GHANA WHOLESALE ELECTRICITY MARKET BULLETIN

MARKET WATCH

Monthly Market Data Analysis

ISSUE NO. 92 **1st February 2024 to 29th February 2024**

This Bulletin covers major developments in the Wholesale Electricity Market (WEM) of Ghana from 1st February 2024 to 29th February 2024. 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 2024 was 3,454.92MW which was lower than the 3,525.90MW recorded in the same period in 2023. The System Peak Load recorded was made up of 3,204.92MW of domestic demand and 296MW of Export demand. The Ghana Peak Load which is Ghana's demand (excluding export) for February 2024 was 3,204.92MW which was lower than the 3,268.10MW recorded in February 2023.

In February 2024, the electricity supply averaged 71.25GWh per day. This value was higherlower than the 67.66GWh per day recorded in February 2023. A total of 2,066.28GWh of electricity was supplied in February 2024 which was 9.07% higher than the 1,894.39GWh recorded in February 2023. Electricity export for the month totaled 187.81GWh which was 10.44% higher than the 170.05GWh in February 2023.

The Regulated Market accounted for 80.56% of electricity purchased in the Ghana Wholesale Electricity market in February 2024. The De-regulated Market accounted for 6.53% in February 2024 whilst the Export Market accounted for the rest.

The Akosombo Dam water level continued to decrease in February 2024 from 273.24ft as at the end of January 2024 to 271.74ft at the end of February 2024. The water level decreased by 1.5ft at the rate of 0.05ft per day in February 2024.

The water level for the Bui dam at the beginning of the month was 568.18ft, which declined at a rate of 0.35ft per day to end the month at 558.10ft

Table 1. Actual Outturn of Electricity Demand and Supply in February 2023 and February 2024.

	Feb-23	Feb-24
	Actual	Actual
Total Supply (GWh)	1,894.39	2,066.3
Source by Power Plants (GWh)		
AKOSOMBO	505.85	624.9
KPONG	83.17	102.3
BUI	145.8	166.2
BUI Solar	6.4	6.6
Kaleo	1.3	3.7
Sunon Asogli	231.07	234.4
TAPCO	191.4	63.1
TICO	176.3	68.6
TT1PP	57.8	68.7
CENIT	32.4	6.7
TT2PP	3.5	-
Twin City	85.9	123.0
KARPOWER	113.7	304.1
AMERI	-	-
KTPP	13.6	26.2
GENSA	-	18.4
CENPOWER	218.9	195.3
AKSA	26.5	49.7
Bridge Power	-	-
Total Domestic Supply (GWh)	1,893.5	2,066.3
Imports (GWh)	0.9	4.3
Total Supply (GWh)	1,894.4	2,070.5
Ghana Coincedent Peak Load (M	3,268.1	3,204.9
System Coincident Peak Load (M	3,525.9	3,454.9

OVERVIEW 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 95.8%. This underscores the importance of natural gas in Ghana's electricity generation mix especially for thermal power plants. We need to at every point in time ensure natural gas supply security as it is one of the biggest threats to a stable and reliable electricity supply.

ELECTRICITY TRADING

Electricity Demand

The System Peak Load for February 2024 was 3,454.92MW as compared to 3,398MW in January 2024 which was 1.67% higher than what was recorded in January 2024. This increase is attributable to an increase in the domestic load.

Likewise, the Ghana Peak Load increased by 1.77% from 3,149MW in January 2024 to reach 3,204.92MW in February 2024. The load factor for February 2024 was 80.39%.

Electricity export at the System Peak Load to CIE, CEB and SONABEL was 250MW in February 2024 which was a 0.4% increase in export compared to January 2024.

Electricity export at the System Peak Load in February 2024 was made up of 86MW and 164MW for CEB and SONABEL respectively. The marginal increase in export demand from January 2024 to February 2024 is attributable to an increase in export demand to CEB.

