



# **PEM Audit Committee 2019 Annual Report**

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**January 2019 to December 2019**

**MARCH 2020**

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



## TABLE OF CONTENTS

<b>I. 2019 ACCOMPLISHMENTS</b>	<b>2</b>
A. Market Readiness Assessment for the Implementation of Enhanced WESM Design and Operations in Luzon And Visayas and WESM in Mindanao	2
A.1. Assessment for Luzon and Visayas	4
A.2. Assessment for Mindanao	8
A.3. Market Readiness Steering Committee	8
B. Software Certification Audit of the New Market Management System (NMMS) including Audit of the Enhancements and Fixes to NMMS and other Market Tools	9
B.1 Software Certification Audit of the New Market Management System	9
B.2. Supplemental Audit of Load Forecasting Module	11
B.3. Supplemental Audit of the Enhancements and Fixes to NMMS and other Market Tools	12
C. Market Operator Performance Standards	13
C.1. Market Operator (MO) Performance Monitoring	13
C.2. Enhanced Market Operator Performance Standards for the Enhanced WESM Operations	13
D. Joint Conduct of 7 <sup>th</sup> Market Operations Audit and 4 <sup>th</sup> Review of Metering Installations and Arrangements	16
E. Other Activities	17
<b>II. COMMITTEE WORK PLAN</b>	<b>17</b>
<b>III. MEMBERSHIP</b>	<b>17</b>
<b>IV. RESPONSIBILITIES</b>	<b>18</b>

## **EXECUTIVE SUMMARY**

In the performance of PAC's responsibilities to make recommendations consistent with efficient and effective systems, software and working processes, the PAC's continuous oversight on the Market Readiness Assessment (MRA) activities for the year 2019 aims to ensure that the New Market Management System (NMMS) components including interfaces with the other systems of the Market Operator (MO) and System Operator (SO), will operate collectively as an integrated system that is reliably ready for the five-minute market.

The MRA 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 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.

As part of MRA, the significant progress on the software certification audit of the NMMS signifies the constant efforts of PEMC and the MO to test the system's functionality and validate its conformance with the WESM Rules and Manuals, and the Price Determination Methodology (PDM). Seven (7) out of eight (8) NMMS components have been duly certified by the end of 2019 while the ongoing audit of the enhancements and fixes is being monitored. The NMMS incorporates the enhancements to the WESM Design and Operations, highlighting the system's improved capabilities, as indicated in the DOE Circular 2015-010-0015.

In 2019, the performance of the MO is monitored and assessed based on the Market Operator Performance Standards (MOPS) that was approved by the DOE on 06 October 2015 to which the over-all rating resulted to Very Satisfactory. The PAC is developing a new set of key performance measures to monitor and assess the MO performance in the forthcoming enhanced WESM operations. The PAC agreed to adapt the principle of a Balanced Scorecard in identifying the key performance measures of the MO.

As the year 2019 has ignited governance activities relating to market revamp, the PAC extends its utmost gratitude to the PEMC and IEMOP, its management and board of directors, the DOE, the ERC, its commissioned external auditors (Intelligent Energy Systems), the Technical Working Group created for the Joint 7<sup>th</sup> Market Operations

Audit and 4<sup>th</sup> Review of Metering Installations and Arrangements and to all the organizations that supported and participated in the events and engagements of the PAC.

The PEM Audit Committee (PAC) submits this Annual Report that covers the activities undertaken and accomplished by the PAC for the year 2019. This report also presents the planned activities of the PAC for the year 2020.

## **I. 2019 ACCOMPLISHMENTS**

### **A. Market Readiness Assessment for the Implementation of Enhanced WESM Design and Operations in Luzon And Visayas and WESM in Mindanao**

