



GHANA WHOLESALE ELECTRICITY MARKET BULLETIN

MARKET WATCH

Monthly Market Data Analysis

ISSUE NO. 75

1st March 2022 to 31st March 2022

This Bulletin covers major developments in the Wholesale Electricity Market (WEM) of Ghana from 1st March 2022 to 31st March 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 for March 2022 was recorded on March 18th, which was 3,469.4 MW. A year-on-year analysis shows that System Peak Load recorded in March represented a growth of 9.4% on the 3,171.95 GWh recorded in March 2021. The System Peak Load recorded comprised 3,166.4 MW of domestic demand and 303 MW of export demand. The Ghana Peak Load recorded was 3,197.7 MW representing a 10.2% growth from the 2,902.95 MW recorded in March 2021.

The average supply of electricity in March 2022 was 67.14 GWh per day, representing a growth of 7.4% over the 59.72 GWh recorded in March 2021. A total of 2,081.41 GWh of electricity was supplied in March 2022, which was higher than the 1,851.34 GWh recorded in March 2021. Electricity supplied by domestic power plants constituted 99% of the total electricity supplied. The remaining 1% was augmentation with inadvertent import from CIE. Electricity export to CIE, CEB, and SONABEL totalled 187.97 GWh in March 2022, a 50.1% increase over the 125.27 GWh recorded in March 2021.

Water levels for the Akosombo GS and Bui GS continued to drop at an increased rate of 0.059 feet per day and 0.235 feet per day respectively in March 2022.

Natural gas continued to be the primary fossil fuel for power generation in March 2022. The share of the total natural consumed was 93.2% and this was higher than the 92.5% recorded in February 2022. Liquid fuel accounted for the remaining 6.8% of the total fuel used, which was lower than the 7.5% recorded in February 2022.

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

	Mar-21	Mar-22
Total Supply (GWh)	1,851.3	2,082.6
Source by Power Plants (GWh)		
AKOSOMBO	421.1	559.4
KPONG	74.7	94.0
BUI	42.0	126.5
BUI Solar	-	7.3
Kaleo	-	1.6
Sunon Asogli	353.6	315.0
TAPCO	128.3	217.8
TICO	225.1	73.1
TT1PP	50.0	36.0
CENIT	56.2	71.8
TT2PP	12.0	0.1
Twin City	23.7	130.3
KARPOWER	286.9	79.9
AMERI	-	-
KTTP	34.3	65.5
CENPOWER	117.1	254.1
AKSA	21.5	48.2
Bridge Power	-	-
Total Domestic Supply (GWh)	1,846.6	2,080.5
Imports (GWh)	4.8	2.1
Total Supply (GWh)	1,851.3	2,082.6
Ghana Coincident Peak Load (MW)	2,903.0	3,197.7
System Coincident Peak Load (MW)	3,172.0	3,469.4

HIGHLIGHTS OF THE MONTH

ELECTRICITY TRADING

Electricity Demand

In March 2022, a System Peak Load of 3,469.4 MW was recorded. This represents a growth of 1.5% over the 3,417.9 MW recorded in February 2022. Export load increased to 303 MW in March 2022, from the 295 MW recorded in February 2022. Thermal and hydroelectric power plants contributed 63% and 37% respectively in meeting the System Peak Load recorded in March 2022.

A marginal reduction of 0.8% was recorded on the Ghana Peak Load for March 2022. A Ghana Peak Load of 3,197.7 MW was recorded in March 2022. This was lower than the 3,224.2 MW recorded in February 2022. Contrary to this, there was a month-on-month increase in average demand for electricity. It increased by 2.3% in March 2022, from 2,734.49 MW recorded in February 2022. Also, the System Load Factor increased marginally to 80.6% in March 2022, from 80% recorded in February 2022.

Electricity supply

Electricity supply per day increased from 59.58 GWh in February 2022 to 67.18 GWh in March 2022. This represents an increase of 13.1%. Similarly, total electricity supplied increased to 2,082.63 GWh in March 2022, from the 1,837.57 GWh recorded in February 2022. Electricity supplied by thermal power plants in March 2022 constituted 62% of the total electricity supplied. This value was marginally higher than the 61.8% recorded in February 2022. The share of the electricity supplied by hydroelectric power plants reduced to 37.5% in March 2022, from 37.3% recorded in February 2022. Also, the share of the electricity supplied by solar power plants reduced to 0.4% in March 2022, from 0.8% recorded in February 2022.

