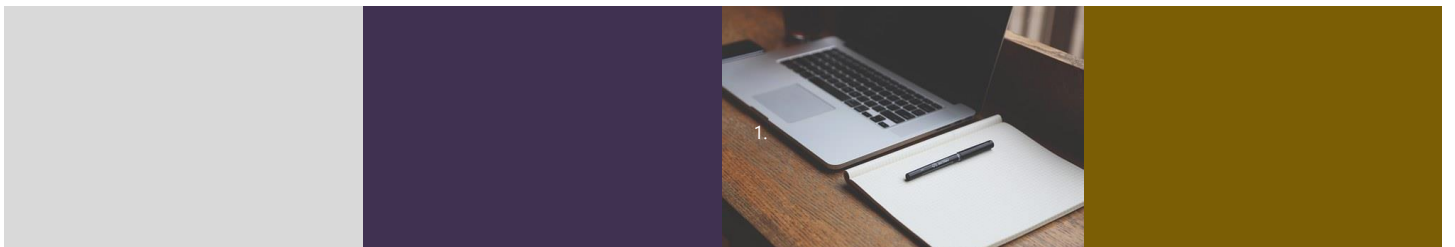


Mindanao Readiness Assessment Report

Report prepared for Philippine Electricity Market Corporation (PEMC)

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Executive summary

In our 26 July report, **Sector Readiness Assessment—Luzon and Visayas**, we highlighted a number of market system and process issues that we consider should be resolved before the new enhanced market design is implemented in the WESM. With the announcement that the launch of the enhanced market design in Luzon and Visayas is to come before the launch of WESM in Mindanao it is thus a requirement that these issues should be resolved satisfactorily and tested for Luzon and Visayas before Mindanao commences.

Subsequent to this report being prepared the start date for Luzon and Visayas enhancements has been moved out to the same date as the Mindanao market start date. We note that change with edits to this report but not our assessment of Mindanao specific readiness criteria that need to be met.

Issues specific to Mindanao are:

- Delays with market registration.
- Low number of market participants participating in the POP, although a very high capacity was represented in the POP, with a number of those parties also being active in Luzon and Visayas and are thus familiar with trading in the WESM.
- The degree to which internet connectivity is an issue for Mindanao is being tested separately. Internet connectivity may impact on dispatch and settlement and thus be a limiting factor on the level of efficiencies that can be realised through the new market-based arrangements. However, we consider that the advantages of moving to WESM in Mindanao as far more compelling than the risk that the System Operator may have to resort to dispatch communications along similar lines as to today's practices if issues arise.
- Meter Service Agreements and IEMOP/ System Operator interfaces and data transfer protocols are not yet fully resolved.

We also note that a number of non-technical issues may impede the smooth launch of WESM in Mindanao. These non-technical issues include collection issues, free-riding off Ancillary Services and uneconomical use of inefficient generation units. The introduction of WESM will make these non-technical issues more transparent and provide more efficient and effective mechanisms for market operations. However, the non-technical issues are likely to require the attention and support of the DOE and the ERC to ensure that they do not unduly interrupt a smooth market launch.

1. Introduction

1.1 Assessment of readiness for WESM in Mindanao

The Philippines Electricity Market Corporation (PEMC) is overseeing an assessment of market readiness for an enhanced design and operation of the Wholesale Electricity Spot Market (WESM) in Luzon and Visayas, and the introduction of WESM in Mindanao. PEMC's program in preparation for the market changes included a Parallel Operation (POP) of the new Market Management System (NMMS) for the dispatch scheduling and pricing of energy and reserves, and the Central Registration and Settlement System (CRSS) to integrate registration and settlement for the wholesale and retail markets.

We were commissioned by PEMC to:

- conduct an assessment of the readiness of the systems, awareness, manpower, and processes of the Independent Electricity Market Operator (IEMOP), the System Operators (SO), PEMC, Metering Service Providers (MSPs), and Market Participants
- to supervise the conduct of parallel operations by the IEMOP
- report to the PEM Audit Committee (PAC) and PEMC on the conduct of the parallel operations and readiness assessment.

This report sets out our findings in relation to the introduction of WESM in Mindanao. Our assessment was undertaken as at 29 July 2019. We have reported separately on readiness to implement the new enhanced market design Luzon and Visayas, in our 26 July report, **Sector Readiness Assessment—Luzon and Visayas**.

1.2 Our approach

On 1 April, we provided PEMC with draft market readiness criteria and workshop questionnaires for discussion with stakeholders during market participant workshops in Cagayan de Oro during the week of 8 April 2019. The criteria were amended to take in the responses from market participants and other key stakeholders. In our report titled **Market Readiness Criteria and Initial Assessment ahead of Parallel Operations**, dated 16 April 2019, we:

- Provided our proposed assessment criteria for market preparedness ahead of the enhanced WESM (Luzon and Visayas) and introduction of WESM (Mindanao). These criteria have been applied during Parallel Operations.
- Provided an initial view of readiness for the enhanced WESM and its introduction in Mindanao informed by feedback from the workshops and initial questionnaires sent to stakeholders.

The assessment criteria set out in our 16 April report forms the basis of our assessment of market readiness for Mindanao in this report. As anticipated in our earlier report, some minor refinements were made to some criteria during the period of parallel operations to improve its effectiveness as a measure of readiness.

While carrying out our market readiness support work, we identified a number of issues that if not addressed could undermine the ability of the market to “go live”. We advised PAC that the readiness work would benefit from the formation of a Steering Committee with separate readiness workstreams to address the “go live” issues. We recommended that each of these workstreams were allocated to a ‘champion’ who sits on the Steering Committee. An overall project plan was recommended that ties the readiness workstreams to the “go live” issues.

