MAG-AMAR-2014

ANNUAL MARKET ASSESSMENT REPORT

For the 2014 Billing Period



PHILIPPINE ELECTRICITY MARKET CORPORATION

MARKET ASSESSMENT GROUP (MAG)

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EXECUTIVE SUMMARY

The 2014 Annual Market Assessment Report (AMAR) provides an overview of the results of the integrated Luzon and Visayas operations of the Wholesale Electricity Spot Market (WESM) for the period 26 December 2013 to 25 December 2014. It highlights significant observations on several indicators of market performance, as provided for in the WESM Catalogue of Market Monitoring Data and Indices, and taking into account the following significant market events/conditions which impact on the operations of the WESM:

A. Declaration of partial market suspension in the Visayas by the Energy Regulatory Commission (ERC) from 08 November 2013 at 1500H to 25 March 2014 at 2400H, due to the destruction of the Visayas power system brought about by typhoon Yolanda. Market assessment is limited only in Luzon and administered prices which were used for settlement in the Visayas were incorporated in the calculation of market prices.

B. Reduction of the offer price ceiling of PhP62,000/MWh to a new level in the amount of PhP32,000/MWh effective 04 January 2014 following the issuances of the WESM Tripartite Committee.

C. Designation of oil-based plant Malaya as a Must-Run-Unit (MRU) effective 23 February 2014 at 0100H under Department Circular No. 2014-01-003, "Designating the 650 MW Malaya Thermal Power Plant as a Must-Run-Unit in the WESM".

D. Implementation of ERC Resolution No. 08, series of 2014 entitled "An Urgent Resolution Setting an Interim Mitigating Measure in the WESM" effective 11 May 2014, which imposed a secondary price cap of PhP6,245/MWh upon breach of the generator weighted average price (GWAP) threshold of PhP8,186/MWh over a rolling seventy-two (72) hour period.

E. Regional assessment of the Luzon and Visayas following the power system disturbance brought about by typhoon Glenda, which resulted in the ERC's suspension of the Luzon market on 16 July 2014 at 0400H to 25 July 2014 at 1200H.

F. Maintenance outage of the Luzon-Leyte HVDC Interconnection on 12 April 2014 at 0900H to 22 April at 1700H, and beginning 16 August 2014 at 0800H through 24 September 2014 at 0400H, resulting in the physical separation of the Luzon and Visayas markets during the covered billing months.

For year 2014, the entry of new capacities in the market totalling at 556.4 MW augmented the WESM registered capacity by about 3.2 percent from 14,651 MW in January to 15,126 MW by yearend. A significant number of these new capacities came from non-scheduled generation, which stood at an average of 423 MW by end of December or about 3 percent of the total registered capacity.

However, only about 61 percent of the total WESM registered capacity had been offered in the market in year 2014, averaging at about 9,076 MW. About 14 percent and 17 percent of the total registered capacity remained unavailable due to outage capacity and capacity not offered, averaging at about 2,103 MW and 2,228 MW during the year. The remaining 5 percent averaging at about 770 MW corresponded to ancillary services which were scheduled by the System Operator to provide regulating, contingency and dispatchable reserves, while 2 percent or about 350 MW was attributable to the MRU designation of oil-based plant Malaya 2, and 1 percent averaging at about 157 MW was on account of non-scheduled generation.

Supply and demand condition was observed to be tight during the 2nd and 3rd quarters of 2014. The April, July and September billing months posted the lowest effective supply at an average

of 8,485 MW, 8,500 MW and 8,863 MW, respectively, on account of the high outage level during said periods, as well as with the onslaught of typhoon Glenda, which caused power system disturbance in Luzon during the July billing month. The effective supply started increasing during the last quarter of 2014 while demand was on a decreasing trend, as colder weather prevailed throughout the period. Supply margin was most narrow during the April, June and July billing months, mainly driven by the higher demand requirements in April and June and the tight supply levels in the July billing month. Dip in the demand was posted in April, September, November and December. The lowest recorded demand was at 4,463 MW, posted on 25 December at 0700H. December consequently posted the widest supply margin for the year, reaching as wide as 4,274 MW at 0300H of 25 December.

System outage capacity averaged at 2,103 MW, notably lower by 7.4 percent from last year's 2,271 MW. Coal plants accounted for majority of the capacity on outage at 41 percent, followed by oil-based plants at 20.5 percent and by geothermal plants at 18.5 percent. The highest capacity on outage was posted during the 3rd quarter of 2014, influenced by the high outage level in July averaging at 2,894 MW. The maximum outage capacity was recorded at 7,350 MW on 16 July at 1000H, driven by the impact of typhoon Glenda in the Luzon grid. Outage capacity followed a decreasing trend in the last quarter of 2014, with December posting the lowest monthly average outage capacity at 1,544 MW.

Meanwhile, generator trading participants continued to submit capacity offers less than their respective plants maximum available capacity, as indicated by the persistently high level of capacity gap in 2014. About 48.3 percent of the system-wide capacity gap was contributed by hydro plants averaging at 1,108 MW, followed by oil-based plants, which contributed 20.4 percent at 455 MW and coal plants at 17 percent, averaging at 379 MW.

High market prices were observed in April posted at PhP9,416/MWh. As a mitigating measure in the ensuing summer months which are associated with high market prices, the secondary price cap of PhP6,245/MWh was set in the WESM effective 11 May. Consequently, the system monthly load-weighted average price was posted at PhP6,321/MWh in May and PhP6,321/MWh in June. However, notwithstanding the secondary cap imposition, the system average prices in May and June 2014 were still higher by 4.5 percent and 35.2 percent from previous year's PhP6,047/MWh and PhP4,271/MWh, respectively.

Market prices posted a significant rise in July by 142.9 percent from last year's PhP2,893/MWh to PhP7,027/MWh, following the low supply recorded during the billing month. Note that prices imposed in Luzon for the duration of the ERC's market suspension in the region (from 16 July at 0400H to 25 July at 1200H) were administered prices determined in accordance with the WESM Manual on Administered Price Determination Methodology.

Conversely, the billing month of January recorded the lowest monthly average price at PhP2,904/MWh, while extreme negative prices were observed in the market during the September, October and December billing months. It is significant to note that the last quarter of year 2014 followed a decreasing trend in market prices, as better supply and demand conditions paved the way for the occurrence of frequently low market prices.

Market prices below Php5,000/MWh were most frequently set by four (4) coal plants from Luzon (Sual, Mariveles, Pagbilao and Masinloc), one Visayas geothermal plant (Leyte A) and three (3) coal plants from Visayas (KSPC, PEDC and CEDC).

Meanwhile, prices within the range of Php5,000/MWh to Php10,000/MWh were mostly set by oil-based plants. Frequent price setters at this range were Luzon oil-based plants Therma Mobile, followed by Visayas oil-based plant EAUC. Also in the list of frequent price-setters are Luzon oil-based plants Trans-Asia and Subic Power and Visayas oil-based plants PB 102 and TPC (Carmen) and coal plant PEDC.

Oil-based plants also dominated the list of frequent price setters at the above PhP10,000/MWh price level, with Luzon oil-based plant Bauang at the top spot, followed by Visayas oil-based plants PB 102, Avon (Nabas), PB 101, Panay DPP III, Luzon oil-based plant Limay, Visayas oil-based plant EAUC and hydro plant Magat. The above PhP20,000/MWh price range was likewise dominated by oil-based plants, particularly from Luzon, with oil-based plant Bauang topping the list of price-setters at that range, followed by Luzon oil-based plants Trans-Asia and Subic Power and by Visayas oil-based plant Cebu TPP 1.

Natural gas plant Kepco Ilijan topped the list of pivotal suppliers in 2014, closely followed by coal plant Sual, natural has plant Sta. Rita, coal plants Pagbilao, Masinloc, natural gas plant San Lorenzo, coal plants Quezon and Mariveles. Similarly in the Visayas, generators became pivotal more frequently during the summer months of April, May and June. Topping the list of pivotal suppliers is the geothermal plant Leyte A, followed by coal plants CEDC, KSPC and PEDC. The highest incidence of pivotal suppliers was however posted in July, consistent with the tight energy balance recorded during the billing month.

Better generation and demand balance was noted system-wide in about 72 percent of the time in year 2014, particularly during the 1st and 4th quarters of the year. However, consistent tight supply and demand was still observed during the 2nd and 3rd quarters of 2014, with the billing months of April, May, June and July posting the highest occurrence of Reserve Margin Index (RMI) with less than 10 percent. Interestingly, said months were marked with high market prices. This indicates that hourly price generally increases as the RMI decreases.

In terms of the Residual Supply Index (RSI), compared with the other billing months, July had the highest percentage of Market RSI below 100 percent (posted at a high of 82.9 percent), indicating the presence of pivotal generators most of the time during the month. It can be recalled that the July billing month also incurred the highest occurrence of trading intervals with low RMI, clearly manifesting that demand and supply conditions were most tight during the said month.

Meanwhile, the spot market exposure of generators was recorded within the range of 9.4 percent at its lowest to a high of 13.0 percent during the year. Spot exposure was highest among the generators in February and March at 13.0 percent and 12.6 percent, respectively, mainly driven by the increase in the volume of spot transactions of the Visayas generators during said months. On the other hand, about 91.0 percent of the total energy withdrawn of customers was covered by bilateral contracts in 2014 while their spot market exposure hovered at only about 9.0 percent. The spot exposure of customers were within the close range of between 7.1 percent at its lowest in August to 10.8 percent in March.

Four (4) major participant groups continued to dominate the market in year 2014, similar to the monthly market share trend in the previous year. San Miguel Corporation (SMC) retained the top spot with the biggest share of the market in terms of registered capacity, averaging at 20.2 percent followed by the Aboitiz group with about 16.8 percent, Power Sector Asset and Liabilities Management Corporation (PSALM) with 15.3 percent and the First Gen group with 15.1 percent. Sem Calaca Power Corporation (SCPC) came in distant fifth with 4.5 percent followed closely by Masinloc Power Partners Co. Ltd (MPPCL), Global Business Power Corporation (GBPC), and GNPower Mariveles Coal Plant Ltd. Co (GMCP) at 4.3 percent, 4.2 percent and 4.1 percent, respectively. While the market remained dominated by the above four major players, there is a notable decline in the percentage of capacity controlled/owned by the major participant groups when compared to the previous year, mainly driven by the entry of new players. The decrease in the market share of the major participant groups was particularly observed during the last quarter of 2014, when majority of the additional capacities were registered in the market.

Result of the Herfindahl-Hirschman Index (HHI) calculation by generating plant and by trading participant both showed that the market is not concentrated. Based on major participant group,

the market remained moderately concentrated over the course of the 12-month period, in terms of registered capacity, registered capacity net of outage, offered capacity and actual generation (metered quantity), considering that there are only four major participants controlling the majority of the market share. Note that the HHI based on offered capacity showed that the market was concentrated during the January to March billing months, while the HHI based on actual generation during the January and February billing months bordered the concentrated mark. The same is attributable to the exclusion of the Visayas plants in the calculation of HHI during the first quarter of the year, following the ERC's declaration of partial market suspension affecting the Visayas during the period.

The HHI calculation by major participant group based on spot transaction indicated a moderately concentrated market except during the January, February and September billing months when the HHI calculation signalled an increase in market concentration, pointing to a concentrated market in said months.

Table of Contents

I. INTRODUCTION 1

II. ENERGY DEMAND 2

A. Demand 2

B. Load Forecast Variation 9

III. SUPPLY PROFILE 11

IV. DEMAND AND SUPPLY 16

A. Demand and Supply Situation 16

B. Reserve Margin Index (RMI) 22

V. OUTAGES 26

VI. CAPACITY GAP 35

VII. MARKET PRICE OUTCOME 40

A. Market Prices 40

B. Frequency and Distribution 46

C. Correlation of Hourly Prices with the Reserve Margin Index (RMI) 48

VIII. MARKET INTERVENTION/SUSPENSION 49

IX. PRICE SETTING INDICES PRICE SETTING FREQUENCY INDEX (PSFI) 51

X. PIVOTAL SUPPLIERS 57

XI. RESIDUAL SUPPLY 59

XII. GENERATOR OFFER PATTERN 63

XIII. CAPACITY FACTOR 68

XIV. TRANSMISSION CONGESTION FREQUENCY INDICES 73

A. Frequency of active constraints (Ex-ante) 73

B. Frequency of active constraints (Ex-post) 76

XV. OVER-RIDING CONSTRAINTS 77

XVI. SPOT MARKET EXPOSURE 81

A. Generator 81

B. Customer 85

XVII. MARKET CONCENTRATION 88

A. Market Share 88

B. Herfindahl-Hirschman Index (HHI) (by Generating Plant, Trading Participant and Major Participant Group) 94

APPENDICES

A. List of WESM Registered Capacities as of 23 December 2014 - Luzon
B. List of WESM Registered Capacities as of 23 December 2014 - Visayas
C. Summary of Generator Trading Intervals with Capacity Gap - Luzon
D. Summary of Generator Trading Intervals with Capacity Gap - Visayas

List of Figures

Figure 1. Historical Demand - Luzon 3
Figure 2. Historical Demand - Visayas 4
Figure 3. Hourly System Demand Profile 5
Figure 4. Hourly Demand Profile - Luzon 6
Figure 5. Hourly Demand Profile - Visayas 7
Figure 6. System Load Factor 8
Figure 7. Load Forecast Variation Distribution (Ex-Ante vs. Ex-Post) - Luzon 9
Figure 8. Load Forecast Variation Distribution (Ex-Ante vs. Ex-Post) - Visayas 10
Figure 9. Supply Profile - 1st Half 12
Figure 10. Supply Profile - 2nd Half 12
Figure 11. Supply Profile (Luzon) - 1st Half 13
Figure 12. Supply Profile (Luzon) - 2nd Half 14
Figure 13. Supply Profile (Visayas) - 1st Half 15
Figure 14. Supply Profile (Visayas) - 2nd Half 15
Figure 15. Demand and Effective Supply, 2014 - 1st Half 17
Figure 16. Demand and Effective Supply, 2014 - 2nd Half 17
Figure 17. Demand and Effective Supply, 2014 - Luzon, 1st Half 19
Figure 18. Demand and Effective Supply, 2014 - Luzon, 2nd Half 19
Figure 19. Demand and Effective Supply, 2014 - Visayas, 1st Half 21
Figure 20. Demand and Effective Supply, 2014 - Visayas, 2nd Half 21
Figure 21. Reserve Margin Index (RMI), System - 1st Half 22
Figure 22. Reserve Margin Index (RMI), System - 2nd Half 23
Figure 23. Reserve Margin Index (RMI), Luzon - 1st Half 24
Figure 24. Reserve Margin Index (RMI), Luzon - 2nd Half 24
Figure 25. Reserve Margin Index (RMI), Visayas - 1st Half 25
Figure 26. Reserve Margin Index (RMI), Visayas - 2nd Half 26
Figure 27. Capacity on Outage - 1st Half 27
Figure 28. Capacity on Outage - 2nd Half 27
Figure 29. Capacity on Outage (Luzon) - 1st Half 30
Figure 30. Capacity on Outage (Luzon) - 2nd Half 31
Figure 31. Capacity on Outage (Visayas) - 1st Half 33
Figure 32. Capacity on Outage (Visayas) - 2nd Half 34
Figure 33. Capacity Gap - 1st Half 36
Figure 34. Capacity Gap - 2nd Half 36
Figure 35. Capacity Gap (Luzon) - 1st Half 37
Figure 36. Capacity Gap (Luzon) - 2nd Half 38
Figure 37. Capacity Gap (Visayas) - 1st Half 39
Figure 38. Capacity Gap (Visayas) - 2nd Half 39
Figure 39. Market Price Trend - 1st Half 43
Figure 40. Market Price Trend - 2nd Half 43
Figure 41. Market Price Trend (Luzon) - 1st Half 44
Figure 42. Market Price Trend (Luzon) - 2nd Half 44
Figure 43. Market Price Trend (Visayas) - 1st Half 45
Figure 44. Market Price Trend (Visayas) - 2nd Half 45
Figure 45. Monthly Market Price Distribution 46
Figure 46. Monthly Market Price Distribution - Luzon 47
Figure 47. Monthly Market Price Distribution - Visayas 48
Figure 48. Correlation on Hourly Market Prices vs. RMI 49
Figure 49. Price Setting Frequency Index - Luzon Plants (PhP5,000/MWh and Below) 51
Figure 50. Price Setting Frequency Index - Visayas Plants (PhP5,000/MWh and Below) 51
Figure 51. Price Setting Frequency Index - Luzon Plants (Above PhP5,000/MWh) 53
Figure 52. Price Setting Frequency Index - Visayas Plants (Above PhP5,000/MWh) 53
Figure 53. Price Setting Frequency Index - Luzon Plants (Above Php10,000/MWh) 54
Figure 54. Price Setting Frequency Index - Visayas Plants (Above Php10,000/MWh) 55

Figure 55. Price Setting Frequency Index - Luzon Plants (Above Php20,000/MWh) 5656
Figure 56. Price Setting Frequency Index - Visayas Plants (Above Php20,000/MWh)..... 5656
Figure 57. Pivotal Supplier Frequency Index - Luzon 5757
Figure 58. Pivotal Supplier Frequency Index - Visayas 5858
Figure 59. RSI Based on Offered Capacity - 1st Half 6060
Figure 60. RSI Based on Offered Capacity - 2nd Half 6060
Figure 61. RSI Based on Offered Capacity - Luzon, 1st Half..... 6161
Figure 62. RSI Based on Offered Capacity - Luzon, 2nd Half..... 6161
Figure 63. RSI Based on Offered Capacity - Visayas, 1st Half 6262
Figure 64. RSI Based on Offered Capacity - Visayas, 2nd Half..... 6262
Figure 65. Geothermal Plants Offer Pattern - Luzon..... 6363
Figure 66. Geothermal Plants Offer Pattern - Visayas..... 6464
Figure 67. Coal Plants Offer Pattern - Luzon..... 6464
Figure 68. Coal Plants Offer Pattern - Visayas..... 6565
Figure 69. Oil-based Plants Offer Pattern - Luzon..... 6666
Figure 70. Oil-based Plants Offer Pattern - Visayas 6666
Figure 71. Hydro Plants Offer Pattern - Luzon..... 6767
Figure 72. Natural Gas Plants Offer Pattern - Luzon 6868
Figure 73. Capacity Factor - Luzon Natural Gas Plants..... 7070
Figure 74. Capacity Factor - Luzon and Visayas Geothermal Plants..... 7070
Figure 75. Capacity Factor - Luzon and Visayas Coal Plants..... 7171
Figure 76. Capacity Factor - Luzon Hydro Plants..... 7171
Figure 77. Capacity Factor - Luzon and Visayas Oil-based Plants 7171
Figure 78. Generator's Spot Market Exposure - System..... 8282
Figure 79. Luzon Generator's Spot Market Exposure..... 8383
Figure 80. Visayas' Generators Spot Market Exposure 8484
Figure 81. Customers' Spot Market Exposure - System 8585
Figure 82. Luzon Customers' Spot Market Exposure 8686
Figure 83. Visayas Customers' Spot Market Exposure..... 8787
Figure 84. Share of Registered Capacity by Major Participant 8989
Figure 85. Share of Offered Capacity by Major Participant..... 9191
Figure 86. Share of Actual Generation by Major Participant..... 9292
Figure 87. Share of Spot Transaction by Major Participant..... 9292
Figure 88. Share of Registered Capacity by Trading Participant 9393
Figure 89. Share of Registered Capacity by Generating Plant 9393
Figure 90. HHI by Major Participant 9595
Figure 91. HHI by Participant 9595
Figure 92. HHI by Plant..... 9595

List of Tables

Table 1. Demand Growth - Luzon 33
Table 2. Demand Growth Percent (%) Change - Luzon 33
Table 3. Demand Growth - Visayas 44
Table 4. Demand Growth Percent (%) Change - Visayas 44
Table 5. Hourly System Demand Profile, 2014 55
Table 6. Hourly System Demand Profile, 2013 55
Table 7. Monthly System Average Demand, 2014 55
Table 8. Hourly Demand Profile - Luzon, 2014 66
Table 9. Hourly Demand Profile - Luzon, 2013 66
Table 10. Monthly Average Demand - Luzon, 2014 66
Table 11. Hourly Demand Profile - Visayas, 2014 77
Table 12. Hourly Demand Profile - Visayas, 2013 77
Table 13. Monthly Average Demand - Visayas 77
Table 14. Monthly Load Factor - 2014 99
Table 15. Monthly Load Factor - 2013 99
Table 16. Load Forecast Variation Distribution (Ex-Ante vs. Ex-Post) - Luzon 1010
Table 17. Load Forecast Variation Distribution (Ex-Ante vs. Ex-Post) - Visayas 1010
Table 18. Supply Profile - System 1212
Table 19. Supply Profile - Luzon 1414
Table 20. Supply Profile - Visayas 1515
Table 21. Effective Supply Summary - 2014 1717
Table 22. Supply Margin Summary - 2014 1717
Table 23. Demand and Supply Summary - 2014 1717
Table 24. Effective Supply Summary - Luzon, 2014 1919
Table 25. Supply Margin Summary - Luzon, 2014 1919
Table 26. Demand and Supply Summary - Luzon, 2014 2020
Table 27. Effective Supply Summary - Visayas, 2014 2121
Table 28. Supply Margin Summary - Visayas, 2014 2121
Table 29. Demand and Supply Summary - Visayas, 2014 2222
Table 30. RMI Distribution - System, 2014 2323
Table 31. RMI Distribution Per Hour Type - System, 2014 2323
Table 32. RMI Distribution - System, 2013 2323
Table 33. RMI Distribution - Luzon, 2014 2424
Table 34. RMI Distribution Per Hour Type - Luzon, 2014 2424
Table 35. RMI Distribution - Luzon, 2013 2525
Table 36. RMI Distribution - Visayas, 2014 2626
Table 37. RMI Distribution Per Hour Type - Visayas, 2014 2626
Table 38. RMI Distribution - Visayas, 2013 2626
Table 39. Capacity on Outage, 2014 2828
Table 40. Year-on-Year Average Outage Capacity Comparison 2828
Table 41. Outage Factor 2929
Table 41. Capacity on Outage - Luzon 3131
Table 42. Year-on-Year Average Outage Capacity Comparison - Luzon 3131
Table 44. Outage Factor - Luzon 3232
Table 45. Capacity on Outage - Visayas 3434
Table 46. Year-on-Year Average Outage Capacity Comparison - Visayas 3434
Table 47. Outage Factor - Visayas 3535
Table 48. Capacity Gap 3636
Table 49. Capacity Gap - Luzon 3838
Table 50. Capacity Gap - Visayas 3939
Table 51. Market Price Trend - System 4444
Table 52. Year-on-Year Average Price Trend Comparison - System 4444
Table 53. Market Price Trend - Luzon 4444
Table 54. Year-on-Year Average Price Trend Comparison - Luzon 4545
Table 55. Market Price Trend - Visayas 4545

Table 56. Monthly Average Price Comparison - Visayas 4545
Table 57. Monthly Market Price Distribution 4646
Table 58. Monthly Market Price Distribution - Luzon 4848
Table 59. Monthly Market Price Distribution - Visayas 4848
Table 60. Total Monthly Occurrences of Market Intervention 5050
Table 61. Monthly Occurrences of Market Intervention - Luzon 5050
Table 62. Monthly Occurrences of Market Intervention/Suspension - Visayas 5050
Table 63. PSFI by Billing Month - Luzon (PhP5,000/MWh and Below) 5252
Table 64. PSFI by Billing Month - Visayas (PhP5,000/MWh and Below) 5252
Table 65. PSFI by Billing Month - Luzon (Above PhP5,000/MWh) 5353
Table 66. PSFI by Billing Month - Visayas (Above PhP5,000/MWh) 5454
Table 67. PSFI by Billing Month - Luzon (Above PhP10,000/MWh) 5555
Table 68. PSFI by Billing Month - Visayas (Above PhP10,000/MWh) 5555
Table 69. PSFI by Billing Month - Luzon (Above PhP20,000/MWh) 5656
Table 70. PSFI by Billing Month - Visayas (Above PhP20,000/MWh) 5656
Table 71. Pivotal Supplier Frequency Index by Billing Month - Luzon 5858
Table 72. Pivotal Supplier Frequency Index by Billing Month - Visayas 5959
Table 73. Market RSI Summary - 2014 6161
Table 74. Market RSI Summary - 2013 6161
Table 75. Market RSI Summary - Luzon, 2014 6161
Table 76. Market RSI Summary - Visayas, 2014 6262
Table 77. Capacity Factor by Plant Type 7272
Table 78. Capacity Factor by Plant Type - Luzon 7272
Table 79. Capacity Factor by Plant Type - Visayas 7373
Table 80. Frequency of Constraints at Load-Side Transformers (Ex-Ante) 7474
Table 81. Frequency of Constraints at Generator Transformers (Ex-Ante) 7474
Table 82. Frequency of Constraints at Transmission Lines (Ex-Ante) 7575
Table 83. Frequency of Constraints at Submarine Cable (Ex-Ante) 7575
Table 84. Frequency of Constraints at Load-Side Substations (Ex-Post) 7676
Table 85. Frequency of Constraints at Generator Transformers (Ex-Post) 7676
Table 86. Frequency of Constraints at Transmission Lines (Ex-Post) 7777
Table 87. Frequency of Constraints at Submarine Cable (Ex-Post) 7777
Table 88. Summary of Over-riding Events by Category - Luzon 7878
Table 89. Summary of Over-riding Events by Category - Visayas 7878
Table 90. Summary of MRU-Related Events per Incident - Luzon 7979
Table 91. Summary of MRU-Related Events per Incident - Visayas 7979
Table 92. Summary of Security Limit-Related Events - Luzon 8080
Table 93. Summary of Security Limit-Related Events - Visayas 8080
Table 94. Summary of Over-riding Events by Plant Type - Luzon 8181
Table 95. Summary of Over-riding Events by Plant Type - Visayas 8181
Table 96. Generators' Spot Market Exposure 8282
Table 97. Year-on-Year Comparison of Generators' Spot Market Exposure 8282
Table 98. Generators' Spot Market Exposure - Luzon 8383
Table 99. Year-on-Year Comparison of Generators' Spot Market Exposure - Luzon 8383
Table 100. Generators' Spot Market Exposure - Visayas 8484
Table 101. Year-on-Year Comparison of Generators' Spot Market Exposure - Visayas 8484
Table 102. Customers' Spot Market Exposure - System 8585
Table 103. Year-on-Year Comparison of Customers' Spot Market Exposure - System 8686
Table 104. Customers' Spot Market Exposure - Luzon 8787
Table 105. Year-on-Year Comparison of Customers' Spot Market Exposure - Luzon 8787
Table 106. Customers' Spot Market Exposure - Visayas 8888
Table 107. Year-on-Year Comparison of Customers' Spot Market Exposure - Visayas 8888
Table 108. New Power Plants 9090

I. INTRODUCTION

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Taken into account were significant market events/conditions as well as enhancements or changes in policies which had impact on the operations of the WESM. For the year in review, these are as follows:

G. The Energy Regulatory Commission's (ERC) declaration of partial market suspension in the Visayas from 08 November 2013 at 1500H to 25 March 2014 at 2400H, due to the destruction of the Visayas power system brought about by typhoon Yolanda. Market assessment for the duration of said market suspension is limited only in the Luzon region. The partial market suspension in the Visayas region was lifted by the ERC on 26 March 2014 at 0100H.

   Administered prices which were used for settlement in the Visayas region during the period were incorporated in the calculation of market prices as presented in the section on Market Price Outcome in this Annual Report.

H. Issuance by the WESM Tripartite Committee of Joint Resolution No. 2 series of 2013 entitled "Adjustments to the WESM Offer Price Cap", which at the interim, reduced the offer price ceiling of PhP62,000/MWh to a new level in the amount of PhP32,000/MWh effective 04 January 2014. Further extension of the same was effected by the WESM Tripartite Committee through its Joint Resolution Nos. 3 and 4, series of 2014. Said Joint Resolutions extended the effectivity of the WESM Offer Price Cap set at PhP32,000/MWh for a period of 120 days from 24 October 2014, pending the determination of a new WESM Offer Price Cap.

I. Designation of oil-based plant Malaya as a Must-Run-Unit (MRU) effective 23 February 2014 at 0100H under Department Circular No. 2014-01-003, "Designating the 650 MW Malaya Thermal Power Plant as a Must-Run-Unit in the WESM".

J. Implementation of ERC Resolution No. 08, series of 2014 entitled "An Urgent Resolution Setting an Interim Mitigating Measure in the WESM", which imposed a secondary price cap of PhP6,245/MWh upon breach of the generator weighted average price (GWAP) threshold of PhP8,186/MWh over a rolling seventy-two (72) hour period. Said ERC Resolution became effective on 11 May 2014. The interim mitigating measure was extended further through ERC Resolution Nos. 13 and 14, series of 2014 which effectively extended the effectivity of the mechanism for a period of 120 days from 10 August 2014 or until the establishment of a permanent pre-emptive mitigation measure in the WESM, whichever comes earlier.

   The trading intervals affected by the imposition of the secondary price cap and its impact on the resulting market prices are included in the discussion on Market Price Outcome in this Report.

   It is also important to note that the permanent mitigating measure was adopted by the ERC on 15 December 2014 through Resolution No. 20, series of 2014 entitled "Adopting and Establishing a Pre-Emptive Mitigation Measure in the WESM" which sets the cumulative price threshold (CPT) equivalent to an average spot price of

PhP9,000/MWh over a rolling 7-day period or 168 trading intervals. A breach of the CPT triggers the imposition of a price cap amounting to PhP6,245/MWh.

K. Following the power system disturbance brought about by typhoon Glenda, the ERC's suspension of the Luzon market on 16 July 2014 at 0400H to 25 July 2014 at 1200H, which affected a total of 225 trading intervals. Regional assessment of the Luzon and Visayas markets were made for the duration of said market suspension.

L. Maintenance outage of the Luzon-Leyte HVDC Interconnection on 12 April 2014 at 0900H to 22 April at 1700H, and beginning 16 August 2014 at 0800H through 24 September 2014 at 0400H, resulting in the physical separation of the Luzon and Visayas markets during the covered billing months.

II. ENERGY DEMAND

A. Demand[1]

1. Historical Demand

Peak electricity demand in Luzon increased moderately in 2014 by an average of 3.2 percent from 8,323 MW in 2013 to 8,497 MW. Said increase falls below the projected peak demand increase for 2014 by the Department of Energy (DOE) at 8,732 MW.

As illustrated in Figure 1 below, when compared to the previous years beginning 26 June 2006[2], both the maximum and average demand followed an increasing trend. However, it is observed that said increase had been declining in recent years. The highest maximum demand growth rate, posted at 9.3 percent was in year 2010, but the maximum and average demand growth rate in the years that followed until 2014 had been declining. From a 5.8 percent increase in 2012, increase in peak demand went down to 3.9 percent in 2013 and 3.2 percent in 2014.

It is worth mentioning that the increase in demand in year 2010 can be attributed to the rise in temperature that year which averaged at 29^0C[3], the highest recorded temperature in Luzon among all the previous eight (8) years. On the other hand, economic growth could have mainly driven the increase in electricity demand from years 2012 to 2014. As reported by the National Statistical Coordination Board (NCSB), the country's accelerated growth in its Gross Domestic Product (GDP)[4] paved the way for the annual GDP to post a growth rate of 6.1 percent in 2014, 7.2 percent in 2013 and 6.8 percent in 2012. Conversely, the annual GDP for 2011 at 3.6 percent is a decline from the annual GDP of 7.6 percent in 2010. This follows the decline in the maximum electricity demand that same year by 2.1 percent.

However, despite the reported economic growth in years 2012 to 2014, we have noted that electricity demand growth rate had been declining. Such decline may have been influenced by the exhibited increase in consumer awareness and responsiveness to the upward trend in electricity prices.

[1] The demand is equal to the total scheduled MW of all load resources for each respective region plus losses.
[2] Commencement of the WESM commercial operations in Luzon
[3] Based on Weather Underground's Luzon Weather History
[4] The GDP is the basic measure of a country's economic performance.

Figure 1. Historical Demand - Luzon

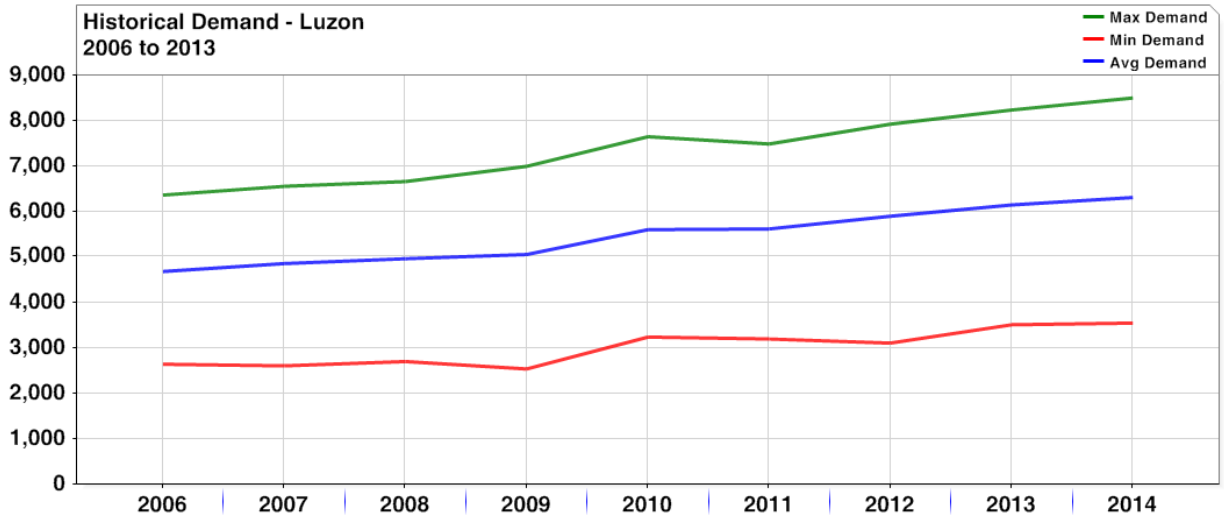


Table 1. Demand Growth - Luzon

	Annual Demand Growth (MW) - Luzon								
	2006	2007	2008	2009	2010	2011	2012	2013	2014
Max Demand	6,361	6,553	6,658	6,993	7,644	7,485	7,921	8,232	8,497
Avg Demand	4,678	4,854	4,960	5,053	5,600	5,615	5,895	6,143	6,307

Table 2. Demand Growth Percent (%) Change - Luzon

	Demand Growth (% Change) - Luzon							
	2007	2008	2009	2010	2011	2012	2013	2014
Max Demand	3.0	1.6	5.0	9.3	-2.1	5.8	3.9	3.2
Avg Demand	3.8	2.2	1.9	10.8	0.3	5.0	4.2	2.7

In the Visayas region, maximum demand grew by 1.9 percent to 1,569 MW in 2014 from 1,540 MW in the previous year. The same notably falls below the projected peak demand growth by the DOE at 1,748 MW.

In comparison with previous years beginning 26 June 2011[5], it is observed that the highest growth rate in maximum demand was posted in year 2013 at 5.3 percent, mirroring the increase in the country's annual GDP that year at 7.2 percent, the highest GDP growth rate from year 2011[6].

Meanwhile, the dip in minimum demand in 2013 as shown in Figure 2 is on account of the high outage level in the region on 08 November 2013 due to the destruction of power lines and facilities in the Visayas brought about by typhoon Yolanda.

[5] Commencement of the WESM commercial operations in Visayas
[6] Based on Published Data from the National Statistical Coordination Board (NCSB)

Figure 2. Historical Demand - Visayas

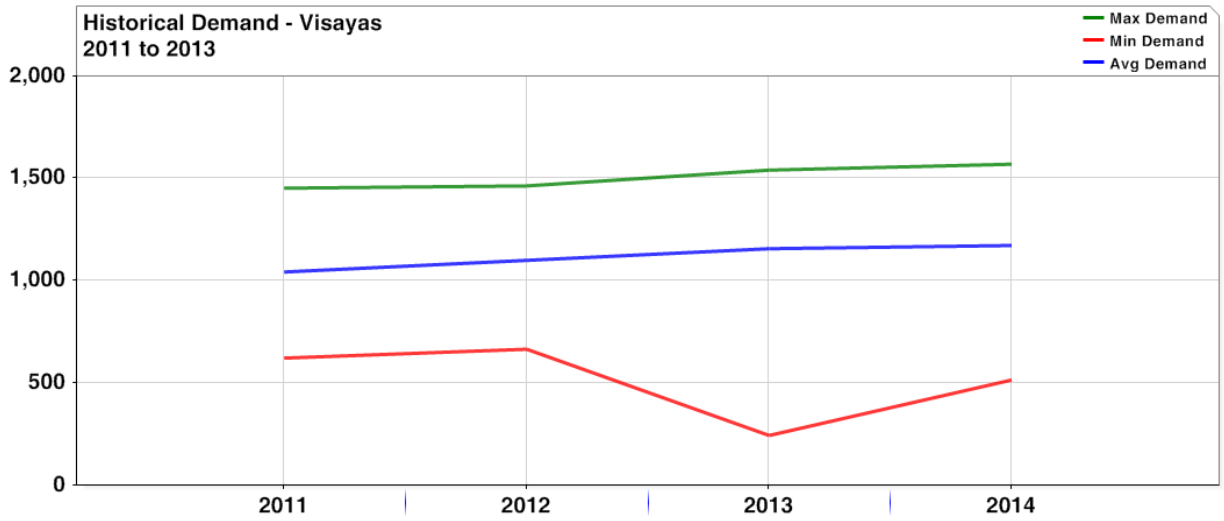


Table 3. Demand Growth - Visayas

	Annual Demand Growth (MW) - Visayas			
	2011	2012	2013	2014
Max Demand	1,452	1,463	1,540	1,569
Avg Demand	1,042	1,099	1,156	1,172

Table 4. Demand Growth Percent (%) Change - Visayas

	Demand Growth (% Change) - Visayas		
	2012	2013	2014
Max Demand	0.8	5.3	1.9
Avg Demand	5.5	5.2	1.3

2. Demand Profile

System-wide demand profile demonstrated the same pattern over the course of a 24-hour period when compared to the previous year. Similar to year 2013, electricity demand reached its morning peak at 1100H averaging at 8,657 MW, its afternoon peak at 1400H, posted at an average of 8,706 MW and its evening peak at 1900H at 8,568 MW.

Noticeable shift from the usual course of electricity demand was the increase in the demand level as early as 1800H during the October, November and December billing months, as illustrated in Figure 3 below. The same differed from the previous months with posted decreases in demand at 1800H from 1700H, attributed to the daily closing of majority of the private and government offices, as well as industrial and commercial establishments at 1700H. Change in this pattern during the last quarter can be attributed to the festivities associated during the Christmas season, which by tradition, begins as early as October of each year.

Seasonal changes/temperature/weather likewise influenced energy usage, as indicated by the monthly comparison of system-wide demand which shows that

demand was highest during the summer month of May at 8,205 MW and was lowest during the December billing month at 7,327 MW.

Note that assessment of system-wide demand started only from the April 2014 billing month, consistent with the ERC's partial market suspension affecting the Visayas, as earlier discussed in Section 1 of this Report.

Figure 3. Hourly System Demand Profile

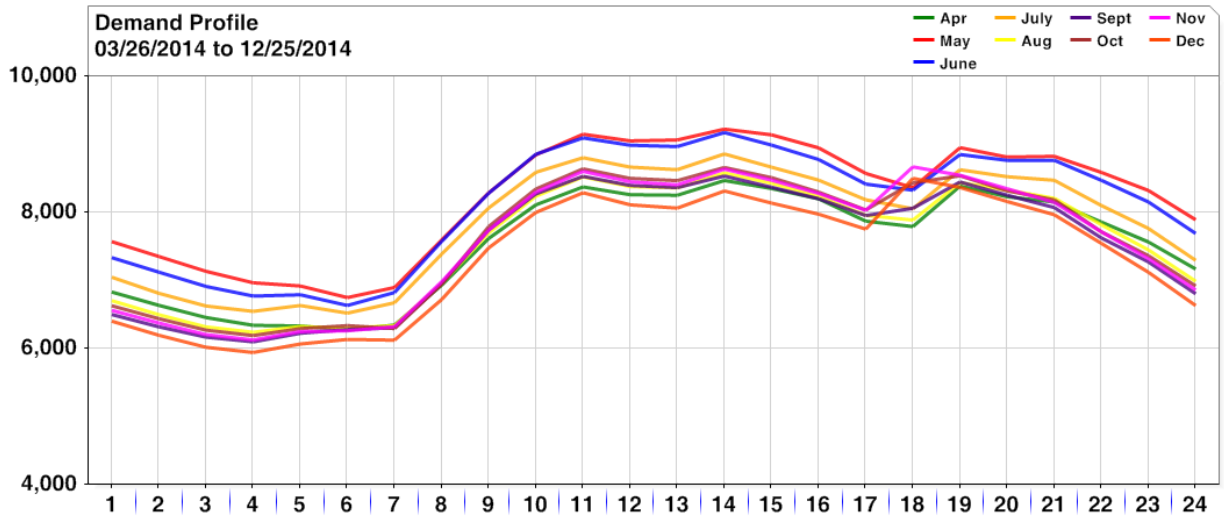


Table 5. Hourly System Demand Profile, 2014

	Average System Demand by Trading Interval (MW), 2014																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Avg. Demand	6,832	6,630	6,448	6,348	6,414	6,378	6,446	7,103	7,846	8,385	8,657	8,524	8,501	8,706	8,552	8,369	8,078	8,230	8,568	8,408	8,301	7,928	7,583	7,132

Table 6. Hourly System Demand Profile, 2013

	Average System Demand by Trading Interval - 2013 (MW)																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Avg. Demand	6,448	6,252	6,083	6,001	6,081	6,095	6,129	6,718	7,462	7,991	8,276	8,146	8,113	8,316	8,173	7,996	7,707	7,817	8,244	8,084	7,908	7,557	7,133	6,772

Table 7. Monthly System Average Demand, 2014

	Average System Demand by Billing Month (MW), 2014									
	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Avg.
Avg. Demand	7,528	8,205	8,098	7,818	7,545	7,478	7,583	7,562	7,327	7,679

Demand profile in the Luzon region followed the trend of the system-wide demand pattern over a 24-hour period. Demand in Luzon likewise peaked at 1100H, 1400H and 1900H at 7,112 MW, 7,146 MW and 7,003 MW, respectively. Demand level during the afternoon peak remained highest, similar to the pattern in 2013, indicating that the bulk of consumers in the region are commercial and industrial consumers, with high energy usage during office/work hours. Lowest demand level on the other hand, was posted at 0400H averaging at 5,215 MW.

Shift in the pattern of demand during the last quarter of the year was likewise observed in Luzon, with the increase in the demand level from the 1700H to 1800H while the rest of the billing months posted a decrease at 1800H from 1700H. The

billing months of January and February also demonstrated the same increase in the movement of demand at 1800H, indicating higher consumption level beginning said hour on account of the Christmas and New Year festivities. This pattern is illustrated in Figure 4 below.

Month-on-month comparison of demand indicate that demand was highest during the May and June billing months, and lowest during the billing months of January, February and December. It is noted that May recorded the highest temperature level in Luzon at 36.4^{0}C while the months of January and February posted the lowest temperature levels at 22.7^{0}C and 22.4^{0}C, respectively.

Figure 4. Hourly Demand Profile - Luzon

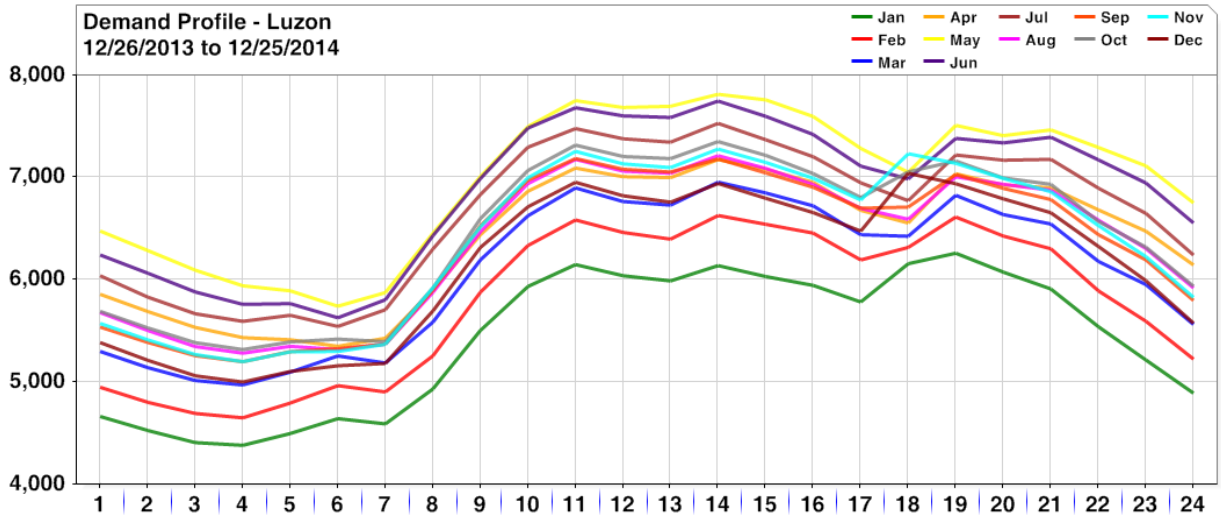


Table 8. Hourly Demand Profile - Luzon, 2014

	Average System Demand by Trading Interval (MW) - Luzon, 2014																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Avg. Demand	5,604	5,438	5,290	5,215	5,284	5,294	5,336	5,833	6,427	6,882	7,112	7,006	6,978	7,146	7,028	6,889	6,646	6,738	7,003	6,873	6,805	6,497	6,236	5,858

Table 9. Hourly Demand Profile - Luzon, 2013

	Average Demand by Trading Interval- Luzon, 2013 (MW)																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Avg. Demand	5,447	5,282	5,139	5,069	5,133	5,150	5,183	5,667	6,254	6,705	6,945	6,843	6,812	6,973	6,855	6,709	6,472	6,559	6,844	6,725	6,606	6,344	6,020	5,719

Table 10. Monthly Average Demand - Luzon, 2014

	Average System Demand by Billing Month (MW) - Luzon, 2014												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Avg
Avg. Demand	5,424	5,785	6,076	6,400	6,970	6,854	6,650	6,356	6,318	6,449	6,388	6,146	6,307

In the Visayas, demand reached its peak at 1900H, posted at an average of 1,401 MW. Morning and afternoon peaks on the other hand, were at 1,335 MW and 1,344 MW, respectively. The same is reflective of the previous year's demand profile for the region as most of its demand comes from household and commercial end-users, with high consumption at night time. Lowest demand level was posted at 0400H, averaging at 431 MW.

Similar to the trends in demand both system-wide and in Luzon, shift in the demand pattern in Visayas was observed during the last quarter of the year at 1800H, when increase in demand spiked between 147 MW at 1700H to 186 MW at 1800H.

Month-on-month comparison of the demand level in Visayas demonstrated that average demand was highest in June at 1,244 MW. This coincided with the temperature in Visayas reaching its highest for the year at an average of 33.9^{0}C during the June billing month. Lowest demand level on the other hand, was recorded during the December billing month averaging at 1,113 MW.

Figure 5. Hourly Demand Profile - Visayas

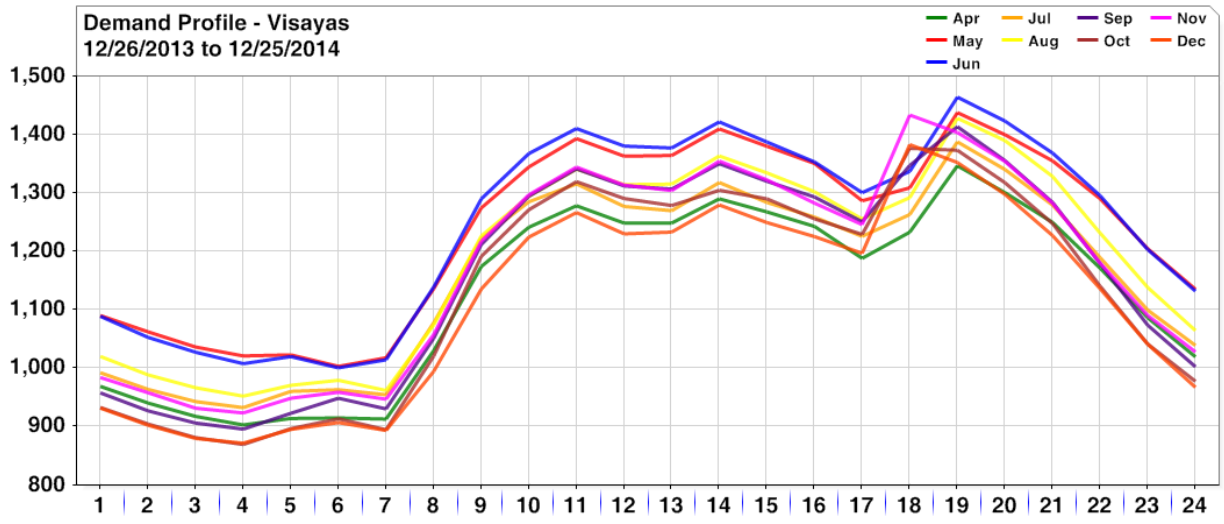


Table 11. Hourly Demand Profile - Visayas, 2014

	Average System Demand by Trading Interval (MW) - Visayas, 2014																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Avg. Demand	997	967	944	931	951	955	948	1,065	1,217	1,292	1,335	1,304	1,300	1,344	1,315	1,286	1,243	1,330	1,401	1,354	1,292	1,202	1,109	1,041

Table 12. Hourly Demand Profile - Visayas, 2013

	Average Demand by Trading Interval - Visayas, 2013 (MW)																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Avg. Demand	980	950	926	916	937	945	934	1,039	1,194	1,271	1,312	1,284	1,279	1,319	1,295	1,270	1,225	1,310	1,399	1,351	1,291	1,197	1,099	1,029

Table 13. Monthly Average Demand - Visayas

	Average Demand by Billing Month (MW) - Visayas, 2014									
	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Avg.
Avg. Demand	1,129	1,237	1,244	1,160	1,189	1,162	1,134	1,173	1,113	1,172

3. Load Factor[7]

Load factor is a measure of the degree of uniformity of demand over a period of time, and is determined by dividing the total energy withdrawn by the product of the peak load and total number of hours in a particular billing period.

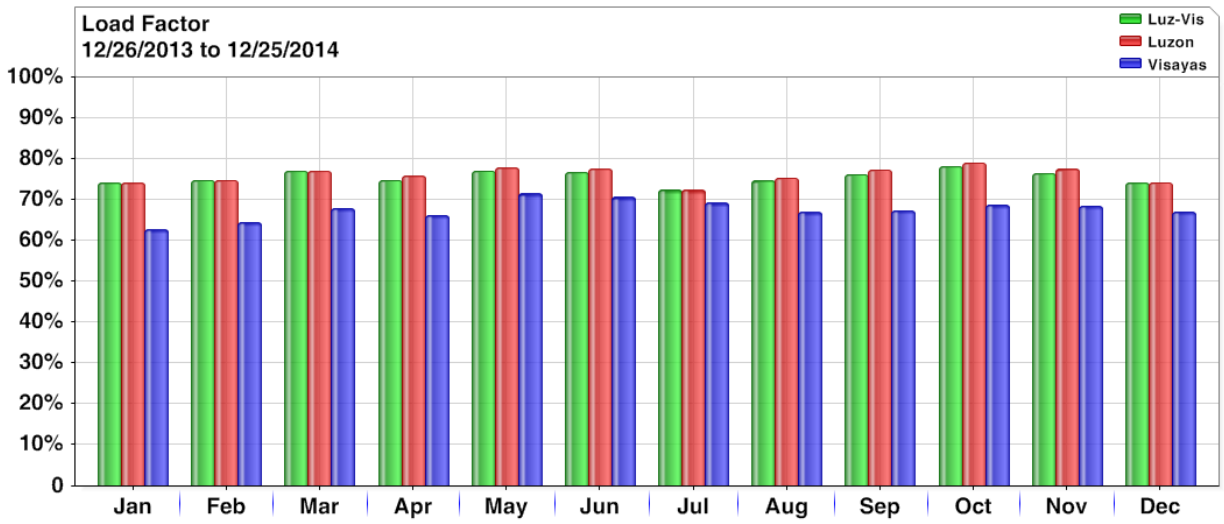
For the year in review, the system-wide load factor slightly increased at 71.7 percent from 70.7 percent of the previous year. Note that the system-wide load factor from January to March as illustrated in Figure 6 is reflective only of the load factor in Luzon in view of the ERC's partial market suspension which affected the Visayas region and was lifted only on 26 March 2014.

Following the ERC's lifting of partial market suspension in the Visayas, the system-wide monthly load factor steadily averaged between 74 percent to 78 percent, the lowest of which was posted in July, and the highest, in October. It is noted that during the July billing month, market suspension was declared in Luzon affecting a total of 225 trading intervals, in view of the power system disturbance caused by typhoon Glenda in the region. Total energy withdrawn was consequently brought lower in July while peak demand remained high, resulting in the low level of load factor during the July billing month. Load factor was also high during the May and June billing months, when peak demand was also highest, consistent with the expected seasonal peak in the demand level during the summer months.

Reflective of the trend system-wide, Luzon manifested the same trend in the levels of monthly load factor, with the billing month of October posting the highest at 79 percent, and July with the lowest load factor at 72.4 percent.

In the Visayas, the summer month of May posted the highest load factor at 71.4 percent when both the peak load and the total energy withdrawn were high, while the January billing month posted the lowest load factor at 62.6 percent.

Figure 6. System Load Factor



[7] Computed from the metered quantity of energy withdrawn

Table 14. Monthly Load Factor - 2014

	Load Factor (%) by Billing Month, 2014												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Avg
System	85.4	85.9	89.0	74.6	77.1	76.6	72.4	74.5	76.1	78.0	76.3	74.0	69.6
Luzon	74.0	74.7	76.9	75.7	77.7	77.4	72.3	75.3	77.3	79.0	77.4	74.1	70.1
Visayas	62.6	64.4	67.9	66.2	71.4	70.6	69.2	66.9	67.4	68.7	68.5	67.0	63.5

Table 15. Monthly Load Factor - 2013

	Load Factor (%) by Billing Month - 2013												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual Avg.
System	73.8	75.5	75.4	74.5	76.4	75.7	76.0	74.0	74.1	76.7	74.6	-	70.7
Luzon	74.6	76.6	76.5	75.3	77.5	76.6	77.2	74.4	74.8	77.7	76.7	76.5	71.7
Visayas	64.8	65.3	66.9	68.6	67.2	66.4	65.9	65.2	66.1	67.8	52.6	62.4	62.8

B. Load Forecast Variation

The load forecast variation compares the ex-ante load schedule and the ex-post load, and intends to measure the level of accuracy of the load forecast in the ex-ante from the actual load in the ex-post.

For year 2014, bulk of the forecast variation between the ex-ante load and the ex-post load fell within the range of +/-3 percent.

