



**Philippine Electricity
Market Corporation**

MONTHLY FORECAST ACCURACY STANDARDS REPORT

(26 December 2022 to 25 February 2023)

15-May -2023
Enforcement and Compliance Office



Philippine Electricity
Market Corporation

MONTHLY 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, Visayas and Mindanao.
4. For the period 26 December 2022 to 25 February 2023 (**February 2023 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 and the cumulative results are required to be assessed with finality by the first quarter of 2024, 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 Monthly results of the MAPE and PER95 monitoring of MDGUs in **Luzon, Visayas, and Mindanao** covering the **February 2023** billing period. Considered in the calculation of the Monthly FAS results are the exclusions and other basis for recalculation mentioned in Section (B) (3.5) of this Report.

As of 26 February 2023, there are 93 facilities registered as MDGU in the WESM. From the registered facilities, 89 facilities from Luzon, Visayas, and Mindanao regions are being monitored; 4 facilities are under test and commissioning (T&C); the Mindanao plants/facilities are now being monitored after the declaration of commercial operation of the WESM Mindanao on 26 January 2023. (DOE DC2022-12-0039, 23 December2022).

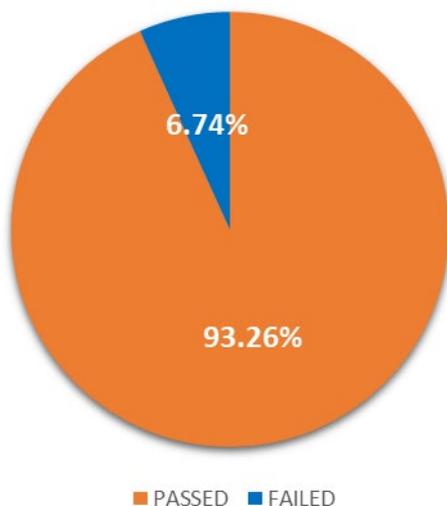
Technology	No. of Resources in Luzon	No. of Resources in Visayas	No. of Resources in Mindanao	Total
On T&C*	1	1	2	4
On Commercial Operations/With FCATC				
Run of River	17	2	12	31
Solar	34	12	5	51
Wind	5	2	0	7
Total	56	16	17	89

*Not yet covered in the FAS Compliance Monitoring in February 2023 Billing Period

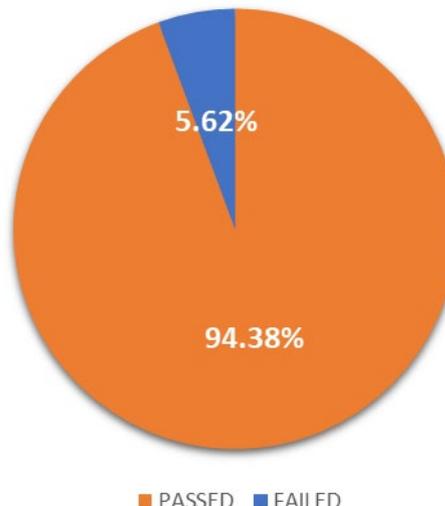
Table 1. Summary of WESM Registration on Must Dispatch Generating Units as of 26 February 2023

FEBRUARY PRELIM VS. FINAL FAS RESULTS

MAPE - PRELIM



MAPE - FINAL



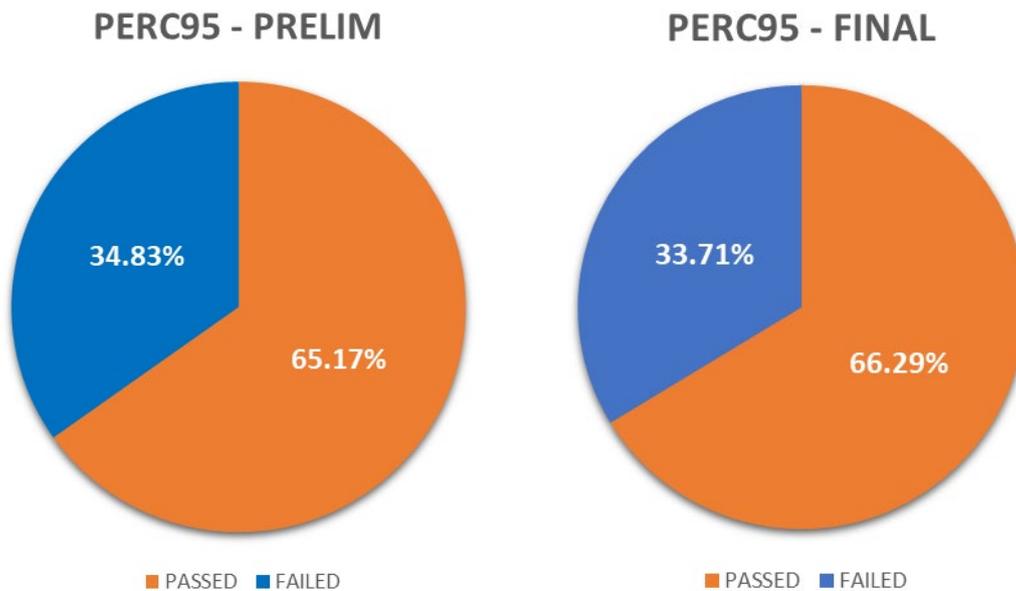
Graph 1. MAPE Prelim FAS Results vs. Final FAS Results for Luzon, Visayas and Mindanao



D. OVERALL FAS RESULTS

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

- From the initial results of monitoring of MAPE, it appears that 83 out of 89 facilities performed within the <9% and <18% threshold and recorded a MAPE passing rate of 93.26%, while only 6 out of 89 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 resulting in a 94.38% passing rate or 84 out of 89 facilities.



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

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

- The initial computation of the PERC95 yielded the following results, 58 out of 89 facilities performed within the <30% threshold with a PERC95 passing rate of 65.17%.
- The ECO likewise performed validation and recalculation, as stated in Section C of this report, and determined the Final FASR-PERC95. The PERC95 results had an improvement in the overall rating of Final FASR-PERC95 after such re-validation/recalculation resulting in a 66.29% passing rate.