The readiness workstreams overseen by the Steering Committee are:

1. MO system Readiness:
 - a. NMMS system readiness
 - b. CRSS system readiness
 - c. MO process readiness
2. SO Readiness
3. MSP and Customer Readiness
4. Mindanao Participation
5. PDM approval
6. Co-optimization energy and reserves
7. Generation Readiness

In preparing this report assessing the readiness for WESM in Mindanao we draw on:

- **Sector readiness assessment – Luzon and Visayas** report 24 July (Phase 1 report)
- **Market Readiness Assessment – Critical Issues Report** 4 July updated (Phase 2 report)
- **Discussion of Mindanao issues with the DOE and ERC** on 05 July 2019.
- Response to the survey of generators where respondents have generation in Mindanao.
- Material emerging from the Mindanao participation workstream
- Material provided by DOE, PEMC, IEMOP and NGCP at the **18th WESM Mindanao readiness Assessment Meeting** held in Iligan City July 29.
- **IEMOP Weekly Report on the Parallel Operations Program** 12 July 2019 – 18 July 2019
- **IEMOP POP stats** updated to 28 July
- **IEMOP Update on Parallel Operations Programme** to the steering committee 8 August

We also note that there are two initiatives focused on the development of the Mindanao market:

- A study by the WESM Technical Committee has been established to study issues that may assist the further development of the Mindanao market once it has been established.
- On 22 July 2019, IEMOP received the letter from DOE requesting a study on the impact of over-declaration or over-nomination in Mindanao.

2. Current status for Mindanao

The MRSC recommended to the PEM Board and DOE to decouple the start date for Luzon and Visayas from the start date for WESM Mindanao Go-Live dates. The decision was upheld at a meeting held in 05 July 2019 among NGCP, PEMC, IEMOP, DOE, and ERC. The DOE responded with a transmittal letter confirming: "The target commercial operation of Enhanced WESM Design in Luzon-Visayas is on 26 October 2019 while the target commercial operation of WESM Mindanao is on 26 January 2020."

The rationale for setting the start date for Mindanao to follow the start date for Luzon and Visayas is that when the market commenced in Mindanao it would rely on the same market systems that had been enhanced, tested and introduced in Luzon and Visayas. However, subsequent to submitting this report, 28 August MRSC recommended to the PEM board PEM Board to move the Go-Live date for Luzon/Visayas to 26 January 2020 so both changes will now take place on the same date. This was relayed to the DOE by letter on 30 August 2019.

At the time this report was prepared the Go-live dates were de coupled and this report focuses on Mindanao specific issues that would otherwise impact on market readiness.

For Luzon and Visayas the change for traders is incremental. The change will be more profound for newly active buyers and sellers in the Mindanao market because there is a complete change in arrangements. That being said, 91% of quantity is currently provided by mostly grid connected generation operated by parties that are also active in Luzon and Visayas, and hence is supplied by entities that already have a developed understanding of WESM.¹

We note that the Mindanao System operator is enthusiastic about the introduction of the market in Mindanao. We also note that the grid connected generators have AGC and there is five-minute wholesale metering in Mindanao.²

There are some issues, however, that are more difficult to address for Mindanao such as forecast accuracy. During the parallel operations, generators were asked to input into the new Siemens system the same bids as they enter into the current ABB system. It was intended that dispatch instructions from the NMMS be:

- sent to generators (where they could assess how they could have complied with 5-minute dispatch instructions)
- sent to the System Operator (where the System Operators for each of Luzon, Visayas and Mindanao could apply their real-time security tools to assess how comfortable they would have been had these instructions been used for dispatch)
- inputs to the CRSS system (where participants can upload BCQ quantities and observe the settlement statements that would have resulted).

¹ Based on Mindanao metered quantity Jan – Jun 2019 from Aboitiz Power, PSALM, SMC, FDC, AC Energy

² Note that as retail market is not yet in place in Mindanao, issues 7 and 16 from our Luzon and Visayas report (which concern metering for the retail market) do not apply to Mindanao.

To the extent that all generators did not match their live market bids into the Parallel Operations system this would have created a deviation that would impact the reliability of comparing dispatch instructions and prices under the two parallel scenarios (existing and new systems). To counter this concern, IEMOP was able to implement a stand-alone NMMS system that directly replicated the bids from the current ABB system to produce dispatch instructions and prices in Luzon and Visayas. This allowed near-comparable dispatch instructions to be produced (at 5-minute intervals) and a more reliable comparison of prices under the old and new parallel scenarios. However, for Mindanao, the IEMOP was not able to test the market prices from NMMS based on generator offers from the current ABB system because Mindanao does not currently have price-based offers; they rely on volume-based nominations.

In the context of market readiness, the lack of testing does not present a barrier to proceeding with the introduction of the market. The System Operator is experienced dispatching the market under the current system and would still be able to do so in the future. We have been advised that the System Operator would welcome the move away from the current nominations-based system to a market-based system suggesting that the market will be more secure under WESM operations.

Readiness assessment of Mindanao

The criteria/checklist for the readiness of Mindanao for the establishment of WSEM for Market Participants, MSPs, MO, and SO, as applicable, are:

Criteria ³
1. All regulatory approvals are obtained
2. Interfaces to the IEMOP and SO are operational, have been tested and are reliable
3. Systems and business processes to support the participation in the NMMS have been established and tested
4. Protocols or contracts with service providers are in place
5. Market participant registration requirements are complete
6. Market settlement requirements are in place (clearing bank accounts are open, initial prudential requirements have been estimated and met)
7. Timely and regular submission of metering-related information in the CRSS successfully tested

Assessment of Mindanao POP against criteria

We prepared this report on the basis that the issues in Luzon and Visayas would have been satisfactorily addressed prior to the introduction of the market in Mindanao. Luzon/Visayas enhancements and the introduction of the market will now take place on the same date. As a result,

³ Market Readiness Criteria and Initial Assessment ahead of Parallel Operations 6 April

our assessment focuses on the Mindanao specific issues some of which are the transition to a market as distinct from a system and process enhancement.

Thus, our approach to assess Mindanao readiness is to assume that the issues in common with Luzon and Visayas will be resolved (as set out in our 26 July report “Sector Readiness Assessment—Luzon and Visayas”) and thus we consider how ready Mindanao is today through the lens of the 7 Mindanao specific criteria signalled from the outset (as accepted by PEMC and PAC).

1. All regulatory approvals are obtained

The critical regulatory approval relevant for Mindanao is the commencement date. The start date for Mindanao had been decoupled from the introduction of enhancements in Luzon and Visayas but both are now to take place on 26 January 2020. Other regulatory approvals required, such as ERC’s approval of the PDM, notably the treatment of reserves, must also be resolved for the Luzon and Visayas markets so are not Mindanao specific.

2. Interfaces to the MO and SO are operational

Throughout the POP there have been problems with the provision of SCADA data and off-line data from the System Operator in Mindanao to IEMOP. There have been problems at both ends of the interface.

In our **Sector readiness assessment – Luzon and Visayas** report we noted:

- RTD mean absolute percentage error for Luzon has exceeded target, however Visayas and Mindanao did not meet operational targets.
- RTD forecast accuracy rate for Luzon and Mindanao has exceeded targets, however Visayas has not met operational targets.

