GHANA WHOLESALE ELECTRICITY MARKET BULLETIN

MARKET WATCH

Monthly Market Data Analysis

ISSUE NO. 82 1st February 2023 to 28th February 2023

This Bulletin covers major developments in the Wholesale Electricity Market (WEM) of Ghana from 1st February 2023 to 28th February 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 (EMOP) would very much appreciate and welcome comments from readers on the Bulletin.

HIGHLIGHTS OF THE MONTH

The System Peak Load for February, 2023 was 3,525.90 MW which was higher than the 3,496.0 MW projected in the 2023 Electricity Supply Plan (ESP). The System Peak Load recorded was made up of 3,268.10MW of domestic demand and 296MW of the Export demand. The Ghana Peak Load which is Ghana's System demand (excluding export) for February, 2023 was 3,269.10 MW which was higher than the 3,146MW projected in the 2023 supply plan. In the month, February 2023, the System Peak occurred on 21st February whilst Ghana Peak occurred on 14th February, 2023.

In February 2023, the electricity supply averaged 67.66GWh per day. This value was marginally lower than the 66.29GWh per day projected in the 2023 ESP. A total of 1,894.39GWh of electricity was supplied in January, 2023 which was 2.07% higher than the 1,856GWh projected in the 2023 ESP. Electricity export for the month totaled 170.05GWh and it was 0.3% higher than the 169.6 GWh projected in the 2023 Electricity Supply plan.

The Regulated Market accounted for 80.12% of electricity purchased in the Ghana Wholesale Electricity market in February 2023. The De-regulated Market accounted for 6.5% in February, 2023 whilst the Export Market accounted for the rest.

The Akosombo Dam water level continued to decrease in February 2023 from 279.50feet as at the end of January 2023 to 269.58 feet at the end of February, 2023. The water level decreased by 9.92 feet at the rate of 0.04 feet per day in February, 2023.

Table 1. Projected and Actual Outturn of Electricity Demand and Supply in January 2023 and February 2023.

	Jan-23		Feb-23	
	Projected	Actual	Projected	Actual
Total Supply (GWh)	1,983.5	2,024.3	**1,856.00**	1,894.4
Source by Power Plants (GWh)				
AKOSOMBO	489.0	543.1	424.4	505.9
KPONG	88.5	88.1	**76**	83.2
BUI	130.5	156.5	96.4	145.8
BUI Solar	12.3	6.4	12.0	6.4
Kaleo		5.4	1.5	1.3
Sunon Asogli	271.8	257.2	**288.7**	231.1
TAPCO	214.3	194.4	193.5	191.4
TICO	222.6	232.7	192.5	176.3
TT1PP	63.2	3.8	-	57.8
CENIT	28.2	7.0	32.8	32.4
TT2PP	6.3	2.2	6.3	3.5
Twin City	120.2	143.8	108.5	85.9
KARPOWER	126.5	114.6	120.0	113.7
AMERI	-	-	-	-
KTPP	-	65.4	57.1	13.6
CENPOWER	177.7	179.6	217.7	218.9
AKSA	25.4	22.7	23.2	26.5
Bridge Power	-	-	-	-
Total Domestic Supply (GWh	1,976.5	2,023.0	1,850.6	1,893.5
Imports (GWh)	-	1.2	-	0.9
Total Supply (GWh)	1,976.5	2,024.3	1,850.6	1,894.4
Ghana Coincedent Peak Load	3,124.0	3,161.4	3,146.0	3,268.1
System Coincident Peak Load	3,474.0	3,557.4	3,496.0	3,525.9

HIGHLIGHTS OF THE MONTH

The water level for the Bui dam at the beginning of the month was 581.14feet and ended the month with a water level of 558.69feet lower than the beginning of the month. The water level continued to decrease at a rate of 0.28feet per day to end the month of February, 2023 at a water level of 573.36 feet.

