

PAC-ANREP-2017

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# **PEM Audit Committee 2017 Annual Report**

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JANUARY 2017 TO DECEMBER 2017

**MARCH 2018**

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



**Philippine Electricity  
Market Corporation**

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## FOREWORD

*The year 2017 marks another impactful and invaluable year for the PEM Audit Committee (PAC). Audit efficiency, holistic insights and resonant results summarize the strategic outcomes of the PAC.*

- The combined audit of Market Operations and Metering Installations consequently led to additional efficiencies by lowering audit expenditure and inducing better alignment in the audit efforts and results. Additionally, technical appraisals of the newly installed technologies (e.g. NMMS, CRSS, AMS) were initiated to affirm and strengthen the confidence of market participants on the efficacy of information systems used in Market Operations.*
- Audit engagements have consistently capitalized on the sagacious experience of external experts to provide an honest and holistic assessment of the local wholesale and retail markets relative to the policies, principles and practices applied in Rules.*
- The said audits triggered evident improvements in the operation of the spot market and in the condition of metering systems and practices. More importantly, the above audits exemplified the continued dedication and commitment of the Market Operator and key Metering Services Providers and highlighted the lack of appreciation of some MSPs in the significance of these audit activities.*

*The PAC extends its utmost gratitude to PEMC, its management and board of directors, the DOE, the ERC, its commissioned external auditors and all the organizations that supported and participated in the events and engagements of the PAC.*



This Annual Report covers the activities undertaken and accomplished by the PAC for the year 2017 and outlines the proposed activities of the PAC for the year 2018.

## **I. 2017 ACCOMPLISHMENTS**

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

### **A. 2016 Market Audit**

As provided for under the WESM Rules Clauses 1.4.6 and 4.5.5.4, the PAC conducted an audit of the operation of the spot market and of the Market Operator (MO), and the review of the security arrangements and requirements of metering installations.

In accordance with the WESM Rules and Retail Rules, the objectives of the independent audit of the operation of the spot market and of the Market Operator/CRB are to:

- a. review and assess the procedures and working processes of the MO/CRB;
- b. review and assess the usefulness and appropriateness of the settlement systems, data management and other procedures and working processes used by the MO/CRB to administer the WESM/RCOA
- c. review and assess the usefulness and appropriateness of the interfaces and exchange of information among the MO, System Operator (SO), Metering Service Provider (MSP) and other service providers in relation to generation scheduling, constraints, dispatch, prices and settlement, and metering;
- d. review and assess the compliance of the MO/CRB with the WESM Rules, Retail Rules and Market Manuals and its documented internal business procedures;

- e. review and assess the appropriateness of actions taken by the MO, SO and MSPs to address previous audit findings;
- f. identify room for improvement in the current systems and processes with the view to enhancing the efficiency of the WESM and the Retail Market; and
- g. review and assess MO's market operations performance in line with standards established by the DOE and recommend improvements in the said standards.

The PAC supervised the implementation of the 2016 Market Audit, an activity for the joint conduct of the 6<sup>th</sup> Independent Audit of the Systems, Procedures and Performance of the Market Operator (6<sup>th</sup> MO Audit) and the 3<sup>rd</sup> Review of Metering Installations and Arrangements (3<sup>rd</sup> Metering Review).

The Audit-Technical Working Group (TWG) assisted the PAC with its activities pertaining to the audit and review of the MO's systems, procedures and performance, as well as the Metering Service Providers' (MSP) metering installations and arrangements, pursuant to the DOE DO2016-06-0009<sup>1</sup>.

#### **A.1. Consultation Meetings between the External Auditor and Auditees**

Following the pre-Inception Report meetings conducted on December 12 to 15, 2016, between PEMC and the External Auditors<sup>2</sup>, consultation meetings with the Auditees for the 3<sup>rd</sup> Metering Review were held on the following dates:

| Date            | Auditees   |
|-----------------|--|
| 05 January 2017 | <ul style="list-style-type: none"> <li>Angeles Electric Corporation (AEC)</li> <li>Batangas II Electric Cooperative (BATELEC 2)</li> </ul> |

<sup>1</sup> Department Order No. DO2016-06-0009 Creating a New Audit Technical Working Group (TWG) to Assist the Philippine Electricity Market Auditor/ PEM Audit Committee (PAC) in the Conduct of Audit of Systems, Procedures and Performance of the Market Operator (MO) and Review of Metering Installations and Arrangements of the Metering Service Providers (MSP) of the Wholesale Electricity and Spot Market (WESM) and Retail Market.

