



PEM Audit Committee Report on the Market Readiness Assessment (MRA)

**For the implementation of enhanced WESM design and operations in
Luzon and Visayas, and WESM in Mindanao**

May 2019

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



EXECUTIVE SUMMARY

This report by the PEM Audit Committee (PAC) provides updates on the Market Readiness Assessment (MRA) activity as of 25 May 2019, including results of the Parallel Operations Program for the period 26 April 2019 to 16 May 2019.

The MRA activity is being conducted to ensure the effective transition to and implementation of the enhanced WESM design and operations in Luzon and Visayas, and WESM in Mindanao. It includes the conduct of a Parallel Operations Program (POP) by the Market Operator (MO), wherein the MO, System Operator (SO), PEMC, and Market Participants are able to try out for themselves the revised WESM processes, specifically the trading, dispatch, and settlement (i.e. bid to bill) processes with 5-minute dispatch intervals. It also includes the identification of concerns arising from the corresponding changes in their systems, processes, and paradigms.

As of 16 May 2019, system availability for new market systems have satisfied the targets while the completeness of market runs and timeliness of market publications for Week-Ahead Projections (WAP), Day-Ahead Projections (DAP), and Hour-Ahead Projections (HAP) have been adversely affected by system issues. Accuracy of regional forecasts have failed to reach targets in weeks 1 and 2, while improvements are seen in week 3. There has been increasing participation in the submission of Generator offers and renewable energy resource nominations since the start of the POP.

The following matters will be closely monitored in the coming month:

1. Operationalization of the stand-alone NMMS system, from which outputs will be used for comparison with MMS results
2. System issues affecting market runs and publication
3. Review of market participation levels
4. Capability of the SO to implement secure dispatch instructions using 5-minute dispatch schedules and merit-order table (MOT) from the MO

Further, the approval of the Energy Regulatory Commission (ERC) of the proposed Price Determination Methodology (PDM) is identified as a critical path for market readiness.

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INTRODUCTION

This report by the PEM Audit Committee (PAC) provides updates on the Market Readiness Assessment (MRA) activity as of 25 May 2019, including results of the Parallel Operations Program for the period 26 April 2019 to 16 May 2019. This report also provides the background and motivation for said activity, and identification of matters for close monitoring to ensure the effective transition to the enhanced WESM design and operations in Luzon and Visayas, and WESM in Mindanao.

Background

In 2013, the Philippine Electricity Market Corporation (PEMC) conducted a Wholesale Electricity Spot Market (WESM) Design Study (WDS) to address the issues identified by the External Auditors of the 1st and 2nd Market Operations Audits, further identify gaps between the WESM Rules and the market mechanisms implemented in the Market Management System (MMS), and propose WESM Rules and Market Manual changes.

Among the issues identified that undermine the efficiency of the WESM are the following:

1. Forced dispatch of generating plants at the minimum stable loading (Pmin) undermines the integrity and purpose of the WESM;¹
2. Constraint Violation Coefficient (CVC) prices are not ideal;² and
3. A long dispatch interval may result in an uneconomic dispatch of generator and increased manual intervention by the System Operator (SO).³

The WDS, which was carried out by the Intelligent Energy Systems (IES) in consultation with the Market Participants, MO, SO, Energy Regulatory Commission (ERC) and Department of Energy (DOE), was finalized in 2014 with the submission of reports and recommendations to enhance the design and operations of the WESM to the DOE.

¹ 2nd Market Operations Audit- Market Software Testing Report by PA Consulting Group (pp. 43-45)

² 2nd Market Operations Audit- Market Software Testing Report by PA Consulting Group (page 51)

³ 1st Market Operations Audit- Independent Operational Assurance Report on the Systems and Procedures of Market Operations by Deloitte Touche Tohmatsu, in coordination with Intelligent Energy Systems (page 141)

On 14 November 2015, the DOE provided policies to enhance the WESM design and operations and starting in 2016 promulgated changes to Market Rules and Manuals, as approved and endorsed by the WESM Rules Change Committee (RCC) and PEM Board.⁴ In 2018, the DOE promulgated transitory provisions for the implementation of WESM in Mindanao. Further, the DOE-approved proposed Price Determination Methodology (PDM), which was submitted to the ERC on 17 May 2017, is currently under hearing by the Energy Regulatory Commission (ERC).

