



# GHANA WHOLESALE ELECTRICITY MARKET BULLETIN

## MARKET WATCH

### Monthly Market Data Analysis

ISSUE NO. 85

1<sup>st</sup> June 2023 to 30<sup>th</sup> June 2023

This Bulletin highlights significant changes in Ghana's Wholesale Electricity Market (WEM) from June 1 to June 30, 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 June 2023, the System Peak Load was 3,439.32MW which was higher than the 3,350.00MW forecasted in the 2023 Electricity Supply Plan (ESP). The System Peak load made up of 3,039.32MW of the domestic demand and 400MW of the Export demand. The Ghana Peak Load which is Ghana's System Demand (excluding export) for March, 2023 was 3,039.32MW which was higher than the 2,970MW projected in the 2023 Electricity Supply Plan (ESP).

The electricity supply averaged 62.73GWh per day in June, 2023. This value was marginally higher than the 61.83GWh per day projected in the 2023 ESP. A total of 1,882.02GWh of electricity was supplied in June, 2023 and was 1.46% higher than the 1,854.9GWh projected in the 2023 ESP. Electricity export for the month totaled 205.68GWh and this was lower than 235.8 GWh projected in the Electricity Supply Plan.

The regulated market accounted for 77.4% of electricity purchased in the Ghana wholesale electricity market in June, 2023. The De-regulated market accounted for 7.1% in March, 2023 while the export market accounted for the rest.

The Akosombo Dam water level continued its decrease from January 2023 through to June 2023. The water level at the beginning of June, 2023 was 265.55feet, was declined to 264.87 feet at the end of the month at a rate of 0.023feet per day in June, 2023.

Bui dam water level for June, 2023 reduced by 1.44feet from the 553.77 feet at the beginning of the month to 552.33 feet. The water level decreased at a rate of 0.048feet per day in June, 2023.

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

	May-23		Jun-23	
	Projected	Actual	Projected	Actual
Total Supply (GWh)	2,012.9	2,087.9	1,854.9	1,882.0
Source by Power Plants (GWh)				
AKOSOMBO	435.0	598.6	415.0	453.3
KPONG	77.9	91.8	81.0	81.3
BUI	75.9	63.5	79.1	40.7
BUI Solar	12.3	6.9	12.2	4.2
Kaleo		2.8	1.9	1.6
Sunon Asogli	375.0	264.2	362.9	250.4
TAPCO	214.3	116.5	207.4	178.1
TICO	222.6	227.5	215.4	210.7
TT1PP	63.2	3.8	61.2	76.3
CENIT	-	11.6	-	1.2
TT2PP	6.3	6.1	6.3	7.1
Twin City	120.2	131.0	116.3	135.6
KARPOWER	151.8	205.1	48.0	229.7
AMERI	-	-	-	-
KTPP	-	71.2	-	1.6
CENPOWER	241.1	199.3	233.3	145.7
AKSA	7.3	79.4	7.2	50.7
Bridge Power	-	-	-	3.9
Total Domestic Supply (GWh)	2,002.9	2,079.3	1,847.2	1,872.0
Imports (GWh)	-	8.6	-	10.0
Total Supply (GWh)	2,002.9	2,087.9	1,847.2	1,882.0
Ghana Coincident Peak Load (MW)	3,116.0	3,150.5	2,970.0	3,039.3
System Coincident Peak Load (MW)	3,561.0	3,509.4	3,350.0	3,439.3

## HIGHLIGHTS OF THE MONTH

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 99.1%.

### ELECTRICITY TRADING

#### Electricity Demand

The System Peak load for June, 2023 was 3,439.32MW as compared to 3,561.4MW in May, 2023 which was 3.4% lower than what was recorded in May, 2023. This decrease is attributable to the decrease in domestic demand at the Peak load in June, 2023. For the 2nd quarter, Ghana attained its maximum system peak load in May, 2023 of 3,561.40MW.

The Ghana Peak Load declined by 3.7% in June, 2023 from May, 2023. The Ghana Peak Load for May, 2023 was 3,155.80MW and it declined to 3,039.32MW in June, 2023. The load factor for June, 2023 was 76%.

