GHANA WHOLESALE ELECTRICITY MARKET BULLETIN

MARKET WATCH

Monthly Market Data Analysis

ISSUE NO. 74 **1st February 2022 to 28th February 2022**

This Bulletin covers major developments in the Wholesale Electricity Market (WEM) of Ghana from 1st February 2022 to 28th February 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

The System Peak Load recorded for February 2022 was 3,417.9 MW which occurred on 28th February 2022. Comparing the System Peak Load recorded in February 2022 to that of February 2021, there was an increase of 10.7% on the 3,087.9 MW recorded in 2021. Breaking down the System Peak Load recorded in February 2022, domestic demand was served using 3,122.9 MW and the remaining 295 MW was used to serve export demand. The Ghana Peak Load recorded for February 2022 was 3,253.2 MW. A year-on-year analysis of the Ghana Peak Load recorded in February 2022 showed a growth of 11.9% on the 2,881.2 MW recorded in February 2021.

The electricity supply in February 2022 averaged 65.28 GWh per day and this was 6.7% higher than the 61.1 GWh per day recorded in February 2021. Similarly, the total electricity supplied in February 2022 was 1,827.88 GWh, and this was 6.7% higher than the 1,711.06 GWh recorded a year ago. The share of the electricity supplied by domestic power plants in the total electricity supply was 99.9% and the remaining 0.1% was from inadvertent imports from CIE. Electricity export in February 2022 totaled 152.63 GWh and this was supplied to CIE, CEB, and SONABLE. The electricity exported in February 2022 was 11.9% higher than the 136.4 GWh recorded in February 2021.

The rate of drop in the water levels for the dams increased in February 2022. The water level for the Akosombo GS dropped by 0.058 feet per day and that of Bui GS dropped by 0.201 feet per day in February 2022.

The natural gas used by thermal power plants in February 2022 dominated the total fuel mix

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

	Feb-21	Feb-22
Total Supply (GWh)	1,711.1	1,837.6
Source by Power Plants (GWh)		
AKOSOMBO	406.4	496.1
KPONG	70.1	81.5
BUI	76.3	103.3
BUI Solar	-	6.6
Kaleo	-	8.2
Sunon Asogli	284.7	238.9
TAPCO	153.9	197.5
TICO	86.7	193.5
TT1PP	1.3	56.2
CENIT	39.0	47.1
TT2PP	8.3	-
Twin City	122.8	92.0
KARPOWER	255.0	71.1
AMERI	-	-
KTPP	61.6	20.0
CENPOWER	115.7	175.7
AKSA	27.6	48.0
Bridge Power	-	-
Total Domestic Supply (GWh)	1,709.4	1,835.7
Imports (GWh)	1.7	1.9
Total Supply (GWh)	1,711.1	1,837.6
Ghana Coincedent Peak Load (MW)	2,881.2	3,224.2
System Coincident Peak Load (MW)	3,087.9	3,417.9

with a share of 92.5%, however, this was lower than the 95.3% recorded in January 2022. The remaining 7.5% of the total fuel mix was liquid fuel (HFO and LCO) and this was higher than the 4.7% recorded in January 2022.

ELECTRICITY TRADING

Electricity Demand

The System Peak Load continued its growth trajectory in February 2022. It increased from 3,246.1 MW in December 2021 to 3,323.5 MW in January 2022 and further increased to 3,417.9 MW in February 2022. This increase represents a growth of 5.3% from December 2021 and 2.8% from January 2022. Also, the growth recorded in February 2021 is reflected in the domestic and export loads. Electricity export increased by 10.1% to 295 MW in February 2022, from the 268 MW recorded in January 2022. The load served by the thermal and hydroelectric power plants to the System Peak Load recorded in February 2022 were in the proportion of 63.9% and 36.1% respectively.

The Ghana Peak Load of 3,224.2 MW recorded in February 2022 represents a growth of 5.5% over the 3,055.5 MW recorded in January 2022. Similarly, the average electricity demand increased by 4.3% to 2,716.42 MW in February 2022, from the 2,603.68 MW recorded in January 2022. The System Load Factor increased marginally to 79.5% in February 2022, from the 78.3% recorded in January 2022.