D. OVERALL FAS RESULTS

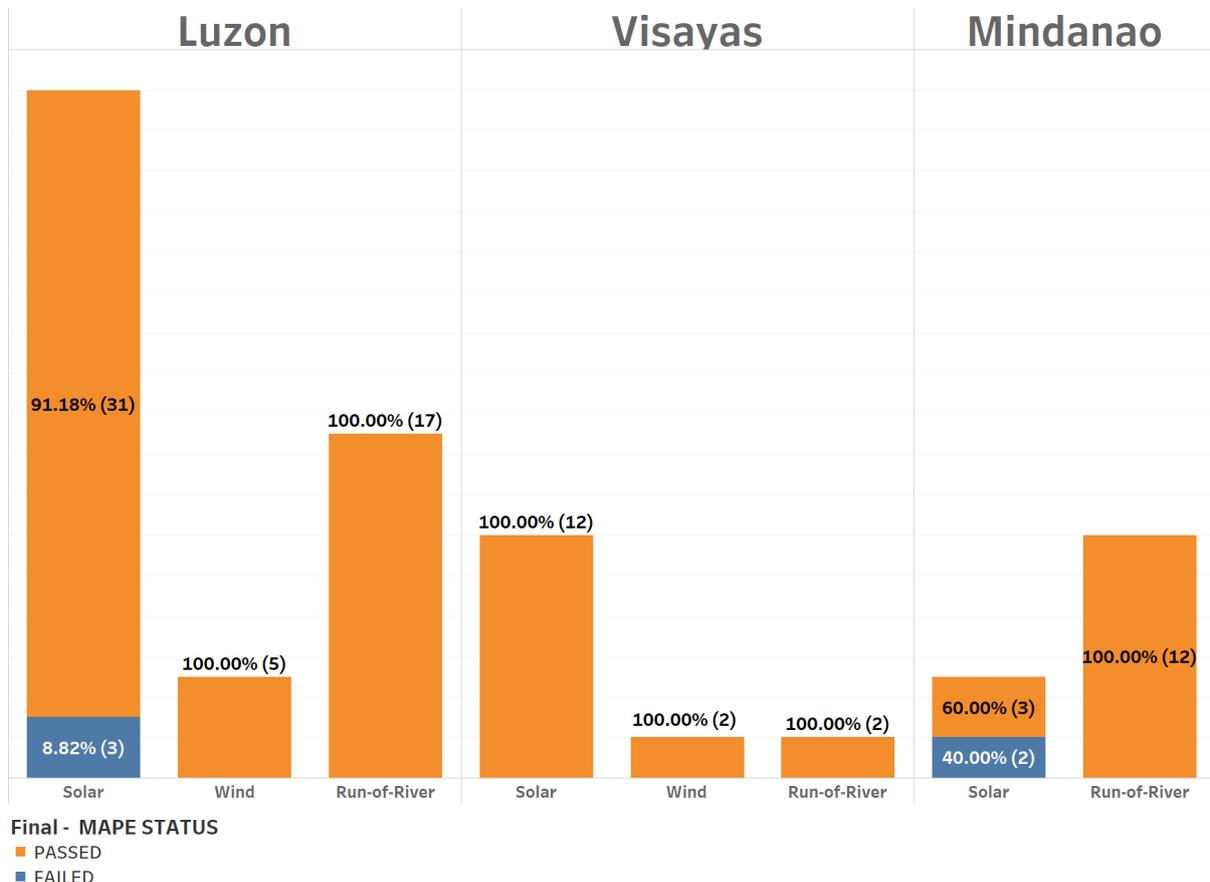
BY REGION AND RESOURCE TYPE

The performance of MDGUs with respect to MAPE and PERC95 was also assessed per region and per technology.

For MAPE

- In the Luzon region, most facilities are solar power plants. Thirty-one (31) out of thirty-four (34) of solar facilities performed within the MAPE threshold resulting in a passing rating of 91.18%. On the other hand, all the facilities under Wind and ROR technology passed the MAPE standards resulting in a 100% passing rate.
- In the Visayas region, sixteen (16) facilities were monitored. Based on the results, all facilities under solar, wind, and ROR technology performed within the MAPE standards resulting in a passing rating of 100%.
- While the commercial operation of WESM Mindanao commenced last January 26, 2023, it is notable that ROR facilities had a 100% passing rate and a 60% passing rate or three (3) facilities under solar technology.

See Graph 3 below for the summary illustration:



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

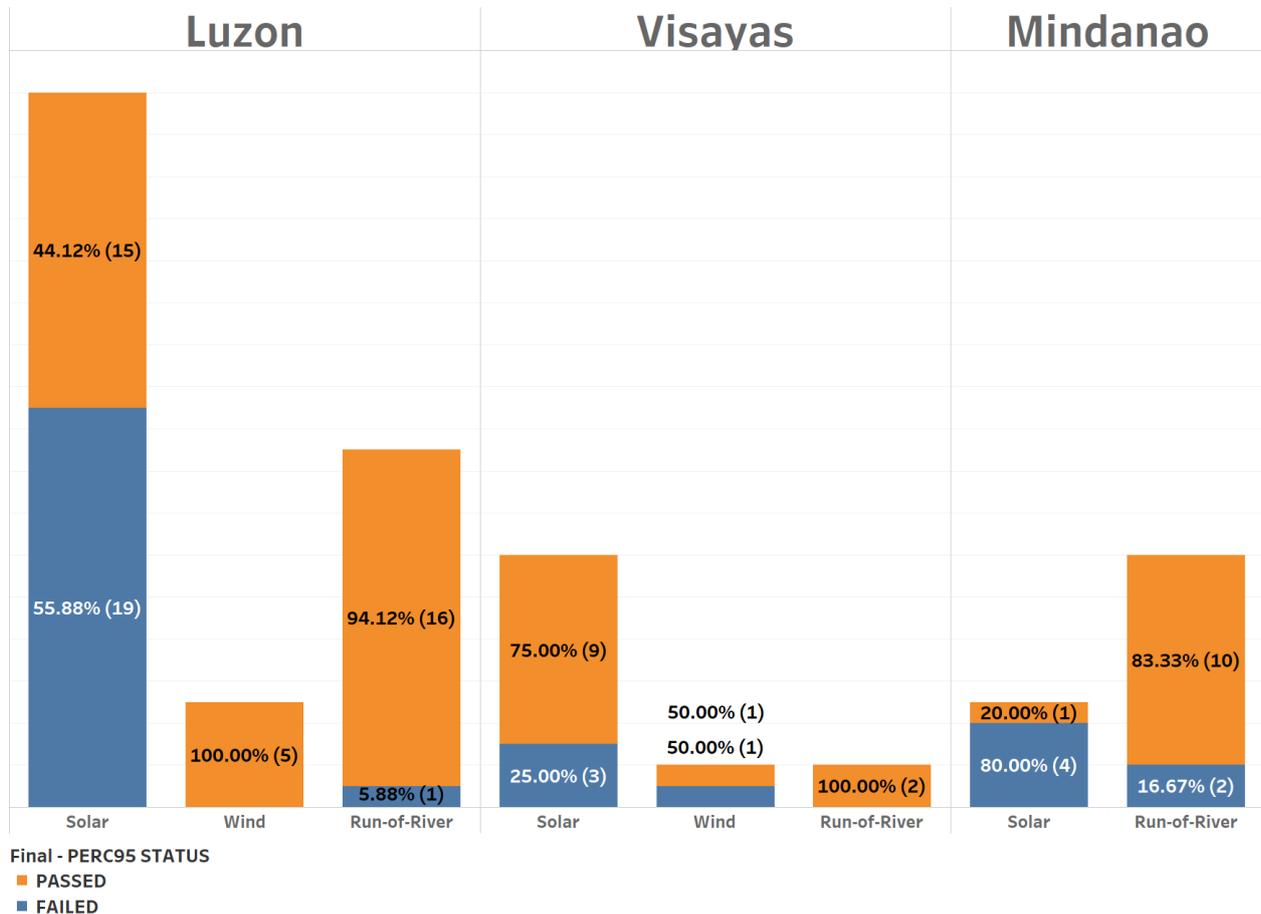


D. OVERALL FAS RESULTS

For PERC95

- In the Luzon region, the majority of facilities are solar power plants, where only fifteen (15) out of thirty-four (34) facilities passed the PERC95 with a total passing rate of 44.12%. On the other hand, 100% of facilities under wind technology passed the PERC95 standards. For ROR technology, sixteen (16) out of the seventeen (17) facilities passed the PERC95 standards giving a 94.12% passing rate.
- In the Visayas region, sixteen (16) facilities were monitored, where nine (9) out of twelve (12) solar facilities performed within the PERC95 standards resulting in a passing rate of 75%. On the other hand, one (1) facility under wind technology passed the PERC95 resulting in a passing rate of 50%. For ROR technology, 100% of facilities passed the PERC95 standards.
- While in the Mindanao region, ten (10) out of twelve (12) ROR facilities passed the PERC95 standards or 83.33%, and only one (1) out of five (5) solar facilities passed the PERC95.

See below Graph 4 for summary results –



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

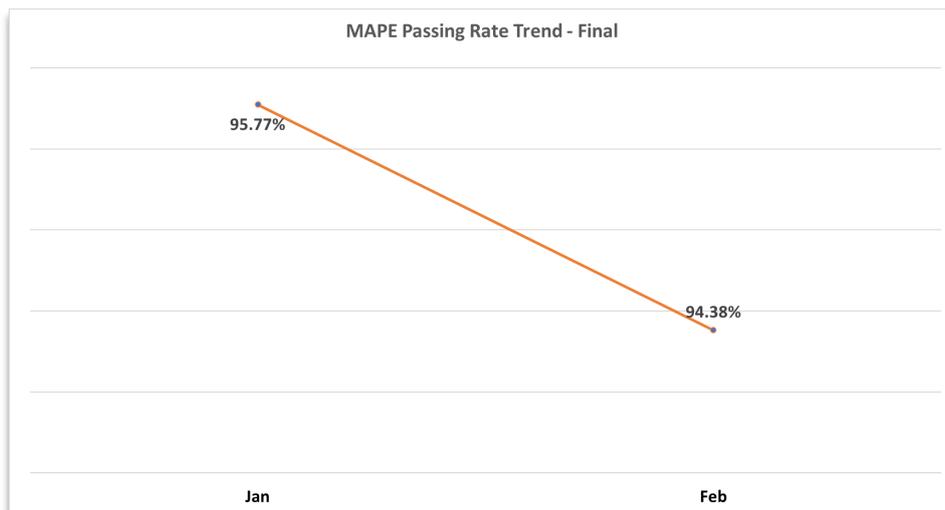


D. OVERALL FAS RESULTS

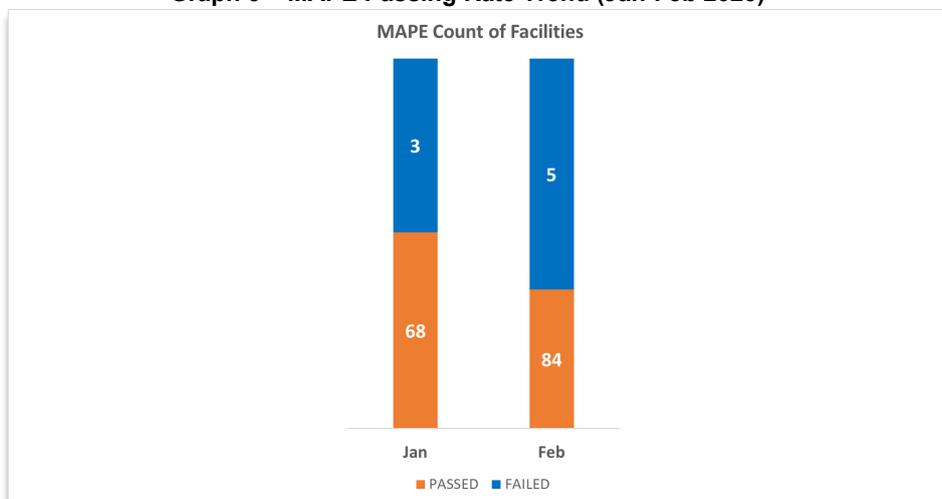
MONTHLY PASSING RATE TREND

Graph 5 below shows the MAPE overall passing rate trend. It may be noticed that there is a decline in the MAPE passing rate from the period January to February 2023. Where seventeen (17) facilities from Mindanao and one (1) facility with a Final Certificate of Approval to Connect (FCATC) were added to the February 2023 monitoring. Two (2) solar facilities in Mindanao contributed to the declined passing rate in February with a 5.61% failure rate in comparison to 4.22% in January 2023.

