



GHANA WHOLESAL ELEC TRICIT Y MARKET BULLETIN

MARKET WATCH

Monthly Market Data Analysis

ISSUE NO. 37

1st January 2019 to 31st January 2019

This Bulletin covers major developments in the Wholesale Electricity Market (WEM) of Ghana from 1st January, 2019 to 31st January, 2019. 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 analysis the electricity supply outlook for Ghana for 2019.

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

The System Peak Load recorded for January was 2,526.2 MW and this was marginally higher than the maximum System Peak Load of 2,525 MW recorded for 2018 in December. The System Peak Load recorded in January 2019 was marginally lower than the 2,554 MW projected in the 2019 ESP by 1.1%. Also, the Ghana Peak Load recorded in January 2019 was 1% lower than the 2,436 MW projected in the 2019 ESP. There was no electricity import from CIE at the System Peak Load recorded in January 2019. However, a total of 114 MW was exported to CEB, CIE and SONABEL at the System Peak Load and was marginally lower than the 118 MW projected in the 2018 ESP by 3%.

A total of 1,539.23 GWh of electricity was supplied in January 2019 which was 3.6% higher than the 1,485.1 GWh projected in the 2019 ESP. Similarly, the total electricity of 1,457.95 GWh consumed domestically was marginally higher than the 1,417.5 GWh projected in the 2019 ESP by 2.8%. A total of 81.28 GWh of electricity was exported in January 2019 which was 20% higher than the 67.6 GWh projected in the 2019 ESP.

The contribution of hydro in the total electricity supplied continued to increase in January 2019 from 47.5% in November 2018 and 49.2% in December 2018 to 51.5%. The increase in electricity generation from hydro sources was as a result of fuel supply challenges to most of the thermal power plants. The total electricity generated from thermal sources decreased from 50.3% in December 2018 to 48.4% in January 2019.

The rate of drop in the water level for Akosombo and Kpong hydro power plants

Table 1. Projected and Actual Outturn of electricity demand and supply in December 2018 and January 2019.

	January 2019		December 2018	
	Projected	Actual Outturn	Projected	Actual Outturn
Total Supply (GWh)	1,485.1	1,535.8	1,456.7	1,502.4
Source by Power Plants (GWh)				
AKOSOMBO	377.1	552.0	313.8	552.0
KPONG	67.6	78.1	51.1	78.1
BUI	53.2	156.0	71.0	156.0
Sunon Asogli	176.2	165.6	117.8	165.6
TAPCO	86.0	124.9	178.6	125.5
TICO	173.8	68.7	202.5	68.7
TT1PP	-	3.2	-	5.4
CENIT	-	-	46.1	-
TT2PP	-	-	-	-
MRP	-	-	-	-
Karpowership	256.7	89.6	210.4	89.6
AMERI	154.0	158.1	75.9	157.9
RTPP	43.6	42.4	63.2	42.4
Trojan Power	-	-	-	-
CENPOWER	-	6.9	107.5	6.9
AKSA	90.0	46.3	14.0	44.6
BXC Solar	2.3	1.8	2.2	-
VR A Solar	0.3	0.3	0.4	-
Genser	-	32.3	-	-
Meinergy	2.3	-	2.2	-
Total Generation (GWh)	1,485.1	1,526.2	1,456.7	1,492.9
Imports (GWh)	-	9.6	-	9.6
Total Supply (GWh)	1,485.1	1,535.8	1,456.7	1,502.4
Deficit/Over supply (GWh)	-	50.7	-	45.7
Ghana Coincident Peak Load (MW)	2,436.0	2,412.2	2,380.0	2,412.2
System Coincident Peak Load (MW)	2,554.0	2,526.2	2,513.0	2,526.2

HIGHLIGHTS OF THE MONTH

continued to increase in January 2019. The rate of drop in the water level for Akosombo dam increased from 0.3 feet per day in November 2018 and 0.04 feet per day in December 2018 to 0.06 feet per day in January 2019. Likewise, the rate of drop in the water level for the Bui dam increased from 0.21 feet per day in November 2018 and 0.23 feet per day in December 2018 to 0.25 feet per day in January 2019.

The consumption of liquid fuel reduced in January 2019, from a share of 17.5% in December 2018 to 16.3%. On the contrary, the consumption of natural gas in the total fuel mix increased from 78.1% in December 2018 to 78.6% in January 2019. Likewise, the share of LPG consumed in the total fuel mix increased from 4.4% in December 2018 to 5.1% in January 2019.

ELECTRICITY DEMAND AND SUPPLY

Electricity Demand

The System Peak Load increased marginally by 0.1%, from 2,524.6 MW recorded in December 2018 to 2,526.2 MW in January 2019. Similarly, the Ghana Peak Load increased marginally by 1.2%, from 2,382.6 MW in December 2018 to 2,412.2 MW in January 2019. The Ghana Peak Load has been increasing since November 2018, from 2,304.8 MW to 2,382.6 MW in December 2018 and now 2,412.2 MW in January 2019. In January 2019, there was no electricity import from CIE during the System Peak Load. Electricity export during the System Peak Load to CEB, CIE and SONABEL were recorded at 37 MW, 28 MW and 49 MW respectively in January 2019. There was a marginal increase in average electricity demand by 3.1%, from 1,991.5 MW in December 2018 to 2,053.6 MW in January 2019. The Load Factor in January 2019 increased from 77.3% in December 2018 to 79.6%. Electricity generation from hydro sources contributed 48.2% of the total electricity served during the System Peak Load and the Ghana Peak Load.

Electricity supply

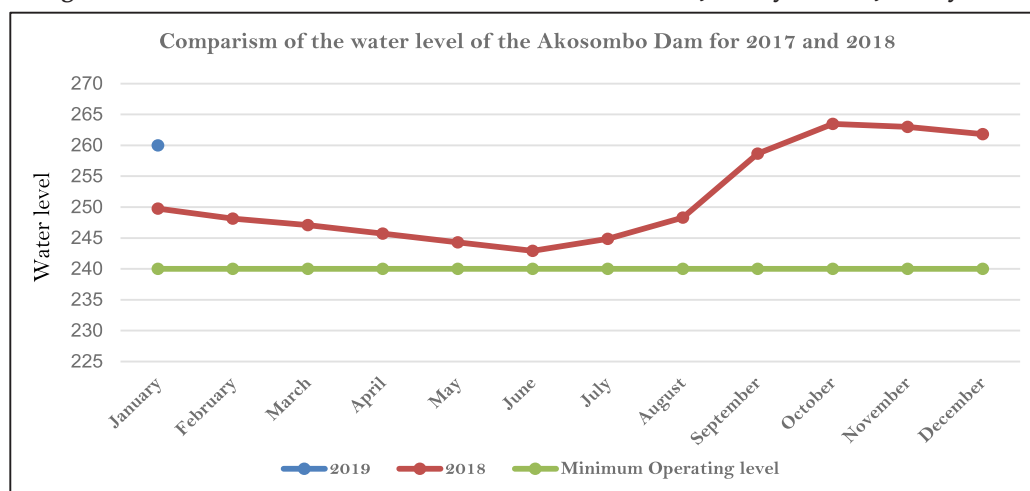
Electricity supply increased by 3.9% in January 2019 when compared with generation in December 2018. Average electricity supplied increased from 47.8 GWh per day in December 2018 to 49.65 GWh per day in January 2019. Similarly, the total electricity supplied increased from 1,481.71 GWh in December 2018 to 1,539.23 GWh in January 2019. The increase in the total electricity supplied in January 2019 was due to increase in domestic demand. Out of the total electricity supplied in January 2019, 9.55 GWh was imported from CIE with the remaining supply from domestic sources. A total of 81.28 GWh was exported to CIE, CEB and SONABEL in the proportion of 7.67 GWh, 30.63 GWh and 42.98 GWh respectively. Electricity generation from hydro sources contributed about 51% of the total electricity supplied in January 2019.

