



**Philippine Electricity
Market Corporation**

ANNUAL FORECAST ACCURACY STANDARDS REPORT

(26 December 2021 to 25 December 2022)

**31-March-2023
Enforcement and Compliance Office**



Philippine Electricity
Market Corporation

ANNUAL FAS REPORT

ENFORCEMENT AND COMPLIANCE OFFICE

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A. COVERAGE

This Monthly Forecast Accuracy Standards (FAS) Report covers:

1. Must Dispatch Generating Units (**MDGU**) or plants on commercial operation (Plants on test and commissioning are not yet included)
2. Plants with Final Certificate of Approval to Connect (FCATC) in alignment with the provisions of DOE Department Circular DC 2022-05-0015.¹
3. MDGU plants in Luzon and Visayas. (Plants in Mindanao are not included pending the commercial operation in WESM Mindanao.)
4. For the period 26 December 2021 to 25 December 2022 (**January -December 2022 Billing Period**).

B. RULE REFERENCE

1. FAS Under the Enhanced WESM Design and Operations

On 16 March 2021, the WESM Manual "Procedures for the Monitoring of Forecast Accuracy Standards for Must Dispatch Generating Units" (WESM-FASMD) Issue 2.0 was promulgated by the Department of Energy (DOE). Said manual establishes the procedures for the monitoring, reporting, and review of the FAS for compliance by the (must-dispatch generating units) MDGU **under the Enhanced WESM Design and Operations (EWDO)**.

On 25 June 2021, the DOE, through the Department Circular DC2021-06-0015, officially declared the commercial operation of the EWDO which necessitated the launching of the NMMS on 26 June 2021 by Independent Electricity Market Operator of the Philippines (IEMOP). PEMC, on the other hand, commissioned the CPEMS in view of the directive of the DOE to monitor the compliance of the trading participants in the WESM under the EWDO.

The FAS Manual Issue 2.0 that was promulgated in March 2021 thus became effective on 26 June 2021 or upon such declaration of commercial operation of the EWDO.

PEMC, through the Enforcement and Compliance Office (ECO), has implemented interim procedures in the form of compliance bulletins and advisories to carry out the mandate as contained in the WESM Rules and FAS Manual. In the process, it noted and consolidated various concerns and issues encountered by both ECO and the trading participants (TPs), and their observations during the implementation of the FAS monitoring under the EWDO regime. ECO also made consultations with the DOE, the Market Operator (MO), and the TPs on those matters. As the one-year monitoring period (January-December 2022 billing period) is about to end and the cumulative results are required to be assessed with finality by the first quarter of 2023, PEMC deems it appropriate to properly address the gaps and to give effect to the related DOE issuance by filing an Urgent Amendment to FAS Manual 2.0 and the relevant provisions of the WESM Rules, including among others, the provision for a pro-rated penalty exemption application, more accurate data reference of the initial loading to address the voluminous cases of data variance, and the consideration of special computation for plants with expansion units.

On 25 December 2022, the WESM Manual "Procedures for the Monitoring of Forecast Accuracy Standards for Must Dispatch Generating Units" (WESM-FASMD) Issue 2.1 became effective after the approval of the

¹ "Supplementing Department Circular No. DC2021-06-0013 on the Framework Governing the Test and Commissioning of Generation Facilities for Ensuring Readiness to Deliver Energy to the Grid or Distribution Network." Published in DOE Website in June 2022.



B. RULE REFERENCE

PEM Board of Directors.² The amendments made to the FAS Manual 2.1 took effect from the beginning of the year 2022 pursuant to Section 5.3.2 of the said Manual.³

2. Transition Period

The compliance with the FAS Manual is determined on an annual basis. The Mean Absolute Percentage Error (MAPE) and Percentile 95 (Perc95) of each must-dispatch generating unit shall be calculated over the period starting on the 26th of December of a year and ending on the 25th of December of the succeeding year.⁴

As mentioned in the preceding paragraphs, the FAS Manual became effective on 26 June 2021 wherein the WESM switched from one-hour trading interval to 5-minute dispatch intervals. With the changes both in the resolution of trading intervals and the formula and conditions in computing the FAS, it becomes impossible to determine the *annual* compliance with the FAS Manual for 2021, *i.e.*, from January 2021 to December 2021 billing periods.

While the ECO already commenced the compliance monitoring of the FAS in July 2021, the monitoring of the FAS from the July to December 2021 billing period was understood to be as the transition period. And with the Urgent Amendment to the FAS Manual on 23 December 2022, the provision on the transition period was likewise amended for clarity. It now reads –

“4.5.1. A *transition period* shall be six (6) months from the commercial operation of the enhanced WESM design and operations unless extended by the DOE through appropriate issuance.”

During the transition period, the must dispatch generating units that fail to meet the requisite forecast accuracy standards, as set out in the FAS Manual, shall not be liable for sanctions imposed under the relevant Market Manual.⁵

Period	Governing Manual	Monitoring Entity	Status
Jan – Jun 2021	FAS Manual 1.0 (Old)	IEMOP	Not subject to sanction
July – Dec 2021	FAS Manual 2.0 (Old)	PEMC	Not subject to sanction (transition period)
Jan – Dec 2022 and onwards	FAS Manual 2.0 (Old)	PEMC	Subject to sanction
Jan – Dec 2022 and onwards	FAS Manual 2.1 (Current)	PEMC	Subject to sanction

² PEM Board Resolution No. 2022-54-06 (Approving the Urgent Amendment to the FAS Manual)

³ “Sec. 5.3.2 The amendments made herein and approved pursuant to the *Procedures for Changes to the WESM Rules, Retail Rules and Market Manuals* shall have a retroactive effect from the beginning of the year that the said amendments are approved, unless the application thereof becomes inequitable and impracticable under the circumstances. For avoidance of doubt, the amended provisions that are given retroactive effect shall be indicated in the PEM Board resolution and/or DOE issuance approving or promulgating them.” *FAS Manual 2.1, 25-Dec-2022*

⁴ Section 4.1.2 of the FAS Manual 2.1

⁵ Section 4.5.2 of the FAS Manual 2.1



B. RULE REFERENCE

3. FAS (MAPE and PERC95) Formula

3.1 Forecast Accuracy Standards

Each must dispatch generating unit shall comply with the following standards with respect to its mean absolute percentage error (MAPE) and percentile 95 of the forecasting error (Perc95)

Technology	MAPE	PERC95
Run-of-river (ROR)	<9%	<30%
Solar	<18%	
Wind		

MAPE and Perc95 shall be calculated over the period starting on the 26th of December of a year and ending on the 25th of December of the succeeding year. Failure to meet the requisite FAS may be liable for sanctions imposed under Clause 7.2 of the WESM Rules and the Penalty Manual.

Calculating Forecast Percentage Error

The Forecast Percentage Error for a dispatch interval of a must-dispatch generating unit shall be calculated using the following formula:

$$FPE_{i,t} = \left| \frac{PQ_{i,t} - MQ_{i,t}}{MQ_{\max,i,bp,t}} \right| \times 100\%$$

Where:

$FPE_{i,t}$ refers to the Forecast Percentage Error (in %) of must dispatch generating unit i for dispatch interval t

$PQ_{i,t}$ refers to the Projected Quantity (in MWh) of must dispatch generating unit i for dispatch interval t . It shall be computed as follows.

$$PQ_{i,t} = \frac{1}{n} \times \frac{IL_{i,t} + PO_{i,t}}{2}$$

Where:

$IL_{i,t}$ refers to the Initial Loading (in MW) of must dispatch generating unit i for dispatch interval t used in the scheduling process

$PO_{i,t}$ refers to the Projected Output (in MW) of must dispatch generating unit i or dispatch interval t used during the scheduling process

n refers to the number of dispatch interval(s)



B. RULE REFERENCE

$MQ_{i,t}$ refers to the Metered Quantity (in MWh) of must dispatch generating unit i for dispatch interval t as provided by the Metering Services Provider

$MQ_{max,i,bp,t}$ refers to the Maximum Metered Quantity (in MWh) of must dispatch generating unit i during the billing period where dispatch interval t belongs as provided by the Metering Services Provider

3.2 Calculating Mean Absolute Percentage Error (MAPE)

The MAPE is the average of the Forecast Percentage Errors for a given period. It is calculated as follows.

$$MAPE_{i,p} = \frac{\sum_{t=1}^{n_p} FPE_{i,t}}{n_p}$$

Where:

$MAPE_{i,p}$ refers to the mean absolute percentage error (in %) of MDGU i for period p

n_p refers to the number of dispatch intervals within period p wherein forecast percentage errors were calculated

$FPE_{i,t}$ refers to the forecast percentage error (in %) of MDGU i for dispatch interval t calculated in accordance with Section 4.2.3

3.3 Calculating Perc95

The Perc95 of a MDGU for a period shall refer to the value (in %) not exceeding 95% of the forecast percentage errors of the MDGU during the period and shall be calculated using the NIST method.

