



GHANA WHOLESALE ELECTRICITY MARKET BULLETIN

MARKET WATCH

Monthly Market Data Analysis

ISSUE NO. 54

1st June 2020 to 30th June 2020

This Bulletin covers major developments in the Wholesale Electricity Market (WEM) of Ghana from 1st June, 2020 to 30th June, 2020. 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 mid-year review of the 2020 GWEM.

The Electricity Market Oversight Panel (EMOP) 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

There was a decrease of 2.7% in the System Peak Load for June 2020, from 2,950.2 MW in May 2020 to 2,870.3 MW. The System Peak Load for June 2020 was also 4.9% lower than the 3,019 MW projected in the 2020 Electricity Supply Plan (ESP). At the System Peak Load, 204 MW was exported to the neighbouring countries. The Ghana Peak Load of 2,666.3 MW recorded in June 2020 was 1.5% higher than the 2,626.3 MW recorded for May 2020 but was 1.2% lower than the 2,699 MW projected in the 2020 ESP for June 2020. The average electricity demand likewise decreased by 4.2%, from 2,378.8 MW in May 2020 to 2,278.3 MW in June 2020.

Average electricity demand for the regulated market was 1,619 MW in June 2020, 188 MW in the deregulated market and 290.4 MW in the export market (206 MW of export to the neighbouring countries and 84.4 MW by VALCO).

A total of 1,509.9 GWh was consumed in June 2020. Of the total consumption, 77.2% was consumed in the regulated market, 9% in the deregulated market and 13.8% in the export market (9.8% to the neighbouring countries and 4% by VALCO).

The average electricity supplied in June 2020 decreased by 4.2%, from 57.1 GWh per day in May 2020 to 54.7 GWh per day. Similarly, the total electricity supplied decreased by 7.3%, from 1,769.1 GWh in May 2020 to 1,640.4 GWh in June 2020. Out of the total electricity supplied in June 2020, 5.54 GWh was imported from CIE whiles the remaining 1,634.86 GWh was supplied from domestic sources. A total of 140.15 GWh was exported to CIE, CEB and SONABEL in June 2020.

Table 1. Projected and Actual Outturn of electricity demand and supply in June 2020 and May 2020.

	June 2020		May 2020	
	Projected	Actual Outturn	Projected	Actual Outturn
Total Supply (GWh)	1,571.2	1,640.4	1,685.3	1,769.1
Source by Power Plants (GWh)				
AKOSOMBO	363.0	328.1	375.0	432.0
KPONG	65.0	64.3	68.0	78.4
BUI	38.0	92.9	42.0	106.8
Sunon Asogli	266.0	346.3	275.0	262.2
TAPCO	81.0	106.3	84.0	108.0
TICO	189.0	105.7	195.0	151.3
TT1PP	-	6.4	27.0	52.3
CENIT	74.0	73.9	77.0	77.4
TT2PP	-	8.7	-	9.0
Amandi	68.0	-	71.0	32.4
Karpowership	259.0	267.6	268.0	251.6
AMERI	121.0	116.2	125.0	117.8
KTTPP	43.0	63.9	74.0	14.6
Trojan Power	-	-	-	-
CENPOWER	-	-	-	0.7
AKSA	-	11.3	-	22.5
Bridge Power	-	-	-	-
BXC Solar	2.0	2.4	2.0	2.7
Safisana	-	-	-	-
VRA Solar	0.2	0.2	0.3	0.2
Genser	-	38.7	-	38.6
Meinergy	2.0	1.9	2.0	2.2
Total Generation (GWh)	1,571.2	1,634.8	1,685.3	1,762.7
Imports (GWh)	-	5.5	-	6.4
Total Supply (GWh)	1,571.2	1,640.4	1,685.3	1,769.1
Deficit/Over supply (GWh)	-	69.2	-	83.8
Ghana Coincident Peak Load (MW)	2,689.0	2,666.3	2,724.0	2,626.3
System Coincident Peak Load (MW)	3,019.0	2,870.3	3,054.0	2,950.2

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The electricity generated from the hydroelectric power plants contributed 29.6% of the total electricity supplied in June 2020, which was lower than the 34.9% recorded in May 2020. The share of the electricity supplied by the thermal power plants constituted 70.1% of the total electricity supplied in June 2020. Electricity supplied from the renewable power plants in June 2020 contributed 0.27% which was lower than the 0.29% recorded for May 2020.

The water level for the Akosombo GS increased in June 2020 by 0.08 feet from 257.49 feet in May 2020 to 257.41 feet. On the contrary, the rate of drop in the water level for the Bui GS decreased by 49.5%, from 0.19 feet per day in June 2020 to 0.096 feet per day in June 2020.

The consumption of Natural gas continued to dominate the total fuel mix in June 2020 with a share of 99.1% which was lower than the 97.5% recorded in May 2020. HFO consumption accounted for 0.9% of the total fuel mix in June 2020. Domestic natural gas supply accounted for 78.7% of the total natural gas consumption while imports from WAGP accounted for the rest of 21.3%.

ELECTRICITY DEMAND AND SUPPLY

Electricity Demand

The System Peak Load recorded in June 2020 decreased to 2,870.3 MW from 2,950.23 MW recorded in May 2020. This represented a 2.7% decrease in demand. Likewise, the System Peak Load recorded in June 2020 was 4.9% lower than the 3,019 MW projected in the 2020 ESP for June 2020. The electricity exported to CIE, CEB and SONABEL at the System Peak Load in May 2020 was 204 MW which was 36.3% lower than the 320 MW projected in the 2020 ESP. The Ghana Peak Load on the other hand increased for June 2020 by 1.5%, from 2,626.3 MW in May 2020 to 2,666.3 MW. In comparison, the Ghana Peak Load recorded in June 2020 was 1.2% lower than the 2,699 MW projected in the 2020 ESP for June 2020. The electricity generated from the hydroelectricity power plants contributed 34.1% of the System Peak Load and 36.8% of the Ghana Peak Load in June 2020.

Average electricity demand including embedded supply decreased from 2,378.8 MW in May 2020 to 2,278.3 MW in June 2020. The average electricity demand in the GWEM in June 2020 decreased by 4.3% to 2,218.3 MW, from 2,318.9 MW in May 2020. Average electricity demand for the regulated market was 1,618.6 MW while the deregulated market was 188.1 MW. Average electricity exported to our neighbouring countries was 205.9 MW and VALCO was 84.4 MW.

Average electricity demand in the regulated market decreased by 8.3% from 1,752 MW in May 2020 to 1,619 MW in June 2020 but was 4.73% higher than the average electricity demand in June 2019. Likewise, electricity demand for the deregulated market reduced by 3.8% from 195 MW in June 2019 to 188 MW in June 2020. The average electricity demand in the deregulated market was also 5.1% lower than the 198 MW recorded in May 2019. Average export demand to our neighbouring countries increased by 12.4% in June 2020 from 183 MW in June 2019 but was 8.8% lower than the average export demand in May 2020 of 224 MW. VALCO on the other hand reduced by 43.7% in June 2020 from 150 MW in June 2019 to 84.4 MW. Average electricity demand recorded for VALCO in June 2020 was 0.8% higher than the average electricity demand in May 2020 of 83.8 MW.

The System Load Factor recorded in June 2020 decreased from 78.6% in May 2020 to 77.3%.

Electricity supply

The average electricity supply including embedded generation supply decreased by 4.2% in June 2020 to 54.7 GWh per day from 57.1 GWh per day in May 2020. Similarly, the total electricity supplied in June 2020 decreased by 7.3%, from 1,769.1 GWh in May 2020 to 1,640.4 GWh. The total electricity supplied for domestic consumption decreased by 7.4%, from 1,619.6 GWh in May 2020 to 1,500.2 GWh in June 2020. The electricity supplied from the hydroelectric sources contributed 29.6% of the total electricity supplied in June 2020 which was lower than the 34.9% recorded in May 2020. Thermal generation accounted for 70.1% of the total electricity supplied in June 2020 which was higher than the 64.8% recorded in May 2020. The share of the electricity supplied by solar power plants was to be 0.27% of the total electricity supply in June 2020.

Average electricity supply to the GWEM decreased by 4% in June 2020 from 52.4 GWh per day in May 2020 to 50.3 GWh per day. Likewise, total electricity supply to the GWEM decreased by 7.1% in June 2020 to 1,582.5 GWh from 1,703.8 GWh. Of the total electricity supply to the GWEM, 77.2% was supplied to the regulated market, 9% to the de-regulated market, 4% to VALCO and 9.8% was exported to the CIE, CEB and SONABEL.

