



GHANA WHOLESALE ELECTRICITY MARKET BULLETIN

MARKET WATCH

Monthly Market Data Analysis

ISSUE NO. 85

1st May 2023 to 31st May 2023

This Bulletin covers major developments in the Wholesale Electricity Market (WEM) of Ghana from 1st May, 2023 to 31st May, 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 May, 2023 was 3,561.40MW which was lower than the 3,561MW projected in the 2023 Electricity Supply Plan (ESP). The System Peak Load recorded was made up of 3,150.47MW of the domestic demand and 410.93MW of export for May, 2023. The Ghana Peak Load which is Ghana's System demand excluding export for May, 2023 was 3,150.47MW which was lower than 3,211MW projected in the 2023 Electricity Supply Plan.

The electricity supply averaged 67.4GWh per day in May, 2023 and this value was higher than the 64.9GWh per day projected in the 2023 ESP. A total of 2,087GWh was supplied in May, 2023 which was higher than the 2,012.9GWh projected in the 2023 ESP. Export to our neighboring countries for the month totaled 226.74GWh and it was higher than the 188.5GWh projected in the 2023 Electricity Supply Plan.

The Regulated Market accounted for 78.7% of electricity purchased in the Ghana wholesale electricity market in May, 2023. The De-regulated market accounted for 6.2% in May, 2023 whilst the export market accounted for 15.05%.

The Akosombo Dam water level decreased in May, 2023. The water level decreased to 265.55 feet at the end of May, 2023 from 267.08 feet at the end of April, 2023 at a rate of 0.049 feet per day.

Bui dam's water level at the beginning of the month was 556.20 feet which decreased at a rate of 0.078 feet per day at the end of May, 2023 at a water level of 553.77 feet.

Table 1. Projected and Actual Outturn of Electricity Demand and Supply in April, 2023 and May 2023.

	Apr-23		May-23	
	Projected	Actual	Projected	Actual
Total Supply (GWh)	2,008.0	1,999.8	2,012.9	2,087.9
Source by Power Plants (GWh)				
AKOSOMBO	420.0	589.8	435.0	598.6
KPONG	75.2	97.1	77.9	91.8
BUI	94.7	140.7	75.9	63.5
BUI Solar	13.0	7.3	12.3	6.9
Kaleo	1.9	3.7		2.8
Sunon Asogli	362.9	226.5	375.0	264.2
TAPCO	207.4	88.2	214.3	116.5
TICO	215.4	177.5	222.6	227.5
TT1PP	-	43.6	63.2	3.8
CENIT	-	5.2	-	11.6
TT2PP	6.3	3.4	6.3	6.1
Twin City	116.3	137.4	120.2	131.0
KARPOWER	183.6	228.1	151.8	205.1
AMERI	-	-	-	-
KTPP	61.2	30.5	-	71.2
CENPOWER	233.3	174.6	241.1	199.3
AKSA	9.0	37.4	7.3	79.4
Bridge Power	-	-	-	-
Total Domestic Supply (GWh)	2,000.2	1,990.9	2,002.9	2,079.3
Imports (GWh)	-	8.9	-	8.6
Total Supply (GWh)	2,000.2	1,999.8	2,002.9	2,087.9
Ghana Coincident Peak Load (MW)	3,232.0	3,192.4	3,116.0	3,153.5
System Coincident Peak Load (MW)	3,582.0	3,487.4	3,561.0	3,561.4

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 plant was 98.2%.

ELECTRICITY TRADING

Electricity Demand

The System Peak Load for May, 2023 was 3,561.4MW as compared to 3,487.40MW in April, 2023. This was 2.12% higher than what was recorded in April, 2023. This increase is attributable to the increase in export demand at the Peak Load

The Ghana Peak Load decreased in May, 2023 compared to April, 2023. The Ghana peak load decreased by 1.14% from 3,192.40MW in April, 2023 to 3,155.8MW in May, 2023. The load factor 78.8%. This means that for May, 2023, an average of 713MW is required for Peak.

Electricity export at the System Peak Load to CIE, CEB and SONABEL was 410.93MW in May, 2023 compared to 298MW in April, 2023. This was made up of 278MW and 155MW for CEB and SONABEL respectively. The growth in the export for May, 2023 is attributable to the increase in export demand to CEB.