On 28 March 2018, the DOE approved the revised rules on metering, requiring the retail Metering Services Providers (MSPs) to submit to the DOE and ERC its compliance program, including the rate applications to be filed with the ERC for the recovery of cost, on the upgrading of the Contestable Customers' metering installations within 30 working days from the effectivity of the DOE Department Circular 2018-04-0009. The DOE further required the retail MSPs to comply with the submission of 5-minute meter data to the MO by dividing the current 15-minute interval energy meter data by three (3).

As provided under the revised Market Rules and Manuals, including the PDM, the enhanced WESM design and operations involve the following, among others:

Market Design / Operations	Current	Enhanced
Dispatch Interval	1 Hour	5 minutes
Consideration of Pmin	Priority dispatch	Submitted as offer
Pricing	Ex-ante & Ex-post	Ex-ante only
Market Re-runs	Manual Market re-runs	Automatic pricing re-runs
Market Projections	Day-ahead projections (DAP) every four (4) hours	DAP every one (1) hour with sensitivities Hour-ahead projections (HAP) every five (5) minutes
Compliance monitoring	Manual dispatch conformance monitoring	Automatic dispatch conformance monitoring for energy
Scheduling/ Trading of Energy and Reserves	Results of central scheduling of reserves are input to energy-only market	Co-optimized energy and reserves

⁴ See ANNEX A – List of DOE Circulars for the Enhanced WESM Design and Operations

Market Design / Operations	Current	Enhanced
Settlements	One Hour interval and resolution Two-Part Settlement	One Hour interval and 5-minute resolution One-Part Settlement
Administered Prices	Calculated during settlement	Calculated by new Market Management System (NMMS)
Price Substitution Methodology (PSM) Settlement	Adjustments made during settlement	PSM prices by NMMS is binding
Must-Run Unit (MRU) Settlement	Generation Price Index (GPI) plus additional compensation	Market price plus additional compensation

To implement these, the WESM information technology systems were upgraded, which include, among others, the NMMS for the dispatch scheduling and pricing of energy and reserves, and the Central Registration and Settlement System (CRSS) to facilitate the integrated registration and settlement for the wholesale and retail markets.

The PAC and PEMC engaged the services of IES to undertake the NMMS and CRSS certification in February 2017 and March 2017, respectively. The need for parallel operations was stressed by the IES, as the software auditor of the NMMS, in its Significant Issue Report No. 1 on 27 April 2017 noting that it will address extremely high risks of running a new market system that could impact: (1) financial outcomes of the market as a whole or for one or more market participants; (2) power system security; (3) reputation of WESM; (4) market participant confidence in the WESM; and (5) investor confidence in the WESM.

The IES recommended the conduct of a parallel testing with full live data, participant bids/offers and other market systems operating in the mode that they are intended to be running with the implementation of the enhanced WESM design and operations. IES likewise recommended the periodic capacity testing, including a scenario where all generators are simultaneously submitting new offers, continuous evaluation of the performance and outcomes of the market during this period, and evaluation whether to start commercial operations only once there is sufficient level of confidence in the information technology (IT) systems operating as intended, including the participant IT systems that must interface with the NMMS.

On 17 November 2018, IES provided the PAC with additional recommendations on the minimum requirements for the conduct of an effective parallel operations, as follows:

1. Run at least three (3) months of parallel operations without a major incident occurring;
2. The same offers from participants would be entered into both the current MMS and NMMS market processes;
3. The MNM in both systems should be the same;
4. Periodic comparisons of the results between the two systems should be carried out and any major discrepancies investigated;
5. Any presence of market dispatch optimization model (MDOM) loss oscillations should be monitored and checked;
6. The NMMS should run continuously in the same manner as it would run following go live; and
7. System performance should be carefully monitored, such that processes are executed in a timely manner and results of all market processes are published to the MOAR database.

Finding merit to IES recommendations, the PAC, during the PEM Board meeting on 12 December 2018, requested and secured the PEM Board's approval of the following:

1. Parallel Operations at least three (3) billing months before the commercial operations of the NMMS;
2. Readiness Assessment of the MO and Market Participants (SO, MSPs, Generators and Customers); and
3. Engagement of a third party to assess the overall readiness of the market under the oversight of the PAC.

