



Terms of Reference for the Audit of the Market Operations and Market Monitoring and Assessment

26 December 2019 to 25 December 2021

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This document is prepared by the
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Market Assessment Group for the
PEM Audit Committee

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1.0 REQUIREMENT

Engagement of the services of a third-party expert to conduct the following:

- a. Independent audit of the:
 - i. Wholesale Electricity Spot Market (WESM) operations and the Market Operator;
 - ii. Retail Competition and Open Access (RCOA) and the Central Registration Body (CRB); and
- b. Governance Arm's Market Monitoring and Assessment review.

2.0 BACKGROUND

2.1 The WESM

- 2.1.1 The Electric Power Industry Reform Act of 2001 (EPIRA) mandates the establishment of the Wholesale Electricity Spot Market (WESM) that will facilitate a competitive market environment in the Philippine electricity industry. Pursuant to the EPIRA, the Department of Energy (DOE) and the electric power industry participants are mandated to jointly formulate the detailed rules governing the operations of the WESM. On 28 June 2002, the DOE, upon the joint endorsement of the electric power industry participants, promulgated the WESM Rules through DOE Department Circular No. 2002-06-003.
- 2.1.2 After several months of trial operations, the WESM commercial operations commenced in Luzon on 26 June 2006. Four years into the commercial operations in Luzon, the Visayas grid was integrated into the WESM and commenced commercial operations on 26 December 2010.
- 2.1.3 Governed by the WESM Rules, the WESM is a venue for trading electricity as a commodity. It serves as a clearing house to reflect the economic value of electricity as indicated by the spot price. The WESM uses the concept of a gross pool market where all electricity output of the generators is centrally coordinated for scheduling and dispatch. Generators, as well as buyers of bulk electricity, compete for a share of this pool to be dispatched and scheduled to meet the electricity demand in real time. The members of the WESM include Generation Companies, Customers, Trading Participants, Network Service Providers, and Metering Services Providers.
- 2.1.4 With respect to policy and regulatory oversight over the WESM, such functions are carried out by the DOE and the Energy Regulatory Commission (ERC). The functions of the DOE involve the formulation of the country's overall energy policy, the development and improvement of the WESM design, as well as the promulgation of the WESM Rules and Manuals, including changes thereto.

- 2.1.5 On the other hand, the ERC enforces the provisions of the EPIRA and its implementing rules and regulations, and has investigative and quasi-judicial powers over any market participant for violations of the EPIRA, its implementing rules and regulations, and the WESM Rules. The ERC also approves, among others, the market fees being collected by the market operator from the market participants to recover the cost of administering and operating the WESM.
- 2.1.6 On 25 June 2021, DOE issued Department Circular No. 2021-06-0015 declaring the commercial operations of the Enhanced WESM Design and Operations (EWDO) effective 26 June 2021 (“Commercial Operation Date”) in Luzon and Visayas. The enhancements include removal of Pmin constrain in the MDOM, shorter trading and dispatch interval of five (5)-minute, ex-ante pricing only, and automated pricing corrections, among others.

2.2 Retail Competition and Open Access (RCOA)

- 2.2.1 Section 31 of the EPIRA mandates the implementation of RCOA not later than three (3) years upon the effectivity of the law. Following the certification by the ERC that the conditions for the implementation of RCOA as stated in the EPIRA have already been met, the RCOA operations started commercially on 26 June 2013.
- 2.2.2 Subsequently, the DOE issued Department Circular No. 2013-01-0002 promulgating the Retail Rules for the Integration of RCOA in the WESM (Retail Rules).
- 2.2.3 On 19 June 2015, the DOE issued Department Circular No. DC2015-06-0010 which provides for policies for the full implementation of the RCOA. To implement the DOE policy on RCOA, ERC adopted the 2016 Rules Governing the Issuance of Licenses to Retail Electricity Suppliers and Prescribing the Requirements and Conditions Therefor and the Revised Rules for Contestability in 2016.
- 2.2.4 Thereafter, the DOE issued Department Circular No. DC2017-12-0013 and Department Circular No. DC2017-12-0014 which superseded the DOE’s earlier issuance, particularly Department Circular No. DC2015-06-0010. Among others, the latter issuances allowed the voluntary participation of end users that meet the threshold provided into the contestable market, and allowed distribution utilities to supply contestable customers within its franchise area.
- 2.2.5 In 2019, the DOE also issued Department Circular No. DC2019-07-0011 which lifted the mandatory requirement for contestable customers in the WESM and allowed their voluntary participation in the WESM.
- 2.2.6 More recently, the DOE issued Department Circular No. DC2021-06-0012 which approved amendments to the WESM Rules and its Market Manuals to promote participation in retail competition.