In Luzon, about 52 percent of the load forecast variation were distributed between -1 percent to -3 percent while about 42.9 percent were variations falling within 1 percent to 3 percent. In the Visayas on the other hand, 33.2 percent of the load forecast variation fell between -1 to -3 percent and about 35 percent were within 1 to 3 percent. Note that 25.3 percent of these variations were null, bulk of which were during the 1st quarter of the year while the Visayas is under the ERC's partial market suspension.

Figure 7. Load Forecast Variation Distribution (Ex-Ante vs. Ex-Post) - Luzon

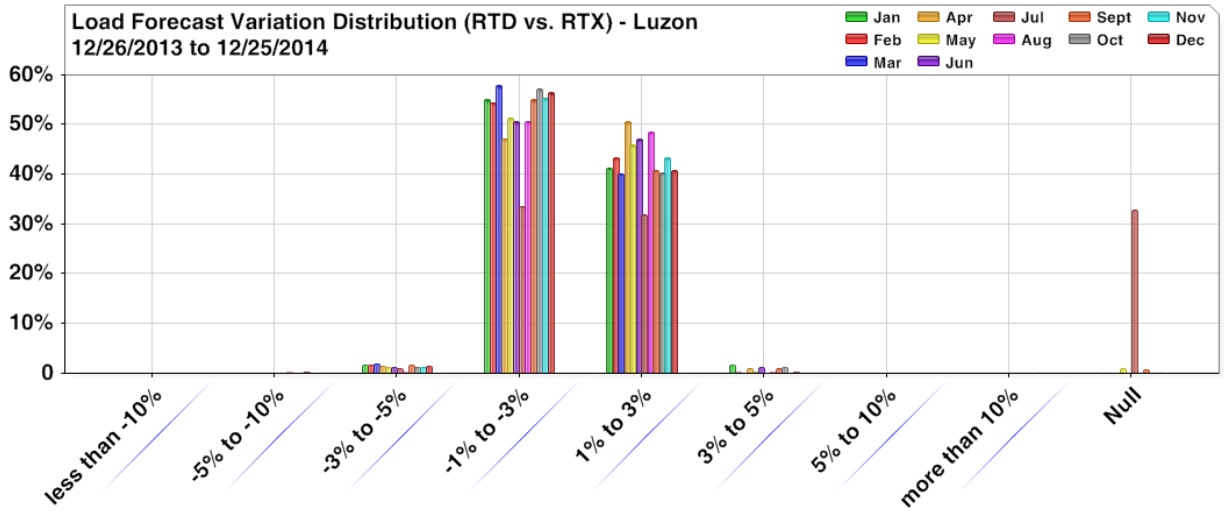


Table 16. Load Forecast Variation Distribution (Ex-Ante vs. Ex-Post) - Luzon

	Load Forecast Variation (%) Distribution (Ex-ante vs. Ex-Post) - Luzon, 2014								
	less than -10%	-5% to -10%	-3% to -5%	-1% to -3%	1% to 3%	3% to 5%	5% to 10%	more than 10%	Null
Jan	0.0	0.1	1.7	55.0	41.3	1.6	0.1	0.0	0.1
Feb	0.0	0.0	1.7	54.4	43.3	0.4	0.1	0.0	0.0
Mar	0.0	0.0	1.8	57.9	40.2	0.1	0.0	0.0	0.0
Apr	0.0	0.0	1.3	47.2	50.5	0.9	0.0	0.0	0.0
May	0.0	0.0	1.1	51.4	46.0	0.4	0.1	0.0	1.0
Jun	0.0	0.0	1.1	50.5	47.0	1.1	0.0	0.0	0.3
Jul	0.1	0.3	0.8	33.6	31.9	0.3	0.0	0.0	32.9
Aug	0.0	0.0	0.4	50.7	48.5	0.4	0.0	0.0	0.0
Sept	0.0	0.4	1.7	55.0	40.9	0.9	0.3	0.0	0.8
Oct	0.0	0.1	1.1	57.2	40.3	1.3	0.0	0.0	0.0
Nov	0.0	0.0	1.2	55.4	43.3	0.1	0.0	0.0	0.0
Dec	0.0	0.4	1.4	56.4	40.8	0.4	0.3	0.1	0.1
Annual Avg.	0.0	0.1	1.3	52.0	42.9	0.7	0.1	0.0	2.9

Note: Results are null if either the ex-ante or the ex-post load forecast is null due to market intervention/suspension.

Figure 8. Load Forecast Variation Distribution (Ex-Ante vs. Ex-Post) - Visayas

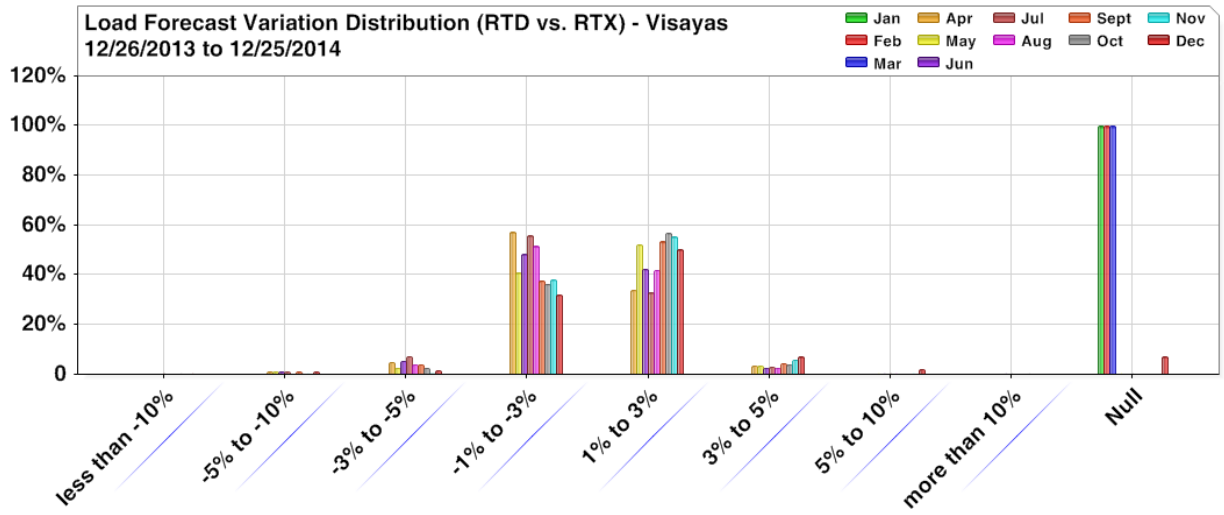


Table 17. Load Forecast Variation Distribution (Ex-Ante vs. Ex-Post) - Visayas

	Load Forecast Variation (%) Distribution (Ex-ante vs. Ex-Post) - Visayas, 2014								
	less than -10%	-5% to -10%	-3% to -5%	-1% to -3%	1% to 3%	3% to 5%	5% to 10%	more than 10%	Null
Jan									100
Feb									100
Mar									100
Apr	0.0	0.9	4.8	57.1	33.7	3.2	0.1	0.0	0.0
May	0.0	1.1	2.2	40.7	52.2	3.2	0.3	0.0	0.3
Jun	0.1	0.9	5.4	48.3	42.2	2.6	0.3	0.3	0.0
Jul	0.3	1.1	7.1	55.7	32.6	2.8	0.3	0.0	0.1
Aug	0.1	0.1	3.6	51.3	41.9	2.6	0.3	0.0	0.0
Sept	0.0	0.9	3.9	37.5	53.2	4.3	0.1	0.0	0.0
Oct	0.3	0.4	2.4	36.1	56.8	3.6	0.1	0.3	0.0
Nov	0.0	0.3	0.7	37.9	55.2	5.6	0.3	0.0	0.0
Dec	0.3	1.1	1.4	31.8	50.1	6.8	1.7	0.0	6.8
Annual Avg.	0.1	0.6	2.6	33.2	35.0	2.9	0.3	0.0	25.3

Note: Results are null if either the ex-ante or the ex-post load forecast is null due to market intervention/suspension or if there was no ex-post run.

III. SUPPLY PROFILE

It was during this year that the market felt the impact of force majeure event when Typhoon Yolanda hit the Visayas on 08 November 2013 and brought severe damage on the Visayas power system. With most of the distribution and transmission lines becoming not operational, the ERC declared partial market suspension in the Visayas on 08 November 2013 at 1500H, which continued until 25 March 2014 at 2400H. During this period, only the Luzon market was operational.

The monitoring of the system-wide supply profile was done beginning April on account of the ERC's partial market suspension in the Visayas which was lifted only on 26 March 2014. Relevant data during other events of market suspension or intervention were likewise excluded in the Supply Profile of this Report. Notably, these are the market suspension in Luzon from 16-25 July as well as the market intervention in the Visayas from 07-09 December. Other noticeable gaps in the Figures below correspond to market intervention events during the billing year. Regional events of market intervention/suspension were also excluded from the Supply Profile of Luzon and Visayas, as illustrated in the succeeding Figures below.

About 556.4 MW of new capacities augmented the WESM registered capacity by about 3.2 percent. From 14,651 MW in January, the registered capacity in the WESM grew to 15,126 MW by yearend, mainly influenced by the entry of new plants in the market. A significant number of these new plants came from non-scheduled generation which was noted to have increased from an average of 77 MW in April, accounting for only 1 percent of the total registered capacity, to 423 MW or 3 percent, by yearend. Overall, non-scheduled generation accounted for about 1 percent of the total registered capacity, averaging at 157 MW.

However, only about 61 percent had been offered in the market in year 2014, averaging at about 9,076 MW. Increase in the level of capacity offered was noted during the last quarter of the year, as illustrated in Figure 10 below. The highest capacity offers were recorded during the October and December billing months, posted at an average of 9,334 MW and 9,603 MW, respectively, representing 64 percent of the total WESM registered capacity during said months, while the month of July was associated with the lowest capacity offers at an average of 8,276 MW or only 56 percent of the total registered capacity for the month.

Meanwhile, about 14 percent and 16 percent of the total registered capacity remained unavailable due to outage capacity and capacity not offered, averaging at about 2,103 MW and 2,228 MW during the year. Further discussion on unavailable capacities will be provided in the succeeding Sections of this Report.

The remaining 5 percent, averaging at about 770 MW corresponded to ancillary services which were scheduled by the System Operator to provide regulating, contingency and dispatchable reserves, while 2 percent or about 350 MW was attributable to the MRU designation of oil-based plant Malaya 2. The provision for ancillary services steadily increased over the year, from an average of 681 MW in April, covering only 5 percent of the total WESM registered capacity during the month, to as much as 892 MW in November (6 percent) and 879 MW in December (6 percent).

Figure 9. Supply Profile - 1st Half

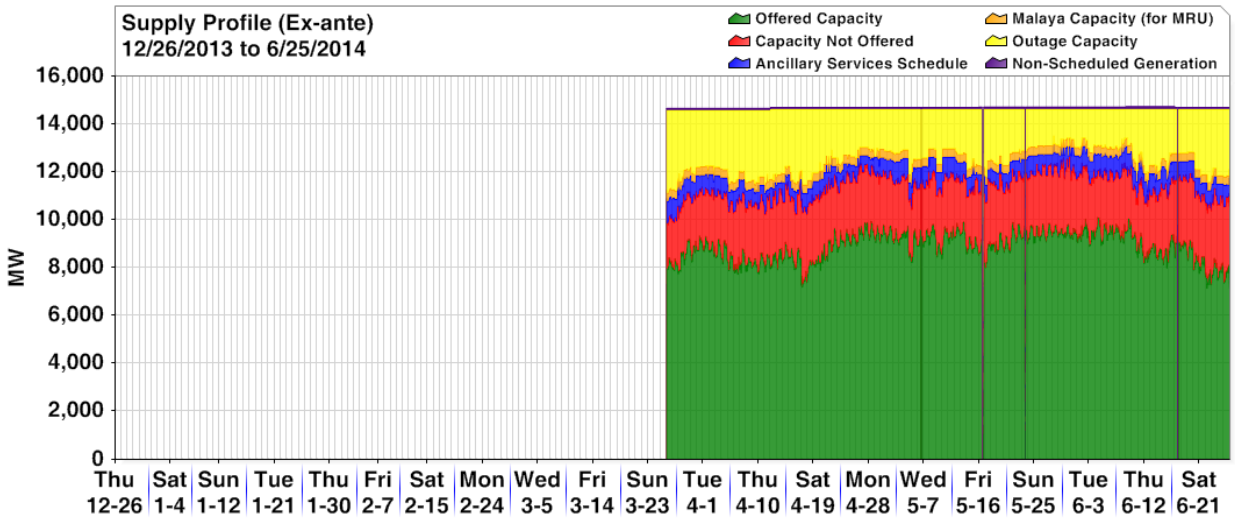


Figure 10. Supply Profile - 2nd Half

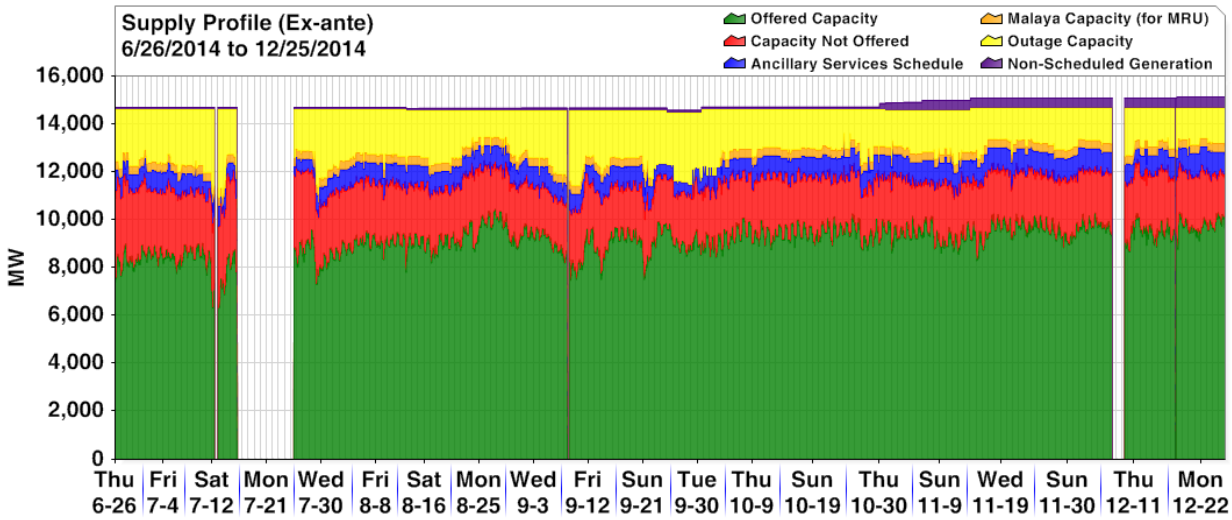


Table 18. Supply Profile - System

	Supply Profile by Billing Month (MW) - 2014									
	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec	Annual Avg.
Registered Capacity (End of Month)	14,691	14,703	14,698	14,696	14,654	14,569	14,704	15,081	15,126	14,760
Avg. Offered Capacity	8,506	9,231	8,970	8,276	8,955	9,140	9,334	9,455	9,603	9,076
Avg. Outage Capacity	2,650	1,944	1,942	2,894	2,001	2,133	1,929	1,676	1,544	2,103
Avg. Capacity Not Offered	2,398	2,388	2,580	2,091	2,481	2,185	2,280	2,231	2,280	2,228
Avg. Ancillary Services Schedule	681	688	754	702	772	785	761	892	879	770
Avg. Malaya Capacity (for MRU)	350	350	350	350	350	350	350	350	350	350
Avg. Non-Scheduled Generation	77	81	88	88	91	105	107	350	423	157

In the Luzon region, about 61 percent of the WESM registered capacity was offered in the market, posted at an average of 7,630 MW. Offered capacity was highest in December at an average of 8,179 MW, and was lowest in July at 6,826 MW Note that the billing month of December posted the highest available supply level, while July recorded the highest outage level during the year.

On the other hand, outage capacity and capacity not offered persisted in Luzon and accounted for about 15 percent and 16 percent of the total registered capacity in the region, averaging at 1,925 MW and 1,953 MW, respectively. About 6 percent or an average of 738 MW was allocated for the provision of ancillary services while 2 percent, which averaged at 376 MW, was attributed to the designation of Malaya as MRU. It is noted that Malaya 1 went on forced outage on 21 March and remained in outage for the duration of year 2014 while Malaya 2 also went on forced outage from 22 September to 03 October.

The remaining 1 percent averaging at 84 MW, was on account of non-scheduled generation in the region. Similar to the trend system-wide, non-scheduled generation grew significantly in Luzon during the last quarter of the year, increasing by 1.9 percent in November to as much as 2.4 percent in December, at an average of 250 MW and 303 MW, respectively. Accounting for this growth in non-scheduled generation are the additional capacities in Luzon which entered the market. These include the entry of the 10.8 MW biomass non-scheduled generating unit of San Jose City 1 Power Corporation (IPOWER) on 01 September, the 18.9 MW capacity of Northwind Renewable Energy Corporation (Northwind2) on 03 November, the 150 MW wind capacity of EDC Burgos Wind Power Corporation on 04 November, and the 81 MW wind capacity of North Luzon Renewable Energy Corporation on 06 November.

The WESM registered capacity in Luzon was posted at 12,889 MW by the end of the December billing month from 12,523 MW in January. On top of the growth in capacity of non-scheduled generation, the WESM registered capacity in the region was further augmented with the entry of the 12.7 MW (2x6.35 MW) oil-based plant La Farge Republic, Inc. on 09 June and the 135 MW coal plant South Luzon Thermal Energy Corporation (SLTEC) on 30 September.

Figure 11. Supply Profile (Luzon) - 1st Half

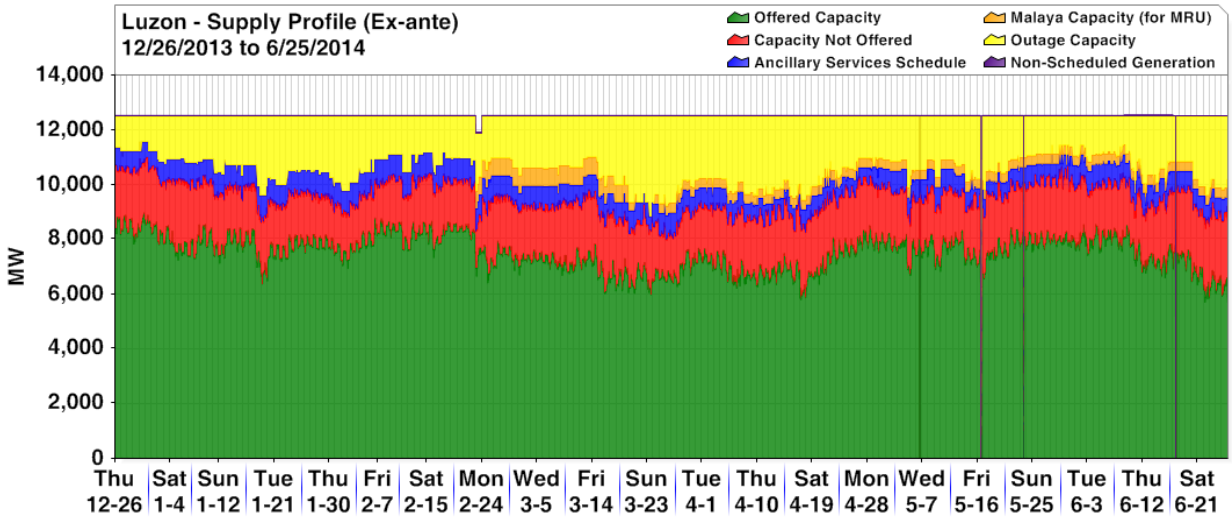


Figure 12. Supply Profile (Luzon) - 2nd Half

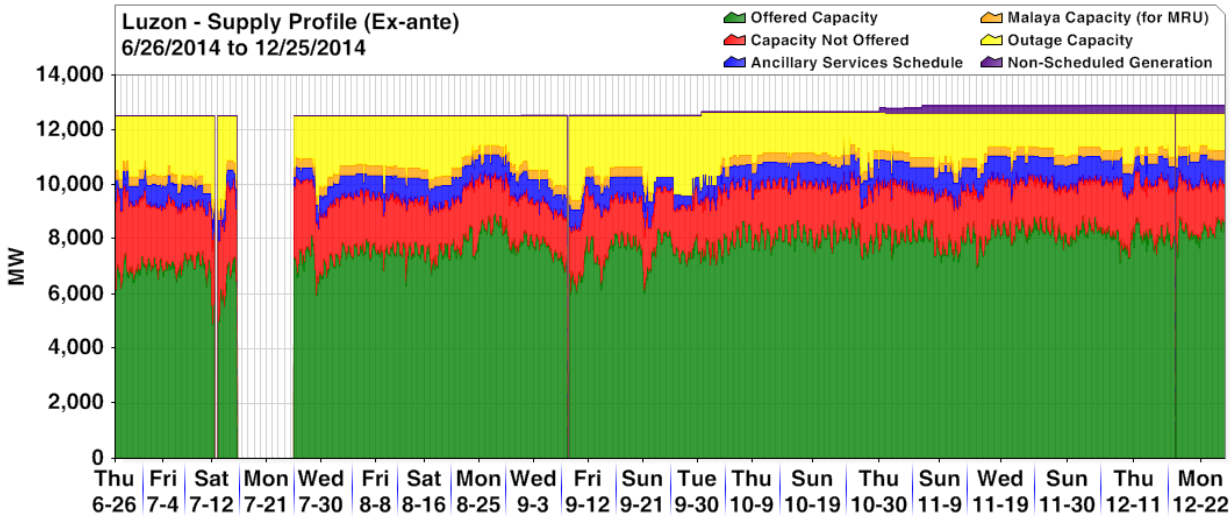


Table 19. Supply Profile - Luzon

	Supply Profile by Billing Month (MW) - Luzon, 2014												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec	Annual Avg.
Registered Capacity (End of Month)	12,523	12,523	12,523	12,523	12,523	12,518	12,516	12,516	12,527	12,662	12,884	12,889	12,591
Avg. Offered Capacity	7,924	7,981	7,014	6,964	7,718	7,490	6,826	7,506	7,665	7,942	8,047	8,179	7,630
Avg. Outage Capacity	1,756	1,823	2,162	2,532	1,803	1,759	2,675	1,867	2,037	1,804	1,526	1,379	1,925
Avg. Capacity Not Offered	2,021	1,760	2,025	1,994	1,960	2,154	2,435	2,005	1,730	1,859	1,816	1,839	1,953
Avg. Ancillary Services Schedule	768	843	727	630	650	714	662	726	743	709	831	821	738
Avg. Malaya Capacity (for MRU)		650	611	350	350	350	350	350	350	350	350	350	376
Avg. Non-Scheduled Generation	42	42	42	42	42	42	42	42	51	53	250	303	84

Meanwhile, the total registered capacity in the Visayas stood at 2,209 MW by the end of year 2014. Of which, the capacity offered in the market comprised about 68 percent, posted at an average of 1,455 MW. About 2 percent or an average of 49 MW accounted for the provision of ancillary services and about 3 percent comprised the non-scheduled generation posted at an average 60 MW. The remaining 7 percent or about 148 MW and 21 percent at an average of 443 MW were unavailable due to outage capacity and capacity not offered, respectively.

Entry of the following additional capacities contributed to the increase in the WESM registered capacity in the region: geothermal plant Energy Development Corporation (40 MW), effective 12 April; solar plant San Carlos Solar Energy, Inc. (11.58 MW) effective 29 May; wind plant Trans-Asia Renewable Energy Corporation (54 MW) effective 31 October and biomass plant Universal Robina Corporation (40 MW) effective 18 December.

Dip in the WESM registered capacity in the Visayas was noted during the September billing month, with the deregistration of the 90 MW (1x50 MW and 1x45 MW) Cebu Thermal Power Plant (CTTP) under the Power Sector Asset and Liabilities Management (PSALM). Eventual registration of CTTP in the WESM under its new owner, SPC Power Corporation, took effect beginning 14 November, illustrated by the capacity increase on said date in the Figure below.

Visayas generating plants were noted to have high capacity offers during the months of April and May, posted at an average of 1,542 MW and 1,514 MW, respectively, while the lowest average offered capacity was posted at 1,392 MW and 1,406 MW during the October and December billing months, following the decline in the level of available capacities in the region.

Note that the Visayas region was still under the ERC's market suspension during the first quarter of the year, as illustrated in the Figure below. Said market suspension was lifted on 26 March at 0100H.

Figure 13. Supply Profile (Visayas) - 1st Half

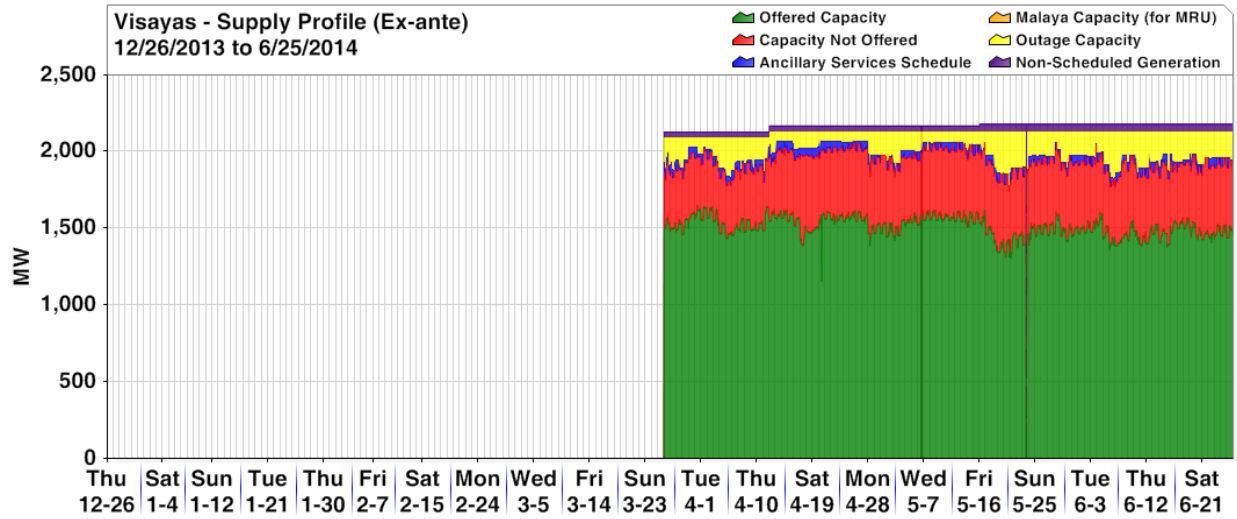


Figure 14. Supply Profile (Visayas) - 2nd Half

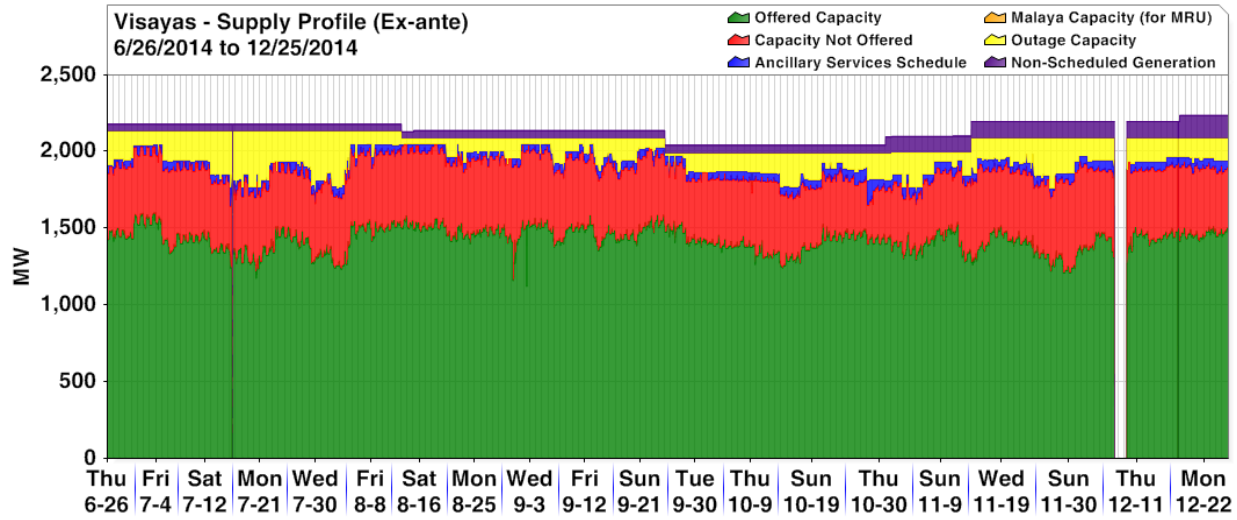


Table 20. Supply Profile - Visayas

	Supply Profile by Billing Month (MW) - Visayas, 2014									
	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec	Annual Avg.
Registered Capacity (End of Month)	2,168	2,180	2,180	2,180	2,139	2,043	2,043	2,128	2,209	2,150
Avg. Offered Capacity	1,542	1,514	1,480	1,420	1,449	1,475	1,392	1,408	1,406	1,455
Avg. Outage Capacity	118	141	183	220	134	96	125	150	165	148
Avg. Capacity Not Offered	404	442	432	456	476	469	421	415	472	443
Avg. Ancillary Services Schedule	51	45	42	42	46	43	54	62	53	49
Avg. Non-Scheduled Generation	34	38	46	46	49	54	54	99	120	60

IV. DEMAND AND SUPPLY

A. Demand and Supply Situation

Effective supply[8] increased by about 4.7 percent to 8,936 MW from last year's average of 8,535 MW, influenced by the entry of additional capacities in the market, among other factors as will be discussed in this Section. The level of commissioning of the additional WESM capacities augmented the total effective supply level particularly during the last quarter of the year, as shown by the consistently high supply level from October to December. The highest effective supply, however, was posted during the billing month of May at an average of 9,225 MW, with more capacities becoming available during the period, particularly from major coal and natural gas plants.

Low supply level was observed during the 2nd and 3rd quarters, with the April, July and September billing months posting the lowest effective supply at an average of 8,485 MW, 8,500 MW and 8,863 MW, respectively. This followed the tight supply condition in the grid during said months, with several instances of supply shortfall on account of the high outage level in said periods, as well as with the onslaught of typhoon Glenda, which caused power system disturbance in Luzon during the July billing month.

The maximum supply level was reached on 11 December at 1400H, posted at 10,256 MW while the minimum supply level was posted at 6,477 MW on 12 July at 0300H.

Drop in the demand[9] level was posted during the April, September, November and December billing months. Seasonal dip in demand was noted during the observance of the Holy Week from 17-20 April; on 01-02 November following the observance of All Saints Day and on 24-25 December in time for the Christmas holidays. Demand similarly dipped on 15 and 20 September during the onslaught of typhoons Luis and Mario. The lowest demand on record was at 4,463 MW, posted on 25 December at 0700H. December consequently posted the widest supply margin for the year, reaching 4,274 MW on 25 December at 0300H. The same is on account of the high level of effective supply which was sustained for the duration of the December billing month while demand was maintained at a relatively low level.

Effective supply followed an increasing trend during the last quarter of 2014 while demand was decreasing, as colder weather prevailed throughout the period. Said interaction of supply and demand resulted in the consistently wide monthly average supply margin posted during the October through the December billing months, though supply insufficiency was still observed on 30 September from 1000H to 1500H and 02 October from 1400H to 1600H. Conversely, supply margin was most narrow during the April, June and July billing months, mainly driven by the higher demand requirements in April and June and the tight supply levels in the July billing month. The minimum supply margin for the year was recorded on 11 July at 2200H, posted at negative 894 MW, while the lowest monthly average supply margin was posted at 683 MW in July.

As illustrated in Figures 15 and 16 below, trading intervals placed under market suspension or intervention were excluded in the system-wide supply and demand data.

[8] The system effective supply is equal to the offered capacity of all generator resources adjusted for any security limit provided by the System Operator and other constraints considered during the market dispatch optimization process such as generator offered ramp rates.
[9] System demand is equal to the total scheduled MW of all load resources in Luzon and Visayas plus losses.

Figure 15. Demand and Effective Supply, 2014 - 1st Half

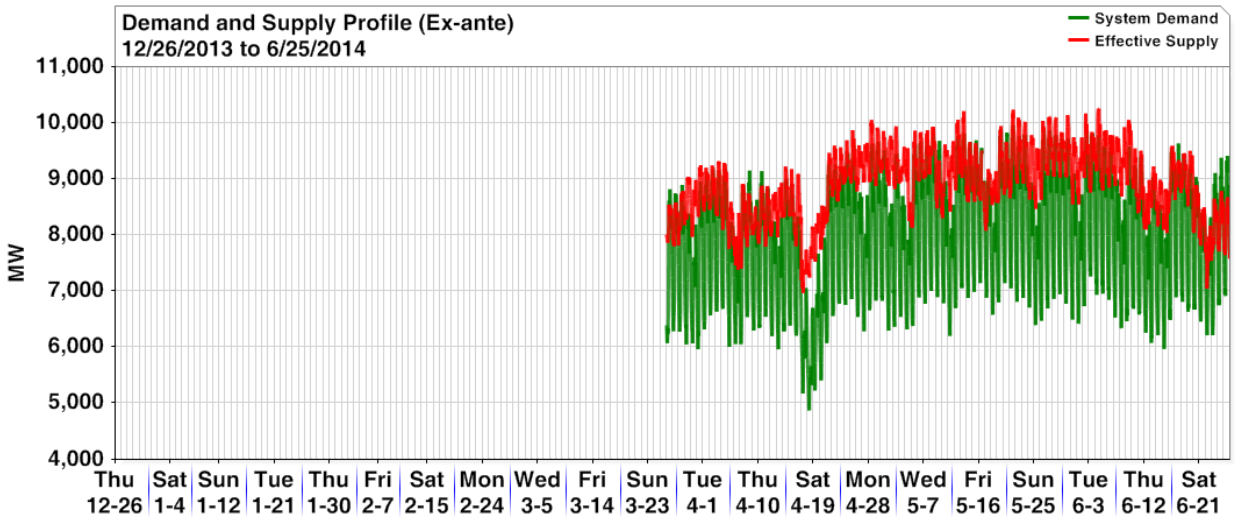


Figure 16. Demand and Effective Supply, 2014 - 2nd Half

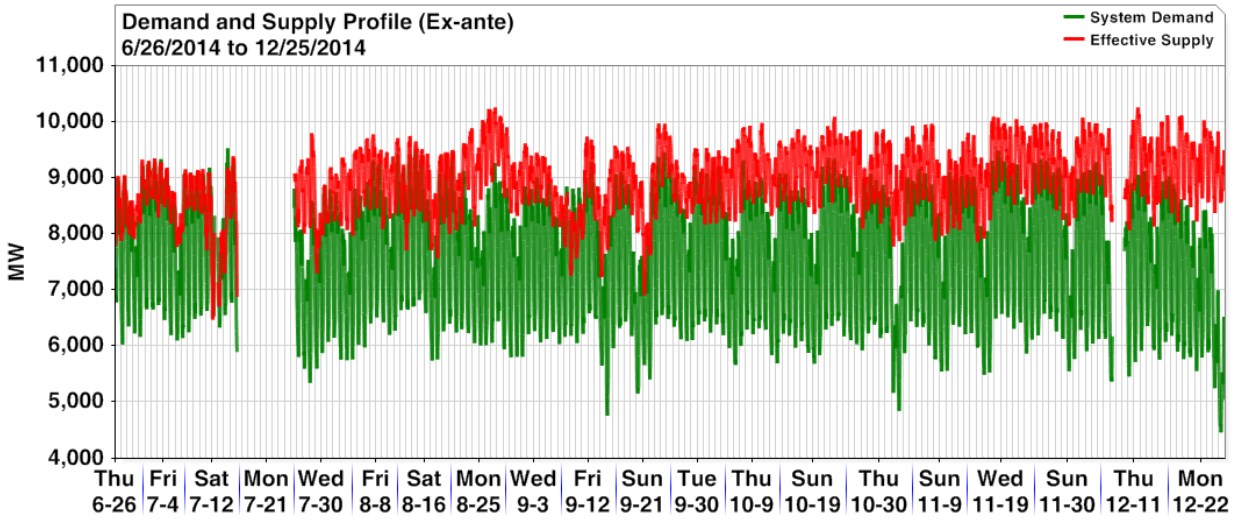


Table 21. Effective Supply Summary - 2014

	Effective Supply Summary (MW) - 2014									
	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual Avg
Max	9,870	10,233	10,254	9,387	10,031	10,256	10,089	10,091	10,256	10,256
Min	6,970	8,080	7,048	6,477	7,302	6,911	8,171	7,778	8,071	6,477
Avg	8,485	9,225	8,998	8,500	8,878	8,863	9,090	9,060	9,214	8,936

Table 22. Supply Margin Summary - 2014

	Supply Margin Summary (MW) - 2014									
	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual Avg
Max	2,573	2,825	2,599	2,248	3,054	3,003	2,965	3,051	4,274	4,274
Min	(450)	(493)	(856)	(894)	(56)	(524)	(380)	76	271	(894)
Avg	956	1,020	900	683	1,333	1,384	1,506	1,499	1,887	1,257

Table 23. Demand and Supply Summary - 2014

	Summary of Demand and Supply (MW) - 2014									
	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual Avg
Avg. Demand	7,528	8,205	8,098	7,818	7,545	7,478	7,583	7,562	7,327	7,679
Avg. Supply	8,485	9,225	8,998	8,500	8,878	8,863	9,090	9,060	9,214	8,936
Avg. Supply Margin	956	1,020	900	683	1,333	1,384	1,506	1,499	1,887	1,257

Wider margin between supply[10] and demand[11] was observed in Luzon during the 1st quarter of 2014 with the relatively high level of available supply posted in January and February, and the low demand requirement associated with the colder weather condition with the 1st quarter of the year. However, with the onset of the summer season, higher demand was noted beginning March, driven by the higher temperature experienced during the period. Notwithstanding the onset of the seasonal peak in demand, effective supply in Luzon dropped as major coal plants went on outage, with the March billing month consequently posting the lowest effective supply for the year, posted at an average of 6,948 MW.

Mirroring the trend system-wide, supply and demand condition was similarly tight in Luzon during the April, June and July billing months, as the tight demand and supply which begun to manifest during the third week of March continued through the succeeding summer months, with a significant number of trading intervals showing cases of undergeneration or supply insufficiency. Effective supply was posted relatively low at an average of 6,966 MW and 7,489 MW in April and June, but was high during the billing month of May at 7,699 MW. However, the high demand posted in May did not significantly improve demand and supply during the period, as insufficiency in supply (negative supply margin) was still observed for a significant number of trading intervals in said billing month, mostly during peak hours.

Effective supply remained low in July, posted at an average of 7,489 MW, notably higher than the offered capacity for the month at 6,826 MW, due to the MRU designation of several plants for the period. The tight supply level which prevailed in July was on account of the significant increase in the outage capacity of several plants, and was likewise driven by the impact of typhoon Glenda to the generating plants in Luzon. Demand was however low in July as colder weather condition set-in, but was still relatively high when compared to the months that followed. Supply margin was at its most narrow in July at an average of only 358 MW. The April, May and June billing months similarly exhibited the same narrow supply margin averaging at 567 MW, 729 MW and 635 MW.

Similar to the trend system-wide, supply levels in Luzon improved at the onset of the August billing month while demand continued to be low. However, supply slightly declined in September, driven by the increase in outage capacity during the month. Supply conditions improved during the last quarter of the year demonstrated by the consistent increase in supply while demand levels continued to drop from October to December. Supply margin was thus sustained at a wide margin, as the monthly average supply margin ranged between 1,223 MW in October to as wide as 1,644 MW in December.

Effective supply level in Luzon was likewise augmented by its imported power from the Visayas through the HVDC Interconnection Link, mostly during off-peak hours. The power flow from Visayas to Luzon was noted to be as much as 440 MW, posted during several off-peak hours in the April billing month. As illustrated in the Figures below, power flow between the two regions was cut-off when the HVDC Link was placed on maintenance outage on 12 April at 0900H to 22 April at 1700H, and from 16 August at 0800H through 24 September at 0400H, rendering the Visayas region unable to export power to Luzon and vice versa.

Year-on-year comparison indicated that average effective supply rose by 2.5 percent from last year's level of 7,199 MW.

[10] The regional effective supply is equal to the offered capacity of all generator resources in each region adjusted for any security limit provided by the System Operator and other constraints considered during MMS simulation such as generator offered ramp rates, excluding the HVDC import/export.

[11] The regional demand is equal to the total scheduled MW of all load resources for each respective region plus losses.

As shown in Figure 18, Luzon was placed under market suspension from 16 July at 1200H to 25 July at 0400H, following the disturbance of the power system in the region due to typhoon Glenda.

Figure 17. Demand and Effective Supply, 2014 - Luzon, 1st Half

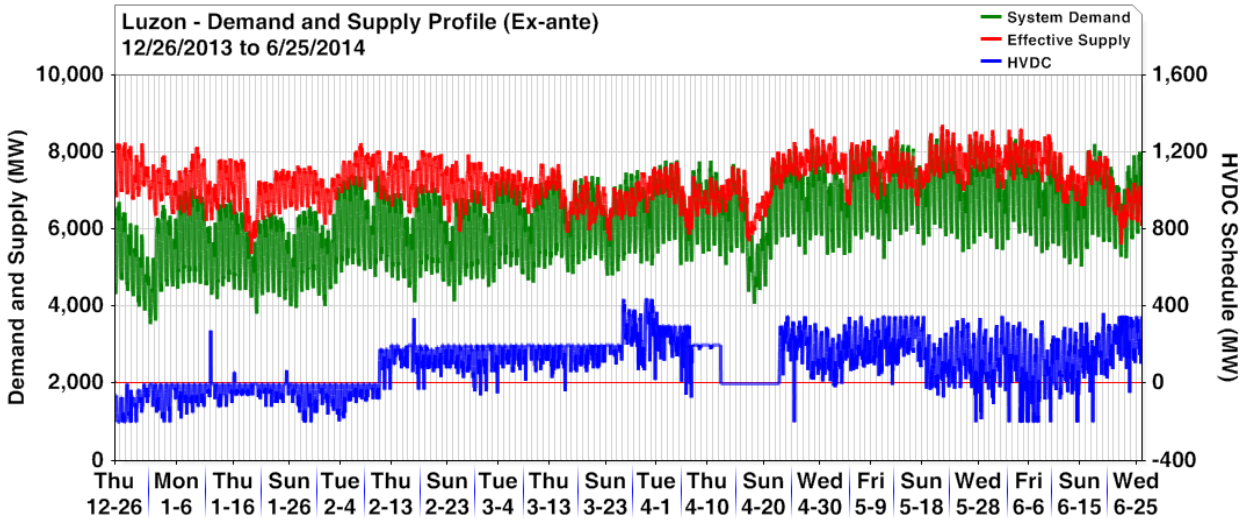


Figure 18. Demand and Effective Supply, 2014 - Luzon, 2nd Half

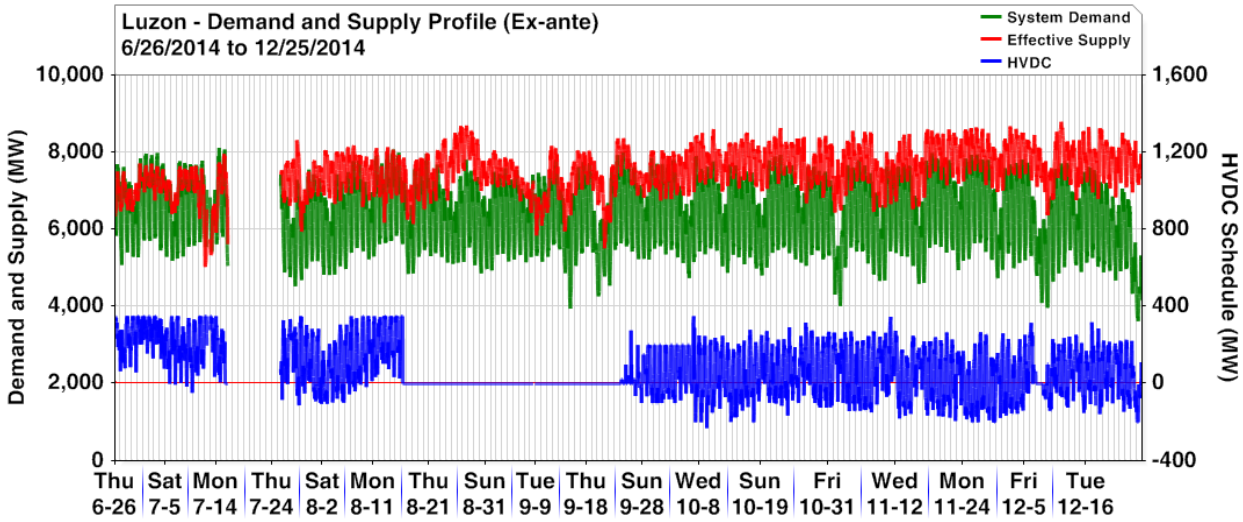


Table 24. Effective Supply Summary - Luzon, 2014

	Effective Supply Summary (MW) - Luzon, 2014												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual Avg
Max	8,252	8,240	7,943	8,268	8,716	8,610	7,957	8,506	8,694	8,629	8,626	8,789	8,789
Min	5,364	5,940	5,714	5,692	6,605	5,608	5,029	5,945	5,508	6,750	6,437	6,365	5,029
Avg	7,104	7,284	6,948	6,966	7,699	7,489	7,008	7,391	7,372	7,672	7,663	7,789	7,377

Table 25. Supply Margin Summary - Luzon, 2014

	Supply Margin Summary (MW) - Luzon, 2014												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual Avg
Max	3,416	2,703	2,206	2,018	2,373	2,161	1,769	2,556	2,491	2,563	2,572	3,826	3,826
Min	367	294	(753)	(625)	(590)	(1,135)	(1,158)	(202)	(744)	(450)	(22)	304	(1,158)
Avg	1,680	1,499	871	567	729	635	358	1,036	1,054	1,223	1,275	1,644	1,069

Table 26. Demand and Supply Summary - Luzon, 2014

	Summary of Demand and Supply (MW) - Luzon, 2014												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual Avg
Avg. Demand	5,424	5,785	6,076	6,400	6,970	6,854	6,650	6,356	6,318	6,449	6,388	6,146	6,307
Avg. Supply	7,104	7,284	6,948	6,966	7,699	7,489	7,008	7,391	7,372	7,672	7,663	7,789	7,377
Avg. Supply Margin	1,680	1,499	871	567	729	635	358	1,036	1,054	1,223	1,275	1,644	1,069

Conversely, decrease in the level of effective supply[12] was noted in the Visayas region as the billing months progressed, with the last quarter of the year posting the lowest level of average effective supply at 1,418 MW in October, 1,397 MW in November, and at 1,395 MW in December. Meanwhile, high level of effective supply was recorded during the months of April, May and June, averaging at 1,518 MW, 1,527 MW and 1,510 MW, respectively, as more capacities became available with the lifting of the ERC's partial market suspension in the Visayas on 26 March 2014, and the resumption of operations of generating plants on outage during the 1st quarter of the year.

Tight supply condition was also noted during the July billing month, with the average effective supply level posted at only 1,461 MW. Decline in the level of available capacities due to the high outage level of major coal plants was observed during the period.

It is observed that even with the decline in the demand[13] requirements in Visayas, thinning of the supply margin still prevailed during the last quarter of 2014. Supply margin was most narrow in November at an average of 224 MW. The resulting supply margin was also narrow in May and June, posted at an average of 290 MW and 265 MW, respectively, following the tight supply and demand condition during said months. Demand was noted to have rose to its highest levels in May and June as temperature also increased with the onset of the summer months.

As earlier cited, the generating plants in the Visayas continued to export cheaper energy to Luzon through the HVDC Interconnection, particularly during off-peak hours. On peak hours however, imported power from Luzon augmented the effective supply level in the Visayas, the highest of which was posted by as much as 230 MW during the October billing month, and by about 200 MW during several peak hours in April, May, June, October, November and December.

Comparison of effective supply from last year's average would show that the supply made available in the Visayas in 2014 increased by 5.6 percent from 1,550 MW in 2013.

Note that as illustrated in Figures 19 and 20 below, the Visayas was under market suspension for the duration of the 1st quarter of 2014, and was likewise placed under market intervention from 07 December at 1000H to 09 December at 0900H.

[12] The regional effective supply is equal to the offered capacity of all generator resources in each region adjusted for any security limit provided by the System Operator and other constraints considered during MMS simulation such as generator offered ramp rates, excluding the HVDC import/export.

[13] The regional demand is equal to the total scheduled MW of all load resources for each respective region plus losses.

Figure 19. Demand and Effective Supply, 2014 - Visayas, 1st Half

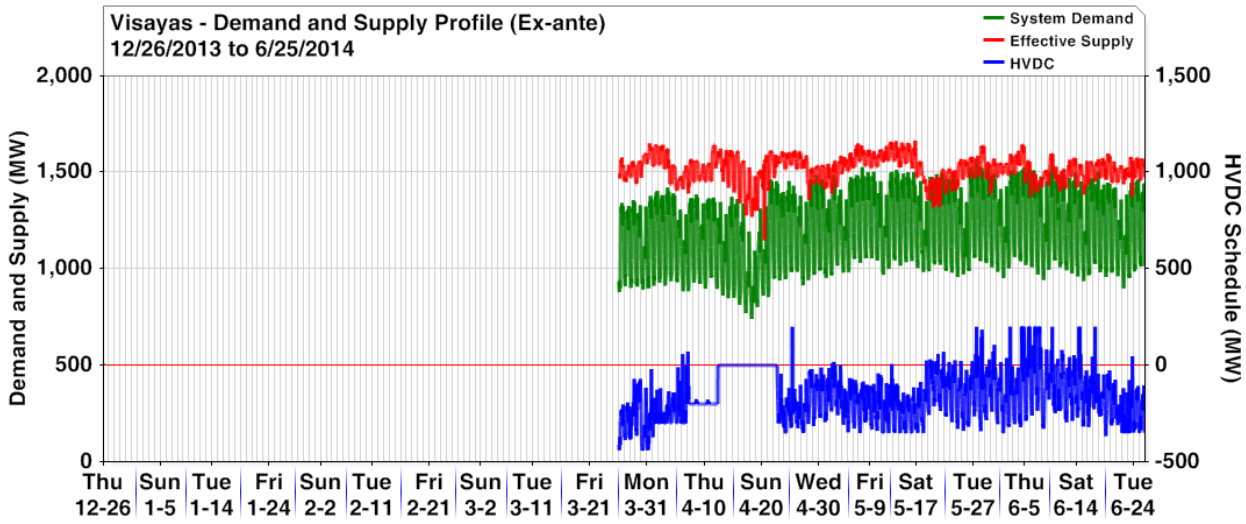


Figure 20. Demand and Effective Supply, 2014 - Visayas, 2nd Half

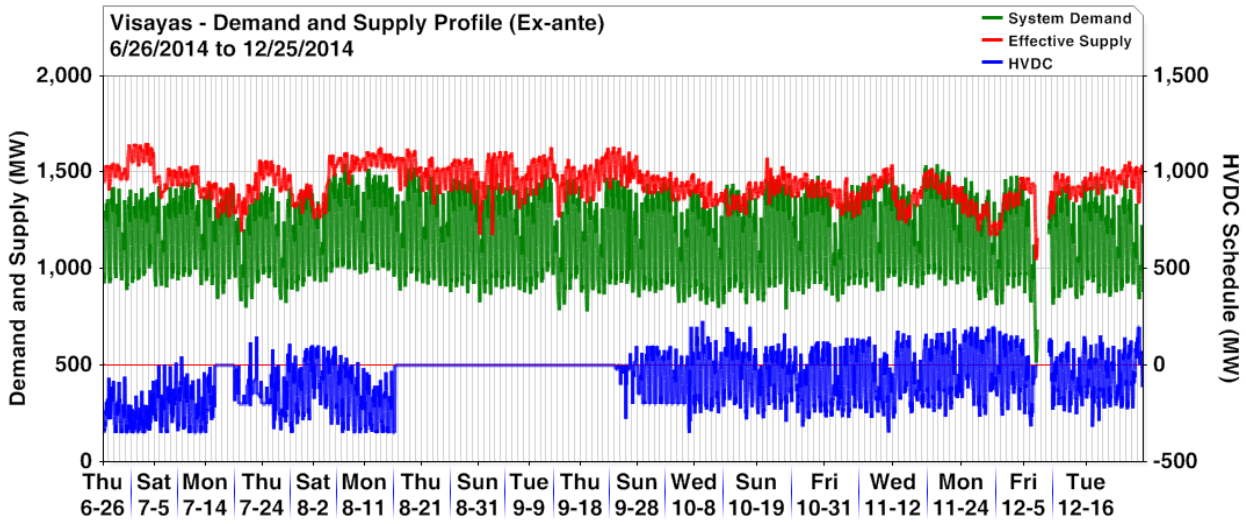


Table 27. Effective Supply Summary - Visayas, 2014

	Effective Supply Summary (MW) - Visayas, 2014									
	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual Avg
Max	1,651	1,665	1,646	1,654	1,631	1,634	1,609	1,542	1,558	1,665
Min	1,149	1,320	1,376	1,193	1,259	1,176	1,274	1,236	1,046	1,046
Avg	1,518	1,527	1,510	1,461	1,486	1,491	1,418	1,397	1,395	1,468

Table 28. Supply Margin Summary - Visayas, 2014

	Supply Margin Summary (MW) - Visayas, 2014									
	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual Avg
Max	670	635	549	622	584	606	611	557	605	670
Min	47	(60)	(48)	(5)	(36)	(164)	(114)	(109)	(138)	(164)
Avg	390	290	265	302	297	329	284	224	282	296

Table 29. Demand and Supply Summary - Visayas, 2014

	Summary of Demand and Supply (MW) - Visayas, 2014									
	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual Avg
Avg. Demand	1,129	1,237	1,244	1,160	1,189	1,162	1,134	1,173	1,113	1,172
Avg. Supply	1,518	1,527	1,510	1,461	1,486	1,491	1,418	1,397	1,395	1,468
Avg. Supply Margin	390	290	265	302	297	329	284	224	282	296

B. Reserve Margin Index (RMI)

The Reserve Margin Index (RMI) measures the balance between demand and supply to identify how tight the energy balance in the market is. For billing year 2014, the assessment of the generation-demand balance was done using the system-wide RMI calculation, consistent with the integrated market operations for the most part of the billing year. Regional calculation was nevertheless presented in this Report. Note that the Visayas region was under partial market suspension during the 1st quarter of the year. As such, system-wide RMI during said period covered the Luzon region only. Similarly, system-wide RMI on trading intervals under market suspension or intervention in either Luzon or Visayas covers only the remaining region under normal condition.

Better generation and demand balance was noted system-wide in about 72 percent of the time in year 2014, particularly during the 1st and 4th quarters of the year. However, consistent with the resulting supply margin as discussed in the preceding Section, tight supply and demand was still observed during the 2nd and 3rd quarters of 2014, with the billing months of April, May, June and July posting the highest occurrence of RMIs with less than 10 percent. The tight RMI which prevailed in said months is mainly driven by the high demand posted in May and June and the low supply availability in April and July.