The average electricity demand for February 2024 was 2,865.31MW compared to 2,735.29MW in January 2024. This represents a 4.75% increase in average demand for February 2023 compared to January 2024

The average electricity demand for the Regulated Market was 2,308.57MW in February 2024. ECG accounted for 87.58% of the average demand whilst NEDCO and EPC accounted for an average of 10.47% and 1.59% respectively. VRA township accounted for 0.33%

The average demand for the De-regulated Market was 187.22MW for February 2024. The mines accounted for 83.23% whilst bulk customers accounted for 16.76% of the De-regulated Market demand. Export markets recorded an average demand of 367MW for February 2024. Demand from neighbouring countries accounted for 74.22% of our export demand whilst VALCO accounted for 25.77%.

Electricity supply

Electricity supplied increased in February 2024 from an average of 67.90GWh per day in January 2024 to 71.25GWh per day in February 2024 representing a 4.93% increase.

The total Supply for February 2024 was 2,066.28GWh whilst January 2024 was 2,104.95GWh, due to the greater number of days in January 2024 compared to February 2024

In addition, domestic supply accounted for 99.8% of the total generation while inadvertent imports from CIE accounted for 0.21%. Electricity export for February 2024 totaled 187.81GWh and this was 10.44% higher than 170.05GWh recorded same period in 2023.

Electricity supplied by thermal plants in February 2024 constituted 56.06% of the total electricity supplied.

The solar power plant contribution to total electricity supplied was 0.50% while hydro accounted for 43.24%. Thus, renewable energy in February 2024 accounted for the total supply was 43.74%.

A total of 1,606.76GWh of electricity was supplied to the Regulated Market in February 2024 which includes ECG, NEDCO, Enclave power and VRA township. ECG accounted for 87.58%, NEDCO accounted for 10.48%, Enclave 1.59% and VRA township accounted for the rest
De-regulated Market and Export Market were supplied with 130.31GWh and 255.44GWh respectively in February 2024.

A total of 189.59GWh of electricity was supplied to our neighbouring countries in February 2024. Electricity export to CIE was 22.29GWh which increased from 22.29GWh recorded in January 2024. Furthermore, exports to CEB increased as well to 55.77GWh from 51.15GWh in January 2024. The total electricity exported to SONABEL was 111.53GWh

HYDRO DAM LEVELS

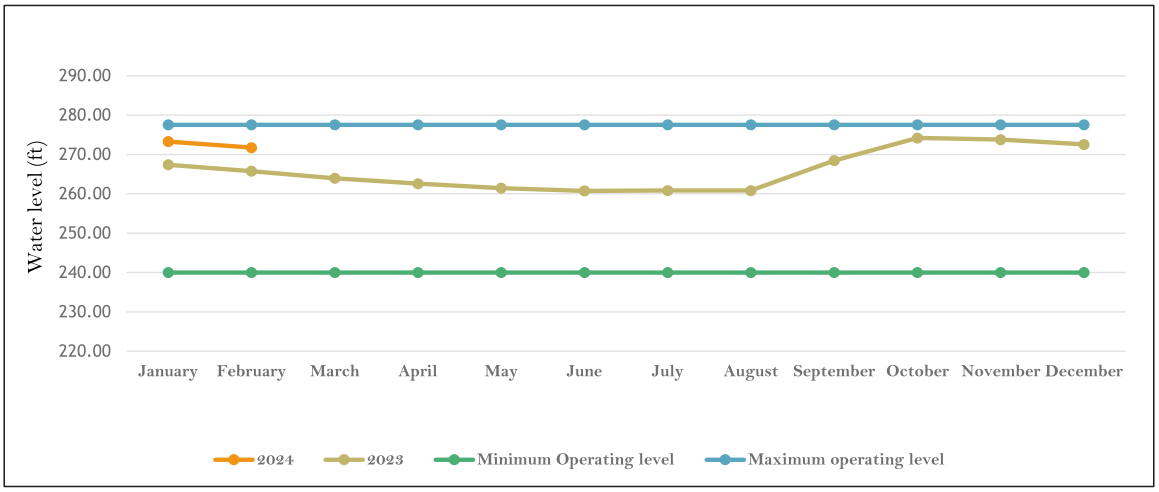
Akosombo water level continued to drop at an increasing rate in February 2024

The rate of drop in the Akosombo dam water level increased from 0.04 ft per day in January 2024 to 0.05 ft per day in February 2024. This represents a 25% increase in the rate of drop. in February 20243 compared to January 2024.