For a more detailed explanation of the NIST Method for Calculating Percentiles, please refer to Appendix A of the FAS Manual.

3.4 Additional Provision in Calculation

Section 4.2 of the FAS Manual Issue 2.0 also provides for the following conditions to be considered in the calculation of forecast percentage errors for each dispatch interval:

- “4.2.5 A one hundred (100) percent FPE shall be imposed to a must dispatch generating unit on a particular dispatch interval where its maximum metered quantity is equal to zero (0) and a projected quantity is not equal to zero (0).



B. RULE REFERENCE

- 4.2.6 A one hundred (100) percent FPE shall be imposed to a must dispatch generating unit for non-submission of projected output.
- 4.2.7 A zero (0) percent FPE shall be imposed to a must dispatch generating unit on a particular dispatch interval where its projected quantity and maximum metered quantity are equal to zero (0)."
- 4.2.8 For generating plants with expansion unit that is either on test and commissioning or in actual operation, as may be allowed by the rules, but is awaiting the issuance of the Certificate of Compliance (COC) or the Provisional Authority to Operate, the following shall apply:
- a) A zero (0) FPE shall be imposed if the projected quantity is less than the combined metered quantity.
 - b) A one hundred (100) FPE shall be imposed if the projected quantity is greater than the combined metered quantity.

For this purpose, the combined metered quantity shall refer to the sum of the metered quantity of the existing capacity unit and that of the expansion unit.

This provision shall apply until the registered Pmax of the power plant or facility is updated in the WESM to include both the capacity of the existing and expansion unit."

3.5 Exclusions

Forecast percentage errors occurring on the following conditions shall be excluded from the calculation of the MAPE and Perc95 of MDGU based on Section 4.3 of the FAS Manual:

- 3.5.1 The dispatch target of the MDGU was restricted below its projected output;
- 3.5.2 The output of the must dispatch generating unit was restricted by the System Operator (SO) as indicated in the SO's report submitted to the Market Operator (MO) in accordance with the WESM Rules;
- 3.5.3 A market suspension or market intervention was declared for the dispatch interval;
- 3.5.4 An outage resulted in its derating; or
- 3.5.5 A natural calamity (e.g., typhoon, landslide) affected the ability of the MDGU to forecast accurately.
- 3.5.6 Any variance in the market data used in the calculation of MAPE and/or PERC95 that may be discovered during the monitoring and assessment must be properly addressed, validated, and verified within the prescribed timeline. The Generation Company shall provide adequate supporting documents to substantiate any claim of data variance. Only those data that have been proven and verified to be inaccurate, inconsistent, or erroneous shall be considered in the recalculation of the results. *(As amended via PEM Board Resolution No. 2022-54-06)*

The exclusions and other basis of recalculation are already incorporated in the Final FAS Result by ECO, considering data and information provided by the Trading Participants.

B. RULE REFERENCE

4. Penalty/Sanctions

Item 4 of Section 5 (Schedule of Breach and Penalties) of the WESM Penalty Manual provides for the following:

- 4.1 Type of Breach: Failure to comply with forecast accuracy standards with respect to projected output submitted for must-dispatch generating unit.

One breach is counted for each year that the failure occurs.

One breach is counted for each category of forecast accuracy standard that was not complied with. That is, failure to comply with the prescribed mean absolute percentage error (MAPE) and failure to meet the prescribed percentile 95 of the forecasting error (Perc95) are counted as separate breaches even if they occur on the same periods.

- 4.2 The MDGU that is in operation for less than a year and is found in breach of *MAPE* or *PERC95*, shall be:

- a) imposed a penalty in proportion to the number of months in operation during the covered monitoring year. For instance, if the plant commenced operation on 26 March, the financial penalty to be imposed shall be in proportion to the nine (9) billing months over the twelve (12) month period.
- b) exempted from liability, if it commences operation within three (3) months prior to the end of the covered monitoring year.

A MDGU shall be considered in operation upon commencement of its operation or participation in the WESM either by virtue of the Final Certificate of Approval to Connect (FCATC) or the commercial operation registration in the WESM, whichever is applicable.

- 4.3 Applicable Penalty: Level 1 – Reprimand; Level 2 - Financial Penalties; Level 3 – Escalated Financial Penalties; Suspension and Deregistration

- 4.4 Financial Penalty: PhP500,000/Breach of MAPE; and PhP500,000/Breach of PERC95

- 4.4.1 Level 2: PhP500,000/Breach of MAPE; and PhP500,000/Breach of PERC95

- 4.4.2 Level 3 (Escalated Penalty: PhP1,000,000/Breach of MAPE; and PhP1,000,000/Breach of PERC95

C. FAS CALCULATION, VALIDATION, AND PUBLICATION PROCEDURE

1. Processes and Timelines of Activities

1.1 Publication of Results

The Prelim FASR published by ECO is based on the data gathered from the Independent Electricity Market Operator of the Philippines (IEMOP) and the application of the formula set in the FAS Manual.



C. FAS CALCULATION, VALIDATION, AND PUBLICATION PROCEDURE

1.2 Validation

The trading participants will have the opportunity to review the monthly initial results of MAPE and PERC95.

The TPs may submit requests for exclusion of dispatch intervals and/or replacement of data for a specific dispatch interval within the current billing month through Accomplished FAS Forms together with the relevant evidence and justifications.

The requested action by TP will be subject to validation by ECO.

1.3 Publication of Final Results

The Final FASR will be issued after due verification and assessment of the relevant data or information.

In summary –

Process	Report/Forms	Platform/Tool	Timeline
Publication of the Initial FAS Results	Preliminary Monthly FASR	CPEMS	Within 30 calendar days from the end of the calendar month of the covered monitoring period.
Validation by TP	Accomplished FAS Form (AFASF)	FTP	Within 15 calendar days from the publication of the Preliminary Monthly FASR
Validation by ECO	Submitted AFASF and Supporting Documents	CPEMS	Within 15 calendar days from the receipt of AFASF
Publication of the Final FAS Results	Final Monthly FASR	CPEMS	Within seventy (70) calendar days from the end of the calendar month of the covered monitoring period.
Publication of the Annual Final FAS Results	Annual FASR	CPEMS	On or before 31 March of the year following the covered monitoring year.



D. OVERALL FAS RESULTS

This report covers the final annual results of the MAPE and PER95 monitoring of MDGUs in **Luzon and Visayas** covering **January to December 2022** billing period. Considered in the calculation of the Annual FAS results are the exclusions and other basis for recalculation mentioned in Section (B) (3.5) of this Report.

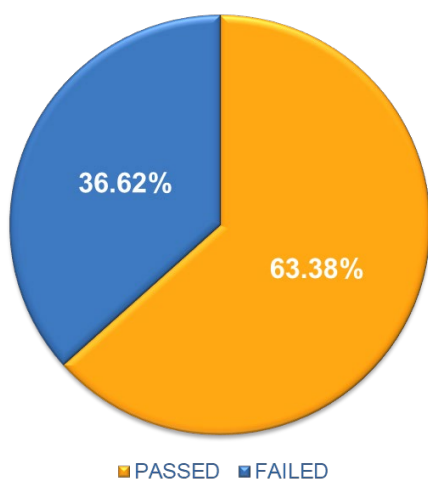
As of 25 December 2022, there are 88 facilities registered as MDGU in the WESM. From the registered facilities, 71 facilities from Luzon and Visayas region are being monitored; 2 facilities are under test and commissioning; and the remaining 15 plants pertain to Mindanao plants/facilities which are exempted from the evaluation as the commercial operation of the WESM Mindanao commenced only on 26 January 2023. (DOE DC2022-12-0039, 23 December 2022)

Technology	No. of Resources in Luzon	No. of Resources in Visayas	No. of Resources in Mindanao	Total
Run of River	17	3	10	30
Solar	34	12	5	51
Wind	5	2	0	7
Total	56	17	15	88

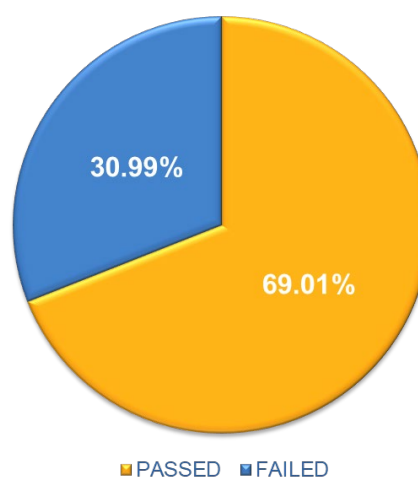
Table 1. Summary of WESM Registration on Must Dispatch Generating Units as of 25 December 2022