2.3 The Market Operator and the Governance Arm

- 2.3.1 Section 30 of the EPIRA provides, among others, DOE will constitute an autonomous group, with equitable representation from electric power industry participants, to act as the Market Operator. On November 2003, the DOE constituted the Philippine Electricity Market Corporation (PEMC), a non-stock and non-profit organization, to operate the WESM.
- 2.3.2 PEMC was designated as the Central Registration Body (CRB) and settlement agent for the RCOA implementation by virtue of DOE Department Circular No. 2012-02-0002 upon the recommendation of the RCOA Steering Committee¹, which is headed by the DOE and composed of key industry players. Thereafter, DOE issued its Department Circular No. 2019-07-011² dated 29 July 2019 which designated the independent market operator as the CRB, thus amending provisions of Department Circular No. 2012-02-0002 designating PEMC as the CRB³.
- 2.3.3 On 18 January 2018, DOE issued the Department Circular No. 2018-01-0002 which endorses and sets out the guidelines on the transition to an independent market operator. Independent Electricity Market Operator of the Philippines (IEMOP) assumed the market operations functions of the WESM on 26 September 2018. PEMC retains its role as the WESM governing entity. PEMC thereafter entered into an Operating Agreement with the IEMOP last 19 September 2018 which details the transfer of the market operator functions, among others. For purposes hereof, PEMC and IEMOP shall be hereinafter alternatively referred to as “Governance Arm” and “Market Operator”, respectively.
- 2.3.4 Upon assuming market operations on 26 September 2018, IEMOP likewise assumed the functions of the CRB for the RCOA.

2.4 Basis for the Audit

- 2.4.1 The PEM Board established the PEM Audit Committee under the WESM Rules, which is mandated, on its own or through appointment of external auditors, to conduct, coordinate and supervise effective and independent audits of the operations of the market and of the Market Operator in order to reinforce Trading Participants’ confidence in the transparency and adequacy of WESM operations. This mandate is provided under Clause 1.5 of the WESM Rules, as amended, and under Section 3.1 of the PEM Audit Market Manual.
- 2.4.2 Under Retail Rules 1.4.3, the PEM Audit Committee is mandated to conduct the audit of the CRB and the systems, processes and procedures and other matters relevant to its operations and the performance of its functions as set forth in the Retail Rules and test and check any new items or new versions of market-related software used or provided by it for use by WESM members.

¹ RCOA Steering Committee Resolution No. 2012-02 dated 02 January 2012.

² “Amending Various Issuances on the Implementation of the Retail Competition and Open Access”.

³ See Section 3 of DOE Circular No. 2019-07-011.

- 2.4.3 Under WESM Rules Clause 1.5.2.a, the PEM Audit Committee shall likewise conduct audit on any other procedures, persons, systems or other matters relevant to the spot market.
- 2.4.4 To ensure sufficient and adequate expertise, the services of independent persons, teams or companies, who shall act as the External Auditor, will be engaged for the said audit, in accordance with Section 3.2.2 of the PEM Audit Manual.

