GHANA WHOLESALE ELECTRICITY MARKET BULLETIN

MARKET WATCH

Monthly Market Data Analysis

ISSUE NO. 73 1st January 2022 to 31st January 2022

This Bulletin covers major developments in the Wholesale Electricity Market (WEM) of Ghana from 1st January 2022 to 31st January 2022. 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

In January 2022, the System Peak Load recorded was 3,323.5 MW which occurred on 14th January 2022. This load was 8.3% higher than the 3,070.2 MW recorded in January 2021. A domestic load of 3,055.5 MW and the Export load of 268 MW made up the System Peak Load recorded in January 2022. The Ghana Peak Load grew by 8.4% in January 2022 to 3,055.5 MW, from 2,818.2 MW recorded in January 2021.

The average electricity supplied in January 2022 was 62.38 GWh per day and this represented an increase of 4.3% on the 59.59 GWh per day recorded in January 2021. Total electricity supplied in January 2022 was 1,933.76 GWh, 4.3% higher than the 1,847.4 GWh recorded in January 2021. Electricity supplied from domestic sources accounted for 99.8% of the supply in January 2022 and the remaining 0.2% was an inadvertent import from CIE. In January 2022, the electricity exported to CIE, CEB, and SONABEL was 172.96 GWh. Electricity export in January 2022 was 1.7% higher than the 170.16 GWh recorded for January 2021.

The water levels for the dams continued to drop in January 2022 as expected. The Akosombo GS water level dropped at a rate of 0.055 feet per day and that of Bui GS dropped at a rate of 0.136 feet per day.

The use of natural gas for power generation continued to dominate the fuel mix with an increased share of 95.3% in January 2022, from the 93.5% recorded in December 2021. The share of liquid fuel used reduced to 4.7% from the 6.5% recorded in December 2021.

Table 1. Actual Outturn of Electricity Demand and Supply in January 2021 and January 2022.

	Jan-21	Jan-22
Total Supply (GWh)	1,847.4	1,934.7
Source by Power Plants (GWh)		
AKOSOMBO	397.9	496.5
KPONG	72.6	79.2
BUI	98.8	73.3
BUI Solar	-	7.0
Kaleo	-	0.2
Sunon Asogli	346.0	200.3
TAPCO	190.5	228.2
TICO	26.7	223.0
TT1PP	77.9	-
CENIT	57.7	30.5
TT2PP	6.1	-
Twin City	81.2	103.3
KARPOWER	269.0	126.3
AMERI	66.1	-
KTPP	-	61.2
CENPOWER	134.8	251.3
AKSA	19.5	51.5
Bridge Power	1.7	-
Total Domestic Supply (GWh)	1,846.4	1,931.9
Imports (GWh)	1.0	2.8
Total Supply (GWh)	1,847.4	1,934.7
Ghana Coincedent Peak Load (MW)	2,818.2	3,055.5
System Coincident Peak Load (MW)	3,070.2	3,323.5

HIGHLIGHTS OF THE MONTH

ELECTRICITY TRADING

Electricity Demand

The System Peak Load of 3,323.5 MW recorded in January 2022 was 2.4% higher than the 3,246.1 MW recorded in December 2021. This increase is attributable to an increase in domestic load from 2,980 MW in December 2021 to 3,055.5 MW in January 2022. However, electricity export declined by 7.3% to 268 MW in January 2022, from the 289 MW recorded in December 2021. The thermal power plants supplied 66.2% of the System Peak Load while hydroelectric power plants accounted for the remaining 33.8%.

The Ghana Peak Load grew by 2.5% to 3,055.5 MW in January 2022, from the 2,980 MW recorded in December 2021. On the contrary, the average electricity demand reduced marginally to 2,590.03 MW in January 2022, from 2,606.98 MW recorded in December 2021. Similarly, the System Load Factor reduced to 77.9% in January 2022, from 80.3% recorded in December 2021.

Electricity supply

A marginal reduction of 0.3% was recorded on the average electricity supply in January 2022 to 62.38 GWh per day, from 62.57 GWh per day in December 2021. Similarly, the electricity supply was reduced to 1,933.76 GWh in January 2022, from 1,939.59 GWh recorded in December 2021. The electricity supplied by thermal power plants constituted 65.9% of the total electricity supplied in January 2022 and this was higher than the 60.8% recorded in December 2021. Consequently, the share of electricity supplied by hydropower plants reduced to 33.6% in January 2022, from 38.8% recorded in December 2021. The share of the electricity supplied by solar power plants on the NITS increased to 0.4% in January 2022, from 0.3% recorded in December 2021.

