



GHANA WHOLESALE ELECTRICITY MARKET BULLETIN

MARKET WATCH

Monthly Market Data Analysis

ISSUE NO. 30

1st June 2018 to 30th June 2018

This Bulletin covers major developments in the Wholesale Electricity Market (WEM) of Ghana from 1st June, 2018 to 30th June, 2018. It analyses the performance of the key WEM indicators against their benchmarks, and examines the likely implications of any discernable trends in the market. This edition of the WEM bulletin presents the half year report of the Wholesale Electricity Market (WEM).

The Energy Commission (EC) would very much appreciate and welcome comments from readers on the Bulletin. Reasonable care has been taken to ensure the information contained in this Bulletin is accurate at the time of publication, nevertheless, any errors, omissions or inaccuracies therein are regretted.

HIGHLIGHTS OF THE MONTH

Overview of the Month

Electricity supply continued to decrease in June 2018 to 43.88 GWh per day from 44.67 GWh per day in May 2018. This represented a marginal reduction of 1.8% on the generation of May 2018. The reduced electricity supplied in June 2018 was predominantly due to a general reduction in electricity generation from thermal power plants and a reduced demand from an average of 1,861.3 MW in May 2018 to 1,828.3 MW in June 2018. Average electricity generation from thermal sources reduced by 5.1%, from 28.14 GWh per day in May 2018 to 26.71 GWh per day in June 2018. Daily average electricity generation from SAPP, TAPCO, TICO, TT1PP and Ameri power plants reduced by 13.8%, 35.1%, 98.4% and 44.9% in June 2018.

Hydro power plants witnessed a general increase in average electricity generation by 3.7% from 16.23 GWh per day in May 2018 to 16.83 GWh per day in June 2018. Average electricity supplied from Akosombo GS and Kpong GS increased marginally by 5.4% and 5.9% respectively in June 2018. The average electricity supplied by Akosombo GS and Kpong GS increased from 12.43 GWh per day and 2.31 GWh per day respectively in May 2018 to 13.1 GWh per day and 2.45 GWh per day respectively in June 2018. On the other hand, average electricity supplied from the Bui GS reduced by 13.8% from 1.49 GWh per day in May 2018 to 1.28 GWh per day in June 2018. The rate of drop in the water level for the Akosombo dam reduced marginally from 0.046 feet per day in May 2018 to 0.045 feet per

Table 1. Projected and Actual Outturn of electricity demand and supply in May 2018 and June 2018.

	June 2018		May 2018	
	Projected	Actual Outturn	Projected	Actual Outturn
Total Supply (GWh)	1,327.4	1,316.4	1,412.6	1,384.8
Source by Power Plants (GWh)				
AKOSOMBO	305.0	392.9	311.7	355.2
KPONG	49.0	73.4	51.1	71.7
BUI	56.0	38.5	57.4	46.1
Sunon Asogli	118.0	98.9	117.8	157.5
TAPCO	86.0	17.8	89.3	64.4
TICO	196.0	218.6	202.4	199.2
TT1PP	-	0.5	59.5	30.5
CENIT	45.0	-	30.7	-
TT2PP	-	-	-	-
MRP	-	-	-	-
Karpowership	218.0	269.7	271.3	249.1
AMERI	73.0	43.6	75.9	81.5
KTTP	61.0	50.5	-	16.0
Trojan Power	-	-	-	-
CENPOWER	104.0	2.1	107.5	0.7
AKSA	14.0	63.0	35.4	39.8
BXC Solar	2.1	2.1	2.2	2.4
VRA Solar	0.3	0.2	0.4	0.2
Genser	-	36.8	-	33.7
Total Generation (GWh)	1,327.4	1,308.5	1,412.6	1,378.0
Imports (GWh)	-	7.8	-	6.8
Total Supply (GWh)	1,327.4	1,316.4	1,412.6	1,384.8
Deficit (GWh)	-	(11.0)	-	(27.8)
Ghana Coincident Peak Load (MW)	2,353.0	2,210.4	2,414.0	2,283.9
System Coincident Peak Load (MW)	2,416.0	2,292.3	2,497.0	2,406.1

HIGHLIGHTS OF THE MONTH

day in June 2018. Similarly, the rate of drop in water level for the Bui dam reduced from 0.095 feet per day in May 2018 to 0.057 feet per day in June 2018.

Consumption of liquid fuel increased in June 2018 by 11.4% due to increase in electricity generation by AKSA and Karpowership power plant by 58.5% and 8.3% respectively as a result in the reduction in natural gas supply. Natural gas supply from AGPP and WAGPCo reduced by 19% and 16.1% in June 2018 respectively. There was no natural gas supply from WAGPCo to Aboadze in June 2018.

Natural gas supply from WAGPCo to Tema and Kpone reduced by 16.1% from 52.18 MMSCFD in May 2018 to 43.76 MMSCFD in June 2018. Similarly, the natural gas supply from AGPP to Aboadze reduced by 19% in June 2018, from 94.76 MMSCFD in May 2018 to 76.71 MMSCFD in June 2018 due to the shut down of the FPSO Kwame Nkrumah for turret remediation work. LPG consumption increased by 9.1% from 291.9 tonnes per day in May 2018 to 318.5 tonnes per day in June 2018.

The System Peak Load recorded a marginal reduction of 4.7% in June 2018. The System Peak Load reduced from 2,406.1 MW in May 2018 to 2,292.3 MW in June 2018. The Ghana Peak Load reduced by 3.2% from 2,283.9 MW in May 2018 to 2,210.4 MW in June 2018.

Import of electricity from CIE increased by 14.8% in June 2018, from 0.22 GWh per day in May 2018 to 0.26 GWh per day. On the contrary, export of electricity to CIE and CEB reduced by 16.7% and 15.9% respectively in June 2018. Electricity export to CIE and CEB reduced from 0.32 GWh per day and 1.34 GWh per day in May 2018 to 0.26 GWh per day and 1.13 GWh per day in June 2018 respectively.

Electricity Demand and Supply

Electricity Demand

The System Peak Load decreased by 4.7% in June 2018 to 2,292.3 MW, from 2,406.1 MW in May 2018. The reduction in the System Peak Load was due to reduction in demand as a result of the cold weather condition in June 2018. The System Peak Load of 2,292.3 MW recorded in June 2018 was 5.1% lower than the 2,416 MW projected under 2018 ESP. Similarly, the Ghana Peak Load recorded a reduction of 73.5 MW in June 2018. The Ghana Peak Load decreased from 2,283.9 MW in May 2018 to 2,210.4 MW in June 2018. Electricity generation from the hydro sources contributed 51.6% to the System Peak Load and 53.9% to the Ghana Peak Load in June 2018. Electricity demand from VALCO also increased from a maximum of 75 MW (January 2018 – May 2018) to a minimum of 100 MW in June 2018.

