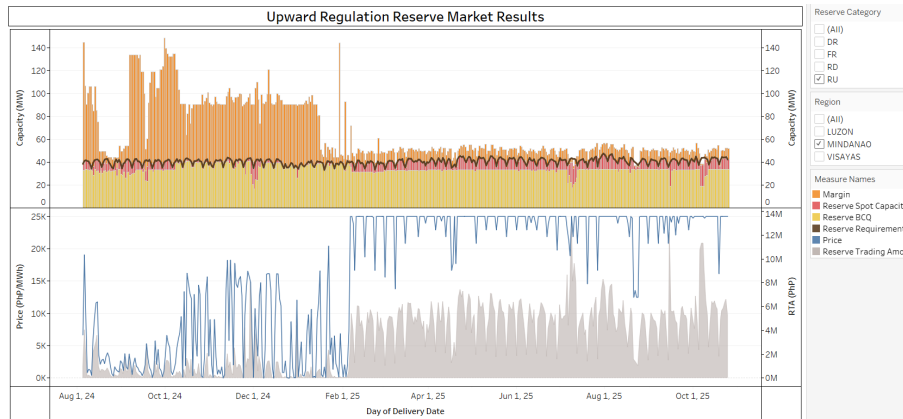


Figure 37. Mindanao Upward Regulation Reserve Market Summary

Across the 15 months, an average offer of 66 MW is seen, with average margin at 26 MW and average requirement at 41 MW. Scheduling is observed to closely track requirement, 99% of the time the requirement is met. Delivered energy is dominated by contracted volumes: Contracted quantities account for 84% of scheduled capacity on average, while spot quantities accounts for the remaining 16%.

Supply conditions are seen to loosen early and tighten later. The highest offer is recorded in October 2024 with 107 MW, while the lowest offer is posted in July 2025 with 48 MW. Over the period, a steady downtrend is indicated, from the first to the last month, offer is reduced by 35% and margin is reduced by 77%.

The lowest requirement and schedule are posted in January 2025 at 38 MW, while the highest schedule is observed in May 2025 at 42 MW.

Price behavior is observed to strengthen materially through the period. The price averaged at PHP16,309/MWh, with the lowest level seen in September 2024 at PHP1,906/MWh and the highest in June 2025 at PHP24,696/MWh.

Monetary outcomes through reserve trading amounts also rise sharply. The lowest reserve trading amount is posted in January 2025 and the highest in October 2025.

d. Additional Analysis

Analyses on registration and plant types using offered capacity data are conducted to provide insights into the reserve providers' preferences for specific reserve categories over time. Although some reserve providers are registered in multiple reserve categories, the current reserve market implementation permits capacity to be offered in only one reserve category per dispatch interval. The types of technologies that offer capacity in each reserve category across regions are also shown in the graphs.

i. Registration Type

1. Luzon Offered Capacity by Registration Type



Figure 38. Luzon Offered Capacities by Registration Type

Across the full period, the largest contribution is provided by multi-service registrations (Contingency + Dispatchable + Regulation), around half of all offered capacity. A well-balanced mix of services is exhibited by this category, led by Contingency Reserve (51%), followed by Dispatchable Reserve (35%), with Regulation (Upward and Downward) together accounting for 14%.

For the Dispatchable + Regulation registration type, the category is skewed toward Dispatchable Reserve, with 61% of capacity allocated to DR, while the remaining share is provided by regulation services (RU and RD). While the Contingency + Dispatchable registrations are found to be almost entirely Dispatchable Reserve (99%).

Contingency + Regulation registrations are identified as the primary source of regulation offered capacity. Regulation Up and Down are evenly split (32% each) in this registration type.

Single-service registrations, which are characterized as strongly Dispatchable Reserve-centric. Nearly two-thirds (65%) of capacity is allocated to Dispatchable Reserve, followed by Contingency Reserve (34%) and negligible regulation.