Electricity export at the System Peak load to CIE, CEB and SONABEL was 400MW in June, 2023. This was made up of 243MW and 157MW of CEB and SONABEL respectively. The growth in the export for June, 2023 is attributable to the increase in export demand to CEB.

In June, 2023 the average electricity demand decreased by 6.9% to 2,486.65MW from 2,671.20MW in May, 2023

The average electricity demand for regulated market was 1,924.82MW which was lower than the 2,102.06MW in May, 2023. This could be attributable to the cold weather conditions in June, 2023 which did not necessitate the need for cooling. For the regulated markets, ECG accounted for 87% of the average demand whilst NEDCO and Enclave Power accounted for an average of 11.2% and 1.5% respectively.

The average demand for the de-regulated market was 176.69MW for June, 2023. The mines accounted for 91.8% whilst bulk customers accounted for 8.2% of the de-regulated market demand. Export markets recorded an average demand of 385.14 MW for June, 2023. In relation to export to neighboring countries, 75% accounted for export demand while VALCO accounted for the rest.

#### Electricity supply

Electricity supply decreased in June 2023 from an average of 67.4GWh per day in May, 2023 to 62.7GWh per day in June, 2023 representing a 0.9% decrease. Total supply on the other hand was 2,087.90GWh in May, 2023 compared to 1,882.02GWh in June, 2023

In addition, domestic supply accounted for 99.5% of the total generation while inadvertent imports from CIE accounted for 0.53%. Electricity export for the month of June, 2023 totaled 205.7GWh and this was lower than the 235.8GWh projected in the 2023 supply plan.

Electricity supplied by thermal plants in June, 2023 constituted 68.65% of the total electricity supplied. The contribution of electricity supplied from the solar power plant was 0.22% whilst hydro accounted for the rest. Hence renewable energy accounted for 38.46% of total supply in June, 2023. Thermal Plants have the greatest share in the electricity mix.

A total of 1,385.86GWh of electricity was supplied to the Regulated Market in June, 2023 whilst de-regulated and export were supplied with 127.2GWh and 277.3GWh respectively.

A total of 208.19GWh of electricity was supplied to the export market to our neighboring countries in June, 2023. Electricity export to CIE was 9.8GWh which was lower than the 12.8GWh recorded in May, 2023. Export to CEB in June, 2023 was 93.5GWh and this was lower than the 108.65GWh recorded in May, 2023. SONABEL'S exported electricity export was 104.9GWh which had decreased from the 105.31GWh recorded in May, 2023.

### HYDRO DAM LEVELS

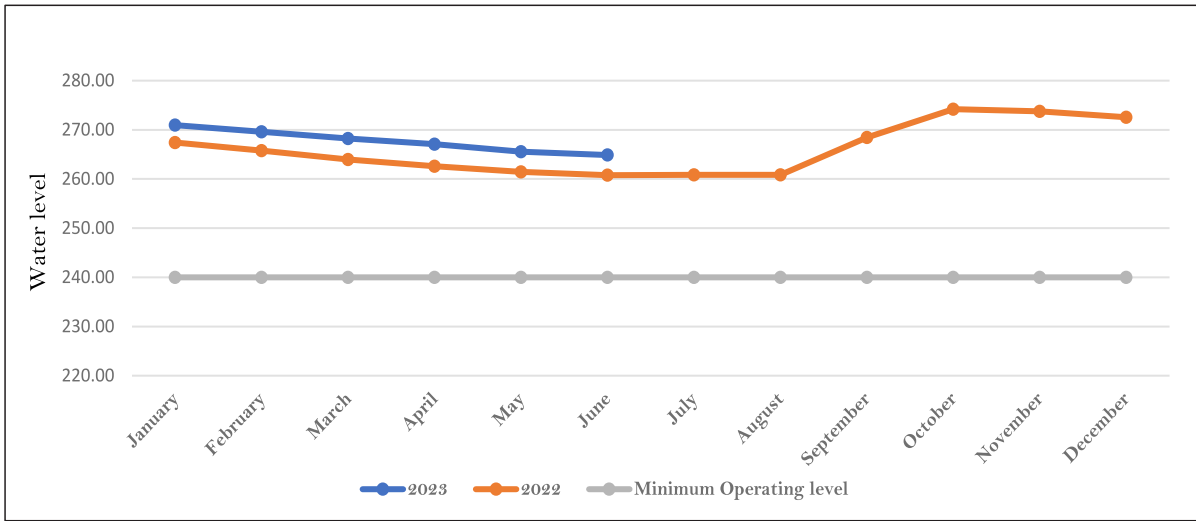
#### Akosombo Dam continues to decrease in June 2023