The average electricity demand for May, 2023 was 2,671.20 MW compared to an average electricity demand for April of 2,644.72MW. The average electricity demand therefore increased in May, 2023

The average electricity demand for regulated market in May, 2023 was 2,102.06MW which is lower than 2,178.06MW recorded in April, 2023. This could be attributable to the cold weather conditions which did not necessitate the need for cooling in May, 2023. For the regulated markets, ECG accounted for 86.7% of the average demand whilst NEDCO and enclave power accounted for an average of 10.97% and 1.5% respectively.

The average demand for the de-regulated market was 166.53MW for May, 2023. The mines accounted for 91.39% whilst bulk customers accounted for 8.6% of the de-regulated market demand. Export market average demand was 402.11MW. Export to neighboring countries accounted for 75.79% of demand whilst VALCO accounted for the rest.

Electricity supply

A total of 2,087.90GWh of electricity was supplied in May, 2023 which was higher than the 1,999.82GWh supplied in April, 2023. Electricity supply averaged 67.4GWh per day in May, 2023 which was higher than the 66.7GWh supplied in April, 2023. In addition, domestic supply accounted for 99.59% of the total generation supplied while inadvertent imports from CIE accounted for 0.41%.

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

A total of 1,564.30GWh of electricity was supplied to the Regulated Market in May, 2023 whilst de-regulated market and export were supplied with 123.90GWh and 299.16GWh respectively.

A total of 226.75GWh of electricity was supplied to the export market in our neighboring countries in May, 2023. Electricity export to CIE was 12.79GWh which was lower than the 20.09GWh recorded in April, 2023. Export to CEB in May, 2023 was 108.65GWh which was rather higher than the 78.05GWh recorded in April, 2023. SONABEL's share on electricity exported was 105.31GWh which was slightly lower than the 105.46GWh recorded in April, 2023.

HYDRO DAM LEVELS

Akosombo Dam rate of drop increases in May, 2023

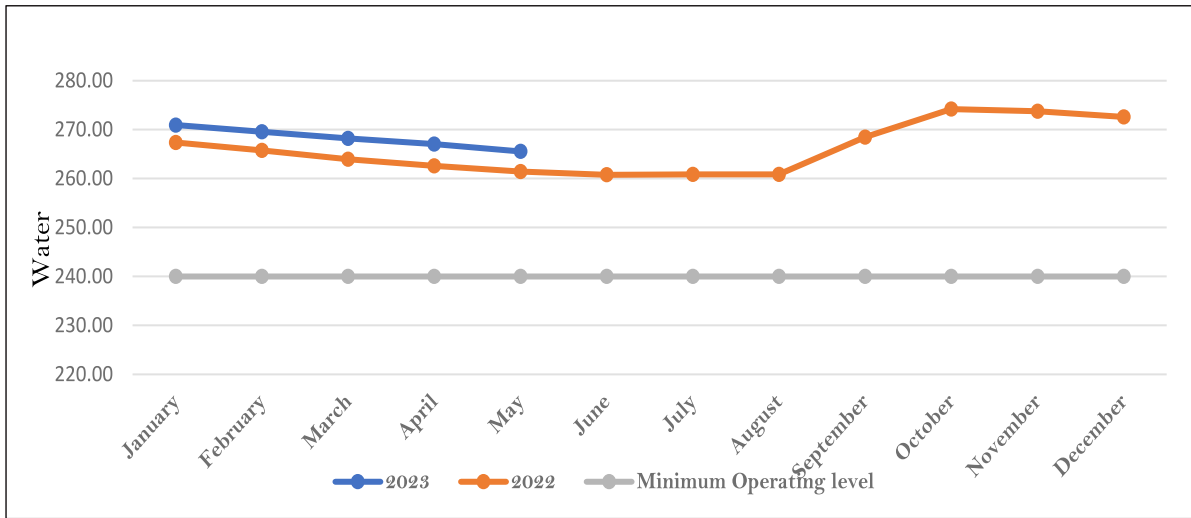
The Akosombo Dam's rate of drop increased from 0.038 feet per day in April, 2023 to 0.049 feet per day in May, 2023. The rate of drop represented a 28.9% increase in May 2023 compared to April 2023.

