

//Settlements Certificate 30 Sept.doc

30 September 2011

Ms Melinda L. Ocampo
President
Philippine Electricity Market Corporation
9th floor, Robinson's Equitable Tower,
ADB Avenue, Ortigas Center,
Pasig City
Republic of the Philippines

Certification of the Market Settlements Software

Dear Ms Ocampo,

As a result of our examination of the WESM Rules and of the market settlements software, we are able to provide the following certification with respect to the market settlements software:

We certify that the market settlements software provided developed by PEMC will perform substantially in compliance with the software specifications implied by WESM Rules dated 28 June 2002, as amended, together with the associated Market Manuals and Operating Procedures with the exceptions as noted below.

Scope of the review and certification

The scope of the audit has included, at a minimum,

1. Examination of the algorithms used in the market settlements software to determine if the algorithms are mathematically equivalent to the prescriptions in the WESM Rules;
2. Tests to determine whether the outputs of the market settlements software are consistent with those which result from the application of the prescriptions in the WESM Rules; and
3. Identification of inconsistencies and non-compliance of the market settlements software with the WESM Rules.

The independent audit does not include ensuring that the computational performance of the software is in accordance with any requirements of the Market Rules.

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Nature of the tests conducted and results obtained

In performing the review and certification of the market settlements software, we have:

- Examined the market settlements and WESM Rules documents to fully understand what functions the software is required to perform, what data the software is required to use, what results the software is required to produce, and how it is to calculate them; and then
- Conducted a series of tests on the software to determine whether the software properly performs these functions and correctly calculates the results required. In this respect, the software was tested for its accuracy in representing the requirements of WESM Rules

Provided the market settlements software is used in the manner intended and with data that conforms to the requirements specified in the PEMC documents or, if not explicitly discussed therein, is within the expected range of values for data pertaining to the characteristics of the Philippine electricity system, we have found that the market settlements software performs all functions and correctly calculates the required results with the following exceptions:

- Significant material errors have been found in the settlements calculations implemented in the Price Substitution and Generation Price Index programs. The Price Substitution software appears to have not considered the "Lumped load" meter readings while the Generation Price Index spreadsheet we received appears to include incorrect data. Because we have carried out a sample test, we have not been able to fully quantify the extent of this problem. Nevertheless, it is possible that market participants have been charged or paid incorrect amounts.
- The SSLA program makes use of a programming technique that suppresses the reporting of errors to users. As a result, if the program fails to open certain input data files, or to save certain output data files, the program will continue executing without any error being readily apparent to the user. Consequently, the results will be incorrect or be those from a previous billing period, without it being apparent that anything is wrong.
- The formulation of the SSLA calculations is specified in section 9.8.3 of manual WESM-SDM-MM-05. The formula for line loss ($\text{Line}_{\text{kW-Loss}}$) is missing the division by a factor of 1000 that is required to calculate a kW quantity from a current in Amperes and a resistance in Ohms. However, the program does include the factor, so correctly calculates the SSLA.

Disclaimer of Liability

PA Consulting Group (PA) has been asked by the Philippine Electricity Market Commission (PEMC) to act as an independent market auditor to perform extensive testing of the market dispatch optimization model (MDOM) to verify its compliance with the WESM Rules

Despite the extensive testing of the software, this certification is not, and cannot be, in the form of an absolute guarantee. Error-free use and compliant results through time will increase the probability that the software is in strict accordance with the design principles.

Further, our certification is only valid if the software is used with care and for the purpose for which it was designed and tested.

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In furnishing this certification, PA specifically limits its liability to the cost of repeating all and any certification evaluations, and any necessary re-certification in reliance on those evaluations. No person shall be entitled to claim against PA, any losses or damage whether direct, indirect, special or consequential, in excess of that limitation. PEMC shall ensure that all persons or parties who may rely on this certification are aware of this limitation of liability.

Yours sincerely

A handwritten signature in black ink, appearing to read "Gregg Edeson". The signature is fluid and cursive, with a long horizontal stroke at the end.

Gregg Edeson
Member of PA's Management Committee

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