Graph 6 shows that in February 2023, two (2) facilities were added to the count of plants that had a failing MAPE standard, where 15 out of the 16 plants that had passed MAPE standards were from Mindanao. While one (1) facility that started its operation in the middle of February billing by virtue of FCATC had a passing MAPE result.



Graph 5 – MAPE Passing Rate Trend (Jan-Feb 2023)



Graph 6 – MAPE Count of Passing Plant (Jan-Feb 2023)

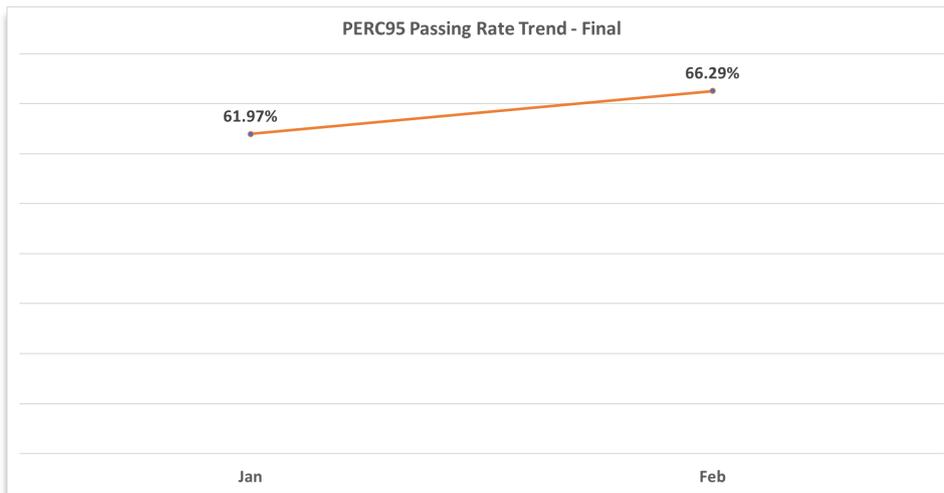


D. OVERALL FAS RESULTS

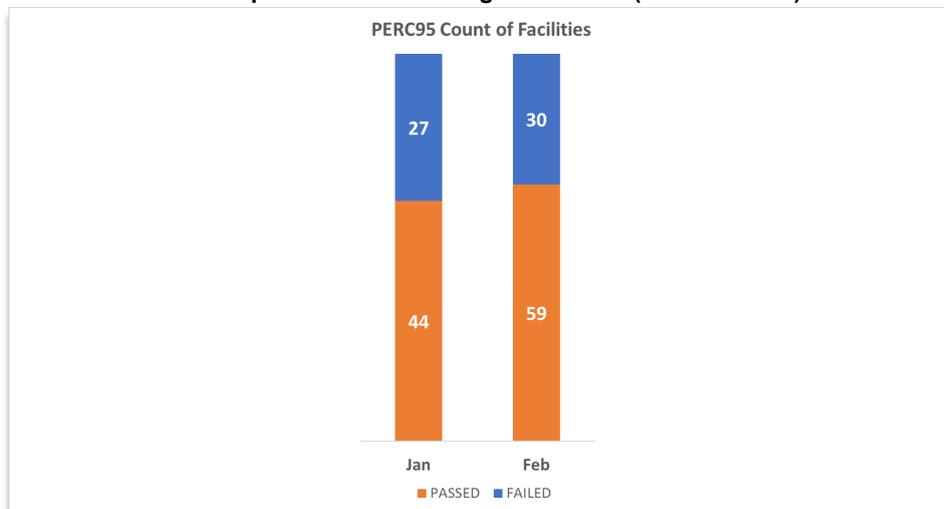
Graph 7 below shows the PERC95 overall monthly passing rate trend. It was observed that there is an improvement in the passing rate from January to February 2023. Where four (4) facilities with failed PERC5 status from January billing had a passed PERC95 status in February and one (1) facility with passed PERC5 status from January billing had a failed PERC95 status in February resulting in a 66.29% passing rate.

Graph 8 shows that in February 2023, three (3) facilities were added to the count of plants that failed the PERC95 standards and eleven (11) out of fifteen (15) facilities were added to the count of plants that passed the PERC95 standards are from the Mindanao region. While one (1) facility that started its operation in the middle of February billing by virtue of FCATC had a passing PERC95 result.

It was observed that the majority of MDGUs are being challenged by the PERC95 obligation, but compared to the year 2022 result, the must-dispatch generating units are now effectively complying with the standards.



Graph 7 – PERC Passing Rate Trend (Jan-Feb 2023)