A total of 172 GWh of electricity was exported in January 2022, representing an increase of 5.3% on the 164.21 GWh recorded in December 2021. The increase in electricity export in January 2022 was due to an increase in supply to SONABEL and CEB by 12.2% and 1% respectively. Electricity export to SONABEL and CEB increased to 96.11 GWh and 45.25 GWh in January 2022, from 85.63 GWh and 44.81 GWh recorded in December 2021 respectively.

Contrary to this, supply to CIE was reduced by 6.4% to 31.6 GWh in January 2022, from 33.77 GWh recorded in December 2021.

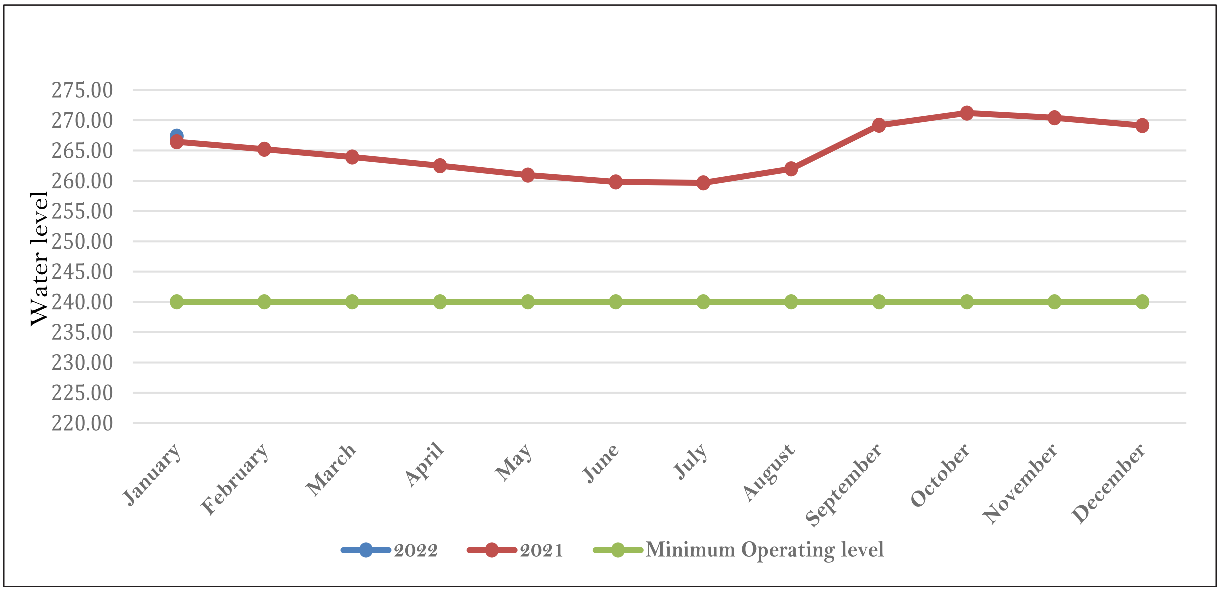
HYDRO DAM LEVELS

Akosombo dam water level continued to drop in January 2022

The rate of drop in the water level for the Akosombo dam increased by 27.9% to 0.055 feet per day in January 2022, from 0.043 feet per day it was recorded in December 2021. Consequently, the water level of 269.11 feet recorded at the beginning of the year dropped by 1.71 feet to a month-end water level of 267.4 feet. The level of the dam at the end of the month was 0.91 feet above the water level recorded for the same period in 2021 and was 27.4 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 2021 to January 2022

Figure 1: Month-End Water Level for Akosombo Dam from January 2021 to January 2022.



