

NATIONAL ENERGY STATISTICAL BULLETIN

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2023 NATIONAL ENERGY STATISTICAL BULLETIN

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Energy Statistics and Balances

April 2023

| Securing Ghana's Future Energy Today

FOREWORD

The 2023 National Energy Statistics provides data on Ghana's energy supply and use situation largely from 2000 to 2022. It contains data on energy production, import, export, and consumption. Additionally, this publication includes information on the country's progress towards achieving Sustainable Development Goal 7.

This publication was prepared using data from various energy sector institutions, including the Ministry of Energy, Volta River Authority (VRA), Ghana Grid Company (GRIDCo), Ghana National Petroleum Corporation (GNPC), National Petroleum Authority (NPA), Ghana National Gas Company (GNGC), Tema Oil Refinery (TOR), Public Utilities Regulatory Commission (PURC), Electricity Company of Ghana, Northern Electricity Distribution Company (NEDCo), Enclave Power Company Ltd (EPC), West African Gas Pipeline Company (WAPCo), as well as data from the Bank of Ghana (BoG) and the Ghana Statistical Service (GSS). We are grateful for the cooperation and assistance of all these agencies and entities.

We believe that the statistics in this publication will be valuable to a wide range of users, including planners, policymakers, researchers, and students.

We also appreciate the feedback we have received from users, which we have used to update and improve the information provided in this year's publication. As such, this year's edition has superseded the 2022 National Energy Statistics.

We would appreciate any feedback by way of comments and suggestions from readers.

This publication is also available on our website www.energycom.gov.gh

Ing. Oscar Amonoo-Neizer
Executive Secretary

TABLE OF CONTENTS

FOREWORD.....	i
TABLE OF CONTENTS.....	ii
LIST OF TABLES.....	iv
LIST OF FIGURES	v
ABBREVIATIONS AND ACRONYMS	vi
CONVERSION FACTORS	vii
GLOSSARY	ix
SECTION 1: ELECTRICITY ACCESS MAPS OF GHANA	1
SECTION 2: ENERGY SUPPLY AND FINAL CONSUMPTION	3
2.1 Total Energy Supply.....	3
2.2 Total Final Consumption by Fuel.....	4
2.3 Total Final Consumption by Sector.....	6
SECTION 3: ELECTRICITY.....	8
3.1 Installed Electricity Generation Capacity.....	8
3.2 Electricity Generation.....	11
3.3 Electricity Export and Import	13
3.4 Peak Load.....	14
3.5 Electricity Transmitted and Losses	15
3.7 Electricity Purchase, Sales and Losses by Distribution Utilities	17
3.8 Electricity Consumption.....	19
3.9 Customer Population by Classification	20
3.10 Dam Headwater level.....	21
3.11 Electricity Distribution Reliability Indices	24
SECTION 4: PETROLEUM	26
4.1 Crude Oil Production	26
4.2 Crude Oil Import and Export	26
4.3 Natural Gas Production and Import	28
4.4 Petroleum Products Production.....	28

4.5 Petroleum Products Import.....	30
4.6 Petroleum Products Export.....	31
4.7 Final Consumption of Petroleum Products.....	33
SECTION 5: BIOMASS	36
5.1 Woodfuel Production	36
5.2 Charcoal Import and Export	37
5.3 Woodfuel Consumption.....	38
SECTION 6: ENERGY BALANCES AND INDICATORS.....	40
6.1 Energy Balance.....	40
6.2 Energy Indicators	40
6.2.1 Sustainable Development Goal 7 (SDG7) Indicators	40
SECTION 7: ENERGY PRICES	45
7.1 Crude Oil Prices.....	45
7.2 Petroleum Products Prices	46
7.3 Average Electricity End User Tariff.....	47

LIST OF TABLES

Table 2.1: Total Energy Supply (ktoe)	4
Table 2.2: Total Final Energy Consumed by Fuels (ktoe)	5
Table 2.3: Final Energy Consumption by Sectors (ktoe)	6
Table 3.1: Grid Installed and Dependable Capacity (MW)	9
Table 3.2: Installed Generation Capacities in Ghana as of 2022 (MW)	10
Table 3.3: Renewable Energy Installed Generation Capacity (KW)	11
Table 3.4: Annual Electricity Generation	12
Table 3.5: Electricity Import and Export (GWh)	13
Table 3.6: System and Ghana Peak Load (MW)	15
Table 3.7: Electricity Transmitted and Transmission Losses (GWh)	16
Table 3.8: Distribution Utilities' Purchases, Sales and Losses (GWh)	18
Table 3.9: Electricity Consumption by Sectors (GWh)	19
Table 3.10: Distribution Utilities Customer Population	21
Table 3.11: Akosombo Dam Month-End Elevation (feet)	22
Table 3.12: Bui Dam Month-End Elevation (feet)	23
Table 3.13: Electricity Distribution Reliability Indices	25
Table 4.1: Crude Oil Import and Export	27
Table 4.2: Production of Petroleum Products (kt)	29
Table 4.3: Petroleum Products Import (kt)	30
Table 4.4: Petroleum Products Export (kt)	32
Table 4.5: Petroleum Products Consumption by Fuels (Ktoe)	33
Table 4.6: Petroleum Product Consumption by Sector (Ktoe)	35
Table 5.1: Biomass Production (Ktoe)	36
Table 5.2: Charcoal Import and Export (ktoe)	38
Table 5.3: Biomass Consumption by Sector (Ktoe)	39
Table 6.1: Energy Balance, 2022 (ktoe)	41
Table 6.2: Energy Balance, 2021 (ktoe)*	42
Table 6.3: Energy Indicators	43
Table 6.4: Sustainable Development Goals (SDG7) Indicators	44
Table 7.1: Average Crude Oil Prices (US\$/bbl)	45
Table 7.2: Average Ex-pump Prices for Petroleum Products	47
Table 7.3: Average Electricity End-User Tariff	48
Table 7.4: Electricity Tariff by Customer Class	49

LIST OF FIGURES

Figure 1.1: Population with access to electricity by region	1
Figure 1.1: Household with access to electricity by region	2
Figure 2.1: Total Energy Supply.....	3
Figure 2.2: Trend in Final Energy Consumption by Fuel.....	5
Figure 2.3: Final Energy Consumed by Sectors.....	7
Figure 3.1: Installed Generating Capacity (2000-2022)	8
Figure 3.2: Electricity Generation (2000-2022)	11
Figure 3.3: Electricity Import and Export	14
<i>Figure 3.4: System and Ghana Peak Load</i>	<i>14</i>
Figure 3.5: Electricity Transmitted and Transmission Losses	16
Figure 3.6: DISCO's Purchases, Sales and Losses	17
Figure 3.7: Electricity Consumption by Sectors	20
Figure 3.8: Customer Population	20
Figure 3.9: Trend in Akosombo Headwater Level.....	22
Figure 3.10: Trend in Bui Dam Headwater Level.....	23
Figure 4.1: Trend in Crude Oil Production	26
Figure 4.2: Trend in Crude Oil Import and Export	27
Figure 4.3: Trend in Natural Gas Production and Import	28
Figure 4.4: Trend in Production of Petroleum Products.....	29
Figure 4.5: Trend in Petroleum Product Import	31
Figure 4.6: Trend in the Export of Petroleum Products.....	32
Figure 4.7: Final Energy Consumption of Petroleum Products by Fuel, 2000-2022	34
Figure 4.8: Final Energy Consumption of Petroleum Products by Sector, 2000-2022.....	35
Figure 5.1: Trend in Biomass Production	37
Figure 5.2: Trend in Charcoal Import and Export.....	37
Figure 5.3: Trend in Biomass Consumption by Sector.....	39
Figure 7.1: Trend in Average Crude Oil Prices.....	46
Figure 7.2: Trend in petroleum products prices.....	46
Figure 7.3: Trend in Average Electricity End-User Tariff	48

ABBREVIATIONS AND ACRONYMS

Bbls	Barrels
GWh	Gigawatt-hour
Kt	Kilotonnes
ktoe	thousand tonnes of oil equivalent
kWh	kilowatt-hour
MMBtu	Million British thermal unit
MW	Megawatt
tBtu	Trillion British Thermal Units
tCO ₂	Tonnes of Carbon dioxide
toe	Tonnes of oil equivalent
W	Watt
ATK	Aviation Turbo Kerosene
DPK	Dual Purpose Kerosene
LCO	Light Crude Oil
LPG	Liquefied Petroleum Gas
RFO	Residual Fuel Oil
Dist. SPV	Distributed Solar PV
FEC	Final Energy Consumption
TES	Total Energy Supply
TFC	Total final consumption
W2E	Waste-to-Energy
ECG	Electricity Company of Ghana
EPC	Enclave Power Company Ltd
GNGC	Ghana National Gas Company
GNPC	National Petroleum Corporation
GRIDCo	Ghana Grid Company
GSS	Ghana Statistical Service
NEDCo	Northern Electricity Distribution Company
NPA	National Petroleum Authority
PURC	Public Utilities Regulatory Commission
VALCO	Volta Aluminium Company
VRA	Volta River Authority
WAGP	West African Gas Pipeline
WAPCo	West African Gas Pipeline Company

CONVERSION FACTORS

Ghana Standard Figures				
Petroleum Products				
Gasoline / Petrol	1	Litres	1324.5	Metric Tonnes
Kerosene	1	Litres	1240.6	Metric Tonnes
Jet Kerosene	1	Litres	1240.6	Metric Tonnes
Gasoil / Diesel	1	Litres	1183.43	Metric Tonnes
Fuel Oil	1	Litres	1009.08	Metric Tonnes
LPG	1	Kg	1000	Metric Tonnes
Petroleum				
Crude Oil	1	Tonne	1.02	TOE
Gasoline / Petrol	1	Tonne	1.05	TOE
Kerosene	1	Tonne	1.03	TOE
Jet Kerosene	1	Tonne	1.03	TOE
Gasoil / Diesel	1	Tonne	1.02	TOE
Fuel Oil	1	Tonne	0.97	TOE
LPG	1	Tonne	1.08	TOE
Crude Oil	1	barrel	36	Imperial gallons
	36	Imperial gallons	163.66	Litres
	7	Barrels	1	Tonne
	1	cubic metre	6.289	Barrels
Natural Gas	1	GJ	1.05	MMBtu
	1	MMBtu	0.0252	TOE
	1.05	MMBtu	1.07	MSCF
	1	MMBtu	27.10	cubic metre (m3)
	1	MMBtu	5.82	bbl. of crude oil equivalent
	1000	m3	36.91	MMBtu
Electricity	1000	W	1	Kw
	1000	kW	1	MW
	1000	MW	1	GW
	1000	kWh	1	MWh
	1000	MWh	1	GWh
	1	GWh	86	TOE
	1	GWh	3600	GJ
	1	TOE	41.86	GJ

Ghana Standard Figures

Woodfuel

Firewood/fuelwood	1	Tonne	0.30-0.36	TOE
Charcoal	1	Tonne	0.68-0.88	TOE
Sawdust/sawmill residues/wood chips	1	Tonne	0.20-0.30	TOE

The low side reflects average dry wood and corresponding charcoal in the forest zones while the high side reflects average dry wood and corresponding charcoal in the savannah zones of the country.

Between 4 – 5 mass units of wood are used to produce one mass unit of charcoal in the country

Charcoal Source	Average Weight (kg) of Charcoal		
	Mini Bag	Maxi Bag	Moisture Content
Sawmill residue	21 – 22	44 - 45	Up to 40%
Savannah wood	30 – 32	55 - 60	Up to 20%
Acacia plant	31 – 32	57 - 63	Up to 20%
All other woods	25 – 27	50 - 55	Up to 25%

GLOSSARY

Energy flows	
Production	It covers the capture, extraction or manufacture of fuels or energy in forms that are ready for general use
Import	It comprises the quantities of fuels entering the national territorial
Export	It comprises the quantities of fuels leaving the national territorial
International Aviation Bunkers	It covers the quantities of fuels delivered to aeroplanes of any nationality for consumption during international flights
International Marine Bunkers	It covers the quantities of fuels delivered to ships of any nationality for consumption during international voyages
Stock changes	It is the difference between opening and closing stock levels. A stock draw is an addition to supply and so will be entered with a positive sign. The converse applies to a stock build.
Total Energy Supply	Represents the amount of energy that is available in the national territory during the reference period. It includes production, import and stock changes, less export and international aviation and marine bunkers
Transformation (Electricity plants)	It refers to power plants designed to produce electricity only for sale to third parties, as their primary activity
Transformation (Oil refineries)	It is the process where quantities of crude oil are processed into petroleum products
Own Use	It is the primary and secondary energy consumed by transformation industries for heating, pumping, lighting and other purposes
Losses	It refers to losses during the transmission, distribution and transport of fuels and electricity
Final Energy Consumption	It refers to all fuel and energy delivered to final users for their energy Use
Non-Energy Use	It comprises the use of energy products as raw materials for the manufacture of non-fuel products as well as for direct uses that do not involve using the products as a source of energy, nor as a transformation input
Statistical differences	It is the numerical difference between the total energy supply and the total use of it. It includes the sum of the unexplained differences for individual fuels as they appear in the energy statistics

SECTION 1: ELECTRICITY ACCESS MAPS OF GHANA

PROPORTION OF THE POPULATION WITH ACCESS TO ELECTRICITY

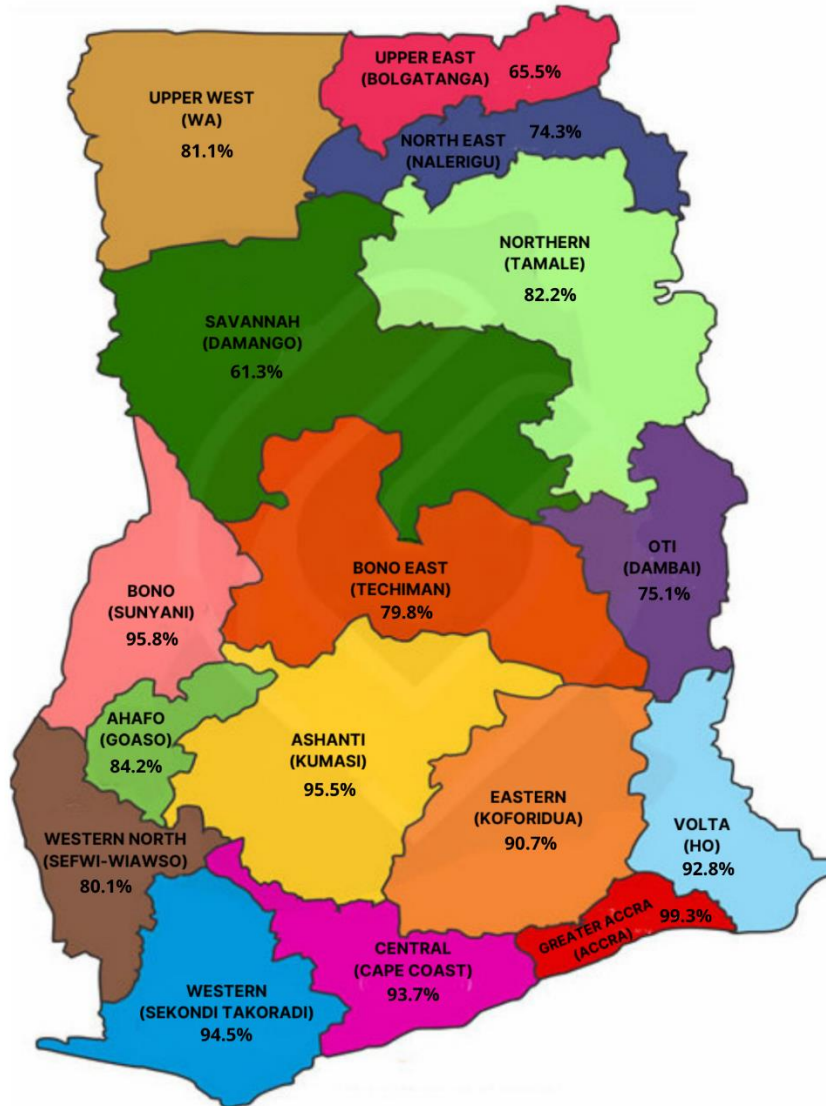


Figure 1.1: Population with access to electricity by region

2022 National population electricity access rate: 88.8%

$$\text{Regional population access} = \frac{\text{Total number of persons connected to the grid in the region}}{\text{Total population of the region}} \times 100$$

PROPORTION OF HOUSEHOLDS WITH ACCESS TO ELECTRICITY



Figure 1.1: Household with access to electricity by region

2022 National household electricity access rate: 86.8%

$$\text{Regional household access} = \frac{\text{Total number of households connected to the grid in the region}}{\text{Total number of households in the region}} \times 100$$

SECTION 2: ENERGY SUPPLY AND FINAL CONSUMPTION

2.1 Total Energy Supply

The total energy supply doubled from 6,146 ktoe in 2000 to 12,331 ktoe in 2022, representing an average annual growth rate of 3.2% (Table 2.1). In 2022, there was an increase of 4.9% compared to 2021 (Figure 2.1). The increase was primarily driven by the increase in biomass supply.

In 2022, the major sources of energy were oil (33.6%), natural gas (28.2%), biomass (32.4%), and hydro (5.7%). Solar energy accounted for less than 1% of the total energy supply. Over the years, natural gas has experienced a significant increase in its share of the total energy supply, rising from 5.6% in 2010 to 28.2% in 2022. On the other hand, the contribution of hydro to the total energy supply decreased from 9.2% in 2000 to 5.7% in 2022. The share of oil in the total energy supply has, however, remained consistently high.