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 99.9%. This underscore the growing importance of natural gas in Ghana's electricity generation mix especially for thermal power plants.

ELECTRICITY TRADING

Electricity Demand

The system peak load for February 2023 was 3,525.90MW as compared to 3,557.38MW in January, 2023 which was 0.9% lower than what was recorded in January, 2023. This decrease is attributable to a decrease in the domestic load.

The Ghana Peak Load increased by 3.4%from 3,161.38MW to reach 3,268.10MW in February, 2023. The load factor for February, 2023 was 72.21%.

Electricity export at the system peak load to CIE, CEB and SONABEL was 296MW in February, 2023 which was a 9.3% reduction in export. Electricity export in February, 2023 was made up of 85MW, 52MW,159MW for CIE, CEB and SONABEL respectively. The decrease in export demand from January 2023 to February 2023 is attributable to decrease in export demand to CEB.

The average electricity demand for January, 2023 was 2,681.62MW compared to 2,794.13MW in February 2023.

The average electricity demand for regulated market was 2,238.58MW whilst January, 2023 was 2,116.73MW. This could be attributed to the weather conditions that necessitated the need for cooling in February, 2023. For the regulated markets, ECG accounted for 87.6% of the average demand whilst NEDCO and Enclave power accounted for an average of 10.7% and 1.7% respectively.

The average demand for the de-regulated market was 183.04MW for February, 2023. The mines accounted for 91.5% whilst bulk customers accounted for 8.5% of the de-regulated market demand. Export markets recorded an average demand of 372.51MW for February, 2023. Export to neighboring countries accounted for 72.8% of our export demand whilst VALCO accounted for the rest.

Electricity supply

A total of 1,894.39GWh of electricity was supplied in February, 2023 which was higher than the 1,856.0GWh projected in the 2023 ESP. Electricity supply averaged to 67.7GWh per day which was 2.3% higher than the 66.3GWh per day projected in the 2023 supply plan. In addition, domestic supply accounted for 99.95% of the total generation while inadvertent imports from CIE accounted for 0.05%. Electricity export for the month of February, 2023 totaled 250.3GWh and this was higher than the 236.7GWh projected in the 2023 ESP.

Electricity supplied by thermal plants in February, 2023 constituted 60.80% of the total electricity supplied.
The solar power plant contribution to total electricity supplied was 0.34% while hydro accounted for 38.81%. hence renewable energy accounted for 39.15% of the total supply in February, 2023. Thermal Plants have a greater share in the electricity mix.

A total of 1,504.3GWh of electricity was supplied to the Regulated Market in February, 2023, whilst de-regulated market and export market were supplied with 123.0GWh and 250.3GWh respectively.

A total of 182.21GWh of electricity was supplied to the export market to our neighboring countries in February, 2023. Electricity export to CIE was 49.67GWh which was higher than the 45.78GWh recorded in January, 2023. Export to CEB in February 2023 was 40.78GWh which was lower than the 75.94GWh recorded in January, 2023. SONABEL's share of the total electricity exported was 91.76GWh lower than the 96.3GWh recorded in January, 2023.