DECEMBER PRELIM VS. FINAL FAS RESULTS

MAPE - PRELIM



MAPE - FINAL



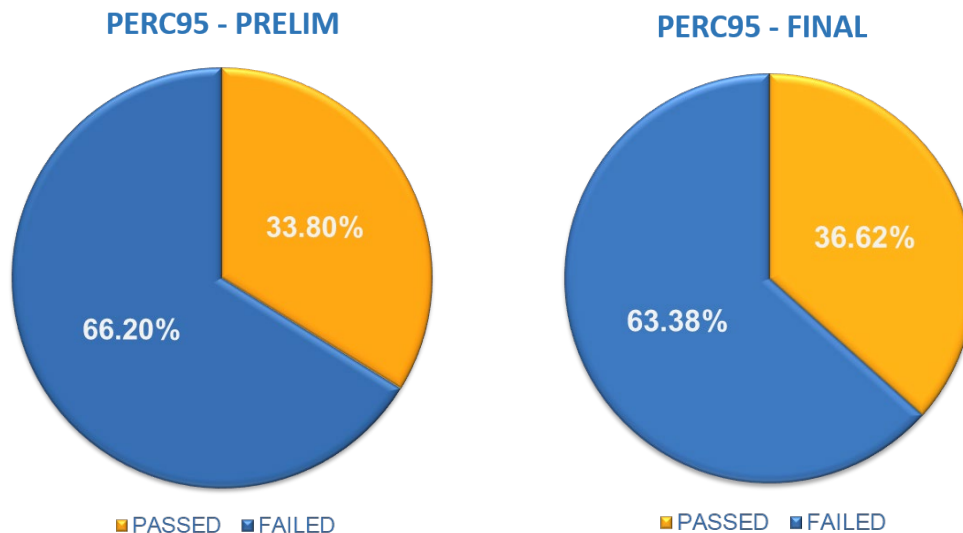
Graph 1. MAPE Prelim FAS Results vs. Final FAS Results for Luzon and Visayas

Graph 1 shows the comparison of MAPE Preliminary Forecast Accuracy Standards Results (Prelim FASR) and Final Forecast Accuracy Standards Results (Final FASR) for Luzon and Visayas must dispatch generators.



D. OVERALL FAS RESULTS

- From the initial results of monitoring of MAPE, it appears that 45 out of 71 facilities performed within the <9% and <18% threshold and recorded a MAPE passing rate of 63.38%, while 26 out of 71 facilities failed to meet the MAPE standards.
- The ECO performed validation and recalculation, as stated in Section C of this report, and determined the Final FASR-MAPE. There was an improvement in the overall rating of Final FASR-MAPE after such re-validation/recalculation recording 69.01%. Four (4) facilities had an improvement in MAPE after said recalculation. The improved MAPE result may also be attributed to the recalculation of plants that operated for less than a year excluding the intervals that are not yet operational.



Graph 2. PERC95 Prelim FAS Results vs. Final FAS Results for Luzon and Visayas

Graph 2, on the other hand, shows the comparison of PERC95 Prelim FASR and Final FASR for Luzon and Visayas MDGUs.

- The initial computation of the PERC95 yielded the following results: 24 out of 71 facilities performed within the <30% threshold with a PERC95 passing rate of 33.80%.
- The ECO likewise performed validation and recalculation, as stated in Section C of this report, and determined the Final FASR-PERC95. There was an improvement in the overall rating of Final FASR-PERC95 by around 3% after such re-validation/recalculation. Two (2) facilities had improved PERC95 results after said recalculation.



D. OVERALL FAS RESULTS

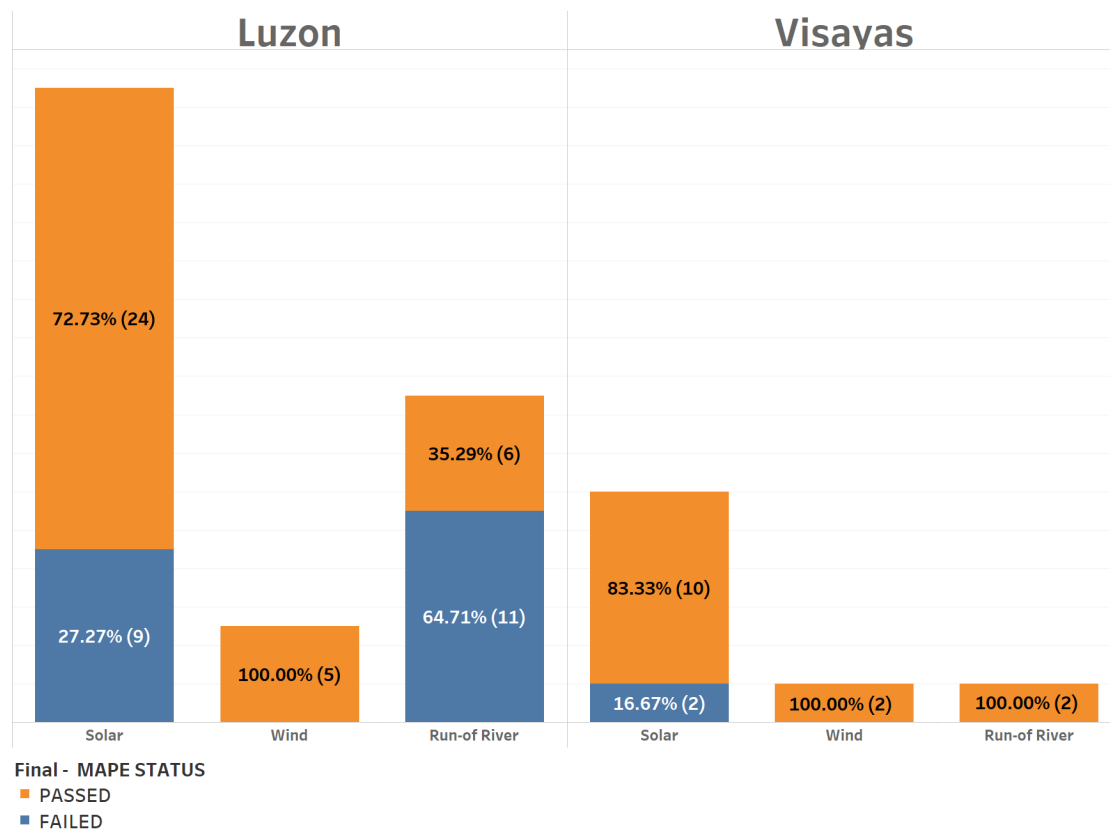
BY REGION AND RESOURCE TYPE

The MAPE and PERC95 performance of MDGUs were assessed per region and per technology and were compared based on the Preliminary FAS Results and Final FAS Results.

For MAPE

- In the Luzon region, most facilities are solar power plants. Twenty-four (24) out of thirty-three (33) of those facilities performed within the MAPE threshold resulting in a passing rating of 72.73%. On the other hand, all the facilities under Wind technology passed the MAPE standards resulting in a 100% passing rate. For ROR technology, only six (6) facilities passed the MAPE standards resulting in a 35.29% passing rate.
- In the Visayas region, sixteen (16) facilities were monitored. Based on the results, ten (10) out of twelve (12) facilities under solar technology had a passing rating of 83.33%. On the other hand, 100% of facilities under wind and ROR technology passed the MAPE standards.

See Graph 3 below for the summary illustration:



Graph 3. MAPE Final Performance of MDGUs per Region/Technology for Luzon and Visayas