The rate of drop in the water level for the Akosombo Dam GS decreased in June, 2023. The rate of drop in the water level decreased to 0.022feet per day in June 2023 from 0.049feet in May, 2023. The water level at the beginning of the month recorded was 265.55 feet which dropped to 264.87 feet. The end month water level recorded of 264.87 feet was 4.03feet higher than what was recorded in the same period of 2022 and 28.24 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 June 2023

## HIGHLIGHTS OF THE MONTH

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



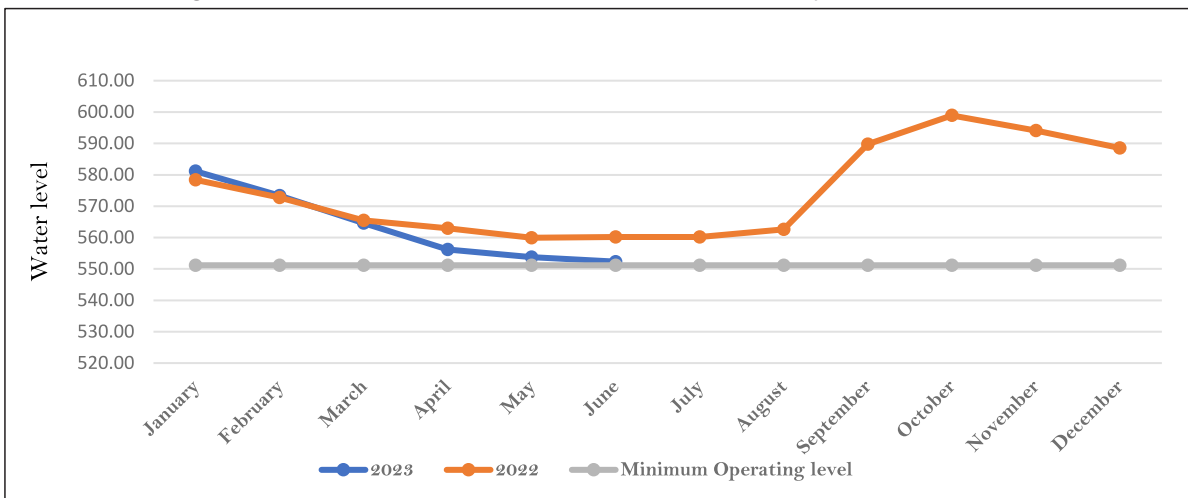
### Bui dam water level continued to decrease in June 2023

Bui dam water level decreased in June, 2023. There was a drop in the water level from 553.77 feet at the beginning of the month to 552.33 feet at the end of the month with a 1.4 feet decrease in water level at the end of June, 2023.

In June, 2023, the month end water level recorded was 7.87 feet lower than what was recorded as the same period in 2022. The dam was just 1.15 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 June, 2023

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



## FUEL SUPPLY FOR POWER GENERATION

### Natural Gas imports increased in June 2023

The supply of natural gas from Nigeria through the West African gas pipeline increased to 84.39MMSCFD in June 2023 from 57.24MMSCFD in May, 2023. This represents a 47.4% increase in the natural gas supply from WAPCo. This increase was as a result of the curtailment of supply from reverse flow from west to the East due to payment issues which necessitated the increase in export from WAPCO in order to meet the shortfall in the East. Natural gas imports accounted for 24.9% of the total fuel mix and 25.1% of the natural gas supply mix.

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

The average natural gas supply for June 2023 from domestic sources was 243.95MMSCFD which was lower than the gas supply of 252.7MMSCFD in May, 2023. On the average, natural gas supply from domestic sources accounted for 74.2% in the total fuel mix and 74.9% in the gas supply mix

### Consumption of liquid fuel decreased in June 2023

In June 2023, a total of 19,308bbbls of DFO was consumed. On the average, liquid fuel accounted for an average of 0.9% in the total fuel mix. DFO accounted for 100% of the total liquid mix. The plant responsible for the consumption of the liquid fuels DFO in June, 2023 was Cenpower.