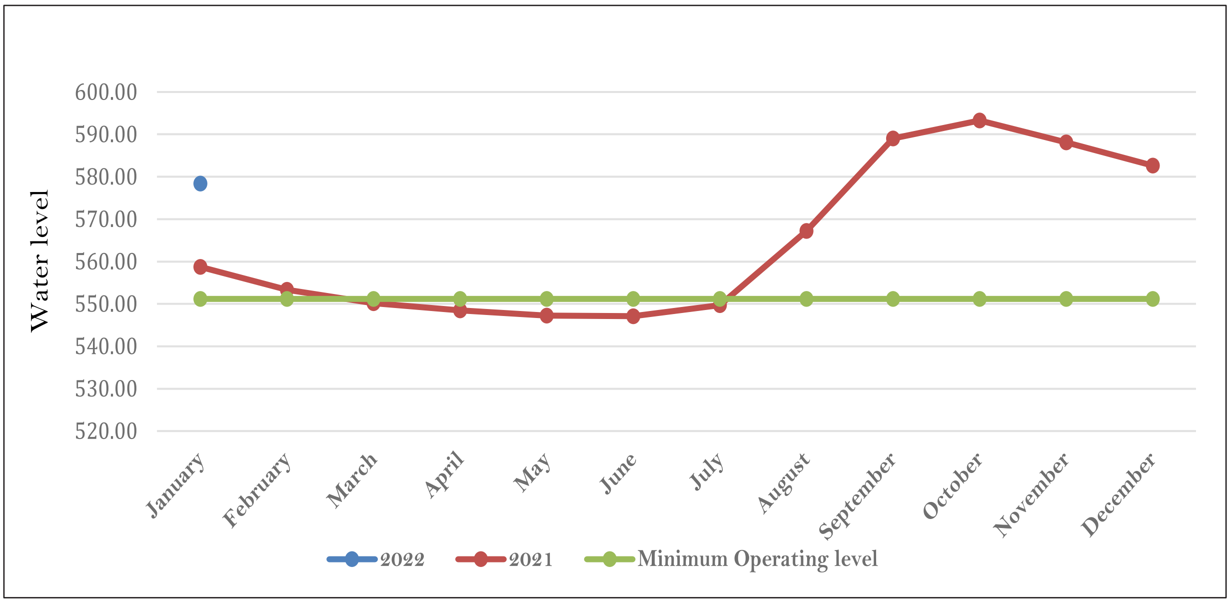
HIGHLIGHTS OF THE MONTH

Bui dam water level continued to drop in January 2022

The rate of drop in the water level for the Bui dam decreased by 23.6% to 0.136 feet per day in January 2022, from 0.178 feet per day in December 2021. Also, the water level of the dam dropped by 4.23 feet from the 582.61 feet recorded at the beginning of the year to 578.38 feet at the end of the month. By the end of January 2022, the water level recorded was 19.69 feet above the level recorded for the same period in 2021 and was 26.26 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 2021 to January 2022.

Figure 2: Month-End Water Level for Bui Dam from January 2021 to January 2022



FUEL SUPPLY FOR POWER GENERATION

Natural gas imported through the West Africa Gas Pipeline Company (WAPCo) decreased in January 2022

The importation of natural gas for power generation in January 2022, averaged 38.54 MMSCFD. This represents a reduction of 5% on the 40.55 MMSCFD recorded in December 2021. A total of 1,194.88 MMSCF of natural gas was imported in January 2022 and this was lower than the 1,256.98 MMSCF recorded in December 2021. Out of the total natural gas consumed, the share of imported natural gas reduced to 13.2% in January 2022, lower than the 15.1% recorded in December 2021. Similarly, the share of the imported natural gas in the total fuel mix in January 2022 was 12.7%, a reduction from the 14.2% recorded in December 2021.

Natural gas supply from domestic sources increased in January 2022

An increase of 11.1% was recorded in the average natural gas supplied from the domestic gas fields for power generation in January 2022. This increment was from 223.66 MMSCFD in December 2021 to 248.55 MMSCFD in January 2022. As a result, total natural gas supplied from the domestic gas fields in January 2022 was 7,705.07 MMSCF and this was higher than the 6,933.44 MMSCF recorded in December 2021. The share of domestic natural gas in January 2022 was 86.8% and this was higher than the 84.9% recorded in December 2021. Similarly, the contribution of domestic natural gas in the total fuel mix was 83.4% in January 2022, higher than the 79.4% recorded in December 2021.

