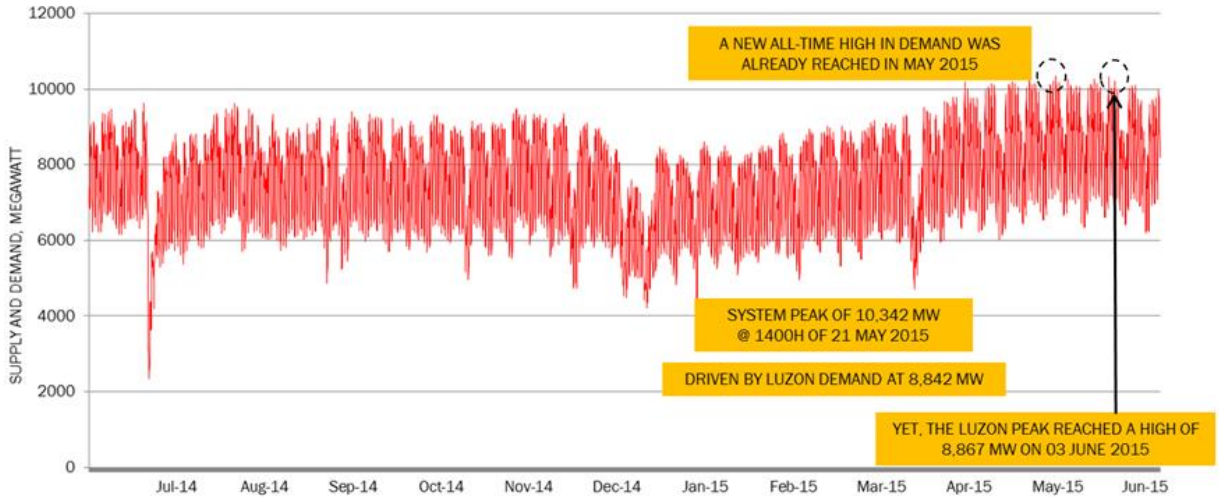

# MARKET BITES: MARKET PERFORMANCE

**(Full Write-up)**
**Powering Progress: PEMC & WESM Annual Report 2014**
**June 26, 2014 to June 25, 2015**

This year saw the combined demand of the Luzon and Visayas grids breaking all-time highs, eventually culminating in a peak demand of 10,342 MW on May 21, 2015 at 1400H. As usual, it was driven largely by the Luzon grid, which peaked at 8,842 MW during that day. The Luzon grid, however, further reached a peak of 8,867 MW on June 3, 2015, therefore, recording a new high in the demand requirement of the said grid. It should be noted, however, that the year-to-year increase in demand only reached around 2% as opposed to recent years.

Figure 1. Hourly Luzon-Visayas (System) Demand Requirement

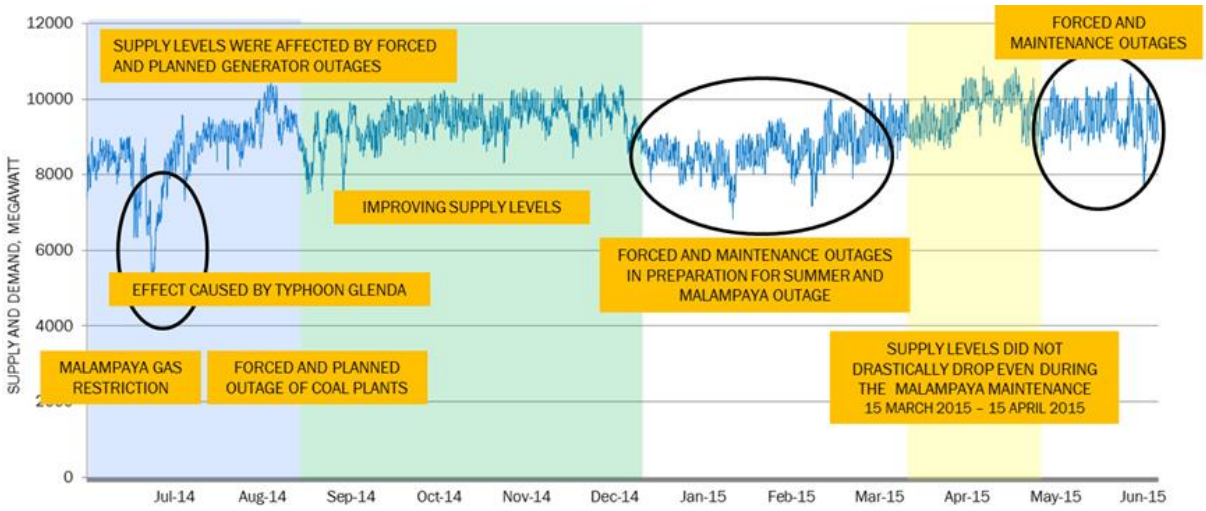


Supply availability was still generally affected by the planned or forced outages of generating units. In fact, the natural gas supply restriction from the Malampaya onshore natural gas complex and the unavailability of many coal-fired plants have been the most notable events that affected the supply conditions at the start of this 12-month period.

Supply levels improved starting August 2014 until December 2014 as several generating units came online. Thereafter, in January 2015, forced and maintenance outages affected the supply levels up until mid-March 2015. Most of the outages were in preparation for the expected high demand requirement in the summer season during the natural gas supply restriction from Malampaya from March 15, 2015 to April 15, 2015. However, the unavailable generating units, particularly the coal-fired plants, came online just in time to support the loss of Malampaya and the higher demand requirement.

As the Malampaya went back to normal operations, supply margins became much wider, but only up until the end of May 2015 as some generating units were again on forced or maintenance outage even as demand started to creep down again with the rainy season beginning to set in.