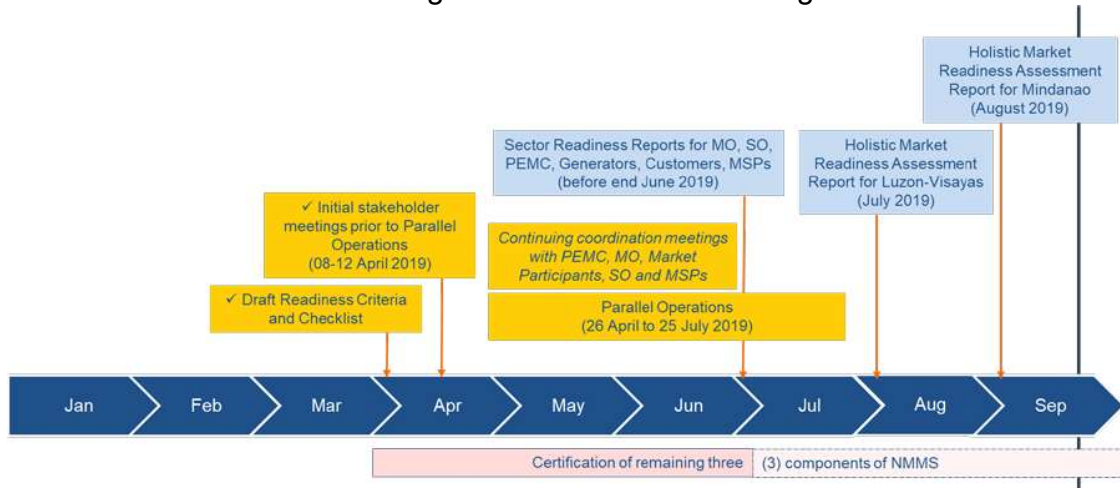
As approved by the PEM Board, the Philippine Electricity Market Corporation (PEMC) engaged the Sapere Research Group Limited (Sapere) to conduct the MRA under the oversight of the PAC. The MRA is being conducted to assess the readiness of the PEMC, Market Operator (MO), System Operator (SO), Metering Services Providers (MSPs) and WESM participants, identify issues for resolution as well as to provide necessary recommendations 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 covered the conduct of a Parallel Operations Program (POP) by the Independent Electricity Market Operator of the Philippines (IEMOP) or the MO, under the supervision of Sapere. The POP enabled the MO, SO, PEMC, and Market Participants to try out for themselves the revised WESM operations, specifically the trading, dispatch, and settlement (i.e. bid to bill) systems and processes with 5-minute dispatch intervals.

The POP tested the operational functionality and interfaces of the new Market Management System (NMMS) and Central Registration and Settlement System (CRSS). That is, it assessed the reliability of the systems from the point of taking up participant bids, creation of dispatch instructions, the publication of prices, and preparation of settlements.

With the results of the POP and consultations with the concerned parties, the MRA also identified issues arising from the corresponding changes in their systems, processes, and paradigms.

Key deliverables of the MRA are the submission of reports by Sapere and the conduct of consultation meetings as shown in the following timeline.



For the period 21 August 2019 to 20 September 2019, MRA activities were focused on the review and approval of the MRA Reports by Sapere.

After the PAC's review and acceptance on 19 August 2019, Sapere submitted the Final MRA Report for Luzon and Visayas on 30 August 2019. A copy was likewise provided to the IEMOP by email, while the PAC submitted the Final Report to the PEM Board and DOE on 04 September 2019. Coincidentally, comments from the National Grid Corporation of the Philippines (NGCP) on the draft version of the Report was received on the same day.

NGCP's comments included their updates on the results of their security assessment for the period 01 to 15 July 2019 and their ongoing coordination with the IEMOP on the MO-SO interfaces through the eDNA and webservices.

On the other hand, the draft MRA Report for Mindanao was submitted by Sapere on 20 August 2019 and was provided to the National Grid Corporation of the Philippines (NGCP) and MO. The PAC presented the MRA Report for Mindanao to the PEM Board on 28 August 2019. After incorporating comments from PEMC, Sapere submitted the Final MRA Report for Mindanao on 09 September 2019, which was accepted by the PAC during its regular meeting on 20 September 2019.

Notably, the PEM Audit Committee provided periodic updates on the MRA to the PEM Board, the DOE and the ERC. The following reports are available in the PEMC website:

- i. 1<sup>st</sup> MRA Report in May 2019;
- ii. 2<sup>nd</sup> MRA Report in June 2019;
- iii. 3<sup>rd</sup> MRA Report in August 2019 including Sapere's Final MRA Report for Luzon and Visayas; and
- iv. 4<sup>th</sup> MRA Report in September 2019 including Sapere's Final MRA Report for Mindanao

#### A.1. Assessment for Luzon and Visayas

Sapere deemed that the market will be ready for the commercial operations of the enhanced WESM design when several key indicators or criteria of readiness are satisfied. These criteria are mapped out in the table below according to the Go-Live Conditions that were also identified by Sapere.

