GHANA WHOLESALE ELECTRICITY MARKET BULLETIN

MARKET WATCH

Monthly Market Data Analysis

ISSUE NO. 88 **1st August 2023 to 31st August 2023**

This Bulletin highlights significant changes in Ghana's Wholesale Electricity Market (WEM) from August 1 to August 31, 2023. It compares the performance of the important WEM indicators to their benchmarks and analyzes the potential effects of any market trends that can be seen.

Although this Bulletin's content has been checked for accuracy at the time of publishing with reasonable care, any mistakes, omissions, or inaccuracies are regrettable. Reader feedback on the Bulletin would be very appreciated and welcomed by the Electricity Market Oversight Panel Secretariat (EMOPS).

HIGHLIGHTS OF THE MONTH

In August 2023, the System Peak Load was 3,181.49MW which was lower than the 3,250MW forecasted in the 2023 Electricity Supply Plan (ESP). The System Peak load is made up of 2,694.49MW of the domestic demand and 487MW of the Export demand. The Ghana Peak Load which is Ghana's System demand for March, 2023 was 2,761.10MW which was lower than the 2,930MW projected in the 2023 electricity supply plan (ESP).

The electricity supply averaged 58.96GWh per day in August, 2023. This value was marginally lower than the 60.57GWh per day projected in the 2023 ESP. A total of 1,828.06GWh of electricity was supplied in August 2023 and was 2.6% lower than the 1,877.7GWh projected in the 2023 ESP. Electricity export for the month totaled 204.64GWh and this was higher than 190.5Gwh projected in the Electricity Supply Plan.

The regulated market accounted for 77.06% of electricity purchased in the Ghana Wholesale Electricity Market in March, 2023. The de-regulated market accounted for 7.02% in March, 2023 while the export market accounted for the rest.

The Akosombo Dam water level marginally increased from July 2023 through to August 2023. The water level at the beginning of August, 2023 was 266.61feet, which increased to 269.45 feet at the end of the month at a rate of 0.09feet per day

Bui dam water level for August, 2023 increased by 6.56feet from the 553.94feet at the beginning of the month to 560.50 feet. The

Table 1. Projected and Actual Outturn of Electricity Demand and Supply in July 2023 and August 2023.

	July ,2023		August, 2023	
	Projected	Actual	Projected	Actual
Total Supply (GWh)	1,855.2	1,910.9	1,877.7	1,828.1
Source by Power Plants (GWh)				
AKOSOMBO	550.0	500.8	513.4	518.0
KPONG	97.4	89.2	83.6	91.03
BUI	75.9	46.0	75.9	75.95
BUI Solar	12.6	1.0	12.8	-
Kaleo	1.9	1.4	1.9	1.39
Sunon Asogli	187.5	275.2	375.0	245.88
TAPCO	214.3	202.8	214.3	160.57
TICO	222.6	238.3	100.1	238.89
TT1PP	26.5	7.1	-	-
CENIT	-	2.2	-	3.34
TT2PP	6.3	3.8	6.3	-
Twin City	120.2	143.2	120.2	134.79
KARPOWER	47.1	223.4	55.1	197.32
AMERI	-	-	-	-
KTPP	36.7	69.1	63.2	76.02
CENPOWER	241.1	69.8	241.1	49.77
AKSA	6.9	28.4	6.8	20.24
Bridge Power	-	3.1	-	6.37
Total Domestic Supply (GWh)	1,847.0	1,904.8	1,869.7	1,819.6
Imports (GWh)	-	6.1	-	8.5
Total Supply (GWh)	1,847.0	1,910.9	1,869.7	1,828.1
Ghana Coincedent Peak Load (MW	2,969.0	2,870.6	2,930.0	2,761.1
System Coincident Peak Load (MW	3,254.0	3,279.6	3,250.0	3,181.5

water level increased at a rate of 0.21feet day in August, 2023.

Natural gas remains the primary fossil fuel for the generation of electricity in the Ghana Wholesale Electricity Market. The share of the natural gas used to generate electricity by thermal power plants was 100%.

ELECTRICITY TRADING

Electricity Demand

The System Peak load for August, 2023 was 3,181.49MW as compared to 3,279.60MW in July, 2023 which was 2.9% lower than what was recorded in July, 2023. This decrease is attributable to a decrease in the domestic demand at the System Peak Load.