Total electricity exported to our neighbouring countries increased by 23.2% in March 2022 to 187.97 GWh, from 152.63 GWh recorded in February 2022. This increase was due to an increase in supply to CEB and SONABEL by 72.7% and 7.6% respectively. Electricity export to CEB and SONABEL were 71.68 GWh and 91.76 GWh in March 2022, from 41.52 GWh and 85.32 GWh recorded in February 2022. Electricity export to CIE decreased to 24.54 GWh in March 2022, from 25.8 GWh recorded in February 2022. Table 1 shows a comparison of the Actual Electricity Demand and Supply for March 2021 and March 2022.

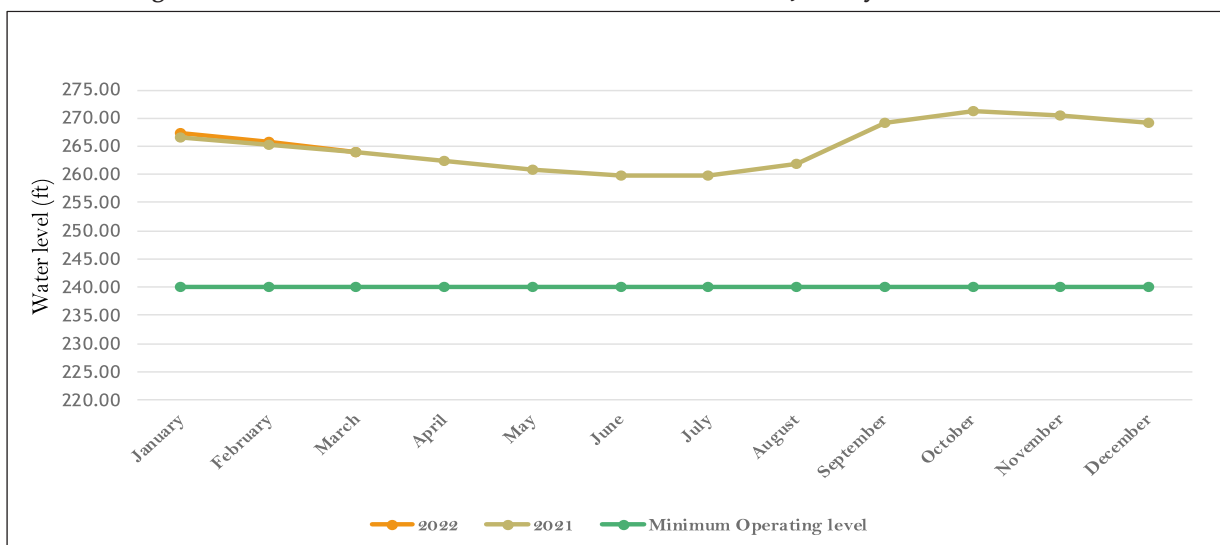
HYDRO DAM LEVELS

Akosombo dam water level continued to drop in March 2022

The rate of drop in the water level for the Akosombo GS increased marginally by 1.7% to 0.059 feet per day in March 2022, from the 0.058 feet per day recorded in February 2022. At the end of March 2022, the water level recorded for the dam was 263.96 feet. This means that the water level had dropped by 1.82 feet from the 265.78 feet recorded at the beginning of the month. The water level recorded at the end of the month was 0.06 feet above the level recorded for the same period in 2021 and was 23.9 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 March 2022