<b>Readiness Criteria that should be Met for the Market to be Ready for Go-Live</b>	<b>Go-Live Condition</b>
ERC approval of Price Determination Methodology (PDM)	Approval of the Price Determination Methodology (PDM)
Ensure that the Market Operator systems are stable and reliable. Several system issues have impacted on the operational performance of the systems, particularly those relating to the CRSS settlement runs and those relating to the DAP market runs. DAP stability and performance either needs to be improved and/or the operational performance targets for DAP relaxed by agreement with PEMC. Dispatch Protocols will need to be aligned also. While we initially noted that DAP timeliness in-itself was not market start critical,	MO systems to demonstrate a sustained period of stability and reliability

<b>Readiness Criteria that should be Met for the Market to be Ready for Go-Live</b>	<b>Go-Live Condition</b>
we remain concerned that the deteriorating trend in timeliness remains undiagnosed.	
Address Market Participant connectivity and constraints in accessing market data through a combination of remedial actions prior to market go-live, and clear post market launch enhancement plans.	Improve Market Participant connectivity and access to data
Follow up training to market participants	
The System Operator has identified concerns with the dispatch schedules and has not signed-off on secure operations under the enhanced WESM	Confirmation of system security following the SO's detailed assessment of the real-time dispatch (RTD), hour-ahead projection (HAP), and day-ahead projection (DAP)
Interface reliability with the SO following: <ul style="list-style-type: none"> <li>• their transfer to new systems (eDNA)</li> <li>• using the new IEMOP web-services</li> <li>• HVDC data is still missing in transfer of off-line data between the SOs and IEMOP</li> </ul>	
Modify CRSS to process 15-minute metering data for those MSP's yet to reprogram their meters Some Market Manuals still require revision and approval by RCC and DOE	Metering Services Providers (MSPs) are able to submit 5-minute meter data (or the MO able to receive 15-minute meter data and convert as a transitional measure)

<b>Readiness Criteria that should be Met for the Market to be Ready for Go-Live</b>	<b>Go-Live Condition</b>
Resolve the conflict between DOE circular DC2018-04-0009 and the market manuals on MSP manipulation of meter data to remove ambiguity and avoid confusion	
Closely connect with the above criterion, forecast Accuracy needs to improve and will require IEMOP to investigate and implement actions to improve RTD MAPE levels for Visayas and Mindanao, and RTD FAR levels for Visayas	Forecast accuracy of the new Market Management System (NMMS) to meet operational targets
Audit and certification of 2 remaining NMMS modules needs to be completed	Confirmation that the audit certification of core NMMS systems remains valid following the subsequent production system changes made by IEMOP (e.g. patches and bug fixes). In its absence, a supplemental audit is conducted, and systems are re-certified

Sapere likewise identified other readiness criteria that the PAC deems should not necessarily hinder the implementation of the enhanced WESM design. These are the following:

<b>Readiness Criteria that should be Met for the Market to be Ready for Go-Live</b>	<b>PAC Comments</b>
Nodal prices correctly reflect marginal costs and adequately model transmission losses	This is an audit finding, which was also found in the current MMS, that is brought about by using a single linear loss equation in the linear programming optimization part of MDOM. The MO committed to continue monitoring the occurrences



<b>Readiness Criteria that should be Met for the Market to be Ready for Go-Live</b>	<b>PAC Comments</b>
	when the modelling of losses affects the optimal dispatch of MDOM.
CRSS Disaster Recovery (DR) process documentation has only been provided by IEMOP for the database, not the other components of the application; it is therefore insufficient to document the failover process	The PAC notes that the IEMOP has acquired certification for Information Security Management System (ISMS), which requires sufficient back-up procedures and process to be in place. While this documentation is important, it is not necessary for the market to commence the enhanced WESM design.
More generally, DR failover documentation should be modified into broader document(s) that includes related IEMOP process (e.g., communication with market participants about IT changes).	
Completed annexes to the Operating Agreement between PEMC and IEMOP—completing the annexes will help to ensure clarity of requirements between PEMC and IEMOP on inter-party services required to enable PEMC to meet its obligations under the new market arrangements (this mainly affects the compliance function).	The PAC notes that this is not a readiness issue. Both PEMC and IEMOP are able to meet their obligations and fulfil their functions under the WESM Rules.
A policy decision on how to proceed with the low levels of Mindanao participation levels and WESM registration	The PAC notes that this is not a readiness issue for Luzon and Visayas, and this is being addressed by the MRSC.

