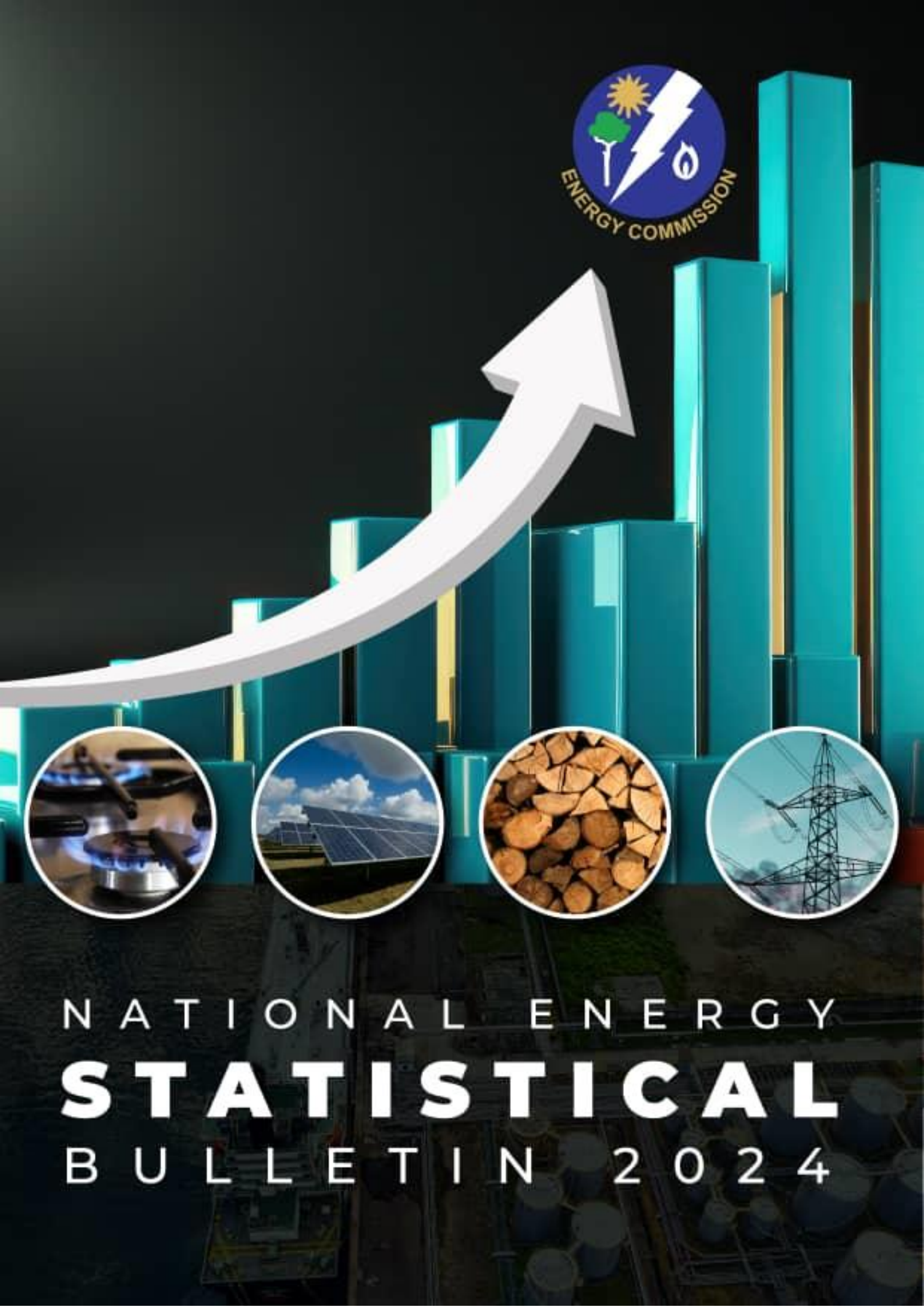

NATIONAL ENERGY STATISTICAL BULLETIN 2024

2024 NATIONAL ENERGY STATISTICAL BULLETIN

ADDRESS
Ghana Airways Avenue
Airport Residential Area
(behind Alliance Française)

Private Mail Bag
Ministries Post Office
Accra – Ghana

POSTCODE

GA-037-3212

CONTACT
PHONE:
0302-813-756/7

FAX:
0302813764

WEBSITE:
www.energycom.gov.gh

EMAIL:
statistics@energycom.gov.gh

FOLLOW US:

EnergyCommissionGhana
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Energy Statistics and Balances

April 2024

| Securing Ghana's Future Energy Today

FOREWORD

The 2024 National Energy Statistics presents comprehensive data on Ghana's energy supply and utilisation dynamics from 2000 to 2023. It contains data on energy production, importation, exportation, and consumption patterns. Moreover, this publication provides insights into Ghana's advancements toward attaining Sustainable Development Goal 7.

This publication was prepared utilising data sourced from various institutions within the energy sector, 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), in addition to data from the Bank of Ghana (BoG) and the Ghana Statistical Service (GSS). We extend our gratitude for the cooperation and assistance rendered by these agencies and entities.

It is our firm belief that the statistical insights provided within this publication will serve as a valuable resource to a diverse array of stakeholders, including planners, policymakers, researchers, and students alike.

Furthermore, we express our gratitude for the invaluable feedback received from our users, which has been instrumental in enhancing and updating the information contained in this year's edition. Consequently, the 2024 edition supersedes the 2023 National Energy Statistics.

We welcome any feedback, comments, and suggestions from our readers, as they play a pivotal role in the continual improvement of future editions.

Ing. Oscar Amonoo-Neizer
Executive Secretary

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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
tCO2	Tonnes of Carbon dioxide
toe	Tonnes of oil equivalent
W	Watt
ATK	Aviation Turbine 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

2023 National population electricity access rate: 88.85%

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

Source: Ministry of Energy

PROPORTION OF HOUSEHOLDS WITH ACCESS TO ELECTRICITY

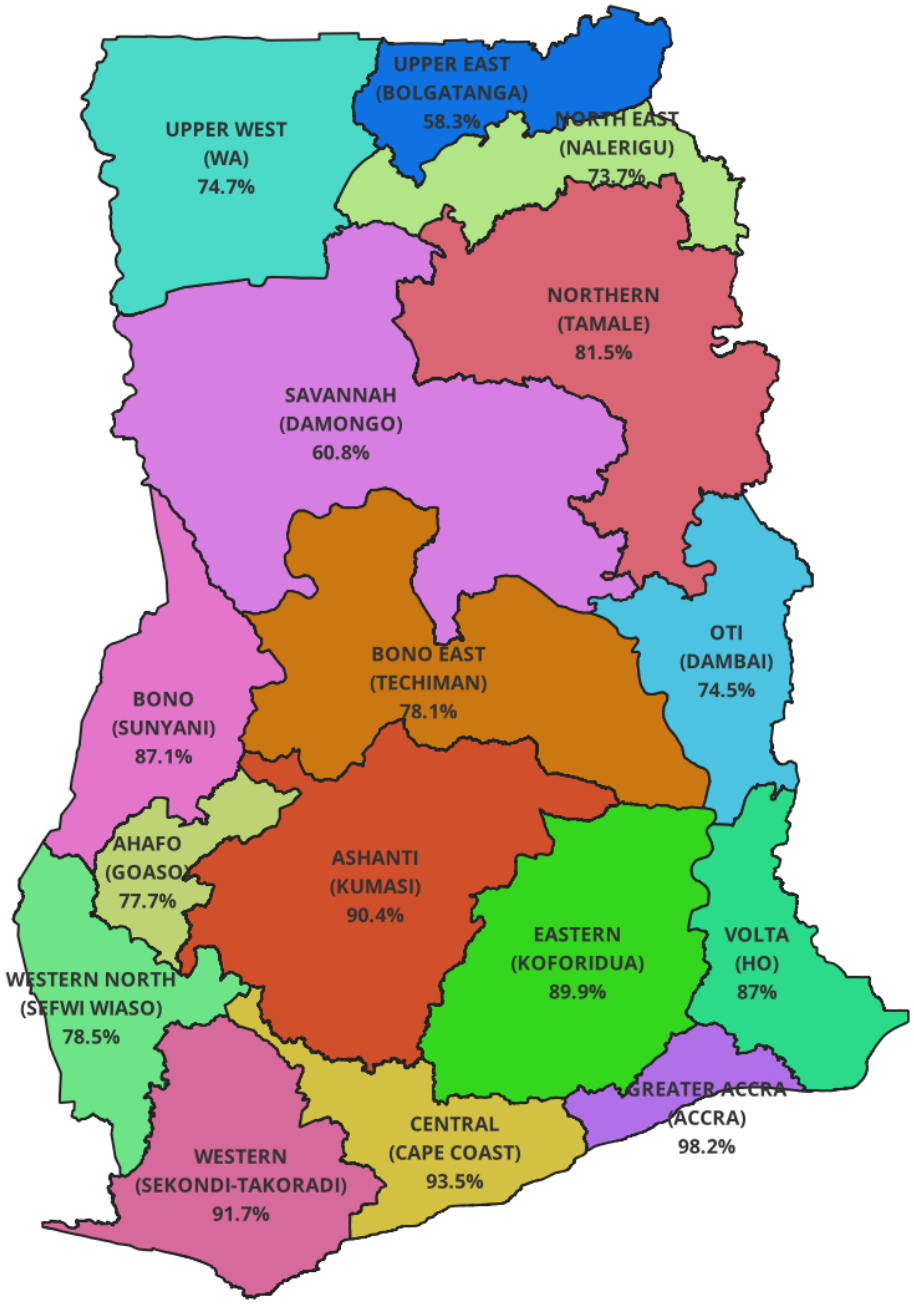


Figure 2.2: Household with access to electricity by region

2023 National household electricity access rate: 87.49%

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

Source: Ghana Statistical Service & Energy Commission

SECTION 2: ENERGY SUPPLY AND FINAL CONSUMPTION

2.1 Total Energy Supply

The total energy supply doubled from 6,146 ktoe in 2000 to 13,218 ktoe in 2023, representing an average annual growth rate of 3.4% (Table 2.1). In 2023, there was an increase of 7.1% compared to 2022 (Figure 2.1).

In 2023, the major sources of energy were oil (37.7%), natural gas (26.4%), biomass (29.8%), and hydro (6%). Solar energy accounted for less than 1% of the total energy supply.

