PA Consulting Group

Philippine Electricity Market Corporation

2012 Independent Audit:
Audit Summary Report

12 December 2012

Executive Summary

The 2012 Audit covers the Philippine Electricity Market Corporation's (PEMC) systems and procedures on market operations, billing and settlement, including the interfaces with the System Operator (SO), the Metering Services Providers (MSP), WESM Participants, the Energy Regulatory Commission (ERC) and the Department of Energy (DOE).

The audit covers four areas:

- Market Software Testing;
- Procedure Review;
- Process and Compliance Review; and
- IT Systems Review.

The Audit was incremental in nature, focusing on key changes and developments since the 2011 audit. The following sections provide summaries of what we have found in each of these areas.

Market Software Testing

Almost all Market Software recommendations in the 2011 audit have had some action taken in response to them by the appropriate departments within PEMC. Some of the 2011 findings have been fully resolved, while others are of a longer term nature and action is either on-going or is planned within appropriate timeframes.

There are twosignificant areas where recommendations have changed since the previous audit:

- Studies conducted by PEMC reinforce our opinion that Meralco sub-transmission assets (and possibly those of other DUs) should be included in the Market Network Model. Further investigation is required in order to implement this in the most effective manner.This will require the involvement and cooperation of external parties such as the DOE, NGCP and the affected DUs.
- The findings regarding the settlements programs are similar to those of the previous audit, with some new errors found during this audit period (which PEMC have already taken action on). The difference is that in the 2011 audit it was believed that the spreadsheet programs were at the end of their life, whereas now it is apparent that they will continue to be used for at least two years beyond this audit period. Therefore it is recommended that a project be undertaken immediately to improve the spreadsheet programs and address all of the specific findings to mitigate the error-prone nature of this system.

These two areas should be given due priority.

Procedure Review

PEMC has made good progress in addressing PA's 2011 audit recommendations with respect to its Internal Procedures. Specifically:

- The governance of Internal Procedures has been advanced; and
- The quality of Internal Procedures has generally improved.

However, although various actions are underway to address PA's 2011 recommendations with respect to Market Manuals, no changes were implemented during this audit period,

PEMC should continue to improve its Internal Procedures, and prioritize action on Market Manuals.

Process and Compliance Review

As above, PEMC has made good progress addressing PA's 2011 audit recommendations regarding its business processes and compliance with its obligations under the WESM Rules. In particular, the number of rule breaches has decreased since last year, and some processes have improved performance scores.

However, the area of Prudential Requirements continues to be an area for concern. As such, we have reiterated some of our 2011 recommendations to review the areas of Prudential Requirements that are under the control of the Market Operator.

IT Systems Review

PEMC has made significant progress implementing the IT security-related recommendations of the 2011 audit, including:

- Achieving ISO 27001 certification;
- Implementing information classification policies;
- Carrying out scheduled vulnerability testing; and
- Establishing, maintaining and using a number of new logging and audit mechanisms.

We are not aware of any other market operator who has achieved ISO 27001 certification. Due to the focus on security, progress against non-security recommendations of the previous audit has been limited, and we repeat a number of recommendations from the previous audit.

We have made new recommendations in a number of areas, with particular focus on improvements to Business Continuity Planning and IT Service Management.

Conclusions

PEMC has demonstrated a clear commitment to addressing the findings and recommendations of both of the previous audits and has generally been cooperative and transparent during the 2012 Audit process; it is apparent that PEMC has cultivated a culture of self-improvement and cooperation. There are numerous staff members across all levels of the organisation who are highly capable and hard-working, and who exude enthusiasm for working to improve both the WESM itself and the manner in which PEMC fulfils its role as the Market Operator.

While this report describes a number of areas where PEMC can still improve its operations, good progress has been achieved and many more improvement initiatives are underway or have been planned. The most significant improvement completed during the audit period was achieving ISO 27001 certification. The most significant on-going initiative is the general review of business processes and Internal Procedure documentation, for which an external consultant has been engaged.

Of the challenges currently faced by the Market Operator, there are three areas that stand out as critical to the successful operation of the market:

1. Calculation of settlements - this is currently performed in spreadsheet programs and a new system will not be in place for some time. The use of Excel/VBA tools for this task is not appropriate by international best practice standards and the tools are error-prone and not user-friendly. This audit recommends improvements that can be made to the spreadsheet programs to mitigate the risk of errors while they continue to be used.

2. Prudential Requirements - these continue to cause significant problems for PEMC as some trading participants fail to meet their payment obligations. While this issue is wider than just the Market Operator and there are measures being undertaken by various parties, there are also

additional actions that PEMC can take to mitigate some of the issues faced as MO, improve PEMC's compliance with the WESM Rules, and incentivise compliance by trading participants.

3. Market design review - a number of design aspects of the WESM have been raised by PEMC and participants, or have been noted by PA, that appear to be problematic or could be improved. Most of these areas do not conflict with the WESM Rules and so are not within the scope of this audit. Nevertheless, attention to these areas could significantly improve the operation and utilisation of the spot market. We note that PEMC plans to tender for an external advisor to conduct a broad market design review. This study will relate closely to the replacement of the Market Management System (MMS) and is critical in defining the requirements of that system.

These three areas need to be addressed in a timely manner and be given high priority and importance.

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1   Objectives and Scope

This 2012 Audit covers PEMC's systems and procedures on market operations, billing and settlement, including the interfaces with the SO, the MSPs, WESM Participants, the ERC and the DOE.

1.1   Audit Objectives

In accordance with Sections 7.2.2 and 8.1 of the PEM Audit Market Manual (Issue 2.0), and consistent with those of the 1st and 2nd Independent Operational Audits of the Systems and Procedures on Market Operations, the general objectives of this audit are to:

4. Review and assess the procedures and working processes of the Market Operator (MO);

5. Review and assess the usefulness and appropriateness of systems, data management and other procedures and working processes used by the MO to administer the WESM, in order to:

    a. Identify the appropriate steps and measures to help the MO effectively and efficiently perform its responsibilities in time and form in accordance with the WESM Rules;

    b. Assess if the MO's practices and work processes ensure the necessary transparency, independence, predictability and non-discrimination, and are in compliance with the WESM Rules and best international practices; and

    c. Assess if the systems, calculations, information flows and data management protect the accuracy and quality of the data and results in generation scheduling, dispatch, prices and settlement, as well as evaluate if internal controls exist and are sufficient to guarantee security and confidentiality where appropriate; and to propose recommendations to improve the: (1) procedures to collect and process the information and, (2) controls of quality and security of data in the WESM.

6. 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;

7. Review and assess the compliance by the MO with the WESM Rules and Market Manuals; and

8. Review and assess the effectiveness of the Market Assessment System (MAS).

1.2   Audit Scope

1.2.1   In scope

This section briefly describes the items that are considered to be in scope for this audit.

- Market Software Testing covers:
    - The Market Network Model (MNM);
    - The load forecasting systems;
    - The market clearing and pricing software;
    - The settlements programs; and
    - The Market Assessment System (MAS).

- The Procedure Review covers WESM Market Manuals and Internal Procedures related to Market Operations and Market Assessment System.
- The Process and Compliance Review covers high risk and high materiality processes selected using the review of historical information and examining procedural gaps.
- The IT Systems Review covers:
  - The architecture, technology and IT management model used;
  - Selected systems and sub-systems beyond those included in the Market Software Testing; and
  - The system interfaces.

Note that in practice the 2012 Audit focussed on:

- Responses to the findings and recommendations from previous audits;
- Areas that are new or have changed since the previous audit; and
- Areas where the previous audit indicated that additional review is merited.