Electricity supply

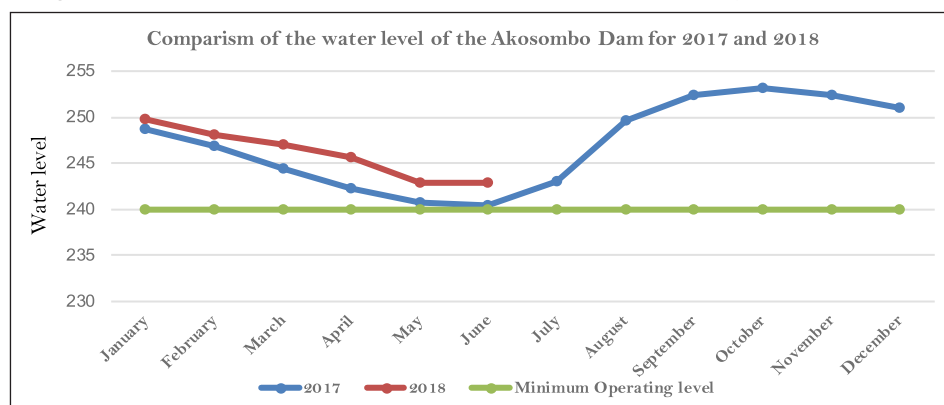
Average electricity supplied in June 2018 reduced to 43.88 GWh from 44.67 GWh per day in May 2018, representing a 1.8% reduction in average supply. Similarly, the total electricity supplied reduced from 1,384.77 GWh in May 2018 to 1,316.36 GWh in June 2018, representing a 4.9% reduction in supply. The contribution of hydro power plant in the total electricity supplied increased from 36.3% in May 2018 to 38.4% in June 2018. A total of 1,308.54 GWh of electricity was generated from domestic sources, while 7.82 GWh imported from CIE. The total electricity supplied in June 2018 was 11.64 GWh lower than the 1,328 GWh projected under the 2018 ESP.

Hydro Dam Levels

Akosombo Dam Water Level dropped in June 2018

The rate of drop in the water level of the Akosombo GS reduced marginally from 0.046 feet per day in May 2018 to 0.045 feet per day in June 2018 despite an increase in generation from hydro sources. The reduced rate of drop was due to marginal inflows into the Akosombo GS in June 2018. The water level of 244.28 feet witnessed at the beginning of the month dropped by 1.35 feet to 242.93 feet at the end of June 2018. The Akosombo dam water level recorded at the end of June 2018 was 2.93 feet above the minimum operating level of 240 feet and was 2.48 feet above the water level recorded for the same period in June 2017.

Figure 1: Month-End Water Level for Akosombo Dam from January 2017 to June 2018



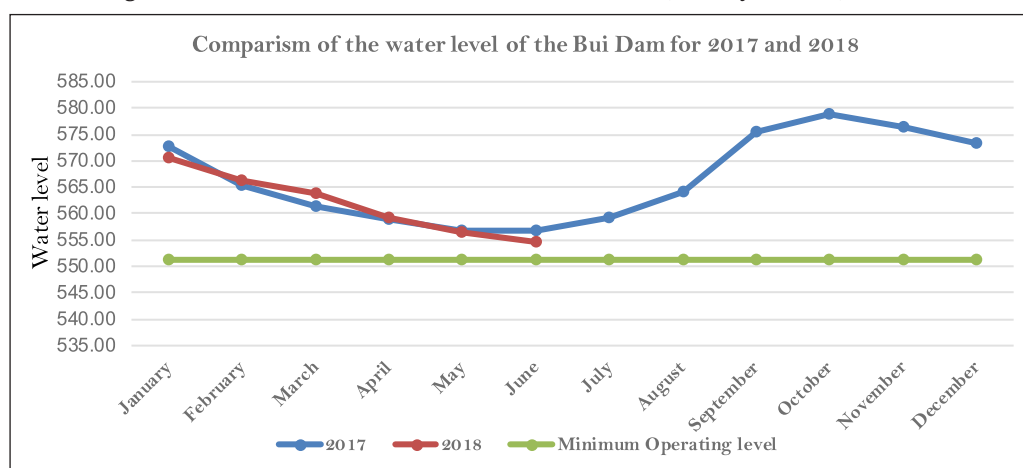
HIGHLIGHTS OF THE MONTH

Bui Dam Water Level continued to decline in June 2018

The rate of drop in the water level for Bui dam continues to decrease in June 2018. The rate of drop reduced from 0.095 feet per day in May 2018 to 0.057 feet per day in June 2018. The reduced rate of drop was significantly due to reduced electricity generation from the Bui GS in June 2018. The water level of the Bui dam dropped by 1.71 feet to 554.65 feet at the end of the month. The water level recorded at the end of June 2018 was 3.47 feet above the minimum operating level of 551.18 feet and was 2.06 feet lower than the water level recorded for the same period in June 2017.

Figure 2 shows comparative end of month trajectory of the level of water in the Bui dam from January 2017 to June 2018.

Figure 2: Month-End Water Level for Bui Dam from January 2017 to June 2018



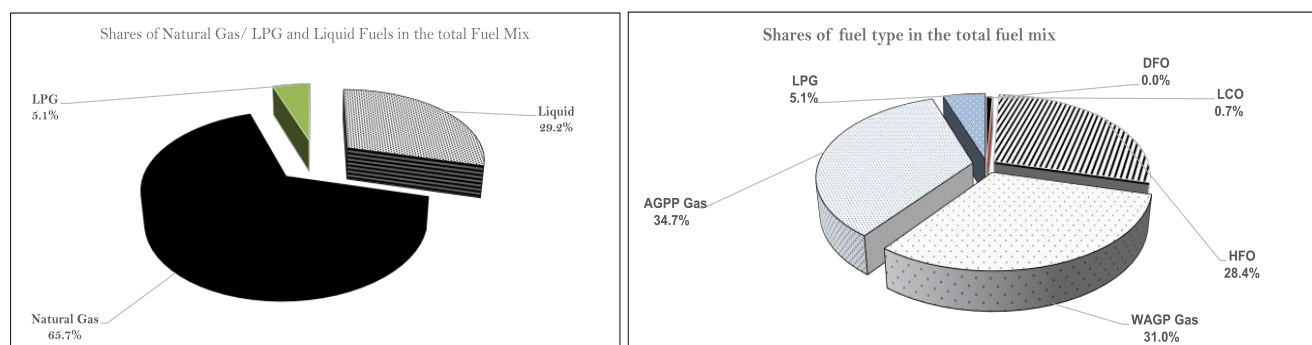
Fuel Supply for Power Generation

The consumption of natural gas continued to dominate the total fuel mix but with a reduced share in June 2018. The shares of natural gas consumption in the total fuel mix reduced from 62.2% in May 2018 to 52.4% in June 2018. The shares of natural gas supply from AGPP to Aboadze Power Enclave in the total fuel mix reduced from 40.7% in May 2018 to 32.9% in June 2018 to lose its dominance in the total fuel mix. Also, natural gas supplied from WAGPCo to Tema and Kpone in the total fuel mix reduced from 20.8% in May 2018 to 19.5% in June 2018.

The shares of liquid fuel in the total fuel mix increased from 32.8% in May 2018 to 41.5% in June 2018. This was predominantly due to increased consumption of HFO for electricity generation in June 2018. The shares of HFO in the total fuel mix increased from 31.8% in May 2018 to 40.2% in June 2018. LCO consumption in the total fuel mix reduced from 0.94% in May 2018 to 0.7% in June 2018. The consumption of DFO in the total fuel mix increased from 0.6% in May 2018 to 0.8% in June 2018. The shares of LPG in the total fuel mix increased from 5% in May 2018 to 6% in June 2018.

Figure 3a and Figure 3b shows the shares of sources of fuel and fuel type in the generation fuel mix for electricity generation respectively.

