



Power Supply and Demand Highlights

January – June 2017

Installed Capacity

21,621 MW

Dependable Capacity

19,537 MW

Available Capacity

15,393 MW

Gross Generation

44,648,716 MWh

Committed Capacity

5,839 MW

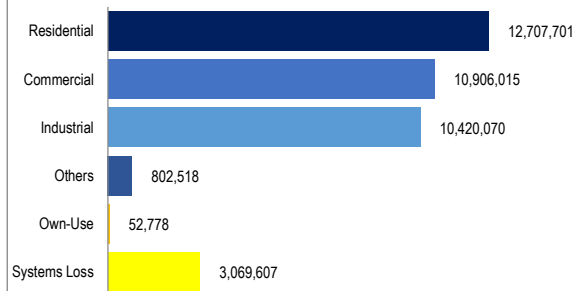
Indicative Capacity

22,160 MW

The Philippine Power System remained generally stable from January to June 2017 despite the natural and man-made calamities experienced during the period such as earthquakes in Batangas in Luzon and Leyte in Visayas and the Marawi siege in Mindanao; and events such as Malampaya Gas maintenance shutdown in Luzon, continued occurrences of forced outages of generation and transmission facilities which resulted to load dropping incidents in the three major grids. The strong coordination among all energy stakeholders to immediately respond to these challenges was key towards this end, coupled with the additional power generation capacities of 237 MW. The relatively low demand during critical supply periods also aid in maintaining the stability of the power system.

To ensure the delivery of quality, reliable, affordable, and secured electricity supply, the DOE initiated the issuance of policies for resiliency, conduct of performance assessment and technical audit for all energy facilities, and reactivated the Inter-Agency Task Force on Securing Energy Facilities (IATFSEF), among others.

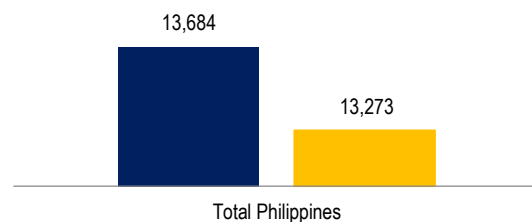
Electricity Sales and Consumption ¹ 37,958,689 MWh



Electricity sales and consumption for the first half of 2017 grew by 1.83 % as compared to the same period last year at 37,276,101 MWh.

Total Non-coincidental Peak Demand, Philippines in MW

■ Jan - June 2017 ■ Jan - Dec 2016



The total peak demand as of June 2017 at 13,684 MW is 3.10% higher compared to the 2016 level at 13,273 MW.

Notes:

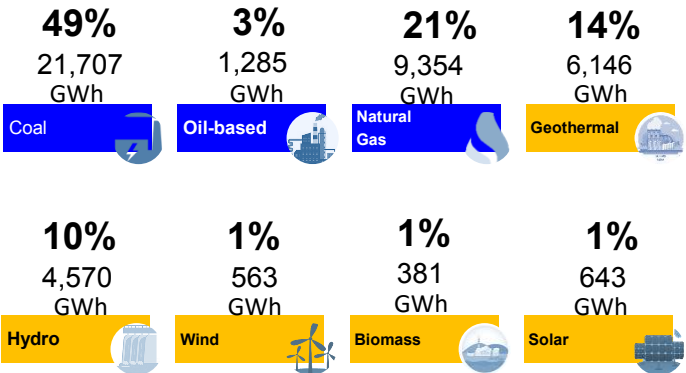
- 1) Excluding data of Small Power Utilities Group (SPUG); most Distribution Utilities (DUs) consider own-use as part of electricity sales to the commercial sector with reference to ERC Resolution No. 11 Series of 2010
- 2) All data are still preliminary as of 30 June 2017
- 3) Due to rounding, totals may not correspond to the sum of all figures throughout the whole document

PHILIPPINES

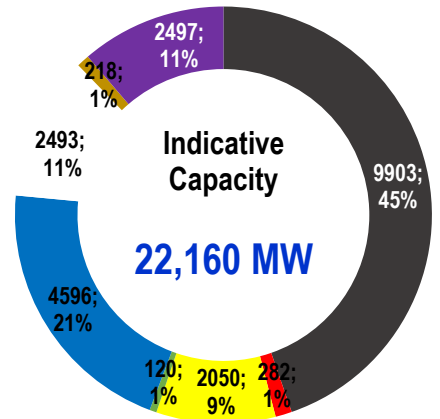
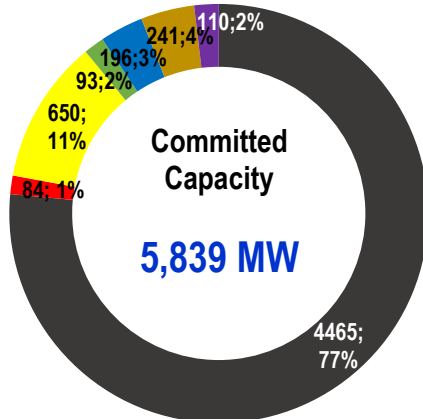
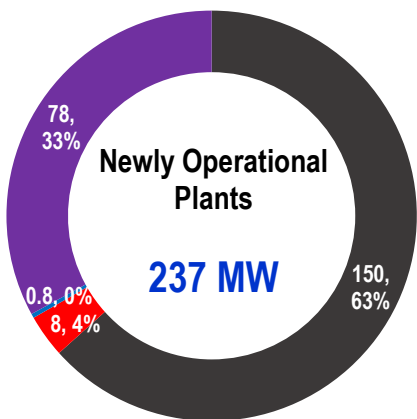
Installed, Dependable and Available Capacity from January-June 2017 (in MW)

Fuel Type	Installed		Dependable		Available		
	MW	Percent Share (%)	MW	Percent Share (%)	Min	Max	Average
Coal	7,568	35.00	7,230	37.01	3,845	7,084	5,530
Oil-Based	3,584	16.58	2,817	14.42	1,469	2,548	2,267
Natural Gas	3,431	15.87	3,291	16.84	1,198	3,295	2,774
Renewable Energy	7,038	32.55	6,199	31.73	3,177	6,136	4,822
<i>Geothermal</i>	<i>1,906</i>	<i>8.82</i>	<i>1,752</i>	<i>8.97</i>	<i>1,097</i>	<i>1,775</i>	<i>1,428</i>
<i>Hydro</i>	<i>3,638</i>	<i>16.83</i>	<i>3,241</i>	<i>16.59</i>	<i>1,801</i>	<i>3,136</i>	<i>2,610</i>
<i>Wind</i>	<i>427</i>	<i>1.97</i>	<i>383</i>	<i>1.96</i>	<i>3</i>	<i>398</i>	<i>160</i>
<i>Biomass</i>	<i>224</i>	<i>1.04</i>	<i>160</i>	<i>0.82</i>	<i>25</i>	<i>131</i>	<i>103</i>
<i>Solar</i>	<i>843</i>	<i>3.90</i>	<i>663</i>	<i>3.39</i>	<i>251</i>	<i>696</i>	<i>521</i>
TOTAL	21,621	100.00	19,537	100.00	9,689	19,063	15,393
Jan-Jun 2016	14,348		13,109		6,712	12,394	10,361