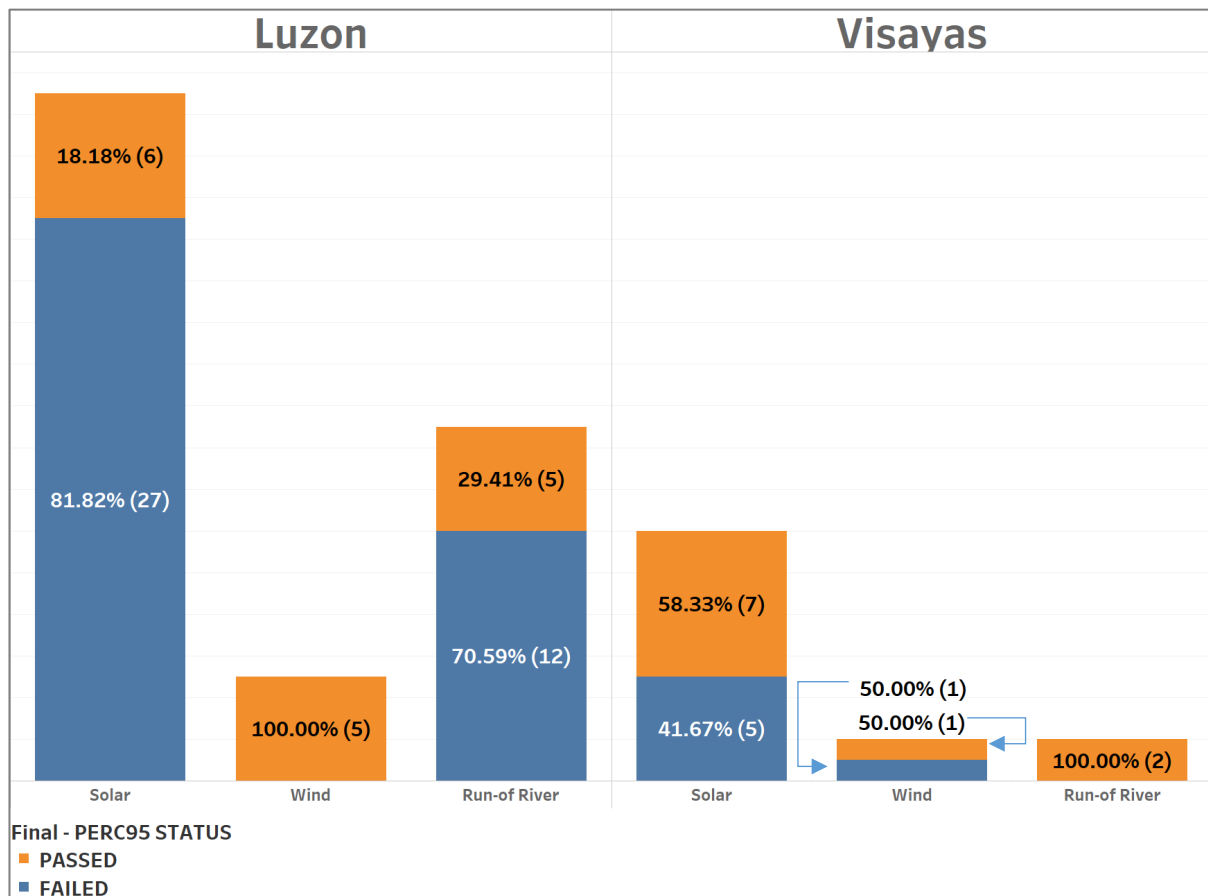


D. OVERALL FAS RESULTS

For PERC95

- In the Luzon region, majority of facilities are solar power plants, where only six (6) out of thirty-three (33) facilities passed the PERC95 with a total passing rate of 18.18%. On the other hand, 100% of facilities under wind technology passed the PERC95 standards. For ROR technology, only five (5) facilities passed the PERC95 standards giving a 29.41% passing rate.
- In the Visayas region, sixteen (16) facilities were monitored, where seven (7) out of twelve (12) solar facilities performed within the PERC95 standards resulting in a passing rate of 58.33%. On the other hand, facilities under wind technology had a passing rate of 50%. For ROR technology, 100% of facilities passed the PERC95 standards.

See below Graph 4 for summary results –



Graph 4. PERC95 Final Performance of MDGUs per Region/Technology for Luzon and Visayas



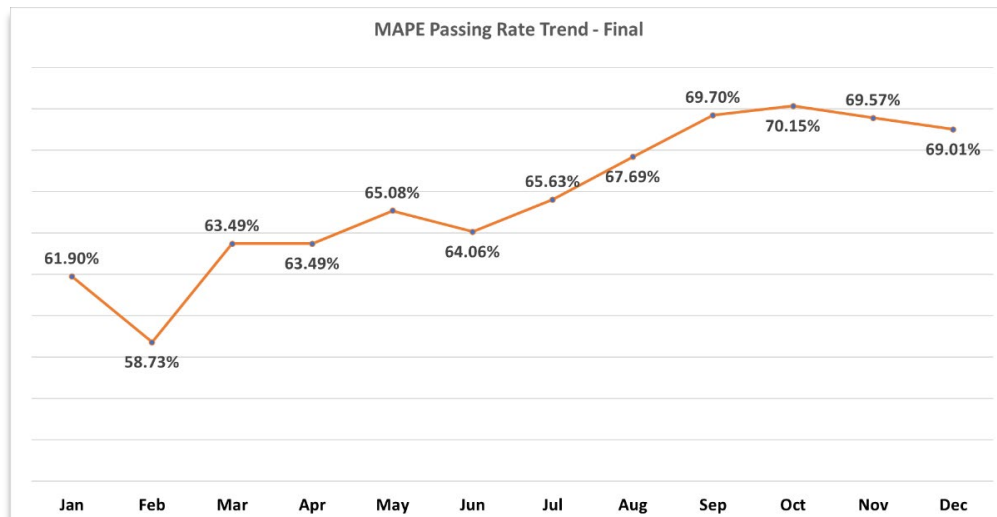
D. OVERALL FAS RESULTS

MONTHLY PASSING RATE TREND

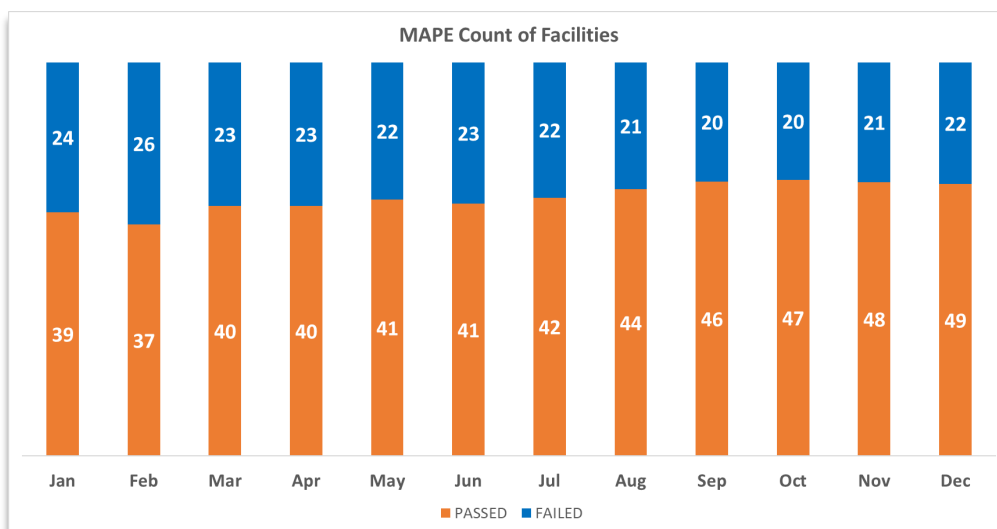
Graph 5 below shows the MAPE overall passing rate trend. It may be noticed that the lowest passing rate from the period January to December 2022 was observed in February 2022, while the highest passing rate of 70.15% was observed in October 2022.

Graph 6 shows that in December 2022, one (1) facility was added to the count of plants that had a passing MAPE standard, and one (1) facility was added to the count of plants that had a failing MAPE standard.

The average MAPE passing rate from January 2022 to December 2022 is 65.71% while the average number of plants that passed MAPE was 43.



Graph 5 – MAPE Passing Rate Trend Jan-Dec 2022



Graph 6 – MAPE Count of Passing Plant Jan-Dec 2022



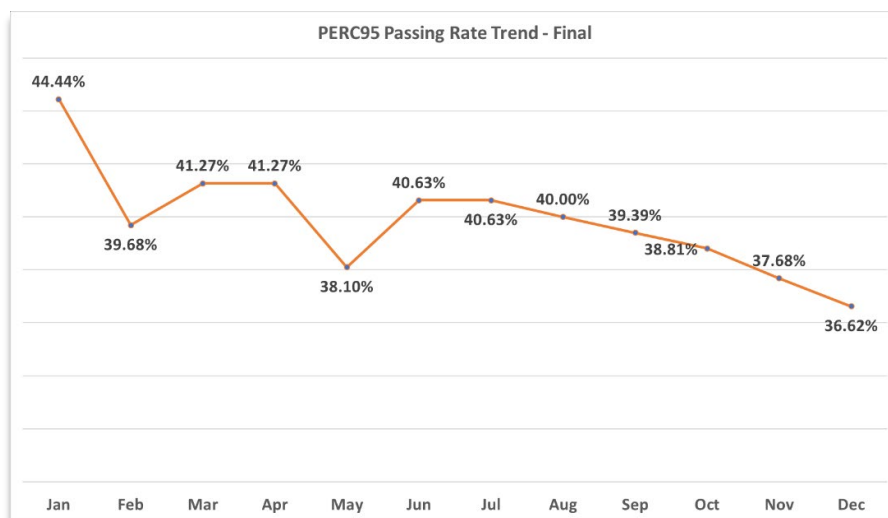
D. OVERALL FAS RESULTS

Graph 7 below shows the PERC95 overall monthly passing rate trend. It was observed that the lowest passing rate from January to December 2022 was observed in December 2022, while the highest passing rate of 44.44% was observed in January 2022.