On 13 March 2019, PEMC engaged the Sapere Research Group Limited (Sapere), after undergoing a competitive selection process, to conduct the MRA under the oversight of the PAC.

Requirements and Objectives

The MRA activity is being conducted to provide informed recommendations to the DOE to ensure the effective transition to and implementation of the enhanced WESM design and operations in Luzon and Visayas, and WESM in Mindanao.

The MRA includes the conduct of a Parallel Operations Program (POP) by the MO, wherein the MO, SO, PEMC, and Market Participants are able to try out for themselves the revised WESM processes, specifically the trading, dispatch, and settlement (i.e. bid to bill) processes with 5-minute dispatch intervals. For expediency, the POP shall be carried out over at least a two-month period, as follows:

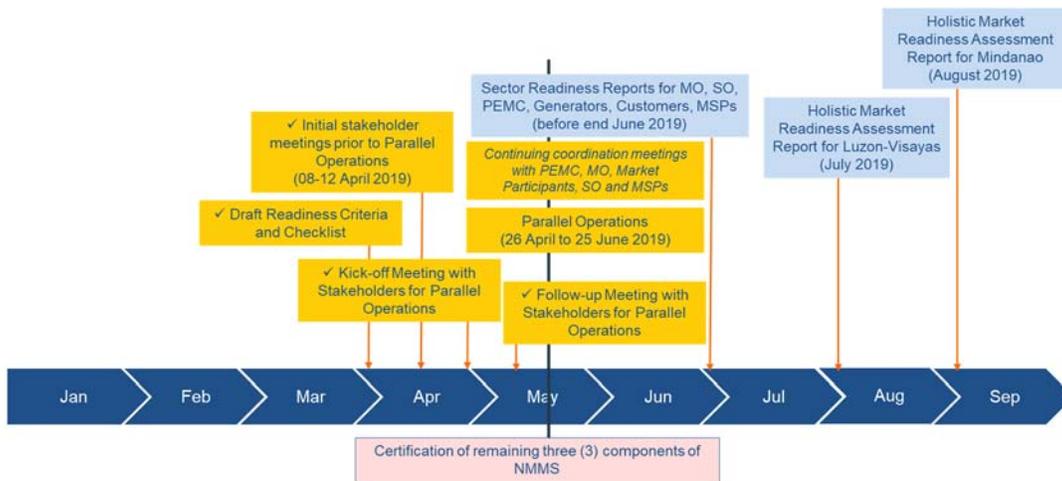
- 26 April 2019 – 25 May 2019: Operations of the NMMS at the main site (Pasig City);
- 26 May 2019 – 25 June 2019: Operations of the NMMS at the back-up site (Cebu City), with fail-over exercise; and
- 26 June 2019 – 25 July 2019: Continuation of the POP subject to the results of the first two (2) months.

The POP will test the operational functionality of the NMMS and CRSS. That is, it will assess the working of the systems from the point of taking up participant bids through to the creation of dispatch instructions, the publication of prices and composition of resulting settlements.

With the results of the POP and consultations with said parties, the MRA also identifies concerns arising from the corresponding changes in their systems, processes, and paradigms.

MRA TIMELINE AND ACTIVITIES

The target submission to the DOE of the Holistic Market Readiness Report for Luzon and Visayas is in July 2019, and for Mindanao in August 2019, as shown in the timeline below.



To this end, the following activities were conducted:

1. Consultation on the draft readiness criteria
2. Stakeholder meetings prior the commencement of the parallel operations
3. Readiness assessment for parallel operations
4. Monitoring of the parallel operations
5. Conduct of structured interviews
6. Participation in stakeholder meetings

Consultation on the Draft Readiness Criteria

On 02 April 2019, Sapere submitted a draft readiness assessment criteria and draft questionnaires for the stakeholder workshops scheduled prior the commencement of the parallel operations. The criteria aims to focus stakeholders on relevant success factors for a smooth and reliable transition to the new enhanced market arrangements, while the questionnaires intended to inform Sapere on how stakeholders perceived their own level of readiness for new enhanced market arrangements.

The drafts were provided by email to Market Participants, MO, SO, PEMC, DOE, and ERC starting on 03 April, for their comments.

