

Report on the 3rd Review of Metering Installations and Arrangements
For the period 26 December 2013 to 25 June 2016
by Intelligent Energy Systems Pty Ltd (IES) in association with Association of Power
Industry Exponents (APEX) and Navarro Amper & Company (Deloitte)

PEM Audit Committee

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FOREWORD

The PEM Audit Committee (PAC) herein submits this report summarizing the results of the recently-concluded 3rd Review of Metering Installations and Arrangements (Metering Review) for the period 26 December 2013 to 25 June 2016, conducted by Intelligent Energy Systems (IES) with its partners. The WESM Rules mandates the PAC, in consultation with the Philippine Electricity Market Corporation (PEMC) and Metering Services Providers (MSP), to review the security arrangements and requirements of metering installations in the WESM. On the other hand, the Retail Rules also requires the PAC to conduct a review of the metering arrangements and compliance of Retail Metering Services Providers (RSMP) and PEMC with the applicable Retail Rules and Market Manuals as RMSPs and as the Central Registration Body (CRB), respectively.

This last Metering Review revealed some interesting insights on how some MSPs and RSMPs have gained from the previous audits conducted. These previous audits triggered evident improvements in the operation and condition of the metering systems and practices of the respective auditees and highlighted the opportunities for the improvement of existing systems, procedures and processes to the advantage of all stakeholders.

In this regard, we wish to convey our appreciation and gratitude for the cooperation and support extended by the auditees, as follows: a) the Metering Services Providers (MSPs) composed of the National Grid Corporation of the Philippines (NGCP) as the lone WESM Metering Services Provider and the Retail Metering Services Providers; and b) PEMC.

Together, we believe that we can bring about change to achieve an efficient, competitive, transparent and reliable electricity spot market.

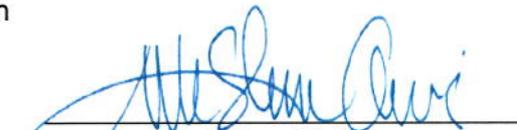
For the PEM Audit Committee,



Felixberto U. Bustos, Jr.
Chairperson



Eduardo Alejandro O. Santos
Member



Christian M. Orias
Member

EXECUTIVE SUMMARY

This report lays down the basis for the conduct of the 3rd Review of Metering Installations and Arrangements and presents the scope and the results of the review together with the recommendations made as a result of the said review.

The audit project, covering the period 26 December 2013 to 25 June 2016, was conducted by Intelligent Energy Systems Pty Ltd (IES) in partnership with the Association of Power Industry Exponents (APEX) and Navarro Amper & Company (known locally as NACo, operating under the banner of Deloitte Philippines), collectively referred to in this report as the Auditor.

The Auditor identified 144 findings and classified them according to a defined risk rating as follows: a) critical, b) significant, c) medium, d) low and e) opportunities for improvement. Details of the risk rating mechanism employed by IES are herein attached in Appendix A of this report. The number of findings are summarized below:

Table 1. Summary of Findings

	Auditee	C	S	M	L	O	Total
1	Manila Electric Company (MERALCO)	1	1	-	1	10	13
2	San Fernando Electric Light and Power Corporation (SFELAPCO)	3	2	-	1	4	10
3	Angeles Electric Corporation (AEC)	2	9	1	1	3	16
4	Batangas II Electric Cooperative, Inc. (BATELEC II)	-	2	-	1	5	8
5	Clark Electric Distribution Corporation (CEDC)	-	5	-	-	4	9
6	Cabanatuan Electric Corporation (CELCOR)	-	4	-	-	5	9
7	Ilocos Norte Electric Cooperative, Inc. (INEC)	-	7	-	-	4	11
8	Subic Enerzone Corporation (SEZ)	-	8	-	-	5	13
9	Tarlac II Electric Cooperative, Inc. (TARELCO II)	1	2	-	-	5	8

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	Auditee	C	S	M	L	O	Total
10	Tarlac Electric, Inc. (TEI)	-	2	-	-	6	8
11	Visayan Electric Company (VECO)	-	5	-	-	5	10
12	National Grid Corporation of the Philippines (NGCP)	6	1	5	-	14	26
13	PEMC BSMD Metering	-	-	-	-	3	3
	Total	13	48	6	4	73	144

Legend: **C** – Critical, **S** – Significant, **M** – Medium, **L** – Low, **O** – Opportunity for Improvement

As seen from Table 1, thirteen findings were classified by the Auditor as critical, and may have a direct impact on the reliability and efficiency of the services of the auditees to their customers and as such immediate action is deemed necessary. Forty-eight items were, on the other hand, classified as significant, which may have a major impact on the operation of metering systems if not addressed with high priority. There were only six (6) findings rated as medium, and four (4) with low risk ratings with moderate impact on WESM market system operations and metering systems.