Electricity supply

The average electricity supplied in February 2022 was 65.28 GWh per day. This was 4.5% higher than the 62.49 GWh per day recorded in January 2022. On the contrary, the total electricity supplied of 1,827.88 GWh recorded in February 2022 was 5.8% lower than the 1,937.14 GWh recorded in January 2022. This reduction was a result of January having a lot more days than February. The share of the supply from thermal power plants reduced to 61.8% in February 2022, from 65.9% recorded in January 2022. The electricity supplied by hydroelectric power plants constituted 37.3% of the electricity supplied in February 2022 and this was higher than the 33.6% recorded in January 2022. The share of the supply from the solar power plants increased to 0.8% in February 2022, from 0.4% recorded in January 2022.

Electricity export in February 2022 reduced by 11.8% to 152.63 GWh, from the 172.96 GWh recorded in January 2022. This reduction is a result of reduced supply to CIE, SONABEL, and CEB by 18.4%, 11.8%, and 5.2% respectively in February 2022. The electricity exported to CIE reduced to 25.8 GWh in February 2022, from 31.6 GWh recorded in January 2022. The supply to CEB reduced to 41.52 GWh in February 2022, from 45.25 GWh recorded in January 2022. Also, electricity export to SONABLE reduced to 85.32 GWh in February 2022, from 96.11 GWh recorded in January 2022.

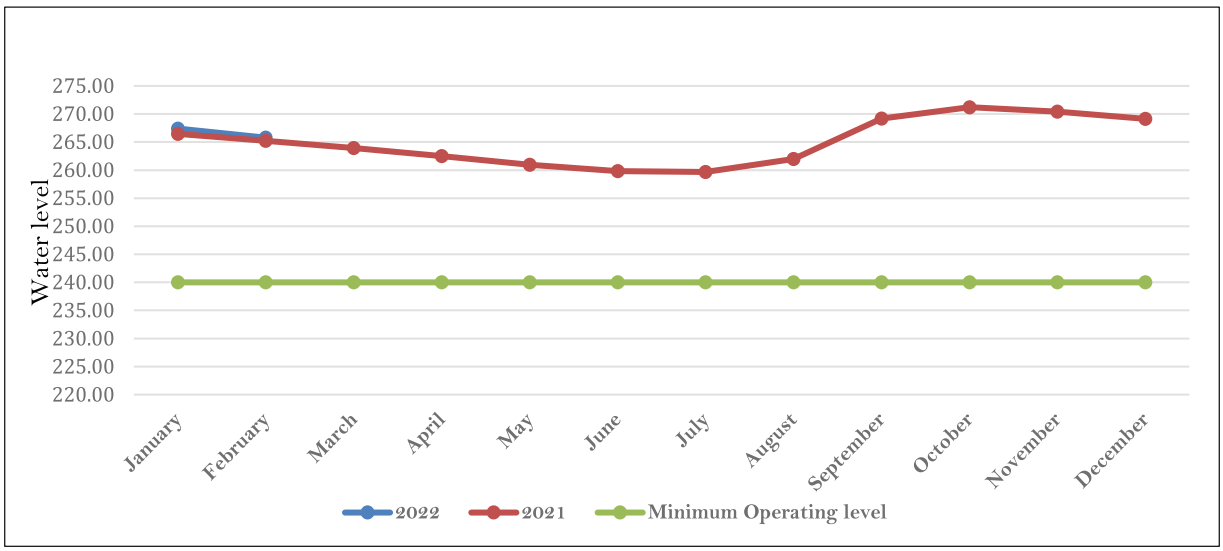
HYDRO DAM LEVELS

Akosombo dam water level continued to drop in February 2022

The water level for the Akosombo GS continued to drop at an average rate of 0.058 feet per day in February 2022, from the 0.55 feet per day recorded in January 2022. As a result, the water level of 267.4 feet recorded at the beginning of February 2022 dropped by 1.62 feet to a month-end water level of 265.78 feet. The level of water in the reservoir at the end of February 2022 was 0.54 feet above the water level recorded for the same period in 2021 and was 25.72 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 February 2022