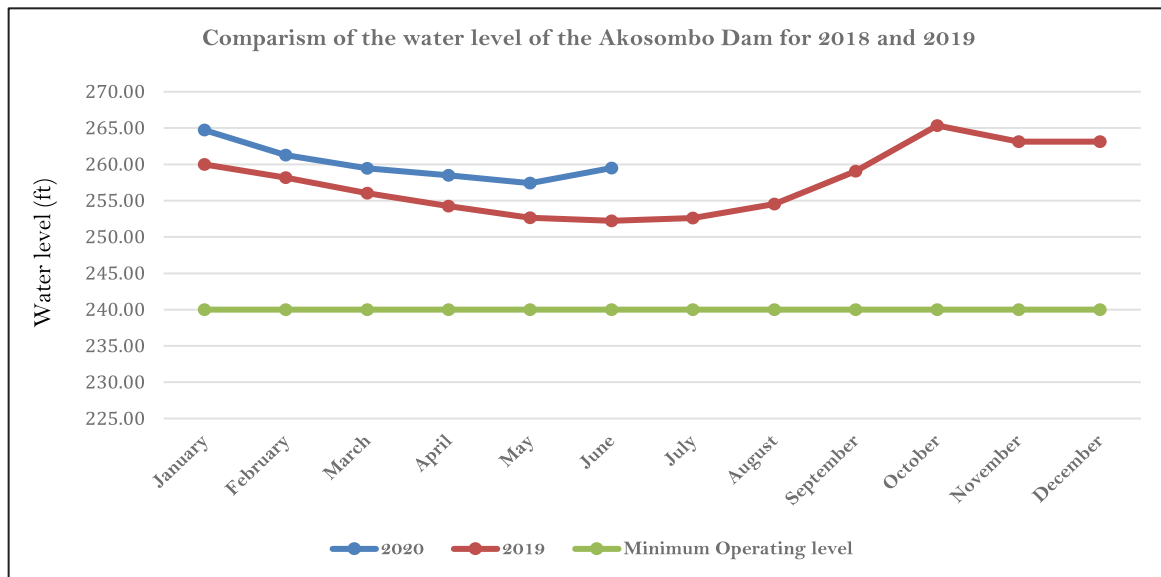
HYDRO DAM LEVELS

The Akosombo Dam Water Level started to increase in June 2020

The water level for the Akosombo dam began to increase in June 2020. The water level increased by 0.08 feet from 257.41 at the beginning of June 2020 to 257.49 feet at the end of June 2020. The water level recorded at the end of the month was 5.24 feet above the water level recorded for the same period in 2019. Also, the water level recorded at the end of June 2020 was 17.49 feet above the minimum operating level.

HIGHLIGHTS OF THE MONTH

Figure 1: Month-End Water Level for Akosombo Dam from January 2019 to June 2020.

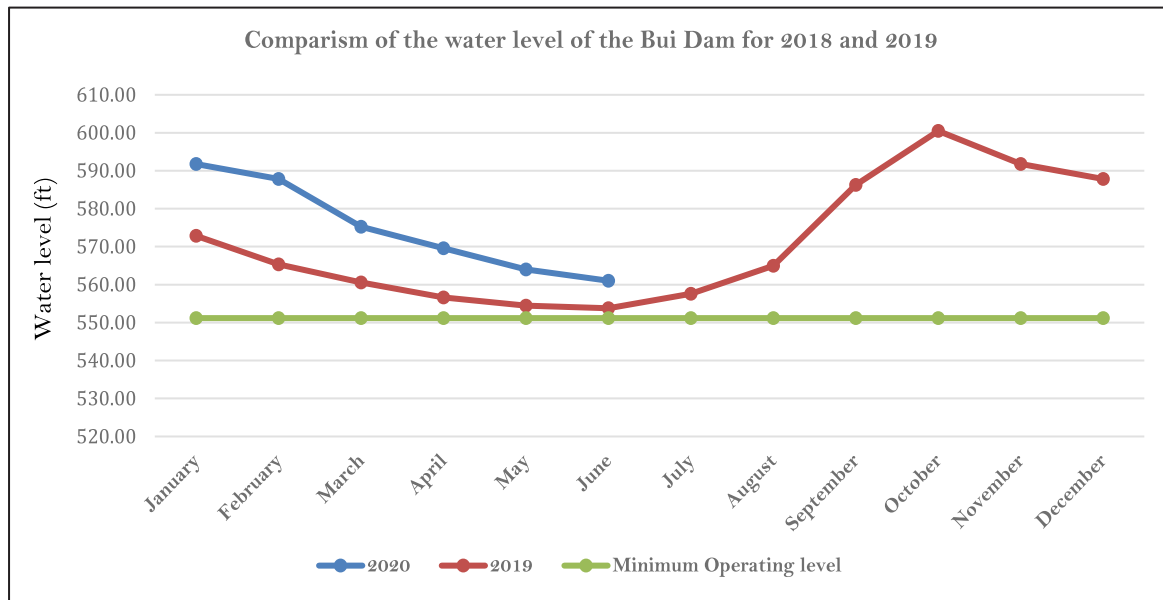


Bui Dam Water Level continued to drop but at a reduced rate in June 2020

The rate of drop in the water level for the Bui dam reduced by 49.5% in June 2020, from 0.19 feet per day in May 2020 to 0.096 feet per day. The water level of 564.01 feet recorded at the beginning of June 2020 dropped by 2.99 feet to a month end water level of 561.02 feet. The water level recorded at the end of June 2020 was 7.22 feet above the water level recorded for the same period in 2019 and was 9.84 feet above the minimum operating water level for the dam of 551.18 feet.

Figure 2 shows the comparative end of month trajectory of the level of water in the Bui dam from January 2019 to June 2020.

Figure 2: Month-End Water Level for Bui Dam from January 2019 to June 2020



FUEL SUPPLY FOR POWER GENERATION

Natural gas imports from the West Africa Gas Pipeline Company (WAPCo) increased in June 2020

The average natural gas flow rate from WAPCo in May 2020 increased by 4.1%, from 65.6 MMSCFD in June 2020 to 68.2 MMSCFD. Consequently, the total natural gas supplied by WAPCo increased from 1,966.8 MMSCF in May 2020 to 2,047 MMSCF in June 2020. The shares of natural gas supplied by WAPCo in the total fuel mix increased from 20.6% in May 2020 to 21.1% in June 2020. Also, the share of the natural gas supplied by WAPCo in the total natural gas consumed increased from 21.1% in May 2020 to 21.3% in June 2020.

Natural gas supply from domestic sources decreased in May 2020

Natural gas supplied from domestic sources increased by 4.1% in June 2020 to 246.5 MMSCFD from 236.89 in May 2020. Similarly,

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the total natural gas supplied from domestic sources induced from 7,343.5 MMSCF in May 2020 to 7,394.9 MMSCF in June 2020. The share of the natural gas supplied from domestic sources in the total fuel mix increased from 76.9% in May 2020 to 78% in May 2020. In the total natural gas consumed in June 2020, the share of the total natural gas supplied from domestic sources reduced from 78.9% in May 2020 to 78.7%.

Liquid Fuel consumption decreased in June 2020

Liquid fuel consumption decreased significantly by 66% in June 2020, from 45,252 barrels in May 2020 to 15,327 barrels. The decrease in liquid fuel consumption was due to the generation of KTPP solely on natural gas which led to zero consumption of DFO in June 2020. Also, there was a reduction in HFO consumption by AKSA due to its lower generation in June 2020. The share of the total liquid fuel consumed in the total fuel mix decreased from 2.5% in May 2020 to 0.9% in June 2020.

The share of the total HFO consumed in June 2020 in the total fuel mix increased from 1.4% in April 2020 to 1.7%. Similarly, the share of the total HFO consumed increased from 69.6% in May 2020 to 100% in June 2020. There was no DFO and LCO consumed in June 2020.

Plant by Plant Highlights

Electricity Generation at the Akosombo Generation Station (GS) decreased in June 2020

The Akosombo GS recorded a decrease in the average electricity supplied by 21.6%, from 13.96 GWh per day in May 2020 to 10.94 GWh per day in June 2020. Similarly, the total electricity supplied by the hydroelectric power plant decreased by 24.2%, from 387.72 GWh in May 2020 to 432.88 GWh in June 2020. The total electricity supplied by Akosombo GS constituted 20% of the total electricity supplied in June 2020 and was 6.8% higher than the 363 GWh projected in the 2020 ESP. The hydroelectric power plant contributed 672.5 MW to the System Peak Load in June 2020. The electricity supplied constituted 23.4% of the System Peak Load.

Electricity supply by Kpong Generation Station (GS) decreased in June 2020

The average electricity supplied by the Kpong GS decreased in June 2020 by 42.8%, from 3.74 GWh per day in May 2020 to 2.14 GWh per day. Likewise, the total electricity of 64.32 GWh supplied by the hydropower plant in June 2020 was 17.9% lower than the 78.38 GWh in May 2020. The total electricity supplied by Kpong GS constituted 3.9% of the total electricity supplied in June 2020 and was 1% lower than the 65 GWh projected in the 2020 ESP. The Kpong GS contributed 108.3 MW to the System Peak Load, representing 3.8% of the peak loads.

Electricity supply by the Bui Generation Station (GS) decreased in June 2020.