Figure 3a: Shares of sources of fuel in total fuel mix for power generation **Figure 3b: Shares of fuel type in the generation fuel mix power generation**



Natural gas flow rate from WAGPCo decreased in June 2018

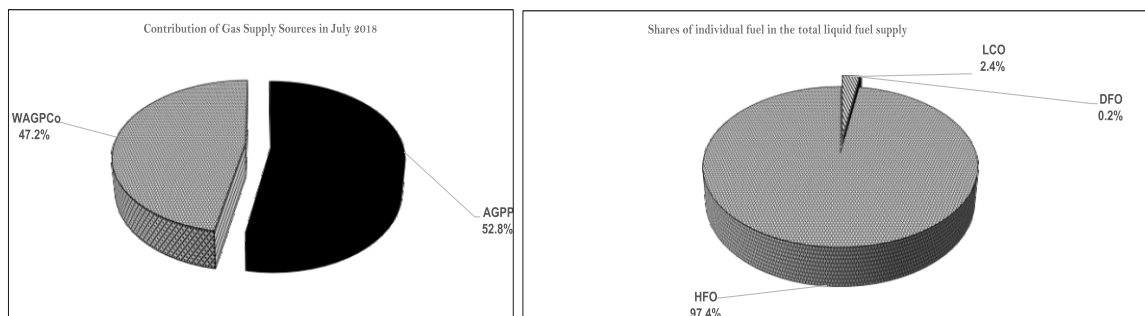
The natural gas flow rate from WAGP to Tema and Kpone reduced by 16% in June 2018, from 52.18 MMSCFD to 43.76 MMSCFD. The reduced flow rate of natural gas from WAGP to Tema and Kpone was due to technical challenges with the natural gas receiving station at Kpone. The low flow rate of natural gas to Tema and Kpone contributed to the reduction in consumption of natural gas by power plants, from 1,694.99 MMSCF in May 2018 to 1,333.19 MMSCF in June 2018. The share of natural gas in the total natural gas consumed, increased from 33.8% in May 2018 to 37.2% in June 2018 despite the reduction in supply.

HIGHLIGHTS OF THE MONTH

Natural gas flow rate from GNGC increased marginally in June 2018.

The flow rate of natural gas from AGPP to the Aboadze Power Enclave reduced by 19% in June 2018 from 94.76 MMSCFD in May 2018 to 76.71 MMSCFD in June 2018. The reduced flow rate of natural gas from AGPP was due to the shutdown of the FPSO Kwame Nkrumah on the 28th May, 2018 to 24th June 2018 for turret remediation works. Natural gas consumption at the Aboadze Power Enclave reduced significantly by 25.4% in June 2018 from 2,794.93 MMSCF in May 2018 to 2,084.49 MMSCF. The shares of natural gas supplied from AGPP in the total natural gas consumed decreased from 66.2% in May 2018 to 62.8% in June 2018.

Figure 4a: Contribution of Natural Gas Supply by sources **Figure 4b: Contribution of individual fuel in the liquid fuel supply**



Liquid Fuel

Liquid fuel consumption in June 2018 increased by 11.4% from 408,975 barrels in May 2018 to 455,764 barrels. This was significantly due to increased electricity generation from AKSA and Karpowership power plants in June 2018. The shares of HFO in the total liquid fuel consumed increased from 95.4% in May 2018 to 96.7% in June 2018. On the contrary, the consumption of LCO decreased from 2.8% in May 2018 to 1.5% in June 2018. The share of DFO in the total liquid fuel mix stood at 1.8% in June 2018, same as it was in May 2018.

Plant by Plant Highlights

Electricity Generation at the Akosombo Generation Station (GS) increased in June 2018

Average electricity supply from the Akosombo GS increased from 12.43 GWh per day in May 2018 to 13.1 GWh per day in June 2018. This represents an increment of 5.4% in the average electricity generation from Akosombo GS. Similarly, the total electricity supplied by the power plant increased by 2%, from 385.24 GWh in May 2018 to 392.91 GWh in June 2018. The total electricity generation from the Akosombo GS constituted 29.9% of the total electricity supplied in June 2018. The power plant generated 28.8% higher than the projected electricity generation under the 2018 ESP due to fuel supply challenges to some of the thermal plants in June 2018. The Akosombo GS contributed 874.9 MW and 878.9 MW to the System Peak Load and the Ghana Peak Load respectively. These contributions represent 38.2% and 38.6% of the System Peak Load and the Ghana Peak Load respectively.

Electricity supply by Kpong Generation Station (GS) increased marginally in June 2018

The Kpong GS witnessed an increase in the average electricity supplied by 5.9% from 2.31 GWh per day in May 2018 to 2.45 GWh per day in June 2018. Similarly, the total electricity supplied by the power plant in June 2018 increased by 2.4%, from 71.67 GWh in May 2018 to 73.42 GWh in June 2018. The total electricity generated by the power plant contributed 5.6% to the total electricity supplied in June 2018. The electricity generated by Kpong GS was 49.89% higher than the 49 GWh projected under the 2018 ESP. Kpong GS contributed 103 MW to the System Peak Load and 109 MW to the Ghana Peak Load, representing 4.5% of the System Peak Load and 4.8% of the Ghana Peak Load.

Electricity supply by the Bui Generation Station (GS) reduced in May 2018

Bui GS recorded a 13.8% reduction in average electricity generation in June 2018. The average electricity supplied by the power plant reduced from 1.49 GWh per day in May 2018 to 1.28 GWh per day in June 2018. Likewise, the total electricity supplied by Bui GS reduced by 16.6%, from 46.15 GWh in May 2018 to 38.51 GWh in June 2018. Bui GS's electricity generation constituted 2.9% of the total electricity supplied in June 2018 and was 31.2% lower than the 56 GWh projected under the 2018 ESP. The power plant contributed 204.5 MW to the System Peak Load and 203.5 MW to the Ghana Peak Load, representing 8.9% of the System Peak Load and 8.9% of the Ghana Peak Load.

Generation by the Sunon Asogli Power Plant (SAPP) reduced in June 2018

Average electricity generation from the Sunon Asogli Power Plant (SAPP) reduced significantly by 35.1% in June 2018, from 5.08 GWh per day in May 2018 to 3.3 GWh per day. The SAPP generated a total of 98.86 GWh in June 2018 and was 37.2% lower than the 157.5 GWh it generated in May 2018. The total electricity supplied by the power plant was 16.2% lower than the 118 GWh projected under the 2018 ESP and constituted 7.5% of the total electricity supplied in June 2018. SAPP contributed 182.2 MW to the System Peak Load and 45.6 MW to the Ghana Peak Load in June 2018. These contributions constituted 8% of the System Peak Load and 2.0% of the Ghana Peak Load. The power plant consumed a total of 784.76 MMSCF of natural gas in generating the 98.86 GWh of electricity in June 2018. The heat rate of the SAPP improved from 8,022.35 Btu/kWh in May 2018 to 7,818.81 Btu/kWh in June 2018.

CENIT Power Plant remained offline in June 2018

The CENIT Power Plant remained offline in June 2018. The power plant was projected to generate 45 GWh in June 2018 under the 2018 ESP.

Ameri Energy Power Plant's generation decreased significantly in June 2018

The Ameri power plant recorded a significant decrease in average electricity generation by 44.8% in June 2018. The average electricity generation reduced from 2.63 GWh per day in May 2018 to 1.45 GWh per day in June 2018. Likewise, the total electricity supplied by the power plant in June 2018 reduced by 46.6%, from 81.54 GWh in May 2018 to 43.55 GWh. The total electricity generated by the Ameri power plant constituted 3.3% of the total electricity supplied and was 40.3% lower than the projected supply for June 2018 in the 2018 ESP. Ameri power plant contributed 48.3 MW to the System Peak Load and 47.8 MW to the Ghana Peak Load, representing 2.1% of the System Peak Load and 2.1% of the Ghana Peak Load. The power plant consumed a total of 380.39 MMSCF of natural gas with an estimated heat rate of 10,139.74 Btu/kWh in June 2018. The heat rate recorded in June 2018 was marginally lower than the 10,191.96 Btu/kWh in May 2018.