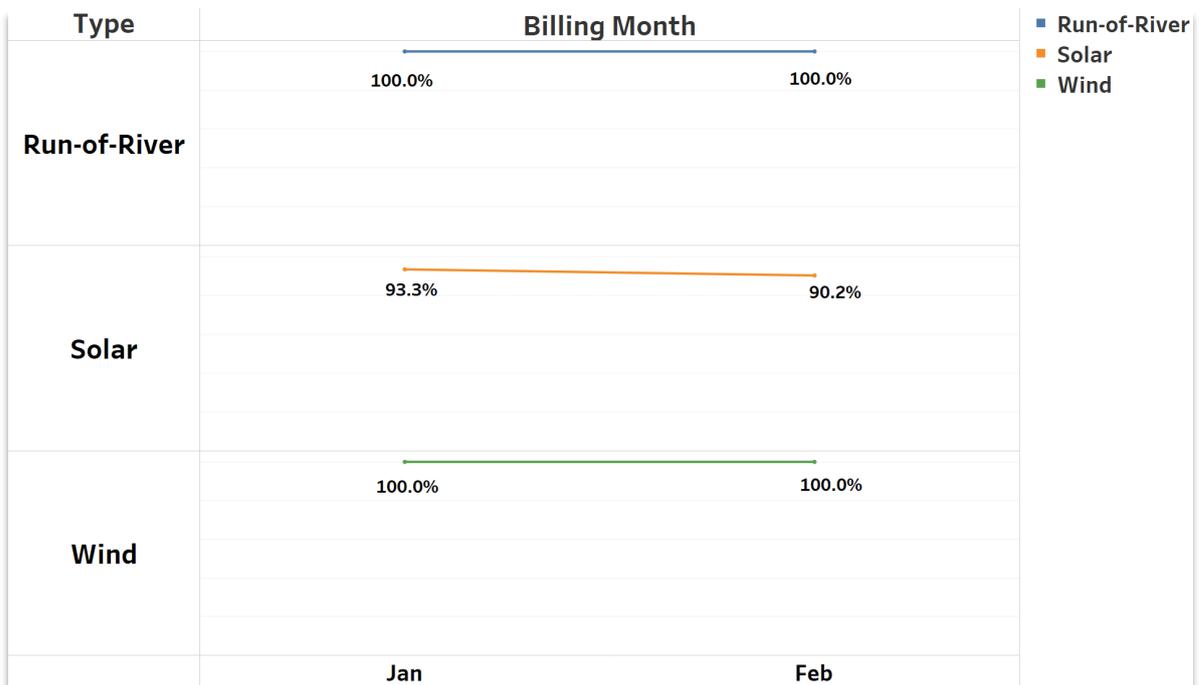


Graph 8 – PERC95 Count of Passing Plant (Jan-Feb 2023)



D. OVERALL FAS RESULTS

It can be observed in Graph 9 that the power plants under the ROR and Wind facilities have an outstanding performance in MAPE which reflects a continuous 100% in their passing rates. The performance of solar power plants in MAPE, however, declined in February 2023, and such decline is attributed to two (2) Mindanao power plants.



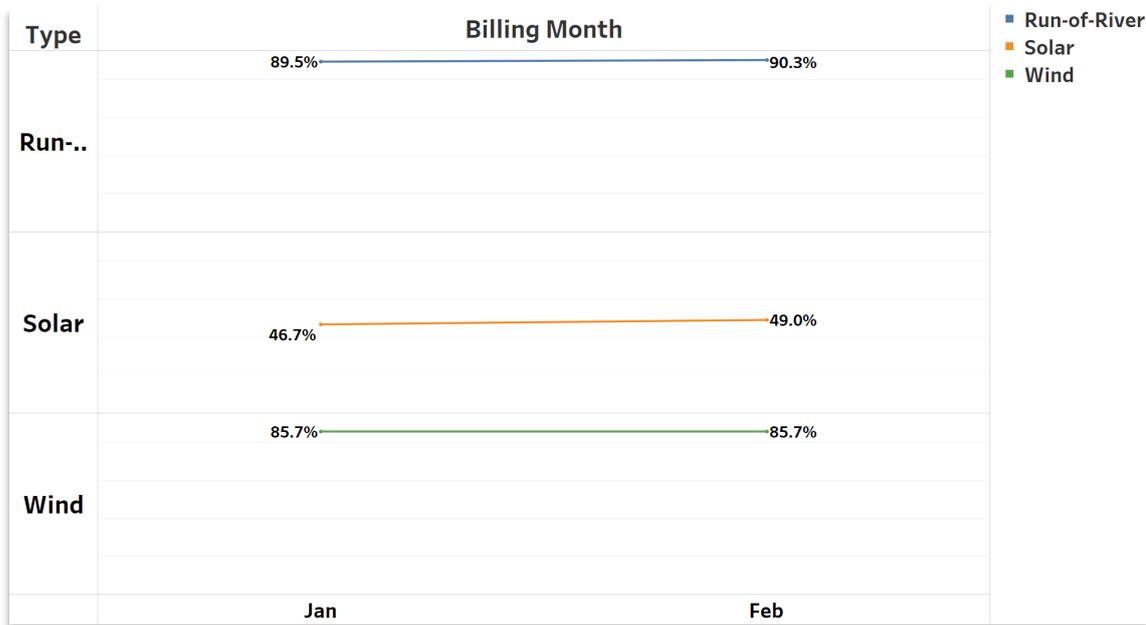
Graph 9 – MAPE Passing Rate Trend per Generator Type (Jan-Feb 2023)

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D. OVERALL FAS RESULTS

As shown in Graph 10, the ROR and solar power plants had an improved passing rate from January 2023 to February 2023 consisting of four (4) facilities with improved PERC95 results, while there is no change in the passing rate on wind power plants.



Graph 10 – PERC95 Passing Rate Trend per Generator Type (Jan-Feb 2023)

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E. MAPE RESULTS

The table below shows the list of MDGUs with their respective cumulative MAPE results in Luzon, Visayas and Mindanao as of February 2023. The summary MAPE performance rating refers to the **February 2023 Prelim FASR and Final FASR**.

Eighteen (18) facilities had improved MAPE results in their Final FASRs, while the final monthly rating for two (2) facilities had declined after re-validation and/or recalculation. There was no change in the ratings with respect to the other sixty-nine (69) facilities.