2. Visayas Offered Capacity by Registration Type

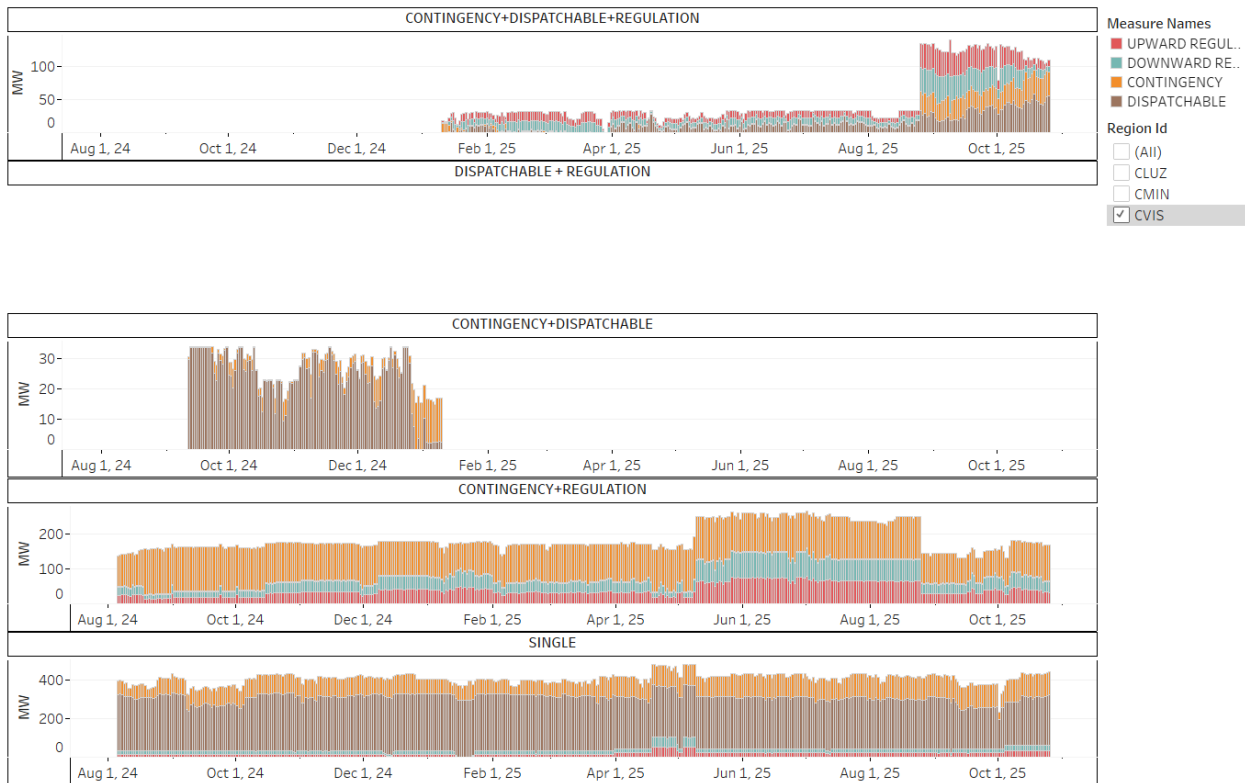


Figure 39. Visayas Offered Capacities by Registration Type

The (Contingency + Dispatchable + Regulation) capacities are offered with 50% in dispatchable, 49% regulation and roughly 1% contingency. Notably, there are no capacities in this registration type until January 2025 and showed surge in capacities beginning September 2025, from 31MW to 126MW.

In the (Contingency + Dispatchable category), the mix is shared but is mainly dominated by dispatchable at roughly 86%, with contingency contributing about 14%. This type of registration is presently only in Visayas from September 2024 to January 2025 billing period.

For (Contingency + Regulation), contingency made up approximately 72% and regulation at 28%. The single registration is dominated by the dispatchable reserve at about 78% while contingency is at 78% and 3% regulation.