Liquid fuel used for power generation decreased in January 2022

The use of liquid fuel for power generation has been on the decline since November 2021. It reduced from 229,999 barrels in November 2021 to 110,319 barrels in December 2021 and is now at 84,107 barrels in January 2022. The reduced use of liquid fuel for power generation has been due to an increased supply of natural gas from the domestic gas fields and reduced generation from the AKSA power plant. The share of HFO used by AKSA constituted 82.3% of the total liquid fuel used in January 2022 and this was higher than the 62.1% recorded in December 2021. In the total fuel mix, the share of HFO reduced marginally to 3.9%, from 4% recorded in December 2021. LCO used in January 2022 constituted 17.7% of the total liquid fuel used and this was lower than the 37.2% recorded in December 2021. Similarly, the share of the LCO used in the total fuel mix reduced to 0.8% in January 2022, from 2.4% recorded in December 2021.

OPERATIONAL FACT SHEET

Monthly Market Data Analysis

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

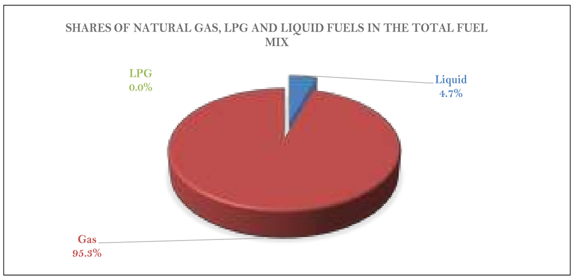


Figure 3b: Shares of fuel types in the generation fuel mix of power generation

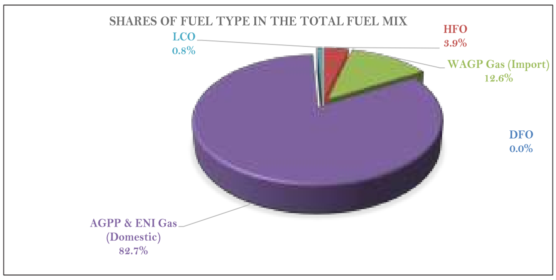


Figure 4a: Contribution of Natural Gas Supply by sources

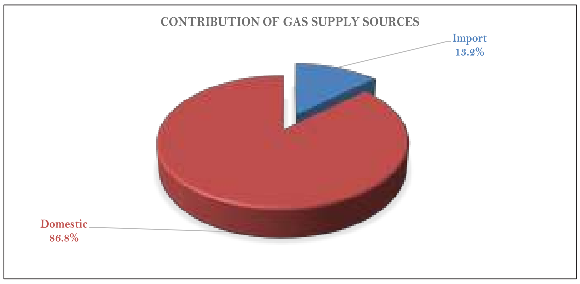


Figure 4b: Contribution of individual fuel in the liquid fuel supply

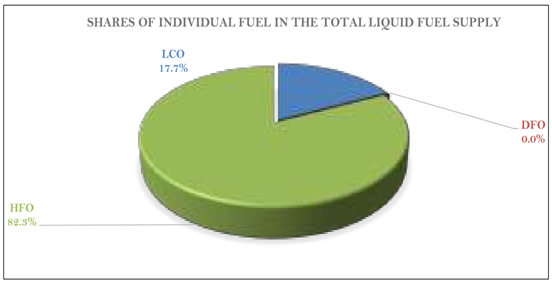


Figure 5a: Electricity Supply by sources

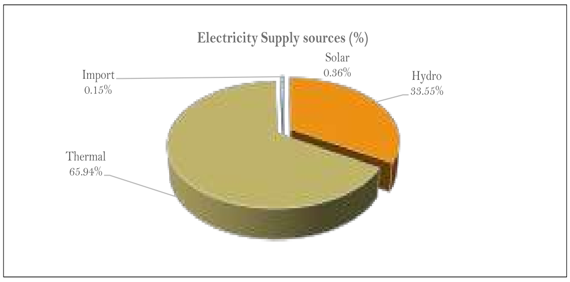
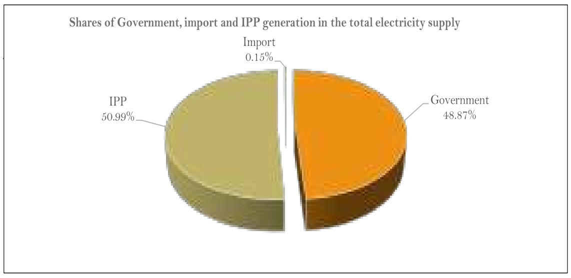