2.5 Objective of the Audit

- 2.5.1 Independent audit of WESM/RCOA operations and Market Operator/CRB - the general objectives of the audit are to:
- a) Review and assess the compliance of the Market Operator/CRB with the WESM Rules, Retail Rules and Market Manuals;
 - b) Review and assess adequacy of the procedures and working processes of the Market Operator/CRB;
 - c) Review and assess the usefulness and appropriateness of settlement systems and data management used by the Market Operator /CRB to administer the WESM/RCOA;
 - d) Review and assess the usefulness and appropriateness of the interfaces and exchange of information of the Market Operator with the System Operator (SO), Metering Service Provider (MSP) and other service providers in relation to generation scheduling, constraints, dispatch, prices and settlement, metering and registration;
 - e) Review and assess the appropriateness of actions taken by the Market Operator to address previous audit findings;
 - f) Review and assess Market Operator's performance in line with standards established by the DOE and recommend improvements in the said standards; and
 - g) Identify room for improvement in the current systems and processes with the view to enhance the competitive level and further the efficiency in the operations of the WESM and implementing the RCOA.
- 2.5.2 Review of Market Monitoring and Assessment – the general objective is to review and assess adequacy of the procedures and working processes used by the Governance Arm in market monitoring and assessment and performance monitoring of the Market Operator.

2.6 Applicable Rules

The following shall guide the External Auditor in the conduct of the audit:

- a) WESM Rules and its Market Manuals;
- b) Retail Rules and its Market Manuals;

- c) Market Operations Performance Standards approved by the DOE; and
- d) Relevant Circulars, Orders and other Issuances or directives of the DOE and ERC.

3.0 AUDIT SCOPE

3.1 Period Covered

This audit shall cover the period 26 December 2019 to 25 June 2021 under the one-hour market and 26 June to 25 December 2021 under the EWDO.

3.2 Auditees

- 3.2.1 Market Operator/CRB for WESM operations and RCOA; and
- 3.2.2 Governance Arm for market monitoring and assessment and performance monitoring of the Market Operator.

3.3 Scope of Work

3.3.1 Market Operations Audit

Task 1.1 – Market Software and Systems Review

This task shall cover the review of the significant changes to the market operations systems, tools and programs introduced during the covered period and its conformance to the Information and Communications Technology Change Management Process (ICMP) of the Market Operator. Refer to “**Annex A**” of this document for the list of market software and systems to be covered in this task.

This task shall also include review of the reliability of communication link and interfaces of the Market Operator with the SO, MSP and other service providers in relation to registration, generation scheduling, constraints, dispatch, prices and settlement, and metering.

Task 1.2 – Process and Compliance Review

This task includes the following:

- a) Review the Market Operator's compliance with its obligations in the WESM Rules, Retail Rules, Market Manuals, relevant Circulars, Orders and other Issuances of the DOE and ERC and existing Internal Business Procedures (IBP);
- b) Review consistency of the corresponding Market Operator's IBP under the one-hour market and the EWDO with the relevant WESM Rules, Retail Rules, Market Manuals, relevant Circulars, Orders and other Issuances of the DOE and ERC.

Task 1.3 – Bid-to-Bill Analysis

This task includes the conduct of chronological testing of the market processes under the one-hour market and EWDO from the trading participants' registration, submission of offers up to invoicing and payment by the Market Operator. The number of sample trading intervals shall be agreed upon by the PEM Audit Committee and the External Auditor.

This task shall likewise include other relevant Market Operator activities that are covered by the specific requirements under the WESM Rules, Manuals and other relevant Protocols, such as participant suspension and de-registration, market suspension, intervention, pricing error, price substitution methodology (PSM) implementation for congestion and application of secondary price.

3.3.2 Market Monitoring and Assessment Review

Task 2.1 Procedures/Process and Compliance Review

- a. Review Governance Arm's working processes and procedures for the market monitoring and assessment, for both one-hour market and EWDO, to ensure consistency with the WESM Rules, Retail Rules, Market Manuals, relevant Circulars, Orders and other Issuances of the DOE and ERC; and
- b. Validate the Market Operator Performance Standards (MOPS) Report approved during the audit period;

3.4 Exclusion

The following areas shall be excluded in the scope of work:

- a) Legal process; and
- b) Budget and planning.

