



# GHANA WHOLESALE ELECTRICITY MARKET BULLETIN

## MARKET WATCH

### Monthly Market Data Analysis

ISSUE NO. 87

1<sup>st</sup> July 2023 to 31<sup>st</sup> July 2023

This Bulletin covers major developments in the Wholesale Electricity Market (WEM) of Ghana from 1<sup>st</sup> July, 2023 to 31<sup>st</sup> July, 2023. It analyses the performance of the key WEM indicators against their benchmarks and examines the likely implications of any discernable trends in the market.

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. The Electricity Market Oversight Panel Secretariat (EMOPS) would very much appreciate and welcome comments from readers on the Bulletin.

#### HIGHLIGHTS OF THE MONTH

The System Peak Load for July, 2023 was 3,279.6MW which was higher than the 3,254MW projected in the 2023 Electricity Supply Plan (ESP). The System Peak Load recorded was made up of 2,870.6MW of the domestic demand and 409MW of Export demand. The Ghana Peak Load which is Ghana's System demand excluding export for July, 2023 was 2,870.6MW which was lower than 2,930MW projected in the 2023 Electricity Supply Plan.

The electricity supply averaged 61.6GWh per day in July 2023 and this value was significantly higher than 59.8Gwh per day projected in the 2023 ESP. A total of 1,910.9GWh was supplied in July, 2023 which was higher than the 1,855.2GWh projected in the 2023 ESP. Electricity Export to our neighboring countries for the month totaled 216.34GWh and it was lower than the 242.4GWh projected in the 2023 Electricity Supply Plan.

In July 2023, 76.9% of the electricity purchased in the Ghana Wholesale electricity market was from the regulated market which consist of ECG, NEDCO and Enclave Power Company. The De-regulated Market (Mines and Bulk Customers) accounted for 7% in July 2023 whilst the Export Market accounted for the rest.

The Akosombo Dam water level increased in July, 2023. The water level increased from 264.87feet to 266.61feet at the end of the month at a rate of 0.056 feet per day.

The water level for the Bui dam at the beginning of the month was 552.33feet which increased at a rate of 0.052feet per day to each

**Table 1. Projected and Actual Outturn of Electricity Demand and Supply in June, 2023 and July 2023.**

	Jun-23		Jul-23	
	Projected	Actual	Projected	Actual
<b>Total Supply (GWh)</b>	1,854.9	1,882.0	1,855.2	1,910.9
<b>Source by Power Plants (GWh)</b>				
AKOSOMBO	415.0	453.3	550.0	500.8
KPONG	81.0	81.3	97.4	89.2
BUI	79.1	40.7	75.9	46.0
BUI Solar	12.2	4.2	12.6	1.0
Kaleo	1.9	1.6	1.9	1.4
Sunon Asogli	362.9	250.4	187.5	275.2
TAPCO	207.4	178.1	214.3	202.8
TICO	215.4	210.7	222.6	238.3
TT1PP	61.2	76.3	26.5	7.1
CENIT	-	1.2	-	2.2
TT2PP	6.3	7.1	6.3	3.8
Twin City	116.3	135.6	120.2	143.2
KARPOWER	48.0	229.7	47.1	223.4
AMERI	-	-	-	-
KTPP	-	1.6	36.7	69.1
CENPOWER	233.3	145.7	241.1	69.8
AKSA	7.2	50.7	6.9	28.4
Bridge Power	-	3.9	-	3.1
<b>Total Domestic Supply (GWh)</b>	1,847.2	1,872.0	1,847.0	1,904.8
<b>Imports (GWh)</b>	-	10.0	-	6.1
<b>Total Supply (GWh)</b>	1,847.2	1,882.0	1,847.0	1,910.9
<b>Ghana Coincident Peak Load (MW)</b>	2,970.0	3,039.3	2,930.0	2,870.6
<b>System Coincident Peak Load (MW)</b>	3,350.0	3,439.3	3,254.0	3,279.6

## HIGHLIGHTS OF THE MONTH

553.94 feet by the end of the month of July, 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 plant was 94.7% of the total fuel used in July, 2023

### ELECTRICITY TRADING

#### Electricity Demand

The System Peak Load for July, 2023 was 3,279.6MW as compared to 3,439.32MW in June, 2023. This was 4.6% lower than what was recorded in June, 2023. This decrease is attributable to a decrease in the domestic demand at the System Peak Load.