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

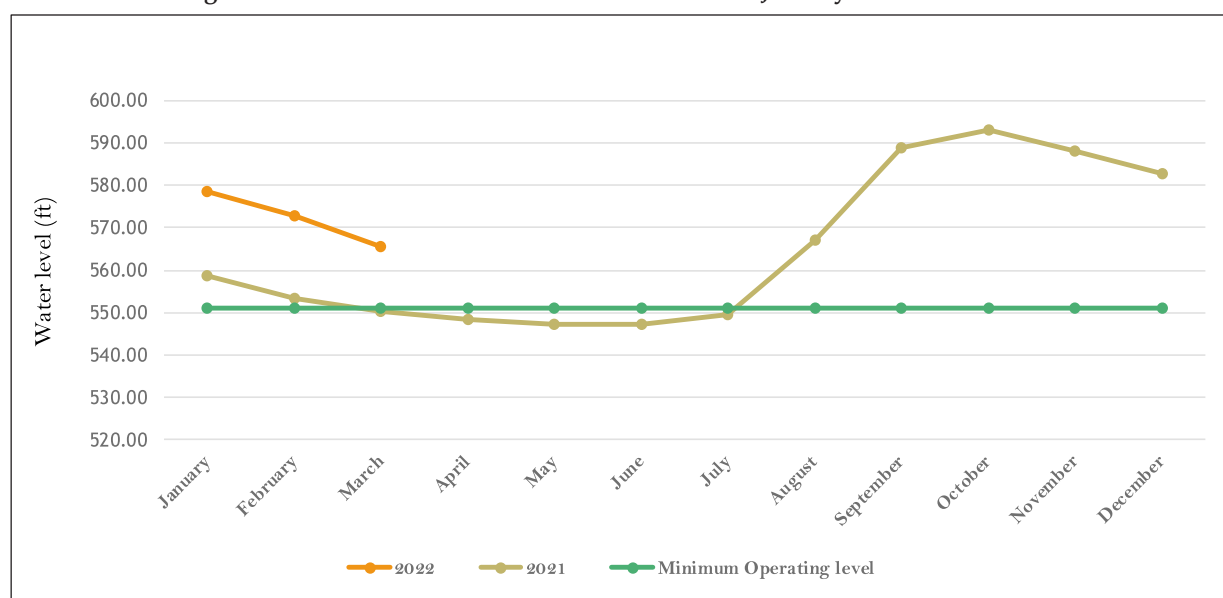


HIGHLIGHTS OF THE MONTH

Bui dam water level continued to drop in March 2022

The water level for the Bui GS continued to drop at an increased rate of 0.235 feet per day. This rate of drop is higher than the 0.201 feet per day recorded in February 2022. At the beginning of March 2022, the water level of the dam was 572.74 feet which dropped by 7.28 feet to a month-end water level of 565.45 feet. The month-end water level for March 2022 was 15.29 feet above the level recorded for the same period in 2021 and was 13.34 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 March 2022.

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



FUEL SUPPLY FOR POWER GENERATION

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

The supply of natural gas through the West African gas pipeline from Nigeria averaged 59.19 MMSCFD in March 2022. This represented an increase of 7.8% on the 54.91 MMSCFD recorded in February 2022. A total of 1,835.02 MMSCF of natural gas was supplied in March 2022 representing a 19.4% increase over the 1,537.34 MMSCF recorded in February 2022. In total, the share of the imported natural gas used for power generation in March 2022 was 19.8%. This was higher than the 18.9% recorded in February 2022. Imported natural gas constituted 18.4% of the total fuel mix in March 2022. This share was higher than the 17.5% recorded in February 2022.

Natural gas supply from domestic sources increased in March 2022

Natural gas supply from the domestic gas fields increased marginally to 235.41 MMSCFD in March 2022, from the 231.73 MMSCFD recorded in February 2022. Total natural gas supplied from domestic gas fields was 7,297.65 MMSCF in March 2022. This was 12.5% higher than the 6,488.46 MMSCF recorded in March 2022. Domestic natural gas continued to dominate the total natural gas used for power generation. However, its share in the fuel mix reduced from% in February 2022 to% in March 2022. share of 80.2% and 74.8% in March 2022, from the 81.1% and 75% recorded in February 2022.

The liquid fuel used for power generation increased in March 2022

An increase of 1.6% was recorded in the use of liquid fuel for power generation. The quantity used increased from 129,511 barrels recorded in February 2022 to 131,576 barrels in March 2022, The increase in the use of liquid fuel was due to the operation of KTPP on DFO and the partial operation of Twin City Energy and CenPower on LCO. The use of HFO by AKSA continued to dominate the liquid fuel mix in March 2022 but at a reduced share of 52.6%, from the 53.4% recorded in February 2022. In the total fuel mix, the share of HFO was 3.6% in March 2022 which was lower than the 4% recorded in February 2022. DFO was the second most used liquid in March 2022 as a result of its share of 27.4% recorded and this was higher than the 11.8% recorded in February 2022. In the total fuel mix, the share of DFO increased to 1.9% in March 2022, from a negligible share of 0.9% in February 2022. LCO used constituted 20.1% of liquid fuel used in March 2022 and this is lower than the 34.8% recorded in February 2022. Also, the share of LCO used in the total fuel mix reduced to 1.4% in March 2022, from the 2.6% recorded in February 2022.