Stakeholder Meetings prior the Commencement of the Parallel Operations

Sapere met with the stakeholders during the week of 08 April to 12 April to gain insights and understanding on the perspectives of different stakeholders on the outcomes sought by various

stakeholders from the Parallel Operations and their preparedness to participate in the new enhanced market arrangements, including what matters they consider they have under control and any aspects they are concerned about that might be tested during the Parallel Operations.

The stakeholder meetings were as follows:⁵

Date	Venue	Stakeholders
08 April 2019	PEMC Office, Ortigas Center, Pasig City	<ul style="list-style-type: none"> • PEMC • Independent Electricity Market Operator of the Philippines (IEMOP) • National Grid Corporation of the Philippines (NGCP) – SO
10 April 2019		<ul style="list-style-type: none"> • Luzon/Visayas Generators • Luzon/Visayas Distribution Utilities (DUs), MSPs, and Directly Connected Customers (DCCs)
11 April 2019	1A Express Hotel, Claro M. Recto Ave., Cagayan de Oro City	<ul style="list-style-type: none"> • Mindanao DUs, MSPs, and DCCs
12 April 2019		<ul style="list-style-type: none"> • Mindanao Generators • NGCP-Mindanao SO • Mindanao Development Authority (MinDA)

Further, during the PEM Board meeting on 24 April 2018, the PAC informed the PEM Board of the MRA activities and requested the PEM Board’s assistance in encouraging the active participation of their respective sectors during the Kick-off Meeting on the Parallel Operations Program (POP) on 25 April 2019 and in the parallel operations starting on 26 April 2019.

Subsequently, the PAC, PEMC and IEMOP, together with Sapere, conducted the said Kick-off Meeting as scheduled on 25 April 2019 to provide opportunity for Market Participants to raise last-minute concerns on their participation in the POP.

Readiness Assessment for Parallel Operations

Based on the meetings with and inputs received from stakeholders, Sapere formed the view that many market stakeholders are ready for parallel operations but not all and provided the following initial assessments and recommendations:

⁵ The DOE and ERC were unavailable at this time

- IEMOP has a high level of self-awareness, as shown in their self-assessments ‘to do’ lists to address gaps. To improve participation of stakeholders, IEMOP may:
 - Move monthly co-ordination meetings with the SO to weekly during the period of parallel operations;
 - Resend market readiness guides to each participant with a checklist of what they need to have in place to participate in the parallel operations;
 - Call each participant to run through the above checklist and help close any outstanding matters;
 - Continue to make 24x7 helpdesk support available;
 - Extend their contact list for market advisories to include all participants who attended stakeholder workshops;
 - Urgently trouble-shoot market system connectivity issues raised; and
 - Accept the support offered by MinDA to encourage Mindanao stakeholders to participate in parallel operations.
- PEMC has a good awareness of what is required of them for market readiness. However, the new PEMC compliance and monitoring tools are likely to be ready for testing within the 2nd half of the parallel operations. With respect to the parallel operations, PEMC also has a role to:
 - Support IEMOP through reinforcing key messaging to stakeholders;
 - Clarify the situation with reserve co-optimisation to market participants as soon as possible to remove this uncertainty (and remove this potential excuse for participants to delay their readiness);
 - Confirm compliance approach during parallel operations (i.e. no requirement to comply with 5-minute despatch instructions) and also clarify compliance approach when enhanced market is launched (i.e. initial focus on education to ensure all participants are afforded every opportunity to comply before further action is taken); and
 - Coordinate with ERC and DOE to ensure all necessary market governance documents are approved (e.g. PDM) or where delays are likely (e.g. grid code) that interim clarity is provided (e.g. through DOE departmental circulars).
- The NGCP-SO is well prepared for parallel operations in respect of systems and interfaces. The SO’s reliance to 5-minute despatch schedules issued by the MO will be assessed during parallel operations.

- Generator participants are ready for parallel operations with much intensive support by IEMOP to bring the market participants up to speed with what is required of them.
- DUs are less impacted by the new arrangements than generators since their concerns are mainly about making use of the new CRSS and being able to upload and receive files and lodge their BCQs.
- MSPs are ready for parallel operations although some teething issues with the CRSS systems is being resolved with bug fixes by the IEMOP.