Gross Power Generation (January-June 2017) 44,648,716 MWh



- The country's total installed capacity remained dominated by coal at 35% or 7,568 MW, followed by renewable energy at 32% or 7,038 MW, oil-based at 17% or 3,584 MW, and natural gas at 16% or 3,431 MW.
- In terms of power generation, coal remained the major source of electricity for Luzon, Visayas, and Mindanao with a combined share at 49% or 21,707 MWh.
- Newly operational plants from January-June 2017 are mainly coal and solar power plants which added 150 MW and 78 MW to the total installed capacity.
- Capacities which will be coming in the pipeline are largely coal power projects with 4,465 MW committed and 9,903 MW indicative capacities.

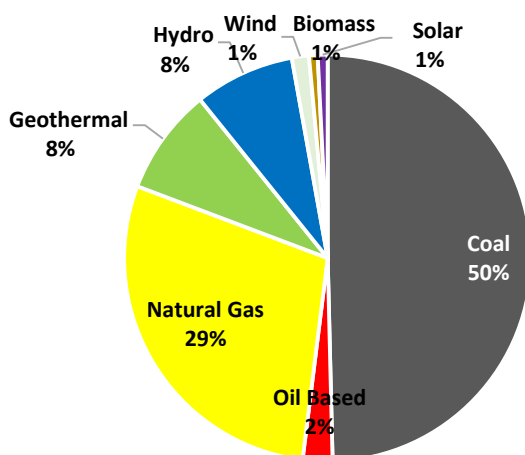


■ Coal ■ Oil-Based ■ Natural Gas ■ Geothermal ■ Hydro ■ Wind ■ Biomass ■ Solar

Installed, Dependable and Available Capacity from January-June 2017 (in MW)

Fuel Type	Installed		Dependable		Available		
	MW	Percent Share (%)	MW	Percent Share (%)	Min	Max	Average
Coal	5,444	35.99	5,230	37.70	2,842	5,135	4,003
Oil Based	2,133	14.10	1,655	11.93	777	1,572	1,384
Natural Gas	3,430	22.67	3,291	23.72	1,198	3,295	2,774
Renewable Energy	4,120	27.24	3,699	26.66	1,981	3,850	2,886
<i>Geothermal</i>	<i>833</i>	<i>5.51</i>	<i>782</i>	<i>5.64</i>	<i>407</i>	<i>872</i>	<i>590</i>
<i>Hydro</i>	<i>2,538</i>	<i>16.78</i>	<i>2,324</i>	<i>16.75</i>	<i>1,487</i>	<i>2,342</i>	<i>1,967</i>
<i>Wind</i>	<i>337</i>	<i>2.23</i>	<i>293</i>	<i>2.11</i>	<i>1</i>	<i>308</i>	<i>113</i>
<i>Biomass</i>	<i>87</i>	<i>0.58</i>	<i>66</i>	<i>0.48</i>	<i>22</i>	<i>63</i>	<i>51</i>
<i>Solar</i>	<i>325</i>	<i>2.15</i>	<i>233</i>	<i>1.68</i>	<i>64</i>	<i>265</i>	<i>165</i>
TOTAL	15,128	100.00	13,874	100.00	6,798	13,852	11,047
Jan-Jun 2016	14,348		13,109		6,712	12,394	10,361

Gross Power Generation (January-June 2017) 32,512,020 MWh



169 MW

• Newly Operational Plants

4,142 MW

• Committed Projects

16,113 MW

• Indicative Projects

HIGHLIGHTS AND SIGNIFICANT INCIDENTS

- Shell Philippines Exploration B.V. (SPEX) conducted the Malampaya Gas Facility Scheduled Maintenance Shutdown (SMS) on 28 January to 16 February 2017 which was safely completed ahead of the planned schedule. Despite this SMS and the occurrence of forced outages of some major power plants, Luzon grid remained stable due to the low demand during the period. During the SMS, Santa Rita, San Lorenzo and Avion Natural Gas-Fired Power Plants run on liquid fuel while Ilijan Natural Gas-Fired Power Plant run on bio-diesel.
- Two earthquakes occurred in Mabini, Batangas on 08 April 2017 causing generator tripping with a total capacity of 1,570 MW in the Batangas area. The affected power plants were Avion Unit 2 (50 MW), San Lorenzo Units 1 and 2 (500 MW), Ilijan B (600 MW), and San Gabriel (420 MW). This incident triggered the issuance of Yellow Alert on 10-11 April 2017 and Red Alert on 10 April 2017. Luzon grid became stable on 16 April 2017 with the synchronization of most of the affected power plants to the grid.

HIGHLIGHTS AND SIGNIFICANT INCIDENTS (continued)

- An Automatic Load Dropping (ALD) incident occurred on 7 June 2017 due to the outage of the 300 MW Calaca Coal-Fired Power Plant (CFPP) Unit 2 and the 150 MW SLPGC CFPP Unit 2. The outage of the power plants was due to the actuation of Batangas System Integrity Protection Scheme (SIPS) caused by the auto-tripping of Calaca-Amadeo 230 kV transmission line 2.
- The 647 MW Sual Coal-Fired Power Plant (CFPP) Unit 2 went on forced outage on 14 June 2017 triggering an ALD incident with recorded system frequency drop at 58.908 Hz. It was reported that the primary cause of transformer failure was internal flash over on the high voltage (HV) winding which resulted to the explosion of HV bushing. On-site repair was not recommended due to carbon deposits contamination all over the internals. As best option, Team Sual will purchase a new transformer and the target synchronization of Sual CFPP Unit 2 is by February 2018.
- At the end of 1st half 2017, a total of 168.8 MW increase in the installed capacity was recorded with the entry of the power plants listed below. In addition, a total of 4,142 MW committed capacity and 16,113 indicative capacity is recorded as of 30 June 2017.