As a result, the water level of 273.24ft recorded at the beginning of the month dropped by 1.50ft to 271.74ft at the end of the month. The month-end water level was however 5.96ft higher than what was recorded in the same period of the previous year, was 5.8ft below the maximum operating level and 31.7ft above the minimum operating level.

Figure 1 shows the comparative end-of-month trajectory of the level of water in the Akosombo Dam from January 2023 to February 2024

Figure 1: Month-End Water Level for Akosombo Dam from January 2023 to February 2024.



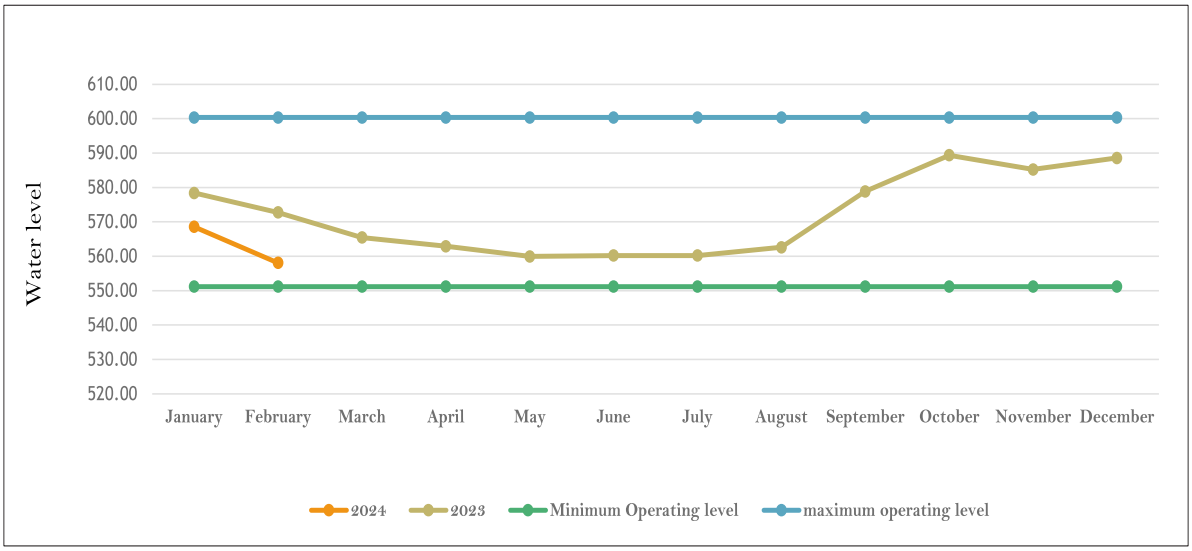
The rate of drop in the Bui Dam water level increased in February 2024

In February 2024, the rate of drop of the water level for the Bui GS increased from 0.321ft per day recorded in January 2024 to 0.34ft per day. The water level for the dam decreased from 568.18ft at the beginning of the month to 558.10ft by the end of the month. In addition, the dam was 6.92ft above the minimum operating level and 42.24ft below the maximum operating level in February, 2024

The steepness or rate of drop in the water level of Bui warrants a conservative dispatch of the plant. That is, the plant should only come online at peak. To achieve this, there is a need to speed up work on the relocation of the Ameri Power Plant (now Kumasi 1 power plant) to ensure reliable and quality of power supply to the middle and Northern parts of Ghana

Figure 2 shows the comparative end-of-month trajectory of the level of water in the Bui dam from January 2023 to February 2024