The Ghana Peak Load decreased in July, 2023, compared to June, 2023. The Ghana Peak Load decreased by 5.6% from 3,039.32MW to 2,870.6MW in July, 2023. The load factor for July, 2023 was 80.93%

Electricity export at the System Peak Load to CIE, CEB and SONABEL was 409MW in July, 2023. This was made up of 76MW, 196MW, 137MW for CIE, CEB and SONABEL respectively. The growth in export demand from June, 2023 to July 2023 is attributable to the increase in export demand by CEB

The average electricity demand for July, 2023 was 2,439.49MW whilst the average electricity demand for June, 2023 was 2,486.65MW. The average electricity demand decreased in July, 2023

The average electricity demand for regulated market in July, 2023 was 1,876.21MW. This could be attributable to the cold weather conditions that did not necessitate the need for too much cooling in July, 2023. For the regulated markets, ECG accounted for 87.37% of the average demand whilst NEDCO and enclave power accounted for an average of 11.05% and 1.57% respectively.

The average demand for the De-regulated market was 170.85MW for July, 2023. The Mines accounted for 91.96% whilst Bulk Customers accounted for 8.04% of the De-regulated market demand. Export markets recorded an average demand of 392.3MW. Export to neighboring countries accounted for 76.06% of for demand whilst VALCO accounted for 23.94%

#### Electricity supply

A total of 1,910.90GWh of electricity was supplied in July, 2023 which was higher than the 1,882.02GWh supplied in June, 2023. Electricity supply averaged 61.6GWh per day lower than the 62.73GWh supplied in June, 2023. In addition, domestic supply accounted for 99.47% of the total generation while inadvertent imports from CIE accounted for 0.53%.

Electricity supplied by thermal plants in July, 2023 constituted 63.1% of the total electricity supplied. The contribution of electricity supplied from the solar power plant is 0.33% whilst hydro accounted for 36.16%. Hence, renewable energy accounted for 36.49% of the total supply in July, 2023. Thermal Plants had a larger percentage in the electricity mix.

A total of 1,395.89GWh of electricity was supplied to the Regulated Market in July, 2023 whilst de-regulated market and export were supplied with 127.10GWh and 291.96GWh respectively.

A total of 231.92GWh of electricity was supplied to the export market in our neighboring countries in July, 2023. Electricity export to CIE was 19.31GWh which was higher than the 10.24GWh recorded in June, 2023. Export to CEB in July, 2023 was 98.97GWh which was higher than what was recorded in June, 2023. SONABEL's share on electricity exported was 113.64GWh which was higher than the 109.53GWh recorded in June, 2023

### HYDRO DAM LEVELS

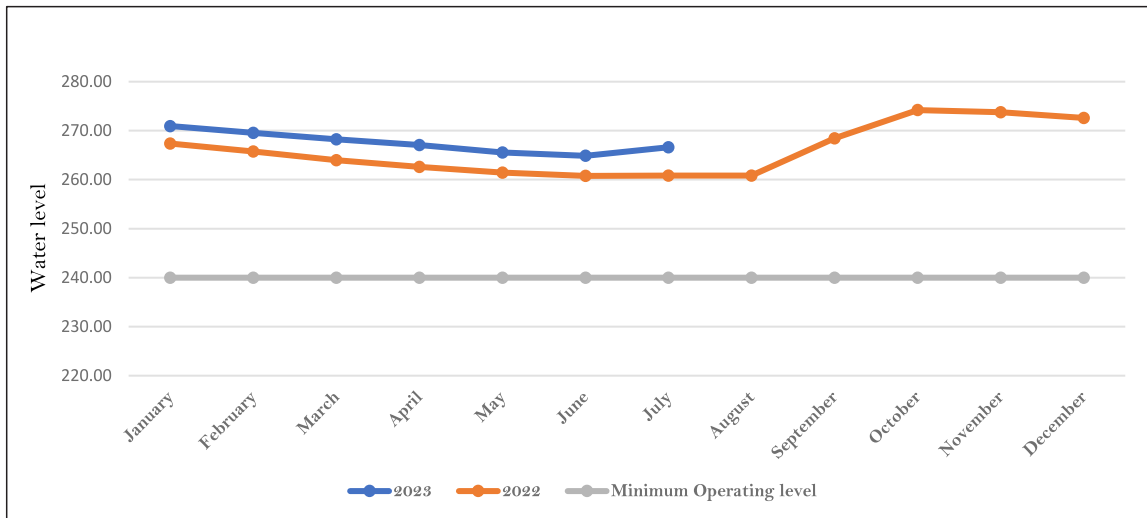
#### Akosombo water level increased in July, 2023