1.2.2   Out of scope

The following items are considered to be out of scope for this audit:

- Actions, processes and procedures required by the WESM Rules to be undertaken by the PEM Board.
- Actions, processes and procedures required by the WESM Rules to be undertaken by the Enforcement and Compliance Organisation (ECO) on behalf of the PEM Board.
- Actions, process and procedures required by the WESM Rules to be undertaken by WESM Participants, the SO, the ERC and the DOE.
- Actions, processes and procedures undertaken by PEMC staff to operate the company; for example Human Resources, Finance, etc. which are not related to the operation of the WESM.

2   Market Software Testing

This report describes PA's assessment of the market software employed in the WESM. The assessment evaluates the calculations within the software against the WESM Rules and Manuals, and compares the software systems with international best practices.

2.1   Scope

Market Software Testing covers the compliance and accuracy of the key algorithms and calculations contained within the suite of market software. Specifically, the purpose of the work stream is to evaluate whether:

- The Market Network Model (MNM) fairly represents the transmission network under the control of the System Operator;
- The Similar Day Load Forecast (SDLF) and Load Predictor (LDP) software and related processes result in suitably accurate and unbiased load forecasts;
- The market clearing software, known as Security Constrained Economic Dispatch (SCED), is compliant with the WESM Rules and Market Manuals;
- The Settlements software is compliant with the WESM Rules and Market Manuals and calculations are performed reliably and accurately; and
- The Market Assessment System (MAS) software and related tools calculate output variables such as market monitoring indices correctly.

2.2   Approach

While our approach differs for each of the five software areas, the focus in each case is on mathematical accuracy and appropriateness, and on compliance of the implementation with the WESM Rules and Market Manuals.

2.3   Key Findings

This section notes the progress made since the previous audit and summarises PA's findings and recommendations as they stand on completion of the 2012 Audit.

2.3.1   Actions addressing previous audit findings

There has been a significant amount of action taken in response to the 2011 Audit.

- BSMD, TOD and MAG have all updated and improved Internal Procedure documentation related to market software;
- BSMD has taken steps to investigate and address settlement errors;
- BSMD has updated the GPI program;
- TOD has conducted two studies related to load forecasting and a further three are planned;
- TOD has conducted a study on the impact of including key Meralco lines in the MNM; and
- TOD has investigated market clearing software issues, resulting in some changes.

Some of the 2011 findings that are repeated here will be addressed by completing the planned actions.

2.3.2 2012findings

Market Network Model

- **Assets common to the Market and System Network Models**

  We believe that these assets are appropriately represented in the MNM.

- **Assets specific to the MNM**

  We believe that the modelling of the additional assets is appropriate for its intended use.

- **Assets not included in the MNM**

  The inclusion of the Meralco sub-transmission system has been shown to have a significant impact on the market dispatch and prices. Given that the SO cannot guarantee to produce an optimal re-dispatch around the constraints in the Meralco sub-transmission system, this strongly suggests that the Meralco sub-transmission system should be included within the MNM so as to guarantee an optimal dispatch. However, as noted above, the pricing impacts are extreme and further study into pricing mitigation should be undertaken before including the sub-transmission in the MNM.

Load Forecasting

- **Type of software used**

  The software used by PEMC employs a standard approach used by many market and system operators. However, other approaches such as neural network software are available for hour-ahead forecasting. We understand that PEMC is examining the possibility of using such software in the WESM.

- **Regional load forecasts**

  Luzon load forecasts achieve a reasonable accuracy. However, the Visayas load forecast inputs require further "tuning" to improve their accuracy, the small size of the regional load notwithstanding.

  Because the regional forecasts cover a considerable geographic area which can experience different weather conditions, forecasting loads by area within each region should produce a more accurate forecast. For example, the forecast load for Luzon might be aggregated from a number of areas within Luzon while that for Visayas might be aggregated from island load forecasts.

- **Nodal load forecasts**

  In principle, the accuracy of the nodal load forecasts should be comparable to that of the regional forecasts, given that they are derived from the regional forecasts which are then allocated to the market nodes using historical data.

  However, our analysis has indicated that nodal forecasts have high absolute percentage error rates. Higher errors (150% to - 80%) are typically associated with smaller loads (5 to 10 MW). We accept that forecasting for small loads where switching on of equipment can represent a relatively large change in load is not straight forward. Nevertheless, some consideration might be given to monitoring the effects of these forecast errors on the scheduling and dispatch of generation.

  If the regional load forecasts were prepared on an area basis, the nodal load forecasts within each area would then be based upon these area forecasts with an expected increase in accuracy.

Market Clearing Software

These findings are essentially repeated from the 2011 Audit. No new findings have been added, while one has been removed. We note that progress has been made towards addressing many of these issues.

- **Determination of load from forecast demand could be improved**
  - The load (off-take) is computed from the input demand (generation) forecast using the parameter "Loss Percentage" which is set to 1.5%.
  - Final losses in RTD average around 1.8% and vary with the level of demand and also vary between regions. Losses in Visayas can vary from less than 0.5% to 4% or more.
  - Using 1.5% for both regions at all times may undermine the accuracy of the demand forecasts.

- **Forced dispatch of Pmin generation undermines the integrity and purpose of the WESM**
  - The forced dispatch of the minimum stable operating limit, Pmin, contradicts WESM Rule 3.6.1.5(c) which states that nodal prices will be such that "the recommended dispatch targets … would be optimal for that participant at those prices, given their offers … and after accounting for other constraints which may affect that Trading Participant".
  - Generators are essentially forced into not complying with WESM Rule 3.5.5.1 which specifies that generators must submit standing offers and is commonly known as the "must offer rule".
  - This situation negatively impacts the ability of the MO to meet the WESM Objectives, specified in Rule 1.2.5, related to competitiveness, efficiency, transparency, reliability and market-reflective pricing.
  - Rule 1.2.2(c)(2)-(3) deal with encouraging market access and participation, and are clearly compromised by this issue.
  - Rule 1.2.2(i) states that a purpose of the WESM Rules is to "encourage the use of environment-friendly renewable sources of energy…"; this is also potentially negatively impacted.

- **Violation of HVDC limits appears to not be possible**
  - HVDC line flow limits are set by imposing a Security Limit. Security limits cannot be violated in SCED and therefore the violation variables specified in the formulation for TCG constraints are effectively not present in SCED. This means that a TCG violation is not possible and other violations will occur instead.
  - This will be fixed in the next software release.

- **Erratic nodal prices in heavy congestion**
  - Erratic prices were observed in Visayas. Visayas nodes reported non-zero sensitivity factors in relation to a constraint in Luzon, despite the HVDC limit binding in the Visayas-to-Luzon direction, which should isolate Visayas nodes from the constraint in Luzon.
  - This will be fixed in the next software release.

- **Undocumented combined ramping constraint in SCED**
  - Contrary to the 2009 audit finding that there is no combined ramping constraint on the dispatch of energy and reserves together, PA has found that such constraints do exist.
  - These are not specified in the formulation and are implemented in an undesirable manner.

- **CVC values are not ideal**
  - Constraint Violation Coefficient (CVC) prices currently used in SCED are those that were originally set with the intention that they be used only until more representative prices could be determined, and could easily be improved upon.

Settlements Software

In our testing of the market settlement software we have found seven key findings:

- **Lack of audit trail**

  Several aspects of the settlements programs, and the way they are used, result in the lack of a definitive audit trail. The results of the settlements programs are dependent on actions and data that are not recorded, and there is not a central repository of all the files used for every billing period. As a result, it is not definitively recorded how any settlement period's settlements values were arrived at, and it may not be possible to reproduce particular settlements values. This is a major concern given the materiality of these program's results.

- **Inconsistent rule wording**

  The wording of the WESM Rules sections 3.13.5.1, 3.13.7, 3.13.9, 3.13.12 and 3.13.17, with respect to the calculation of trading amounts, contains some inconsistencies. While an experienced reader is able to determine the intent of the rules, it is advisable to clarify these sections.

