



RESOLUTION NO. 20, Series of 2014

**A RESOLUTION ADOPTING AND ESTABLISHING A
PRE-EMPTIVE MITIGATION MEASURE IN THE
WHOLESALE ELECTRICITY SPOT MARKET (WESM)**

WHEREAS, Republic Act No. 9136, otherwise known as the Electric Power Industry Reform Act of 2001 (EPIRA), declares it as a policy of the state to ensure the quality, reliability, security and affordability of the supply of electric power, as well transparent and reasonable prices of electricity in a regime of free and fair competition;

WHEREAS, it has also been declared as a policy of the state to protect the public interest as it is affected by the rates and services of electric utilities in the process of restructuring the electric power industry;

WHEREAS, under the EPIRA¹, the Energy Regulatory Commission (ERC) has been specifically tasked to promote competition, encourage market development, ensure customer choice and discourage/penalize abuse of market power in the restructured electric industry;

WHEREAS, the EPIRA has likewise mandated the ERC to ensure the adequate promotion of consumer interest² and has vested it with the authority³ to monitor and take measures to penalize abuse of market power, cartelization, and anti-competitive or discriminatory behaviour by any electric power industry participant;

WHEREAS, on May 5, 2014, the ERC issued Resolution No. 8, Series of 2014 setting an interim pre-emptive mitigation measure in the Wholesale Electricity Spot Market (WESM) to mitigate sustained high prices during the May and June 2014 supply months;

WHEREAS, the said Resolution has established a price threshold in the WESM applied over a seventy-two (72) hour period, which is determined through rolling average Generator Weighted Average Price (GWAP) and a secondary cap to be imposed upon a breach of the above defined threshold;

WHEREAS, on June 16, 2014, the ERC issued Resolution No. 13, Series of 2014 extending the effectivity of the pre-emptive mitigation measure for forty-five (45) days from its expiration or until August 9, 2014;

WHEREAS, on August 5, 2014, the ERC issued Resolution No. 14, Series of 2014 extending further the effectivity of the mechanism for a period of one hundred twenty (120) days from August 10, 2014 or until the establishment of a permanent pre-emptive mitigation measure in the WESM, whichever comes earlier;

¹ Section 43, EPIRA

² Section 41, EPIRA

³ Sections 43 (k) and 45, EPIRA

WHEREAS, under the said Resolution, the ERC has determined the need to adopt a permanent pre-emptive mitigation measure for the WESM and thus, directed all interested stakeholders to submit their proposed measures;

WHEREAS, mindful of the need to establish a pre-emptive mitigation measure to limit the impact of extreme price volatilities and excessive levels of prices in the WESM, the ERC conducted a public consultation and focus group discussions on the proposals submitted by the industry stakeholders;

NOW, THEREFORE, for and in consideration of the foregoing, the **ERC** hereby **ISSUES** and **ADOPTS** the following:

1. A Cumulative Price Threshold (CPT) amounting to PhP1,512,028.00 equivalent to the Generator Weighted Average Prices (GWAP) over a rolling 7-day period or one hundred sixty eight (168)-hour trading interval, is hereby set in the WESM. This is equivalent to an average spot price of PhP9,000/MWh over the period.

Table 1. Formulation of the rolling average price threshold

Period	No. of Hours in a day	Average LWAP (PhP/MWh)	Price Threshold PhP/MWh
1 st Off-peak	8	2,756	22,048
Peak	10	8,166	81,660
Price Spike	3	32,000	96,000
2 nd Off-peak	3	5,432	16,296
Total	24		216,004
7-day Cumulative Price Threshold			1,512,028
Average CPT Per Hour			9,000

A breach of the CPT for the said period triggers the imposition of a price cap amounting to PhP6,245/MWh. The market clearing price for the immediate trading interval following the breach will be pegged at the value of the price cap and shall be imposed until after a determination that the succeeding GWAP rolling average is already below the CPT.

However, during the period where the price cap is imposed, if there are intervals where the market clearing price is lower than the price cap, the market clearing price will be applied for settlement purposes.

A copy of the Discussion Paper on the Pre-emptive Mitigation Measure is hereto attached as Annex "A".

2. During the period where the CPT has been breached and the price cap is in effect, the oil-based plants will be entitled to recover additional compensation equivalent to the remainder of the total cost of fuel and variable Operations & Maintenance (O&M) costs, upon submission of sufficient proof that the application of the pre-emptive mitigation measure is not sufficient to cover the fuel cost and variable O&M costs of the plant, to be evaluated and confirmed by the Philippine Electricity Market Corporation (PEMC); and
3. The claim for additional compensation by oil-based plants shall be processed by PEMC within thirty (30) days from receipt of the supporting documents.