Table 2.1: Total Energy Supply (ktoe)

Year	Oil[1]		Natural Gas[2]		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	39.1	414	6	601	8.6	-	-	3,237	46.3	6,988
2011	2,898	38.1	810	11	650	8.5	-	-	3,256	42.8	7,614
2012	3,418	42.9	410	5	694	8.7	-	-	3,443	43.2	7,965
2013	4,169	46.7	307	3	708	7.9	0.3	0	3,743	41.9	8,927
2014	4,007	43.5	652	7	721	7.8	0.3	0	3,836	41.6	9,217
2015	3,988	41.3	1,247	13	503	5.2	0.3	0	3,925	40.6	9,663
2016	4,466	46.1	729	8	478	4.9	2	0.02	4,019	41.5	9,694
2017	3,932	40.1	1,206	12	483	4.9	2	0.03	4,177	42.6	9,801
2018	4,600	42	1,669	15	517	4.7	3	0.03	4,153	38.0	10,942
2019	4,445	39.4	2,098	19	624	5.5	4	0.04	4,115	36.5	11,286
2020	4,355	36.2	3,014	25	627	5.2	5	0.04	4,029	33.5	12,030
2021	4,414	37.3	3,189	27	647	5.5	11	0.09	3,562	30.1	11,822
2022	4,152	33.6	3,472	28	704	5.7	14	0.11	3,993	32.4	12,342
2023	4,984	37.7	3,487	26	790	6	12.8	0.10	3,944	29.8	13,218

Source: Energy Commission

[1] oil includes both crude oil and petroleum products
[2] Natural gas refers to dry marketable production

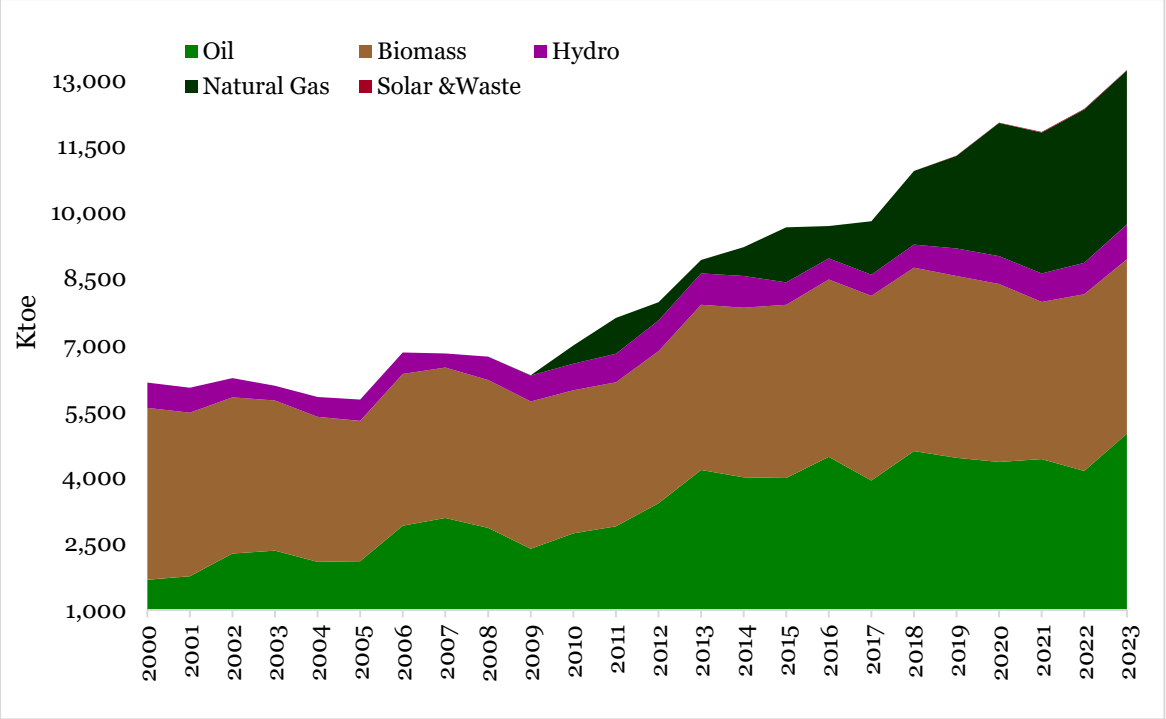


Figure 2.1: Total Energy Supply

2.2 Total Final Consumption by Fuel

The total final energy consumption increased from 5,468 ktoe in 2000 to 9,107 ktoe in 2023, at an average annual growth rate of 2.2%. Particularly in 2023, there was a 3.2% increase in total final energy consumption compared to 2022.

Meanwhile, electricity consumption rose by 4.5%, reaching 1,621 ktoe in 2023 from 591 ktoe in 2000 (Table 2.2). On the other hand, petroleum consumption displayed an upward trajectory until 2021, peaking at 4,640 ktoe, but experienced a decline of 7% in 2022 before increasing by 7.5% to 4,651 ktoe in 2023. Biomass consumption, albeit fluctuating, has generally decreased over the years at a rate of 0.8%, declining from 3,432 ktoe in 2000 to 2,845 ktoe in 2023 with its share decreasing in the total final consumption from 62.8% to 31.2%.

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

Year	Electricity[1]		Petroleum[2]		Biomass		Total
	Ktoe	%	Ktoe	%	Ktoe	%	Ktoe
2000	591	10.8	1,445	26.4	3,432	62.8	5,468
2001	614	11.5	1,467	27.6	3,238	60.9	5,319
2002	586	11.2	1,550	29.7	3,082	59.1	5,218
2003	449	9.2	1,494	30.7	2,925	60.1	4,868
2004	458	9.2	1,705	34.1	2,839	56.8	5,002
2005	513	10.3	1,712	34.4	2,745	55.2	4,970
2006	623	12.3	1,775	35.0	2,671	52.7	5,069
2007	532	10.3	2,023	39.1	2,614	50.6	5,170
2008	601	11.7	1,973	38.6	2,544	49.7	5,118
2009	618	11.0	2,496	44.4	2,513	44.7	5,627
2010	667	12.2	2,408	44.0	2,395	43.8	5,471
2011	765	13.0	2,704	45.9	2,419	41.1	5,889
2012	851	12.9	3,189	48.3	2,566	38.8	6,606
2013	908	12.9	3,308	47.1	2,804	39.9	7,020
2014	917	13.1	3,243	46.2	2,853	40.7	7,013
2015	829	11.5	3,497	48.4	2,896	40.1	7,222
2016	993	13.8	3,255	45.3	2,945	40.9	7,193
2017	1,058	14.7	3,104	43.0	3,053	42.3	7,214
2018	1,166	14.9	3,581	45.8	3,063	39.2	7,809
2019	1,252	15.4	3,793	46.7	3,069	37.8	8,114
2020	1,370	15.9	4,248	49.1	3,026	35.0	8,644
2021	1,502	17.1	4,640	52.7	2,660	30.2	8,802
2022	1,562	17.7	4,317	48.9	2,946	33.4	8,826
2023	1,621	17.8	4,641	51.0	2,845	31.2	9,107

[1]Includes commercial losses

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

Source: Energy Commission

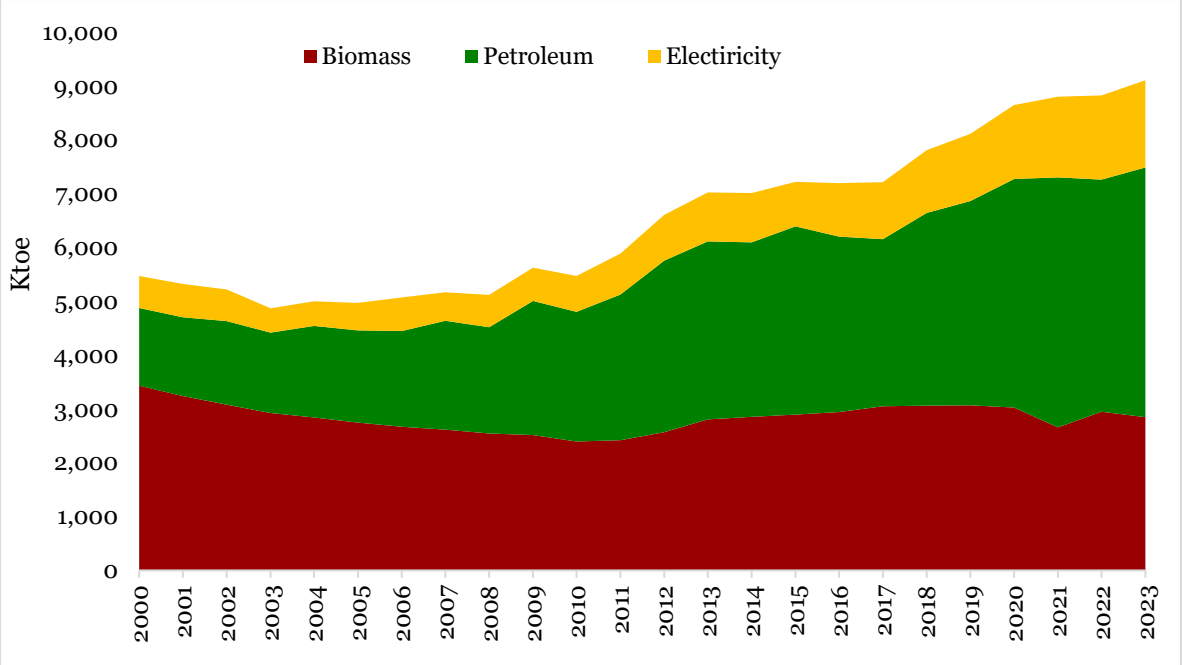


Figure 2.2: Trend in Final Energy Consumption by Fuel

2.3 Total Final Consumption by Sector

The primary contributors to final energy consumption are the industrial, transport, and residential sectors. Industry and transport sectors experienced steady growth, with industrial consumption increasing notably post-2010 at a growth rate of 3.9% and transport showing a 5% growth reaching 3,604 ktoe in 2023, with a notable 8.5% rise from the previous year.

In contrast, residential consumption experienced a slight decline of 0.1% annually from 2000 to 2023. The service sector demonstrated a steady rise with an average annual growth rate of about 5.2%, while agriculture showed an upward trajectory with an average annual growth rate of about 4.7%, experiencing a 2.2% increase in 2023 compared to the previous year (Table 2.3).