Conduct of structured interviews

Sapere further met with stakeholders to further extend their understanding of specific issues that were previously raised during the initial stakeholder meetings prior parallel operations. These meetings were as follows:

Date	Venue	Stakeholders / Agenda
03 May 2019	DOE Office, Taguig City	<ul style="list-style-type: none"> • DOE / Mindanao readiness, PDM, energy and reserve cooptimization
	ERC Office, Pasig City	<ul style="list-style-type: none"> • ERC / PDM, energy and reserve cooptimization
09 May 2019	NGCP Office, Quezon City	<ul style="list-style-type: none"> • NGCP SO and Metering / Business processes around providing information to IEMOP, running the security schedule, getting the energy dispatch information from IEMOP and then issuing reserve dispatch instructions for the parallel operation
15 May 2019	PEMC Office	Retail MSPs / Concerns and status of implementing 5-minute metering <ul style="list-style-type: none"> • Pangasinan III Electric Cooperative, Inc. • Tarlac II Electric Cooperative, Inc. • Balamban Enerzone Corporation • Manila Electric Company • Angeles Electric Corporation
16 May 2019	San Miguel Office, Pasig City	Generators / Systems and procedures ensure timely receipt of 5-minute dispatch targets and advice of receipt of instructions; concerns and status of system enhancements <ul style="list-style-type: none"> • San Miguel Corporation
	SN Aboitiz Power Office, Taguig City	<ul style="list-style-type: none"> • SN Aboitiz Power

Date	Venue	Stakeholders / Agenda
17 May 2019	Helios Office, Makati City	<ul style="list-style-type: none"> • Helios Solar Energy Corporation
20 May 2019	PSALM Office, Quezon City	<ul style="list-style-type: none"> • Power Sector Assets & Liabilities Management Corporation (PSALM)
	First Gen Office, Pasig City	<ul style="list-style-type: none"> • First Gas Corporation / First Gen Corporation

During the above-cited meetings, Market Participants requested further trainings on the revised Market Rules and Manuals, and new market systems.

Participation in stakeholder meetings

To further engage Market Participants in the POP, the PAC, PEMC and IEMOP, together with Sapere, conducted a Follow-up Meeting on Parallel Operations on 08 May 2019 at the PEMC Office, Pasig City. Among others, Market Participants raised access and interface issues regarding the NMMS and CRSS, which the IEMOP noted for immediate resolution.

The PAC, through the PEMC, provided support to the DOE in their activities leading to the implementation of WESM in Mindanao and encouraging generator participants to actively participate in the POP. Updates on the MRA activity was presented by Sapere in the following fora:

Date	Venue	Stakeholders / Agenda
09 May 2019	Legend Hotel, Mandaluyong City	<ul style="list-style-type: none"> • 16th WESM Mindanao Readiness Technical Working Group (TWG) Meeting
21 May 2019	DOE Office, Taguig City	<ul style="list-style-type: none"> • High-Level Meeting with Luzon Generators on the Implementation of New Market Design in the WESM
23 May 2019	Cebu Parklane Hotel, Cebu City	<ul style="list-style-type: none"> • High-Level Meeting with Visayas Generators on the Implementation of New Market Design in the WESM