This Resolution shall take effect fifteen (15) days after its publication in a newspaper of general circulation in the country.

Let copies of this resolution be furnished the University of the Philippines Law Center-Office of the National Administrative Register.

Pasig City, December 15, 2014.


ZENAIDA G. CRUZ-DUCUT
Chairperson and CEO


GLORIA VICTORIA C. YAP-TARUC
Commissioner


ALFREDO J. NON
Commissioner


JOSEFINA PATRICIA A. MAGPALE-ASIRIT
Commissioner

Copy furnished:

Philippine Electricity Market Corporation,
To furnish all Members of the WESM


DBB/NDC/DTL/FSCJ

The Adoption of a Pre-emptive Mitigation Measure for the Philippine Wholesale Electricity Spot Market (WESM)

1. A Pre-emptive Mitigation Measure to address sustained high market prices

The current cap in the WESM has been adopted to limit or reduce possible instances of excessive increases in or high market prices. Such cap has been set at the marginal cost of operating the most expensive plant (diesel thermal plant). However, the significant spikes in market clearing prices experienced in the November and December 2013 billing months indicated that the offer price cap being the only price mitigation in the market is not sufficient to address conditions of sustained high market prices. The offer price cap does not likewise address the clearing of prices at extremely negative levels such as what took place in December 2008¹ and January 2009².

Throughout WESM operation, the market has already experienced a number of extremely positive and negative prices. The possibility and actual occurrence of such only cause price to be more volatile in that it tends to induce opportunistic participant behaviour. Ultimately, all of this can potentially form a vicious cycle that could harm the sustainability of the whole market in the long run³.

For this reason, a pre-emptive mitigation measure, which caters to unreasonably sustained high prices is needed to be set in the market in a manner that will equally consider the interests of the stakeholders and the consuming public.

2. Practice in Other Jurisdictions

In other jurisdictions, a cumulative price index is used to measure sustained high market prices.

- a. **In the National Electricity Market (NEM) of Australia**, the value of a rolling 336 – half hour interval (or 7 – day period) is used to gauge whether a price cap (or Administered Price Cap, APC) should be imposed on the market prices. The rolling average is benchmarked against the Cumulative Price Threshold (CPT), which is equal to AUD 201,900.00 (or PhP7,425,643.76)⁴. Equivalently, the average price for the period is around AUD 600.893 (or PhP22,100.13).

¹ The lowest price recorded in 2008 was PhP-102,313/MWh, 0700H on Christmas day, primarily due to depressed demand levels and extremely low offer prices, among others.

² During 2009 the market also recorded the lowest (and only negative) monthly average price at PhP-594/MWh in January of that year. It was attributed to similar reasons as with the extreme negative prices in 2008, that is, the combined effect of low demand and high supply margin levels.

³ Study of Mitigating Measures for the Philippine Electricity Market, submitted by PEMC to the ERC on July 24, 2014

⁴<http://themoneyconverter.com/AUD/PHP.aspx> last accessed December 16, 2014

If the CPT has been breached, prices cannot go beyond the APC for the rest of the day, which is set at AUD 300.00 (or PhP 11,033.65), enough to cover the Short Run Marginal Costs (SMRCs) of plants in the Australian Market.

The price cap is assessed for lifting on 0400H of the next day.

- b. **In Texas**, a price threshold of USD 175,000 (or PhP7,834,484.00)⁵ is based on the revenue which should be recovered by their peaking plants (or Peaker Plants). Once the prices accumulate at this value, the price cap of USD 2,000.00 (or PhP 89,536.96) will be imposed, less than half of their original price cap of USD 5,000.00 (or PhP 223,842.40).

The price cap is lifted on an annual basis (annual resource adequacy cycle), which means that, if the threshold is breached, a lower price cap will be observed for the rest of the year.

3. Methodology

Similar to the methodologies in Australia and Texas, a rolling average of market prices will be gauged against a pre-set threshold. For the WESM, the ex-ante prices will be monitored against a threshold by taking the rolling average of Generator Weighted Average Price (GWAP). The threshold is determined by taking into consideration the load curve for the day and assigning reference prices for the peak and off-peak hours where the baseload, intermediate and peaking plants are assumed to operate and set the prices. Sustained high Real Time Dispatch (RTD) market prices would be deemed to have occurred if the rolling average for a seven (7) – day period is greater than said threshold. If this occurs, succeeding intervals would be placed under a price cap until the rolling average is below the price threshold, indicating that the occurrence of sustained high prices have ceased. This means that after the period has been breached, if a particular market price in any of the succeeding intervals is greater than the price cap, the market clearing price for that trading interval will be pegged at the value of the price cap. However, in trading intervals where the market clearing price is lower than the price cap, the market clearing price will be retained.