Year-on-year RMI comparison would indicate tighter demand and supply balance in 2013, where the frequency of trading intervals with posted RMIs of less than 10 percent was noted to have occurred in 31.9 percent of the time, higher than the 28 percent recorded for year 2014. It may be recalled that the November and December 2013 billing months were marked with the highest occurrences of tight to insufficient supply conditions in the previous year, attributable to the shutdown of the Malampaya gas platform, and the concurrent outages of the major coal plants in Luzon.

Figure 21. Reserve Margin Index (RMI), System - 1st Half

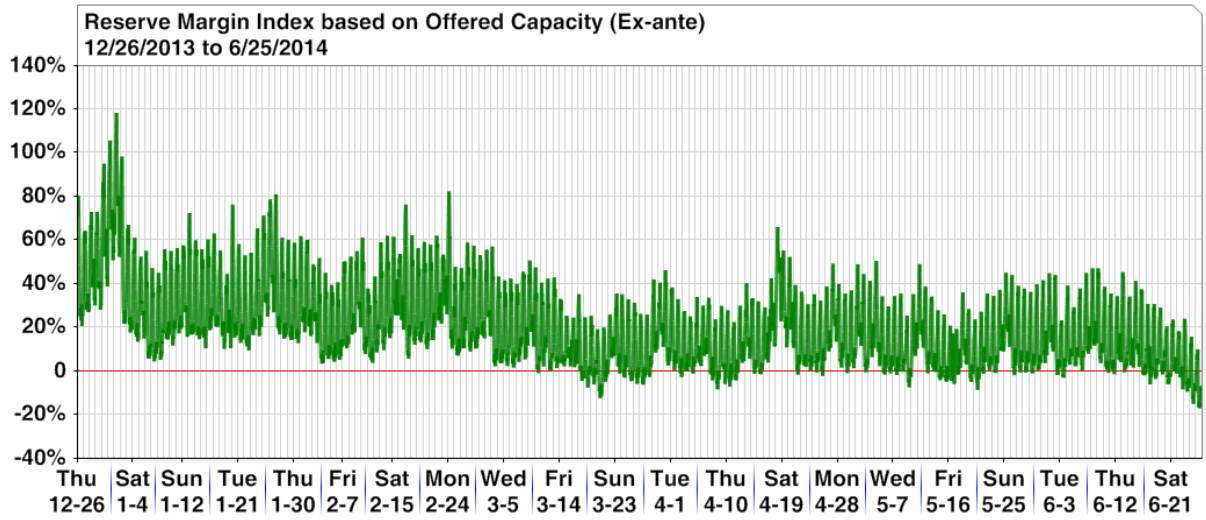


Figure 22. Reserve Margin Index (RMI), System - 2nd Half

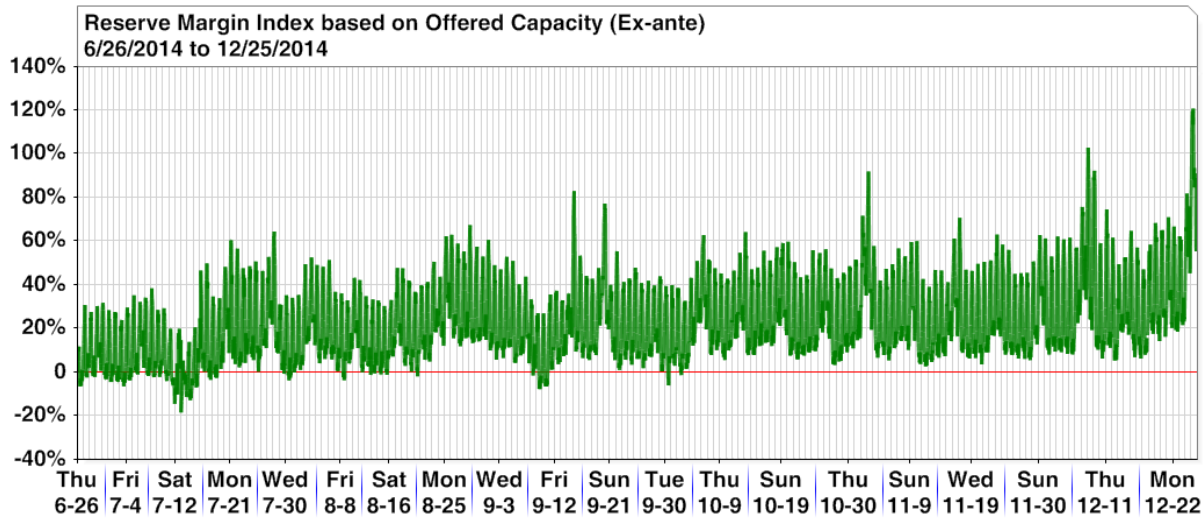


Table 30. RMI Distribution - System, 2014

	RMI Distribution by Billing Month (%) - 2014												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual Avg.
Less or equal to 10%	3.1	8.7	39.3	46.4	45.4	53.1	54.7	29.6	18.3	16.9	14.8	6.8	28.0
More than 10%	96.9	91.3	60.7	53.6	54.6	46.9	45.3	70.4	81.7	83.1	85.2	93.2	72.0

Table 31. RMI Distribution Per Hour Type - System, 2014

RMI Distribution	No. of Trading Intervals		Percent of Time	
	Peak	Off-Peak	Peak	Off-Peak
Less or equal to 10%	1,939	424	52.3	8.8
More than 10%	1,770	4,374	47.7	91.2

Table 32. RMI Distribution - System, 2013

	RMI Distribution by Billing Month (%) - 2013												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual Avg.
Less or equal to 10%	12.0	9.9	29.5	49.2	42.5	33.3	20.4	19.6	19.1	44.2	51.3	53.3	31.9
More than 10%	88.0	90.1	70.5	50.8	57.5	66.7	79.6	80.4	80.9	55.8	48.7	46.7	68.1

Following the system-wide trend on RMI, Luzon likewise exhibited better generation-demand balance in about 72.1 percent of the time in 2014, having imported power from the Visayas to improve its energy balance, mostly during off-peak hours. Note that except for January, the HVDC power flow was mostly going to Luzon all throughout the year. Nevertheless, January posted the highest frequency of RMIs at the above 10 percent threshold, at 95.7 percent of the time, driven by the demand which was the lowest monthly average demand across all billing months. The February and December billing months were also marked with better energy balance at 91.1 percent and 92.2 percent of the time, respectively, driven by the low demand level in February while supply was noted to be at its highest in December.

Also, consistent with the monthly supply margin in Luzon, and despite the imported energy from the Visayas which augmented the supply level in the region, April, June and July demonstrated the tightest energy balance, with RMIs of less than 10 percent posted at a high of 50.1 percent, 53.2 percent and 65.4 percent, respectively during said months. The same is driven by the high demand requirement and low supply level which prevailed in the summer months of April and June, and the tight supply condition in July, marked with several

events of generation deficiency. Note that the July billing month posted the highest incidence of outage and capacity gap for the year.

Figure 23. Reserve Margin Index (RMI), Luzon - 1st Half

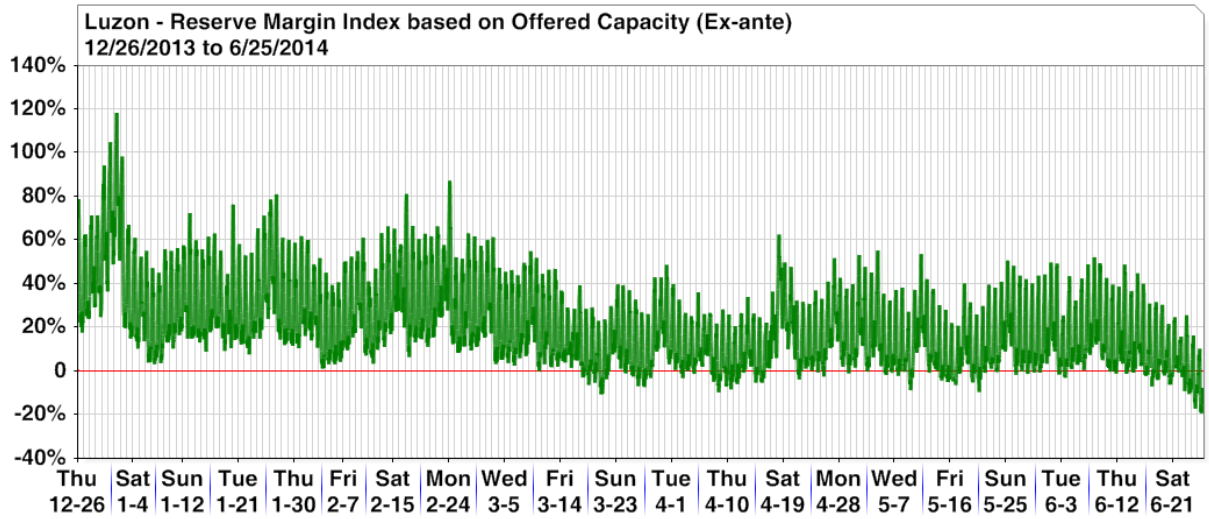


Figure 24. Reserve Margin Index (RMI), Luzon - 2nd Half

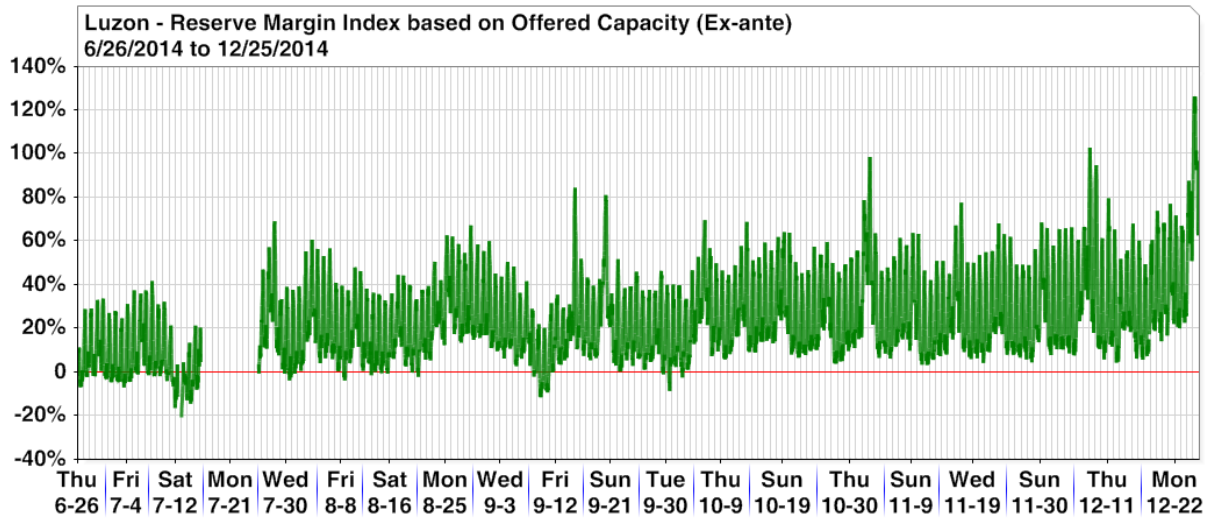


Table 33. RMI Distribution - Luzon, 2014

	RMI Distribution by Billing Month (%) - Luzon, 2014												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual Avg.
Less or equal to 10%	4.3	8.9	32.9	50.1	44.9	53.2	65.4	29.2	20.6	17.5	13.7	7.8	27.9
More than 10%	95.7	91.1	67.1	49.9	55.1	46.8	34.6	70.8	79.4	82.5	86.3	92.2	72.1

Table 34. RMI Distribution Per Hour Type - Luzon, 2014

RMI Distribution	No. of Trading Intervals		Percent of Time	
	Peak	Off-Peak	Peak	Off-Peak
Less or equal to 10%	1,939	437	52.3	9.1
More than 10%	1,770	4,361	47.7	90.9

Table 35. RMI Distribution - Luzon, 2013

	RMI Distribution by Billing Month (%) - Luzon, 2013												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual Avg.
Less or equal to 10%	18.0	17.7	38.2	52.3	47.7	37.5	22.9	24.9	24.9	46.9	53.8	55.3	36.6
More than 10%	82.0	82.3	61.8	47.7	52.3	62.5	77.1	75.1	75.1	53.1	46.2	44.7	63.4

On the other hand, the occurrence of trading intervals with RMIs of less than 10 percent in the Visayas region was observed in about 37.8 percent of the time in year 2014, and had the highest occurrence during the billing months of May at 55.4 percent, June at 59.7 percent and July at 68.8 percent. The same follows the resulting supply margin in the Visayas, where both the months of May and June posted narrow supply margin mainly influenced by the increase in demand during said months, while the July billing month recorded tight supply conditions due to the concurrent outages of the major coal plants in the region. It is interesting to note that even though the energy balance in the Visayas was consistently tight during the said three months, majority of the HVDC power flow continued to be mostly directed towards Luzon.

Conversely, better supply and demand balance was observed during the billing months of September, November and December, with RMIs of more than 10 percent posted at 79 percent, 77.7 percent and 93.6 percent of the time. The significant decrease in the outage level during the September billing month as well as the maintenance outage of the HVDC Interconnection which limited the exported power by the Visayas to Luzon, improved the region's supply level, resulting in better generation and demand balance during said month. Meanwhile, the November and December billing months both recorded thin supply margins with the steady decrease in the level of supply in Visayas during the last quarter of the year. However, RMIs in November and December still indicated better energy balance, attributable to the notable increase in the imported energy from Luzon through the HVDC Interconnection, which improved the supply level in the region. This notwithstanding, majority of the HVDC power flow continued to be directed towards Luzon during said months.

Figure 25. Reserve Margin Index (RMI), Visayas - 1st Half

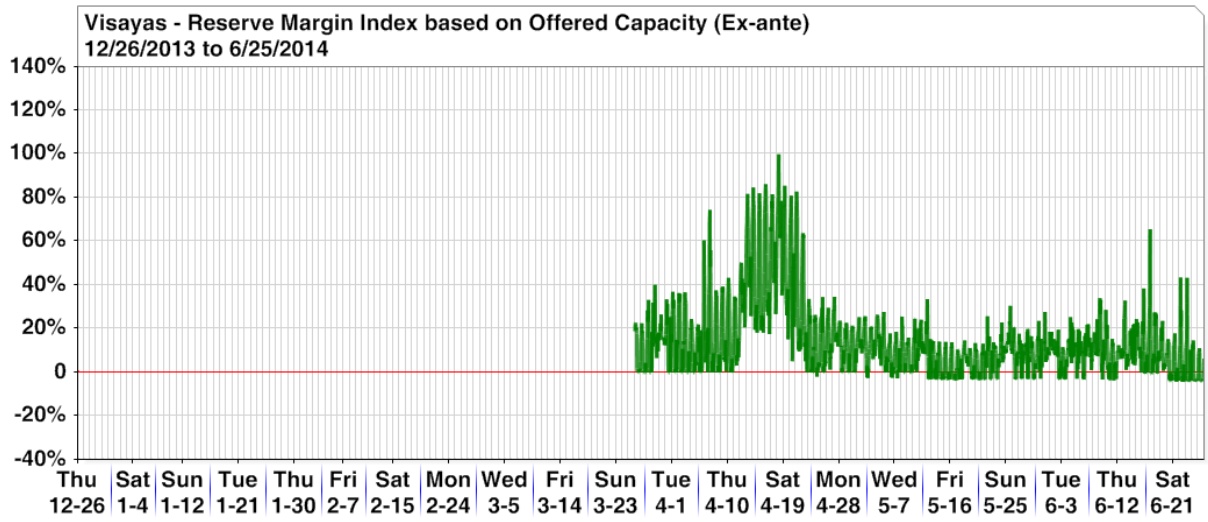


Figure 26. Reserve Margin Index (RMI), Visayas - 2nd Half

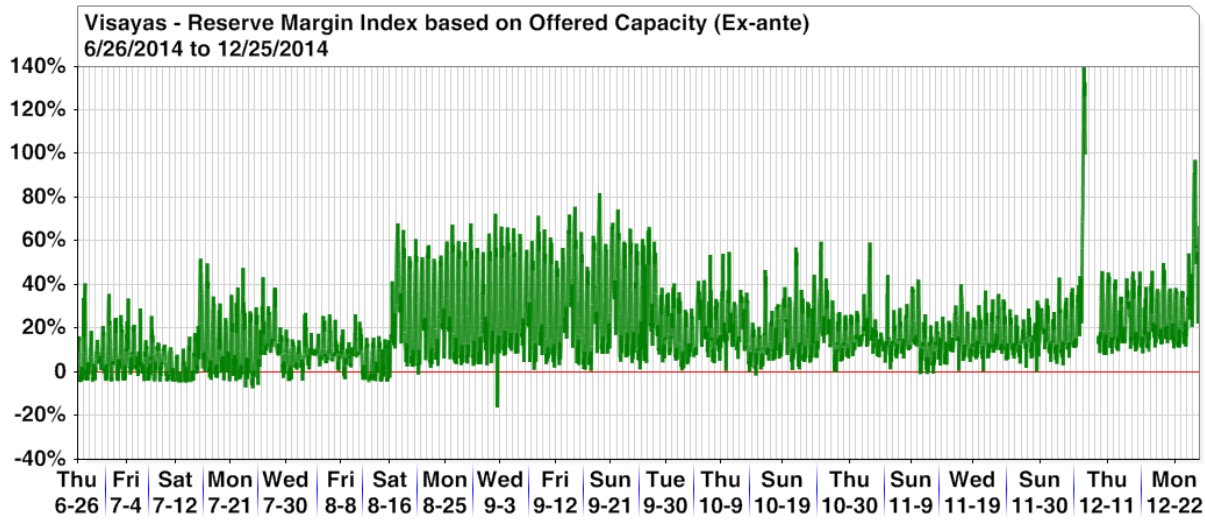


Table 36. RMI Distribution - Visayas, 2014

	RMI Distribution by Billing Month (%) - Visayas, 2014									
	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual Avg.
Less or equal to 10%	31.6	55.4	59.7	68.8	47.6	21.0	25.8	22.3	6.4	37.8
More than 10%	68.4	44.6	40.3	31.2	52.4	79.0	74.2	77.7	93.6	62.2

Table 37. RMI Distribution Per Hour Type - Visayas, 2014

RMI Distribution	No. of Trading Intervals		Percent of Time	
	Peak	Off-Peak	Peak	Off-Peak
Less or equal to 10%	1,939	437	52.3	9.1
More than 10%	1,770	4,361	47.7	90.9

Table 38. RMI Distribution - Visayas, 2013

	RMI Distribution by Billing Month (%) - Visayas, 2013											
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Annual Avg.
Less or equal to 10%	3.2	0.1	5.2	24.6	19.5	12.0	3.5	5.9	3.8	23.3	8.0	10.0
More than 10%	96.8	99.9	94.8	75.4	80.5	88.0	96.5	94.1	96.2	76.7	92.0	90.0

V. OUTAGES

System outage capacity averaged at 2,103 MW, notably lower by 7.4 percent from last year's 2,271 MW. Coal plants accounted for majority of the capacity on outage at 41 percent, followed by oil-based plants at 20.5 percent and by geothermal plants at 18.5 percent.

The hourly outage trend as shown in the Figures below illustrate that outage capacity was relatively high during the 1st and 2nd quarters of the year. However, the highest capacity on outage was posted during the 3rd quarter of 2014, primarily influenced by the high outage level during the billing month of July averaging at 2,894 MW. The maximum outage capacity was recorded at 7,350 MW on 16 July at 1000H, driven by the impact of typhoon Glenda in the Luzon grid.

Outage capacity followed a decreasing trend in the last quarter of 2014 with the December billing month posting the lowest monthly average outage capacity at 1,544 MW.

Significant decreases in the outage capacity in 2014 were noted in comparison with the monthly averages posted in year 2013, particularly during the November and December billing months, when outage capacity decreased by 43 percent (from 2,940 MW to 1,676 MW) and 40.3 percent (from 2,587 MW to 1,544 MW), respectively. Outage capacity was particularly high in November and December 2013 due to the maintenance shutdown of the Malampaya gas platform in November which affected the output of natural gas plants. The same was further aggravated by the forced outages of several coal plants in Luzon resulting in the high outage level recorded for the period.

Conversely, outage capacity increased by 105 percent from an average of 1,412 MW in July 2013 to 2,894 MW in July 2014.

Figure 27. Capacity on Outage - 1st Half

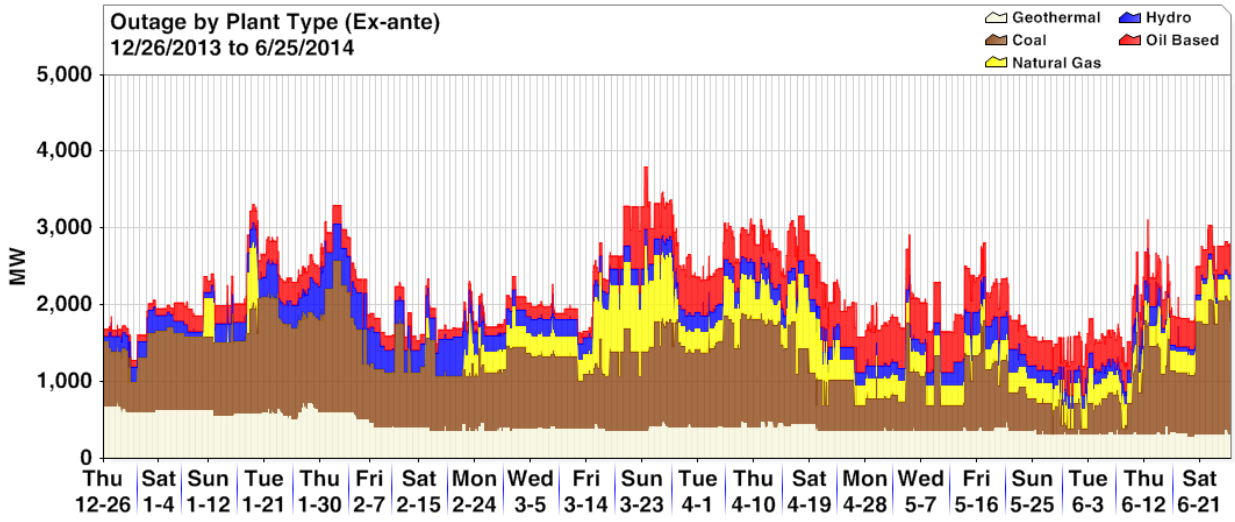


Figure 28. Capacity on Outage - 2nd Half

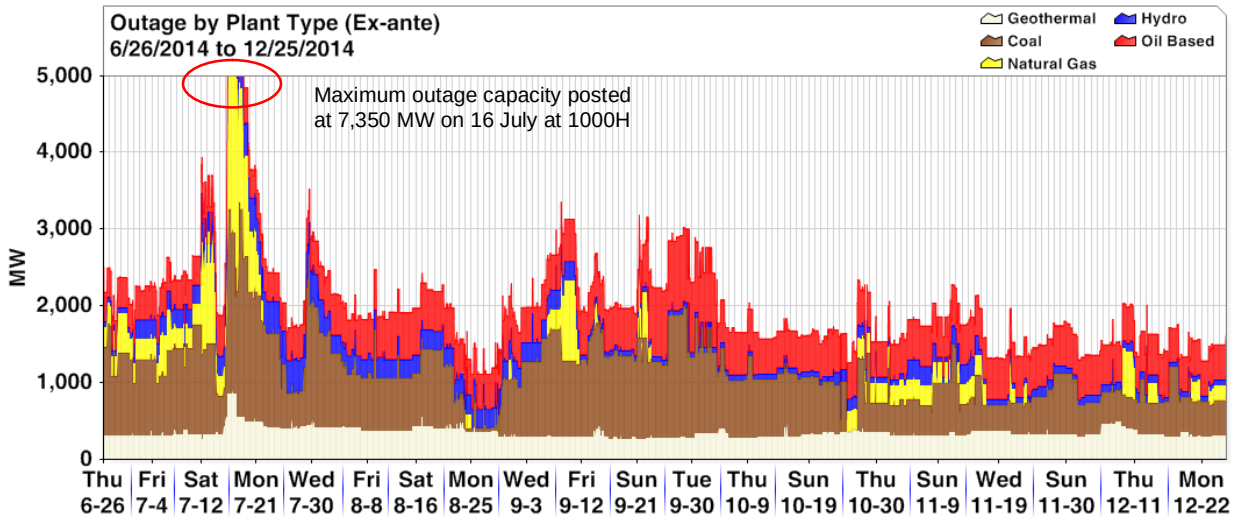


Table 39. Capacity on Outage, 2014

Plant Type	Average Outage Capacity by Billing Month (MW) - 2014												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual Avg.
Coal	1,010	1,035	951	1,069	604	789	1,218	791	952	904	500	518	862
Nat Gas	76	46	516	465	266	302	574	6	143	7	183	86	220
Geo	609	471	382	413	367	315	393	404	300	315	340	344	388
Hydro	216	393	216	198	215	148	281	288	170	81	135	93	203
Oil	188	181	256	504	493	388	428	513	567	622	519	503	431
Total	2,098	2,126	2,320	2,650	1,944	1,942	2,894	2,001	2,133	1,929	1,676	1,544	2,103

Table 40. Year-on-Year Average Outage Capacity Comparison

	Year-on-Year Average Outage Capacity Comparison by Billing Month												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual Avg.
2014 (MW)	2,098	2,126	2,320	2,650	1,944	1,942	2,894	2,001	2,133	1,929	1,676	1,544	2,103
2013 (MW)	2,514	2,439	2,242	1,996	1,879	2,132	1,412	2,022	2,094	2,984	2,940	2,587	2,271
Y-Y (%) Change	(16.5)	(12.8)	3.5	32.8	3.5	(8.9)	105.0	(1.0)	1.9	(35.4)	(43.0)	(40.3)	(7.4)

Table 41 below shows the monthly outage factor per plant type and per outage type. As shown in the Table below, the outage factor of coal plants was posted at 16.3 percent in 2014. Its monthly outage factor followed the trend in outage capacity, with the April and July billing months posting the highest outage factor at 20.3 percent and 23.2 percent, respectively. The same is attributable to the high forced outages among coal plants during said months posted at 11.3 percent in April and at 15 percent in July. On the other hand, the November and December billing months obtained the lowest outage factor among coal plants at 9.3 percent and 9.6 percent, respectively.

Meanwhile, natural gas plants posted its outage factor at 8.0 percent. High outage factor was registered in March and July at 18.5 percent and 20.9 percent, respectively, consistent with the increase in the outage capacity of natural gas plants in said months.

Geothermal plants consistently posted high outage factor all throughout 2014, and posted its total outage factor at 22.4 percent. However, the highest outage factor was recorded in January and February at 34.3 percent and 29 percent, driven by the high outage capacity among the geothermal plants in Visayas in said months.

Hydro plants demonstrated high outage factor in February at 16 percent influenced by the increase in the maintenance outage factor during the month at 6.6 percent. High outage factor was similarly incurred during the July and August billing months at 11.4 percent and 11.7 percent. Planned outage factor accounted for majority or 5.5 percent of the total outage factor of hydro plants in 2014 which was posted at 8.3 percent.

Oil-based plants registered its total outage factor at 19.1 percent system-wide in 2014. The September and October billing months posted the highest outage factor at 25 percent and 27.3 percent, respectively, driven by the increase in the forced outage factor among oil-based plants during said months.

Table 41. Outage Factor

Plant Type	Outage Type	Outage Factor (%) by Billing Month - System-2014												
		Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Avg
COAL	Planned Outage	18.2	17.1	15.4	8.9	3.9	4.8	5.7	10.0	10.6	14.1	1.0	0.0	9.1
	Forced Outage	0.8	2.4	2.6	11.3	7.5	10.2	15.0	5.0	7.0	2.9	8.3	9.6	12.8
	Maintenance Outage	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.5	0.0	0.0	0.0	0.0
	Deactivated Shutdown	0.0	0.0	0.0	0.1	0.0	0.0	2.3	0.0	0.0	0.0	0.0	0.0	0.2
COAL Total Outage Factor		19.1	19.5	18.0	20.3	11.4	15.0	23.2	14.9	18.1	17.0	9.3	9.6	16.3
NATG	Planned Outage	1.1	0.0	9.0	4.9	0.0	1.1	0.6	0.0	0.0	0.3	3.3	0.0	1.6
	Forced Outage	0.0	0.0	9.2	10.4	9.6	9.9	7.5	0.2	0.4	0.0	0.6	2.1	4.1
	Maintenance Outage	1.6	1.3	0.3	1.7	0.0	0.0	0.5	0.0	1.9	0.0	2.7	1.1	0.9
	Deactivated Shutdown	0.0	0.3	0.0	0.0	0.0	0.0	12.3	0.0	2.9	0.0	0.0	0.0	1.3
NAT GAS Total Outage Factor		2.7	1.6	18.5	17.0	9.6	11.0	20.9	0.2	5.2	0.3	6.6	3.2	8.0
GEO	Planned Outage	6.1	2.6	2.1	4.1	2.2	2.2	1.2	1.0	0.8	0.0	0.0	0.0	1.9
	Forced Outage	15.8	13.7	8.7	7.2	6.4	5.4	8.2	9.5	6.8	5.1	4.4	5.1	14.3
	Maintenance Outage	0.7	0.5	0.3	0.3	0.3	0.3	1.9	2.3	1.5	3.3	4.0	1.5	1.4
	Deactivated Shutdown	11.6	12.1	12.8	11.7	11.5	9.3	10.6	10.6	9.0	9.1	11.0	13.0	11.0
GEO Total Outage Factor		34.3	29.0	24.0	23.2	20.4	17.2	21.9	23.4	18.0	17.5	19.5	19.6	22.4
HYD	Planned Outage	5.1	6.0	5.9	5.9	7.9	4.2	8.1	9.3	5.9	2.0	3.2	1.8	5.5
	Forced Outage	0.1	2.0	2.0	1.3	0.0	0.0	0.0	0.1	0.0	0.4	0.3	0.6	0.6
	Maintenance Outage	1.4	6.6	0.0	0.0	0.0	1.1	2.4	1.4	0.1	0.0	1.2	0.7	1.3
	Deactivated Shutdown	2.2	1.4	0.8	0.8	0.8	0.8	0.8	0.8	0.9	0.8	0.9	0.9	1.0
HYDRO Total Outage Factor		8.8	16.0	8.8	8.1	8.8	6.2	11.4	11.7	6.9	3.3	5.5	3.8	8.3
OIL	Planned Outage	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.2	4.1	2.0	0.5	1.1	0.9
	Forced Outage	6.5	3.8	9.6	21.5	19.4	14.5	15.6	16.0	18.2	24.8	20.5	19.3	30.9
	Maintenance Outage	0.0	0.0	0.3	1.5	2.7	2.7	3.0	3.4	2.7	0.6	1.6	1.5	1.7
	Deactivated Shutdown	2.1	4.0	1.5	0.1	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.7
OIL Total Outage Factor		8.6	7.8	11.4	23.2	22.1	17.2	18.9	22.7	25.0	27.3	22.6	22.0	19.1

More capacities were likewise made available in the Luzon region demonstrated by the 7.4 percent decline in outage capacity which averaged at 1,925 MW, from last year's 2,078 MW. Similar to the trend system-wide, outage capacity was highest during the 3rd quarter but significantly declined towards the end of 2014, with the billing month of December posting the lowest monthly average outage capacity in Luzon at 1,379 MW, followed by the 1,526 MW average outage capacity in November.

The highest monthly average outage capacity was posted in July at 2,675 MW, driven by the significant increase in the outage level of all plant types in the region. Outage capacity reached a maximum of 7,021 MW on 16 July at 0800H when major power plants in South Luzon tripped or went on shutdown as a contingency measure during the passage of typhoon Glenda. Among these generating plants are major coal plants Calaca 2, GN Power 1, Pagbilao 1 and 2 and QPPL as well as natural gas plants Ilijan A and B, Sta. Rita 1, 2 and 3 and San Lorenzo 1 and 2.

The high outage level in July was observed even prior to the ERC's market suspension in Luzon following the power system disturbance of typhoon Glenda. Major coal plants Calaca 1 and 2, GN Power 2, Masinloc 1 and 2, Sual 1 and 2, all went on forced outages due to various equipment-related concerns during the first two weeks of the July billing month. Hydro plants likewise showed an increase in its monthly average outage capacity, attributable to the planned outage of Kalayaan 1 since 1 July. High outage capacity was likewise observed on 11-14 July when natural gas plants Ilijan A and B were shutdown due to natural gas piping. Further, geothermal plants also increased its outage capacity due to the forced outages of Bacman 1 and 2 which were related to the tripping of the Daraga-Bacman 230kV Line 1 and the unplanned outage of Makban 10.

Also contributing to the bulk of outage capacity was the high outage incidence during the March, April and September billing months, averaging at 2,162 MW, 2,532 MW and 2,037 MW, respectively. As shown in Figure 29, the outage capacity of natural gas plants significantly rose in March, at an average of 516 MW from only 46 MW in February. The

drastic increase is attributable to the planned outages of Ilijan A1, A2 and A3, Sta. Rita 1 and 3, and San Lorenzo 2, as well as the unplanned/forced outage of Sta. Rita 4. In addition, oil-based plants likewise increased from an average of 152 MW to 237 MW in March due to the forced outages of Malaya 1 and 2, Limay 2 and 4, and the unplanned outage of Limay 3. The maximum outage on record during the March billing month was posted on 23 March from trading intervals 0800H to 1900H, when natural gas plants San Lorenzo 2 and Sta. Rita 3 commenced its planned outages on top of the existing outages of major coal plants and the then ongoing planned outage of natural gas plant Ilijan A.

The increase in outage capacity was sustained through the April billing month in Luzon, with the prevailing high level of outage capacity of major coal plants GN Power 1 and Calaca 2 which both went on planned outage, the forced outages of Masinloc 2 and Pagbilao 2 due to boiler tube leak, and the forced outage of Calaca 1 due to instrument transformer trouble. Also, natural gas plants which went on outage in March carried-on with its planned outages through the April billing month while Sta. Rita 2 and 3 went on forced outages. Geothermal plants also increased its outage incidence following the outages of Bacman 1 and 4, Makban 1, 6 and 9. Finally, the average outage capacity of oil-based plants further rose during the month, taking into account the outages posted by Limay 1, 2, 4,5, 6 and 8 as well as the continuing outage of Malaya 1.

High outage capacity was also recorded during the September billing month, mainly driven by the series of outages of major coal and natural gas plants in Luzon following the restriction of the Malampaya gas platform on 08-11 and 21 September. Coal plants Calaca 1 and 2 and Masinloc 2 went on forced outages on several occasions in September. Notably, GN Power 2 went on forced outage beginning 05 September due to the tripping of its 7.2 kV power station while GN Power 1 was on maintenance outage from 12-15 September. Sual 2 likewise went on planned outage from 29 August and Sual 1, starting from 25 September. Meanwhile, Ilijan Blocks A1, A2 and A3 and Block B1 went on a series of deactivated shutdown due to the restriction of the Malampaya gas platform while Ilijan Block B was on forced outage from 09-10 September due to natural gas fuel reduction from 600 MW to 300MW. Sta. Rita 2, on the other hand, was on maintenance outage from 06-11 September.

Oil-based plants Limay 4 and 5 similarly were on forced outages while Limay 8 went on planned outage in September while Malaya 2 went on forced outage from 22 September on top of the forced outage of Malaya 1 which had been on outage since 21 March.

Figure 29. Capacity on Outage (Luzon) - 1st Half

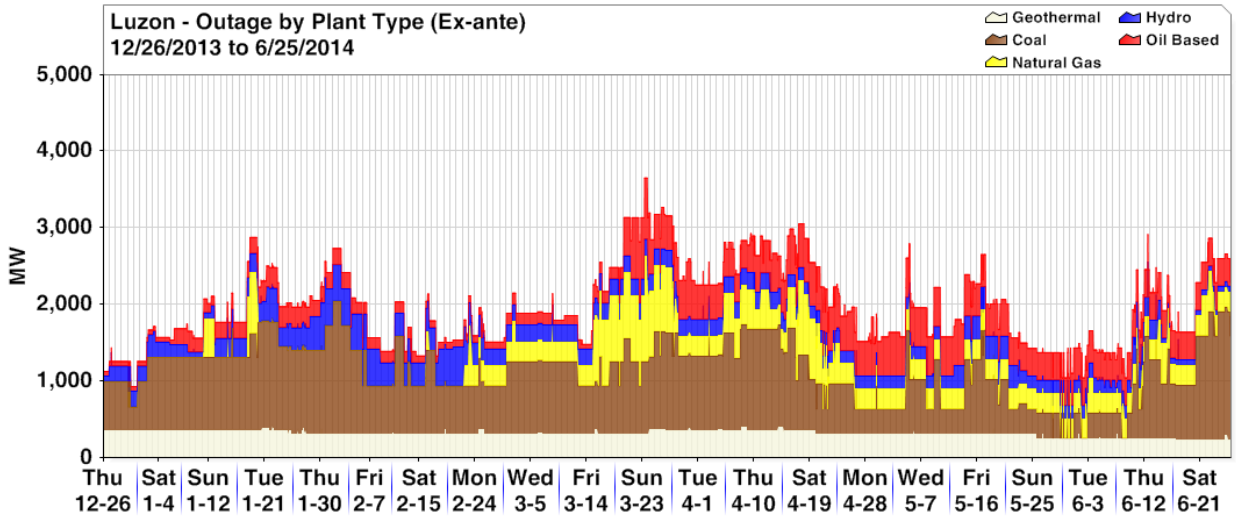


Figure 30. Capacity on Outage (Luzon) - 2nd Half

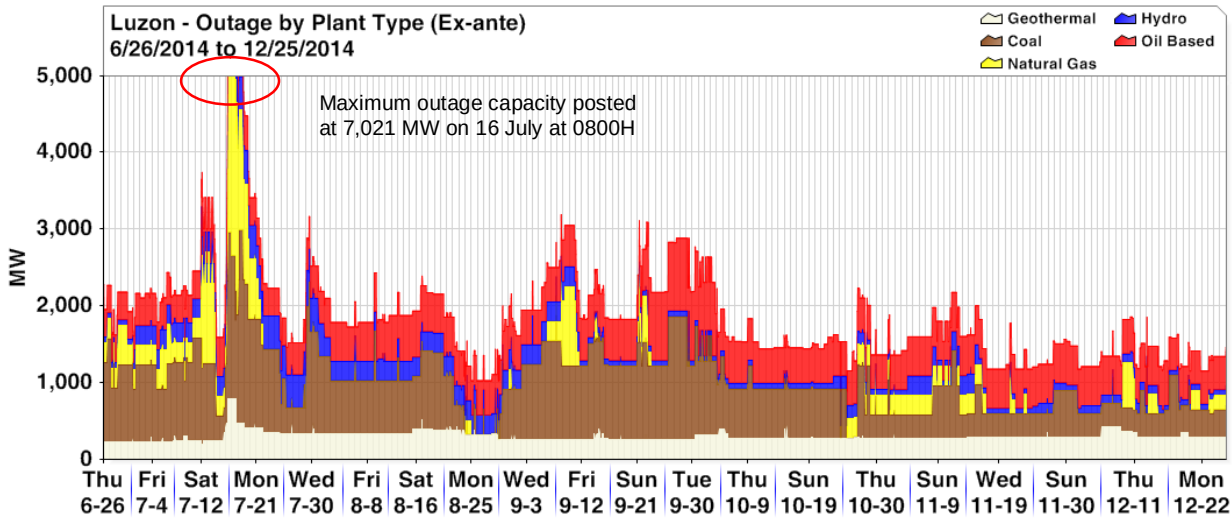


Table 42. Capacity on Outage - Luzon

Plant Type	Average Outage Capacity by Billing Month (MW) - Luzon, 2014												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual Avg.
Coal	941	921	879	1,028	540	689	1,089	716	889	818	422	398	777
Nat Gas	76	46	516	465	266	302	574	6	143	7	183	86	220
Geo	362	312	314	349	307	249	320	358	280	290	285	319	312
Hydro	216	393	216	198	215	148	281	288	170	81	135	93	203
Oil	161	152	237	491	475	371	410	500	555	608	501	483	413
Total	1,756	1,823	2,162	2,532	1,803	1,759	2,675	1,867	2,037	1,804	1,526	1,379	1,925

Table 43. Year-on-Year Average Outage Capacity Comparison - Luzon

	Year-on-Year Average Outage Capacity Comparison by Billing Month - Luzon												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual Avg.
2014 (MW)	1,756	1,823	2,162	2,532	1,803	1,759	2,675	1,867	2,037	1,804	1,526	1,379	1,925
2013 (MW)	2,368	2,265	2,131	1,802	1,791	2,001	1,290	1,889	1,952	2,726	2,592	2,127	2,078
Y-Y (%) Change	(25.8)	(19.5)	1.5	40.5	0.7	(12.1)	107.4	(1.1)	4.3	(33.8)	(41.1)	(35.2)	(7.4)

Table 44 shows that the plant type with the highest outage factor in Luzon was recorded by geothermal plants, averaging at about 35.2 percent. Luzon geothermal plants consistently logged an outage factor of above 30 percent across all billing months, except in June when the posted outage factor was slightly lower at 27.9 percent, following the decline of their outage capacity during said month. It is noteworthy that the level of forced outages and deactivated shutdown were significantly higher than the planned and maintenance outages of geothermal plants.

Oil-based plants in Luzon posted the next highest outage factor, at an average of about 22.7 percent, 18 percent of which were attributable to forced outages. Low outage factor was noted for the billing months of January and February, consistent with the low outage capacity of oil-based plants during the period.

On the other hand, the outage factor of coal plants averaged at about 17.1 percent. Consistent with the data on its outage capacity, forced outage factor of coal plants increased during the April and July billing months at 12.4 percent and 16.4 percent, corresponding to the high outage capacities registered by coal plants in both months.

Natural gas plants posted its outage factor at 8 percent, but registered a high of 20.9 percent in July, 18.5 percent in March and 17 percent in April. Note the rise in its planned outage

factor during the March and April billing months, and in its deactivated shutdown in July. The same is consistent with the increase in the outage capacities of natural gas plants in said months.

Hydro plants posted its outage factor at 8.3 percent in year 2014 but likewise incurred increases in its total outage factor during the February, July and August billing months, corresponding to the rise in its maintenance outage factor in February and the increases in its planned outage capacities in July and August.

Note that forced outages comprised about 12.9 percent of the total outage factor in the Luzon region, followed by planned outage factor at 4.9 percent.

Table 44. Outage Factor - Luzon

Plant Type	Outage Type	Outage Factor (%) by Billing Month - Luzon-2014												
		Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Avg
COAL	Planned Outage	20.4	17.8	16.9	10.4	4.6	4.3	5.1	11.7	12.4	14.5	1.2	0.0	9.9
	Forced Outage	0.4	2.6	2.5	12.4	7.3	11.0	16.4	4.1	6.7	3.1	7.9	8.5	6.9
	Maintenance Outage	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.0	0.0	0.0	0.0
	Deactivated Shutdown	0.0	0.0	0.0	0.1	0.0	0.0	2.7	0.0	0.0	0.0	0.0	0.0	0.2
COAL Total Outage Factor		20.8	20.4	19.4	22.9	11.9	15.3	24.3	15.8	19.7	17.6	9.0	8.5	17.1
NATG	Planned Outage	1.1	0.0	9.0	4.9	0.0	1.1	0.6	0.0	0.0	0.3	3.3	0.0	1.6
	Forced Outage	0.0	0.0	9.2	10.4	9.6	9.9	7.5	0.2	0.4	0.0	0.6	2.1	4.1
	Maintenance Outage	1.6	1.3	0.3	1.7	0.0	0.0	0.5	0.0	1.9	0.0	2.7	1.1	0.9
	Deactivated Shutdown	0.0	0.3	0.0	0.0	0.0	0.0	12.3	0.0	2.9	0.0	0.0	0.0	1.3
NAT GAS Total Outage Factor		2.7	1.6	18.5	17.0	9.6	11.0	20.9	0.2	5.2	0.3	6.6	3.2	8.0
GEO	Planned Outage	8.1	2.3	2.7	7.5	4.4	3.8	0.4	0.0	0.0	0.0	0.0	0.0	2.5
	Forced Outage	14.7	13.9	12.2	13.7	12.3	10.7	16.7	18.7	13.2	8.3	6.4	8.1	12.4
	Maintenance Outage	0.1	0.0	0.1	0.0	0.0	0.0	3.4	4.0	0.8	6.5	4.0	2.3	1.8
	Deactivated Shutdown	17.5	18.6	19.9	17.6	17.5	13.4	16.1	18.0	17.9	18.2	22.0	25.9	18.5
GEO Total Outage Factor		40.4	34.8	34.9	38.9	34.2	27.9	36.6	40.8	32.0	33.1	32.4	36.3	35.2
HYD	Planned Outage	5.1	6.0	5.9	5.9	7.9	4.2	8.1	9.3	5.9	2.0	3.2	1.8	5.5
	Forced Outage	0.1	2.0	2.0	1.3	0.0	0.0	0.0	0.1	0.0	0.4	0.3	0.6	0.6
	Maintenance Outage	1.4	6.6	0.0	0.0	0.0	1.1	2.4	1.4	0.1	0.0	1.2	0.7	1.3
	Deactivated Shutdown	2.2	1.4	0.8	0.8	0.8	0.8	0.8	0.8	0.9	0.8	0.9	0.9	1.0
HYDRO Total Outage Factor		8.8	16.0	8.8	8.1	8.8	6.2	11.4	11.7	6.9	3.3	5.5	3.8	8.3
OIL	Planned Outage	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.0	5.1	2.4	0.6	1.4	1.1
	Forced Outage	6.6	3.1	10.9	26.0	22.8	17.1	18.3	19.2	21.9	29.9	24.6	23.3	18.7
	Maintenance Outage	0.0	0.0	0.3	1.9	3.4	3.3	3.7	4.3	3.3	0.7	1.9	1.5	2.0
	Deactivated Shutdown	2.6	5.0	1.9	0.1	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.8
OIL Total Outage Factor		9.2	8.1	13.1	28.0	26.2	20.4	22.5	27.4	30.4	33.1	27.1	26.3	22.7

As in the case of Luzon, the Visayas region similarly demonstrated a 7.3 percent decline in its outage capacity in year 2014, posted at an average of 178 MW, when compared to the previous year's 192 MW, which recorded a higher level of outage capacity particularly in November and December 2013 due to the power system disturbance caused by typhoon Yolanda.

Outage capacity in the region was observed to be at its highest during the 1st quarter of the year, while the Visayas was still under the ERC's market suspension. The January and February billing months correspondingly posted the highest monthly average outage capacity in year 2014 at 342 MW and 303 MW, majority of which were on account of the high outage level of geothermal plants, particularly by geothermal plant Leyte A which was isolated from the grid beginning 08 November 2013, due to the destruction caused by typhoon Yolanda. Meanwhile, more capacities were made available in March, averaging at 158 MW, with the resumption of operations of generating plants on outage in the previous months.

Outage capacity significantly declined at the onset of the April billing month, as the Visayas resumed normal operations with the lifting of the ERC's market suspension on 26 March 2014 at 0100H. The steady increase in the level of outage capacity in the region was however noted beginning the May billing month, and all through June and July, with the latter posting the next highest incidence of outage for the year at an average of 220 MW. Coal plants incurred the highest increase among all plant types, on the average from 100 MW in June to 129 MW. The same is attributable to the preventive maintenance shutdown of Kepco Salcon 1 which went-on from 05-22 July.

Outage capacity was at its lowest during the September billing month, posted at an average of 96 MW, following the decrease in the outage capacities of all resource types in Visayas. Geothermal plants had the highest decrease from an average of 46 MW in August to 21 MW, mainly attributable to the resumption of operations of PGPP2 Unit 1 which was on forced outage since 29 July 2014. Outage capacity then recorded a steady increase from October until the end of December 2014, resulting in the decline of available capacities in the region during the last quarter.

The high incidence of outage among coal plants in the Visayas contributed to the increase in outage capacity in October at an average of 125 MW, with the recorded outages of Kepco Salcon 2 and CEDC 1 for the most part of the billing month. Outage capacity further increased during November, averaging at 150 MW, attributable to the notable 306.2 percent rise in the outages of geothermal plants from the previous month's 13 MW to 53 MW. Geothermal plants Upper Mahiao 3, Leyte 3 and PGPP1 Unit 3 all went on a series of forced outages while PGPP2 Unit 3 was on planned outage during the billing month.

Outage capacity in the region further increased to an average of 165 MW in December, on account of the increases in the outage capacity of coal plants and oil-based plants. The maximum outage on record was posted at an average of 329.7 MW, from 1900H of 26 November to 1600H of 27 November, following the forced outages of coal plants CEDC 3 and PEDC 2 on top of the existing outages of Cebu TPP 1 and TPC Sangi.

Figure 31. Capacity on Outage (Visayas) - 1st Half

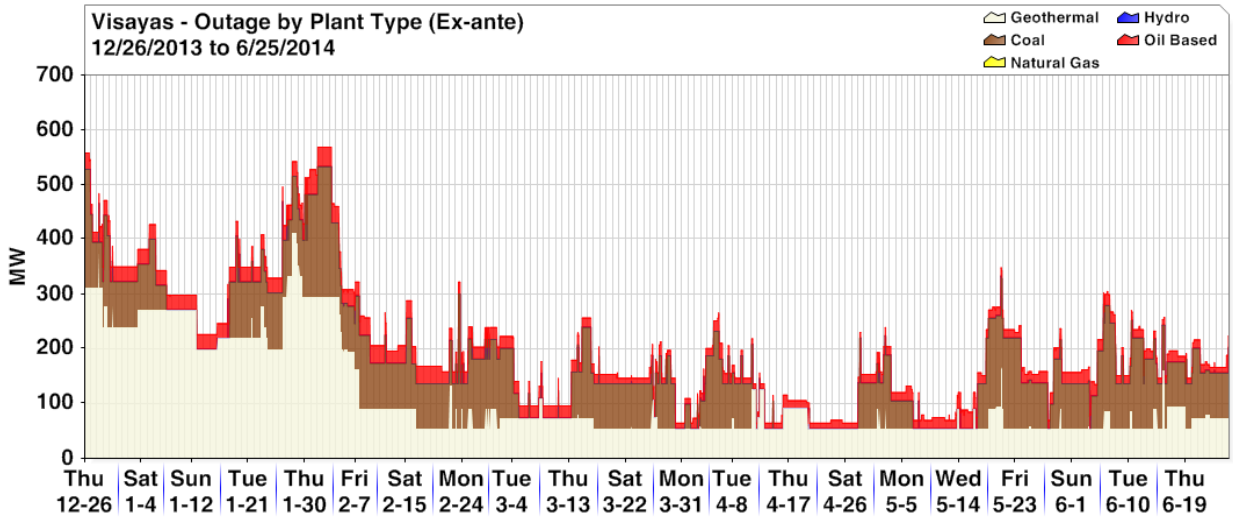


Figure 32. Capacity on Outage (Visayas) - 2nd Half

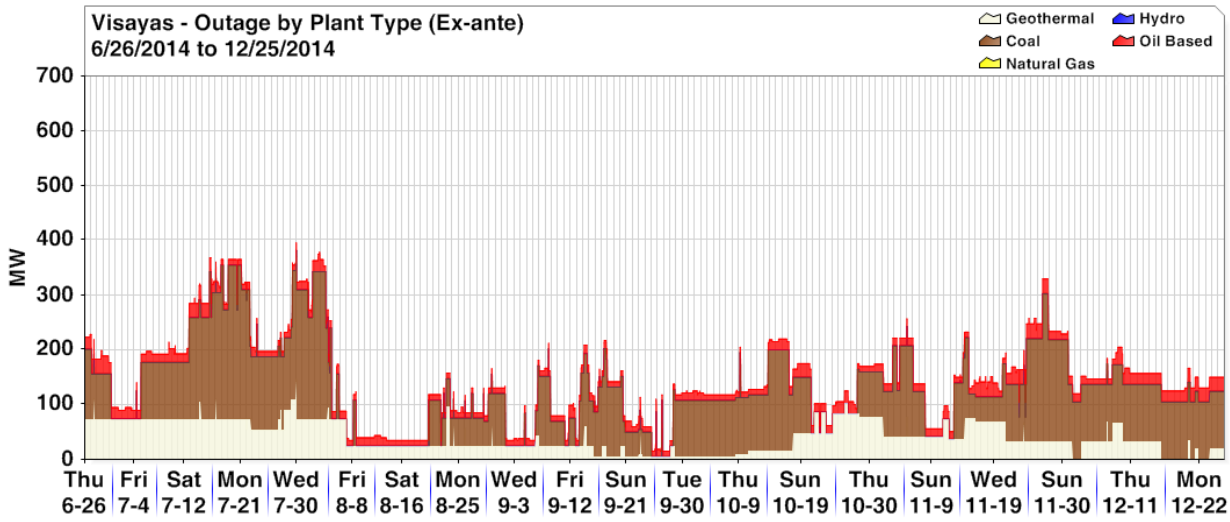


Table 45. Capacity on Outage - Visayas

Plant Type	Average Outage Capacity by Billing Month (MW) - Visayas, 2014												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual Avg.
Coal	69	115	72	40	64	100	129	75	63	86	78	121	84
Geo	246	159	68	64	60	66	73	46	21	25	55	24	76
Oil	26	29	18	14	18	17	18	13	12	14	18	19	18
Total	342	303	158	118	141	183	220	134	96	125	150	165	178

Table 46. Year-on-Year Average Outage Capacity Comparison - Visayas

	Year-on-Year Average Outage Capacity Comparison by Billing Month - Visayas												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual Avg.
2014 (MW)	342	303	158	118	141	183	220	134	96	125	150	165	178
2013 (MW)	146	174	112	193	88	131	122	133	142	257	348	460	192
Y-Y (%) Change	134.8	74.1	41.4	(38.8)	61.2	39.6	80.1	0.8	(32.3)	(51.6)	(56.7)	(64.2)	(7.3)

Consistent with the above, coal plants in the Visayas recorded the highest total outage factor in the region at 11.2 percent. Majority of the same was on account of the high incidence of forced outages among the Visayas coal plants which comprised 6.8 percent of its total outage factor. Meanwhile, the outage factor of geothermal plants were notably high in January and February posted at 28 percent and 23 percent, respectively, mainly on account of the high forced outage recorded during the period following the destruction of generating facilities in the region due to Typhoon Yolanda. The total outage factor of geothermal plants in 2014 was posted at 9.5 percent.

Oil-based plants on the other hand, posted its outage factor at 4.2 percent, majority of which was attributable to forced outages. The January and February billing months posted the highest monthly total outage factor among the oil-based plants in Visayas at 6 percent and 6.6 percent, respectively.