STATUS OF PARALLEL OPERATIONS

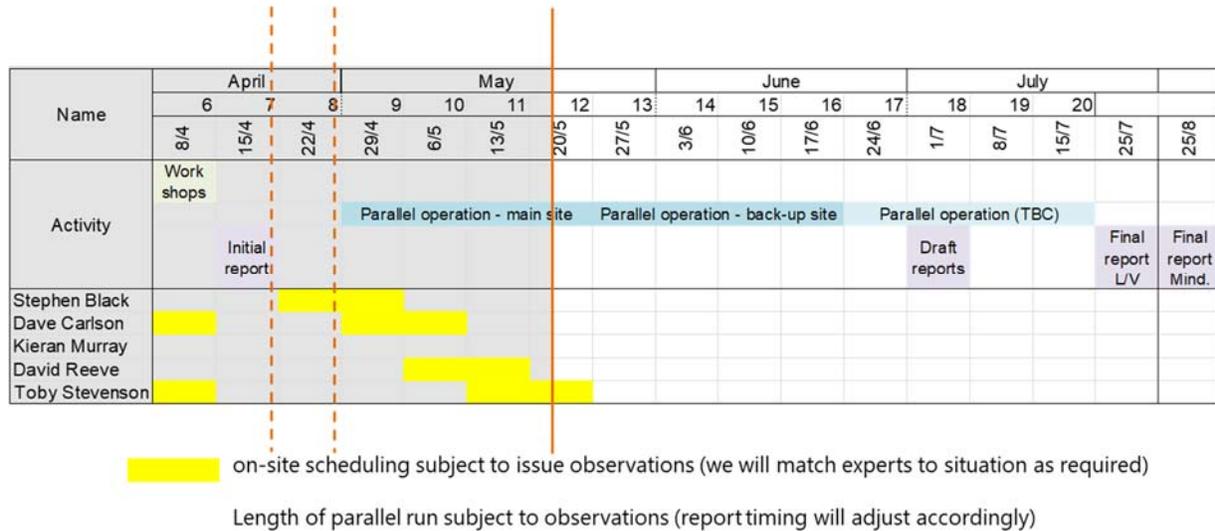
The Parallel Operations Program (POP) commenced on 26 April 2019, at 00:05 H. It includes the operation by the IEMOP of the following systems:

1. Current Systems for the operation of the current one (1) hour dispatch interval in accordance with the current Market Rules and Manuals
 - a. MMS by ABB
 - b. CRSS – for registration and declaration of bilateral contract quantity (BCQ)
 - c. Macro settlement spreadsheets – for metering and settlement
 - d. PEMC/IEMOP website
2. New Systems for the trial operation of the enhanced design and processes, i.e. 5-minute dispatch interval in accordance with the corresponding revised Market Rules and Manuals except for compliance to the must-offer rule (MOR) and 5-minute RTD schedules
 - a. NMMS by Siemens
 - i. Production system – wherein Market Participants have access through the Market Participant Interface (MPI)
 - ii. Stand-alone offline system that has the same functionalities as the Production System. The MO shall use this system with the same inputs used in the current MMS. The results generated out of the processes from the two systems (NMMS vs. current MMS) shall be compared for evaluation required by the ERC for their review and approval of the proposed PDM.
 - b. CRSS
 - c. IEMOP website

In the supervision of the POP, Sapere regularly interacts with the IEMOP, which submits daily and weekly POP Reports to Sapere. In turn, Sapere submits and presents to the PAC their Weekly Progress Report by email and teleconference. As of this writing, Sapere submitted three (3) weekly reports, as follows:

Date	Covered Period	Parallel Operations Highlights
07 May 2019	Week 1: 26 April – 2 May 2019	<ul style="list-style-type: none"> • Level of Generator participation, specifically, the submission of offers in the NMMS, for Mindanao participants is much less than that for Luzon and Visayas • Standalone NMMS system not yet operational • System availability and market run completion issues were encountered • ISP outage affected communications with Luzon System Operator
15 May 2019	Week 2: 3 May – 9 May 2019	<ul style="list-style-type: none"> • Level of Generator participation in Mindanao continues to be much less than in Luzon and Visayas • Standalone NMMS system continues to be not operational • System availability and market run completion issues continue to be encountered • Regional forecast accuracy is highly inconsistent and overall failed to meet targets • NMMS not producing implementable 5-minute dispatch schedules that the SO can use to assess their own capability to implement secure dispatch instructions • No incident reports received • Noted that there is a need for a coordination role supervising the arrangements governing the parallel operation to strengthen the communication among the concerned entities on a more frequent basis
22 May 2019	Week 3: 10 May – 16 May 2019	<ul style="list-style-type: none"> • Level of Generator participation in Mindanao has improved, while participation in Luzon and Visayas are above 80% • NMMS not producing implementable 5-minute dispatch schedules. System Operator not yet commenced their assessment of the impact of 5-minute schedules on system security • System Operator not ready for 5-minute dispatch under co-optimisation • Standalone NMMS system continues to be not operational • System availability issues and market run completion continue to be encountered • Issues with HAP, DAP or WAP market runs on 14 May. No successful runs on 15th or 16th May. • No incident reports received

In accordance with the MRA requirements, Sapere has been on-site from 02 to 23 May to closely monitor the POP. Per their workplan as of 20 May below, Sapere will be remotely monitoring the POP and reporting to the PAC by teleconference starting on 24 May.