⁵<http://themoneyconverter.com/usd/php.aspx> last accessed December 16, 2014

The concept is illustrated below:

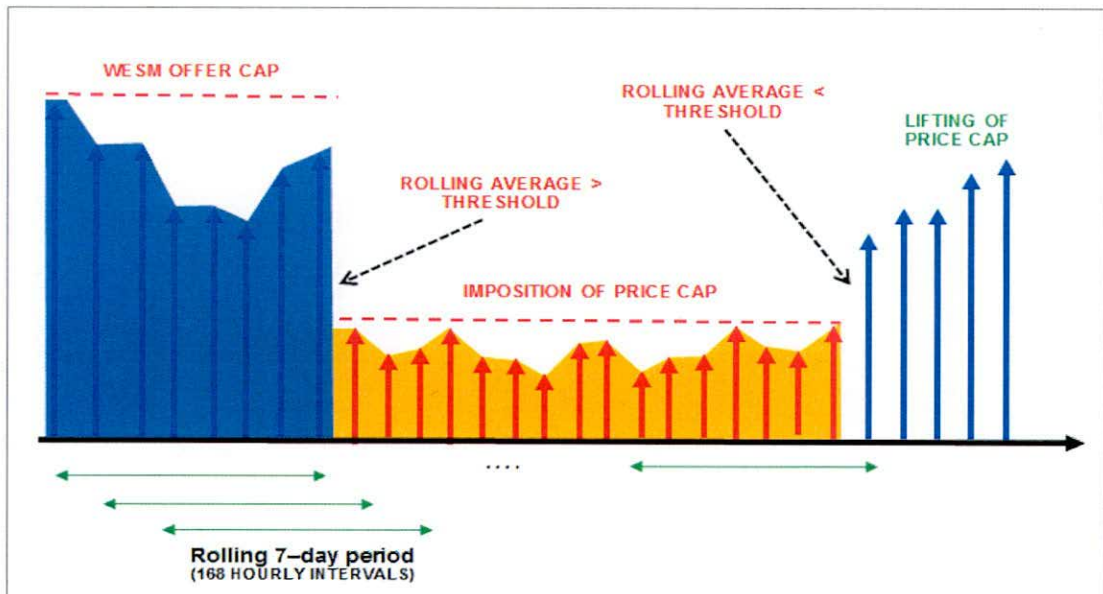


Figure 1. Conceptual Illustration of the Mitigation Measure

The following parameters are needed to facilitate effective monitoring and mitigation of sustained high market prices:

- a. **The rolling – average threshold:** the rolling average threshold is set such that:
- The market allows clearing of typical spot market prices during normal periods;
 - Allows the market to clear at high market prices during tight supply events, preserving important economic signals; and
 - Price cap would likely set in during extreme events (e.g., situation during Malampaya Outage last Nov – Dec 2013).

In setting the rolling average threshold, the historical load weighted average prices during April, May & June of 2010–2014 (period of high demand, or during summer periods) were considered, in addition to assuming the market prices to clear at the level of Php32,000.00 for three (3) intervals in a day:

Period	Average LWAP (PhP/MWh)	No. of Hours
1 st Off-peak	2,756	8
Peak	8,166	10
Price Spike	32,000	3
2 nd Off-peak	5,432	3

Table 1. Formulation of Rolling Average Threshold Based on Historical Summer Prices and allowed clearing at PhP32,000.00/MWh

The PhP32,000/MWh price applied during the three-hour (3) intervals allocated for price spike is the maximum price that a trading participant is allowed to offer in the WESM. And the intervals are equivalent to the hours that the peaking plants are allowed to operate.