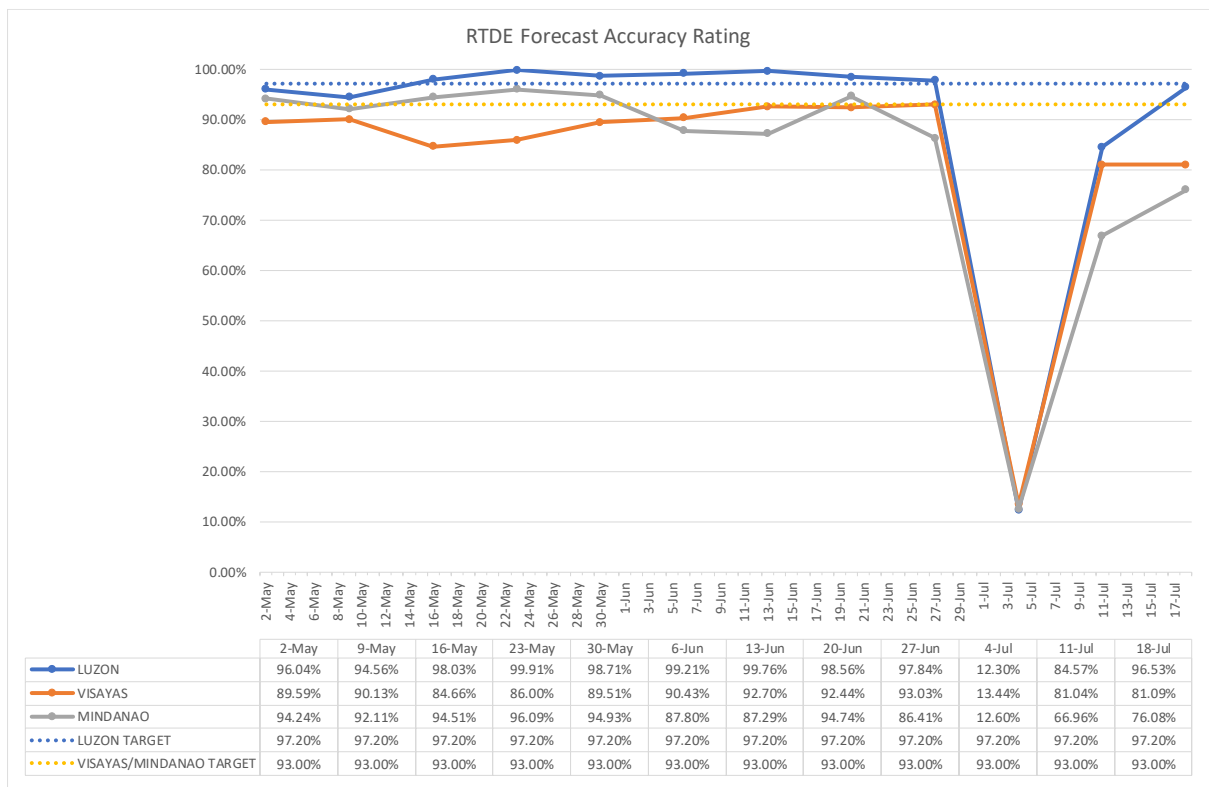
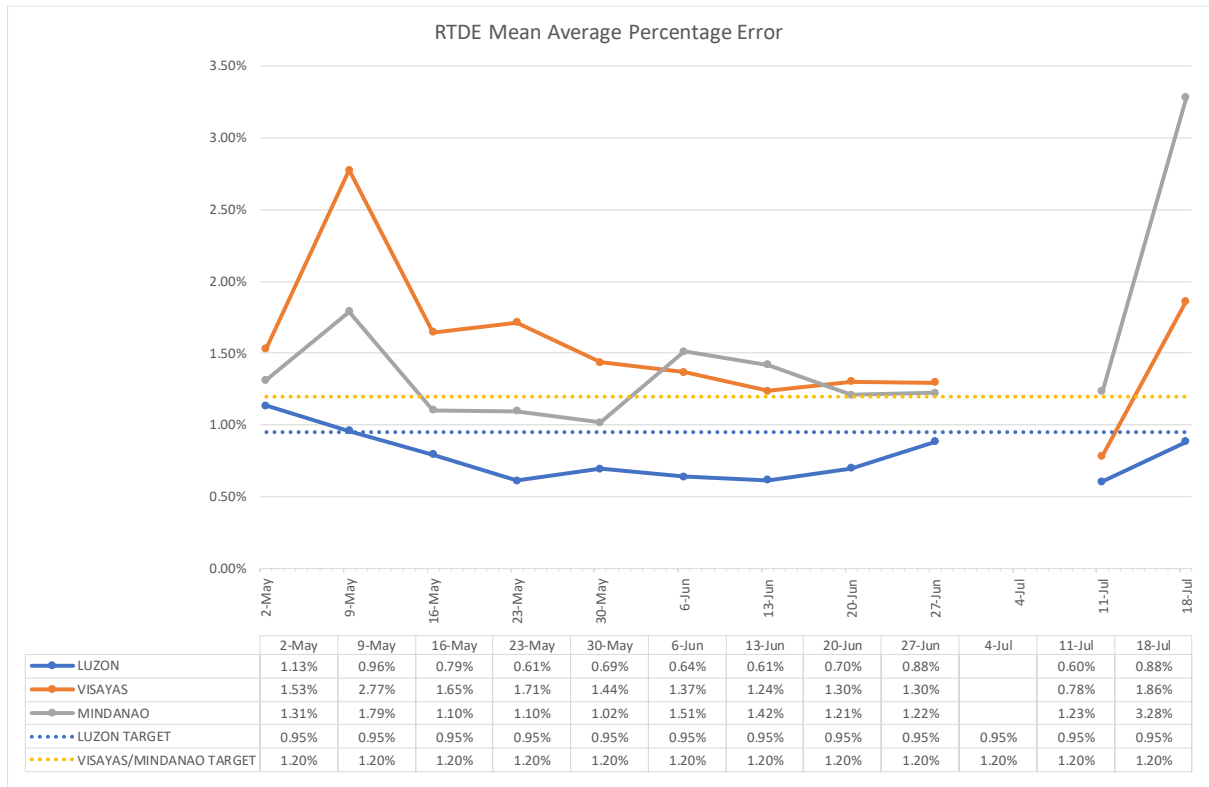
Following a review with IEMOP in the first week of POP, we agreed to remove the performance criteria relating to the DAP MAPE and focus on RTD.