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

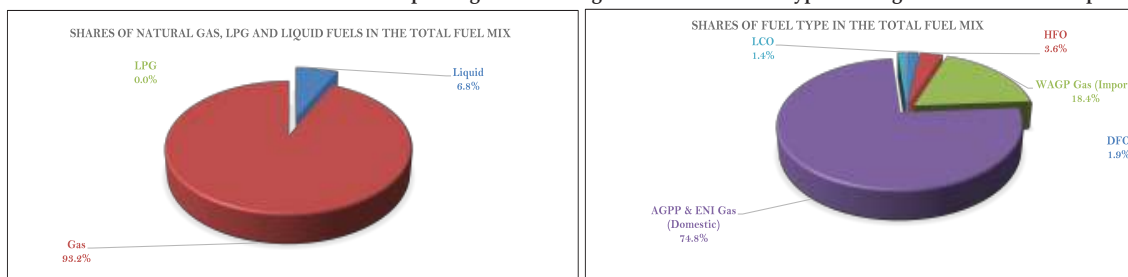


Figure 4a: Contribution of Natural Gas Supply by sources

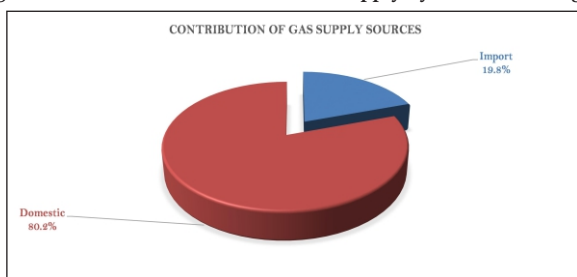


Figure 4b: Contribution of individual fuel in the liquid fuel supply

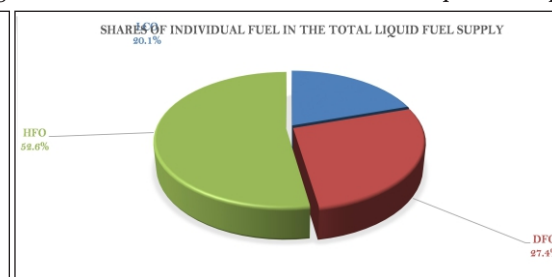


Figure 5a: Electricity Supply by sources

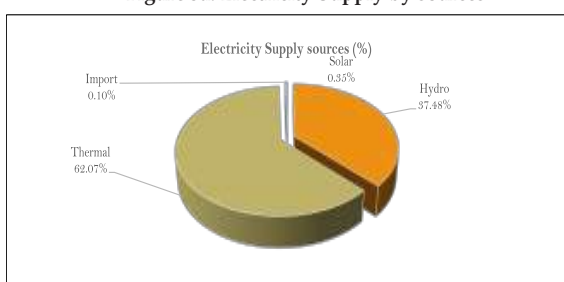
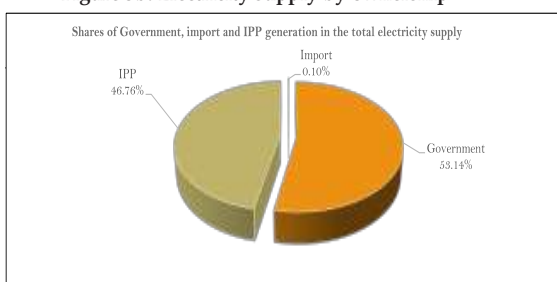


Figure 5b: Electricity supply by ownership



Peak Electricity Supply for March 2022		
Source of Supply	Generation at System Peak Load (MW)	Generation at Ghana Peak Load (MW)
AKOSOMBO	912.40	876.00
KPONG	137.00	141.00
BUI	235.70	233.80
BUI Solar	-	-
SEAP	534.10	350.30
TAPCO	304.00	310.00
TICO	168.00	-
TT1PP	107.00	-
CENIT	106.00	108.00
TT2PP	-	-
TWIN CITY	195.80	197.70
KARPOWER	-	420.50
AMERI	-	-
KTPP	102.00	101.00
Trojan Power	-	-
CENPOWER	362.00	367.00
AKSA	305.40	309.40
Bridge Power	-	-
IMPORT	-	-
Export to CIE at peak	44.00	9.00
Export to CEB at peak	116.00	72.00
Export to Sonabel	143.00	136.00
System Coincident Peak Load	3,469.40	
Ghana Coincident Peak Load		3,197.70
Total Supply		