Figure 2. Hourly Luzon-Visayas (System) Generation Offer

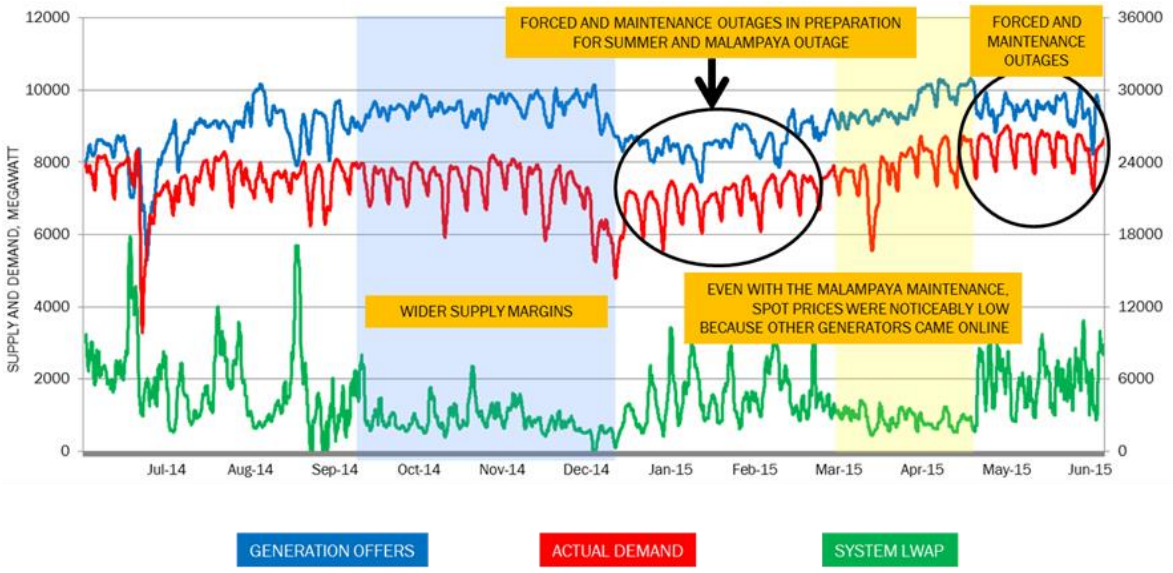



The outcome of spot prices in the WESM is still largely driven by the interaction of supply and demand. To further attest to this, the following are the highlights for the 12-month period of July 2014 to June 2015:

- High prices in July 2014 due to varying events such as the planned and forced outage of major generating units, impact of typhoon Glenda, and the Malampaya gas restriction
- Price spikes continued to persist in August 2014 given the planned and forced outages of major generating units

- The HVDC was also under maintenance from August to September 2014, therefore, hampering the additional power that typically comes from the Visayas to Luzon
- Spot prices then dipped from October to December 2014 as demand dropped further, while supply levels improved during this period
- The various forced and maintenance outages in the grid, again mostly owing to the preparations for the summer, resulted in higher spot prices from January to February 2015
- Resulting spot prices then dipped from mid-March to May 2015 because of the higher availability of generation, even in the midst of the Malampaya maintenance
- However, high prices again picked up starting end of May 2015 with a few generating units going off-line for maintenance

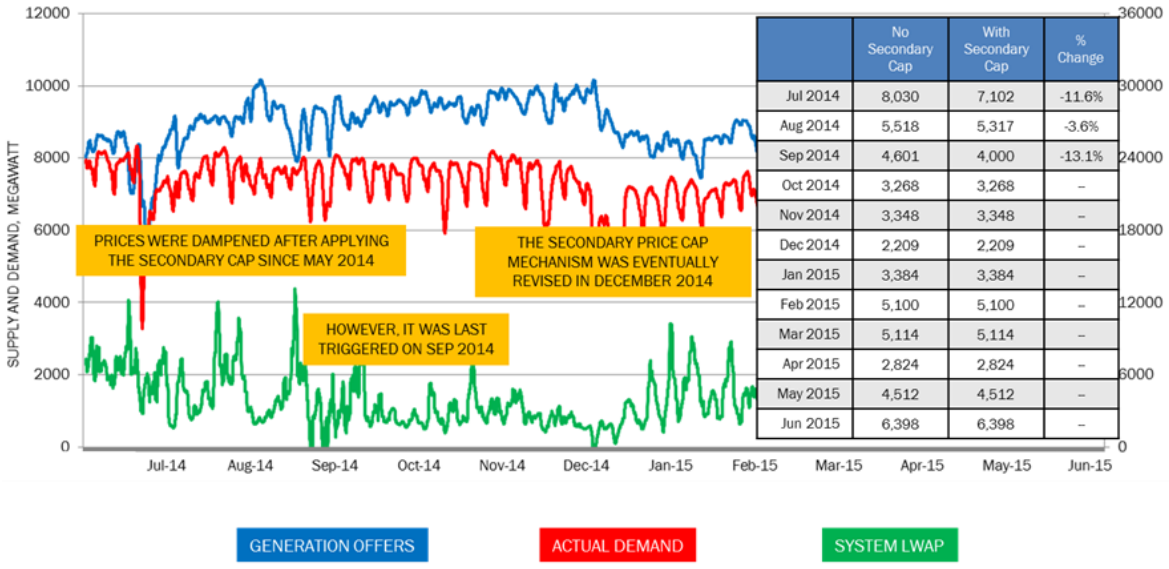
Figure 3. Hourly System Supply, Demand, and LWAP



Continuous high prices were dampened by the imposition of the secondary cap. During the same 12-month period, the secondary price cap was only applied from July to September 2014, therefore, suppressing the rampantly high prices during the said period.

Even if it was last triggered in September 2014, it had served its purpose admirably, more so that it was eventually revised in December 2014 with a new mechanism that uses a 168-hour rolling average and a cumulative price threshold of PHP 9,000/MWh. Prices dipped by an average of 9% after the imposition of said mechanism on the continuously high spot prices

Figure 4. Application Secondary Price Cap

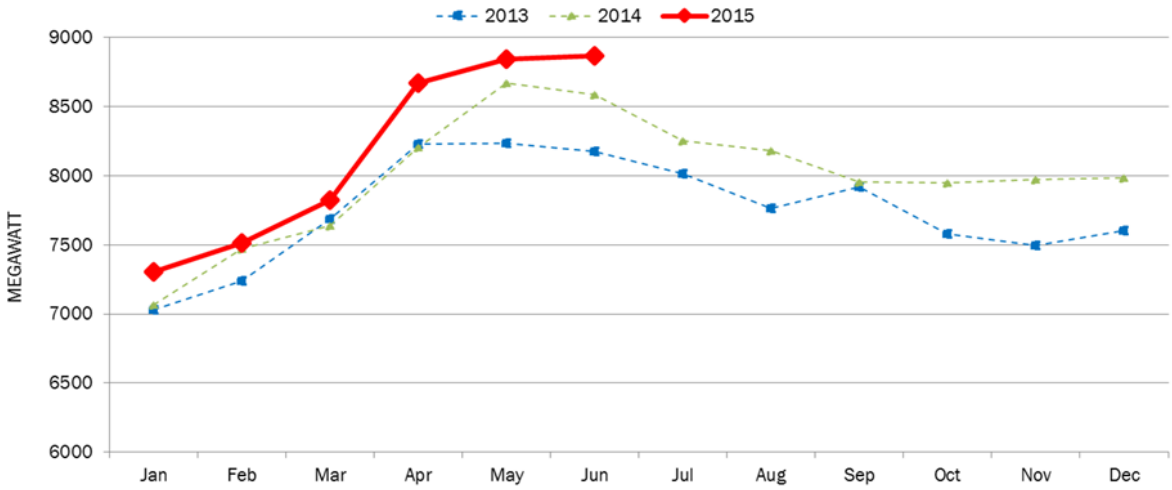



| | No Secondary Cap | With Secondary Cap | % Change |
|---|---|---|---|
| Jul 2014 | 8,030 | 7,102 | -11.6% |
| Aug 2014 | 5,518 | 5,317 | -3.6% |
| Sep 2014 | 4,601 | 4,000 | -13.1% |
| Oct 2014 | 3,268 | 3,268 | – |
| Nov 2014 | 3,348 | 3,348 | – |
| Dec 2014 | 2,209 | 2,209 | – |
| Jan 2015 | 3,384 | 3,384 | – |
| Feb 2015 | 5,100 | 5,100 | – |
| Mar 2015 | 5,114 | 5,114 | – |
| Apr 2015 | 2,824 | 2,824 | – |
| May 2015 | 4,512 | 4,512 | – |
| Jun 2015 | 6,398 | 6,398 | – |