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



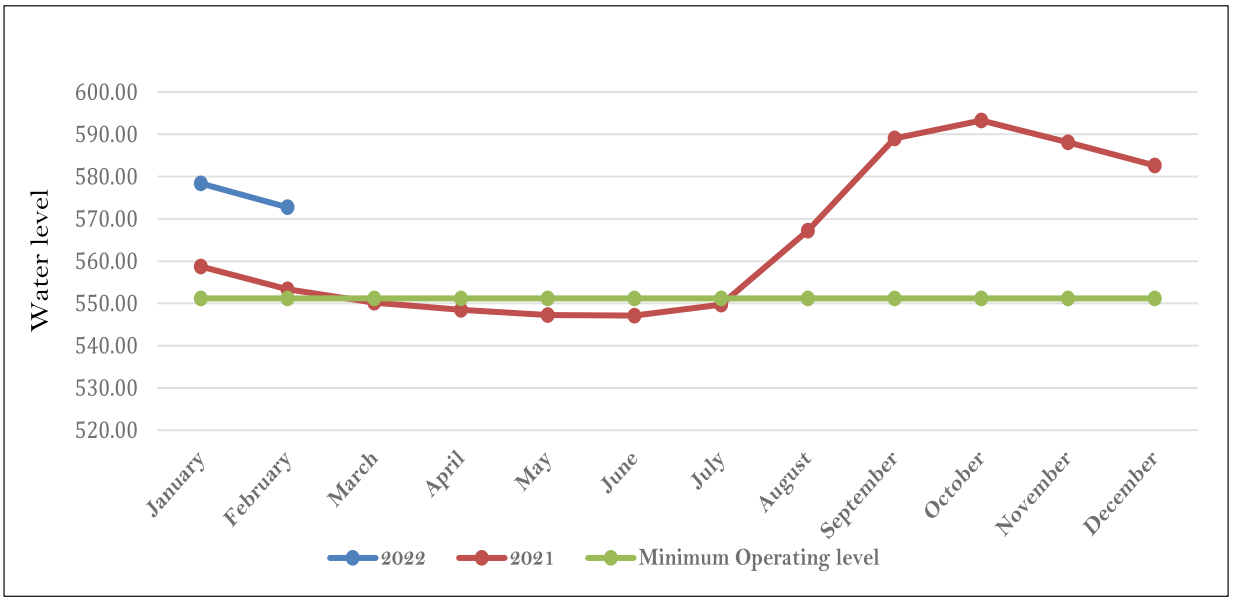
HIGHLIGHTS OF THE MONTH

Bui dam water level continued to drop in February 2022

The rate of drop in the water level in the Bui GS recorded a significant increase of 47.8%. Its drop increased from 0.136 feet per day recorded in January 2022 to 0.201 feet per day in February 2022. Consequently, the water level for the dam dropped by 5.64 feet, from 578.38 feet recorded at the beginning of February 2022 to 572.74 feet at the end of the month. The month-end water level recorded for the Bui dam was 19.43 feet above the water level recorded for the same period in 2022 and was 20.62 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 February 2022.

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



FUEL SUPPLY FOR POWER GENERATION

The Natural gas imported through the West Africa Gas Pipeline Company (WAPCo) Increased in February 2022

The natural gas supplied through the West African gas pipeline increased significantly by 42.1% in February 2022. An average of 54.91 MMSCFD of natural gas was imported which was higher than the 38.54 MMSCFD recorded in January 2022. The natural gas imported in February 2022 totaled 1,537.34 MMSCF and this was 28.7% higher than the 1,194.88 MMSCF recorded in January 2022. The imported natural gas constituted 18.9% of the total natural gas consumed in February 2022 which was higher than the 13.1% recorded in January 2022. In the total fuel mix, the share of imported natural gas increased to 17.5% in February 2022, from the 12.5% recorded in January 2022.

Natural gas supply from domestic sources decreased in February 2022

A reduction of 7.8% was recorded in the average supply of natural gas from domestic natural gas sources in February 2022. The supply decreased to 231.73 MMSCFD in February 2022, from the 251.34 MMSCFD recorded in January 2022. A total of 6,488.46 MMSCF of natural gas was supplied from the domestic gas fields in February 2022 which was 16.7% lower than the 7,791.4 MMSCF recorded in January 2022. In the total natural gas used for power generation in February 2022, the share of the domestic gas was 81.1% and this was lower than the 86.9% recorded in January 2022. Similarly, the share of domestic gas in the total fuel mix reduced to 75% in February 2022, from 82.6% recorded in January 2022.