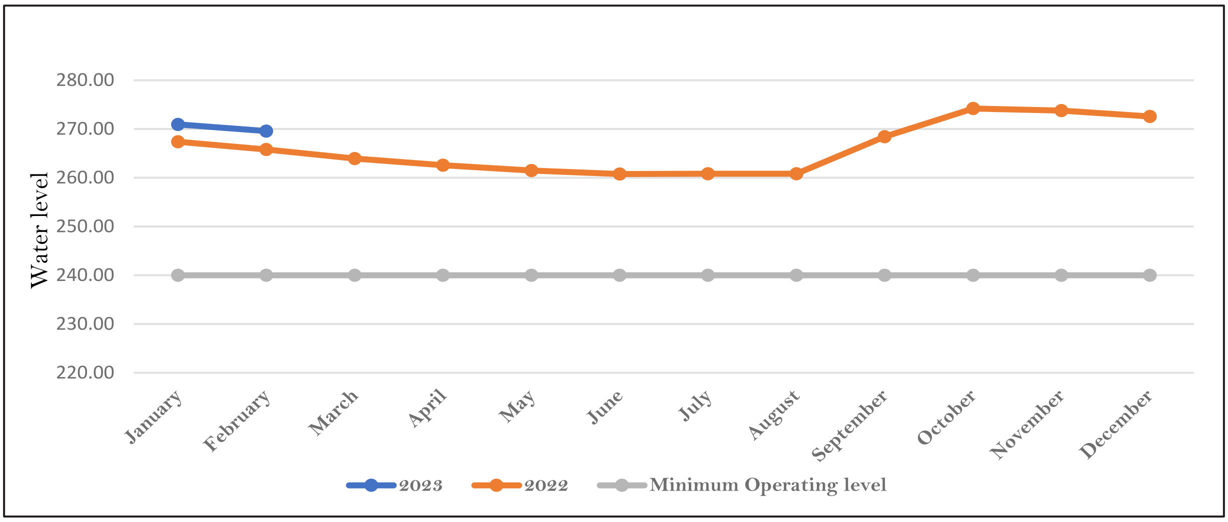
HYDRO DAM LEVELS

Akosombo water level continued to drop in February, 2023

There was a rate of drop in the water level for the Akosombo GS in February, 2023. In January 2023, the water level decreased at 0.052 feet per day whilst the water level continued to drop at 0.048 feet per day in February, 2023. As a result, the beginning month water level recorded was 270.95 feet and it dropped by 1.37 feet to 269.58 feet at the end of the month which was more than what was recorded in the same period in 2022. The end month water level of Akosombo dam for February, 2023 was 3.8 feet more than water level in the same period of the previous year. The month of February, 2023 attained 29.58 feet above the minimum operating level for Akosombo GS,