HYDRO DAM LEVELS

Akosombo Dam Water Level continued to drop in January 2019

There was an increase in the rate of drop in the water level for the Akosombo dam, from 0.04 feet per day in December 2018 to 0.06 feet per day in January 2019. The water level of 261.8 feet recorded at the beginning of the year dropped by 1.8 feet to 260 feet at the end of January 2019. The water level recorded at the end of January 2019 was 10.25 feet higher than the water level recorded for the same period in 2018.

Figure 1: Month-End Water Level for Akosombo Dam from January 2018 to January 2019



Bui Dam Water Level continued to drop in January 2019

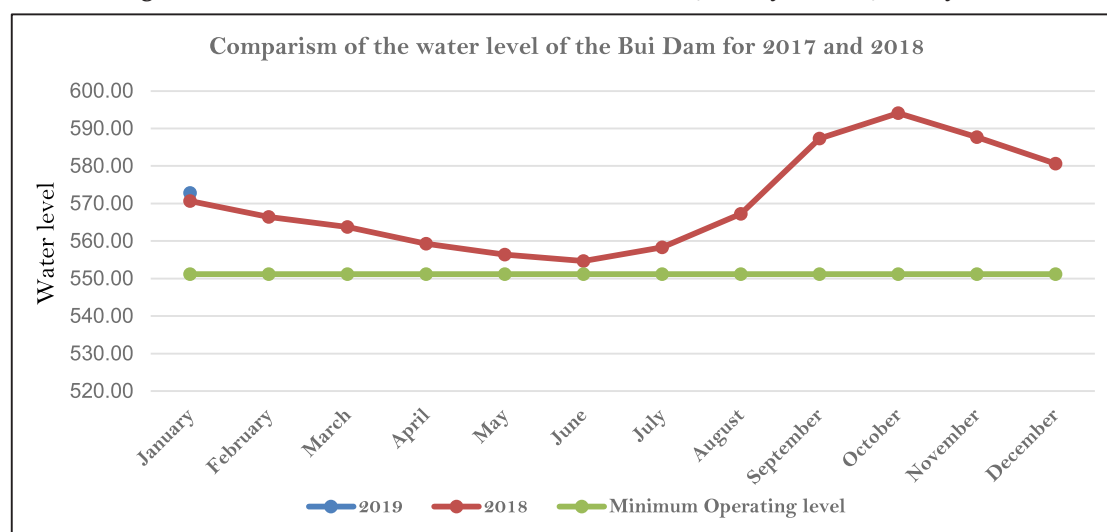
The rate of drop in the water level for Bui dam increased in January 2019, from 0.23 feet per day in December 2018 to 0.25 feet per day. The water level of 580.61 feet recorded at the beginning of the month reduced by 7.78 feet to 572.83 feet at the end of the

HIGHLIGHTS OF THE MONTH

month. The water level recorded at the end of the month was 2.18 feet above the water level recorded for the same period in 2018.

Figure 2 shows comparative end of month trajectory of the level of water in the Bui dam from January 2018 to January 2019.

Figure 2: Month-End Water Level for Bui Dam from January 2018 to January 2019



FUEL SUPPLY FOR POWER GENERATION

Natural gas flow rate from WAGPCo decrease in January 2019

Natural gas supply from WAGPCo to Tema and Kpone decreased by 7.2% in January 2019. The natural gas flow rate decreased from 59.82 MMSCFD in December 2018 to 54.49 MMSCFD in January 2019. Similarly, the total natural gas supplied by WAGP to Tema and Kpone decreased from 1,771.93 MMSCF in December 2018 to 1,720.04 MMSCF in January 2019. Natural gas supplied by WAGP contributed 25.7% of the total fuel mix which was higher than the 23.7% it recorded in December 2018. Also, in the total natural gas consumed, the share of WAGPCo increased from 30.3% in December 2018 to 32.8% in January 2019.

Natural gas flow rate from GNGC decreased in January 2019.

There was a reduction in the natural gas flow rate from Atuabo Gas Processing Plant (AGPP) to the thermal power plant in Aboadze by 6.9%, from 63.05 MMSCFD in December 2018 to 58.73 MMSCFD in January 2019. Similarly, the total natural gas supplied from AGPP decreased from 1,886.44 MMSCF in December 2018 to 1,820.61 MMSCF in January 2019. The total natural gas supplied by GNGC constituted 26% of the total fuel consumed in January 2019 which was marginally lower than the 26.4% it recorded in December 2018. Natural gas from GNGC contribution to the total natural gas consumed decreased marginally from 33.8% in December 2018 to 33% in January 2019.

Natural gas flow from GNPC decreased in January 2019

Natural gas supply from GNPC to the Aboadze Power Enclave decreased from 66.87 MMSCFD in December 2018 to 60.74 MMSCFD in January 2019. Also, the total natural gas supplied by GNPC decreased from 2,000.73 MMSCF in December 2018 to 1,882.82 MMSCF in January 2019. The total natural gas supplied by GNPC constituted 26.9% of the total fuel mix in January 2019 which was lower than the 28% it recorded in December 2018. Again, the share of the natural gas supplied by GNPC decreased in the total natural gas consumed from 35.9% in December 2018 to 34.2% in January 2019.

Liquid Fuel

The consumption of liquid fuel decreased by 10.9% in January 2019, from 220,234 barrels in December 2018 to 196,231 barrels. Out of the total liquid fuel consumed in January 2019, HFO constituted 93.9% which was higher than the 75.7% it recorded in December 2018. In the total fuel mix, the share of HFO increased from 13.3% in December 2018 to 15.3% in January 2019. The consumption of LCO in the total liquid fuel consumed decreased from 24.2% in December 2018 to 6.1% in January 2019. In the total fuel mix, the share of LCO decreased from 4.2% in December 2018 to 1% in January 2019.