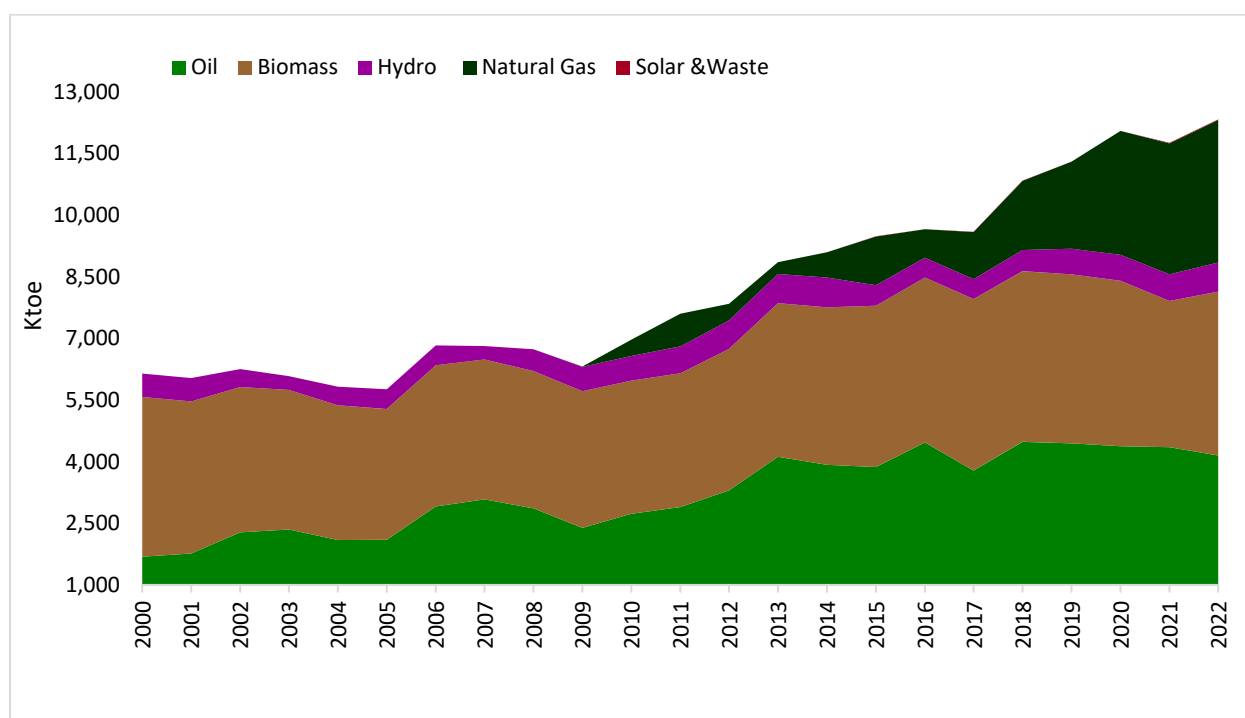


Figure 2.1: Total Energy Supply

Table 2.1: Total Energy Supply (ktoe)

Year	Oil		Natural Gas		Hydro		Solar		Biomass		Total ktoe
	ktoe	%	ktoe	%	ktoe	%	ktoe	%	ktoe	%	
2000	1,688	27.5	-	-	568	9.2	-	-	3,891	63.3	6,146
2001	1,761	29.2	-	-	568	9.4	-	-	3,705	61.4	6,035
2002	2,277	36.4	-	-	433	6.9	-	-	3,541	56.6	6,251
2003	2,347	38.6	-	-	334	5.5	-	-	3,398	55.9	6,079
2004	2,094	35.9	-	-	454	7.8	-	-	3,277	56.3	5,824
2005	2,103	36.5	-	-	484	8.4	-	-	3,178	55.1	5,766
2006	2,908	42.6	-	-	483	7.1	-	-	3,439	50.4	6,830
2007	3,082	45.3	-	-	320	4.7	-	-	3,408	50.0	6,811
2008	2,862	42.5	-	-	533	7.9	-	-	3,344	49.6	6,738
2009	2,390	37.8	5	0.1	591	9.4	-	-	3,329	52.7	6,316
2010	2,735	39.2	394	5.6	601	8.6	-	-	3,237	46.5	6,967
2011	2,898	38.1	796	10.5	650	8.6	-	-	3,256	42.8	7,601
2012	3,300	42.1	403	5.1	694	8.9	-	-	3,443	43.9	7,840
2013	4,115	46.5	292	3.3	708	8.0	0.3	0	3,743	42.3	8,858
2014	3,923	43.1	619	6.8	721	7.9	0.3	0	3,836	42.2	9,100
2015	3,871	40.8	1,185	12.5	503	5.3	0.3	0	3,925	41.4	9,483
2016	4,466	46.2	692	7.2	478	5.0	2	0.02	4,019	41.6	9,658
2017	3,785	39.5	1,146	11.9	483	5.0	2	0.03	4,177	43.5	9,593
2018	4,482	41.3	1,684	15.5	517	4.8	3	0.03	4,153	38.3	10,839
2019	4,445	39.3	2,117	18.7	624	5.5	4	0.04	4,115	36.4	11,305
2020	4,378	36.3	3,014	25.0	627	5.2	5	0.04	4,029	33.4	12,053
2021	4,352	37.0	3,189	27.1	647	5.5	11	0.09	3,562	30.3	11,760
2022	4,147	33.6	3,472	28.2	704	5.7	14	0.11	3,993	32.4	12,331

2.2 Total Final Consumption by Fuel

The total final energy consumption grew steadily from 5,470 ktoe in 2000 to 8,537 ktoe in 2022, representing a 2.2% average annual growth rate. However, there was an increase of 0.2% in the total final energy consumed in 2022 compared to 2021. Electricity consumption, however, has consistently increased at a rate of 4.3%, reaching 1,509 ktoe in 2022.

In contrast, petroleum consumption decreased to 4,318 ktoe in 2022 from 4,641 ktoe in 2021. This represents a decline of 7%. Biomass consumption has also been declining at a rate of 0.7%, dropping from 3,432 ktoe in 2000 to 2,940 ktoe in 2022.

Table 2.2: Total Final Energy Consumed by Fuels (ktoe)

Year	Electricity ¹		Petroleum ²		Biomass		Total
	Ktoe	%	Ktoe	%	Ktoe	%	
2000	592	10.8	1,445	26.4	3,432	62.8	5,470
2001	613	11.5	1,467	27.6	3,238	60.9	5,318
2002	582	11.2	1,550	29.7	3,082	59.1	5,214
2003	446	9.2	1,494	30.7	2,925	60.1	4,864
2004	456	9.1	1,705	34.1	2,839	56.8	5,000
2005	510	10.3	1,712	34.5	2,745	55.3	4,967
2006	621	12.3	1,775	35.0	2,671	52.7	5,068
2007	539	10.4	2,023	39.1	2,614	50.5	5,176
2008	621	12.1	1,973	38.4	2,544	49.5	5,138
2009	641	11.3	2,496	44.2	2,513	44.5	5,650
2010	715	13.0	2,408	43.6	2,395	43.4	5,519
2011	790	13.4	2,704	45.7	2,419	40.9	5,913
2012	796	12.2	3,189	48.7	2,566	39.2	6,551
2013	910	13.0	3,308	47.1	2,804	39.9	7,022
2014	920	13.1	3,243	46.2	2,853	40.7	7,016
2015	914	12.5	3,497	47.9	2,896	39.6	7,307
2016	1,077	14.8	3,255	44.7	2,945	40.5	7,277
2017	1,121	15.4	3,103	42.6	3,053	42.0	7,276
2018	1,150	14.8	3,581	45.9	3,063	39.3	7,794
2019	1,226	15.2	3,793	46.9	3,069	37.9	8,088
2020	1,327	15.4	4,248	49.4	3,026	35.2	8,602
2021	1,453	16.6	4,641	53.0	2,660	30.4	8,754
2022	1,509	17.2	4,318	49.3	2,940	33.5	8,767

¹Includes commercial losses

²Petroleum consumption from 2016 onwards includes natural gas used in industry

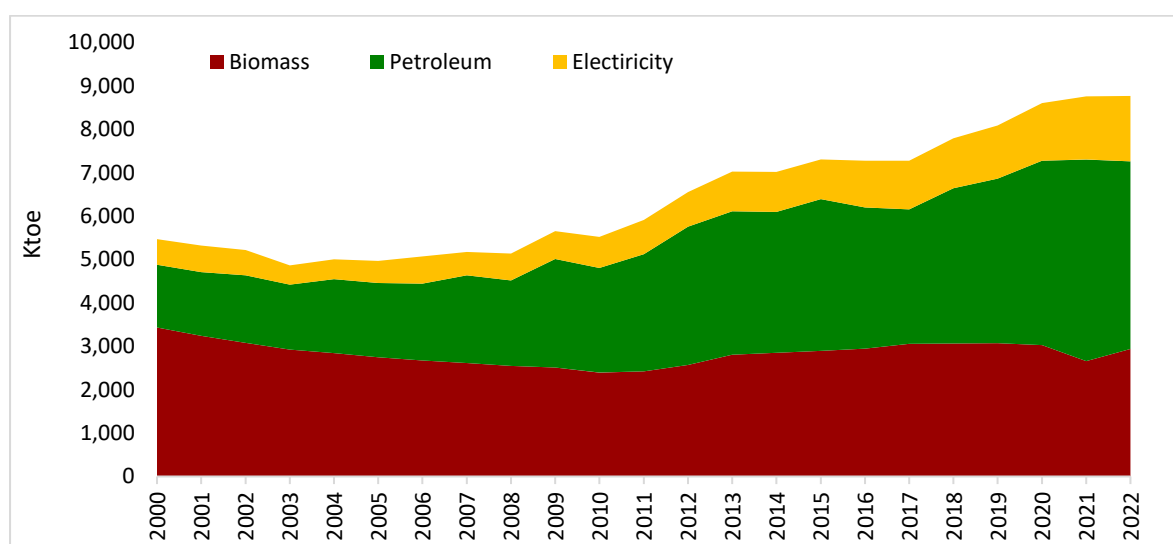


Figure 2.2: Trend in Final Energy Consumption by Fuel

2.3 Total Final Consumption by Sector

The main contributors to final energy consumption are the industry, transport, and residential sectors. The industrial sector's energy consumption increased by 3.8% per year, reaching 1,656 ktoe in 2022. The transport sector's energy consumption grew at a higher rate of 5.3% per year, reaching 3,535 ktoe in 2021, before decreasing by 6% to 3,322 ktoe in 2022. In contrast, residential consumption declined with a growth rate of 0.1%, from 3,390 ktoe in 2000 to 3,320 ktoe in 2022. The service sector has experienced an average annual growth rate of around 5.3% from 2000 to 2022. Furthermore, the agriculture sector's consumption increased steadily over the period, followed by a decline in 2022 (Table 2.3).

Table 2.3: Final Energy Consumption by Sectors (ktoe)

Year	Residential	Industry	Service	Agriculture	Transport	Non-Energy Use	Total
2000	3,390	732	121	33	1,186	7	5,470
2001	3,218	739	123	29	1,200	8	5,318
2002	3,085	703	127	29	1,261	9	5,214
2003	2,945	552	132	32	1,196	8	4,864
2004	2,883	565	135	30	1,377	9	5,000
2005	2,814	611	145	35	1,352	10	4,967
2006	2,635	895	173	41	1,315	10	5,068
2007	2,579	859	165	49	1,516	9	5,176
2008	2,565	891	145	59	1,473	5	5,138
2009	2,661	924	167	66	1,819	13	5,650
2010	2,595	785	254	35	1,843	7	5,519
2011	2,749	811	233	48	2,063	10	5,913
2012	2,878	833	261	62	2,511	5	6,551
2013	3,010	943	331	61	2,673	4	7,022
2014	3,008	869	351	106	2,680	1	7,016
2015	3,150	985	251	101	2,819	-	7,307
2016	3,208	987	371	105	2,606	-	7,277
2017	3,309	1,051	400	126	2,390	-	7,276
2018	3,325	1,164	392	119	2,794	-	7,794
2019	3,362	1,234	402	123	2,968	-	8,088
2020	3,443	1,446	321	139	3,253	-	8,602
2021	3,151	1,571	351	147	3,535	-	8,754
2022	3,320	1,656	376	92	3,322	-	8,767

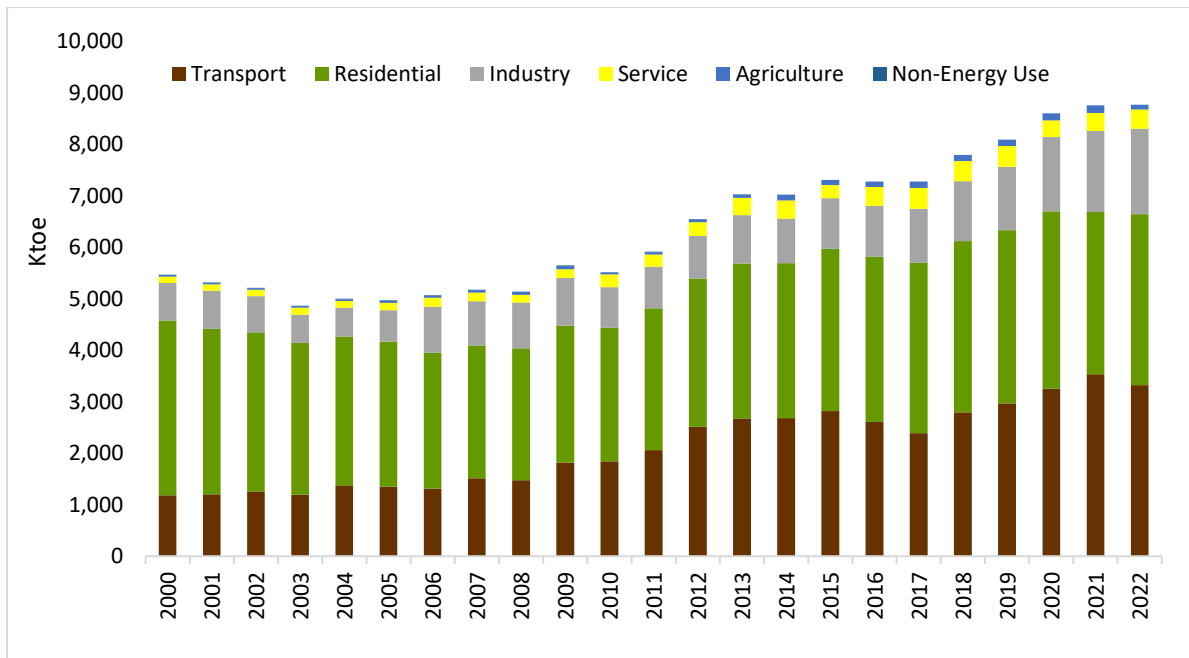


Figure 2.3: Final Energy Consumed by Sectors

SECTION 3: ELECTRICITY

3.1 Installed Electricity Generation Capacity

The total grid-installed electricity generation capacity, excluding distributed generation, witnessed an annual average growth of 2.7% from 1,652 MW in 2000 to 2,165 MW in 2010. Subsequently, it experienced a further increase, reaching 5,454 MW in 2022, representing an annual average growth of 8%. Similarly, the dependable capacity increased from 1,358 in 2000 to 1,940 MW in 2010, reaching 4,843 MW in 2022 (Table 3.1).

In 2011 the installed thermal generation capacity was 990 MW, quadrupling to 3758 MW in 2022 at an annual average growth rate of 12.9%. Notably, there has been a significant increase in the contribution of renewable energy sources, especially in recent years.

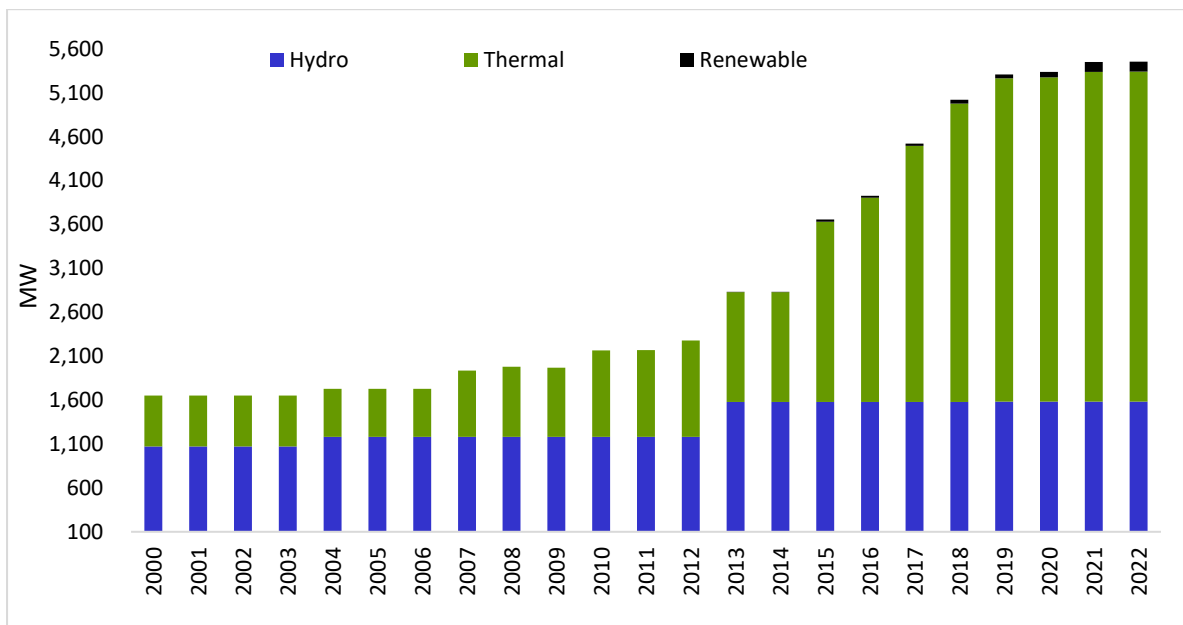


Figure 3.1: Installed Generating Capacity (2000-2022)

Table 3.1: Grid Installed and Dependable Capacity (MW)

Year	Installed Capacity				Dependable Capacity			
	Hydro	Thermal	Other Renewable ¹	Total	Hydro	Thermal	Other Renewable ¹	Total
2000	1,072	580	-	1,652	928	430	-	1,358
2001	1,072	580	-	1,652	951	530	-	1,481
2002	1,072	580	-	1,652	974	530	-	1,504
2003	1,072	580	-	1,652	982	530	-	1,512
2004	1,180	550	-	1,730	1,040	500	-	1,540
2005	1,180	550	-	1,730	1,040	500	-	1,540
2006	1,180	550	-	1,730	1,040	500	-	1,540
2007	1,180	755	-	1,935	1,040	670	-	1,710
2008	1,180	801	-	1,981	1,040	695	-	1,735
2009	1,180	790	-	1,970	1,040	725	-	1,765
2010	1,180	985	-	2,165	1,040	900	-	1,940
2011	1,180	990	-	2,170	1,040	905	-	1,945
2012	1,180	1,100	-	2,280	1,040	1,005	-	2,045
2013	1,580	1,248	-	2,828	1,380	1,105	-	2,485
2014	1,580	1,248	-	2,828	1,380	1,187	-	2,567
2015	1,580	2,053	-	3,633	1,380	1,957	-	3,337
2016	1,580	2,324	23	3,927	1,380	2,119	-	3,499
2017	1,580	2,917	23	4,520	1,380	2,568	-	3,948
2018	1,580	3,398	43	5,021	1,380	3,058	-	4,438
2019	1,584	3,682	43	5,309	1,365	3,296	-	4,661
2020	1,584	3,694	59	5,337	1,400	3,435	-	4,835
2021	1,584	3754.9	112	5,451	1400	3482	-	4,882
2022	1584	3757.9	112.1	5,454	1370	3472.8	-	4,843

¹Solar and waste

The list of power plants, excluding off-grid and distributed generation, in Ghana as of the end of December 2022, is shown in Table 3.2.