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

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

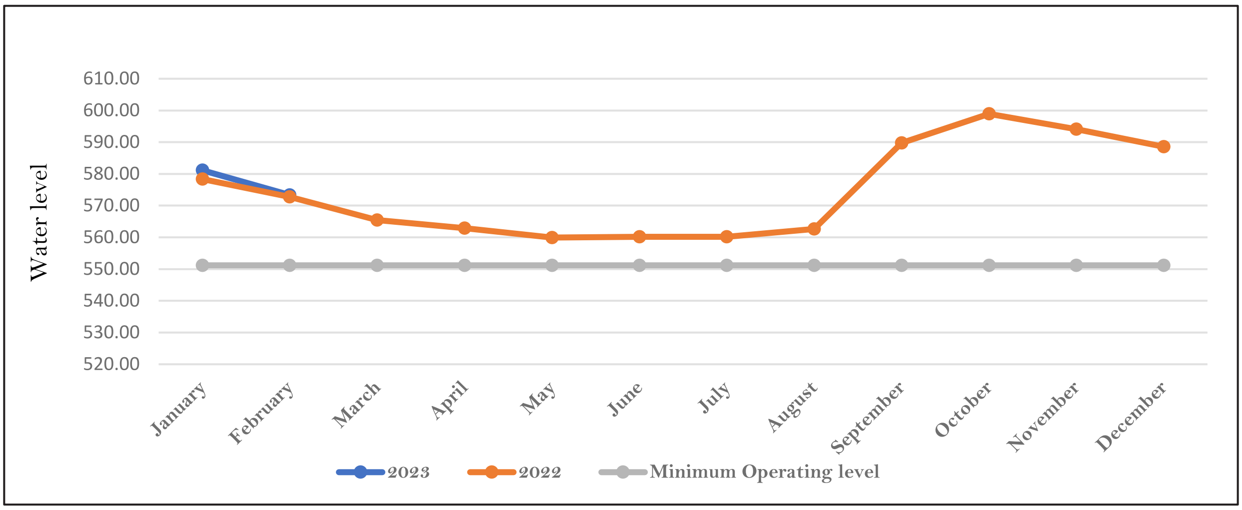


Bui dam water level continued to drop in February, 2023

In February 2023, the rate of drop of the water level for the Bui GS increased from 0.24 feet per day recorded in January 2023 to 0.28 feet per day. The water level for the dam decreased from 581.14 feet at the beginning of the month to 573.36feet by the end. The dam's monthly water level was 0.62 feet higher than the level recorded for the same time period in 2022 and 22.18 feet higher than the dam's minimal operating level.

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

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



FUEL SUPPLY FOR POWER GENERATION

Natural gas imports decreased in February 2023

The supply of natural gas from Nigeria through the West African gas pipeline reduced from 55.4MMSCFD in January, 2023 to 54.2MMSCFD in February, 2023. This represents a 2.2% decrease. Natural gas imports share in the total fuel mix and the natural gas supply mix accounted for 17.6%.

Natural gas supply from domestic sources increased in February, 2023

The average natural gas supply for February 2023 from domestic sources was 260.1MMSCFD which is higher than the average gas supply of 242.2MMSCFD at the beginning of the year. On the average natural gas from domestic sources accounted for 82.3% of the total fuel supplied and 82.4% in the gas supply mix.

Consumption of liquid fuel decreased in the Second month of 2023

There is a decrease in liquid fuel consumption in February 2023 from January 2023 which recorded 12,370.39bbls. There was a record of liquid fuel consumption of 1,501.12bbls made up of 1,472.31bblsLCO and 28.81bbls DFO in February, 2023. On the average of 0.1% in the total fuel mix. LCO accounted for 98.0% of the total liquid mix whilst DFO accounted for the rest. The plant responsible for the consumption of liquid fuels, LCO and DFO, in February, 2023 was Cenpower.