Additional Capacities (01 January to 30 June 2017)

Newly-Operating Power Plants	Location	Installed Capacity (MW)	Dependable Capacity (MW)	Commercial Operation Date
COAL				
SCPC Limay CFPP Unit 1	Limay, Bataan	150.0	150.0	May 2017
SUBTOTAL		150.0	150.0	
HYDRO				
San Luis Mini HEPP	San Luis, Aurora	0.8	0.8	January 2017
SUBTOTAL		0.8	0.8	
SOLAR				
Mariveles Solar	Mariveles, Bataan	18.0	12.6	February 2017
SUBTOTAL		18.0	12.6	
TOTAL		168.8	163.4	

Summary of Committed and Indicative Power Projects As of 30 June 2017

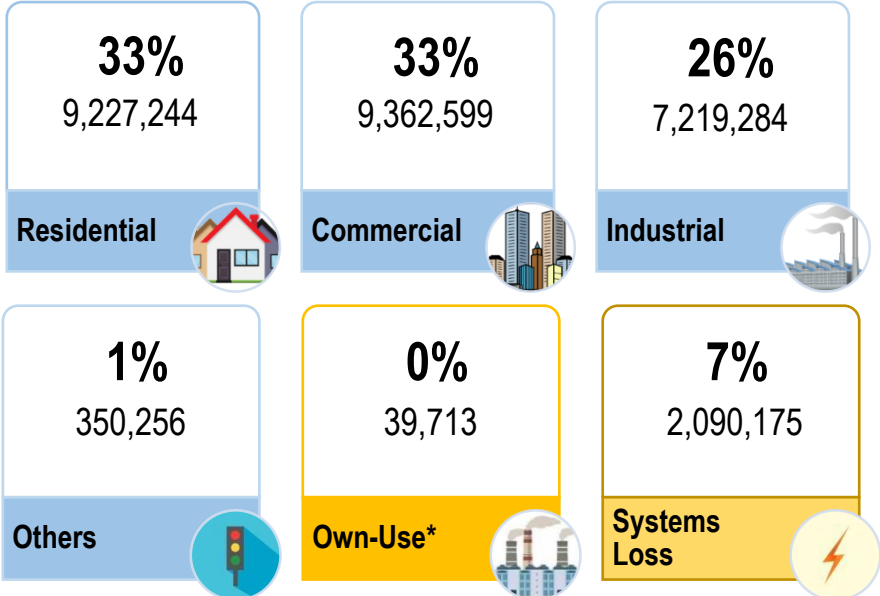
Type of Power Plant	Committed			Indicative		
	No. of Proponents*	Capacity (MW)	% Share	No. of Proponents	Capacity (MW)	% Share
Coal	6	3,240.0	78.2	11	7,760.0	48.2
Oil-Based	1	46.0	1.1	1	150.0	0.9
Natural Gas	1	650.0	15.7	3	2,050.0	12.7
Renewable Energy	13	205.8	5.0	76	6,152.7	38.4
<i>Geothermal</i>	2	43.0	1.0	1	50.0	0.3
<i>Hydro</i>	3	7.5	0.2	38	3,140.3	19.5
<i>Biomass</i>	4	50.9	1.2	10	114.2	0.7
<i>Solar</i>	4	104.4	2.5	21	1,572.8	9.8
<i>Wind</i>	0	0.0	0.0	6	1,275.4	7.9
TOTAL	21	4,141.8	100.0	91	16,112.7	100.0
Battery Storage**	1	10.0		2	230.0	

* Per Technology accounting purposes; declared capacity for Ancillary Services (AS) to the system

** For accounting purposes; declared capacity for Ancillary Services (AS) to the system

LUZON

Electricity Sales and Consumption (in MWh)

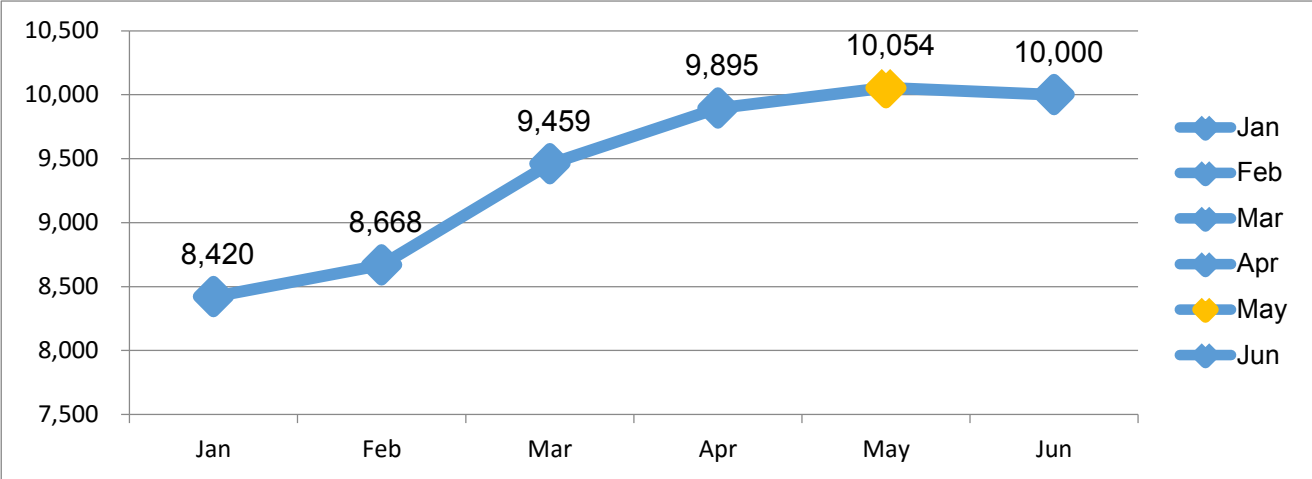


- Electricity sales and consumption in Luzon from January to June 2017 reached a total of 28,289,272 MWh. This is 2.13% higher than the same period in 2016 at 27,700,584 MWh.
- This is driven by the consumption of the residential sector at 34% or 9,227,244 MWh.
- Luzon's share to the country's total electricity sales and consumption remained the largest at 75%.