Table 2.3: Final Energy Consumption by Sectors (ktoe)

Year	Residential	Industry	Service	Agriculture	Transport	Non-Energy Use	Total
2000	3,389	731	121	33	1,186	7.2	5,468
2001	3,218	740	123	29	1,200	7.8	5,319
2002	3,086	706	127	29	1,261	8.7	5,218
2003	2,946	553	132	32	1,196	8.4	4,868
2004	2,884	566	135	30	1,377	9.2	5,002
2005	2,815	613	146	35	1,352	9.7	4,970
2006	2,636	896	173	41	1,315	10.3	5,069
2007	2,576	855	164	49	1,516	8.8	5,170
2008	2,557	880	144	59	1,473	4.9	5,118
2009	2,650	913	165	66	1,819	13.1	5,627
2010	2,573	769	244	35	1,842	7.4	5,471
2011	2,739	801	228	48	2,063	9.7	5,889
2012	2,900	854	273	62	2,511	5.5	6,606
2013	3,009	942	330	61	2,673	3.7	7,020
2014	3,007	868	351	106	2,680	1.1	7,013
2015	3,083	968	251	100	2,819	-	7,222
2016	3,122	1,017	343	104	2,606	-	7,193
2017	3,252	1,041	406	125	2,389	-	7,214
2018	3,325	1,249	323	119	2,794	-	7,809
2019	3,361	1,282	381	122	2,967	-	8,114
2020	3,445	1,486	321	139	3,253	-	8,644
2021	3,151	1,619	351	147	3,535	-	8,802
2022	3,324	1,711	376	92	3,322	-	8,826
2023	3,276	1,745	389	94	3,604	-	9,107

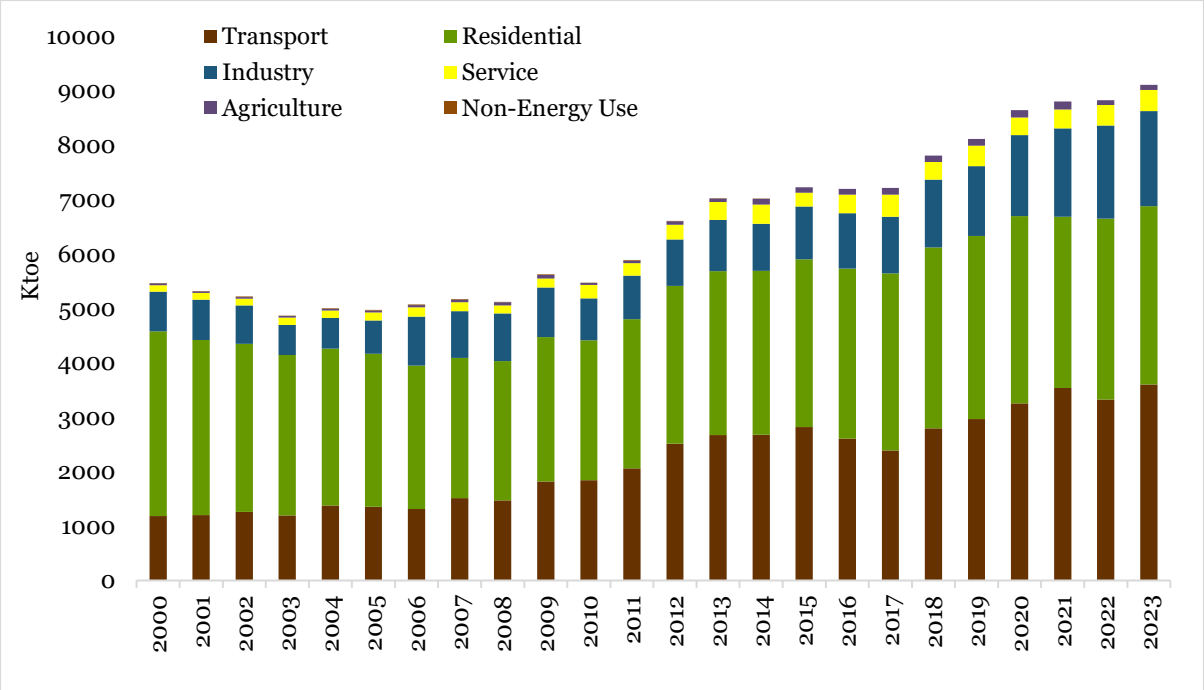


Figure 2.3: Final Energy Consumed by Sectors

3.1 Installed Electricity Generation Capacity

Electricity generation capacity, excluding distributed generation, has increased by 5.5% over the period reaching 5,639 MW in 2023, as depicted in Figure 3.1. This comprises hydro, thermal, and other renewable sources. As of 2023, hydro plants contributed 28.1% of the total installed capacity, with thermal plants and renewable sources contributing 69.6% and 2.3% respectively (Table 3.1). Correspondingly, the dependable capacity from these sources, also increased by 6%.

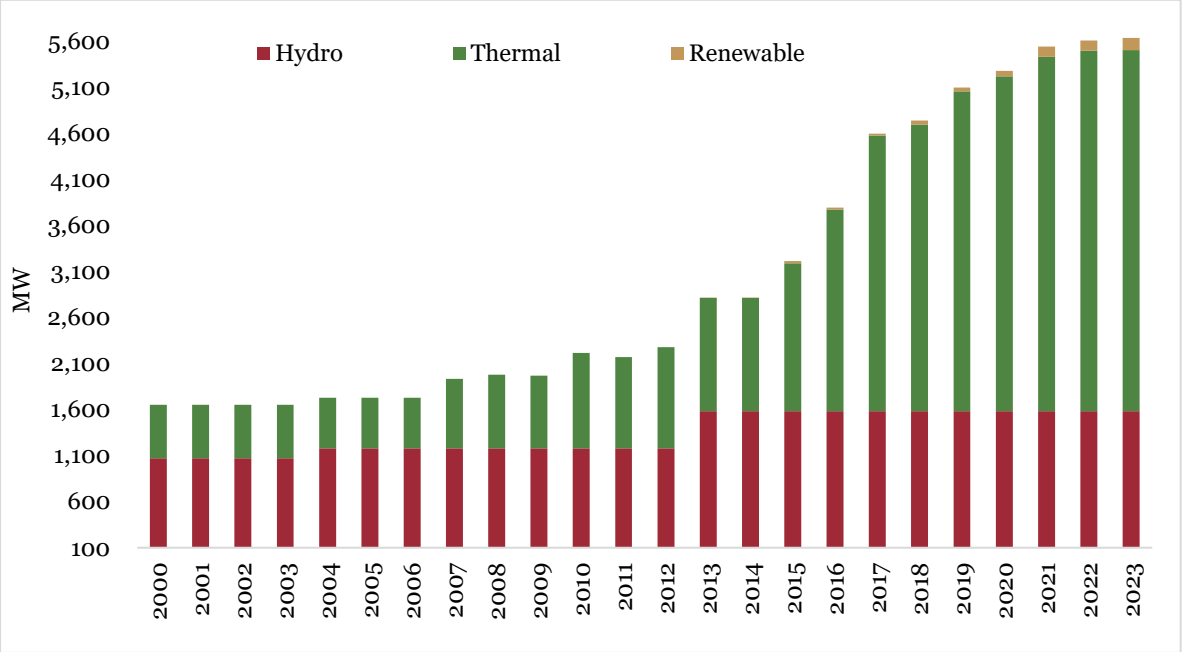


Figure 3.1: Installed Generating Capacity (2000-2023)

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	1,035	-	2,215	1,040	945	-	1,985
2011	1,180	990	-	2,170	1,040	895	-	1,935
2012	1,180	1,100	-	2,280	1,040	995	-	2,035
2013	1,584	1,232	3	2,818	1,380	1,105	2	2,487
2014	1,584	1,232	3	2,818	1,380	1,105	2	2,487
2015	1,584	1,607	23	3,213	1,380	1,475	18	2,873
2016	1,584	2,189	23	3,795	1,380	2,009	18	3,407
2017	1,584	2,993	23	4,599	1,380	2,729	18	4,127
2018	1,584	3,113	43	4,740	1,380	2,884	34	4,298
2019	1,584	3,473	43	5,100	1,365	3,225	34	4,624
2020	1,584	3,639	59	5,282	1,400	3,393	47	4,840
2021	1,584	3,849	112	5,545	1,400	3,583	89	5,073
2022	1,584	3,914	112	5,610	1,374	3,618	89	5,081
2023	1,584	3,923	132	5,639	1,411	3,664	106	5,180

[1]Solar and waste

Source: Energy Commission

The list of power plants, excluding off-grid and distributed generation, in Ghana as of the end of December 2023, is shown in Table 3.2.

Table 3.2: Installed Generation Capacities in Ghana as of 2023 (MW)

Plant	Installed Capacity	Dependable Capacity
Hydro Power Plants		
Akosombo	1,020	900
Kpong	160	140
Bui	404	371
Tsatsadu Hydro	0.045	0.045
Sub-total	**1,584**	**1,411**
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
Takoradi T3	132	120
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[3]	200	190
Genser[4]	181	158
Sub-total	**3,923**	**3,664**
Other Renewables		
On-grid		
VRA Solar (Navrongo)[2]	2.5	2.0
VRA Solar (Lawra)[2]	6.5	5.2
VRA Solar (Kaleo)[2]	28	22
BXC Solar[2]	20	16
Meinergy[2]	20	16
Bui Solar[2]	55	44
Safisana Biogas[2]	0.1	0.1
Sub-total	**132**	**106**
Total	**5,639**	**5,180**

Source: Energy Commission

[3] Currently undergoing testing and preparations before its commercial operation date (COD)
[4] 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	Wind	
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	-	-	-	-	58.3		5,003
2018	155	-	9,441	20,000	-	-	-	-	-	29,596
2019	-	-	9,924	-	-	45	-	-	-	9,969
2020	-	-	9,626	6,540	-	-	-	-	-	16,166
2021	-	-	7,367	63,000	-	-	-	-	-	70,367
2022*	-	-	4,392	1,000	-	-	-	-	-	5,392
2023*	-	-	2,410	19,750	-	-	-	-	-	22,160
Total	**7,424**	**20**	**51,689**	**132,790**	**100**	**45**	**-**	**314**	**11**	**192,394**

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

3.2 Electricity Generation

Hydro, thermal, and renewables constitute Ghana's electricity generation[5] mix. Historically, hydropower held a dominant position, accounting for 92% of the total generation in 2000. However, its contribution declined to 51% by 2015, marked by occasional minor fluctuations. In contrast, thermal generation has shown an upward trend since 2016, peaking at 65% in 2021 and then decreasing to 62% in 2023. Moreover, renewable energy generation in Ghana has remained minimal throughout the period.

The total electricity generation experienced a slightly more than threefold increase, rising from 7,224 GWh in 2000 to 24,264 GWh in 2023, translating to an annual average growth rate of 5.4%. In 2023, hydropower and thermal plants generated 9,187 GWh (38%) and 14,930 GWh (62%) of the total electricity respectively. The remaining 148 GWh, representing 0.61%, came from other renewables operating at the sub-transmission level (Table 3.4).

[5] Electricity generation includes embedded generation and import.

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	10,894	52	18,197	40	60	0.28
2020	7,293	12,815	57	20,165	36	64	0.28
2021	7,521	14,417	122	22,060	34	65	0.55
2022	8,192	14,818	162	23,172	35	64	0.70
2023	9,187	14,930	148	24,264	38	62	0.61

Source: GRIDCo and ECG

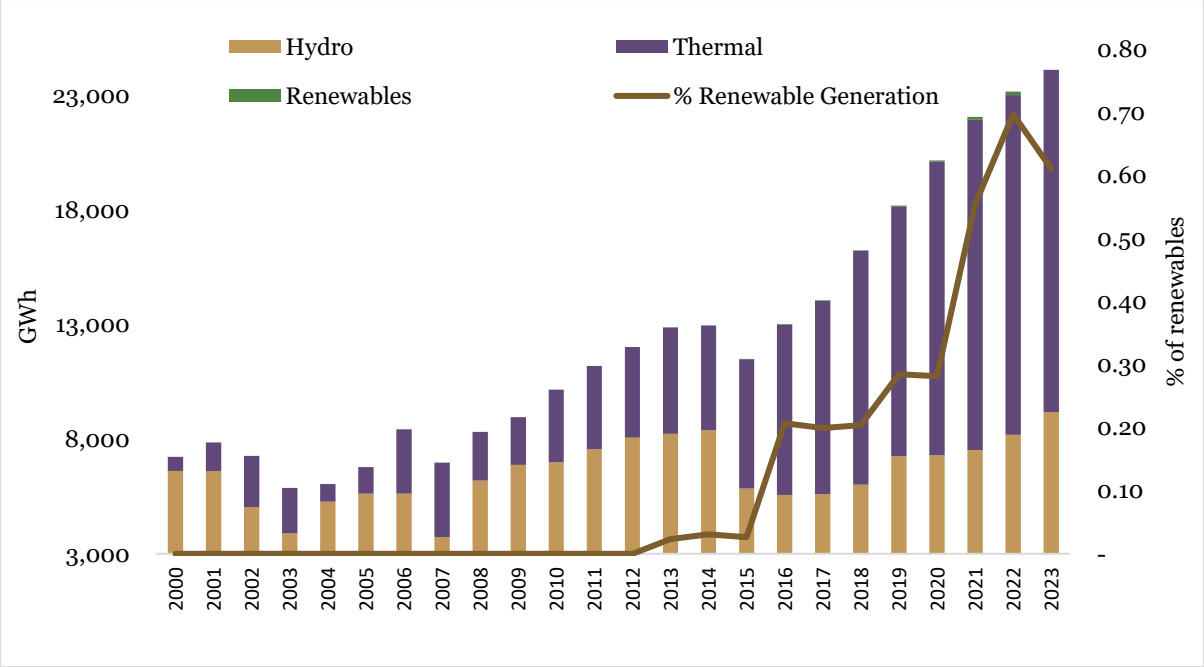


Figure 3.2: Electricity Generation (2000-2023)

3.3 Electricity Export and Import

From the early 2000s, there was a substantial decline in electricity imports, dropping from its peak of 1,146 GWh in 2002 to 37 GWh in 2022, at an average rate of 15.8%. However, 2023 saw a marginal twofold increase in imports compared to the previous year.