The water level for Akosombo GS increased in July, 2023. In the 2nd quarter of 2023, the water level continued to rise at an increased rate in July 2023 increasing by 1.74 feet at a rate of 0.056 feet per day. In addition, the water level of 264.87 feet recorded at the beginning of the month increased to 266.61feet at the end of the month and was higher than what was recorded in the same period in 2022. The month end water level of the Akosombo dam was 5.77 feet above the water level recorded for the same period in 2022 and was 26.61 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 July 2023

## HIGHLIGHTS OF THE MONTH

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



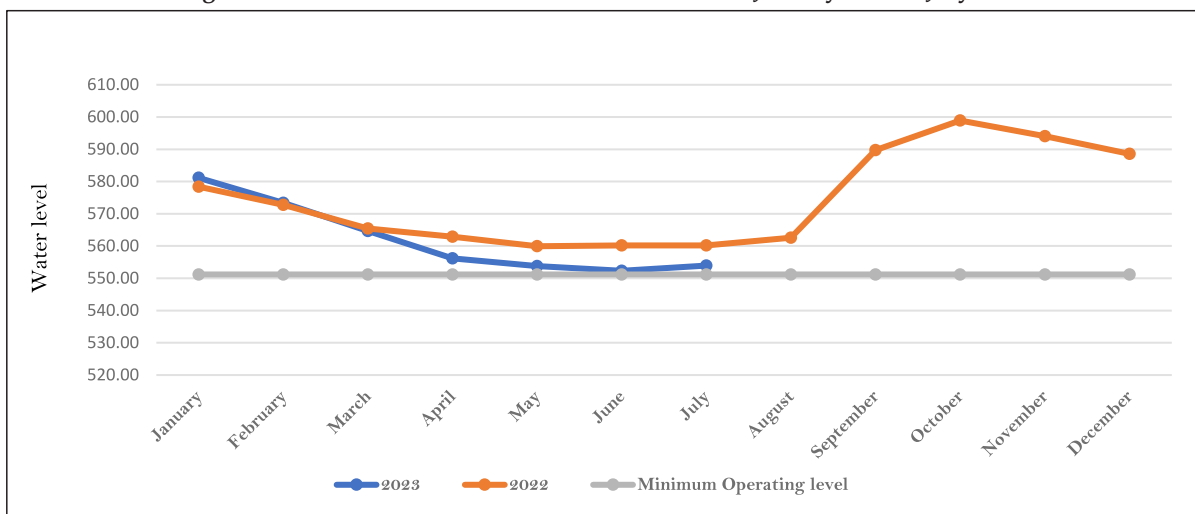
### Bui dam water level continued to rise in July, 2023

Bui dam water level continuously increased in July, 2023. There was a growth in the water level from 552.33 feet at the beginning of the month to 553.94 feet at the end of the month representing a 1.16feet increase in water level at the end of July, 2023.

In July, 2023, the month end water level recorded was 6.26feet lower than what was recorded as the same period in 2022. However, the dam water level is 2.76 feet above the minimum operating level of the dam.

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

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



## FUEL SUPPLY FOR POWER GENERATION

### Natural Gas imports decreased in July, 2023

The supply of natural gas from Nigeria through the West African gas pipeline declined from 84.39MMSCFD in June, 2023 to 54.42MMSCFD in July 2023. This represent a 35.5% decrease in natural gas supply from WAPCO. Natural gas imports accounted for 17.3% in the total fuel mix and 18.3% in the gas supply mix.