Table 3.2: Installed Generation Capacities in Ghana as of 2022 (MW)

Plant	Installed Capacity	Dependable Capacity
Hydro Power Plants		
Akosombo	1,020	900
Kpong	160	140
Bui	404	330
Tsatsadu Hydro	0.045	0.045
Sub-total	1,584	1,370
Thermal Power Plants		
Takoradi Power Company (TAPCO)	330	315
Takoradi International Company (TICO)	340	330
Tema Thermal 1 Power Plant (TT1PP)	110	100
Tema Thermal 2 Power Plant (TT2PP)	80	70
Cenit Energy Ltd	110	100
Kpone Thermal Power Plant	220	200
Ameri Plant	250	230
Sunon Asogli Power (Ghana) Ltd	560	530
Karpowership	470	450
Amandi (Twin City)	210	201
AKSA	370	330
Cenpower	360	340
Early Power / Bridge Power ¹	191	144
Genser ²	157	133
Sub-total	3,758	3,473
Other Renewables		
On-grid		
VRA Solar (Navrongo) ²	2.5	-
VRA Solar (Lawra) ²	6.5	-
VRA Solar (Kaleo) ²	13	-
BXC Solar ²	20	-
Meinergy ²	20	-
Bui Solar ²	50	-
Safisana Biogas ²	0.1	-
Sub-total	112	-
Total	5,454	4,843

¹ Currently undergoing testing and preparations before its commercial operation date (COD)

² Connected at the sub-transmission level (embedded generation)

Table 3.3: Renewable Energy Installed Generation Capacity (KW)

Year	Off-grid			On-grid			Mini-Grid		Installed	
	Solar	Wind	Dist. SPV	Utility Solar	W2E	Hydro	Wind	Solar		
2013	-	-	495	2,500	-	-	-	-	-	2,995
2014	1,350	-	443	-	-	-	-	-	-	1,793
2015	4,003	20	700	20,000	100	-	-	256	11	25,090
2016	1,238	-	2,626	-	-	-	-	-	-	3,865
2017	678	-	4,266	-	-	-	-	58	-	5,003
2018	155	-	9,441	20,000	-	-	-	-	-	29,596
2019			9,924		-	45	-	-	-	9,969
2020*			7,520	6,540						14,060
2021*			3,975	63,000						66,975
2022*			3,001							3,001
Total	7,424	20	42,390	112,040	100	45	-	314	11	162,345

Note: This excludes large hydro (Akosombo, Kpong and Bui); *Provisional
Source: Ministry of Energy & Energy Commission

3.2 Electricity Generation

The electricity generation³ in Ghana has been primarily derived from hydro and thermal sources. However, there has been a gradual increase in the share of renewable sources due to lower costs of PV and wind technologies, as well as efforts to diversify the generation mix. Hydropower was the leading source of electricity generation in Ghana between 2000 and 2015, with its share ranging from 51% to 92%. However, from 2016, the share of thermal power has increased steadily, reaching its highest share of 65% in 2021, and subsequently dropping marginally to 64% in 2022.

It is worth noting that the share of renewable energy generation in Ghana has been negligible throughout the period, with the highest share being 0.70% in 2022.

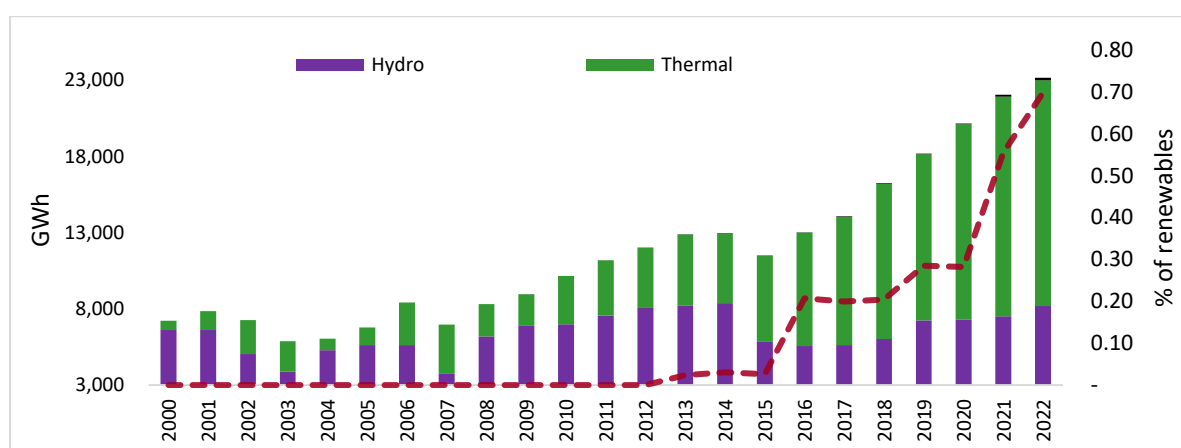


Figure 3.2: Electricity Generation (2000-2022)

³ Electricity generation includes embedded generation and import.

In the span of 21 years, total electricity generated in Ghana grew almost threefold from 7,859 GWh in 2001 to 23,163 GWh in 2022, which translates to an annual average growth rate of 5.3%. The electricity generated in 2022 was made of 8,192 GWh from hydro sources, 14,810 GWh from thermal sources, and 162 GWh from renewable sources.

Table 3.4: Annual Electricity Generation

Year	Generation (GWh)				Share (%)		
	Hydro	Thermal	Other Renewables	Total	Hydro	Thermal	Other Renewables
2000	6,610	614	-	7,224	92	8	-
2001	6,609	1,250	-	7,859	84	16	-
2002	5,036	2,237	-	7,273	69	31	-
2003	3,885	1,996	-	5,881	66	34	-
2004	5,280	758	-	6,038	87	13	-
2005	5,629	1,159	-	6,788	83	17	-
2006	5,619	2,811	-	8,430	67	33	-
2007	3,727	3,251	-	6,978	53	47	-
2008	6,196	2,129	-	8,325	74	26	-
2009	6,877	2,081	-	8,958	77	23	-
2010	6,995	3,171	-	10,166	69	31	-
2011	7,561	3,639	-	11,200	68	32	-
2012	8,071	3,953	-	12,024	67	33	-
2013	8,233	4,635	3	12,870	64	36	0.02
2014	8,387	4,572	4	12,963	65	35	0.03
2015	5,844	5,644	3	11,491	51	49	0.03
2016	5,561	7,435	27	13,023	43	57	0.21
2017	5,616	8,424	28	14,067	40	60	0.20
2018	6,017	10,195	33	16,246	37	63	0.20
2019	7,252	10,885	52	18,188	40	60	0.28
2020	7,293	12,820	57	20,170	36	64	0.28
2021	7,521	14,408	122	22,051	34	65	0.55
2022	8,192	14,810	162	23,163	35	64	0.70

Source: GRIDCo and ECG

3.3 Electricity Export and Import

In 2000, Ghana's electricity import stood at 864 GWh, while it exported 392 GWh, leading to a negative net export of -472 GWh. This trend of negative net export persisted for the following five years, with the country importing more electricity than it exported.

From 2008 to 2022, Ghana consistently recorded a positive net export, implying that it was exporting more electricity than it was importing. Notably, the net export rose significantly from 2017 to 2022, reaching its highest point of 2,177 GWh in 2022 as indicated in Table 3.4.

Table 3.5: Electricity Import and Export (GWh)

Year	Import	Export	Net Export
2000	864	392	-472
2001	462	302	-160
2002	1,146	612	-534
2003	940	535	-405
2004	878	667	-211
2005	815	639	-176
2006	629	755	126
2007	435	249	-186
2008	275	538	263
2009	198	752	554
2010	141	1,036	896
2011	165	802	637
2012	177	716	539
2013	121	654	533
2014	165	630	465
2015	236	581	346
2016	765	473	-292
2017	320	377	56
2018	140	739	600
2019	127	1,430	1,303
2020	58	1,855	1,797
2021	44	1,734	1,690
2022	37	2,215	2,177

Source: GRIDCo

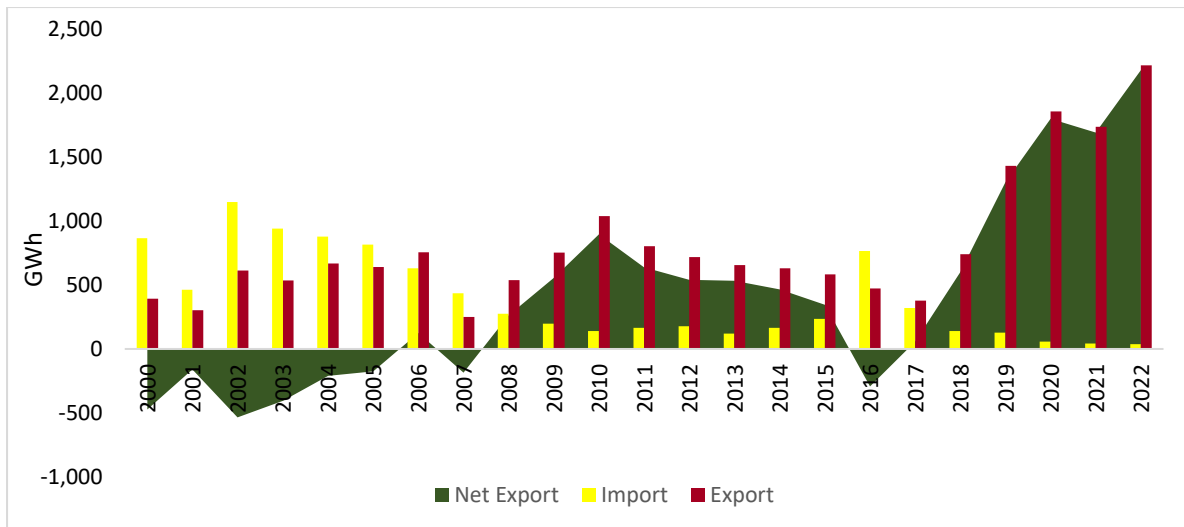


Figure 3.3: Electricity Import and Export

3.4 Peak Load

Table 3.5 displays data on the System Peak (Ghana Load at Peak + VALCO load + export load) and Domestic Peak (ECG + NEDCo + Mines + Direct Customers of VRA) for Ghana from 2000 to 2022. From 2000 to 2010, both the System Peak and Domestic Peak experienced a gradual increase (with some fluctuations), growing at an average annual rate (AAGR) of 2.6% and 5.4%, respectively. However, from 2010 to 2022, there was a significant increase in both the System Peak and Domestic Peak, with an AAGR of 7.2% and 6.8%, respectively. In 2022, the System Peak reached 3,469 MW, which was a remarkable increase of 5.1% compared to the 2000 figure. Similarly, the Domestic Peak in 2022 was 3,065 MW, indicating a significant increase of 6.2% compared to the 2000 figure.

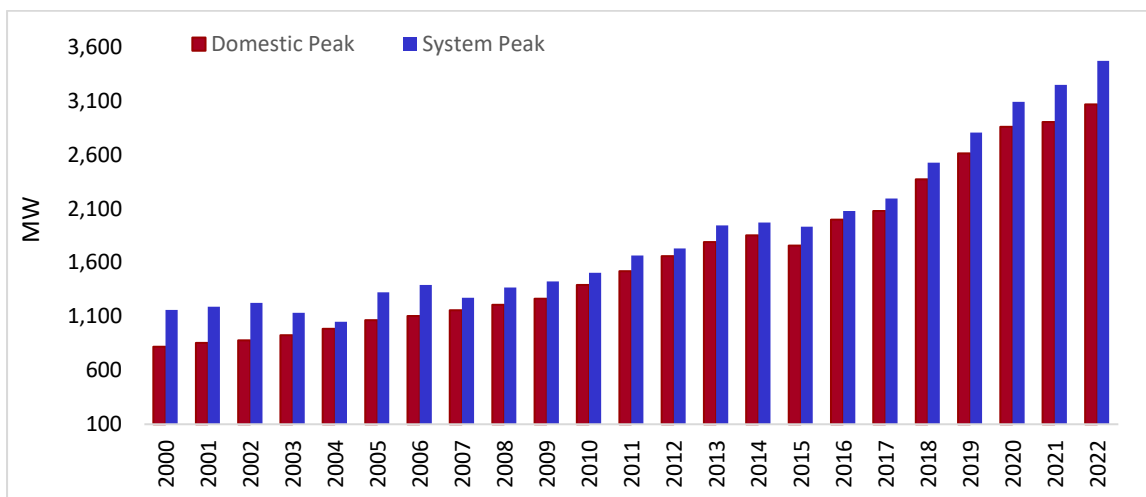


Figure 3.4: System and Ghana Peak Load

Table 3.6: System and Ghana Peak Load (MW)

Year	System Peak ³	Domestic Peak ⁴
2000	1,161	820
2001	1,190	854
2002	1,227	879
2003	1,135	925
2004	1,049	985
2005	1,325	1,064
2006	1,393	1,104
2007	1,274	1,158
2008	1,367	1,208
2009	1,423	1,263
2010	1,506	1,391
2011	1,665	1,520
2012	1,729	1,658
2013	1,943	1,791
2014	1,970	1,853
2015	1,933	1,757
2016	2,078	1,997
2017	2,192	2,077
2018	2,525	2,371
2019	2,804	2,613
2020	3,090	2,857
2021	3,246	2,904
2022	3,469	3,065

³System Peak = Ghana Load at Peak + VALCO Load + Export Load;

⁴Maximum Demand for Ghana (ECG + NEDCo + Direct Customers of VRA + Mines)

Source: GRIDCO

3.5 Electricity Transmitted and Losses

Table 3.7 provides data on the total electricity transmitted and transmission losses over the period. Total electricity transmitted has shown a consistent increase, from 8,067 GWh in 2000 to 22,478 GWh in 2022, with transmission losses also increasing, from 229 GWh to 922 GWh over the same period. Transmission losses as a percentage of total electricity transmitted have fluctuated over the years, ranging from a low of 2.8% in 2000 to a high of 5.9% in 2003.

Total electricity transmission losses recorded for 2022 was 922.32 GWh, equivalent to 4.1% of the total energy transmitted. It is noteworthy that the losses decreased to 4.1% of total electricity transmitted in 2022, from the 5.0% recorded in 2021. This percentage aligns with the benchmark set by the Public Utilities Regulatory Commission (PURC) at 4.1%.

Table 3.7: Electricity Transmitted and Transmission Losses (GWh)

Year	Electricity Transmitted	Transmission Losses	Transmission losses % of total electricity transmitted
2000	8,067	229	2.8
2001	8,293	259	3.1
2002	8,402	368	4.4
2003	6,800	402	5.9
2004	6,891	205	3.0
2005	7,565	249	3.3
2006	9,013	318	3.5
2007	7,123	256	3.6
2008	8,423	303	3.6
2009	9,131	343	3.8
2010	10,267	413	3.7
2011	11,340	505	4.8
2012	12,164	522	4.3
2013	12,927	580	4.4
2014	13,071	565	4.3
2015	11,692	443	3.4
2016	13,700	607	4.4
2017	14,308	587	3.8
2018	15,960	707	4.4
2019	17,887	843	4.7
2020	19,717	888	4.5
2021	21,466	1,076	5.0
2022	22,478	922	4.1

Source: GRIDCO

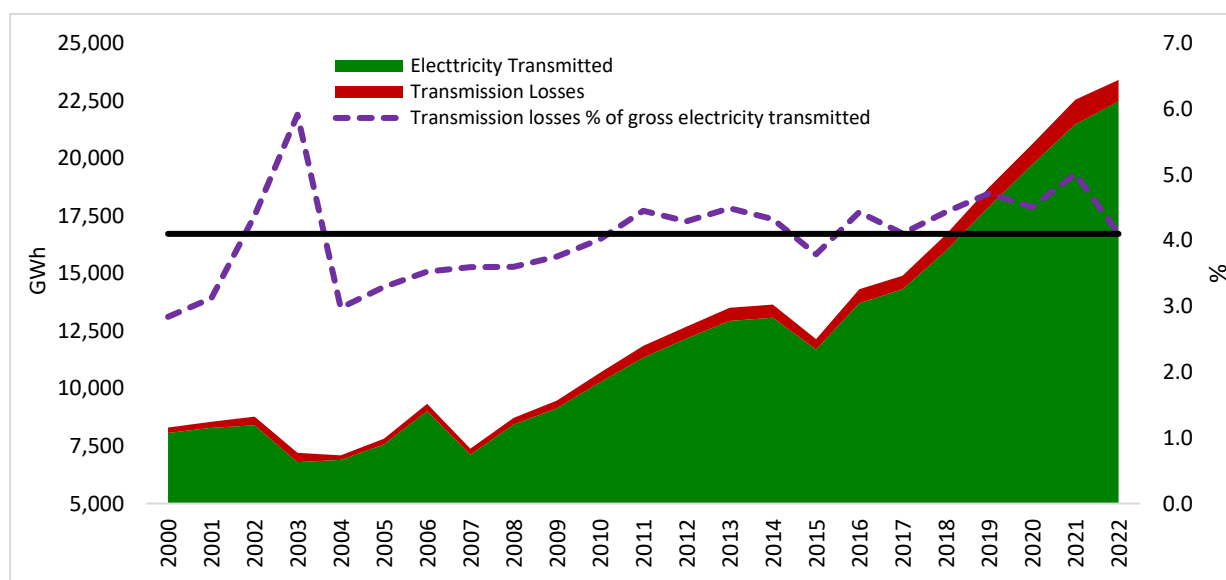


Figure 3.5: Electricity Transmitted and Transmission Losses

3.7 Electricity Purchase, Sales and Losses by Distribution Utilities

Over the period from 2000 to 2022, the Electricity Company of Ghana (ECG) and the Northern Electricity Distribution Company (NEDCo) recorded consistent growth in their total purchases, with average annual growth rates of 6.1% and 8.1% respectively. Additionally, since acquiring a distribution license in 2015, Enclave Power Company (EPC) witnessed a substantial average annual growth rate of approximately 12.1% in their total purchases (Table 3.8).

In 2022, the distribution utilities purchased 16,863 GWh of electricity, with sales amounting to 11,808 GWh. Among them, ECG recorded the highest purchase of 14,811 GWh, accounting for 87.8% of the total, followed by NEDCo with 1,824 GWh (10.8%) and EPC with 228 GWh (1.4%). Correspondingly, their respective sales figures were 10,274 GWh, 1,307 GWh, and 227 GWh. Furthermore, the distribution losses incurred by these utilities in 2022 were measured at 4,537 GWh (89.75%) for ECG, 517 GWh (10.23%) for NEDCo, and 1.1 GWh (0.02%) for EPC.