Table 47. Outage Factor - Visayas

Plant Type	Outage Type	Outage Factor (%) by Billing Month - Visayas-2014												
		Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Avg
COAL	Planned Outage	5.4	13.2	6.5	0.1	0.0	7.2	9.2	0.0	0.0	11.2	0.0	0.0	4.3
	Forced Outage	3.6	1.3	2.8	5.2	8.5	5.9	7.0	9.7	8.6	1.8	11.1	15.6	6.8
	Maintenance Outage	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0
	Deactivated Shutdown	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
COAL Total Outage Factor		9.0	14.5	9.3	5.3	8.5	13.0	16.7	9.7	8.6	13.0	11.1	15.6	11.2
GEO	Planned Outage	4.1	3.0	1.5	0.6	0.0	0.6	1.9	2.0	1.5	0.0	0.0	0.0	1.3
	Forced Outage	17.0	13.5	5.2	0.5	0.5	0.3	0.1	0.5	0.3	1.8	2.4	2.1	3.7
	Maintenance Outage	1.3	1.0	0.6	0.6	0.6	0.5	0.5	0.6	2.2	0.1	4.1	0.7	1.1
	Deactivated Shutdown	5.6	5.6	5.6	5.6	5.4	5.4	5.4	3.2	0.0	0.0	0.0	0.0	3.5
GEO Total Outage Factor		28.0	23.0	12.9	7.3	6.6	6.8	7.9	6.3	3.9	1.9	6.5	2.8	9.5
OIL	Planned Outage	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Forced Outage	6.0	6.6	4.2	2.9	5.0	3.8	4.1	3.0	2.7	3.2	3.6	2.9	4.0
	Maintenance Outage	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.4	1.5	0.2
	Deactivated Shutdown	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OIL Total Outage Factor		6.0	6.6	4.2	3.1	5.0	3.8	4.1	3.0	2.7	3.3	3.9	4.4	4.2

VI. CAPACITY GAP

The capacity gap measures the difference between the maximum available capacity of generating plants less offered capacity, outage capacity and the contracted capacity for ancillary services with the National Grid Corporation of the Philippines (NGCP).

The year in review demonstrated that generator trading participants continued to submit capacity offers less than their respective plants maximum available capacity, as indicated by the persistently high level of capacity gap in 2014. The highest capacity cap on record was posted during the second quarter of the year, with the billing month of June posting the highest monthly average capacity gap at 2,580 MW. The same contributed to the decrease in supply during said month and is attributed to the increase in the average capacity gap by all resource types, except for hydro plants, which showed a minimal decline but nonetheless contributed the bulk of the capacity gap in June at an average of 1,306 MW. Coal plants registered the highest month-on-month increase in capacity gap in June from an average of 270 MW in May to 442 MW. On the other hand, the lowest levels of capacity gap was posted during the first and third quarters of the year, with the February and March billing months posting the lowest monthly average capacity gap at 1,760 MW and 2,025 MW, respectively.

About 48.3 percent of the system-wide capacity gap was contributed by hydro plants averaging at 1,108 MW, followed by oil-based plants, which contributed 20.4 percent at 455 MW and coal plants at 17 percent, averaging at 379 MW. Natural gas plants posted the least capacity gap in 2014, averaging at only 49 MW or 2.1 percent of the total average capacity gap, and by geothermal plants with 272 MW, contributing about 12 percent of the total capacity gap for the year.

As shown in Figure 34 below, significant drop in the level of capacity gap was observed on 16-25 July, following the system-wide market suspension on said dates, on account of the power system disturbance caused by typhoon Glenda.

It should be noted that the system-wide data on capacity gap covering the January to March billing months is inclusive of the Luzon region only, in view of the ERC's market suspension affecting the Visayas during said months.

Figure 33. Capacity Gap - 1st Half

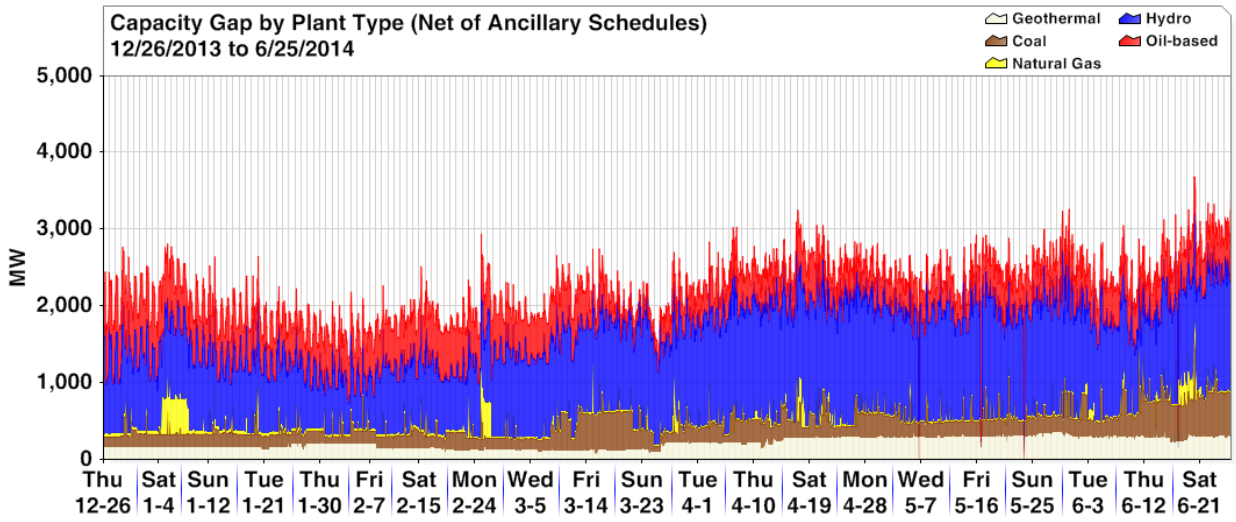


Figure 34. Capacity Gap - 2nd Half

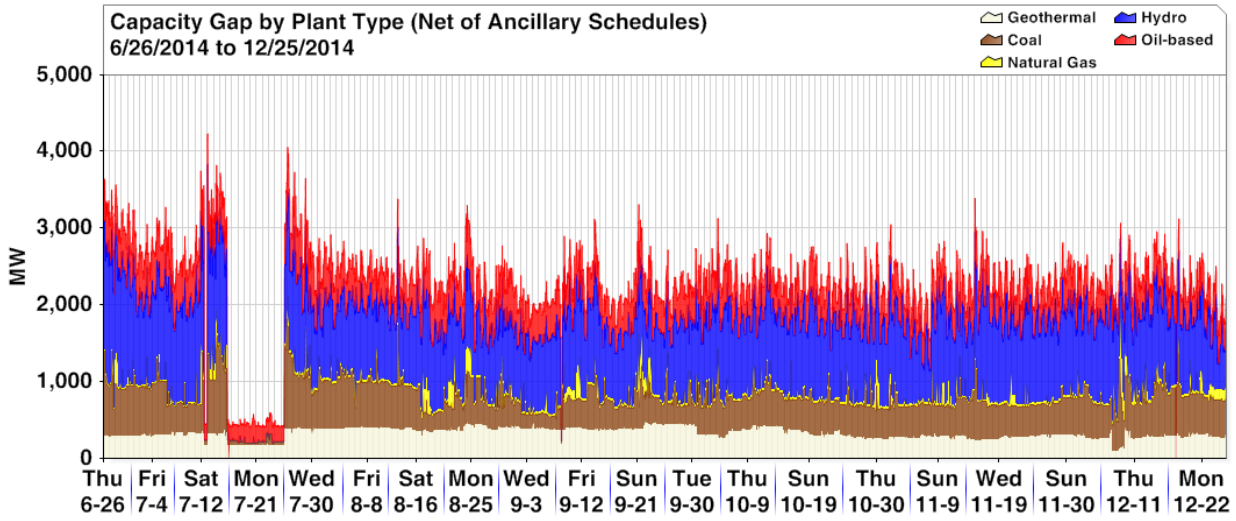


Table 48. Capacity Gap

Plant Type	Average Capacity Gap by Billing Month (MW) - 2014												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Annual Avg.
Coal	198	192	317	253	270	442	468	572	370	456	459	547	379
Natural Gas	100	42	30	42	18	48	44	59	60	29	48	58	49
Geothermal	156	164	119	241	294	297	269	388	400	364	275	281	272
Hydro	961	786	1,143	1,445	1,405	1,306	1,352	989	934	1,007	1,043	1,016	1,108
Oil-Based	605	575	417	415	412	492	417	474	429	424	407	378	455
Total	2,021	1,760	2,025	2,398	2,388	2,580	2,091	2,481	2,185	2,280	2,231	2,280	2,228

Submission of offers less than generating plants' maximum available capacity was likewise consistently noted in the Luzon region. Following the trend system-wide, bulk of the capacity gap in Luzon was contributed by hydro plants, posting an average capacity gap of 1,108 MW or 56.7 percent of the total capacity gap in the region for the 2014 billing period. The same denotes the limited or non-submission of offers from all resource types in Luzon, but particularly, from hydro plants.

The billing months of June and July posted the highest monthly average capacity gap at 2,154 MW and 2,435 MW, respectively, while February and September obtained the lowest capacity gap for the year, averaging at 1,760 MW ad 1,730 MW.

The increased level of capacity gap during the billing months of June and July are observed to be same months characterized by tight supply and demand condition, as discussed in the preceding Sections of this Report. The notable rise in the capacity gap of coal plants from an average of 207 MW in May, to 384 MW in June, and to a high of 607 MW in July, mainly influenced the increase in the monthly average capacity gap in Luzon. Likewise, oil-based plants registered a significant increase in capacity gap from an average of 191 MW in May, to 277 MW in June and 296 MW in July.

The highest level of capacity gap in the region was posted at a maximum of 3,788 MW on 12 July at 2400H, attributable to the high capacity not offered by hydro plants which accounted for about 53 percent of the total capacity gap for the hour. It is observed that hydro and oil-based plants tend to offer more of their available capacity during peak hours (and less during off-peak hours), as indicated by the peak and off-peak variation shown in the succeeding Figures.

As a matter of due course, the capacity gap per generator trading participant will still be subject to further evaluation.

Figure 35. Capacity Gap (Luzon) - 1st Half

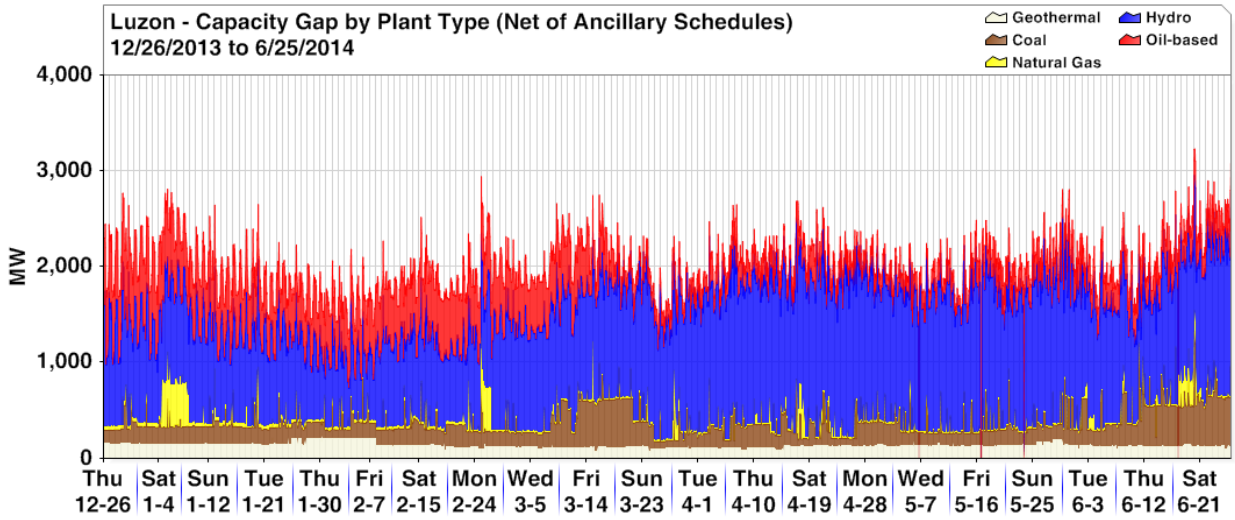


Figure 36. Capacity Gap (Luzon) - 2nd Half

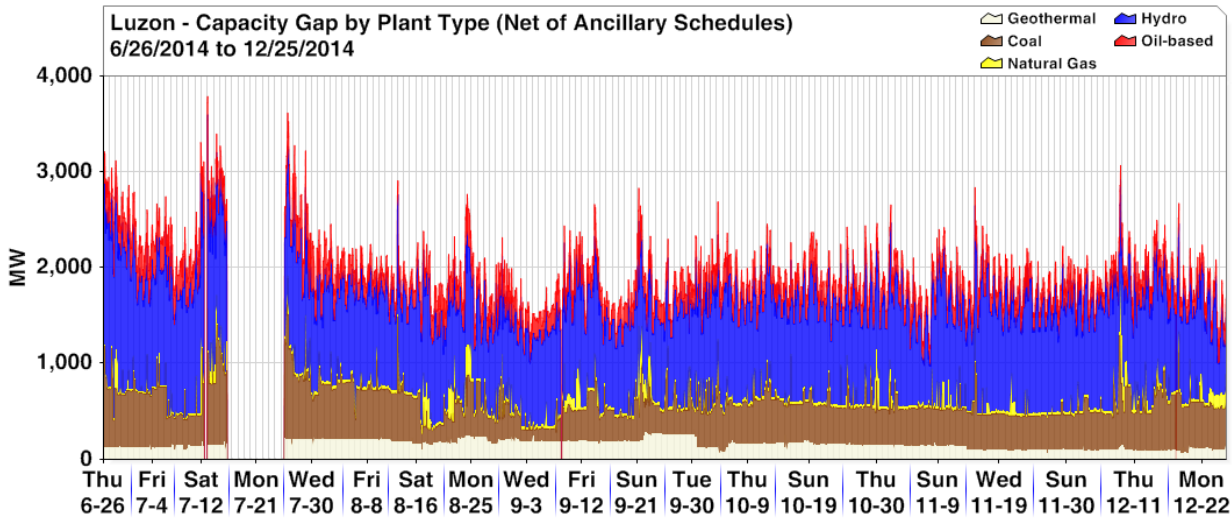


Table 49. Capacity Gap - Luzon

Plant Type	Average Capacity Gap by Billing Month (MW) - Luzon, 2014												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Annual Avg.
Coal	198	192	317	188	207	384	607	510	323	447	408	486	348
Natural Gas	100	42	30	42	18	48	44	59	60	29	48	58	49
Geothermal	156	164	119	120	138	140	136	202	205	172	128	102	149
Hydro	961	786	1,143	1,445	1,405	1,306	1,352	989	934	1,007	1,043	1,016	1,108
Oil-Based	605	575	417	198	191	277	296	245	208	204	190	177	299
Total	2,021	1,760	2,025	1,994	1,960	2,154	2,435	2,005	1,730	1,859	1,816	1,839	1,953

Looking at the Visayas, oil-based and geothermal plants accounted for about 49.6 MW and 38.2 MW, respectively, of the capacity gap in the region while the remaining 12.2 percent pertains to the capacity gap of coal plants.

The highest average monthly capacity gap was posted during the billing months of August, September and December, averaging at 476 MW, 469 MW and 472 MW, respectively. It is interesting to note that the August and September billing months were marked with thin supply margins, aggravated by the maintenance outage of the HVDC Link which rendered it incapable to import power from Luzon. On the other hand, the December billing month posted the lowest effective supply in Visayas in 2014.

Spikes in the level of capacity gap were noted on 20 April at 1100H-1200H, posted at 852 MW and 853 MW; on 02 September at 1100H-1200H registered at 886 MW, on 31 April at 0500H-0700H posted at 737 MW, at 0800H-0900H, recorded at 726 MW and at 1100H-1200H, at 644 MW. It is observed that capacity gap in the region tended to be higher during off-peak hours.

As a matter of due course, the capacity gap per generator trading participant will still be subject to further evaluation.

Figure 37. Capacity Gap (Visayas) - 1st Half

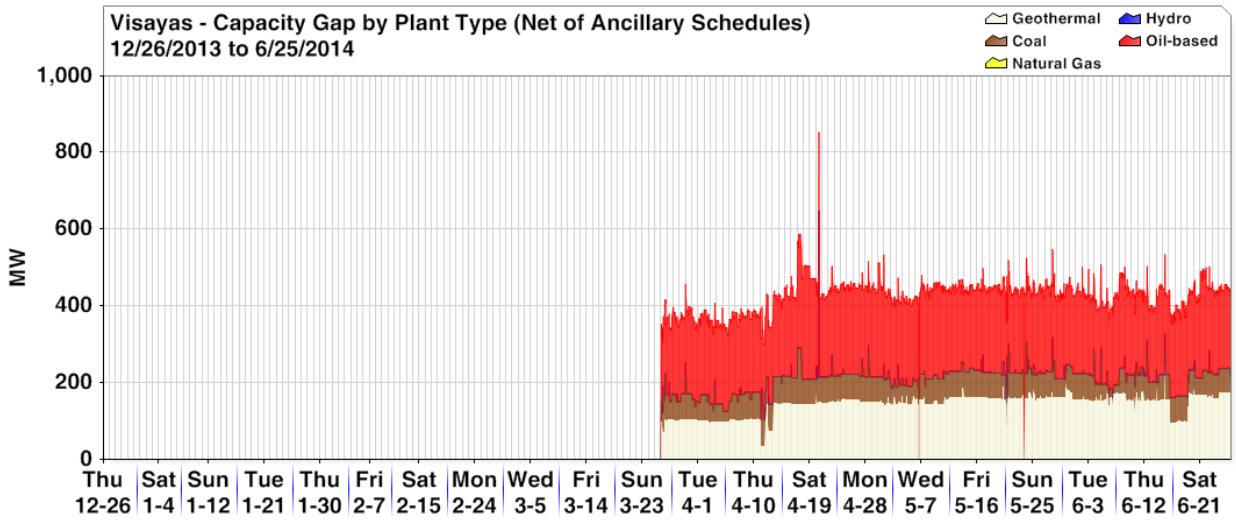


Figure 38. Capacity Gap (Visayas) - 2nd Half

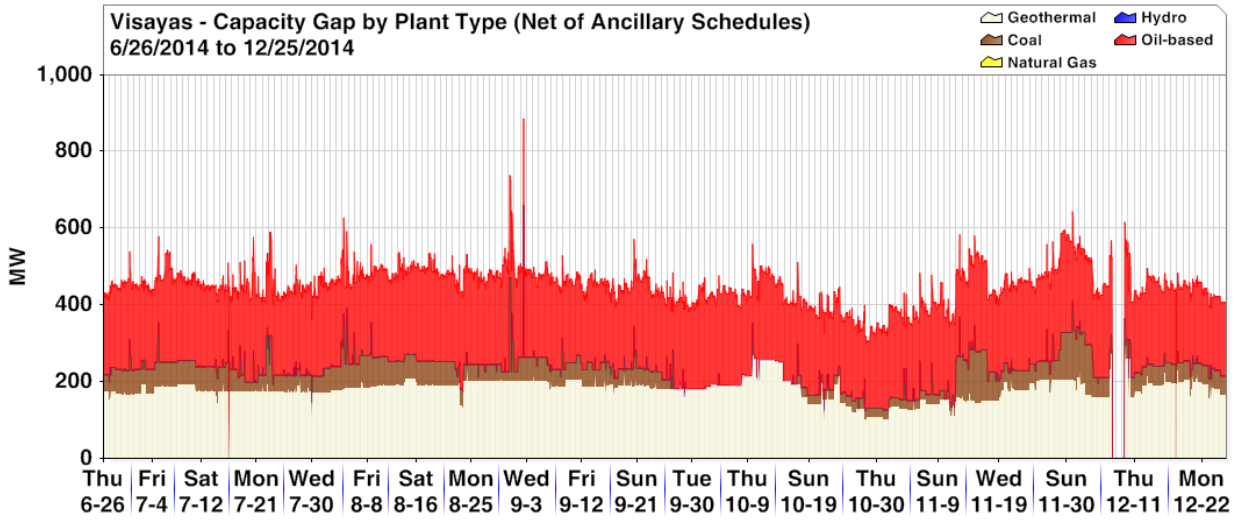


Table 50. Capacity Gap - Visayas

Plant Type	Average Capacity Gap by Billing Month (MW) - Visayas, 2014									
	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Annual Avg.
Coal	66	64	59	60	62	50	10	50	66	54
Geothermal	121	157	158	178	186	196	191	147	192	169
Oil-Based	217	221	216	218	228	223	220	217	215	220
Total	404	442	432	456	476	469	421	415	472	443

VII. MARKET PRICE OUTCOME[14]

A. Market Prices

This Section assesses the resulting market prices in year 2014, taking into account the demand and supply situation as discussed in the previous sections as well as the administered prices imposed during events of market intervention/suspension which were consequently used in settlement during affected trading intervals.

High market prices were observed during the summer months of April, May and June with monthly average prices posted at PhP9,416/MWh, PhP6,321/MWh and PhP5,772/MWh, respectively. The average market price posted in July was likewise high at PhP7,027/MWh. Conversely, the billing month of January recorded the lowest monthly average price at PhP2,904/MWh. On the other hand, the last quarter of year 2014 followed a decreasing trend in market prices, as better supply and demand conditions paved the way for the occurrence of frequently low market prices. The average demand reached its lowest level in December while supply further increased, resulting in wide supply margins during the period.

Tight to insufficient supply and the higher demand requirement with the onset of summer drove market prices to high levels in April. Tight supply conditions were observed on 17-28 March, mainly attributable to the high outage level following the forced outages of Calaca 1 and Masinloc 2 on top of the planned outages of Calaca 2, GN Power 1 and Ilijan Block A. High prices continued through April as the maximum limit of HVDC power flow going to Luzon was maximized in several trading intervals from 30 March to 12 April, thus further limiting the supply of excess and cheaper power from the Visayas region. This resulted in price separations between Luzon and Visayas, with Luzon obtaining higher market prices, and oil-based plant Bauang as marginal generator. Further, the HVDC power flow was totally cut-off when the HVDC Interconnection was placed on maintenance outage on 12 April at 0900H to 22 April at 1700H, rendering the Visayas unable to export power to Luzon.

Sustained high market prices continued through the summer months of May and June. To mitigate the possible spikes in prices during the ensuing summer months, an interim pre-emptive mitigation measure was set in the WESM through ERC Resolution No. 08 effective 11 May 2014. In line with the implementation of said ERC Resolution, the secondary price cap of PhP6,245/MWh was imposed in 43 trading intervals in May. Note that the 72-hour rolling average price threshold of PhP8,186/MWh was breached for a total of 62 trading intervals on 15-16, 20-21 May. However, the secondary price cap was imposed in only 43 trading intervals inasmuch as the resulting GWAP for the other trading intervals were below the secondary cap. High prices in May were posted during the high outage level recorded on 04-09 and 13-20 May, following the forced outages of major plants Sual 1 and 2, Pagbilao 1 and 2, Calaca 2 and Ilijan Block B.

With the imposition of the secondary cap, the system monthly load-weighted average price was posted at PhP6,321/MWh, lower by 6.1 percent from PhP6,729/MWh based on actual market prices without the secondary cap imposition. Note that administered prices were implemented system-wide on 06 May at 1500H, 23 May at 1400H and on 16 May at 1400H-1800H, affecting the Luzon region.

[14] The market prices were represented by the following: (i) ex-ante load weighted average price (LWAP) for trading intervals without pricing error during ex-ante, (ii) ex-post LWAP for trading intervals with pricing error during ex-ante but without pricing error during ex-post, (iii) LWAP based on the market re-run result for trading intervals with pricing error both during ex-ante and ex-post, (iv) administered price for loads for trading intervals under market intervention, and (v) estimated load reference price (ELRP) for trading intervals where the ERC-approved Price Substitution Mechanism (PSM) was applied.

The secondary price cap was also imposed during the June billing month, lowering the monthly average market price by about 14.7 percent from PhP6,767/MWh based on actual market prices. Administered prices were also used for settlement on 17 May between 1100H-1200H in Luzon. The 72-hour rolling average price threshold of PhP8,186/MWh was breached for a total of 70 trading intervals on 22-25 June, when a series of price spikes were observed in the market. However, the secondary cap was imposed only in 55 trading intervals given that the resulting GWAPs for the other 15 trading intervals were lower than the secondary cap. High market prices in June were on account of the unavailability of major coal plants Calaca 1, Masinloc 2, Pagbilao 1 and Sual 1 and natural gas plants San Lorenzo 1 and 2 and Sta. Rita 4.

Notably, the imposition of the secondary price cap reduced the average market prices during the summer months of May and June, which were usually associated with high market prices. This notwithstanding, year-on-year comparison would indicate that the system average prices in May and June 2014 were still higher by 4.5 percent and 35.2 percent from previous year's PhP6,047/MWh and PhP4,271/MWh, respectively.

Supply and demand was even tighter in July due to the low supply recorded for the billing month. Consequently, average market prices posted a significant rise by 142.9 percent from last year's PhP2,893/MWh to 7,027/MWh. The secondary cap was breached for a total of 77 trading intervals on 26 June and 12-14 July. However, noting that the resulting GWAPs were lower than the secondary cap for some of the affected trading intervals, the secondary cap was imposed in only 56 trading intervals in Luzon and 68 trading intervals in Visayas. Prices imposed in Luzon for the duration of the ERC's market suspension in the region (from 16 July at 0400H to 25 July at 1200H) were administered prices determined in accordance with the WESM Manual on Administered Price Determination Methodology.

Price spikes were noted to have occurred in certain trading intervals on 26 June, 30 June, 12, 14 July, the highest of which was PhP29,439/MWh on 30 June at 1500H, mainly driven by the unavailability of Calaca 1, GN Power 2, Masinloc 2 and Pagbilao 1. Demand was likewise high on said dates, posted at 9,071 MW and 8,946 MW at 1500H and 1600H, respectively. High level of outage was likewise noted from 11-14 July attributed to the outages of Ilijan A and B, Calaca 1 and 2, GN Power 2, Masinloc 1 and Pagbilao 1 leading to the dispatch of more expensive oil-based plants. Sustained high market prices were likewise observed during the last part of the July billing month when only the Visayas market was operational. This is driven by the high outage incidence of several Visayas coal plants. Note that with the secondary cap imposition, the monthly average market price in July was lower by 12.5 percent from the actual average market price posted at PhP8,030/MWh.

The level of system market prices was relatively higher during the second half of August following the increase in demand and drop in supply which were observed from 11-15 August. Also, the unavailability of the HVDC Link effectively limited the flow of supply to Luzon as the Visayas was unable to export its excess generation from 16 August at 0800H. The highest price in August was posted at PhP25,776/MWh on 12 August at 1500H. The secondary price cap was imposed for a total of 18 trading intervals, from 13 August at 1600H to 14 August at 1900H, on 20 August at 2300H and on 21 August at 1000H.

Extreme Negative Prices

Conversely, extreme negative prices were observed in the market during the September, October and December billing months.

Extreme negative prices were recorded in the Visayas affecting a total of 30 off-peak trading intervals on 14-15 and 18-24 September, as demand levels dropped due to cooler weather conditions, aggravated by the shutdown of the HVDC Interconnection which made the Visayas unable of exporting its excess generation to Luzon. Prior to the shutdown, Visayas was exporting as much as 350 MW to Luzon during off-peak hours. Subsequently, changes in the offer pattern of several Visayas plants were observed during the billing month, when generators began to offer all or a portion of their capacities at extreme negative prices during off-peak hours. Extreme negative prices in the Visayas reached as low as PhP-101,651/MWh on 15 September at 0400H.

Market prices in Visayas averaged at a low of PhP-380/MWh in the September billing month. Nonetheless, based on settlement calculations, the Customer Effective Spot Settlement Price was posted at PhP5,585/MWh. Note that the HVDC shutdown on 16 August at 0800H to 24 September at 0400H physically separated the market into two pricing regions (Luzon and Visayas). Thus, despite the extreme negative prices posted in the Visayas, average market prices in Luzon during the September billing month was posted at PhP4,831/MWh. High market prices were observed in the region from 05-12 September following the low supply level experienced during the period caused by the outages of major coal plants Calaca 1 and 2, GN Power 1 and 2 and Sual 2 and the shutdown of several natural gas plants, further aggravated by the shutdown of the HVDC Interconnection.

The secondary price cap was imposed in both Luzon and Visayas for a total of 34 trading intervals in September, from 09 September at 1600H to 10 September at 2300H and on 11 September at 0900H-1000H, 1200H-1300H and 1600H. In addition, administered prices were applied from 1400H-1900H on 08 September, during the market intervention in Luzon.

The occurrences of extreme negative prices in the Visayas continued through the early part of October, which pulled down system market prices. Accordingly, negative prices, as low as PhP-12,867/MWh, were observed system-wide during six (6) off-peak trading intervals on 27 September at 0100H, 0200H, 0700H and 0800H and on 28 September at 0200H. The lowest market price on record in the Visayas in the October billing month was posted at PhP-98,490/MWh on 27 September at 0500H.

On the other hand, system-wide market prices eased during the December billing month, resulting in an average of PhP2,232/MWh which was lower from the previous month's PhP3,348/MWh. Five (5) trading intervals were marked with extreme negative prices, posted at PhP-51,065/MWh at 0300H, PhP-83,855/MWH at 0400H, PhP-51,299/MWh at 0500H, PhP-84,433/MWh at 0700H and PhP-51,656/MWh at 0800H. Supply margin remained wide all-throughout 25 December with the significant drop in system demand and the relatively high supply level, resulting in the extreme negative prices which were recorded on said trading day. The system-wide trend was influenced by the extreme negative prices observed in Luzon during the off-peak hours of 25 December, from 0500H to 0800H, ranging from PhP-62,763/MWh on 0500H to as low as PhP-102,726/MWh at 0400H, influenced by the offer prices submitted by major coal plants Masinloc and Calaca 2.

Note that administered prices were used for settlement system-wide on 17 December at 1900H, and during the market intervention in the Visayas from 07 December at 1000H to 09 December at 0900H.

Maximum Prices

Implementation of the new level of the offer price ceiling from PhP62,000/MWh to PhP32,000/MWh effective 04 January significantly reduced the maximum prices on record in 2014 when compared to the previous year.

The maximum system price on record was posted at PhP32,604/MWh on 02 June at 1400H. However, the year's maximum price was registered at PhP35,790/MWh in the Luzon region on 16 May at 1700H. Year-on-year comparison would show that the same is a significant decline from the maximum prices posted in 2013, with the billing month of May posting the maximum price at PhP55,518/MWh, followed by PhP53,534/MWh posted in November. The decline from previous year was noted to be as much as 69.8 percent, corresponding to the decline in the maximum price on record in December 2013 at PhP40,589/MWh to PhP12,261/MWh in 2014.

Minimum Prices

A review of the minimum spot prices system-wide would show that minimum spot prices were consistently high in 2014, with the minimum prices from January to July ranging from PhP312/MWh to as much as PhP1,765/MWh. Notable decline in the minimum spot prices were observed in the August and November billing months which both posted a minimum spot price of PhP0/MWh while the months of September, October and December posted negative minimum spot prices.

Figure 39. Market Price Trend - 1st Half

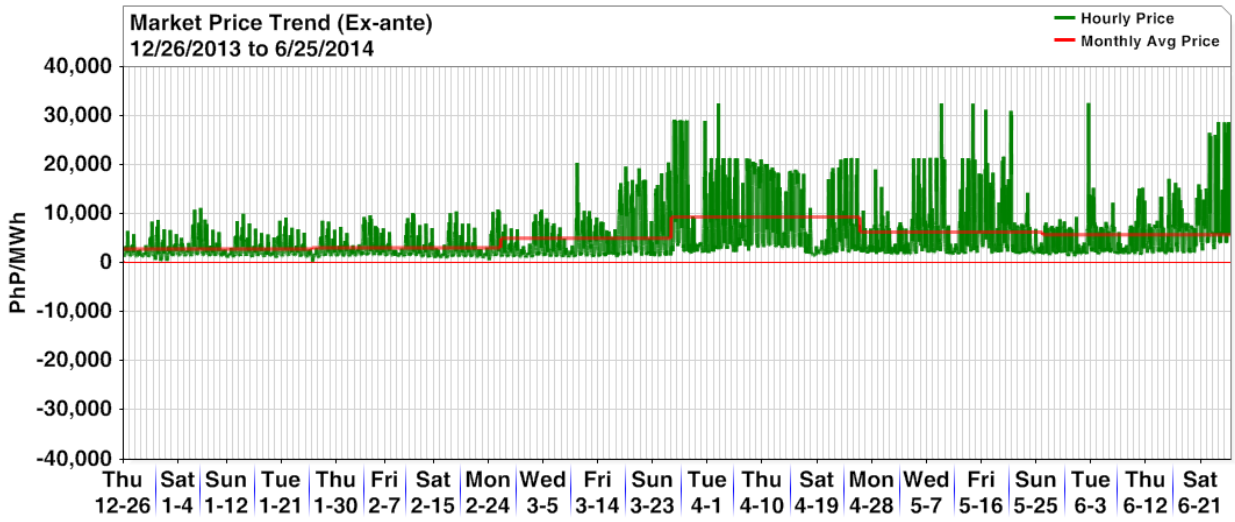


Figure 40. Market Price Trend - 2nd Half

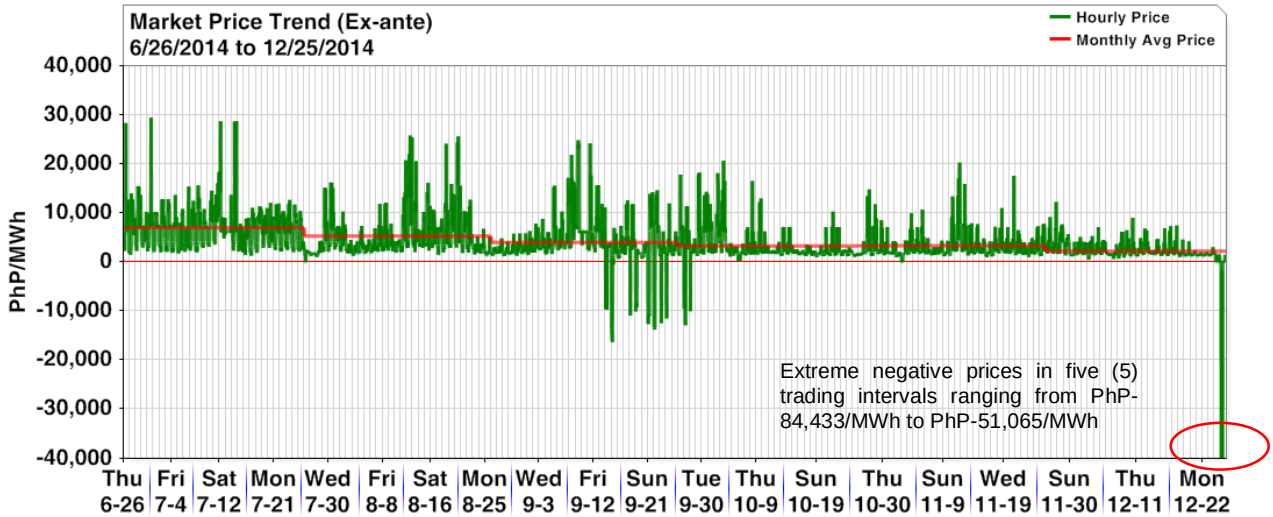


Table 51. Market Price Trend - System

	Market Price Trend by Billing Month (PhP/MWh) - 2014												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual Avg.
Max Price	11,252	10,940	20,505	32,525	32,535	32,604	29,439	25,776	24,839	20,691	20,245	12,261	22,810
Min Price	471	312	1,174	1,539	1,765	1,389	1,310	0	(16,265)	(12,867)	-	(84,433)	(8,721)
Avg Price	2,904	3,121	5,050	9,416	6,321	5,772	7,027	5,317	4,028	3,268	3,348	2,232	4,816

Table 52. Year-on-Year Average Price Trend Comparison - System

	Year-on-Year Market Price Trend Comparison by Billing Month - 2014												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual Avg.
2014 (PhP/MWh)	2,904	3,121	5,050	9,416	6,321	5,772	7,027	5,317	4,028	3,268	3,348	2,232	4,816
2013 (PhP/MWh)	3,073	2,766	4,785	7,018	6,047	4,271	2,893	3,162	2,735	6,590	11,246	11,060	5,463
Y-Y (%) Change	(5.5)	12.8	5.5	34.2	4.5	35.2	142.9	68.2	47.3	(50.4)	(70.2)	(79.8)	(11.8)

Figure 41. Market Price Trend (Luzon) - 1st Half

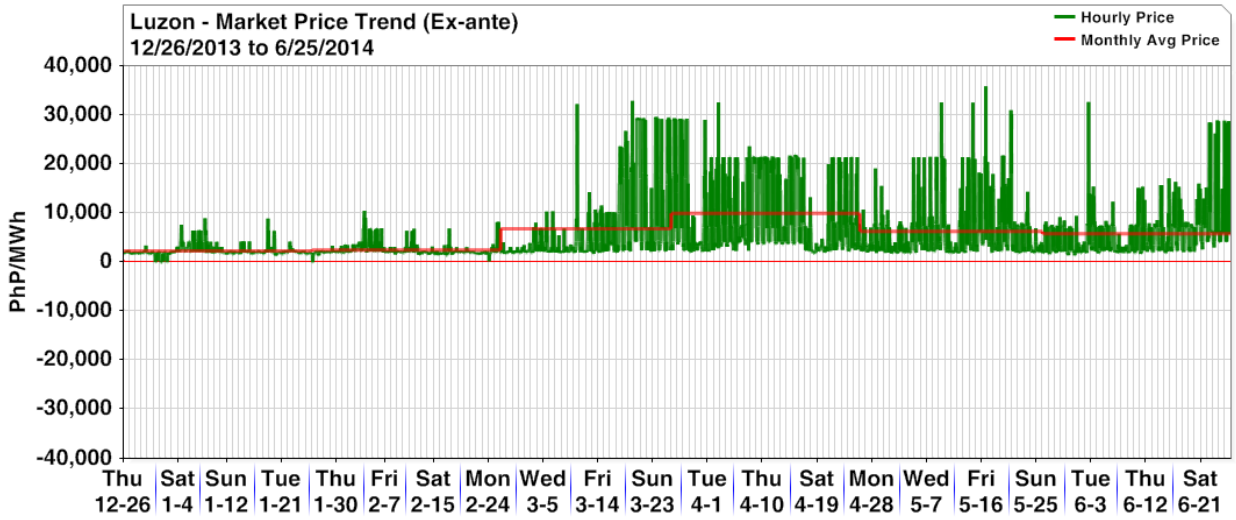


Figure 42. Market Price Trend (Luzon) - 2nd Half

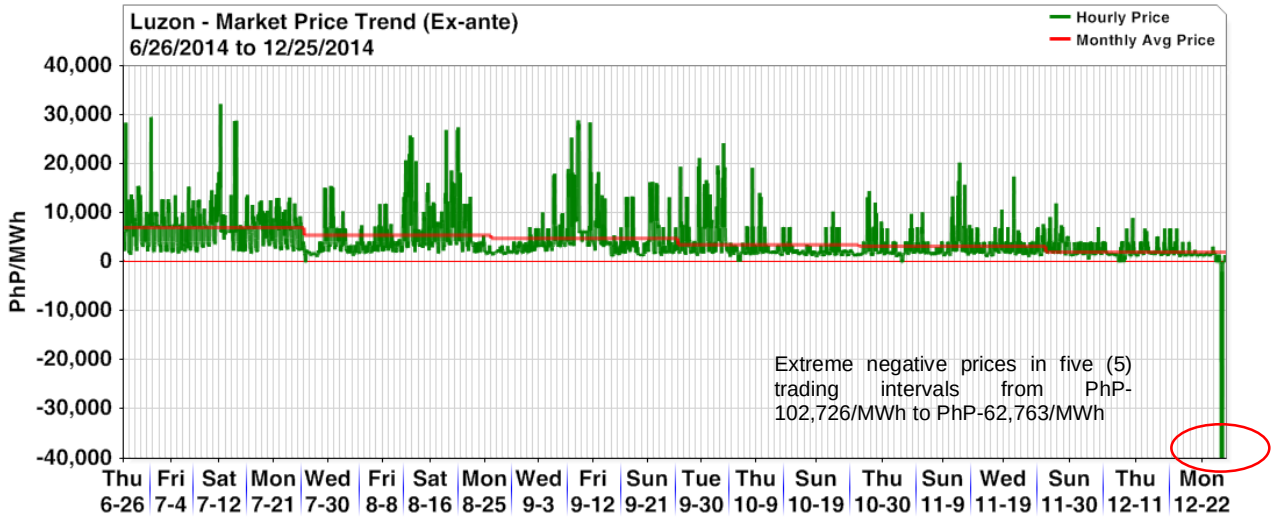


Table 53. Market Price Trend - Luzon

	Market Price Trend by Billing Month (PhP/MWh) - Luzon, 2014												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual Avg.
Max Price	8,959	10,449	32,859	32,525	35,790	32,604	32,181	27,440	28,882	24,259	20,242	11,942	24,765
Min Price	0	0	1,671	1,839	1,804	1,385	1,506	0	1,217	100	-	(102,726)	(7,658)
Avg Price	2,309	2,488	6,788	9,951	6,246	5,778	7,038	5,490	4,831	3,539	3,253	2,070	4,970

Table 54. Year-on-Year Average Price Trend Comparison - Luzon

	Year-on-Year Market Price Trend Comparison by Billing Month - Luzon, 2014												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual Avg.
2014 (PhP/MWh)	2,309	2,488	6,788	9,951	6,246	5,778	7,038	5,490	4,831	3,539	3,253	2,070	4,970
2013 (PhP/MWh)	3,038	2,792	4,890	6,993	6,053	4,310	2,880	3,202	2,678	6,641	16,104	18,194	6,473
Y-Y (%) Change	(24.0)	(10.9)	38.8	42.3	3.2	34.1	144.4	71.4	80.4	(46.7)	(79.8)	(88.6)	(23.2)

Figure 43. Market Price Trend (Visayas) - 1st Half

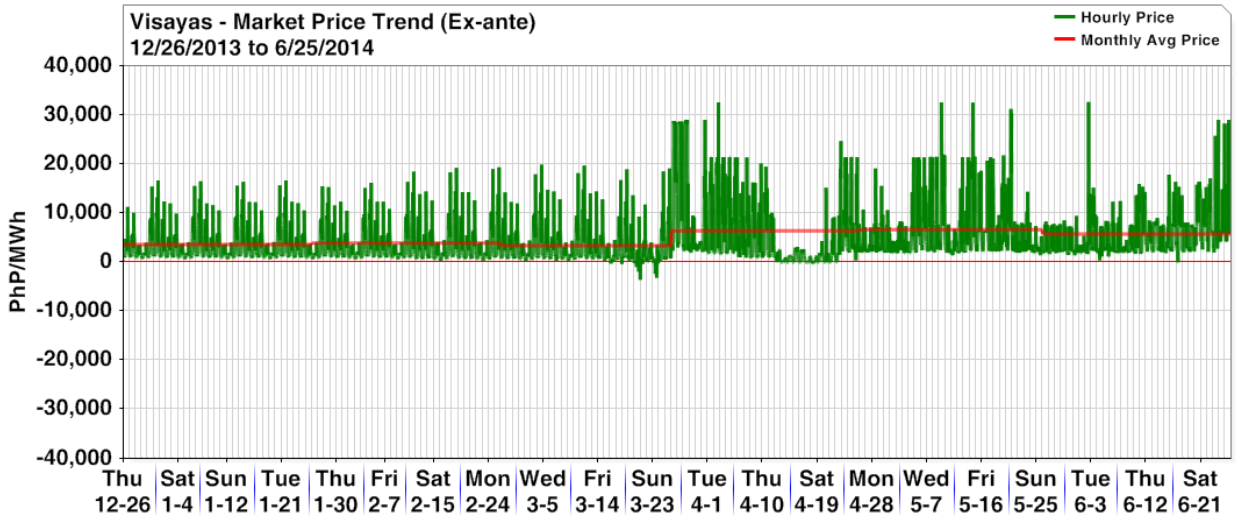


Figure 44. Market Price Trend (Visayas) - 2nd Half

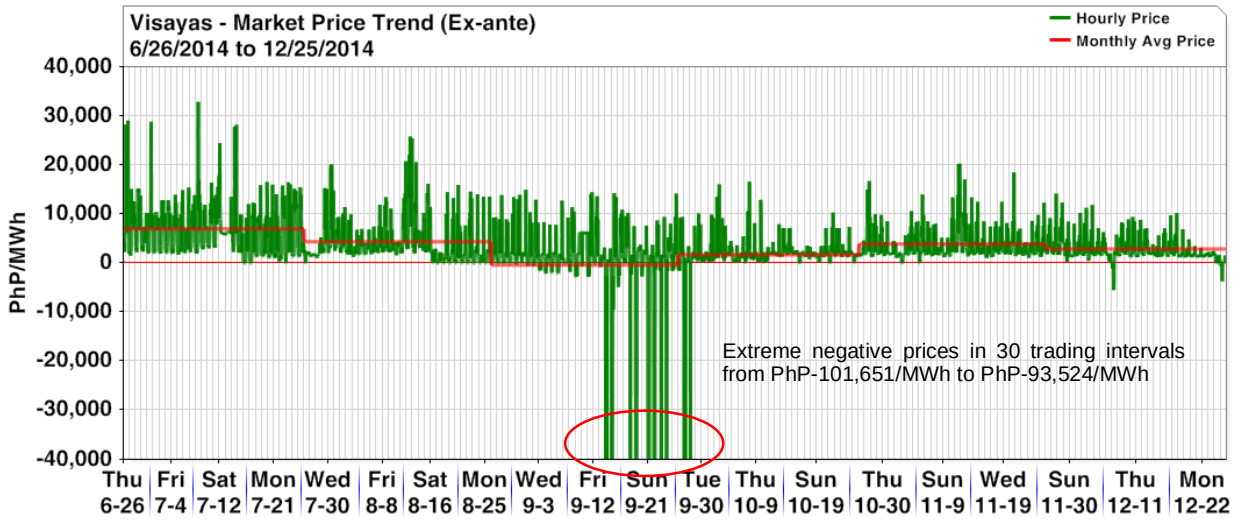


Table 55. Market Price Trend - Visayas

	Market Price Trend by Billing Month (PhP/MWh) - Visayas, 2014												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual Avg.
Max Price	16,661	19,325	19,852	32,525	32,535	32,604	32,852	25,816	14,939	16,604	20,262	14,133	23,194
Min Price	628	267	(3,577)	(253)	1,430	-	-	(13)	(101,651)	(98,490)	-	(5,494)	(17,283)
Avg Price	3,616	3,916	3,367	6,377	6,618	5,741	6,965	4,389	(380)	1,706	3,874	2,848	4,087

Table 56. Monthly Average Price Comparison - Visayas

	Year-on-Year Market Price Trend Comparison by Billing Month - Visayas, 2014												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual Avg.
2014 (PhP/MWh)	3,616	3,916	3,367	6,377	6,618	5,741	6,965	4,389	(380)	1,706	3,874	2,848	4,087
2013 (PhP/MWh)	3,249	2,627	4,226	7,158	6,014	4,055	2,890	2,950	3,028	6,320	3,465	3,722	4,135
Y-Y (%) Change	11.3	49.1	(20.3)	(10.9)	10.0	41.6	141.0	48.8	(112.6)	(73.0)	11.8	(23.5)	(1.1)

B. Frequency and Distribution

The price distribution in the Figures below show the price movements across the 2014 billing months. The same manifests that prices for the majority of the covered period were within the range of PhP2,000/MWh to PhP4,000/MWh at 36.3 percent. The May to July billing months, however, posted a notable variation to the price distribution trend for the year, as the frequency of the price ranging between PhP6,000/MWh to PhP8,000/MWh rose significantly to 22.8 percent, 33.3 percent and 27.5 percent, respectively, from an annual average of only 9.1 percent. Further, when compared with the other billing months, the billing month of July demonstrated a significantly high price distribution posted at 15.3 percent and 8.5 percent of market prices between above PhP8,000/MWh to PhP10,000/MWh, and prices ranging from above PhP10,000/MWh to PhP12,000/MWh. Over-all, the frequency of prices at the above PhP20,000/MWh range for the billing months of April to July obtained increases at 7.7 percent and 4.4 percent, from an average of only .5 percent covering all other months. The same is consistent with the increase in the monthly average prices recorded during the summer months of April, May and June as well as in the July billing month.

The September and December billing months, on the other hand, recorded a high of 4.3 percent and 3.3 percent, respectively, in the frequency of the distribution of prices at PhP0/MWh and below. The same corresponds to the high incidence of negative to extreme negative prices posted during said billing months.

Figure 45. Monthly Market Price Distribution

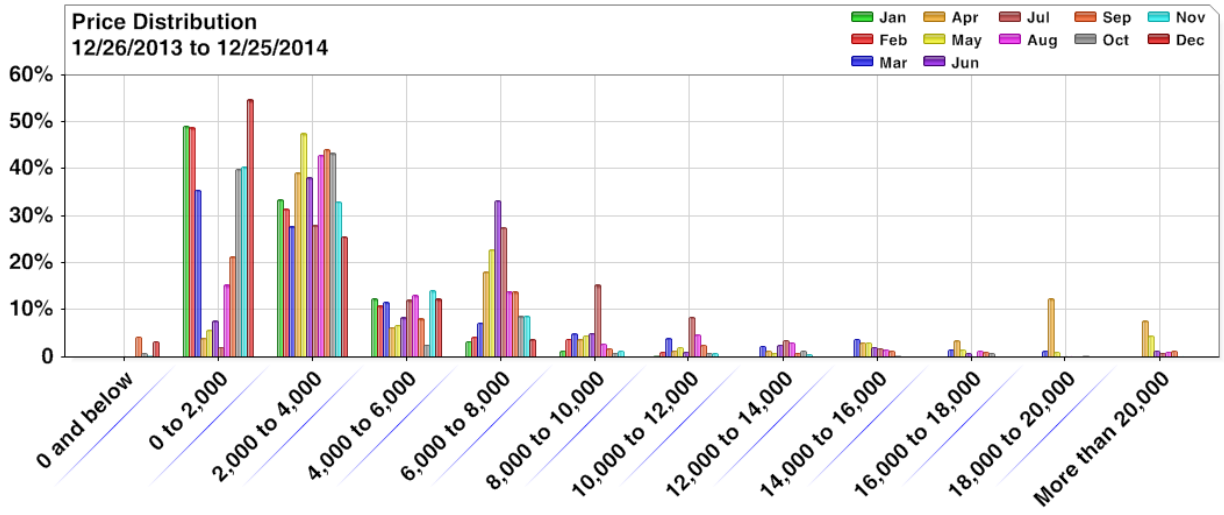


Table 57. Monthly Market Price Distribution

Price Range (PhP/MWh)	Market Price Distribution by Billing Month (%) - 2014												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Avg.
0 and below	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.3	0.8	0.4	3.3	0.7
0 to 2,000	49.2	48.8	35.6	3.9	5.7	7.7	2.1	15.3	21.2	40.0	40.5	54.7	27.0
2,000 to 4,000	33.5	31.5	27.7	39.2	47.5	38.2	27.9	43.0	44.2	43.3	33.1	25.6	36.3
4,000 to 6,000	12.5	10.9	11.8	6.3	6.8	8.3	12.1	13.2	8.1	2.5	14.2	12.4	9.9
6,000 to 8,000	3.2	4.2	7.3	18.0	22.8	33.3	27.5	14.0	14.0	8.6	8.7	3.6	13.8
8,000 to 10,000	1.2	3.8	4.9	3.6	4.6	5.0	15.3	2.7	1.6	0.8	1.2	0.3	3.7
10,000 to 12,000	0.4	0.9	3.9	1.2	2.1	0.9	8.5	4.7	2.4	0.8	0.7	0.0	2.2
12,000 to 14,000	0.0	0.0	2.2	1.2	0.7	2.4	3.5	3.1	0.8	1.3	0.5	0.1	1.3
14,000 to 16,000	0.0	0.0	3.7	3.0	3.1	2.0	1.8	1.5	1.2	0.4	0.3	0.0	1.4
16,000 to 18,000	0.0	0.0	1.5	3.4	1.4	0.8	0.3	1.3	0.9	0.8	0.3	0.0	0.9
18,000 to 20,000	0.0	0.0	1.2	12.5	1.0	0.0	0.3	0.1	0.0	0.4	0.0	0.0	1.3
More than 20,000	0.0	0.0	0.3	7.7	4.4	1.3	0.8	1.1	1.2	0.1	0.1	0.0	1.4

Comparing the price distribution between the regions would indicate that market prices were relatively higher in Luzon than in Visayas. Majority or about 39.5 percent of the market prices in Luzon were within the price range of PhP2,000/MWh to PhP4,000/MWh while majority of the prices in the Visayas at 34.6 percent were within the range of PhP0/MWh to PhP2,000/MWh.

Notable variations to the price distribution trend in Luzon are the respective increases in the distribution of prices between PhP6,000/MWh to PhP8,000/MWh during the billing months of May, June and July, posted at 23.6 percent, 34.3 percent and 32.1 percent, from an average of only 8.8 percent in the previous and succeeding months. Also, as compared with the other billing months, the months of March, April and May showed a higher level of price distribution at the above PhP20,000/MWh range, recorded at 7.6 percent, 18.1 percent and 4.6 percent. These correspond to the increase in market prices during said months. Conversely, indicating the declining trend in the market prices in Luzon, the distribution of prices between PhP0/MWh to PhP2,000/MWh followed an increasing trend from 19.0 percent in September, 35.8 percent in October, 41.3 percent in November and a high of 57.9 percent in December.

Similar to the trend exhibited in Luzon, the Visayas likewise posted notable variation to the distribution of market prices during the April to July billing months, indicating the increase in prices during the period. Higher distribution at 24.2 percent, 30.8 percent and 22.8 percent corresponding to prices between PhP6,000/MWh to PhP8,000/MWh were observed for the May, June and July billing months while the April and May billing months posted the highest distribution at the above PhP20,000/MWh among all other months at 7.0 percent and 5.0 percent, respectively. On the other hand, the distribution of market prices at PhP0/MWh and below increased significantly in September at 29.2 percent. The same corresponds to the high incidence of extreme negative prices in the Visayas during the billing month, when the Luzon and Visayas regions were separated into two pricing regions following the maintenance outage of the HVDC Interconnection from 16 August at 0800H, all through 24 September at 0400H.