3. Mindanao Offered Capacity by Registration Type

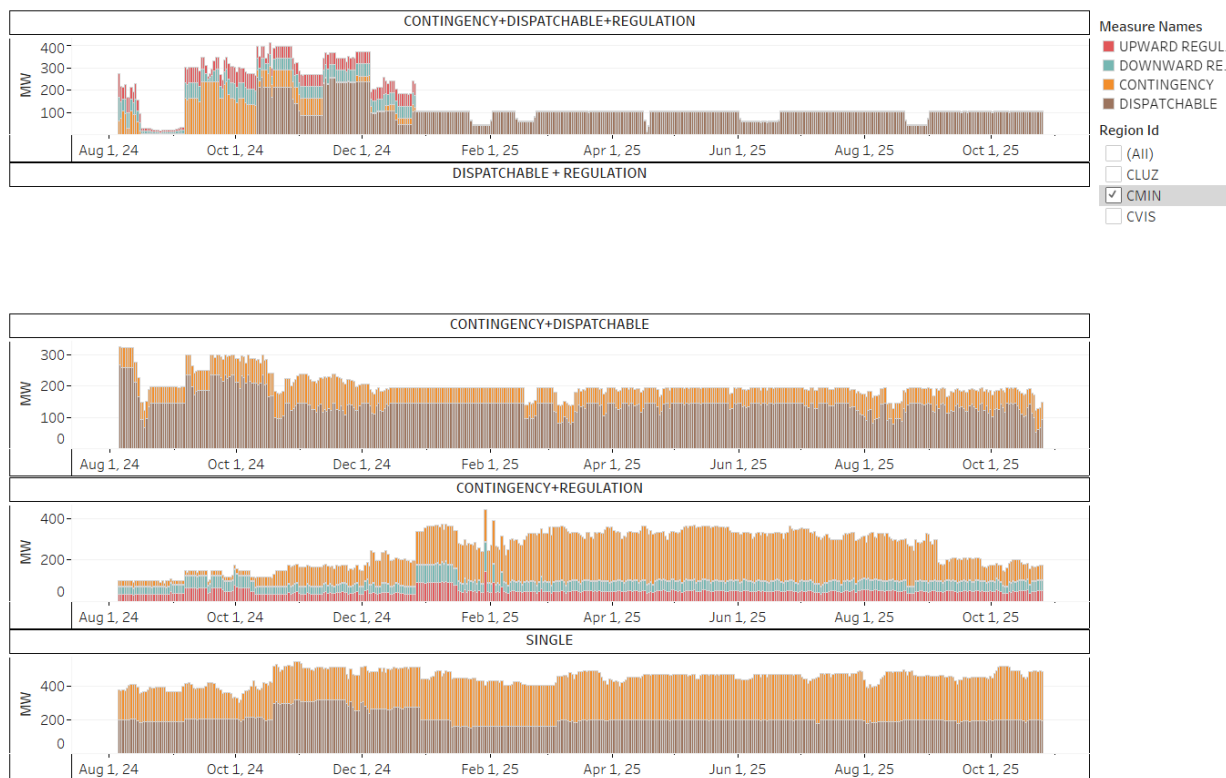


Figure 40. Mindanao Offered Capacities by Registration Type

The multiple services (Contingency + Dispatchable + Regulation) registration type shows the most balanced mix, as 62% is provided as dispatchable, 16% as contingency, and the remaining capacity in regulation. Visible during the start of the period are the offered capacity for contingency and regulation and later concentrated to dispatchable reserve starting January 2025. Shown in December 2024, hydro plants capacities that are offered in regulation end the certification validity for dispatchable reserve in this registration type and are then considered under the (Contingency + Regulation) registration type.

In the (Contingency + Dispatchable) registration type, a dispatchable heavy blend is represented, with the offered capacity breakdown of 71% dispatchable and 29% contingency.

For (Contingency + Regulation), a graph dominated by contingency is observed, with 60% offered as contingency and 40% for regulation. Contingency reserve offers are increased starting February 2025 as capacities are added in this registration type by hydro plants previously from the (Contingency + Dispatchable + Regulation) registration type. Contingency reserve offered capacity from this registration type averaged at 231MW from March 2025 to August 2025 and then declined during the billing months of September and October 2025.

Within the single registration type, a stable base is formed, as 54% of the offered capacity is allocated for contingency reserve and 46% for dispatchable reserve.

More than two thirds of total offered capacity in Mindanao reserve market is from single and (Contingency + Regulation) registration types.