Monthly Market Data Analysis

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

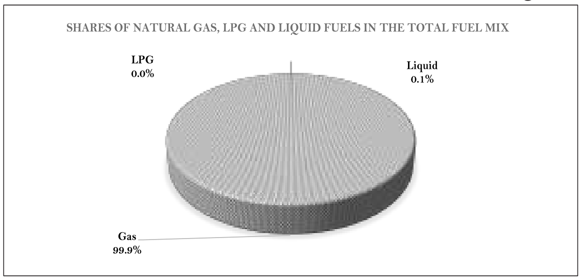


Figure 3b: Shares of fuel types in the generation fuel mix of power generation

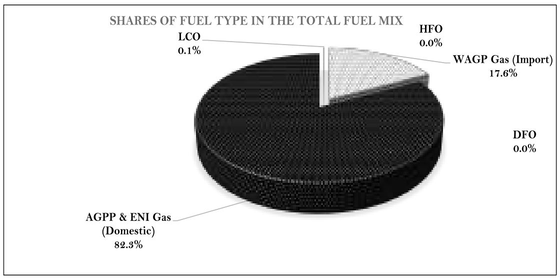


Figure 4a: Contribution of Natural Gas Supply by sources

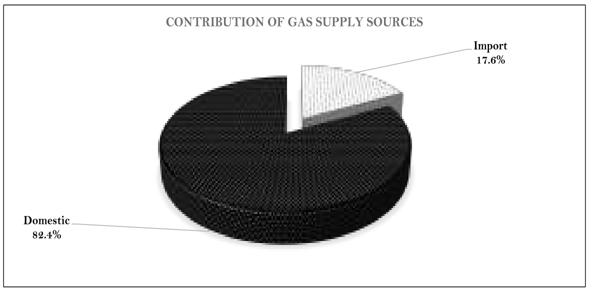


Figure 4b: Contribution of individual fuel in the liquid fuel supply

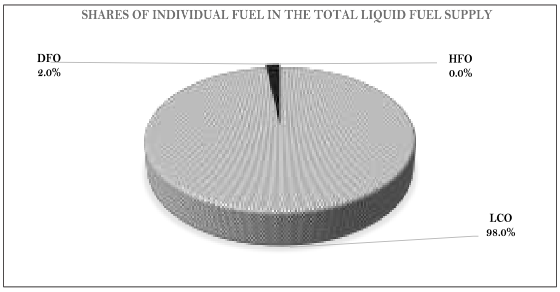


Figure 5a: Electricity Supply by sources

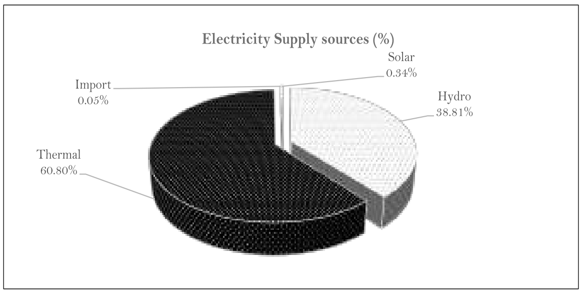
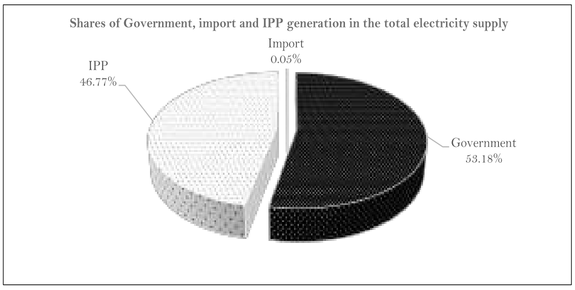


Figure 5b: Electricity supply by ownership



Peak Electricity Supply for February 2023		
Source of Supply	Generation at System Peak Load (MW)	Generation at Ghana Peak Load (MW)
AKOSOMBO	983.10	957.80
KPONG	142.50	138.00
BUI	346.10	354.60
BUI Solar	351.70	352.80
SEAP	291.70	298.00
TAPCO	166.60	157.00
TICO	106.00	-
TT1PP	106.00	106.00
CENIT	-	-
TT2PP	199.20	203.80
TWIN CITY	423.00	348.40
KARPOWER	-	-
AMERI	-	102.00
KTPP	-	-
Trojan Power	364.00	365.00
CENPOWER	46.00	88.70
AKSA	-	-
Bridge Power	-	-
IMPORT	3,525.90	3,472.10
Export to CIE at peak	85.00	13.00
Export to CEB at peak	52.00	55.00
Export to Sonabel	159.00	136.00
System Coincident Peak Load	**3,525.90**	
Ghana Coincedent Peak Load		**3,472.10**

OPERATIONAL FACT SHEET

February 2023 Average Monthly Natural Gas Flowrate (MMSCFD)	
Location	Monthly Average
Etoki	57.01
Tema WAGPCo	160.08
Aboadze WAGPCo	144.89
ENI	197.59
Aboadze AGPP	99.67
Reverse Flow	104.31

Hydro Dam Water level for February 2023			
	Beginning month (ft)	End month (ft)	Change in water level
Hydro Dam			(feet)
Akosombo	270.95	269.58	-1.37
Bui	581.14	573.36	-7.78