With these prices, the following daily market price profile would be established:

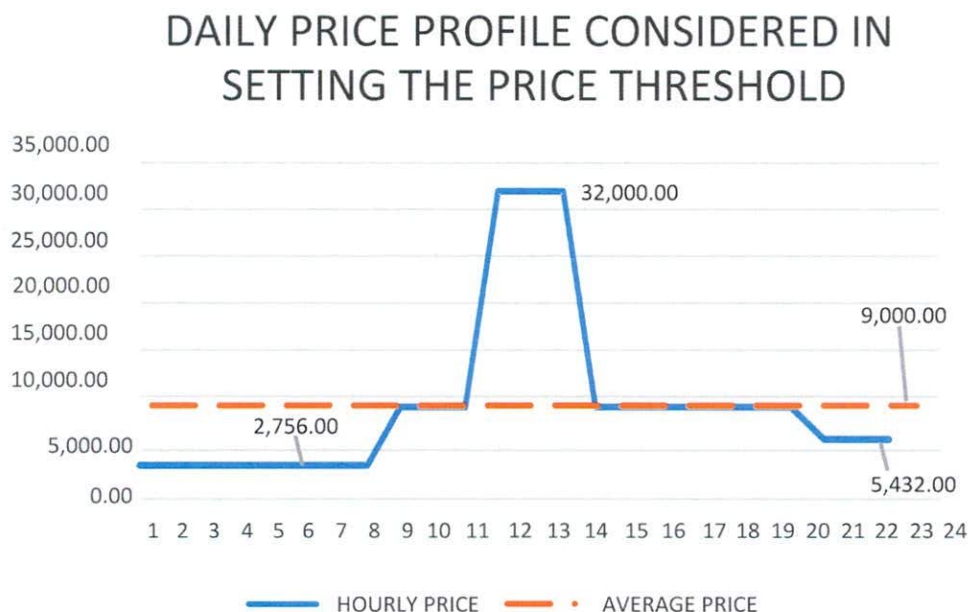


Figure 2. Market Price Profile for Determination of Rolling - Average Threshold

Using this profile, the rolling average price threshold is determined at PhP9,000.00/MWh, which is the average daily Load Weighted Average Price (LWAP) for the period considered.

It should be cleared further that with this mitigation measure, so long as resulting rolling average GWAP fall below PhP9,000/MWh for the 7-day period, regular market clearing results are observed.

- b. **The value of the price cap:** the price cap is set at **PhP 6,245.00/ MWh**, which is equal to the ERC regulated price imposed pursuant to ERC Order on ERC Case No. 2014-021 MC dated March 3, 2014.
- c. The measure is based on the determination that if the cumulative price threshold is breached, the part of the cost of the riskiest investment (a diesel plant) would have already been recovered.⁶ Thus, the price cap is set at a level that would just allow recovery of a Generator's marginal costs.

The price cap is pegged at a level that would only cover recovery of marginal costs because spot prices ordinarily do not reflect recovery of Fixed Costs (Capital Costs and Fixed O & M) as a generator would tend to bid at a price that approximates its marginal costs to remain competitive⁷.

In the presence of competition in the market, generators are forced to offer or bid electricity close to their marginal cost. Bearing in mind that dispatch of electricity in the market involves the stacking of generator cost to determine the wholesale prices, otherwise known as the "merit order dispatch", a generator is expected to bid/offer only at the most optimal bid or its marginal cost.⁸

As electricity markets are designed to be an efficient and competitive venue for the trading of electricity, wholesale electricity prices therefore must reflect the **Short Run Marginal Cost (SRMC)**. Generally, SRMC is defined as the change in total costs that arises as a consequence of changing the quantity produced by one unit. These costs are therefore only those that vary with one unit change in quantity produced, all other things constant. SRMC therefore **does not include fixed costs** which do not vary in an instant in time and does not change with the change in output level.⁹

The major components of the SRMC in the electricity industry are: 1) cost of fuel; and; 2) costs associated with operation, maintenance and administrative expenses that change with the level of components since the timing and frequency of such maintenance is dependent on output and utilization levels. **Fixed costs are not included, neither are they recovered**, through SRMC measures. However, since the wholesale electricity market ensures an appropriate mix of generating plants, the excess of the marginal clearing price above a certain plants' operating cost during those intervals where it is dispatched, as represented by the graph below, may be used to cover for other costs accruing to the same.¹⁰