Table 2. Individual Performance of MDGUs (Running MAPE)

Resource Name	MAPE Performance as of February 2023	
	Prelim FASR	Final FASR
RUN-OF-RIVER (ROR)		
01AMPHAW_G01	2.63%	2.62%
01BAKSIP_G01	8.61%	8.61%
01BAKUN_G01	2.60%	2.60%
01BINENG_G01	0.17%	0.17%
01BUTAO_G01	8.25%	8.25%
01NMHC_G01	0.19%	0.19%
01NMHC_G03	0.00%	0.00%
01SABANG_G01	1.25%	1.21%
01SLANGN_G01	2.83%	2.83%
01SMBELL_G01	0.36%	0.36%
03BALUG_G01	5.73%	5.73%
03BART_G01	15.33%	15.33%
03CLBATO_G01	7.67%	7.67%
03INARI_G01	6.55%	6.55%
03MAJAY_G01	11.72%	11.72%
03PALAK_G01	7.13%	7.13%
03UPLAB_G01	1.25%	1.25%
04TAFT_G01	1.90%	1.90%
08SUWECO_G01	2.15%	2.15%
11FGBPC_G01	1.94%	1.94%
11MANFOR_G01	1.99%	1.78%
11MANFOR_G02	3.74%	3.13%
11MINBU_G01	3.95%	3.95%
11MNCBLG_G01	1.71%	1.71%
12ASIGA_G01	9.81%	9.81%
13EUROH_G01	3.43%	3.43%



E. MAPE RESULTS

Resource Name	MAPE Performance as of February 2023	
	Prelim FASR	Final FASR
13SIBULAN_G01	12.76%	1.45%
13TALOM1_G01	6.01%	4.13%
13TALOM23_G01	4.26%	3.29%
13TUDAY2_G01	3.98%	2.74%
14MARBEL_U01	6.38%	6.38%
SOLAR		
01ARAYSOL_G01	8.78%	8.78%
01ARMSOL_G01	8.32%	8.26%
01BOSUNG_G01	97.75%	97.75%
01BTNSOL_G01	7.76%	7.76%
01BTSOLEN_G01	4.46%	4.46%
01BULSOL_G01	7.89%	7.89%
01BURGOS_G02	7.14%	7.12%
01BURGOS_G03	7.60%	7.59%
01CABSOL_G01	10.08%	10.08%
01CLASOL_G01	6.72%	6.72%
01CONSOL_G01	7.52%	7.52%
01DALSOL_G01	8.11%	8.11%
01GIGSOL_G01	2.73%	2.73%
01MAEC_G01	4.10%	4.10%
01MARSOL_G01	9.07%	9.07%
01PASQSOL_G01	65.36%	2.38%
01PETSOL_G01	4.04%	4.04%
01PETSOL_G02	4.32%	4.32%
01RASLAG_G01	6.08%	6.08%
01RASLAG_G02	5.91%	5.91%
01RASLAG_G03	7.38%	7.38%
01SPABUL_G01	7.53%	7.53%
01SUBSOL_G01	4.19%	3.72%
01TERASU_G01	3.79%	3.79%
01YHGRN_G01	5.86%	5.86%
01ZAMSOL_G01	5.57%	5.57%
02ECOPRK_G01	4.24%	4.24%
02ECOTAGA_G01	5.05%	5.05%



E. MAPE RESULTS

Resource Name	MAPE Performance as of February 2023	
	Prelim FASR	Final FASR
02SMNRTH_G01	67.50%	67.50%
02VALSOL_G01	5.17%	5.17%
03CALSOL_G01	7.11%	7.11%
03MEC_G01	6.94%	6.94%
03SOLACE_G01	4.86%	4.86%
04PHSOL_G01	4.36%	4.36%
04SEPSOL_G01	3.98%	3.97%
05TOLSOL_G01	7.34%	7.34%
06CARSOL_G01	3.98%	3.98%
06HELIOS_G01	3.96%	3.96%
06MANSOL_G01	4.68%	4.68%
06MNTSOL_G01	4.18%	4.18%
06SACASL_G01	17.72%	17.71%
06SACASL_G02	5.97%	5.94%
06SACSUN_G01	6.13%	6.13%
06SLYSOL_G01	6.82%	6.80%
08COSMO_G01	0.00%	0.00%
11KBSOL_G01	27.64%	27.64%
11KIRAS_G01	14.21%	14.21%
13DIGSOL_G01	4.82%	4.93%
14ASTROSOL_G01	59.25%	59.25%
14NVSOL_G01	8.15%	8.15%
WIND		
01BURGOS_G01	7.50%	7.48%
01CAPRIS_G01	4.83%	4.83%
01NWIND_G01	6.50%	6.76%
01NWIND_G02	5.77%	5.77%
03AWOC_G01	7.94%	7.94%
08PWIND_G01	12.93%	12.93%
08SLWIND_G01	6.14%	6.14%



F. PERC95 RESULTS

Table 3 shows the cumulative PERC95 results for each MDGU in Luzon and Visayas as of February 2023. The PERC95 summary performance rating refers to the **February 2023 Prelim FASR and Final FASR**.

Twenty-nine (29) facilities had improved PERC95 results in their Final FASRs, while the final monthly rating for two (2) facilities had declined after re-validation and/or recalculation. There was no change in the overall ratings with respect to the other fifty-eight (58) facilities.

Table 3. Individual Performance of MDGUs (Running PERC95)

Resource Name	PERC95 Performance as of February 2023	
	Prelim FASR	Final FASR
RUN-OF-RIVER (ROR)		
01AMPHAW_G01	6.01%	6.01%
01BAKSIP_G01	16.40%	16.40%
01BAKUN_G01	8.52%	8.52%
01BINENG_G01	0.00%	0.00%
01BUTAO_G01	23.33%	23.33%
01NMHC_G01	0.00%	0.00%
01NMHC_G03	0.00%	0.00%
01SABANG_G01	3.72%	3.67%
01SLANGN_G01	11.50%	11.50%
01SMBELL_G01	1.02%	1.02%
03BALUG_G01	16.88%	16.88%
03BART_G01	16.45%	16.45%
03CLBATO_G01	56.58%	56.58%
03INARI_G01	28.85%	28.79%
03MAJAY_G01	24.66%	24.66%
03PALAK_G01	25.42%	25.42%
03UPLAB_G01	4.82%	4.82%
04TAFT_G01	1.76%	1.76%
08SUWECO_G01	4.59%	4.59%
11FGBPC_G01	6.70%	6.70%
11MANFOR_G01	4.69%	4.14%
11MANFOR_G02	10.49%	8.17%
11MINBU_G01	11.67%	11.67%
11MNCBLG_G01	3.47%	3.47%
12ASIGA_G01	97.74%	97.74%
13EUROH_G01	14.71%	14.71%