# 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

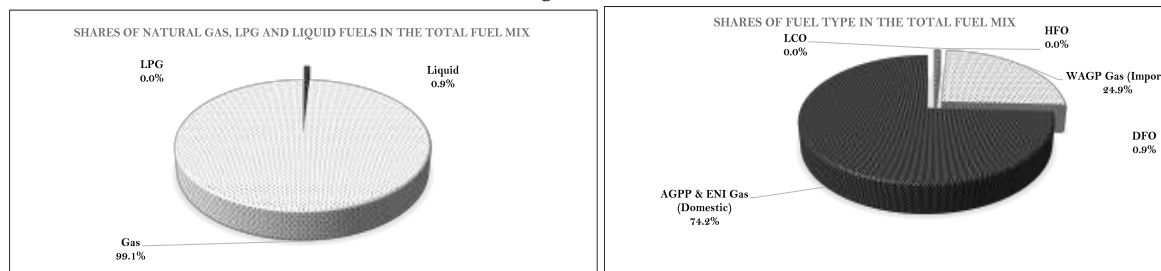


Figure 4a: Contribution of Natural Gas Supply by sources

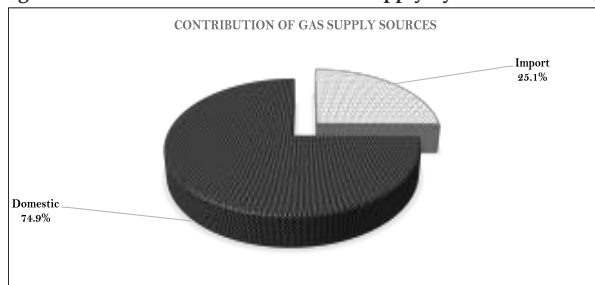


Figure 4b: Contribution of individual fuel in the liquid fuel supply

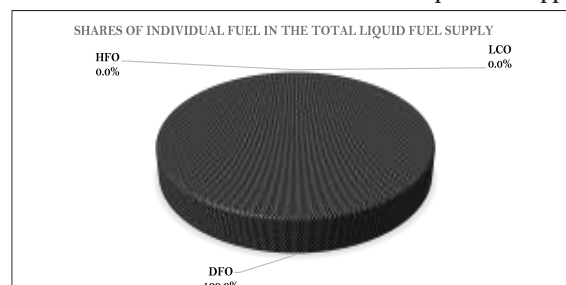


Figure 5a: Electricity Supply by sources

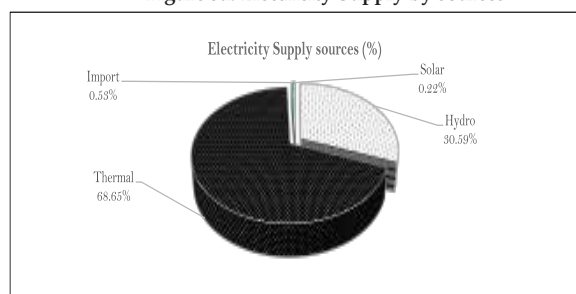
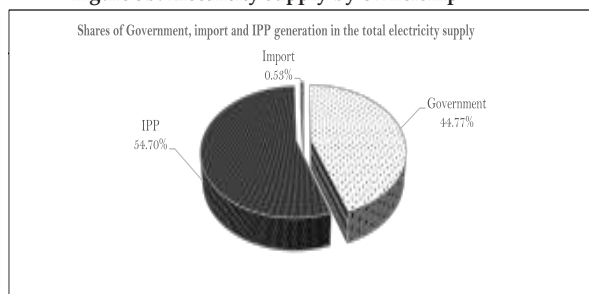


