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Melinda L. Ocampo
President
Philippine Electricity Market Corporation
9th & 18th Floors, Robinson's Equitable Tower
ADB Avenue, Ortigas Center
Pasig City 1600
Republic of the Philippines

Dear Ms Ocampo

Certification of the Price Substitution Methodology Executable Application

PA Consulting Group (PA) has been asked by the Philippine Electricity Market Corporation (PEMC) to act as an independent market auditor to perform certification testing of the Price Substitution Methodology Executable Application (PSM) software to verify its compliance with the Wholesale Electricity Spot Market (WESM) Rules.

Certification

This certification is specific to the Price Substitution Methodology Executable Application. The PSM is the software that implements the price substitution methodology approved by the Energy Regulatory Commission (ERC) in ERC Case No. 2008-051 RC in relation to Chapter 2.10.5 and other relevant provisions of the *WESM Rules* and on criteria and guidelines specified in the Methodology for Determining Pricing Errors and Price Substitution Due to Congestion for Energy Transaction in the WESM Issue 3.0 (MDPEPS) WESM Manual.

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

> *We certify that version 4.0 of the PSM software will perform substantially in compliance with the WESM Rules as amended by Department of Energy (DOE) Department Circulars up to and including DC2012-02-0011, together with the WESM Manual, "Methodology for Determining Pricing Errors and Price substitution Due to Congestion for Energy Transaction in the WESM Issue 3.0".*

> *Although we have observed and noted some aberrations or anomalies in relation to the software specifications, we believe that they are not likely, of themselves, to represent a material deviation from the design concept contained in the WESM Rules provided due attention is paid to the points noted in this Certification in the use of the software.*

continued

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Scope of the review and certification

The scope of the review has included, at a minimum:

1. Examination of the algorithms specified in the MDPEPS to determine if the algorithms are mathematically equivalent to the formulation described in the WESM Rules;

2. Tests to determine whether the outputs of the PSM software are consistent with those which result from the application of the formulation described in the WESM Rules; and

3. Identification of inconsistencies and non-compliance of the PSM 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 WESM Rules.

Nature of the tests conducted and results obtained

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

- Examined the WESM Rules, the MDPEPS Manual and PSM functional specification documents to fully understand what functions the software is required to perform, what data it is required to use, what results the software is required to produce, and how it is to calculate them; and

- 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 PSM 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 PSM software performs all functions and correctly calculates the required results with the following exceptions:

- *Price substitution where market clearing price is zero.* This functionality is forced dispatch of generators to their minimum stable operating limit, or Pmin, is implemented as specified in the MDPEPS Manual but is arguably in conflict with Price Substitution Methodology Executable Application Software Functional Specifications version1.0 (MO-PSM-001).

Disclaimer of Liability

Despite the extensive testing of the software, this certification is not, and cannot be, in the form of an absolute guarantee.

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

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

Steve Thornton
Member of PA's Management Group