Liquid fuel used for power generation increased in February 2022

A total of 129,511 barrels of liquid fuel was used for power generation in February 2022 which was 45.5% higher than the 88,984 barrels recorded in January 2022. This significant increase in the use of liquid fuel in February 2022 was due to the operation of the Twin City (Amandi) and CenPower Plant on LCO and KTPP on DFO to make up for the shortfall in domestic gas supply. HFO's share in the liquid fuel mix reduced to 53.4% in February 2022, from 80.3% recorded in January 2022. The share of HFO in the total fuel mix in February 2022 was 4%, higher than the 3.9% recorded in January 2022. LCO used in February 2022 constituted 34.8% of the total liquid fuel used and this was higher than the 19.7% recorded in January 2022. In the total fuel mix, the share of the LCO used was 2.6% in February 2022 which was higher than the 1% recorded in January 2022. The share of the DFO in the liquid fuel mix was 11.8% and 0.6% in the total fuel mix in February 2022.

Monthly Market Data Analysis

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

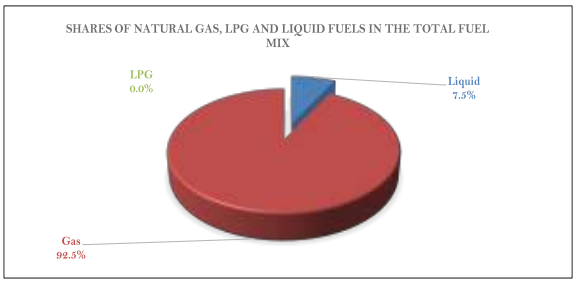


Figure 3b: Shares of fuel types in the generation fuel mix of power generation

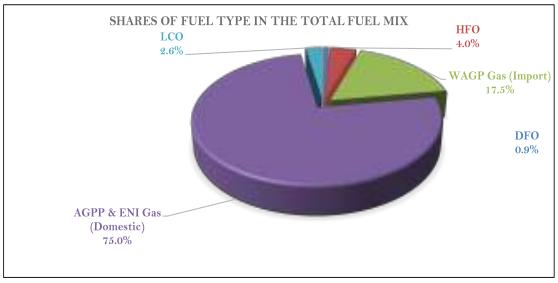


Figure 4a: Contribution of Natural Gas Supply by sources

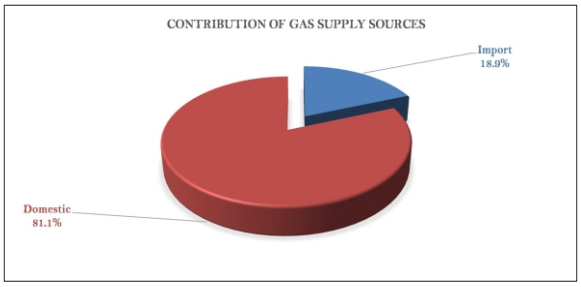


Figure 4b: Contribution of individual fuel in the liquid fuel supply

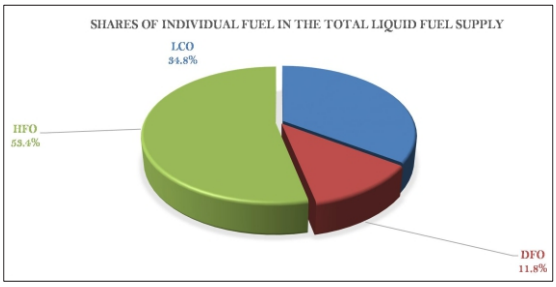


Figure 5a: Electricity Supply by sources

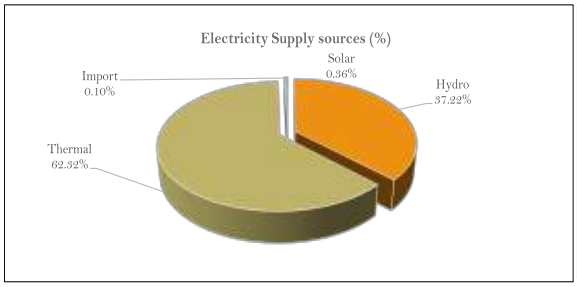
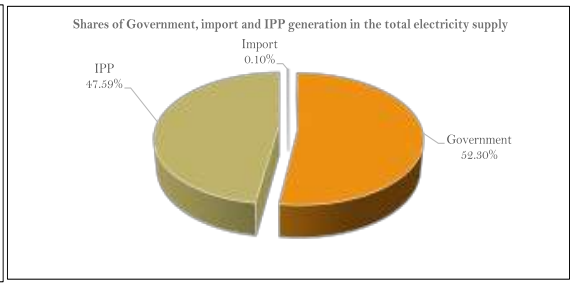