Further, the work papers of the Auditor of the Market Operator and Governance Arm for ISO 27001 and ISO 9001 surveillance, cannot be made available to the External Auditor. Hence, the External Auditor shall formulate its own audit approach to review the quality management and information security posture of the Market Operator and Governance Arm.

3.5 Materiality

- 3.5.1 The materiality levels for the tests of transactions and significant findings shall be set and disclosed by the External Auditor, for comments of the party to be audited and subject to review and approval of the PEM Audit Committee.
- 3.5.2 Upon the discretion of the External Auditor and review of the PEM Audit Committee, other thresholds may be adopted for the reporting of significant issues identified during the course of the review, although it is recognized that there may be qualitative aspects in determining the significance of any issue. That is, the External Auditor shall report and evaluate the impact of the issues that come to its attention that exceed these significant issues threshold, or that it believes to be significant for other reason.

4.0 PROPOSED ARRANGEMENTS

4.1 Project Schedule

- 4.1.1 The audit is expected to commence upon receipt of the Notice to Proceed issued by the PEM Audit Committee through the Governance Arm. It is deemed completed upon the issuance of the Certificate of Completion by the PEM Audit Committee.
- 4.1.2 Below are the details of the activities to be conducted for the completion of the project with the corresponding tentative schedules.

No.	Activity	Tentative Schedule
1	Kickoff Meeting (projected to be conducted immediately upon issuance of Notice to Proceed)	Week 1 of May 2022
2	Consultation and/or Coordination Meetings with the Parties to be audited	Week 2 – 3 of May 2022
3	Submission of Inception Report and Start of the Audit	Week 1 of June 2022
4	Submission of Draft Audit Reports and Software Certificates	October 2022
5	Submission of Final Audit Reports and Software Certificates	November 2022
6	Reporting to the PAC, PEM Board, DOE and ERC	December 2022
7	Meetings with the PEM Audit Committee and/or concerned process owners	As needed

4.2 Deliverables

- 4.2.1 The External Auditor shall submit two (2) copies each of the original and soft copy files of the reports which include the following:
- a) Inception Report – It shall contain the External Auditor’s Audit Plan, Methodology and Work Program. This shall confirm the audit scope and outline the audit approach, including the audit process, schedule of proposed client interaction during the duration of audit work, among others, which shall be finalized together with the External Auditor and PEM Audit Committee, in consultation with the parties to be audited.

The External Auditor shall also conduct a workshop on the audit process and audit approach.

- b) Progress Report – It shall highlight the status and relevant developments of the audit activities.

The Progress Report shall provide the following:

- i. Initial findings for the period covered by the Progress Report, including the recommendation and the target date that the responsible audited party will address the finding;
 - ii. Updates on the initial findings reported in the prior Progress Report; and
 - iii. Status of Audit Activities.
- c) Significant Issues Report – It shall include findings that have material impact to the market and/or findings that need to be addressed immediately, if any. The Auditor shall provide best practice recommendations based on other competitive electricity markets to address the significant issue.
- d) Draft Audit Report – It shall contain the details of the findings, recommendations and action plans with corresponding timetables, the details of which shall be discussed by the External Auditor with the PEM Audit Committee, concerned auditees and other relevant entities as determined by the PEM Audit Committee.

Before the Draft Audit Report is finalized, the External Auditor shall give the concerned process owners the opportunity to comment on the draft audit report and meet with the External Auditor to discuss the findings, if necessary.