Figure 2: Month-End Water Level for Bui Dam from January 2023 to February 2024



FUEL SUPPLY FOR POWER GENERATION

Natural gas imports decreased in February 2024

The supply of natural gas from Nigeria through the West African gas pipeline reduced from 55.39MMSCFd in January 2024 to 52.38MMSCFD in February 2024. This represents a decrease of 5.43%. On average, gas imports accounted for 17.4% of the total fuel mix and 18.1% in the gas supply mix in January 2024

Natural gas supply from domestic sources increased in February 2024

The average natural gas supply for February 2024 was 2496.3458MMSCFD which was higher than the average gas supply of 2385.1170MMSCFD in January 2024. On average natural gas from domestic sources accounted for 78.3% of the total fuel supplied and 81.9% of the gas supply mix

Consumption of liquid fuel decreased in February 2024

There was a decrease in liquid fuel consumption in February 2024 from 115,8972,907 bbls recorded in January 2024 to 74,9635,830 bbls in February 2024. There was no consumption of LCO but 56,631499 bbls DFO and 19,331 bbls HFO. On average, liquid fuel accounted for an average of 4.12% of the total fuel mix. HFO and DFO accounted for 28.27.8% and 721.8.2% of the total liquid mix. The plants responsible for the consumption of liquid fuel, HFO and DFO in February 2024 were KTPP and AKSA