F. PERC95 RESULTS

Resource Name	PERC95 Performance as of February 2023	
	Prelim FASR	Final FASR
13SIBULAN_G01	17.27%	6.32%
13TALOM1_G01	20.98%	14.88%
13TALOM23_G01	14.09%	7.71%
13TUDAY2_G01	13.02%	8.79%
14MARBEL_U01	50.62%	50.62%
SOLAR		
01ARAYSOL_G01	37.77%	37.77%
01ARMSOL_G01	38.42%	38.32%
01BOSUNG_G01	136.84%	136.84%
01BTNSOL_G01	37.46%	37.46%
01BTSOLENSOL_G01	21.54%	21.54%
01BULSOL_G01	32.44%	32.43%
01BURGOS_G02	31.79%	31.68%
01BURGOS_G03	33.60%	33.57%
01CABSOL_G01	45.21%	45.21%
01CLASOL_G01	28.71%	28.70%
01CONSOL_G01	31.12%	31.12%
01DALSOL_G01	36.05%	36.05%
01GIGSOL_G01	14.85%	14.85%
01MAEC_G01	20.65%	20.65%
01MARSOL_G01	41.99%	41.95%
01PASQSOL_G01	100.00%	12.80%
01PETSOL_G01	20.58%	20.58%
01PETSOL_G02	21.44%	21.44%
01RASLAG_G01	32.69%	32.69%
01RASLAG_G02	31.39%	31.39%
01RASLAG_G03	37.17%	37.17%
01SPABUL_G01	30.62%	30.62%
01SUBSOL_G01	21.60%	19.71%
01TERASU_G01	18.35%	18.30%
01YHGRN_G01	27.68%	27.68%
01ZAMSOL_G01	30.38%	30.38%
02ECOPRK_G01	21.96%	21.95%



F. PERC95 RESULTS

Resource Name	PERC95 Performance as of February 2023	
	Prelim FASR	Final FASR
02ECOTAGA_G01	25.74%	25.74%
02SMNRTH_G01	100.00%	100.00%
02VALSOL_G01	26.37%	26.37%
03ADISOL_G01	100.00%	100.00%
03CALSOL_G01	34.96%	34.96%
03MEC_G01	29.95%	29.95%
03SOLACE_G01	22.80%	22.77%
04PHSOL_G01	23.07%	23.07%
04SEPSOL_G01	21.66%	21.62%
05TOLSOL_G01	33.58%	33.57%
06CARSOL_G01	21.81%	21.80%
06HELIOS_G01	19.54%	19.54%
06MANSOL_G01	23.85%	23.84%
06MNTSOL_G01	21.29%	21.29%
06SACASL_G01	100.00%	100.00%
06SACASL_G02	27.56%	27.35%
06SACSUN_G01	27.52%	27.49%
06SLYSOL_G01	32.05%	31.87%
08COSMO_G01	0.00%	0.00%
11KBSOL_G01	100.00%	100.00%
11KIRAS_G01	100.00%	100.00%
13DIGSOL_G01	24.44%	25.12%
14ASTROSOL_G01	100.00%	100.00%
14NVSOL_G01	36.65%	36.65%
WIND		
01BURGOS_G01	23.05%	22.93%
01CAPRIS_G01	15.82%	15.82%
01NWIND_G01	23.11%	24.32%
01NWIND_G02	21.24%	21.22%
03AWOC_G01	24.14%	24.14%
08PWIND_G01	41.03%	41.03%
08SLWIND_G01	18.08%	18.06%



G. ECO GENERAL OBSERVATION

The following were observed and noted during the **February 2023** monitoring period and based on the computed FAS results:

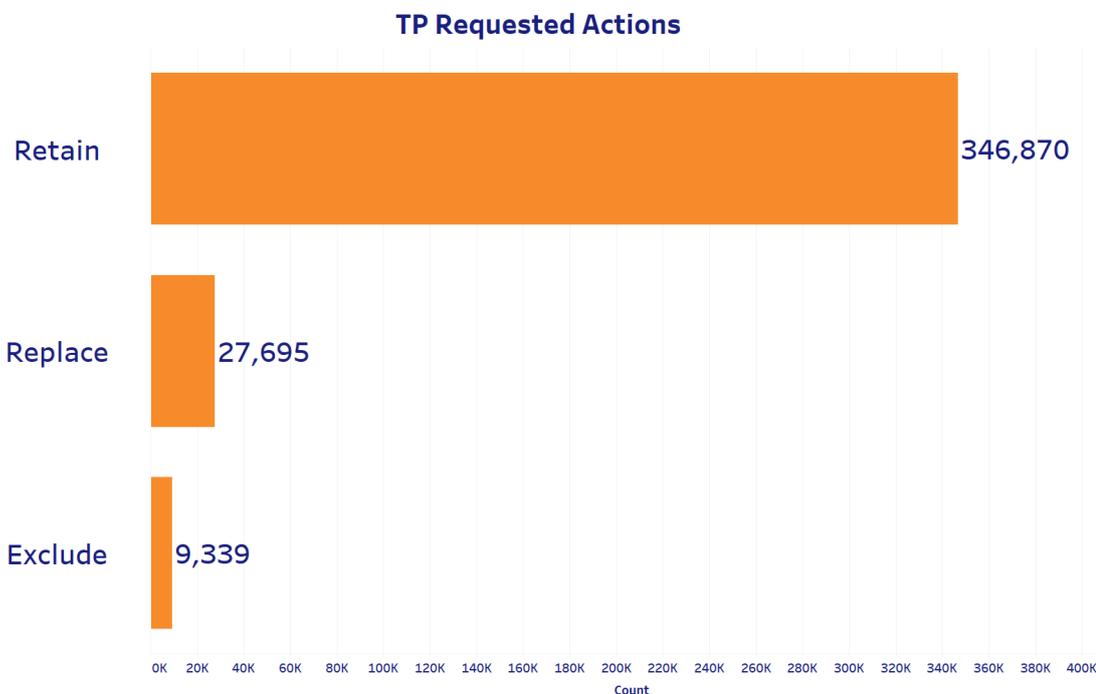
- Actual Basis for Recalculations.** Out of the 89 facilities monitored, 39 facilities or 44% submitted justifications and supporting documents relative to the requested exclusion/s as mentioned in Section (C) (1.2) of this report. In terms of interval counts, a total of 383,904 out of 794,592 or 48% were covered by the submissions. After due consideration of the requests for recalculation, the result remains the same for MAPE and PERC95 ratings.