Figure 5b: Electricity supply by ownership



Peak Electricity Supply for January 2022		
Source of Supply	**Generation at System Peak Load (MW)**	**Generation at Ghana Peak Load (MW)**
AKOSOMBO	754.40	754.40
KPONG	132.40	132.40
BUI	235.40	235.40
BUI Solar	-	-
SEAP	351.10	351.10
TAPCO	313.30	313.30
TICO	288.30	288.30
TT1PP	-	-
CENIT	-	-
TT2PP	-	-
TWIN CITY	199.60	199.60
KARPOWER	269.80	269.80
AMERI	-	-
KTPP	101.00	101.00
Trojan Power	-	-
CENPOWER	370.30	370.30
AKSA	307.90	307.90
Bridge Power	-	-
IMPORT	-	-
Export to CIE at peak	52.00	52.00
Export to CEB at peak	66.00	66.00
Export to Sonabel	150.00	150.00
System Coincident Peak Load	**3,323.50**	
Ghana Coincedent Peak Load		**3,055.50**
Total Supply		
Total Supply without export		

OPERATIONAL FACT SHEET

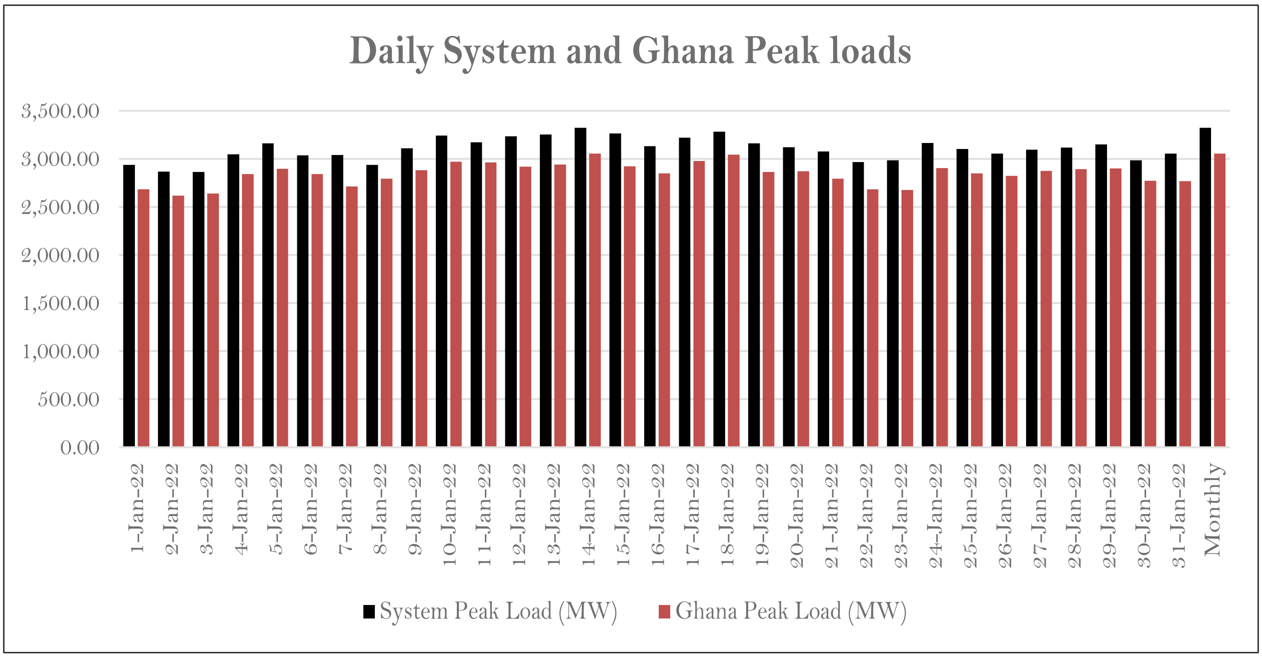
January 2021 Average Monthly Natural Gas Flowrate	
Location	Monthly Average
Etoki	44.44
Tema WAGPCo	0.00
Aboadze WAGPCo	0.00
Aboadze GNGC	112.71
Reverse Flow	70.67