Operational Results (26 April 2019 to 16 May 2019)

Similar with the Market Operator Performance Standards (MOPS), system performance and regional forecast are monitored and assessed during the POP are as follows:⁶

Criteria	Target	Week 1	Week 2	Week 3
System Availability				
MPI Availability	99.90%	100.00%	99.70%	100.00%
CRSS System Availability	99.90%	95.33%	100.00%	97.70%
EMDRP Availability	99.90%	100.00%	100.00%	100.00%
IEMOP Website Availability	99.50%	100.00%	100.00%	100.00%
Completeness of Market Runs				
Real-Time Dispatch (RTD)	95.00%	99.70%	100.00%	96.78%
Hour-Ahead Projections (HAP)	95.00%	96.63%	100.00%	67.81%

⁶ Note: For simplicity, the ratings are coded either as meeting target (green) or below target (red).

Criteria	Target	Week 1	Week 2	Week 3
Day-Ahead Projections (DAP)	95.00%	88.10%	99.40%	66.67%
Week-Ahead Projections (WAP)	95.00%	100.00%	100.00%	71.43%
Dispatch Interval Pricing Calculation (DIPC)	95.00%	99.70%	100.00%	99.80%
Timeliness of Market Run Publication				
RTD Publication	95.00%	100.00%	100.00%	99.95%
Hour-Ahead Projections (HAP)	95.00%	100.00%	100.00%	100.00%
Day-Ahead Projections (DAP)	95.00%	93.90%	83.20%	67.26%
Week-Ahead Projections (WAP)	95.00%	100.00%	100.00%	100.00%
RTD mean absolute percentage error (MAPE)				
Luzon	0.95%	1.13%	0.96%	0.79%
Visayas	1.20%	1.53%	2.78%	1.65%
Mindanao	1.20%	1.31%	1.79%	1.10%
RTD forecast accuracy rating (FAR)				
Luzon	97.20%	96.00%	94.5%	98.0%
Visayas	93.00%	89.60%	90.1%	84.7%
Mindanao	93.00%	94.20%	92.1%	94.5%

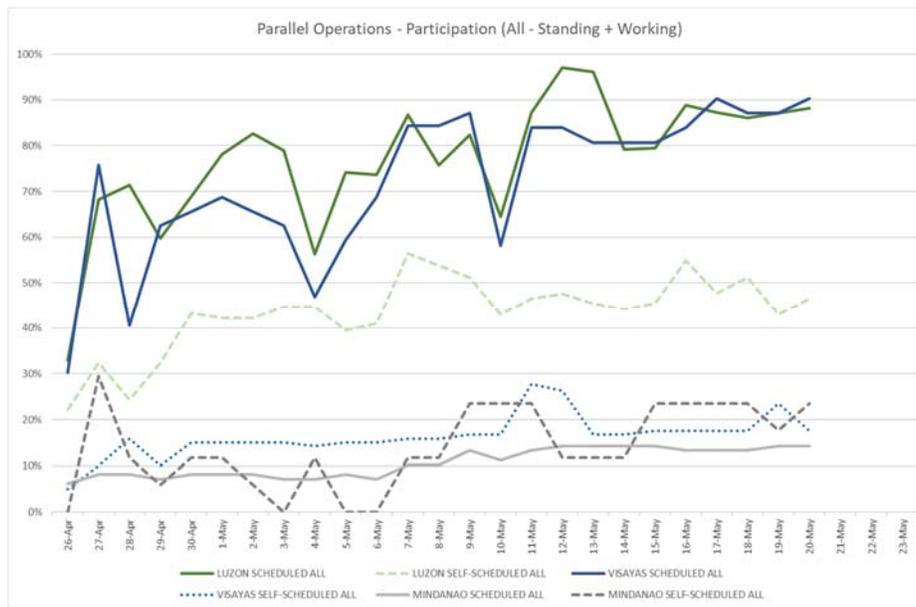
Source: Sapere Weekly Reports are the primary source of data; IEMOP Weekly Reports are used when there is incomplete information

System availability for new market systems have largely satisfied the targets while the completeness of market runs and timeliness of market publications for WAP, DAP, and HAP have been adversely affected by system issues.⁷ Accuracy of regional forecasts have failed to reach targets in weeks 1 and 2, while improvements are seen in week 3.