*Note: Most DUs consider own-use as part of electricity sales to the commercial sector with reference to ERC Resolution No. 11 Series of 2010

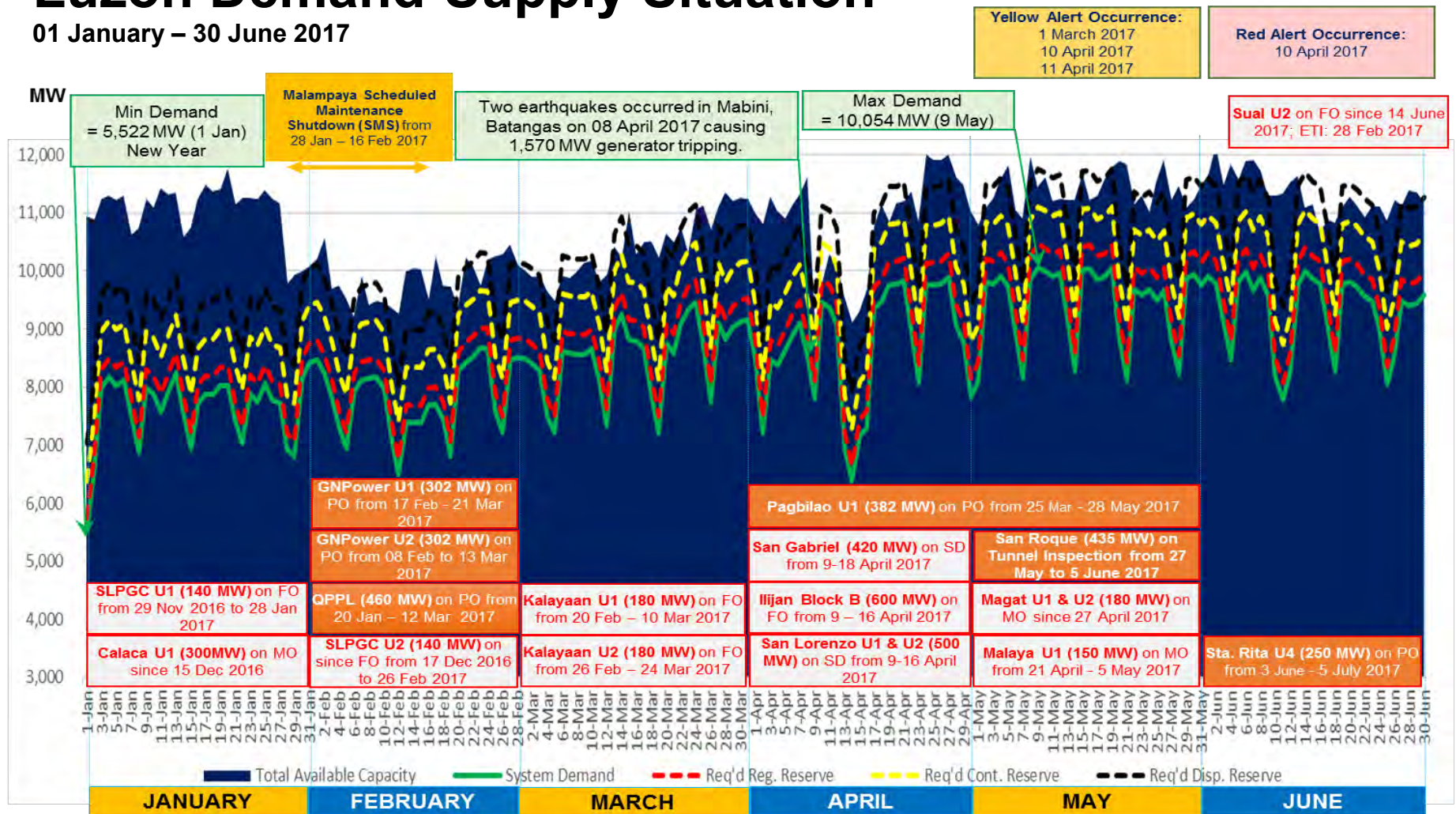
•Luzon reached new all-time high system peak demand at 10,054 MW which occurred on 09 May 2017, 2:27 PM with corresponding 11,218 MW available capacity. This peak demand is 3.26% higher than the previous year at 9,726 MW.

Monthly Peak Demand (in MW)



Luzon Demand-Supply Situation

01 January – 30 June 2017



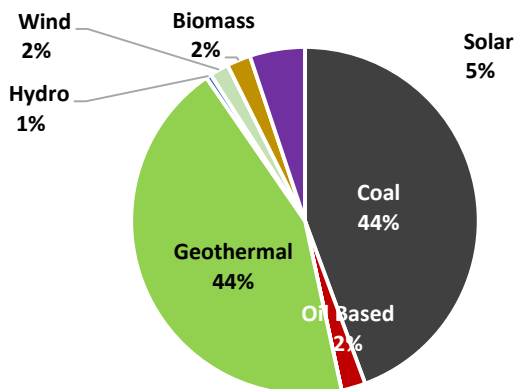
Source: National Grid Corporation of the Philippines (NGCP) Daily Operations Report

Note: FO – Forced Outage / PO – Planned Outage / MO – Maintenance Outage / SD – Shutdown

Installed, Dependable and Available Capacity from January-June 2017 (in MW)

Fuel Type	Installed		Dependable		Available		
	MW	Percent Share (%)	MW	Percent Share (%)	Min	Max	Average
Coal	1,054	31.43	1,050	35.64	638	1,046	892
Oil Based	663	19.77	447	15.17	252	435	394
Natural Gas	1	0.03	0	0.00	0	0	0
Renewable Energy	1,635	48.76	1,449	49.19	844	1,369	1,198
<i>Geothermal</i>	<i>965</i>	<i>28.78</i>	<i>870</i>	<i>29.53</i>	<i>646</i>	<i>803</i>	<i>756</i>
<i>Hydro</i>	<i>20</i>	<i>0.60</i>	<i>18</i>	<i>0.61</i>	<i>6</i>	<i>17</i>	<i>11</i>
<i>Wind</i>	<i>90</i>	<i>2.68</i>	<i>90</i>	<i>3.05</i>	<i>2</i>	<i>90</i>	<i>47</i>
<i>Biomass</i>	<i>101</i>	<i>3.01</i>	<i>84</i>	<i>2.85</i>	<i>3</i>	<i>68</i>	<i>52</i>
<i>Solar</i>	<i>459</i>	<i>13.69</i>	<i>387</i>	<i>13.14</i>	<i>187</i>	<i>391</i>	<i>332</i>
TOTAL	3,353	100.00	2,946	100.00	1,734	2,850	2,484
Jan-Jun 2016	2,965		2,498		1,323	2,383	2,019

Gross Power Generation (January-June 2017) 6,966,158 MWh



68 MW

- Newly Operational Plants

408 MW

- Committed Projects

3,504 MW

- Indicative Projects

HIGHLIGHTS AND SIGNIFICANT INCIDENTS

- For the first half of 2017, the total gross generation of power plants in the Visayas grid reached a total of 6,966 GWh. Fifty four percent (54%) or a total of 3,719 GWh came from generation facilities powered by renewable energy resources; 44% or 3,090 GWh came from coal-fired power plants; and 2% or 157 GWh came from oil-based power plants.
- From the months of January until June 2017, the power situation in the Visayas grid has been generally stable due to the additional capacities that went on commercial operation. There are some instances where the Visayas grid experienced tight supply conditions especially during the simultaneous outages of large coal-fired and geothermal power plants.
- As of June 2017, a total of 68 MW of installed capacity was added to the Visayas grid composed of solar and diesel-fired power generation facilities. Committed and indicative capacities as of the first half of 2017 reached 408 MW and 3,504 MW, respectively.