Furthermore, the water level of 267.08 feet recorded at the beginning of the month, dropped by 1.53 feet to 265.55 at the end of the month. The water level at the end of May, 2023 was 4.08 feet above water level recorded for the same period in 2022 and 25.55 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 May 2023

HIGHLIGHTS OF THE MONTH

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



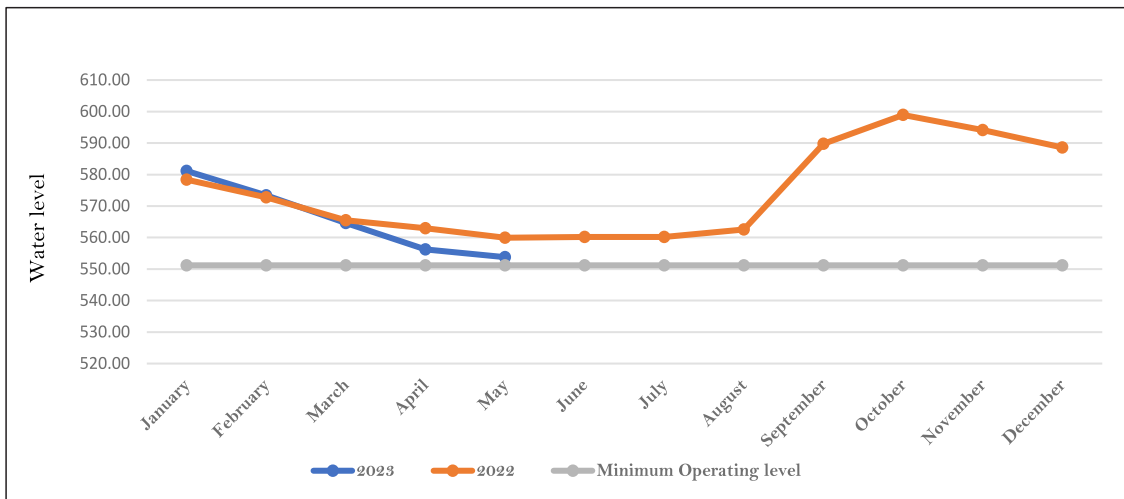
Bui dam water level continued to decrease in May, 2023

Bui dam water level decreased in May, 2023. There was a drop in the water level from 556.20 feet at the beginning of the month to 553.77 feet at a rate of 0.078 feet at the end of the month resulting in 2.43 feet decrease in the water level at the end of May, 2023.

In May, 2023, the month end water level recorded was 6.17 feet lower than what was recorded as the same period in 2022. The water level for the Bui dam was just 2.59 feet above the minimum operating level of the power plant. This has necessitated the conservative operation of the plant. The power plant is now restricted to operating two unit only at peak. This would ensure that the level of the dam does not reach the minimum level of 551.18 feet.

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

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



FUEL SUPPLY FOR POWER GENERATION

Natural Gas imports Increased in May, 2023

The supply of natural gas from Nigeria through the West African gas pipeline increased from 51.15MMSCFD in April 2023 to 57.24MMSCFD in May 2023. This depicts a 11.9% increase in natural gas supply. On the average, gas imports accounted for 17.9% in the total fuel mix and 18.2% in the gas supply mix.

Natural gas supply from domestic sources increased in May 2023

The average natural gas supply for May, 2023 was 252.7MMSCFD which was higher than the average gas supply of 222.90MMSCFD in April 2023. This indicates 13.4% increase in the domestic supply of natural gas. On the average natural gas from domestic sources accounted for 80.3% in the total fuel mix and 81.8% in the gas supply mix

Consumption of liquid fuel decreased in May 2023

In May 2023, liquid fuel consumption was recorded as 35,831.39bbbls made up 22,466.11bbbls DFO and 13,365.25bbbls HFO in January, 2023. On the average, liquid fuel accounted for an average of 1.8% in the total fuel mix. DFO accounted for 59.9% of the total liquid mix whilst HFO accounted for 40.1%. The plants responsible for the consumption of liquid fuels, DFO & HFO, in May, 2023 were KTPP, AKSA and 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