Figure 5b: Electricity supply by ownership



Peak Electricity Supply for February 2022		
Source of Supply	Generation at System Peak Load (MW)	Generation at Ghana Peak Load (MW)
AKOSOMBO	875.10	770.90
KPONG	131.00	133.00
BUI	228.30	231.80
BUI Solar	-	-
SEAP	351.50	350.40
TAPCO	306.70	208.30
TICO	162.70	336.00
TT1PP	-	108.00
CENIT	109.00	-
TT2PP	-	-
TWIN CITY	194.50	199.60
KARPOWER	378.80	439.10
AMERI	-	-
KTPP	99.00	-
Trojan Power	-	-
CENPOWER	372.00	371.00
AKSA	209.30	105.10
Bridge Power	-	-
IMPORT	-	-
Export to CIE at peak	68.00	29.00
Export to CEB at peak	87.00	-
Export to Sonabel	140.00	-
System Coincident Peak Load	3,417.90	
Ghana Coincedent Peak Load		3,224.20
Total Supply		
Total Supply without export		

OPERATIONAL FACT SHEET

February 2021 Average Monthly Natural Gas Flowrate	
Location	Monthly Average
Etoki	51.72
Tema WAGPCo	0.00
Aboadze WAGPCo	0.00
Aboadze GNGC	102.73
Reverse Flow	80.92

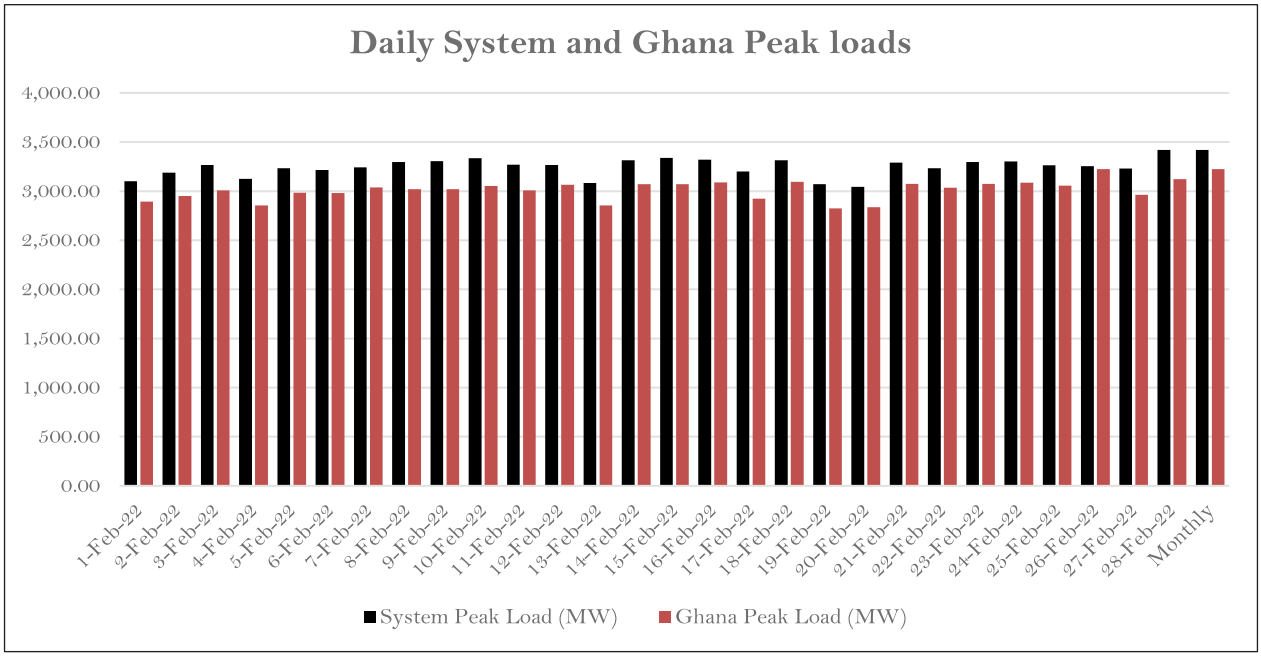
Hydro Dam Water level for February 2022			
	Beginning month (ft)	End month (ft)	Change in water level
Hydro Dam			(feet)
Akosombo	267.40	265.78	-1.62
Bui	578.38	572.74	-5.64