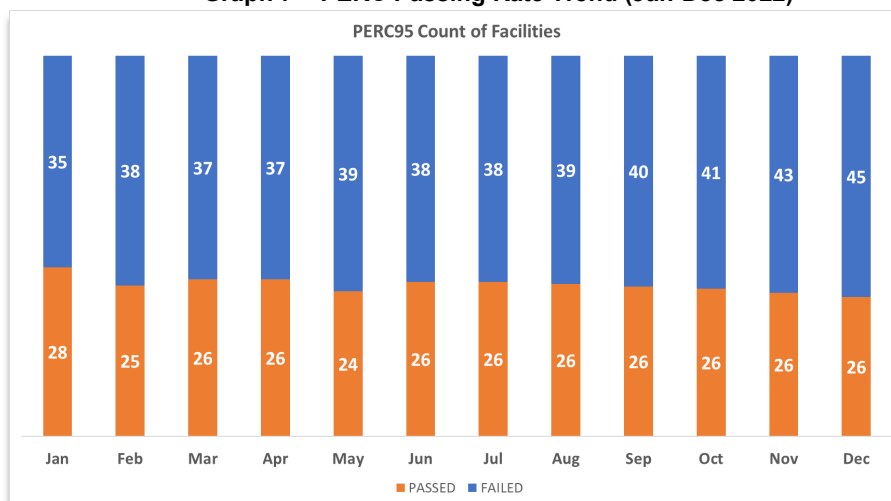
It is observed that the majority of MDGUs are being challenged by the PERC95 obligation, which causes a continuous downtrend in the passing rate from January 2022 up to December 2022.

Graph 8 shows that in December 2022, two (2) facilities were added to the count of plants that failed the PERC95 standards.

The average PERC95 passing rate from January 2022 to December 2022 is 39.88% with 26 plants, on the average, that passed the PERC95 throughout the period.



Graph 7 – PERC Passing Rate Trend (Jan-Dec 2022)

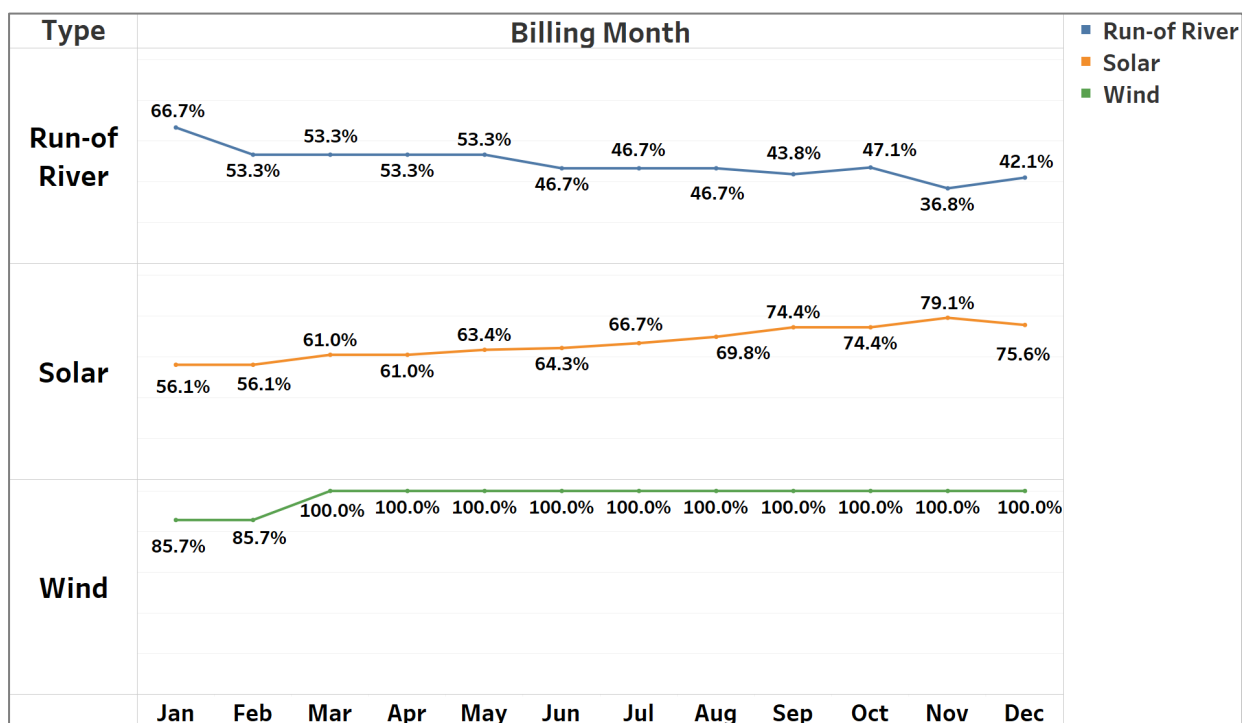


Graph 8 – PERC95 Count of Passing Plant (Jan-Dec 2022)



D. OVERALL FAS RESULTS

It can be observed in Graph 9 that the wind power plants have a consistently outstanding performance in MAPE which reflects a continuous 100% in their passing rates. The performance of solar power plants in MAPE, however, declined in December 2022, and such decline is attributed to the plants that started operation only in December 2022 which happened to have failing rate. The same is true for the ROR power plants which registered a decline in the passing rate in November 2022 due to the performance of additional/new plant in the said month.



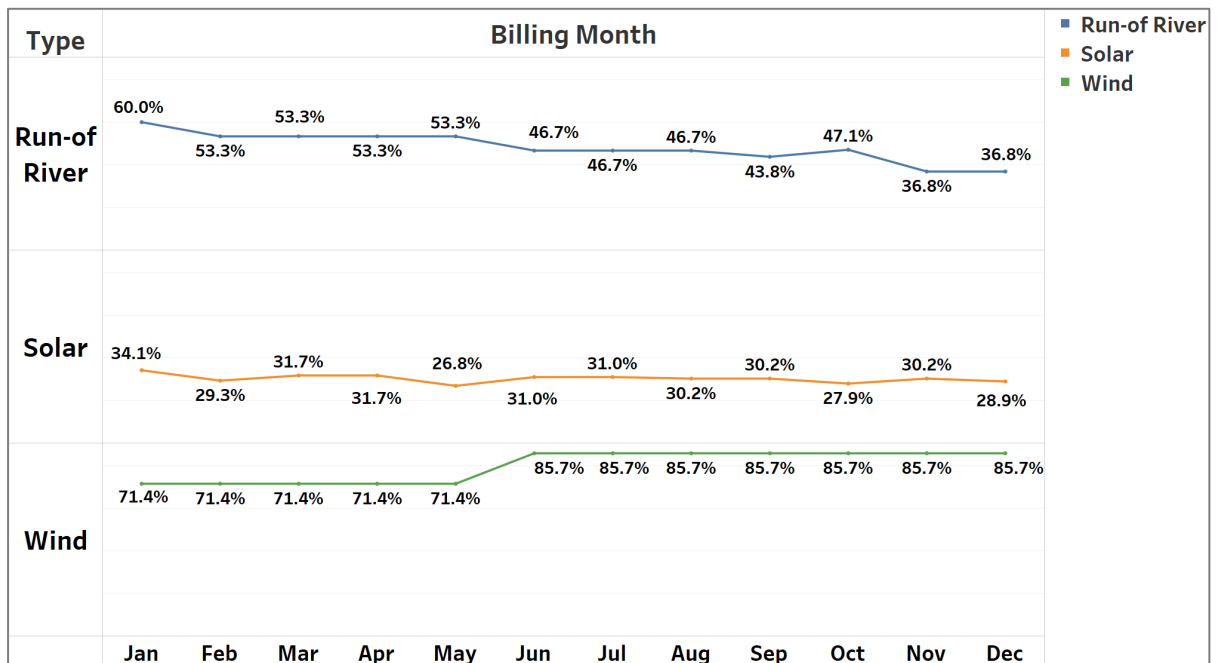
Graph 9 – MAPE Passing Rate Trend per Generator Type (Jan-Dec 2022)

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D. OVERALL FAS RESULTS

As shown in Graph 10, the wind power plants have a high passing rate since January 2022 and have continuously improve until December 2022 while the solar and ROR power plants both registered a low passing rate, *i.e.*, below 50%.



Graph 10 – PERC95 Passing Rate Trend per Generator Type (Jan-Dec 2022)

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E. MAPE RESULTS

Twelve (12) facilities had improved MAPE results in their Final FASRs, while the final monthly rating for five (5) facilities had declined after re-validation and/or recalculation. There was no change in the ratings with respect to the other fifty-four (54) facilities. Out of the twelve (12) facilities with improved results, there was a significant change in the Final FASR with respect to eight (8) facilities. This was brought about by the recalculation in consideration of the actual date of the commercial operation of the plants. This means that the preliminary results of some plants included the results for period that the plants were not in operation but the same was adjusted during the final calculation.