### Natural gas supply from domestic sources decreased in July 2023

The average natural gas supply for July, 2023 was 236.32MMSCFD which was lower than the average gas supply of 243.95MMSCFD in June, 2023. This represent a 3.1% decrease in domestic supply in July, 2023 compared to June 2023. Natural gas supply from domestic sources accounted for 77.4% in the total fuel mix and 81.7% in the gas supply mix.

### Consumption of liquid fuel increased in July, 2023

A total of 115,018.27bbbls of liquid fuel made up 99,800.77bbbls LCO, 7,96bbbls HFO and 15,209.54bbbls DFO was consumed in July, 2023. liquid fuel accounted for an average of 5.3% in the total fuel mix. LCO accounted for 92% of the total liquid mix whilst HFO accounted for 8%. The plants responsible for the consumption of liquid fuels, LCO and DFO and HFO in July, 2023 were SAPP, KTPP and AKSA.

# 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 types in the generation fuel mix of power generation

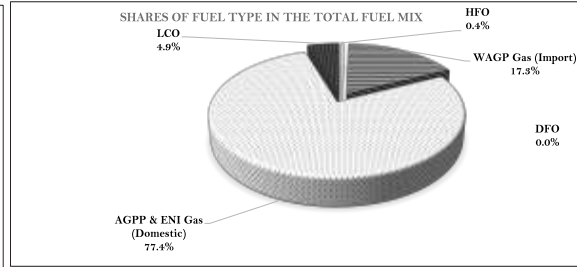
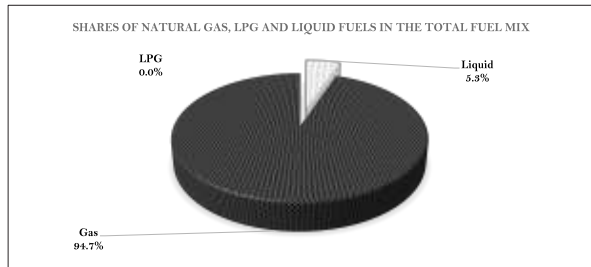


Figure 4a: Contribution of Natural Gas Supply by sources



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

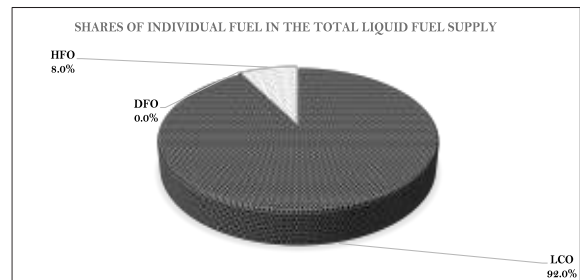


Figure 5a: Electricity Supply by sources

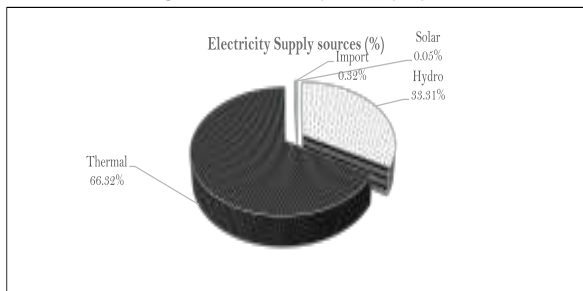
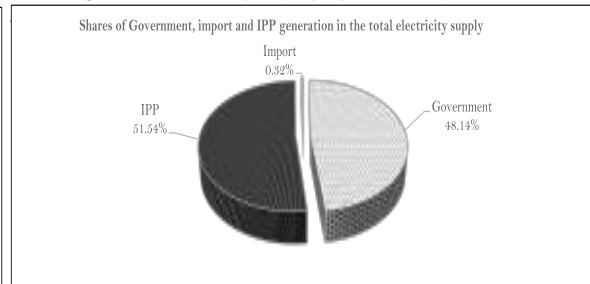