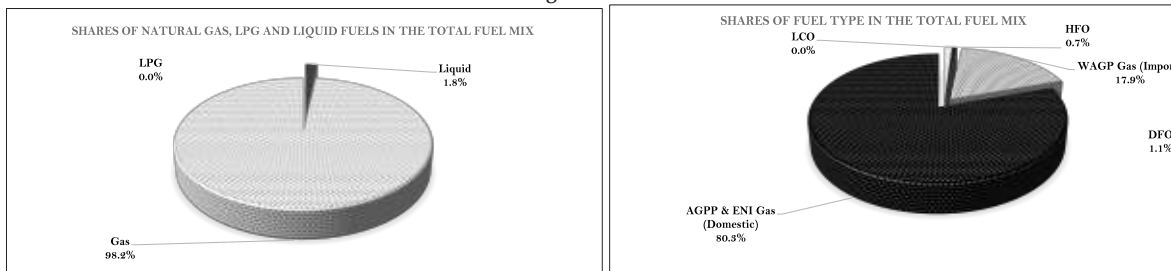


Figure 4a: Contribution of Natural Gas Supply by sources

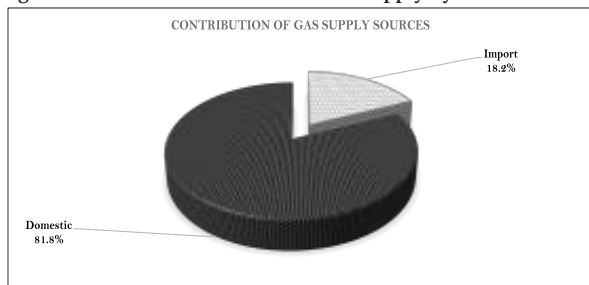


Figure 4b: Contribution of individual fuel in the liquid fuel supply

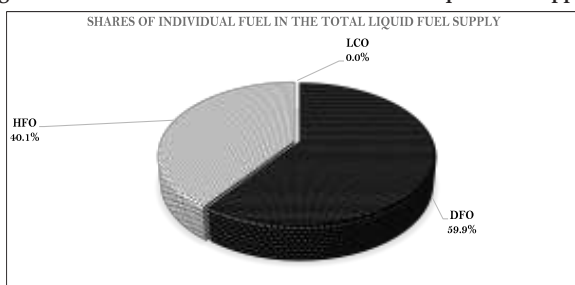


Figure 5a: Electricity Supply by sources

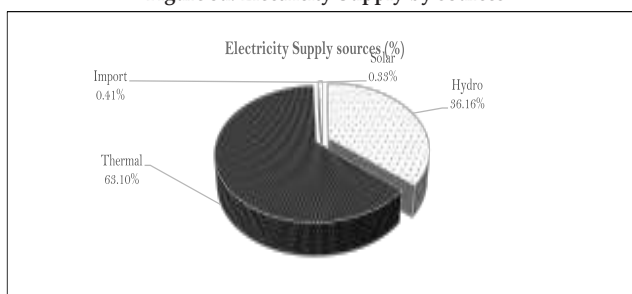
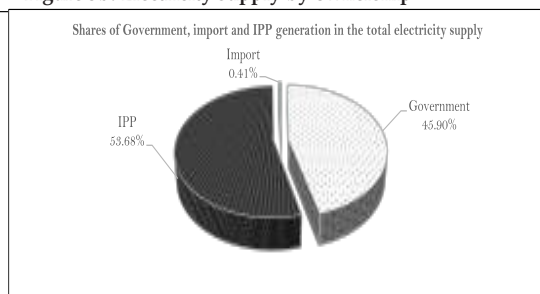


Figure 5b: Electricity supply by ownership



Peak Electricity Supply for May 2023		
Source of Supply	Generation at System Peak Load (MW)	Generation at Ghana Peak Load (MW)
AKOSOMBO	978.40	948.66
KPONG	128.80	127.76
BUI	204.20	220.28
BUI Solar	-	-
SEAP	344.30	391.80
TAPCO	138.60	142.80
TICO	333.00	338.07
TT1PP	-	-
CENIT	-	-
TT2PP	10.00	9.90
TWIN CITY	194.70	196.60
KARPOWER	452.00	421.80
AMERI	-	-
KTPP	102.00	100.00
Trojan Power	-	-
CENPOWER	353.00	358.00
AKSA	270.40	135.80
Bridge Power	-	-
IMPORT	52.00	3.00
Export to CIE at peak	-	-
Export to CEB at peak	278.00	104.00
Export to Sonabel	155.00	137.00
System Coincident Peak Load	3,561.40	
Ghana Coincedent Peak Load		3,153.47