- e) Final Audit Reports – A final report for each of the work areas shall be submitted, containing the following:
- i. Audit methodology;
 - ii. Main findings, including, but not limited to audit results of the specific tasks conducted under the scope of work; and identified non-compliance to the WESM and Retail Rules and Manuals and other applicable rules including the level of materiality as set by the Auditor;
 - iii. Recommendations, such as possible ways to improve the WESM and RCOA Rules, operating procedures, control objectives, specific controls, practices and processes in order to address non-compliance or provide best practices; and
 - iv. Response/ Comments by the Auditees relative to the findings and recommendations of the External Auditor.

Software Certificates – For the Market Operations Audit, the External Auditor shall issue Audit Certificate/s, as applicable, which will confirm that all programs and software, including in-house developed, are compliant with the Market Rules and Manuals

The Final Audit Report shall have public version which does not contain any confidential data and shall be published in the Market Information Website.

Two (2) hard copies of the final audit report and software certificates shall be submitted by the External Auditor together with the soft copy.

4.2.2 The External Auditor shall present its findings to the PEM Audit Committee, PEM Board, ERC and DOE. The Final Report will be made available to the PEM Audit Committee, PEM Board, ERC, DOE and to the Auditees.

4.2.3 The table below provides for the tentative schedule for the submission of the above-mentioned reports and reporting:

No.	Deliverables	Tentative Schedule
1	Inception Report	Within 25 calendar days from the receipt date of the Notice to Proceed
2	Progress Reports	Every month from the receipt date of the Notice to Proceed
3	Significant Issues Report/s	As needed, to be submitted thru email within 5 calendar days upon discovery
4	Draft Audit Report including Software Certificates	October 2022
5	Final Audit Report including Software Certificates	November 2022
6	Reporting to PEM Board, ERC and DOE	December 2022

4.3 Qualifications of External Auditor/ External Auditor Team Members

4.3.1 The External Auditor's Audit Team shall be composed of competent audit professionals that have adequate experience and capability of understanding the business, information technology (IT), controls and processes that are adopted by similar electricity markets which are applicable to the WESM, RCOA and Market Governance.

4.3.2 The team shall have the following qualifications:

- a) The Team Leader (Key Auditor) shall have project management skills;
- b) The members of the Audit Team shall include, but are not limited to, the following:
 - i. Audit expert (operations and financial);
 - ii. Information and communications technology expert;
 - iii. Electricity market operations expert;

- iv. Regulatory expert (Legal, Finance, Economics);
- c) At least one of the members of the External Audit Team shall have at least one of the following qualifications, or their equivalent:
 - i. Certified Information Systems Auditor (CISA);
 - ii. Certified Information Systems Security Professional (CISSP);
 - iii. ISO 27001 Auditor Certification for Information Security Management Systems (ISMS); and
 - iv. Certified Internal Auditor (CIA);
- d) The project is open for local and foreign auditing firms. Joint venture partnership is allowed.

4.4 Interface between the External Auditor, the Auditees and PEM Audit Committee

4.4.1 The External Auditor shall report to the PEM Audit Committee for the duration of the audit.

4.4.2 All activities of the External Auditor shall be accordingly coordinated with the PEM Audit Committee, through the PAC Secretariat. The PAC Secretariat shall provide linkages between the PEM Audit Committee, the External Auditor, and the Auditees. It shall extend all reasonable support to the External Auditor for the duration of its services, which support shall include, among others:

- a) Facilitate technical assistance of Auditees;
- b) Provide necessary office space, internet access, access pass, etc.;
- c) Facilitate access to all data and information for the implementation of the audit, including the access to the use of Auditees' software; and
- d) Arrange meetings with the PEM Audit Committee and Auditees' to discuss issues and concerns pertaining to the conduct of the review.