The Ghana Peak Load declined by 3.8% in August 2023 from July, 2023. The Ghana Peak load for July, 2023 was 2,870.60MW and it declined to 2,761.10MW in August, 2023. The Load factor for August 2023 was 79.80%. Ghana's domestic demand has shown a downward trajectory in the 3rd quarter of 2023.

Electricity export at the System Peak load to CIE, CEB and SONABEL was 487MW in August, 2023. This was made up 103MW, 223MW and 161MW for CIE, CEB and SONABEL respectively.
This indicates an increase in export demand from 409MW in July 2023 to 487 MW in August 2023 which is attributable to the increase in export demand to our neighboring countries.

In August, 2023 the average electricity demand decreased by 4.2% to 2,335.33MW from 2,439.49MW in July, 2023

The average electricity demand for regulated market in August, 2023 was 1,799.7MW which was lower than the 1,876.21MW in July, 2023. For the regulated markets, ECG accounted for 83.8% of the average demand whilst NEDCO and Enclave Power accounted for an average of 12.58% and 1.59% respectively.

The average demand for the de-regulated market was 164MW for August, 2023. The mines accounted for 91.4% whilst bulk customers accounted for 8.59% of the de-regulated market demand. Export markets recorded an average demand of 371.64 MW for August, 2023. Demand from neighboring countries accounted for 75.34% of export demand while VALCO accounted for the rest

Electricity supply

Electricity supply decreased in August, 2023 from an average of 61.64GWh per day in July, 2023 to 58.96GWh per day, representing a 4.3% decrease. Total supply on the other hand was 1,910.90GWh in July, 2023 compared to 1,828.06GWh in August, 2023

Domestic supply accounted for 99.54% of the total generation whilst inadvertent imports from CIE accounted for 0.046%. Electricity export for the month of August, 2023 totaled 204.64GWh and this was lower than the 260.8GWh projected in the 2023 supply plan.

Electricity supplied by thermal plants in August, 2023 constituted 61.99% of the total electricity supplied. There was 0.08% contribution of electricity supplied from the solar power plant. Hydro accounted for the 37.47%. Hence renewable energy accounted for 37.6% of total supply in August, 2023. Thermal Plants had a larger share in the electricity mix.

A total of 1,338.96GWh of electricity was supplied to the Regulated Market in August, 2023 whilst de-regulated and export were supplied with 122GWh and 250.66GWh respectively.

A total of 217.39GWh of electricity was supplied to the export market in August, 2023. Electricity export to CIE was 15.02GWh which was lower than the 19.31 GWh recorded in July, 2023. Export to CEB in August, 2023 was 89.81Gwh and this was lower than what was recorded in July, 2023. Electricity export to SONABEL was 112.56GWh which had increased from the 113.64GWh recorded in July, 2023.

HYDRO DAM LEVELS

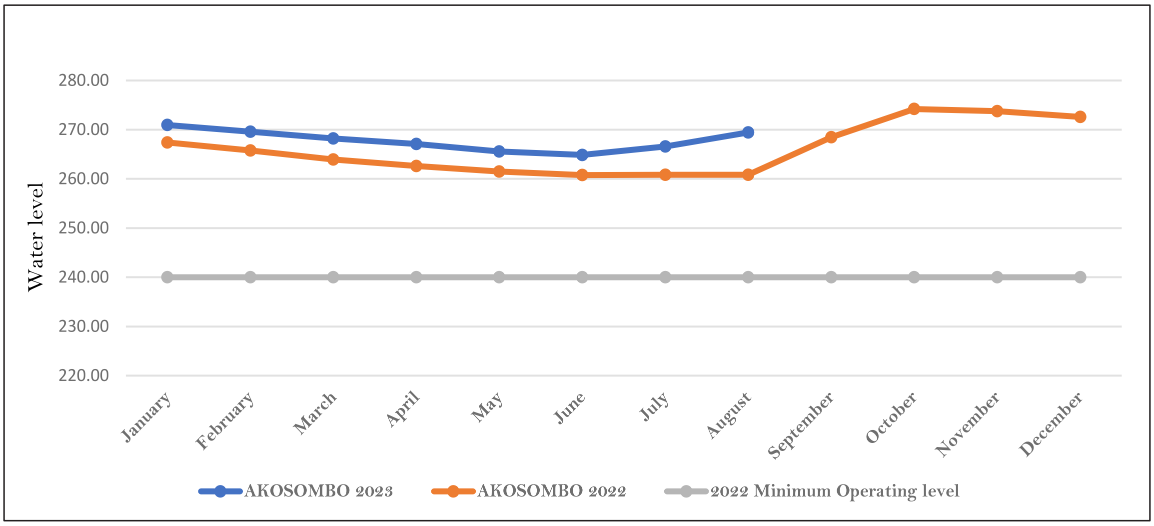
The Akosombo water level increased in August, 2023