## MARKET OUTCOMES

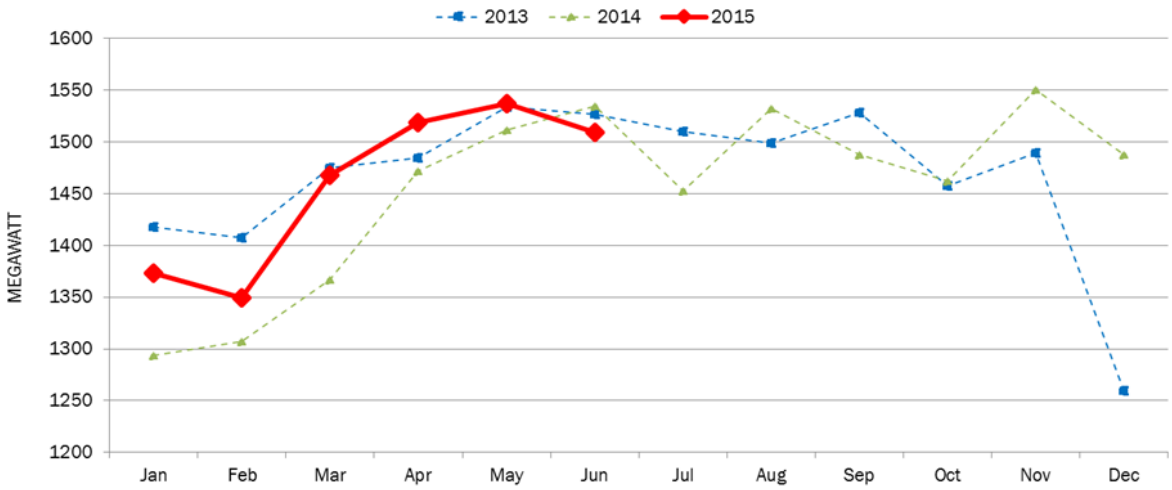
Demand has steadily increased in the Luzon grid, reaching an all-time high of 8,867 MW on June 3, 2015 at 1400H.

Figure 5. Monthly Peak Demand Requirements in the Luzon grid



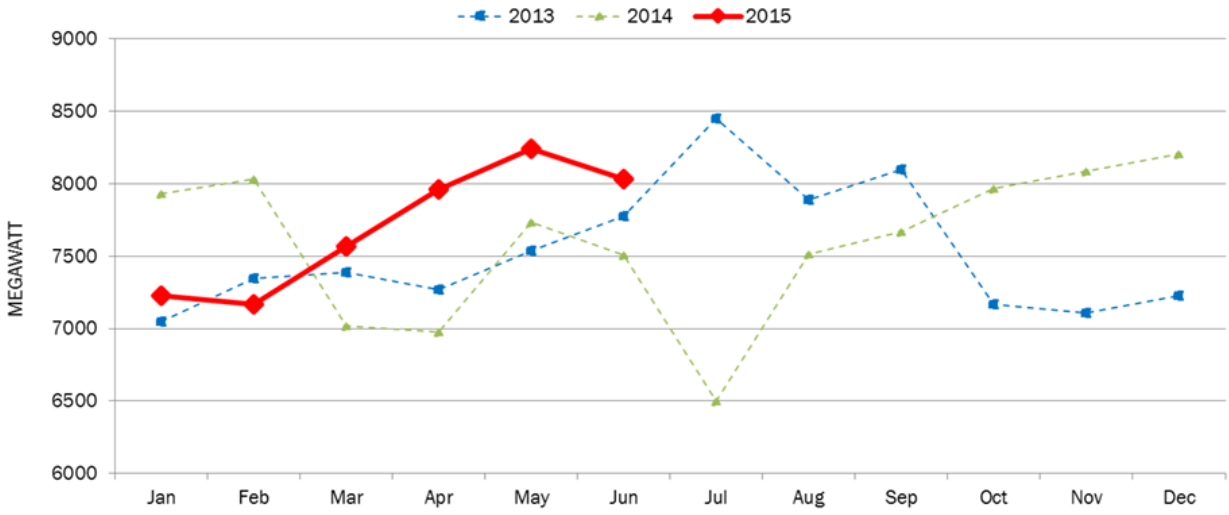

At the onset in the Visayas grid, peak demand requirements showed a dip from last year, suggesting it has not fully recovered from the devastation caused by typhoon Yolanda in November 2013. However, starting April 2015, demand in the said grid was able to surpass the peak demand in the same months of previous years

Figure 6. Monthly Peak Demand Requirements in the Visayas grid



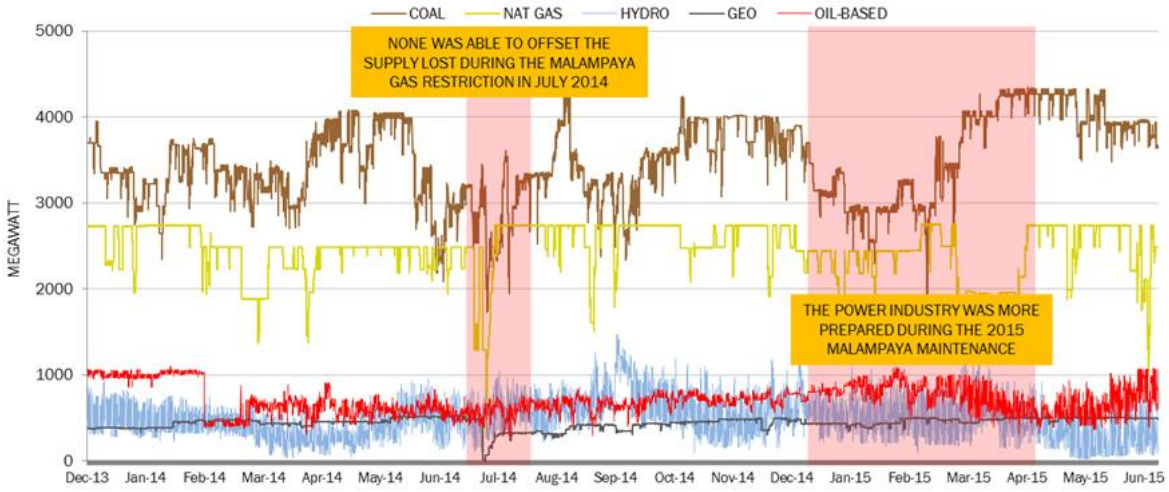

The preparations made for the summer of 2015 was evident in the level of supply in the Luzon grid.