- **Errors found in settlement calculations**

  Significant material errors have been found in the settlements calculations implemented in the Administered Prices, Must Run Units, and VAT programs. Possible material errors have also been found in the Price Substitution program. Because we have carried out a sample test, we have not been able to fully quantify the extent of this problem. Nevertheless, it is likely that market participants have been charged or paid incorrect amounts.

- **Lack of error checking and reporting**

  This is highlighted by several of the specific material errors observed, but in general error checking is absent throughout the settlement programs. This is poor practice in any software with significant material impact, and is of particular concern given the need to manually set up data for each program, the need to follow undocumented manual processes, and the fact that the settlements system combines data from multiple sources.We note that some error checking occurs outside of the settlements programs. However, this is not exhaustive, as evidenced by the material errors that have been observed.

- **Hard-coding of variable data in macro code**

  Numerous examples of hard-coding data that can change between billing periods in the VBA macro code have been observed. Some specific cases have been noted in the observations for certain programs, however this should not be considered an exhaustive list as this audit did not involve an exhaustive code review. This hard-coding is not best practice, and greatly increases the chances of errors being introduced into the programs.

- **Errors and lack of clarity in Market Manuals and Internal Procedures**

  A number of observations have been made regarding incorrect or incomplete formulae in the Market Manuals and Internal Procedure documentation. Furthermore, in many cases the formulae do not make use of proper indexing of the variables involved. As a result, they are ambiguous and do not specify the formulation of the Settlements system in sufficient detail.

- **Lack of clarity regarding settlement of MRUs, and incorrect implementation**

  The WESM Rules, MRU Market Manualand MRU Internal Procedure are not specific enough regarding the settlement amounts for MRU generators, especially regarding the treatment of Bilateral Contract (BC) quantities. In their current form, the documentation requires some interpretation in order to determine what the correct settlement amount is in each situation. According to our best interpretation, the formulae specified in the Market Manual and Internal Procedure and implemented in the software are incorrect, particularly in the case where a generator's MRU quantity is less than its BC quantity.

Market Assessment System

The MAG has addressed the findings from the 2011 Audit and there are no new key or material findings resulting from this 2012 Audit. The two findings below are the most significant of several non-material findings related to the Excel VBA tools used for pre-processing of data for loading in the MAS.

- **Inadequate documentation**
  - The User Manual does not identify the names and locations of the pre-processing tools, or the names of the source files.
  - The User Manual lists ancillary schedule data as being processed via Excel-based macros but it is actually a manual process.
  - The Excel files contain a few notes on use of the tools and file locations but not full instructions.

- **Hard-coded data ranges with no code checks**
  - The location of data to be copied from the source file is hard-coded within the macros, e.g. "A3:F78". If the data were to shift locations the tools would not notice and the resulting CSV files would be in error, though such errors would most likely be discovered later.
  - The code does not perform any checks that could notify the user that data might have shifted.

- **MRR HVDC data tool - final manual process needs improving**
  - The message that appears at the end of the process to change the hour 24 date and time is confusing and is inadequate for a new user.
  - The process should not be manual.

- **PSM RTD/RTX prices tool - not fully flexible for increasing number of generators/loads**
  - Uses a fixed number of rows for generators and loads, which could be exceeded as more are added to the market.

2.4   Key Recommendations

2.4.1   Market Network Model

We recommend that, PEMC:

- Integrate the Meralco sub-transmission into the MNM and undertake additional studies to assess the impacts with up-to-date information and to evaluate possible pricing mitigation measures; and

- Determine whether the other cases where distribution utilities are able to link Market Trading Nodes (MTN) are able to influence the market dispatch and pricing; and

In making these recommendations, we note that the cooperation of external parties is required for it to be possible for PEMC to implement them. Specifically, it will require the relevant DUs to provide PEMC with network information that is up to date at the time of the study, including:

- Parameters of the DU's 115kV system (lines, reactors, transformers, etc.) and any other systems that have the capability of connecting MTNs;

- Breaker-oriented single line diagram; and

- Real-time information from Remote Telemetering Units (RTUs).

It will also require the general involvement and cooperation from the relevant DUs, as well as from the DOE and the NGCP.

2.4.2   Load Forecasting

In line with our recommendations in the 2011 Audit, we now recommend that:

- The studies currently underway into improved load forecasting be completed; and
- Where these show that cost-effective improvements can be made, these improvements be implemented.

2.4.3   Market Clearing Software

In line with our recommendations in the 2011 Audit, we now recommend that PEMC:

- Implement the planned changes for separate regional Loss Percentage parameters and complete the planned study of Loss Percentage values (Note that implementation in the current MMS system should only be undertaken if the benefits over the time until the new MMS is in production justify the cost of making the change);
- Implement the software patch MA 1.5.13, which allows the violation of TCG constraints as intended in the Formulation and addresses the erratic prices that have been observed in the market during some periods of high congestion;
- Go ahead with the planned review of the forced dispatch of Pmin generation in SCED and that an alternative methodology be chosen that would remove the negative impact on the market that the current situation has;
- Prior to the start of the reserve market or replacement of the MMS, complete the investigation into combined ramping constraint options and decide whether to remove or replace the existing undocumented constraint, and update the Formulation if necessary; and
- Further review the setting of Constraint Violation Coefficient values and nodal VoLL prices. This should include considering using values that represent the true cost of violation events and can therefore be passed on to the market instead of forcing market reruns. We note that a Technical Working Group (TWG) has been formed for this purpose.

2.4.4   Settlements Software

We recommend that the Market Operator:

- Implement a definitive audit trail;
- Reword selected WESM Rules on settlement to enhance clarity of formulation;
- Add further detail to the MRU Market Manual to clarify the correct settlement of Bilateral Contract quantities with respect to MRUs, and consequently correct the formulae specified in the Internal Procedure and implemented in the MRU program;
- Update settlements procedure documentsso that they:
  – Contain correct and complete specification of the formulae used;
  – Contain complete documentation of the manual procedures required to run the programs; and
  – Are consistent with the programs being documented;
- Address the errors PA has uncovered in the Administered Prices, Must Run Unit, VAT and Price Substitution programs by:
  – Confirming our findings with respect to the errors found;
  – Correcting any errors found; and
  – Advising affected market participants accordingly.
- Implement exhaustive error-checking and reporting throughout the settlements programs; and
- Review the results of the settlements programs from past billing periods to check that unreported error conditions have not resulted in incorrect settlements results.

We note that action has already been taken by BSMD on some of the above recommendations, particularly on quantifying and correcting the errors, and that there is an on-going project with an external consultant to update PEMC's Internal Procedure documentation which includes settlements.

Given that the settlements spreadsheets are intended to be used for two years or more beyond the end of the audit period, these recommendations need to be addressed as soon as possible and with the highest priority. This is not something that can realistically be done by BSMD staff alongside their existing workload; rather we suggest that this be done as a single coordinated project involving IT professionals assigned (or contracted) full-time to the task.

2.4.5   Market Assessment System

Since none of the findings in this area are material findings, we leave it to the MAG to determine whether the benefit gained from the suggested improvements merits the time and effort required to implement them. However, we suggest that the following four are the more important recommendations and would be well worth the effort required to address them.

- **Improve documentation of the MAS pre-processing tools.**
  - Add tool and source file names and locations to the User Manual and correct the ancillary schedule data table entry to specify that it is a manual process.
  - Add full instructions to the Excel files, perhaps on a separate sheet, that are sufficient for a new user to run the tool without additional outside instruction.
- **All tools - add simple data checks to the code**
  - Include checks that data such as day, time/hour or column heading is in the expected location.
  - Include checks for expected data type, e.g. text, date, time, number, positive number, or integer.
  - The code should pop up a warning message to alert the user if a data check fails. Messages should be sufficient to direct the user to the exact location of the potential problem.
- **MRR HVDC data tool - add code to automate saving the result file**
  - Include code to adjust the Interval 24 date and time, name and save the result file.
  - If this is too difficult, improve the instructions and/or pop-up message.
- **PSM RTD/RTX prices tool - allow for varying number of generators/loads**
  - Rather than have a fixed source data range, set it dynamically.