The water level for Akosombo GS increased in August, 2023. In August, 2023 there was an increment in water level by 2.84feet at a rate of 0.09 feet per day. In addition, the water level of 266.61 feet recorded at the beginning of the month increased to 269.45feet at the end of the month and was higher what was recorded in the same period in 2022. The month end water level of the Akosombo dam was 8.61 feet above the water level recorded for the same period in 2022 and was 29.45 feet above the minimum operating level of the dam.

Figure 1 shows the comparative end-of-month trajectory of the level of water in the Akosombo Dam from January 2022 to August 2023.

HIGHLIGHTS OF THE MONTH

Figure 1: Month-End Water Level for Akosombo Dam from January 2022 to August 2023.



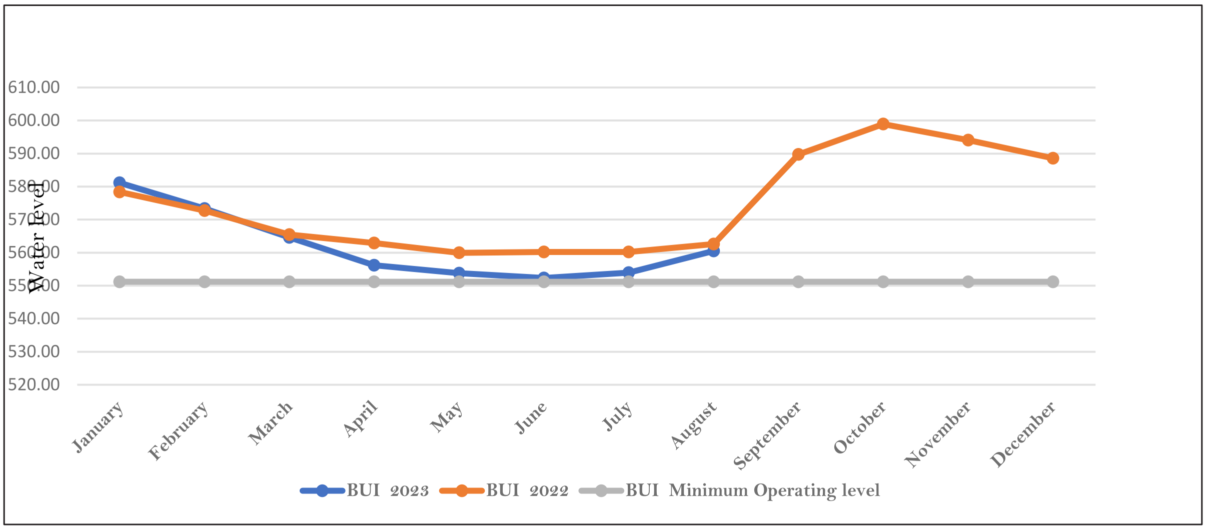
Bui dam water level continued to increase in August, 2023

Bui dam water level continued to increase in August, 2023. The water level increased from 553.94feet at the beginning of the month to 560.50feet at the end of the month by 6.56feet.

In August, 2023, the month end water level recorded was 2.1feet lower than what was recorded as the same period in 2022. In 2023 so far, only January and February recorded a higher water level compared to the same period as 2022. However, the dam water level is 9.3feet above the minimum operating level.

Figure 2 shows the comparative end-of-month trajectory of the level of water in the Bui dam from January 2022 to August 2023

Figure 2: Month-End Water Level for Bui Dam from January 2022 to August 2023



FUEL SUPPLY FOR POWER GENERATION

Natural gas imports decreased in August, 2023

The supply of natural gas from Nigeria through the West African gas pipeline decreased to 49.56MMscfd in August, 2023 from 54.42MMscdf in July, 2023. This represents 8.9% decrease. Natural gas imports accounted for 20.7% in the total fuel mix and natural gas supply mix accounted for 25.3%

Natural gas supply from domestic sources decreased in August, 2023

The average natural gas supply for August 2023 from domestic sources was 235.90MMscfd which was lower than the gas supply of 236.32MMscfd in July,2023. On the average natural gas from domestic sources accounted for 61.2% in the total fuel mix and 74.7% in the gas supply mix

Consumption of liquid fuel in August was zero

In August 2023, there was no record of liquid fuel consumption.