In contrast, the nation experienced growth in electricity exports. Initially, there was a decline of 6.3% annually in exports from 392 GWh in 2000 to 249 GWh in 2007, before experiencing marginal annual growth averaging 1% from 2008 to 2015. Subsequently, exports declined by 18.6% to 473 GWh in 2016. However, exports rebounded strongly at an annual rate of 37.3% to 2,528 GWh in 2023 as depicted in Figure 3.3.

This surge in export volumes underscores Ghana's emergence as a significant player in the energy market, particularly evident since 2008 when positive net exports became a consistent trend, as depicted in Table 3.5.

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	1690
2022	37	2,215	2,177
2023	79	2,528	2,449

Source: GRIDCo

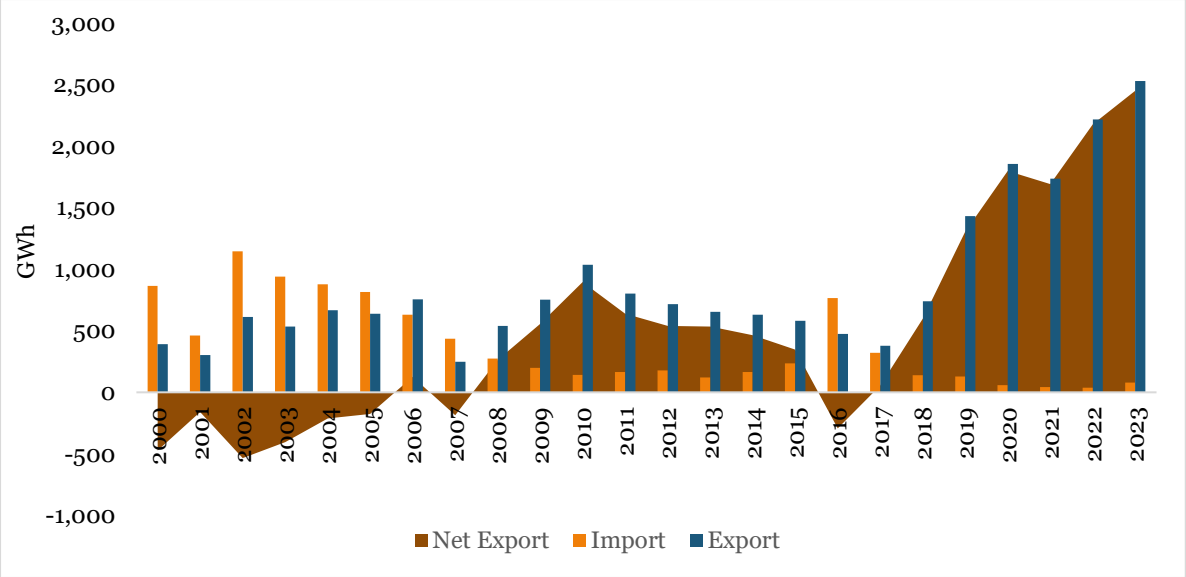


Figure 3.3: Electricity Import and Export

3.4 Peak Load

Table 3.6 presents 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 2023. Over the period, there was a threefold increase in the System Peak and a nearly fourfold increase in the Domestic Peak. In 2023, the System Peak observed was 3,618 MW. This signifies an increase of 4.3% compared to the 2022 figure. Similarly, the Domestic Peak in 2023 was 3,171 MW, indicating a significant increase of 3.5 % compared to the 2022 figure.

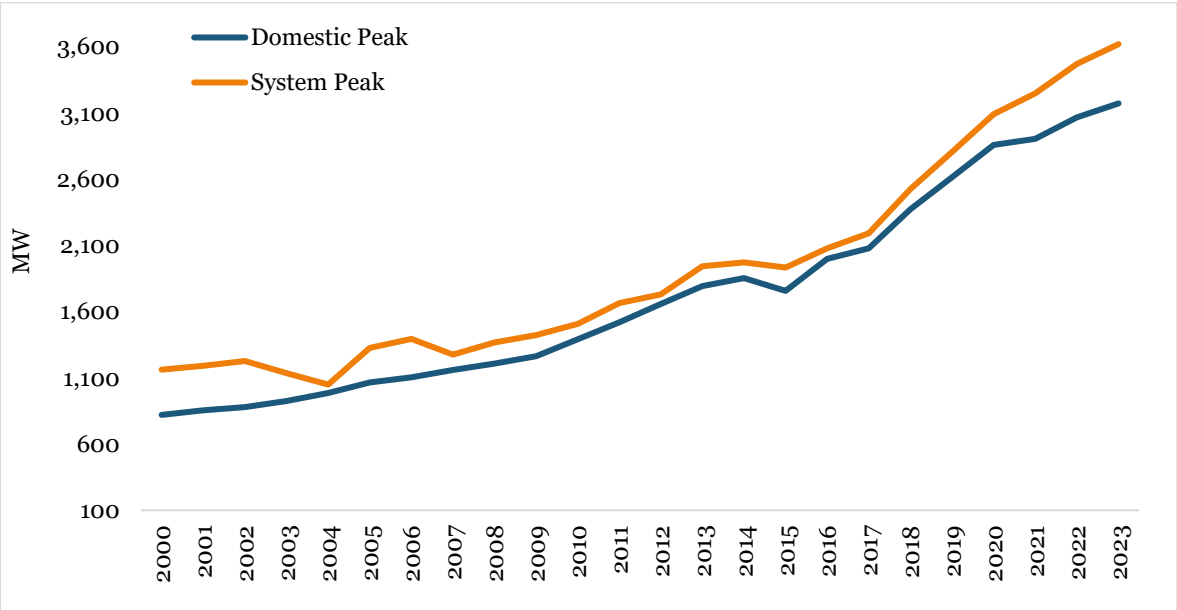


Figure 3.4: System and Ghana Peak Load

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
2023	3,618	3,171

[3]System Peak = Ghana Load at Peak + VALCO Load + Export Load;
[4]Maximum Demand for Ghana (ECG +NEDCo + Direct Customers of VRA + Mines)
Source: GRIDCo

3.5 Electricity Transmitted and Losses

The total electricity transmitted and transmission losses over the period are depicted in Table 3.7. The quantities of electricity transmitted in Ghana shows an upward trend increasing from 8,067 in 2000 to 23,551 in 2023, albeit with occasional dips in 2003, 2007 and 2015.

In 2000, losses stood at 229 GWh, accounting for 2.8% of the total electricity transmitted. This figure rose to a peak of 1,076 GWh in 2021, representing 5% of total electricity transmitted, before dropping to 922 GWh in 2022. Notably, in 2023, losses further decreased to 908 GWh. As of 2023, transmission loss recorded a 3.9%, a decrease from 4.1% in recorded in 2022. (Table 3.7). This reduction is noteworthy, particularly considering that it falls below the benchmark set by the Public Utilities Regulatory Commission (PURC) at 4.1%. It's important to note that this benchmark was achieved in 2022.

Table 3.7: Electricity Transmitted and Transmission Losses (GWh)

Year	Electricity Transmitted	Transmission Losses	Transmission losses % of total electricity transmitted
2000	8,067	229	2.84
2001	8,293	259	3.12
2002	8,402	368	4.38
2003	6,800	402	5.91
2004	6,891	205	2.97
2005	7,565	249	3.29
2006	9,013	318	3.53
2007	7,123	256	3.59
2008	8,423	303	3.60
2009	9,131	343	3.76
2010	10,267	413	4.02
2011	11,340	505	4.45
2012	12,164	522	4.29
2013	12,927	580	4.49
2014	13,071	565	4.32
2015	11,692	443	3.79
2016	13,700	607	4.43
2017	14,308	587	4.10
2018	15,960	707	4.43
2019	17,887	843	4.71
2020	19,717	888	4.50
2021	21,466	1076	5.01
2022	22,478	922	4.10
2023	23,551	908	3.86

Source: GRIDCo

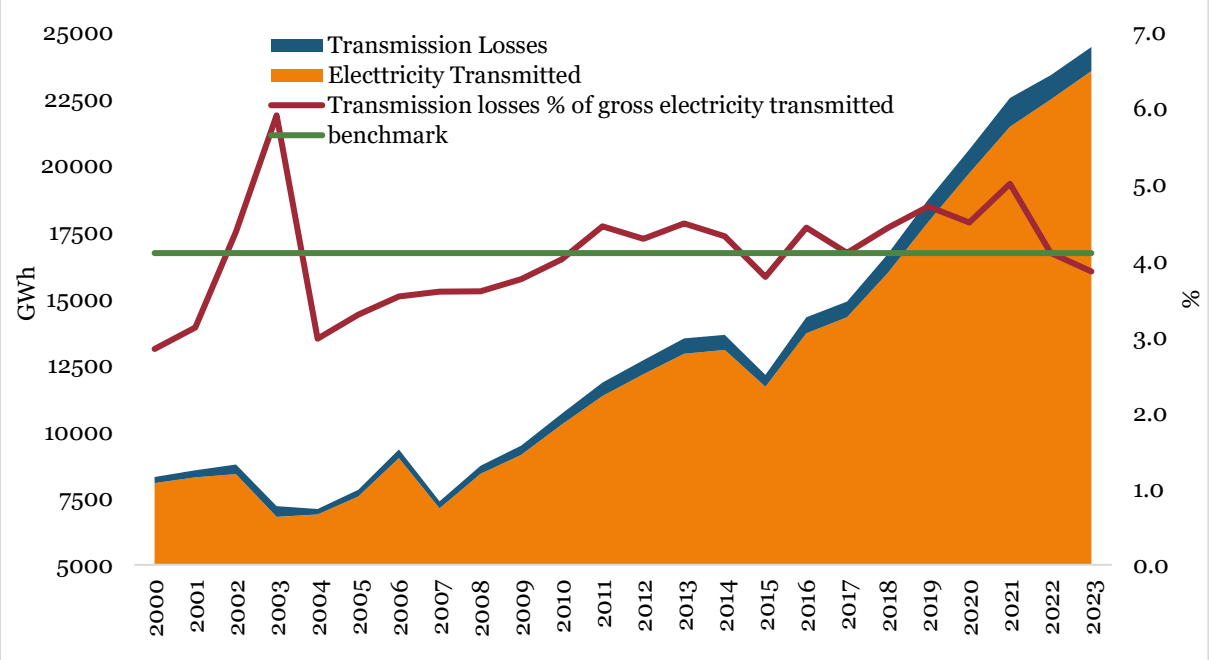


Figure 3.5: Electricity Transmitted and Transmission Losses

3.7 Electricity Purchase, Sales and Losses by Distribution Utilities

The Electricity Company of Ghana (ECG) and the Northern Electricity Distribution Company (NEDCo) have experienced significant growth in their total purchases from 2000 to 2023, with ECG nearly quadrupling and NEDCo increasing by six-fold. This upward trajectory covers a span of twenty-four years, resulting in recent totals of approximately 15,352 GWh for ECG and 1,938 GWh for NEDCo. Furthermore, since 2015, Enclave Power Company (EPC) has experienced a significant threefold rise in its total purchases (Table 3.8).