## A.2. Assessment for Mindanao

Sapere deemed that Mindanao will be ready for the commercial operations of the WESM when the Go-Live Conditions identified in their MRA Report for Luzon and Visayas are addressed. Sapere likewise noted issues specific to Mindanao that remained to be completed in order to ensure the effectiveness of the market readiness, as follows:

1. Delays with market registration.
2. Low number of market participants participating in the POP, although a very high capacity was represented in the POP, with a number of Mindanao participants also being active in Luzon and Visayas and are thus familiar with trading in the WESM.
3. Internet connectivity may impact on dispatch and settlement and thus be a limiting factor on the level of efficiencies that can be realized through the new market-based arrangements. However, the advantages of moving to WESM in Mindanao is far more compelling than the risk that the System Operator may have to resort to current dispatch practices if issues arise.
4. Meter Service Agreements and IEMOP/System Operator interfaces and data transfer protocols are not yet fully resolved.

Sapere further identified non-technical issues, such as collection issues, free-riding off Ancillary Services and uneconomical use of inefficient generation units, which may impede the smooth launch of WESM in Mindanao. The PAC notes that the implementation of WESM in Mindanao will provide the mechanisms to address, if not fully resolve, these issues.

## A.3. Market Readiness Steering Committee

As part of MRA activities, the Market Readiness Steering Committee (MRSC) was created composed of champions from various industry stakeholders (i.e. PEMC, IEMOP, SO, Generators), which were designated to the work streams identified by Sapere.

The following work streams were formulated to address and ensure that all the required Go-Live conditions for the 5-minute market are met through action plans and responsibilities allocated for the delivery by each Work Stream

- i. Market Operator (MO) Readiness
- ii. System Operator (SO) Readiness
- iii. Metering Services Providers (MSP) and Customer Readiness
- iv. Mindanao Readiness
- v. Price Determination Methodology
- vi. Reserves
- vii. Generator Readiness
- viii. PEMC Readiness

Periodic updates on these work streams as of 24 September 2019 are also included in the aforementioned PAC MRA Reports which are accessible in the PEMC website.

As of 10 December 2019, MRSC, which is led by PEMC President and members from IEMOP, NGCP, PEMC and PIPPA, has conducted ten (10) meetings with the Work Stream Champions providing updates on their respective action plans.

It is noted that while the PAC oversees the MRA activity, the action plans and activities of the MRSC to address issues arising from the MRA are independent from the PAC.

## **B. Software Certification Audit of the New Market Management System (NMMS) including Audit of the Enhancements and Fixes to NMMS and other Market Tools**

### **B.1 Software Certification Audit of the New Market Management System**

The PAC continued to oversee the completion of the conduct of the NMMS Software Certification Audit. Said project involved the validation and testing of eight (8) NMMS components, the status of which as of 31 December 2019 are provided in the table below:

Component	Status
<b>1. Market Dispatch Optimization Model.</b> Determine if the mathematical algorithms used are mathematically equivalent to the formulation described in the proposed PDM.	Completed on March 2019
<b>2. Market Projections and Real-Time Dispatch Runs.</b> Determine if the processes in executing the Week-Ahead Projection, Day-Ahead Projection, Hour-Ahead Projection, and Real-Time Dispatch conform to the relevant provisions of the proposed WESM Rules and Manuals.	Completed on February 2019
<b>3. Market Participant Interface.</b> Determine if the interface for market participants employ schemes, particularly involving the bid validation rules, that are consistent with the provisions of the proposed WESM Rules and Manuals.	Completed in September 2018
<b>4. Compliance Monitoring.</b> Determine if the process for determining dispatch compliances for energy dispatch and reserve response conform to the proposed dispatch conformance standards that is stated in the relevant WESM Manual.	Completed in August 2019
<b>5. Post-Market Run Calculations.</b> Determine if the applications for the post-processing of real-time spot prices are consistent with the Price Determination Methodology.	Completed in September 2018
<b>6. Load Forecasting.</b> Determine if the applications for determining regional and nodal load forecasts conforms to the objectives of providing accurate net load forecasts as provided for in the WESM Rules.	Completed in November 2019