Figure 46. Monthly Market Price Distribution - Luzon

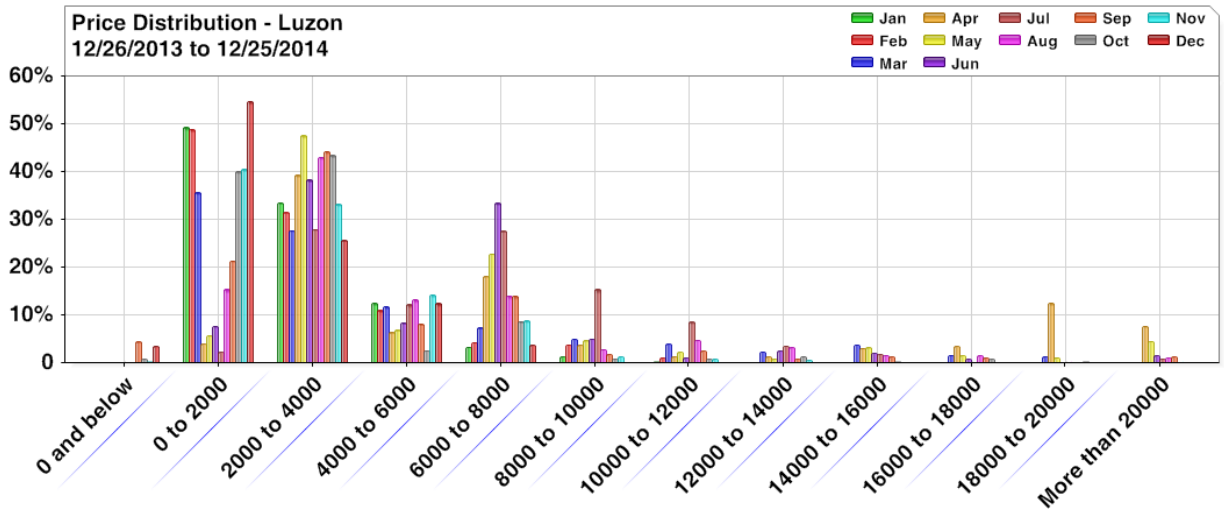


Table 58. Monthly Market Price Distribution - Luzon

Price Range (PhP/MWh)	Market Price Distribution by Billing Month (%) - Luzon, 2014												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Avg.
0 and below	1.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	4.3	0.5
0 to 2,000	44.1	37.5	8.8	1.9	6.1	7.7	1.3	13.7	19.0	35.8	41.3	57.9	23.0
2,000 to 4,000	46.9	56.9	51.5	33.1	45.6	38.2	27.1	38.4	39.2	44.9	31.3	21.8	39.5
4,000 to 6,000	5.0	1.3	6.8	14.2	8.3	8.6	11.8	19.1	19.4	5.4	15.2	12.5	10.7
6,000 to 8,000	2.2	3.4	14.7	16.8	23.6	34.3	32.1	11.2	11.2	8.8	9.0	3.1	14.1
8,000 to 10,000	0.3	0.7	1.9	5.0	4.6	3.5	12.6	5.4	4.0	0.8	0.9	0.3	3.3
10,000 to 12,000	0.0	0.3	3.3	1.2	1.4	1.2	6.8	4.4	0.8	0.6	0.5	0.1	1.7
12,000 to 14,000	0.0	0.0	0.0	0.7	0.6	2.2	5.6	3.1	2.4	1.1	0.7	0.0	1.4
14,000 to 16,000	0.0	0.0	1.2	1.3	3.5	2.4	1.5	1.5	0.7	0.6	0.3	0.0	1.1
16,000 to 18,000	0.0	0.0	2.2	4.7	1.1	0.7	0.1	1.2	0.9	0.8	0.3	0.0	1.0
18,000 to 20,000	0.0	0.0	1.9	3.0	0.7	0.0	0.3	0.9	1.2	1.0	0.0	0.0	0.7
More than 20,000	0.0	0.0	7.6	18.1	4.6	1.3	0.8	1.1	1.2	0.3	0.1	0.0	2.9

Figure 47. Monthly Market Price Distribution - Visayas

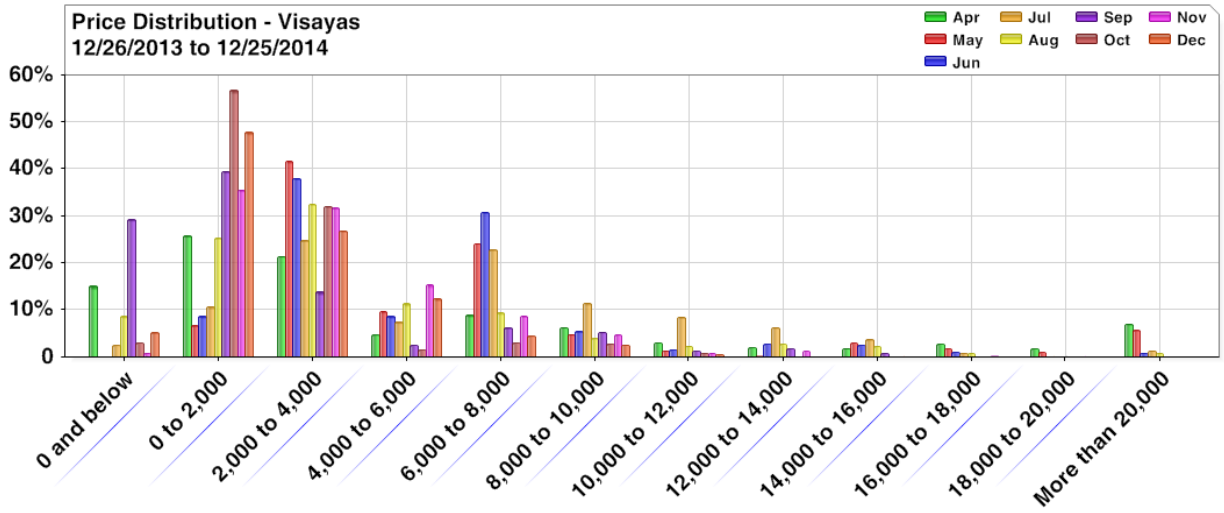


Table 59. Monthly Market Price Distribution - Visayas

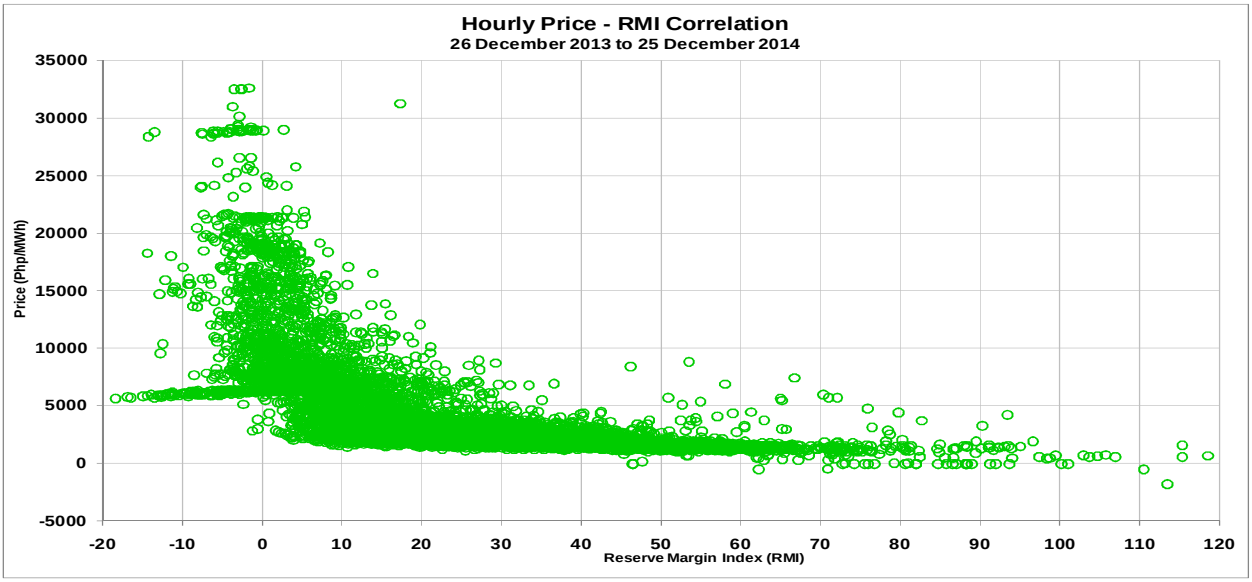
Price Range (PhP/MWh)	Market Price Distribution by Billing Month (%) - Visayas, 2014									
	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Avg.
0 and below	15.1	0.0	0.3	2.4	8.6	29.2	2.9	0.7	5.1	5.7
0 to 2,000	25.7	6.7	8.6	10.7	25.3	39.5	56.7	35.5	47.8	34.6
2,000 to 4,000	21.4	41.7	38.0	24.7	32.5	13.8	32.1	31.7	26.8	26.0
4,000 to 6,000	4.7	9.7	8.6	7.4	11.3	2.4	1.4	15.5	12.5	9.4
6,000 to 8,000	8.9	24.2	30.8	22.8	9.4	6.2	2.9	8.7	4.4	11.5
8,000 to 10,000	6.3	4.7	5.4	11.5	3.9	5.2	2.6	4.7	2.5	5.1
10,000 to 12,000	3.1	1.3	1.5	8.5	2.3	1.3	0.8	0.8	0.6	2.2
12,000 to 14,000	1.9	0.4	2.7	6.3	2.7	1.6	0.3	1.3	0.1	1.7
14,000 to 16,000	1.7	2.9	2.4	3.6	2.2	0.7	0.0	0.3	0.1	1.4
16,000 to 18,000	2.7	1.8	0.9	0.8	0.8	0.0	0.3	0.4	0.0	0.7
18,000 to 20,000	1.6	1.0	0.0	0.1	0.3	0.0	0.0	0.1	0.0	0.4
More than 20,000	7.0	5.7	0.8	1.3	0.8	0.0	0.0	0.3	0.0	1.3

C. Correlation of Hourly Prices with the Reserve Margin Index (RMI)

The correlation of hourly market prices and the reserve margin index (RMI) is shown in the succeeding chart. Results of the correlation indicated an inverse relationship all throughout the billing year, which demonstrated that as the RMI decreases, the hourly price generally increases.

It can be recalled that the billing months of April to July, which posted the highest market prices for the year, are also the same months marked with the highest occurrence of RMIs of less than 10 percent, as discussed in the preceding Chapter on RMI.

Figure 48. Correlation on Hourly Market Prices vs. RMI



VIII. MARKET INTERVENTION/SUSPENSION

The market intervention or suspension index is a general indicator used to assess the development of the WESM in relation to special conditions, which, under the WESM Rules, include emergency, system security threat, and *force majeure* events. Either the Market Operator (MO) or System Operator (SO) may declare/initiate market intervention depending on the emergency events. On the other hand, market suspension is an event wherein the ERC declares the operation of the spot market to be suspended in cases of natural calamities or national and international security emergencies. In the event of market intervention or suspension, the administered price shall be used for WESM settlement.

Note that administered prices are used for the settlement of transactions in trading intervals affected by either market intervention or suspension. In the event that a market intervention or suspension is declared to be applied only to one region, the administered prices apply only to the region where the suspension or intervention is declared.

In 2014, market intervention was declared system-wide and in the Luzon and Visayas regions, while market suspension was declared in Luzon during the July billing month on account of the impact to the power system of typhoon Glenda which hit the region on said month. System-wide, market-intervention was declared in four (4) trading intervals, initiated by the SO and the MO, on account of workflow stoppage resulting from erroneous snapshot data. These affected the billing months of May, July and December, respectively.

On a per region basis, twenty-five (25) market intervention events were noted to have been initiated by the SO in Luzon, all of which were declared due to manual load dropping during the billing months of May, June, July and September. The July billing month posted the highest number of MI occurrences in Luzon, affecting a total of twelve (12) trading intervals.

On the other hand, the environmental impact of typhoon Ruby in the Visayas prompted the MO to initiate market intervention in the region affecting a total of 48 intervals from 7 December at 1000H to 9 December at 0900H.

Finally, market suspension was declared by the ERC in Visayas for the whole duration of the 1st quarter of 2014 (from 26 December 2013 to 25 March 2014), on account of the destruction of the Visayas power system due to typhoon Yolanda which hit the region on 08 November 2013. It may be recalled that the ERC declared partial market suspension which affected the Visayas on 08 November 2013 at 1500H. The same continued through the 1st quarter of 2014. The Luzon region was similarly placed under market suspension on 16 July at 0400H to 25 July at 1200H, affecting a total of 225 trading intervals. The suspension was brought about by the power system disturbance brought about by typhoon Glenda in the Luzon grid.

Table 60. Total Monthly Occurrences of Market Intervention

Initiated by	Remarks (Luz-Vis)	2014												
		Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Total
MO	Force Majeure (MMS Concern)												1	
	Force Majeure (MO Other Concern)							1						
	Sub-Total (MO-Initiated)							1					1	**1**
NGCP-SO	Emergency/Security Event													
	Force Majeure (SCADA/EMS Concern)					2								
	Force Majeure (SO Other Concern)													
	Sub-Total (NGCP-SO-Initiated)					**2**								**2**
ERC	Declaration of (Partial) Market Suspension													
	Sub-Total (ERC-Initiated)													
Total						**2**		**1**					**1**	**4**

Table 61. Monthly Occurrences of Market Intervention - Luzon

Initiated by	Remarks (Luzon)	2014												
		Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Total
MO	Force Majeure (MMS Concern)													
	Force Majeure (MO Other Concern)													
	Sub-Total (MO-Initiated)													
NGCP-SO	Emergency/Security Event					5	2	12		6				**25**
	Force Majeure (SCADA/EMS Concern)													
	Force Majeure (SO Other Concern)													
	Sub-Total (NGCP-SO-Initiated)					**5**	**2**	**12**		**6**				**25**
ERC	Declaration of Market Suspension							225						225
	Sub-Total (ERC-Initiated)							**225**						**225**
Total						**5**	**2**	**237**		**6**				**250**

Table 62. Monthly Occurrences of Market Intervention/Suspension - Visayas

Initiated by	Remarks (Visayas)	2014												
		Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Total
MO	Force Majeure (MMS Concern)													
	Force Majeure (MO Other Concern)							1						1
	Sub-Total (MO-Initiated)							**1**						**1**
NGCP-SO	Emergency/Security Event												48	**48**
	Force Majeure (SCADA/EMS Concern)													
	Force Majeure (SO Other Concern)													
	Sub-Total (NGCP-SO-Initiated)												**48**	**48**
ERC	Declaration of Market Suspension	744	744	672										**2160**
	Sub-Total (ERC-Initiated)	**744**	**744**	**672**										**2160**
Total		**744**	**744**	**672**				**1**					**48**	**2209**

IX. PRICE SETTING INDICES PRICE SETTING FREQUENCY INDEX (PSFI)

The price setting indices identify generating plants or generators that set the price or are near setting the spot prices. A generating plant or a generator is considered a price setter if the last accepted offer price is within 95 to 100 percent of the nodal price. Frequent price-setters may have greater opportunities to design bidding strategies to influence market price outcome. The PSFI as discussed in this Report is the percentage of time in a given period that a generator qualifies as price setter.

Market prices below Php5,000/MWh were most frequently set by four (4) coal plants from Luzon (Sual, Mariveles, Pagbilao and Masinloc), one Visayas geothermal plant (Leyte A) and three (3) coal plants from Visayas (KSPC, PEDC and CEDC).

Prices within the range of Php5,000/MWh to Php10,000/MWh were mostly set by oil-based plants. Frequent price setters at this range were Luzon oil-based plants Therma Mobile, followed by Visayas oil-based plant EAUC. Also in the list of frequent price-setters are Luzon oil-based plants Trans-Asia and Subic Power and Visayas oil-based plants PB 102 and TPC (Carmen) and coal plant PEDC.

Figure 49. Price Setting Frequency Index - Luzon Plants (PhP5,000/MWh and Below)

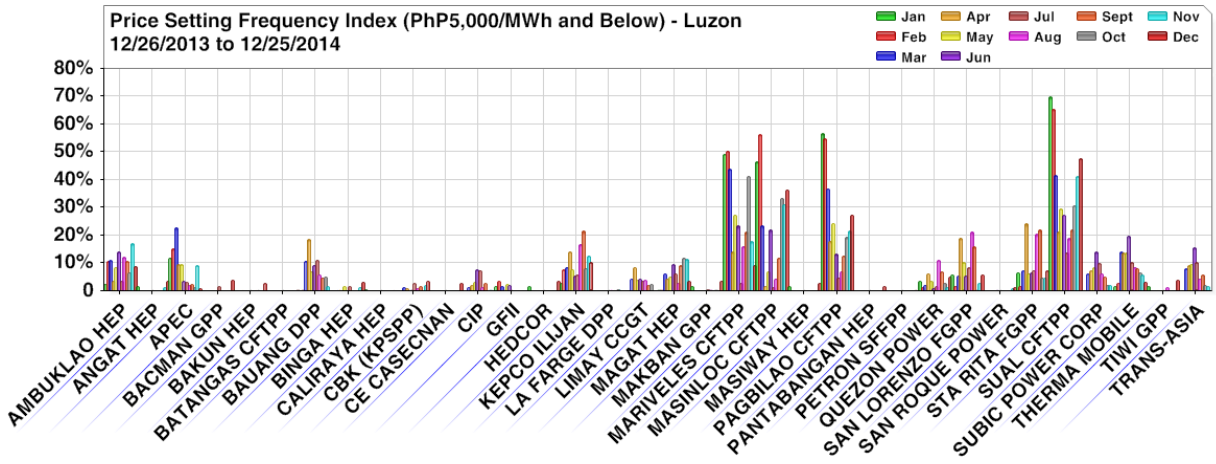


Figure 50. Price Setting Frequency Index - Visayas Plants (PhP5,000/MWh and Below)

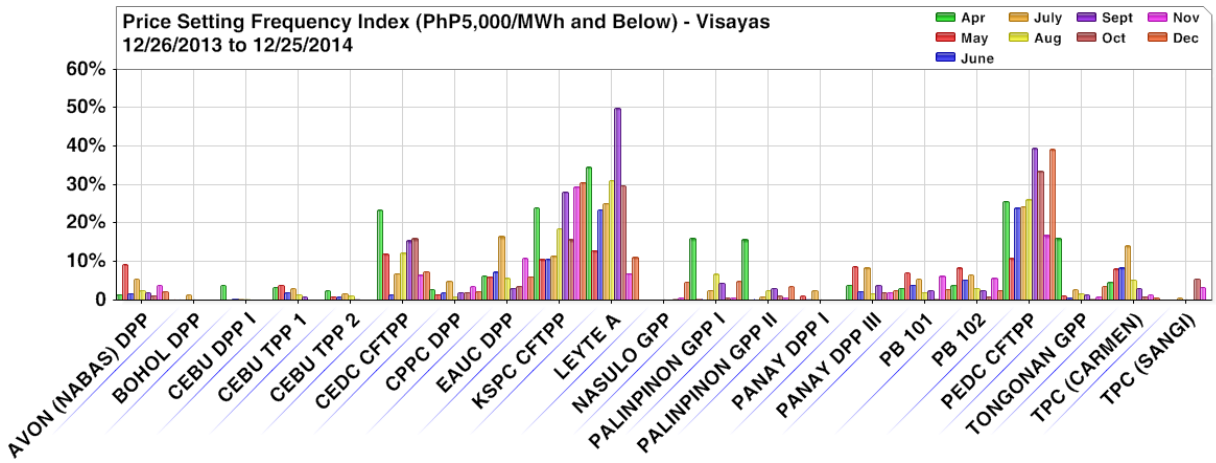


Table 63. PSFI by Billing Month - Luzon (PhP5,000/MWh and Below)

Plant	PSFI (%) by Billing Month - Luzon (PhP5,000/MWh and Below)											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
AMBUKLAO HEP	2.2	10.5	10.9	3.4	8.5	14.0	3.3	12.0	10.5	6.5	16.8	8.8
ANGAT HEP	1.5						0.1				1.2	3.5
APEC	11.8	15.1	22.8	9.4	9.3	3.2	2.9	2.0	2.4	1.1	8.9	0.8
BACMAN GPP							1.4			0.4	0.4	3.8
BAKUN HEP	0.3			0.1					0.1	0.3		2.5
BATANGAS CFTPP												0.6
BAUANG DPP	0.1	0.5	10.6	18.4	6.8	9.1	11.1	5.8	4.6	5.0	1.5	
BINGA HEP			0.1	0.3	1.4		1.4				1.2	3.1
CALIRAYA HEP	0.7											0.1
CBK (KPSPP)	0.4	0.4	1.2	0.8		0.5	2.5	0.9	1.3	0.1	2.0	3.5
CE CASECNAN	0.4											2.5
CIP			1.2	2.0	2.9	7.4	7.2	1.2	2.6		0.5	
GFII	1.6	3.2	1.3	0.5	2.2	2.0	0.3					
HEDCOR	1.5						0.1				0.4	3.3
KEPCO ILIJAN	2.8	7.4	8.3	14.1	7.6	5.1	5.6	16.7	21.4	8.1	12.5	10.0
LA FARGE DPP								0.3	0.1	0.7	0.3	
LIMAY CCGT			4.3	8.5	3.6	4.3	3.5	3.6	1.9	2.4		
MAGAT HEP	0.5	0.5	6.1	4.3	5.0	9.4	6.1	2.8	8.9	11.8	11.2	3.3
MAKBAN GPP	1.6						0.7	0.5		0.6	0.4	3.5
MARIVELES CFTPP	49.2	50.3	43.6	13.8	27.2	23.3	2.5	16.0	21.0	41.3	17.6	9.2
MASINLOC CFTPP	46.2	56.2	23.4	1.5	6.8	21.9	1.1	4.2	11.8	33.3	31.0	36.4
MASIWAY HEP	1.5											2.6
PAGBILAO CFTPP	56.5	54.7	36.8	17.9	24.2	13.0	4.6	6.9	12.5	19.3	21.4	27.2
PANTABANGAN HEP	0.1											1.7
PETRON SFFPP												0.3
QUEZON POWER	3.2	1.2	1.9	6.0	3.3	0.8	1.7	10.9	6.7	2.8	1.2	5.0
SAN LORENZO FGPP	5.8	1.6	5.2	19.0	10.0	5.2	8.2	21.2	15.7	0.6	2.6	5.8
SAN ROQUE POWER						0.3					0.8	1.3
STA RITA FGPP	6.5	1.6	7.1	24.1	6.1	6.3	7.2	20.3	21.9	4.6	4.7	7.1
SUAL CFTPP	69.6	65.3	41.4	21.2	29.3	27.2	13.8	18.8	22.0	30.6	41.0	47.5
SUBIC POWER CORP		0.1	6.0	7.1	8.2	13.8	9.9	6.0	4.8	1.9	1.7	
THERMA MOBILE	1.6	2.6	13.8	13.6	13.6	19.6	10.0	8.3	8.1	6.4	5.5	3.1
TIWI GPP	1.6				0.1			1.1	0.1		0.4	3.8
TRANS-ASIA		0.1	7.7	8.9	9.6	15.5	10.0	4.0	5.5	1.9	1.5	

Table 64. PSFI by Billing Month - Visayas (PhP5,000/MWh and Below)

Plant	PSFI (%) by Billing Month - Visayas (PhP5,000/MWh and Below)								
	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
AVON (NABAS) DPP	1.3	9.3	1.7	5.6	2.4	2.0	1.0	3.9	2.1
BOHOL DPP	0.1	0.1	0.1	1.3					
CEBU DPP I	3.9	0.3	0.5	0.4	0.4				
CEBU TPP 1	3.4	3.9	1.9	2.9	1.5	0.9			
CEBU TPP 2	2.4	0.8	0.8	1.7	1.1	0.4			
CEDC CFTPP	23.4	12.1	1.3	6.9	12.4	15.5	16.0	6.5	7.5
CPPC DPP	2.8	1.4	1.9	4.9	0.8	2.0	1.9	3.5	2.1
EAUC DPP	6.3	6.0	7.3	16.5	5.6	3.0	3.5	11.0	6.1
KSPC CFTPP	24.1	10.6	10.8	11.5	18.5	28.1	15.7	29.4	30.6
LEYTE A	34.5	12.9	23.5	25.1	31.2	50.0	29.9	6.9	11.1
NASULO GPP							0.4	0.7	4.7
PALINPINON GPP I	16.1	0.4	0.3	2.5	6.7	4.4	0.6	0.7	4.9
PALINPINON GPP II	15.7		0.3	0.8	2.6	3.1	1.0	0.7	3.5
PANAY DPP I		1.0	0.4	2.4	0.1				
PANAY DPP III	3.9	8.8	2.3	8.3	1.7	3.8	1.9	2.0	2.5
PB 101	3.1	7.2	3.9	5.6	2.0	2.4	0.4	6.2	2.8
PB 102	3.8	8.3	5.2	6.7	3.1	2.4	0.7	5.6	2.5
PEDC CFTPP	25.7	10.8	23.9	24.3	26.1	39.5	33.5	16.8	39.2
TONGONAN GPP	16.1	1.1	0.7	2.6	1.6	1.3	0.4	0.8	3.6
TPC (CARMEN)	4.6	8.1	8.3	14.2	5.2	3.1	0.8	1.5	0.6
TPC (SANGI)	0.1			0.6			5.6	3.4	

Figure 51. Price Setting Frequency Index - Luzon Plants (Above PhP5,000/MWh)

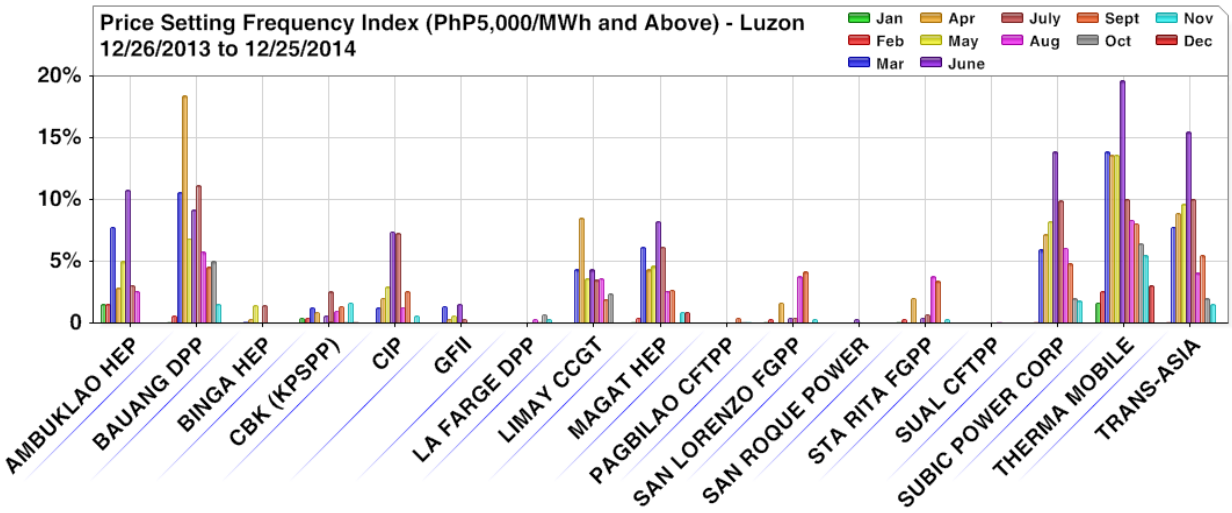


Figure 52. Price Setting Frequency Index - Visayas Plants (Above PhP5,000/MWh)

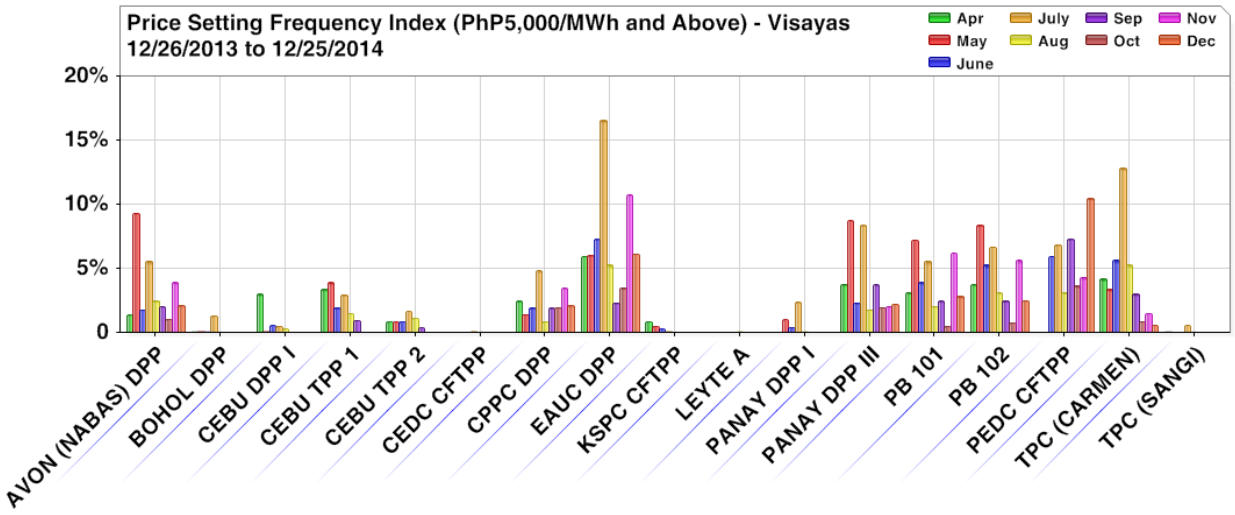


Table 65. PSFI by Billing Month - Luzon (Above PhP5,000/MWh)

Plant	PSFI (%) by Billing Month - Luzon (PhP5,000/MWh to PhP10,000/MWh)											
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
AMBUKLAO HEP	1.5	1.5	7.7	2.8	5.0	10.8	3.1	2.6				
BAUANG DPP	0.1	0.5	10.6	18.4	6.8	9.1	11.1	5.8	4.6	5.0	1.5	
BINGA HEP			0.1	0.3	1.4		1.4					
CBK (KPSPP)	0.4	0.4	1.2	0.8		0.5	2.5	0.9	1.3	0.1	1.6	0.1
CIP			1.2	2.0	2.9	7.4	7.2	1.2	2.6		0.5	
GFII			1.3	0.3	0.6	1.5	0.3					
LA FARGE DPP								0.3	0.1	0.7	0.3	
LIMAY CCGT			4.3	8.5	3.6	4.3	3.5	3.6	1.9	2.4		
MAGAT HEP	0.1	0.4	6.1	4.3	4.6	8.2	6.1	2.6	2.7		0.8	0.8
PAGBILAO CFTPP									0.4	0.1	0.1	
SAN LORENZO FGPP	0.1	0.3		1.6		0.4	0.4	3.8	4.2		0.3	
SAN ROQUE POWER						0.3						
STA RITA FGPP	0.1	0.3		2.0		0.4	0.7	3.8	3.4		0.3	
SUAL CFTPP								0.1				
SUBIC POWER CORP		0.1	6.0	7.1	8.2	13.8	9.9	6.0	4.8	1.9	1.7	
THERMA MOBILE	1.6	2.6	13.8	13.6	13.6	19.6	10.0	8.3	8.1	6.4	5.5	3.1
TRANS-ASIA		0.1	7.7	8.9	9.6	15.5	10.0	4.0	5.5	1.9	1.5	

Table 66. PSFI by Billing Month - Visayas (Above PhP5,000/MWh)

Plant	PSFI (%) by Billing Month - Visayas (PhP5,000/MWh to PhP10,000/MWh)								
	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec
AVON (NABAS) DPP	1.3	9.3	1.7	5.6	2.4	2.0	1.0	3.9	2.1
BOHOL DPP	0.1	0.1	0.1	1.3					
CEBU DPP I	3.0	0.1	0.5	0.4	0.3				
CEBU TPP 1	3.4	3.9	1.9	2.9	1.5	0.9			
CEBU TPP 2	0.8	0.8	0.8	1.7	1.1	0.4			
CEDC CFTPP				0.1					
CPPC DPP	2.4	1.4	1.9	4.9	0.8	1.9	1.9	3.5	2.1
EAUC DPP	5.9	6.0	7.3	16.5	5.2	2.3	3.5	10.8	6.1
KSPC CFTPP	0.8	0.4	0.3	0.1					
LEYTE A					0.1				
PANAY DPP I		1.0	0.4	2.4	0.1				
PANAY DPP III	3.8	8.8	2.3	8.3	1.7	3.8	1.9	2.0	2.2
PB 101	3.1	7.2	3.9	5.6	2.0	2.4	0.4	6.2	2.8
PB 102	3.8	8.3	5.2	6.7	3.1	2.4	0.7	5.6	2.5
PEDC CFTPP			5.9	6.8	3.1	7.3	3.6	4.3	10.4
TPC (CARMEN)	4.2	3.3	5.6	12.8	5.2	3.0	0.8	1.5	0.6
TPC (SANGI)	0.1			0.6					

Oil-based plants also dominated the list of frequent price setters at the above PhP10,000/MWh price level, with Luzon oil-based plant Bauang at the top spot, followed by Visayas oil-based plants PB 102, Avon (Nabas), PB 101, Panay DPP III, Luzon oil-based plant Limay, Visayas oil-based plant EAUC and hydro plant Magat.

Meanwhile, the above PhP20,000/MWh price range was likewise dominated by oil-based plants, particularly from Luzon, with oil-based plant Bauang topping the list of price-setters at that range, followed by Luzon oil-based plants Trans-Asia and Subic Power and by Visayas oil-based plant Cebu TPP 1.

Figure 53. Price Setting Frequency Index - Luzon Plants (Above Php10,000/MWh)

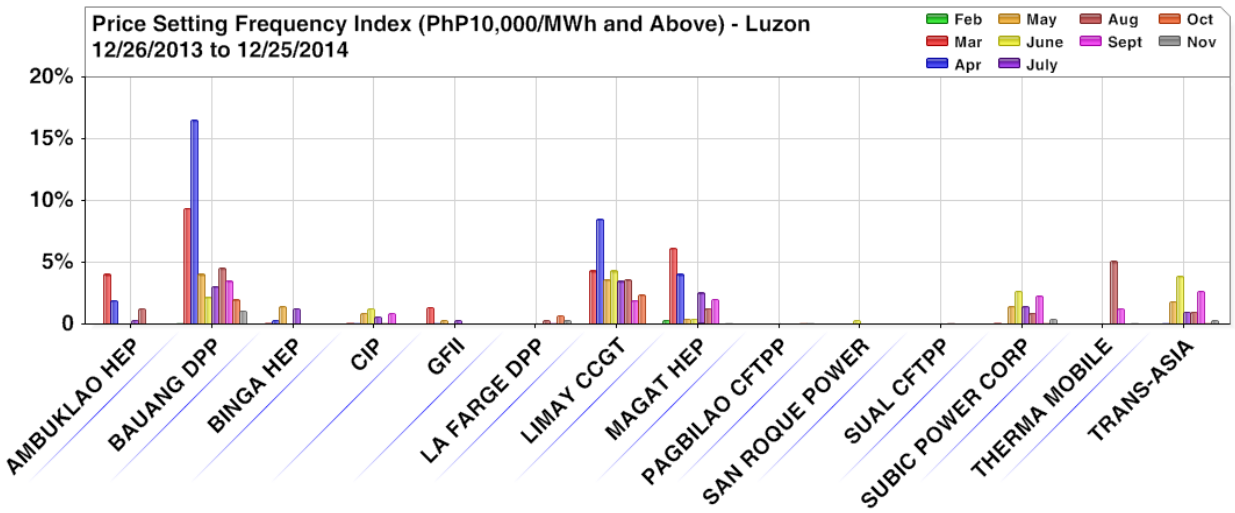


Figure 54. Price Setting Frequency Index - Visayas Plants (Above Php10,000/MWh)

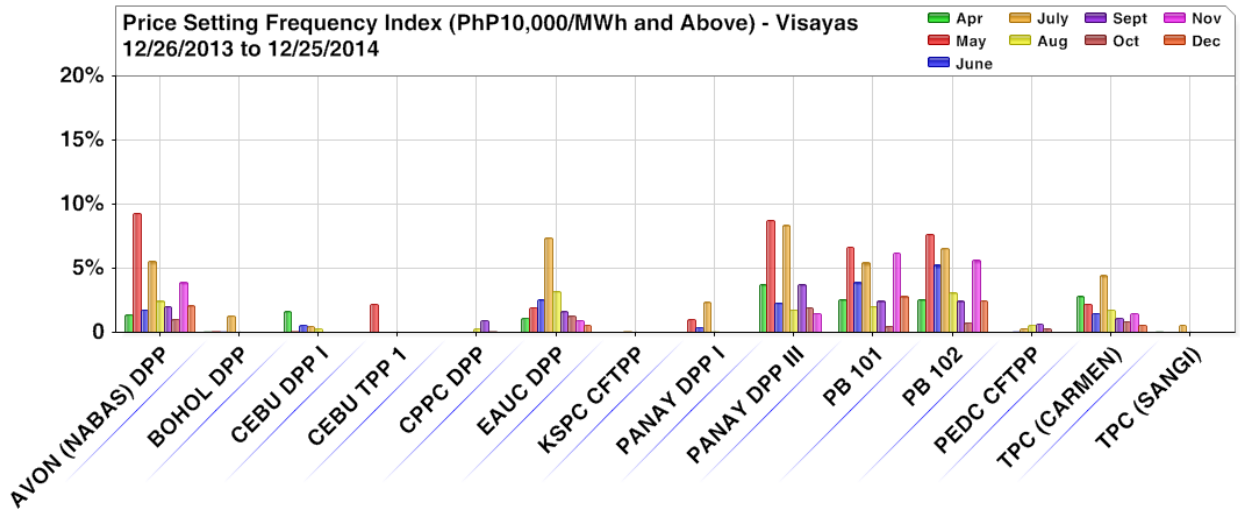


Table 67. PSFI by Billing Month - Luzon (Above PhP10,000/MWh)

Plant	PSFI (%) by Billing Month - Luzon (Above PhP10,000/MWh)									
	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov
AMBUKLAO HEP		4.0	1.9			0.3	1.2			
BAUANG DPP	0.1	9.4	16.5	4.0	2.2	3.1	4.6	3.5	1.9	1.08
BINGA HEP		0.1	0.3	1.4		1.3				
CIP		0.1	0.1	0.8	1.2	0.6	0.1	0.8		
GFII		1.3	0.1	0.3		0.3				
LA FARGE DPP							0.3	0.1	0.7	0.3
LIMAY CCGT		4.3	8.5	3.6	4.3	3.5	3.6	1.9	2.4	
MAGAT HEP	0.3	6.1	4.0	0.4	0.4	2.5	1.2	2.0		0.1
PAGBILAO CFTPP									0.1	0.1
SAN ROQUE POWER					0.3					
SUAL CFTPP							0.1			
SUBIC POWER CORP		0.1		1.4	2.7	1.4	0.8	2.3	0.1	0.4
THERMA MOBILE							5.1	1.2		0.1
TRANS-ASIA			0.1	1.8	3.9	1.0	0.9	2.7	0.1	0.3

Table 68. PSFI by Billing Month - Visayas (Above PhP10,000/MWh)

Plant	PSFI (%) by Billing Month - Visayas (Above PhP10,000/MWh)								
	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
AVON (NABAS) DPP	1.3	9.3	1.7	5.6	2.4	2.0	1.0	3.9	2.1
BOHOL DPP	0.1	0.1	0.1	1.3					
CEBU DPP I	1.6	0.1	0.5	0.4	0.3				
CEBU TPP 1		2.2							
CPPC DPP					0.3	0.9	0.1		
EAUC DPP	1.1	1.9	2.6	7.4	3.2	1.6	1.3	0.9	0.6
KSPC CFTPP				0.1					
PANAY DPP I		1.0	0.4	2.4	0.1				
PANAY DPP III	3.8	8.8	2.3	8.3	1.7	3.8	1.9	1.5	
PB 101	2.6	6.7	3.9	5.4	2.0	2.4	0.4	6.2	2.8
PB 102	2.6	7.6	5.2	6.5	3.1	2.4	0.7	5.6	2.5
PEDC CFTPP			0.1	0.3	0.5	0.7	0.3		
TPC (CARMEN)	2.8	2.2	1.5	4.4	1.7	1.1	0.8	1.5	0.6
TPC (SANGI)	0.1			0.6					

Figure 55. Price Setting Frequency Index - Luzon Plants (Above Php20,000/MWh)

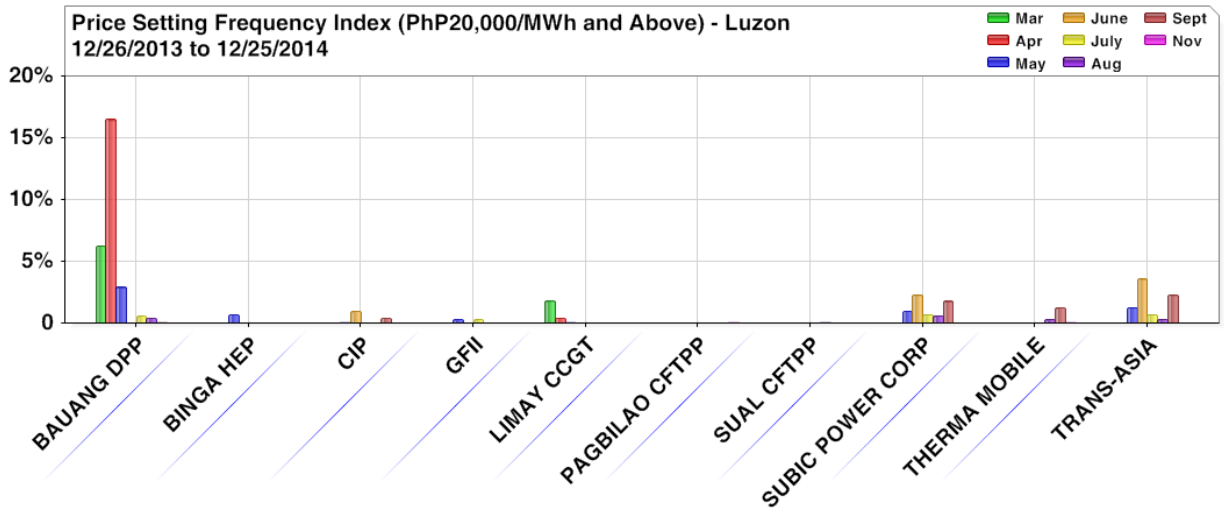


Figure 56. Price Setting Frequency Index - Visayas Plants (Above Php20,000/MWh)

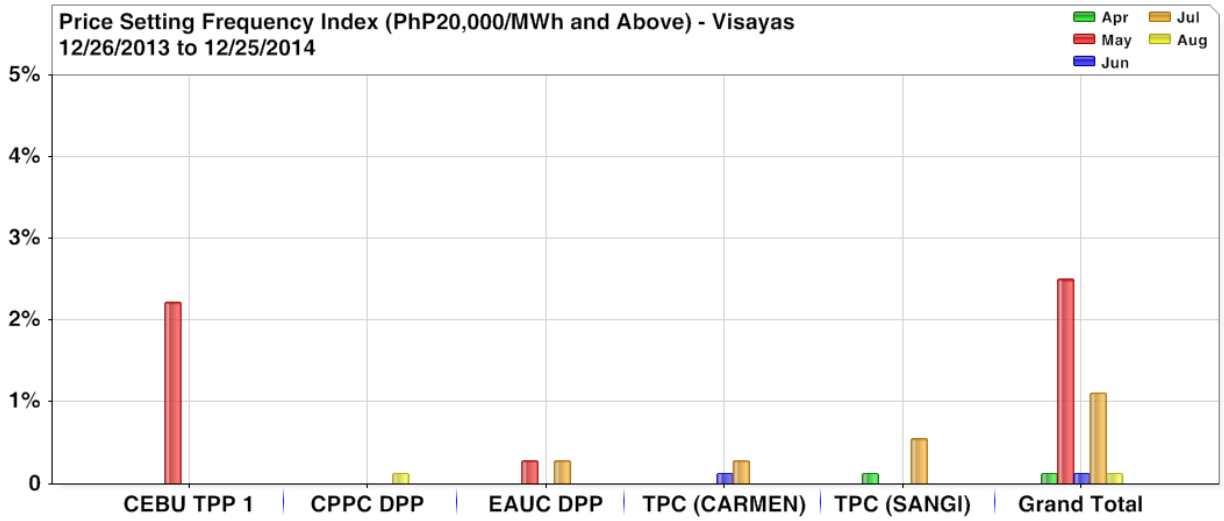


Table 69. PSFI by Billing Month - Luzon (Above PhP20,000/MWh)

Plant	PSFI (%) by Billing Month - Luzon (Above PhP20,000/MWh)							
	Mar	Apr	May	June	July	Aug	Sept	Nov
BAUANG DPP	6.3	16.5	2.9		0.6	0.4	0.1	
BINGA HEP			0.7					
CIP			0.1	0.9			0.4	
GFII			0.3		0.3			
LIMAY CCGT	1.8	0.4	0.1					
PAGBILAO CFTPP								0.1
SUAL CFTPP						0.1		
SUBIC POWER CORP			1.0	2.3	0.7	0.5	1.7	
THERMA MOBILE						0.3	1.2	0.1
TRANS-ASIA			1.3	3.6	0.7	0.3	2.3	

Table 70. PSFI by Billing Month - Visayas (Above PhP20,000/MWh)

Plant	PSFI (%) by Billing Month - Visayas (Above PhP20,000/MWh)				
	Apr	May	June	July	Aug
CEBU TPP 1		2.2			
CPPC DPP					0.1
EAUC DPP		0.3		0.3	
TPC (CARMEN)			0.1	0.3	
TPC (SANGI)	0.1			0.6	

X. PIVOTAL SUPPLIERS

The Pivotal Supply Index (PSI) is a binary variable (1 for pivotal and 0 for not pivotal) which measures the frequency that a generating plant is pivotal in a particular period. A generator is pivotal if its capacity is needed to meet the demand requirements thus enabling pivotal generators with greater opportunity to influence the market price.

The higher the system demand, or if a large plant is on outage, the higher the probability of plants qualifying as pivotal. Note that the calculation for pivotal suppliers was based on regional data for the billing months of January, February, March, August and September as well as the affected trading intervals in July, on account of the regional market suspension during the 1st quarter of 2014 and the July billing month. Meanwhile, the maintenance outage of the HVDC Interconnection from 16 August to 24 September physically separated the Luzon and Visayas, affecting the August to September billing months.

The list of the most frequent pivotal suppliers in Luzon and Visayas are shown in the Figures below. In Luzon, natural gas plant Kepco Ilijan topped the list of pivotal suppliers in 2014, followed closely by coal plant Sual, natural gas plant Sta. Rita, coal plants Pagbilao, Masinloc, natural gas plant San Lorenzo, coal plants Quezon and Mariveles. It was observed that the frequency by which generators became pivotal increased significantly during the April, May, June and July billing months, when the demand-generation balance was most tight. On the other hand, the billing months of October, November and December posted the lowest incidence of pivotal supply, consistent with the declining trend in both the system demand and supply during the last quarter of the year. Conversely, system demand was highest during the billing months of May, June and July.

Similarly in the Visayas, generators became pivotal more frequently during the summer months of April, May and June. Topping the list of pivotal suppliers is the geothermal plant Leyte A, followed by coal plants CEDC, KSPC and PEDC. The highest incidence of pivotal suppliers was however posted in July, consistent with the tight energy balance recorded during the billing month. The presence of pivotal suppliers was observed to be less frequent in October and November while the December billing month was marked with the absence of pivotal supply. The imported power from Luzon through the HVDC Interconnection during said months augmented the supply level in the Visayas, and consequently improved the region's generation-demand balance.

Figure 57. Pivotal Supplier Frequency Index - Luzon

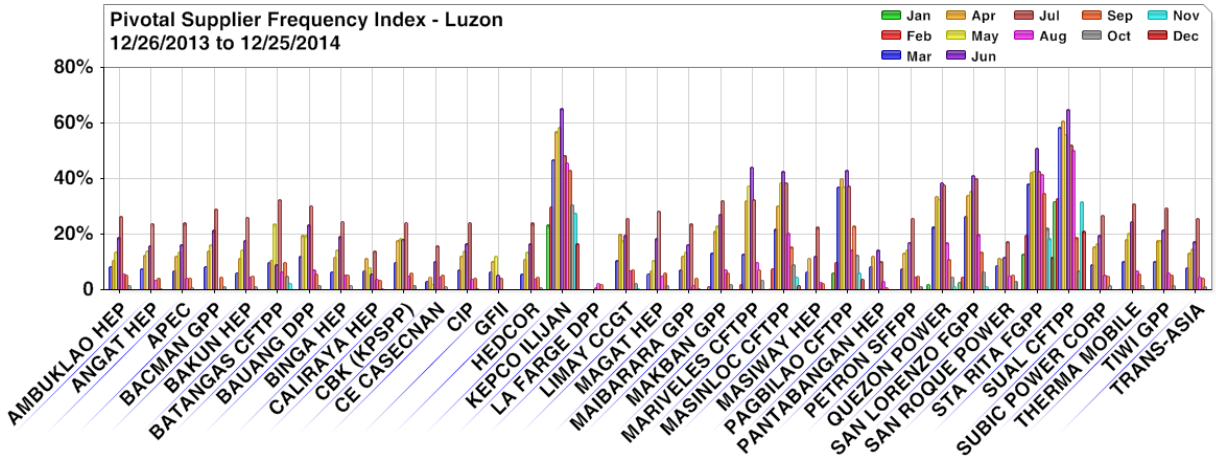


Figure 58. Pivotal Supplier Frequency Index - Visayas

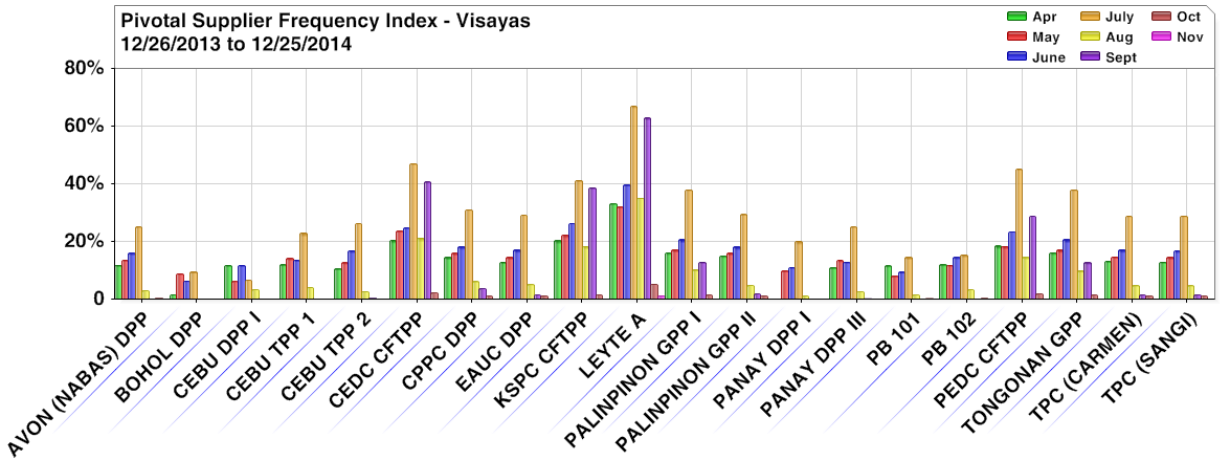


Table 71. Pivotal Supplier Frequency Index by Billing Month - Luzon

Plant	Pivotal Supplier Index (%) by Billing Month - Luzon, 2014											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
AMBUKLAO HEP	0.0	0.3	8.3	10.8	13.6	18.7	26.3	5.6	5.4	1.4	0.0	0.0
ANGAT HEP	0.0	0.0	7.4	12.4	13.9	16.0	23.9	3.5	4.2	0.7	0.0	0.0
APEC	0.0	0.0	6.7	12.2	13.8	16.3	24.0	4.0	4.2	0.8	0.0	0.0
BACMAN GPP	0.0	0.0	8.3	14.1	16.1	21.4	28.9	0.0	4.6	1.0	0.0	0.0
BAKUN HEP	0.0	0.0	6.1	11.4	14.4	17.9	26.0	4.7	5.0	1.3	0.0	0.0
BATANGAS CFTPP	0.1	0.4	9.8	10.8	23.6	9.0	32.4	6.3	9.9	4.7	2.4	0.4
BAUANG DPP	0.0	0.4	11.9	19.5	19.4	23.5	30.3	7.0	5.5	1.5	0.0	0.0
BINGA HEP	0.0	0.0	6.4	11.7	14.2	19.1	24.6	5.2	5.4	1.4	0.0	0.0
CALIRAYA HEP	0.0	0.0	6.8	11.3	8.1	5.5	13.9	3.9	3.5	0.7	0.0	0.0
CBK (KPSPP)	0.0	0.4	10.0	17.7	18.3	18.1	24.2	5.0	5.9	1.5	0.0	0.0
CE CASECNAN	0.0	0.0	3.0	4.7	1.9	10.1	15.8	4.4	5.1	1.3	0.0	0.0
CIP	0.0	0.0	7.0	12.2	13.9	16.7	24.2	3.8	4.2	0.7	0.0	0.0
GFII	0.0	0.0	6.5	10.1	12.2	5.1	4.3	0.0	0.0	0.0	0.0	0.0
HEDCOR	0.0	0.0	5.5	11.0	13.5	16.7	24.0	3.9	4.4	0.8	0.0	0.0
KEPCO ILIJAN	23.3	29.8	46.7	56.9	58.5	65.2	48.3	45.8	43.0	30.6	27.6	16.7
LA FARGE DPP	0.0	0.0	0.0	0.0	0.0	0.0	0.8	2.4	1.7	0.1	0.0	0.0
LIMAY CCGT	0.0	0.0	10.4	20.2	17.6	19.6	25.8	6.9	7.3	2.2	0.7	0.0
MAGAT HEP	0.0	0.1	5.8	6.9	10.4	18.4	28.2	5.0	6.0	1.7	0.0	0.0
MAIBARARA GPP	0.0	0.0	7.0	12.2	13.8	16.4	23.9	1.6	4.2	0.7	0.0	0.0
MAKBAN GPP	0.1	1.1	13.2	21.0	22.9	27.0	32.1	7.3	5.9	1.8	0.0	0.0
MARIVELES CFTPP	0.4	1.7	12.8	32.0	37.5	44.1	32.4	9.9	7.3	3.5	0.4	0.0
MASINLOC CFTPP	0.5	7.7	21.9	30.1	38.6	42.5	38.5	20.4	15.3	9.0	4.6	1.5
MASIWAY HEP	0.0	0.0	6.5	11.4	0.0	12.1	22.6	2.8	2.4	0.0	0.0	0.0
PAGBILAO CFTPP	5.9	9.9	36.9	40.2	36.8	42.9	37.2	14.5	23.0	12.5	5.9	3.9
PANTABANGAN HEP	0.0	0.0	8.5	12.2	0.0	14.2	10.0	3.1	0.8	0.0	0.0	0.0
PETRON SFFPP	0.0	0.0	7.4	13.2	14.4	17.1	25.7	4.7	4.8	1.0	0.0	0.0
QUEZON POWER	2.0	0.3	22.8	33.7	32.5	38.6	37.8	16.9	10.9	4.4	1.2	0.0
SAN LORENZO FGPP	2.8	4.4	26.3	34.0	35.4	41.1	40.0	19.9	13.6	6.4	1.2	0.4
SAN ROQUE POWER	0.0	0.3	8.8	11.4	11.1	11.7	17.4	5.0	5.4	2.9	0.0	0.0
STA RITA FGPP	12.8	19.8	37.9	42.3	42.6	51.1	42.6	41.5	34.5	22.1	18.4	11.5
SUAL CFTPP	31.7	32.8	58.3	60.8	56.0	65.1	52.1	50.3	18.7	6.7	31.6	21.1
SUBIC POWER CORP	0.0	0.0	8.9	15.6	16.5	19.5	26.7	5.1	4.8	1.4	0.0	0.0
THERMA MOBILE	0.0	0.3	10.1	18.3	20.3	24.6	30.8	6.7	5.5	1.4	0.0	0.0
TIWI GPP	0.0	0.3	10.1	17.6	17.6	21.6	29.6	5.9	5.4	1.4	0.0	0.0
TRANS-ASIA	0.0	0.0	7.9	13.2	14.6	17.2	25.6	4.6	4.3	1.0	0.0	0.0

Table 72. Pivotal Supplier Frequency Index by Billing Month - Visayas

Plant	Pivotal Supplier Index (%) by Billing Month - Visayas, 2014							
	Apr	May	June	July	Aug	Sept	Oct	Nov
AVON (NABAS) DPP	11.7	13.6	16.0	25.0	9.0	0.3	0.7	0.0
BOHOL DPP	1.5	8.8	6.2	9.3	0.0	0.0	0.0	0.0
CEBU DPP I	11.7	6.1	11.7	6.7	9.4	0.3	0.0	0.0
CEBU TPP 1	12.0	14.2	13.6	22.9	12.2	0.3	0.0	0.0
CEBU TPP 2	10.5	12.6	16.8	26.3	10.2	0.7	0.0	0.0
CEDC CFTPP	20.4	23.5	24.6	47.1	74.7	40.7	2.1	0.0
CPPC DPP	14.4	16.0	18.1	31.0	19.4	3.5	1.3	0.0
EAUC DPP	12.8	14.4	16.9	29.2	15.3	1.6	1.0	0.0
KSPC CFTPP	20.3	22.4	26.3	41.1	69.2	38.6	1.5	0.0
LEYTE A	33.1	31.9	39.5	67.1	89.9	62.9	5.1	1.2
PALINPINON GPP I	16.1	17.1	20.6	37.9	41.5	12.9	1.4	0.0
PALINPINON GPP II	15.1	16.0	18.0	29.3	15.1	1.7	1.3	0.0
PANAY DPP I	0.0	9.7	11.0	20.0	3.1	0.0	0.0	0.0
PANAY DPP III	10.9	13.5	12.9	25.0	7.1	0.5	0.0	0.0
PB 101	11.6	7.9	9.3	14.4	3.9	0.0	0.6	0.0
PB 102	12.0	11.8	14.5	15.3	10.1	0.4	0.7	0.0
PEDC CFTPP	18.4	18.3	23.4	45.1	60.6	28.9	1.7	0.0
TONGONAN GPP	16.1	16.9	20.6	37.9	40.9	12.6	1.4	0.0
TPC (CARMEN)	13.2	14.7	16.9	28.8	14.9	1.3	1.0	0.0
TPC (SANGI)	12.9	14.4	16.8	28.8	14.1	1.3	1.3	0.0

XI. RESIDUAL SUPPLY

The Residual Supply Index (RSI) is a dynamic continuous index that provides additional information to the concept of pivotal supplier (PSI), by measuring the ratio of available generation without a generator to the total generation required to supply the demand. It identifies a generator based on offers, with market power and has the ability to raise prices above the level of effective competition. The Market RSI is measured as the lowest RSI among all generators in the market. A Market RSI less than 100 percent indicates the presence of pivotal generator/s or supplier/s.