Figure 7. Monthly Average Generation Offers in the Luzon grid



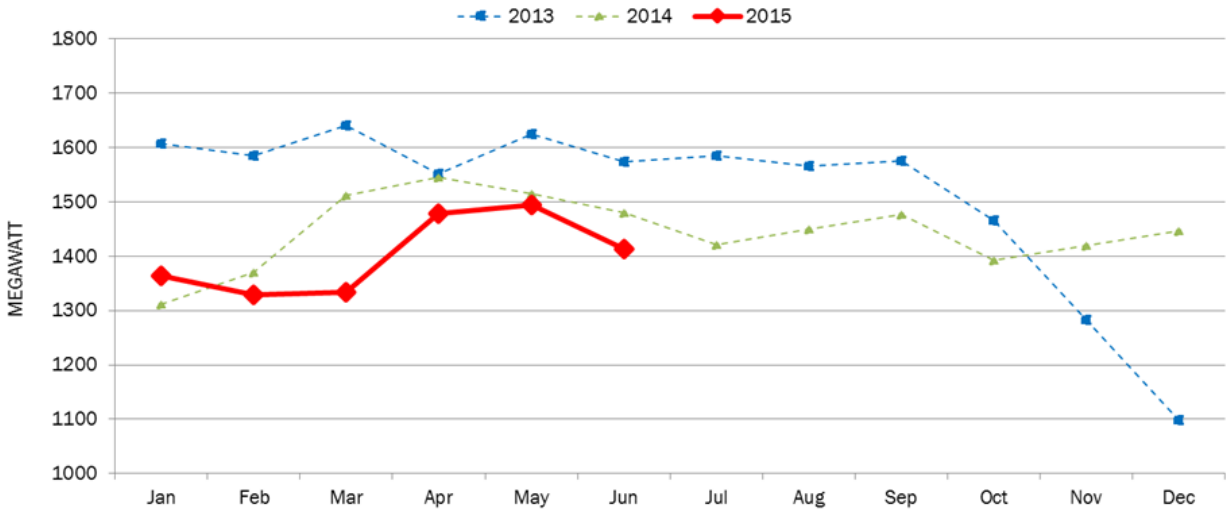

After experiencing tight supply conditions in recent years (such as in July 2014), the power industry was more prepared for similar events that were expected to take place in the summer of 2015.

Figure 8. Hourly Availability per Fuel Type in the Luzon grid



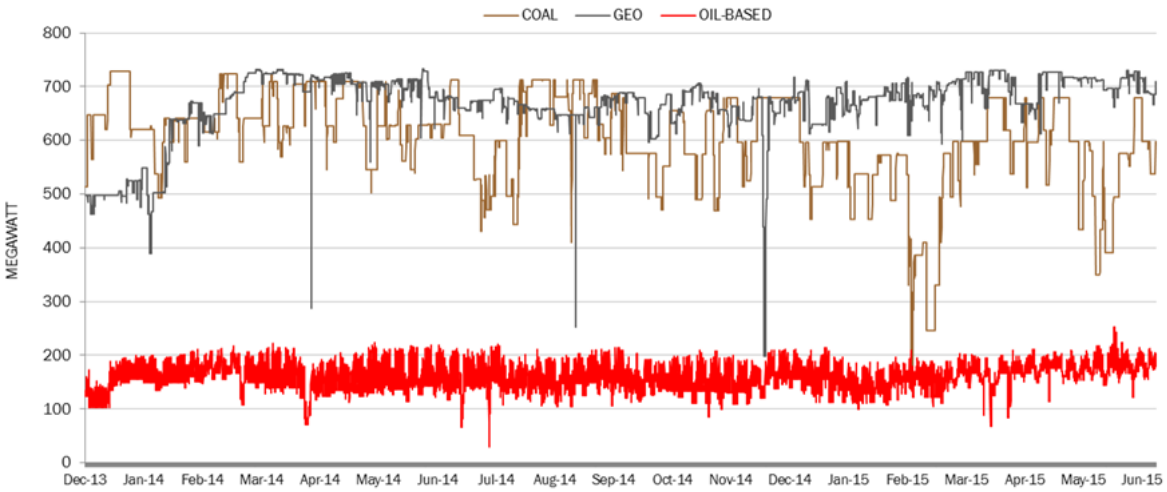

Supply levels in the Visayas have significantly dropped in 2015. This has been a noticeable trend since last year, which resulted in the frequent issuance of Yellow Alerts in the said grid.

Figure 9. Monthly Average Generation Offers in the Visayas grid




The availability of coal-fired plants has been sporadic recently, which is why frequent notices of Yellow Alert were issued by the System Operator in the said grid.

Figure 10. Hourly Availability per Fuel Type in the Visayas grid

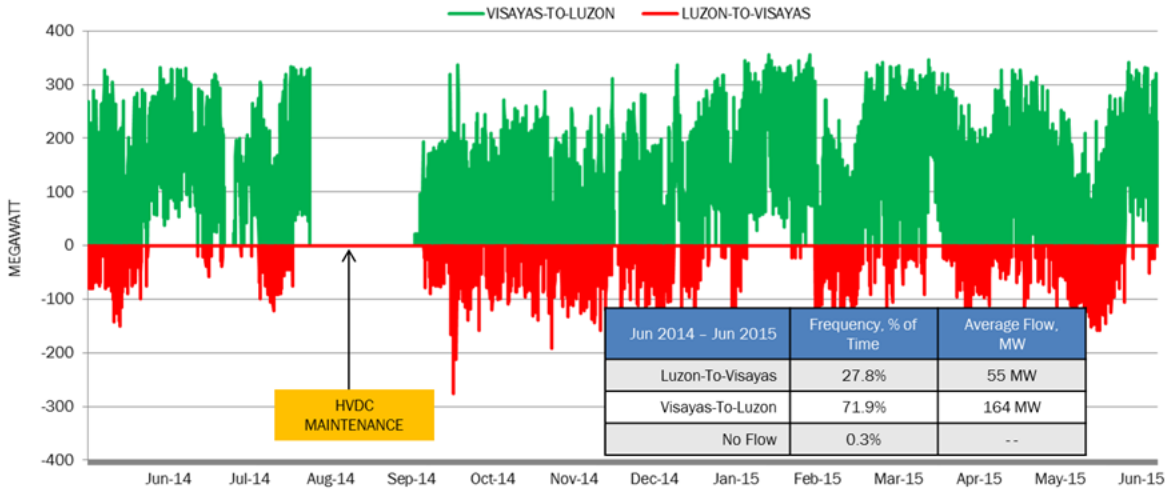



Transmission constraints, security requirements, seasonal behavior, and weather conditions also affect market price outcomes. One notable non-supply event that affected market results is the unavailability of the HVDC link.