Figure 5b: Electricity supply by ownership



Peak Electricity Supply for July 2023

Source of Supply	Generation at System Peak Load (MW)	Generation at Ghana Peak Load (MW)
AKOSOMBO	900.60	900.60
KPONG	140.00	140.00
BUI	202.10	202.10
BUI Solar	-	-
SEAP	429.70	429.70
TAPCO	305.00	305.00
TICO	343.00	343.00
TT1PP	-	-
CENIT	-	-
TT2PP	-	-
TWIN CITY	200.90	200.90
KARPOWER	451.90	451.90
AMERI	-	-
KTPP	103.00	103.00
Trojan Power	-	-
CENPOWER	188.00	188.00
AKSA	15.40	15.40
Bridge Power	-	-
IMPORT	-	-
Export to CIE at peak	76.00	76.00
Export to CEB at peak	196.00	196.00
Export to Sonabel	137.00	137.00
<b>System Coincident Peak Load</b>	<b>3,279.60</b>	
<b>Ghana Coincedent Peak Load</b>		<b>2,870.60</b>

## OPERATIONAL FACT SHEET

July 2023 Average Monthly Natural Gas Flowrate (MMSCFD)	
Location	Monthly Average
Etoki	52.93
ENI	204.05
Tema WAGPCo	99.59
Aboadze WAGPCo	195.03
Aboadze GNGC	110.22
Reverse Flow	50.04

Hydro Dam Water level for July 2023			
	Beginning month (ft)	End month (ft)	Change in water level
Hydro Dam			(feet)
Akosombo	264.87	266.61	1.74
Bui	552.33	553.94	1.61

	Weekly Electricity Supply (GWh)				
	Week 1	Week 2	Week 3	Week 4	Total
AKOSOMBO	121.02	110.63	113.12	156.02	500.79
KPONG	21.48	19.86	19.78	28.10	89.22
BUI Hydro	16.76	8.53	7.89	12.77	45.96
Bui Solar	0.00	0.00	0.00	1.04	1.04
VRA Kaleo	0.36	0.32	0.33	0.41	1.42
SAPP	48.54	75.40	62.45	88.77	275.16
TAPCO	34.24	45.45	50.44	72.71	202.84
TICO	55.88	56.52	56.32	69.56	238.28
TT1PP	7.08	0.00	0.00	0.00	7.08
CENIT	0.00	0.00	0.00	2.22	2.22
TT2PP	1.71	1.71	0.39	0.00	3.80
Twin City	32.25	32.69	32.59	45.69	143.23
KARPOWER	64.85	46.17	53.76	58.61	223.39
AMERI	0.00	0.00	0.00	0.00	0.00
KTPP	10.44	17.41	15.71	25.58	69.14
Cenpower	6.25	0.01	21.32	42.21	69.79
AKSA	11.15	6.86	4.35	6.01	28.38
Bridge Power	0.00	0.34	0.55	2.20	3.10
Import	1.80	1.18	0.73	2.37	6.08
<b>Total</b>	<b>433.81</b>	<b>423.08</b>	<b>439.73</b>	<b>614.29</b>	<b>1,910.90</b>