Monthly Market Data Analysis

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

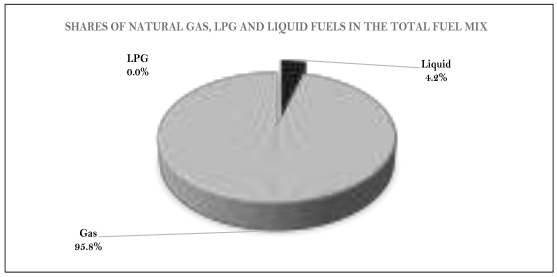


Figure 3b: Shares of fuel types in the generation fuel mix of power generation

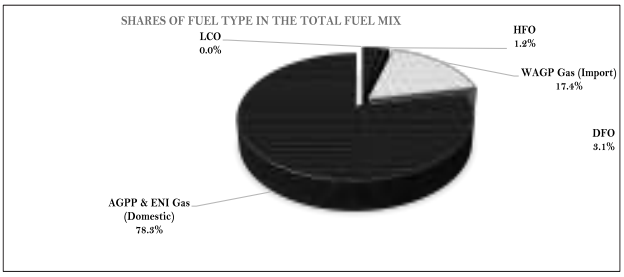


Figure 4a: Contribution of Natural Gas Supply by sources

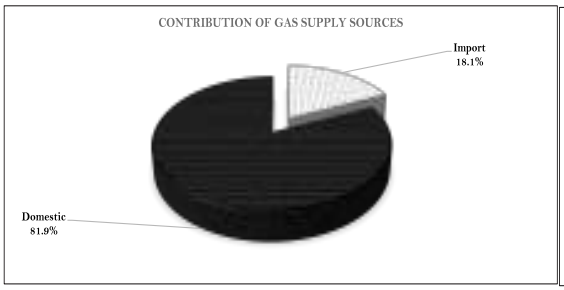


Figure 4b: Contribution of individual fuel in the liquid fuel supply

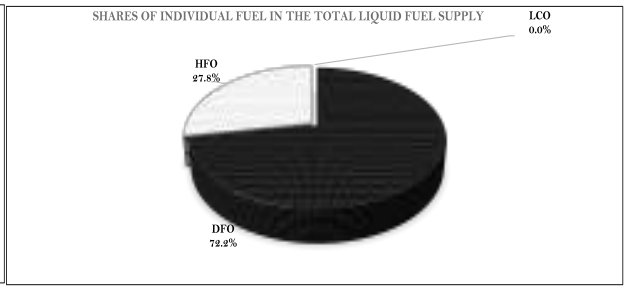


Figure 5a: Electricity Supply by sources

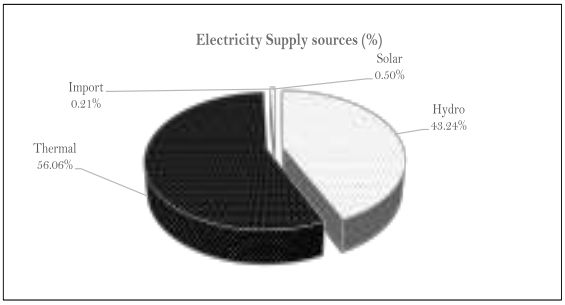
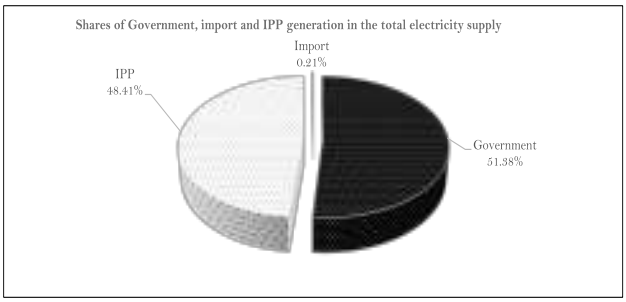


Figure 5b: Electricity supply by ownership



Peak Electricity Supply for February 2024		
Source of Supply	Generation at System Peak Load (MW)	Generation at Ghana Peak Load (MW)
AKOSOMBO	955.40	955.40
KPONG	150.90	150.90
BUI	305.40	305.40
BUI Solar	314.40	314.40
SEAP	102.00	102.00
TAPCO	108.00	108.00
TICO	-	-
TT1PP	-	-
CENIT	-	-
TT2PP	188.40	188.40
TWIN CITY	461.00	461.00
KARPOWER	-	-
AMERI	185.00	185.00
KTPP	-	-
Trojan Power	361.00	361.00
CENPOWER	296.40	296.40
AKSA	-	-
Bridge Power	-	-
IMPORT	3,454.92	3,454.92
Export to CIE at peak	-	-
Export to CEB at peak	86.00	86.00
Export to Sonabel	164.00	164.00
System Coincident Peak Load	**3,454.92**	
Ghana Coincedent Peak Load		**3,454.92**

(MMSCFD)	
Location	Monthly Average
Etoki	67.76
Tema WAGPCo	149.00
Aboadze WAGPCo	162.21
ENI	231.49
Aboadze AGPP	124.26
Reverse Flow	93.90

Hydro Dam Water level for February 2024			
	Beginning month (ft)	End month (ft)	Change in water level
Hydro Dam			(feet)
Akosombo	273.24	271.74	-1.50
Bui	568.18	558.10	-10.08