Hydro Dam Water level for January 2022			
	Beginning month (ft)	End month (ft)	Change in water level
Hydro Dam			(feet)
Akosombo	269.11	267.40	-1.71
Bui	582.61	578.38	-4.23

	Weekly Electricity Supply (GWh)				
	Week 1	Week 2	Week 3	Week 4	Total
AKOSOMBO	115.41	114.65	111.82	154.66	496.54
KPONG	18.26	18.26	18.22	24.44	79.18
BUI Hydro	16.96	14.70	16.04	25.61	73.31
Bui Solar	1.38	1.57	1.69	2.38	7.03
VRA Kaleo	0.00	0.00	0.00	0.20	0.20
SAPP	26.48	49.51	52.32	74.40	202.72
TAPCO	50.31	51.88	52.37	73.60	228.16
TICO	55.16	50.76	49.11	68.00	223.02
TT1PP	0.00	0.00	0.00	0.00	0.00
CENIT	6.90	10.11	6.80	6.69	30.50
TT2PP	0.00	0.00	0.00	0.00	0.00
Twin City	32.68	32.77	33.03	4.84	103.32
KARPOWER	18.08	23.49	27.79	56.98	126.34
AMERI	0.00	0.00	0.00	0.00	0.00
KTPP	14.18	17.05	14.24	15.72	61.18
Cenpower	56.03	59.82	52.03	83.39	251.28
AKSA	12.72	12.08	12.35	14.36	51.52
Bridge Power	0.00	0.00	0.00	0.00	0.00
Import	0.30	0.14	0.41	1.99	2.84
Total	**424.85**	**456.81**	**448.21**	**607.26**	**1,937.14**

	Month Average fuel prices					
	Gazetted Natural Gas Price	Weighted average natural gas price	LCO	HFO	DFO	LPG
US$/MMBtu	6.08	6.20	14.96	13.77	25.29	18.56

Power Plants	Average fuel price (US$/MMBtu)
TAPCO	6.08
TICO	6.08
SAPP	6.08
TT2PP	0.00
TT1PP	6.08
CENIT	6.08
KARPOWERSHIP	6.08
AMERI PLANT	0.00
KPONE THERMAL	6.08
CENPOWER	6.54
AKSA ENERGY	13.77
Twin City	6.08
Bridgepower	0.00



Daily System and Ghana Peak loads
3,500.00
3,000.00
2,500.00
2,000.00
1,500.00
1,000.00
500.00
0.00
1-Jan-22
2-Jan-22
3-Jan-22
4-Jan-22
5-Jan-22
6-Jan-22
7-Jan-22
8-Jan-22
9-Jan-22
10-Jan-22
11-Jan-22
12-Jan-22
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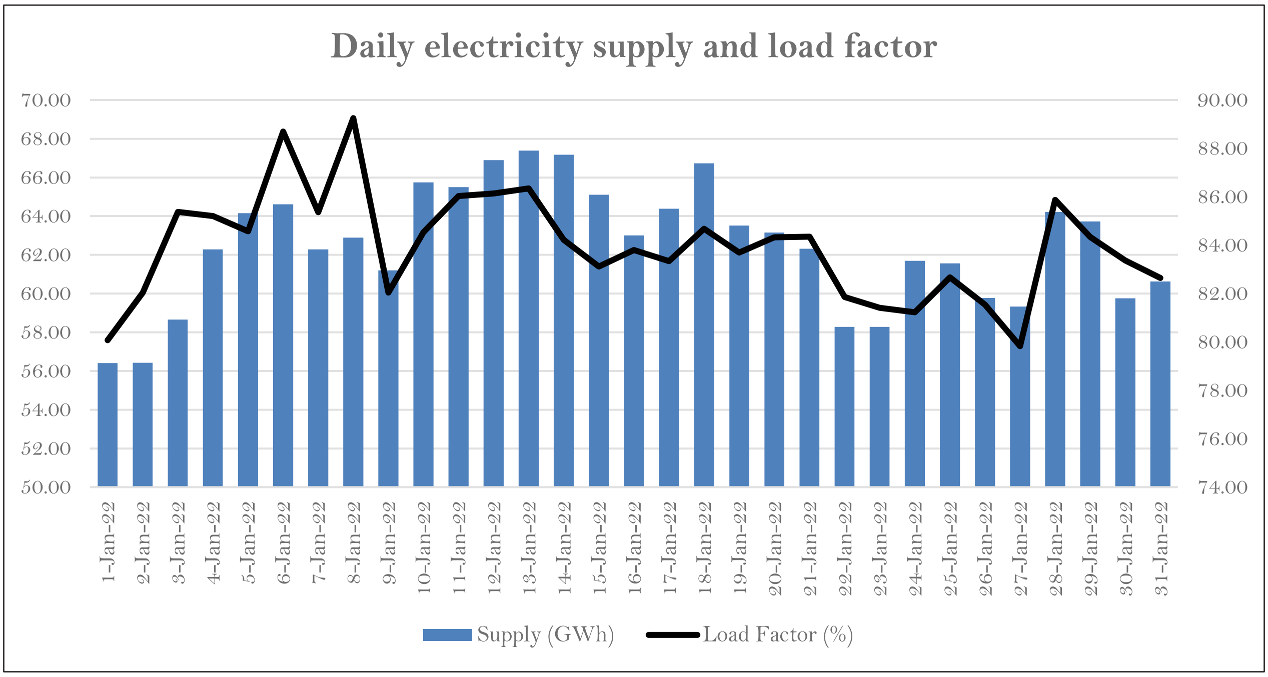
23-Jan-22
24-Jan-22
25-Jan-22
26-Jan-22
27-Jan-22
28-Jan-22
29-Jan-22
30-Jan-22
31-Jan-22
Monthly
System Peak Load (MW)
Ghana Peak Load (MW)