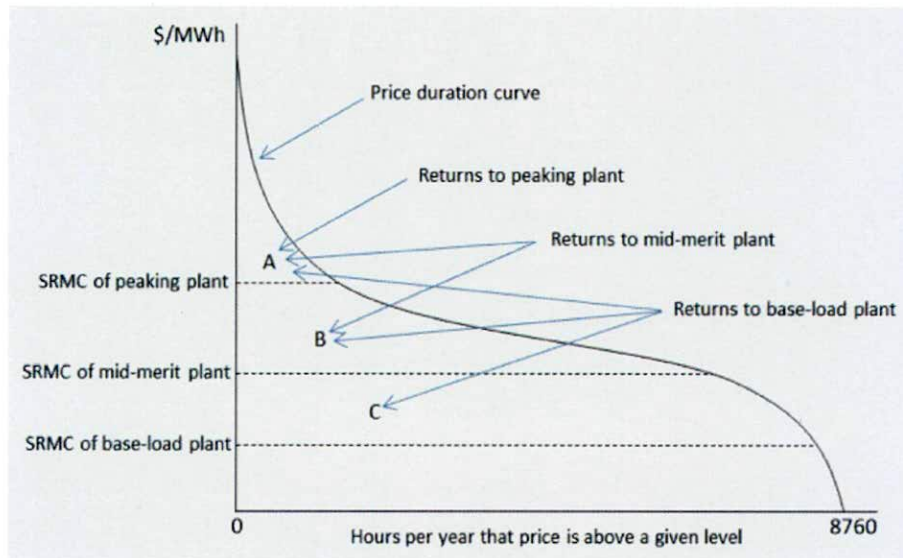
⁶Note that for other plants (mid-merit and base load plants), long term market prices are more important for investment considerations. This means that the allowed price spikes is affecting most the peaking plants.

⁷ The economic theory is that where there is competition, where neither buyer nor seller has significant market power, the prices that will come out of the operation of the market is close to **marginal cost**, such that the seller makes only a normal or "fair" return on its investment, Page 14, Decision on ERC Case No. 2005-056 dated 22 June 2006

⁸ Competitive Electricity Markets: A Wholesale Primer, William Hogan

⁹ McHugh (2008), *Short Run Marginal Cost*, Economic Regulation Authority, Western Australia

¹⁰ "A Comparative Analysis of Actual Locational Marginal Prices in the PJM Market and Estimated Short-Run Marginal Costs: 2003-2006" London Economics International



Hartley & Moran (2000), *Marginal Costs and Prices in Electricity Industry*
 Merret & Trindade (2012), *The State of Competition*

The above graph depicts that dispatched plants on a particular trading interval earns "rents" relative to its short-run operating costs whenever a plant with higher operating costs is called upon to supply the marginal amount of electricity to the system. In this vein, plants are forced to bid/offer at their SRMC to be able to be dispatched.

- d. **Additional compensation for oil-based power plants:** For oil-based plants which have SRMCs higher than the price cap, they may file for additional compensation with PEMC. In NEM Australia, the price cap is set such that SRMCs or variable costs of operation can be recovered.

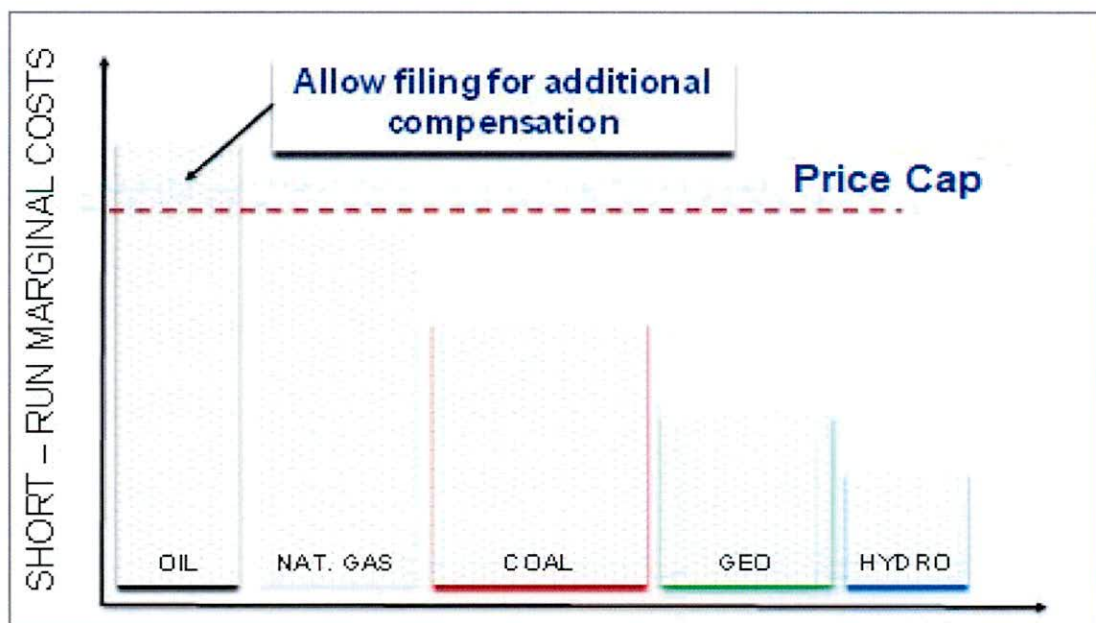


Figure 3. Conceptual Determination of Secondary Cap, considering SRMCs of various plants