Plant by Plant Highlights

Electricity Generation at the Akosombo Generation Station (GS) increased in January 2019

There was an increase in the electricity generation from the Akosombo GS in January 2019 by 13.1%. Average electricity generated increased from 15.74 GWh per day in December 2018 to 17.81 GWh per day in January 2019. Similarly, the total electricity supplied by the hydro power plant increased from 487.98 GWh in December 2018 to 552.03 GWh in January 2019. The total electricity supplied by the hydro power plant constituted 36.1% of the total electricity supplied in January 2018 and was 46.4% significantly higher than the 377.1 GWh projected in the 2019 ESP. A total load of 862.1 MW to both the System Peak Load

HIGHLIGHTS OF THE MONTH

and the Ghana Peak Load, representing 34.1% of these peak loads in January 2019.

Electricity supply by Kpong Generation Station (GS) increased in January 2019

Kpong GS recorded an increase of about 6.6% in the electricity it supplied in January 2019 when compared with what was recorded in December 2018. Average electricity generated by the hydro power plant increased from 2.36 GWh per day in December 2018 to 2.52 GWh per day in January 2019. Similarly, the total electricity supplied by the hydro power plant increased from 73.3 GWh in December 2018 to 78.13 GWh in January 2019. The total electricity supplied by Kpong GS contributed 5.1% of the total electricity supplied in January 2019 and was 15.6% higher than the 67.6 GWh projected in the 2019 ESP. The Kpong GS generated 108 MW to both the System Peak Load and the Ghana Peak Load, translating into 4.3% of these peak load in January 2019.

Electricity supply by the Bui Generation Station (GS) decreased in January 2019

The total electricity generated in January 2019 was 7.3% lower than what it generated in December 2018. The average electricity generated by Bui GS reduced from 5.43 GWh per day in December 2018 to 5.03 GWh per day in January 2019. The power plant supplied a total of 168.29 GWh in December 2018 which is higher than the 156.03 GWh in January 2019. The total electricity supplied by the hydro power plant constituted 10.2% of the total electricity supplied in January 2019 and was 1.8 folds significantly higher than the 55.2 GWh projected in the 2019 ESP. The hydro power plant contributed 246 MW to both the System Peak Load and the Ghana Peak Load, representing 9.7% of these peak load in January 2019.

Generation by the Sunon Asogli Power Plant (SAPP) increased in January 2019

The electricity generated by SAPP in January 2019 increased by 16% when compared with what it generated in December 2018. The SAPP operated in January 2018 at an average of 5.34 GWh per day in January 2019 which was higher than the 4.61 GWh per day it generated in December 2018. The thermal power plant supplied a total of 165.59 GWh in January 2019 which was higher than the 142.8 GWh in December 2018. The total electricity supplied by SAPP constituted 10.8% of the total electricity supplied in January 2019 and was 6% lower than the 176.2 GWh projected in the 2019 ESP. The thermal power plant generated 246 MW to both the System Peak Load and the Ghana Peak Load, representing 9.7% the peak load. SAPP consumed a total of 1,218.58 MMSCF of natural gas, at an estimated heat rate of 8,060.25 Btu/kWh in January 2019 which was higher than the 7,840.88 Btu/kWh in December 2018.

Ameri Energy Power Plant's generation increased in January 2019

The Ameri Energy power plant recorded an increase in its average electricity generation in January 2019 by 16.2%, from 4.38 GWh per day in December 2018 to 5.09 GWh per day. Similarly, the total electricity supplied by the thermal power plant increased from 135.87 GWh in December 2018 to 157.93 GWh in January 2019. The total electricity supplied by Ameri constituted 10.3% of the total electricity supplied in January 2019 and was 2.6% higher than the 154 GWh projected in the 2019 ESP. The thermal power plant contributed 241.7 MW to both the System Peak Load and the Ghana Peak Load. This translates into 9.6% of both peak loads. The thermal power plant consumed a total of 1,412.93 MMSCF of natural gas at an estimated heat rate of 10,377.86 Btu/kWh in January 2019 which was higher than the 10,136.04 Btu/kWh it recorded in December 2018.

The Karpowership Power Plant's generation increased in January 2019

The average electricity generated by the Karpowership in January 2019 increased by 15.9%, from 2.49 GWh per day in December 2018 to 2.89 GWh per day. Likewise, the total electricity supplied by the thermal power plant increased from 77.33 GWh in December 2018 to 89.65 GWh in January 2019. Karpowership's total electricity supplied constituted 5.9% of the total electricity supplied in January 2019 and was 65.1% lower than the 256.7 GWh projected in the 2019 ESP. The thermal power plant contributed 238.5 MW to both the System Peak Load and the Ghana Peak Load, representing 9.4% of both peak loads. A total of 120,252 barrels of HFO was consumed by the thermal power plant at an estimated heat rate of 8,115.34 Btu/kWh in January 2019. The heat rate recorded by the thermal power plant in January 2019 was marginally higher than the 8,112.74 Btu/kWh it recorded in December 2018.

AKSA Power Plant's generation increased in January 2019

Average electricity generation from AKSA increased from 1.37 GWh per day in December 2018 to 1.49 GWh per day in January 2019. The total electricity supplied by the thermal power plant increased by 9%, from 42.49 GWh in December 2018 to 46.31 GWh in January 2019. The total electricity supplied by the thermal plant constituted 3% of the total electricity supplied in January 2019 and was 48.6% lower than the 90 GWh projected in the 2019 ESP. AKSA supplied 77.1 MW to both the System Peak load and the Ghana Peak load, representing 3.1% of both peak loads in January 2019. 62,387 barrels of HFO was consumed by the thermal power plant at an estimated heat rate of 8,150.76 Btu/kWh in January 2019 which was marginally lower than the 8,166.3 Btu/kWh it recorded in December 2018.

Takoradi International Company (TICO) generation decreased in January 2019

Average electricity generated by TICO power plant decreased by 40.3%, from 3.71 GWh per day in December 2018 to 2.22 GWh per day in January 2019. Likewise, the total electricity supplied by the thermal power plant decreased from 115.1 GWh in December 2018 to 68.68 GWh in January 2019. The total electricity supplied by the thermal power plant contributed 4.5% of the total electricity supplied in January 2019 and was 60.5% higher than the 173.8 GWh projected in the 2019 ESP. TICO contributed 108 MW to the System Peak Load and the Ghana Peak Load, representing 4.3% of both peak loads. A total of 731.63 MMSCF of natural gas was consumed by the thermal power plant at an estimated heat rate of 11,438.73 Btu/kWh in January 2019 which was marginally lower than the 11,450.45 Btu/kWh it recorded in December 2018.

Takoradi Power Company (TAPCO) Plant's generation increased in January 2019

There was an increase of 7.4% in the average electricity supplied by the TAPCO power plant in January 2019, from an average of 3.75 GWh per day in December 2018 to 7.43 GWh per day. Similarly, the total electricity supplied by the thermal power plant increased from 116.26 GWh in December 2018 to 124.89 GWh in January 2019. The total electricity supplied by the thermal power

HIGHLIGHTS OF THE MONTH

plant contributed 8.2% of the total electricity supplied in January 2019 and was 45.2% higher than the 86 GWh projected in the 2019 ESP. A load of 108 MW was supplied by TAPCO to both the System Peak Load and the Ghana Peak Load, translating into 4.3% of both peak loads. TAPCO consumed a total of 1,289.65 MMSCF of natural gas at an estimated heat rate of 11,088.36 Btu/kWh in January 2019 which was lower than the 11,223.28 Btu/kWh it recorded in December 2018.