Daily electricity supply and load factor
70.00
68.00
66.00
64.00
62.00
60.00
58.00
56.00
54.00
52.00
50.00
90.00
88.00
86.00
84.00
82.00
80.00
78.00
76.00
74.00
1-Jan-22
2-Jan-22
3-Jan-22
4-Jan-22
5-Jan-22
6-Jan-22
7-Jan-22
8-Jan-22
9-Jan-22
10-Jan-22
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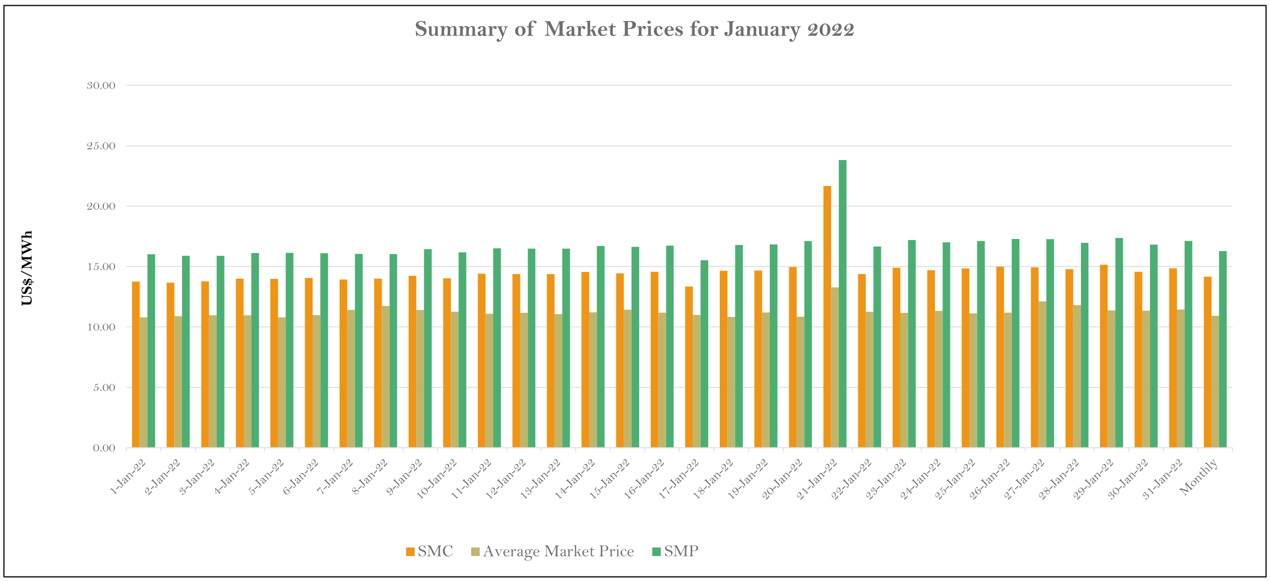
23-Jan-22
24-Jan-22
25-Jan-22
26-Jan-22
27-Jan-22
28-Jan-22
29-Jan-22
30-Jan-22
31-Jan-22
Supply (GWh)
Load Factor (%)