Additional Capacities (01 January to 30 June 2017)

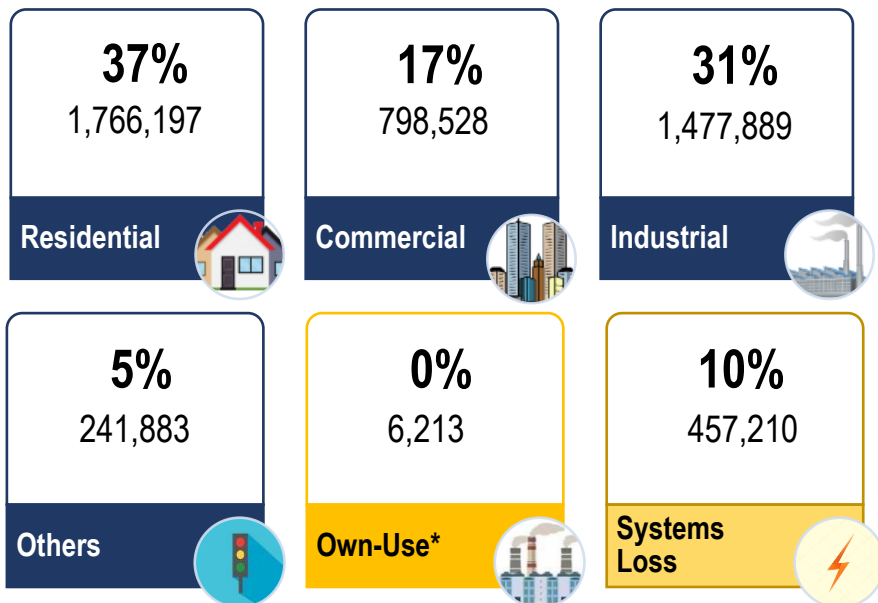
Newly-Operating Power Plants	Location	Installed Capacity (MW)	Dependable Capacity (MW)	Commercial Operation Date
OIL-BASED				
Calumangan DPP U4	Bago City, Negros Occidental	8.00	6.40	May 2017
SUB-TOTAL		8.00	6.40	
SOLAR				
First Toledo Solar Power Project	Toledo, Cebu	60.00	49.00	June 2017
SUB-TOTAL		60.00	49.00	
TOTAL		68.00	55.40	

Summary of Committed and Indicative Power Projects As of 30 June 2017

Type of Power Plant	Committed			Indicative		
	No. of Proponents*	Capacity (MW)	% Share	No. of Proponents	Capacity (MW)	% Share
Coal	1	135.0	33.1	3	900.0	25.7
Oil-Based	1	8.0	2.0	3	87.2	2.5
Natural Gas	0	0.0	0.0	0	0.0	0.0
Renewable Energy	11	265.4	64.9	29	2,517.2	71.8
<i>Geothermal</i>	1	50.0	12.2	1	40.0	1.1
<i>Hydro</i>	3	31.1	7.6	12	705.3	20.1
<i>Biomass</i>	6	178.6	43.7	2	14.5	0.4
<i>Solar</i>	1	5.7	1.4	10	539.6	15.4
<i>Wind</i>	0	0.0	0.0	4	1,217.8	34.8
TOTAL	13	408.4	100.0	35	3,504.4	100.0
Battery Storage**	0	0.0		3	130.0	

* Per Technology accounting purposes; declared capacity for Ancillary Services (AS) to the system

Electricity Sales and Consumption (in MWh)

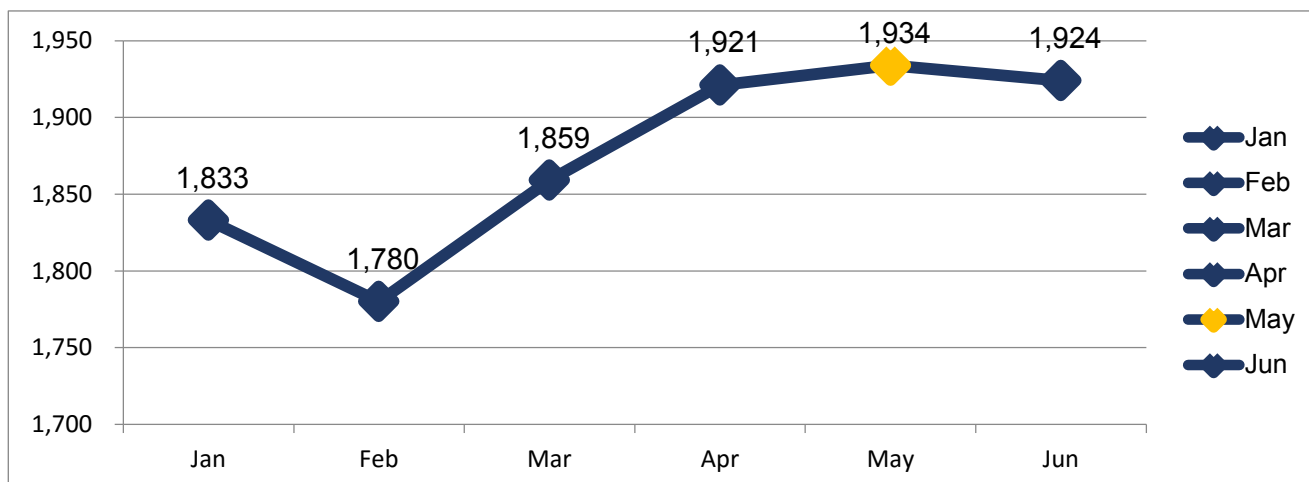


- Electricity sales and consumption in Visayas from January to June 2017 reached a total of 4,747,921 MWh. This is 0.41% higher than the same period in 2016 at 4,728,529 MWh.
- Similar to Luzon, electricity consumption in the Visayas is also driven by the residential sector at 37% or 1,766,197 MWh.
- Visayas' share to the country's total electricity sales and consumption is at 12%.