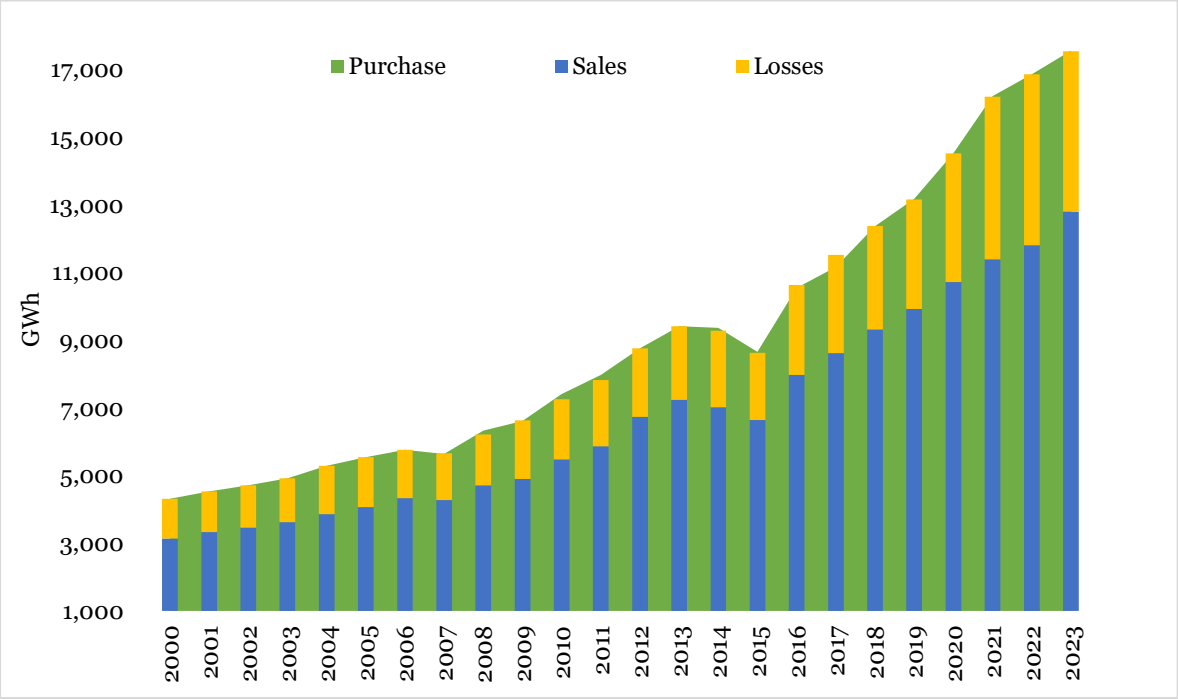


Figure 3.6: DISCO's Purchases, Sales and Losses

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	25.7	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	1,283	25.4	501	312	189	37.7	-	-	-	-	5,546	4,072	1,472	26.5
2006	5,253	3,978	1,274	24.3	507	356	151	29.8	-	-	-	-	5,760	4,334	1,425	24.7
2007	5,146	3,909	1,250	24.3	494	366	129	26.1	-	-	-	-	5,640	4,275	1,379	24.5
2008	5,799	4,317	1,374	23.7	529	392	137	25.9	-	-	-	-	6,328	4,709	1,511	23.9
2009	6,052	4,483	1,574	26.0	566	413	162	28.6	-	-	-	-	6,618	4,896	1,736	26.2
2010	6,771	4,972	1,649	24.4	635	511	126	19.9	-	-	-	-	7,406	5,483	1,775	24.0
2011	7,259	5,285	1,815	25.0	719	581	147	20.5	-	-	-	-	7,978	5,865	1,963	24.6
2012	7,944	6,079	1,864	23.5	822	658	165	20.1	-	-	-	-	8,766	6,737	2,029	23.2
2013	8,479	6,496	1,982	23.4	937	737	200	21.3	-	-	-	-	9,416	7,233	2,182	23.2
2014	8,370	6,262	2,024	24.2	998	759	239	23.9	-	-	-	-	9,368	7,020	2,263	24.2
2015	7,544	5,831	1,680	22.3	1,013	720	294	29.0	102.3	95.9	6.3	6.2	8,659	6,646	1,980	22.9
2016	9,316	7,115	2,212	23.7	1,123	763	440	39.2	107.5	99.8	7.5	7.0	10,546	7,977	2,659	25.2
2017	9,783	7,575	2,379	24.3	1,224	889	521	42.6	157.4	154.6	2.7	1.7	11,165	8,618	2,903	26.0
2018	10,901	8,251	2,649	24.3	1,318	910	404	30.6	160.7	159.5	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	235.4	229.0	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	242.1	237.0	5.3	2.2	14,524	10,717	3,804	26.2
2021	14,222	9,884	4,323	30.4	1,764	1,281	483	27.4	232.4	229.6	2.6	1.1	16,219	11,394	4,809	29.6
2022	14,811	10,274	4,537	30.6	1,824	1,307	517	28.3	227.7	226.6	1.0	0.5	16,863	11,808	5,055	30.0
2023	15,352	11,218	4,133	26.9	1,938	1,324	600	31.0	268.7	263.1	1.3	0.5	17,559	12,805	4,735	27.0

[5] Distribution Losses include technical and commercial losses

3.8 Electricity Consumption

The total electricity consumption has been increasing over the years, from 6,869 GWh in 2000 to 18,849 GWh in 2023, representing an annual rate of 4.5% (Table 3.9). Predominantly, this growth has been observed in the residential and industrial sectors, with the services sector also experiencing an increase, albeit not as pronounced as the former two sectors. Conversely, electricity consumption in the transport and agriculture sectors remains relatively modest.

In 2023, the industrial sector emerged as the largest consumer of electricity, followed by the residential sector, with the services sector ranking third. Agriculture and transport sectors consumed significantly smaller quantities of electricity. The trend in electricity consumption by the various sectors is depicted in Figure 3.7.

Table 3.9: Electricity Consumption by Sectors (GWh)

Year	Residential	Industry	Service	Agriculture	Transport	Total
2000	2,020	4,367	475	2	4	6,869
2001	2,178	4,463	492	4	4	7,141
2002	2,264	4,027	516	5	4	6,817
2003	2,377	2,266	563	6	14	5,226
2004	2,540	2,186	573	8	16	5,323
2005	2,715	2,573	658	10	11	5,967
2006	2,712	4,013	502	9	10	7,246
2007	2,571	3,213	387	8	12	6,190
2008	2,921	3,619	425	9	11	6,984
2009	3,261	3,235	664	15	8	7,184
2010	3,532	2,589	1,628	2	9	7,760
2011	3,702	3,345	1,837	2	13	8,899
2012	3,988	3,718	2,182	2	9	9,899
2013	4,222	3,868	2,465	2	5	10,562
2014	4,031	3,992	2,632	3	7	10,665
2015	4,266	3,990	1,381	2	2	9,640
2016	4,217	4,970	2,355	3	3	11,548
2017	5,038	4,455	2,805	3	3	12,304
2018	5,739	5,788	2,018	7	6	13,558
2019	6,068	5,645	2,836	7	6	14,562
2020	6,844	6,704	2,363	17	7	15,936
2021	6,962	7,693	2,775	25	10	17,465
2022	7,100	8,069	2,960	33	11	18,172
2023	7,479	8,250	3,069	39	11	18,849

Source: Energy Commission

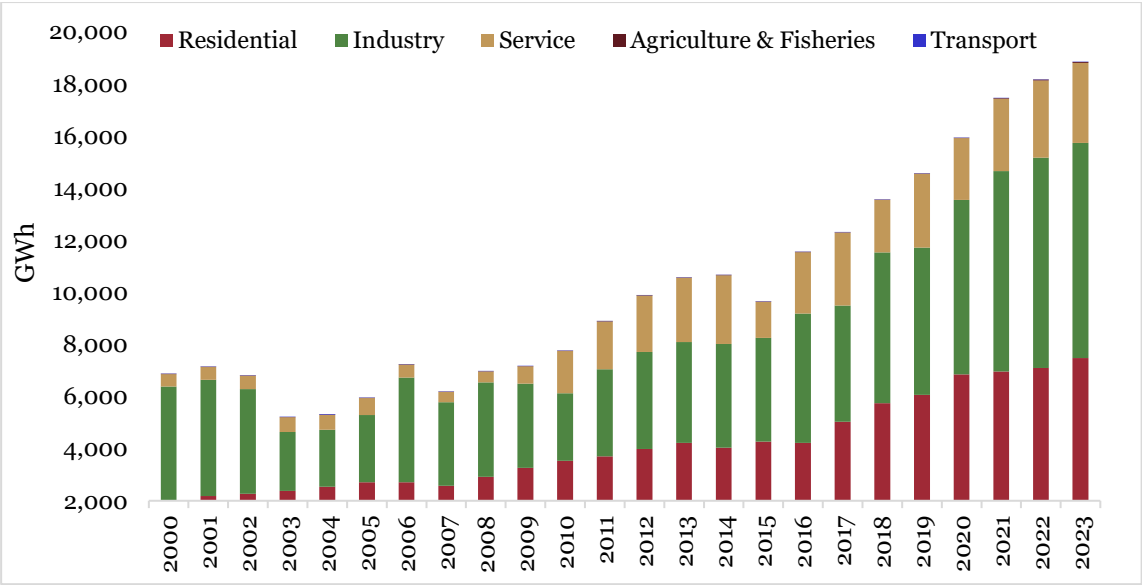


Figure 3.7: Electricity Consumption by Sectors

3.9 Customer Population by Classification

Table 3.10 presents the distribution of electricity customers in Ghana by customer-type (residential, non-residential, and Special Load Tariff (SLT)) from the year 2000 to 2023. The total number of customers shows a consistent increase from 932,598 in 2000 to 5,937,212 in 2023, representing an annual average growth rate of 8.4%. Residential customers have consistently constituted the largest customer segment, comprising 86% of the total customer base in 2023, while non-residential customers and SLT customers accounted for 14% and 0.04%, respectively, in the same year. Over the years, the growth rate of residential customers (8.6%) has been higher than that of non-residential customers (7.2%) and SLT customers (4.6%).