<sup>2</sup> Consortium of Intelligent Energy Systems (IES), Alliance of Power and Energy Xponents (APEX) and Navarro Amper & Co (NACo)



|                 |   |
|-----------------|---|
|                 | <ul style="list-style-type: none"> <li>• Cabanatuan Electric Corporation (CEDC)</li> <li>• Clark Electric Distribution Corporation (CELCOR)</li> <li>• San Fernando Electric Light &amp; Power Cp. (SFELAPCO)</li> <li>• Tarlac Electric Inc. (TEI)</li> <li>• Tarlac II Electric Cooperative (TARELCO 2)</li> <li>• Visayan Electric Company Inc. (VECO)</li> <li>• Ilocos Norte Electric Cooperative Inc. (INEC)</li> </ul> |
| 06 January 2017 | <ul style="list-style-type: none"> <li>• Manila Electric Company (MERALCO)</li> <li>• Subic Enerzone Corporation (SEZ)</li> <li>• National Grid Corporation of the Philippines (NGCP)</li> </ul>  |
| 10 January 2017 | <ul style="list-style-type: none"> <li>• PEMC-BSMD (Metering)</li> </ul>  |

## A.2. Submission of Inception Report

The Inception Report for the joint 2016 Market Audit was submitted on 16 February 2017. The same was distributed to all the Auditees for information and reference.

The 6<sup>th</sup> MO Audit covered the period 26 December 2014 to 25 June 2016 and included the following tasks:

- Task 1 – Market Software and Systems Review
- Task 2 – Information Security and Technology Review
- Task 3 – Process & Compliance Review
- Task 4 – Bid-to-Bill Analysis
- Task 5 – Review of Rules and Manuals

On the other hand, the 3<sup>rd</sup> Metering Review covered the period 26 December 2013 to 25 June 2016 and included the following tasks:

- Task 1 - Process and Compliance Review
- Task 2 - Procedures Review

- Task 3 - Review of Systems Used by Metering Service Providers (MSPs)
- Task 4 - Review of Metering Installations (on-site inspections)

For the 3<sup>rd</sup> Metering Review, metering inspections commenced on 22 February 2017 and completed on 04 June 2017. There were a total of 245 (136 – WESM; 109 – RCOA) metering facilities inspected. Several interviews and walkthrough meetings were also conducted for the tasks under the 6<sup>th</sup> MO Audit.

### **A.3. Submission of Draft Reports and Conduct of Close-out Meetings**

The report for the 3<sup>rd</sup> Metering Review covering wholesale and retail MSPs and PEMC-BSMD (Metering), and the 6<sup>th</sup> MO Audit per task were submitted in October 2017. The reports were also provided to the Auditees for comments prior to the conduct of close-out meetings.

The PAC together with the Audit-TWG conducted close-out meetings with the Auditees and External Auditors on 23 October 2017 for the 6<sup>th</sup> MO Audit. For the 3<sup>rd</sup> Metering Review, the close-out meetings with the wholesale and retail MSPs were conducted on 9 -11 October 2017 and with PEMC-BSMD (Metering) on 27 October 2017.

During the close-out meetings for the 3<sup>rd</sup> Metering Review, wholesale and retail MSP representative/s were invited to join the presentation and discussion of the audit findings and recommendations in the draft report. The main objective of the meeting was for the Auditees to provide their action plans to address the observations and proposed recommendations of the External Auditors, as detailed in the draft reports, for inclusion in the final report. At the conclusion of the meeting, all parties were expected to be clarified on the audit findings and the action plans presented by the Auditees to address the audit findings.

The process owners audited for the 6<sup>th</sup> MO Audit as well as the wholesale and retail MSPs audited for the 3<sup>rd</sup> Metering Review submitted comments to the draft reports, which were subsequently incorporated on the same.



During its special meeting on 20 October 2017, the PAC and Audit-TWG, upon review, accepted the Last Progress Reports for the joint 2016 Market Audit. The Last Progress Reports were the draft reports submitted prior to the Final Reports.

#### **A.4. Submission of Final Reports and Teleconference Meeting for the Presentation of the Final Reports**

After the close-out meetings, the External Auditors accordingly revised the draft reports taking into consideration the comments of the Auditees, the PAC and the Audit-TWG during the discussions on the said reports. The draft final reports for the joint 2016 Market Audit, as revised, were subsequently submitted to PAC in November 2017.