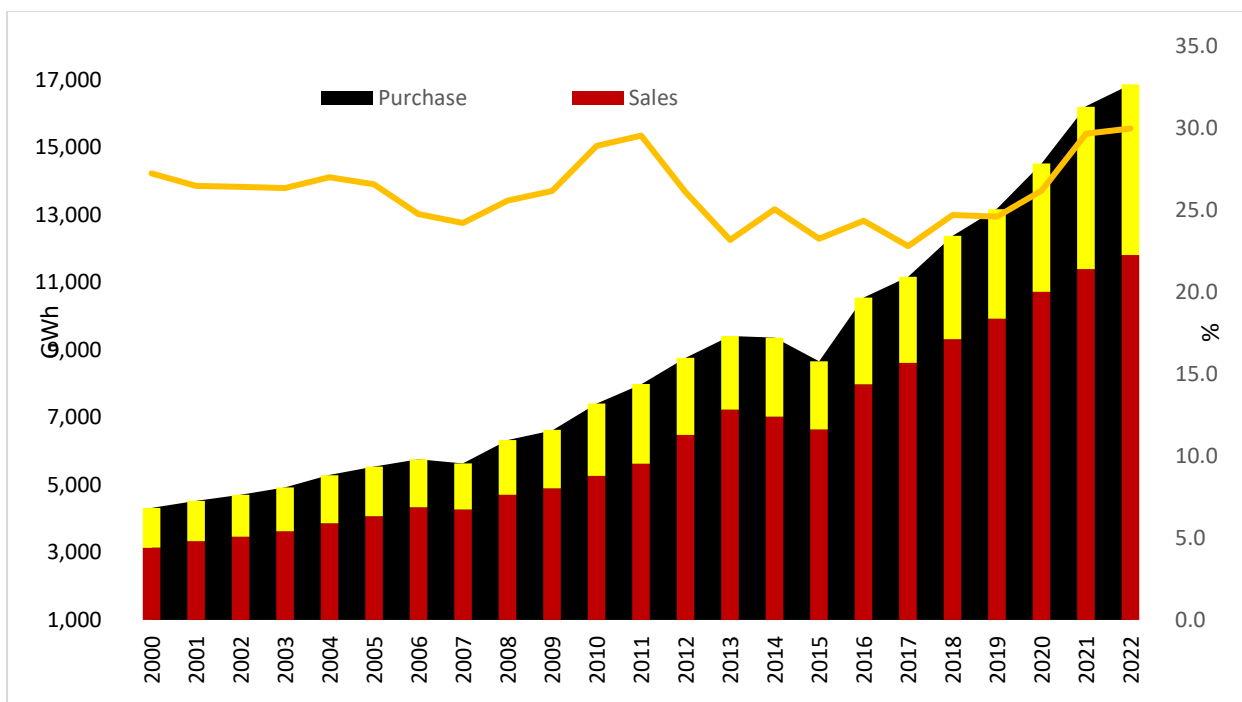


Figure 3.6: DISCO's Purchases, Sales and Losses

Table 3.8: Distribution Utilities' Purchases, Sales and Losses (GWh)

Year	ECG				NEDCo				EPC				Total			
	Purchase	Sales	Losses ⁵	% of Losses	Purchase	Sales	Losses ⁵	% of Losses	Purchase	Sales	Losses ⁵	% of Losses	Purchase	Sales	Losses ⁵	% of Losses
2000	3,989	2,910	1,078	27.0	330	232	98	29.7	-	-	-	-	4,319	3,142	1,176	27.2
2001	4,175	3,080	1,095	26.2	355	251	104	29.3	-	-	-	-	4,530	3,331	1,199	26.5
2002	4,326	3,200	1,126	26.0	383	265	118	30.8	-	-	-	-	4,709	3,466	1,244	26.4
2003	4,496	3,343	1,153	25.6	426	283	143	33.6	-	-	-	-	4,922	3,625	1,296	26.3
2004	4,818	3,539	1,279	26.5	473	323	150	31.7	-	-	-	-	5,291	3,862	1,429	27.0
2005	5,045	3,760	1,285	25.5	501	312	189	37.7	-	-	-	-	5,546	4,072	1,474	26.6
2006	5,253	3,978	1,275	24.3	507	356	151	29.8	-	-	-	-	5,760	4,334	1,426	24.8
2007	5,146	3,909	1,237	24.0	494	366	129	26.1	-	-	-	-	5,640	4,275	1,366	24.2
2008	5,799	4,317	1,482	25.6	529	392	137	25.9	-	-	-	-	6,328	4,709	1,619	25.6
2009	6,052	4,483	1,570	25.9	566	413	162	28.6	-	-	-	-	6,618	4,896	1,732	26.2
2010	6,771	4,756	2,015	29.8	635	511	126	19.9	-	-	-	-	7,406	5,266	2,141	28.9
2011	7,259	5,050	2,209	30.4	719	581	147	20.5	-	-	-	-	7,978	5,631	2,356	29.5
2012	7,944	5,823	2,121	26.7	822	658	165	20.1	-	-	-	-	8,766	6,480	2,286	26.1
2013	8,479	6,496	1,983	23.4	937	737	200	21.3	-	-	-	-	9,416	7,233	2,183	23.2
2014	8,370	6,262	2,108	25.2	998	759	239	23.9	-	-	-	-	9,368	7,020	2,347	25.1
2015	7,544	5,831	1,713	22.7	1,013	720	294	29.0	102	96	6.3	6.2	8,659	6,646	2,013	23.3
2016	9,316	7,115	2,201	23.6	1,123	763	360	32.0	108	100	7.5	7.0	10,546	7,977	2,568	24.4
2017	9,783	7,575	2,208	22.6	1,224	889	335	27.4	157	155	2.7	1.7	11,165	8,618	2,546	22.8
2018	10,901	8,251	2,649	24.3	1,318	910	404	30.6	161	160	4.3	2.7	12,379	9,321	3,057	24.7
2019	11,535	8,685	2,850	24.7	1,413	1,010	386	27.3	235	229	6.1	2.6	13,183	9,924	3,243	24.6
2020	12,706	9,333	3,374	26.6	1,576	1,148	425	27.0	242	237	5.1	2.1	14,524	10,717	3,804	26.2
2021	14,222	9,884	4,323	30.4	1,764	1,281	483	27.4	232	230	2.8	1.2	16,219	11,394	4,809	29.7
2022	14,811	10,274	4,537	30.6	1,824	1,307	517	28.3	228	227	1.1	0.5	16,863	11,808	5,055	30.0

⁵ Distribution Losses include technical and commercial losses

3.8 Electricity Consumption

The total electricity consumption has been increasing steadily over the years, from 6,889 GWh in 2000 to 17,547 GWh in 2022, representing an annual rate of 4.3% (Table 3.9). In terms of sectors, the residential sector had consistently been the largest consumer of electricity, followed by the industrial sector but in 2022 the industrial sector displaced the residential sector. The service sector has been the third largest consumer of electricity, with agriculture and transport consuming much smaller amounts of electricity. This indicates that the demand for electricity in the residential sector is high, possibly due to increasing urbanization and population growth. The trend in electricity consumption by the various sectors is presented in Figure 3.7.

Table 3.9: Electricity Consumption by Sectors (GWh)

Year	Residential	Industry	Service	Agriculture	Transport	Total
2000	2,026	4,380	476	2	4	6,889
2001	2,174	4,455	491	4	4	7,128
2002	2,249	4,001	513	5	4	6,773
2003	2,360	2,249	558	6	14	5,187
2004	2,528	2,177	571	8	16	5,299
2005	2,699	2,558	655	10	11	5,932
2006	2,705	4,001	500	9	9	7,224
2007	2,604	3,254	392	8	12	6,270
2008	3,019	3,740	439	9	11	7,219
2009	3,384	3,357	688	16	9	7,454
2010	3,786	2,775	1,745	2	10	8,317
2011	3,822	3,454	1,897	2	13	9,187
2012	3,729	3,478	2,040	2	9	9,258
2013	4,230	3,876	2,470	2	5	10,583
2014	4,043	4,003	2,640	3	7	10,695
2015	5,048	4,185	1,381	6	5	10,625
2016	5,214	4,611	2,687	8	7	12,528
2017	5,699	4,583	2,738	9	8	13,036
2018	5,739	4,799	2,824	10	8	13,380
2019	6,078	5,081	3,081	11	10	14,261
2020	6,829	6,226	2,355	17	7	15,434
2021	6,959	7,130	2,773	25	10	16,898
2022	7,111	7,428	2,965	33	11	17,547

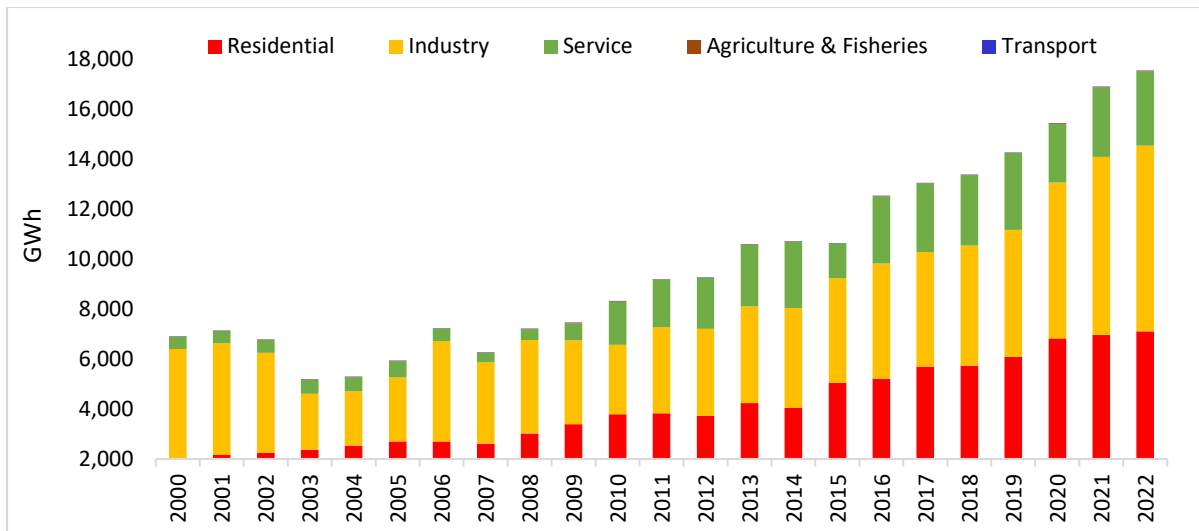


Figure 3.7: Electricity Consumption by Sectors

3.9 Customer Population by Classification

Table 3.9 presents the number of electricity customers in Ghana by customer type (residential, non-residential, and Special Load Tariff (SLT)) from the year 2000 to 2022. The total number of customers increased from 932,598 in 2000 to 5,566,711 in 2022, representing an annual average growth rate of 8.5%. Residential customers have consistently been the largest customer group, with a share of 86% in 2022, while non-residential customers and SLT customers represent 14% and 0.04% respectively in the same year. Over the years, the growth rate of residential customers (8.7%) has been higher than that of non-residential customers (7.1%) and SLT customers (4.5%). Among the distribution utilities, ECG holds the majority share of 79.6%, followed by NEDCO (20.4%) and EPC (0.003%) in terms of the total number of electricity customers.

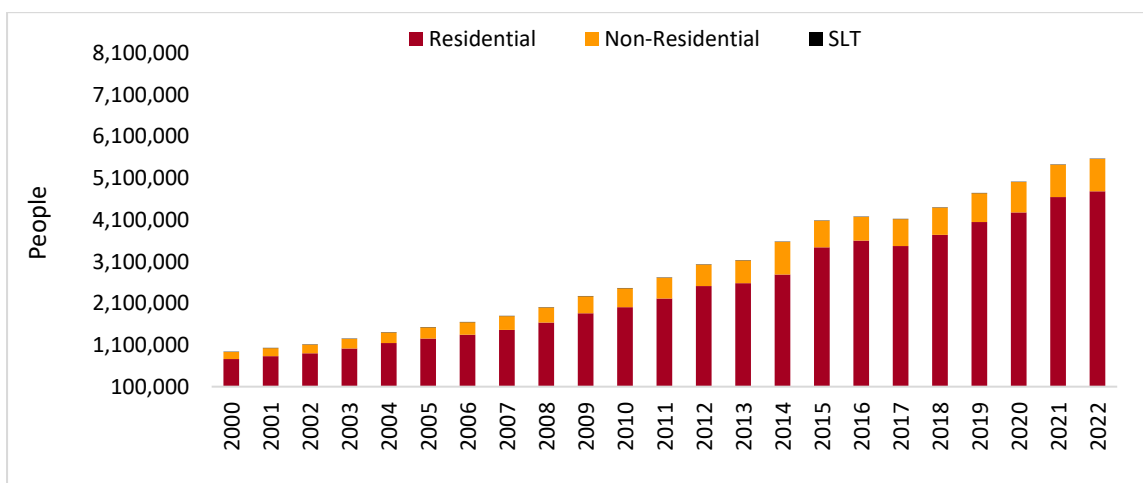


Figure 3.8: Customer Population

Table 3.10: Distribution Utilities Customer Population

Year	Residential	Non-Residential	SLT	Total
2000	758,558	173,245	795	932,598
2001	832,212	189,807	828	1,022,847
2002	902,815	205,687	855	1,109,357
2003	1,014,404	230,651	880	1,245,935
2004	1,146,016	253,340	902	1,400,258
2005	1,253,330	272,442	964	1,526,736
2006	1,347,067	295,703	1,016	1,643,786
2007	1,463,679	328,511	1,055	1,793,245
2008	1,634,407	365,844	1,157	2,001,408
2009	1,856,962	413,634	1,233	2,271,829
2010	2,006,972	454,430	1,369	2,462,771
2011	2,209,957	505,447	1,481	2,716,885
2012	2,511,208	514,492	1,647	3,027,347
2013	2,582,294	545,665	1,882	3,129,841
2014	2,789,913	779,780	2,034	3,571,727
2015	3,445,423	630,518	2,115	4,078,055
2016	3,600,185	568,473	1,438	4,170,096
2017	3,474,163	641,003	1,496	4,116,662
2018	3,743,430	650,971	1,544	4,395,945
2019	4,046,358	692,046	1,744	4,740,148
2020	4,275,929	733,550	1,805	5,011,284
2021	4,648,932	775,312	1,998	5,426,242
2022	4,786,044	778,554	2,113	5,566,711

Source: ECG, EPC & NEDCo

3.10 Dam Headwater level

The water levels of the two major hydropower dams in the country, the Akosombo and Bui, have remained largely above their respective minimum levels of 240 ft and 550 ft, as shown in Figure 3.10 and Figure 3.11. Tables 3.10 and 3.11 show the summary of Akosombo and Bui dam water levels.

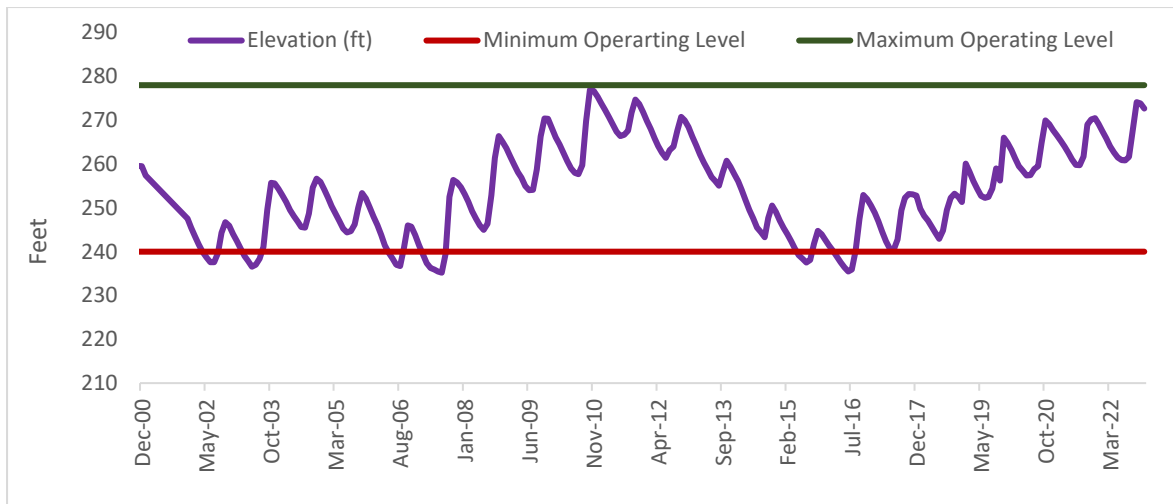


Figure 3.9: Trend in Akosombo Headwater Level

Table 3.11: Akosombo Dam Month-End Elevation (feet)

Years	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2000	260	258	257	255	253	252	252	255	260	263	262	260
2001	257	255	253	251	250	248	247	246	250	252	249	248
2002	246	244	242	240	239	238	238	240	244	247	246	244
2003	242	241	239	238	237	237	238	241	250	256	256	254
2004	253	251	250	248	247	246	246	249	255	257	256	254
2005	252	250	249	247	245	244	245	246	250	253	252	250
2006	248	246	244	242	240	239	237	237	241	246	246	244
2007	242	239	237	236	236	236	235	240	253	256	256	255
2008	253	251	249	248	246	245	246	253	261	266	265	264
2009	262	260	258	257	255	254	254	259	266	270	270	268
2010	266	265	263	261	259	258	258	260	270	277	277	275
2011	274	272	271	269	267	266	267	268	272	275	274	272
2012	270	268	266	264	263	261	263	264	268	271	270	268
2013	266	264	262	260	259	257	256	255	258	261	259	258
2014	256	254	252	250	248	246	245	243	248	251	249	247
2015	245	244	242	241	239	238	238	238	242	245	244	243
2016	241	240	239	238	236	236	236	240	247	253	252	251
2017	249	247	245	242	241	240	243	249	252	253	253	253
2018	250	248	247	246	244	243	245	250	252	253	253	251
2019	260	258	256	254	253	252	253	254	259	256	266	265
2020	263	261	260	259	257	257	259	260	265	270	269	268
2021	267	265	264	263	261	260	260	262	269	270	270	269
2022	267	266	264	263	262	261	261	262	268	274	274	273

Table 3.12: Bui Dam Month-End Elevation (feet)

Years	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2014	576	571	565	559	554	551	552	554	559	572	584	584
2015	582	578	574	571	567	563	558	555	561	575	592	591
2016	586	580	574	565	554	552	552	554	563	581	585	581
2017	577	573	565	562	559	557	557	559	564	576	579	576
2018	577	573	565	562	559	557	557	559	564	576	579	576
2019	573	566	561	557	554	554	558	565	586	600	597	592
2020	588	582	575	570	564	561	559	559	563	573	570	565
2021	559	553	550	549	547	547	550	566	588	591	588	583
2022	579	573	566	563	560	560	562	569	589	599	594	589

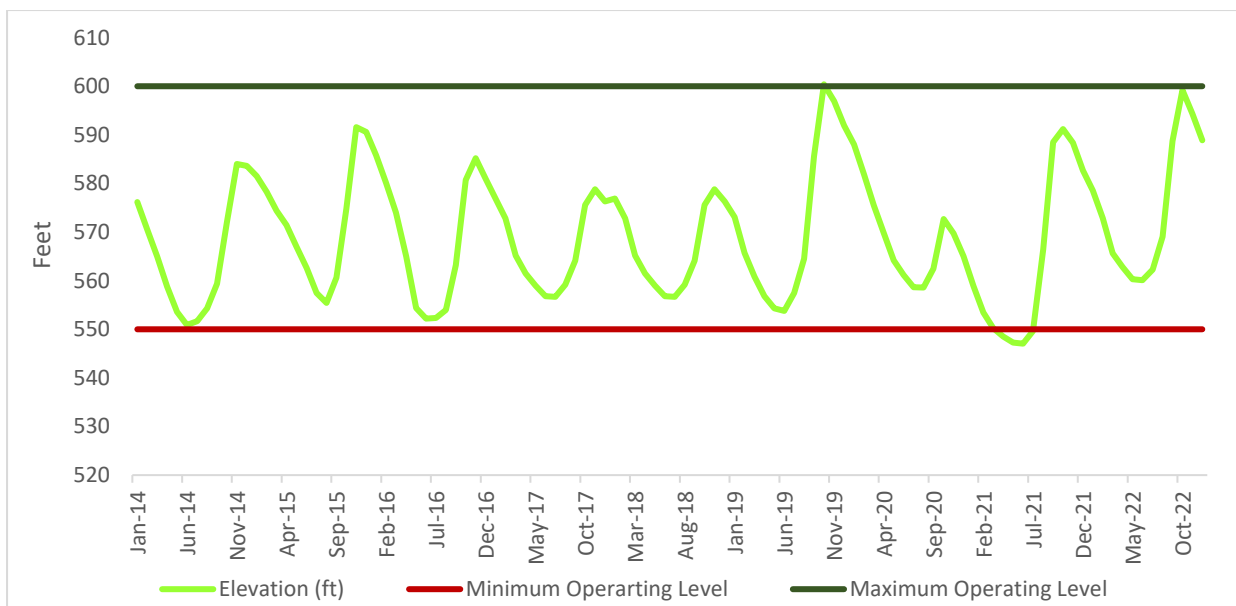


Figure 3.10: Trend in Bui Dam Headwater Level

3.11 Electricity Distribution Reliability Indices

Table 3.12 presents the reliability indices for the electricity supply in different operational areas of the ECG and NEDCo in Ghana from 2016 to 2022.