The latest figures are:

- RTD mean absolute percentage error (MAPE) for Mindanao 1.20%
- RTD forecast accuracy rating (FAR) for Mindanao 93%
- DAP MAPE for Mindanao 2.20%

The historic trends are shown in the graphs below:⁴

⁴ No accuracy figures were provided during week 10. IEMOP advises that this was due to their deletion of the historic demand database. We are unsure why this was necessary and what underlying performance issues were masked as a result



In our **Sector readiness assessment – Luzon and Visayas** report we also reported:

Network links and data interfaces between MO and SO infrastructure for the main and back-up sites have been fully established and tested	<ul style="list-style-type: none"> Mindanao SO has not yet transferred any data.
Network links and data interfaces between MO and SO infrastructure for the main and back-up sites have been fully established and tested	<ul style="list-style-type: none"> Offline data has been submitted to MO from Luzon SO and Visayas SO, although HVDC information is still missing from Visayas. Mindanao SO has not yet transferred any data.

Criteria (Systems operations)	
<p>Capability and processes to update off-line data (e.g. security limits, outage, contingency list) to the NMMS is in place</p> <p>i) Business processes in place to consider:</p> <ul style="list-style-type: none"> co-optimised reserve and speed to respond to 5-minute dispatch and emergencies in the setting of security limits, or speed to issue non-optimised dispatch instructions for reserve to respond to 5-minute dispatch and emergencies, with the appropriate setting of security limits for optimal energy dispatch. <p>Security review of the Mindanao power system to assess contingencies and security limits for the start of new WESM rules</p>	<ul style="list-style-type: none"> There have been problems in providing this data during POP from Visayas SO. Luzon and Visayas are now providing regular off-line data except for the HVDC (Visayas). It is critical that the SO is able to assess its ability to securely manage the network under the new rules. Security assessments are proceeding but the reliability of schedules is still an issue. The SO is yet to sign off on its ability to coordinate security. <p>Ancillary service providers to the SO need to either arm/disarm frequency response characteristics or activate/deactivate Automatic Generator Control (AGC) to provide primary or secondary reserve. Currently these services are provided on an hourly dispatch planned a day ahead. Neither the SO nor the generators have tested these facilities for arming/disarming/activating/deactivating every 5 minutes. As such, the market is not ready for 5-minute reserve dispatch. We understand that the SO will not prepare for 5-minute reserve dispatch until the issue of energy/reserve co-optimisation in the Price Determination Methodology (PDM) has been settled.</p>

At the 29 July Mindanao readiness meeting NGCP provided status updates of:

- FTP and ICCP implementation in Mindanao – all FTP meets criteria and data have been configured for both NAIR and eDNA ICCP database. NGCP also report initial test result showed that 5-min RTD can be satisfactorily implemented through AGC.
- Off-line Data Implementation in Mindanao – the SO-MO data interchange programs have been deployed. Several elements are subject to testing with SO and MO, some are still subject to testing by end users with MO.

- RTU and telecom installation – 93% of capacity with RTU and EGs below 5 MW ready to go. 6% have RTU installed but still have some issues. 1% not applicable for RTU installation.
- Post-Dispatch Analysis (Nominations of Distribution Utilities) – identifies the parties engaging in under nomination and overdrawing. Commercial operation of WESM in Mindanao will end this practice.
- WESM metering readiness – Regulatory approvals, documentation, FLOC diagrams and reprogramming of meters from 15min to 5 min is complete. 20% of operational MSP-MMS interface establishment, 30% of meter registration and 20% approval of metering service agreements remain outstanding.

IEMOP also provided update on initial results of the SO security assessment:

- Participation level of generator participants (submission of offers/nomination) affects NMMS market results, which are used by SO in its security assessment

3. Systems and business processes to support the participation in the NMMS have been established and tested

Mindanao market participants have had low engagement to the enhanced WESM during POP. Part of this may be due to political incentives. Political factors may include collection issues with some DUs, free-riding off Ancillary Services through over-nomination and older and smaller plants may be less competitive in a market setting and fear being economically stranded.

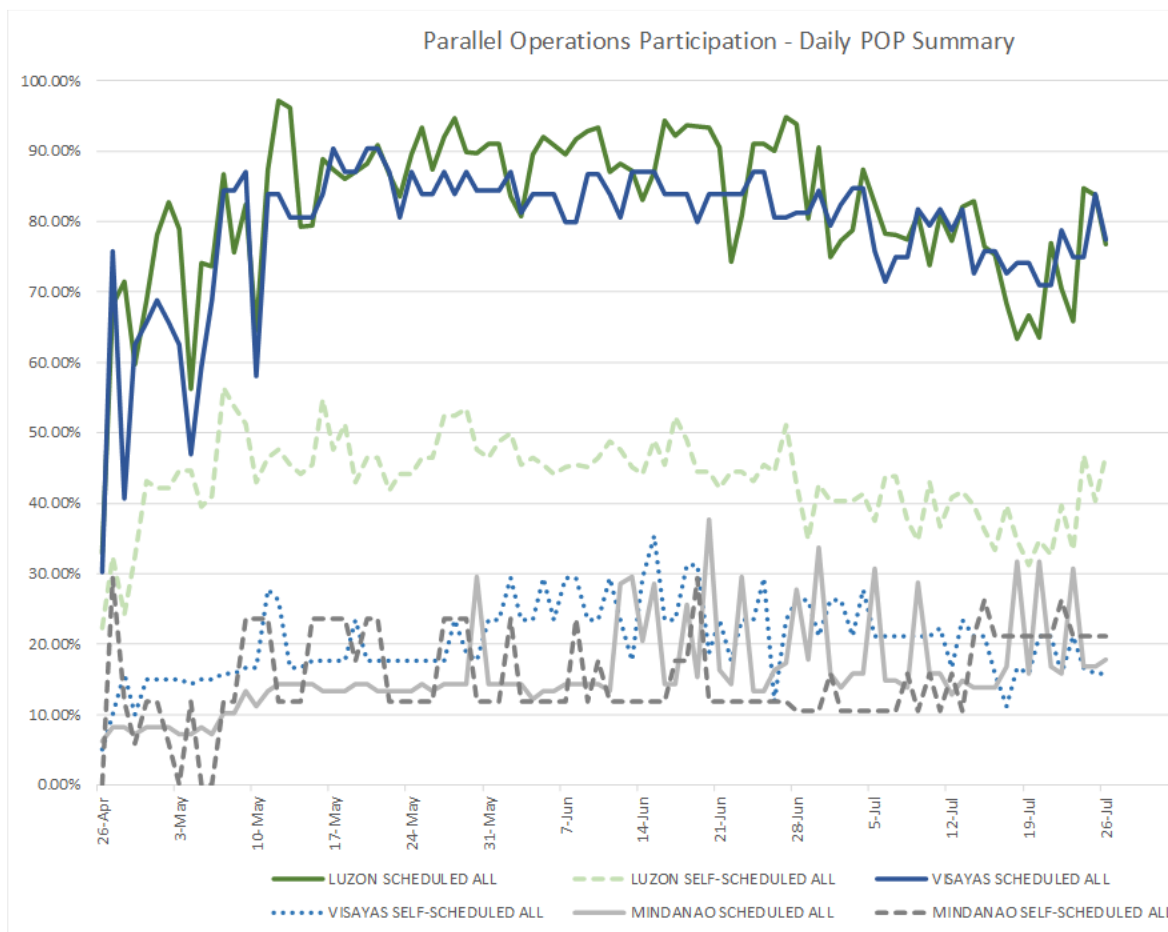
Part of the Mindanao issue has also been due to technical problems associated with the poor state of internet connectivity in Mindanao.