Power is exchanged between the Luzon and Visayas grids through the 350 kV HVDC link. The Visayas grid used to be able to provide their excess power to the Luzon grid at around 72% of the time with an average rate of 169 MW. However,

recently, the Luzon grid has frequently been providing power to the Visayas grid as the latter has been experiencing a shortfall in supply.

Figure 11. HVDC Profile

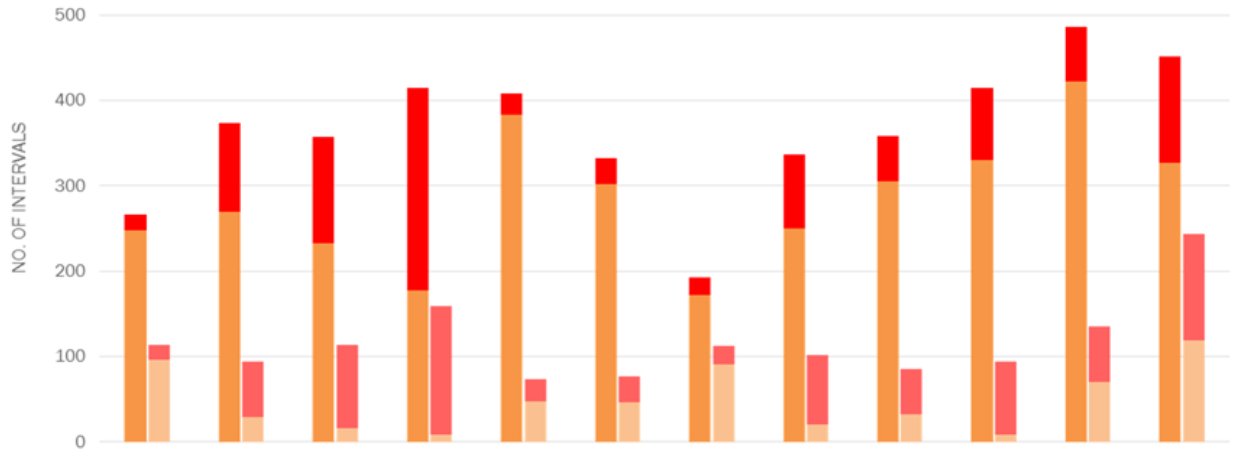



| Jun 2014 – Jun 2015 | Frequency, % of Time | Average Flow, MW |
|---|---|---|
| Luzon-To-Visayas | 27.8% | 55 MW |
| Visayas-To-Luzon | 71.9% | 164 MW |
| No Flow | 0.3% | -- |

Pricing errors remain to be prevalent in the Luzon grid, most of which are because of the local N-1 Constraint Violation Coefficient (CVC) at the MERALCO interchange.

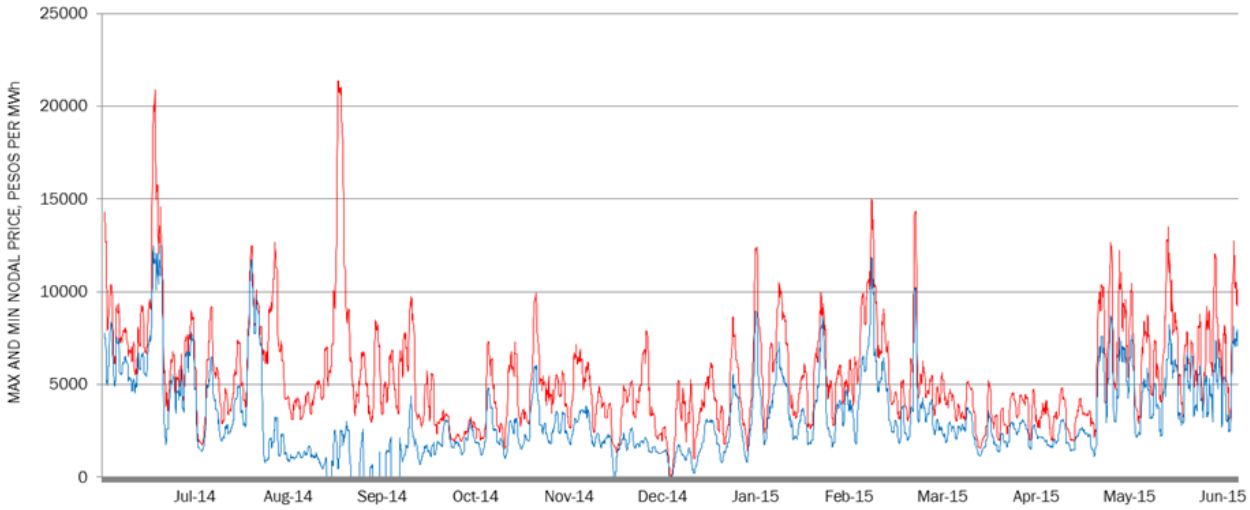
It should also be noted that a significant uptick in congestion-related Pricing Error Notice (PEN) was also observed throughout the year.

Figure 12. PEN Summary



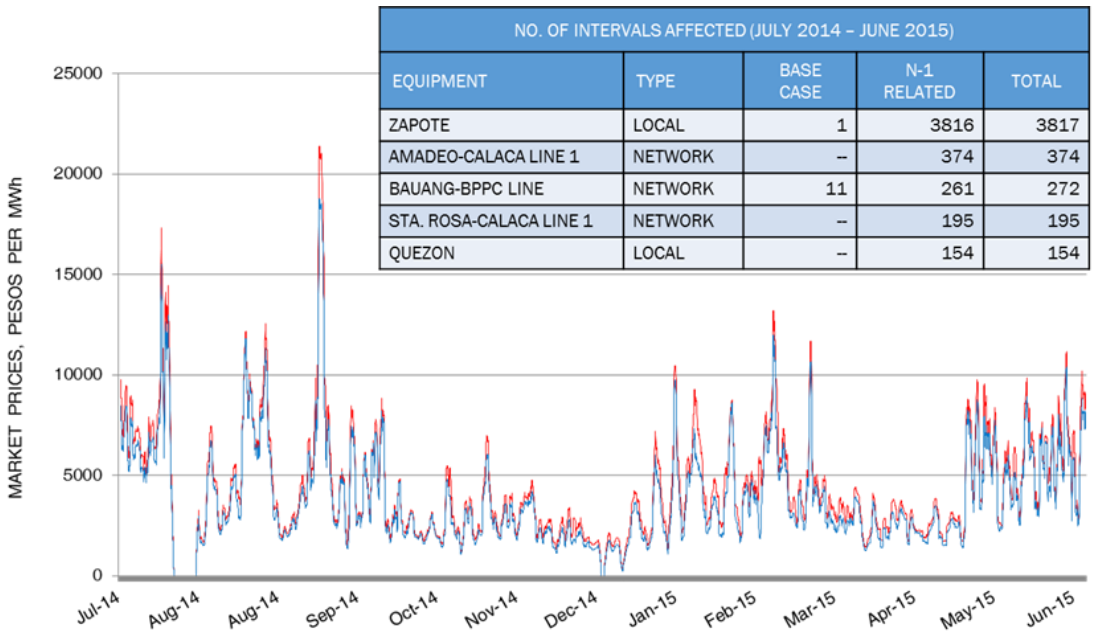
There have also been instances of huge price differences between the Luzon and Visayas grids, either as a result of the HVDC maintenance or congestions in the grids, therefore, affecting market price outcomes.