F. PERC95 RESULTS

Fourteen (14) facilities had improved PERC95 results in their Final FASRs, while there was no change in the ratings with respect to the other fifty-seven (57) facilities. Out of the fourteen (14) facilities with improved results, there was a significant change in the Final FASR with respect to six (6) facilities. Similar to the observation in MAPE, such significant change was brought about by the recalculation in consideration of the actual date of the commercial operation of the plants. The period was adjusted to cover only those months in actual operation (reckoned from the commercial operation date) resulting in the change in the final calculation for PERC95.

G. ECO GENERAL OBSERVATION

The following were observed and noted during the **January - December 2022** monitoring period and based on the computed FAS results:

1. **Clarification in the Formula Used.** Since the start of the implementation of the FAS Manual 2.0, both ECO and the generator-MDGUs observed a number of issues and concerns in the monitoring of the FAS, particularly in the treatment or reference of the initial loading which is part of the calculation for the FPE which, in turn, affected the MAPE and PERC95 results. After due consultation and deliberation with IEMOP on the reference data to be used for calculation, ECO performed a recalculation of FAS results from the beginning of the covered monitored period (January 2022 – August 2022). This led to some adjustments to the FAS monitoring activities of ECO which includes the following:
 - a. Deferment of the publication of the Monthly Preliminary and Final FAS Results during the recalculation covering the billing period from January to May 2022.
 - b. Conduct several consultations and focus group discussions with the Department of Energy (DOE), the MO and the TPs.
 - c. Filing of the Proposed Urgent Amendments to the WESM Manual “Procedures for the Monitoring of Forecast Accuracy Standards for Must Dispatch Generating Units” (WESM-FASMD) and the related provisions of the WESM Rules.
 - d. Implementation of the revised FAS Manual (FAS Manual 2.1) which became effective on 25 December 2022.
2. **Actual Basis for Recalculations.** Out of the 71 facilities monitored, 35 facilities, or 48% submitted justifications and supporting documents relative to the requested exclusion/s as mentioned in Section (C) (1.2) of this report. In terms of interval counts, a total of 3,784,320 out of 7,463,520 or 50.7% were covered by the submissions. After due consideration of the requests for recalculation, one (1) facility registered a declined MAPE and PERC95 ratings, and two (2) facilities had an improved rating in PERC95.

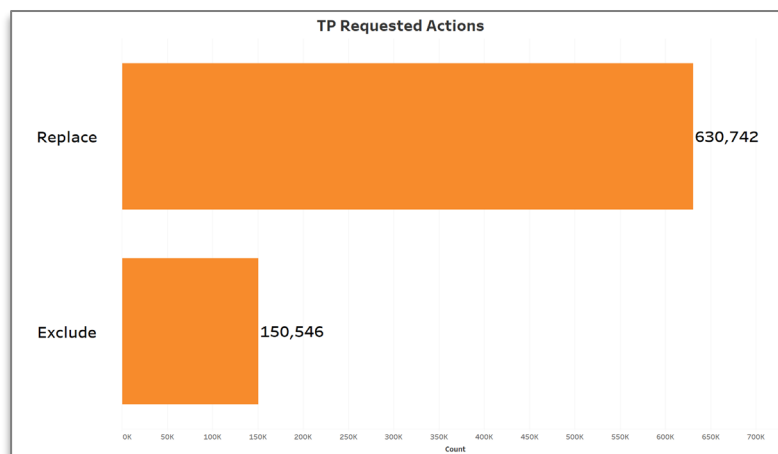


G. ECO GENERAL OBSERVATION

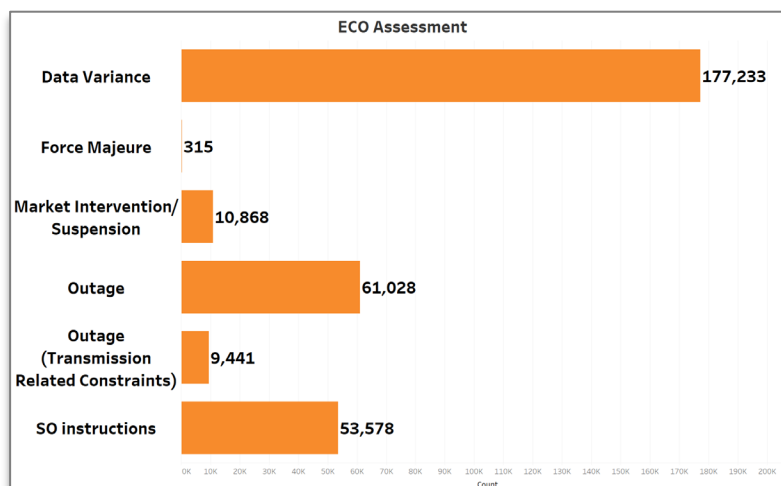
For this period, the recalculations were based on the requests:

- (a) For exclusions due to Outages, Market Suspension/Intervention, System Operator Instructions, Force Majeure; and
- (b) For replacement of data for specific dispatch intervals due to data variance.

Such requests would have involved recalculation for 150,546 intervals (for exclusion) but only 135,230 or 84.76% of the intervals were considered by ECO, and only 177,233 out of 630,742 intervals, or 28.01% were verified to be data variance that warranted recalculation. The ECO likewise applied the special condition applicable to MDGUs with expansion unit of 01SUBSOL_G01 in 54,996 intervals during the unit's test and commissioning activity and during issuance of FCATC awaiting COC pursuant to Section 4.2.8 of the FAS Manual. The same was already reflected in the January – December 2022 FAS results.



Graph 11 – Summary of Requested Exclusions/Replacement of Data for Recalculation



Graph 12 – Summary of Accepted Exclusions/Replacement of Data Used in Recalculation



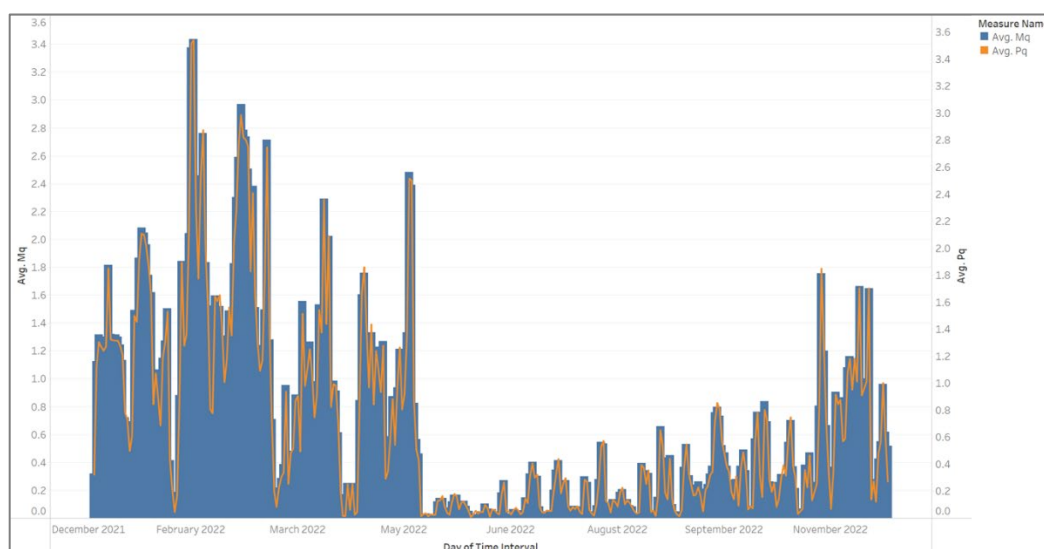
G. ECO GENERAL OBSERVATION

Furthermore, the request for exclusion by reason of outage is also assessed based on the actual occurrence of an incident. The outage that is considered for purposes of recalculation as Exclusion (under Section 4.3.1 [d]) is any full or partial unavailability of *equipment or facility*, as defined in the WESM Rules⁶. It is, thus, distinguished from the resource constraints which refer to the unavailability of the supply or source of energy. Resource constraint is not one of the Exclusions provided in the FAS Manual.

- 3. Non-Submission of 0 MW Projected Outputs.** The non-submission of nominations resulted in 100% Forecast Percentage Error (FPE) in some dispatch intervals. It must be noted that under Section 4.2.6 of the FAS Manual, the nomination of zero (0) MW in times of zero projection in the generation would carry some weight in the calculation of the FPE. Thus, for a solar plant that has expected zero generation during nighttime and nominates zero (0) MW would have less error than a solar plant that does not nominate at all.
- 4. Observed Variance Between MQ and PQ.** A huge difference between the Metered Quantity (MQ) and the Projected Quantity (PQ) resulted in a high FPE in some dispatch intervals; MAPE and PERC95 are derived from the cumulative values of FPE.