Kpone Thermal Power Plant's (KTPP) generation decreased in January 2019

Electricity generated by KTPP decreased marginally by 6.4% in January 2019 when compared with its generation in December 2018. Average electricity generated by the thermal power plant decreased from 1.46 GWh per day in December 2018 to 1.37 GWh per day in January 2019. Likewise, the total electricity generated by the Kpone thermal power plant (KTPP) decreased from 45.28 GWh in December 2018 to 42.4 GWh in January 2019. KTPP's total electricity supplied constituted 2.8% of the total electricity supplied in January 2019 and was 2.8% marginally lower than the 43.6 GWh projected in the 2019 ESP. A total load of 101 MW was supplied by KTPP to both the System Peak Load and the Ghana Peak Load, representing 4% of both peak loads. The thermal power plant consumed a total of 445.56 MMSCF of natural gas at an estimated heat rate of 11,509.75 Btu/kWh in January 2019 which was higher than the 10,303.01 Btu/kWh it recorded in December 2018.

Tema Thermal 1 Power Plant's (TT1PP) decreased in January 2019

TT1PP operated in January 2019 for only 3 days and generated a total of 5.38 GWh. The thermal power plant consumed a total of 31.88 MMSCF of natural gas at an estimated heat rate of 11,086.43 Btu/kWh in January 2019. The thermal power plant was projected to be offline and did not contribute to both the System Peak Load and the Ghana Peak Load in January 2019.

Embedded Electricity Generation

Genser Power Plant's generation increased in January 2019

Average electricity generation from the thermal power plant increased by 12.5%, from 0.93 GWh per day in December 2018 to 1.04 GWh per day in January 2019. Similarly, the total electricity supplied by the power plant increased from 28.7 GWh in December 2018 to 32.3 GWh in January 2019. The total electricity supplied by Genser constituted 2.1% of the total electricity supplied in January 2019. The thermal power plant consumed a total of 8,647.51 tonnes of LPG at an estimated heat rate of 11,418.94 Btu/kWh in January 2019 which was higher than the 11,171.02 Btu/kWh it recorded in December 2018.

BXC Solar generation increased in January 2019

BXC solar power plant recorded a significant increase of 56.7% in the total electricity it supplied in January 2019, from 1.15 GWh in December 2018 to 1.8 GWh. The total electricity supplied by the solar power plant constituted 0.1% of the total electricity supplied in January 2019 and was 21.7% lower than the 2.3 GWh that was projected in the 2019 ESP.

VRA Navrongo Solar generation increased in January 2019

There was an increase in the total electricity supplied by the VRA Navrongo solar power plant in January 2019 by 8.6%, from 0.26 GWh in December 2018 to 0.28 GWh. The total electricity supplied by the solar power plant was 7.4% lower than the 0.3 GWh that was projected in the 2019 ESP. The electricity generated by the solar power plant contributed 0.02% of the total electricity that was supplied in January 2019.

Electricity Exchange – Import increased significantly while Exports decreased in December 2018

There was a significant increase in electricity import from CIE in January 2019 by 95.5%, from 0.16 GWh per day in December 2018 to 0.31 GWh per day. The total electricity imported increased from 4.89 GWh in December 2018 to 9.55 GWh in January 2019. Electricity import did not contribute to both the System Peak Load and the Ghana Peak Load in January 2019.

Average electricity export to CIE, CEB and SONABEL decreased in January 2019 by 6%, from 2.79 GWh per day in December 2018 to 2.62 GWh per day. Consequently, average electricity supplied to CIE and SONABEL decreased by 54% and 1.3%, from 0.54 GWh per day and 1.41 GWh per day in December 2018 to 0.25 GWh per day and 1.39 GWh per day in January 2019 respectively. On the contrary, average electricity supply to CEB increased by 16.7%, from 0.85 GWh per day in December 2018 to 0.99 GWh per day in January 2019.

A total of 81.28 GWh of electricity was exported to CIE, CEB and SONABEL in January 2019 which was lower than the 86.46 GWh supplied in December 2018. Out of the total electricity supplied, 7.67 GWh and 42.98 GWh were exported to CIE and SONABEL in January 2019 which were lower than the 16.65 GWh and 43.57 GWh in December 2018. The total electricity exported to CEB increased from 26.25 GWh in December 2018 to 30.63 GWh in January 2019. The total electricity exported was 20.2% higher than the 67.6 GWh projected in the 2019 ESP.

However, Ghana continues to be a net exporter of electricity in January 2019.

OPERATIONAL FACT SHEET

Monthly Market Data Analysis

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

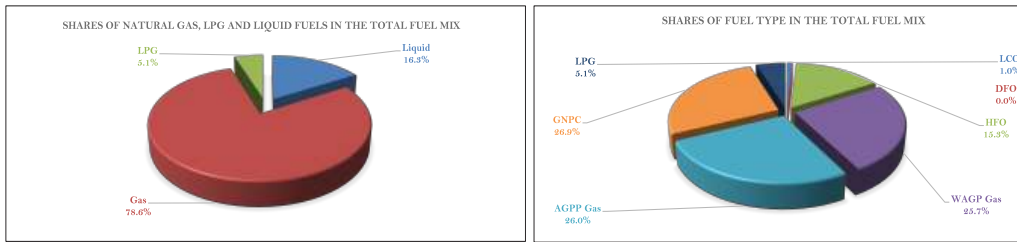


Figure 4a: Contribution of Natural Gas Supply by sources

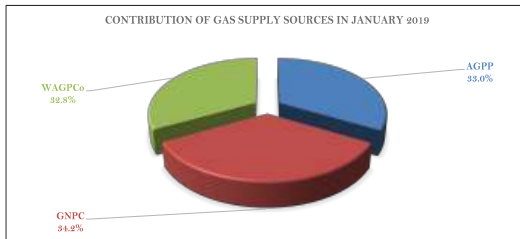
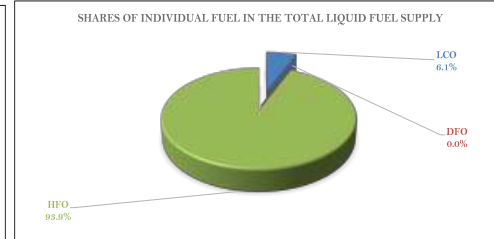