3   Procedure Review

The Procedure Review assesses whether the Market Operator and the Market Assessment Market Manuals and Internal Procedures are aligned with the WESM Rules and meet best practice standards as assessed by the PA procedure evaluation framework.
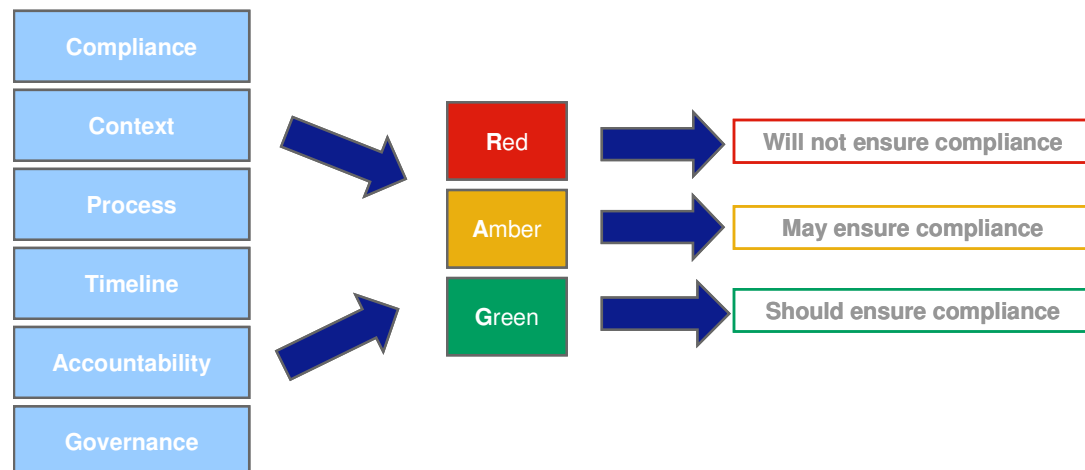
3.1   Scope

Documents which are in scope for this review encompass WESM Market Manuals and Internal Procedures related to Market Operations and the Market Assessment System.

Note that in practice, we reviewed only those Market Manuals and Internal Procedures that are new or have changed since the 2011 Audit.

3.2   Approach

New and changed Procedures have been reviewed and scored against six criteria and allocated a summary Red-Amber-Green (RAG) score that indicated how well each procedure performed overall. The Procedure Assessment Framework is illustrated in the figure below.

Figure 1   Procedure Assessment Framework

To determine the compliance score though this framework, we employed an obligation mapping approach that mapped all WESM Rules obligations against existing Procedures with a view to determining which obligations were not addressed by the Procedures being reviewed.

3.3   Key Findings

This section notes the progress made since the previous audit and summarises PA's findings and recommendations as they stand on completion of the 2012 Audit.

3.3.1 Actions addressing previous audit findings

Overall PEMC has made excellent progress implementing PA's 2011 Audit recommendations. During our review we have noted the following:

- There has been significant improvement in the governance of procedures:
  – TOD and BSMD were able to provide us with a mapping of old procedures to new procedures, along with a summary of changes made. This is indicative of good procedure management.
  – All Internal Procedures reviewed were consistent with respect to structure, content and naming conventions.
- The overall quality of procedures has generally improved, with some areas showing significant improvement:
  – Almost all TOD Procedures scored green. There has been a marked improvement and on a procedure-by-procedure basis they have implemented almost all of PA's recommendations.
  – The IR-PS team's Procedures were also high quality and scored highly.

In addition to these completed actions, there is an on-going project with an external consultant to further improve PEMC's Internal Procedure documentation.

3.3.2 2012findings

Summary findings of the 2012 Procedure Review are shown in the table below.

Table 1   Summary of Procedure Review scores and key findings

Documents	Findings
Market Manuals	**Summary RAG scores** ♦ 3 ♦ 10 ♦ 8 There have been no changes since last year.
TOD Internal Procedures	**Summary RAG scores** ♦ 1 ♦ 3 ♦ 19 • TOD has made excellent progress implementing PA's recommendations. All TOD Internal Procedures except two scored green: • We have noted great improvement in timeline and accountability definition and governance. •
Market Network Model Internal Procedures	**Summary RAG scores** ♦ 0 ♦ 0 ♦ 7 • Excellent progress has been made addressing PA's recommendations, with all points addressed and covered. • All MNM Procedures now have a green score.
Billing and Settlement Internal Procedures (Settlement and Reconciliation)	**Summary RAG scores** ♦ 1 ♦ 8 ♦ 0 • The quality of Procedures has greatly improved, and all of the red procedures from last year are now amber. • The Settlement & Reconciliation team had one red procedure. This is a new Procedure used to calculate Initial Prudential Requirements. It has scored red as it does not address the relevant Prudential Requirements obligations from the WESM Rules.

	• We note that the process descriptions in the Settlement procedures are still inadequate to enable a new user to run the tool. • The Procedures also have a lack of revision control mechanisms.
Billing and Settlement Internal Procedures (Metering)	**Summary RAG scores** ♦ 0 ♦ 18♦ 1 • The Metering team have made good progress against PA's 2011 recommendations. • The quality of the Procedures has improved overall. The Daily Metering Procedures, in particular, have improved greatly. • The Procedures, although signed and versioned, have no revision control mechanism. • The process descriptions in some of the monthly procedures are still hard to follow.
Accounts Management Internal Procedures	**Summary RAG scores** ♦ 5 ♦ 3♦ 0 There have been no changes since last year.
Registration and Customer Relations Internal Procedures	**Summary RAG scores** ♦ 0 ♦ 3♦ 3 • The Procedures developed by IR-PS are thorough, comprehensive and very clearly written. The thorough coverage of accountability means that even where processes are described at a high level, a reader is able to escalate an issue to appropriate personnel. • The procedures should make the obligations of indirect participants clearer. • The current suite of procedures does not address facility registration, deregistration, aggregation, and transfer in great detail.
Market Assessment System	**Summary RAG scores** ♦ 0 ♦ 1♦ 1 • The MMU has added an Internal Procedure and a User Manual to its documentation. • The new procedures are good quality and are generally written and structured very well. •

The remaining section in this chapter summarises the high-level recommendations resulting from these review findings.

3.4   Recommendations

Notwithstanding the improvements we have noted, PA has also noted some further areas requiring remedial action. Our recommendations are summarised in the table below.

Table 2   Summary of Procedure Review recommendations

Area	Recommendations
Market Manuals	Bring Market Manuals up to green standard using a phased approach: • Assign accountability for managing changes to Market Manuals and implementing PA's recommendations. We recommend creating a group or team

	whose is accountable for delivering and publishing the Market Manuals. • Set realistic but challenging timeframes. • Implement a phased change process, i.e. change the highest priority Market Manuals first.
AMU Internal Procedures	We recommend that AMU revise all existing AMU Procedures to bring them up to "green" standard as soon as possible. Notwithstanding the expected raft of changes in the WESM Rules related to Prudential Requirements it is important to note the following: • There are a number of business processes (particularly collections and payment) that are very poorly documented (if at all). These are high volume process and unlikely to change drastically until processes are automated in 2013. We strongly recommend that these be documented. • Most of the prudential requirements Rule Changes are in very early stages of the Rule Change process. In the meantime, processes such as prudential drawdown (and subsequent tracking of replenishment) occur frequently. As such, they should be documented but currently are not. We note that AMU has engaged a Consultant to help them review and document their business processes. We recommend that AMU work with this consultant to implement PA's recommendations above.
Procedure development and management	The MO should continue to bring all red and amber Internal Procedures to green standard (addressing PA's Procedure specific findings). In particular, we note that: • BSMD (Settlement & Reconciliation) need to improve the process descriptions in their Procedures. • It would be useful to introduce a Related Tools section to all Procedures. • Procedures should include information on file and data archiving, including locations of related archived files.