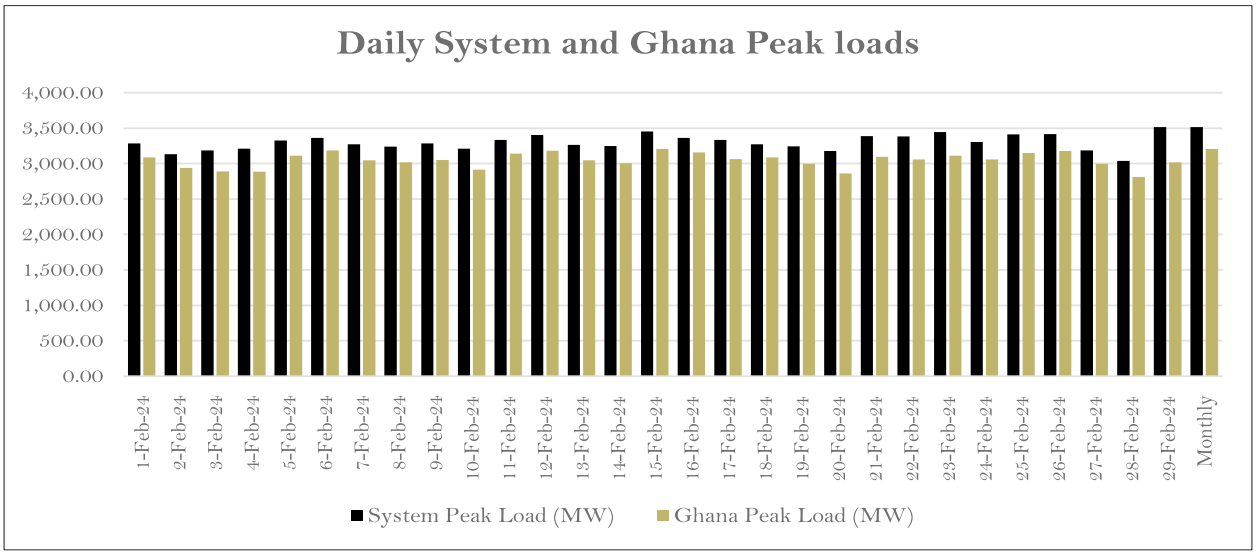
	Weekly Electricity Supply (GWh)				
	Week 1	Week 2	Week 3	Week 4	Total
AKOSOMBO	143.42	150.43	154.55	154.57	602.97
KPONG	24.81	24.48	24.62	24.87	98.77
BUI Hydro	33.17	42.65	44.78	40.96	161.56
Bui Solar	1.53	1.79	1.84	1.41	6.57
VRA Kaleo	0.83	0.97	0.92	0.87	3.59
SAPP	58.66	55.39	54.62	53.42	222.08
TAPCO	17.07	16.86	16.72	10.03	60.67
TICO	15.40	18.08	18.76	15.09	67.34
TT1PP	16.46	16.65	16.67	16.58	66.36
CENIT	0.00	1.33	0.00	3.00	4.33
TT2PP	0.00	0.00	0.00	0.00	0.00
Twin City	30.98	29.87	29.75	28.02	118.61
KARPOWER	66.92	74.62	76.18	75.60	293.32
AMERI	0.00	0.00	0.00	0.00	0.00
KTPP	6.54	8.02	1.96	8.45	24.97
Cenpower	45.18	49.67	51.92	48.59	195.35
AKSA	11.96	9.28	14.03	11.53	46.80
Bridge Power	0.00	0.00	0.00	0.00	0.00
Import	0.61	0.96	1.60	0.93	4.09
Total	473.52	501.02	508.91	493.92	1,977.37