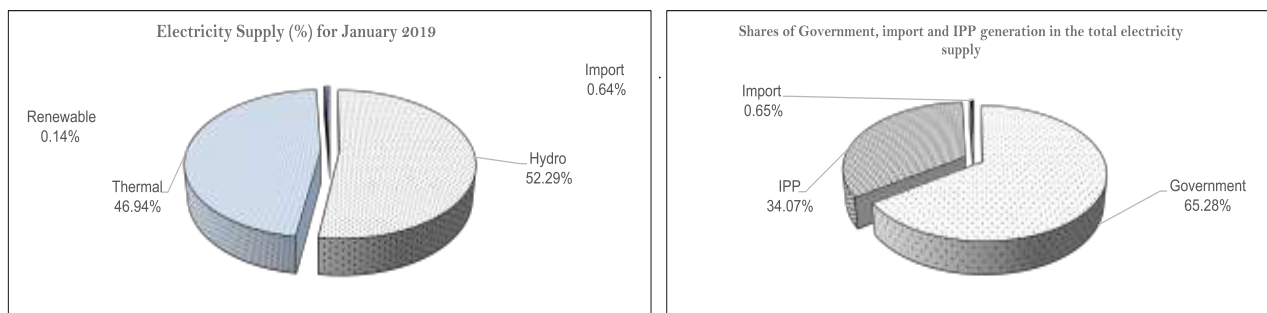
Figure 4b: Contribution of individual fuel in the liquid fuel supply



Peak Electricity Supply - January 2019			
Source of Supply	Generation at System Peak Load of January 2019 (MW)	Generation at Ghana Peak Load of January 2019 (MW)	Electricity Supply (GWh)
AKOSOMBO	862.10	862.10	552.03
KPONG	108.00	108.00	78.13
BUI	246.00	246.00	156.03
SEAP	316.80	316.80	165.59
TAPCO	108.00	108.00	124.89
TICO	108.00	108.00	68.68
TT1PP	-	-	3.15
CENIT	-	-	-
TT2PP	-	-	-
MRP	-	-	-
KARPOWER	238.50	238.50	89.65
AMERI	241.70	241.70	158.06
KTPP	101.00	101.00	42.40
Trojan Power	-	-	-
CENPOWER	119.00	119.00	6.95
AKSA	77.10	77.10	46.31
BXC Solar	-	-	1.80
Safisana	-	-	-
VRA Solar	-	-	0.28
Genser	-	-	32.30
IMPORT	-	-	9.55
Export to CIE at peak	28.00	28.00	30.63
Export to CEB at peak	37.00	37.00	7.67
Export to Sonabel	49.00	49.00	42.98
System Coincident Peak Load	2,526.20		
Ghana Coincident Peak Load		2,412.20	
Total Supply			1,535.79
Total Supply without export			1,454.51

Ghana Electricity Demand & Supply		
		Jan-19
Maximum System Peak Load	MW	2,526.2
Minimum System Peak Load	MW	2,115.5
Average Peak Generation	MW	2,418.8
System Base Load	MW	1,344.5
Total Electricity	GWh	1,537.1
Load Factor (LF)	%	80.0

OPERATIONAL FACT SHEET



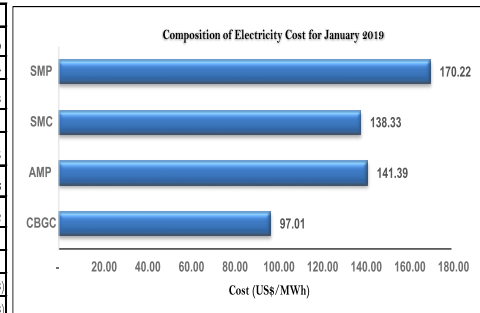
Power Plant Data for January 2019								
	Installed Capacity (MW)	Plant Capacity Utilization (%)	Electricity Generation (GWh)	Gas Consumption (MMBtu)	LCO Consumption (MMBtu)	DFO Consumption (MMBtu)	HFO Consumption (MMBtu)	LPG Consumption (MMBtu)
Akosombo	1,020.00	72.74	552.03	-	-	-	-	-
Kpong	160.00	65.63	78.13	-	-	-	-	-
Bui	400.00	52.43	156.03	-	-	-	-	-
SEAP	560.00	39.74	165.59	1,334,700.23	-	-	-	-
TAPCO	330.00	50.87	124.89	1,384,868.75	-	-	-	-
TICO	340.00	27.15	68.68	785,646.34	-	-	-	-
TT1PP	126.00	3.36	3.15	34,922.27	-	-	-	-
CENIT	126.00	-	-	-	-	-	-	-
TT2PP	49.50	-	-	-	-	-	-	-
KARPOWER	470.00	25.64	89.65	-	-	-	727,523.17	-
AMERI	250.00	84.98	158.06	1,640,314.01	-	-	-	-
Cenpower	340.00	2.75	6.95	-	71,916.42	-	-	-
TROJAN	56.00	-	-	-	-	-	-	-
KTPP	220.00	25.90	42.40	488,021.45	-	-	-	-
AKSA	360.00	17.29	46.31	-	-	-	377,443.63	-
GENSER	95.00	45.70	32.30	-	-	-	-	368,831.74
BXC	20.00	12.10	1.80	-	-	-	-	-
Meinergy	20.00	9.00	1.34	-	-	-	-	-
Total	4,942.50	41.53	1,527.30	5,668,473.05	71,916.42	-	1,104,966.80	368,831.74

Average Monthly flowrate (MMSCFD)	
Location	Monthly Average
Etoki	62.86
Tema WAGPCo	56.39
Aboadze WAGPCo	0.00
Aboadze GNGC	121.60

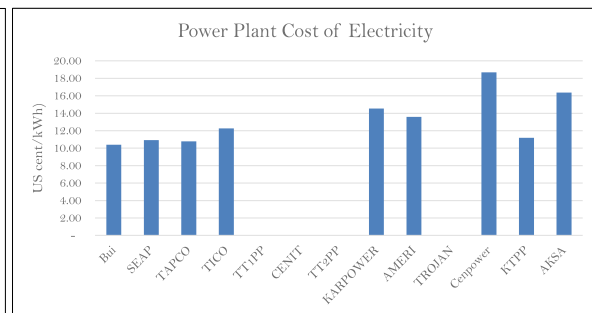
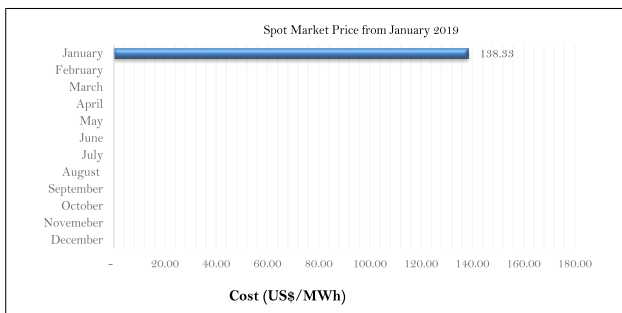
Jan-19			
	Beginning month (ft)	End month (ft)	Change in water level (feet)
Hydro Dam			
Akosombo	261.80	260.00	-1.80
Bui	580.61	572.83	-7.78