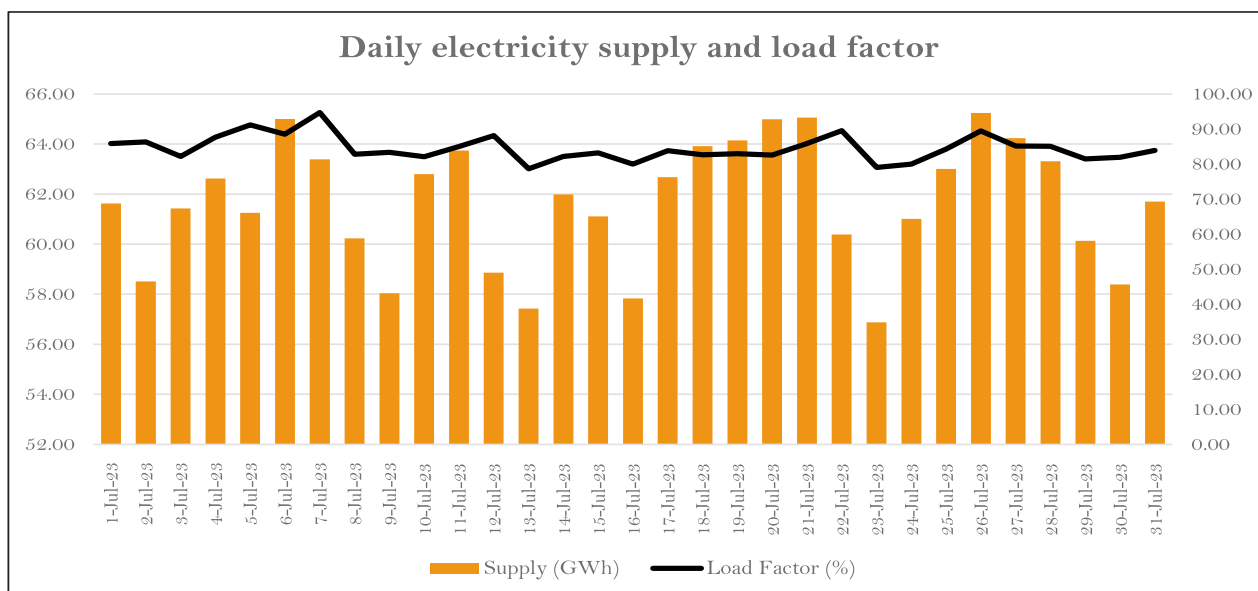
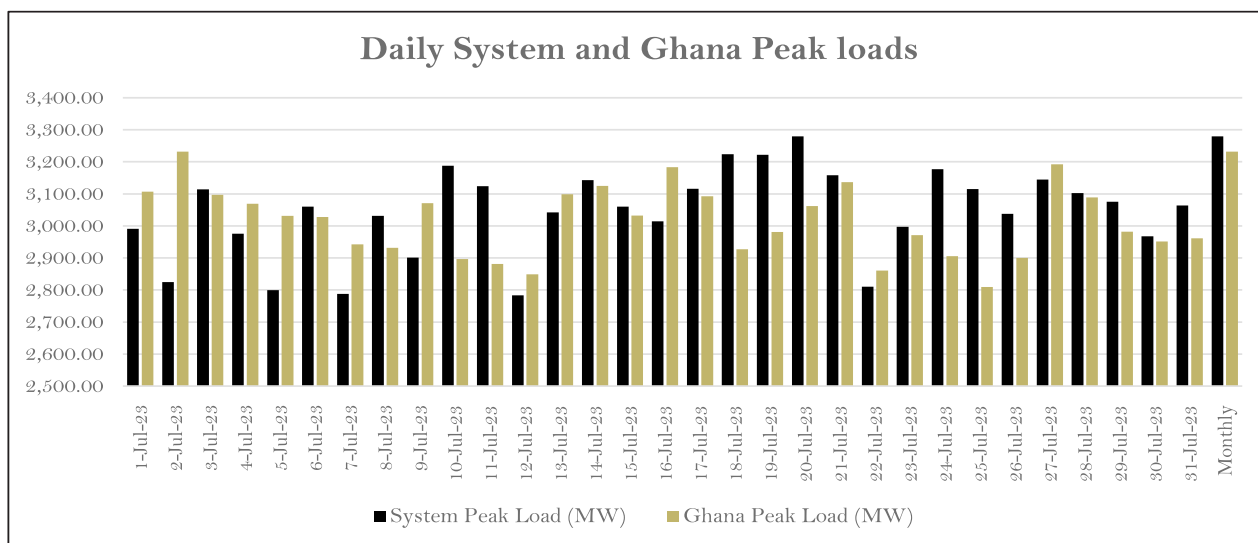
	Fuel Consumption (MMBtu)				
	Heat rate (Btu/kWh)	Natural gas	LCO	HFO	DFO
TAPCO	9,599.52	1,947,186.47	-	-	-
TICO	7,906.13	1,883,845.74	-	-	-
SAPP	7,999.08	1,673,094.89	527,946.09	-	-
TT2PP	11,486.68	43,681.56	-	-	-
TT1PP	12,730.32	90,130.65	-	-	-
CENIT	12,167.85	27,012.64	-	-	-
KARPOWERSHIP	8,075.39	1,803,948.60	-	-	-
AMERI PLANT	-	-	-	-	-
KPONE THERMAL	11,528.90	797,055.15	-	-	42.74
CENPOWER	8,275.03	577,506.82	-	-	-
AKSA ENERGY	7,944.05	179,376.71	-	46,046.88	-
Twin City	7,783.80	1,114,844.72	-	-	-
Bridgepower	10,861.00	33,668.00	-	-	-