The mechanism provides that in the event that oil-based plants are dispatched during period where the price threshold is breached, they are entitled to recover additional compensation equal to the remainder of the total cost of fuel and variable Operations & Maintenance (O&M) cost. Claims for additional compensation shall be filed by the affected Generation Company with the Philippine Electricity Market Corporation (PEMC) together with sufficient proof that the price cap is not sufficient to cover its plant fuel cost and variable Operating & Maintenance expenses.

- e. **The period of lifting the price cap:** the price cap will be lifted whenever the rolling average is less than the defined threshold. In this regard, an hourly evaluation of possible lifting of the secondary price cap shall be in place once the same is imposed.

4. THE IMPLEMENTATION OF THE SECONDARY CAP AS AN INTERIM MITIGATION MEASURE

The Secondary Cap scheme has been implemented initially as an interim mitigating measure in the WESM where the 72-hour rolling average GWAP was gauged against the PhP8,186.00/MWh set threshold. Its implementation during the period May 11, 2014 to June 25, 2014 resulted to the following imposition of the Secondary Price Cap in the market:

No.	Date	Interval/s	Duration (in hours)	No. of Intervals w/ Capped Prices
1	May 15	0300-1400	12	7
2	May 15	1600-2100	6	6
3	May 15	2300-2400	24	12
	May 16	0100-2200		
4	May 17	0100-1000	10	5
5	May 20	2300	1	1
6	May 21	1100-1900	9	7
7	June 22	1600-2400	18	11
	June 23	0100-0900		
8	June 23	1100-1600	6	6
9	June 23	1900-2000	2	2
10	June 23	2300-2400	14	9
	June 24	0100-1200		
11	June 24	1400-1500	2	2
12	June 24	1700-2100	5	5
13	June 24	2300-2400	2	2
14	June 25	0200-1100	10	7
15	June 25	1300-1400	2	2
16	June 25	1600-2400	9	9
TOTAL			132	93

Beginning the second half of May 2014 billing until June 2014 billing, 16 Secondary Price Cap imposition events were registered composed of 132 intervals out of the total 1,104 (11 May – 25 June 2014). From the 132 intervals tagged with imposition, 93 intervals were subjected to Secondary Price Cap. It is noted that there would have been four (4) more intervals capped at PhP6,245, had there been no market intervention declared during the period.¹¹

¹¹ The System Operator declared market intervention for Luzon on 16 May 2014 at 1400H – 1800H due to zero (0) reserve brought about by the emergency shutdown of Pagbilao 1. This coincided with the imposition of the Secondary Price Cap. At 1400H – 1700H, administered prices were above the level of PhP 6,245 but were, nonetheless, left uncapped even with the imposition of the Secondary Price Cap

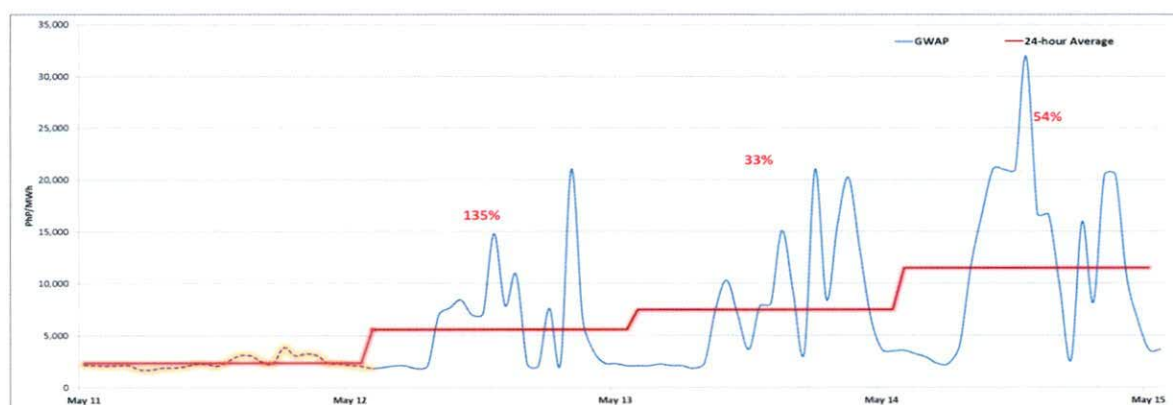
The table below shows the breakdown of the varying price levels that were capped during the implementation of the interim mitigating measure.