*Note: Most DUs consider own-use as part of electricity sales to the commercial sector with reference to ERC Resolution No. 11 Series of 2010

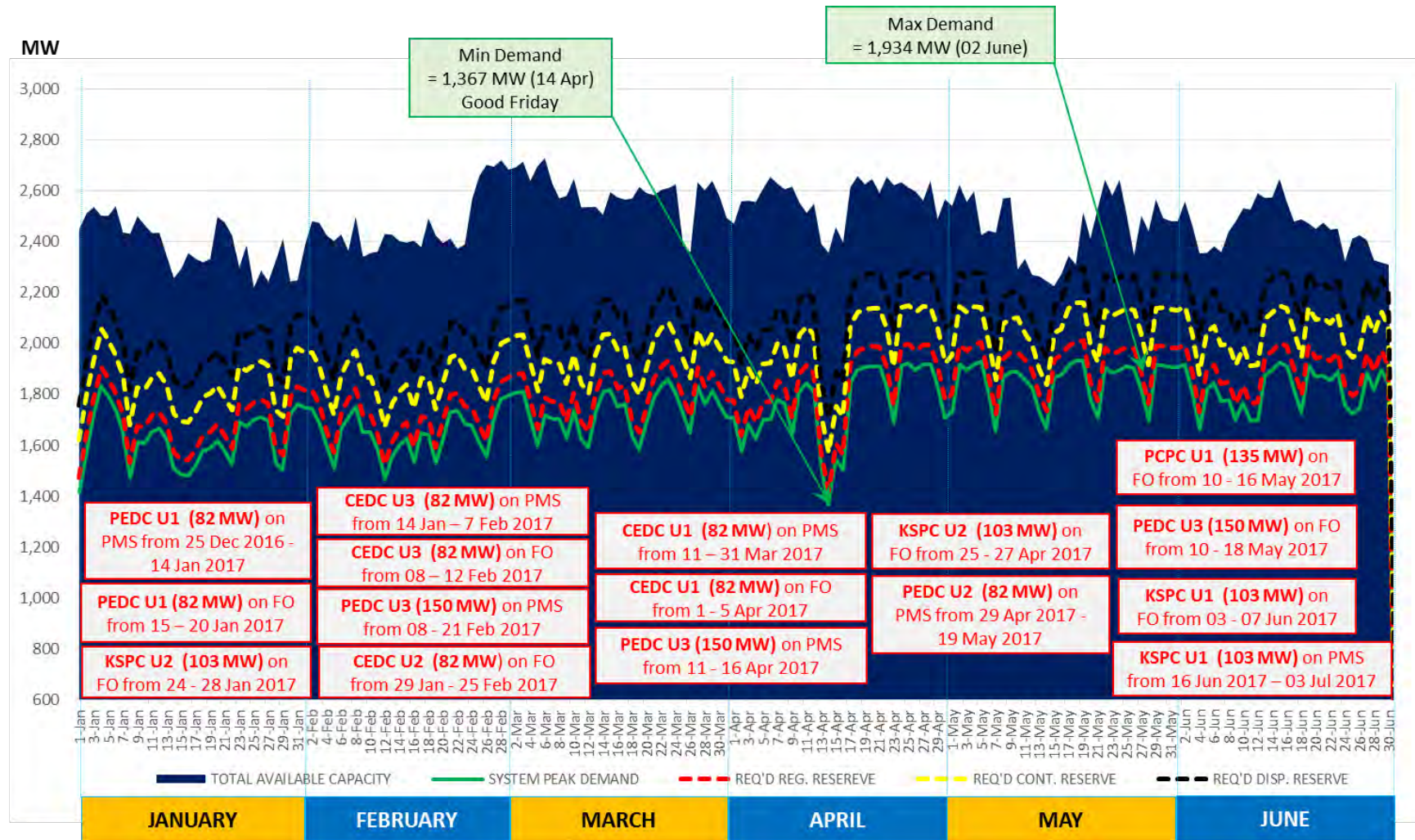
- Highest system peak demand in Visayas at 1,934 MW occurred on 02 June 2017, 2:10 PM with corresponding 2,558 MW available capacity. This peak demand is 2.11% higher than the previous year at 1,894 MW.

Monthly Peak Demand (in MW)



Visayas Demand-Supply Situation

01 January – 30 June 2017

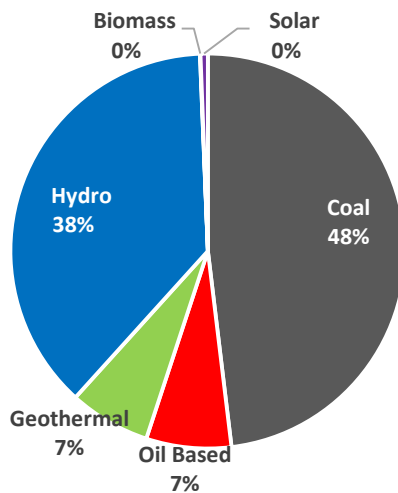


Note: FO – Forced Outage / PO – Planned Outage / MO – Maintenance Outage / SD – Shutdown

Installed, Dependable and Available Capacity from January-June 2017 (in MW)

	Installed		Dependable		Available		
	MW	Percent Share (%)	MW	Percent Share (%)	Min	Max	Average
Coal	1,070	34.10	950	35.00	365	903	635
Oil Based	788	25.10	715	26.30	440	541	489
Natural Gas	0	0.00	0	0.00	0	0	0
Renewable Energy	1,283	40.80	1,051	38.70	352	917	738
<i>Geothermal</i>	<i>108</i>	<i>3.50</i>	<i>100</i>	<i>3.70</i>	<i>44</i>	<i>100</i>	<i>82</i>
<i>Hydro</i>	<i>1,080</i>	<i>34.40</i>	<i>899</i>	<i>33.10</i>	<i>308</i>	<i>777</i>	<i>632</i>
<i>Wind</i>	<i>0</i>	<i>0.00</i>	<i>0</i>	<i>0.00</i>	<i>0</i>	<i>0</i>	<i>0</i>
<i>Biomass</i>	<i>36</i>	<i>1.10</i>	<i>10</i>	<i>0.40</i>	<i>0</i>	<i>0</i>	<i>0</i>
<i>Solar</i>	<i>59</i>	<i>1.90</i>	<i>43</i>	<i>1.60</i>	<i>0</i>	<i>40</i>	<i>24</i>
TOTAL	3,141	100.00	2,717	100.00	1,156	2,362	1,863
Jan-Jun 2016	2,742		2,318		895	2,014	1,497