The average electricity supplied by the Bui GS decreased by 10.1%, from 3.45 GWh per day in May 2020 to 3.1 GWh per day in June 2020. Consequently, the total electricity supplied by the Bui GS decreased by 13.1%, from 106.83 GWh per day in May 2020 to 92.85 GWh per day in June 2020. The total electricity supplied by the hydroelectric power plant constituted 5.7% of the total electricity supplied in June 2020. The Bui GS contributed 199.4 MW to the System Peak Load, representing 7% of the peak loads in June 2020.

The Sunon Asogli Power Plant (SAPP) increased generation in June 2020

The Sunon Asogli Power Plant (SAPP) recorded an increase in the average electricity supplied in June 2020 by 36.4%, from 8.46 GWh per day in May 2020 to 11.54 GWh per day. Similarly, the total electricity supplied by SAPP increased by 32.1%, from 262.18 GWh in May 2020 to 346.27 GWh in June 2020. The total electricity supplied by the thermal power plant constituted 21.1% of the total electricity supplied in June 2020 and was 30.2% higher than the 266 GWh projected in the 2020 ESP. SAPP contributed 514.4 MW to the System Peak Load, representing 17.9% of the peak loads in May 2020. A total of 2,502.4 MMSCF of natural gas was consumed by the thermal power plant, at an estimated heat rate of 8,005.7 Btu/kWh in June 2020 which was higher than the 7,723.97 Btu/kWh recorded in May 2020.

Ameri Energy Power Plant's generation increased marginally in June 2020

The average electricity supplied by the Ameri power plant increased to 3.87 GWh per day from 3.8 GWh in May 2020. On the contrary, the total electricity supplied by the Ameri power plant increased marginally by 1.8%, from 117.82 GWh in May 2020 to 116.15 GWh in June 2020 due to the greater number of days in May than in June. The total electricity supplied by the thermal power plant constituted 7.1% of the total electricity supplied in June 2020 and was 2.6% lower than the 121 GWh projected in the 2020 ESP. The Ameri power plant contributed 193.5 MW to the System Peak Load representing 6.7% of the peak load in June 2020. A total of 1,059.8 MMSCF of natural gas was consumed by the thermal power plant at an estimated heat rate of 10,108 Btu/kWh in June 2020 which was higher than the 10,251 Btu/kWh recorded in May 2020.

The Karpowership Power Plant's generation increased in June 2020

The Karpowership recorded a marginal increase of 9.9% in the average electricity supplied in June 2020 from 8.12 GWh per day in June 2020 to 8.92 GWh per day. Similarly, the total electricity supplied by the power ship increased by 5.4%, from 238.66 GWh in April 2020 to 251.6 GWh in May 2020. The total electricity supplied by the thermal power plant constituted 16.3% of the total electricity supplied in May 2020 and was 6.1% lower than the 268 GWh projected in the 2020 ESP. Karpowership contributed 311.3 MW to the System Peak Load and 414.7 MW to the Ghana Peak Load, representing 10.6% and 14.7% of the respective peak loads in May 2020. The thermal power plant consumed a total of 1,827.03 MMSCF of natural gas at an estimated heat rate of 7,995.01 Btu/kWh in May 2020 which was lower than the 8,063.15 Btu/kWh recorded in April 2020.

AKSA Power Plant's generation decreased in June 2020

There was a decrease in the average electricity supplied by the AKSA power plant by 47.9%, from 0.73 GWh per day in May 2020 to 0.38 GWh per day in June 2020. Likewise, the total electricity supplied by the AKSA power plant decreased by 49.6%, from 22.49 GWh in May 2020 to 11.33 GWh in June 2020. The total electricity supplied by the thermal power plant constituted 0.7% of the total electricity supplied in June 2020. The AKSA power plant was projected to be offline in June 2020. The thermal power plant contributed 15.7 MW to the System Peak Load in June 2020 which constituted 0.6% of the System Peak Load. A total of 15,327 barrels of HFO at an estimated heat rate of 8,184.68 Btu/kWh in June 2020 which was higher than the 8,164.23 Btu/kWh recorded in May 2020.

Takoradi International Company (TICO) generation decreased in June 2020

The TICO power plant continued to record a reduction in the average electricity supplied in June 2020 compared to April 2020 and May 2020 by 31.7% and 27.9%. The average electricity supplied reduced from 5.15 GWh per day in April 2020, 4.88 GWh per day in May 2020 to 3.52 GWh per day in June 2020. Also, the total electricity supplied by the thermal power plant decreased by 30.2%, from 151.32 GWh in May 2020 to 105.68 GWh in June 2020. The total electricity supplied by the thermal power plant constituted 6.4% of the total electricity supplied in June 2020 and was 44.1% lower than the 189 GWh projected in the 2020 ESP. TICO contributed 169.5 MW to the System Peak Load representing

HIGHLIGHTS OF THE MONTH

5.9% of the peak loads in June 2020. The thermal power plant consumed a total of 1,127.42 MMSCF of natural gas at an estimated heat rate of 11,818.04 Btu/kWh in June 2020 which was higher than the 11,814.9 Btu/kWh recorded in May 2020.

Takoradi Power Company (TAPCO) Plant's generation decreased in June 2020

The average electricity generated by TAPCO decreased by 0.8%, from 3.51 GWh per day in May 2020 to 3.54 GWh per day in June 2020. The total electricity supplied by TAPCO, on the other hand, decreased from 108.9 GWh in May 2020 to 106.34 GWh in June 2020 due to the larger number of days in May than June. The total electricity generated by the thermal power plant constituted 6.5% of the total electricity supplied in June 2020 and was 31.3% higher than the 81 GWh projected in the 2020 ESP. The thermal power plant contributed 155.2 MW to the System Peak Load, representing 5.4% of the peak loads in June 2020. A total of 770.79 MMSCF of natural gas was consumed by the thermal power plant at an estimated heat rate of 8,029.85 Btu/kWh in June 2020, which was lower than the 8,300.99 Btu/kWh recorded in May 2020.

CENIT Power Plant's decreased its generation in June 2020.

The Average electricity supplied by the CENIT power plant decreased by 1.5%, from 2.5 GWh per day in May 2020 to 2.46 GWh per day in June 2020. Similarly, the total electricity supplied by the thermal power plant decreased by 4.5%, from 77.44 GWh in May 2020 to 73.94 GWh in June 2020. The total electricity supplied by the thermal power plant constituted 4.5% of the total electricity supplied in June 2020 and was 0.1% lower than the 74 GWh projected in the 2020 ESP. The CENIT power plant contributed 109 MW to the System Peak Load, representing 3.8% of the peak load in June 2020. A total of 776.25 MMSCF of natural gas was consumed by the thermal power plant at an estimated heat rate of 11,630.6 Btu/kWh in June 2020 which was higher than the 10,757.07 Btu/kWh recorded in May 2020.

Kpone Thermal Power Plant (KTPP) generation increased in June 2020

The KTPP operated throughout June 2020. The power plant generated 63.91 GWh in June 2020, significantly higher than the 14.64 GWh it generated in May 2020. The total electricity supplied by the thermal power plant constituted 3.9% of the total electricity supplied in June 2020. The KTPP contributed 101 MW to the System Peak Load, representing 3.5% of the peak load in June 2020. The thermal power consumed a total of 658.37 MMSCF of natural gas at an estimated heat rate of 11,411.8 Btu/kWh in June 2020 lower than the 11,525.56 Btu/kWh recorded in May 2020.

Tema Thermal 1 Power Plant's (TT1PP) was mostly shut down in June 2020

The TT1PP was mostly shut down in June 2020 to make natural gas available for the operation of KTPP on a rotational basis. The power plant, however, generated 6.43 GWh in June 2020 consuming 73.9 MMSCF of natural gas at an estimated heat rate of 12,721.79 Btu/kWh.

Embedded Electricity Generation

Genser Power Plant's generation increased in June 2020

There was an increase in the average electricity supplied by the Genser power plant in June 2020 by 4%, from 1.24 GWh per day in May 2020 to 1.29 GWh per day. Similarly, the total electricity supplied by the thermal power plant increased by 0.3%, from 38.59 GWh per day in May 2020 to 38.71 GWh in June 2020. The total electricity supplied by the Genser power plant constituted 2.4% of the total electricity supplied in June 2020. A total of 450.84 MMSCF of natural gas was consumed by the thermal power plant at an estimated heat rate of 12,901.88 Btu/kWh in June 2020 which was higher than the 11,391.51 Btu/kWh recorded in May 2020.

BXC Solar generation decreased in June 2020

The BXC solar power plant recorded a decrease in the average electricity generated from 0.09 GWh per day in May 2020 to 0.08 GWh per day in June 2020. The total electricity supplied in June 2020 likewise decreased from 2.73 GWh in May 2020 to 2.42 GWh by 11.4%. The total electricity supplied by the solar power plant constituted 0.2% of the total electricity supplied in June 2020 and was 21% higher than the 2 GWh projected in the 2020 ESP. The supply from the BXC solar power plant constituted 0.2% of the total electricity supplied in June 2020.