Price Range (PhP/MWh)	Hour Type		Total
	Peak	Off-Peak	
6,245 - 10,000	10	12	22
10,000 - 15,000	19	7	26
15,000 - 20,000	16	3	19
20,000 - 25,000	3	3	6
Above 25,000	18	2	20
Total	66	27	93

Table 4. Summary of Capped Prices, 11 May – 25 June 2014

Based on the Table 4¹², about 71% of the capped prices occurred during peak hours. On the other hand, 76% of the capped prices were originally at the level of PhP 10,000/MWh or above. The highest price that was capped reached PhP 32,000 on June 23, 0900H while the lowest hovered just above the Secondary Price Cap level at PhP 6,662.31 on May 17, 0300H.

The Figure below adequately exemplifies how the Secondary Price Cap prevents sustained high prices in the market. In this situation, the 72 hourly prices comprising the rolling average on May 15 at 0200H which recorded the first ever breach of the threshold level was dissected into three (3) 24-hour averages. Including the daily average price of May 11 as the reference period, it was observed that a pattern of price creep-up was developing. Starting from an average price of PhP 2,383/MWh, the daily average price began significantly increasing in the following days, at one point even doubling more than the previous average. This trend, however, was effectively detected by the mitigation measure and, as well as, immediately acted upon such that the creeping pattern gradually disappeared in the days that followed.



¹²Study of Mitigating Measures for the Philippine Electricity Market, submitted by PEMC to the ERC on July 24, 2014

Shown also in the Figure below is the trend of the rolling average from May 11, 2014 to June 25, 2014.



Note: The red line corresponds to the 72-hour rolling average prices while the other red line glowing in orange represents the original rolling average price if not mitigated.

It can be gleaned from the above graph that the Secondary Price Cap addressed sustained high prices in the WESM. This was most evident in the first four (4) events of imposition.

5. Summary: Parameters for the Mitigation Measure

Based on the discussions above, the following parameters and their corresponding levels are set:

Cumulative Price Threshold	Secondary Price Cap	Lifting
PhP9,000.00/MWh	PhP6,245.00/MWh	By the hour

- Rolling-Average Threshold:** PhP9,000.00/MWh, based on historical summer prices from April, May and June of 2010-2014 and allowance for 3 intervals in a day with price at PhP32,000.00.
- Price Cap:** PhP 6,245.00/MWh, based on LWAP in the WESM from January to September, 2013.
- Lifting of Price Cap:** Evaluation of rolling-average shall be by the hour once price cap is imposed.

The historical market prices considered in the determination of the rolling average threshold for the permanent mitigation measure were updated and the PhP32,000/MWh WESM offer cap was used as the reference price during the three (3) intervals allocated for price spike instead of the PhP27,000/MWh originally used. This

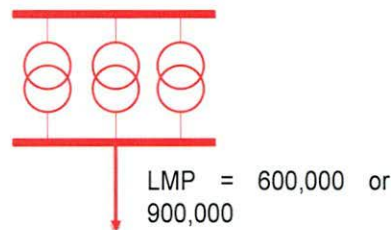
resulted in the PhP9,000/MWh adjusted rolling average threshold from the original PhP8,186/MWh level.

6. Implementation of the Rolling Average Computation and Price Cap Application

It should be taken into consideration that some intervals would have Pricing Errors, for which appropriate prices should be used for substitution. As the rolling average is to be computed in an hourly basis, the availability of prices in real – time becomes an issue.

To enable the computation of the rolling average in real-time, estimate prices are proposed for the following scenarios:

A. Pricing Errors Due to Localized Constrained Violation Coefficient (Base Case or Contingency)

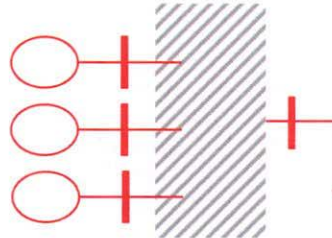


While most of the Localized Contingency / Base Case Pricing Error affect load – end resources, the prices of generator market trading nodes remain unaffected. For this reason, the nodal prices of generators for an interval where a localized Pricing Error have occurred become sufficient for purposes of computing the GWAP:

Only affects loads (load – end)
GWAP will not be affected
Input to Rolling Average = GWAP for interval