A teleconference meeting with the External Auditors, for the presentation to the PAC and Audit-TWG of the audit findings and recommendations based on the draft final reports was held on 18 December 2017.

The External Auditor submitted the Final Reports and Software Certificates to the PAC. on 27 January 2018 for the 6<sup>th</sup> MO Audit and 19 February 2018 for the 3<sup>rd</sup> Metering Review, the details of which are as follows:

| <b>Audit Activity</b>  | <b>Audit Report and Software Certificate</b>   | <b>Date Submitted</b> |
|--|--|-----------------------|
| 6 <sup>th</sup> Independent Audit of Market Systems and Operations | <ol style="list-style-type: none"> <li>1. Report on MDOM Software Testing and Certification (with Software Certificate)</li> <li>2. Report on Settlement Systems Testing and Certification (with Software Certificate)</li> <li>3. Report on Information Systems and Technology Review s</li> <li>4. Report on Market Assessment System Review</li> <li>5. Report on Process and Compliance Review</li> <li>6. Report on Bid-to-bill Analysis</li> <li>7. Report on Market Operations Holistic Review</li> </ol> | 27 January 2018       |



|   |  |                  |
|---|--|------------------|
|   | 8. Report on Summary of Previous Audit Findings  |                  |
| 3 <sup>rd</sup> Review of Metering Installations and Arrangements | 1. NGCP Report<br>2. MERALCO Report<br>3. SFELAPCO Report<br>4. AEC Report<br>5. TEI Report<br>6. VECO Report<br>7. TARELCO II Report<br>8. CELCOR Report<br>9. CEDC Report<br>10. BATELEC II Report<br>11. INEC Report<br>12. SEZ Report<br>13. PEMC-BSMD (Metering) Report<br>14. Holistic Review Report | 19 February 2018 |

The audit findings and recommendations were presented for information of the Transition Committee on 29 January 2018 and to the PEM Board during its meeting on 28 February 2018. The same will also be presented to the DOE and ERC tentative in March 2018.

In view of the audit findings and recommendations identified in the reports, the PAC requested for the MO's action plan, with corresponding timelines, to address the said audit findings and recommendations, as part of PAC's audit monitoring.

#### **B. Independent Software Certification Audit of the New Market Management Systems and the Central Registration and Settlement Systems**

PEMC submitted its proposed request for audits of the NMMS and CRSS and its corresponding Terms of Reference (TOR). Upon due deliberation, the PAC approved and

published the draft TOR for comments in the market information website for comments of WESM members and interested parties.

Upon recommendation by the PAC, the PEM Board subsequently approved the Terms of Reference and the engagement of the External Auditor (Intelligent Energy Systems Pty. Ltd. or IES), to conduct the software audit.

The Audit-TWG evaluated the financial and technical proposals for the NMMS and CRSS Audit, and in a special meeting specifically called to discuss the results of the evaluation of the Audit-TWG, the PAC thereafter approved the same and agreed to proceed with the contract negotiations with the External Auditor.

## **B.1. CRSS Audit**

### **B.1.1. Contract Signing and Submission of Inception Report**

The contract between PEMC and IES for the external audit services for the pre-deployment certification of the CRSS was signed on 29 March 2017. Further discussion and demonstration with the CRSS Project Team and the CRSS vendor was requested by the External Auditor for them to be able to complete the Inception Report, thus the same was submitted in August 2017.

The Inception Report was presented during the PAC meeting on 10 August 2017 and was subsequently approved by the PAC.

The CRSS Audit focused on the following components:

1. Metering Modules (including Interim Macro Tools). Determine if the mathematical algorithms used are mathematically equivalent to the formulation described in the proposed WESM and Retail Metering Manuals; and

2. Settlement Calculations Module. Determine if the mathematical calculations for settlement are accurate in accordance to the proposed PDM, and the Billing and Settlements Manual.

#### **B.1.2. Submission and Initial Presentation of the Draft Preliminary Report**

On 11 October 2017, the findings on the CRSS Audit based on the submitted draft preliminary report were presented to the process owners, PAC and Audit-TWG. There were no major audit findings although additional data were needed to be provided by the process owners for the External Auditors to verify that the daily and monthly VEE process is correctly implemented.

During its special meeting on 20 October 2017, the PAC and Audit-TWG accepted the acceptance of the Preliminary Audit Report for the CRSS Audit.