ECG and NEDCo did not meet the SAIFI benchmark in any of the operational areas, indicating a high occurrence of system outages in 2022, albeit with some improvement compared to 2021. In terms of rural operation areas, ECG showed better SAIFI performance in 2022 compared to 2021, while NEDCo experienced a notable increase. Despite the lack of compliance with the benchmark, there has been a gradual improvement in the SAIFI performance of ECG and NEDCo in metropolitan and urban areas.

The SAIDI for ECG and NEDCO in metro and urban operation areas indicates a significant reduction in 2022 compared to 2021, indicating a decrease in the duration of outages in these areas. However, in rural operation areas, the SAIDI for ECG decreased in 2022 compared to 2021, while NEDCO experienced a significant increase, suggesting an extended duration of outages in the latter region. It is worth noting that ECG and NEDCO were compliant with the SAIDI benchmarks in all metropolitan, urban, and rural areas for the year 2022.

In 2022, ECG and NEDCo met the regulatory benchmarks for CAIDI in all operational areas, ensuring that consumers did not experience outages with durations exceeding the permissible limits.

Table 3.13: Electricity Distribution Reliability Indices

Reliability Index	Operational Area	Regulatory Benchmarks per L.I 1935	2017		2018		2019		2020		2021		2022	
			ECG	NEDCo	ECG	NEDCo	ECG	NEDCo	ECG	NEDCo	ECG	NEDCo	ECG	NEDCo
System Average Interruption Frequency Index (SAIFI)	Metro	6.0	48.0	132.0	28.0	146.0	26.5	42.4	15.5	50.5	17.1	27.5	15.3	20.1
	Urban	6.0	88.0		57.0		45.1	59.8	26.4	33.8	27.4	24.7	21.8	19.7
	Rural	6.0	104.0		61.0		60.4	52.8	34.2	47.9	28.2	55.1	18.8	60.4
System Average Interruption Duration Index (SAIDI)	Metro	48.0	77.0	117.0	44.0	123.0	37.7	61.0	23.8	65.1	26.1	59.2	24.7	46.0
	Urban	72.0	115.0		71.0		63.4	85.2	42.9	45.1	52.2	38.7	43.7	28.4
	Rural	144.0	135.0		76.0		80.0	74.7	51.9	79.6	56.3	81.0	40.0	103.8
Customer Average Interruption Duration Index (CAIDI)	Metro	8.0	2.0	1.0	2.0	1.0	1.4	1.4	6.0	1.3	1.5	2.2	1.6	2.1
	Urban	12.0	1.0		1.0		1.4	1.4	6.5	1.3	1.9	1.6	2.0	1.6
	Rural	24	1.0		1.0		1.3	1.4	6.0	1.6	2.0	1.5	2.1	1.8

SECTION 4: PETROLEUM

4.1 Crude Oil Production

Since commercial production commenced in 2011, there has been a remarkable growth in crude oil production. Production of crude oil increased from 23,833 thousand barrels to 51,757 thousand barrels in 2022. Moreover, the inclusion of Jubilee, TEN, and OCTP has contributed significantly to Ghana's crude oil production since 2010. However, the production rate has been plateaued in recent years and even dropped slightly as shown in Figure 4.1.

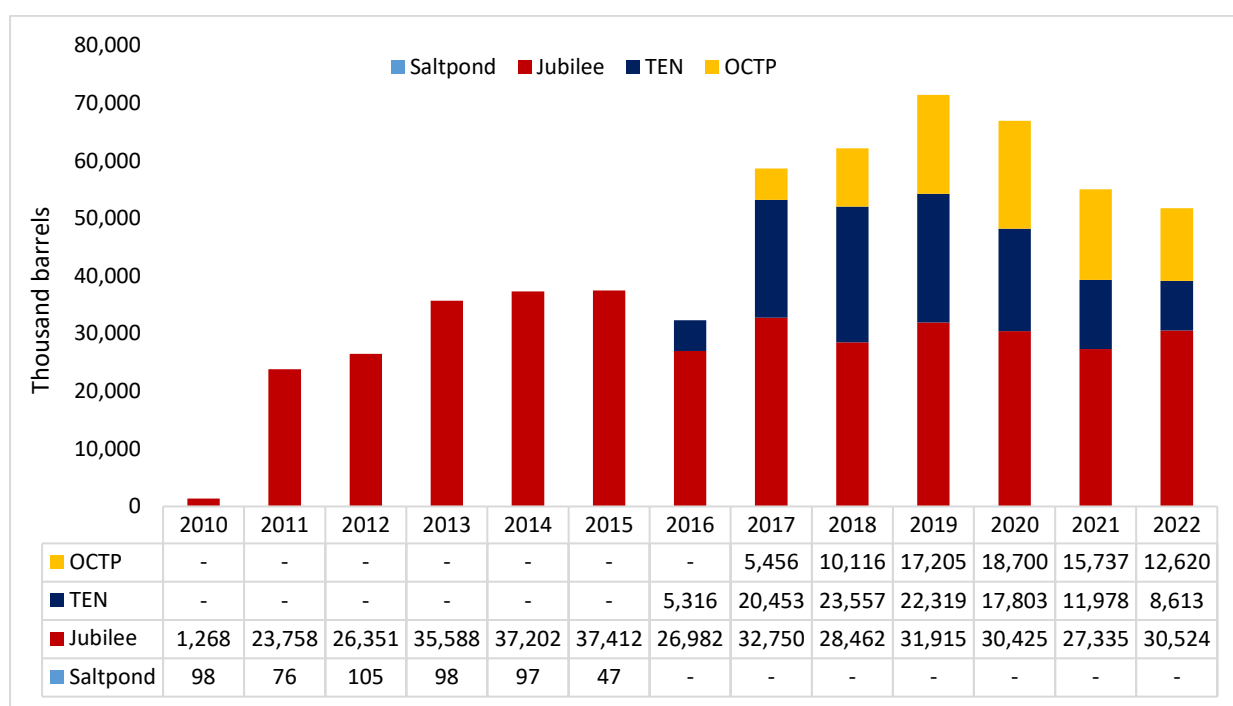


Figure 4.1: Trend in Crude Oil Production

Source: Petroleum Commission & Ghana National Petroleum Corporation

4.2 Crude Oil Import and Export

Crude oil imports declined from 10,721 thousand barrels in 2011 to 226 thousand barrels in 2022, at an average annual rate of 29.6%. The use of crude oil for power generation experienced a significant decline from 6,495 thousand barrels in 2013 to 382 thousand barrels in 2020, with all crude oil imports in 2021 and 2022 being directed towards refinery use. (Table 4.2).

Crude oil export substantially increased in 2011 with the commencement of commercial production. It increased from 24,451 thousand barrels in 2011 to 52,237 thousand barrels in 2022, at a compound annual growth rate of 7.1%.

Table 4.1: Crude Oil Import and Export

Year	Import (ooo' bbls)			Export (ooo' bbls)
	Refinery use	Electricity Generation	Total Import	
2000	7,923	1,072	8,994	-
2001	8,840	1,931	10,772	-
2002	8,256	4,212	12,467	62
2003	9,843	3,693	13,537	72
2004	12,695	1,144	13,838	160
2005	11,519	2,254	13,772	82
2006	6,735	5,254	11,990	160
2007	8,698	5,679	14,376	189
2008	9,777	4,054	13,831	214
2009	3,090	3,787	6,877	173
2010	6,728	4,910	11,638	98
2011	8,919	1,802	10,721	24,451
2012	3,541	4,926	8,467	26,431
2013	2,621	6,495	9,116	35,194
2014	491	4,362	4,852	37,703
2015	433	1,741	2,173	36,460
2016	6,920	3,199	10,119	29,904
2017	385	1,248	1,633	56,990
2018	984	395	1,379	62,020
2019	4,901	909	5,810	70,985
2020	4,461	382	4,843	67,458
2021	514	0	514	55,416
2022	226	0	226	52,237

Source: NPA & Petroleum Commission

Figure 4.2 shows the trend in crude oil import and export from 2000 to 2022.

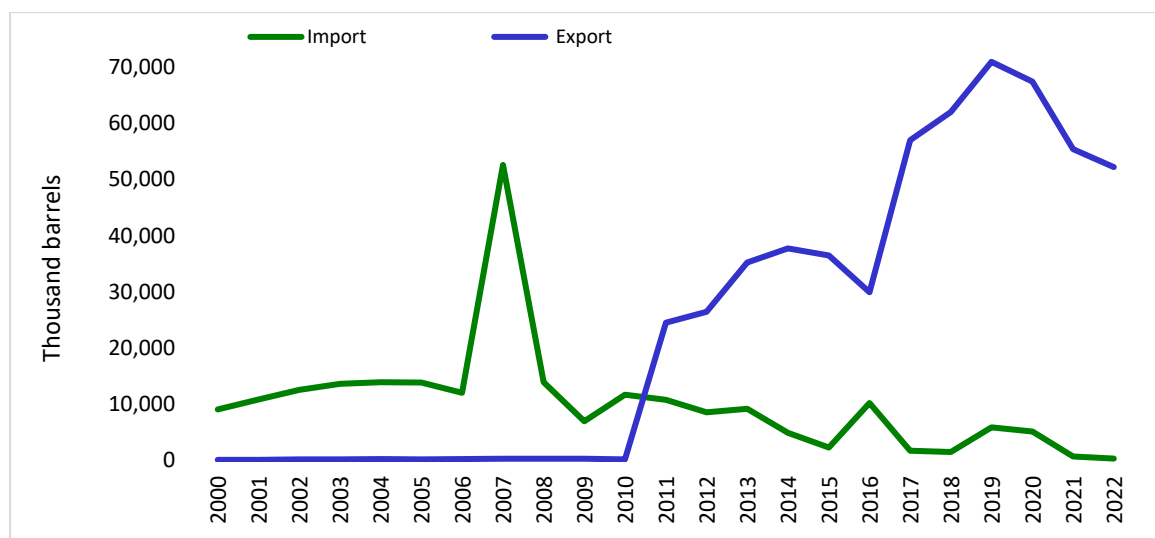


Figure 4.2: Trend in Crude Oil Import and Export

4.3 Natural Gas Production and Import

Ghana's gas production⁴ has witnessed significant growth over the past few years, with production increasing from 2.0 tBtu in 2014 to 117.87 tBtu, representing an annual growth rate of 66.5% (Table 4.3). Additionally, to complement domestic production, the total gas imported⁵ from Nigeria through the West African Gas Pipeline (WAGP), has also been gradually increasing, albeit at a slower rate (Figure 4.3).

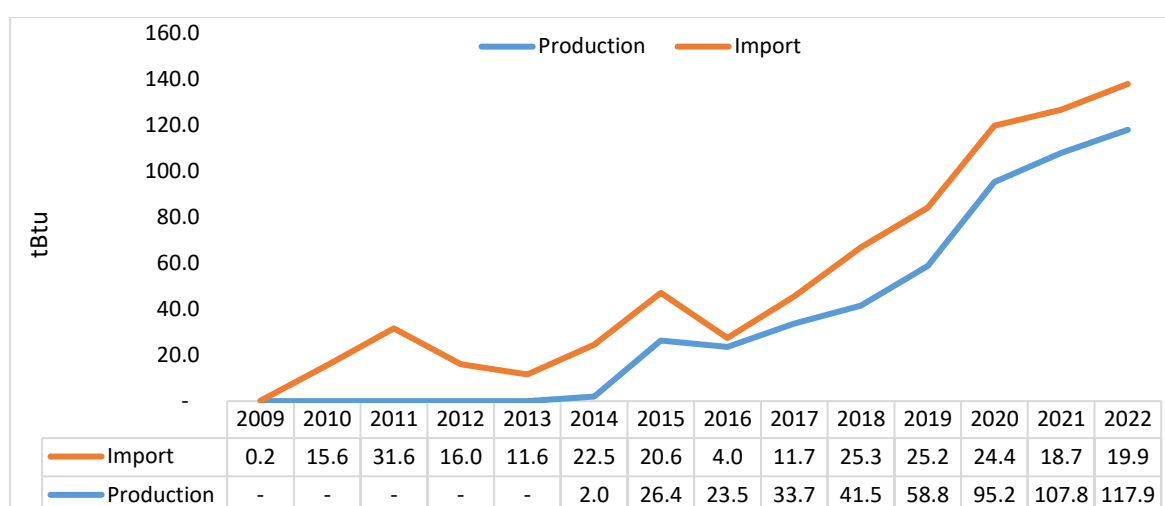


Figure 4.3: Trend in Natural Gas Production and Import

Source: GNGC & VRA

4.4 Petroleum Products Production

The total production of petroleum products decreased by nearly sevenfold, from 1,028 kt in 2000 to 157 kt in 2022. In 2022, the majority of production was attributed to LPG (116 kt), followed by fuel oil (27 Kt) and gas/diesel oil (14 Kt). However, no production of gasoline, kerosene, and ATK occurred in 2022.

LPG production grew at an average annual rate of 11.8% from 2000 to 2022, while the production of gas/diesel oil and RFO declined by 13.7% and 9.8% respectively during the same period.

⁴ Include natural gas production from GNGC and non-associated gas

⁵ Natural gas delivered through WAGP

Table 4.2: Production of Petroleum Products (kt)

Year	LPG	Gasoline	Kerosene	ATK	Gas Oil	RFO	Total
2000	10	239	52	108	358	262	1,028
2001	7	286	98	64	353	261	1,070
2002	24	346	61	82	447	196	1,155
2003	53	434	110	86	507	164	1,352
2004	66	553	111	107	568	199	1,604
2005	75	567	88	119	486	205	1,541
2006	36	294	65	46	294	156	891
2007	67	493	122	66	398	49	1,195
2008	55	391	169	21	361	225	1,222
2009	14	135	49	1	103	25	327
2010	32	338	71	117	293	97	946
2011	45	344	53	116	310	91	958
2012	27	158	21	48	122	79	454
2013	26	167	15	60	113	43	424
2014	3	40	4.5	9	28	44	129
2015	2	32	0.2	18	28	9	89
2016	114	244	24.5	38	255	64	739
2017	114	6	2	0	9	4	136
2018	88	102	33	22	114	32	390
2019	70	125	12	80	198	205	690
2020	85	66	35	28	150	216	580
2021	95	43	24	1	71	147	381
2022	116	-	-	-	14	27	157

Source: TOR, GNGC & NPA

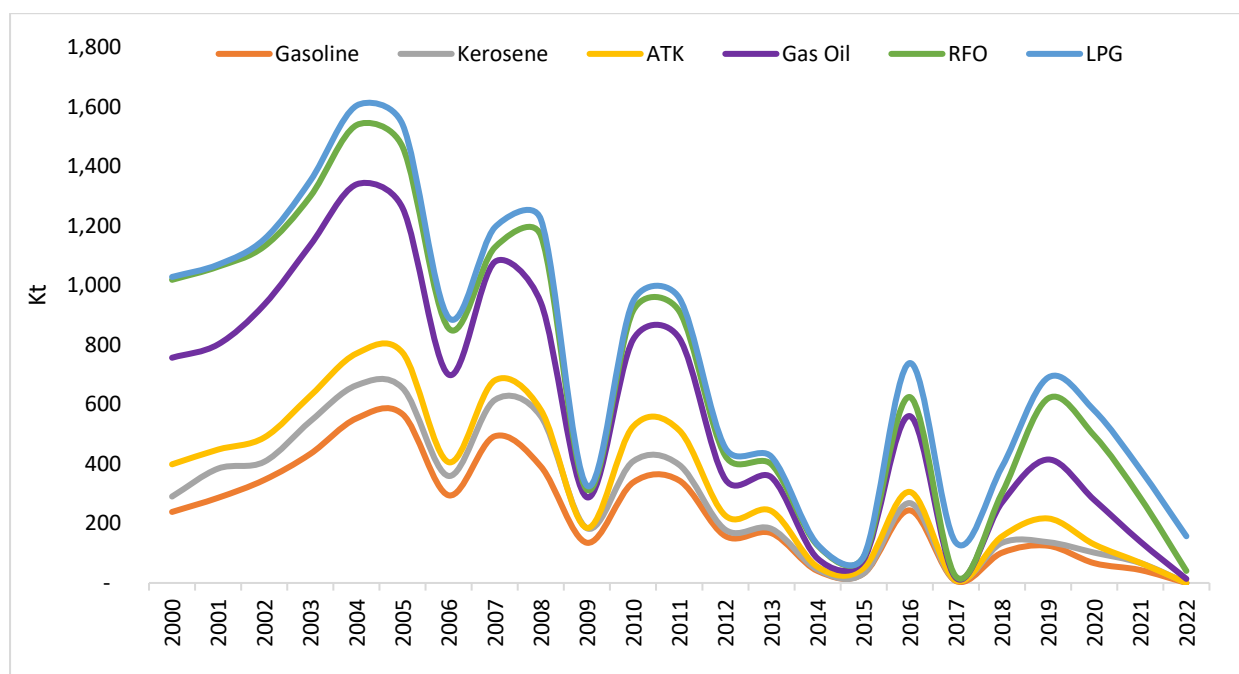


Figure 4.4: Trend in Production of Petroleum Products

4.5 Petroleum Products Import

The total petroleum product import has been increasing over the years, at an average annual growth rate of 7.6%, from 816 kt in 2000 to 4,049 kt in 2022. The share of gasoline and gas oil in the total petroleum product imported in 2022 was 38.4% and 50.4% respectively, making them the leading imported product.