Meinergy Solar generation decreased in June 2020

The Meinergy solar power plant recorded a decrease in the average electricity generated from 0.07 GWh per day in May 2020 to 0.06 GWh per day in June 2020. Likewise, there was an increase of 15.6% in the total electricity supplied by the Meinergy solar power plant in June 2020. The total electricity supplied increased from 2.24 GWh in May 2020 to 1.89 GWh in June 2020. The total electricity supplied by the solar power plant was 5.5% lower than the 2 GWh projected in the 2020 ESP and constituted 0.1% of the total electricity supplied in June 2020.

VRA Navrongo Solar generation decreased in May 2020

The total electricity supply from the VRA Navrongo solar recorded a decrease of 8.3%, from 0.24 GWh in May 2020 to 0.22 GWh in June 2020. The solar power plant's total electricity supplied constituted 0.01% of the total electricity supplied in June 2020.

Electricity Exchange – Import and Export decreased in June 2020

There was a decrease of 14.4% in the average electricity imported from 0.21 GWh per day in May 2020 to 0.18 GWh per day in June 2020. Likewise, the total electricity imported from CIE decreased from 6.39 GWh in May 2020 to 5.54 GWh in June 2020. The total electricity imported constituted 0.3% of the total electricity supplied in June 2020.

There was also a reduction in the average electricity exported to SONABEL, CEB and CIE by 6.2%, from 4.98 GWh per day in May to 4.67 GWh in June 2020. The average electricity exported to CIE and CEB decreased from 0.32 GWh per day and 1.67 GWh per day in May 2020 to 0.3 GWh per day and 1.51 GWh per day in June 2020 respectively. On the contrary, the average electricity supplied to SONABEL increased by 0.7%, from 2.84 GWh per day in May 2020 to 2.86 GWh per day in June 2020.

The total electricity exported to SONABEL, CEB and CIE increased by 6.3%, from 149.52 GWh in May 2020 to 140.15 GWh in June 2020. The total electricity supplied to SONABEL decreased by 2.4%, from 87.98 GWh in May 2020 to 85.79 GWh in June 2020 due to the higher number of days in May than in June. On the contrary, the total electricity exported to CIE and CEB decreased from 9.9 GWh and 51.64 GWh in May 2020 to 8.94 GWh and 45.42 GWh in June 2020 respectively.

Ghana continued to be a net exporter of electricity in June 2020.

OPERATIONAL FACT SHEET

Monthly Market Data Analysis

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

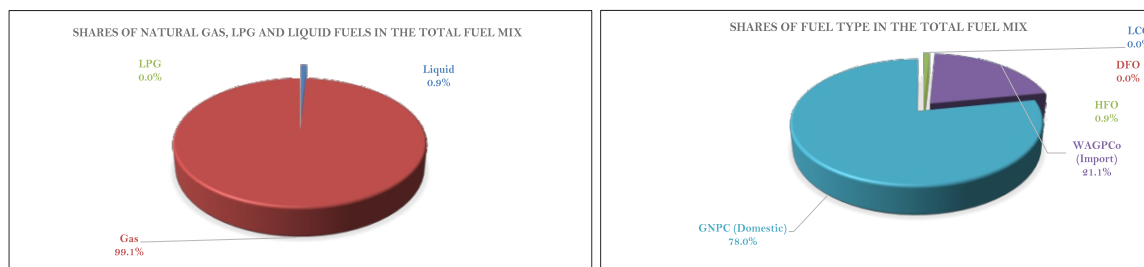
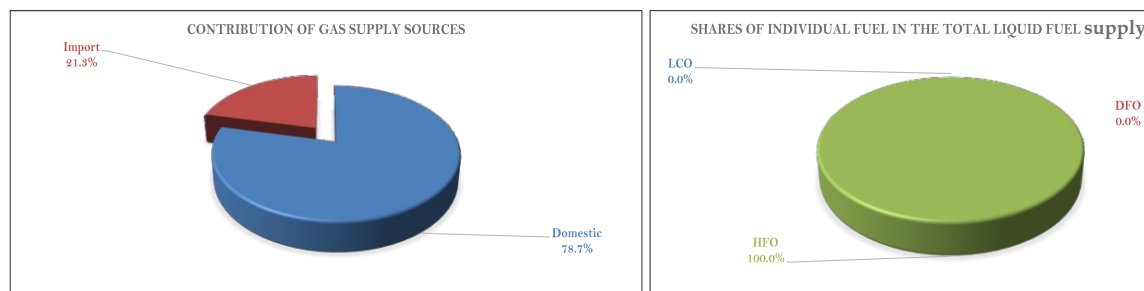


Figure 4a: Contribution of Natural Gas Supply by sources

Figure 4b: Contribution of individual fuel in the liquid fuel supply

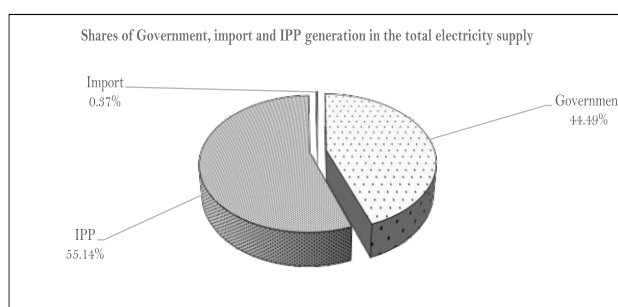
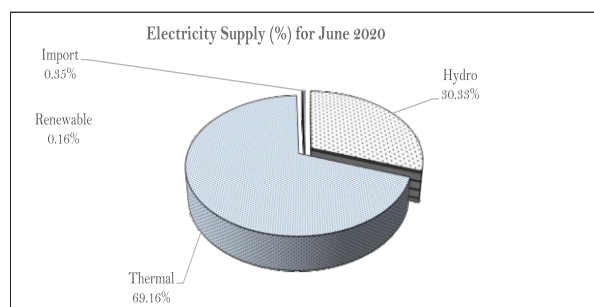


Peak Electricity Supply - June 2020			
Source of Supply	Generation at System Peak Load (MW)	Generation at Ghana Peak Load (MW)	Electricity Supply (GWh)
AKOSOMBO	672.47	672.47	328.10
KPONG	108.27	108.27	64.32
BUI	199.42	199.42	92.85
SEAP	514.40	514.40	346.27
TAPCO	155.19	155.19	106.34
TICO	169.51	169.51	105.68
TT1PP	-	-	6.43
CENIT	109.00	109.00	73.94
TT2PP	-	-	8.66
MRP	-	-	-
KARPOWER	401.80	401.80	267.65
AMERI	193.50	193.50	116.15
KTPP	101.00	101.00	63.91
Trojan Power	-	-	-
CENPOWER	-	-	-
AKSA	15.70	15.70	11.33
BXC Solar	-	-	2.42
Safisana	-	-	-
VRA Solar	-	-	0.22
Genser	230.00	230.00	38.71
Meinergy	-	-	1.89
IMPORT	2,870.27	2,870.27	5.54
Export to CIE at peak	-	-	45.42
Export to CEB at peak	75.00	75.00	8.94
Export to Sonabel	129.00	129.00	85.79
System Coincident Peak Load	2,870.27		
Ghana Coincident Peak Load		2,666.27	
Total Supply			1,640.39
Total Supply without export			1,500.24

OPERATIONAL FACT SHEET

Average Monthly Flowrate (MMSCFD)	
Location	Monthly Average
Etoki	70.82
Tema WAGPCo	113.72
Aboadze WAGPCo	2.09
Aboadze GNGC	124.59
Reverse Flow	49.39

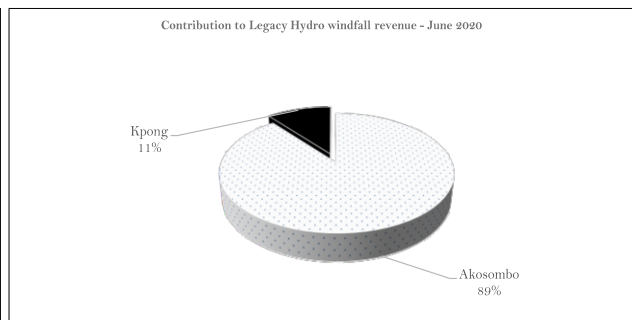
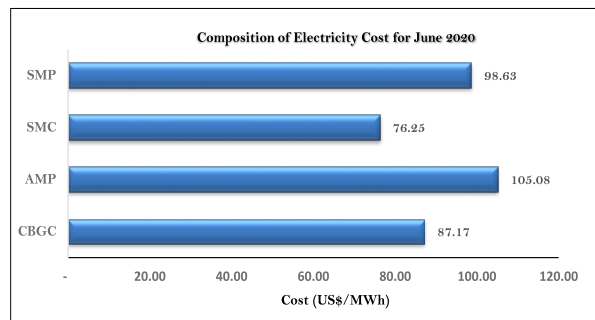
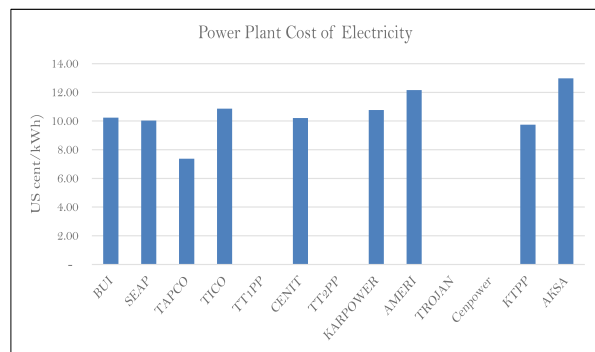
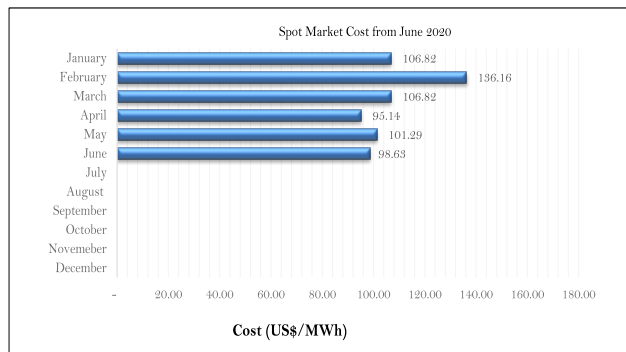
Jun-20			
	Beginning month (ft)	End month (ft)	Change in water level (feet)
Hydro Dam			
Akosombo	257.41	257.49	0.08
Bui	564.01	561.02	-2.99