ii. Analysis by Plant Type

1. Luzon Offered Capacity by Plant Type

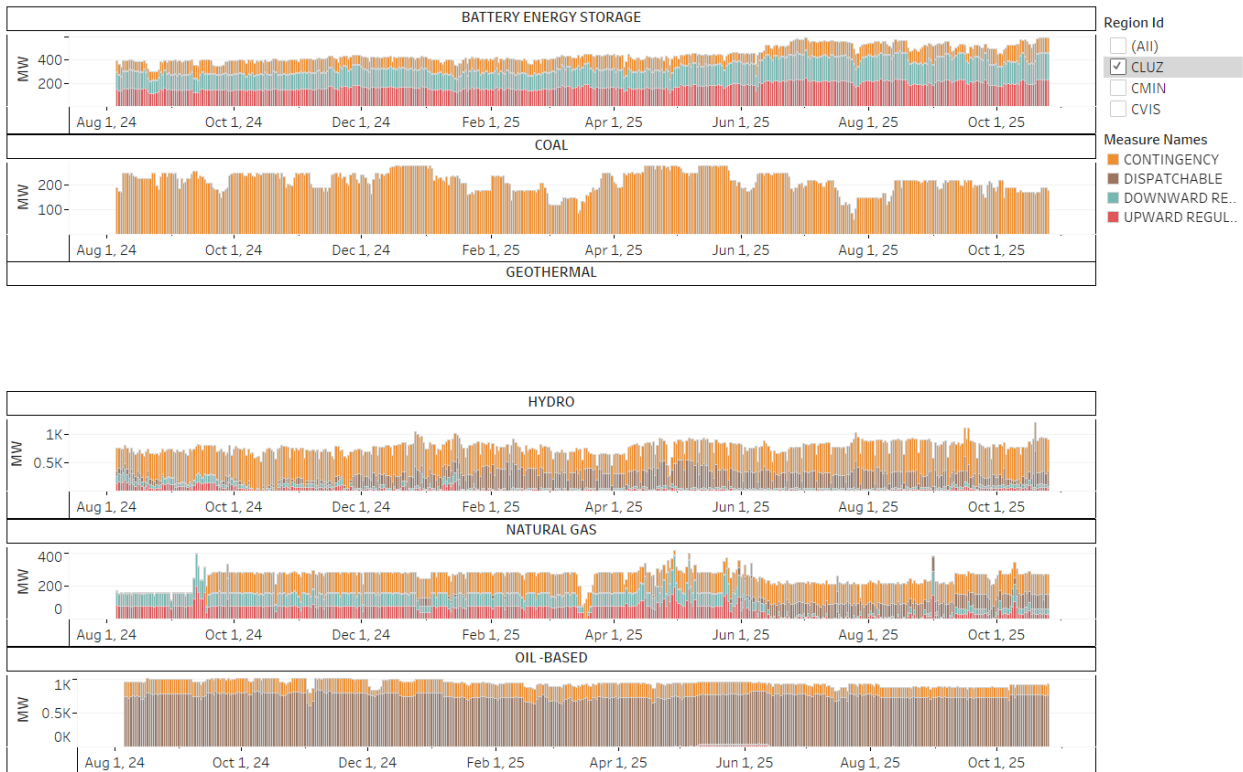


Figure 41. Luzon Offered Capacities by Plant Type

Battery resources are predominantly offered in regulation, and approximately 62% of all RU and RD in the system are provided by batteries while coal is offered exclusively in contingency reserve in Luzon with no participation in dispatchable or regulation.

Hydro is primarily offered in contingency reserve, with about 44% provided as contingency, approximately 21% offered in dispatchable, and around 36% offered in regulation. Natural gas plants offered their capacities across all services, with offers in contingency and regulation in the start of the period and added dispatchable in the second half with less capacities for regulation. Oil is mostly offered in dispatchable, with approximately 76% as dispatchable, about 17% offered in contingency, and roughly 7% allocated to regulation.