	Weekly Electricity Supply (GWh)				
	Week 1	Week 2	Week 3	Week 4	Total
AKOSOMBO	120.68	134.44	126.57	124.16	505.85
KPONG	20.41	21.18	20.84	20.74	83.17
BUI Hydro	35.79	37.15	32.91	39.91	145.76
Bui Solar	1.65	1.71	1.49	1.57	6.43
VRA Kaleo	0.40	0.41	0.33	0.11	1.25
SAPP	57.08	57.55	60.05	56.39	231.07
TAPCO	50.09	43.14	49.25	48.96	191.43
TICO	54.45	50.61	30.66	40.61	176.33
TT1PP	15.41	8.84	16.38	17.13	57.76
CENIT	4.82	10.53	10.47	6.61	32.43
TT2PP	1.52	1.58	0.00	0.36	3.46
Twin City	22.45	1.16	30.52	31.76	85.89
KARPOWER	17.00	45.70	21.80	29.18	113.68
AMERI	0.00	0.00	0.00	0.00	0.00
KTPP	2.50	8.74	2.36	0.00	13.60
Cenpower	52.36	59.24	54.95	52.37	218.92
AKSA	8.43	5.86	6.46	5.75	26.50
Bridge Power	0.00	0.00	0.00	0.00	0.00
Import	0.14	0.10	0.17	0.45	0.86
Total	**465.19**	**487.94**	**465.20**	**476.06**	**1,894.39**

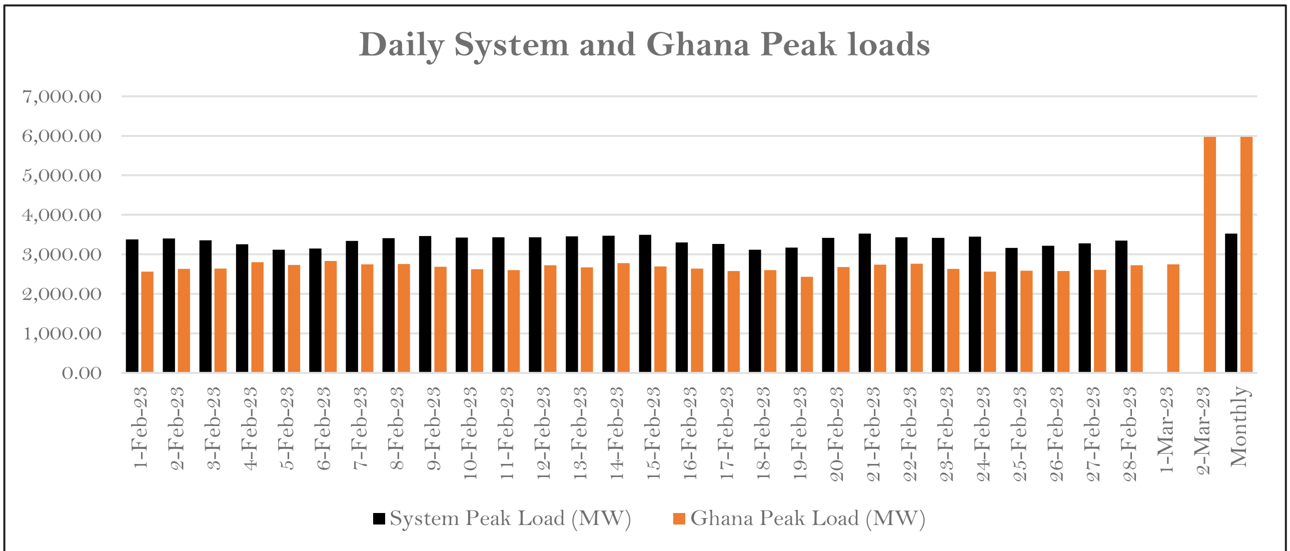
		Fuel Consumption (MMBtu)			
	Heat rate (Btu/kWh)	Natural gas	LCO	HFO	DFO
TAPCO	8,706.89	1,666,794.89	-	-	-
TICO	7,382.00	1,301,667.91	-	-	-
SAPP	7,436.02	1,718,240.61	-	-	-
TT2PP	11,060.78	38,248.17	-	-	-
TT1PP	12,359.33	713,875.17	-	-	-
CENIT	10,244.09	332,185.01	-	-	-
KARPOWERSHIP	8,187.88	930,777.33	-	-	-
AMERI PLANT	-	-	-	-	-
KPONE THERMAL	12,919.82	175,670.82	-	-	-
CENPOWER	7,777.40	1,694,683.75	7,788.50	-	155.07
AKSA ENERGY	7,854.72	208,186.87	-	-	-
Twin City	7,842.96	672,467.01	75.88	-	1,081.60
Bridgepower	-	-	-	-	-