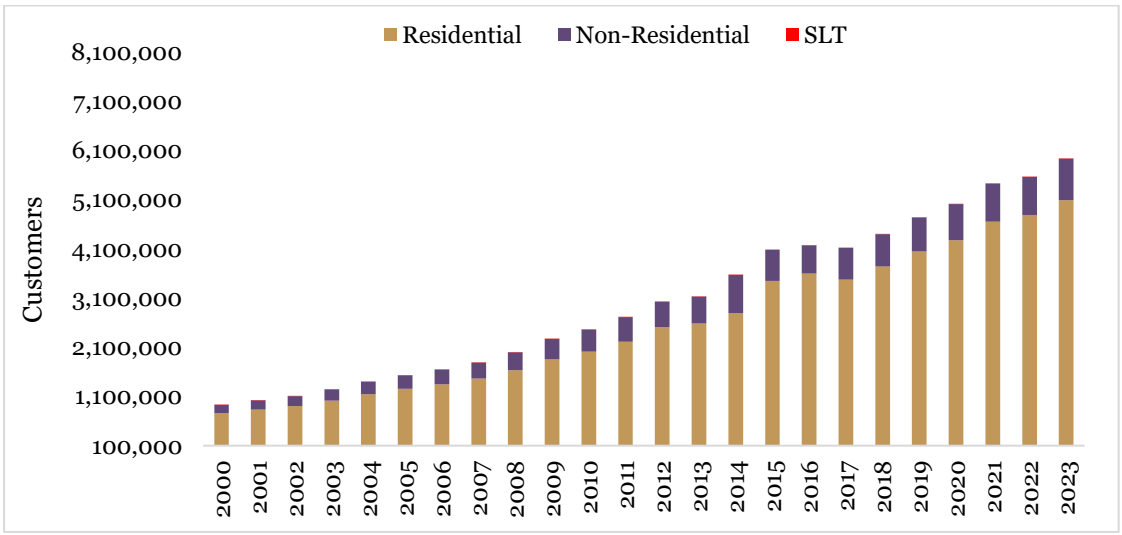


Figure 3.8: Customer Population

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
2023	5,085,561	849,405	2,246	5,937,212

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 3.9 and Figure 3.10. Tables 3.11 and 3.12 show the summary of Akosombo and Bui dam water levels.

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
2023	271	270	268	267	266	265	267	269	275	277	276	275

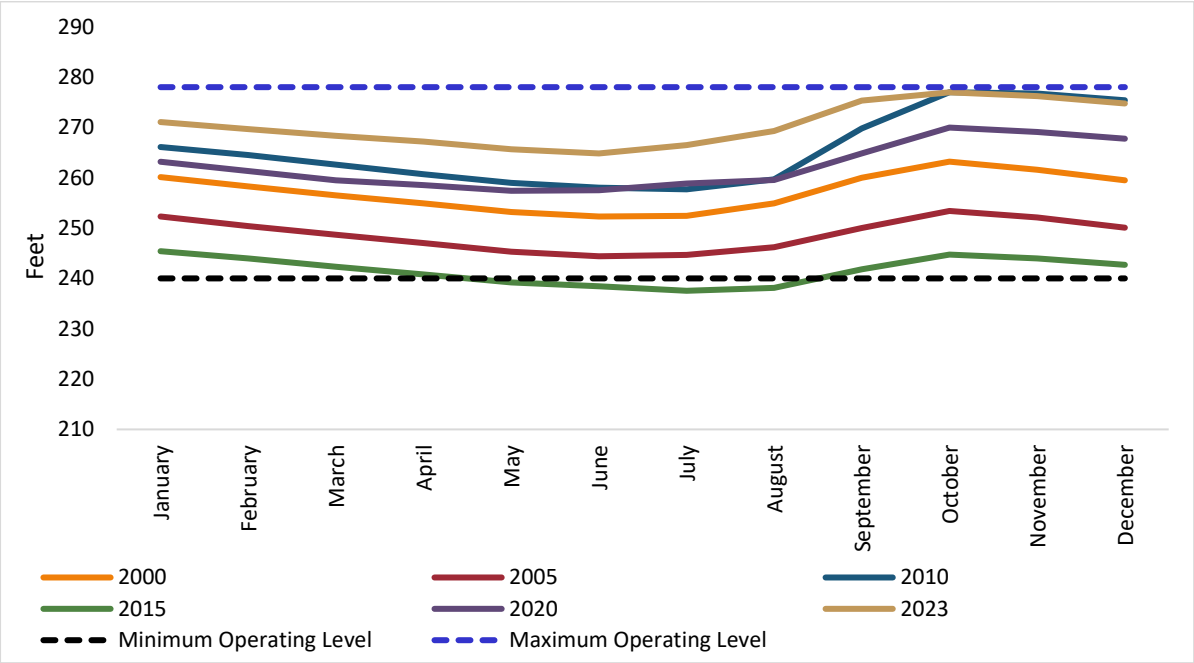


Figure 3.9: Trend in Akosombo Headwater Level

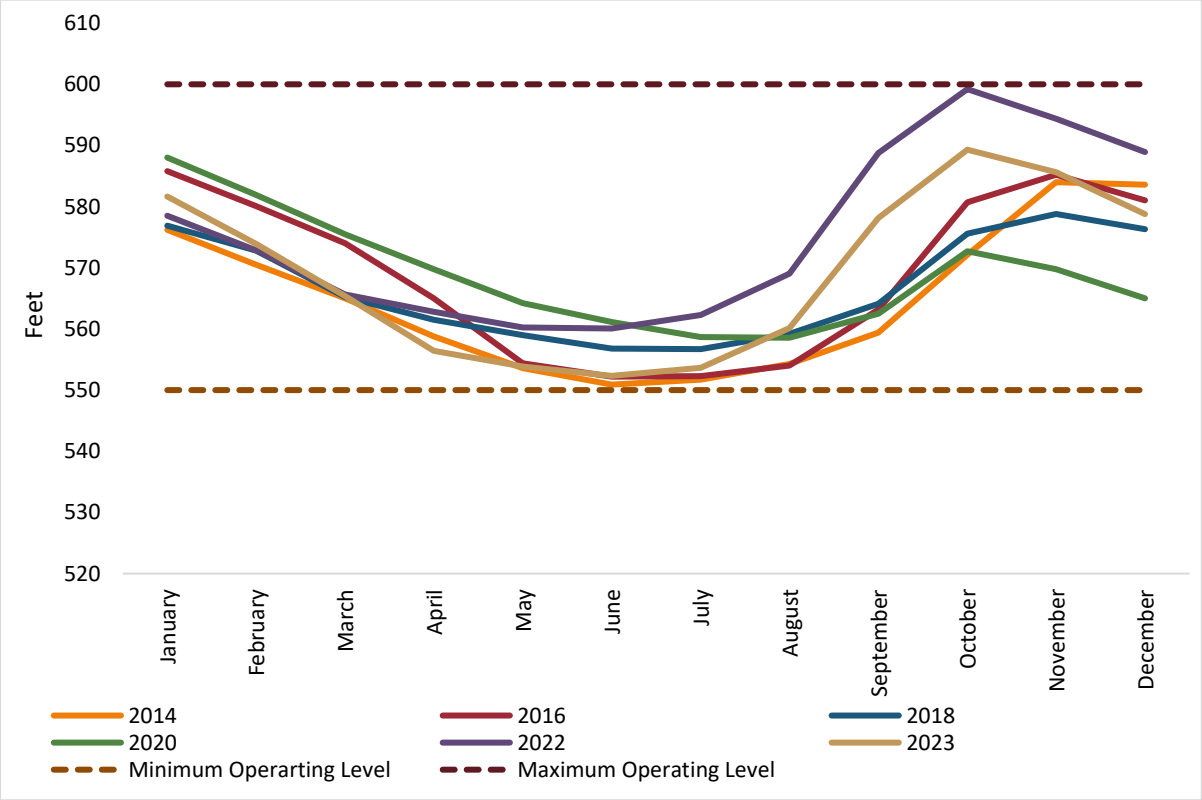


Figure 3.10: Trend in Bui Dam Headwater Level

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
2023	582	574	565	556	554	552	554	560	578	589	586	579

3.11 Electricity Distribution Reliability Indices

Table 3.13 presents the reliability indices for the electricity supply in different operational areas of the ECG and NEDCo in Ghana from 2018 to 2023. The System Average Interruption Frequency Index (SAIFI) and System Average Interruption Duration Index (SAIDI) reliability indices indicate a general downward trend observed across all operational areas of both utilities throughout the years. This decline indicates an improvement in the reliability and continuity of electricity supply over time. Specifically, metro areas consistently exhibit the lowest SAIFI and SAIDI values, suggesting better reliability and shorter outage durations compared to Urban and Rural areas. Despite improvements, neither ECG nor NEDCo met the SAIFI benchmark in any operational area, indicating a persistent prevalence of system outages throughout the years.

Regarding Customer Average Interruption Duration Index (CAIDI), while variations exist across operational areas of both utilities, ECG and NEDCo have consistently met the regulatory benchmarks for CAIDI in all operational areas, ensuring that consumers did not experience outages with durations exceeding the permissible limits.