2. Visayas Offered Capacity by Plant Type

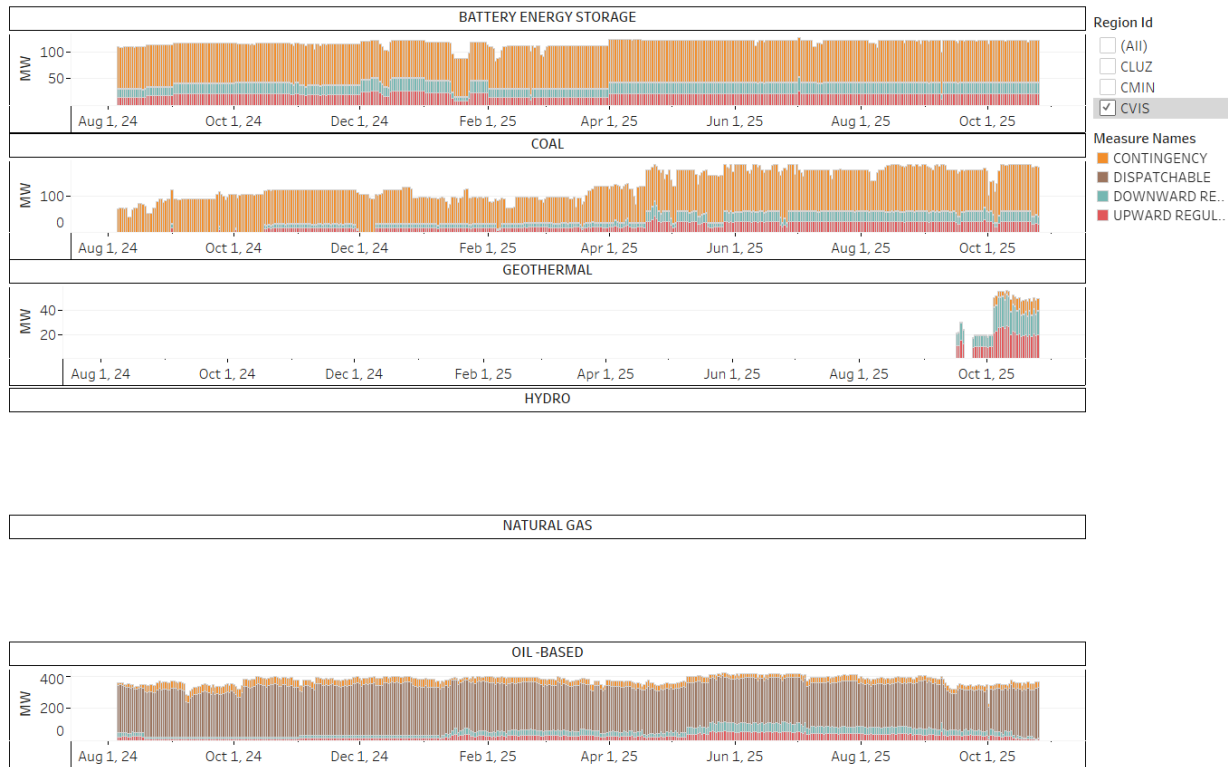


Figure 42. Visayas Offered Capacities by Plant Type

A balanced profile is provided by battery energy storage system resources, with contingency reserve offered capacity making up around 70% of the battery output and regulation making up the remaining share.

The largest share of contingency reserve offered capacity is provided by coal plants, while some capacity is offered at regulation, particularly during April to September 2025, when contingency offered capacity is raised. Geothermal plants offered capacities are visible during the September to October 2025 billing months especially in regulation.

Dispatchable reserve is overwhelmingly provided by oil-based plants, with roughly 88% to 90% of the dispatchable reserve offered capacity and about 43% of the regulation reserve contributed over the period.

Majority of Visayas reserve market offered capacity is from oil-based plants with substantial capacities from battery energy storage resources and coal plants.