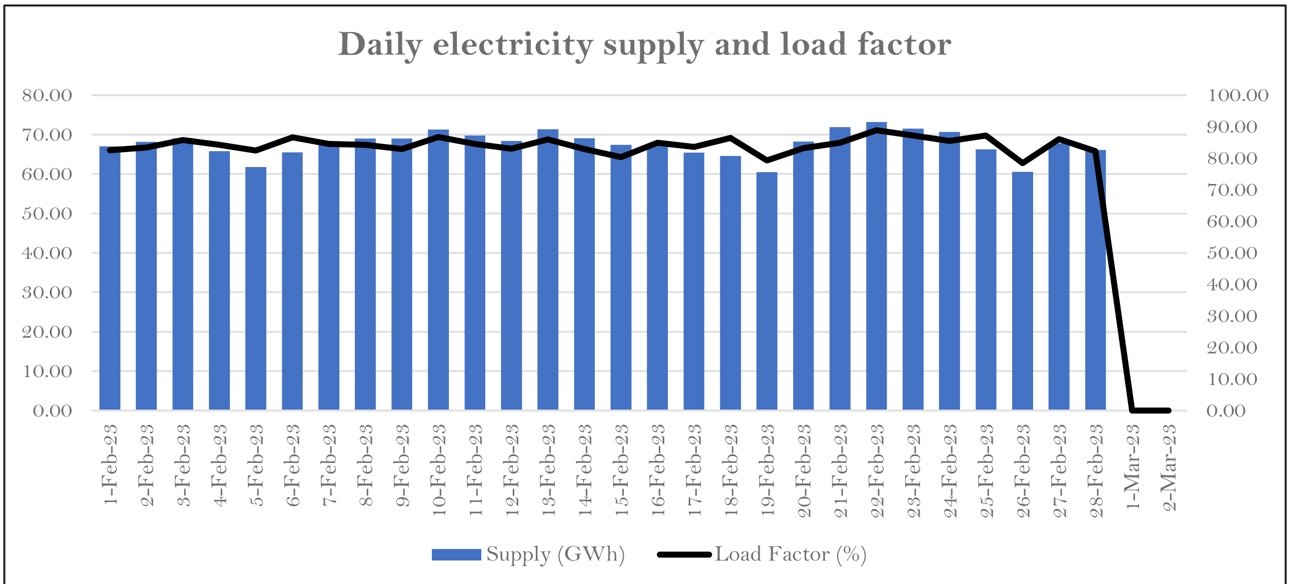
Monthly Average Electricity Prices in the WEM				
		Feb-23	Jan-23	Change
Average Market Price (AMP)	US$/MWh	100.42	115.92	-15.50
System Marginal Cost (SMC)	US$/MWh	121.28	160.43	-39.15
System Marginal Price (SMP)	US$/MWh	145.11	178.57	-33.46