4 Process and Compliance Review

The Process and Compliance Review assesses whether selected Market Operator and Market Assessment processes are in compliance with the WESM Rules and consistent with best practice standards defined by our process evaluation framework.

4.1 Scope

The table below summarises the processes that are in scope for the 2012 Process and Compliance Review. It includes those high risk/materiality processes identified during the 2011 Audit, as well as the Registration process.
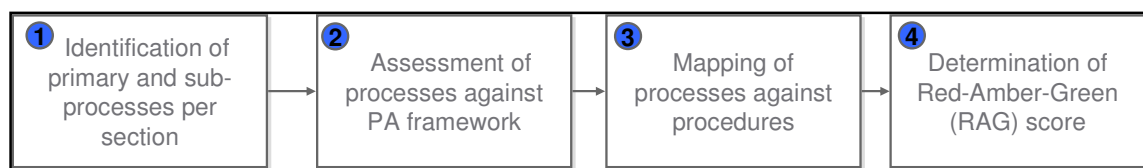
Table 3   Processes in scope

Process Area	Scope of Review
Market fees and budget	• Incremental review: follow-up of issues noted in last audit.
Trading and Operations	• Follow-up of issues noted in last audit. • Compliance testing of WESM Rules that were breached last year (e.g. PEN issuance) and high volume, high materiality obligations (e.g. compliance with timetable in Dispatch Protocol).
Settlements (including Prudential Requirements)	• Follow-up of issues noted in last audit. • Compliance testing of WESM Rules that were breached last year and high volume, high materiality obligations (e.g. timeliness of Settlement Statements).
Market Assessment	• Incremental review: follow-up of issues noted in last audit.
Registration (IR-PS)	• Full process review. • Compliance testing of all high materiality Registration obligations.

The Registration process was not reviewed in the 2011 Audit.

4.2 Approach

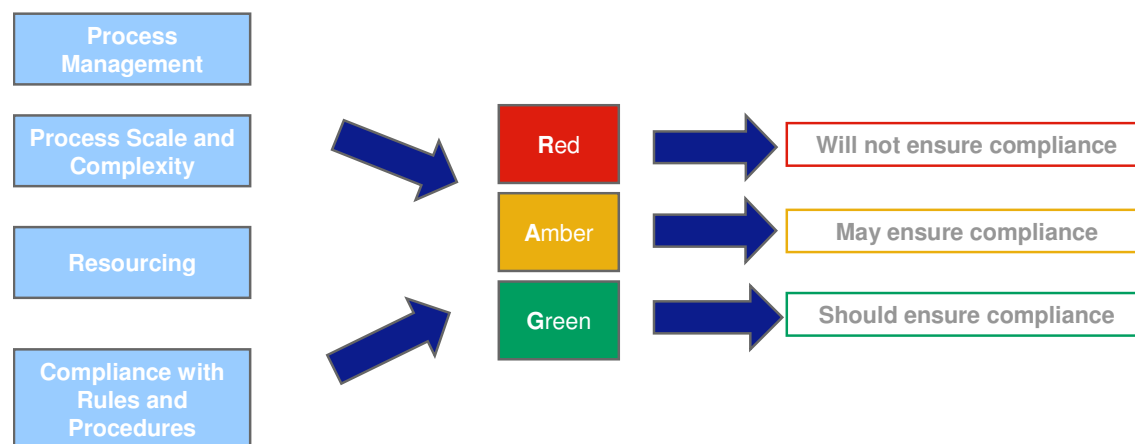The activities undertaken for the 2012 Process and Compliance Review broadly mirror the approach used in the 2011 Audit, but with a particular focus on changes that have occurred during the year and on the issues identified in 2011. The four stages in a full assessment are illustrated in the figure below.

Figure 2   Process Assessment Stages

The Process Assessment Framework used in stage 2 is illustrated in the figure below.

Figure 3   Process Assessment Framework

To determine the compliance score though this framework, we interviewed relevant staff, reviewed supporting documentation, and assessed process performance and risk mitigation.

4.3   Key Findings

This section notes the progress made since the previous audit and summarises PA's findings and recommendations as they stand on completion of the 2012 Audit.

4.3.1   Actions addressing previous audit findings

PEMC has made very good progress against PA's recommendations as highlighted in the table below.

Table 4   Progress against 2011 Process and Compliance Review recommendations

2011 Recommendation	PEMC Actions
Review areas of market design encompassing Prudential Requirements, P_{min}, Pricing Errors and Market Reruns and MRU Management	• A number of Prudential Requirements rule change proposals are being investigated, but no changes have been implemented so far. • TOD is in the process of tendering out a study on the P_{min} Issue. • TOD has undertaken studies around the Pricing Error and Market Rerun issue (Metro Manila contingency constraint issue). • PEMC has raised the MRU Management issue with the SO, ERC and DOE.
Adopt a more rigorous approach to compliance testing.	• Significant improvements in compliance monitoring and reporting. • MAG is now responsible for publishing the Market Operator Performance Standards which provide thorough coverage.
Improve IT security and implement the classification of information.	• Significant improvements in IT security, ISO27001 certification demonstrates PEMC's commitment in this area. • Good progress in information classification, but largely restricted to new documents. More needs to be done to classify existing documentation, and non-document data.
Develop robust performance metrics to monitor performance of the BSMD.	• The Metering team is now measured on timeliness of Meter Trouble Reports.

4.3.2   2012findings

Summary of WESM Rules breaches

- The total number of breaches recorded is 31% lower than in the 2011 Audit. The number of material breaches has decreased significantly from 16 in 2011 to 9 in 2012.

- The area of Prudential Requirements accounts for 39% of total breaches and 67% of material breaches.

- We note that there are currently three Rule Change Proposals in front of the Rule Change Committee (RCC) which will reduce the number of breaches noted in the BSMD and AMU area further. These proposals will:

  – Introduce the concept of a "working day";

  – Change the customer payment deadline described in MR 3.14.6; and

  – Change the revision to preliminary statement deadline in MR 3.14.4.4.

The table below shows the number of WESM Rules breaches during the audit period by materiality and process area. The number noted in the 2011 audit is provided in parentheses for comparison.

Table 5   Number of WESM Rules breached by materiality and process area

Process Area	Material Breaches	Non-material Breaches	Total Number of Breaches
TOD - Market Operations	0 (3)	3 (2)	3 (5)
IR-PS Registration	3 (1)	1 (0)	4 (1)
BSMD - Settlement & Reconciliation	0 (5)	4 (3)	4 (8)
AMU - Prudential Requirements	6 (7)	1 (3)	7 (10)
Finance, Accounting and Planning	0 (0)	0 (2)	0 (2)
Total	**9 (16)**	**9 (10)**	**18 (26)**

Note that:

- Although TOD - Market Operations has no material breaches against the WESM Rules we have noted one material breach against the Market Manual on Pricing Errors; and

- IR-PS registration activities were not audited last year and the only breach recorded against them related to Visayas participants being registered without posting security.

4.4   Recommendations

Notwithstanding the improvements we have noted, PA has also noted some further areas requiring remedial action. Our recommendations are summarised in the table below.

Table 6   Summary of Process and Compliance Review recommendations

Area	Recommendations
Registration	• Review the recently publishedMarket Manual covering Registration procedures to ensure it addresses the procedural gaps identified by PA. • Continue to monitor the timeliness of Registration application processing deadlines with a target of attaining 100% of applications processed and approved on time.