Out of the total 144 findings identified by the auditor, there were 73 observations classified as opportunities for further improvement of the auditees' systems, procedures and processes to more closely adhere to international best practices.

Overall, IES noted the great improvement in the performance of NGCP during the 3rd Metering Review for the process compliance and procedures as compared with the 2nd Metering Review. The Auditor likewise noted that most outstanding non-conformances were with Trading Participant – owned facilities. NGCP thus seeks support to encourage TP cooperation, which the Auditor likewise recommends.

I. ABOUT THIS REPORT

The 3rd Review of Metering Installations and Arrangements (Metering Review) was carried out for the Philippine Electricity Market Corporation (PEMC) by Intelligent Energy Systems Pty Ltd (IES) in partnership with the Association of Power Industry Exponents (APEX) and Navarro Amper & Company (known locally as NACo).

The general objective of this metering review is to assess the adequacy of the metering standards, security systems and processes in the WESM and the Retail Market. In this regard, the review entailed the evaluation of the systems, procedures and performance of the WESM Metering Service Providers (MSP) and selected Retail MSPs (RSMPs) to confirm that the metering arrangements and installations comply with the WESM Rules, Retail Rules, associated Market Manuals, Philippine Distribution Code (PDC), and the Philippine Grid Code (PGC), and to identify and report any possible non-compliance, should there be any.

For this review, IES together with its associates, audited the performance of the lone WESM MSP – the National Grid Corporation of the Philippines (NGCP) and 11 Retail Metering Service Providers, as well as the PEMC.

The Terms of Reference¹ for this review project entailed the following tasks:

Task 1: Process and Compliance Review – In general, this task entailed the assessment of the following:

- Compliance of the WESM and Retail Competition and Open Access (RCOA) Metering Service Providers with its obligations under applicable rules;
- Compliance of the MSPs with its documented internal procedures, specifically the processes for the retrieval of data, secured metered quantity and its daily and monthly transmission to the Market Operator and the Central Registration Body; and
- Adequacy and conformance of MSPs with the applicable rules and standards for preventive maintenance performed on metering equipment, including completeness of maintenance programs, test results and sealing records.

Task 2: Procedures Review – This task called for the review of the following:

- Adequacy of internal procedures/protocols of MSPs in meter data collection, including but not limited to, manual retrieval of meter data in cases of communication failure;
- Availability of recovery plan and procedures in case of erased or corrupted metering data and of an off-site data storage location; and

¹ For the details of the Terms of Reference for this Audit Project, please refer to this link:
http://www.wesm.ph/inner.php/downloads/audit_activities

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- Consistency of MSP's internal business procedures with the WESM Rules, Retail Rules and relevant Market Manuals.

Task 3: Review of Systems Used by Metering Service Providers – This task entailed the assessment of the following:

- Reliability of the meter communication links and interfaces to the meter data collection system of MSPs and the communication links and interfaces between the MSPs and the MO;
- Availability, accuracy and reliability of software, tools and programs uses by MSPs in meter data collection, processing and database;
- Availability of back-up systems in the event of power failure;
- Adequacy of remote monitoring facilities of MSPs to alert the MO of any failure of any components of the metering installation; and
- Adequacy of physical and logical access security of metering data held in metering installations and metering database.

Task 4: Review of Metering Installations (On-site Inspection) – The on-site inspections covered sample metering sites in Luzon and Visayas and included, among other things, the following:

- Assessment of the compliance of the design, technical specifications, operation, maintenance, safety and security of metering installations with the standards set forth in the applicable Rules and Manuals;
- Determination of the appropriateness of the revenue metering and market trading node location;
- Checking of the consistency of metering installation components with the corresponding Metering Installation Registration Forms (MIRF); and
- Checking the availability of check meters for main revenue meters, if deemed applicable.

II. SUMMARY OF THE AUDIT FINDINGS

For the metering review, selected Metering Services Providers (MSPs) with Contestable Customers were reviewed. Embedded-FIT generators were also included in the audit. Overall, the auditor inspected 11 Retail MSPs, one (1) Wholesale MSP: NGCP Metering, and PEMC - Metering Unit and reviewed their operations for the covered period from 26 December 2013 to 25 June 2016. This is the third time that NGCP and PEMC have been audited through the Metering Review supervised by the PAC. On the other hand, 3 out of 11 RMSPs, namely MERALCO, AEC, and SFELAPCO, have been audited twice beginning the 2nd Metering Review.