ECONOMIC FACT SHEET

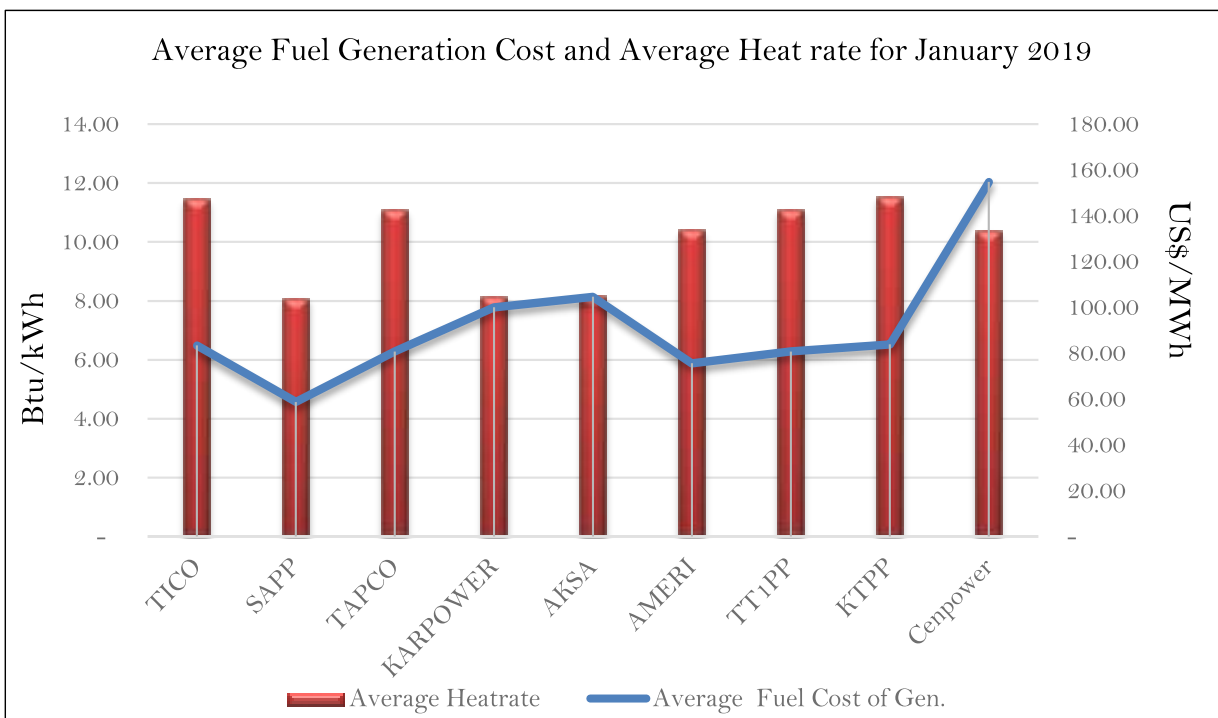
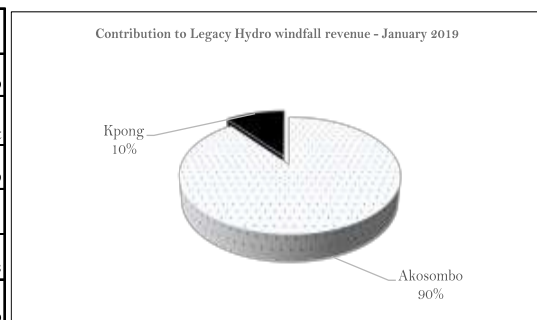
		Actual	Projected	Difference
Average Market Energy Cost	US\$/MWh	104.27	91.69	12.59
Average Market Capacity Charge (AMCC)	US\$/MWh	37.12	36.17	0.94
Total Average Market Cost (TAC)	US\$/MWh	141.39	127.86	13.53
System Marginal Cost (SRMC)	US\$/MWh	138.33	104.88	33.45
System Marginal Capacity Charge (SRMCC)	US\$/MWh	31.89	23.42	8.46
Spot Market Price (SMP)	US\$/MWh	170.22	128.51	41.92
Composite Bulk Generation Charge (CBGC)	US\$/MWh	97.01	97.01	-
Deviation of TAC from CBGC	US\$/MWh	(44.38)	(30.50)	(13.88)
Deviation of SMP from CBGC	US\$/MWh	(73.21)	(51.23)	(21.98)



	Gazetted Natural gas Price	Weighted average Natural gas price	LCO	HFO	DFO
US\$/MMBtu	7.29	6.98	13.12	9.56	17.52



Average Fuel Prices		
		Jan-19
Fuel Type	Unit	Delivered Cost
Natural Gas	US\$/MMBtu	7.29
LCO	US\$/BBL	69.41
HFO	US\$/Tonne	369.68
DFO	US\$/Tonne	707.70



ECONOMIC FACT SHEET

Power Plant	Average Heat rate (Btu/KWh)	Average Fuel Cost of Generation (US\$/MWh)	Emission Factor kgCO ₂ /kWh
SAPP	7,840.88	69.23	0.42
TAPCO	11,223.28	81.82	0.60
TICO	11,450.45	83.47	0.61
TT1PP	11,088.59	97.91	0.59
CENIT	12,006.50	-	0.64
TT2PP	11,366.34	100.36	0.60
KARPOWER	8,112.74	80.41	0.64
AMERI	10,136.04	73.89	0.54
TROJAN	-	-	
KTPP	10,303.01	90.98	0.55
Cenpower	-	-	0.83
AKSA	8,166.30	92.65	0.64
Genser	11,171.02	-	0.70
Average			0.57

	Projected Market Prices (US\$/MWh)											
	Jan-19	Feb-19	Mar-19	Apr-19	May-19	Jun-19	Jul-19	Aug-19	Sep-19	Oct-19	Nov-19	Dec-19
Average Market Energy Cost (AMEC)	91.69	90.56	90.97	93.55	92.82	91.00	91.06	83.74	79.81	84.15	84.13	82.32
Average Market Capacity Charge (AMCC)	36.17	36.29	36.42	36.13	35.73	36.01	36.33	31.67	34.62	34.73	34.99	33.96
Total Average Market Cost (TAC)	127.86	126.85	127.39	129.68	128.54	127.01	127.40	115.40	114.43	118.88	119.12	116.28
Short Run Marginal Cost (SRMC)	104.88	104.88	104.88	104.88	104.88	104.88	104.88	88.55	88.55	88.55	88.55	88.55
Short Run Marginal Capacity Charge (SRMCC)	23.42	25.11	23.42	23.95	23.42	23.95	23.42	23.42	23.95	23.42	23.95	23.42
Spot Market Price (SMP)	128.31	129.99	128.31	128.83	128.31	128.83	128.31	111.97	112.50	111.97	112.50	111.97

Other Market News and Trends

1. The 2019 Electricity Supply Plan (ESP)

The Ghana Grid Company (GRIDCo) coordinated the development of the 2019 Electricity Supply Plan (ESP) that involved key stakeholders of the power sector. The committee was made up of representatives from GRIDCo, Energy Commission, Volta River Authority (VRA), Bui Power Authority (BPA), Electricity Company of Ghana (ECG) and Northern Electricity Development Company (NEDCo).