HIGHLIGHTS OF THE MONTH

Kpong Thermal Power Plant's (KTPP) generation increased significantly in June 2018

Average electricity generation from KTPP significantly increased by over two folds in June 2018, from 0.52 GWh per day in May 2018 to 1.68 GWh per day. Similarly, the total electricity generated by the power plant increased from 15.98 GWh in May 2018 to 50.46 GWh in June 2018. The total electricity supplied by the power plant constituted 3.8% of the total electricity supplied in June 2018. This generation was however 17.3% lower than projected under 2018 ESP. KTPP did not contribute to the System Peak Load but contributed 100 MW to the Ghana Peak Load, representing 4.4% of the Ghana Peak Load. The power plant consumed 542.89 MMSCF of natural gas, with an estimated heat rate of 10,598.45 Btu/kWh in June 2018. The heat rate was significantly better than the 11,492.91 Btu/kWh recorded in May.

The Karpowership Power Plant's generation increased in June 2018

Average electricity generation from Karpowership increased by 11.9%, from 8.04 GWh per day in May 2018 to 8.99 GWh per day in June 2018. Karpowership's total electricity generated increased from 249.14 GWh in May 2018 to 269.74 GWh in June 2018. The total electricity generated by the power plant constituted 20.5% of the total electricity supplied in June 2018 and was 23.7% higher than the 218 GWh projected under the 2018 ESP. Karpowership contributed 430.6 MW to the System Peak Load and 433.8 MW to the Ghana Peak Load, representing 18.8% of the System Peak Load and 19.1% of the Ghana Peak Load. The power plant consumed a total of 361,866.05 barrels of HFO, at an estimated heat rate of 8,116.44 Btu/kWh in June 2018. The heat rate recorded in June 2018 was marginally higher than 8,097.77 Btu/kWh in May 2018.

AKSA Power Plant's generation increased significantly in June 2018

The average electricity generation from the AKSA power plant increased significantly by 63.7%, from 1.28 GWh per day in May 2018 to 2.1 GWh per day in June 2018. Consequently, the total electricity generated by the power plant increased by 58.5%, from 39.77 GWh in May 2018 to 63.02 GWh in June 2018 due to increase in HFO stock. AKSA's total electricity generated contributed 4.8% to the total electricity supplied in June 2018 and was significantly higher than the 13.5 GWh projected under the 2018 ESP. AKSA power plant contributed 101.8 MW to the System Peak Load and 106.8 MW to the Ghana Peak Load, representing 4.4% of the System Peak Load and 4.4% of the Ghana Peak Load. The power plant consumed a total of 85,423.17 barrels of HFO to generate the 63.02 GWh, with an improvement in heat rate from 8,220.58 Btu/kWh in May 2018 to 8,200.39 Btu/kWh in June 2018.

Takoradi International Company (TICO) generation increased in June 2018

The average electricity generation from the TICO power plant increased by 13.4% in June 2018, from 6.43 GWh per day in May 2018 to 7.29 GWh per day. Correspondingly, the total electricity supplied by the power plant increased by 9.7%, from 199.24 GWh in May 2018 to 218.56 GWh in June 2018. The total electricity generated by the power plant constituted 16.6% of the total electricity supplied in June 2018 and was 11.5% higher than the 196 GWh projected under the 2018 ESP. TICO contributed 330 MW to the System Peak Load and 327 MW to the Ghana Peak Load, representing 14.4% of the System Peak Load and the Ghana Peak Load. A total of 1,561.53 MMSCF of natural gas was consumed by the power plant at an estimated average heat rate of 7,451.71 Btu/kWh in June 2018. The heat rate recorded in June 2018 was higher than the 7,258.87 Btu/kWh recorded in May 2018.

Takoradi Power Company (TAPCO) Plant's generation decreased in June 2018

The TAPCO power plant operated for seven days in June 2018 due to fuel supply challenges and routine maintenance on its gas turbines. The power plant however generated an average of 2.54 GWh per day in June 2018 when it operated and was 22.1% higher than the 2.08 GWh in May 2018. The total electricity supplied by the power plant reduced by 72.3%, from 64.35 GWh in May 2018 to 17.8 GWh in June 2018. The total electricity generated by TAPCO constituted 1.4% of the total electricity supplied in June 2018 and was 79.3% lower than the 86 GWh projected under the 2018 ESP. TAPCO did not contribute to both the System Peak Load and the Ghana Peak Load in June 2018. The power plant consumed a total of 142.56 MMSCF of natural gas, 8,053.38 barrels of LCO and 421.84 barrels of DFO at an increased heat rate of 10,872.63 Btu/kWh in June 2018 from 10,681.36 Btu/kWh in May 2018.

Tema Thermal 1 Power Plant's (TT1PP) decreased in June 2018

TT1PP came online and operated for a day in June 2018. The power plant supplied a total of 0.47 GWh in June 2018. A total of 5.54 MMSCF of natural gas was consumed at an estimated heat rate of 11,601.13 Btu/kWh in June 2018. The power plant was projected to be offline under the 2018 ESP.

Trojan Power Plant's continued to be offline in June 2018

The Trojan Power Plants in both Tema and Kumasi have been offline since July 2017 and continued to be offline in June 2018 due to fuel supply challenges.

Genser Power Plant's generation increased in June 2018

The average electricity generation from the Genser power plant increased in June 2018 by 12.9%, from 1.09 GWh per day in May 2018 to 1.23 GWh per day. Similarly, the total electricity supplied by the power plant increased by 9.2%, from 33.65 GWh in May 2018 to 36.76 GWh in June 2018. The total electricity generated by the power plant constituted 2.79% of the total electricity supplied in June 2018. The power plant consumed a total of 9,556.04 tonnes of LPG at an improved heat rate from 11,100.99 Btu/kWh in May 2018 to 11,087.65 Btu/kWh in June 2018.

BXC Solar generation decreased in June 2018

The BXC solar power plant's average electricity generation decreased by 9.4%, from 0.08 GWh per day in May 2018 to 0.07 GWh per day in June 2018. The total electricity generated by the power plant in June 2018 decreased by 12.3%, from 2.43 GWh in May 2018 to 2.13 GWh. The solar power plant's total electricity generated constituted 0.2% of the total electricity supplied in June 2018. BXC solar power plant generated as projected under the 2018 ESP.

VRA Navrongo Solar generation increased in June 2018

The total electricity supplied by VRA Navrongo Solar increased by 10%, from 0.20 GWh in May 2018 to 0.22 GWh in June 2018. The power plant's total electricity generated constituted 0.02% of the total supplied in June 2018. The solar plant's total electricity generated was 26.7% lower than the 0.3 GWh projected under the 2018 ESP.

Electricity Exchange – Imports increased while Exports decreased in June 2018

Average electricity import from La Cote D'Ivoire increased by 18.7%, from 0.22 GWh per day in May 2018 to 0.26 GWh per day in June 2018. This notwithstanding, a total of 7.82 GWh of electricity was imported in June 2018 which was 14.8% higher than the 6.81 GWh in May 2018. The total electricity imported constituted 0.59% of the total electricity supplied in June 2018. Electricity import contributed 17 MW to the System Peak Load and 24 MW to the Ghana Peak Load, representing 0.7% of the System Peak Load and 1.1% of the Ghana Peak Load.