3. Mindanao Offered Capacity by Plant Type

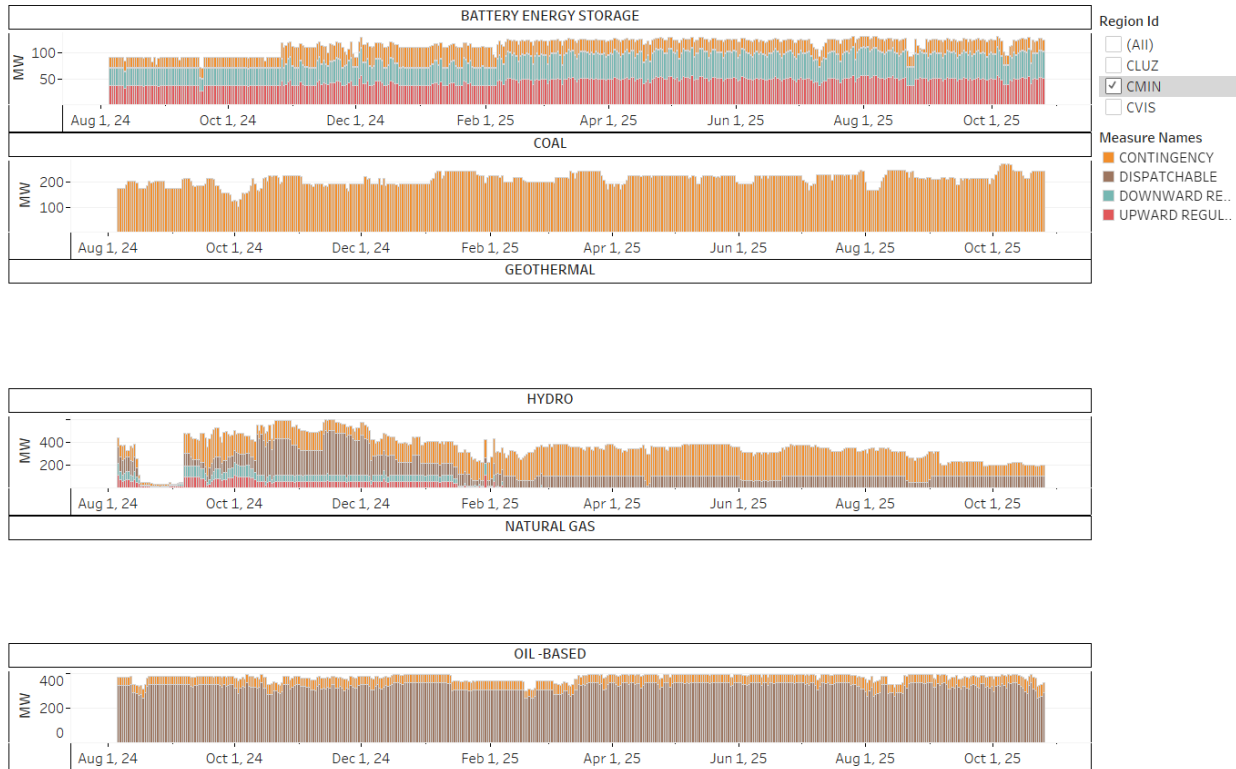


Figure 43. Mindanao Offered Capacities by Plant Type

The battery energy storage resources offered capacity is overwhelming regulation-oriented, accounting for 78% of its offered capacity and 22% for contingency reserve.

The capacity offered by coal plants is purely for contingency reserve while hydro plants' offered capacity is mixed with 53% for contingency, 35% for dispatchable and 12% for regulation as visible during the first half as capacity previously from regulation is shifted to contingency during the second half. The capacity offered by hydro plants is also in a downward trend as seen in the graph.

Oil-based plant's offered capacity is dispatchable reserve-centric at 86% for dispatchable and the rest for contingency.

The battery energy storage resources dominate the regulation, coal plants dominate the contingency, and the hydro plants are split in all types of reserve.

e. Energy and Reserve Market Prices

i. Luzon

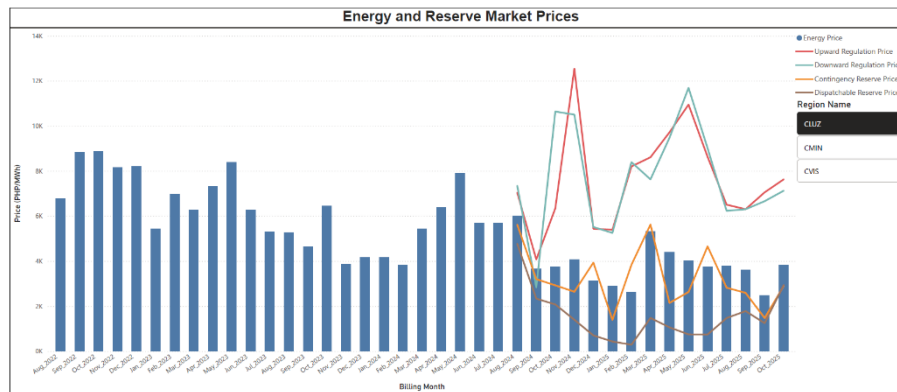


Figure 44. Luzon Energy and Reserves Market Prices

Starting August 2024 (reserve market resumption period), a sharp decline is recorded as the energy price is reduced from PHP 5,998/MWh to PHP 3,662/MWh in September 2024 (-39%). A brief recovery is then posted through November 2024 (PHP 4,071/MWh) before a renewed softening is registered in December 2024 to February 2025, when a trough of PHP 2,627/MWh is reached. A sudden spike is logged in March 2025, as the price is lifted to PHP 5,319/MWh after which gradual easing is recorded through June 2025 (PHP 3,736/MWh) and relative stability is maintained around PHP 3,600/MWh to PHP 3,800/MWh in July to August 2025. Another dip is then marked in September 2025, when a new low of PHP 2,489/MWh is set, followed by a rebound to PHP 3,827/MWh in October 2025. Overall, the post-August 2024 period is characterized by an initial drop, a brief mid-period surge around March 2025, and a subsequent softening that is capped by a late-period rebound, with the range for the interval defined by PHP 2,489/MWh to PHP 5,998/MWh.