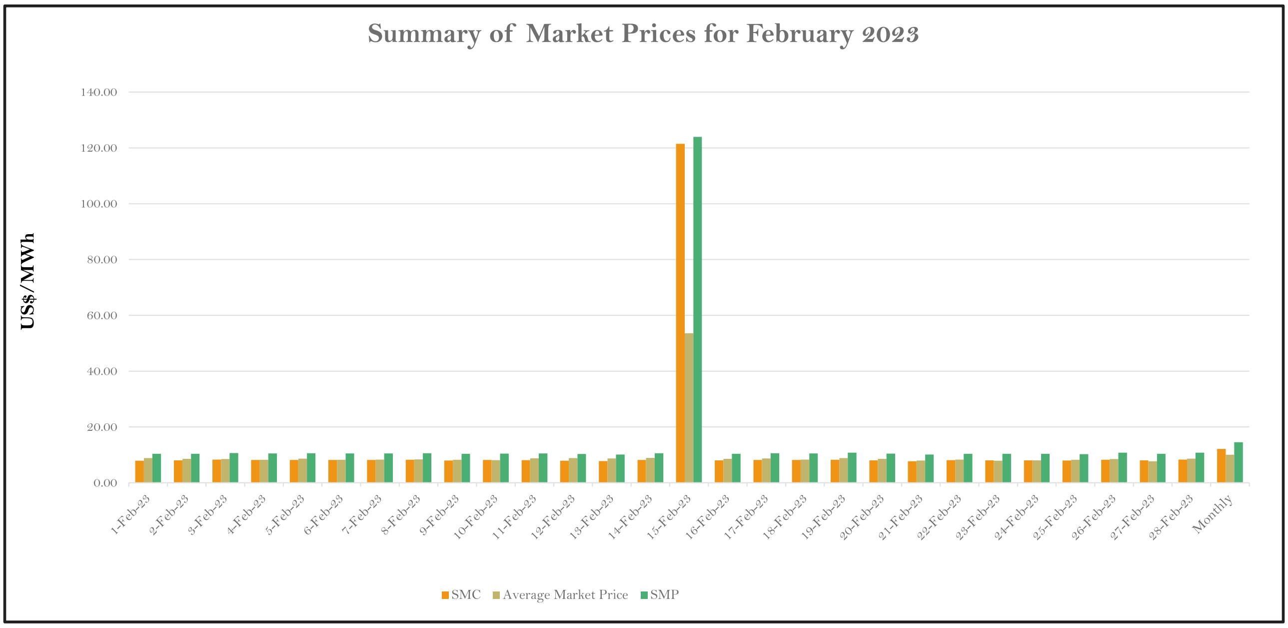
OPERATIONAL FACT SHEET

	Month Average fuel prices					
	Gazetted Natural Gas Price	Weighted average natural gas price	LCO	HFO	DFO	LPG
US$/MMBtu	6.08	6.33	22.37	18.37	38.48	17.96

Power Plants	Average fuel price (US$/MMBtu)
TAPCO	6.08
TICO	6.08
SAPP	6.08
TT2PP	6.08
TT1PP	6.08
CENIT	6.08
KARPOWERSHIP	6.08
AMERI PLANT	0.00
KPONE THERMAL	6.08
CENPOWER	6.16
AKSA ENERGY	6.08
Twin City	6.13
Bridgepower	0.00






Summary of Market Prices for February 2023
US$/MWh
140.00
120.00
100.00
80.00
60.00
40.00
20.00
0.00
1-Feb-23
2-Feb-23
3-Feb-23
4-Feb-23
5-Feb-23
6-Feb-23
7-Feb-23
8-Feb-23
9-Feb-23
10-Feb-23
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20-Feb-23
21-Feb-23
22-Feb-23
23-Feb-23
24-Feb-23
25-Feb-23
26-Feb-23
27-Feb-23
28-Feb-23
Monthly
SMC
Average Market Price
SMP

Acronyms

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*
LCO = Light Crude Oil	*LI = Legislative Instrument*
LTA = Long Term Average	*MW = Megawatt*
MMscf = Million Standard Cubic Feet	*MWh = Mega-watt hours*
NITS = National Interconnected Transmission System	*PV = Photovoltaic*
SAPP = Sunon Asogli Power Plant	*SMP = System Marginal Price*
SNEP = Strategic National Energy Plan	*TEN = Tweneboa, Enyenra, Ntomme*
TT1PP = Tema Thermal 1 Power Plant	*TT2PP = Tema Thermal 2 Power Plant*
VRA = Volta River Authority	*WAGPCo – West African Gas Pipeline Company*
WAGP = West African Gas Pipeline	*WEM = Wholesale Electricity Market*

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