OPERATIONAL FACT SHEET

March 2021 Average Monthly Natural Gas Flowrate	
Location	Monthly Average
Etoki	67.29
Tema WAGPCo	0.00
Aboadze WAGPCo	0.00
Aboadze GNGC	76.52
Reverse Flow	103.43

Hydro Dam Water level for March 2022			
	Beginning month (ft)	End month (ft)	Change in water level
Hydro Dam			(feet)
Akosombo	265.78	263.96	-1.82
Bui	572.74	565.45	-7.28

Weekly Electricity Supply (GWh)					
	Week 1	Week 2	Week 3	Week 4	Total
AKOSOMBO	131.81	123.88	120.04	183.63	559.37
KPONG	22.18	20.74	20.42	30.66	94.00
BUI Hydro	32.54	27.44	29.56	36.99	126.53
Bui Solar	1.49	1.69	1.59	2.53	7.31
VRA Kaleo	0.33	0.38	0.33	0.53	1.57
SAPP	52.40	55.57	84.92	122.11	315.01
TAPCO	48.90	50.45	47.68	70.81	217.83
TICO	0.74	7.60	25.75	39.01	73.10
TT1PP	0.00	0.00	10.57	25.47	36.04
CENIT	18.02	12.32	17.88	23.56	71.79
TT2PP	0.00	0.00	0.00	0.06	0.06
Twin City	24.10	29.86	30.44	45.91	130.31
KARPOWER	31.71	47.94	0.22	0.00	79.87
AMERI	0.00	0.00	0.00	0.00	0.00
KTPP	17.14	17.12	13.84	17.39	65.50
Cenpower	60.14	58.95	50.80	84.18	254.07
AKSA	13.66	13.40	15.24	5.85	48.15
Bridge Power	0.00	0.00	0.00	0.00	0.00
Import	0.84	0.31	0.40	0.58	2.13
Total	456.01	467.65	469.69	689.29	2,082.63

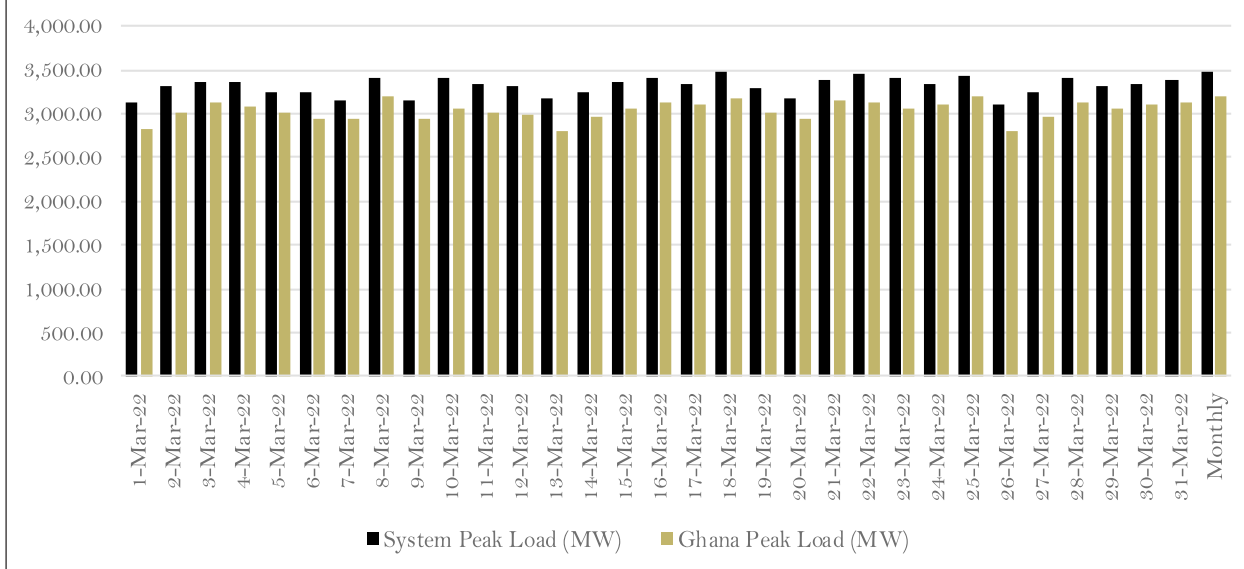
	Heat rate (Btu/kWh)	Fuel Consumption (MMBtu)			
		Natural gas	LCO	HFO	DFO
TAPCO	8,722.66	1,900,082.90	-	-	-
TICO	8,170.60	597,249.04	-	-	-
SAPP	7,719.71	2,431,754.34	-	-	-
TT2PP	11,854.08	769.33	-	-	-
TT1PP	12,677.63	456,901.84	-	-	-
CENIT	11,611.71	833,579.96	-	-	-
KARPOWERSHIP	7,957.40	635,578.35	-	-	-
AMERI PLANT	-	-	-	-	-
KPONE THERMAL	11,561.03	553,515.25	-	-	203,720.78
CENPOWER	7,925.56	1,991,232.37	22,394.96	-	-
AKSA ENERGY	8,168.99	-	-	393,343.54	-
Twin City	7,863.25	895,714.12	127,687.81	-	1,227.75
Bridgepower	-	-	-	-	-