In our **Sector readiness assessment – Luzon and Visayas** report we note

Criteria (PEMC)	POP Performance
Participants have been provided training on new market rule obligations	<ul style="list-style-type: none"> • Compliance to the new 5-minute arrangements were not part of POP (as parallel dispatch was not binding). However, training schedules have been developed to help ensure generators in Luzon, Visayas and Mindanao are aware of their new obligations under the enhanced market design. Planned rollout over August and September is planned as follows: <ul style="list-style-type: none"> ○ Concepts (new rules on compliance monitoring of offered capacity compliance and dispatch conformance standards) ○ Hands-on training on CPEMS (the compliance monitoring and reporting software). • We also note that a 'grace' period will be introduced for the initial post go-live period to assist generators to become fully familiar with how to comply with new arrangements.
Market assessment procedures and tools have been updated accordingly. Plans to manage	<ul style="list-style-type: none"> • In respect of new market monitoring, assessment, and compliance monitoring systems for 5-minute dispatch intervals

<p>additional case load are in place (we would recommend that an initial shift in focus towards participant education be applied while participants become accustomed to new rule compliance obligations)</p>	<p>are in place, and staff have been handling data in MySQL since March.</p> <ul style="list-style-type: none"> • For Market Monitoring and Assessment System this required: <ul style="list-style-type: none"> ○ Real-time Market Monitoring – new development ○ Post-monitoring and analysis – reconfiguration from 1-hour to 5-minute resolution • For Compliance Monitoring: <ul style="list-style-type: none"> ○ Compliance Post-Evaluation Monitoring Systems (CPEMS) – new development. • In the development of the tool (CPEMS), PEMC already considers the new sets of data under the 5-minute dispatch interval regime. • To manage the additional case load, ECO formed a cluster or group of accounts which will be handled by each ECO personnel in charge with the monitoring. • PEMC included in its annual plan a continuing education or orientation regarding the new rules and systems. Particular attention is given to the potential new entrants in the WESM, i.e., Mindanao participants who are most likely not familiar yet with the compliance-related rules. • We also note that a 'grace' period will be introduced for the initial post go-live period to assist generators to become fully familiar with how to comply with new arrangements.
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The chart below shows the level of participation for scheduled and non-scheduled generators in each of Luzon, Visayas and Mindanao. On the basis this is calculated Mindanao scheduled generation appears low but when the capacity of the gensets is taken into account the daily participation is in the 80% to 90% range.



However, it is important to note that a low level of market participation during POP is not necessarily in itself a requirement for market readiness. We have earlier commented on this in our weekly updates to PAC with the following points:

Low levels of participation will

- a) *impede ability for participants to test their readiness;*
- b) *create infeasible aggregate market offers that will require workarounds;*
- c) *not allow true load testing of interfaces and systems; and*
- d) *may be symptomatic of reluctance to participate in live market*

As we noted earlier in this report the majority of generation in Mindanao is being provided by grid connected generators, most of which (by capacity) are also active in Luzon and Visayas and thus will have existing systems and business processes in place.

We understand it is likely that a number of the smaller embedded generators and co-operatives will not have systems and processes in place, and this may present problems for their participation in WESM. That possibility doesn't create a reason for not proceeding with the introduction of the market. If it does turn out that there is some non-participation (for whatever reason) that will be a matter for the DOE to address.

4. Protocols or contracts with service providers are in place

There are two areas of service provider contracting that still need to be fully resolved:

- i. Meter Service Agreements, and
- ii. IEMOP/ System Operator interfaces and data transfer

Based on NGCP's 29 July update, they have completed 80.2% of their Metering Service Agreement (MSA) requirements.

- Load Customers (100%)
- Directly Connected Generating Plants (92.31% 24/26)
- EGs with metering facilities provided by NGCP (78.57% 11/14)
- EGs not yet metered by NGCP with MSA on process (28.57% 4/14)

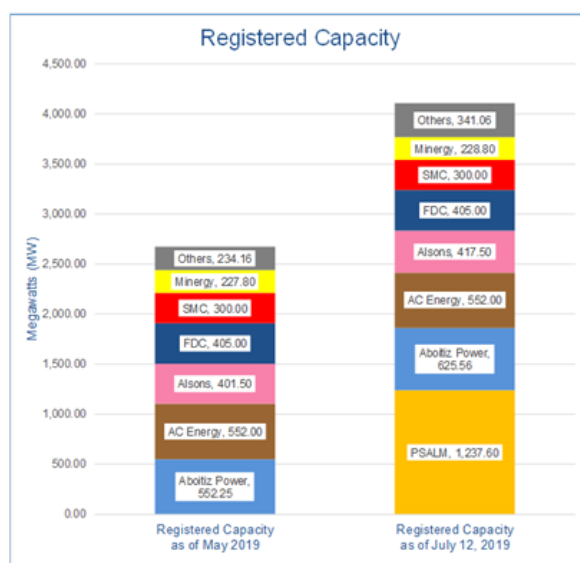
Based on IEMOP's 29 July update the following IEMOP/ System Operator interface issues still need to be resolved:

Issue	Cause	Resolution		Target Date
Unable to meet 100% Completeness due to Market Run Failures	Variances/defects in some software enhancements Performance issues	Deploy fixes to resolve defects and performance issues		End of August 2019
	Non-convergent power flow due to lack of offers	Require TPs to submit standing/working offers in the NMMS		ASAP
SO requested to move provision of schedules 2 minutes before start time	SO needs 2 minutes of processing time once they have received data	Reconfigure market run workflow execution in the NMMS		W1 August 2019
Inaccurate load forecast	Inaccurate load forecast was based on actual data provided via ICCP/SCADA	IEMOP to investigate issue with the Mindanao System Operator		ASAP

5. Market participant registration requirements are complete

Mindanao Registered Capacity (May 2019 & 12 July 2019)

- 54% increase in the total registered capacity in Mindanao since May 2019 from 2,672.71 MW to 4,107.52 MW



From IEMOP's **Weekly Report on the Parallel Operations Program 12 July 2019 – 18 July 2019** (updated to reflect changes presented 29 July 2019 at Iligan City)

5. Market Readiness

5.1. WESM Mindanao Registration Status

Appendix 2 of this report shows the registration status per WESM Mindanao Participant as of 18 July 2019.

Summary of Membership Registration

- In terms of number of participants, 81 of 86 expected participants have submitted their applications for registration.
- Only two (2) three (3) are registered for WESM Membership, namely, the National Grid Corporation of the Philippines (NGCP) and the Power Sector Assets and Liabilities Management Corporation (PSALM), which are already registered in the WESM.
- Three (3) companies were able to submit their complete requirements, namely: (a) GN Power Kauswagan, AP Digos (b) SMC Power, and (c) Therma South Inc. IEMOP is currently performing a registration assessment based on their submitted information.
- The five (5) participants that are expected, but have yet to file their applications are the following:
 - Directly Connected Customers (4): PNOC Exploration Corporation, BUSCO Sugar Milling Company, MENZI Agricultural Corporation, Mindanao State University
 - Electric Cooperatives (1): Lanao del Sur Electric Cooperative, Inc.

Summary of Facility Registration

- In terms of number of facilities, there are 83 of 104 expected facilities that have applied for registration, but these have yet to complete their registration requirements.

6. Market settlement requirements are in place (clearing bank accounts are open, initial prudential requirements have been estimated and met)

We note that very few participants have yet to meet WESM settlement requirements. This is not surprising given that this was not a requirement during POP as commercial operations were not part of this exercise. Due to the cost imposed of providing prudential security it is expected that participants will leave this final step of market registration to the last possible moment. However, once a market start date is communicated with participants it will be necessary for IEMOP to follow-up with all participants to ensure that prudential requirements are met based on their projected consumption.

7. Timely and regular submission of metering-related information in the CRSS successfully tested

NGCP, Mindanao's only wholesale MSP, cannot meet the data submission times specified under the Metering Manuals due to problems with internet connectivity in Mindanao. NGCP has assured us that they can have the metering data submitted to ensure settlement. While the issue with poor internet connectivity is not ideal, our view is that if settlement is secure then the market is ready. A market rule change or derogation may thus be required for Mindanao to allow for this limitation.

Previously set out as unresolved issues that remain live

1 Low or political incentives to engage in enhanced WESM--the launch of the WESM in Mindanao will continue to be frustrated and delayed by political considerations unless clear DOE policy is made and enforced.

- DOE may need to decide between enforcement action or revision of mandatory policy with respect to smaller embedded generators and co-operatives.
- ERC may need to enforce WESM rules to prevent free riding.

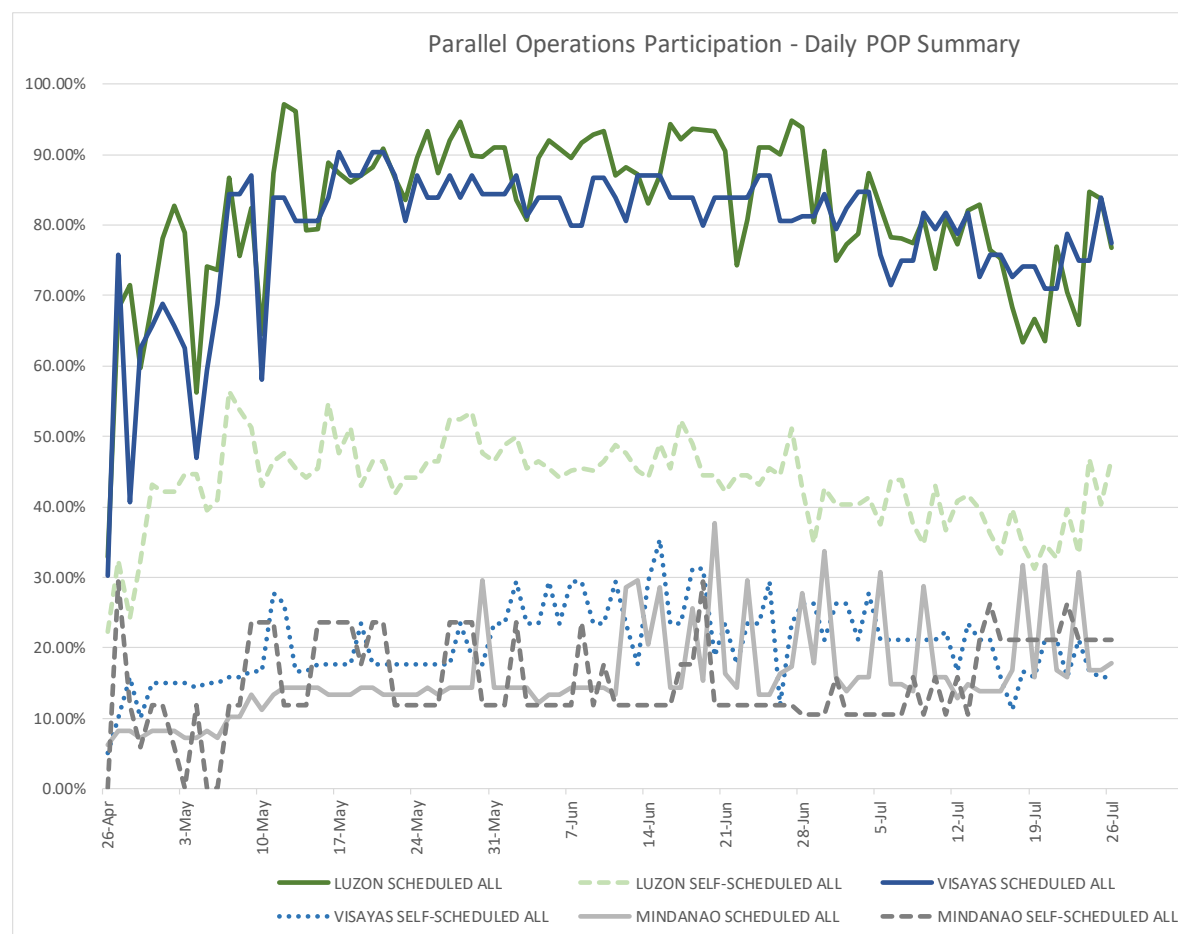
2 We have been unable to establish with clarity whether the internet capability between IEMOP and market participants or between SO and market participants is a hindrance to commencing the WESM in Mindanao. The Mindanao System Operator is quite clear that even if it is the case that offers cannot be submitted from time to time or traders are not necessarily able to see their schedules, they are still able to maintain a secure system in Mindanao.