Monthly Market Data Analysis

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

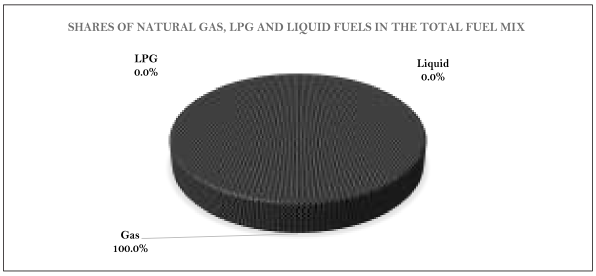


Figure 3b: Shares of fuel types in the generation fuel mix of power generation

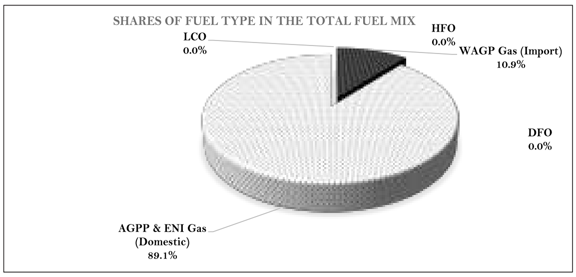


Figure 4a: Contribution of Natural Gas Supply by sources

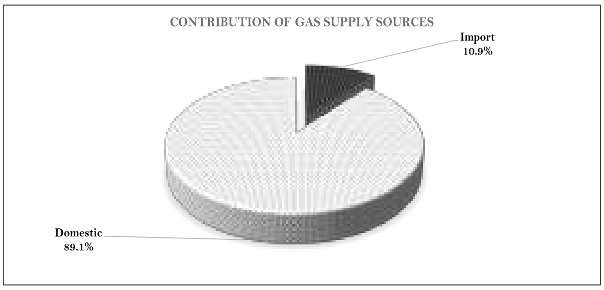


Figure 4b: Contribution of individual fuel in the liquid fuel supply

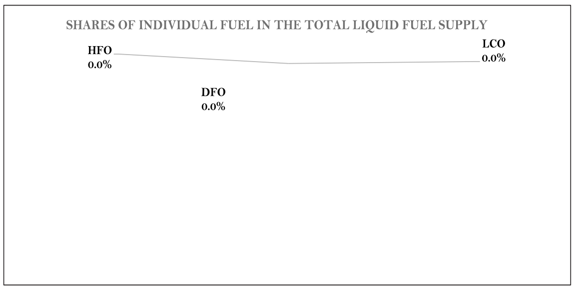


Figure 5a: Electricity Supply by sources

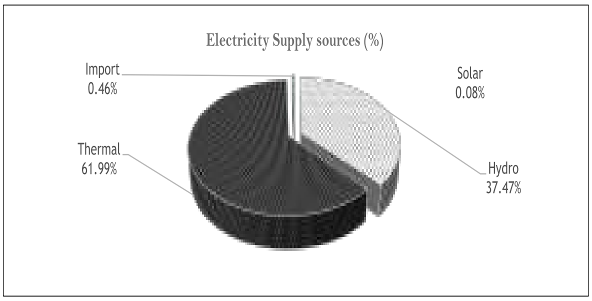
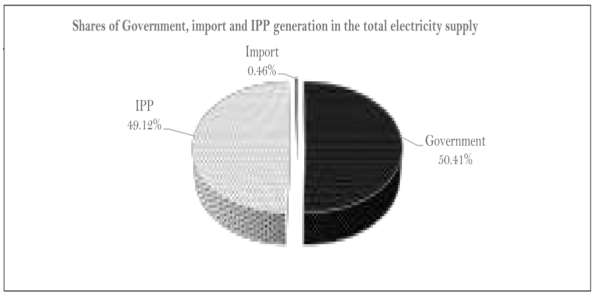