Monthly Average Electricity Prices in the WEM				
		Jul-23	Jun-22	Change
Average Market Price (AMP)	US\$/MWh	104.46	103.91	0.55
System Marginal Cost (SMC)	US\$/MWh	97.45	99.32	-1.87
System Marginal Price (SMP)	US\$/MWh	116.34	117.07	-0.73

# OPERATIONAL FACT SHEET

US\$/MMBtu	Month Average fuel prices					
	Gazetted Natural Gas Price	Weighted average natural gas price	LCO	HFO	DFO	LPG
	8.1221	6.51	22.37	18.37	38.48	17.96

Power Plants	Average fuel price (US\$/MMBtu)
TAPCO	8.12
TICO	8.12
SAPP	11.54
TT2PP	8.12
TT1PP	8.12
CENIT	8.12
KARPOWERSHIP	8.12
AMERI PLANT	0.00
KPONE THERMAL	8.12
CENPOWER	8.12
AKSA ENERGY	10.22
Twin City	8.12
Bridgepower	8.12



# ECONOMIC FACT SHEET

## Summary of Market Prices for July 2023



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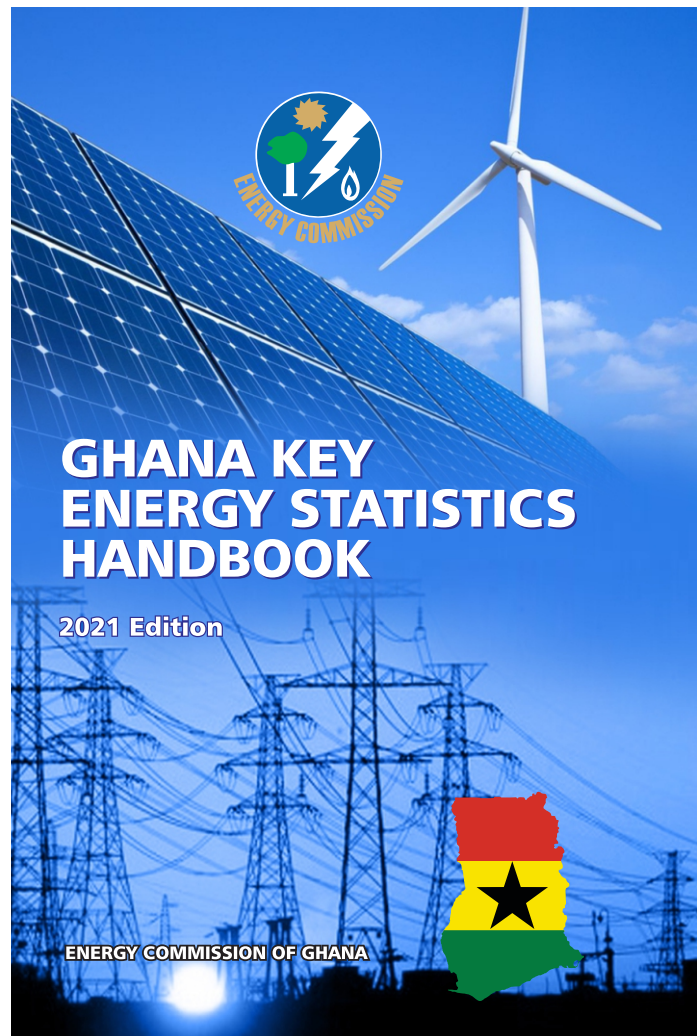
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*AGPP = Atuabu Gas Processing Plant*

*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*

*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*

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