Appendix A: Mindanao discussion in our 4 July Critical Issues Report

Our assessment of market readiness for the introduction of a market in Mindanao from the 4 July **Market Readiness Assessment – Critical Issues Report** is reproduced here. This workstream focuses on a single critical issue - Mindanao Participation Levels and Registration

Key issues:

- Participation rates during POP have been low for Mindanao as compared with Luzon and Visayas. This is especially the case for Embedded Generation and Co-operatives. This is illustrated below (updated to 26 July).



- Registration rates are also low and not improving quickly
- We suspect the low take up may be more politically motivated than technically motivated. Political factors include:
 - Collection issues with some DUs.
 - Free-riding off Ancillary Services through over-nomination.
 - Older and smaller plants may be less competitive in a market setting and fear of being economically stranded.

- Technical factors for Mindanao include less reliable internet provision.
- A policy decision needs to be made with respect to how best proceed with Mindanao. Options include:
 - continue as is and be prepared to take enforcement action against those participants that fail to register in the WESM, or
 - Relax the mandatory registration of fully contracted embedded generators to avoid additional cost (i.e. transmission charge, wheeling charge, line rental, other administrative costs) upon WESM participation. If this step is believed worthy of consideration it should first be informed by IEMOP and SO considering and advising on any impact on system security and market performance
 - Decouple the start date for Mindanao and make a virtue of the extra time to complete a study of Mindanao specific issues with recommendations as to how these are resolved.
- Regardless of which step is chosen we believe it is appropriate for the WESM to be introduced to prevent the inefficiencies (notably the free-riding issues which have been well documented by NGCP) in that market.
- At this stage we believe that there may be a number of participants who may not wish to join WESM. The move from self-scheduling and self-dispatch to a market where schedules are provided on the basis of price offers and dispatch has to meet the SO schedules will mean that generators lose their autonomy.

Responsible parties to address:

- DOE to decide between enforcement action or revision of mandatory policy with respect to smaller or fully contracted embedded generators and co-operatives.
- ERC to prevent free riding.
- SO & IEMOP to advise on non-mandatory concerns.
- IEMOP to provide more onsite support on market registration and training and to publish minimum internet requirements.
- DOE to make a decision on the start date of Mindanao relative to the current enhanced WESM. This decision should be informed by a plan of what would be done for Mindanao specifically before the Mindanao market goes live.

Impact on market if not addressed:

- The launch of Mindanao will continue to be frustrated and delayed by political considerations unless clear DOE policy is made. Whether the go live date is the same as the enhanced WESM or decoupled and a plan set out DOE should provide clear guidance.

Mindanao participation Workstream

Overview:

Mindanao will be new to WESM and as such there will be a greater stepwise change for participants as compared to Visayas and Luzon. This will necessitate greater support and attention being provided for market readiness.

Workstream Champion:

The workstream champion for this workstream is Mr. Marcial Brummel Jimenez

Beginning Status (1 June 2019):

- The Mindanao readiness group have met 16 times
- Bigger step change – new to WESM (Luzon and Visayas just receiving enhancements)
- Potential Resistance
 - generators moving from self-scheduling and self-dispatch to merit-order based scheduling and dispatch. DUs may be reluctant to part with existing autonomy.
 - market is in oversupply and competitively discovered market prices might not suit all generators.
 - Free riding on AS through over nominations

Updated status (26 June 2019):

- At the end of the second month of POP participation remains stubbornly low for scheduled and unscheduled generators.
- It is unlikely that anything will change in a third month of POP
- The survey from Phase 1 showed
 - Of the survey and market readiness response we got 17 responses covering Mindanao generation out of 23. This includes 11 who solely have generation in Mindanao and 6 who have generation in Mindanao and Luzon or Visayas. The return rate for Mindanao is 65.4%
 - The state of readiness for Mindanao participants includes all of the same issues and conditions as Luzon and Visayas but with the addition of some Mindanao specific issues. These are:
 - The disincentive for some of the DUs with embedded generation to embrace the WESM
 - A level of internet capability that may be less reliable than Luzon and Visayas between both SO and IEMOP and market participants.
 - These issues should be immediately clarified further, and the case made whether to decouple the introduction of the Mindanao market from the introduction of the enhanced market in Luzon and Visayas. This should be done in conjunction with the steering committee so the PEMC board can be properly advised at its meeting on 30 July.

Updated status (3 July following the Steering Committee)

The steering committee considered the case for keeping Mindanao on the same timeline for WESM introduction as for WESM enhancements in Luzon and Visayas.

The case for keeping the start dates aligned is the imperative to introduce the order and efficiencies of the market in Mindanao. The case for decoupling the dates is to allow a bit more time to analyse and address the Mindanao specific issues that have come to the fore during the POP.

On balance it was decided to decouple the start dates with Mindanao to start at least three months after Luzon and Visayas. Sapere will be submitting a separate report on market readiness in Mindanao. We will work with PEMC's Market Assessment Manager Marcial Brummel J. Jimenez and Ira Lee P. Corectico to carry out some analysis of the generators operating in Mindanao. We will test the characteristics of generation in Mindanao and identify how much generation is affected by any of the various issues below. This will enable PEMC to focus on problems that need to be addressed, understand how big those problems are, identify which ones can be addressed in the time before Mindanao goes live and ensure the best chance of successful launch in Mindanao.