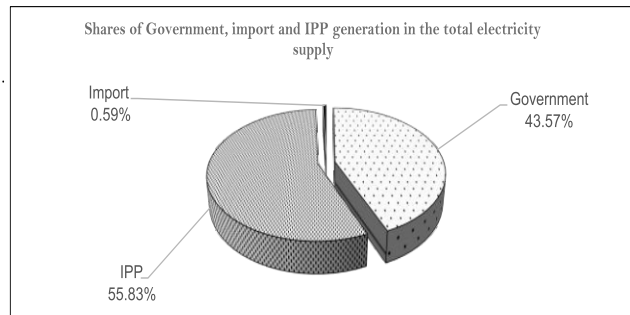
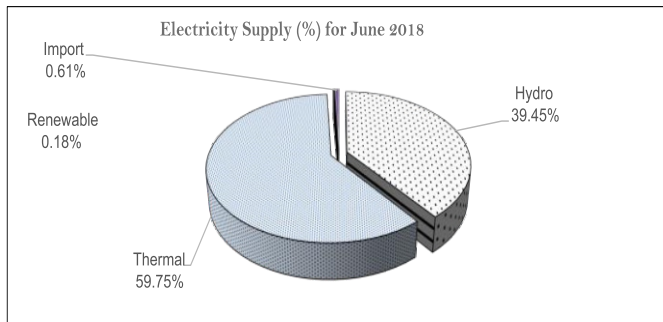
The average electricity export to CIE and CEB decreased by 16.7% and 15.9% respectively in June 2018. The average electricity export to CIE and CEB decreased from 0.32 GWh per day and 1.34 GWh in May 2018 to 0.26 GWh and 1.13 GWh per day in June 2018 respectively. Similarly, total electricity export to CIE and CEB decreased by 19.4% and 18.6%, from 9.78 GWh and 41.63 GWh in May 2018 to 7.88 GWh and 33.88 GWh in June 2018 respectively. The total electricity exported to CIE and CEB in June 2018 was 11.1% lower than the 47 GWh projected under the 2018 ESP. Ghana begun to export electricity to Burkina Faso (SONABEL), with the test of the transmission system commencing from 28th June, 2018. Ghana continues to be a net exporter of electricity in June 2018.

OPERATIONAL FACT SHEET

Peak Electricity Supply - June 2018			
Source of Supply	Generation at System Peak Load of May 2018 (MW)	Generation at Ghana Peak Load of May 2018 (MW)	Electricity Supply (GWh)
AKOSOMBO	874.90	878.90	392.91
KPONG	103.00	109.00	73.42
BUI	204.50	203.50	38.51
SAPP	182.20	45.60	98.86
TAPCO	-	-	17.80
TICO	330.00	327.00	218.56
TT1PP	-	-	0.47
CENIT	-	-	-
TT2PP	-	-	-
MRP	-	-	-
KARPOWER	430.60	433.80	269.74
AMERI	48.30	47.80	43.55
KTPP	-	100.00	50.46
Trojan Power	-	-	-
CENPOWER	-	-	2.13
AKSA	101.80	106.80	63.02
BXC Solar	-	-	2.13
Safisana	-	-	-
VRA Solar	-	-	0.22
Genser	-	-	36.76
IMPORT	17.00	24.00	7.82
Export to CEB	-	-	33.88
Export to CIE	146.00	66.00	7.88
System Coincident Peak Load	2,292.30	-	-
Ghana Coincedent Peak Load	-	2,210.40	-
Total Supply	-	-	1,316.36
Total Supply without export	-	-	1,274.60

Ghana Electricity Demand & Supply		
		Jun-18
Maximum System Peak Load	MW	2,292.3
Minimum System Peak Load	MW	1,988.0
Average Peak Generation	MW	2,227.4
System Base Load	MW	1,268.2
Total Electricity	GWh	1,316.4
Load Factor (LF)	%	74.9

OPERATIONAL FACT SHEET



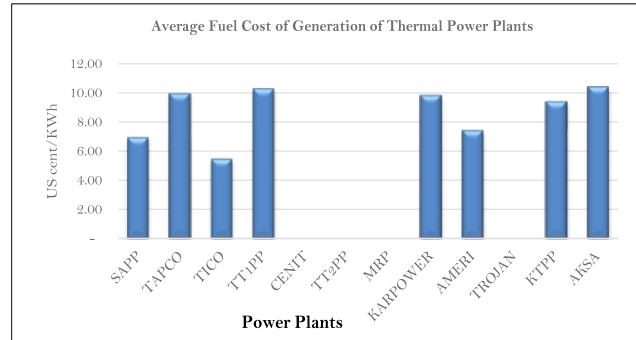
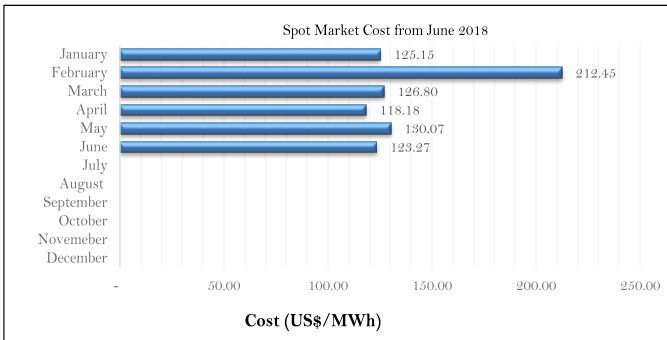
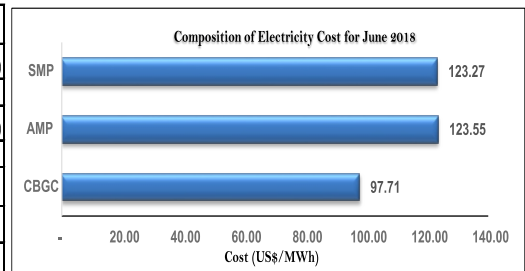
Power Plant Data for June 2018								
	Installed Capacity (MW)	Plant Capacity Utilization (%)	Electricity Generation (GWh)	Natural Gas Consumption (MMBtu)	LCO Consumption (MMBtu)	DFO Consumption (MMBtu)	HFO Consumption (MMBtu)	LPG Consumption (MMBtu)
Akosombo	1,020.00	53.50	392.91	-	-	-	-	-
Kpong	160.00	63.73	73.42	-	-	-	-	-
Bui	400.00	13.37	38.51	-	-	-	-	-
SEAP	560.00	24.52	98.86	772,988.80	-	-	-	-
TAPCO	330.00	7.49	17.80	148,692.68	42,602.39	2,270.35	-	-
TICO	340.00	89.28	218.56	1,628,680.23	-	-	-	-
TT1PP	126.00	0.52	0.47	5,452.53	-	-	-	-
CENIT	126.00	-	-	-	-	-	-	-
TT2PP	49.50	-	-	-	-	-	-	-
MRP	-	-	-	-	-	-	-	-
KARPOWER	470.00	79.71	269.74	-	-	-	2,189,289.62	-
AMERI	250.00	24.20	43.55	441,595.87	-	-	-	-
TROJAN	56.00	-	-	-	-	-	-	-
Cenpower	0	-	2.13	-	-	-	-	-
KTPP	220.00	31.85	50.46	534,798.35	-	-	-	-
AKSA	320.00	27.35	63.02	-	-	-	516,810.20	-
Genser	95.00	53.74	36.76	-	-	-	-	407,581.93
Total	4,522.50	40.11	1,306.19	3,532,208.45	42,602.39		2,706,099.82	407,581.93