Component	Status
<b>7. Financial Transmission Rights.</b> Determine if the design intended by PEMC for Financial Transmission Rights are consistent with the relevant business requirements document and design documents of the NMMS Project.	Testing yet to start in view of the prioritization of Supplemental Audits 1 and 2 (see Section B.1 and B2 below)
<b>8. Market Operations Archiving Repository.</b> Determine if the required information are published consistent with the timelines proposed in the relevant provisions of the WESM Rules and Manuals.	Completed in January 2019

The PAC likewise provided oversight on IES' submission of Judicial Affidavit, Audit Reports, and Software Certification on Components No. 1, 2, 4, 6 and 8 that have been audited in 2019, including IES' appearance before the ERC as PEMC's expert witness during the proposed Price Determination Methodology (PDM) hearings on 27 to 29 March 2019, and 04 to 05 December 2019.

## B.2. Supplemental Audit of Load Forecasting Module

The certification of the NMMS-Load Forecasting module was completed and submitted to the ERC on 02 December 2019. IES appeared as expert witness on the NMMS Software Certification Audit during the PDM hearings held on 04 and 05 December 2019. In compliance to the ERC directives to PEMC/IEMOP during the PDM hearing, the PAC extended the certification of the NMMS-Load Forecasting module as follows:

- Re-assessment of the WAP and DAP load forecasts using 3-months' worth of data (26 October 2019 to 25 January 2020) for Luzon and Visayas; and
- Assessment of the RTD, HAP, DAP, WAP load forecasts for Mindanao covering 02 December 2019 to 02 March 2020.

### B.3. Supplemental Audit of the Enhancements and Fixes to NMMS and other Market Tools

In accordance with the provision of the PEM Audit Manual Section 10.2.3 which mandates the PAC to undertake the conduct of pre-deployment tests of new software, the PAC decided to push through with the pre-certification audit of the enhancements and fixes to the NMMS and CRSS, including other tools and modules to be used by the MO in preparation for the enhanced WESM design.

Also, noting the erroneous implementation of the formula for the Net Settlement Surplus (NSS) allocation to participants with WESM transactions during the period 26 May 2018 to 25 May 2019, the PAC deemed it necessary to audit the corrected NSS tool that was implemented for the billing period starting on 26 May 2019 to confirm that the corrections made accurately implement the NSS guidelines under ERC Resolution No. 01 Series of 2018.

On 02 September 2019, PEMC, upon the agreement of the IEMOP and the PAC, provided IES with the Terms of Reference (TOR) for the audit of the enhancements and fixes to the NMMS and CRSS.

On 16 September 2019, the IEMOP inquired the PAC whether the Trading Operations Central Management System (TOCMS), specifically the modules on load forecasting and computation of the Load Distribution Factor (LDF), and the Interim Metering Macro Tools (IMMT), which affect the accuracy of WESM's pricing, scheduling, and settlement process, should undergo pre-certification audit. The PAC deemed that the TOCMS and similar software/tools/applications should be audited prior the Go-Live Date.

The scope of TOR was accordingly revised to include the TOCMS and IMMT in the pre-certification audit. Negotiation between PEMC and IES was held on 02 October 2019, with the supplemental audit contract notarized on 06 December 2019.

As of December 2019, the status of audit of (1) NMMS enhancements and fixes; (2) TOCMS Nodal LDFs and Very Short-Term Load Forecasting; and

(3) Separate Settlements for Mindanao and Settlement Statements is still ongoing.

On the other hand, audit of (1) CRSS modules and enhancements; and (2) Interim Metering Macro Tools and the NSS Tool have been completed with the draft reports already submitted by IES for review.

## C. Market Operator Performance Standards

### C.1. Market Operator (MO) Performance Monitoring

The monitoring of the MO's performance is in accordance with Clause 1.3.2.3 of the WESM Rules and Clause 1.4.2 of the Retail Rules and the Market Operator Performance Standards (MOPS) that was approved by the DOE on 06 October 2015.

The PEM Audit Committee (PAC) reviewed and approved three (3) quarterly status reports and the annual report on the results of the MO Performance Monitoring in 2019. The PAC presented the said reports during the regular meetings of the PEM Board, for approval, as shown in the table below.