OPERATIONAL FACT SHEET

May 2023 Average Monthly Natural Gas Flowrate (MMSCFD)	
Location	Monthly Average
Etoki	61.42
Tema WAGPCo	155.47
Aboadze WAGPCo	157.82
Aboadze GNGC	96.48
Reverse Flow	90.57
ENI	205.15

Hydro Dam Water level for May 2023			
	Beginning month (ft)	End month (ft)	Change in water level
Hydro Dam			(feet)
Akosombo	267.08	265.55	-1.53
Bui	556.20	553.77	-2.43

	Weekly Electricity Supply (GWh)				
	Week 1	Week 2	Week 3	Week 4	Total
AKOSOMBO	141.19	142.98	131.62	182.81	598.59
KPONG	21.56	20.66	20.27	29.29	91.79
BUI Hydro	13.71	17.52	10.34	21.96	63.52
Bui Solar	1.64	1.69	1.45	2.14	6.92
VRA Kaleo	1.01	0.49	0.39	0.63	2.52
SAPP	61.63	59.48	58.26	84.80	264.16
TAPCO	23.87	23.57	23.95	45.09	116.48
TICO	52.39	54.55	55.37	65.14	227.45
TT1PP	3.81	0.00	0.00	0.00	3.81
CENIT	0.00	0.00	2.59	8.99	11.59
TT2PP	1.36	1.56	0.75	2.42	6.09
Twin City	32.02	32.11	29.34	37.52	130.99
KARPOWER	41.39	62.13	33.29	68.29	205.11
AMERI	0.00	0.00	0.00	0.00	0.00
KTPP	10.48	18.77	17.28	24.71	71.24
Cenpower	48.12	29.37	49.90	71.90	199.30
AKSA	14.94	22.78	16.06	25.66	79.44
Bridge Power	0.00	0.00	0.00	0.00	0.00
Import	1.19	1.67	2.61	3.13	8.60
Total	470.31	489.32	453.49	674.48	2,087.61