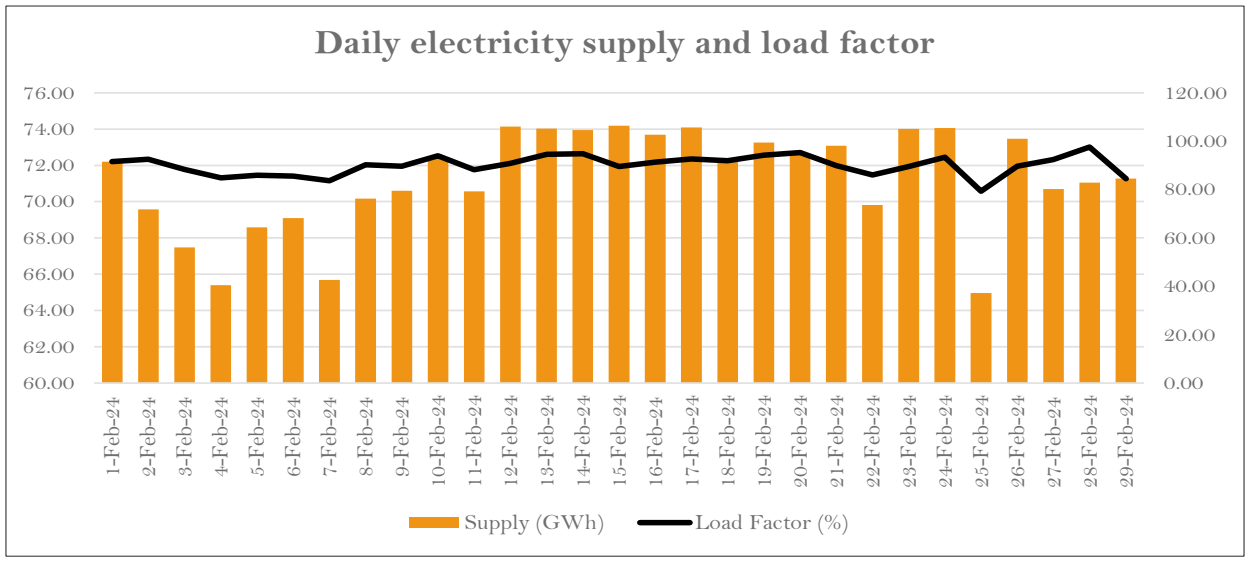
		Fuel Consumption (MMBtu)			
	Heat rate (Btu/kWh)	Natural gas	LCO	HFO	DFO
TAPCO	12,836.79	778,769.52	-	-	-
TICO	10,668.63	718,454.04	-	-	-
SAPP	8,605.01	1,911,021.44	-	-	-
TT2PP	-	-	-	-	-
TT1PP	13,833.76	917,980.54	-	-	-
CENIT	12,269.21	53,090.09	-	-	-
KARPOWERSHIP	8,312.17	2,438,148.96	-	-	-
AMERI PLANT	-	-	-	-	-
KPONE THERMAL	12,330.01	13,979.44	-	-	293,917.03
CENPOWER	7,880.86	1,529,994.74	-	-	9,506.22
AKSA ENERGY	10,375.23	368,461.08	-	117,051.99	-
Twin City	8,169.64	969,033.69	-	-	-
Bridgepower	-	-	-	-	-

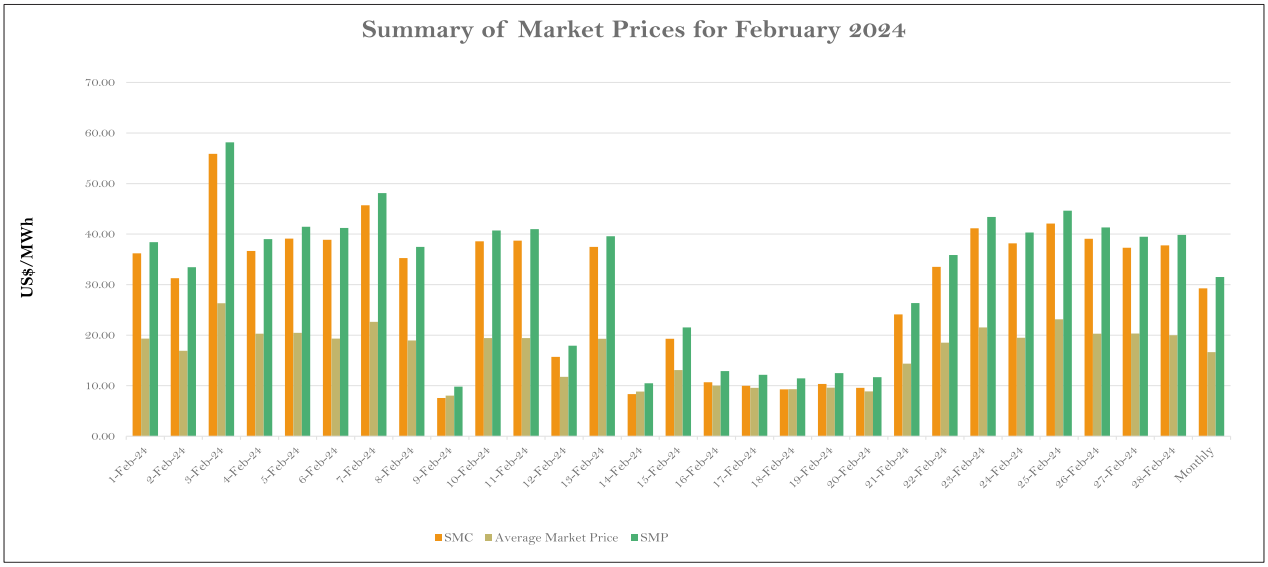
Monthly Average Electricity Prices in the WEM				
		Feb-24	Jan-24	Change
Average Market Price (AMP)	US$/MWh	166.42	115.92	50.50
System Marginal Cost (SMC)	US$/MWh	292.75	160.45	132.30
System Marginal Price (SMP)	US$/MWh	315.00	178.57	136.43