<b>Monitoring Period</b>	<b>Covered date</b>	<b>PAC Approval</b>	<b>Presentation to PEM Board</b>
4Q 2018	26 September – 25 December 2018	15 February 2019	27 February 2019
4Q 2018 - 1Q 2019	26 September 2018 – 25 March 2019	17 May 2019	29 May 2019
4Q 2018 - 2Q 2019	26 September 2018 – 25 June 2019	19 August 2019	28 August 2019
Annual 2019	26 September 2018 – 25 September 2019	21 November 2019	27 November 2019

The over-all performance of the MO for the period 26 September to 25 September 2019 is Very Satisfactory.

### C.2. Enhanced Market Operator Performance Standards for the Enhanced WESM Operations

The PAC was tasked to develop a new set of performance measures aimed at monitoring and assessing the performance of the MO under the enhanced WESM operations.

The PAC, through the Market Assessment Group (MAG) started identifying common performance measures by benchmarking MO performance metrics in other jurisdictions. Other electricity markets that were studied include the following:

- i. Australia Energy Market Operator (AEMO),
- ii. Electricity Market Corporation (EMC),
- iii. Korea Power Exchange (KPX),
- iv. New Zealand's Exchange (NZX),
- v. PJM Interconnection (PJM),
- vi. Midwest Independent Transmission System Operator (MISO),
- vii. New York Independent System Operator (NYISO),
- viii. California Independent System Operator Corporation (CAISO),
- ix. ISO New England (ISO-NE) and Southwest Power Pool (SPP).

The PAC agreed to adapt the principle of a Balanced Scorecard in identifying the key performance measures of the MO. The Balanced Scorecard translates mission statement of an organization into specific measures looking at four perspectives namely: customer, internal business, innovation and learning, and financial.

The customer perspective focuses on how the customers or stakeholders see the organization, particularly their satisfaction on services provided by the organization. The internal business perspective covers the key business processes that have greatest impact on customer satisfaction, focusing on timeliness, accuracy and cost of services provided. The innovation perspective refers to the ability to innovate with the end view of improving efficiency in operation. The financial perspective focuses on financial measures relating to profitability, growth and stakeholder value.

As of December 2019, the PAC have initially identified strategic measures with the greatest impact to market operations and stakeholders as shown in the table below.

<b>Perspective</b>	<b>Performance Measure</b>	<b>Description</b>
Stakeholder	Stakeholder Satisfaction on Over-all MO Performance	Satisfaction of the stakeholders on the over-all



Perspective	Performance Measure	Description
		performance of the MO in delivering its market and support services. This would be based on net satisfaction survey.
	Stakeholder Satisfaction on Response to and Resolution of Queries, Data Requests and Complaints	Satisfaction of the stakeholders on the response to and resolution of queries, data requests and complaints by the MO
Internal Business	Final Settlement Accuracy	Frequency or the number of Adjustments in the final settlement calculations.
	RTD Forecast Accuracy – Mean Absolute Percentage Error (MAPE)	MAPE measures how far is the forecasted demand compared to the actual demand. Lower value of MAPE implies higher Forecast Accuracy.
	RTD Forecast Accuracy – Forecast Error Rate (FER)	FER measures the number of intervals wherein the forecast exceeds a tolerance level.
Innovation	New Market Management System Market Participant Interface (NMMS MPI) Availability	Total number of hours that the NMMS MPI is available against the total number of hours in a year
	Central Registration and Settlement System User Interface (CRSS UI) Availability	Total number of hours that the CRSS UI is available against the total number of hours in a year
	Market Intervention Attributable to MO	Number of trading intervals affected by the market interventions caused by to the MO

Perspective	Performance Measure	Description
Financial	Collection Efficiency	Collection efficiency in terms of the payments received or drawn from the prudential security by the MO for a particular billing period against the total amount receivable from the market participants
	Budget Utilization	Utilization of the MO's approved budget in a year

#### **D. Joint Conduct of 7<sup>th</sup> Market Operations Audit and 4<sup>th</sup> Review of Metering Installations and Arrangements**