Power Plant Data June 2020								
	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	44.68	328.10	-	-	-	-	-
Kpong	160.00	55.83	64.32	-	-	-	-	-
Bui	400.00	32.24	92.85	-	-	-	-	-
SEAP	560.00	85.88	346.27	2,772,108.52	-	-	-	-
TAPCO	330.00	44.75	106.34	853,862.59	-	-	-	-
TICO	340.00	43.17	105.68	1,248,930.95	-	-	-	-
TT1PP	126.00	7.08	6.43	81,750.20	-	-	-	-
CENIT	126.00	81.50	73.94	859,919.08	-	-	-	-
TT2PP	87.00	13.82	8.66	111,730.93	-	-	-	-
KARPOWER	470.00	79.09	267.65	2,128,320.54	-	-	-	-
AMERI	250.00	64.53	116.15	1,174,061.68	-	-	-	-
Cenpower	370.00	-	-	-	-	-	-	-
TROJAN	56.00	-	-	-	-	-	-	-
KTPP	220.00	40.35	63.91	729,328.31	-	-	-	-
AKSA	360.00	4.37	11.33	-	-	-	92,726.68	-
Amandi	192.00	-	-	-	-	-	-	-
Bridge Power	-	-	-	-	-	-	-	-
GENSER	95.00	56.59	38.71	499,431.81	-	-	-	-
VRA Solar	2.50	12.01	0.22	-	-	-	-	-
BXC	20.00	16.78	2.42	-	-	-	-	-
Meinergy	20.00	13.15	1.89	-	-	-	-	-
Total	5,204.50	43.63	1,634.85	10,459,444.62	-	-	92,726.68	-

ECONOMIC FACT SHEET

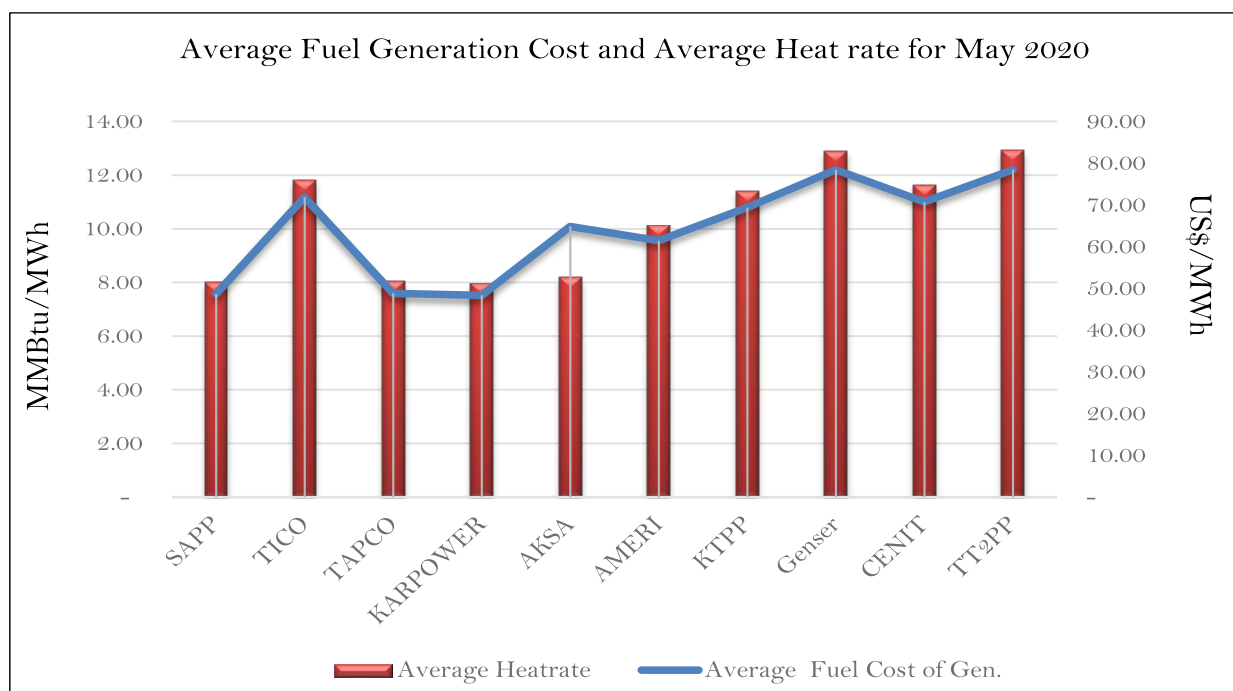
		Actual	Projected	Difference
Average Market Energy Cost	US\$/MWh	65.47	54.79	10.68
Average Market Capacity Charge (AMCC)	US\$/MWh	39.61	46.28	(6.67)
Total Average Market Cost (TAC)	US\$/MWh	105.08	101.07	4.01
System Marginal Cost (SMC)	US\$/MWh	76.25	59.87	16.38
System Marginal Capacity Charge (SMCC)	US\$/MWh	22.38	23.95	(1.57)
Spot Market Price (SMP)	US\$/MWh	98.63	83.82	14.81
Composite Bulk Generation Charge (CBGC)	US\$/MWh	87.17	87.17	-
Deviation of TAC from CBGC	US\$/MWh	(17.91)	(13.90)	(4.01)
Deviation of SMP from CBGC	US\$/MWh	(11.46)	3.35	(14.81)



	Gazetted Natural Gas Price	Weighted average Natural Gas Price	LCO	HFO	DFO	LPG
US\$/MMBTu	6.08	6.20	8.56	7.92	9.15	11.69

Average Fuel Prices		
		Jun-20
Fuel Type	Unit	Delivered Cost
Natural Gas	US\$/MMBTu	6.08
LCO	US\$/BBL	45.27
HFO	US\$/Tonne	244.90
DFO	US\$/Tonne	369.80
LPG	US\$/Tonne	498.66

ECONOMIC FACT SHEET



Power Plant	Capacity Utilization (%)	Average Heat rate (Btu/KWh)	Average Fuel Cost of Generation (US\$/MWh)	Emission Factor (kgCO ₂ /kWh)
Akosombo	44.68	-	-	-
Kpong	55.83	-	-	-
Bui	32.24	-	-	-
SAPP	85.88	8,005.70	48.67	0.42
TAPCO	44.75	8,029.85	48.82	0.43
TICO	43.17	11,818.04	71.85	0.63
TT1PP	7.08	12,721.79	77.35	0.68
CENIT	81.50	11,630.60	70.71	0.62
TT2PP	13.82	12,905.83	78.47	0.68
Amandi	79.09	-	-	-
KARPOWER	79.09	7,951.98	48.35	-
AMERI	64.53	10,108.06	61.46	0.54
TROJAN	-	-	-	-
KTPP	40.35	11,411.80	69.38	0.61
AKSA	4.37	8,184.68	64.85	0.64
Cenpower	-	-	-	-
Genser	56.59	12,901.88	78.44	0.68