Area	Recommendations
	• Review procedures on validating operational parameters of registering facilities.
Trading & Operations – Market Operations	• Review MR 3.5.11.5 with a view to deleting it or amending it to take into account the shorter gate closure time. • Continue with plans to undertake an independent review of the market issues related to P_{min}/MRU. • Review the wording of the provisions around PEN publication so as to ensure consistency between the Rules and the Market Manual on Pricing Errors.
Settlements & Reconciliation	• Document settlement statement procedures (i.e. creating and emailing statements and sending associated attachments to participants). • Introduce adequate documentation for the suite of spreadsheet tools. As noted last year, while the Internal Procedures include some documentation of the formulation underlying the various tools, there is no actual documentation of the tools (i.e. how to use the various spreadsheet programs).
Metering	• Create formal documentation for in-house programs.
Finance, Planning and Accounting	• We reiterate our recommendations from last year and recommend that the Finance, Planning and Accounting team work with the engaged Consultant to document their business processes by developing Internal Procedures that address their business processes.
Accounts Management	• Undertake a comprehensive review of Prudential Obligations and enforcement options. • ISTD, AMU and any other responsible teams should aim for WBSS Account Management Modules implementation no later than April 2013. We further recommend contingency planning in the event of delays. • Develop performance metrics to monitor MO and Market Participant compliance with payment deadlines.
Market Monitoring Unit	• Edit the existing Internal Procedures to include details around how to create the monitoring reports themselves.
Market information and confidentiality	• Emphasise consistent timing in publication of regular reports.

4.4.1 Proposed way forward

As with the 2011 Audit, PA is making a large number of recommendations, and we appreciate that it is not practicable to implement all of these at once. In this section, we propose a prioritised approach to implementing our recommendations as follows:

• In the first instance, we recommend that PEMC continue with its plans to study the market design issues flagged in the 2011 Audit.

• Second, we recommend that PEMC continue to enhance compliance monitoring and reporting processes.

5 IT Systems Review

The IT Systems Review is an assessment against international best practice standards with respect to software management, operations and security. It also includes software validation for selected interfaces and systems beyond those included in the Market Software Testing.

5.1 Scope

The scope of the IT Systems Review covers the following areas:

- Application architecture - specifically standardisation, IT security and data management.
- Technology and infrastructure assessment - specifically the network and data centre infrastructure, Business Continuity and Disaster Recovery arrangements.
- IT Service Management - specifically PEMC's approach to incident and change management.
- Interface testing - to verify transmittal of information between various software systems maintained by PEMC as well as between PEMC and third parties.
- Software validation - assessment of applications beyond those covered by Market Software Testing.

5.2 Approach

The review included an assessment of both PEMC policies and practices including a verification of current practice against recommendations made in the previous audit. The international best practice standards considered included ISO 27001 and ISO 27002 for IT security, Uptime Institute Tier Standard Topology (for Data centre infrastructure) and ITIL v3 (for IT Service Management).

5.3 Key Findings and Recommendations

This section notes the progress made since the previous audit and summarises PA's findings and recommendations as they stand on completion of the 2012 Audit.

5.3.1 Actions addressing previous audit findings

PEMC have made significant progress implementing security-related recommendations of the previous audit, including:

- Achieving ISO 27001 certification;
- Implementing information classification policies;
- Carrying out scheduled vulnerability testing; and
- Establishing, maintaining and using a number of new logging and audit mechanisms.

Due to the focus on security, progress against non-security recommendations of the previous audit has been limited.

5.3.2 2012findings and recommendations

Summary findings and recommendations of the 2012 IT Systems Review are shown in the tables below. Recommendations marked *N* are new, those marked *R* are repeated from the previous audit, and *P* denotes a partial repeat of a recommendation against which some progress has been made.

Application architecture

Table 7   Summary of application architecture assessment

Application architecture	
Assessment	PEMC have documented policies and procedures for architecture, security, and information management.The architecture policies provide some support for increasing consistency and standardisation in PEMC's IT environment. Some room for improvement remains, particularly in the area of system design documentation.
	The security and information management policies provide sound guidance for PEMC IT operations. In particular, the documentation forms the basis of PEMC's Information Security Management System (ISMS) which has achieved ISO 27001 certification. Relevant ISO 27002 controls are well covered.
	Security of MMS systems, data centre and network remains appropriate in most areas.Security of corporate systems, data centre and network is unacceptable in some areas.
	Information classification policies have been partially implemented, and in particular all new documents have been appropriately classified.
Recommendations	To address the issues discovered with the application architecture, we recommend: • *[N]* Considering a project to determine and capture PEMC's chosen architecture and standards, and to ensure compliance (or considered non-compliance) through the change management process; • *[P]* Extending the information classification policies to existing documentation and supporting the classification with technology. Within the corporate systems, this involves making better use of the existing FileNet implementation. Within the MMS network, this would require finding a new solution such as implementing an additional instance of FileNet. Additional software would need to be procured to enable files to be permanently deleted and securely encrypted; •

Technology/infrastructure

Table 8   Summary of technology/infrastructure assessment

Technology/infrastructure assessment	
Network and data centre	
Assessment	Availability targets for MMS and corporate systems are toward the lower end of the range used by market operators around the world, but not unreasonable.Availability statistics for MMS and corporate systems are likely to be overstated, due to the reliance on manual notifications to determine outage times.
Recommendations	• *[R]* Increase level of redundancy provided for infrastructure in corporate data centre. We note that PEMC already have a planned project to address this in 2013.
Business Continuity Planning and Disaster Recovery	
Assessment	The Business ContinuityPlan (BCP) covers BC activities at a management level. It includes high level content providing useful structures for maintaining business continuity.
	However, much of the document describes the process taken to create the plan rather than the actions that PEMC will take when it is activated.
	To be truly useful, the plan should be extended to the detail of how individual business processes will be maintained when business as usual is not possible.
	As at the end of the audit period, the Disaster Recovery Plan (DRP) did not include content for corporate systems. A new DRP with corporate system content has taken

	effect subsequent to the audit period.
	DR simulation plans now include placeholders for corporate system information, but these are not yet populated, as there is no environment in which to test corporate system restoration.
Recommendations	To address the issues discovered when assessing the BCP and disaster recovery plans, we recommend that PEMC:
	• *[R]* Extend the MMS test environment and commission a suitable corporate test environment to allow DR plan components to be tested without impacting production;
	• *[N]* Hold hard and soft copies of BCP and DRP offsite. Key personnel should have a copy at their home and copies should also be kept at all secondary and backup-sites;
	• *[N]* Prioritise all business functions and IT systems, and include prioritisation in the BCP, along with identification of key staff, systems and facilities required in a disaster;
	• *[N]* Add backup site detail in BCP, including facilities available and who will go there;
	• *[N]* Include in the BCP, or link to, detailed activity plans for maintaining continuity of specific business services (e.g. Trading Operations) in the event of loss of Robinson's Tower, and the event of having no access to IT systems;
	• *[R]* Include corporate systems - as well MMS - in the disaster recovery plan; and
	• *[R]* Simulate, as much as possible, the entire disaster recovery plan. This should include forming the defined teams that will respond to a disaster, executing failover to the alternate site, and restoring data from tape backups.