Month Average fuel prices						
	Gazetted Natural Gas Price	Weighted average natural gas price	LCO	HFO	DFO	LPG
US\$/MMBtu	6.08	6.40	22.16	19.93	32.16	18.23

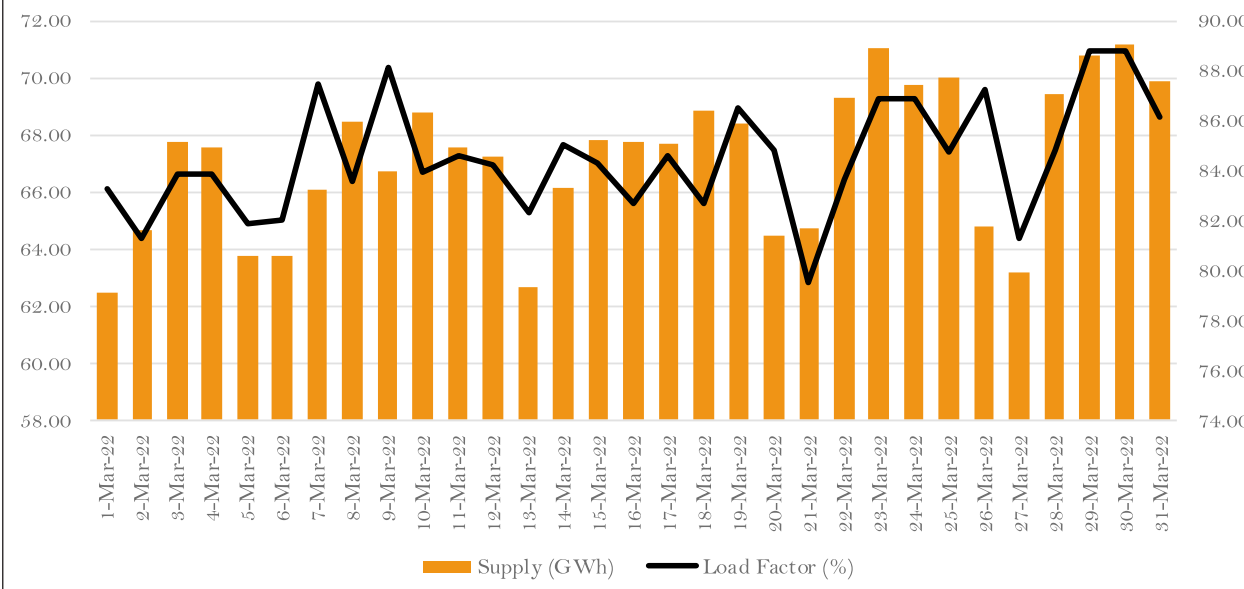
OPERATIONAL FACT SHEET

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

Daily System and Ghana Peak loads

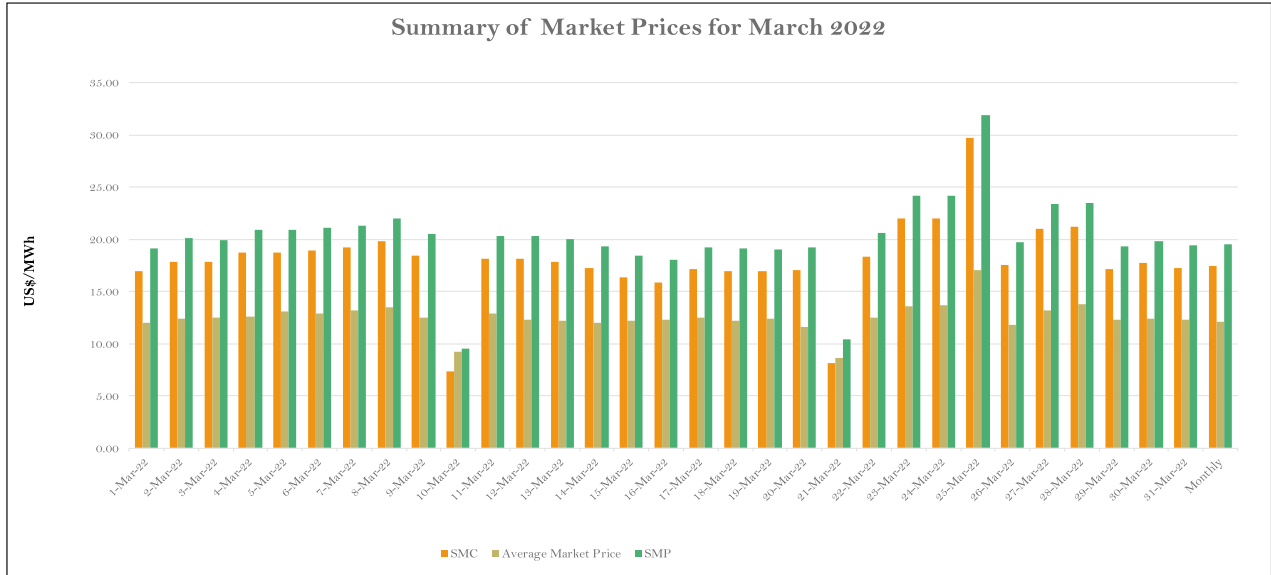


Daily electricity supply and load factor



ECONOMIC FACT SHEET

Monthly Average Electricity Prices in the WEM				
		Mar-22	Feb-22	Change
Average Market Price (AMP)	US\$/MWh	121.36	117.00	4.36
System Marginal Cost (SMC)	US\$/MWh	174.59	158.00	16.60
System Marginal Price (SMP)	US\$/MWh	195.56	181.81	13.75