TRANSACTIONS IN THE GHANA WHOLESALE ELECTRICITY MARKET FOR THE FIRST HALF 2020

2.1 ELECTRICITY DEMAND

2.1.1 System Demand Overview

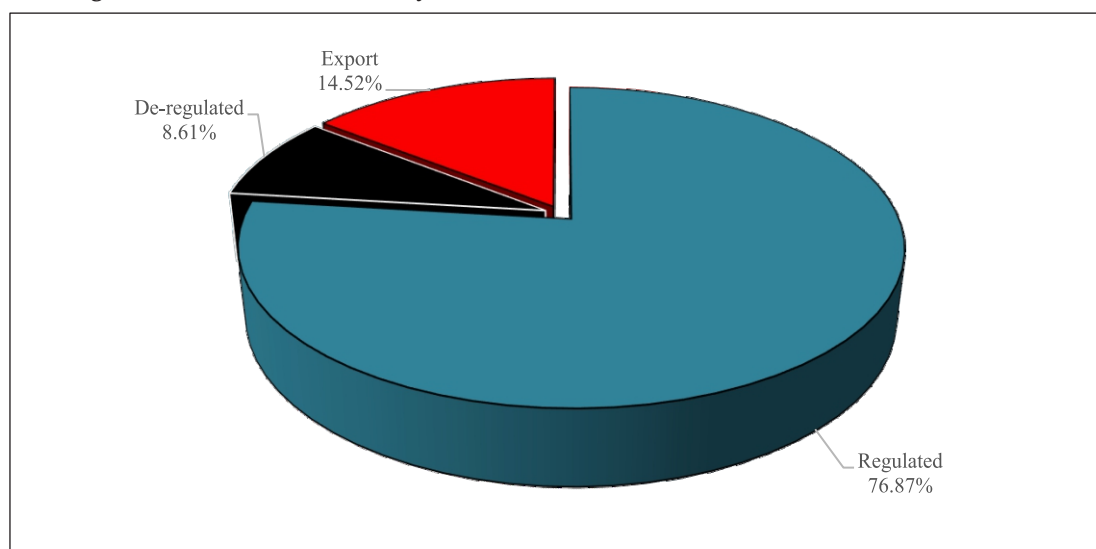
System peak demand, recorded in the first half of 2020 was 2,956 MW, corresponding to an increase of 6.3% over a peak demand of 2,781 MW recorded in the first half of 2019. The system peak demand recorded was also 4.1% lower than the 3,082 MW projected in the 2020 ESP for the first half of 2020. The Average electricity demand for the first half of 2020 of 2,476 MW, represented an increase of 2.4% over 2018 and 6.3% higher than the average electricity demand projected for the first half of 2020 in the 2020 ESP.

Hydroelectric power station generation in meeting the system peak demand of 2,956 MW in the first half of 2020 was 1,137 MW, thus contributing 38.5% of the total generation capacity while the thermal-based power plants accounted for the rest of 1,818.7 MW (61.5%).

The Ghana peak demand recorded for the first half of 2020 was 2,691 MW, an increase of 5.6% over the 2,547 MW recorded in the same period in 2019. This was, however, 2.6% lower than the 2,762.6 MW projected for the first half of 2020.

The total consumption of electricity in the GWEM in the first half of 2020 was 9,393.1 GWh. This represented an increase of 0.4% higher than the 9,351.7 GWh that was recorded in the first half of 2019 but was 0.1% lower than the 9,404.3 GWh projected for the first half of 2020 in the 2020 ESP. Of the total consumption of 9,393.1 GWh recorded in the first half of 2020, the Regulated Market accounted for 76.9%, the De-regulated Market accounted for 8.6%, and the Export Market contribution 14.5%. Figure 1 shows the shares of electricity consumed according to the type of market in the first half of 2020.

Figure 1: Shares of the electricity consumed in the various market in the first half of 2020



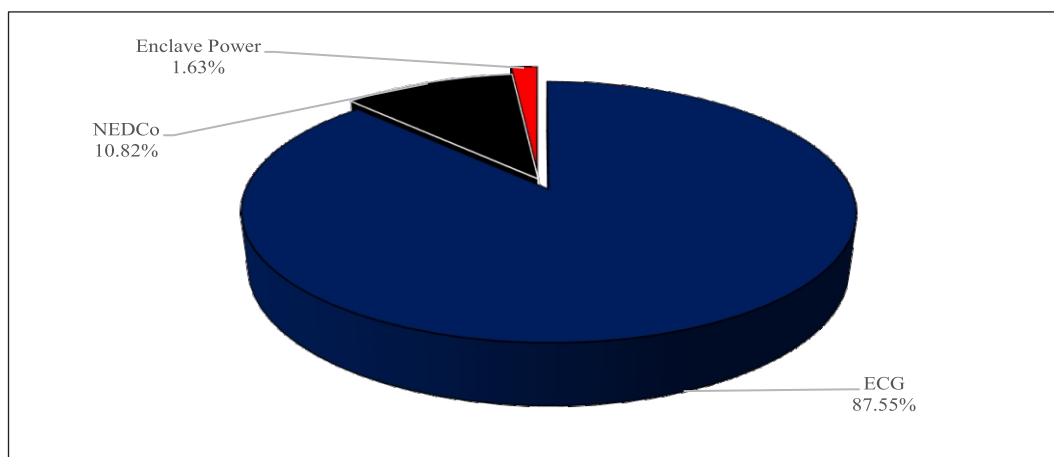
2.1.2 Regulated Market Demand

The combined average electricity demand of the Distribution Companies increased by 7.3% to 1,742.1 MW in the first half of 2020 from 1,624.1 MW in the same period of 2019.

A total of 7,567.7 GWh of electricity was consumed in the Regulated Market in the first half of 2019. This represented a growth of 1.4% on the 7,464.2 GWh recorded in the same period of 2019 and was also 7.4% higher than the 7,048.3 GWh projected in the 2020 ESP for the first half of 2020.

The electricity consumption recorded for ECG was 6,321.2 GWh, representing a 2.6% growth on the 6,161.8 GWh it consumed in the first half of 2019 which is similar to the projected consumption in the 2020 ESP. The consumption recorded for NEDCo and EPC were 781.4 GWh and 117.7 GWh in the first half of 2020 respectively. These represented 4.2% growth over their first half of 2020 consumption of 749.9 GWh for NEDCO but was 18.1% lower than the 143.7 GWh for EPC. The electricity consumption of NEDCo was 5.2% higher than the 743.1 GWh projected in the 2020 ESP for the first half of 2020. The EPC's consumption, on the other hand, was 17.9% lower than the projected 143.4 GWh in the 2020 ESP.

Figure 2 shows the shares of electricity consumed by the Distribution Companies in the first half of 2020.



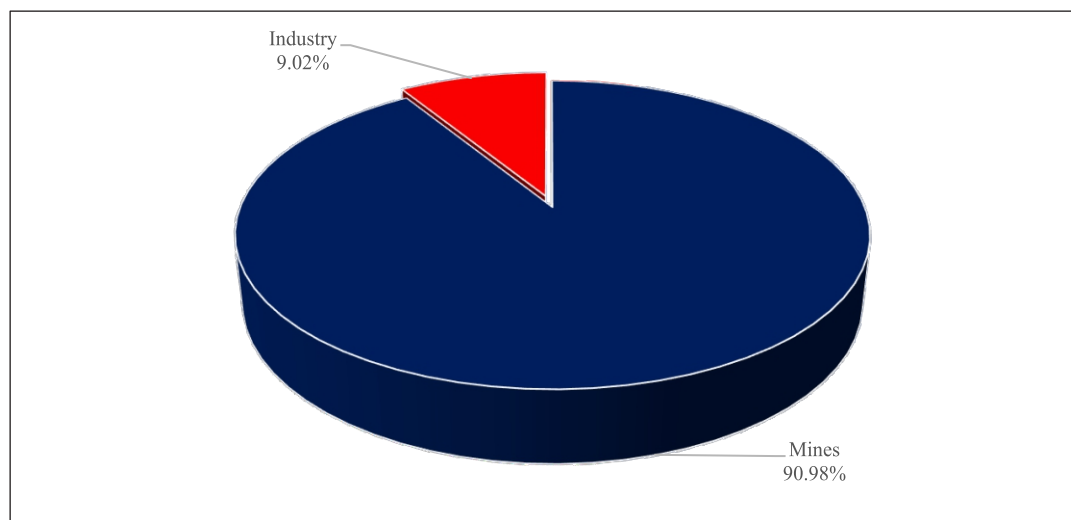
2.1.3 De-regulated Market Demand

The average demand for Bulk Customers dropped by 5%, from 196.2 MW in the first half of 2019 to 186.3 MW in 2020. Demand for the mining companies accounted for 91% of the total demand of the Bulk Customers in the first half of 2020 while the large industrial customers accounted for the rest of 9%.

Electricity consumption by Bulk Customers in the De-regulated Market decreased by 5% in the first half of 2020, from 852.2 GWh in 2019 to 809.2 GWh in 2020. The consumption in the first half of 2020 represented 11.2% lower than the 911.6 GWh projected in the 2020 ESP. The electricity consumption recorded for the Bulk Customers constituted 9% of the total national electricity consumption for the first half of 2020.

The consumption of the mining companies decreased by 6.9% in the first half of 2020 from 790.7 GWh in the first half of 2019 to 736.2 GWh. Figure 3 shows the shares of electricity consumed by customer category in the De-regulated Market in the first half of 2020.

Figure 3: Shares of the electricity consumed by customer category in the De-regulated Market



2.1.4 Export Market Demand

The average electricity demand for the export to our neighbouring countries increased from 201.9 MW in the first half of 2019 to 235.3 MW in the first half of 2020, representing an increase of 16.5%. VALCO's average demand decreased by 39.8%, from 130.6 MW in the first half of 2019 to 78.6 MW in the same period of 2020.