Figure 5b: Electricity supply by ownership



Peak Electricity Supply for August 2023		
Source of Supply	Generation at System Peak Load (MW)	Generation at Ghana Peak Load (MW)
AKOSOMBO	963.87	778.00
KPONG	110.70	141.40
BUI	198.43	305.50
BUI Solar	-	-
SEAP	352.80	319.70
TAPCO	300.28	209.80
TICO	339.41	344.90
TT1PP	-	-
CENIT	-	-
TT2PP	-	-
TWIN CITY	200.00	197.70
KARPOWER	409.90	439.10
AMERI	-	-
KTPP	106.00	106.00
Trojan Power	-	-
CENPOWER	169.00	162.00
AKSA	31.10	47.00
Bridge Power	-	-
IMPORT	-	-
Export to CIE at peak	103.00	53.00
Export to CEB at peak	223.00	89.00
Export to Sonabel	161.00	148.00
System Coincident Peak Load	3,181.49	
Ghana Coincedent Peak Load		2,761.10

OPERATIONAL FACT SHEET

(MMSCFD)	
Location	Monthly Average
Etoki	50.88
Tema WAGPCo	101.17
ENI	192.67
Aboadze WAGPCo	176.05
Aboadze GNGC	106.13
Reverse Flow	51.67

Hydro Dam Water level for August, 2023			
	Beginning month (ft)	End month (ft)	Change in water level(ft)
Akosombo	266.61	269.45	2.84
Bui	553.94	560.50	6.56

Monthly Average Electricity Prices in the WEM				
		Aug-23	Jul-22	Change
Average Market Price (AMP)	US$/MWh	110.96	103.91	7.05
System Marginal Cost (SMC)	US$/MWh	104.27	99.32	4.96
System Marginal Price (SMP)	US$/MWh	123.17	117.07	6.10

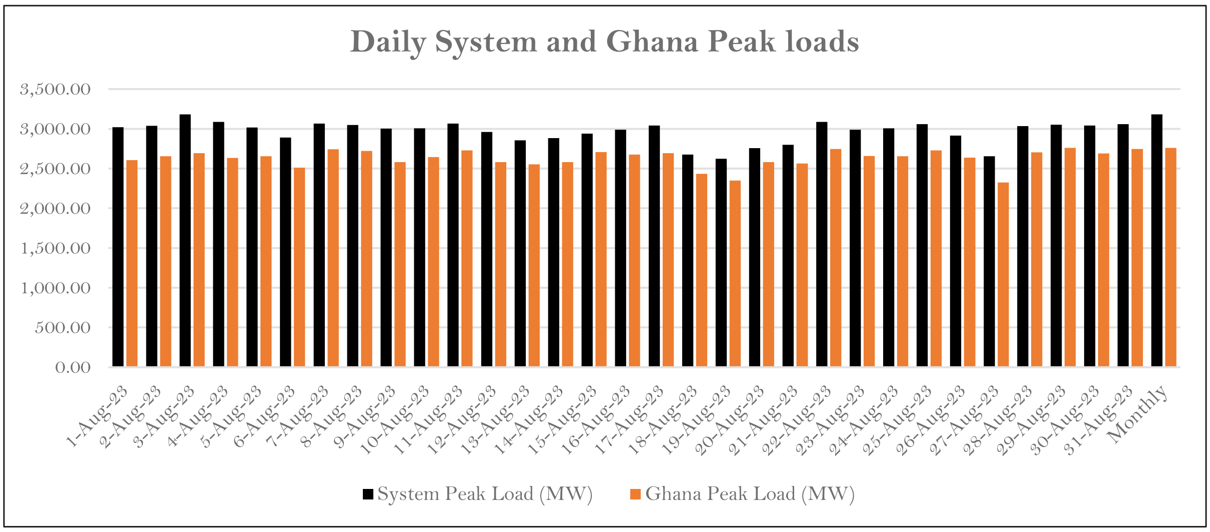
	Month Average fuel prices					
	Gazetted Natural Gas Price	Weighted average natural gas price	LCO	HFO	DFO	LPG
US$/MMBtu	8.1221	6.50	17.24	15.05	34.38	17.96