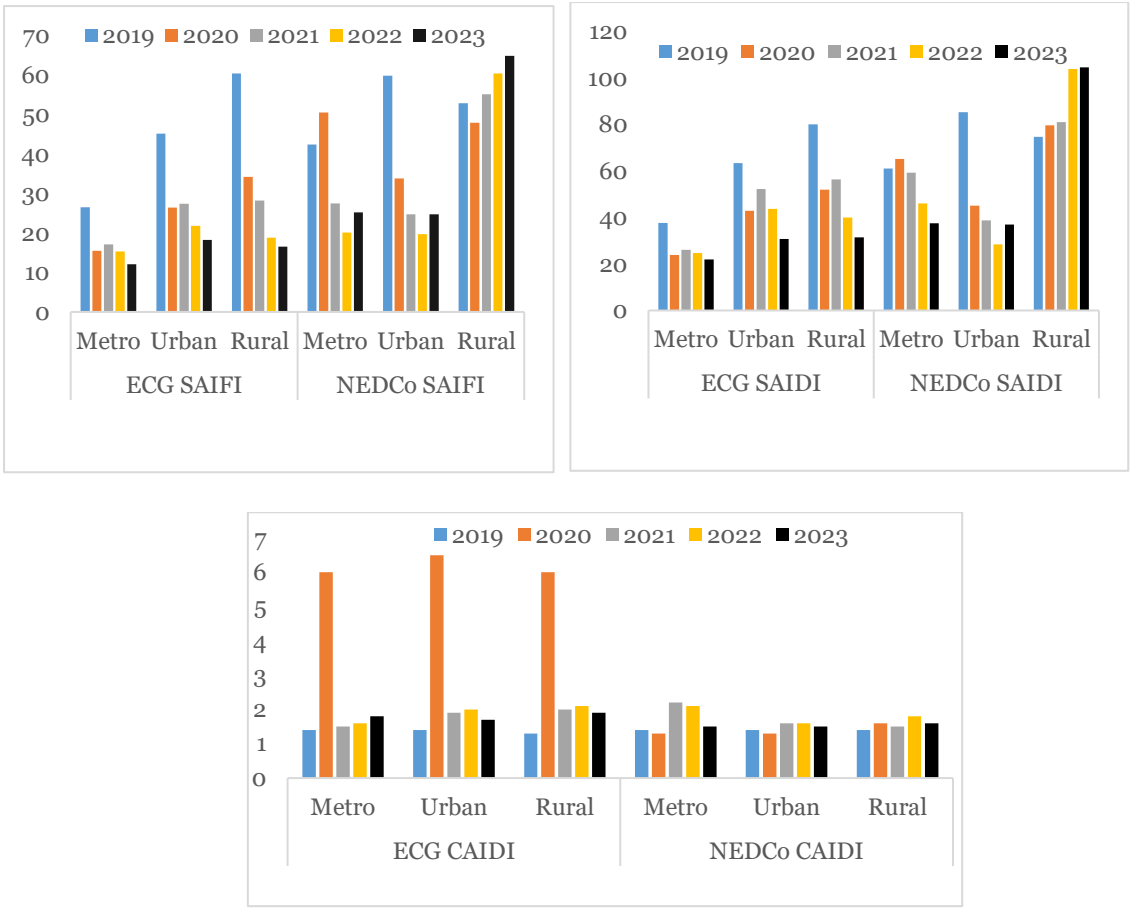


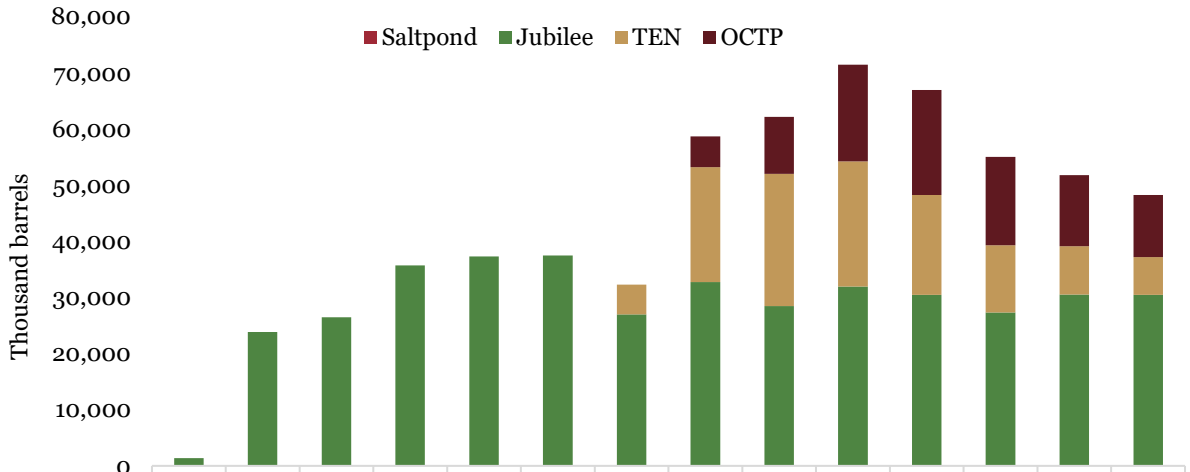
Figure 3.11: Distribution Regulatory Indices

Table 3.13: Electricity Distribution Reliability Indices

Reliability Index	Operational Area	Regulatory Benchmarks per L.I 1935	2018		2019		2020		2021		2022		2023	
			ECG	NEDCo	ECG	NEDCo	ECG	NEDCo	ECG	NEDCo	ECG	NEDCo	ECG	NEDCo
System Average Interruption Frequency Index (SAIFI)	Metro	6.0	28.0	146.0	26.5	42.4	15.5	50.5	17.1	27.5	15.3	20.1	12.1	25.2
	Urban	6.0	57.0		45.1	59.8	26.4	33.8	27.4	24.7	21.8	19.7	18.2	24.7
	Rural	6.0	61.0		60.4	52.8	34.2	47.9	28.2	55.1	18.8	60.4	16.5	64.8
System Average Interruption Duration Index (SAIDI)	Metro	48.0	44.0	123.0	37.7	61.0	23.8	65.1	26.1	59.2	24.7	46.0	21.9	37.5
	Urban	72.0	71.0		63.4	85.2	42.9	45.1	52.2	38.7	43.7	28.4	30.7	36.9
	Rural	144.0	76.0		80.0	74.7	51.9	79.6	56.3	81.0	40.0	103.8	31.5	104.6
Customer Average Interruption Duration Index (CAIDI)	Metro	8.0	2.0	1.0	1.4	1.4	6.0	1.3	1.5	2.2	1.6	2.1	1.8	1.5
	Urban	12.0	1.0		1.4	1.4	6.5	1.3	1.9	1.6	2.0	1.6	1.7	1.5
	Rural	24	1.0		1.3	1.4	6.0	1.6	2.0	1.5	2.1	1.8	1.9	1.6

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 23.8 million barrels in 2011 to 48.2 million barrels in 2023. The inclusion of Jubilee, TEN, and OCTP has contributed significantly to Ghana's crude oil production since 2010, as shown in Figure 4.1.



	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
OCTP	-	-	-	-	-	-	-	5,456	10,11	17,20	18,70	15,73	12,62	11,08
TEN	-	-	-	-	-	-	5,316	20,45	23,55	22,31	17,80	11,97	8,613	6,716
Jubilee	1,268	23,75	26,35	35,58	37,20	37,41	26,98	32,75	28,46	31,91	30,42	27,33	30,52	30,44
Saltpond	98	76	105	98	97	47	-	-	-	-	-	-	-	-

Figure 4.1: Trend in Crude Oil Production
Source: Petroleum Commission & Ghana National Petroleum Corporation

4.2 Crude Oil Import and Export

Table 4.1 presents data on Ghana's crude oil imports and exports from the year 2000 to 2023. Import volumes showed a consistent rise until 2005, followed by a decline of 12.9% in 2006, rebounding in 2007, and then plateauing at lower levels with a downward trend from 2007 onwards with occasional fluctuations, reaching 2.05 million barrels in 2023 (Table 4.2). Export volumes in 2023 increased by nine-fold compared to the previous year.

Conversely, export volumes increased significantly from 2011 until 2019, peaking at 70.99 million barrels, but have since been declining at an average annual rate of 10.8%, reaching 47.87 million barrels in 2023. Export volumes in 2023 decreased by approximately 8.4% compared to the previous year.

Table 4.1: Crude Oil Import and Export

Year	Import (000' bbls)			Export (000' 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	24,450
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	965	1,728	2,693	56,990
2018	984	395	1,379	62,020
2019	4,906	904	5,810	70,985
2020	4,671	400	5,071	67,458
2021	1,136	-	1,136	55,416
2022	226	-	226	52,237
2023	1,627	425	2,052	47,871

Source: NPA & Petroleum Commission

Figure 4.2 shows the trend in crude oil import and export from 2000 to 2023.

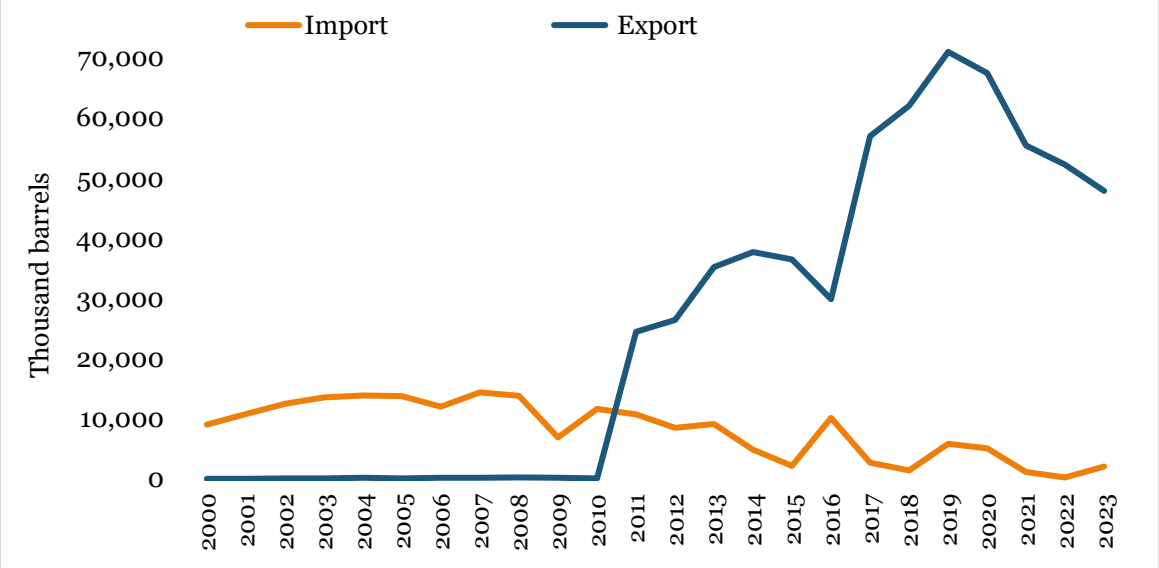
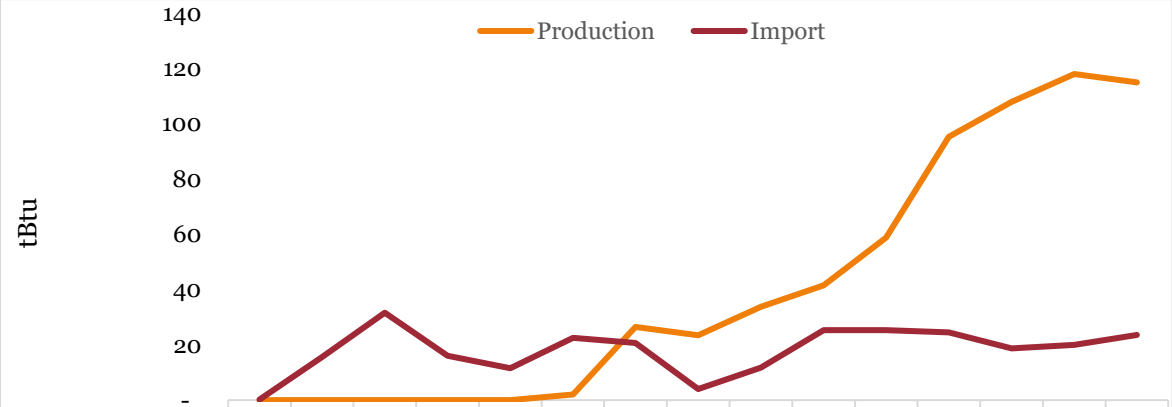


Figure 4.2: Trend in Crude Oil Import and Export

4.3 Natural Gas Production and Import

Ghana's gas production[6] has witnessed significant growth over the past few years, with production increasing from 2.0 tBtu in 2014 to 114.89 tBtu in 2023, representing an annual growth rate of 56.8% (Table 4.3). In 2023, the quantities of gas production declined by 2.5%. Additionally, to complement domestic production, the total gas imports[7] from Nigeria through the West African Gas Pipeline (WAGP), have experienced occasional fluctuations, but overall demonstrating a consistent upward trend, albeit at a slower rate (Figure 4.3).