The Figures below indicate the hourly trend of the market RSI for the billing year, plotted against pivotal suppliers. Compared with the other billing months, July had the highest percentage of Market RSI below 100 percent (posted at a high of 82.9 percent), indicating the presence of pivotal generators most of the time during the month. It can be recalled that the July billing month also incurred the highest occurrence of trading intervals with low reserve margin (RMI), clearly manifesting that demand and supply conditions were most tight during the said month. Consequently, July posted the highest monthly average market price for the year. The RSI distribution at the below 100 percent mark were also relatively high during the billing months of March, April, May and June posted at 65.0 percent, 61.0 percent, 60.6 percent and 68.3 percent. Notably, these are the same months characterized by tight supply and demand, as previously discussed.

On the other hand, as better supply and demand condition prevailed in the market during the last quarter of the year, the frequency of the occurrence of market RSI below 100 percent steadily declined to its lowest at 21.3 percent in December.

The market RSI exceeded the 100 percent mark at an average of about 52.7 percent of the time in 2014, higher than the average of 39.8 percent in year 2013, indicating the decrease

in the number of pivotal suppliers on a year to year comparison. It can be recalled that the occurrence of RSI values at the below 100 percent mark in 2013 were pulled higher during the billing months of April and May, November and December when demand and supply conditions were at its most tight.

Looking at the regional RSI levels in August and September during the shutdown of the HVDC Interconnection indicate that better RSI levels were obtained in Luzon during the period while a significantly high RSI level at the below 100 percent mark was incurred in the Visayas for the August billing month. Note that the regional screening for RSI in the Visayas consistently showed the same high RSI level at below 100 percent, the occurrence of which averaged at a high of about 90.6 percent of the time in 2014. The same indicates the strong presence of regional pivotal supplier/s in the Visayas which available capacity is necessary to meet the demand requirement in the region.

Note that trading intervals with below 100 percent RSI had 1 or more pivotal suppliers. Conversely, trading intervals with above 100 percent RSI had no pivotal suppliers.

Figure 59. RSI Based on Offered Capacity - 1st Half

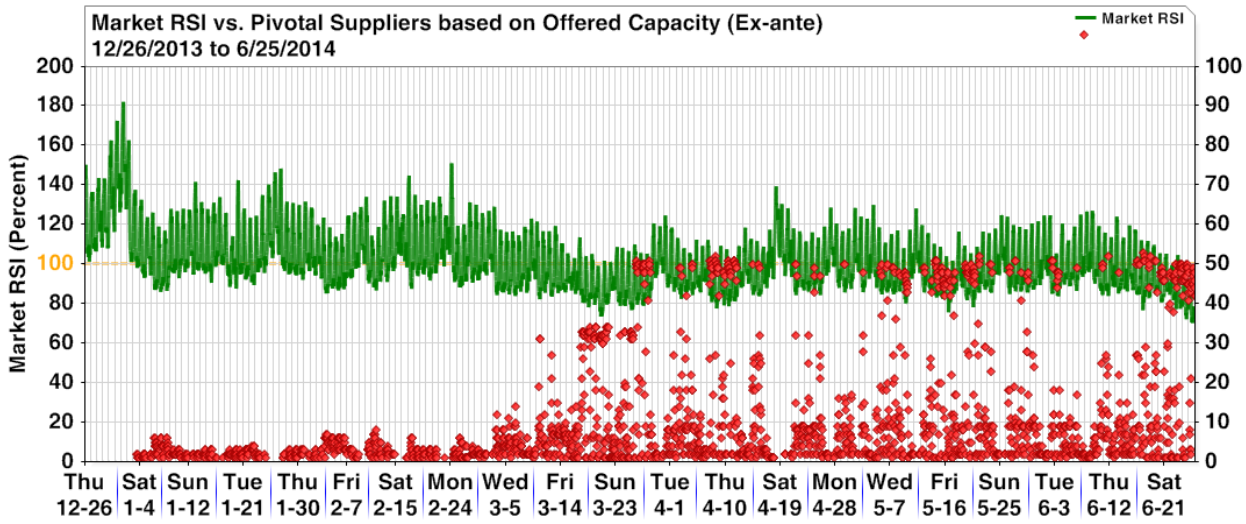


Figure 60. RSI Based on Offered Capacity - 2nd Half

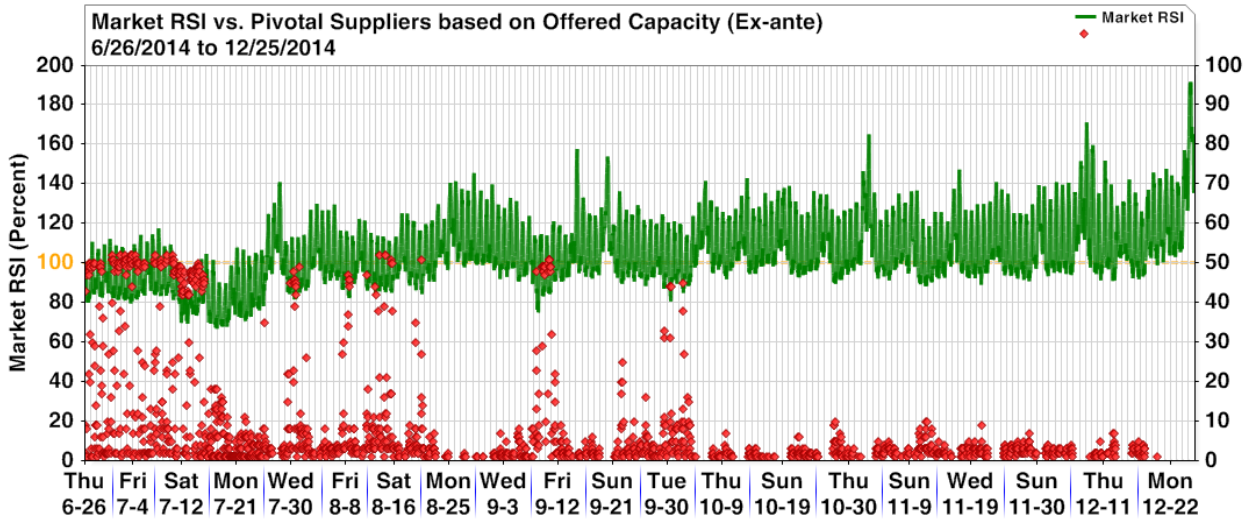


Table 73. Market RSI Summary - 2014

	Market RSI (%) Distribution by Billing Month - 2014												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec	Annual Avg.
More than or equal to 100%	71.6	63.7	35.0	39.0	39.4	31.7	17.1	52.6	65.3	69.4	66.7	78.7	52.7
Less than 100%	28.4	36.3	65.0	61.0	60.6	68.3	82.9	47.4	34.7	30.6	33.3	21.3	47.3

Table 74. Market RSI Summary - 2013

	Market RSI (%) Distribution by Billing Month, 2013												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual Avg.
More than or equal to 100%	53.0	50.8	40.3	28.5	30.7	39.8	51.5	52.6	51.7	33.2	18.7	25.8	39.8
Less than 100%	47.0	49.2	59.7	71.5	69.3	60.2	48.5	47.4	48.3	66.8	81.3	74.2	60.2

Figure 61. RSI Based on Offered Capacity - Luzon, 1st Half

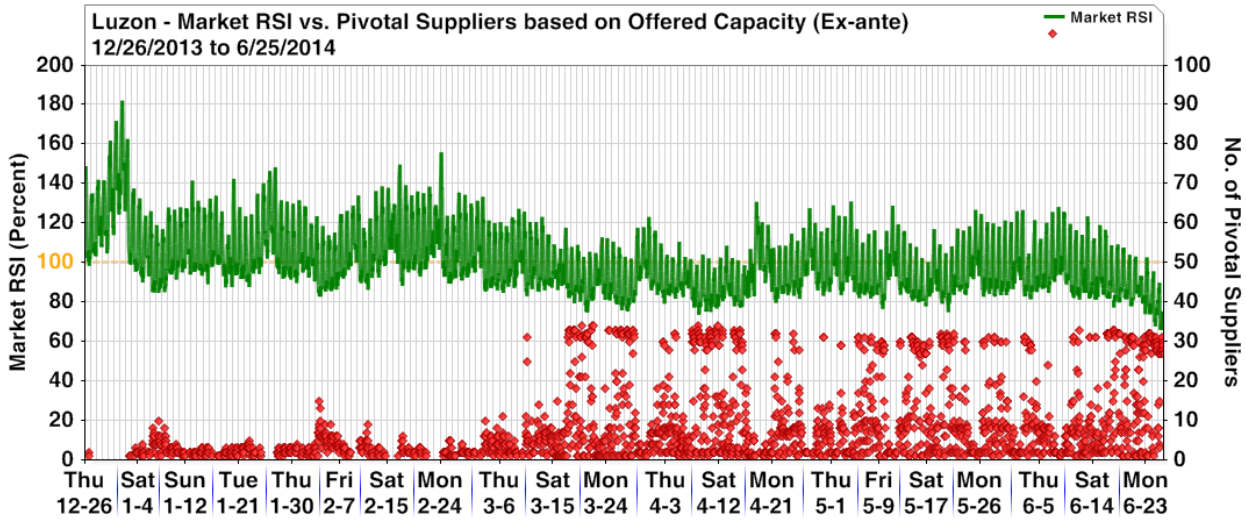


Figure 62. RSI Based on Offered Capacity - Luzon, 2nd Half

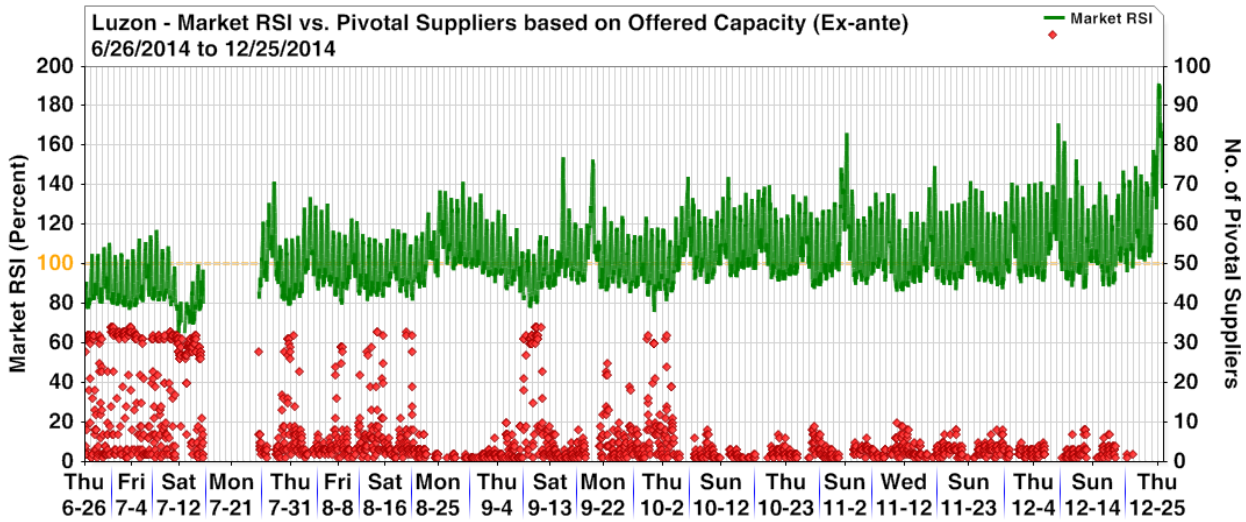


Table 75. Market RSI Summary - Luzon, 2014

	Market RSI (%) Distribution by Billing Month - Luzon, 2014												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual Avg.
More than or equal to 100%	68.0	65.5	41.2	23.1	35.6	28.8	16.8	47.2	53.9	62.5	60.1	72.0	48.8
Less than 100%	32.0	34.5	58.8	76.9	64.4	71.2	83.2	52.8	46.1	37.5	39.9	28.0	51.2

Figure 63. RSI Based on Offered Capacity - Visayas, 1st Half

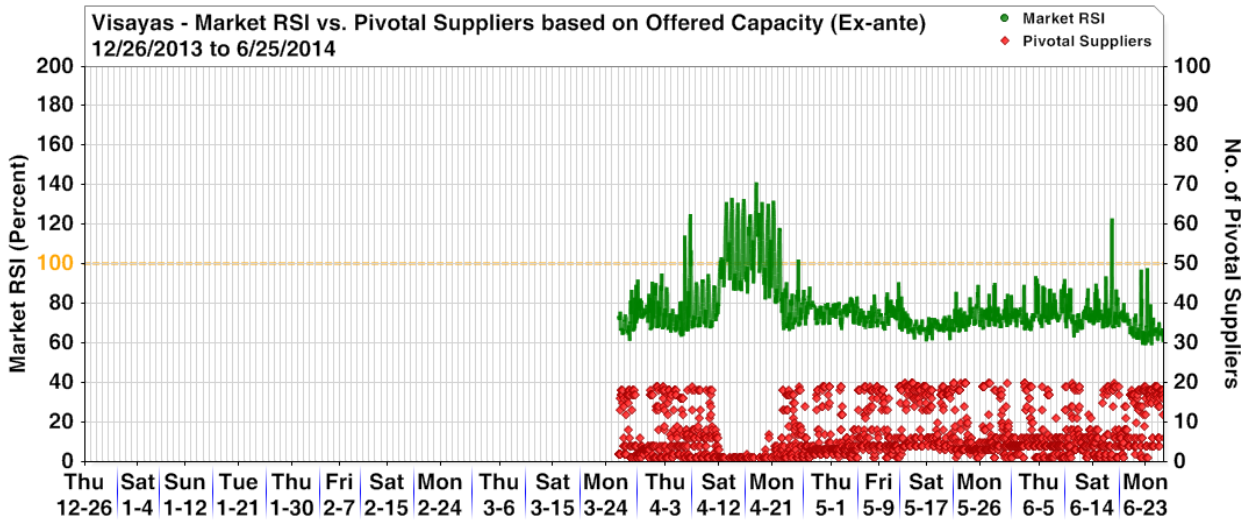


Figure 64. RSI Based on Offered Capacity - Visayas, 2nd Half

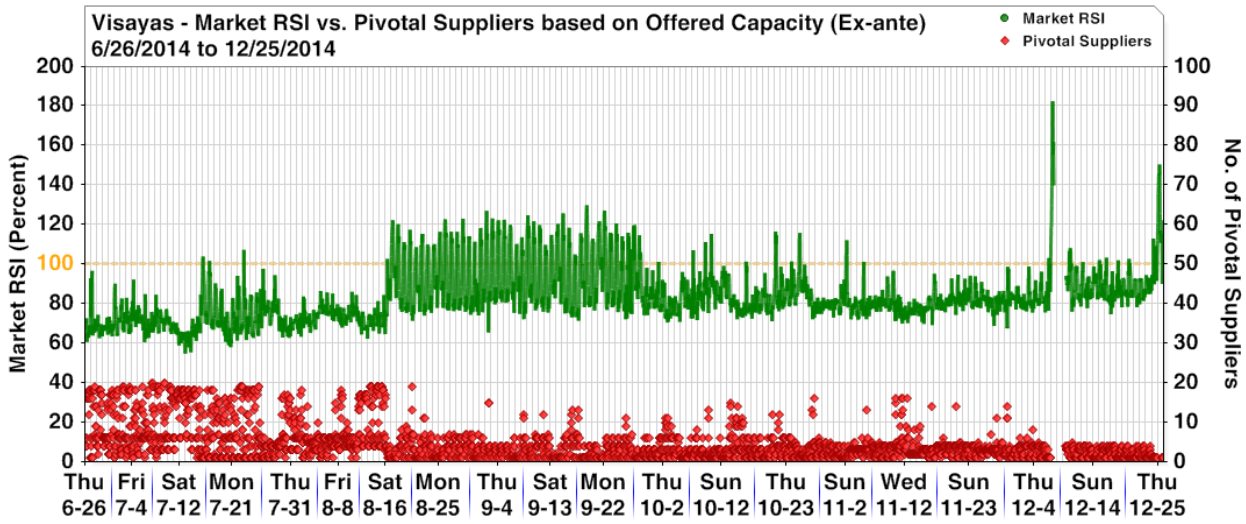


Table 76. Market RSI Summary - Visayas, 2014

	Market RSI (%) Distribution by Billing Month - Visayas, 2014									
	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Avg.
More than or equal to 100%	20.2	0.0	0.3	0.7	10.1	36.8	5.7	0.9	8.9	9.4
Less than 100%	79.8	100.0	99.7	99.3	89.9	63.2	94.3	99.1	91.1	90.6

XII. GENERATOR OFFER PATTERN

Generation offer index aims to determine trends or strategy in the offer behaviour of generators. The following Figures show the offer pattern of generating plants according to resource type.

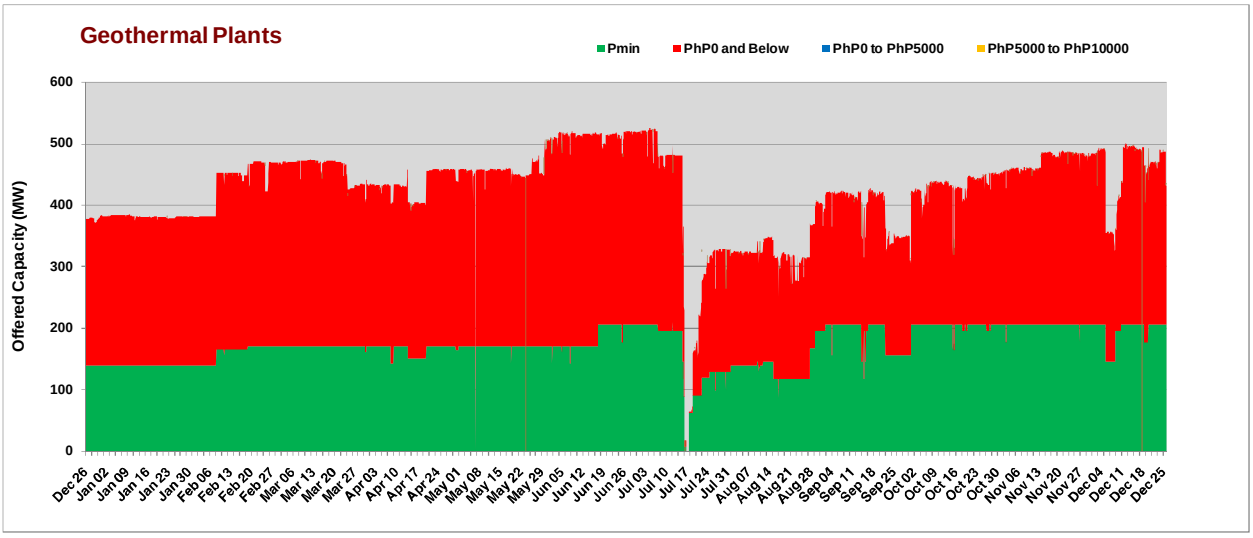
Offer prices of the geothermal plants in Luzon remained consistently low in 2014, as all of its offers were priced at PhP5000/MWh and below throughout the year. Capacity offers of geothermal plants were observed to be higher during the first semester of 2014 and were at its lowest during the July and August billing months.

Higher capacity offers were noted with the submission of offers of Bacman 1 and Maibarara beginning 08 February following the conclusion of their respective commissioning tests. Meanwhile, dip in the level of its capacity offers was noted beginning 16 July attributed to the power system disturbance caused by typhoon Glenda which resulted in the ERC's market suspension in Luzon. Increased unavailability of geothermal plants in July and August influenced the decline in its capacity offers during said months, while resumption of operations of plants on outage gave rise to the increase in capacity offers of Luzon geothermal plants in the September billing month.

It is significant to note the higher capacity offers of Luzon geothermal plants beginning 01 October driven by the submission of capacity offers of Bacman 1. The same ended the designation of Bacman 1 as a Must-Run-Unit (MRU) which started on 22 August. Its last MRU designation was recorded on 26-30 September.

Luzon geothermal plants also registered a drop in its capacity offers from 05-09 December, on account of the deactivated shutdown of Bacman 1, 2 and 3 within said dates, following the passage of typhoon Ruby in the region.

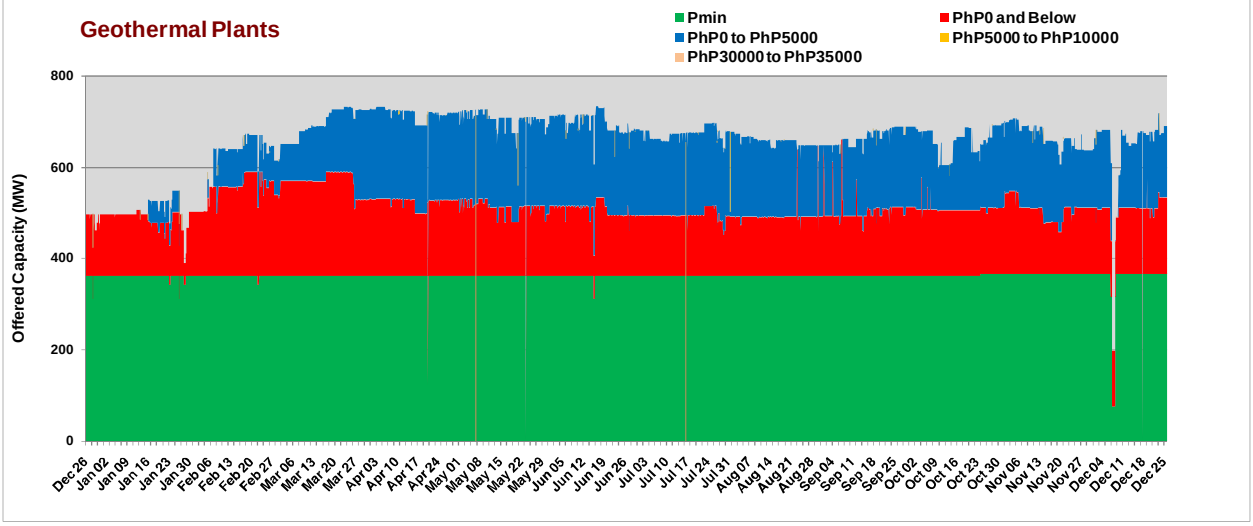
Figure 65. Geothermal Plants Offer Pattern - Luzon



Similarly, almost 100 percent of the offered capacities of Visayas geothermal plants were consistently priced at PhP5,000/MWh and below. As shown in the next succeeding Figure, the capacity offers submitted by geothermal plants in the Visayas remained almost consistent throughout the year. Noteworthy is the steady increase of its capacity offers from the February billing month, as more geothermal plants in the region resumed its operations following the power system disturbance brought about by typhoon Yolanda in November 2013. Further increase in the capacity offers of geothermal plants were observed beginning the April billing month with the lifting of the ERC's market suspension on 26 March.

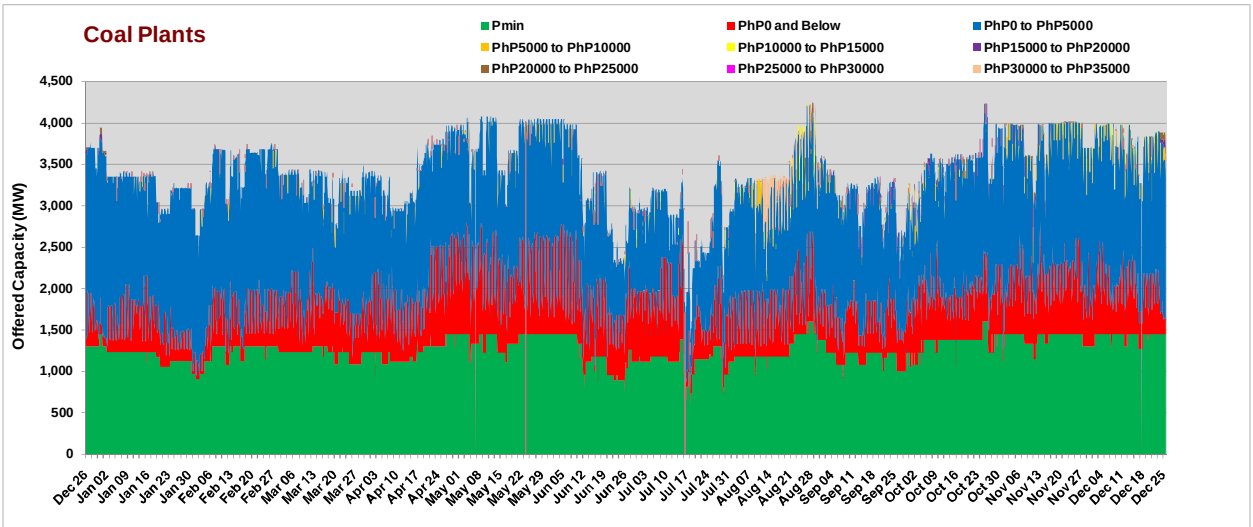
The noticeable dip in the capacity offers of geothermal plants on 07-08 December was during the market intervention event in the Visayas, following the outages of Palinpinon 1 Unit 3, and Leyte 2 on top of the existing outage of Upper Mahiao 4.

Figure 66. Geothermal Plants Offer Pattern - Visayas



Coal plants had relatively low offer prices in 2014. In Luzon, about 98.6 percent of the its capacity offers were offered at a price below Php5,000/MWh. Capacity offers noticeably dropped in July due to the high outage incidence among Luzon coal plants.

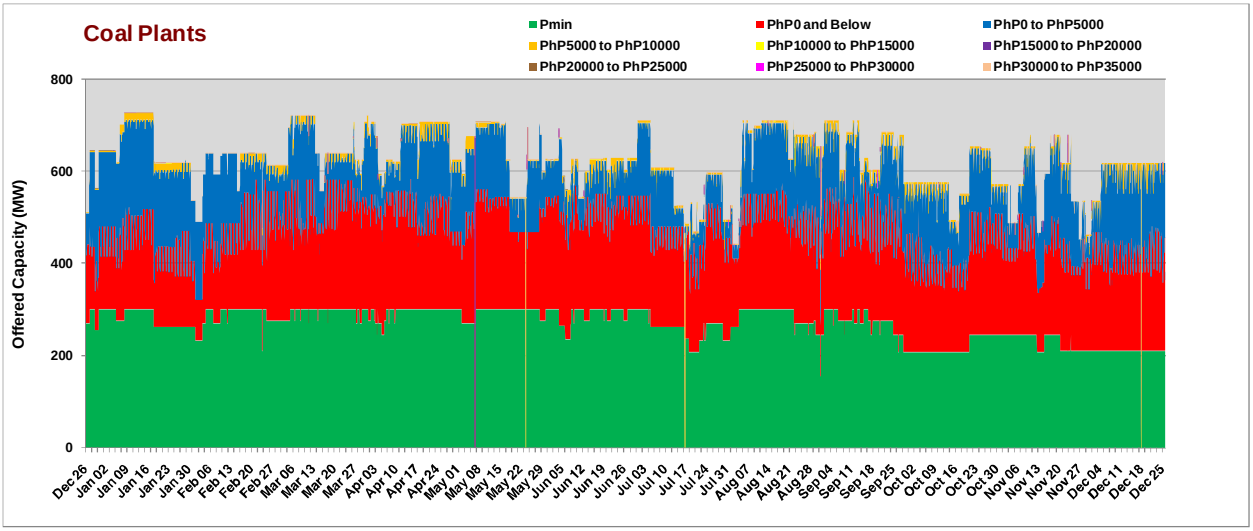
Figure 67. Coal Plants Offer Pattern - Luzon



Visayas coal plants had about 98.1 percent of their offered capacities priced at below Php5,000/MW, while about 1.9 percent were priced between PhP5,000/MW to PhP10,000/MW. The remaining 0.2 percent were apportioned to prices above PhP30,000/MWh.

A notable decline in the offered capacities of Visayas' coal plants was observed in July, coincident to the high incidence of outages of Visayas coal plants during said month.

Figure 68. Coal Plants Offer Pattern - Visayas

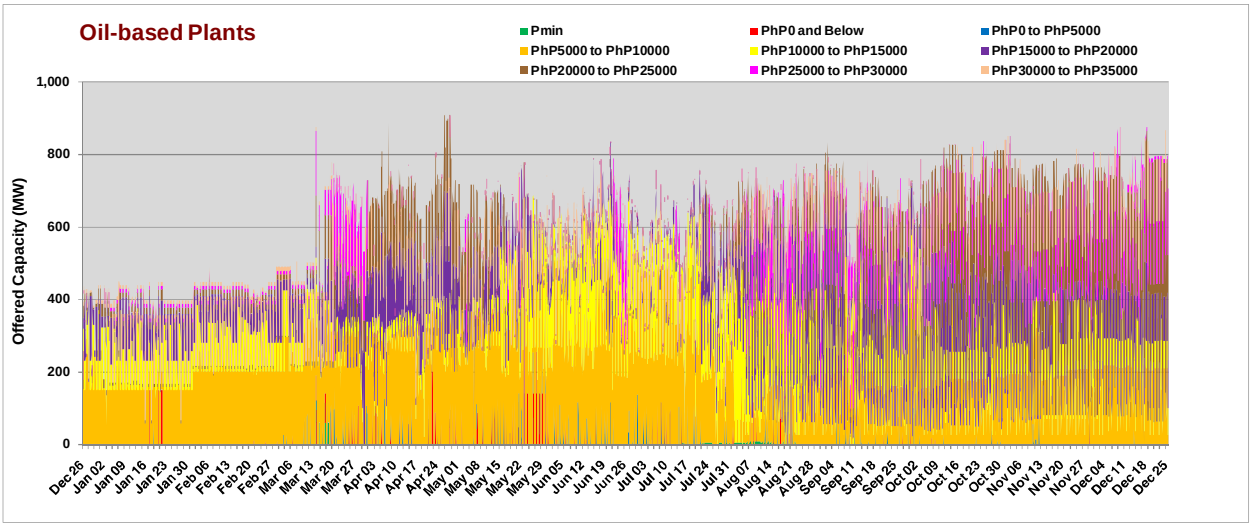


Oil-based plants remained to be the most expensive source of power among all plant types, as indicated by its high offer prices. For the year 2014, offer prices of oil-based plants in Luzon were consistently high as about 33.4 percent of its offers were priced above PhP20,000/MWh while about 31 percent were offers above PhP10,000/MWh to PhP20,000/MWh. The next 34.1 percent were offer prices within above PhP5,000/MWh to PhP10,000/MWh. The remaining 0.5 percent and 0.8 percent were offers apportioned between above PhP0/MWh to PhP5,000/MWh and PhP0/MWh and below, respectively.

Lower capacity offers were observed during the 1st quarter of 2014 attributable to the higher level of capacity not offered in the market among oil-based plants. However, the level of its capacity offers during the August to December billing months were sustained at higher levels than the previous months. Moreover, offer prices of Luzon oil-based plants was noted to have steadily increased all throughout said billing months, with about 78 percent to 81 percent of its offers retained at prices PhP10,000/MWh and above. Dispatch of oil-based plants, however, was more frequently observed in the April to July billing months, when market prices were also high.

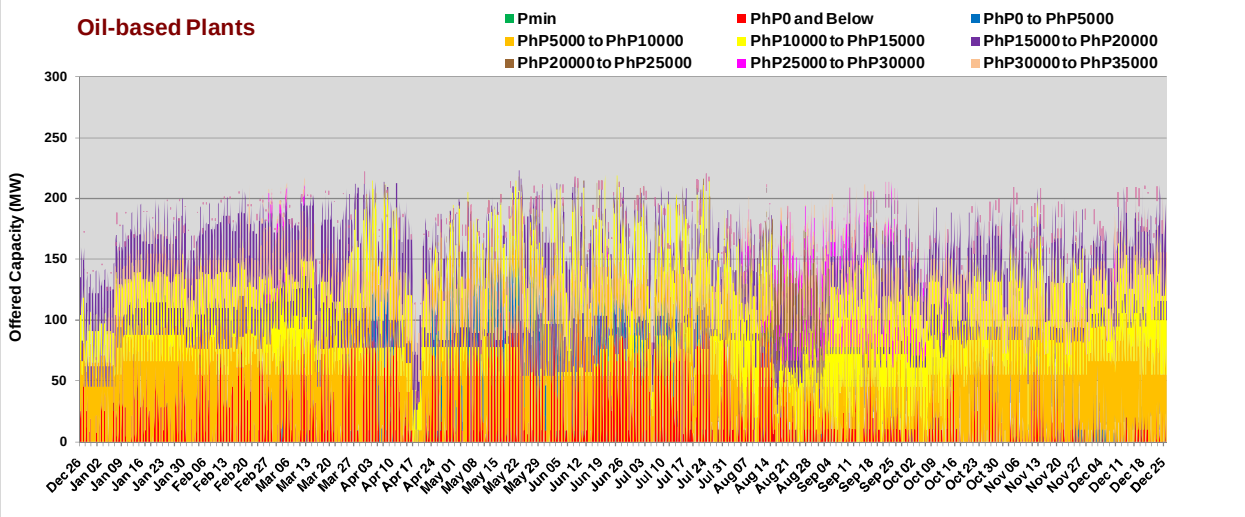
It is significant to mention that the year-on-year comparison of the offer prices of Luzon oil-based plants points to significantly higher offer prices in 2013. For the December 2013 billing month alone, 35.6 percent of its offers were at above PhP20,000/MWh, while 24 percent of the same were apportioned to prices at above PhP40,000/MWh. It may be recalled that the previous WESM offer price cap of PhP62,000/MWh was reduced to PhP32,000/MWh effective 04 January 2014.

Figure 69. Oil-based Plants Offer Pattern - Luzon



Similarly, a large percentage of the capacity offers from Visayas oil-based plants were priced higher than other resource types, with about 50.8 percent of its offers priced at above PhP10,000/MWh. Offers were priced consistently within the same range throughout the year, but was highest during the July billing month when offers above PhP10,000/MWh were posted at about 70.5 percent of its total offers. The dispatch of the capacity offers of Visayas oil-based plants nonetheless dropped from about 20.7 percent in August to only 9.8 percent in September. Higher level of dispatch was however noted in July.

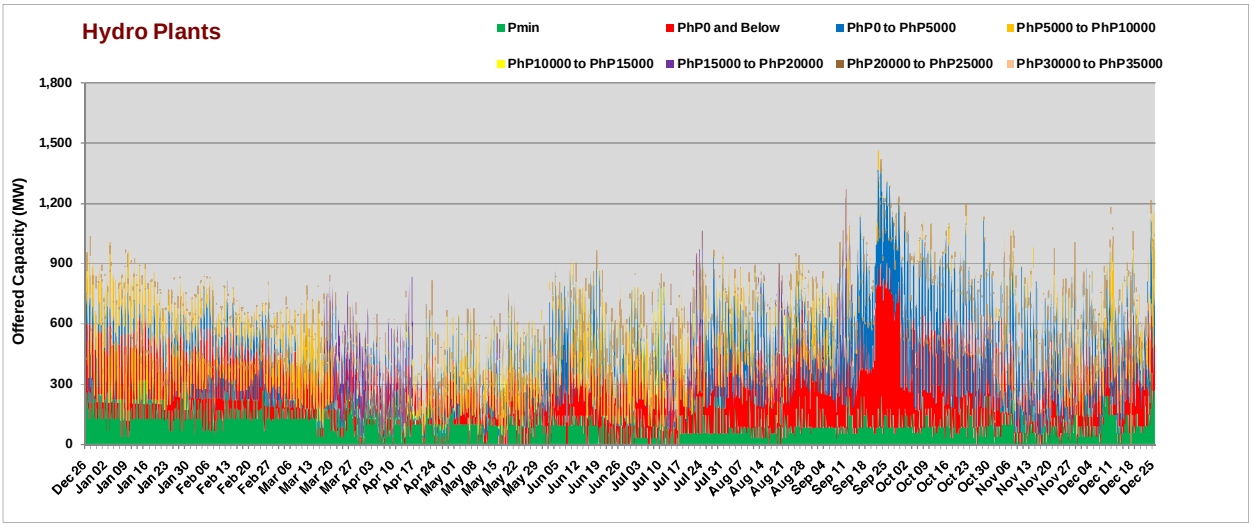
Figure 70. Oil-based Plants Offer Pattern - Visayas



The aggregate hourly offer pattern of hydro plants remained volatile in 2014 in terms of capacity and price. About 57.4 percent of its capacity was priced at PhP0/MWh and below while 23 percent was apportioned to prices between above PhP0/MWh to PhP5,000/MWh. Capacity offers within the higher price range of above PhP5,000/MWh to PhP10,000/MWh was noted at 16.2 percent and those above PhP10,000/MWh were at 3.3 percent.
Capacity offers were observed to be priced higher beginning the March billing month all throughout the summer months of April and May as well as in July, when capacity offers above PhP5,000/MWh rose to above 30 percent.

Offered capacity notably rose during the second half of the year during the cooler weather months/rainy season, particularly in September and October, noting that more capacities from hydro plants became available during said months. As illustrated in the preceding Sections, the level of monthly average outage capacity of hydro plants was lowest in October, while the lowest incidence of capacity not offered was incurred during the September billing month.

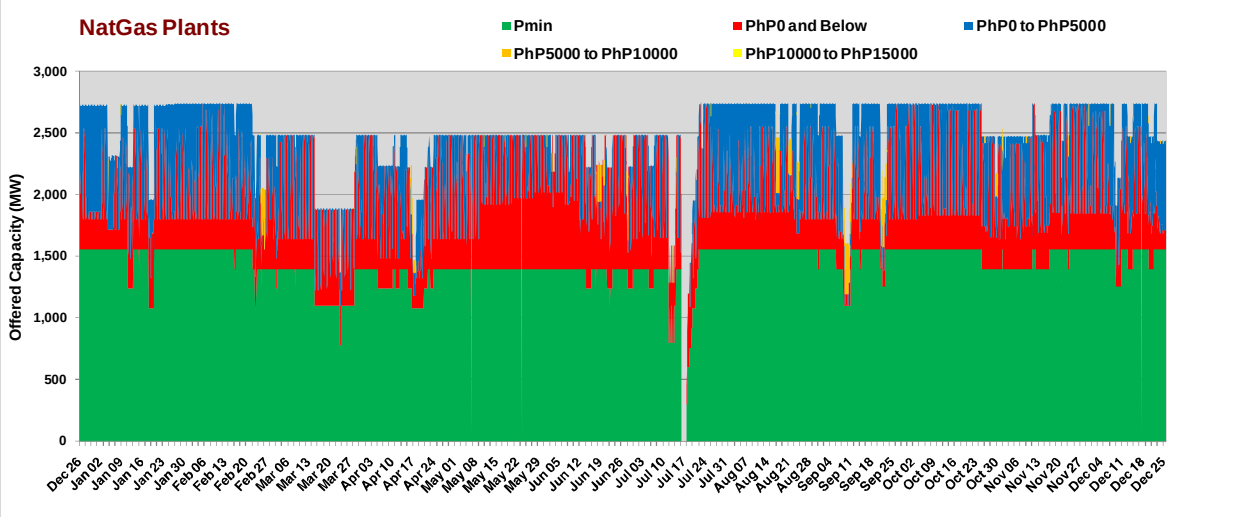
Figure 71. Hydro Plants Offer Pattern - Luzon



Another cheap source of power, 99.5 percent of the offered capacities of natural gas plants were priced below PhP5,000/MWh in 2014 while the remaining 0.5 percent was apportioned to prices within above PhP5,000/MWh to PhP10,000/MWh. Capacity offers posted during the billing months of March to July were notably lower than the remaining billing months as illustrated in Figure 71 below. The same follows the trend in the outage capacity of natural gas which were significantly high in March to July, thus influencing the decline in the capacity being offered by natural gas plants during said months.

Dip in the capacity offers of natural gas plants were noted on 16-19 July, during the ERC's market suspension in Luzon.

Figure 72. Natural Gas Plants Offer Pattern - Luzon



XIII. CAPACITY FACTOR

The capacity factor is calculated as the ratio of the scheduled capacity in the market of each of the plant type relative to its registered maximum capacity, registered less outage capacity, and maximum offered capacity. As shown in the Figures below, the monthly capacity factor of generation facilities show that the same varies depending on the energy resource type.

Natural gas plants were consistent in its high level of capacity factor in comparison with the other plant types. Natural gas plants posted the highest utilization based on registered capacity and registered less outage capacity at an average of 76.7 percent and 82.6 percent, respectively. The overall utilization of natural gas plants throughout the year indicates that it had fewer occurrences of outages, least capacity gaps, offered the most of their registered capacities, and had about 84.2 percent of its offered capacity dispatched in the market. Year-on-year comparison indicates the same trend in capacity factor for natural gas plants though utilization based on offered capacity was higher in the previous year at an average of 90.5 percent.

Geothermal plants had the highest capacity factor based on offered capacity, averaging at 100.6 percent for the covered year. As shown in the succeeding Figures, the capacity factor of geothermal plants exceeded the 100 percent mark for the most part of the year, attributable to the designation of several geothermal plants as MRUs. Monthly capacity factor based on registered capacity is relatively low, however, hovering at only about 60.8

percent while utilization in terms of registered less outage capacity was posted at 77.8 percent. The same is an indication of the consistently high outage level of geothermal plants, particularly among the geothermal plants in the Luzon region. Year-on-year comparison illustrates the same low level of utilization in 2013, with its capacity factor based on registered capacity and registered less outage capacity posted within the same low levels at 58.8 percent and 77.4 percent, respectively.

Note that higher RTD schedules than offered capacities were incurred in various billing months due to the MRU designation of identified geothermal plants in Luzon and Visayas. In Luzon, Bacman 2 was designated as MRU beginning 31 May 2013 and continued to run as MRU until 18 February 2014. It was again designated as MRU from 18, 26-30 August to 01 September relative to its conduct of commissioning tests. Bacman 1 was likewise noted to have been designated as MRU from 26 January to 07 February; and on several dates in August and September also related to the conduct of commissioning tests. Meanwhile, Maibarara was also designated as MRU from 26 January to 07 February. In the Visayas, Nasulo's designation as MRU during the May, June and July billing months likewise resulted in the higher dispatch schedule of geothermal plants than its offered capacities.

Decrease from the above 100 percent utilization of geothermal plants based on offered capacity was noted in the March and April billing months as both Bacman 1 and Maibarara started to offer their respective capacities in the market following the conclusion of their commissioning tests. Similar decline was noted in the November and December billing months following the commencement of Nasulo's commercial operations on 24 October which consequently stopped its MRU designation.

Coal plants on the other hand, posted a higher level of utilization in 2014 when compared to the previous year. Last year's utilization based on registered capacity and based on registered capacity averaged at 65.3 percent and 75.7 percent, respectively, while the same were posted at an average of 67.9 percent and 80.8 percent in 2014. This indicates that more capacities from coal plants became available in 2014 than in the previous year.

Capacity factor of coal plants in year 2014 based on registered capacity ranged from a low of 57.5 percent in January to a high of 77.8 percent in May. On the other hand, utilization based on available capacities ranged between 72.6 percent to 87.7 percent. Higher utilization levels were however observed in terms of offered capacity which averaged at 89.4 percent. Above 100 percent utilization was incurred by coal plants in July on account of the designation of some Luzon coal plants as MRU plants, mainly attributable to the commissioning tests undertaken by Calaca 2 in July which continued through the August billing month.

Capacity factors based on registered and net of outage capacity were lowest in the case of hydro plants, averaging only about 17.3 percent and 18.8 percent, respectively. Said low level of utilization demonstrates the limited submission of offers of hydro plants. Relative to this, it should be noted that hydro plants account for majority of the capacity gap in the market. On the other hand, higher level of capacity factor based on offered capacity, which averaged at 78.8 percent and ranged from 69.6 percent in May to 89.7 percent in September, was noted for hydro plants in 2014, indicating that capacities of hydro plants, when offered, were generally dispatched in the market.

While capacity factors of hydro plants displayed the same low levels in 2013 based on registered and net of outage capacity when compared to other resource types, the same is nonetheless higher than in 2014, averaging at about 20.8 percent and 23.6 percent, respectively, while utilization based on offered capacity averaged at 80.4 percent. The higher utilization levels of hydro plants in the previous year reflects its higher dispatch rate,

particularly during the second semester of 2013 when the supply and demand condition was generally tighter, paving the way for the more frequent dispatch of hydro plants which are priced relatively higher than other resource types except for oil-based plants.

Oil-based plants recorded the lowest capacity factor among all plant types, averaging at a mere 7.8 percent and 9.7 percent when measured in terms of registered capacity and registered less outage capacity. Considering its high offer prices, the capacity factor of oil-based plants in terms of offered capacity mirrors the same trend, posting its utilization at an annual average of only 20.4 percent. Significant increases in the level of utilization were posted by oil-based plants during the billing months of April, May, June and July at 56.4 percent, 46.7 percent, 41.7 percent and 59.8 percent, respectively, clearly manifesting the dispatch of the higher-priced oil-based plants due to the tight demand and supply prevailing on said months. Said trend illustrates the same low utilization posted by oil-based plants in the previous year, though higher capacity factor based on offered capacity was observed in 2014 from last year's 14.8 percent.