IT management model

Table 9   Summary of IT management model assessment

IT Service Management	
Service Operations	
Assessment	PEMC's defined processes for Service Operations generally compare favourably to international best practice.
	Incidents have severity, but are not prioritised at the time of occurrence, nor is there facility in WIMPSys to hold a priority for an incident. This means that the assignee effectively decides the priority of the incident.
	Staff generally understand the distinction between incidents, change requests and work orders, though some work orders should rather have been incidents.
	Activities generally follow procedures, except where technology does not allow it.
Recommendations	To address the issues discovered when assessing Service Operations we recommend that PCME:
	• *[P]* Ensure that a new or changed Incident Management tool:
	– Captures data and workflows for all request types, including queries and logical access requests;
	– Allows all request types to have both severity and priority;
	– Uses terminology consistent with procedure documentation; and
	– Uses consistent workflow states for all request types;
	• *[N]* Identify and designate business owners for MMS and each corporate system;
	• *[N]* Formalise Service Levels for MMS and corporate systems, including incident response and resolution targets; and
	• *[N]* Ensure that incidents are captured as incident records, not as work orders.
	We note that PEMC have a project planned to implement a new Service Management tool in 2013.
Service Transition	

IT Service Management	
Assessment	PEMC has adopted an ITIL-aligned process to manage change to their systems.
	The process, roles, and responsibilities are clearly documented within the Internal Procedure, and are structured around six forms. The process is comprehensive and robust.
	The process is managed manually, with paper forms, and is not supported by a Configuration Management System.
	The change management process is followed more closely than we observed last year, but still not in all cases. Change requestors do not understand the appropriate material to put in each section, costs are not estimated, and benefits given only qualitatively.
	In all cases, change approvers were correct for the classification of the change. Three changes were deployed to production prior to testing. In a few cases, change request forms are undated. On one form, dates appear to have been altered after signatures have been appended. This is a particularly troubling observation.
	We note that Market Network Model changes must be approved by the President and ratified by the PEM Board. PEMC could reconsider if MNM changes really warrant discussion and approval at the highest levels.
	The process could be simplified, streamlined and enforced through the use of technology to support change workflow, and PEMC could gain a better understanding of environment state by implementing a Configuration Management System to identify the effects of system change, and identify unauthorized changes.
	Gathering information on system design, configuration and deployment is difficult due to the lack of a single set of up to date documentation, and the storage of change information in hard copy.
Recommendations	To address the issues discovered when assessing service transition, we recommend that :
	• *[N]* Change requestors are given more guidance on how to capture relevant information andchange approvers ensure that there is enough information on the form to support their approval;
	• *[N]* All changes are tested prior to production implementation;
	• *[N]* Dates on approval forms are not altered, either before or after approval – if they require alteration, a new form should be printed and reapproved;
	• *[N]* PEMC considersa rule change to reduce the level of approvals required for MNM changes. Although correctly classified as major, it may not add value to have the president and board approve them;
	• *[R]* PEMC support the change management process with technology to automate and enforce the process and simplify reporting;
	• *[R]*PEMC initiate a project to investigate the benefits of other ITIL services. We suggest that PEMC would benefit from implementing the Configuration Management service to give better control of assets and control when releasing software; and
	• *[N]*PEMC maintain a central repository of system design documentation, separate from the change request process, and update this documentation as part of the change request process.

IT interfaces

Only one interface had changed significantly since the last audit. No issues were found.

Table 10   Summary of interface testing recommendations

Interface Testing	
Recommendations	• *[N]* PEMC should consider whether it is more appropriate to provide the System

	Operator with Optimized Load data in place of or as well as Original Load data.
	• *[N]* PEMC should consider whether it is more appropriate to provide Market Participants with Optimized Load data in place of or as well as Original Load data.

Software applications (non-market software)

There have been no changes to these software systems since the prior audit.

Table 11   Summary of software application assessment

Software application assessment	
General Software Life Cycle Practices	
Description	In most of the bespoke applications developed and maintained by PEMC, areas of improvement remain which are not in line with common practices.
Recommendations	• *[P]* Organisation wide IT policies should be reviewed to ensure appropriate measures are adopted to maintain separate environments for development, testing and production. Technical and functional documentation should also be maintained. • *[R]* Introducing a Design Authority to get better control and direction to the overall PEMC IT estate and architecture.
Inadequate Hardware	
Description	Performance and reliability issues were identified in number of IT systems
Recommendations	• *[P]* Key applications which should be scheduled for hardware upgrade are MMS, BDES and PEMC website. We understand that hardware upgrades are included in upcoming MMS and BDES projects.

Appendix A: Summary of 2012 Audit Recommendations and PEMC Responses

This appendix summarises the recommendations made in the 2012 Audit together with PEMC's responses.

The recommendations listed are described only to a degree sufficient to identify the recommendation. For the full text and detail of the recommendations, refer to the appropriate section in this report.

A.1   Market Software

Table 12   Summary of Market Software recommendations and responses

	PA recommendation	PEMC response
Market Network Model		
1	Integrate Meralco sub-transmission into the MNM and determine if there are other DUs whose sub-transmission can influence market dispatch and pricing	PEMC needs the latest network data of Meralco, and other identified DUs to be able to undertake the market simulations
Load Forecasting		
2	Complete planned load forecasting studies and implement resulting improvement recommendations	PEMC is scheduled to complete the studies by 4Q 2012 and will make appropriate recommendations based on the results of the studies
3	Implement the planned changes for separate regional Loss Percentage parameters	Coordination with MMS Vendor on cost impact of planned changes is already on-going. However, its final implementation is still under study pending the completion of the load forecasting studies by 4Q 2012
Market clearing software		
4	Deploy the software patch MA 1.5.13 to the production environment	This has now been completed.
5	Undertake planned Pmin review	Preparation of TOR for the engagement of third party for the Pmin review is on-going
6	Complete the investigation into combined ramping constraint options	On-going drafting of WESM PDM Document to incorporate minor changes in relation to the Joint-Ramping Constraint and transmission loss modeling (MDOM Modification Project). Completion of drafting is contingent on the implementation and completion of the MDOM Modification Project by the MMS Vendor.
7	Complete review of CVC and nodal VoLL values and consider inclusion in market prices	PEMC is currently undertaking internal study which is due for completion by 1Q 2013
Settlements spreadsheets		
8	Implement a definitive audit trail	We will improve the audit trail of current settlements process in the CRSS (RCOA Project).

	PA recommendation	PEMC response
9	Reword selected WESM Rules to enhance clarity	The BSMD shall review the wording of the WESM Rules sections 3.13.5.1, 3.13.7, 3.13.9, 3.13.12 and 3.13.17, with respect to the calculation of trading amounts, contains some inconsistencies.
10	Add detail to the MRU Market Manual to clarify BCQ settlement and implement in program	BSM shall review the manual, as recommended.
11	Improve formulae and manual process descriptions in settlements Procedures	BSM shall review the internal procedure and update the formula. This will be included in the documentation review currently undertaken by SGV.
12	Address errors in AP, MRU, VAT and PSM programs and advise participants	BSM shall conduct and review the program and shall institute the necessary changes to correct and prevent the errors. Target Date: 1st Quarter 2013
13	Implement error-checking and reporting in settlement programs	BSM shall try to identify additional parameters for possible error trapping. 1st Quarter 2013
14	Review results of settlements programs from past billing periods	BSM shall conduct and review the program and shall institute the necessary changes to correct and prevent the errors. Target Date: 1st Quarter 2013
156	Undertake a specific project involving IT professionals to improve the spreadsheet programs as soon as possible	BSMD will refer this recommendation to ISTD.
Market Assessment System		
16	Improve documentation of pre-processing tools	In coordination with ISTD, we will enhance the pre-processing tools (excel macros) to incorporate the recommendations of PA (target date: 4Q2012)
17	Add data checks to pre-processing tool code	
18	Automate saving MRR HVDC data tool result file	
19	Allow for varying number of generators/loads in PSM RTD/RTX prices tool	

A.2   Procedures

Table 13   Summary ofProcedure recommendations and responses

	PA recommendation	PEMC response
General		
20	Bring all Market Manuals up to green standard	The internal process in governing amendments on the WESM Manuals will be documented and gaps, if any, shall be addressed in the said process. The said process will be included in business process review currently undertaken by SGV.
212	Continue to bring all red and amber Procedures up to green standard	
22	Add Related Tools section to Procedures	
23	Include file and data archiving in Procedures	
Accounts Management Unit		
24	Revise all AMU Procedures to bring them up to green standard	PEMC engaged a consultant (SGV) to review and document all the AMU procedures and all other PEMC Unit's Internal Procedures.
BSMD		

	PA recommendation	PEMC response
25	Improve process descriptions in Procedures	PEMC engaged a consultant (SGV) to review and document all the AMU procedures and all other PEMC Unit's Internal Procedures.