Figure 5b: Electricity supply by ownership



Peak Electricity Supply for June 2023		
Source of Supply	Generation at System Peak Load (MW)	Generation at Ghana Peak Load (MW)
AKOSOMBO	800.16	800.16
KPONG	140.03	140.03
BUI	199.05	199.05
BUI Solar	-	-
SEAP	348.10	348.10
TAPCO	288.24	288.24
TICO	339.14	339.14
TT1PP	107.00	107.00
CENIT	-	-
TT2PP	10.00	10.00
TWIN CITY	200.80	200.80
KARPOWER	441.20	441.20
AMERI	-	-
KTPP	-	-
Trojan Power	-	-
CENPOWER	362.00	362.00
AKSA	121.60	121.60
Bridge Power	-	-
IMPORT	82.00	82.00
Export to CIE at peak	-	-
Export to CEB at peak	243.00	243.00
Export to Sonabel	157.00	157.00
<b>System Coincident Peak Load</b>	<b>3,439.32</b>	
<b>Ghana Coincedent Peak Load</b>		<b>3,039.32</b>

## OPERATIONAL FACT SHEET

Hydro Dam Water level for June 2023			
	Beginning month (ft)	End month (ft)	Change in water level (feet)
Hydro Dam			
Akosombo	265.55	264.87	-0.68
Bui	553.77	552.33	-1.44

	Month Average fuel prices					
	Gazetted Natural Gas Price	Weighted average natural gas price	LCO	HFO	DFO	LPG
US\$/MMBtu	6.0952	6.45	22.37	18.37	38.48	17.96

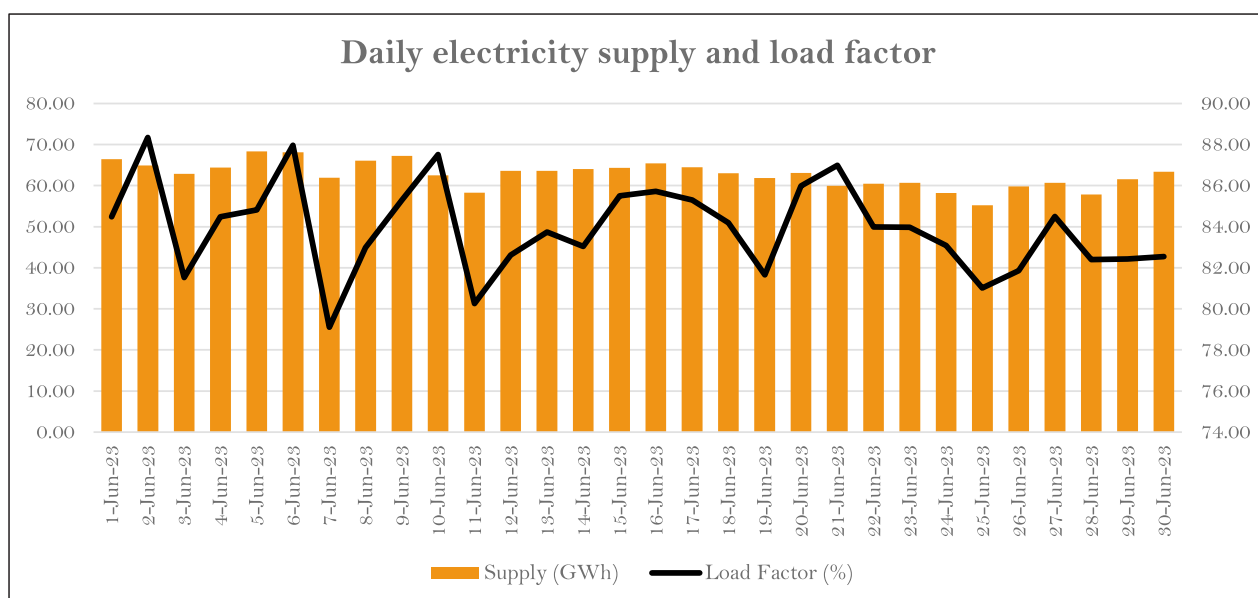
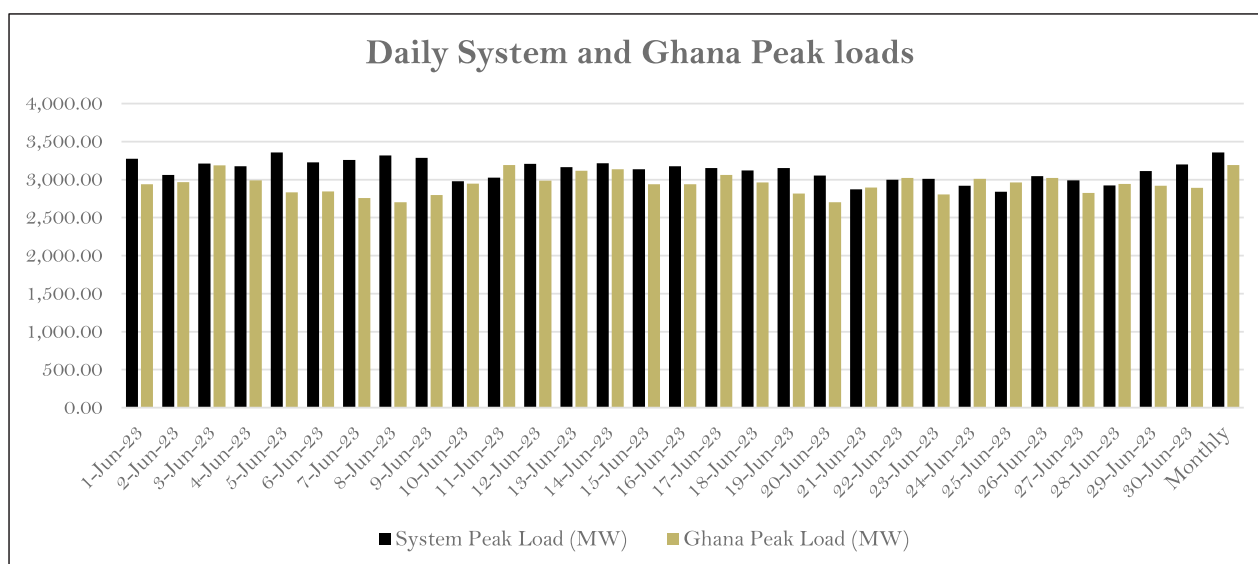
Power Plants	Average fuel price (US\$/MMBtu)
TAPCO	6.10
TICO	6.10
SAPP	6.10
TT2PP	6.10
TT1PP	6.10
CENIT	6.10
KARPOWERSHIP	6.10
AMERI PLANT	0.00
KPONE THERMAL	6.10
CENPOWER	8.97
AKSA ENERGY	7.78
Twin City	6.10
Bridgepower	0.00