#### **B.1.3. Submission of Final Reports and Teleconference Meeting for the Presentation of Final Reports**

The External Auditor accordingly revised the draft report taking into consideration the comments and discussions provided by the process owners. The draft final report for the CRSS Audit was subsequently submitted to the PAC in November 2017.

During the teleconference meeting on 18 December 2017, the Final Report for the CRSS Audit was also presented to the PAC and Audit-TWG. It was noted that all CRSS software elements (i.e. Settlements module; Interim Metering Macro Tools (WESM and RCOA); Metering (VEE) module; and Data Warehouse module) were found to be compliant with the appropriate Rules and Manuals. The results of the audit imply that the enhancements made



by the system to the market participants' registration and settlement were in conformance with the WESM Rules and Manuals.

## **B.2. NMMS Audit**

The contract between PEMC and IES for the external audit services for the pre-deployment certification of the NMMS was signed on 17 February 2017. The Inception Report for the pre-deployment certification of the NMMS was submitted on 20 April 2017. The first Significant Issues Report was submitted on 27 April 2017, containing the observations on the implementation of full parallel operations prior to NMMS go-live.

The Inception Report was discussed with the NMMS Project Team during the PAC meeting on 10 August 2017. The PAC subsequently approved the Inception Report, with revised timelines agreed upon considering new project developments.

The NMMS Audit focused on the following components:

1. Market Dispatch Optimization Algorithm. Determine if the mathematical algorithms used are mathematically equivalent to the formulation described in the proposed PDM.
2. Market Projections and Real-Time Dispatch Runs. 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.
3. Market Participant Interface. 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.

4. Compliance Monitoring. 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.
5. Post-Market Run Calculations. Determine if the applications for the post-processing of real-time spot prices are consistent with the Price Determination Methodology.
6. Forecast. 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.
7. Financial Transmission Rights. 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.
8. Market Publications. Determine if the required information are published consistent with the timelines proposed in the relevant provisions of the WESM Rules and Manuals.

Testing the market dispatch optimization algorithm and the market participant interface commenced, following the approval of the Inception Report, with PEMC providing the requested data to the external auditor for further review and for the development of the test cases. During the period, the PAC discussed the Significant Issues Reports and Progress Reports submitted by the External Auditor related to the ongoing NMMS Audit.

#### **C. Independent Software Certification Audit of the Accounts Management System**

During its regular meeting on 08 December 2017, the PAC was informed of PEMC's request for an Independent Software Certification Audit of the Accounts Management System (or AMS Audit). This newly developed AMS is an automated collection and payment software



system for market transactions internally developed by PEMC. The said review will indicate if the software is ready for its implementation and whether said software is in compliance with the WESM Rules and its objectives.

The PAC then reviewed the Terms of Reference for the AMS Audit which the AMS Project Team submitted on 20 November 2017. The PAC subsequently approved the publication of the Terms of Reference for comments of WESM members and interested parties. The Terms of Reference was published in the market information website on 13 December 2017. No comments were received until the deadline for submission of comments on 12 January 2018.

Tentative timeline of activities for the AMS Audit is shown below:

| No. | Activity   | Schedule                                |
|-----|--|---|
| 1   | PEM Board Approval of the following:<br>a. AMS Terms of reference<br>b. Engagement of External Auditor and Mode of Procurement | 28 February 2018<br>(PEM Board Meeting) |
| 2   | Issuance of the Request for Expression of Interest to the Short-listed Bidders   | 02 March 2018                           |
| 3   | Issuance of the Request for Proposal to the Short-listed Bidders   | 1 <sup>st</sup> week of March 2018      |
| 4   | Conduct of Pre-Bid Conference  | 2 <sup>nd</sup> week of March 2018      |
| 5   | Submission & Receipt of Technical and Financial Proposal; Opening of Technical Proposal  | 3 <sup>rd</sup> week of March 2018      |
| 6   | Evaluation of Technical Proposal by the TWG  | 4 <sup>th</sup> week of March 2018      |
| 7   | Opening of the Financial Proposal  | 1 <sup>st</sup> week of April 2018      |
| 8   | Negotiation, Contract Signing & Issuance of Notice to Proceed  | 2 <sup>nd</sup> week of April 2018      |
| 9   | Board Presentation on the Result of the Selection Process for information  | 4 <sup>th</sup> week of April 2018      |



| No. | Activity  | Schedule   |
|-----|---|--|
| 10  | Inception Report  | 4 <sup>th</sup> week of April 2018                           |
| 11  | Progress and Significant Issues Report (as needed)          | Every 2 weeks from the receipt date of the Notice to Proceed |
| 12  | Preliminary Audit Report                                    | 2 <sup>nd</sup> week of May 2018                             |
| 13  | Submission of Final Audit Reports and Software Certificates | 1 <sup>st</sup> week of June 2018                            |
| 14  | End of Audit Reporting to the PAC and PEM Board             | 30 June 2018   |