Gross Power Generation (January-June 2017) 5,170,538 MWh



0 MW

- Newly Operational Plants

1,289 MW

- Committed Projects

2,543 MW

- Indicative Projects

HIGHLIGHTS AND SIGNIFICANT INCIDENTS

- Power situation in the Mindanao Grid has been stable for the first half of 2017 compared to previous years due to the sufficient available supply.
- Power generation in Mindanao reached 5,170 GWh for the first half of 2017. Almost half of the grid's power generation came from coal-fired power plants at 2,486 GWh. For renewable energy, hydro power plants' share at 38% or 1,947 GWh was the largest, followed by geothermal at 7% or 344 GWh, solar power plants at 0.6% or 31 GWh, and biomass at 0.04% or 2 GWh. The remaining 7% or 360 GWh came from oil-based power plants.
- There were no additional power plants that went on commercial operation in Mindanao from January to June 2017, but there are a number of coal-fired power plants which came online and currently undergoing testing and commissioning:
 - 135 MW FDC Misamis Coal Power Project Unit 3
 - 150 MW SMC Malita Coal Power Project Unit 3
 - 3x55 MW Minergy Balingasag Coal Power Project Units 1-3

HIGHLIGHTS AND SIGNIFICANT INCIDENTS (continued)

- The Inter-Agency Task Force on Securing Energy Facilities (IATFSEF) composed of the DOE, National Power Corporation (NPC), National Electrification Administration (NEA), Power Sector Assets and Liabilities Management Corporation (PSALM), National Grid Corporation of the Philippines (NGCP), Lanao Del Sur Electric Cooperative, Inc. (LASURECO), Philippine National Police (PNP), Armed Forces of the Philippines (AFP), and other industry players continue to push for the restoration of energy facilities in the province of Lanao del Sur and Marawi City which are damaged by the ongoing military operations versus the Maute group since May 2017.
- The Wholesale Electricity Spot Market (WESM) in Mindanao was launched last 28 June 2017 in SMX Lanang, Davao City. The WESM provides a level-playing field in Mindanao by allowing generators to trade their un-contracted capacities and at the same time providing consumers more options to source out their electricity at cheaper rates. Trial operations for the WESM Mindanao have commenced and will start its commercial operation after the review and approval of the DOE on the readiness assessment provided by the Philippine Electricity Market Corporation (PEMC).

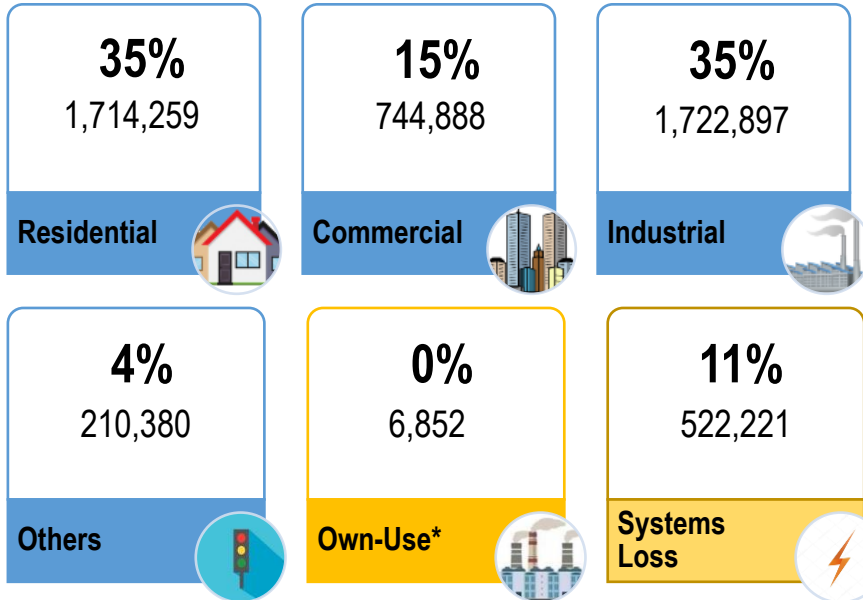
Mindanao Summary of Committed and Indicative Power Projects As of 30 June 2017

Type of Power Plant	Committed			Indicative		
	No. of Proponents*	Capacity (MW)	% Share	No. of Proponents	Capacity (MW)	% Share
Coal	5	1,090.0	84.6	6	1,243.0	48.9
Oil-Based	4	29.5	2.3	4	45.2	1.8
Natural Gas	0	0.0	0.0	0	0.0	0.0
Renewable Energy	9	169.2	13.1	35	1,254.6	49.3
<i>Geothermal</i>	0	0.0	0.0	1	30.0	1.2
<i>Hydro</i>	6	157.2	12.2	20	750.2	29.5
<i>Biomass</i>	3	12.0	0.9	6	89.4	3.5
<i>Solar</i>	0	0.0	0.0	8	385.0	15.1
<i>Wind</i>	0	0.0	0.0	0	0.0	0.0
TOTAL	18	1,288.7	100.0	45	2,542.8	100.0

* Per Technology accounting purposes; declared capacity for Ancillary Services (AS) to the system

MINDANAO

Electricity Sales and Consumption (in MWh)