Figure 13. System-wide Max and Min Nodal Prices




Focusing on the Luzon grid alone, there have been minimal price separations across nodes. There were congestions that did reflect extreme nodal price separations, most of which were N-1 related constraints. Still, most of these congestions were mitigated by either the issuance of PENs or the imposition of the Price Substtution Methodology (PSM) for Congestion.

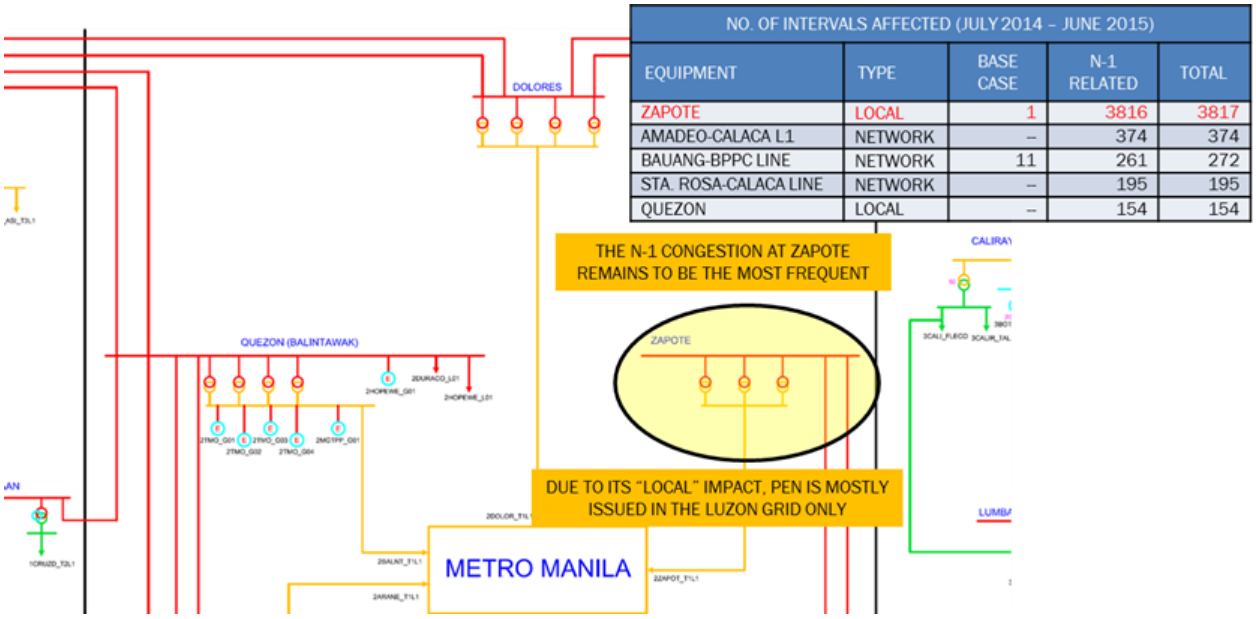
Figure 14. Luzon Max and Min Nodal Prices, and Congestion Summary




| NO. OF INTERVALS AFFECTED (JULY 2014 – JUNE 2015) | | | | |
|---|---|---|---|---|
| EQUIPMENT | TYPE | BASE CASE | N-1 RELATED | TOTAL |
| ZAPOTE | LOCAL | 1 | 3816 | 3817 |
| AMADEO-CALACA LINE 1 | NETWORK | -- | 374 | 374 |
| BAUANG-BPPC LINE | NETWORK | 11 | 261 | 272 |
| STA. ROSA-CALACA LINE 1 | NETWORK | -- | 195 | 195 |
| QUEZON | LOCAL | -- | 154 | 154 |

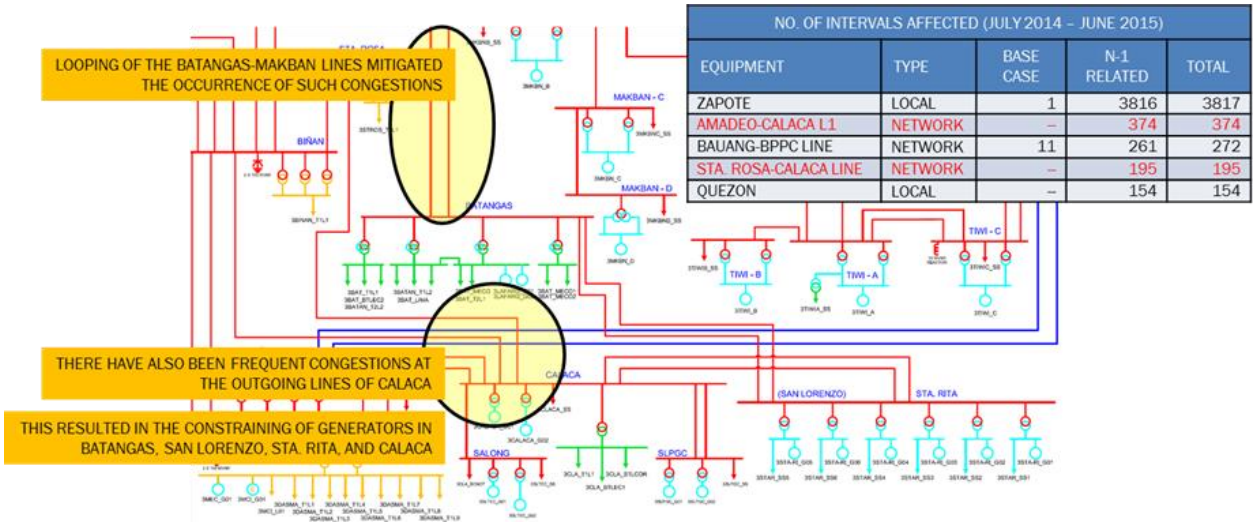
The congestion resulting from the N-1 imposition at the transformers of the Zapote substation remains to be the most frequent. With the MERALCO nodes modelled as load-end equipment, the congestion at Zapote affects the price of its relevant node only, and as a result, PEN is mostly issued in the Luzon grid.