A statistical test, Mann–Kendall (MK) trend test is applied to the Luzon energy price series to determine the trend of the energy prices. The MK test is done on two covered periods, August 2022 to October 2025 and August 2024 (Resumption of the Commercial Operations of the Reserve Market) to October 2025, and yield the following results:

A statistically significant downward trend is detected over the full August 2022 to October 2025 history, and a median decline of about PHP 125/MWh per month is estimated, while the period starting August 2024, a negative slope is observed but the MK test is not significant; therefore, a monotonic downward trend is not confirmed for August 2024 to October 2025, even though an average decline of about PHP 51/MWh per month is suggested by Sen's slope.

ii. Visayas

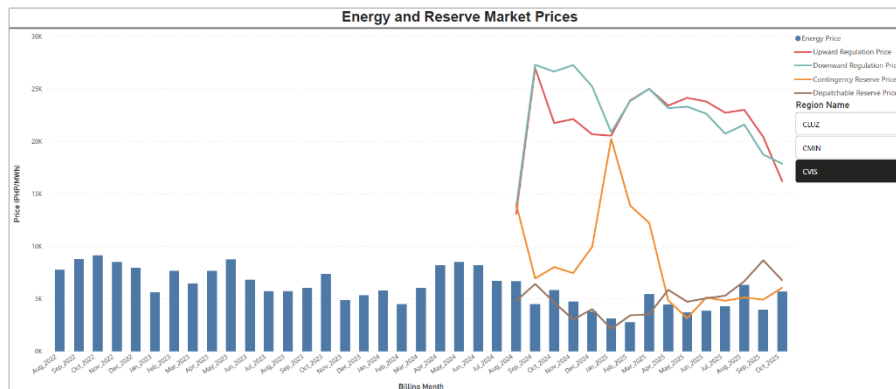


Figure 45. Visayas Energy and Reserves Market Prices

Beginning August 2024, a pronounced shift in the Visayas energy-price trajectory is observed. The energy price is first recorded at PHP 6,666/MWh in August 2024 and is then reduced sharply to PHP 4,472/MWh in September 2024 (a decline of –33%). This downward movement is sustained through February 2025, when the price reaches a low of PHP 2,750/MWh. This establishes a clear softening phase in the months immediately following Reserve Market resumption, and the decline coincides with the onset of highly volatile and elevated reserve prices—particularly in upward and downward regulation, which surge above PHP 20,000/MWh across multiple months.

From March 2025, the trend partially reverses. A short-term rebound is posted, with energy prices increasing to PHP 5,392/MWh in March 2025 and remaining elevated in April to May 2025 at PHP 4,421/MWh to PHP 3,696/MWh. However, the recovery is not sustained. By June to September 2025, prices again retreat to the mid-to-low PHP 3,800/MWh to PHP 2,489/MWh range, culminating in another trough in September 2025. A final bounce to PHP 5,680/MWh in October 2025 concludes the period, reinforcing the overall volatility that characterizes the post August 2024 environment.

Same with Luzon, a Mann–Kendall (MK) trend test is applied to the Visayas energy-price series for the two periods that yielded the following results: For the first period, A statistically significant downward trend is detected over the full August 2022 to October 2025 period. On average, the energy price is reduced by about PHP 110/MWh per month. While the second period (August 2024 to October 2025) resulted in a slight downward tendency is observed after August 2024, but a monotonic decline is not statistically confirmed. The estimated median month-to-month change is small, and the confidence interval includes zero, so persistent trending is not established for this shorter period.

iii. Mindanao

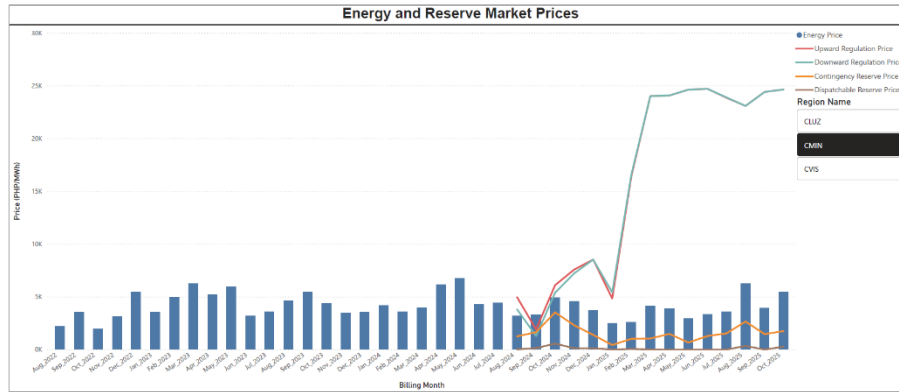


Figure 46. Mindanao Energy and Reserves Market Prices

From August 2024, a lower starting level is set at PHP 3,192/MWh and a mild uptick is posted in September 2024 at PHP 3,300/MWh. A temporary rise is then recorded in October 2024 at PHP 4,926/MWh before a renewed easing is observed through December 2024 at PHP 3,705/MWh. A trough is reached in January to February 2025 at PHP 2,509/MWh to PHP 2,577/MWh, so the post-resumption period is characterized by an initial softening versus July 2024 at PHP 4,412/MWh.