The 2019 ESP provides an outlook of power demand and supply for 2019 taking into consideration all the firmed up additional new projects and existing generation sources. The subsequent editions of the Market Bulletin in 2019 will make reference and comparison of actuals with the projections of the 2019 ESP.

1.2 Demand and Supply outlook for 2019

Electricity demand grew by 15.2% in 2018 against a projected 15.1% in the 2018 ESP. Electricity consumption also grew by 11.8% against a projected 11.6% in the 2018 ESP. Peak demand and consumption for 2019 in the 2019 ESP to grow by 5.5% and 8% respectively due to the following reasons:

- Full operation of the Second Cell - line by VALCO, increasing the Company's peak demand to about 147 MW
- Increase in export to SONABEL (Burkina Faso)- from an average of 45 MW in 2018 to 100 MW:
- Demand increases attributable to on-going distribution network expansion works intended to extend coverage and improve service quality to ECG and NEDCo customers.
- Expected completion and commissioning of various on-going rural electrification projects within the ECG and NEDCo distribution zones in 2019.

Table 1.4.1: 2019 Demand and Supply Balance (GWh)

Projected Demand/Supply	Demand/Supply (GWh)
Total Domestic	15,038
VALCO	1,284
Exports (CEB+SONABEL+CIE)	916
Total Projected Demand	17,238
Projected Supply	
Total VRA Hydro (Akosombo & Kpong GS)	5,070
Bui GS	650
Total Hydro	5,720
<i>VRA Existing Thermal & Solar Generation</i>	
TAPCO (T1)	1,492
TT1PP	211.4
TT2PP/TT2PP-X	0
MRP	0
KTPP	158.2
Solar	3
Total VRA Thermal Generation	1,864
<i>Existing IPP Generation</i>	
SAPP I & II	2,656
TICO (T2)	1,934
CENIT	0
AMERI	1,007
Karpower Barge	2,775
Cenpower	0
AKSA	1,227
Trojan	0
BXC Solar	27
MIENERGY	27
Safisana	0.7
Total IPP Thermal Generation	9,653
Total VRA Supply	6,934
Total Non-VRA Supply	10,303
Import	0
Total Supply	17,238

The supply plan developed for 2019 projects a total supply of 17,238 GWh to meet export demand and domestic demand. The total projected supply of 17,238 GWh will be supplied from domestic sources. Electricity export is projected to grow by 23.5% in 2019 from 740 GWh in 2018 to 914 GWh in 2019. Domestic consumption is also projected to increase by 12.5% in 2019 from 14,405 GWh in 2018 to 16,324 GWh in 2019.

Taking planned maintenance and fuel constraints into consideration, the monthly available capacity will range between 3,246 MW and 3,861 MW with the System Peak Demand ranging between 2,470 MW and 2,666 MW. The annual System Peak Demand is estimated to

Other Market News and Trends

occur in November 2019 at 2,666 MW. There is no projected demand and supply imbalance in 2018 with reserve margins expected to range from 27% to 56%. Hydro supply will account for 40.3% of the System Peak Load while thermal capacity will account for the rest. Domestic demand is projected to grow at 5.2% in 2019 from 2,383 MW in 2018 to 2,506 MW in 2019.

Table 1.4.2 monthly demand and supply projection for 2019

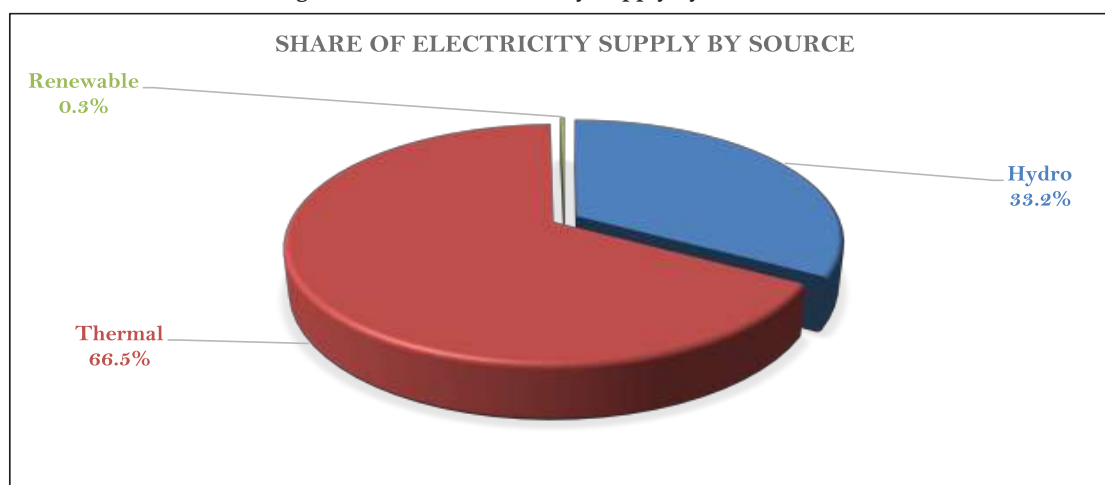
DEMAND	January	February	March	April	May	June	July	August	September	October	November	December	Annual
Demand (MW)	2,554	2,564	2,621	2,653	2,641	2,554	2,470	2,473	2,550	2,637	2,666	2,595	2,666
Available generation capacity (MW)	3,246	3,246	3,421	3,861	3,761	3,861	3,861	3,411	3,686	3,526	3,526	3,796	3,861
Import (MW)	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Generation capacity with import (MW)	3,246	3,246	3,421	3,861	3,761	3,861	3,861	3,411	3,686	3,526	3,526	3,796	3,861
Surplus/Deficit with import	692	682	800	1,208	1,120	1,307	1,391	938	1,136	889	860	1,201	1,391
Surplus/deficit without Import (MW)*	692	682	800	1,208	1,120	1,307	1,391	938	1,136	889	860	1,201	1,391
Reserve Margin with import (%)	27	27	31	46	42	51	56	38	45	34	32	46	40
Reserve Margin without import (%)*	27	27	31	46	42	51	56	38	45	34	32	46	40
Demand for Export (MW)	118	118	118	150	150	150	150	150	150	160	160	160	160
Domestic Demand (MW)	2,436	2,446	2,503	2,503	2,491	2,404	2,320	2,323	2,400	2,477	2,506	2,435	2,506
SUPPLY													
Domestic Supply (GWh)*	1,485	1,355	1,452	1,467	1,482	1,386	1,394	1,410	1,387	1,465	1,456	1,518	17,238
Import (GWh)	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Projected Supply (GWh)	1,485	1,355	1,452	1,467	1,482	1,386	1,394	1,410	1,387	1,465	1,456	1,518	17,238
Export to CEB and SONABEL (GWh)	68	61	68	80	83	80	80	80	78	78	78	80	914
Domestic Consumption (GWh)*	1,418	1,274	1,385	1,387	1,400	1,307	1,314	1,329	1,309	1,387	1,377	1,438	16,324