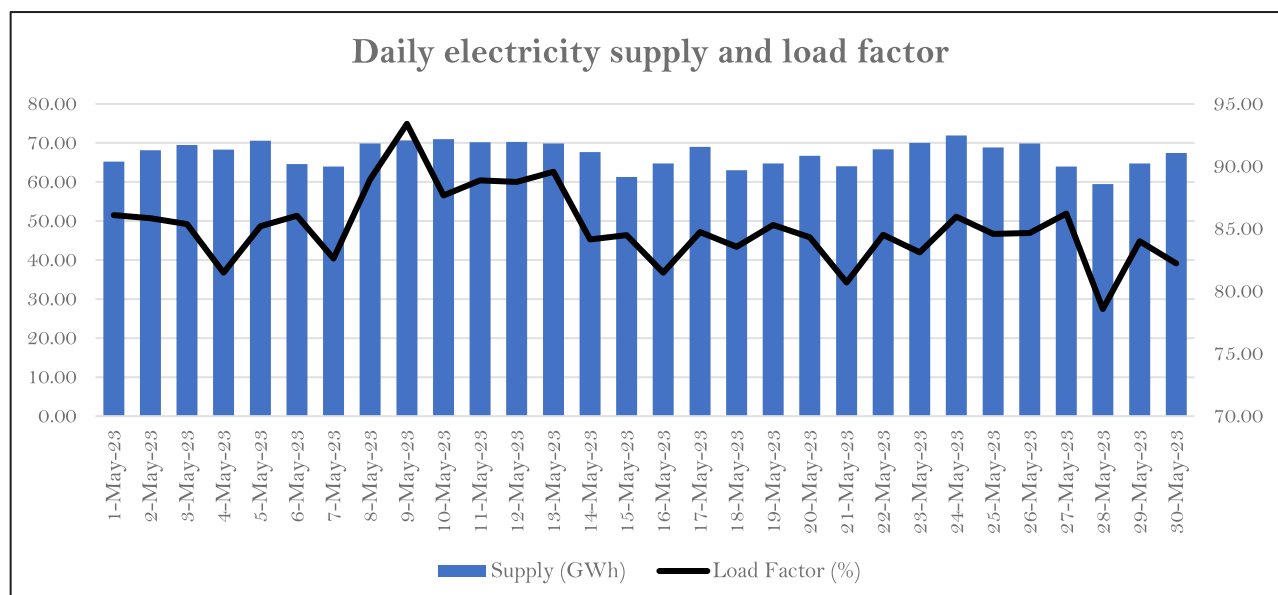
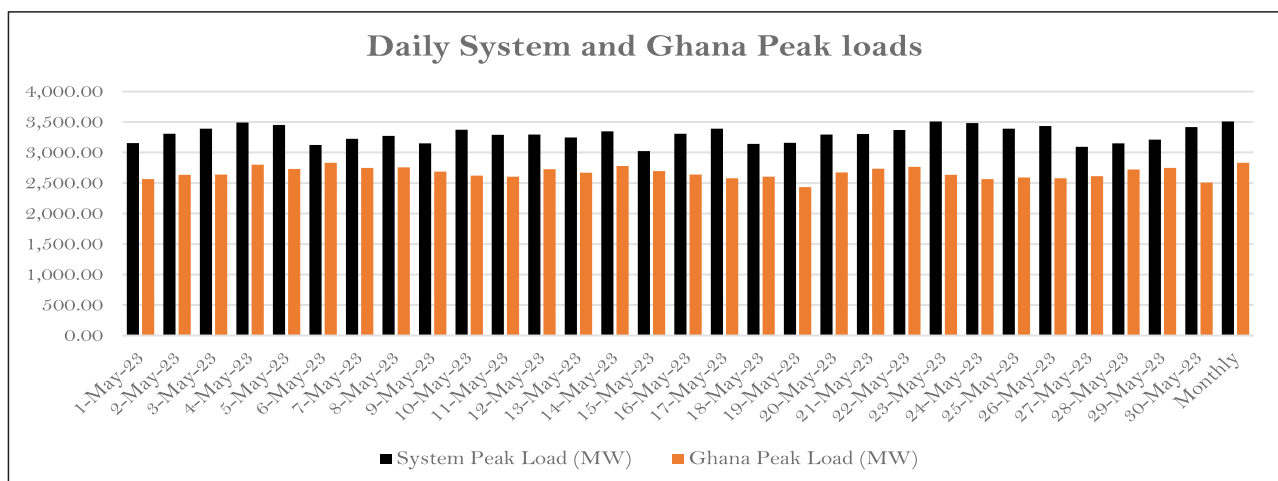
	Heat rate (Btu/kWh)	Fuel Consumption (MMBtu)			
		Natural gas	LCO	HFO	DFO
TAPCO	9,125.62	1,062,915.71	-	-	-
TICO	7,513.17	1,708,880.04	-	-	-
SAPP	8,005.99	2,114,889.57	-	-	-
TT2PP	11,457.25	69,813.58	-	-	-
TT1PP	12,833.06	48,893.94	-	-	-
CENIT	12,023.71	139,330.78	-	-	-
KARPOWERSHIP	8,219.49	1,685,868.47	-	-	-
AMERI PLANT	-	-	-	-	-
KPONE THERMAL	11,604.17	796,880.63	-	-	29,852.50
CENPOWER	7,803.95	1,473,224.78	-	-	82,080.48
AKSA ENERGY	8,742.32	613,555.27	-	80,926.80	-
Twin City	7,856.77	1,028,946.87	-	-	214.77
Bridgepower	-	-	-	-	-

Monthly Average Electricity Prices in the WEM				
		May-23	Apr-22	Change
Average Market Price (AMP)	US\$/MWh	101.88	150.01	-48.13
System Marginal Cost (SMC)	US\$/MWh	98.37	248.18	-149.81
System Marginal Price (SMP)	US\$/MWh	117.03	269.37	-152.34