Figure 73. Capacity Factor - Luzon Natural Gas Plants

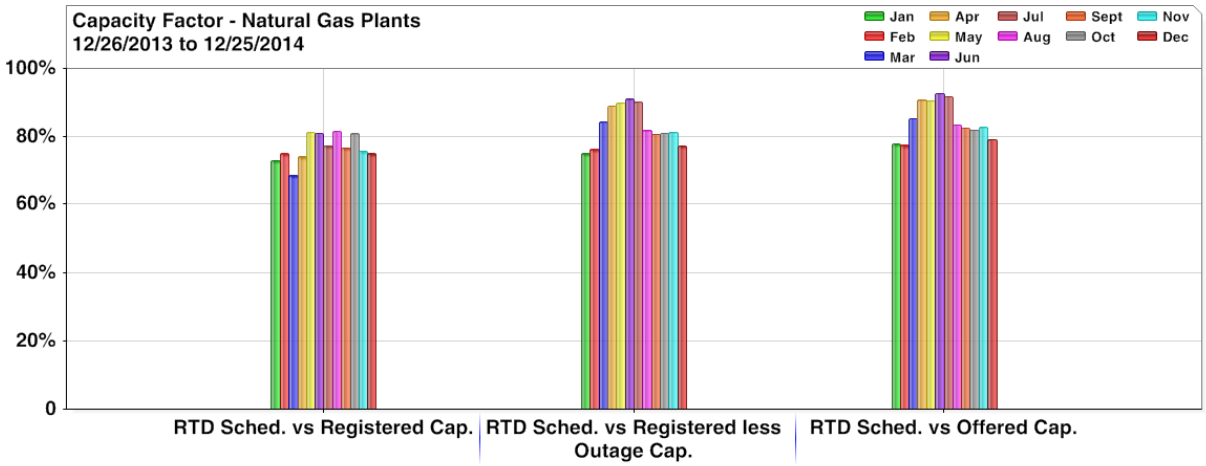


Figure 74. Capacity Factor - Luzon and Visayas Geothermal Plants

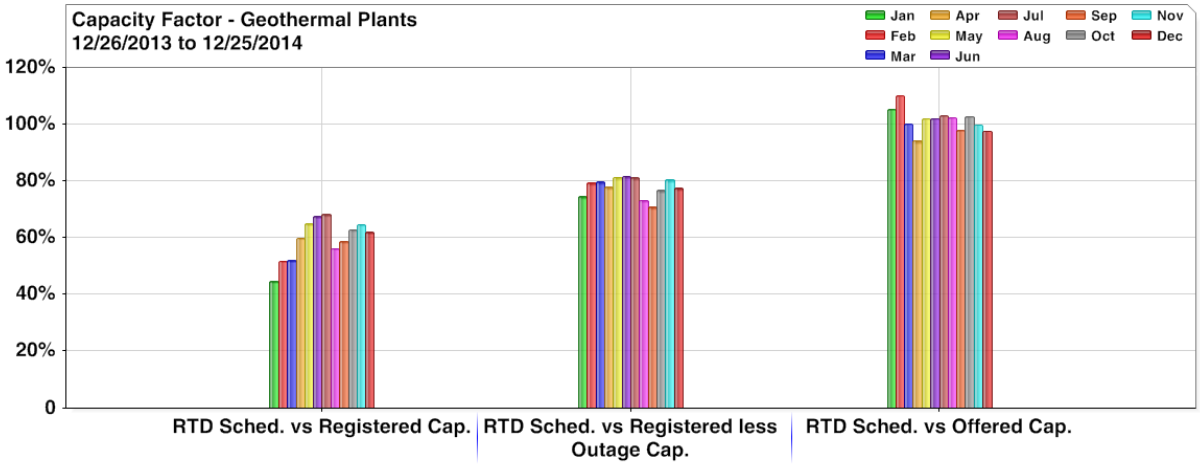


Figure 75. Capacity Factor - Luzon and Visayas Coal Plants

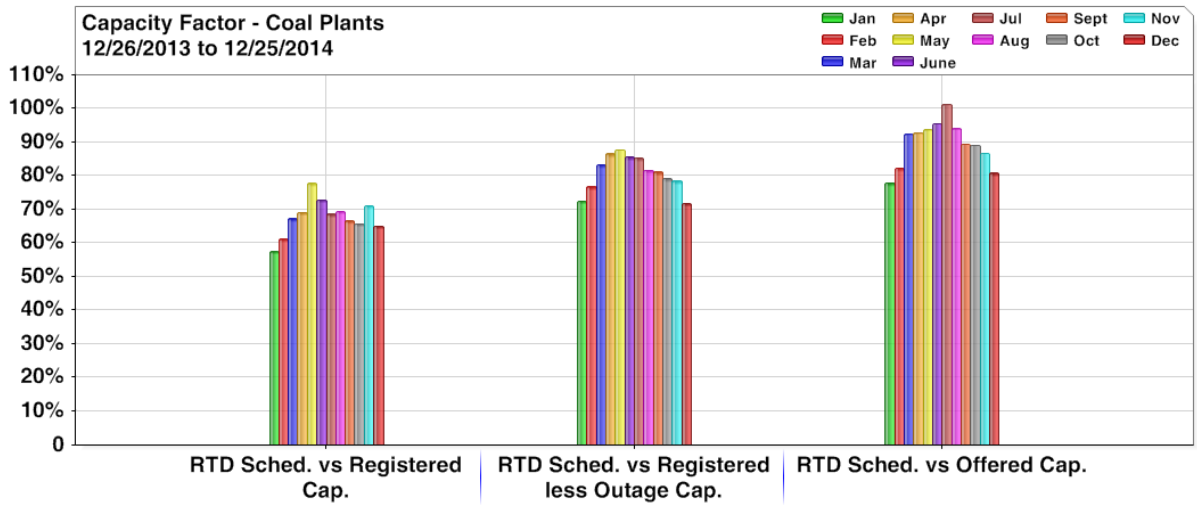


Figure 76. Capacity Factor - Luzon Hydro Plants

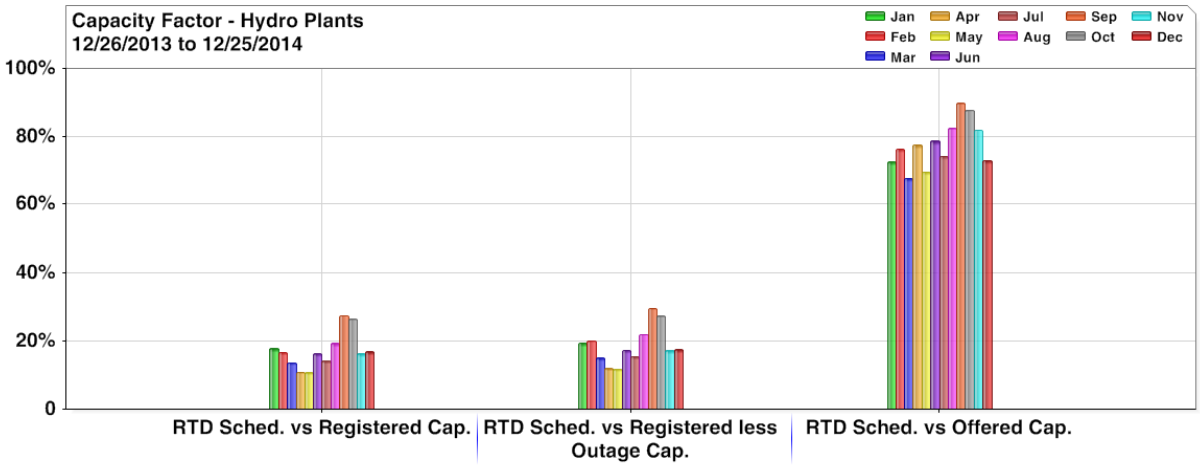


Figure 77. Capacity Factor - Luzon and Visayas Oil-based Plants

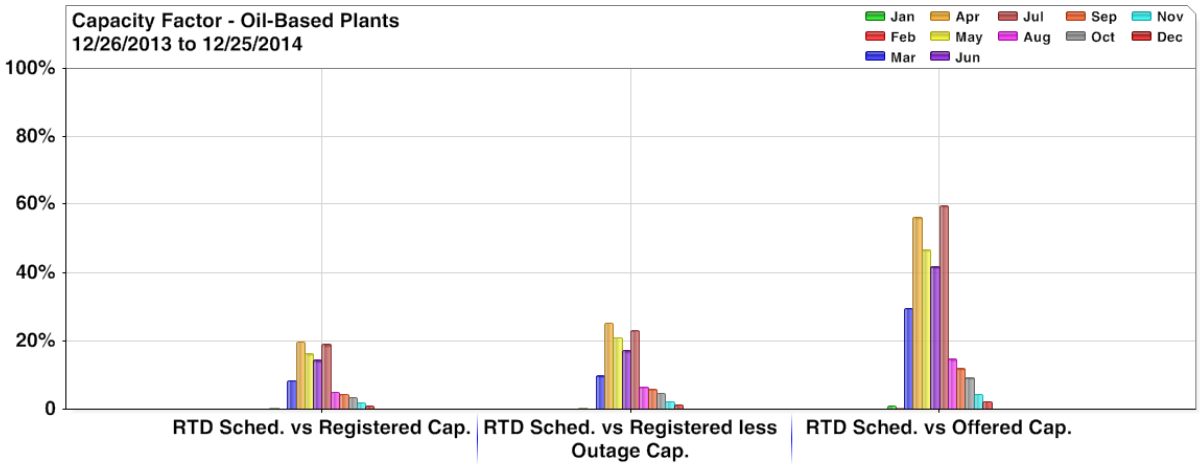


Table 77. Capacity Factor by Plant Type

Plant Type	Capacity Factor (%) by Billing Month, 2014 RTD Schedule vs. Registered Capacity												
	Jan	Feb	Mar	Apr	May	June	Jul	Aug	Sept	Oct	Nov	Dec	Annual Avg.
Coal	57.5	61.1	67.2	69.1	77.8	72.9	68.5	69.5	66.6	65.8	71.2	65.0	67.9
Natural Gas	73.0	75.0	68.5	74.0	81.2	81.1	77.3	81.5	76.7	80.8	75.8	75.0	76.7
Geothermal	44.5	51.8	51.9	60.0	64.9	67.6	68.2	56.3	58.7	62.9	64.8	62.0	60.8
Hydro	17.7	16.7	13.6	10.9	10.7	16.3	14.1	19.3	27.5	26.4	16.2	16.8	17.3
Oil-Based	0.5	0.3	8.5	19.7	16.4	14.3	19.1	4.9	4.3	3.4	1.7	0.9	7.8

Plant Type	RTD Schedule vs. Registered less Outage Capacity												
	Jan	Feb	Mar	Apr	May	June	Jul	Aug	Sept	Oct	Nov	Dec	Annual Avg.
Coal	72.6	76.7	83.4	86.5	87.7	85.7	85.4	81.7	81.1	79.2	78.5	71.8	80.8
Natural Gas	75.0	76.2	84.2	89.0	89.8	91.0	90.2	81.7	80.7	81.0	81.2	77.4	82.6
Geothermal	74.5	79.3	79.7	77.8	81.3	81.7	81.2	73.3	70.8	76.6	80.4	77.5	77.8
Hydro	19.4	19.9	15.0	11.9	11.7	17.3	15.4	21.9	29.6	27.3	17.1	17.4	18.8
Oil-Based	0.5	0.3	9.7	25.4	20.9	17.3	23.0	6.4	5.7	4.7	2.2	1.2	9.7

Plant Type	RTD Schedule vs. Offered Capacity												
	Jan	Feb	Mar	Apr	May	June	Jul	Aug	Sept	Oct	Nov	Dec	Annual Avg.
Coal	77.9	82.3	92.3	92.7	93.7	95.5	101.2	93.9	89.5	89.1	86.8	80.9	89.4
Natural Gas	77.9	77.4	85.4	90.6	90.5	92.8	91.8	83.5	82.6	81.9	82.7	79.1	84.2
Geothermal	105.1	110.0	100.0	94.2	101.9	101.9	102.9	102.2	97.7	102.6	99.7	97.7	100.6
Hydro	72.6	76.4	67.7	77.6	69.6	78.6	74.3	82.3	89.7	87.7	82.0	73.0	78.8
Oil-Based	0.9	0.5	29.6	56.4	46.7	41.7	59.8	14.7	11.9	9.1	4.5	2.3	20.4

Table 78. Capacity Factor by Plant Type - Luzon

Plant Type	Capacity Factor (%) by Billing Month, Luzon - 2014 RTD Schedule vs. Registered Capacity												
	Jan	Feb	Mar	Apr	May	June	Jul	Aug	Sept	Oct	Nov	Dec	Annual Avg.
Coal	57.5	61.1	67.2	68.0	77.4	72.3	67.5	68.7	66.3	64.9	70.6	65.2	67.2
Natural Gas	73.0	75.0	68.5	74.0	81.2	81.1	77.3	81.5	76.7	80.8	75.8	75.0	76.7
Geothermal	44.5	51.8	51.9	47.8	50.5	56.2	55.7	37.3	46.8	48.2	53.0	51.5	49.4
Hydro	17.7	16.7	13.6	11.0	10.7	16.3	14.2	19.4	27.6	26.5	16.2	16.8	17.3
Oil-Based	0.5	0.3	8.5	21.5	16.7	14.3	19.9	4.4	4.5	3.5	1.1	0.6	7.6

Plant Type	RTD Schedule vs. Registered less Outage Capacity												
	Jan	Feb	Mar	Apr	May	June	Jul	Aug	Sept	Oct	Nov	Dec	Annual Avg.
Coal	72.6	76.7	83.4	88.0	87.8	85.2	85.0	81.5	82.5	78.8	77.6	71.3	80.6
Natural Gas	75.0	76.2	84.2	89.0	89.8	91.0	90.2	81.7	80.7	81.0	81.2	77.4	82.6
Geothermal	74.5	79.3	79.7	78.1	76.6	77.9	78.1	62.8	68.7	71.9	78.3	80.7	75.6
Hydro	19.4	19.9	15.0	11.9	11.7	17.4	15.5	21.9	29.7	27.4	17.2	17.5	18.9
Oil-Based	0.5	0.3	9.7	29.5	22.6	18.0	25.4	6.1	6.4	5.2	1.5	0.9	9.8

Plant Type	RTD Schedule vs. Offered Capacity												
	Jan	Feb	Mar	Apr	May	June	Jul	Aug	Sept	Oct	Nov	Dec	Annual Avg.
Coal	77.9	82.3	92.3	93.8	93.2	95.3	102.7	94.6	91.4	90.2	86.0	80.4	89.4
Natural Gas	77.9	77.4	85.4	90.6	90.5	92.8	91.8	83.5	82.6	81.9	82.7	79.1	84.2
Geothermal	105.1	110.0	100.0	100.0	99.9	99.5	99.6	102.4	104.5	101.6	99.9	98.4	101.7
Hydro	72.6	76.4	67.7	77.6	69.6	78.6	74.3	82.3	89.7	87.7	82.0	73.0	78.8
Oil-Based	0.9	0.5	29.6	61.9	48.1	42.7	65.9	13.3	12.4	9.0	2.8	1.6	19.7

Table 79. Capacity Factor by Plant Type - Visayas

Plant Type	Capacity Factor (%) by Billing Month, Visayas - 2014									
	RTD Schedule vs. Registered Capacity									
	Apr	May	June	Jul	Aug	Sept	Oct	Nov	Dec	Annual Avg.
Coal	75.4	80.4	76.6	72.6	74.8	68.2	71.5	75.3	63.5	73.2
Geothermal	72.1	78.9	78.5	76.2	74.8	70.5	77.7	76.6	73.4	75.4
Oil-Based	12.2	15.1	14.3	16.8	7.0	3.6	3.3	4.3	2.1	8.8

Plant Type	RTD Schedule vs. Registered less Outage Capacity									
	Apr	May	June	Jul	Aug	Sept	Oct	Nov	Dec	Annual Avg.
Coal	79.6	87.6	88.0	87.0	82.7	74.3	81.8	84.5	75.4	82.3
Geothermal	77.7	84.4	84.5	82.7	79.7	72.2	80.0	81.8	75.2	79.8
Oil-Based	12.6	15.7	14.8	17.5	7.3	3.7	3.4	4.5	2.2	9.1

Plant Type	RTD Schedule vs. Offered Capacity									
	Apr	May	June	Jul	Aug	Sept	Oct	Nov	Dec	Annual Avg.
Coal	87.4	96.2	96.4	95.9	90.7	80.0	83.1	91.7	83.9	89.5
Geothermal	90.7	103.1	103.5	104.5	102.1	93.7	103.2	99.6	97.1	99.7
Oil-Based	34.1	41.5	38.1	45.8	20.7	9.9	9.6	12.9	5.8	24.7

XIV. TRANSMISSION CONGESTION FREQUENCY INDICES

This section presents the frequency of transmission congestions, which includes the constraints and congestion in generator and load-side substations, transmission lines, and those encountered by the submarine cable.

A. Frequency of active constraints (Ex-ante)

About 95.3 percent (5,249 constraints) of the total constraints (5,509 constraints) at the load-side transformers were observed in the Luzon region, while the Visayas region accounted for merely 4.7 percent (260 constraints).

Similar to the previous year, high occurrence of constraints were observed particularly at the Zapote and Dasmarinas substations in Luzon which accounted for majority or 69.7 percent (3,840 constraints) and 15 percent (828 constraints), respectively, of the total occurrences of load-side transformer constraints. Constraints at the Zapote transformer were noted to have occurred due to the violation of the contingency (N-1) requirement. Meanwhile, constraints at the load-side transformers in the Visayas were all attributable to base case constraints.

Table 80. Frequency of Constraints at Load-Side Transformers (Ex-Ante)

Region	Equipment	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Total
Luzon	Bauang Transformer							2						2
	Bayombong Transformer							2						2
	Concepcion Transformer							2						2
	San Jose EHV Transformer												4	4
	San Manuel EHV Transformer							2		3				5
	Gamu Transformer							4						4
	Laoag Transformer										26			26
	La Trinidad Transformer							6			1	3	1	11
	Labrador Transformer							3						3
	San Manuel (New) Transformer							2						2
	San Esteban Transformer							4			2		1	7
	San Manuel Transformer							4						4
	Santiago Transformer				26	95		7						128
	Tuguegarao Transformer				15	40	85	57						197
	Araneta Transformer										82	31		113
	Balintawak Transformer					2	8		1	9	2	4		26
	Dolores Transformer		9		1	16	2							28
	Muntinlupa Transformer					4					11			15
	Zapote Transformer	187	239	260	312	451	397	278	336	331	365	366	318	3840
	Dasmariñas Transformer	10	2	28	300	233	163	2	20	8	44	9	9	828
	Naga Transformer				2									2
Sub-Total (Luzon)		197	250	288	656	841	655	375	357	351	533	413	333	5249
Visayas	Babatngon Transformer										1		2	3
	Calbayog Transformer	4												4
	Maasin Transformer	20					1				1		5	27
	Ormoc Transformer												5	5
	Tongonan Transformer	22									1		1	24
	Cebu Transformer				9	18	31	8		10	2	1	4	83
	Lapu- Lapu Transformer	7	5											12
	Mandaue Transformer										24	12		36
	Quiot Transformer				2				1	1	5			9
	Ubay Transformer	14											1	15
	Sta. Barbara Transformer					1						10	31	42
Sub-Total (Visayas)		67	5	0	11	19	32	8	1	11	34	23	49	260
TOTAL		264	255	288	667	860	687	383	358	362	567	436	382	5509

Base case constraints at several generator transformers were likewise noted to have occurred for a total of 177 times during the billing year. The generator transformers in Luzon accounted for 33.3 percent (59 constraints) while 66.7 percent (118 constraints) were attributable to the Visayas generator transformers.

Table 81. Frequency of Constraints at Generator Transformers (Ex-Ante)

Region	Equipment	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Total
Luzon	Bakun Transformer				1					1	1			3
	BPPC Transformer				1		3							4
	Bacman Transformer					1		7		1	2		7	18
	Caliraya Transformer	3												3
	Kalayaan Transformer				2			1						3
	Makban A Transformer			1	1				3					5
	Makban B Transformer							5			3			8
	Malaya Transformer			2									1	3
	Tiwi C Transformer					1		1	5	1			4	12
Sub-Total (Luzon)		3	0	3	5	2	3	14	8	3	6	0	12	59
Visayas	Tongonan Transformer	15	1	4	1	5	2	2	1	8	1	1	27	68
	CEDC Transformer							2	1	2	2		2	9
	Palinpinon GPP 1 Transform	2	4		2	2								10
	Palinpinon GPP 2 Transform	1	3	1				2	4	9	3		1	24
	PEDC Transformer		1	1		1	1		1			2		7
Sub-Total (Visayas)		18	9	6	3	8	3	6	7	19	6	3	30	118
TOTAL		21	9	9	8	10	6	20	15	22	12	3	42	177

Transmission lines in both regions were likewise with constraints, due to contingency and base case constraints for a total of 1,038 times in 2014. About 84.4 percent (876 constraints) occurred in Luzon while the remaining 15.6 percent (162 constraints) were on the transmission lines in the Visayas region.

Table 82. Frequency of Constraints at Transmission Lines (Ex-Ante)

Region	Equipment	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Total
Luzon	Bauang-BPPC 230kV Line			1	44	25	1	7		3				81
	Bauang-Kadampat 230kV Line		2			1					1			4
	Bauang-La Trinidad 230kV Line					1		11		7				19
	Binga-La Trinidad 230kV Line												5	5
	Binga-San Manuel 230kV Line					1				8				9
	Botolan-Cawago 230kV Line					1				3				4
	BPPC-Kadampat 230kV Line					1								1
	San Manuel (EHV)-San Manuel (New) 230kV Tie-Line							2						2
	Kadampat-Sual 230kV Line						54							54
	Laoag-Currimao 115kV Line												1	1
	Labrador-Botolan 230kV Line					1				6				7
	Mexico-Hermosa 230kV Line										4			4
	Olongapo-Cawago 230kV Line									3				3
	San Jose (EHV)-San Jose 230kV Tie-Line									1			3	4
	San Manuel (New)-San Manuel (Old) 230kV Tie-Line							2		17				19
	Balintawak-San Jose 230kV Line					3	4			5	4	2		18
	Manila (Paco)-Muntinlupa (Sucat) 230kV Line									1				1
	Amadeo-Calaca 230kV Line					7			74	68	208			357
	Batangas-Makban A 230 kV Line									5				5
	Biñan-Calaca 230kV Line								2		10			12
	Calauan-Makban A 230 kV Line	1				6			27	8	8	3	3	56
	Dasmariñas-Amadeo 230kV Line								4	1				5
	Dasmariñas (EHV)-Dasmariñas 230kV Tie-Line				4									4
	Sta. Rosa-Calaca 230kV Line					6		1	29	50	115			201
Sub-Total (Luzon)		1	2	1	48	53	59	23	136	186	350	5	12	876
Visayas	Ormoc-Maasin 138kV Line	7											2	9
	New Naga-Cebu 138kV Line				8	1				2			1	12
	Quiot-New Naga 138kV Line				14	8		10	11	1				44
	New Naga-Samboan 138kV Line												1	1
	Toledo-New Naga 138kV Line					3				3	12	5		23
	Calung-Calung-Toledo 138kV Line					35				1	21			57
	Amlan-Mabinay 138kV Line					1								1
	Kabangkalan-Bacolod 138kV Line		1			13								14
	Mabinay-Kabangkalan 138kV Line	1												1
Sub-Total (Visayas)		8	1	0	22	61	0	10	11	7	33	5	4	162
TOTAL		9	3	1	70	114	59	33	147	193	383	10	16	1038

Constraints at the Visayas submarine cables likewise occurred in 2014, particularly at the Negros-Panay HVDC submarine cable which consistently experienced constraints throughout the year and accounted for 75 percent or 666 times of the total 887 constraints during the billing year. These may have resulted from the maximization of the transfer capabilities of the HVDC lines which in turn, resulted in price separations.

Table 83. Frequency of Constraints at Submarine Cable (Ex-Ante)

Region	Equipment	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Total
Visayas	Cebu-Negros Submarine Cable	12	5			2						8	4	31
	Leyte-Bohol Submarine Cable	19					2						7	28
	Leyte-Cebu Submarine Cable	11	8				12		15		25	50	41	162
	Negros-Panay Submarine Cable	82	32	20	11	82	31		22	164	72	55	95	666
TOTAL		**124**	**45**	**20**	**11**	**84**	**45**	**0**	**37**	**164**	**97**	**113**	**147**	**887**

B. Frequency of active constraints (Ex-post)

Occurrence of constraints at the load-side substations during the ex-post were noted to be significantly lower (592 times) when compared to the 5,509 constraints during the ex-ante, considering that the N-1 contingency constraint is no longer imposed in the e-post. Consequently, constraints at the load-side substations during ex-post were all attributed to base case constraints.

Table 84. Frequency of Constraints at Load-Side Substations (Ex-Post)

Region	Equipment	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Total
Luzon	Bauang Transformer			1										1
Luzon	Laoag Transformer										18			18
Luzon	La Trinidad Transformer												1	1
Luzon	San Esteban Transformer												2	2
Luzon	Santiago Transformer				36	99		2						137
Luzon	Tuguegarao Transformer				16	43	98	68						225
Luzon	Naga Transformer				1									1
Sub-Total (Luzon)		0	0	1	53	142	98	70	0	0	18	0	3	385
Visayas	Babatngon Transformer										1		2	3
Visayas	Calbayog Transformer	5												5
Visayas	Maasin Transformer	19							2		1		8	30
Visayas	Ormoc Transformer												6	6
Visayas	Tongonan Transformer	19												19
Visayas	Cebu Transformer				7	14	29	1		7	2		4	64
Visayas	Lapu- Lapu Transformer	6	3											9
Visayas	Mandaue Transformer										20	3		23
Visayas	Quiot Transformer				2	2					2			6
Visayas	Ubay Transformer	14											1	15
Visayas	Sta. Barbara Transformer											16	11	27
Sub-Total (Visayas)		63	3	0	9	16	29	1	2	7	26	19	32	207
TOTAL		63	3	1	62	158	127	71	2	7	44	19	35	592

Constraints at generator transformers continued to occur during ex-post runs, affecting a total of 175 trading intervals.

Table 85. Frequency of Constraints at Generator Transformers (Ex-Post)

Region	Equipment	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Total
Luzon	Bakun Transformer										1			1
Luzon	BPPC Transformer						2							2
Luzon	Bacman Transformer							9			2		4	15
Luzon	Caliraya Transformer	4												4
Luzon	Makban A Transformer								3					3
Luzon	Makban B Transformer							5			3			8
Luzon	Malaya Transformer			2									1	3
Luzon	Tiwi C Transformer					1			7	1			1	10
Sub-Total (Luzon)		4	0	2	0	1	2	14	10	1	6	0	6	46
Visayas	Tongonan Transformer	15	1	4	1	8	2	3		8	1	1	28	72
Visayas	CEDC Transformer				1		1	3	2	5	3		3	18
Visayas	KSPC Transformer								1					1
Visayas	Palinpinon GPP 1 Transformer	1	3		1	3								8
Visayas	Palinpinon GPP 2 Transformer		3	1				2	2	8	1			17
Visayas	PEDC Transformer			1		3	2		3			4		13
Sub-Total (Visayas)		16	7	6	3	14	5	8	8	21	5	5	31	129
TOTAL		20	7	8	3	15	7	22	18	22	11	5	37	175

On the other hand, the frequency of constraints at both Luzon and Visayas transmission lines remarkably decreased during the ex-post runs, occurring in only 145 trading intervals, attributable to the removable of the N-1 contingency as a constraint in the ex-post process.

Table 86. Frequency of Constraints at Transmission Lines (Ex-Post)

Region	Equipment	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Total
Luzon	Bauang-BPPC 230kV Line				3	1								4
Luzon	Currimao-Bantay __kV Line												2	2
Luzon	Laoag-Currimao __kV Line												2	2
Luzon	Amadeo-Calaca 230kV Line								3		2			5
Luzon	Dasmariñas (EHV)-Dasmariñas 230kV Tie-Line		1		1									2
Sub-Total (Luzon)		0	1	0	4	1	0	0	3	0	2	0	4	15
Visayas	Ormoc-Maasin 138kV Line	4											2	6
Visayas	Mandaue-Lapu-Lapu 138kV Line	1												1
Visayas	New Naga-Cebu 138kV Line				7	1					1		1	10
Visayas	Quiot-New Naga 138kV Line				15	12		5	7					39
Visayas	Toledo-New Naga 138kV Line					1				2	8	2		13
Visayas	Calung-Calung-Toledo 138kV Line					32					19			51
Visayas	Kabangkalan-Bacolod 138kV Line		1			8								9
Visayas	Mabinay-Kabangkalan 138kV Line	1												1
Sub-Total (Visayas)		6	1	0	22	54	0	5	7	2	28	2	3	130
TOTAL		6	2	0	26	55	0	5	10	2	30	2	7	145

Several constraints were noted to have occurred, most especially at the Negros-Panay Sub-Cable during the ex-post process. Said occurrences were however slightly fewer at 817 trading intervals.

Table 87. Frequency of Constraints at Submarine Cable (Ex-Post)

Region	Equipment	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Total
Visayas	Cebu-Negros Submarine Cable	9				1						18	12	40
Visayas	Leyte-Bohol Submarine Cable	18											6	24
Visayas	Leyte-Cebu Submarine Cable	4	3				13		14		15	53	43	145
Visayas	Negros-Panay Submarine Cable	77	24	11	6	107	28		16	167	53	34	85	608
TOTAL		**108**	**27**	**11**	**6**	**108**	**41**	**0**	**30**	**167**	**68**	**105**	**146**	**817**

XV. OVER-RIDING CONSTRAINTS

Over-riding constraints, as defined in the WESM Rules[15], are constraints imposed in the market dispatch optimization model (MDOM) by the Market Operator (MO), at the recommendation of the System operator (SO), with the intention of over-riding the effect of a Trading Participant's offers or demand bids.

Results of the monitoring of over-riding constraints imposed on generators and N-1 contingency requirements are highlighted in this Report. Note that the categories of the over-riding events are based on data and information provided by the SO.

For the year 2014, about 71.2 percent (13,244 events) of the total 18,608 constraints[16] system-wide were impositions made on the generators in Luzon while the remaining 28.8 percent (5,364 events) were constraints imposed on Visayas generators.

[15] WESM Rules, Chapter 11 (Glossary)

[16] The monitoring of the over-riding constraints on generators is done on a per generator trading node per trading interval. A constraint imposed on a generator trading node on a particular trading interval is considered as one **over-riding event**. The monitoring of the over-riding constraints is based on the data and information

By category, about 87.8 percent (16,341 events) of the total impositions arose from the designation of Must-Run-Units (MRUs) by the SO, while the remaining 11.5 percent (2,138 events), 0.6 percent (112 events) and 0.1 (17 events) percent were due to security limit, line limitation and generator limitation, respectively.

Table 88. Summary of Over-riding Events by Category - Luzon

Category	Summary of Over-riding Events by Category, Luzon - 2014												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Generator Limitation									4				4
Line Limitation				22	70	3						17	112
MRU	1,375	1,178	223	567	509	720	799	430	400	470	1,519	3,008	11,198
Security Limit	156	32	97	122	34	249	214	628	171	107	74	46	1,930
Grand Total	1,531	1,210	320	711	613	972	1,013	1,058	575	577	1,593	3,071	13,244

Table 89. Summary of Over-riding Events by Category - Visayas

Category	Summary of Over-riding Events by Category, Visayas - 2014									
	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Generator Limitation								13		13
MRU	16	429	873	871	1,013	1,057	691	23	170	5,143
Security Limit		3		21	6	64	33	6	75	208
Grand Total	16	432	873	892	1,019	1,121	724	42	245	5,364

About 62.7 percent (10,246 events) of the MRU-related events in 2014 were attributable to the conduct of commissioning tests. Of which, 6,315 events were commissioning tests performed in Luzon while the remaining 3,931 events were from the Visayas.

MRU related events on commissioning tests were observed to be highest during the 4th quarter of 2014 influenced by the MRU designation of new generating plants which underwent commissioning tests during the period. These new plants include: coal plant SLTEC which commenced its commissioning tests on 09 October; biofuel plant IPOWER, which is on commissioning since 24 October; wind plants Burgos, Capris, NWIND2 and SLWIND which began its commissioning tests on 30 October, 09 November, 28 November and 18 December, respectively. The conduct of commissioning tests by the above plants continued through the end of billing year 2014 and contributed to the significant increase in the number of over-riding events attributed to MRU designations. Meanwhile, solar plant San Carlos began its commissioning test on 06 June and continued intermittently in the succeeding months until the November billing month.

MRU incidents in view of commissioning tests were likewise high in January and February. The same is on account of the conduct of commissioning tests by Bacman 2 which accounted for the bulk of the MRU-related events attributed to commissioning tests. It may be recalled that Bacman 2 had been conducting commissioning tests since 31 May 2013 and had been designated as MRU until 18 February 2014. The remaining events involved Bacman 1, Therma Mobile, Caliraya and Kalayaan 1 and Maibarara which all underwent commissioning during the period. Note the decline in MRU events during the March billing month, largely due to the completion of the commissioning tests of geothermal plants Bacman 1 and 2 and Maibarara last February 2014.

Increase in MRU events from the April billing month were observed following the conduct of commissioning tests by new plant Nasulo which lasted until October, while another new plant, La Farge, underwent commissioning tests from June to August.

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provided by MO (i.e. real time market results and MMS-input files on security limits) and SO (i.e. SO Data for Market Monitoring).

It is worthy to note the impact of the commissioning of these new plants to the level of supply. The total effective supply in the market was observed to have increased by as much as 292 MW, with the commissioning of the above new plants.

On the other hand, about 9.8 percent (1,601 events) of the MRU incidents in 2014 is attributable to the inadequate reserve level, with the April to July billing months posting the highest occurrence. Note that Malaya 2 solely accounted for the said imposition all through the year. Meanwhile, unreported MRU incidents held about 8 percent (1,302 events) of the total MRU-related incidents for the year. Another 10.3 percent (1,676 events) were reported under MRU event but no remarks were provided by NGCP-SO.

Table 90. Summary of MRU-Related Events per Incident - Luzon

MRU Incident	Summary of MRU Related Events, Luzon - 2014												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
AGC Test						9							9
Ancillary Certification Test							16			18			34
Ancillary test	62	8	2			1		49	27		20	40	209
Capacity Test								1	10		16	17	44
Cems Rata And Stack Sampling Test												14	14
Combustion Test			60										60
Commissioning test	717	1,044			2	271	324	267	267	326	1,061	2,036	6,315
Data gathering	4					88							92
Data Gathering Test												18	18
Dependable capacity test				40									40
Dispatchable Reserve Test										2			2
Electrostatic precipitator and stack sampling test	6												6
Governor Test							9						9
Governor Valve Re-Testing									6				6
Heat rate test	26							15					41
Inadequate reserve level			146	372	440	255			53				1,266
INADEQUATE RESERVE LEVELS							335						335
Load Test								2					2
Load variation test		2							1				3
NCC test	48											34	82
NDC test	259					43	91						393
No Remarks	222	124	15	41	23	37	21	82	27	7	6	7	612
Other (Security Limit)							3						3
Out Since 1730h 11/08/2014.											2		2
Partial Discharge Testing									9				9
Performance Test					42	14						31	87
Preliminary performance test				16									16
RATA test	14												14
Reactive Power Support Test								4					4
Reliability test				2									2
Smoke Emission Test						2							2
Stack emission test	17												17
System Test Ngcp Facilities/Equipment												5	5
System voltage requirement				96	2								98
Thermal Limits Of Transmission Line And Equipment												128	128
Transformer limit												17	17
Unreported										104	409	645	1,158
Vibration Data Gathering											5		5
Vibration Test								10		13		16	39
Total	1,375	1,178	223	567	509	720	799	430	400	470	1,519	3,008	11,198

*No Remarks included blanks for January to September

Table 91. Summary of MRU-Related Events per Incident - Visayas

MRU incident	Summary of MRU Related Events, Visayas - 2014									
	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Commissioning test	16	429	587	567	642	958	559	16	157	3,931
Environmental Monitoring					4					4
No Remarks			286	304	367	99	8			1,064
Unreported							124	7	13	144
Total	16	429	873	871	1,013	1,057	691	23	170	5,143

*No Remarks included blanks from April to September

About 11.5 percent of the total over-riding constraints in 2014 (2,138 events) were categorized under security limit. The Luzon region accounted for majority of the security limit impositions, at 90.3 percent with 1,930 events, while Visayas recorded only 208 events, or 9.7 percent of the total system-wide security limit imposition.

The billing month of August posted the highest number of security limit impositions at 634 events. In particular, seven (7) generators, namely Calaca units 1 and 2, GN Power 1 and 2, Masinloc 1, Pagbilao 2 and San Lorenzo 1, all conducted start-up related activities for a total of 26 events during the August billing month. On the other hand, Sual 1 and 2 were imposed with security limits due to equipment limitation, for a total of 11 events. Meanwhile, Sta. Rita 1, 2, 3, and 4 and San Lorenzo 1 and 2 underwent fuel changeover for a total of 23 trading intervals. Ilijan B was imposed with security limit for 20 trading intervals on 24 August related to the Malampaya gas restriction. Another 2 events were recorded involving GN Power attributable to plant shutdown preparation. The remaining 106 events which were not reported by NGCP-SO involved Calaca 2 (99 events), Pagbilao 2 (1 event) and KSPC (6 events). However, bulk of the security limit events in August, posted at 68.6 percent or 435 events were related to the commissioning tests of Calaca 2.

Noteworthy is that majority of the security limits imposed in year 2014 were attributed to the conduct of commissioning tests, registered at 744 events or 34.8 percent of the total security limit impositions for the year. This is followed by the security limit impositions on account of start-up profile and related activities by some of the generators, following their respective outages. The same registered a total of 575 events, accounting for about 26.9 percent of the total security limit impositions for the year. Further, about 10.8 percent or 230 events were reported by the NGCP-SO as security limit incidents but no remarks had been provided.

It should be noted that over-riding events attributable to commissioning tests are usually categorized as MRU-related events, but were however categorized as security limit-related events by the NGCP-SO.

Table 92. Summary of Security Limit-Related Events - Luzon

Reason for Security Limit	Summary of Security Limit Related Events, Luzon - 2014												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
ANCILLARY RE-CERTIFICATION TEST										52			52
Commissioning test					11	148	48	435	5	3	10		660
Equipment Limitation								22	1				23
Fuel Changeover								23	15		4		42
Fuel Change-over						3	7						10
Internal ancillary test	8												8
Line maintenance	102												102
Line/equipment outage			69							5			74
Malampaya-related concern	2	1		6				20	67				96
NDC test	2												2
No Remarks		1				36	34	100	12	1	1		185
PARTIAL DISCHARGE RETESTING										6			6
Partial discharge test									6				6
Shutdown profile	17	4		15		12	9	2	5	6	8	11	89
Start up profile / related activities	25	26	28	101	23	50	116	26	60	31			486
Start-up profile/activities											41	31	72
Unreported										3	8		11
Vibration Test											2	4	6
Total	156	32	97	122	34	249	214	628	171	107	74	46	1,930

*No Remarks included blanks for January to September

Table 93. Summary of Security Limit-Related Events - Visayas

Reason for Security Limit	Summary of Security Limit Related Events, Visayas - 2014												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Boiler Tube Leak												53	53
Commissioning test									60	14	3	7	84
Emission Testing												6	6
Generator Concern									2				2
No Remarks							21	6	2	5	2	9	45
Solenoid Trip Test											1		1
Start up profile / related activities					3					14			17
Total					3		21	6	64	33	6	75	208

*No Remarks included blanks from April to September

Geothermal plants accounted for 6,634 over-riding events by plant type system-wide, or about 35.7 percent of the total impositions, mostly attributable to the conduct of commissioning tests by Bacman 1 and 2 and Maibarara in January and February, by plant

Nasulo from April to October, and by Bacman 1 from the August to September billing months.

Wind plants came next with 3,233 events or 17.4 percent of the total over-riding incidents in 2014. Note the significant increase demonstrated in the number of over-riding events involving wind plants in December, accounting for 3,233 events during the billing month, attributable to the higher number of MRU events of wind plants Burgos, Capris, NWIND 2, and SLWIND due to the conduct of commissioning tests.

Coal plants on the other hand, accounted for 2,778 events or 14.9 percent of the over-riding events system-wide. The same is largely attributed to the commissioning tests of Calaca 2 particularly during the May to August billing months.

About 12 percent or 2,233 events were due to the impositions involving oil-based plants, with the highest impositions recorded during the billing months of April to July. Majority of these impositions involved Malaya 2. Over-riding events involving Therma Mobile, Limay A and B were likewise noted during the period.

The remaining 6.7 percent (1,244 events), 5.9 percent (1,107 events), 4.9 percent (903 events), 2.6 percent (476 events) were on account of the over-riding events involving natural gas plants, solar plant San Carlos, biofuel plants and hydro plants, respectively.

Table 94. Summary of Over-riding Events by Plant Type - Luzon

Plant Type	Summary of Over-Riding Events by Plant Type, Luzon - 2014												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Grand Total
COAL	77	19	72	50	132	470	372	627	65	331	108	353	2,676
GEO	861	1,168						255	277	112			2,673
HYD	54	8		30	17	21	25	97	59	58	21	86	476
NATG	453	13	73	113	5	168	136	46	113	6	54	64	1,244
OIL	86	2	175	518	459	313	480	33	61	50		37	2,214
WIND											986	2,072	3,058
BIOF										20	424	459	903
Grand Total	1,531	1,210	320	711	613	972	1,013	1,058	575	577	1,593	3,071	13,244

Table 95. Summary of Over-riding Events by Plant Type - Visayas

Plant Type	Summary of Over-Riding Events by Plant Type, Visayas - 2014												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Grand Total
COAL					3		21	6	4	14	1	53	102
GEO				16	429	671	719	743	744	630		9	3,961
OIL								4		4	3	8	19
SOLR						202	152	266	373	76	38		1,107
WIND												175	175
Grand Total				16	432	873	892	1,019	1,121	724	42	245	5,364

XVI. SPOT MARKET EXPOSURE

The spot market exposure is the difference between the total energy transacted in the market and the bilateral contract quantity (BCQ). This measures the extent by which trading participants are exposed to the hourly spot price volatility in the market.

A. Generator

The generator's spot market exposure is equivalent to the percentage of energy injected not covered by the bilateral contracts entered into between generators and customers.

System-wide, the Figure below shows that an average of only about 11.2 percent of the total volume of energy injected to the system in 2014 was not contracted and was consequently

sold in the spot market, while about 88.8 percent was covered by bilateral contracts and was thus shielded from the volatility of the prices in the spot market.

The Figure below demonstrates that during the year, the spot market exposure of generators was sustained within the close range of 9.4 percent at its lowest to a high of 13.0 percent. Spot exposure was highest among the generators in February and March at 13.0 percent and 12.6 percent, respectively, mainly driven by the increase in the volume of spot transactions of the Visayas generators during said months. More capacities notably became available with the resumption of operations of generating plants within the February and March billing months. These plants were previously on outage due to the power system destruction caused by typhoon Yolanda in November 2013. The billing month of July likewise posted a relatively high exposure for the generators at 12.2 percent, when market prices were also high. Meanwhile, the August billing month posted the lowest monthly spot market exposure of generators at 9.4 percent.

Note that the spot exposure of Visayas generators during the period 26 December 2013 to 25 March 2014 or for the duration of the ERC's partial market suspension of the Visayas was settled in the market using the applicable administrative price.

Year-on-year comparison indicates that system-wide spot exposure of generators decreased from an average of about 14.5 percent in 2013 following the decline in the volume of spot transactions which averaged at 732,492 MWh in the previous year, to 581,137/MWh in 2014. Nonetheless, the total metered quantity of generators rose by 2.5 percent from an average of 5,063,413 MWh in 2013 to 5,188,447 MWh in 2014.

Figure 78. Generator's Spot Market Exposure - System

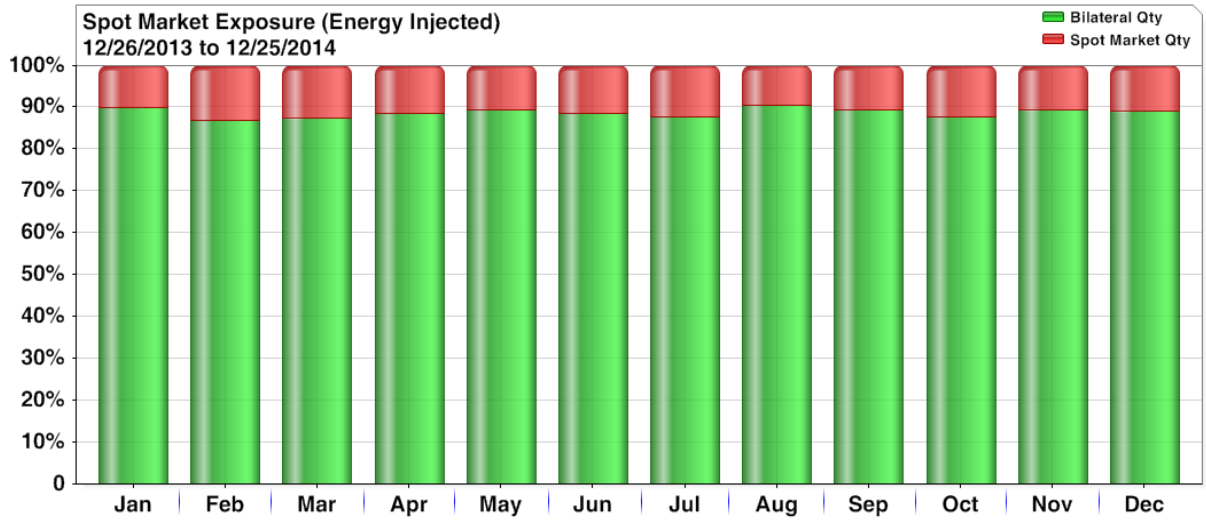


Table 96. Generators' Spot Market Exposure

	Generators' Spot Exposure by Billing Month, 2014												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Annual Avg.
Metered Qty (MWh)	4,530,169	4,811,537	4,591,414	5,372,248	5,686,227	5,795,851	5,046,527	5,376,654	5,348,955	5,276,482	5,413,894	5,011,412	5,188,447
Bilateral Qty (MWh)	4,075,228	4,185,784	4,014,031	4,761,862	5,087,215	5,137,161	4,432,418	4,873,130	4,787,829	4,635,458	4,836,144	4,461,471	4,607,311
Spot Market Qty (MWh)	454,941	625,753	577,383	610,386	599,013	658,690	614,109	503,524	561,126	641,024	577,751	549,941	581,137
Bilateral (%)	90.0	87.0	87.4	88.6	89.5	88.6	87.8	90.6	89.5	87.9	89.3	89.0	88.8
Spot Market (%)	10.0	13.0	12.6	11.4	10.5	11.4	12.2	9.4	10.5	12.1	10.7	11.0	11.2

Table 97. Year-on-Year Comparison of Generators' Spot Market Exposure

	Year-on-Year Comparison of Generators' Monthly Spot Exposure												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Annual Avg.
2014 (%) Spot Exposure	10.0	13.0	12.6	11.4	10.5	11.4	12.2	9.4	10.5	12.1	10.7	11.0	11.2
2013 (%) Spot Exposure	13.4	14.1	15.4	17.5	16.8	13.1	11.7	10.3	11.6	17.5	15.3	16.7	14.5
Y-Y (%) Change	(3.3)	(1.1)	(2.9)	(6.2)	(6.3)	(1.8)	0.4	(1.0)	(1.1)	(5.3)	(4.6)	(5.8)	(3.3)

The spot market exposure of Luzon generators averaged at 10.0 percent in 2014 while about 90.0 percent of the total volume of energy injected in the region was covered by bilateral contracts. The same is lower by 3.5 percent from the average spot exposure of Luzon generators in 2013, posted at 13.5 percent. Mirroring the trend system-wide, the level of spot exposure in Luzon was maintained within the close range of a low of 7.9 percent to a high of 12.7 percent. Notably, the spot exposure recorded during the last quarter of 2013 was significantly higher when compared to the spot exposure in the same period of 2014. The same was posted at 16.5 percent in October, 15.0 percent in November and 17.8 percent in December when market prices were exceptionally high as compared to 2014's 11.4 percent, 9.5 percent and 10.0 percent, respectively.

Year-on-year comparison in terms of the volume of spot transactions in the region demonstrates a notable decline by about 23.8 percent from last year's average of 578,502/MWh to 440,938/MWh. However, the total metered quantity was noted to have increased by 2.9 percent from an average of 4,276,276/MWh to 4,402,025/MWh. Correspondingly, increase in the region's bilateral contract quantities from the previous year was noted at 7.1 percent from 3,697,774/MWh in 2013 to 3,961,087/MWh.

Figure 79. Luzon Generator's Spot Market Exposure

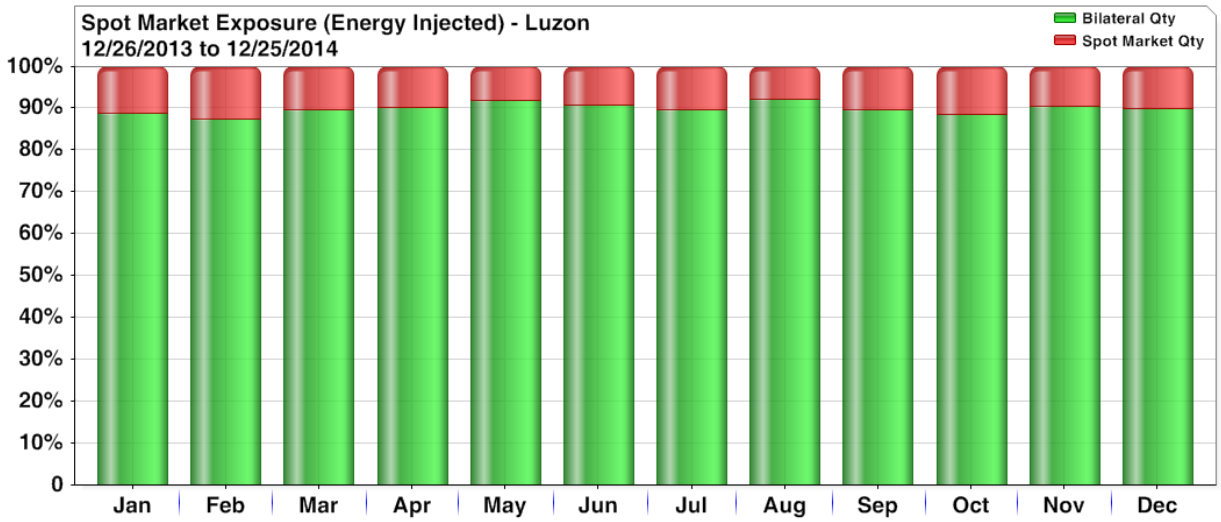


Table 98. Generators' Spot Market Exposure - Luzon

	Generators' Spot Exposure by Billing Month, Luzon-2014												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Annual Avg.
Metered Qty (MWh)	3,947,754	4,142,572	3,860,133	4,531,699	4,785,688	4,883,140	4,207,636	4,539,354	4,592,002	4,511,281	4,571,053	4,251,992	4,402,025
Bilateral Qty (MWh)	3,503,013	3,617,905	3,457,915	4,094,203	4,396,090	4,436,046	3,771,053	4,181,649	4,112,821	3,998,651	4,136,371	3,827,327	3,961,087
Spot Market Qty (MWh)	444,741	524,666	402,217	437,497	389,598	447,095	436,583	357,705	479,181	512,630	434,682	424,665	440,938
Bilateral (%)	88.7	87.3	89.6	90.3	91.9	90.8	89.6	92.1	89.6	88.6	90.5	90.0	90.0
Spot Market (%)	11.3	12.7	10.4	9.7	8.1	9.2	10.4	7.9	10.4	11.4	9.5	10.0	10.0

Table 99. Year-on-Year Comparison of Generators' Spot Market Exposure - Luzon

	Year-on-Year Comparison of Generator's Monthly Spot Exposure - Luzon												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Annual Avg.
2014 (%) Spot Exposure	11.3	12.7	10.4	9.7	8.1	9.2	10.4	7.9	10.4	11.4	9.5	10.0	10.0
2013 (%) Spot Exposure	11.6	13.6	14.3	16.1	15.7	11.7	10.7	8.8	10.5	16.5	15.0	17.8	13.5
Y-Y (%) Change	(0.4)	(1.0)	(3.9)	(6.4)	(7.5)	(2.6)	(0.3)	(0.9)	(0.1)	(5.2)	(5.5)	(7.8)	(3.5)

Spot exposure of Visayas generators was higher than that of the Luzon region, averaging at about 17.8 percent of its total volume of energy transacted. Monthly spot volume in the region ranges from a minimal 1.8 percent in January to a high of 24 percent in March, with the resumption of operations of generating plants that were on outage since November 2013

due to the destruction caused by typhoon Yolanda. Spot exposure of Visayas generators was likewise observed to be high when compared to the other billing months in 2014 during the months of April, May, June and July, when the spot exposure of Visayas generators ranged between 20.6 percent to 23.3 percent. On the other hand, low spot exposure was noted during the January and September billing months at 1.8 percent and 10.8 percent, respectively.

It is important to note that the Visayas market was still under market suspension during the 1st quarter of 2014, and as such, spot exposure of Visayas generators during the period was settled in the market using the administrative prices which were determined in accordance with the WESM Manual on Administered Price Determination Methodology.

Year-on-year comparison demonstrates a 1.7 percent decline in the annual average spot exposure of Visayas generators from 19.6 percent in 2013 to 17.8 percent in 2014.

Accordingly, the volume of energy transacted by Visayas generators was slightly lower by 0.09 percent from the previous year's average volume of 787,138 MWh to 786,422/MWh. Spot transactions similarly declined by 8.9 percent from an average spot volume of 153,990/MWh to 140,198/MWh in 2014. The same is attributable to the significant decreases in the spot transactions recorded for the January and February billing months, when the Visayas market was still under market suspension, and likewise during the September and October billing months, when extreme negative prices were posted in the region. Correspondingly, bilateral contracting was higher by 2.1 percent in 2014 at 664,224/MWh than in the previous year's 633,137/MWh.

Figure 80. Visayas' Generators Spot Market Exposure

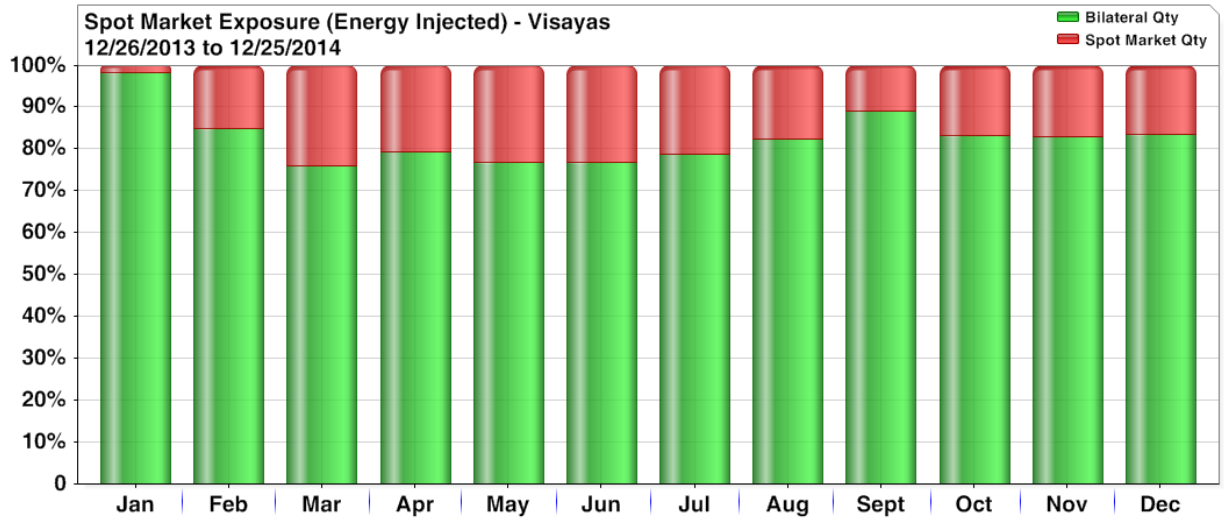


Table 100. Generators' Spot Market Exposure - Visayas

	Generators' Spot Exposure by Billing Month, Visayas-2014												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Annual Avg.
Metered Qty (MWh)	582,415	668,965	731,281	840,548	900,539	912,710	838,890	837,300	756,953	765,201	842,841	759,420	786,422
Bilateral Qty (MWh)	572,215	567,878	556,116	667,659	691,124	701,115	661,365	691,481	675,007	636,807	699,773	634,143	646,224
Spot Market Qty (MWh)	10,200	101,087	175,165	172,889	209,415	211,595	177,526	145,819	81,946	128,394	143,069	125,276	140,198
Bilateral (%)	98.2	84.9	76.0	79.4	76.7	76.8	78.8	82.6	89.2	83.2	83.0	83.5	82.2
Spot Market (%)	1.8	15.1	24.0	20.6	23.3	23.2	21.2	17.4	10.8	16.8	17.0	16.5	17.8

Table 101. Year-on-Year Comparison of Generators' Spot Market Exposure - Visayas

	Year-on-Year Comparison of Generator's Monthly Spot Exposure - Visayas												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Annual Avg.
2014 (%) Spot Exposure	1.8	15.1	24.0	20.6	23.3	23.2	21.2	17.4	10.8	16.8	17.0	16.5	17.8
2013 (%) Spot Exposure	21.4	16.7	21.2	25.2	22.9	20.5	17.5	18.6	17.8	22.4	17.2	9.3	19.6
Y-Y (%) Change	(19.6)	(1.6)	2.8	(4.6)	0.4	2.7	3.7	(1.2)	(6.9)	(5.6)	(0.3)	7.2	(1.7)

B. Customer

The Customer's spot exposure is equivalent to the percentage of energy withdrawn not covered by bilateral contracts. Note that energy transactions of customers which are sourced from bilateral power supply contracts effectively limit their exposure to the volatility of market prices in the WESM.

About 91.0 percent of the total energy withdrawn of customers was covered by bilateral contracts in 2014 while their spot market exposure hovered at only about 9.0 percent. Spot market exposure was observed to be highest with the customers in February and March at 10.8 percent and 10.5 percent, respectively, and the July and October billing months, which both recorded its customers spot exposure at 10.0 percent. Nevertheless, the monthly spot exposure of customers were within the close range of between 7.1 percent at its lowest in August to 10.8 percent in March. The same is significantly lower than the spot market exposure of customers in the previous year which ranged between 8.1 percent to as high as 15.4 percent.

Year-on-year comparison would indicate a 3.2 percent decline from the 2013 customers' spot exposure posted at an annual average of 12.2 percent. Correspondingly, spot transactions also posted a decline in 2014 at an average of 453,937 MWh from the previous year's 602,179 MWh. Metered quantity of customers recorded for the year nevertheless posted a 2.6 percent increase from last year's average of 4,933,100 MWh to 5,061,240. The same corresponds to the 6.4 percent increase in the bilateral contracting of customers from 4,330,921 MWh average volume of energy transacted through contracts in 2013 to an average of 4,607,303 MWh in 2014.

Figure 81. Customers' Spot Market Exposure - System

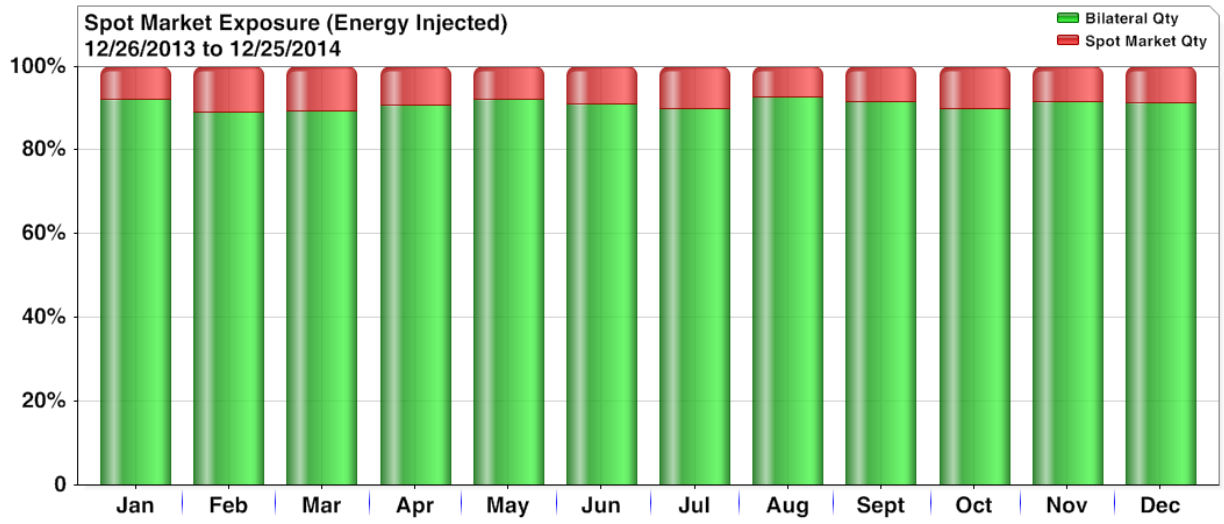


Table 102. Customers' Spot Market Exposure - System

	Customers' Spot Exposure by Billing Month - 2014												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual Avg.
Metered Qty (MWh)	4,422,504	4,689,998	4,484,256	5,247,391	5,525,025	5,647,294	4,927,536	5,245,893	5,224,612	5,150,551	5,280,784	4,889,040	5,061,240
Bilateral Qty (MWh)	4,075,228	4,185,784	4,014,031	4,761,862	5,087,215	5,137,161	4,432,418	4,873,130	4,787,737	4,635,458	4,836,144	4,461,471	4,607,303
Spot Market Qty (MWh)	347,277	504,215	470,225	485,530	437,810	510,133	495,118	372,763	436,875	515,093	444,641	427,569	453,937
Bilateral Qty (%)	92.1	89.2	89.5	90.7	92.1	91.0	90.0	92.9	91.6	90.0	91.6	91.3	91.0
Spot Market (%)	7.9	10.8	10.5	9.3	7.9	9.0	10.0	7.1	8.4	10.0	8.4	8.7	9.0

Table 103. Year-on-Year Comparison of Customers' Spot Market Exposure - System

	Year-on-Year Comparison of Customers' Monthly Spot Market Exposure												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Annual Avg.
2014 (%) Spot Exposure	7.9	10.8	10.5	9.3	7.9	9.0	10.0	7.1	8.4	10.0	8.4	8.7	9.0
2013 (%) Spot Exposure	11.0	11.7	13.1	15.4	14.5	10.8	9.4	8.1	9.5	15.4	13.4	14.2	12.2
Y-Y (%) Change	(3.1)	(1.0)	(2.6)	(6.1)	(6.5)	(1.8)	0.6	(1.0)	(1.1)	(5.4)	(5.0)	(5.5)	(3.2)

About 9.2 percent of the total energy requirement of Luzon customers was procured from the spot market while the remaining 90.8 percent was procured through bilateral contracts. About 90.4 percent of said bilateral contracts were entered into by the customers with the generators within Luzon while about 0.4 percent was bilateral contract quantities from Visayas generators.