5.0 ANNEX A – CHANGES TO MARKET SYSTEMS, TOOLS, AND PROGRAMS FOR THE COVERED PERIOD

No	IT System Name	Description	Basis for Change	Effective Date	Change Impact
1	Accounts Management System Instance for WESM Mindanao	Implementation of an instance of the AMS for WESM Mindanao which is 'distinct' separate from the AMS instance for the Luzon and Visayas WESM	RFC-2103-02 DOE DC No. 2018-05-0017 dated 26 Jun 2018	Testing completed on 31 Mar 2021 Awaiting final Go-Live data, pending the Go-Live of WESM Mindanao	<ul style="list-style-type: none"> • 'Configuration' change will create separate instance of AMS that is dedicated to WESM Mindanao. • System limitation of the current AMS prevent the integration of WESM Mindanao to the current processes of Luzon-Visayas WESM • Separate instance with its own ID/Number format for WESM bills, journal vouchers and other reports will be created to handle WESM Mindanao functions • This will utilize the current (certified) version of the AMS and no coding shall be performed. • This is to expedite processing of WESM Mindanao financial transactions in preparation for the EWDO. A future version of the AMS will accommodate WESM Luzon, Visayas and Mindanao transactions.

No	IT System Name	Description	Basis for Change	Effective Date	Change Impact
2	Enhancements to Software used for generation of Merit Order Table for 1-hour market	Exclusion of reserve capacities from the existing Merit Order Table transmitted to the Luzon and Visayas System Operator	RFC-2001-001	Testing completed on 27 Oct 2020 20 November 2020	Compliance with request of System Operator
3	Enhancement on Regular MRU tool	Update of regular MRU Tool used by TOD-MBS to filter out customers with MQ injection in the allocation process.	RFC-2010-009	31 March 2021	<ul style="list-style-type: none"> Resulting software shall identify customers with MQ injection or negative Settlement values to exclude them during the computation of MRU amounts. This is to ensure that no incorrect payments are issued to Customer Participants due to MQ injection.
4	Enhancement on PSM Program Ver. 1.1.1.08	Update of current PSM program tool used by TOD-MBS for the computation of Trading Amounts during the following conditions: <ul style="list-style-type: none"> Addition of XAPBABUY for Luzon Trading Participants during PSM-RTD (Luzon), PSM-RTX (Luzon), AP-RTD (Visayas, and AP-RTX 	RFC-2010-011	15 February 2021	<ul style="list-style-type: none"> Ensure output accuracy Process voluminous data Efficient interchange and common referencing of data

No	IT System Name	Description	Basis for Change	Effective Date	Change Impact
		(Visayas) pricing combination condition <ul style="list-style-type: none"> Exclusion of XAPBABUY for Visayas Trading Participants during OK-RTD (Luzon), PSM-RTX (Luzon), PSM-RTD (Visayas) and PSM-RTX (Visayas) pricing combination condition This is to ensure accuracy of the Trading Amounts computed whenever the identified regional pricing conditions occur.			
5	Development of a System Wide (Luzon and Visayas) Merit Order Table	Consolidation of Merit Order Table for Luzon and Visayas Grids	COF-2005-008 Issue/Request raised by the SO	19 November 2020	Compliance to request of System Operator
6	Setting of GWAP Rolling Average Period to 3 Days	This is a configuration change in the MMS to adopt a shorter rolling average period from one hundred twenty (120) hours or 5 days to seventy-two (72) hours or 3 days to implement ERC Resolution No. 07, Series of 2021.	RFC-2107-010	31 July 2021	Comply with ERC Resolution No. 07, Series of 2021

No	IT System Name	Description	Basis for Change	Effective Date	Change Impact
7	NMMS Change Order 8	Implementation of the following enhancements to the NMMS: <ul style="list-style-type: none"> • Save Case Processing and Workflow Setup • Disconnected Node Pricing in MDOM • SO Files FTP – Transfer Enhancements • SO COP Data Processing Enhanced Logging • Reserve Requirement Processing - Modifications 	COF-2008-013	Completed	Improvements to MMS functions
8	NMMS Change Order 9	Implementation of the following Enhancements to the MMS: <ul style="list-style-type: none"> • Revisions to the Merit Order Table • HIS Interface to External Database 	COF-2010-014	Completed	Comply with System Operator requested changes for Merit Order Table