One of the reasons being observed for having a huge difference between MQ and PQ is the infrequent revision of nomination of capacity despite the apparent need for a revision based on the actual generation. This means that there are plants that rarely revise their nominations even if the projected outputs previously nominated no longer represent the capacity or the projections in the relevant intervals. There are also instances where despite the revisions, the revised nominations of projected outputs still differ to a large extent from the metered quantity. To illustrate certain plant's actual activity in terms of nomination that we monitored this year –

- Actively revising nomination; forecast is accurate.



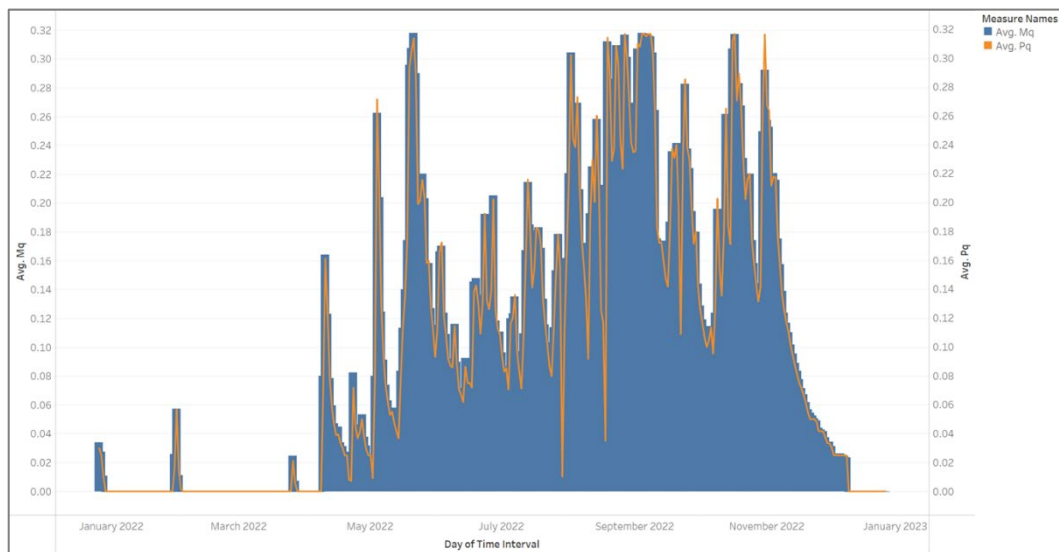
Graph 13-A – Projected Quantity vs. Metered Quantity Comparison Scenario A

⁶ WESM Rules Glossary, Chapter 11



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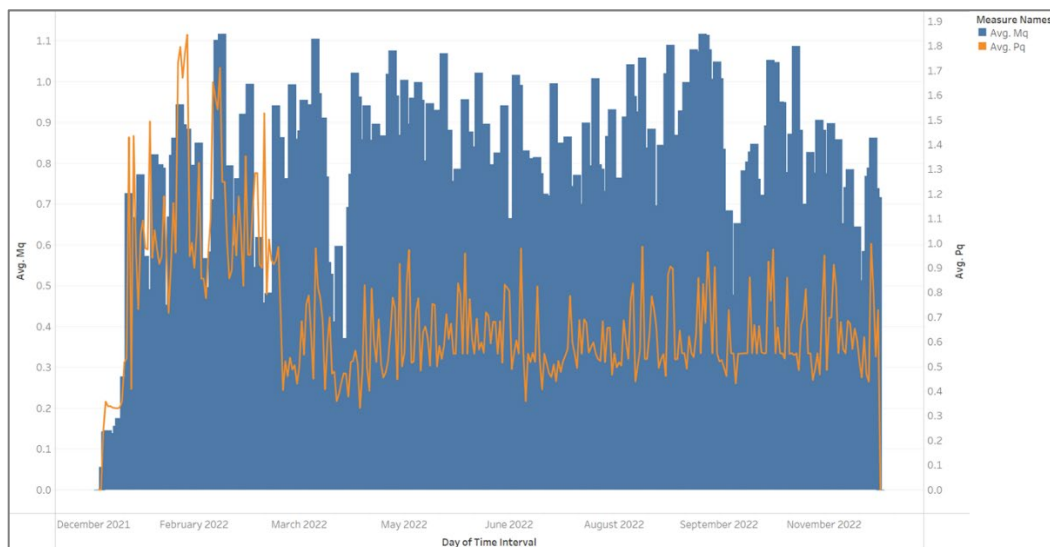
- b) Actively revising nomination; forecast is fairly close to/approximate of the MQ.



Graph 13-B – Projected Quantity vs. Metered Quantity Comparison Scenario B

It was observed that the performance of some MDGUs which made efforts to revise nominations of their respective projected outputs – albeit imprecise vis-à-vis the resulting metered quantity – had still yielded a failing MAPE results ranging from 19% to 25%.

- c) Actively revising nomination; but forecast is inaccurate.

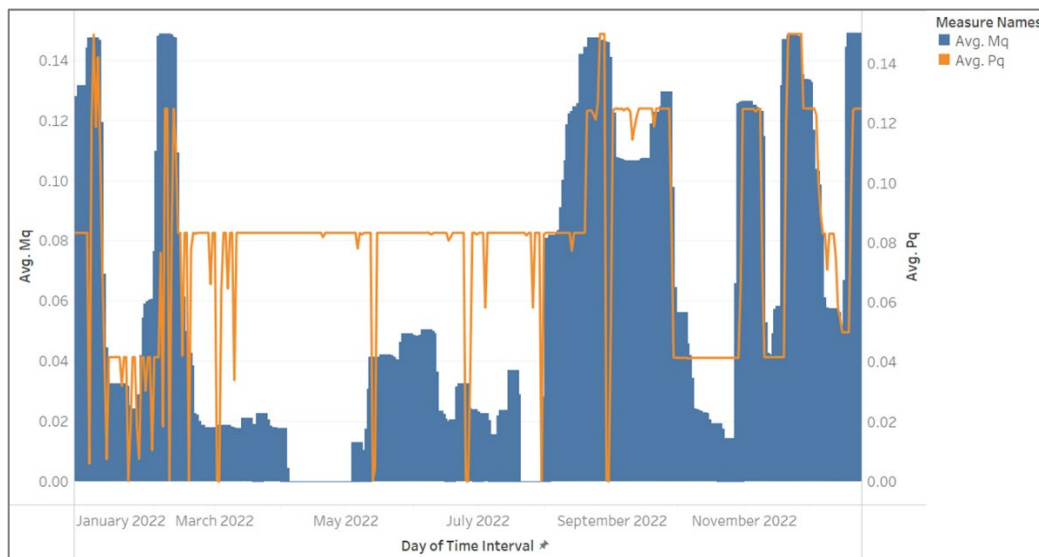


Graph 13-C – Projected Quantity vs. Metered Quantity Comparison Scenario C



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d) Not actively revising nomination; with inaccurate forecast.



Graph 13-D – Projected Quantity vs. Metered Quantity Comparison Scenario D

In a series of training / awareness activities of PEMC on FAS compliance, the MDGUs with low passing rates are highly encouraged to comply with the standards by revising and/or reflecting their most recent projections in their nominations via the market management system (MMS).

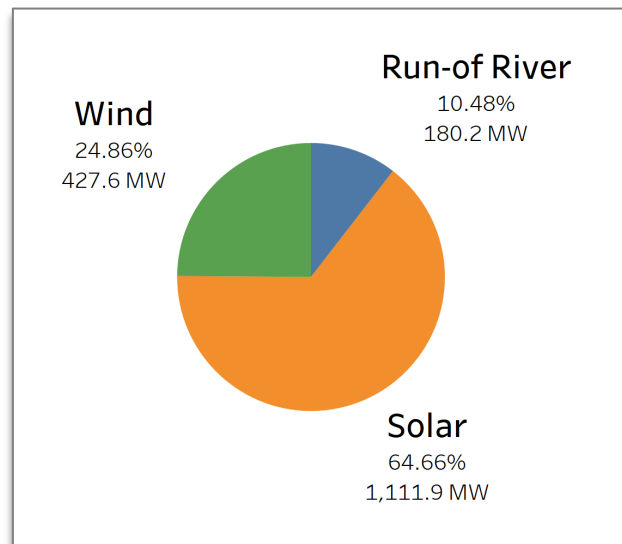
- Results After Recalculation.** For those intervals which have been recalculated due to the occurrences of some incidents that qualify as “exclusions,” within the meaning of Section 4.3 of the FAS Manual, it was observed that the resulting FPE varies depending on the plant’s performance with respect to the intervals that have not been covered by exclusions. The exclusions had either yielded a higher FPE for some plants or an improved FPE for others.

For those intervals which have been recalculated due to the occurrences of data error or non-updating/bad data in the NMMS that qualify as “data variance” and which allows replacement or substitution of corrected/validated data under Section 4.3.2 of the FAS Manual, it was observed that the resulting FPE varies depending on the plant’s performance using the correct data in place of the bad data.