Customers in Luzon recorded the lowest spot exposure during the August billing month at 7.0 percent and the highest spot exposure at 11.4 percent and 11.1 percent, respectively, during the February and March billing months.

Year-on-year comparison would show the significant decline in the spot exposure of Luzon customers from 13.5 percent in 2013. Bilateral contracting of Luzon customers from within and outside the region conversely increased from last year's 86.4 percent and 0.1 percent, indicating that a higher percentage of the energy withdrawn by the Luzon customers was protected from the price fluctuations in the spot market. Accordingly, the volume of energy transacted by Luzon customers through bilateral contracting with Luzon generators increased by 4.6 percent from an average of 3,668,112 MWh in 2013 to 3,938,621 MWh, while those contracted with generators outside Luzon similarly grew by 4.0 percent from last year's average of 3,928 MWh to 16,625 MWh. Spot transactions notably declined by about 30.0 percent from 575,054 MWh to 402,368 MWh.

The average metered quantity of Luzon customers grew from the previous year's average of 4,247,095 MWh to 4,357,616 MWh in 2014.

Figure 82. Luzon Customers' Spot Market Exposure

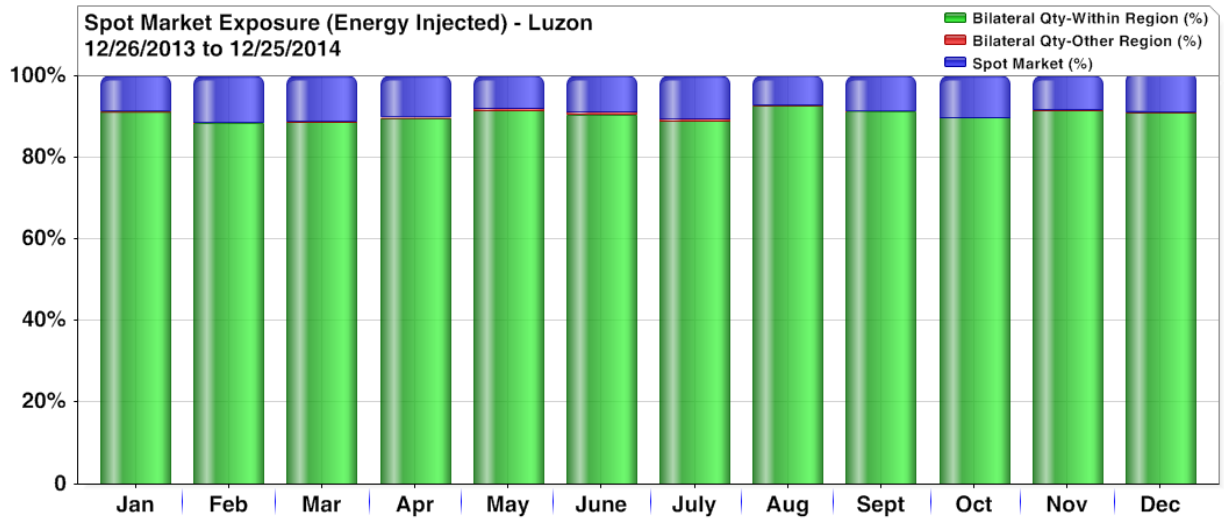


Table 104. Customers' Spot Market Exposure - Luzon

	Customers' Spot Exposure by Billing Month - Luzon, 2014												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual Avg.
Metered Qty (MWh)	3,831,502	4,077,841	3,876,574	4,536,992	4,763,297	4,858,531	4,218,415	4,498,735	4,494,130	4,442,305	4,507,299	4,185,766	4,357,616
Bilateral Qty-Within Region (MWh)	3,491,539	3,602,791	3,435,488	4,059,231	4,355,178	4,394,204	3,745,029	4,169,452	4,102,062	3,982,990	4,121,436	3,804,062	3,938,622
Bilateral Qty-Other Region (MWh)	11,534	11,214	12,689	19,829	31,897	31,135	25,304	12,907	5,952	7,965	14,165	14,920	16,626
Spot Market Qty (MWh)	328,429	463,837	428,397	457,932	376,222	433,193	448,082	316,377	386,116	451,350	371,698	366,784	402,368
Bilateral Qty-Within Region (%)	91.1	88.4	88.6	89.5	91.4	90.4	88.8	92.7	91.3	89.7	91.4	90.9	90.4
Bilateral Qty-Other Region (%)	0.3	0.3	0.3	0.4	0.7	0.6	0.6	0.3	0.1	0.2	0.3	0.4	0.4
Spot Market (%)	8.6	11.4	11.1	10.1	7.9	8.9	10.6	7.0	8.6	10.2	8.2	9.6	9.2

Table 105. Year-on-Year Comparison of Customers' Spot Market Exposure - Luzon

	Year-on-Year Comparison of Customers' Monthly Spot Market Exposure - Luzon												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Annual Avg.
2014 (%) Spot Exposure	8.6	11.4	11.1	10.1	7.9	8.9	10.6	7.0	8.6	10.2	8.2	9.6	9.2
2013 (%) Spot Exposure	13.2	14.1	14.9	16.4	15.6	11.9	10.8	8.9	10.2	16.7	14.4	15.4	13.5
Y-Y (%) Change	(4.6)	(2.7)	(3.9)	(6.3)	(7.7)	(3.0)	(0.2)	(1.9)	(1.7)	(6.6)	(6.1)	(5.8)	(4.3)

About 7.3 percent of the total energy withdrawn by the Visayas customers was sourced from the spot market. The highest spot exposure was posted in June at 9.8 percent and was lowest in January at 3.2 percent. Correspondingly, 92.7 percent was procured through bilateral contracts. Of which, 89.5 percent were entered into with the generators within Visayas while the remaining 3.2 percent was through contracts with the generators from outside the region.

Year-on-year comparison would show that spot exposure of Visayas customers notably increased from 4.3 percent in 2013. Bilateral contracting within region likewise increased from 91.4 percent while contracting with generators outside the region declined from 4.3 percent in the previous year. This demonstrates the significant increase in the volume of spot transactions of Visayas customers, posted at 51,569 MWh from 29,823 MWh in the previous year while bilateral contracting outside the region declined from 29,662 MWh to 22,457 MWh. On the other hand, the volume of bilateral contracting within region slightly grew from 629,219 MWh to 629,598 MWh. The total metered quantity of the Visayas customers increased by about 2.2 percent from 688,704 MWh in 2013 to 703,625 MWh in 2014.

Figure 83. Visayas Customers' Spot Market Exposure

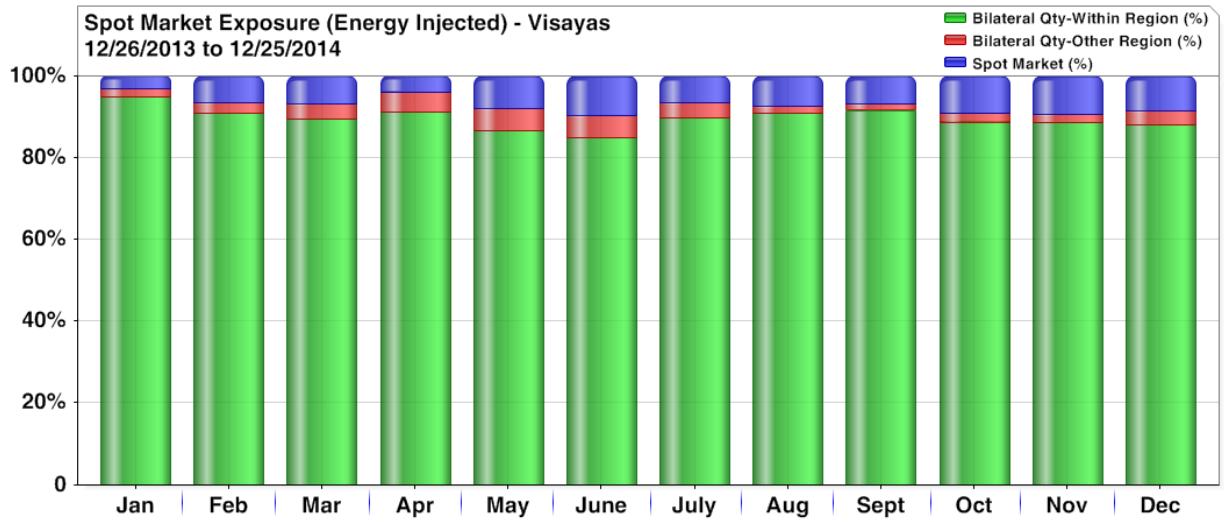


Table 106. Customers' Spot Market Exposure - Visayas

	Customers' Spot Exposure by Billing Month - Visayas, 2014												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual Avg.
Metered Qty (MWh)	591,002	612,157	607,682	710,400	761,728	788,762	709,121	747,158	730,482	708,246	773,486	703,274	703,625
Bilateral Qty-Within Region (MWh)	560,681	556,665	543,428	647,830	659,228	669,981	636,061	678,574	669,055	628,842	685,608	619,223	629,598
Bilateral Qty-Other Region (MWh)	11,474	15,115	22,427	34,972	40,912	41,842	26,024	12,197	10,668	15,661	14,935	23,265	22,458
Spot Market Qty (MWh)	18,848	40,378	41,827	27,598	61,588	76,940	47,036	56,387	50,759	63,743	72,943	60,785	51,569
Bilateral Qty-Within Region (%)	94.9	90.9	89.4	91.2	86.5	84.9	89.7	90.8	91.6	88.8	88.6	88.0	89.5
Bilateral Qty-Other Region (%)	1.9	2.5	3.7	4.9	5.4	5.3	3.7	1.6	1.5	2.2	1.9	3.3	3.2
Spot Market (%)	3.2	6.6	6.9	3.9	8.1	9.8	6.6	7.5	6.9	9.0	9.4	8.6	7.3

Table 107. Year-on-Year Comparison of Customers' Spot Market Exposure - Visayas

	Year-on-Year Comparison of Customers' Monthly Spot Market Exposure - Visayas												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Annual Avg.
2014 (%) Spot Exposure	3.2	6.6	6.9	3.9	8.1	9.8	6.6	7.5	6.9	9.0	9.4	8.6	7.3
2013 (%) Spot Exposure	(1.8)	(2.6)	2.1	9.1	7.8	4.3	0.7	3.2	4.8	7.3	6.5	10.9	4.3
Y-Y (%) Change	5.0	9.2	4.8	(5.2)	0.2	5.5	5.9	4.4	2.2	1.7	2.9	(2.2)	3.0

XVII. MARKET CONCENTRATION

These indices measure the concentration of a market, to assess if existing conditions facilitate or impede the development of competition. As most probably is true for any market, the less concentrated the market, the greater the possibility of effective competition.

A. Market Share

The market share indices, from which the Herfindahl-Hirschman Index (HHI) is computed, measure the percentage of energy or capacity that a Trading Participant controls in the monitored market. It has been recognized that those with smaller market share find it more difficult to exercise market power. For this Report, calculation of market share was based on three major groupings: (i) by major participants; (ii) by trading participants; and (iii) by generating plants.

1. By Major Participant

Four (4) major participant groups continued to dominate the market in year 2014, similar to the monthly market share trend in the previous year. San Miguel Corporation (SMC) retained the top spot with the biggest share of the market in terms of registered capacity averaging at 20.2 percent followed by the Aboitiz group with about 16.8 percent, Power Sector Asset and Liabilities Management Corporation (PSALM) with 15.3 percent and the First Gen group with 15.1 percent. Sem Calaca Power Corporation (SCPC) came in distant fifth with 4.5 percent followed closely by Masinloc Power Partners Co. Ltd (MPPCL), Global Business Power Corporation (GBPC), and GNPower Mariveles Coal Plant Ltd. Co (GMCP) at 4.3 percent, 4.2 percent and 4.1 percent, respectively.

While the market remained dominated by the above four major players, there is a notable decline in the percentage of capacity controlled/owned by the major participant groups when compared to the previous year, mainly driven by the entry of new players as identified in the Table below. Decrease in the market share of the major participant groups was particularly observed during the last quarter of 2014, in time when majority of the additional capacities were registered in the market.

Correspondingly, market shares of the remaining participant groups either grew or decreased, influenced by the entry of these additional capacities or the change in some of the plants' registered capacity, as well as the privatization of generation

facilities. Changes in the market share of the participant groups in the WESM are illustrated in the Figures below.

Note that PSALM, which held the second top spot in the previous year, posted a reduction in its market share and slid to third spot behind the Aboitiz group. The same is mainly on account of the transfer of ownership of the Cebu Thermal Power Plant (CTTP) with an aggregate capacity of 95 MW, to SPC Power Corporation (SPC). The market share of PSALM decreased from October 2014 following the transfer of ownership of CTTP to SPC effective 25 September. Consequently, the market share of SPC increased from October 2014. On the other hand, the First Gen group retained its position in fourth place with the entry of the 40 MW geothermal plant Nasulo on 12 April and the 150 MW wind capacity of EDC Burgos Wind Power Corporation on 04 November.

With the declining market share of the major participant groups, market shares of the NLREC, NWPDC, Other Independent Power Producers (IPPs), SCSEI and Universal Robina Corporation (URC) steadily increased as the market grew with the entry of new power plants such as: the 81 MW wind generating facility of North Luzon Renewable Energy Corporation (CAPRIS) on 06 November and the 18.9 MW wind plant of the North Wind Power Development Corporation (Northwind2) on 01 November; the 15 MW oil-based plant of Lafarge Republic, Inc. (La Farge) on 09 June and the 10.8 MW biomass plant of San Jose City I Power Corp (IPOWER) on 28 August; San Carlos Energy's (SACASOL) 11.7 MW solar generating facility on 29 May; and the 40 MW biomass power plant of URC on 18 December.

In the same manner, the Trans-Asia group also registered notable increases in its market share during the fourth quarter. This is on account of the entry of the 135 MW coal plant South Luzon Thermal Energy Corporation (SLTEC) on 30 September and the 54 MW wind capacity of Trans-Asia Renewable Energy Corporation (SLWIND) on 31 October.

Conversely, decline in the market share of the National Power Corporation (NPC) was observed during the November billing month, attributed to the transfer of registration of the 218 MW hydro plant Angat from the NPC to Angat Hydropower Corporation (AHC) on 31 October.

Figure 84. Share of Registered Capacity by Major Participant

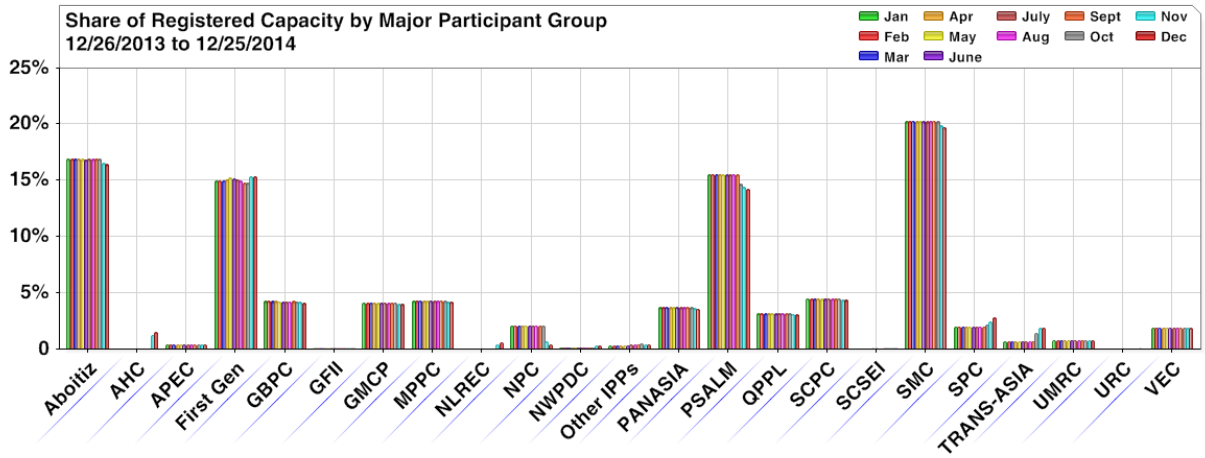


Table 108. New Power Plants

New Power Plants Registered in the WESM, 2014				
Plant Type	**Market Participant Name**	**Node ID**	**Registered Capacity (MW)**	**Registration Effectivity Date**
Biomass	San Jose City I Power Corp.	1IPOWER_G01	10.8	28-Aug-2014
	Universal Robina Corp.	6URC_G01	40.0	18-Dec-2014
Sub-total (Biomass)			***50.8***	
Coal	South Luzon Thermal Energy Corp.	3SLTEC_G01	135.0	30-Sep-2014
Sub-total (Coal)			***135.0***	
Geothermal	Energy Development Corporation	6NASULO_G01	40.0	12-Apr-14
Sub-total (Geothermal)			***40.0***	
Oil-based	Lafarge Republic, Inc.	2LAFARG_GO1	7.5	9-Jun-2014
		2LAFARG_GO2	7.5	9-Jun-2014
Sub-total (Oil-based)			***15.0***	
Solar	San Carlos Energy, Inc.	6SACASL_GO1	11.7	29-May-2014
Sub-total (Solar)			***11.7***	
Wind	EDC Burgos Wind Power Corp.	1BURGOS_G01	150.0	4-Nov-2014
	North Luzon Renewable Energy Corp.	1CAPRIS_G01	81.0	6-Nov-2014
	North Wind Power Development Corp.	1NWIND_G02	18.9	1-Nov-2014
	Trans-Asia Renewable Energy Corp.	8SLWIND_G01	54.0	31-Oct-2014
Sub-total (wind)			***303.9***	
TOTAL			**556.4**	

The SMC group likewise dominated the market share in terms of offered capacity with an average of 27.1 percent across all billing months, followed by the First Gen group with 19.1 percent, the Aboitiz group with 16.3 percent and PSALM with 7.0 percent. Closely following in the fifth spot is MPPCL with 6.1 percent market share, Quezon Power Partners Limited (QPPL) with 4.8 percent and GMCP with 4.2 percent. Note the sharp reduction in the market share of PSALM based on offered capacity when compared to its market shared based on registered capacity. The same is in view of the excluded capacity of oil-based plant Malaya from the total offered capacity of PSALM following its designation as a must-run-unit in the market effective 23 February by virtue of Department of Energy (DOE) Circular No. 2014-01-003.

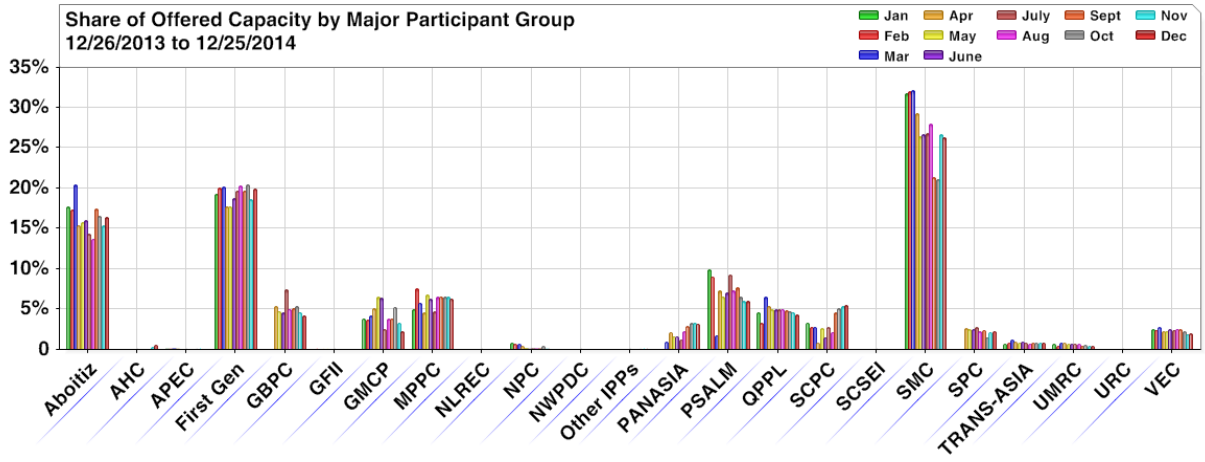
Looking at Figure 84 below, it is observed that the market share of the Aboitiz group based on offered capacity grew in March. The same is influenced by the notable decreases in the offered capacities of MPPCL and PSALM during the March billing month. Decrease in MPPCL's offered capacity to 5.8 percent in March from 7.5 percent in February was attributable to the high outage capacity of the two units of Masinloc (MPPCL). Meanwhile, PSALM registered a low 1.8 percent market share in March on account of the exclusion of the Malaya power plant from the total offered capacity of the PSALM group beginning the March billing month. Further, the Visayas market was still under the ERC's market suspension during the period, thus, the power plants of PSALM in the Visayas, including Leyte A, which accounts for majority of the capacity of PSALM in the region, was excluded from the calculation of offered capacity until the lifting of the ERC's market suspension on 26 March.

On the other hand, the respective market shares of Aboitiz, GMCP and MPPCL posted notable decreases during the July billing month while the market shares of GBPC, PSALM and SPC increased. This followed the decline in the offered capacities of said participant groups resulting from the high outage level registered

by Pagbilao 1 & 2 (Aboitiz), Mariveles 1 & 2 (GMCP) and Masinloc 1 & 2 (MPPCL) in July. The same influenced the increase in the market share of GBCP, PSALM and SPC, following the increase in the respective market shares of CEDC, PEDC, TPC (Sangi), TPC (Carmen), Leyte A, KSPC and Panay 1 & 3.

Also noteworthy is the decline in the share of offered capacity by the SMC group during the September and October billing months. This can be attributed to the outages of power plants Ilijan and Sual 1 & 2 in September. Meanwhile, Sual 1 went on planned outage for the duration of the October billing month, influencing the low offered capacity by the SMC group and the resulting decline in its market share during those months.

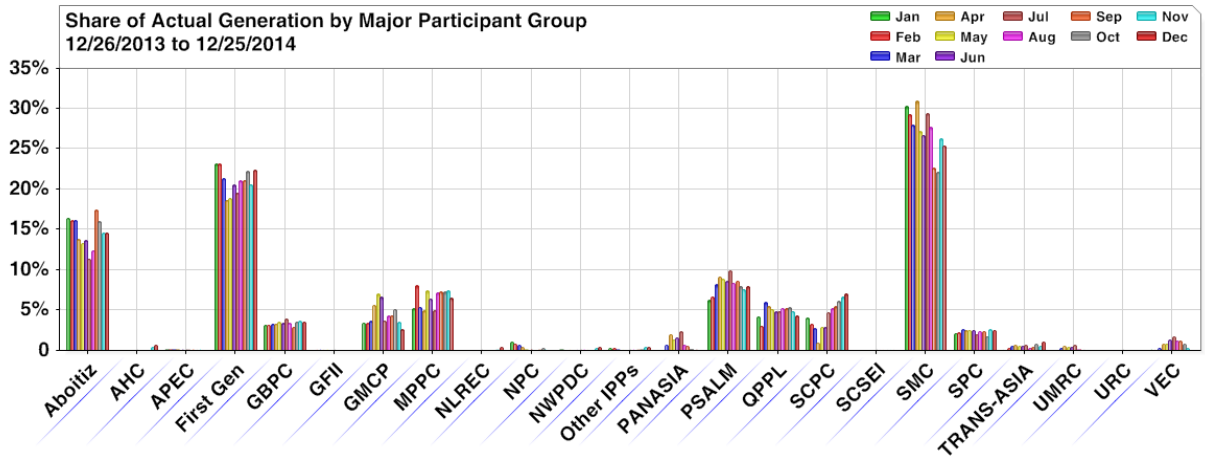
Figure 85. Share of Offered Capacity by Major Participant



Similar to the trend in the previous year, majority of the demand requirement in 2014 was supplied by the SMC and First Gen groups, registering their respective market shares based on actual generation (metered quantity) at an average of 27.1 percent and 21.0 percent, respectively, followed by the Aboitiz group with 14.6 percent, PSALM with 8.2 percent, MPPCL with 6.5 percent, QPPL with 4.9 percent and GMCP with 4.5 percent.

Consistent with the trend in the market share based on offered capacity, the market share of the SMC group based on actual generation likewise dipped in September and October attributable to the high outage level of SMC plants during said months. Also, the market share of Aboitiz, GMCP and MPPCL posted decreases in July due to the high incidence of outage among its plants during the billing month. Further, PSALM recorded its lowest share of the market in January and February, due to the high outage level among its Visayas plants and of Leyte A, in particular.

Figure 86. Share of Actual Generation by Major Participant

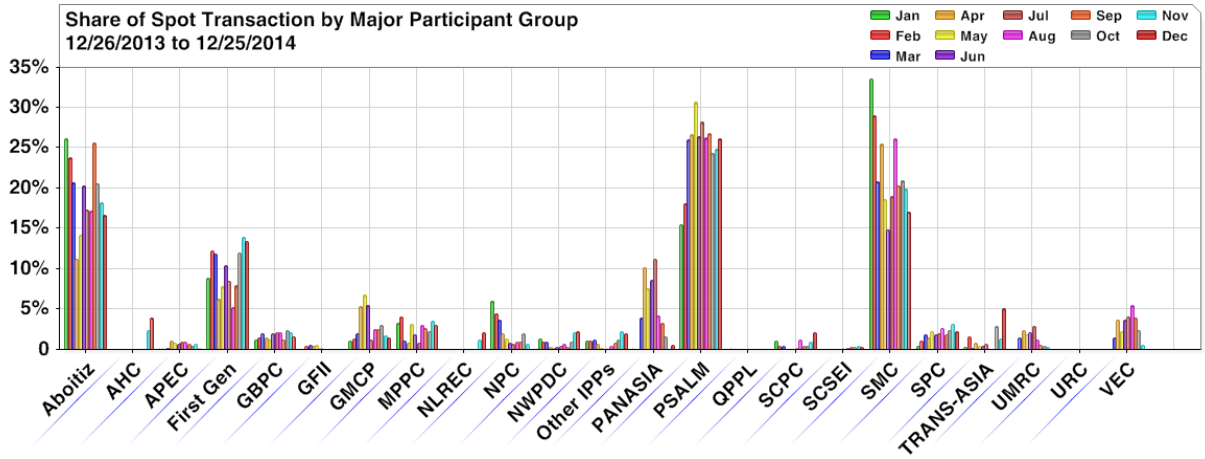


PSALM posted the biggest share of the market in terms of spot transaction among the major participant groups, posting a market share of 25.3 percent, followed by the SMC group at 21.9 percent and the Aboitiz group at 19.1 percent. First Gen notably registered a much lower market share based on spot transaction with only 9.7 percent share of the market, indicating that majority of the actual generation by the First Gen plants are already covered by contracts.

Participant groups Panasia and GMCP registered the next biggest market share based on spot transaction at 4.6 percent and 3.0 percent while Visayas Electric Company (VEC) and MPPCL both posted their market shares at 2.4 percent.

Note the spike in the market share of the Aboitiz group during the January, February and September billing months while the SMC group posted the highest market share levels in January and February. On the other hand, PSALM recorded its highest share in spot transaction during the May billing month.

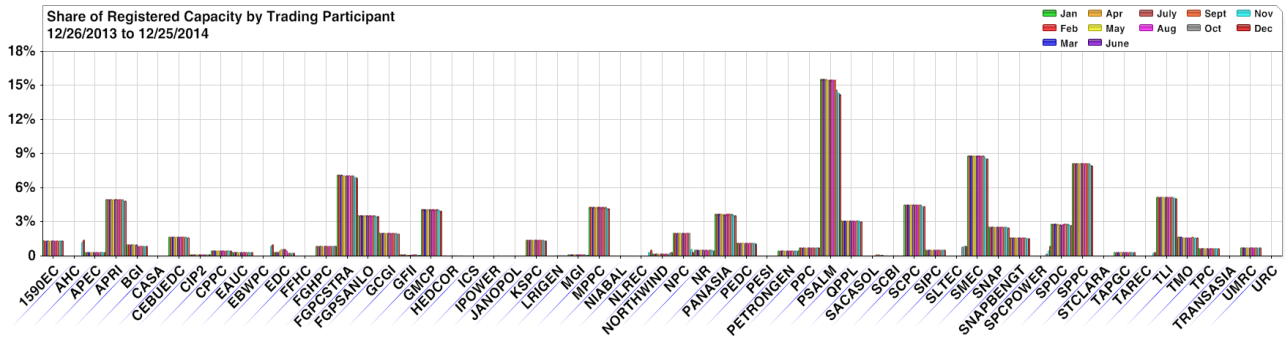
Figure 87. Share of Spot Transaction by Major Participant



2. By Trading Participant

PSALM had the biggest market share of registered capacity by trading participant, averaging at about 15.3 percent, distantly followed by San Miguel Energy Corporation (SMEC) with an 8.8 percent share of the market; South Premiere Power Corporation (SPPC) with 8.1 percent, FGP Corporation (FGPCSTRA) at 7.1 percent and Therma Luzon Inc. with 5.2 percent. Note that SMEC is the trading participant for major coal plant Sual while SPPC trades in the market for natural gas plant Ilijan. FGPCSTRA and TLI, on the other hand, are the trading participants for the Sta. Rita natural gas plants and major coal plant Pagbilao, respectively.

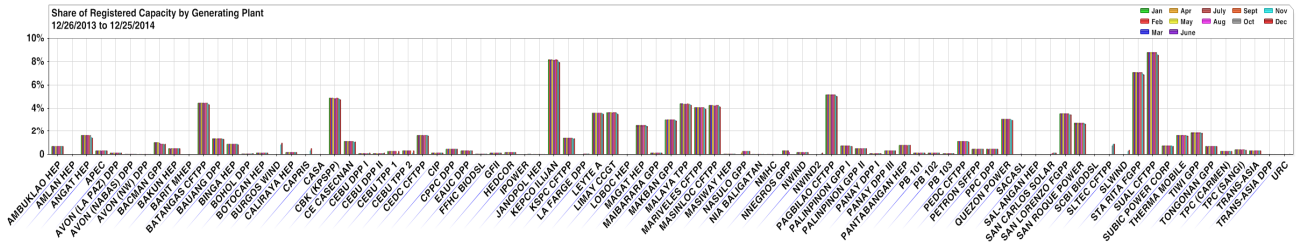
Figure 88. Share of Registered Capacity by Trading Participant



3. By Generating Plant

Consistent with the above, Sual, Ilijan, Sta. Rita and Pagbilao registered the biggest market share based on registered capacity by generating plant averaging at about 8.8 percent, 8.1 percent, 7.1 percent and 5.2 percent, respectively. CBK (KSPP) followed with an average of about 4.9 percent share of the market, followed closely by major coal plant Batangas with 4.5 percent, Malaya with 4.4 percent, Masinloc with 4.3 percent, Mariveles with a share of 4.1 percent, Limay and Leyte A with about 3.7 percent, and San Lorenzo, with 3.6 percent share of the market.

Figure 89. Share of Registered Capacity by Generating Plant



B. Herfindahl-Hirschman Index (HHI) (by Generating Plant, Trading Participant and Major Participant Group)

The HHI measures the degree of market concentration that takes into account the relative size and distribution of participants in the market. Defined as the sum of squares of the participant's market share, the HHI approaches zero when the market has very large number of participants with each having a relatively small market share. In contrary, the HHI increases as the number of participants in the market decreases, and the disparity in the market shares among the participants increases. The following are the widely-used HHI screening numbers: (1) when HHI is less than 1,000 the market is not concentrated; (2) in the range of 1,000 to 1,800 the market is moderately concentrated; (3) greater than 1,800 but less than 2,500 the market is concentrated; and (4) greater than 2,500 the market is highly concentrated and signals lack of competition in the market.

The Figures below show the monthly HHI calculated based on the following scenarios: registered capacity, registered capacity net of outage, offered capacity, metered quantity and spot transaction. The HHI, when based on registered capacity, provides the base scenario in assessing market concentration which does not vary over time unless there are significant changes in the ownership and registered capacity of the generators, or registration and deregistration of generators.

Result of the HHI calculation by generating plant and by trading participant both showed that the market is not concentrated. However, if the HHI calculation is based on spot transaction by trading participant, the market concentration was observed to have increased and ranged from not concentrated during the billing months of January, February and October to December, to a moderately concentrated market during the March to September billing months.

Based on major participant group, the market remained moderately concentrated over the course of the 12-month period, in terms of registered capacity, registered capacity net of outage, offered capacity and actual generation (metered quantity), considering that there are only four major participants controlling the majority of the market share. Note that the HHI based on offered capacity showed that the market was concentrated during the January to March billing months, while the HHI based on actual generation during the January and February billing months bordered the concentrated mark. The same is attributable to the exclusion of the Visayas plants in the calculation of HHI during the first quarter of the year, following the ERC's declaration of partial market suspension affecting the Visayas during the period.

The HHI calculation by major participant group based on spot transaction indicated a moderately concentrated market except during the January, February and September billing months when the HHI calculation signalled an increase in market concentration, pointing to a concentrated market in said months. The market became concentrated in January and February on account of the exclusion of the Visayas plants in the HHI calculation as earlier discussed while the September billing month is marked with the significant decline in the spot transaction of plants from the Visayas, which consequently influenced the increase in the HHI level during the month.

Compared with the previous year however, it is observed that the HHI levels in 2014 based on major participant group showed improvement from last year's level of market concentration. In particular, last year's HHI calculation ranged from concentrated to highly concentrated in terms of spot transaction. The improvement in market concentration may be attributed to the registration of additional capacities in the market resulting in the decrease in market share of the four dominant participant groups.

Figure 90. HHI by Major Participant

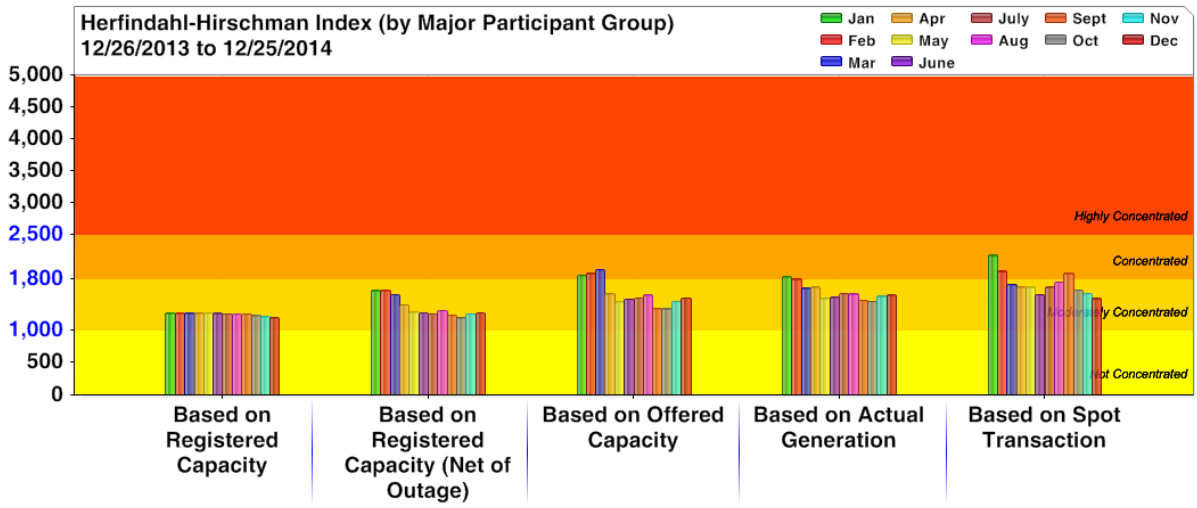


Figure 91. HHI by Participant

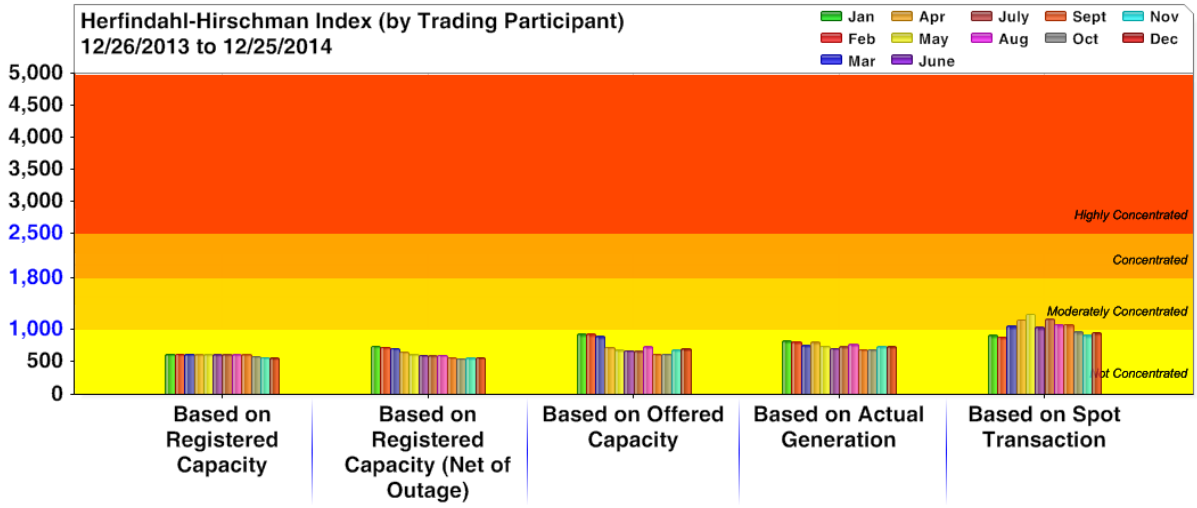
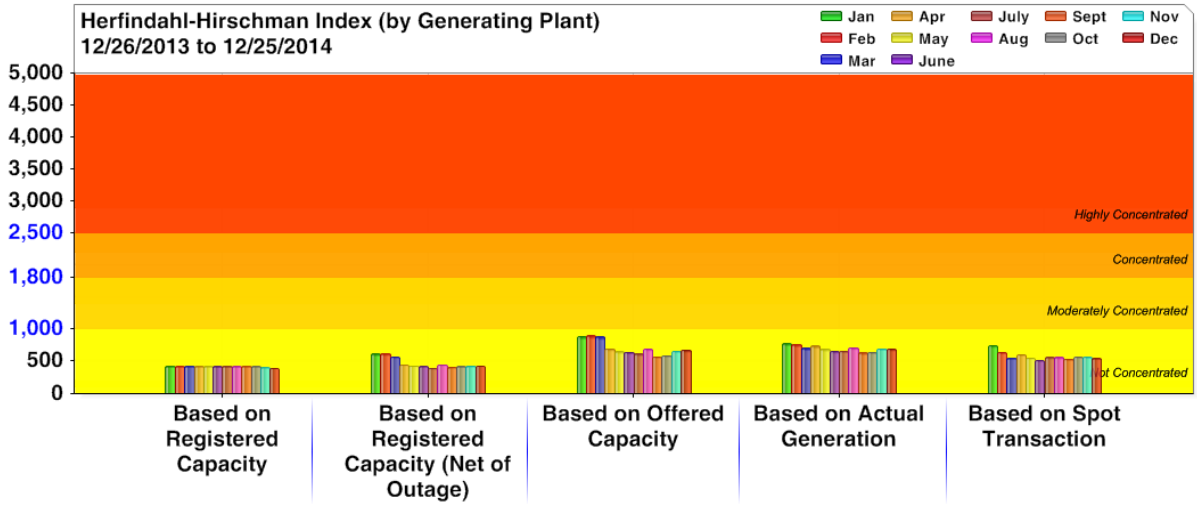


Figure 92. HHI by Plant



APPENDIX 'A'

List of WESM Registered Capacities as of 23 December 2014 - Luzon

WESM Registered Capacities as of 23 December 2014					
No.	Participant Name	Generation Facility Registered/WESM Resource Name	Plant Type	Classification	Registered Maximum Capacity (Pmax) (MW)
LUZON					
1	1590 Energy Corporation	1BAUANG_G01	Oil-Based	Scheduled	200
2	Angat Hydropower Corporation	1ANGAT_A	Hydro	Scheduled	18
3	Angat Hydropower Corporation	1ANGAT_M	Hydro	Scheduled	200
4	AP Renewables Inc.	3MKBN_A	Geothermal	Scheduled	126
5	AP Renewables Inc.	3MKBN_B	Geothermal	Scheduled	126
6	AP Renewables Inc.	3MKBN_C	Geothermal	Scheduled	110
7	AP Renewables Inc.	3MKBN_D	Geothermal	Scheduled	40
8	AP Renewables Inc.	3MKBN_E	Geothermal	Scheduled	40
9	AP Renewables Inc.	3ORMAT_G01	Geothermal	Scheduled	12
10	AP Renewables Inc.	3TIWI_A	Geothermal	Scheduled	118
11	AP Renewables Inc.	3TIWI_B	Geothermal	Scheduled	43.7
12	AP Renewables Inc.	3TIWI_C	Geothermal	Scheduled	114
13	Asia Pacific Energy Corporation	1APEC_G01	Oil-Based	Scheduled	52
14	Bac-Man Geothermal Inc.	3BACMAN_G01	Geothermal	Scheduled	115
15	Bac-Man Geothermal Inc.	3BACMAN_G02	Geothermal	Scheduled	20
16	CIP II Power Corporation	1CIP2_G01	Oil-Based	Scheduled	21.27
17	EDC Burgos Wind Power Corporation*	1BURGOS_G01	Wind	Non-scheduled	150
18	First Gen Hydro Power Corporation	1MASIWA_G01	Hydro	Scheduled	12.4
19	First Gen Hydro Power Corporation	1PNTBNG_U01	Hydro	Scheduled	60
20	First Gen Hydro Power Corporation	1PNTBNG_U02	Hydro	Scheduled	60
21	FGP Corporation (San Lorenzo)	3STA-RI_G05	Natural Gas	Scheduled	264.8
22	FGP Corporation (San Lorenzo)	3STA-RI_G06	Natural Gas	Scheduled	261.8
23	First Gas Power Corporation (Sta Rita)	3STA-RI_G01	Natural Gas	Scheduled	257.3
24	First Gas Power Corporation (Sta Rita)	3STA-RI_G02	Natural Gas	Scheduled	255.7
25	First Gas Power Corporation (Sta Rita)	3STA-RI_G03	Natural Gas	Scheduled	265.5
26	First Gas Power Corporation (Sta Rita)	3STA-RI_G04	Natural Gas	Scheduled	264
27	GNPower Mariveles Coal Plant Ltd. Co.	1MARVEL_G01	Coal	Scheduled	302
28	GNPower Mariveles Coal Plant Ltd. Co.	1MARVEL_G02	Coal	Scheduled	302
29	Green Future Innovations, Inc.	1GFII_G01	Biomass	Scheduled	19.81
30	HEDCOR, Inc.	1SLANGN_G01	Hydro	Non-scheduled	2.4
31	HEDCOR, Inc.	1NMHC_G01	Hydro	Non-scheduled	5.09
32	Lafarge Republic, Inc.	3LAFARG_G01	Oil-Based	Scheduled	6.35
33	Lafarge Republic, Inc.	3LAFARG_G02	Oil-Based	Scheduled	6.35
34	Maibarara Geothermal, Inc.	3MGPP_G01	Geothermal	Scheduled	20
35	Masinloc Power Partners Co. Ltd.	1MSINLO_G01	Coal	Scheduled	315
36	Masinloc Power Partners Co. Ltd.	1MSINLO_G02	Coal	Scheduled	315
37	National Irrigation Administration	1NIABAL_G01	Hydro	Non-scheduled	6
38	North Luzon Renewable Energy Corporation*	1CAPRIS_G01	Wind	Non-scheduled	81
39	North Wind Power Development Corporation	1NWIND_G01	Wind	Non-scheduled	27
40	North Wind Power Development Corporation*	1NWIND_G02	Wind	Non-scheduled	18.9
41	Panasia Energy, Inc.	1LIMAY_A	Oil-Based	Scheduled	270
42	Panasia Energy, Inc.	1LIMAY_B	Oil-Based	Scheduled	270
43	People's Energy Services Inc.	3BART_G01	Hydro	Non-scheduled	1.8
44	Petron Corporation	1PETRON_G01	Oil-Based	Scheduled	70
45	PSALM Corporation	1CASECN_G01	Hydro	Scheduled	165
46	PSALM Corporation	1HEDCOR_G01	Hydro	Scheduled	30
47	PSALM Corporation	3BOTOCA_G01	Hydro	Scheduled	20.8
48	PSALM Corporation	3CALIRY_G01	Hydro	Scheduled	28
49	PSALM Corporation	3KAL_G01	Hydro	Scheduled	180
50	PSALM Corporation	3KAL_G02	Hydro	Scheduled	180
51	PSALM Corporation	3KAL_G03	Hydro	Scheduled	180
52	PSALM Corporation	3KAL_G04	Hydro	Scheduled	180
53	PSALM Corporation	3MALAYA_G01	Oil-Based	Scheduled	300
54	PSALM Corporation	3MALAYA_G02	Oil-Based	Scheduled	350
55	Quezon Power (Philippines) Ltd. Co.	3QPPL_G01	Coal	Scheduled	459
56	San Jose City I Power Corporation*	1IPOWER_G01	Biomass	Non-scheduled	10.8
57	San Miguel Energy Corporation	1SUAL_G01	Coal	Scheduled	647
58	San Miguel Energy Corporation	1SUAL_G02	Coal	Scheduled	647
59	SEM-Calaca Power Corporation	3CALACA_G01	Coal	Scheduled	330
60	SEM-Calaca Power Corporation	3CALACA_G02	Coal	Scheduled	330
61	SN Aboitiz Power - Benguet, Inc.	1BINGA_U01	Hydro	Scheduled	33
62	SN Aboitiz Power - Benguet, Inc.	1BINGA_U02	Hydro	Scheduled	33
63	SN Aboitiz Power - Benguet, Inc.	1BINGA_U03	Hydro	Scheduled	33
64	SN Aboitiz Power - Benguet, Inc.	1BINGA_U04	Hydro	Scheduled	33
65	SN Aboitiz Power - Benguet, Inc.	1AMBUK_G01	Hydro	Scheduled	105
66	SN Aboitiz Power - Magat, Inc.	1MAGAT_U01	Hydro	Scheduled	95
67	SN Aboitiz Power - Magat, Inc.	1MAGAT_U02	Hydro	Scheduled	95
68	SN Aboitiz Power - Magat, Inc.	1MAGAT_U03	Hydro	Scheduled	95
69	SN Aboitiz Power - Magat, Inc.	1MAGAT_U04	Hydro	Scheduled	95
70	South Luzon Thermal Energy Corporation*	3SLTEC_G01	Coal	Scheduled	135
71	South Premiere Power Corporation	3ILIJAN_G01	Natural Gas	Scheduled	600
72	South Premiere Power Corporation	3ILIJAN_G02	Natural Gas	Scheduled	600
73	Strategic Power Development Corporation	1SROQUE_U01	Hydro	Scheduled	137
74	Strategic Power Development Corporation	1SROQUE_U02	Hydro	Scheduled	137
75	Strategic Power Development Corporation	1SROQUE_U03	Hydro	Scheduled	137
76	Therma Luzon, Inc.	3PAGBIL_G01	Coal	Scheduled	382
77	Therma Luzon, Inc.	3PAGBIL_G02	Coal	Scheduled	382
78	Therma Mobile, Inc.	2TMO_G01	Oil-Based	Scheduled	66
79	Therma Mobile, Inc.	2TMO_G02	Oil-Based	Scheduled	67.2
80	Therma Mobile, Inc.	2TMO_G03	Oil-Based	Scheduled	57
81	Therma Mobile, Inc.	2TMO_G04	Oil-Based	Scheduled	52
82	Trans-Asia Power Generation Corporation	1T_ASIA_G01	Oil-Based	Scheduled	50
83	Udenna Management Resource Corporation	1S_ENRO_G01	Oil-Based	Scheduled	110
84	Vivant Sta. Clara Northern Renewables Generation Corporation	1BAKUN_G01	Hydro	Scheduled	76

APPENDIX 'B'

List of WESM Registered Capacities as of 23 December 2014 - Visayas

WESM Registered Capacities as of 23 December 2014					
No.	**Participant Name**	**Generation Facility Registered/WESM Resource Name**	**Plant Type**	**Classification**	**Registered Maximum Capacity (Pmax) (MW)**
VISAYAS					
1	Bohol I Electric Cooperative, Inc.	7JANOPO_G01	Hydro	Non-scheduled	5
2	Cebu Energy Development Corporation	5CEDC_G01	Coal	Scheduled	246
3	Cebu Private Power Corporation	5CPPC_G01	Oil-Based	Scheduled	70
4	Central Azucarera de San Antonio	8CASA_G01	Biomass	Non-scheduled	4
5	East Asia Utilities Corporation	5EAUC_G01	Oil-Based	Scheduled	49.6
6	Energy Development Corporation	6NASULO_G01	Geothermal	Scheduled	47.5
7	First Farmers Holdings Corporation	6FFHC_G01	Biomass	Non-scheduled	12
8	Green Core Geothermal Inc.	6PAL1A_G01	Geothermal	Scheduled	109.57
9	Green Core Geothermal Inc.	6PAL2A_G01	Geothermal	Scheduled	79.16
10	Green Core Geothermal Inc.	4LGPP_G01	Geothermal	Scheduled	107
11	ICS Renewables	6AMLA_G01	Hydro	Non-scheduled	0.9
12	KEPCO Salcon Power Corporation	5KSPC_G01	Coal	Scheduled	103
13	KEPCO Salcon Power Corporation	5KSPC_G02	Coal	Scheduled	103
14	National Power Corporation (PB 101)	8STBAR_PB	Oil-Based	Scheduled	20
15	National Power Corporation (PB 102)	8STBAR_PB2	Oil-Based	Scheduled	20
16	National Power Corporation (PB 103)	8PANIT_PB	Oil-Based	Scheduled	15
17	Panay Energy Development Corporation	8PEDC_G01	Coal	Scheduled	167.4
18	Panay Power Corporation	8GLOBAL_G01	Oil-Based	Scheduled	10
19	Panay Power Corporation*	8PPC_G01	Oil-Based	Scheduled	72
20	Panay Power Corporation*	8AVON_G01	Oil-Based	Scheduled	20
21	PSALM Corporation	4LEYTE_A	Geothermal	Scheduled	538
22	San Carlos Bioenergy, Inc.	6SCBE_G01	Biomass	Non-scheduled	8.3
23	San Carlos Solar Energy, Inc.	6SACASL_G01	Solar	Non-scheduled	19.8
24	SPC Island Power Corporation	7BDPP_G01	Oil-Based	Scheduled	16.2
25	SPC Island Power Corporation	8PDPP_G01	Oil-Based	Scheduled	15
26	SPC Island Power Corporation	8PDPP3_G01	Oil-Based	Scheduled	52
27	SPC Power Corporation	5CDPPI_G01	Oil-Based	Scheduled	18
28	SPC Power Corporation	5CDPPI_G02	Oil-Based	Scheduled	18
29	SPC Power Corporation	5CTPP_G01	Coal	Scheduled	45
30	SPC Power Corporation	5CTPP_G02	Coal	Scheduled	50
31	Sta Clara Power Corporation	7LOBOC_G01	Hydro	Non-scheduled	1.2
32	Toledo Power Company	5TPC_G01	Oil-Based	Scheduled	40
33	Toledo Power Company	5TPC_G02	Coal	Scheduled	60
34	Trans-Asia Oil and Energy Development Corporation	8GUIM_G01	Oil-Based	Non-scheduled	3
35	Trans-Asia Renewable Energy Corporation*	8SLWIND_G01	Wind	Non-scheduled	54
36	Universal Robina Corporation*	6URC_G01	Biomass	Non-scheduled	40

*Capacities are used for modelling purposes only. These are subject to change upon submission of the ERC Certification of plant specifications based on ERC's ocular technical inspection.

APPENDIX 'C'

Summary of Generator Trading Intervals[17] with Capacity Gap - Luzon
26 December 2013 to 25 December 2014

Plant Type	Generator-Trading Intervals with Capacity Gap (Luzon)												
	Generating plant outage	Equipment-related concern	Water elevation/ availability	NIA IDR	Steam supply	Generator/equipment test	Line limitation	Start-up profile	Shutdown profile	Fuel oil operation	Others	No offer/ reason	Total
COAL	490	16,392	200	0	14	792	0	272	70	0	20,732	9,747	48,709
GEO	84	363	0	0	44,008	1,374	0	42	400	0	6,138	8,068	60,477
HYDRO	9,123	66	27,990	15,912	0	234	96	16	1	0	4,232	68,721	126,391
NATGAS	10	10	0	0	0	1	0	165	185	2,616	21,211	58	24,256
OIL	8,674	24,955	35	0	0	602	0	0	820	0	31,162	18,872	85,120
TOTAL	18,381	41,786	28,225	15,912	44,022	3,003	96	495	1,476	2,616	83,475	105,466	344,953

APPENDIX 'D'

Summary of Generator Trading Intervals[18] with Capacity Gap - Visayas
26 December 2013 to 25 December 2014

Plant Type	Generator Trading Intervals with Capacity Gap (Visayas)												
	Generating plant outage	Equipment-related concern	Water elevation/ availability	NIA IDR	Steam supply	Generator/equipment test	Line limitation	Start-up profile	Shutdown profile	Fuel oil operation	Others	No offer/ reason	Total
COAL	6,213	7,128	0	0	0	0	0	42	50	0	12	2,668	16,113
GEO	3,846	244	0	0	13,213	1	0	15	1,120	671	75	1,313	20,498
OIL	22,410	1,908	0	0	0	0	0	0	674	0	14,359	24,888	64,239
TOTAL	32,469	9,280	0	0	13,213	1	0	57	1,844	671	14,446	28,869	100,850

[17] Total generator resource trading-intervals in Luzon – calculated as the number of registered generator resource nodes multiplied by the total trading intervals in the billing month.
[18] Total generator resource trading-intervals in Visayas – calculated as the number of registered generator resource nodes multiplied by the total trading intervals in the billing month.