B. Pricing Errors due to Under-generation/Over-generation G and System – Wide Value of Lost Load (VoLL) CVC

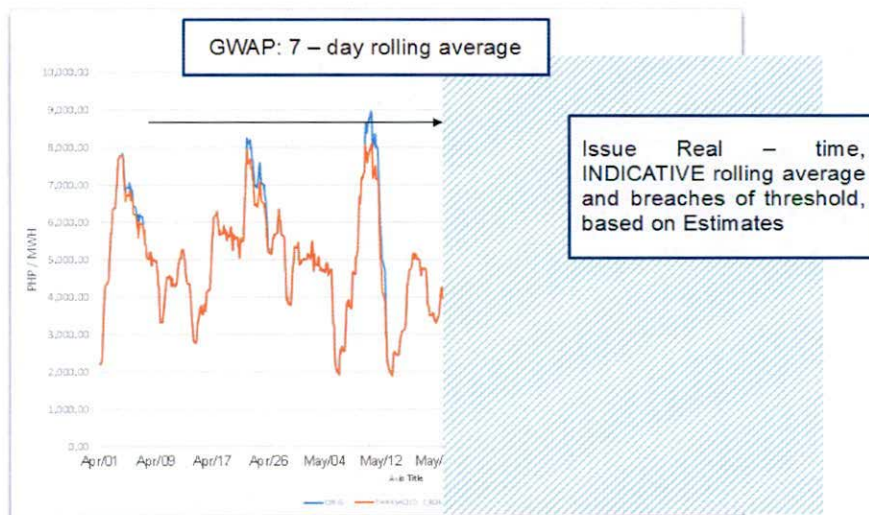
Supply < Demand (UGEN) or
Load Curtailed



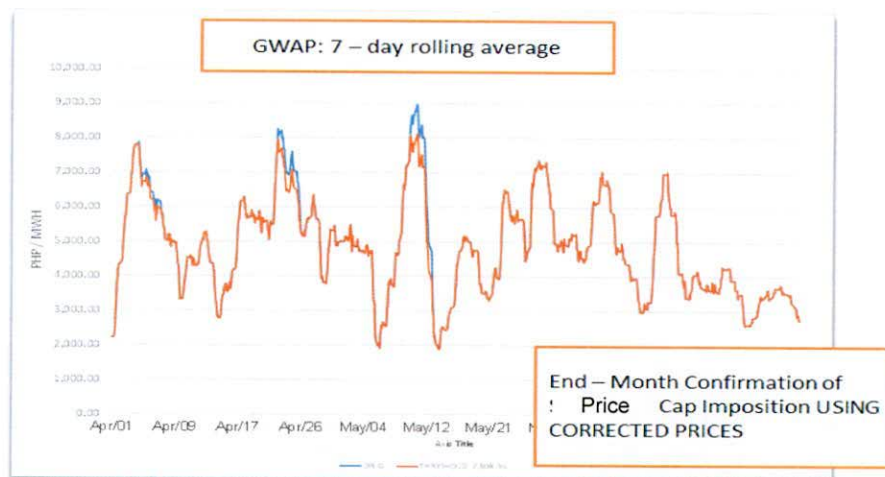
Since supply – related Pricing Errors affect all nodal prices, an estimate price could be determined by taking the average Market Re –Run (MRR) prices for the months of January to May of 2014. The resulting average MRR prices during the said periods is PhP21,000.00 / MWh.

Considering price estimation for the calculation of Rolling Averages, **the imposition of the Price Cap on basis of price estimates becomes an issue.** For this reason, the calculation of real – time Rolling Average will only be used as an indicative measure of whether or not the Price Threshold of PhP9,000 is breached. A final validation by the end of the billing month will be performed to confirm which intervals will be subject to the price cap.

Real – time calculation of Rolling Average, based on Estimate Prices (if with PEN) to indicate potential breach of the price threshold:



End – month confirmation for imposition of Price Cap:



7. Hierarchy of Prices when Price Cap is in Effect:

When the Price Cap is in effect, the following hierarchy of Pricing Status would be observed:

PRICING STATUS	
ADMINISTERED PRICING (AP)	
PEN (UGEN / VOLL)	PRICE CAP 6,245.00
PRICE SUBSTITUTION MECHANISM (PSM)	
PEN (LOCALIZED CVC)	
OK	
MINIMUM	

This means that if a particular interval is already subject to Administered Pricing due to Market Suspension or Market Intervention, the Price Cap would not be imposed on said trading interval. However, for all other types of Pricing Status, the Price Cap would be imposed, provided that their corresponding effective (or corrected) price is greater than the Price Cap.