Location	Monthly Average
Etoki	46.63
Tema WAGPCo	43.76
Aboadze WAGPCo	0.00
Aboadze GNGC	76.71

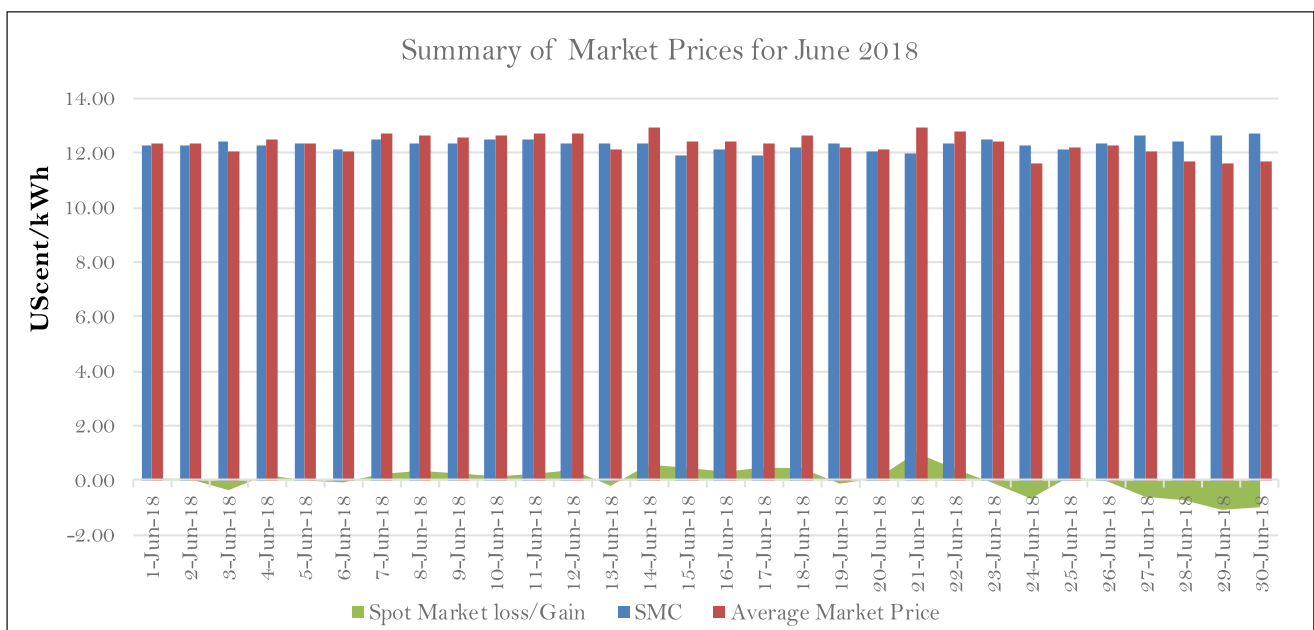
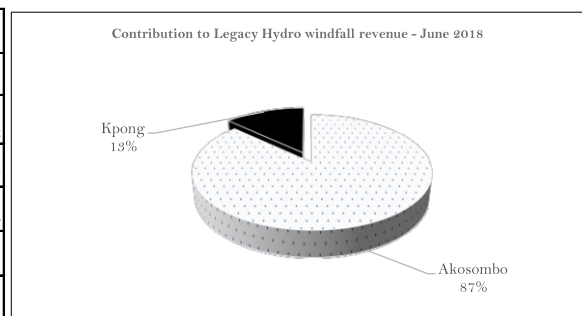
Jun-18			
	Beginning month (ft)	End month (ft)	Change in water level (feet)
Hydro Dam			
Akosombo	244.28	242.93	-1.35
Bui	556.35	554.65	-1.71

ECONOMIC FACT SHEET

		Jun-18	May-18	Change
Average Market Price	US\$/MWh	123.55	123.56	(0.01)
System Marginal Cost (SMC)	US\$/MWh	123.27	130.07	(6.80)
Composite Bulk Generation Charge (CBGC)	US\$/MWh	97.71	97.71	-
Deviation of TAC from CBGC	US\$/MWh	(25.84)	(25.85)	0.01
Deviation of SMC from CBGC	US\$/MWh	(25.56)	(32.36)	6.80



Average Fuel Prices		
		Jun-18
Fuel Type	Unit	Delivered Cost
Natural Gas	US\$/MMBtu	8.06
LCO	US\$/BBL	84.40
HFO	US\$/Tonne	435.31
DFO	US\$/Tonne	707.78



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1.0 Review of 2018 half year performance of electricity generation and supply

1.1. Electricity Demand

The first half of 2018 has witnessed an increment in the System Peak Load from 2,160 MW in 2017 to 2,292.3 MW in June 2018. During this period, the maximum System Peak Load recorded was 2,432.9 MW in April 2018. This was predominantly due to increase in electricity export to CIE and CEB. The load served to CIE and CEB at the System Peak Load was 108 MW and 112 MW respectively in April 2018. Similar, the Ghana Peak Load increased steadily from 2,139 MW in January 2018 to 2,210.4 MW. The maximum Ghana Peak Load recorded during this period was 2,283.9 MW in May 2018. Electricity generation from Hydro sources contributed an average of 45% and 44.5% to the System Peak Loads and the Ghana Peak Loads respectively during the first half of 2018. The total available capacity recorded in the first half was between 2,150 MW and 3,048 MW. Average electricity demand ranged between 1,721.1 MW to 1,958.63 MW, with an average of 1,841.67 MW for the first half of 2018.

1.2. Electricity Supply

Average electricity supplied in the first half ranged between 41.31 GWh per day and 47.01 GWh per day. There was a total 8,000.2 GWh of electricity supplied with import accounting for 1% of the total supply. The total electricity supplied was 1.1% higher than the 7,910.3 GWh projected under the 2018 ESP. Out the total electricity supplied, 144.9 GWh and 99 GWh were exported to CEB and CIE respectively. Electricity generation from Hydro sources contributed 35.2% of the total electricity supplied with thermal sources accounting for 63.6% and 0.2% from solar power plants.

1.3. Hydro Dam levels

The water level for the Akosombo dam has dropped steadily in the first half of the year. The Akosombo dam began the year with a water level of 251.31 feet which was 0.84 feet higher than the water level recorded at the same period in 2017 and was 11.31 feet above the minimum operating water level of 240 feet. The water level of the Akosombo dam dropped from 251.31 feet at the beginning of the year by 8.38 feet to 242.93 feet at the end of June 2018. Therefore, the water level dropped at an average of 0.046 feet per day in the first half of 2018. The water level of 242.93 feet recorded at the end of June 2018 was 2.48 feet higher than the 240.45 feet recorded in June 2017 and was 2.93 feet higher than the minimum operating level.

The water level for the Bui Dam at the beginning of the year stood at 574.03 feet, which was 2.82 feet lower than the water level recorded for the same period in 2018. The water level for the Bui dam dropped by 19.38 feet, from 574.03 feet to 554.65 feet at the end of June 2018. The Bui dam water level dropped by 0.107 feet per day during the first half of the year. The water level of 554.65 feet recorded at the end of June 2018 was 2.06 feet lower than the 556.71 feet recorded in June 2017 and was 3.47 feet higher than the minimum operating water level of 551.18 feet.