Issues List:

The analysis will help put these issues in context, identify who can address each one and separate issues that are not required to be addressed prior to go live:

- DU creditworthiness
- Poor participation especially from the embedded generators
- Internet connectivity – how bad is it and is it a problem holding the market back
- Unsettled transactions
- Registration for the POP low and did not improve as time went by
- Untraceable Energy ("Hulog ng Langit")
- Some embedded generators and co-operatives may be less enthusiastic to join market. The move from self-scheduling and self-dispatch to the structure of a market and SO dispatch will disadvantage some commercially.
- No analysis has been presented to show the scale of any of these issues and what their impact would be on the market if it went ahead
- Now that the start date has been decoupled from Luzon and Visayas and deferred by at least three months there is time to focus on problems that need to be addressed, understand how big those problems are, identify which ones can be addressed in the time before Mindanao goes live and ensure the best chance of successful launch in Mindanao
- Some generators have back up services because they have facilities in Luzon or Visayas, others do not.
- When the Mindanao start date is announced it should be made clear that the date is firm.
- Surveys have revealed that there is still a strong requirement for training in market and settlement software and practices.
- Protracted launch (initially advised for 2017) may have invalidated much of the original training and readiness support provided
- Impact of the Bangsamoro Basic Law (BBL) on the implementation of WESM Mindanao

- Seasonality of Supply considering the dominant share of Hydro Plants
- Network Challenges in peculiar parts of the grid (i.e. low voltage)
- Privatisation of NPC pursuant to EPIRA Section 47
- Prevalence of Manual load dropping even if there is excess capacity

Action Plan:

Actions	Comments	Update as of 18 July
PEMC and DOE to agree on messaging for Mindanao	This is an easy fix, agree a plan and agree consistent messaging	Done. DOE approved proposed Go-Live date for Mindanao (26 January 2020) on 05 July 2019
Analysis the number of generation companies, the number and total capacity of their generation and any other relevant status (for example whether they are operated by a WESM generator or solely Mindanao based).	Sapere is still to submit a report on Mindanao readiness. Sapere and PEMC will work together to do some analysis for the purpose of readiness assessment (Sapere) and action plan (PEMC)	PEMC to provide data to Sapere within the week (refer to slide from Champion)
PEMC to work with SO to establish whether some of the DUs could be allowed to operate autonomously (along the lines of a DSO type arrangement)	PEMC to work with SO to establish whether some of the DUs could be allowed to operate autonomously (along the lines of a DSO type arrangement)	PEMC/TC is conducting a study on the technical issues of embedded generation in Mindanao (3Q 2019 - 2Q 2020); PEMC/TC needs to jumpstart this (participation of embedded generators: either demand response or generation)
Consider other approaches that would lead to WESM being able to be successfully introduced in Mindanao if more time was provided by decoupling the Mindanao launch from Luzon and Visayas.	Consider other approaches that would lead to WESM being able to be successfully introduced in Mindanao if more time was provided by decoupling the Mindanao launch from Luzon and Visayas.	On the registration level, potential registered capacity has increased by 54% (4,107 MW) Updates from the meeting with DOE held on 05 July: > Per SO, the system security concerns will be addressed by the WESM > Per DOE, they are coordinating with DOE/Malacanang to address financial/commercial concerns

Appendix B: Mindanao Survey results

Of the survey and market readiness response we got 17 responses covering Mindanao generation out of 23. This includes 11 who solely have generation in Mindanao and 7 who have generation in Mindanao and Luzon or Visayas. The return rate for Mindanao was 65.4%

The results from the survey around the clumsiness of accessing NMMS, submitting offers and downloading the RTD data for Mindanao were similar to Luzon and Visayas. That may be partially because of those respondents who are also present in Luzon and Visayas. It may also reflect a similar distribution of non-scheduled generators who responded as was the case with Luzon and Visayas.

There are some Mindanao specific issues. However, these were not really expanded on in the survey, but we have been advised of these in face to face meeting with generators including generators operating in both Mindanao and WESM and generators operating solely in Mindanao.

Some Mindanao specific issues cited amongst all generators with plant in Mindanao (i.e. including generators who didn't answer the Mindanao specific questions) are:

- Internet reliability esp. Mindanao.
- Sometimes trouble accessing IP addresses, sometimes access but can't upload
- PDM not approved, Issues with NMMS, CRSS registration ongoing
- Trouble accessing system
- Issues including no resource ID for Mind. Plant

Q: Interfaces to the IEMOP and SO are operational, have been tested and are reliable

- Not yet
- Unstable. There are dates where we have difficulty accessing the IP addresses of IEMOP. On some case, we can access but cannot upload the offer.
- Yes x3
- [For NMMS, there are issues encountered. For CRSS, the registration is on-going](#)

Q: Systems and business processes to support the participation in the NMMS have been established and tested

- *No, there are still registered facility information not yet updated.*
- Not yet. Ongoing development by our Third-party software developer for the deployment of 5-minute dispatch monitoring for power plants.
- Yes x4

Q: Protocols or contracts with service providers are in place

- Yes x3
- Not yet. Ongoing discussions with our Third-party software developers and Internet Service Providers for the deployment of 5-minute dispatch monitoring for power plants.
- ongoing processing of MSA and TSA for WESM registration

Q: Market participant registration requirements are complete

- *No, there are still requirements have not yet obtained.*
- complete
- NO Ongoing processing of MSA required

- Ongoing
- Yes

Q: Market settlement requirements are in place (clearing bank accounts are open, initial prudential requirements have been estimated and met)

- *Depends on customer registration to WESM in Mindanao*
- In place
- initial prudential requirements not estimated or met.
- Do have clearing bank account and on the process of estimating the initial prudential requirements.
- Yes

3. About Sapere

Sapere Research Group is one of the largest expert services firms in Australasia, and a leader in the provision of independent economic, forensic accounting and public policy services. We provide independent expert testimony, strategic advisory services, data analytics and other advice to Australasia's private sector corporate clients, major law firms, government agencies, and regulatory bodies.

'Sapere' comes from Latin (to be wise) and the phrase 'sapere aude' (dare to be wise). The phrase is associated with German philosopher Immanuel Kant, who promoted the use of reason as a tool of thought; an approach that underpins all Sapere's practice groups.

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