A.3　Process and Compliance

Table 14　Summary of Process and Compliance recommendations and responses

	PA recommendation	PEMC response
Registration		
26	Continue to monitor the timeliness of Registration application processing	The internal procedure on assessment of applications has been revised to allow for parallel processing by assessing departments. As recommended, assessing departments will be strictly monitored to ensure their compliance with the timelines. We submitted proposed revisions to the WESM Rules on the term "business days" to "working days" that will exclude weekends and holidays in the timeline for the processing of applications for WESM membership. This will facilitate compliance as it is a more realistic timeline
27	Review procedures on validating operational parameters of registering facilities	We will review the existing procedures. However, some operational parameters, particularly on registered capacities, are already addressed in the Registration Manual which incorporates requirements for validation of registered capacities.
TOD - Market Operations		
28	Review MR 3.5.11.5 to account for shorter gate closure time	Draft proposal to define "reasonable estimate" to comply with the provisions of MR 3.5.11.5 is under review by PEMC
29	Review wording around PEN publication for consistency between WESM Rules and Market Manual	PEMC will review wording around PEN publication for consistency between WESM Rules and Market Manual and propose appropriate changes as necessary by 4Q 2012
BSMD - Settlements		
30	Document settlement statement procedures	PEMC engaged a consultant (SGV) to review and document all the AMU procedures and all other PEMC Unit's Internal Procedures.
31	Introduce adequate documentation of spreadsheet programs	PEMC engaged a consultant (SGV) to review and document all the AMU procedures and all other PEMC Unit's Internal Procedures.
BSMD - Metering		
32	Create documentation for in-house programs	PEMC engaged a consultant (SGV) to review and document all the AMU procedures and all other PEMC Unit's Internal Procedures.
Finance, Planning and Accounting		
33	Document business processes in Procedures	PEMC engaged a consultant (SGV) to review

	PA recommendation	PEMC response
		and document all the AMU procedures and all other PEMC Unit's Internal Procedures.
Accounts Management Unit		
34	Undertake comprehensive review of collections and payment, Prudentials and enforcement	To resolve the issues on the non-compliance with the PR, PEMC discussed the concerns with the participants, coordinated with concerned entities (i.e., NEA, DOE, PHILRECA), made a study on the possible options and presented to the PEMC Board some recommendations. On 25 August 2011, the PEMC Board directed the RCC to further study the PR to arrive at the best solutions.
MAG - Market Monitoring Unit		
35	Include details on how to create monitoring reports in Procedure	PEMC engaged a consultant (SGV) to review and document all the AMU procedures and all other PEMC Unit's Internal Procedures.

A.4   IT Systems

Table 15   Summary of IT System recommendations and responses

	PA recommendation	PEMC response
Application architecture		
36	Considering project to capture architecture and standards, and to ensure change management process compliance	A study will be made to determine if this responsibility will require a new position or can be lodged in an existing position. Timeline: 1Q2013
37	Extend information classification policy to existing documentation and support the process with technology (same as 43)	Per discussion with SGV, they will adopt the ISMS info class to all PEMC documents and will recommend to the BPR Committee
Technology & infrastructure		
38	Increase level of redundancy in corporate data centre	Already issued an NCPAR which requires redundancy. Budget included for 2013 implementation
Business Continuity Planning and Disaster Recovery		
39	Extend MMS test environment and commission a corporate test environment to allow DR plan components to be tested	Extension of the MMS test environment will be considered in the new MMS. IST shall study the licensing and infrastructure requirements to provide a suitable corporate test environment and thereafter file appropriate budget. This will be elevated to the BCP Committee for proper disposition.
40	Hard and soft copies of BCP and DRP offsite	Done, Admin already provided a controlled copy of BCP to Cebu and EBS.
41	Prioritise business functions and IT systems, and include in BCP	On-going, Included in the current BIA conducted by the BCP Teams
42	Add backup site detail in BCP	Considered in the current document review of BCP
43	Include detailed activity plans for maintaining	Considered in the current document review of

	PA recommendation	PEMC response
	continuity of specific business services in BCP	BCP
44	Include corporate systems in DRP	Done, Already included in 2012 version of DRP Simulation Plan
45	Simulate, as much as possible, the entire DRP	Included in the BCP timeline the test of the whole BC Plan including the DR Plan
IT service management - Service Operations		
46	Improve Incident Management tool	Will be addressed by the newly filed ICT Change Request: QISR
47	Identify and designate business owners for MMS and each corporate system	IST shall consider in reviewing and updating incident handling procedure which is currently being reviewed by SGV
48	Formalise Service Levels for MMS and corporate systems	IST shall consider in reviewing and updating incident handling procedure which is currently being reviewed by SGV
49	Ensure that incidents are captured as incident records, not as work orders	Will be addressed by the newly filed ICT Change Request: QISR Timeline: EO 2013
IT service management - Service Transition		
50	Give more guidance to change requestors on how to capture relevant information	The form has been revised to simplify the process of change request and to ensure that appropriate attachments are included during the approval process. Action item: IST shall improve the ICT Change Request form guide to capture relevant info. Timeline: EO October 2012
51	Test all changes prior to production implementation	Test and Quality Control had been in place since October 2010 as part of ICT Change management
52	Ensure dates on approval forms are not altered	Agree, this is currently being practiced; we do not alter dates of approval. Apparently, If there are changes to the request, the requesting party is requested to cancel the old request and file a new one.
53	Reconsider level of approvals for MNM changes	Clause 3.2.1.5 of the WESM Rules requires that any alteration of the market network model shall be approved by the PEM Board. Hence, before being ratified by the Board, the MNM change must first be reviewed and endorsed by the President. Any deviation from this process will entail WESM Rules revision.
54	Support change management process with technology	IST to study software that supports change management automation and thereafter, IST will file a change request to support this recommendation. Timeline: to submit study by 1Q2013
55	Investigate benefits of other ITIL services	Suggest that we send IT Personnel to ITIL Certification Trainings and IST to initiate a technical working group to come up with the configuration management service best practices.

	PA recommendation	PEMC response
		Timeline: include 2014 Training Plan or earlier if there are cost-savings.
56	Maintain central repository of system design documentation	This was already addressed by the new ICT Change Form. All system design documentation must only be written in the Change form as references to the change request. All system design documentation will now be filed separately in the DMS. Timeline: 1Q2013
IT interfaces		
57	Consider providing SOs Optimized Load data in place of or as well as Original Load data	This will be studied in coordination with TOD.
58	Consider providing Participants Optimized Load data in place of or as well as Original Load data	This will be studied in coordination with TOD.
Software applications (non-market software)		
59	Review IT policies to ensure appropriate measures to maintain separate environments for development, testing and production	Done, Process of maintaining project and maintenance metrics identifies areas for improvement. Metric monitoring has been recently implemented. Already in line with Section 10 and 11 of ISMS standards. This covers most of the required.
60	Introduce Design Authority for better control and direction of overall IT estate and architecture	A study will be made to determine if this responsibility will require a new position or can be lodged in an existing position. Timeline: 1Q2013
61	MMS, BDES and PEMC website should be scheduled for hardware upgrade	Complete MMS hardware replacement is included in the New MMS Project. BDES hardware upgrade is included in the BDES Phase 2 Project. Hardware upgrade for the PEMC website will be studied and included in the ISSP. Timeline: see project timeline for each systems

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