The auditor identified 144 findings with risk ratings as follows: 13 critical, 48 significant, six (6) medium, four (4) low, and about 73 opportunities for improvement (OFI) classified according the defined risk rating², herein summarized below:

Table 2. Number of Findings

	Auditee	C	S	M	L	O	Total
1	Manila Electric Company (MERALCO)	1	1	-	1	10	13
2	San Fernando Electric Light and Power Corporation (SFELAPCO)	3	2	-	1	4	10
3	Angeles Electric Corporation (AEC)	2	9	1	1	3	16
4	Batangas II Electric Cooperative, Inc. (BATELEC II)	-	2	-	1	5	8
5	Clark Electric Distribution Corporation (CEDC)	-	5	-	-	4	9
6	Cabanatuan Electric Corporation (CELCOR)	-	4	-	-	5	9
7	Ilocos Norte Electric Cooperative, Inc. (INEC)	-	7	-	-	4	11
8	Subic Enerzone Corporation (SEZ)	-	8	-	-	5	13

² Details of the risk rating mechanism employed by IES are herein attached in Appendix A of this report.

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	Auditee	C	S	M	L	O	Total
9	Tarlac II Electric Cooperative, Inc. (TARELCO II)	1	2	-	-	5	8
10	Tarlac Electric, Inc. (TEI)	-	2	-	-	6	8
11	Visayan Electric Company (VECO)	-	5	-	-	5	10
12	National Grid Corporation of the Philippines (NGCP)	6	1	5	-	14	26
13	PEMC BSMD Metering	-	-	-	-	3	3
	Total	13	48	6	4	73	144

Legend: C – Critical, S – Significant, M – Medium, L – Low, O – Opportunity

Table 2 shows that NGCP had the highest number of critical findings at six (6) out of the 13 auditees. These findings are those that could have a direct impact on the reliability and efficiency of service to the customers and where immediate action of the NGCP is necessary. NGCP also had the highest number of opportunities for improvement at 14, particularly 11 for the organization’s metering installations, one (1) for its processes and procedures and two (2) for its systems.

For RCOA, Angeles Electric Corporation (AEC), a distributor covering the Angeles City area in Pampanga, had the highest number of significant findings identified which may have a major impact on the operation of WESM market systems or metering systems if not addressed. Meanwhile, the Auditor noted that MERALCO had well developed procedures in place with its RCOA but needed adjustment and improvements in its systems, processes and compliance. In its review, the External Auditor identified a total of ten (10) opportunities for improvement on the metering systems and procedures of the MSP. Also, it had been noted that most previous non-compliances have been corrected by MERALCO but similar ones have been observed in the newly-selected sites.

Table 3. Summary of Findings of 2nd and 3rd Metering Review for MSPs

2nd Metering Review				
MSP	Process Compliance and Procedure review	Systems Review	Metering Installations	Total
NGCP	12	11	22	45
MERALCO	6	7	14	27
AEC	3	1	2	6
SFELAPCO	2	1	3	6
Total	23	20	41	39

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3rd Metering Review				
MSP	Process Compliance and Procedure review	Systems Review	Metering Installations	Total
NGCP	2	2	22	26
MERALCO	2	2	9	13
AEC	4	7	6	17
SFELAPCO	1	5	4	10
Total	9	16	41	40

Overall, IES noted the great improvement in the performance of NGCP during the 3rd Metering Review for the process compliance and procedures as compared with the 2nd Metering Review. A notable decrease in the number of identified non-conformances as shown in Table 3 reflects a marked improvement in the performance of NGCP as the WESM Metering Service Provider, indicative of a strong management focus on improving NGCP's services as MSP. The Auditor likewise noted that most outstanding non-conformances were with Trading Participant - owned facilities. NGCP thus seeks support to encourage TP cooperation, which the Auditor likewise recommends.

The PAC during its meeting last 18 December 2017 fully accepted the findings and recommendations of IES as provided in the Final Audit Report.

III. APPENDICES
APPENDIX A
Audit Risk and Rating Framework

The External Auditor assigned risks on its audit findings based on a methodology that considered the likelihood of occurrence and its consequence.