LPG has consistently shown moderate growth since 2000, increasing at an average annual growth rate of 8.7%. Kerosene imports have decreased significantly since 2002, with no imports recorded after 2015, while ATK imports have been relatively stable, with a significant spike in 2017 and 2018.

Table 4.3: Petroleum Products Import (kt)

Year	LPG	Gasoline	Kerosene	ATK	Gas Oil	DPK	Fuel Oil	Total
2000	35	387	30	-	363	-	-	816
2001	36	389	22	-	354	-	-	801
2002	32	371	49	-	298	-	-	750
2003	17	232	35	-	286	-	-	569
2004	11	255	-	-	313	-	-	579
2005	7	167	-	-	404	-	-	578
2006	68	360	100	79	780	-	-	1,387
2007	47	275	67	43	807	-	-	1,238
2008	68	255	136	156	579	-	-	1,194
2009	151	563	78	84	970	-	-	1,845
2010	148	570	-	-	872	-	-	1,590
2011	178	713	-	-	1,201	18	-	2,109
2012	242	812	-	96	1,309	115	-	2,573
2013	204	1,017	-	41	1,639	-	44	2,946
2014	236	1,254	-	112	1,742	-	49	3,394
2015	198	1,182	-	109	2,161	-	-	3,650
2016	178	1,236	-	113	1,720	-	386	3,632
2017	202	1,304	-	181	1,781	-	608	4,076
2018	315	1,324	-	184	1,753	-	649	4,224
2019	275	1,265	-	181	1,733	-	366	3,821
2020	262	1,682	-	80	1,946.7	-	63	4,033
2021	221	1,717	-	203	1,864	-	85	4,090
2022	221	1,564	-	209	2,055	-	26	4,075

Source: National Petroleum Authority

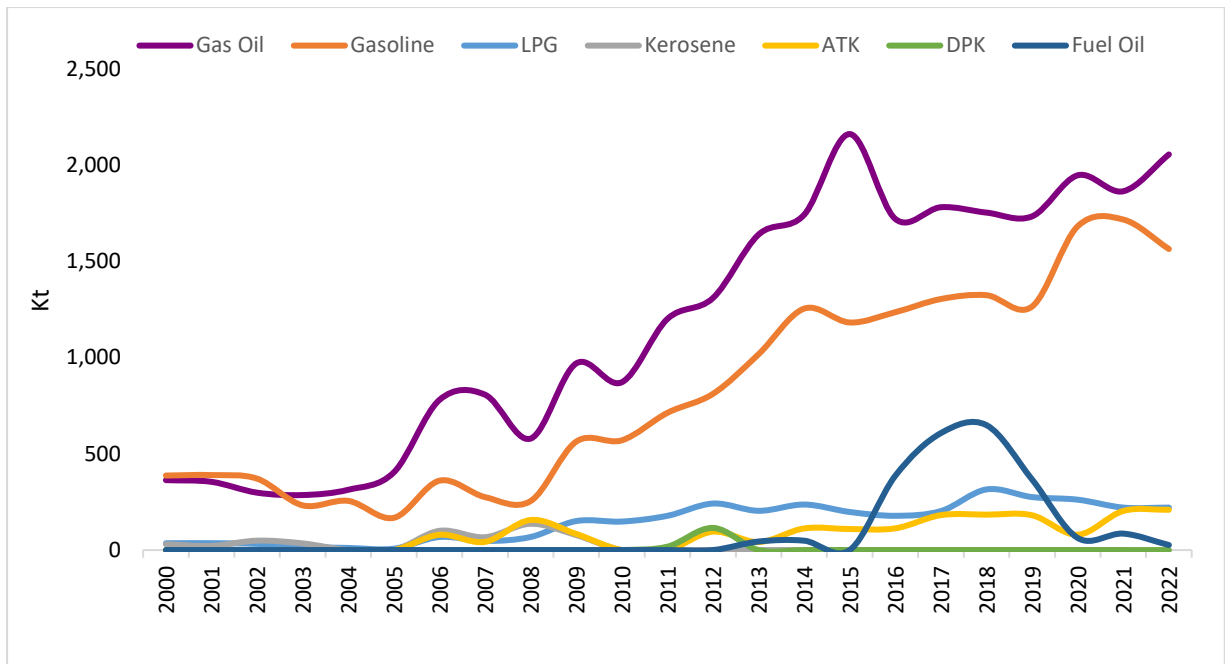


Figure 4.5: Trend in Petroleum Product Import

4.6 Petroleum Products Export

Petroleum products export is presented in Table 4.6. The total exports have decreased by an average annual rate of 3.4% from 440 in 2000 to 204 in 2022. The primary export product was ATK, which included volumes transferred to aircraft involved in international aviation bunkering. Fuel oil, gas oil, and gasolines showed a decline over the years. LPG showed a fluctuating trend with an average decrease rate of 12.1% over the period.

Table 4.4: Petroleum Products Export (kt)

Year	LPG	Gas Oil ¹	Fuel Oil	ATK ²	Gasolines	Total
2000	6	51	191	95	97	440
2001	1	35	216	75	127	453
2002	4	36	152	88	129	410
2003	11	46	89	84	104	335
2004	6	61	169	99	151	486
2005	13	38	163	110	204	526
2006	10	66	46	105	113	341
2007	10	53	26	114	164	366
2008	5	88	148	107	78	427
2009	1	382	30	111	41	566
2010	-	291	41	97	104	532
2011	-	357	44	136	155	691
2012	-	81	45	125	54	305
2013	-	52	4	116	36	207
2014	-	11	-	100	10	121
2015	18	13	3	92	90	215
2016	25	169	68	123	273	658
2017	40	284	18	146	191	679
2018	5	37	41	177	67	327
2019	1	20	91	205	108	425
2020	3	10	173	113	5	305
2021	0.04	10	75	188	18	292
2022	0.35	7	-	194	3	204

¹Includes sales to international marine bunkers

²Includes sales to international aviation bunkers

Source: NPA and JUHI Ghana

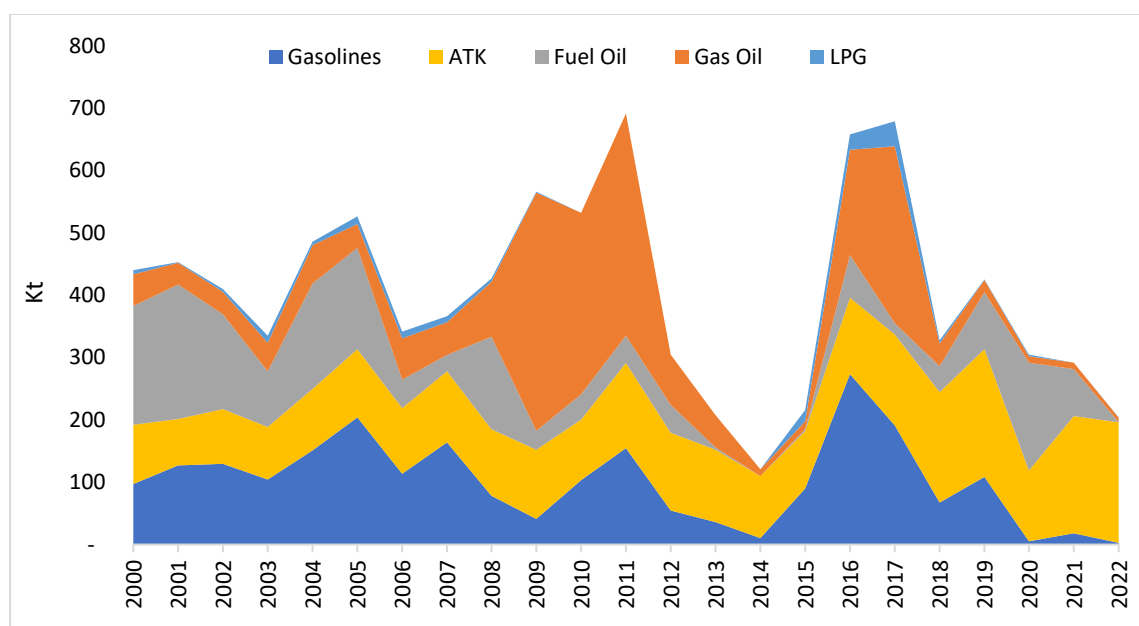


Figure 4.6: Trend in the Export of Petroleum Products

4.7 Final Consumption of Petroleum Products

Petroleum products consumption by fuel and sector are presented in Tables 4.7 and 4.8, respectively. There has been a consistent increase in total petroleum consumption in Ghana from 1,445 Ktoe in 2000 to 4,318 Ktoe in 2022, indicating an average annual growth of 5.1%. The consumption of gasoline/premix and gas oil have the highest shares in total consumption in 2022, accounting for 39.4% and 46.1%, respectively. Furthermore, both fuels have an average growth rate of 5% over the years.

Table 4.5: Petroleum Products Consumption by Fuels (Ktoe)

Year	LPG	Gasoline / Premix	Kerosene / ATK	Gas Oil	RFO	Natural Gas	Total
2000	49	587	72	679	59	-	1,445
2001	46	594	74	699	54	-	1,467
2002	54	631	79	732	53	-	1,550
2003	61	538	77	770	47	-	1,494
2004	71	638	84	866	47	-	1,705
2005	76	602	86	898	49	-	1,712
2006	95	577	88	956	59	-	1,775
2007	101	619	77	1,174	53	-	2,023
2008	127	630	49	1,118	49	-	1,973
2009	238	800	106	1,311	41	-	2,496
2010	193	815	62	1,306	32	-	2,408
2011	232	895	82	1,459	36	-	2,704
2012	290	1,104	64	1,698	32	-	3,189
2013	272	1,196	45	1,757	38	-	3,308
2014	261	1,216	24	1,715	26	-	3,243
2015	301	1,270	23	1,890	13	-	3,497
2016	304	1,181	17	1,736	13	4.97	3,255
2017	299	1,198	21	1,527	10	47.93	3,103
2018	311	1,376	17	1,773	35	68.79	3,581
2019	324	1,470	22	1,859	40	78.67	3,793
2020	359	1,684	15	2,017	47	125.98	4,248
2021	373	1,880	18	2,130	77	163.31	4,641
2022	329	1,706	24	1,993	51	214.91	4,318

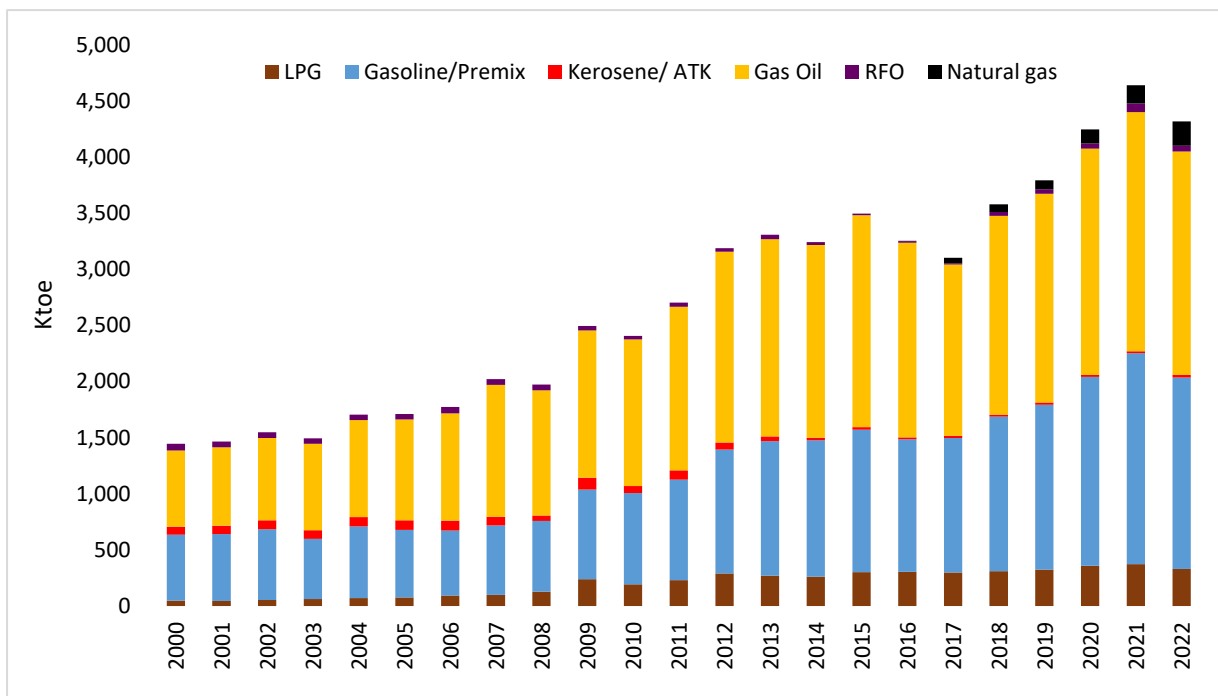


Figure 4.7: Final Energy Consumption of Petroleum Products by Fuel, 2000-2022

The transport sector has seen the highest growth in petroleum product consumption over the years. In 2000, the sector consumed 1,186 ktoe of petroleum products increasing to 3,322 ktoe in 2022. This represents an increase of over 180% over the period. The industrial sector has also seen significant growth in petroleum consumption, increasing from 125 ktoe in 2000 to 721 ktoe in 2022.

The residential and service sectors, however, have seen relatively stable petroleum products consumption over the years, with minor fluctuations. Table 4.8 presents the consumption of petroleum products by sector from 2000 to 2022.

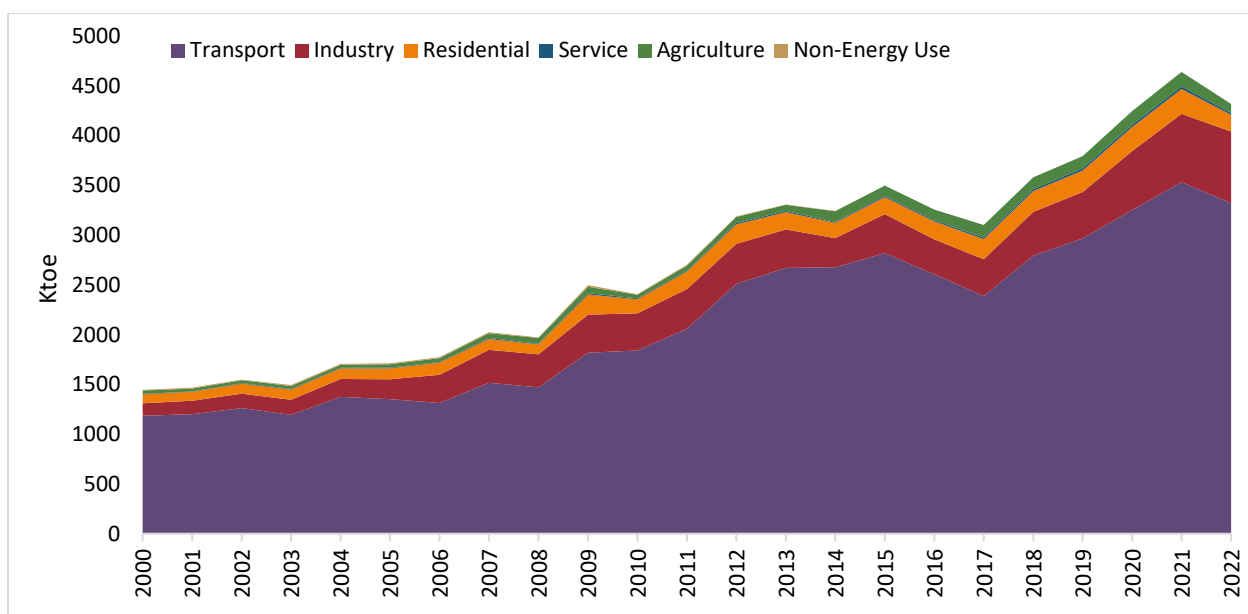


Figure 4.8: Final Energy Consumption of Petroleum Products by Sector, 2000-2022

Table 4.6: Petroleum Product Consumption by Sector (Ktoe)

Year	Residential	Industry	Service	Agriculture	Transport	Non-Energy Use	Total
2000	88	125	5	33	1186	7	1,445
2001	90	135	5	29	1200	8	1,467
2002	100	146	6	29	1261	9	1,550
2003	100	153	7	31	1195	8	1,494
2004	106	179	5	30	1375	9	1,705
2005	112	199	6	34	1351	10	1,712
2006	121	284	7	40	1314	10	1,775
2007	110	334	8	48	1515	9	2,023
2008	99	332	7	59	1472	5	1,973
2009	204	383	13	65	1819	13	2,496
2010	144	372	8	35	1842	7	2,408
2011	176	398	11	48	2061	10	2,704
2012	198	401	12	62	2510	5	3,189
2013	173	385	12	61	2673	4	3,308
2014	153	292	11	106	2679	1	3,243
2015	172	392	13	100	2819	0	3,497
2016	179	352	14	104	2606	0	3,255
2017	202	369	18	125	2389	0	3,103
2018	210	441	19	118	2793	0	3,581
2019	218	466	20	122	2967	0	3,793
2020	243	593	23	137	3252	0	4,248
2021	252	686	25	144	3534	0	4,641
2022	165	721	21	89	3322	0	4,318

SECTION 5: BIOMASS

5.1 Woodfuel Production

The total wood supply declined from 3,891 Ktoe in 2000 to 3,993 Ktoe in 2022, representing an average annual rate of decline of 0.1% (Table 5.1).

Table 5.1: Biomass Production (Ktoe)

Year	Wood for Charcoal	Wood for Firewood	Other	Total Wood Supply
2000	1,094	2,742	55	3,891
2001	1,116	2,539	51	3,705
2002	1,144	2,350	47	3,541
2003	1,178	2,176	44	3,398
2004	1,219	2,017	40	3,277
2005	1,268	1,873	37	3,178
2006	1,662	1,742	35	3,439
2007	1,718	1,657	33	3,408
2008	1,729	1,583	31	3,344
2009	1,766	1,533	30	3,329
2010	1,822	1,386	30	3,237
2011	1,812	1,414	31	3,256
2012	1,899	1,514	30	3,443
2013	2,032	1,681	30	3,743
2014	2,128	1,679	30	3,836
2015	2,226	1,669	30	3,925
2016	2,324	1,665	29	4,019
2017	2,433	1,714	29	4,177
2018	2,359	1,766	28	4,153
2019	2,263	1,823	29	4,115
2020	2,170	1,830	29	4,029
2021	1,952	1,582	29	3,562
2022	2,279	1,692	23	3,993

NB: 2007-2009 figures extrapolated from 2003 field survey data; 2011-2022 figures extrapolated from 2010 field survey data and include sawdust, sawmill residue, etc.