1.4. Fuel supply

Power Plant	GAS (MMSCF)	LCO (BBL)	DFO (BBL)	HFO (BBI)	LPG (TONNES)
SAPP	5,983.91	18,392.05	-	-	
TAPCO	3,413.54	8,053.38	421.84	-	
TICO	7,412.94	122,499.97	-	-	
TTIPP	1,425.75	-	-	-	
CENIT	-	-	-	-	
TT2PP	-	-	-	-	
MRP	-	-	-	-	
Karpower	-	-	-	2,161,590.93	
Ameri	2,323.97	-	-	-	
KTPP	683.22	-	77,116.39	-	
Trojan Power	-	-	-	-	
CenPower	-	-	9,057.76	-	
AKSA	-	-	-	727,200.86	
Genser	-	-	-	-	49,455.57
Total	21,243.33	148,945.40	86,595.99	2,888,791.79	49,455.57

The first half of the year 2018 has witnessed a total consumption of 41.1 trillion Btu (British thermal unit) of fuel for electricity generation after converting all fuel used into a common unit. Out of the total 41.1 trillion Btu of fuel consumed, natural gas consumption constituted 53.9%, LCO constituted 1.9%, DFO constituted 1.1%, HFO constituted 42.4% and LPG constituted 0.6%.

Natural gas supply from the AGPP constituted 60% of the total natural gas consumed, whilst natural gas supply from WAGPCo accounted for the remaining 40%. There was no supply of natural gas from AGPP in February 2018 due to the shutdown of the Atuabo

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processing plant for maintenance work to be carried out. The FPSO Kwame Nkrumah was shut down from 28th May 2018 to 24th June 2018 for turret remediation work. Of the total natural gas supplied from WAGPCo, the SAPP consumed 70.4%, TT1PP consumed 16.8%, 4.7% was consumed at the Aboadze enclave and 8% was consumed by KTRP for the commissioning of its gas turbines in May 2018.

The Karpowership used 74.8% of the total HFO consumed for electricity generation while AKSA used the remaining 25.2%. TICO, TAPCO and SAPP used 82.2%, 5.4% and 12.3% of the total LCO consumed respectively. KTRP used about 89.1% of the total DFO consumed in the first half of 2018.

1.5. Power Plants highlight

Power Plant	Projected Generation (GWh)	Actual Generation (GWh)	Deviation (%)	Projected Average Demand (MW)	Actual Average Demand (MW)
Akosombo	1,850.0	2,095.4	13.26	425.88	482.36
Kpong	297.2	396.5	33.41	68.42	91.28
Bui	334.9	324.2	-3.19	77.08	74.63
SAPP	759.0	766.1	0.93	174.72	176.35
TAPCO	397.4	372.9	-6.17	91.49	85.84
TICO	1,153.0	1,120.5	-2.82	265.43	257.94
TT1PP	178.6	123.0	-31.10	80.00	55.12
CENIT	-	-	-	-	-
TT2PP	-	-	-	-	-
MRP	-	-	-	-	-
Karpower	1,535.1	1,611.9	5.00	353.39	371.06
Ameri	346.1	318.9	-7.87	79.68	73.41
KTRP	179.5	98.5	-45.11	85.00	46.66
Trojan Power	-	-	-	-	-
CenPower	423.1	3.1	-99.27	97.40	0.71
AKSA	441.7	536.8	21.54	101.67	123.58
Genser	-	136.1	-	-	31.32
BXC Solar	12.6	14.6	15.76	13.97	16.17
VRA Solar	2.1	1.4	-35.18	2.30	1.49
Import	-	80.4	-	-	18.50
Total Supply	7,910.3	8,000.2	1.14	1,820.98	1,841.67
Total Supply excluding Export	7,689.0	7,756.3	0.88	1,770.02	1,785.53
Total Export (CIE/CEB/SONABEL)	221.4	243.9	10.16		

1.5.1 Hydro Generation

In general, hydro power plants generated 13.5% higher than the 2,482.1 GWh projected under the 2018 ESP. The total electricity generation of 2,816.1 GWh supplied by the hydro power plants constitute 35.2% of the total electricity supplied in first half of 2018. Electricity generation from the Akosombo GS was 13.3% higher than the 1,850 GWh projected under the 2018 ESP. The Akosombo GS operated with an average capacity of 482 MW for the first half of the year which was 56 MW higher than the 426 MW projected under the 2018 ESP. Similarly, the 396.5 GWh generated by the Kpong GS was 33.4% higher than the 297.2 GWh projected under the 2018 ESP. The Kpong GS operated with an average capacity of 91 MW for the first half of the year and was 23 MW higher than the 68 MW projected under the 2018 ESP. On the contrary, the total electricity generated by the Bui GS did not meet the 335 GWh projected under the 2018 ESP. The total electricity generation of 324.2 GWh from the Bui GS deviated from the projected by 3.2%. The Bui GS operated on an average of 75 MW for the first half of 2018 which was 2 MW lower than the 77 MW projected under the 2018 ESP.

1.5.2. Thermal Generation

Thermal generation sources contributed 63.6% of the total electricity supplied in the first half of 2018 as against the 68.4% projected under the 2018 ESP. The reduced electricity generation was predominantly due to fuel supply challenges to some of the thermal power plants.

The thermal power plants in the Aboadze power enclave all generated lower than projected under the 2018 ESP. TAPCO, TICO and Ameri power plants electricity generation deviated by 6.2%, 2.8% and 7.9% respectively. The TAPCO power plant however

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generated an average of 85.84 MW instead of the 91.49 MW projected under the 2018 ESP. The TICO and Ameri power plants generated at an average capacity of 257.94 MW and 73.41 MW respectively instead of the projected 265.43 MW and 79.68 MW respectively.

The TT1PP and KTPP electricity generation deviated by 31.1% and 45.1% respectively for the first half of 2018. TT1PP and KTPP generated at an average capacity of 55.12 MW and 46.66 MW instead of 80 MW and 85 MW respectively. The Karpowership and AKSA power plants generated 5% and 21.5% higher than projected under the 2018 ESP. The Karpowership generated an average load of 371.06 MW and was higher than the 353.39 MW projected under the 2018 ESP. AKSA power plant generated an average capacity of 123.58 MW and was higher than the 101.67 MW projected under the 2018 ESP. The SAPP's generation was marginally higher than projected under the 2018 ESP for the first half of 2018. The total electricity generation of 766.1 GWh was 7.1 GWh higher than the 759 GWh projected under the 2018 ESP. SAPP generated at an average load of 176.35 MW and was marginally higher than the 174.72 MW projected under the 2018 ESP.

1.0 Performance Indicators of Power Plants

2.1 Capacity Utilization Factor (CUF)

The Capacity Utilization Factor (CUF) for the hydro power plants recorded a general increment in June 2018. The CUF of the Akosombo GS increased from 52.46% in May 2018 to 53.5% in June 2018 and the CUF of Kpong GS increased from 62.21% in May 2018 to 63.73% in June 2018. On the contrary, the CUF of Bui GS decreased from 16.02% in May 2018 to 13.37% in June 2018.