	Month Average fuel prices					
	Gazetted Natural Gas Price	Weighted average natural gas price	LCO	HFO	DFO	LPG
US$/MMBtu	6.0952	6.33	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	0.00
TT1PP	6.10
CENIT	6.10
KARPOWERSHIP	6.10
AMERI PLANT	0.00
KPONE THERMAL	37.01
CENPOWER	6.30
AKSA ENERGY	9.05
Twin City	6.10
Bridgepower	0.00






Summary of Market Prices for February 2024
US$/MWh
70.00
60.00
50.00
40.00
30.00
20.00
10.00
0.00
1-Feb-24
2-Feb-24
3-Feb-24
4-Feb-24
5-Feb-24
6-Feb-24
7-Feb-24
8-Feb-24
9-Feb-24
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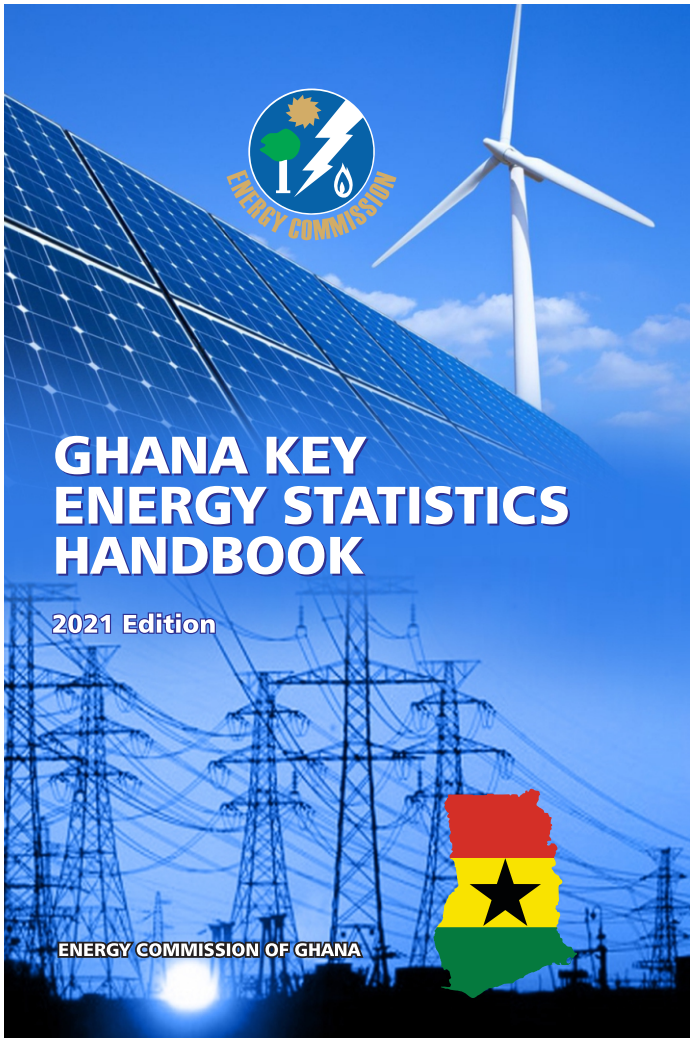
26-Feb-24
27-Feb-24
28-Feb-24
Monthly
SMC
Average Market Price
SMP



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

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