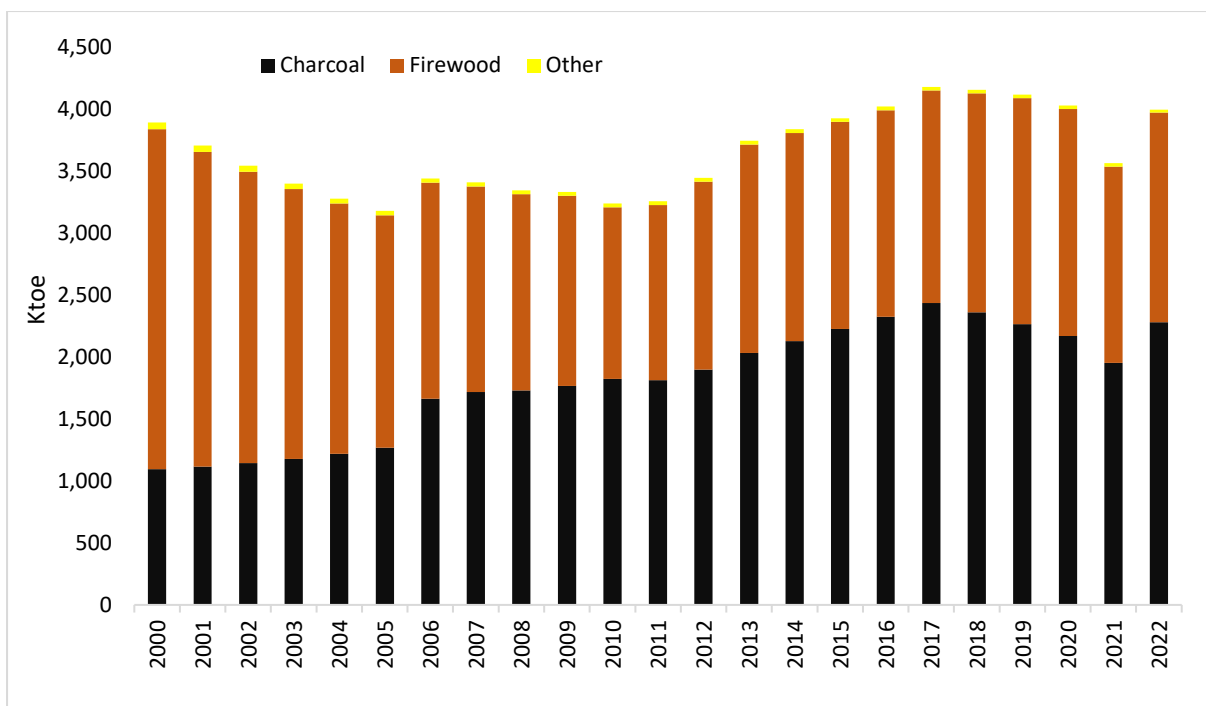


Figure 5.1: Trend in Biomass Production

5.2 Charcoal Import and Export

Ghana's imports and exports of charcoal from 2000-2022 are presented in Table 5.2. Charcoal imports increased by 18.6% over the decade from 0.003 ktoe (4.2 tonnes) in 2010 to 0.011 ktoe (13.86 tonnes) in 2021. However, in 2022, no charcoal imports were recorded. Charcoal exports on the other hand, decreased from 2.34 ktoe in 2000 to 0.5 ktoe in 2022.

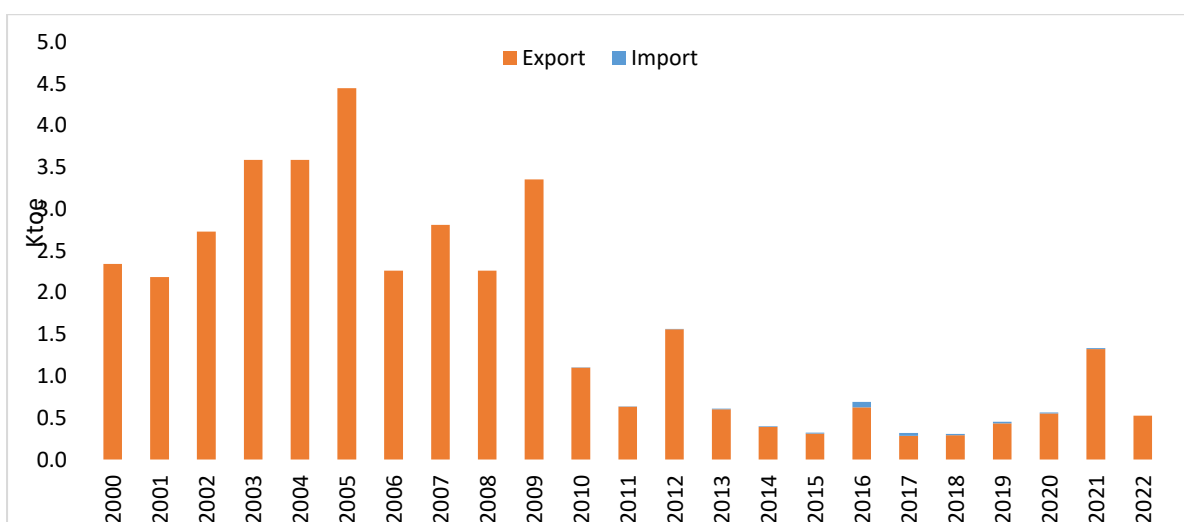


Figure 5.2: Trend in Charcoal Import and Export

Table 5.2: Charcoal Import and Export (ktoe)

Years	Import	Export
2000	-	2.3
2001	-	2.2
2002	-	2.7
2003	-	3.6
2004	-	3.6
2005	-	4.4
2006	-	2.3
2007	-	2.8
2008	-	2.3
2009	-	3.4
2010	0.00	1.1
2011	0.00	0.6
2012	0.00	1.6
2013	0.01	0.6
2014	0.01	0.4
2015	0.01	0.3
2016	0.06	0.6
2017	0.03	0.3
2018	0.01	0.3
2019	0.02	0.4
2020	0.01	0.6
2021	0.01	1.3
2022	-	0.5

5.3 Woodfuel Consumption

The total consumption of wood fuel has decreased from 3,432 ktoe in 2000 to 2,940 ktoe in 2022. This represents an average annual rate of decline of 0.7%. (Table 5.3). Although residential consumption has remained the highest, its share in total consumption has decreased from 91% in 2000 to 86.5% in 2022. The service sector has also shown a consistently stable consumption trend, while the industrial sector's consumption has slightly increased from 230 in 2000 to 297 in 2022, with an average annual growth of 1.2%.

Table 5.3: Biomass Consumption by Sector (Ktoe)

Year	Residential	Service	Industry	Total
2000	3,127	75	230	3,432
2001	2,941	75	222	3,238
2002	2,792	77	214	3,082
2003	2,642	77	206	2,925
2004	2,560	80	199	2,839
2005	2,470	83	192	2,745
2006	2,282	122	267	2,671
2007	2,245	123	245	2,614
2008	2,207	100	238	2,544
2009	2,166	95	252	2,513
2010	2,125	96	174	2,395
2011	2,244	59	116	2,419
2012	2,360	73	133	2,566
2013	2,473	107	224	2,804
2014	2,508	113	232	2,853
2015	2,544	120	233	2,896
2016	2,580	126	238	2,945
2017	2,617	147	288	3,053
2018	2,622	130	311	3,063
2019	2,622	117	331	3,069
2020	2,614	95	318	3,026
2021	2,300	87	272	2,660
2022	2,543	100	297	2,940

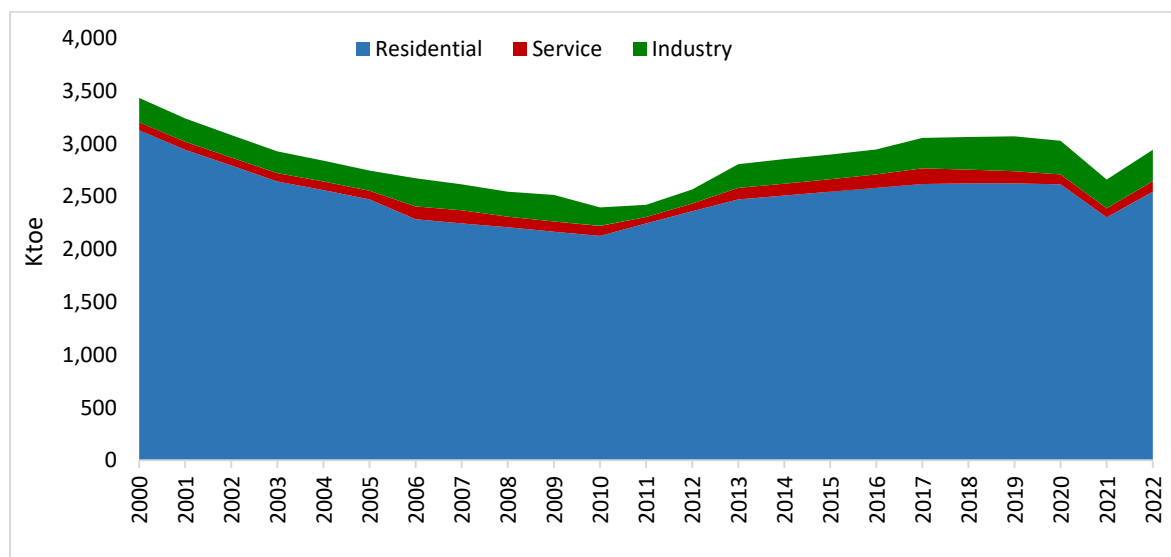


Figure 5.3: Trend in Biomass Consumption by Sector

SECTION 6: ENERGY BALANCES AND INDICATORS

6.1 Energy Balance

The country's energy balance for 2022 and 2021 is presented in Tables 6.1 and 6.2 respectively. The energy balance shows the summary of all flows of energy products in the country in a specified period, usually one year. It is presented in a common unit ktoe and with products aggregated by category: oil, natural gas, petroleum products, wood, charcoal, solar, hydro, and electricity, displaying their flows from supply to final consumption.

6.2 Energy Indicators

Energy indicators are energy use/supply characteristics with specific, observable and measurable attributes. They are developed to describe the link between energy use/supply and human activities. They, therefore, support policy formulation and implementation efforts. They also help to define potential targets and assess comparative analysis among countries. There are various indicators relating to energy, and its resultant emission. Some are energy intensity, energy use per capita and grid emission factor. Table 6.3 presents an overview of statistical indicators concerning relative importance of energy.

6.2.1 Sustainable Development Goal 7 (SDG7) Indicators

The Sustainable Development Goals (SDGs) aim to foster economic growth, ensure social inclusion and protect the environment. Sustainable Development Goal indicators, include statistical indicators on Social, Economic and Environment. While the importance of these various indicators is recognised, this section focuses on indicators concerning relative importance of energy. SDG 7, specifically, dedicated to energy, is to ensure access to affordable, reliable, sustainable and modern energy for all by 2030. Table 6.4 presents the country's progress in achieving SDG 7.

Table 6.1: Energy Balance, 2022 (ktoe)

Supply and Consumption	Crude Oil	Natural Gas	Petroleum Products	Wood	Charcoal	Solar	Hydro	Electricity	Total
Production	7,325	2,970	-	3,993	-	14	704	-	15,007
Imports	32	502	4,217	-	-	-	-	3.2	4,754
Exports	-7,269	-	-13	-	-0.5	-	-	-190	-7,473
International Marine Bunkers	-	-	-2	-	-	-	-	-	-2.4
International Aviation Bunkers	-	-	-194	-	-	-	-	-	-194
Stock changes	66.9	-	-9.7	-	-	-	-	-	57.3
TES	154	3,472	3,998	3,993	-0.5	14	704	-187	12,148
Transfers	-123	-	132	-	-	-	-	-	8.6
Statistical differences	10	51	-17	-	-	-	-	-	24
Transformation (Electricity plants)	-	-3,206	-33	-	-	-14	-704	1,992	-1,966
Transformation (Oil refineries)	-42	-	40	-	-	-	-	-	-1.6
Other transformation	-	-	-	-2,279	1,226	-	-	-	-1,053
Energy industry own use	-	-	50	-	-	-	-	68	119
Losses	-	-	-	-	-	-	-	227	227
TFC	-	215	4,103	1,715	1,226	-	-	1,509	8,767
Residential	-	-	165	1,395	1,148	-	-	611	3,320
Industry	-	215	506	296	0	-	-	639	1,656
Commerce & Service	-	-	21	23	77	-	-	255	376
Agriculture & Fisheries	-	-	89	-	-	-	-	2.8	92
Transport	-	-	3,322	-	-	-	-	0.9	3,322
Non-Energy Use	-	-	-	-	-	-	-	-	-

Table 6.2: Energy Balance, 2021 (ktoe)*

Supply and Consumption	Crude Oil	Natural Gas	Petroleum Products	Wood	Charcoal	Solar	Hydro	Electricity	Total
Production	7,759	2,717	-	3,562	-	10.5	647	-	14,695
Imports	84.9	471	4,234	-	0.01	-	-	3.8	4,794
Exports	-7,711	-	-96	-	-1.3	-	-	-149	-7,957
International Marine Bunkers	-	-	-7.0	-	-	-	-	-	-7.0
International Aviation Bunkers	-	-	-194	-	-	-	-	-	-194
Stock changes	78	-	203	-	-	-	-	-	282
TES	211	3,189	4,141	3,562	-1.3	11	647	-145	11,613
Transfers	-98	-	105	-	-	-	-	-	6.9
Statistical differences	-289	41	-56	-	0.01	-	-	-	-304
Transformation (Electricity plants)	-50	-2,985	-73	-	-	-11	-647	1,896	-1,869
Transformation (Oil refineries)	-300	-	288	-	-	-	-	-	-12.1
Other transformation	-	-	-	-1,952	1,051	-	-	-	-901
Energy industry own use	23	-	40	-	-	-	-	62	125
Losses	28	-	-	-	-	-	-	236	264
TFC	-	163	4,477	1,610	1,050	-	-	1,453	8,754
Residential	-	-	252	1,315	985	-	-	598	3,151
Industry	-	163	522	272	0.2	-	-	613	1,571
Commerce & Service	-	-	25	23	64	-	-	238	351
Agriculture & Fisheries	-	-	144	-	-	-	-	2.2	147
Transport	-	-	3,534	-	-	-	-	0.8	3,535
Non-Energy Use	-	-	-	-	-	-	-	-	-

* Revised

Table 6.3: Energy Indicators

Indicator	Unit	2000	2010	2015	2016	2017	2018	2019	2020	2021	2022
Population	million	18.9	24.7	27.7	28.3	29.0	29.6	30.3	30.8	30.8	31.4
GDP (current US\$) ¹	million US\$	4,983	32,197	48,595	56,010	60,327	67,299	68,338	70,029	79,524	73,769
GDP, PPP (constant 2017 international \$) ¹	million \$	54,123	94,867	133,286	137,782	148,983	158,220	168,516	169,382	178,455	184,237
Total Energy Supply	ktoe	6,146	6,967	9,483	9,658	9,593	10,839	11,305	12,053	11,760	12,331
Total Final Energy Consumed	ktoe	5,470	5,519	7,307	7,277	7,276	7,794	8,088	8,602	8,754	8,767
Total Electricity Generated	GWh	7,224	10,166	11,491	13,023	14,067	16,246	18,188	20,170	22,051	23,163
Total Electricity Consumed	GWh	6,889	8,317	10,625	12,528	13,036	13,380	14,261	15,434	16,898	17,547
Total Petroleum Products Consumed	ktoe	1,445	2,408	3,497	3,255	3,103	3,581	3,793	4,248	4,641	4,318
Total Biomass Consumed	ktoe	3,432	2,395	2,896	2,945	3,053	3,063	3,069	3,026	2,660	2,940
Energy Intensity (TES/GDP current million US\$)	toe/million US\$	1,233.5	216.4	195.1	172.4	159.0	161.1	165.4	172.1	147.9	167.2
Energy Intensity in PPP (TES/ GDP in PPP)	toe/million \$	113.6	73.4	71.1	70.1	64.4	68.5	67.1	71.2	65.9	66.9
Energy Intensity in PPP (FEC/ GDP in PPP)	toe/million \$	101.1	58.2	54.8	52.8	48.8	49.3	48.0	50.8	49.05	47.59
Total Primary Energy Supply/capita	toe/capita	0.33	0.28	0.34	0.34	0.33	0.37	0.37	0.39	0.38	0.39
Energy use per capita (TFC/persons)	toe/capita	0.29	0.22	0.26	0.26	0.25	0.26	0.27	0.28	0.28	0.28
Total Electricity Generated/capita	kWh/capita	382.0	412.3	415	460	486	549	601	655	715	739
Total Electricity Consumed/capita	kWh/capita	364.3	337.3	384	443	450	452	471	501	548	560
Total Petroleum Products Consumed/capita	toe/capita	0.08	0.10	0.13	0.11	0.11	0.12	0.13	0.14	0.15	0.14
Total Biomass Consumed/capita	toe/capita	0.18	0.10	0.10	0.10	0.11	0.10	0.10	0.10	0.09	0.09
Total Electricity Consumed/GDP	kWh/US\$ 1,000 of GDP	1,382.5	258.3	218.6	223.7	216.1	198.8	208.7	220.4	212.5	237.9
Total Energy Supply/GDP	toe/US\$ 1,000 of GDP	1,233.5	216.4	195.1	172.4	159.0	161.1	165.4	172.1	147.9	167.2
Total Petroleum Products Consumed/GDP	toe/US\$ 1,000 of GDP	290.0	74.8	72.0	58.1	51.4	53.2	55.5	60.7	58.4	58.5
Grid Emission Factor (wind/solar projects) *	tCO ₂ /MWh	-	0.38	0.30	0.56	0.55	0.41	0.38	0.33	0.37	0.33
Grid Emission Factor (all other projects)*	tCO ₂ /MWh	-	0.53	0.33	0.54	0.55	0.49	0.44	0.38	0.43	0.37

NB: * The figures have been revised. Grid emission factor is the amount of CO₂ emitted per unit of electricity generated and supplied into the national electricity grid. In simple terms, it measures the carbon intensity of the national electricity grid. Project activities displacing electricity from the grid can use this emission factor to estimate the CO₂ emissions impacts of the project.