Monthly Average Electricity Prices in the WEM				
		Jun-23	May-22	Change
Average Market Price (AMP)	US\$/MWh	100.33	101.88	-1.54
System Marginal Cost (SMC)	US\$/MWh	95.46	98.37	-2.91
System Marginal Price (SMP)	US\$/MWh	117.07	117.03	0.05

	Heat rate (Btu/kWh)	Fuel Consumption (MMBtu)			
		Natural gas	LCO	HFO	DFO
TAPCO	10,467.66	1,863,797.91	-	-	-
TICO	8,044.46	1,695,353.96	-	-	-
SAPP	8,055.51	2,016,907.58	-	-	-
TT2PP	11,605.61	82,482.22	-	-	-
TT1PP	12,373.48	944,220.16	-	-	-
CENIT	12,246.57	14,267.25	-	-	-
KARPOWERSHIP	8,147.78	1,871,261.05	-	-	-
AMERI PLANT	-	-	-	-	-
KPONE THERMAL	11,589.80	18,665.38	-	-	-
CENPOWER	8,028.70	1,066,103.43	-	-	103,914.45
AKSA ENERGY	9,252.48	404,585.21	-	64,261.79	-
Twin City	7,840.28	1,062,953.77	-	-	-
Bridgepower	-	-	-	-	-