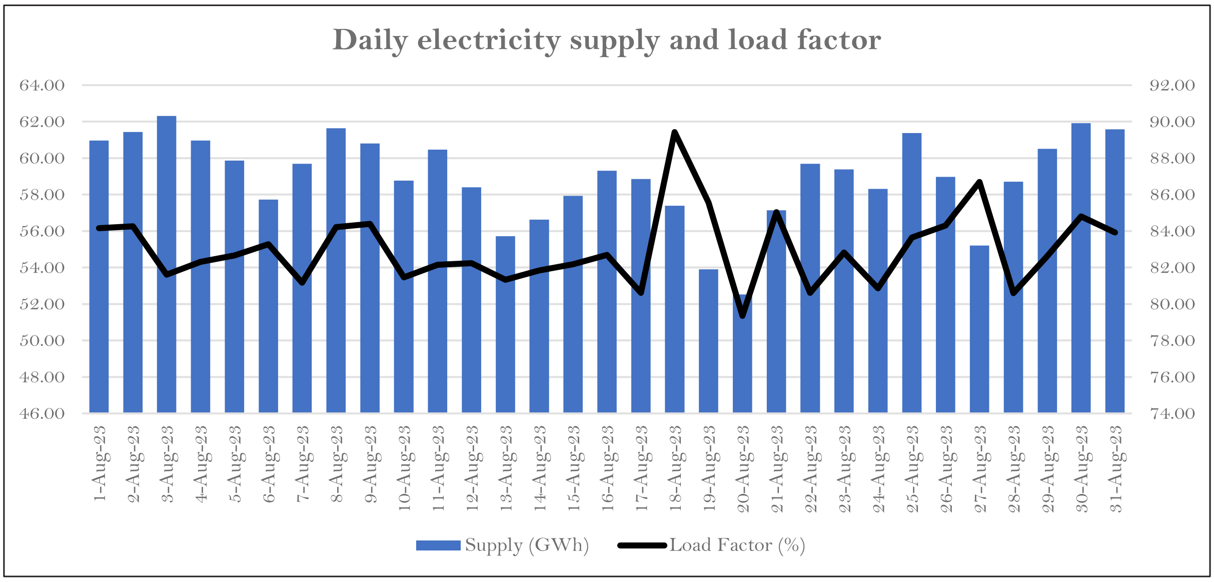
Power Plants	Average fuel price (US$/MMBtu)
TAPCO	8.12
TICO	8.12
SAPP	8.12
TT2PP	0.00
TT1PP	0.00
CENIT	8.12
KARPOWERSHIP	8.12
AMERI PLANT	0.00
KPONE THERMAL	8.12
CENPOWER	8.12
AKSA ENERGY	8.12
Twin City	8.12
Bridgepower	8.12

OPERATIONAL FACT SHEET

	Weekly Electricity Supply (GWh)				
	Week 1	Week 2	Week 3	Week 4	Total
AKOSOMBO	115.62	126.27	109.96	166.15	518.00
KPONG	20.43	22.25	19.57	28.78	91.03
BUI Hydro	9.68	12.09	18.00	36.18	75.95
Bui Solar	0.00	0.00	0.00	0.00	0.00
VRA Kaleo	0.31	0.26	0.32	0.49	1.39
SAPP	53.41	58.56	56.40	77.50	245.88
TAPCO	43.43	31.73	33.01	52.40	160.57
TICO	55.99	55.69	53.67	73.54	238.89
TT1PP	0.00	0.00	0.00	0.00	0.00
CENIT	0.00	0.00	0.00	3.34	3.34
TT2PP	0.00	0.00	0.00	0.00	0.00
Twin City	32.80	30.82	25.45	45.71	134.79
KARPOWER	50.70	48.80	49.36	48.46	197.32
AMERI	0.00	0.00	0.00	0.00	0.00
KTPP	14.90	17.75	18.09	25.28	76.02
Cenpower	19.54	0.00	0.00	30.23	49.77
AKSA	2.74	4.76	6.59	6.15	20.24
Bridge Power	0.43	1.06	4.88	0.00	6.37
Import	2.98	2.35	1.73	1.43	8.50
Total	**422.94**	**412.41**	**397.05**	**595.66**	**1,828.06**

		Fuel Consumption (MMBtu)			
	Heat rate (Btu/kWh)	Natural gas	LCO	HFO	DFO
TAPCO	11,376.86	1,826,748.08	-	-	-
TICO	8,050.01	1,923,084.34	-	-	-
SAPP	8,767.66	2,155,808.25	-	-	-
TT2PP	-	-	-	-	-
TT1PP	-	-	-	-	-
CENIT	8,840.85	29,531.96	-	-	-
KARPOWERSHIP	8,962.35	1,768,461.45	-	-	-
AMERI PLANT	-	-	-	-	-
KPONE THERMAL	11,391.51	865,998.48	-	-	-
CENPOWER	9,146.75	455,221.88	-	-	-
AKSA ENERGY	9,917.98	200,786.51	-	-	-
Twin City	8,597.41	1,158,824.55	-	-	-
Bridgepower	15,092.43	96,093.50	-	-	-