Table 6.4: Sustainable Development Goals (SDG7) Indicators

Target	Indicator	Indicator Definition	Disaggregation	Unit	2010	2015	2016	2017	2018	2019	2020	2021	2022	
7.1 Ensure universal access to affordable, reliable and modern energy services.	7.1.1 Proportion of the population with access to electricity	Proportion of population with access to electricity	National	%	64.4	83.2	83.6	84.1	84.3	85	85.3	87	88.8	
			Urban	%	83.9	93.6	96.6	100	100	100	100	100	100	100
			Rural	%	39.7	56.9	61.7	67	68.3	70.5	71.7	72.9	74.0	
		Households with access to electricity	National	%	64.2	75.7	78.5	81.4	81.6	82.5	82.8	86.3	86.8	
			Urban	%	83.8	90.7	91.4	92	92.2	92.6	93	95.2	95.8	
			Rural	%	39.5	56.6	61.5	66.9	68.1	70.4	71.5	72.6	73.6	
	7.1.2 Proportion of population with primary reliance on clean fuels and technology	Proportion of population using Electricity as a primary source for cooking	National	%	0.54	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.4
			Urban	%	0.76	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.5
			Rural	%	0.27	0.1	0.1	0.2	0.2	0.3	0.3	0.3	0.2	0.2
		Proportion of population using LPG as primary source for cooking	National	%	18.2	23.9	24.3	24.5	24.8	25.1	25.3	36.9	40.2	
			Urban	%	28.9	35.3	35.1	34.8	34.6	34.3	34.1	51.3	56.1	
			Rural	%	4.8	6.8	7.7	8.7	9.9	11.3	12.8	14.8	16.5	
7.2 Increase substantially the share of renewable energy in the global energy mix.	7.2.1 Renewable energy share in the total final energy consumption	National ¹	%	52.4	46.0	46.8	48.1	44.8	44.0	40.8	34.1	38.1		
		National ²	%	8.9	6.4	6.4	6.2	5.5	6.1	5.6	5.9	6.4		
7.3. Double the global rate of improvement in energy efficiency.	Energy intensity measured in terms of total energy supply and GDP, PPP (constant 2017 international \$)		National	TOE/ million US\$	73.4	71.1	70.1	64.4	68.5	67.1	71.2	65.9	66.9	
	Energy intensity measured in terms of final energy consumption and GDP, PPP (constant 2017 international \$)		National	TOE/ million US\$	58.2	54.8	52.8	48.8	49.3	48.0	50.8	49.1	47.6	

¹Includes woodfuel

²Excludes woodfuel (electricity consumed from solar, biogas and hydro only)

Sources: Ghana Statistical Service, Ministry of Energy & Energy Commission

SECTION 7: ENERGY PRICES

7.1 Crude Oil Prices

The average price of crude oil in Ghana has generally been increasing over the years. However, there have been periods of decline as well, such as from 2013 to 2016 and in 2020. The average crude oil price increased by 39.5% from US\$70.8/bbls in 2021 to US\$98.8/bbls in 2022. The highest and lowest monthly average price for 2022 was recorded in June and December respectively. Table 7.1 shows the monthly average crude oil price from 2001 to 2022.

Table 7.1: Average Crude Oil Prices (US\$/bbl)

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
2001	25.8	27.7	25.7	25.4	25.4	26.7	25.7	25.8	26.1	21.5	19.2	19.3	24.5
2002	20.0	20.2	24.0	26.0	25.7	24.5	25.7	26.3	28.3	27.5	24.5	27.5	25.0
2003	30.2	32.4	29.5	24.8	25.4	27.2	28.2	29.4	26.8	29.0	28.8	29.6	28.4
2004	30.6	30.3	32.7	30.0	37.1	35.5	37.7	41.7	42.8	49.4	44.6	40.6	37.8
2005	44.9	45.9	53.3	53.2	49.9	55.6	57.9	63.8	63.7	59.4	56.2	57.6	55.1
2006	63.9	61.1	63.1	70.6	71.0	69.7	74.2	73.9	63.5	60.1	60.0	62.5	66.1
2007	54.6	59.0	62.4	67.5	67.9	70.6	75.8	71.2	77.0	82.5	92.1	91.5	72.7
2008	91.9	94.5	103.0	110.4	124.6	133.5	134.8	115.2	100.8	73.6	55.1	43.3	98.4
2009	45.6	43.7	47.3	51.2	58.6	69.3	65.8	73.1	68.2	73.9	77.5	75.2	62.5
2010	76.9	74.7	79.9	85.7	77.0	75.7	75.5	77.1	78.2	83.5	86.1	92.4	80.2
2011	96.8	104.1	114.6	123.1	114.5	113.9	116.7	109.8	110.0	108.8	110.6	107.7	110.9
2012	111.6	127.0	124.6	125.9	109.4	95.9	102.8	113.2	113.0	111.5	109.5	109.2	112.8
2013	112.3	116.1	109.5	103.3	103.3	103.3	107.4	110.3	111.2	109.5	107.8	110.6	108.7
2014	107.3	108.8	107.7	108.1	109.2	112.0	108.2	103.5	98.6	88.1	79.4	62.4	99.4
2015	49.7	58.7	57.0	60.9	65.6	63.8	56.8	48.2	48.6	48.1	44.4	37.7	53.3
2016	31.9	33.4	39.8	43.3	47.6	49.9	46.6	47.2	47.2	51.4	47.1	54.9	45.0
2017	55.5	56.0	52.5	53.7	51.1	47.5	49.2	51.9	55.2	57.5	62.9	62.3	54.6
2018	69.1	65.7	66.7	71.7	77.1	75.9	75.0	73.9	79.1	80.6	66.0	57.7	71.5
2019	60.2	64.5	67.1	71.7	70.3	63.1	64.2	59.5	62.3	59.6	62.7	65.2	64.2
2020	63.7	55.5	33.7	26.6	32.1	40.8	43.2	45.0	41.9	41.4	44.0	50.2	43.2
2021	55.3	62.3	65.8	65.3	68.3	73.4	74.3	70.5	74.9	83.8	80.8	74.8	70.8
2022	85.5	94.3	112.5	105.8	111.6	117.2	105.1	97.7	90.6	93.6	90.4	81.3	98.8

Source: Bank of Ghana

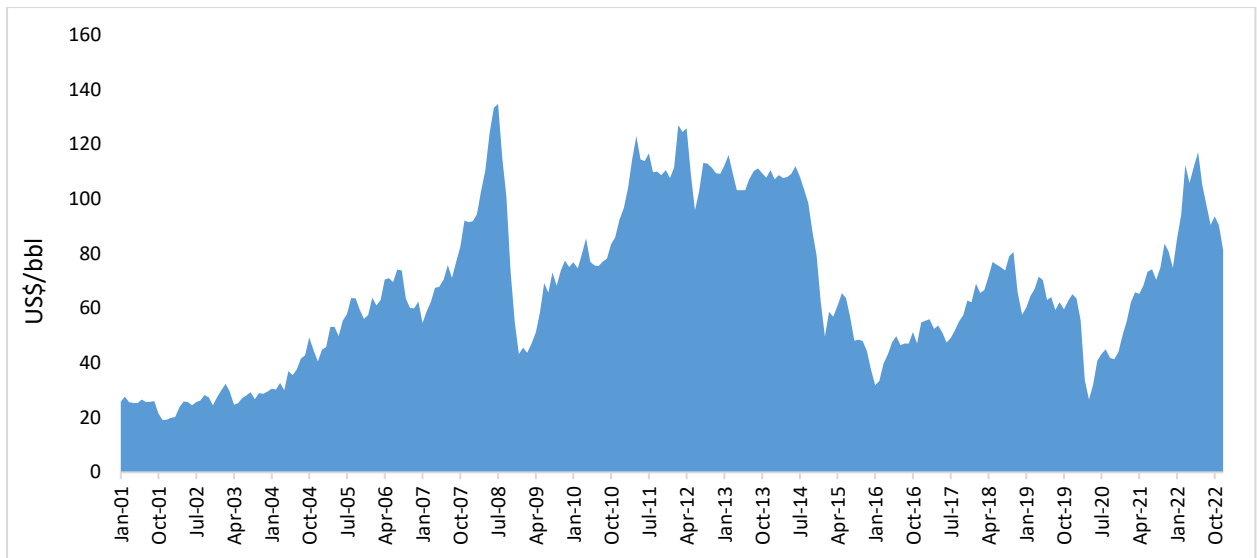


Figure 7.1: Trend in Average Crude Oil Prices

7.2 Petroleum Products Prices

Table 7.2 presents the yearly average ex-pump prices of petroleum products (petrol, diesel, kerosene and LPG) in the country.

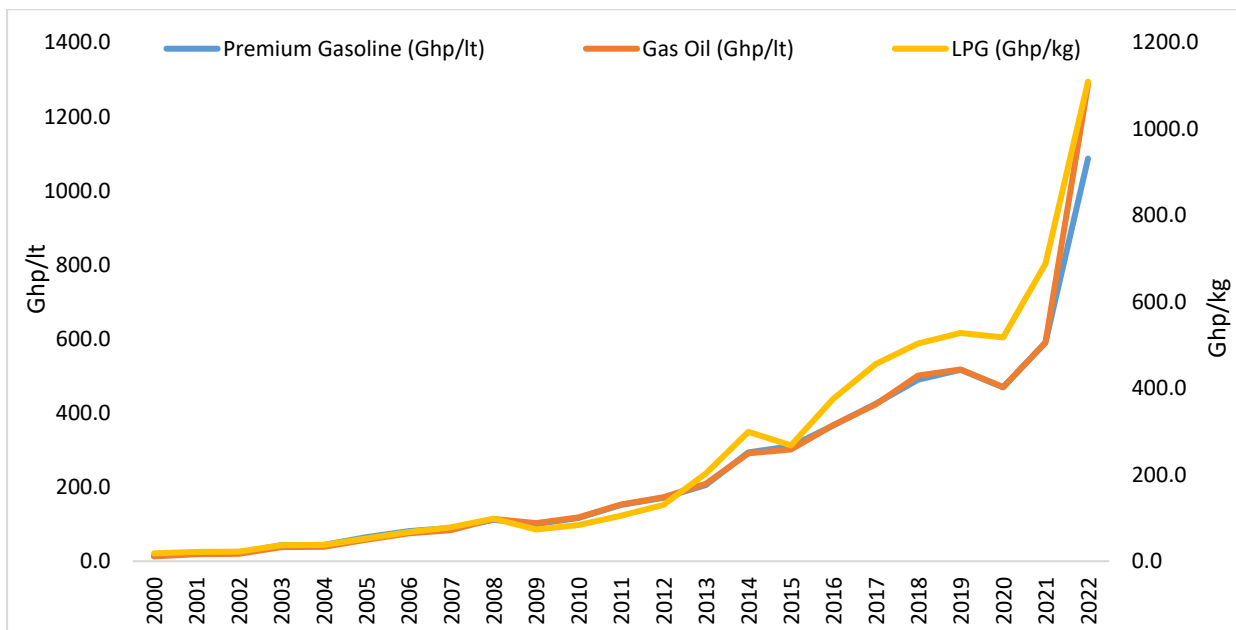


Figure 7.2: Trend in petroleum products prices

Table 7.2: Average Ex-pump Prices for Petroleum Products

Year	Premium Gasoline (Ghp/lt)	Gas Oil (Ghp/lt)	Kerosene (Ghp/lt)	LPG (Ghp/kg)
2000	13.7	12.8	12.8	18.2
2001	22.0	18.6	18.6	21.6
2002	23.3	19.6	19.6	22.0
2003	43.5	38.0	38.0	37.3
2004	44.4	38.9	38.9	38.0
2005	65.0	57.8	49.7	52.4
2006	81.2	75.5	62.4	67.2
2007	89.6	83.8	73.8	78.4
2008	111.3	113.9	106.5	98.2
2009	100.2	102.4	79.3	73.1
2010	117.0	118.1	91.0	83.8
2011	151.9	153.3	91.0	104.8
2012	171.3	172.9	91.0	130.6
2013	206.0	208.7	127.2	202.8
2014	294.1	291.3	285.0	299.0
2015	310.1	301.9	296.9	268.3
2016	366.1	367.4	283.0	375.7
2017	425.0	423.3	346.5	456.0
2018	489.7	500.9	432.9	503.9
2019	516.5	517.1	471.2	522.5
2020	469.3	469.9	425.1	517.8
2021	589.9	589.8	-	686.8
2022	1086.7	1287.4	-	1109.5

Source: NPA

7.3 Average Electricity End User Tariff

The average electricity end-user tariff of electricity consumers consists of the following three categories: residential, non-residential and special load tariff. The electricity end-user tariff increased at an annual average growth rate of 19.1%, from 2000 to 2022 (Table 7.3). Comparing 2021 to 2022, there was a minute increase of about 6.2%, in the average electricity end-user tariff (GH¢/kWh).

Table 7.3: Average Electricity End-User Tariff

Year	GHC/kWh	US\$/kWh
2000	0.02	0.02
2001	0.03	0.05
2002	0.07	0.08
2003	0.07	0.08
2004	0.07	0.08
2005	0.07	0.08
2006	0.08	0.08
2007	0.10	0.10
2008	0.15	0.12
2009	0.15	0.10
2010	0.21	0.15
2011	0.25	0.16
2012	0.23	0.12
2013	0.31	0.16
2014	0.46	0.14
2015	0.54	0.15
2016	0.82	0.21
2017	0.80	0.18
2018	0.70	0.15
2019	0.72	0.14
2020	0.73	0.13
2021	0.75	0.13
2022	0.79	0.10

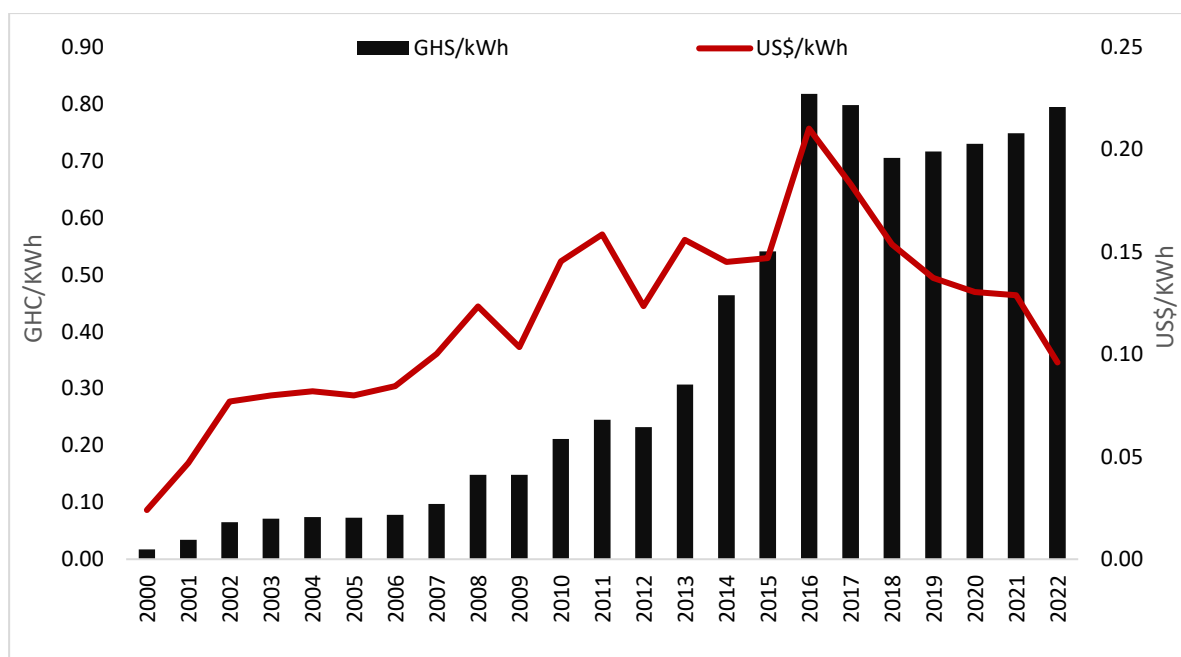


Figure 7.3: Trend in Average Electricity End-User Tariff

Table 7.4: Electricity Tariff by Customer Class

Tariff Category	Effective Date													
	Dec, 2011	Oct, 2013	Jan, 2014	Jul, 2014	Oct, 2014	Apr, 2015	Jul, 2015	Dec, 2015	Oct, 2018	Jul, 2019	Oct, 2019	Oct, 2020	Jan, 2021	Sept, 2022
Residential														
0-30 (Exclusive)	-	-	-	-	-	-	-	-	-	-	-	-	-	42
0 - 50 (Exclusive)	10	16	17	19	21	21	21	34	28	31	33	33	33	-
31 - 300 (Ghp/kWh)	-	-	-	-	-	-	-	-	-	-	-	-	-	89
51 - 300 (Ghp/kWh)	18	31	35	39	41	42	42	67	56	62	65	65	65	
301 - 600 (Ghp/kWh)	23	41	45	50	54	55	55	87	72	80	85	85	85	116
600+ (Ghp/kWh)	25	45	50	56	59	61	61	97	80	89	94	94	94	128
Service Charge for Lifeline Consumers (Ghp/month)	165	296	325	364	388	398	398	633	213	213	213	213	213	213
Service Charge for Other Residential Consumers (Ghp/month)	165	296	325	364	388	398	398	633	633	704	746	746	746	1073
Non-Residential														
0 -300 (Ghp/kWh)	25	45	50	56	59	61	61	97	68	75	80	80	80	84
301 - 600 (Ghp/kWh)	27	48	53	59	63	65	65	102	72	80	85	85	85	89
600+ (Ghp/kWh)	42	76	83	93	100	102	102	163	114	126	134	134	134	133
Service Charge (Ghp/month)	276	493	541	606	646	663	663	1055	1055	1173	1243	1243	1243	1243
SLT - Low Voltage														
Maximum Demand (Ghp/kVA/month)	1543	2760	3029	3395	3617	3712	3712	5910	5910	-	6960	6960	6960	6960
Energy Charge (Ghp/kWh)	26	47	52	58	62	63	63	101	76	99	89	89	105	133
Service Charge (Ghp/month)	1102	1972	2164	2425	2584	2651	2651	4221	4221	4693	4971	4971	4971	50,000
SLT - Medium Voltage														
Maximum Demand (Ghp/kVA/month)	1323	2366	2596	2910	3100	3182	3182	5065	5065	-	5966	5966	5966	5966
Energy Charge (Ghp/kWh)	20	37	40	45	48	49	49	78	59	75	69	69	80	100
Service Charge (Ghp/month)	1543	2760	3029	3395..1	3617	3712	3712	5910	5910	6570	6960	6960	6960	50,000
SLT - High Voltage														
Maximum Demand (Ghp/kVA/month)	1323	2366	2596	2910	3100	3182	3182	5065	5065	-	5966	5966	5966	5966
Energy Charge (Ghp/kWh)	19	34	37	41	44	45	45	72	54	79	63	63	83	75
Service Charge (Ghp/month)	1543	2760	3029	3395	3617	3712	3712	5910	5910	6570	6960	6960	6960	50,000
SLT-High Voltage - Mines														
Capacity Charge (Ghp/KVA/Month)	1543	2760	3029	3395	3617	3712	3712	5910	5910	-	6960	6960	6960	6960
Energy Charge (Ghp/kWh)	30	53	58	66	70	72	72	114	103	249	121	121	264	264
Service Charge (Ghp/Month)	1543	2760	3029	3395	3617	3712	3712	5910	5910	6570	6960	6960	6960	50,000

Source: PURC