- General Statistics.** The total capacity of MDGUs being monitored from Luzon and Visayas is 1,292.14 MW composed of 64.66% (1,111.9 MW) solar power plants, 24.86% (427.6 MW) wind power plants, and 10.48% (180.2 MW) ROR power plants.



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Graph 14 – Must Dispatch Generating Units Capacity

Average MAPE and PERC95 by Resource Type –

Resource	MAPE	PERC95
Solar	15.9%	60%
Wind	6.8%	23.3%
ROR	14.7%	67.7%

Average MAPE and PERC95 by status and by Resource Type –

Resource	Passed		Failed	
	MAPE	PERC95	MAPE	PERC95
Solar	8.5%	22.99%	38.8%	74.99%
Wind	6.7%	20.21%	N/A	41.67%
ROR	2.89%	6.01%	6.01%	103.65%

Passing Rate by Region –

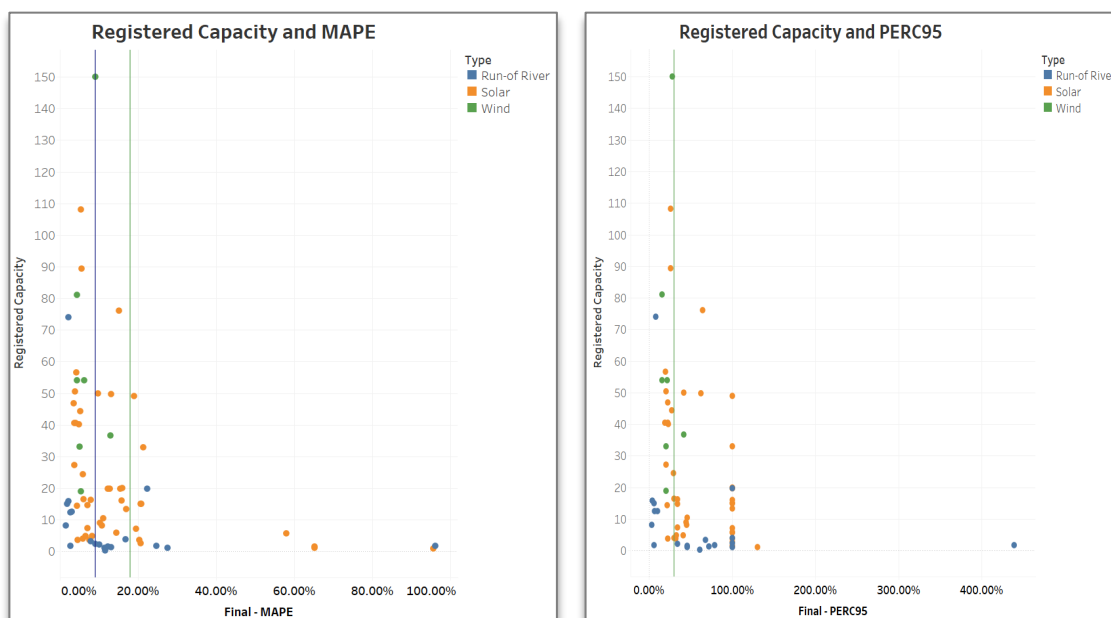
Region	MAPE	PERC95
Luzon	63.64% (35 out of 55)	29.09% (16 out of 55)
Visayas	87.5% (14 out of 16)	62.5% (10 out of 16)



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7. **Result Distribution.** The majority of the MAPE results are concentrated at 60MW and 20% MAPE area while the majority of the PERC95 results are concentrated at 60MW and 100% PERC95 area. It will be observed that the MDGUs with a capacity of at least 50MW (11 out of 71 facilities being monitored) garnered a one hundred percent (100%) passing rate in MAPE and eighty-one percent (81%) passing rate in PERC95.

It will also be observed based on the graph that the size of the MDGU has no direct relation to MAPE and PERC95. It is because the forecast errors are derived from the percentage of a metered quantity.



Graph 15 – MAPE and PERC95 Result Distribution

The ROR facilities' performance in MAPE and PERC95 are both declining since January 2022. One of the potential reasons is that the MAPE standard for ROR facilities is lower (>9%) compared to the standard for solar and wind facilities (>18%). If the >18% MAPE standard will be also applied to ROR facilities, the ROR passing rate of will rise to at least 60%. For the solar and wind Facilities, using the nine percent (>9%) MAPE standard will result in a reduced MAPE passing rate of 46.67% (from 75.76%) for solar facilities and 71.43% (from 100%) for wind facilities.

8. **Exemption.** Pursuant to DOE Department Circular 2022-05-0015, ECO includes in its monitoring the MDGUs with FCATC which participated in the WESM (while awaiting the issuance of the COC from ERC) in terms of their compliance with the FAS Manual.

It was observed that during the covered monitoring year, four (4) out of five (5) plants with issued FCATC or commercially operated in the last quarter of 2022 failed to meet the MAPE and PERC95 standards. Should these plants become unable to pass the annual results (January – December 2022), the concerned TPs of the said MDGUs will be exempted from penalty/sanction, as it commences operation within three (3) months prior to the end of the covered monitoring year as provided in Sec 4.6.2 (b) of the FAS Manual Issue 2.1.



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9. **Observed Timeline.** As mentioned in paragraph G.1 (a) of this Report, recalculations were made for the billing months of January to August 2022 for all MDGUs to reflect the correct reference data consistent with the provisions of the FAS Manual 2.1, particularly on the use of the “initial loading” data. With notice to the DOE during the virtual meeting held on 12 September 2022, a deferment in the issuance of the FAS Report and the corresponding adjustment in the timeline was made during such recalculation activities, as summarized in the table below:

Activities	Description	Target Timeline	Completed Date
a) Meeting with MDGUs	ECO organized a meeting with the MDGUs on the recalculation activity covering the 1 st half of 2022. Agenda: <ul style="list-style-type: none">Recalculation (January - August 2022)TP and ECO activities timelineOpen Forum and Next steps	27-Sep-2022	27-Sep-2022
b) FAS Recalculation (January – August 2022)	ECO performed revalidation, reassessment, and recalculation for the period covered January - August 2022	14-Oct-2022	04-Oct-2022
c) Prelim FAS Results for January – August 2022	Submission of AFASF and supporting documents from the Trading Participants for Billing Months starting January – August 2022	14-Dec-2022	14-Dec-2022
d) Final FAS Results for January – August 2022	Publication of Final FAS Results for January – August 2022	14-Dec-2022	16-Dec-2022
e) [Additional Activity] WESM Compliance Bulletin 16.1	Issuance/publication of the WESM Compliance Bulletin 16.1 (implementing FAS Manual 2.1) for the guidance of the concerned trading participant-MDGUs.		22-Dec-2022
f) Prelim FAS Results for September – December 2022	Publication of Prelim FAS Results for September – December 2022	26-Dec-2022	27-Dec-2022
g) AFASF Submission (September – December 2022)	Submission of AFASF and supporting documents from the Trading Participants for Billing Months September - December 2022	15-Jan-2023	16-Jan-2023



Philippine Electricity
Market Corporation

ANNUAL FAS REPORT

ENFORCEMENT AND COMPLIANCE OFFICE

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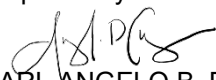
G. ECO GENERAL OBSERVATION


Activities	Description	Target Timeline	Completed Date
h) [Additional Activity] FAS recalculation January – December 2022	ECO performed further recalculation on observed frequent/additional data variance issues.		16-Feb-2023
i) Final FAS Results for September - November 2022	Publication of Final FAS Results for September - November 2022	04-Feb-2023	16-Feb-2023
j) Prelim FAS Results for December 2022	Submission of AFASF and supporting documents from the Trading Participants for the Billing Month December 2022	09-Feb-2023	09-Mar-2023
k) Final FAS Results for January - December 2022	Publication of Final FAS Results for December 2022	31-Mar-2023	24-Mar-2023
l) Annual Final FAS Report for 2022	Publication of the Annual Final FAS Report for 2022 and Issuance of the Notice of Specified Penalties to concerned trading participants-MDGUs	31-Mar-2023	31-Mar-2023

10. The overall MAPE and PERC95 results written in this report include the plants that operated for less than one year but are exempted from the penalty imposition pursuant to Sec 4.6.2 of the FAS Manual.
11. Individual Compliance Monitoring and Assessment Reports (CMAR) - FAS for MAPE and PERC95 were issued to all MDGUs covered by the compliance monitoring and assessment of ECO. The imposition of penalty shall be based on the cumulative annual results indicated in the said CMARs issued.


For the information of the DOE, the PEM Board, and the Compliance Committee pursuant to Section 4.4.6 of the FAS Manual.

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