#### D. Other Activities

As part of its regular activity, the PAC conducted thirteen (13) meetings<sup>3</sup> for CY 2017.

During the covered period, the members of the PAC actively participated as resource speakers for PAC presentations to the Management and the PEM Board regarding its various activities. Similarly, the PAC enthusiastically joined PEMC in its various activities with WESM Stakeholders.

<sup>3</sup> At any time and as may be practicable, the PAC may conduct meetings more than once a month.

## II. 2018 WORK PLAN

The PAC's work plan for CY 2018 contains the following activities:

| Item | Activity  | 2018 Target | Deliverables  |
|------|---|-------------|---|
| 1.   | Review of PAC Annual Report   | Q1 2018     | Submission of Annual Report to the PEM Board  |
| 2.   | Joint Conduct of the 6 <sup>th</sup> Market Audit   | Q1 2018     | Submission of Final Audit Reports (with Software Certificates, as applicable) to the PEM Board, ERC and DOE |
| 3.   | Review of PEM Audit Manual  | Q2 2018     | Submission of Proposed Amendments to the RCC  |
| 4.   | Conduct of Independent Software Certification Audit of the Central Registration and Settlement System | Q2 2018     | Submission of Final Audit Report (with Software Certificate) to the PEM Board, ERC and DOE                  |
| 5.   | Conduct of Independent Software Certification Audit of the Accounts Management System                 | Q2 2018     | Submission of Final Audit Report (with Software Certificate) to the PEM Board, ERC and DOE                  |

| Item | Activity   | 2018 Target | Deliverables   |
|------|--|-------------|--|
| 6.   | Conduct of Independent Software Certification Audit of the New Market Management System  | Q3 2018     | Submission of Final Audit Report (with Software Certificate) to the PEM Board, ERC and DOE |
| 7.   | Submission of Proposed Amendments to WESM Rules, Retail Rules and Manuals  | Continuing  | Submission of Proposed Amendments to the RCC   |
| 8.   | Conduct of other Audits as may be requested in accordance with the WESM Rules, Retail Rules and Manuals and upon directive by DOE, ERC and PEM Board | As required | Report   |



### **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<br>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. Mr. Santos and Engr. Orias have been appointed to the PAC as members since September 2011, and were re-appointed as PAC members on May 2015.

### **IV. RESPONSIBILITIES**

Pursuant to WESM Rules Clause 1.5.2, the responsibilities of the PEM Auditor<sup>4</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;

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<sup>4</sup> Pursuant to 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.

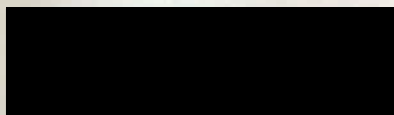
- d. Recommend changes to the WESM Rules where the PEM Auditor detects deficiencies as a consequence of an audit, review, test, check or other form of review; and
- e. Publish on the market information website the results of any findings and recommendations under WESM Rules 1.5.1.

The PEM Auditor's main responsibility is summarized in the PEM Audit Committee 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.

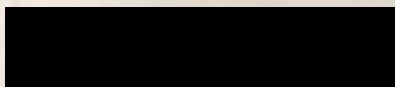
Moreover, Section 11.2.2 of the same manual provides that the PEM Auditor shall review the security arrangements and requirements of metering installations.

Submitted By:

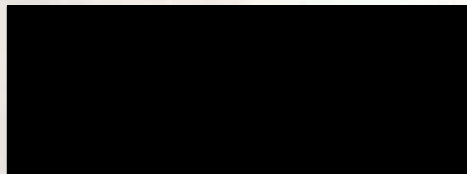
**THE PEM AUDIT COMMITTEE**



**Felixberto U. Bustos, Jr.**  
Chairperson / PEM Auditor



**Eduardo Alejandro O. Santos**  
Member



**Christian M. Orias**  
Member