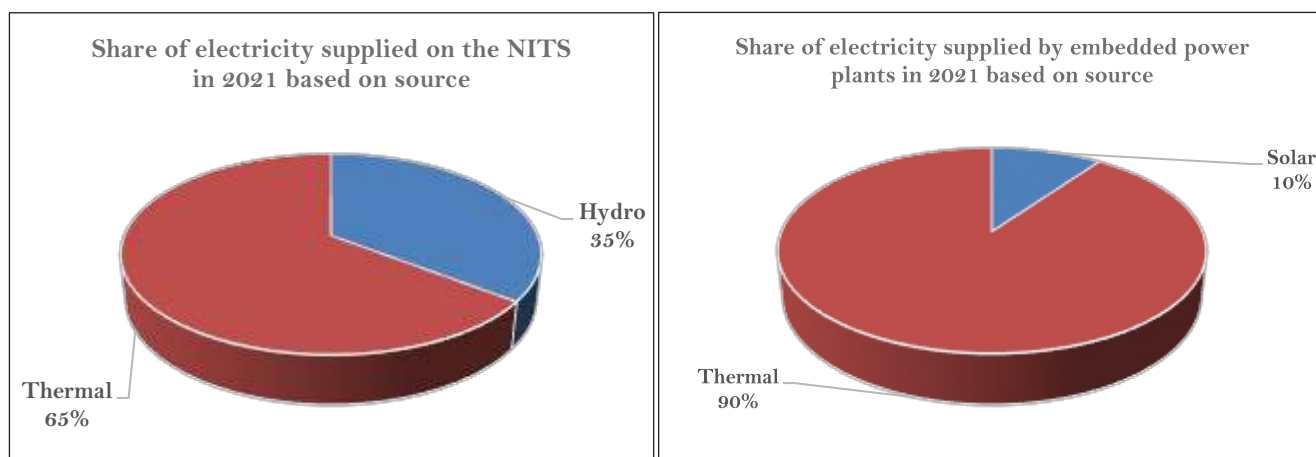
OTHER MARKET NEWS AND TRENDS

Performance of the Wholesale Electricity Market (WEM) in 2021

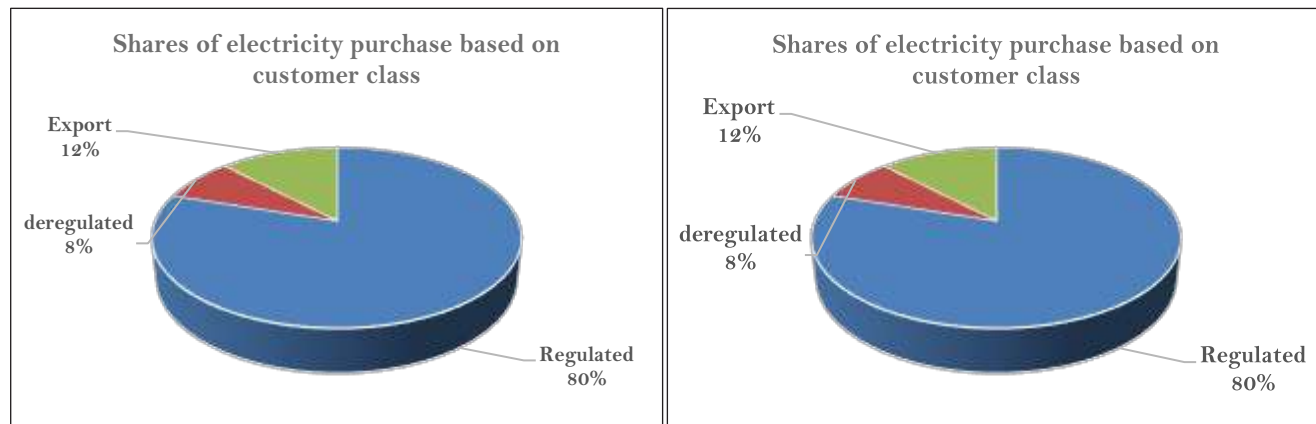
The EMOP Secretariat continues its analysis of the performance of the Wholesale Electricity Market for 2021. This edition focus on electricity supply in the wholesale electricity market of Ghana with emphasis on supply to each customer class.

Electricity Supply in 2021

A total of 21,465.3 GWh of electricity was supplied on the NITS in 2021 made up of 21,422.6 GWh of domestic supply and 43.6 GWh on inadvertent import. Renewable energy (Hydro and solar power plants) supplied 35.4% of the total electricity supplied in 2021 while thermal power plants supplied 64.6%.



The regulated market accounted for 17,035.7 GWh (79.9%) of the total electricity purchased in 2021. The deregulated market accounted for 1,645.7 GWh (7.7%) of total electricity purchased in 2021. The export market purchased 2,636.2 GWh constituting 12.4% of the total electricity purchased in 2021.



The Electricity Company of Ghana (ECG) accounted for 70.1% of the total electricity purchased in 2021 with Northern Electricity Distribution Company (NEDCo) and export to neighbouring countries accounted for 8.7% and 8.6% respectively. The Mines accounted for 7% while VALCO accounted for 3.8% of the total electricity purchased. EPC and other bulk customers accounted for 1.1% and 0.8% of the total electricity purchased respectively.

On the regulated market, ECG accounted for 87.7% of the total electricity purchased whilst NEDCo and Enclave Power Company (EPC) accounted for 10.8% and 1.4% respectively.

In the deregulated market, mines accounted for 90.2% of the total electricity purchased while the other bulk customers accounted for 9.8%. Electricity purchased by VALCO accounted for 30.8% of the electricity exported in 2021 while export to neighbouring countries accounted for 69.2%.

Energy Commission's Senior High Schools' Renewable Energy Challenge



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- The submission may include the following:
 - Completed Registration Form by the school; and
 - A brief project proposal of what the school intends to present at the Regional Challenge.
- Each school shall submit only one project.



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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
 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

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