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

- For exclusions due to Outages, Market Suspension/Intervention; and
- For replacement of data for specific dispatch intervals due to data variance.

Such requests would have involved recalculation for 9,339 intervals (for exclusion) but only 416 or 4.45% of the intervals were considered by ECO.

For data variance, only 17,928 out of 27,695 intervals or only 64.73% were verified to be data variance and thus warrant recalculation.

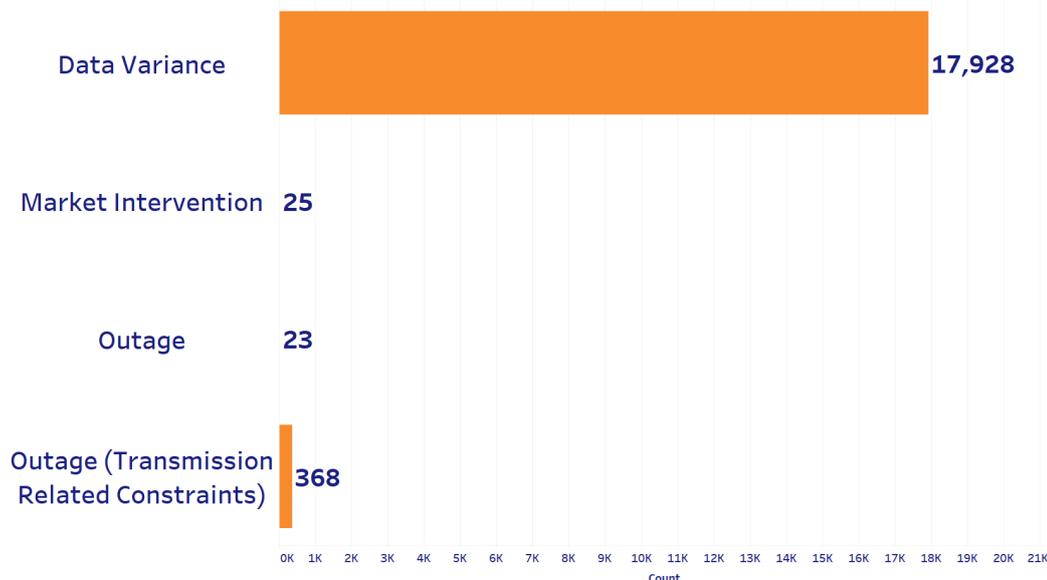


Graph 11 – Summary of Requested Exclusions/Replacement of Data for Recalculation



G. ECO GENERAL OBSERVATION

ECO Assessment



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

Another reason for the low acceptance rate for the February 2023 billing period is the request for exclusion, which is not covered by Exclusions under Section 4.3.1 of the FAS Manual. For instance, the hydro constraints due to low water elevation is not among the incidents that is allowed to be excluded from the calculation. It is not synonymous to the outage that is considered in the Exclusion.

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.

- 2. 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. It was observed that only 5% and 3.9% of the total number of intervals had missing nomination of projected outputs from January and February 2023, respectively. This also concludes the high passing rate in MAPE and PERC95.
- 3. 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.

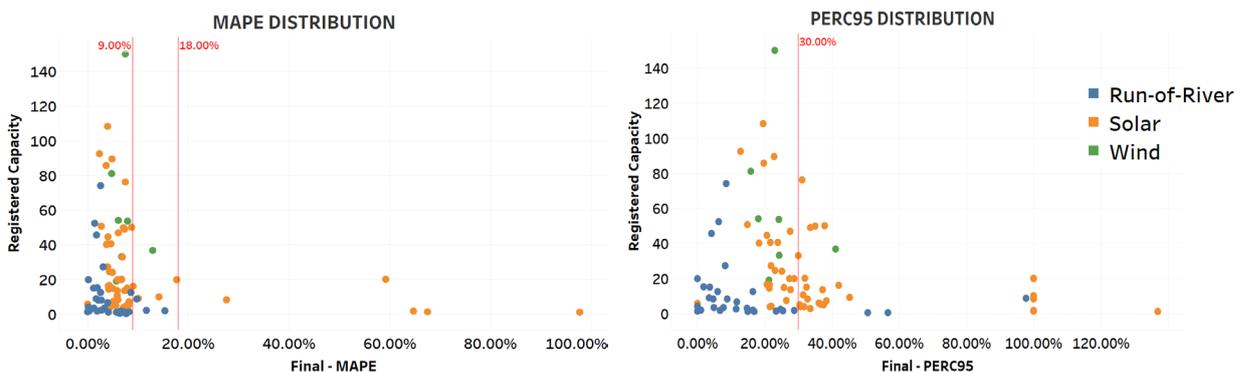
⁶ WESM Rules Glossary, Chapter 11



G. ECO GENERAL OBSERVATION

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 also varies depending on the plant’s performance using the correct data in place of the bad data.

- Result Distribution.** The majority of the MAPE results are concentrated at 60MW and 10% MAPE area while the majority of the PERC95 results are concentrated at 60MW and 40% PERC95 area. While it was also noticeable in both graphs that there are four (4) solar facilities with low accuracy at 60% MAPE and 100% PERC95 area due to non-submission of projected output during nighttime that contributes to a 100% FPE. While one (1) solar facility with PERC95 beyond 130% is due to a high difference between its projected quantity and metered quantity during the daytime, and non-submission of 0 MW projected output at nighttime resulting in a 100% forecast percentage error.



Graph 13 – MAPE and PERC95 Result Distribution

It can be observed in the above 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.

- Cumulative Computation.** The periodic FAS results for this billing period will form part of the subsequent periodic and annual calculation of the FAS results as the computation for the current and the succeeding months will be cumulative until 25 December 2023.

For the information of the DOE, the PEM Board, and the Compliance Committee pursuant to Section 4.4.5 of the FAS Manual, Section 4.15 of the Penalty Manual Issue 1.0 and Section 10.3.1 of the Enforcement and Compliance Manual Issue 1.0.

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MFASR_2023-02-01

Final Audit Report

2023-05-22

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