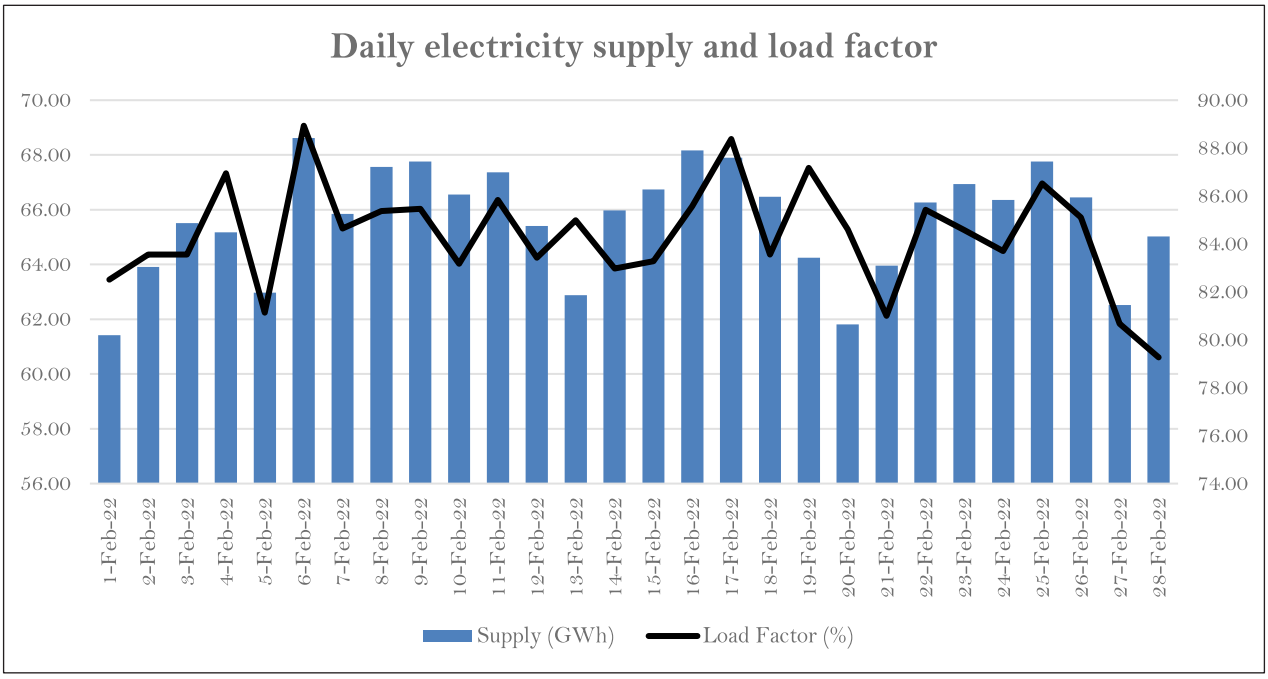
	Weekly Electricity Supply (GWh)				
	Week 1	Week 2	Week 3	Week 4	Total
AKOSOMBO	117.30	126.30	121.90	130.60	496.11
KPONG	18.90	20.53	20.51	21.53	81.46
BUI Hydro	26.74	21.51	21.49	33.61	103.35
Bui Solar	1.71	1.59	1.68	1.62	6.61
VRA Kaleo	7.12	0.37	0.32	0.37	8.18
SAPP	66.99	57.67	56.68	57.58	238.92
TAPCO	50.91	51.04	49.83	45.69	197.46
TICO	48.53	44.52	53.50	47.00	193.54
TT1PP	5.28	17.09	18.01	15.80	56.18
CENIT	17.15	11.97	13.66	4.33	47.11
TT2PP	0.00	0.00	0.00	0.00	0.00
Twin City	6.94	32.10	25.26	27.74	92.04
KARPOWER	32.34	17.98	10.18	10.56	71.06
AMERI	0.00	0.00	0.00	0.00	0.00
KTPP	11.39	0.67	0.00	7.92	19.98
Cenpower	28.59	47.88	55.29	43.91	175.67
AKSA	13.18	12.10	10.69	12.08	48.04
Bridge Power	0.00	0.00	0.00	0.00	0.00
Import	0.39	0.21	0.30	0.98	1.89
Total	453.45	463.51	459.30	461.31	1,837.57