OPERATIONAL FACT SHEET

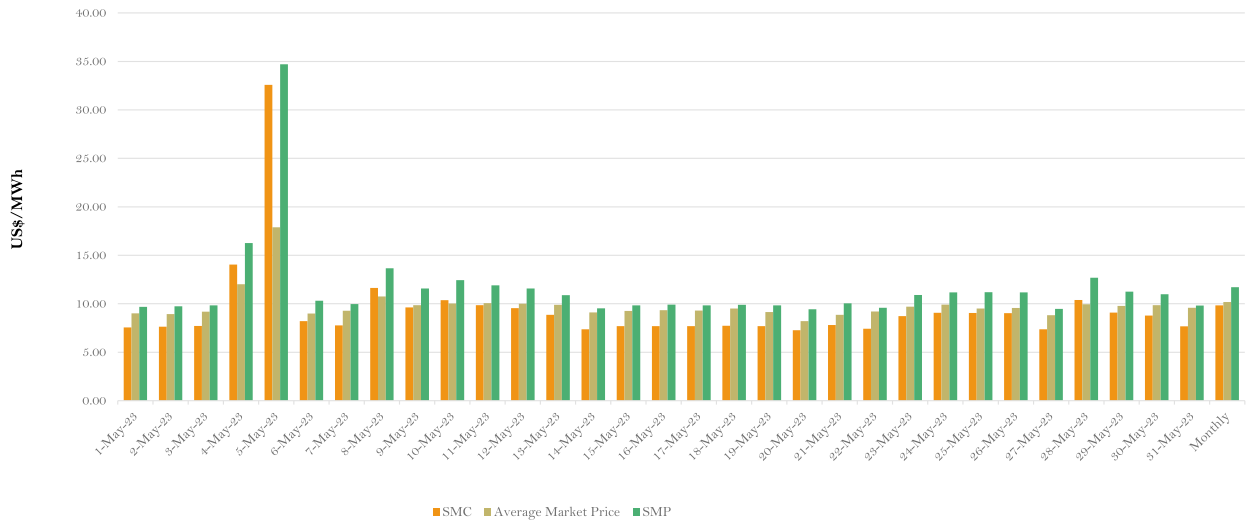
Power Plants	Average fuel price (US\$/MMBtu)
TAPCO	6.52
TICO	6.52
SAPP	6.52
TT ₂ PP	6.52
TT ₁ PP	6.52
CENIT	6.52
KARPOWERSHIP	6.52
AMERI PLANT	0.00
KPONE THERMAL	7.67
CENPOWER	8.20
AKSA ENERGY	7.90
Twin City	6.52
Bridgepower	0.00

Month Average fuel prices						
	Gazetted Natural Gas Price	Weighted average natural gas price	LCO	HFO	DFO	LPG
US\$/MMBtu	6.5165	6.32	22.37	18.37	38.48	17.96



ECONOMIC FACT SHEET

Summary of Market Prices for May 2023



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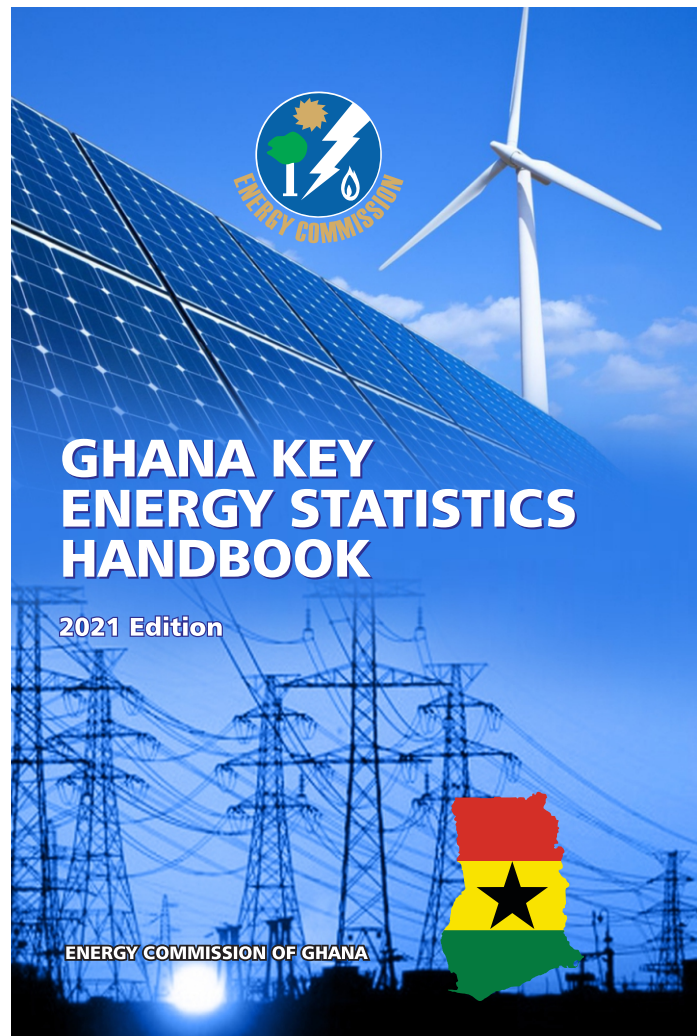
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Acronyms

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

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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