Figure 15. Luzon Congestion Summary (Zapote Load-end Congestion)




N-1 related congestions were frequently experienced at the outgoing lines of Calaca during the past year, therefore, resulting in the generators at Sta. Rita, San Lorenzo, Batangas, and Calaca being constrained off in such situations.

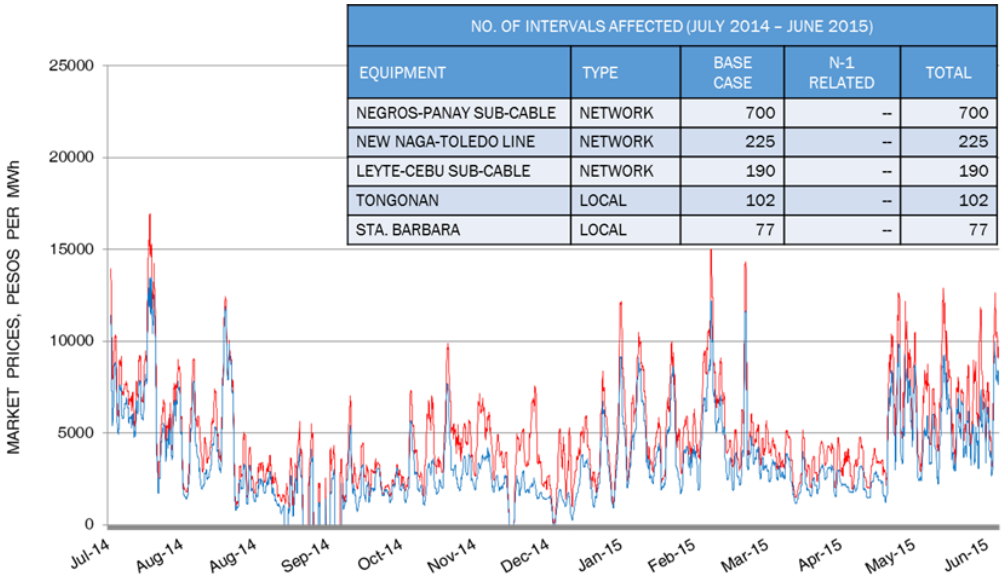
Figure 16. Luzon Congestion Summary (Calaca Outgoing Lines)




The looping of the Batangas-Makban lines was able to eventually help solve the congestion in the said area

In the Visayas grid, extreme nodal price separations were more frequent, largely because of the radial congestions at the 138 kV submarine cables in this grid.

Figure 17. Visayas Max and Min Nodal Prices, and Congestion Summary



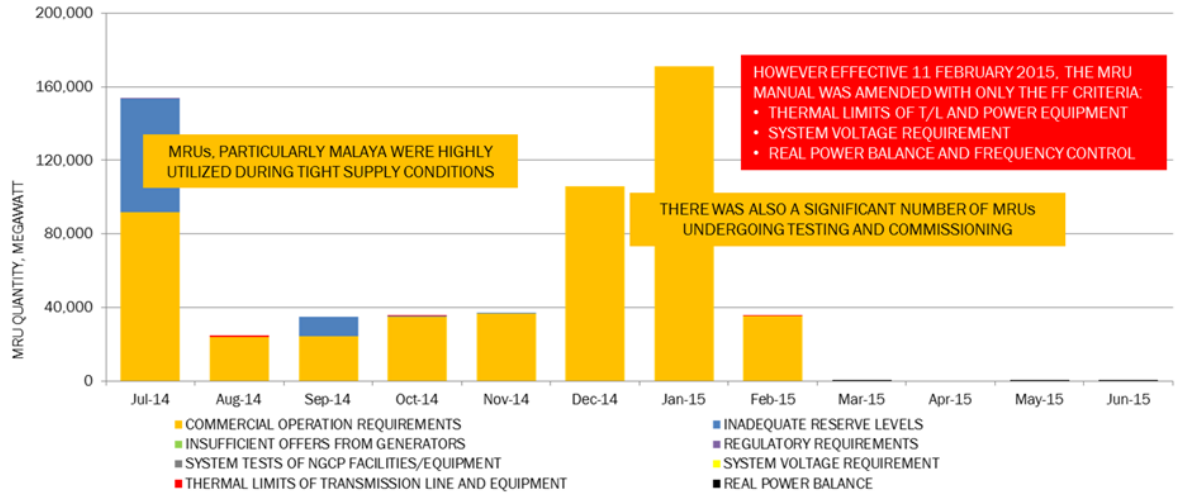

| NO. OF INTERVALS AFFECTED (JULY 2014 – JUNE 2015) | | | | |
|---|---|---|---|---|
| EQUIPMENT | TYPE | BASE CASE | N-1 RELATED | TOTAL |
| NEGROS-PANAY SUB-CABLE | NETWORK | 700 | – | 700 |
| NEW NAGA-TOLEDO LINE | NETWORK | 225 | – | 225 |
| LEYTE-CEBU SUB-CABLE | NETWORK | 190 | – | 190 |
| TONGONAN | LOCAL | 102 | – | 102 |
| STA. BARBARA | LOCAL | 77 | – | 77 |

Frequent congestions were experienced at the 138 kV submarine cable connecting the islands of Negros and Panay due to the scarcity in generation at the island of Panay.

Must-Run Units (MRUs) were highly utilized last year because of the tight supply conditions. A lot of generating units, mostly new and renewable energy resources, were also nominated as MRUs for their testing and commissioning requirements.

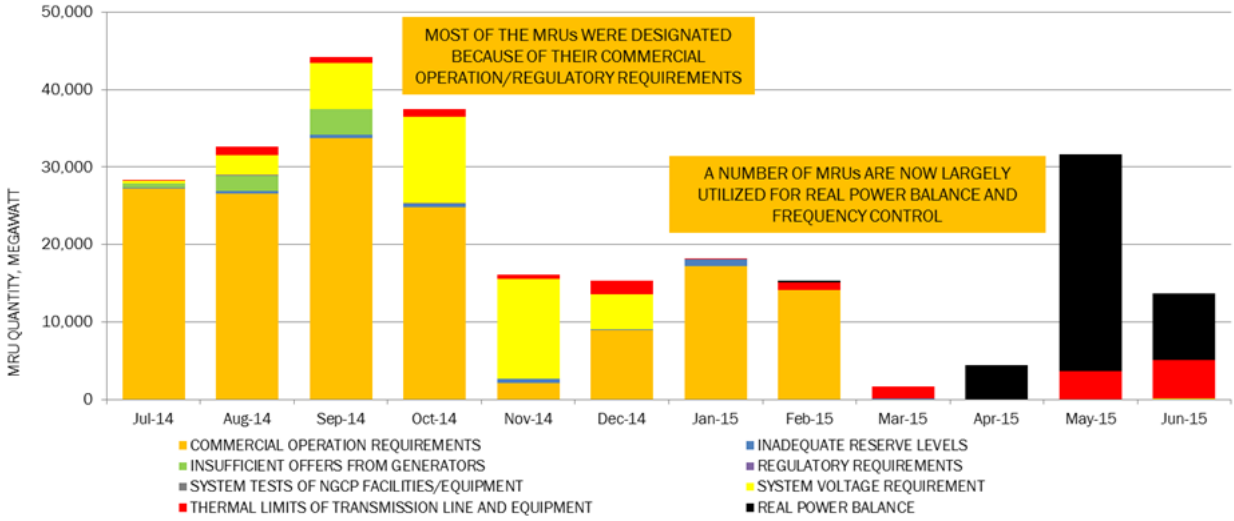
However, effective February 11, 2015, the MRU Manual was amended to only cover generating units that are constrained on for security-related reasons, such as for thermal limits of equipment, system voltage requirement, and real power balance.