		Fuel Consumption (MMBtu)			
	Heat rate (Btu/kWh)	Natural gas	LCO	HFO	DFO
TAPCO	9,018.88	1,780,856.08	-	-	-
TICO	8,566.51	1,657,952.42	-	-	20.62
SAPP	5,941.05	1,419,414.00	-	-	-
TT2PP	-	-	-	-	-
TT1PP	12,747.06	716,066.06	-	-	-
CENIT	11,822.75	557,001.66	-	-	-
KARPOWERSHIP	8,034.39	570,923.88	-	-	-
AMERI PLANT	-	-	-	-	-
KPONE THERMAL	11,570.32	146,705.44	-	-	84,478.71
CENPOWER	7,948.21	1,246,748.99	145,853.43	-	3,660.91
AKSA ENERGY	8,181.04	-	-	393,014.50	-
Twin City	8,144.64	638,743.75	109,864.90	-	1,018.73
Bridgepower	-	-	-	-	-

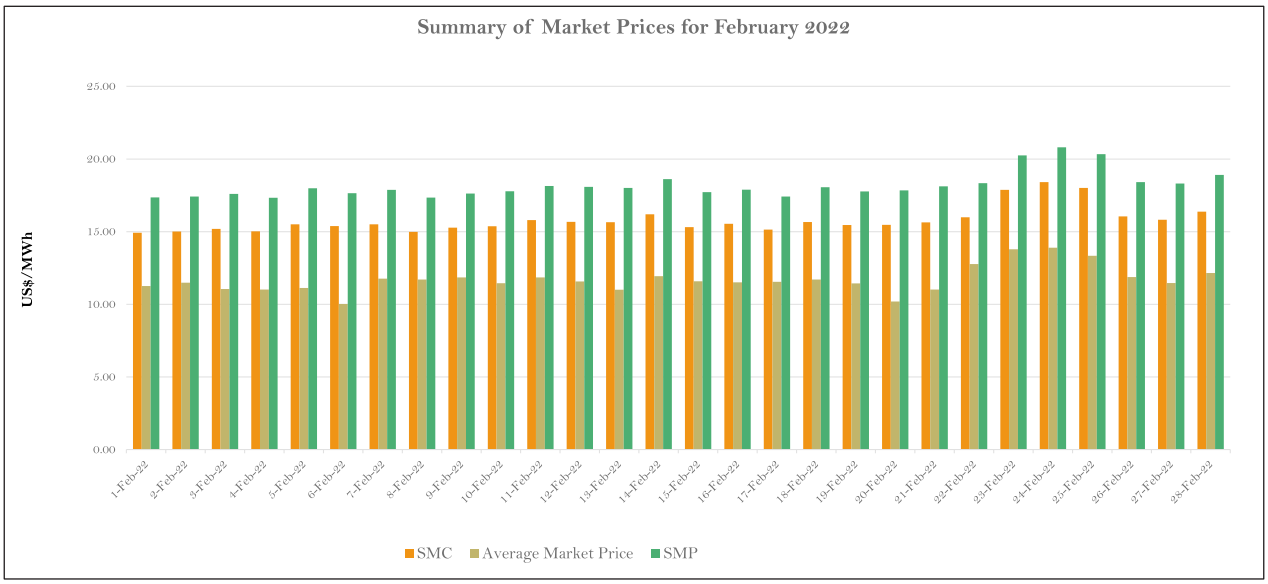
	Month Average fuel prices					
	Gazetted Natural Gas Price	Weighted average natural gas price	LCO	HFO	DFO	LPG
US$/MMBtu	6.08	6.20	14.96	13.77	25.29	18.56

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	13.10
CENPOWER	7.06
AKSA ENERGY	13.77
Twin City	7.41





Monthly Average Electricity Prices in the WEM				
		Feb-22	Jan-22	Change
Average Market Price (AMP)	US$/MWh	117.00	109.19	7.81
System Marginal Cost (SMC)	US$/MWh	158.00	141.66	16.34
System Marginal Price (SMP)	US$/MWh	181.81	162.78	19.03