Monthly Average Electricity Prices in the WEM				
		Jan-22	Jan-22	Change
Average Market Price (AMP)	US$/MWh	109.19	105.18	4.01
System Marginal Cost (SMC)	US$/MWh	141.66	128.48	13.18
System Marginal Price (SMP)	US$/MWh	162.78	149.32	13.46



OTHER MARKET NEWS AND TRENDS

Performance of the Wholesale Electricity Market (WEM) in 2021

The EMOP Secretariat will, in the coming bulletins, chronicle the performance of the Wholesale Electricity Market for 2021. This will include electricity demand, electricity supply, fuel consumption and prices, transmission system performance, and the cost of electricity supplied in the wholesale electricity market.

Electricity Demand in 2021

Ghana's system peak load has been increasing at an annual rate of 7.6%. It has increased from 2,803.7 MW in 2019 to 3,089.5 MW in 2020 and 3,246.1 MW in 2021. There is an increase of 442 or 15.8% MW between 2019 and 2021.

Similarly, Ghana's demand (domestic demand), that is, system peak load minus exports, registered an annual growth rate of 9.6% from 2,480 MW in 2019 to 2,775 MW in 2020 and 2980 MW in 2021.

The Regulated Market

The regulated market which includes, primarily, the distribution companies (Electricity Company of Ghana, Northern Distribution Company, and Enclave Power Company) has seen an increase in their annual average demand by 15.1% between 2019 to 2021. The average electricity demand grew by 6.6% in 2020 from 1,572.4 MW in 2019 to 1,676.8 MW in 2020. Likewise, the average electricity demand for the regulated market increased by 24.3% in 2021 from 1,676.8 MW in 2020 to 2,084.7 MW in 2021. Average electricity demand has therefore increased by 407.9 MW between 2020 and 2021 and 512.3 MW between 2019 and 2021.

The Deregulated Market

The de-regulated market is made up of bulk customers whose consumption threshold is set by the Energy Commission. In Ghana bulk customers operating in the wholesale electricity market are made up of mining companies and large industries. Average yearly electricity demand in the de-regulated market from 2019 to 2021 decreased by an average of 8.2%, that is, a reduction of 36.6 MW. This is attributable to a slam in demand between 2019 and 2020 by 18.2% due to the COVID-19 pandemic. Demand, however, picked up in 2021 by 3.2% compared to the demand in 2020 but lower than the 2019 levels of 233.6 MW. The average demand in 2020 and 2021 was 191 MW and 197 MW respectively.

Export

Ghana exports electricity on contractual arrangements to its neighbouring countries: Togo and Benin through Communauté Electrique du Bénin (CEB) and Burkina Faso through La Société Nationale d'Electricité du Burkina (SONABEL). In addition, there is a power exchange arrangement with Compagnie Ivoirienne d'Electricité (CIE) of La Côte d'Ivoire. Electricity supply to the VALCO aluminum smelter, located in Tema, is also considered part of the export market (according to the PURC Act, Act 538). Export demand increased by 12.9% between 2019 and 2021, from 277.7 MW in 2019 to 353.8 MW in 2021. Average export demand to the neighboring countries increased by 22.1% from 2019 to 2021 from 171 MW in 2019 to 254.9 MW in 2021. Electricity export to neighbouring countries has been one of the main drivers of demand from 2019 to 2021. The average demand by VALCO however decreased by 3.7% from 106.7 MW in 2019 to 99 MW in 2021.

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
TT2PP = Tema Thermal 2 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

For any enquiries please contact the:
EMOP Secretariat, Energy Commission, Accra.
Tel: 0302 813756/7/9 **E-mail:** emop@energycom.gov.gh