Market Participation

There has been increasing participation in the submission of Generator offers and renewable energy resource nominations since the start of the POP, as provided below:

⁷ Corresponding Incident Reports from IEMOP are yet to be received



The chart does not reflect, however, whether non-participation is because of a reluctance to participate or there are other issues preventing participation. For instance, Generators have expressed the following issues during the structured interviews by Sapere and DOE High-Level Meetings with Generators:

- Log in failures
- Intermittent slow response on the interface between IEMOP and participants
- Problems with the API web service
- Unexpected RTD schedules

The chart also only measures uploading of offers by generation unit. It does not measure whether participants are downloading RTD schedules to assess the outputs from NMMS themselves, it does not measure how many organisations are or are not participating and it doesn't reflect the portion of capacity in each part of the market covered by participating market participants.

These issues will be further explored through a survey by Sapere within the next month. Other measures for market participation will also be considered, e.g. offer submission/nominations by Market Participant Company, capacity (MW), or energy (MWh); and participation in submitting BCQ declaration.

Matters for further Monitoring

As discussed above, Sapere raised a number of issues that indicate that Parallel Operations had not begun as expected. Sapere suggested that the market may not have been as prepared for Parallel Operations as had been indicated to them prior to commencement.

At this point, the PAC, upon recommendation of Sapere and confirmation of PEMC and IEMOP, has yet to determine whether parallel operations will be extended. To be able to come up with an informed decision, the following matters will be closely monitored in the coming month:

1. Operationalization of the Standalone NMMS system
2. System issues affecting market runs and publication
3. Review of market participation levels
4. Capability of the SO to implement secure dispatch instructions using 5-minute dispatch schedules and merit-order table (MOT) from the MO

Also for monitoring is the ERC's approval of the Price Determination Methodology (PDM), which is deemed a critical path for market readiness, such that the market cannot be determined to be ready until the PDM is approved by the ERC. Further, subsequent enhancements to the NMMS and CRSS may be required if in case the ERC approves pricing mechanisms that are different from those already programmed in said systems.

ANNEX A – List of DOE Circulars for the Enhanced WESM Design and Operations

- [DC2015-10-0015](#) Providing Policies for Further Enhancement of the WESM Design and Operations
- [DC2016-10-0014](#) Adopting Further Amendments to the WESM Rules (Enhancements to WESM Design and Operations)
- [DC2017-03-0001](#) Adopting Further Amendments to the WESM Rules and Market Manuals for the Implementation of Enhancements to WESM Design and Operations (Provisions for Price Determination Methodology and Constraint Violation Coefficients and Pricing Re-run)
- [DC2018-06-0017](#) Adopting Further Amendments to the WESM Rules and Market Manuals (Transitory Provisions for the Implementation of WESM in Mindanao)
- [DC2018-05-0015](#) Adopting Further Amendments to the WESM Rules and Market Manuals for the Implementation of Enhancements to WESM Design and Operations (Provisions for Metering, Market Trading Node and Scheduling Point)
- [DC2018-04-0012](#) Adopting Further Amendments to the WESM Market Manuals on Price Determination Methodology and Constraint Violation Coefficients and Pricing Re-Run for the Implementation of Enhancements to WESM Design and Operations
- [DC2018-04-0011](#) Adopting Further Amendments to the WESM Market Manual on Market Operator Information Disclosure And Confidentiality for the Implementation of Enhancements to WESM Design and Operations
- [DC2018-04-0010](#) Adopting Further Amendments to the WESM Rules, Retail Rules and Retail Market Manual on Metering for Clarifications on Retail Market Integration
- [DC2018-04-0009](#) Adopting Further Amendments to the Retail Rules and its Market Manual on Metering Standards and Procedures for the Implementation of Enhancements to WESM Design And Operations
- [DC2018-04-0008](#) Adopting Further Amendments to the WESM Market Manuals on Billing and Settlement and Load Forecasting Methodology for the Implementation of Enhancements to WESM Design and Operations
- [DC2018-04-0007](#) Adopting Further Amendments to the WESM Rules and Market Manual on Dispatch Protocol for the Implementation of Enhancements to WESM Design and Operations