Electricity exported to neighbouring countries in the first half of 2020 increased by 10.2%, from 927.8 GWh in the first half of 2019 to 1,022.2 GWh and was also 16.6% higher than the 877 GWh projected for the same period in the 2020 ESP.

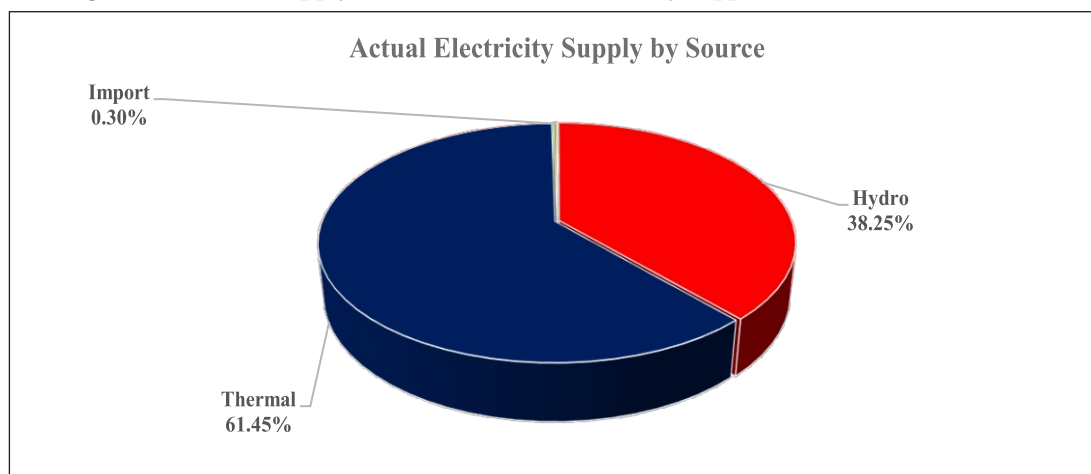
In the first half of 2020, the electricity consumption of VALCO decreased by 39.8% from 567.4 GWh in the first half of 2019 to 341.5 GWh.

2.2 ELECTRICITY SUPPLY

Total electricity generated and supplied in the GWEM rose by 10.2% from 9,003 GWh in the first half of 2019 to 9,919.1 GWh in the same period of 2020. The electricity supply was made up of 9,889.5 GWh from domestic generation and 29.7 GWh of inadvertent imports via the La Cote D'Ivoire intertie.

Thermal power plants accounted for the larger share of the total electricity supplied in the first half of 2020, their contribution of 61.5% was higher than the 55.4% recorded for the same period of 2019 but was higher than the 66.4% projected in the 2020 ESP. Hydroelectric power plants accounted for 38.3% of the total electricity supply but was lower than its share of 44.6% in the first half of 2019. In the 2020 ESP, hydroelectricity power was projected to account for 33.6% of the total electricity supply.

Figure 4: Shares of supply sources in the total electricity supplied in the first half of 2020.



Electricity supplies in the GWEM are traded via the Bilateral Contract Market (BCM) and the Spot Market. The total electricity traded in the BCM was 6,759.3 GWh representing 68.1% of the total electricity traded in the first half of 2020 but was lower than the 7,005 GWh projected in the 2020 ESP. On the Spot Market, 3,159.8 GWh of electricity, constituting 31.9% of the total electricity traded in the first half of 2020 was traded but was significantly lower than the 2,838 GWh projected in the 2020 ESP.

2.2.1 Electricity Supply to the Regulated Market

The electricity needs of the Regulated Market were met from both the Bilateral Contract Market and the Spot Market in the first half of 2020.

A total of 7,567.7GWh of electricity was traded in the Regulated Market in the first half of 2020. Of this amount, 5,829.8 GWh was purchased from the BCM, constituting 77% of the total electricity purchased in the Regulated Market. The rest of the 1,737.9 GWh constituting 23% of the total was purchased from the Spot Market.

The ECG purchased a total of 5,113.4 GWh of electricity from the BCM in the first half of 2020 and this represented 77.2% of all the electricity purchases of ECG of 6,625.4 GWh from the wholesale electricity market in the first half of 2020. To make up for its total electricity requirements, ECG also purchased 1,512 GWh from the Spot Market in the first half of 2020 which represented 22.8% of the company's total electricity purchases from the GWEM.

NEDCo purchased a total of 819 GWh of electricity from the wholesale electricity market in the first half of 2020. Of the total electricity purchased, 627.8 GWh was from the BCM and this represented 76.7% of NEDCo's purchases on the NITS. The Spot Market purchases of NEDCo was 191.2 GWh representing 22.3% of its total purchases.

The EPC purchased a total of 123.4 GWh of electricity in the first half of 2020. Of this amount, 88.6 GWh was purchased via the BCM representing 71.8% of the total electricity purchased by EPC. The rest of EPC's total requirements of 34.8 GWh in the first half of 2020 representing 28.2% of its total purchases was received from the Spot Market.

2.2.2 Electricity Supply to the De-regulated Market

Bulk Customers in the De-regulated Market purchased a total of 848.1 GWh of electricity in the first half of 2020. Of the amount, 595.3 GWh of electricity was purchased on the BCM while 252.79 GWh was received from the Spot Market. These represented 70.2% and 29.8% of their total supply from the BCM and Spot Market respectively.

2.2.3 Electricity Supply to the Export market

A total of 1,022.2 GWh of electricity was exported to Ghana's neighbouring countries with the BCM contributing 511.1 GWh which constituted 50% of the total electricity exported in the first half of 2020.

In the first half of 2020, all of VALCO's needs of 341.5 GWh was served from only the Spot Market in line with GoG's policy directive regarding the electricity supply to the smelter.

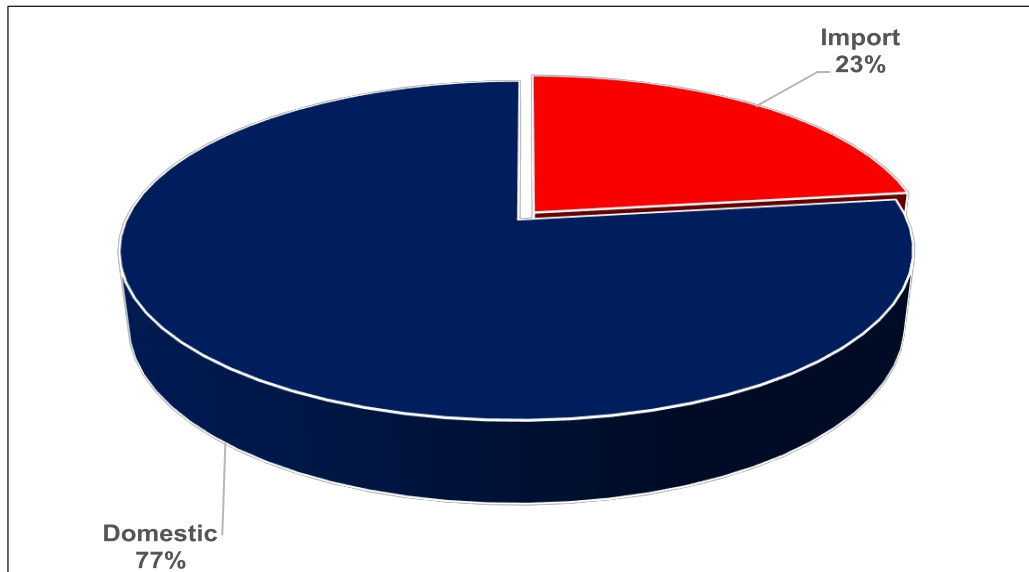
2.3 FUEL SUPPLY AND PRICES

2.3.1 Fuel Supply

The fuel for electricity generation by thermal power plants are natural gas, heavy fuel oil (HFO), Light Crude Oil (LCO), and a small amount of distillate fuel oil (DFO) used primarily for starting and stopping of the gas turbines. The sources of natural gas supply are i) domestic oil and gas fields and ii) imports from Nigeria through the West African Gas Pipeline (WAGP). All liquid fuels for power generation are imported.

In the first half of 2020, a total of 35,659.1 MMSCF of natural gas constituting 77% of the total natural gas supplied was from domestic sources and the rest of 10,651.4 MMSCF constituting 23% was imported through the WAGP. Figure 5 shows the shares of natural gas supply from various sources.

Figure 5: shows the shares of natural gas from the various supply sources.



A total of 57 trillion Btu of all fuels used by thermal power plants for electricity generation was consumed in the first half of 2020 compared to 56.1 trillion Btu that was projected to be consumed in the first half of 2020 ESP.

2.3.1.1 Natural Gas Consumption

A total of 50.7 trillion Btu of natural gas was consumed in the first half 2019 by power plants, accounting for 88.9% of the total fuel mix but this figure was 2.9% lower than was projected in the 2020 ESP for the first half of 2020.

Natural gas supply from the WAGP constituted 23.1% of the total natural gas supplied in the first half of 2020, GNGC constituted 18.7% while supply from GNPC/ENI constituted 58.2%.