From March 2025, a rebound is registered at PHP 4,115/MWh and is followed by moderate prices in April to July 2025 PHP 3,569/MWh to PHP 3,891/MWh. A sharp spike is then logged in August 2025 at PHP 6,252/MWh, after which partial normalization is recorded in September 2025 at PHP 3,945/MWh and a further lift is posted in October 2025 at PHP 5,439/MWh. Throughout this period, reserve prices (RU/RD) are kept elevated—often at PHP 6,100/MWh to PHP 8,528/MWh in October to December 2024 and near PHP 16,363/MWh to PHP 24,696/MWh in February to October 2025—yet the energy price is observed to remain subdued for long stretches, indicating that the post-August 2024 environment is defined more by volatility with intermittent rebounds than by a sustained upward trend.

The Mann- Kendall trend test showed the following results: A mild downward tendency is indicated across February 2023 to October 2025, but a monotonic decline is not statistically confirmed at the 5% level. The median month-to-month change is estimated near PHP -33/MWh, and the confidence interval is observed to include zero. While A slight upward tendency is suggested after August 2024, but a monotonic trend is not statistically confirmed. The positive Sen’s slope is estimated, yet the confidence interval is shown to span zero, so persistent trending is not established for this short sample.

6. Conclusions

Reserve adequacy is maintained across Luzon, Visayas, and Mindanao from August 2024 to October 2025, as scheduled reserves are generally aligned with reserve requirements in all months and categories. Supply margins are observed to be sufficient, and no persistent shortfall in delivery is indicated. System reliability through reserve scheduling is therefore supported throughout the period.

Reserve prices are observed to rise as reserve margins shrink and spot dependence increases, with a clear hierarchy in terms of price: Regulation > Contingency > Dispatchable. The most extreme prices appear in regulation (RU/RD), where offer volumes are small relative to requirements, so thin headroom is produced even when some bilateral coverage exists.

In Luzon, prices sit at intermediate levels: Dispatchable Reserve at PHP 1,493/MWh with 36% BCQ and substantial spot take, Contingency Reserve at PHP 3,157/MWh with 55% BCQ, and Regulation (RU/RD) PHP 7,635/MWh despite 70% BCQ. Prices remain elevated because regulation margins are very thin, so scarcity is still reflected even with higher contract coverage.

In the Visayas, the highest prices are recorded across products: Dispatchable Reserve at PHP 5,011/MWh, Contingency Reserve at PHP 8,320/MWh, and Regulation Reserve (RU/RD) at PHP 22,016/MWh–PHP 22,689/MWh. This outcome is driven by tight availability and heavy spot reliance—especially in Dispatchable Reserve, where only 5% of the schedule is covered by BCQ and almost the entire requirement clears at spot, while regulation offers sit only modestly above requirements.

In Mindanao, the cheapest product is Dispatchable Reserve at PHP 114/MWh, supported by ample margin and 97% BCQ. Contingency Reserve at PHP 1,570/MWh remains moderate under 83% BCQ. However, Regulation Reserve (RU/RD) at PHP 16,309–PHP 16,424/MWh still price high because absolute headroom is limited showing that scarce capability, not just low contracting, drives regulation prices.

Batteries dominate regulation in Luzon and Mindanao and play a complementary role in the Visayas, reflecting their critical function in system balancing. Coal plants are uniformly concentrated in contingency reserve across regions. Oil-based plants are the primary providers of dispatchable reserves, particularly in the Visayas and Mindanao, and remain important contributors to regulation in the Visayas. Hydro resources serve a diversified but diminishing role, especially in Luzon and Mindanao, while natural gas in Luzon provides operational flexibility by participating across all reserve types.

The decline in energy spot market prices is not explained solely by the commercial operation of the reserve market. While the reserve market may contribute to price moderation, its impact is interrelated with broader market conditions.

7. Recommendation

A broader study is recommended in which additional factors are considered to provide a more comprehensive understanding of price formation in the reserve and energy markets. These factors include, but are not limited to, prevailing supply and demand conditions, the integration of Mindanao into the WESM, the frequency and effect of transmission congestion, and the increasing penetration of renewable energy technologies. In the recommended study, these variables are examined to determine their correlation with energy prices and to assess how their interactions influence market results.