# OPERATIONAL FACT SHEET

	Weekly Electricity Supply (GWh)				
	Week 1	Week 2	Week 3	Week 4	Total
<b>AKOSOMBO</b>	108.15	107.04	106.92	131.17	453.27
<b>KPONG</b>	18.64	18.90	19.25	24.56	81.34
<b>BUI Hydro</b>	13.72	9.20	10.02	7.77	40.72
<b>Bui Solar</b>	1.33	1.00	1.33	0.53	4.19
<b>VRA Kaleo</b>	0.40	0.35	0.38	0.44	1.56
<b>SAPP</b>	56.96	57.87	59.01	76.53	250.38
<b>TAPCO</b>	49.40	49.57	34.17	44.92	178.05
<b>TICO</b>	53.21	48.42	39.49	69.63	210.75
<b>TT1PP</b>	16.42	17.98	18.26	23.65	76.31
<b>CENIT</b>	1.17	0.00	0.00	0.00	1.17
<b>TT2PP</b>	1.63	1.67	1.70	2.10	7.11
<b>Twin City</b>	32.05	32.78	33.06	37.68	135.58
<b>KARPOWER</b>	53.72	51.10	62.61	62.23	229.67
<b>AMERI</b>	0.00	0.00	0.00	0.00	0.00
<b>KTPP</b>	1.61	0.00	0.00	0.00	1.61
<b>Cenpower</b>	37.18	30.08	36.10	42.36	145.73
<b>AKSA</b>	8.29	12.49	17.17	12.73	50.67
<b>Bridge Power</b>	0.46	3.46	0.00	0.00	3.92
<b>Import</b>	2.56	3.34	2.55	1.56	10.01
<b>Total</b>	<b>456.88</b>	<b>445.26</b>	<b>442.03</b>	<b>537.85</b>	<b>1,882.02</b>



# ECONOMIC FACT SHEET



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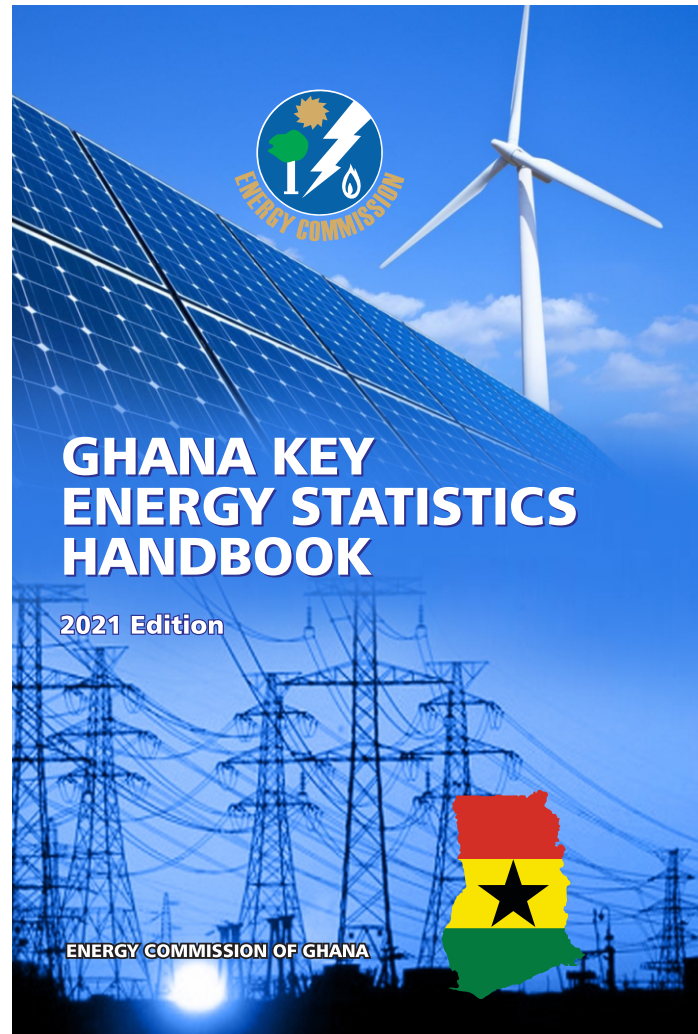
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*AGPP = Atuabu Gas Processing Plant  
CBGC = Composite Bulk Generation Charge  
DFO = Distillate Fuel Oil  
ECG = Electricity Company of Ghana  
ESP – Electricity Supply Plan  
GHp = Ghana Pesewa  
GWh = Giga-watt Hours  
KTPP = Kpone Thermal Power 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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