2.3.1.2 HFO Consumption

Heavy Fuel Oil (HFO) consumption in the first half of 2020 was 2.3 trillion Btu which constituted 4% of the total fuel mix but significantly higher than the 1.3 trillion Btu projected in the 2020 ESP by over 76.9%.

2.3.1.3 LCO Consumption

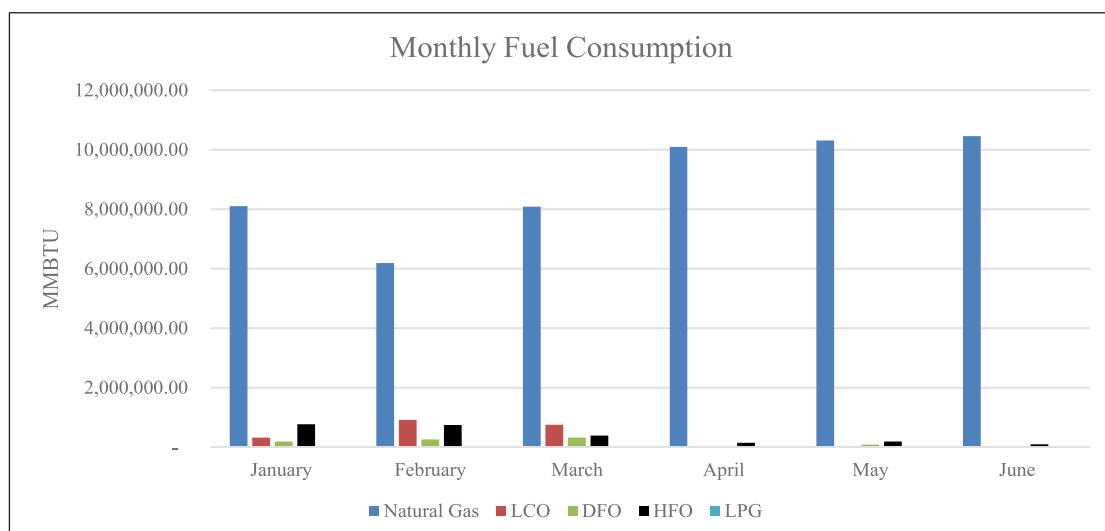
A total of 3.3 trillion Btu of LCO was consumed in the first half of 2020, constituting 5.7% of the fuel mix. This was higher than the projected 2.6 trillion Btu in the 2020 ESP for the first half of 2020.

2.3.1.3 DFO Consumption

A total of 0.8 trillion Btu of DFO was consumed in the first half of 2020 which constituted 1.4% of the total fuel mix.

Figure 6 shows the trends in monthly fuel consumption for the first half of 2020.

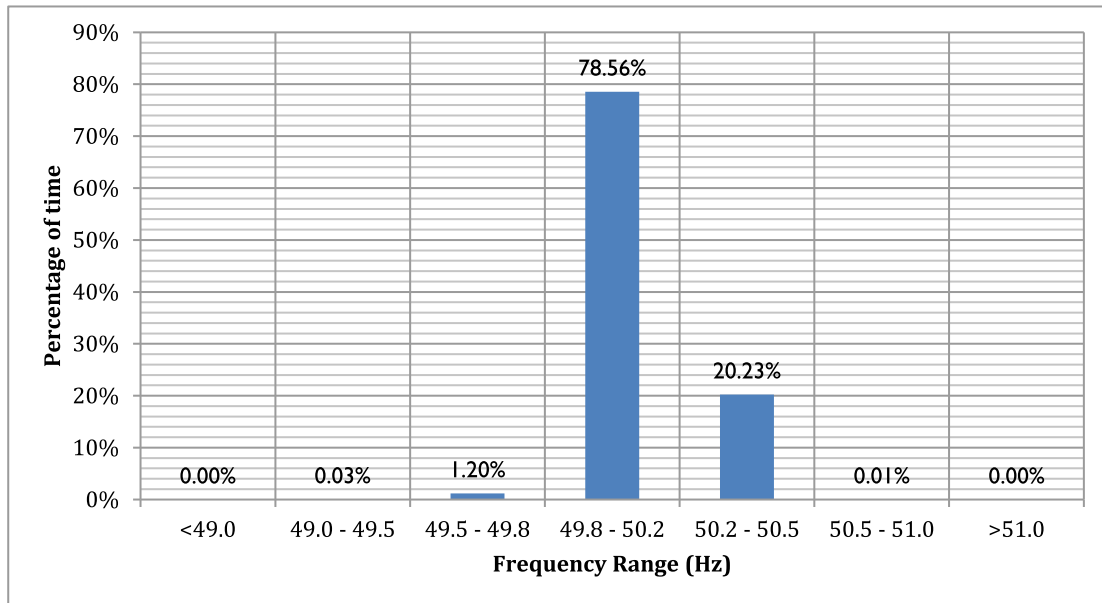
Figure 6: Monthly fuel consumption for the first half of 2020.



2.4 Transmission System Reliability

According to data from GRIDCo, the transmission frequency was 78.6 % of the time within the prescribed band of 49.8Hz to 50.2Hz. Figure 10 shows a summary of the performance of the transmission system with respect to frequency stability.

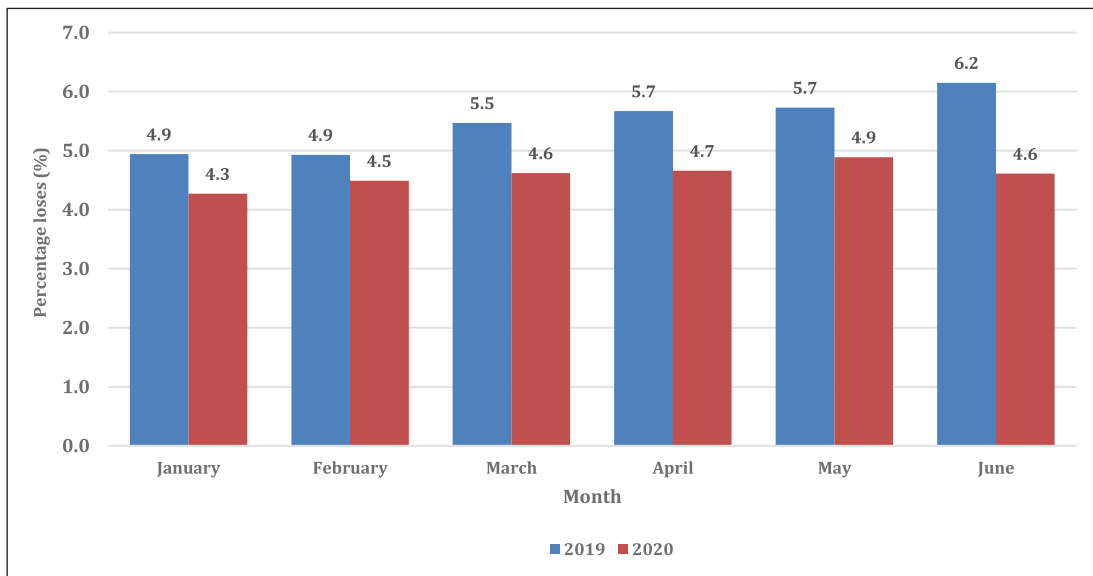
Figure 7: System frequency distribution for the first half of 2020



2.5 Transmission System losses

The total transmission system losses averaged 4.6% in the first half of 2020. This was 16.4% below the average losses of 5.5% recorded in the first half of 2019. The monthly transmission system losses ranged between 4.3% and 4.9% in the first half of 2020 compared to 3.2% and 6.2% in 2018.

Figure 8: Transmission losses for the first half of 2019 and 2020



Acronyms

AGPP = Atuabu Gas Processing Plant

CBGC = Composite Bulk Generation Charge

DFO = Distillate Fuel Oil

ECG = Electricity Company of Ghana

ESP = Electricity Supply Plan

GHP = Ghana Pesewa

GWh = Giga-watt Hours

KTPP = Kpone Thermal Power Plant

MRP = Mine Reserve Plant

LCO = Light Crude Oil

LTA = Long Term Average

MMscf = Million Standard Cubic Feet

NITS = National Interconnected Transmission System

SAPP = Sunon Asogli Power Plant

SNEP = Strategic National Energy Plan

TT2PP = Tema Thermal 2 Power Plant

VRA = Volta River Authority

WAGP = West African Gas Pipeline

Btu = British Thermal Units

CUF = Capacity Utilization Factor

EC = Energy Commission

EMOP = Electricity Market Oversight Panel

FPSO = Floating Production, Storage and Offloading

GNGC = Ghana National Gas Company

HFO = Heavy Fuel Oil

kWh = Kilo-watt hours

LEAP = Long-range Energy Alternative Planning

LI = Legislative Instrument

MW = Megawatt

MWh = Mega-watt hours

PV = Photovoltaic

SMP = System Marginal Price

TEN = Tweneboa, Enyenra, Ntomme

TT2PP = Tema Thermal 2 Power Plant

WAGPCo = West African Gas Pipeline Company

WEM = Wholesale Electricity Market

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