The CUF of TICO, KTPP, Karpowership, AKSA and Genser power plants increased while the CUF of SAPP, TAPCO, TT1PP and Ameri power plant decreased in June 2018. The CUF of Karpowership and AKSA increased from 73.67% and 17.26% in May 2018 to 79.71% and 27.35% in June 2018 respectively. Similarly, the CUF of TICO and KTPP increased from 81.39% and 10.09% in May 2018 to 89.28% and 31.85% in June 2018 respectively. Genser's CUF increased from 49.2% in May 2018 to 53.74% in June 2018. SAPP and TAPCO's CUF decreased from 39.06% and 27.08% in May 2018 to 24.52% and 7.49% in June 2018. Likewise, the CUF of TT1PP and Ameri decreased from 33.56% and 45.3% in May 2018 to 0.52% and 24.2% in June 2018.

The System Load Factor increased from 75.33% in May 2018 to 79.76% in June 2018.

The Plant utilization factors of the various plants are contained in table 2.1.

Table 2.1.1: Power Plant Capacity Utilization, Average heat rate and Average Fuel Cost of Generation

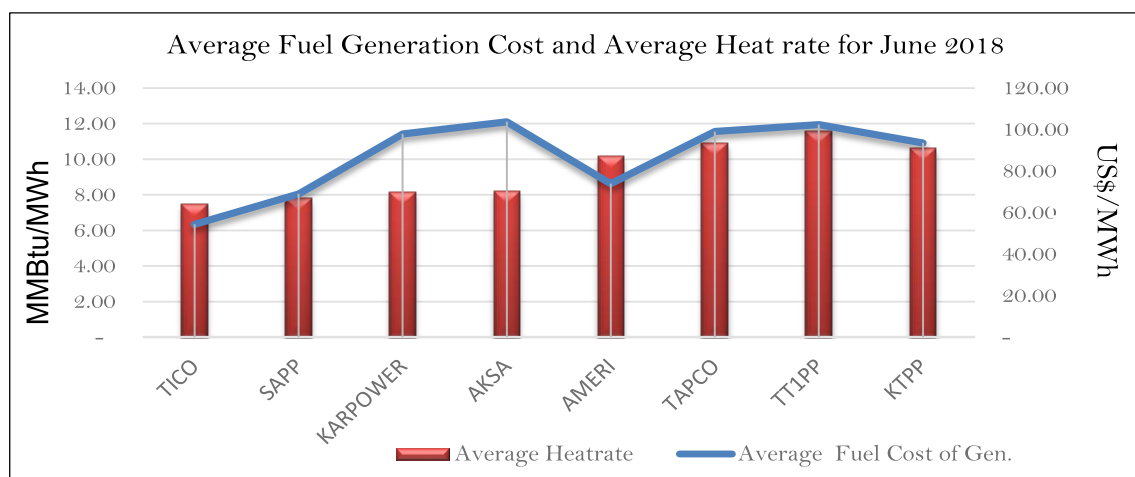
Power Plant	Capacity Utilization (%)	Average Heat rate (Btu/KWh)	Average Fuel Cost of Generation (US\$/MWh)
Akosombo	53.50	-	-
Kpong	63.73	-	-
Bui	13.37	-	-
SAPP	24.52	7,818.81	69.04
TAPCO	7.49	10,872.63	99.06
TICO	89.28	7,451.71	54.32
TT1PP	0.52	11,601.13	102.44
CENIT	-	-	-
TT2PP	-	-	-
MRP	-	-	-
KARPOWER	79.71	8,116.44	97.90
AMERI	24.20	10,139.74	73.92
TROJAN	-	-	-
KTPP	31.85	10,599.39	93.59
AKSA	27.35	8,200.39	103.78
Genser	53.74	11,087.65	-

2.2 Heat Rate (Fuel Efficiency)

There was a general decrease in fuel efficiency of most of the thermal power plants with the exception of SAPP, Ameri, KTPP and AKSA. The fuel efficiency of SAPP and Ameri power plant increased from 42.5% and 33.5% in May 2018 and 43.6% and 33.7% in June 2018 respectively. Likewise, KTPP and AKSA power plant's fuel efficiency increased from 29.7% and 41.5% in May 2018 to 32.2% and 41.6% in June 2018 respectively. Fuel efficiency for TAPCO and TICO reduced from 31.9% and 45.9% in May 2018 to 31.4% and 45.8% in June 2018. Similarly, the fuel efficiency of TT1PP and Karpowership decreased from 30.9% in May 2018 to 29.4% in June 2018. Genser power plant recorded a reduced fuel efficiency from 31.1% in May 2018 to 30.8% in June 2018.

Figure 2.1 shows the ranking of the thermal power plants based on their efficiency of the thermal power plants.

Figure 2.1: Fuel efficiency ranking of thermal power plants with their respective fuel cost of generation.



2.3 Average Fuel Cost of Electricity Generation

The average fuel cost of electricity generation decreased by 3.9%, from US\$71.05/MWh in May 2018 to US\$68.73/MWh in June 2018 due to an average improvement in heat rate for most of the thermal power plants. SAPP, Ameri and KTPP recorded a reduction in their average fuel cost of electricity generation while TAPCO, TICO, TT1PP, Karpowership and AKSA recorded an increment in their average fuel cost of electricity. The Average fuel cost of electricity generation of KTPP reduced from US\$126.17/MWh in May 2018 to US\$93.58/MWh in June 2018 due to a significant improvement in heat rate. The average fuel cost of electricity generation of SAPP and Ameri reduced from US\$73.77/MWh and US\$74.3/MWh in May 2018 to US\$69.04/MWh and US\$73.92/MWh in June 2018 respectively due to improvement in heat rate. The average fuel cost of electricity generation for TAPCO, TICO and TT1PP increased from US\$77.87/MWh, US\$54.19/MWh and US\$97.64/MWh in May 2018 to US\$99.06/MWh, US\$54.32/MWh and US\$102.44/MWh in June 2018 respectively due to reduction in heat rate. The Karpowership average fuel cost of electricity generation increased from US\$94.05/MWh in May 2018 to US\$97.9/MWh in June 2018 due to a reduction in heat rate. AKSA's average fuel cost of electricity generation increased from US\$100.36/MWh in May 2018 to US\$103.78/MWh in June 2018 due to an increase in the price of HFO.

Acronyms

AGPP = Atuabu Gas Processing Plant	Btu = British Thermal Units
CBGC = Composite Bulk Generation Charge	CUF = Capacity Utilization Factor
DFO = Distillate Fuel Oil	EC = Energy Commission
ECG = Electricity Company of Ghana	EMOP = Electricity Market Oversight Panel
ESP = Electricity Supply Plan	FPSO = Floating Production, Storage and Offloading
GHp = Ghana Pesewa	GNGC = Ghana National Gas Company
GWh = Giga-watt Hours	HFO = Heavy Fuel Oil
KTPP = Kpone Thermal Power Plant	kWh = Kilo-watt hours
MRP = Mine Reserve Plant	LEAP = Long-range Energy Alternative Planning
LCO = Light Crude Oil	LI = Legislative Instrument
LTA = Long Term Average	MW = Megawatt
MMscf = Million Standard Cubic Feet	MWh = Mega-watt hours
NITS = National Interconnected Transmission System	PV = Photovoltaic
SAPP = Sunon Asogli Power Plant	SMP = System Marginal Price
SNEP = Strategic National Energy Plan	TEN = Tweneboa, Enyenra, Ntomme
TT2PP = Tema Thermal 2 Power Plant	TT2PP = Tema Thermal 2 Power Plant
VRA = Volta River Authority	WAGPCo = West African Gas Pipeline Company
WAGP = West African Gas Pipeline	WEM = Wholesale Electricity Market

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