In fulfilment of its mandate under Sections 3.1 and 11.2.2 of the PEM Audit Manual, which states that it has to conduct, on his own or through an appointment of auditor, and to coordinate and supervise effective and independent audits of the operation of the spot market and of the Market Operator and to review the security arrangements and requirements of metering installations, in order to reinforce Trading Participants' confidence in the transparency and adequacy of the operation of the WESM, the PAC has secured the PEM Board's approval, during the 30 October 2019 board meeting, of the following:

- i. Proposed Joint Conduct of the 7th Market Operations Audit and 4th Review of Metering Installations and Arrangements;
- ii. Terms of Reference;
- iii. Engagement of a Third Party Auditor through a Competitive Selection Process; and
- iv. Creation of Technical Working Group

The PEM Audit Committee (PAC) has commenced with the preparatory activities for the selection of the Third-Party Auditor thru the following:

<b>Activity</b>	<b>Date</b>
Publication of Request for Expression of Interest (EOI)	08 November 2019
Receipt of EOI	28 November 2019
Shortlisting of Eligible Bidders	06 December 2019

## **E. Other Activities**

The PEM Audit Committee actively participated in the PEMC Corporate Strategic Planning Workshop for CY2020 held on 19 September 2019. Correspondingly, PAC updated its Work Plan for 2019-2021 to reflect the directions agreed upon during the PEMC Strategic Planning.

## **II. COMMITTEE WORK PLAN**

Annex A provides details of the PEM Audit Committee's program of activities as updated for 2020 consistent with the PEMC's Corporate Strategic Plan which was approved by the PEM Board on 25 March 2020.

## **III. MEMBERSHIP**

The PEM Audit Committee is currently composed of the following experts in the fields of risk and financial management, information technology, and information systems:

Chairperson :	Prof. Felixberto U. Bustos, Jr.
Members :	Mr. Eduardo Alejandro O. Santos
	Engr. Christian M. Orias

Prof. Bustos was appointed as member of the PEM Audit Committee on 27 April 2007 and was designated as the Chairperson. He was then re-appointed as PAC Chairperson on 30 August 2018. Mr. Santos and Engr. Orias have been appointed to the PAC as members since September 2011 and were re-appointed as PAC members on 30 August 2018.

As its primary support unit, the Market Assessment Group (MAG) provides both technical as well as administrative support to the PAC in performing its functions and obligations under the WESM Rules and applicable WESM Manuals.

#### **IV. RESPONSIBILITIES**

Pursuant to WESM Rules Clause 1.5.2, the responsibilities of the PEM Auditor<sup>1</sup> are as follows:

- a. Conduct annual audits of the Market Operator and the settlement system and any other procedures, persons, systems or other matters relevant to the spot market;
- b. Test and check any new items or versions of software provided by the Market Operator for use by WESM members;
- c. Review any procedures and practices which are covered by the WESM Rules at the direction of the PEM Board;
- d. Recommend changes to the WESM Rules where the PEM Auditor detects deficiencies as a consequence of an audit, review, test, check or other form of review; and
- e. Publish on the market information website the results of any findings and recommendations under WESM Rules 1.5.1.

The PEM Auditor's main responsibility is summarized in the PEM Audit Market Manual Section 3.1, which states that it has to conduct, on his own or through an appointment of auditor, and to coordinate and supervise effective and independent audits of the operation of the spot market and of the Market Operator, in order to reinforce Trading Participants' confidence in the transparency and adequacy of the operation of the WESM.

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<sup>1</sup> Pursuant to the Guidelines Governing the Constitution of PEM Committees, the PEM Auditor was already changed to constitute as PEM Audit Committee (PAC). The WESM Rules, PEM Audit Market Manual Issue 2.0 and Retail Market Manual are currently being revised in harmony with the existing guidelines.

Moreover, Section 11.2.2 of the same manual provides that the PEM Auditor shall review the security arrangements and requirements of metering installations.

The monitoring of the MO's performance is in accordance with Clause 1.3.2.3 of the WESM Rules and Clause 1.4.2 of the Retail Rules and the Market Operator Performance Standards (MOPS) that was approved by the DOE on 06 October 2015. Currently, the PAC provides oversight and approval of the MOP Monitoring results prior to endorsement to the DOE.

Submitted By:

**THE PEM AUDIT COMMITTEE**

(signed)

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Felixberto U. Bustos, Jr.  
Chairperson

(signed)

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Eduardo Alejandro O. Santos  
Member

(signed)

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Christian M. Orias  
Member