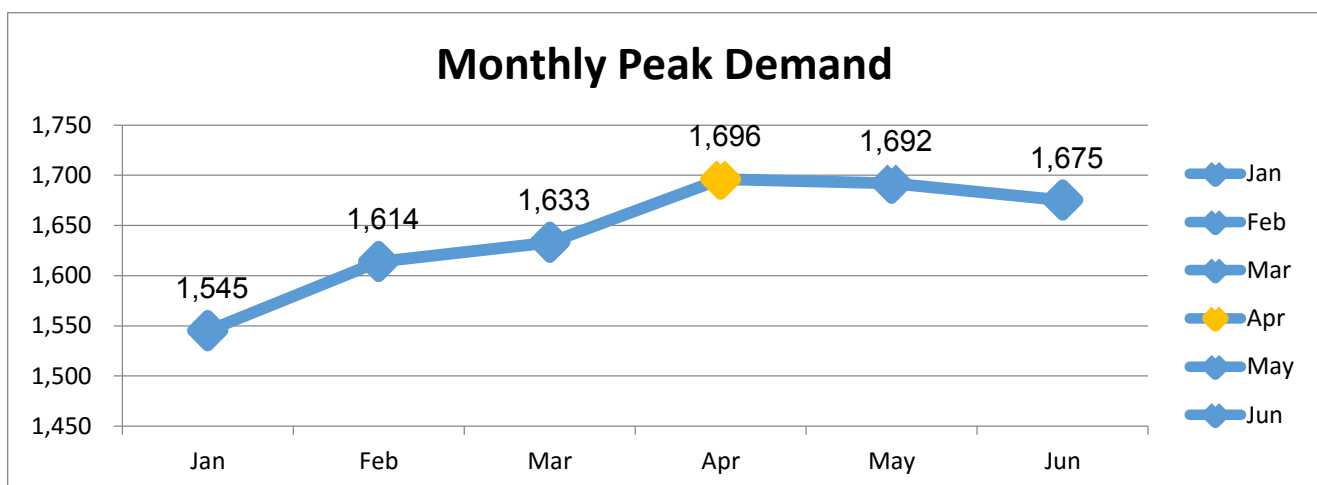


- Electricity sales and consumption in Mindanao from January to June 2017 reached a total of 4,921,497 MWh. This is 1.54 % higher than the same period in 2016 at 4,846,988 MWh.
- This is driven by the consumption of the residential and industrial sectors with at par shares at 35% and 34%, respectively.
- Mindanao's share to the country's total electricity sales and consumption is at 13%.

**Note: Most DUs consider own-use as part of electricity sales to the commercial sector with reference to ERC Resolution No. 11 Series of 2010*

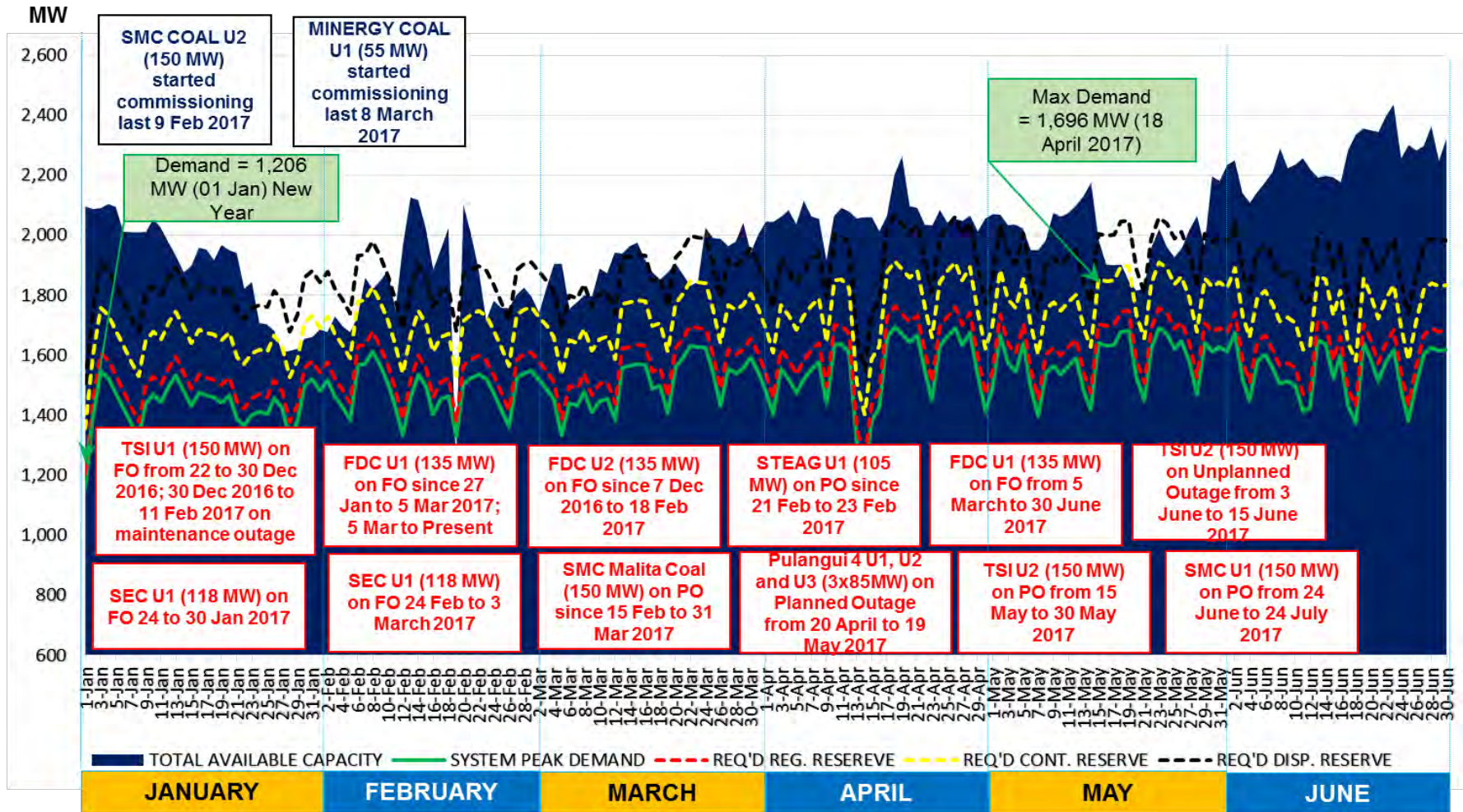
- Highest system peak demand in Mindanao at 1,696 MW occurred on 18 April 2017, 2:46 PM with corresponding 2,202 MW available capacity.. This peak demand is 2.60% higher than the previous year at 1,653 MW.

Monthly Peak Demand (in MW)



Mindanao Demand-Supply Situation

01 January – 30 June 2017



Source: National Grid Corporation of the Philippines (NGCP) Daily Operations Report

Note: FO – Forced Outage / PO – Planned Outage / MO – Maintenance Outage / SD – Shutdown

References:

List of Existing Power Plants as of June 2017, Department of Energy (DOE),
<https://www.doe.gov.ph/list-existing-power-plants>

Private Sector – Initiated Power Projects as of June 2017, Department of Energy (DOE), <https://www.doe.gov.ph/private-sector-initiated-power-projects>

Daily Operations Report (DOR), National Grid Corporation of the Philippines (NGCP)

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