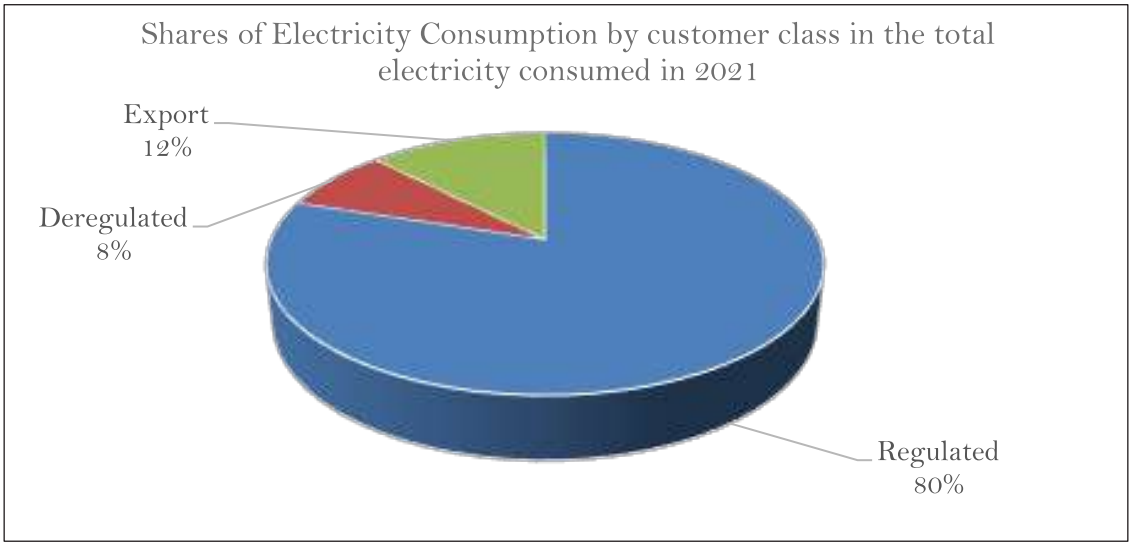
OTHER MARKET NEWS AND TRENDS

Performance of the Wholesale Electricity Market (WEM) in 2021

The EMOP Secretariat continues in this bulletin to chronicle the performance of the Wholesale Electricity Market for 2021. This bulletin edition of the bulletin will focus on electricity consumption in the wholesale electricity market of Ghana with emphasis on consumption by each customer class.

Electricity Consumption in 2021

Electricity consumption in the wholesale electricity market increased by 8.3% in 2021 compared to the electricity consumed in 2020. Electricity consumption has increased from 18,693.5 GWh in 2020 to 20,249.58 GWh in 2021. Electricity consumption by the regulated market accounted for 79.9% of the total electricity consumed in 2021 which is marginally more than its share of 77.4% in 2020. The de-regulated market accounted for 7.7% whiles the export market accounted for 12.4% in 2021.



Electricity consumption in the regulated market has increased by 11.8% in 2021 compared to 2020. It increased from 14,468.6 GWh in 2020 to 16,180.3 GWh in 2021. ECG consumption has increased by 12.18% in 2021 from 12,653.3 GWh in 2020 to 14,194.9 GWh in 2021. NEDCo also experienced an 11.4% in 2021 from 1,573.2 GWh in 2020 to 1,752.9 GWh in 2021. Enclave power's consumption has decreased by 4% in 2021 from 242.1 GWh in 2020 to 232.5 GWh in 2021. The ECG accounted for 88% of the total electricity consumed in 2021 compared to 11% for NEDCo and 1% for Enclave Power.

The deregulated market's consumption growth decreased by 5.15% in 2021 from 1,648.2 GWh in 2020 to 1,563.2 GWh. Mining companies consumption growth decreased by 5.9% in 2021 compared to 2020. The slam in growth could be attributed to the impact of COVID-19. Bulk customers on the other hand saw a 2.1% growth in their consumption between 2020 and 2021. Bulk customer consumption increased from 150.2 GWh in 2020 to 153.4 GWh in 2021.

Electricity export just as in the deregulated market recorded a negative growth rate of 2.7% in 2021. Electricity consumption decreased from 2,576.7 GWh in 2020 to 2,505.7 GWh in 2021. Electricity consumption by our neighboring countries decreased by 6.5% in 2021. Electricity consumption by VALCO however increased by 7%.

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
TT2PP = Tema Thermal 2 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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