Table 4 below defines the risk assignment based on the likelihood of occurrence and its consequence while Table 5 provides the likelihood classification guidelines. Table 6, on the other hand, provides the consequence classification guidelines while Table 7 provides the risk rating definitions. Finally, Table 8 provides the compliance rating for issues identified.

Table 4. Risk Assignment Based on Likelihood & Consequence

		Consequence				
		Immaterial	Minor	Moderate	Major	Extreme
Likelihood	Almost Certain	Low	Medium	Significant	Critical	Critical
	Likely	Low	Medium	Significant	Critical	Critical
	Possible	Low	Medium	Significant	Significant	Critical
	Unlikely	Low	Low	Medium	Medium	Critical
	Rare	Low	Low	Medium	Medium	Significant

Table 5. Likelihood Classification Guidelines

Likelihood	Annual Probability	Frequency of Event	Qualitative Description
Almost Certain	> 70%	3 in 4 year event	Will occur in most circumstances; statistical record of several occurrences.
Likely	41% to 70%	1 in 2 year event	Can be expected to occur in most circumstances; statistical record of some occurrence.
Possible	21% to 40%	1 in 3 year event	May occur but not expected in most circumstances; statistical record of at least one occurrence.
Unlikely	1% to 20%	1 in 10 year event	Conceivable but unlikely to occur in any given year; no history of occurrence.
Rare	< 1%	1 in 100 year event	Will only occur in exceptional circumstances; no history of occurrence.

Table 6: Consequence Classification Guidelines

Consequence	Financial Impact	Reputational Impact	Security Impact	Safety Impact	Infrastructure & Environment
Extreme	Very Significant; > 2.5% of participant turnover/ sector turnover	Significant long term damage to stakeholder confidence; high loss of public confidence.	Will result in violation of power system security standards or other technical standards. Security of confidential information & systems at high risk.	Fatality or permanent injury or widespread impact on public safety.	Permanent long-term effect or irreversible damage caused.
Major	Significant; > 1% of participant/ sector turnover	Significant short term damage to stakeholder confidence; some loss of public confidence.	Could result in violation of power system security / technical standards; Security of confidential information & systems at risk.	Serious injury requiring hospitalisation > 5 days or localised impact on public safety.	Significant effect, difficult to reverse the impact.
Moderate	> 0.1% of participant / sector turnover	Some damage to stakeholder confidence.	Under some situations could result in violation of power system security / technical standards. Security of systems / information could be jeopardised in some cases.	Injury requiring < 5 days of hospitalisation or medical treatment.	Measurable effect, easily reversible.
Minor	Small	Manageable reduction in stakeholder confidence.	Unlikely to lead to violation of power system	Medical treatment only.	Measurable effect, no reverse actions required.

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Consequence	Financial Impact	Reputational Impact	Security Impact	Safety Impact	Infrastructure & Environment
			security / technical standards. Unlikely to jeopardise the security of information / systems.		
Immaterial	Very small	No lasting effects.	Does not lead to violation power system security or technical standards; Will not result in leakage of confidential information.	First aid.	No measurable effect.

Table 7. Risk Rating Definitions

Risk Rating	Definition
Critical	C Issues that may have a severe or catastrophic technical, security, safety or financial impact. Finding could also have a direct impact on the reliability and efficiency of service to a customer. Findings should be addressed immediately.
Significant	S Issues which may have a major impact on the operation of WESM market systems or metering systems if they are not addressed with high priority.
Medium	M Issues with a moderate impact on WESM market system operations and metering systems.
Low	L Issues with a minor impact on WESM market system operations and metering systems.
Opportunity	O An opportunity for improvement. Typically, would apply to internal controls or procedures. It may be relevant in situations where no written requirement in the regulations, rules or procedures. It may also pertain to improving the operation of systems and WESM market systems and/or metering system processes to more closely adhere to international best practices.

Table 8. Proposed Compliance Ratings

Compliance Rating		Definition
Level 1	1	Evidence of frequent non-compliance with a Rule or Manual. These should be addressed as a matter of high priority. Examples include violation of requirements for WESM or RCOA.
Level 2	2	Findings which could possibly result in non-compliance with a Rule or Manual but where there was no evidence of actual non-compliance found. No actions being taken to mitigate the impact of the problem. The issue should generally be addressed within one to two months.
Level 3	3	Evidence of non-frequent or isolated non-compliance with assurance criteria. These should be addressed within two to three months.
Level 4	4	Housekeeping matters and opportunities for improving internal controls and procedures relating to financial processes. These should be addressed within three to six months.