Summary of Market Prices for August 2023
US$/MWh
16.00
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
1-Aug-23
2-Aug-23
3-Aug-23
4-Aug-23
5-Aug-23
6-Aug-23
7-Aug-23
8-Aug-23
9-Aug-23
10-Aug-23
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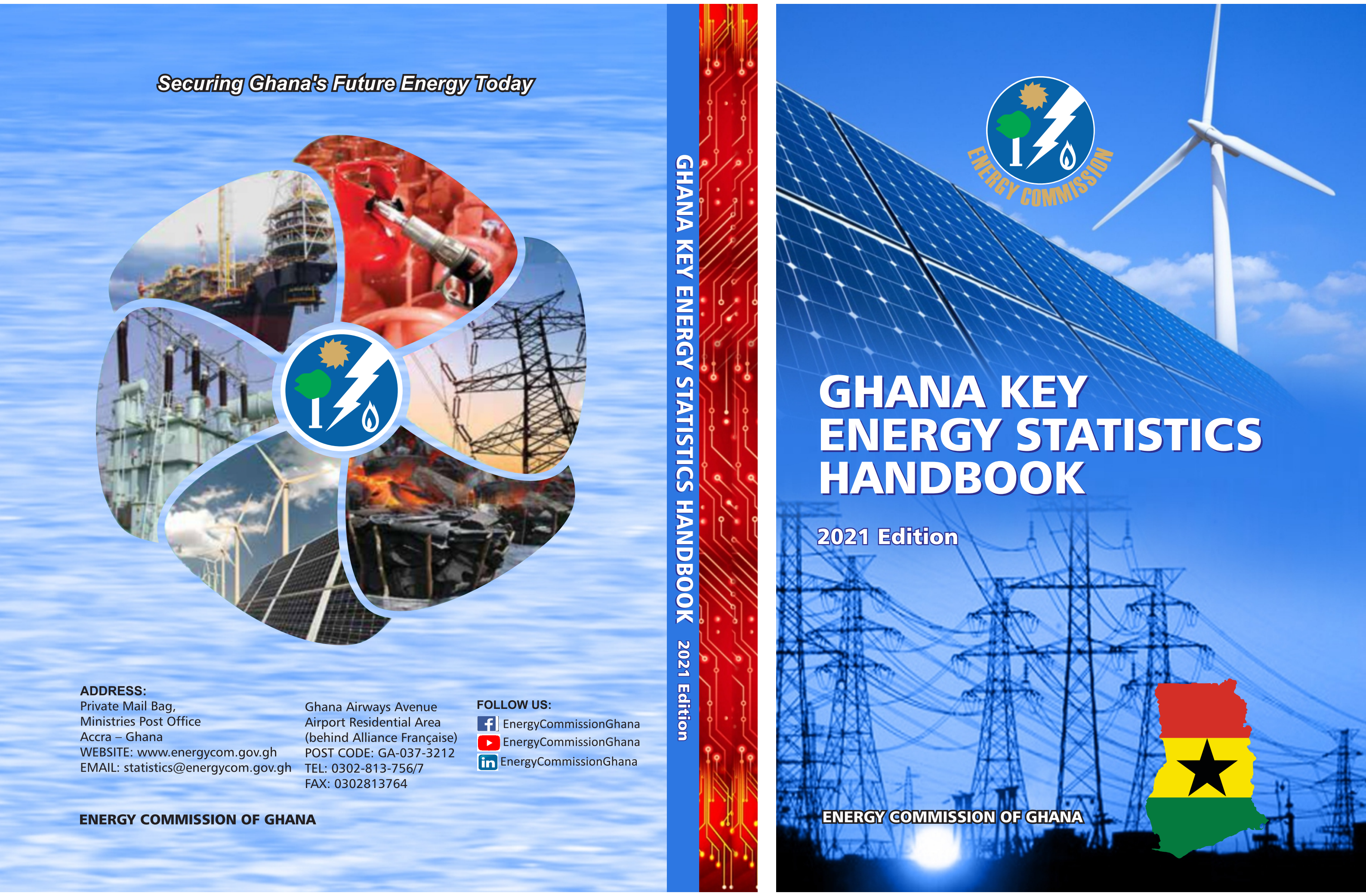
Monthly
SMC
Average Market Price
SMP



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*

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