Figure 18. Luzon Must-Run Units




A number of generating units were also undergoing testing and commissioning in the Visayas grid, resulting in a high influx of MRUs. But now, Visayas MRUs are frequently utilized for real power balance and frequency control.

Figure 19. Visayas Must-Run Untis



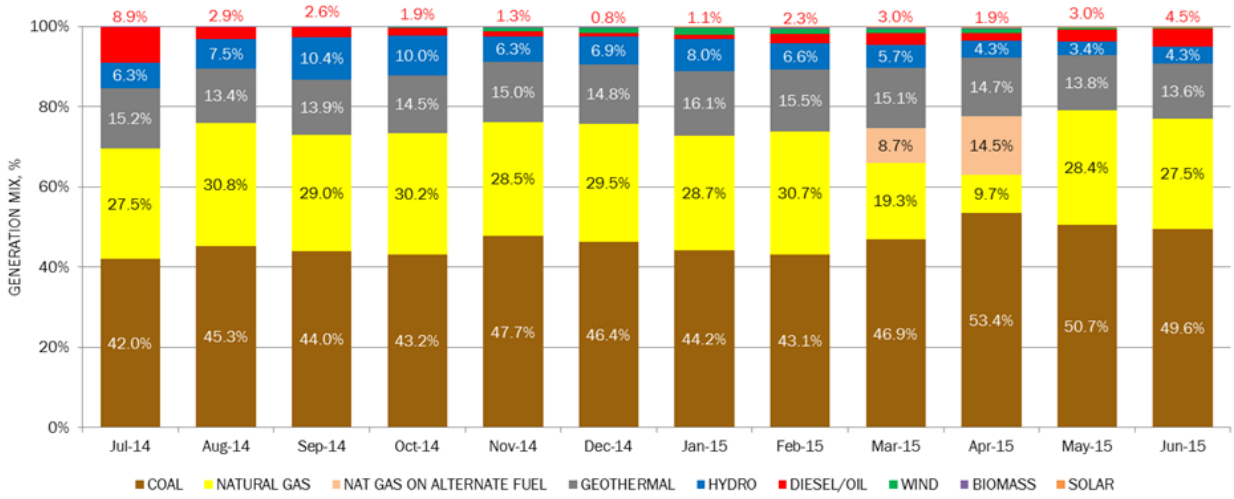

## MARKET TRANSACTIONS

Although the capacity mix registered in the WESM is varied, coal and natural gas power plants still accounted for almost three-fourths of the monthly generation mix.

Coal plants, reflected its highest share in the WESM generation mix in April 2015 accounting for more than half of the generation produced across the Luzon and Visayas grids. The contribution of natural gas plants dipped at times as a result of

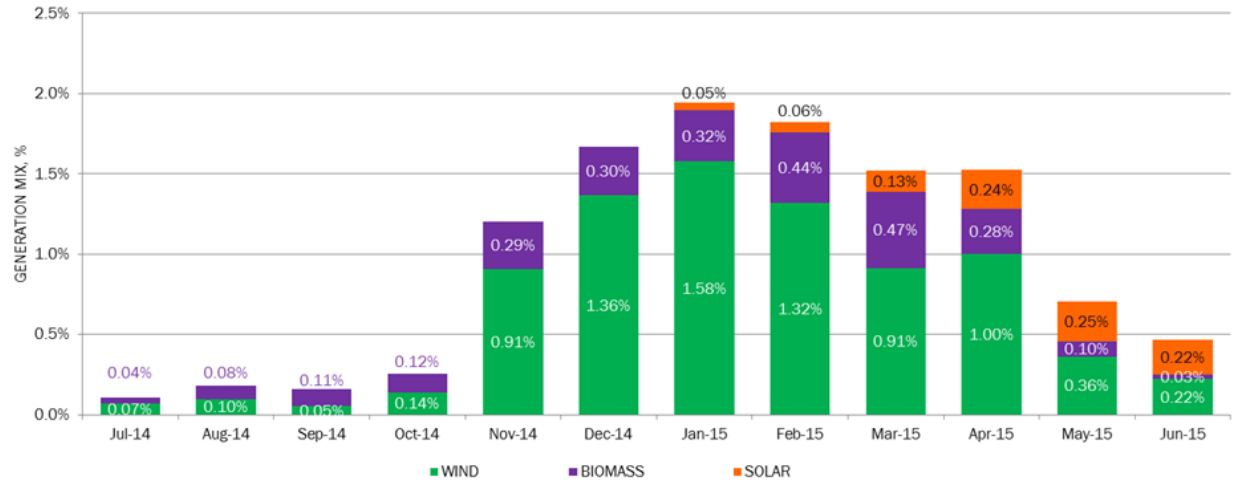
the restrictions at Malampaya. In fact, in March and April 2015, even with natural gas plants running on alternate fuel, its total contribution was lower as opposed to the other months. Geothermal power plants continued to contribute around 14%., while the contribution of hydro-electric power plants varied from 4% to 10%. Oil-based plants, on the other hand, were largely dispatched during periods of tight supply conditions.

Figure 20. System-wide Generation Mix




It should be noted that there has been a substantial increase in the contribution of renewable energy in the WESM generation mix, particularly wind power plants. Although wind contribution has slightly dipped in recent months, solar plants saw an uptick in its production.

Figure 21. Generation Mix Share of Emerging RE, System-wide




Total transactions for the 12-month period from July 2014 to June 2015 amounted to 60,734 GWh, which is higher than last year's 58,190 GWh (July 2013 to June 2014).

7.5% of this quantity was transacted in the spot market, while the rest were netted out of the market settlements as bilateral contract quantities. The total spot market customer trading amount for the same period amounted to PHP 31,734 Million, which is lower than PHP 60,989 Million that was obtained from the same period last year (July 2013 to June 2014).

For their spot market transactions, the WESM customers transacted at an Effective Spot Settlement Price (ESSP) ranging from PHP 2,314/MWh (December 2014) to PHP 7,971/MWh (July 2014).

Figure 22. BCQ/Spot Quantities and ESSP, System-Wide