* Author's own analysis based on projected figures

Shares of electricity supply

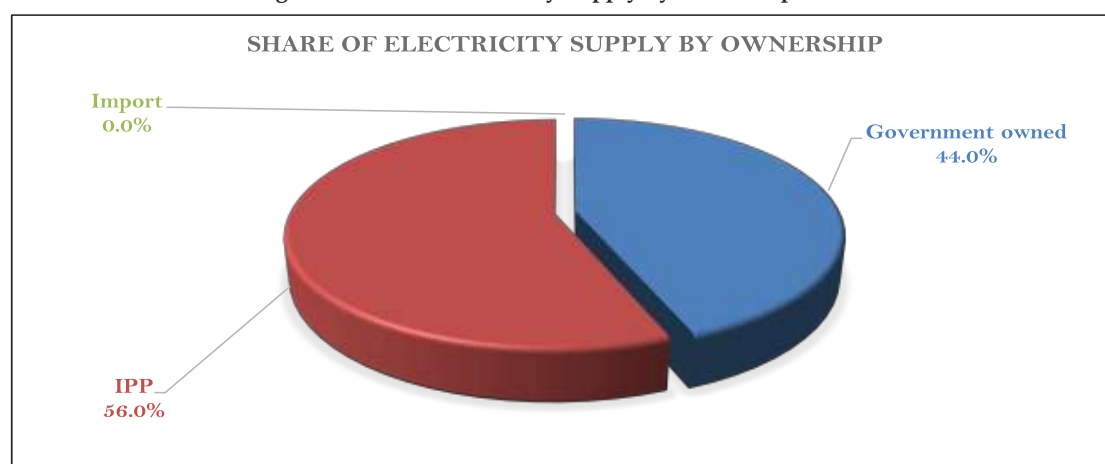
Hydro generation sources is projected to account for 30.4% of the total supply, 69.3% by thermal sources and 0.3% from solar sources. Hydro share of the total supply is projected to reduce from 37% in 2018 to 33% in 2019 while thermal generation is projected to increase from 62% in 2018 to 67% in 2019. Figure 1.0 shows the projected shares of electricity supply by source in 2019.

Figure 1.0 Shares of Electricity Supply by source in 2019



Government owned Utility share in the total electricity supply is projected to increase from 45% in 2018 to 44% in 2019 while IPP supply is projected to increase from 54% in 2018 to 55% in 2019. There is no projected import in 2019. Figure 2.0 shows the share of electricity supply by ownership in 2019.

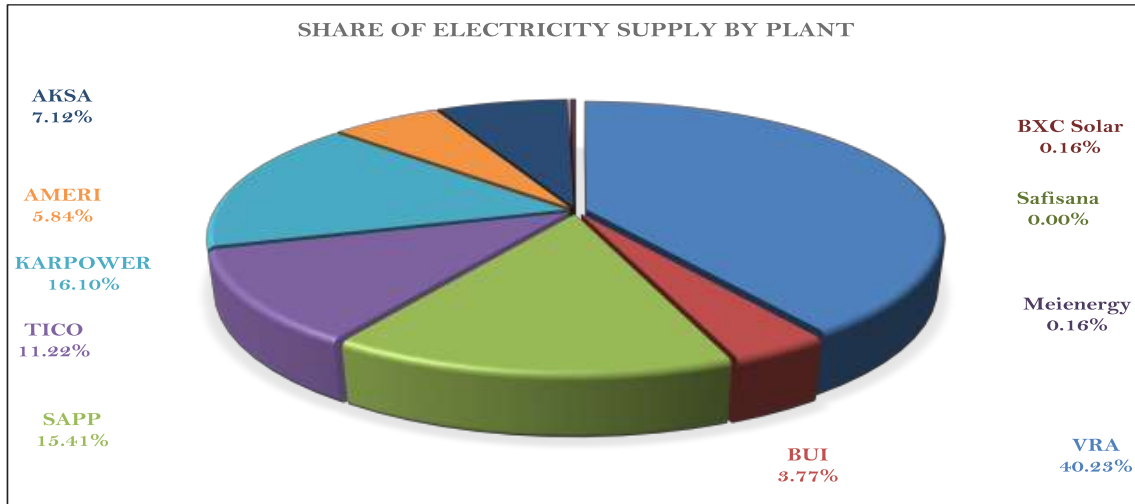
Figure 2.0 Share of Electricity Supply by Ownership in 2019



Other Market News and Trends

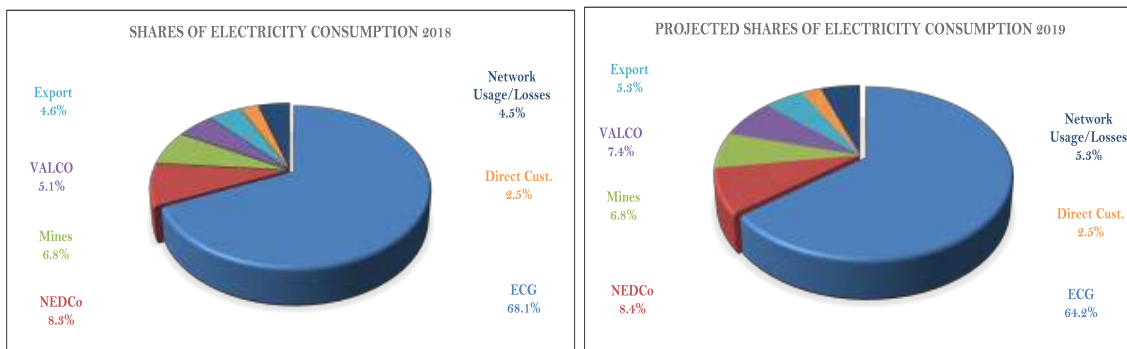
Electricity supply from VRA power plants is projected to account for 40.2% of the total electricity projected to be supplied in 2019. Karpowership, TICO, and SAPP are projected to account for 16.1%, 11.2, and 15.4% respectively of the total supply in 2019. Both BXC Solar and Meinerger are projected to account for 0.16% of the total supply in 2019. Figure 3.0 shows the projected share of electricity supply by plants in 2019

Figure 3.0 Shares of Electricity Supply by plants in 2019



Shares of electricity consumption for the Electricity Company of Ghana is projected to reduce from 68% in 2018 of the total supply to 64% in 2019. Shares of electricity export, consumption by VALCO and network usage are projected to increase from 4.6%, 5.1% and 4.5% respectively in 2018 to 5.3%, 7.4% and 5.3% respectively in 2019. Shares of electricity consumption by the mines and NEDCo is projected to remain relatively the same as that of 2018 at 6.8% and 8.4% respectively.

Figure 4.0 Comparison of shares of electricity consumption between 2018 and projection for 2019.



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
 KTRP = 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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