	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Production	-	-	-	-	-	2	26	23	34	41	59	95	108	118	115
Import	0	16	32	16	12	23	21	4	12	25	25	24	19	20	24

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 six-fold, from 1,028 kt in 2000 to 264 kt in 2023. Nonetheless, there was a 68.2% increase in production volume in 2023 compared to the previous year. This increase was primarily driven by an increase in the production of Residual Fuel Oil (RFO) and Gasoil and Gasoline. In 2023, except for Liquefied Petroleum Gas (LPG), all other products recorded increases compared to 2022. LPG accounted for the majority share of the total production at 39%, while Gasoil, RFO and Gasoline comprised 28%, 25% and 9%, respectively. However, there was no production of kerosene, and Aviation Turbine Kerosene (ATK) reported in 2023.

[6] Include natural gas production from GNGC and non-associated gas
[7] 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
2023	103	23	-	-	73	65	264

Source: TOR, GNGC & NPA

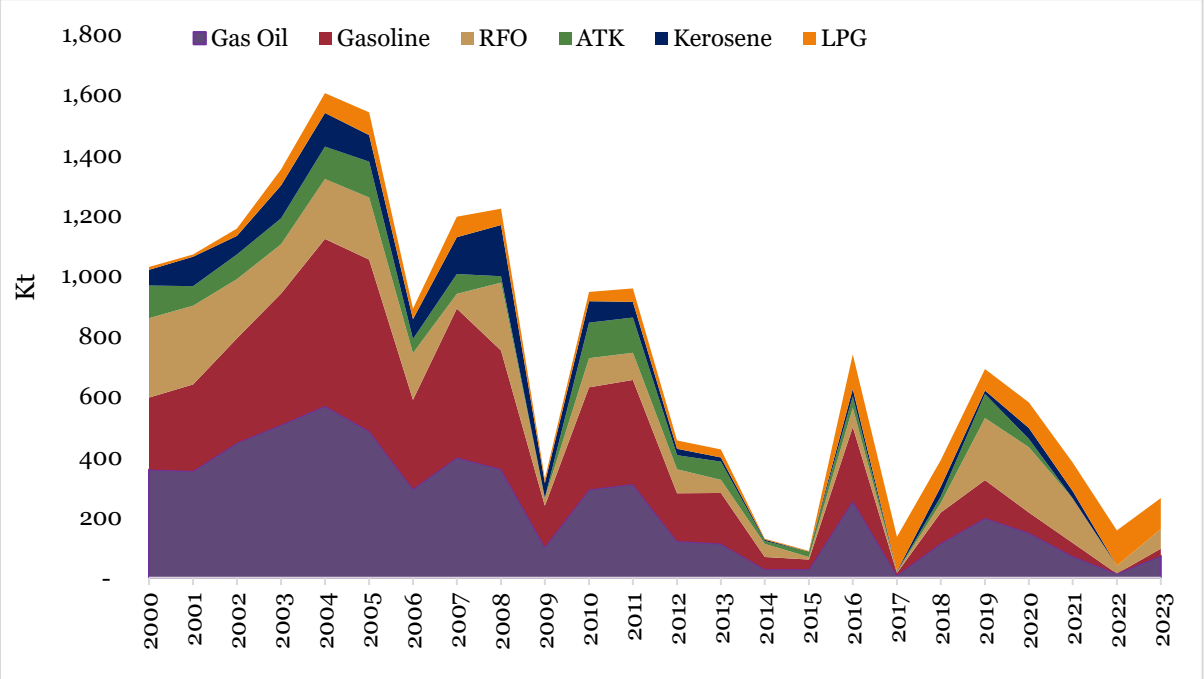


Figure 4.4: Trend in Production of Petroleum Products

4.5 Petroleum Products Import

The total petroleum product imports show a consistent growth trend in Ghana's total petroleum product imports, averaging a 7.9% annual increase from 2000 to 2023, as detailed in Table 4.3. LPG, gasoline, and gas oil all demonstrate an overall upward trajectory over this period. LPG imports have shown steady, albeit moderate, growth since 2000, with an average annual growth rate of 9.7%.

Conversely, kerosene imports have declined substantially since 2002, ceasing entirely after 2009, while ATK imports have remained relatively stable. Fuel oil imports witnessed significant fluctuations, experiencing spikes in 2015 and 2020 before tapering off from 2020 to 2023. In 2023, the total imported quantities of petroleum products reached 4,667 Kt, representing a 14.5% increase compared to the 4,075 Kt recorded in 2022.

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	1,947	-	63	4,033
2021	221	1,717	-	203	1,864	-	85	4,090
2022	221	1,564	-	209	2,055	-	26	4,075
2023	297	1,917	-	143	2,288	-	22	4,667

Source: National Petroleum Authority

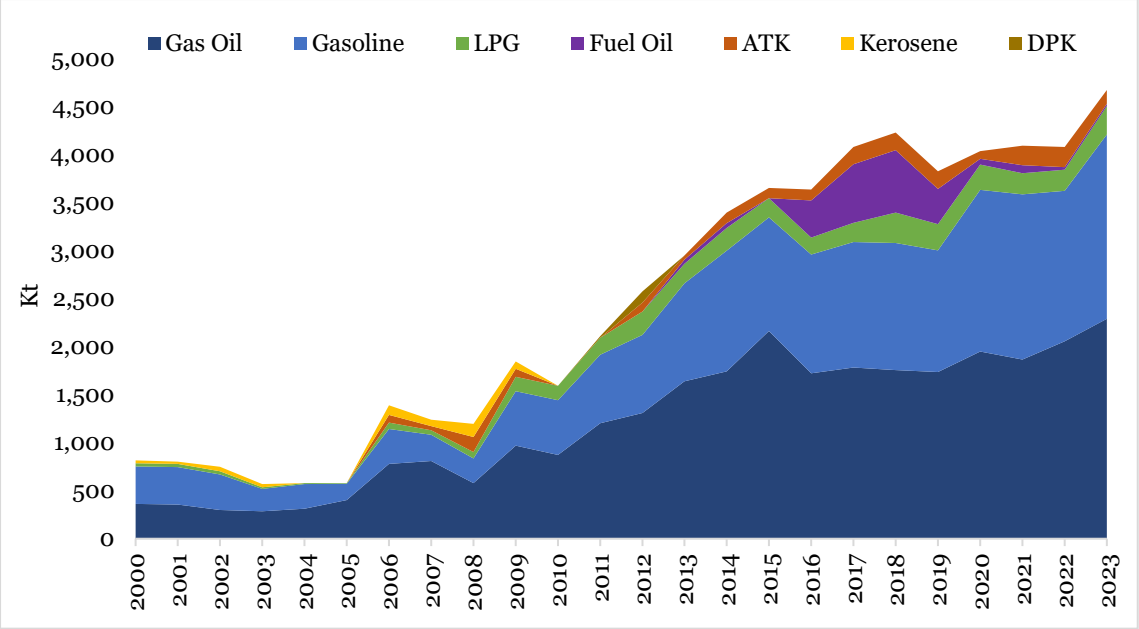


Figure 4.5: Trend in Petroleum Product Import

4.6 Petroleum Products Export

Table 4.6 presents the export data for petroleum products, depicting a decline at an average annual rate of 3.5%, from 440 Kt in 2000 to 192 Kt in 2023. Among these exports, ATK emerged as the predominant product, primarily destined for international aviation bunkering. Gasoil exports showed initial fluctuations, followed by an increase from 2006 to 2011, then sharply declining until 2015, and subsequently plateauing at lower levels. Similarly, gasoline exports exhibited fluctuations, including steady growth from 2000 to 2005 and a significant drop from 2012 to 2014, followed by a brief recovery from 2015 to 2017, and ultimately reaching zero exports in 2023.

In 2023, the total exported quantities of petroleum products reached 192 Kt, marking a 5.9% decrease compared to the 204 Kt recorded in 2022.

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
2023	2	7	-	183	-	192

[1]Includes sales to international marine bunkers
[2]Includes sales to international aviation bunkers
Source: NPA and JUHI Ghana

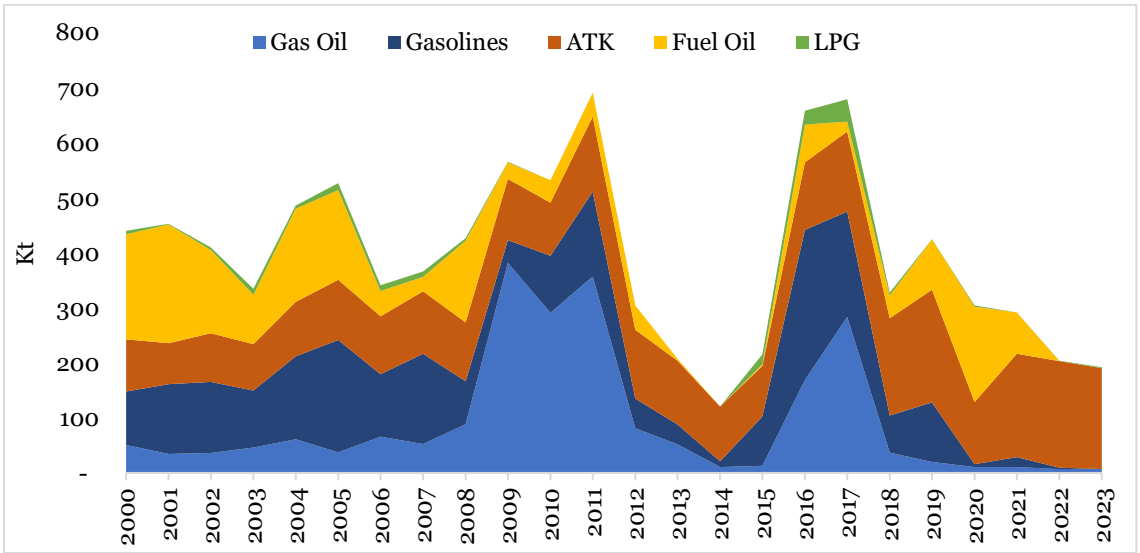


Figure 4.6: Trend in the Export of Petroleum Products

4.7 Final Consumption of Petroleum Products by Fuel

Petroleum products consumption by fuel and sector are presented in Tables 4.5 and 4.6, respectively. There has been a consistent increase in total petroleum consumption in Ghana from 1,445 Ktoe in 2000 to 4,651 Ktoe in 2023, indicating an average annual growth of 5.2%.

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	5.1	3,255
2017	299	1,198	21	1,527	10	49.0	3,104
2018	311	1,376	17	1,773	35	68.5	3,581
2019	324	1,470	22	1,859	40	78.3	3,793
2020	359	1,684	15	2,017	47	125.4	4,248
2021	373	1,880	18	2,130	77	162.6	4,640
2022	329	1,706	24	1,993	51	214.0	4,317
2023	343	1,813	18	2,152	77	247.5	4,651

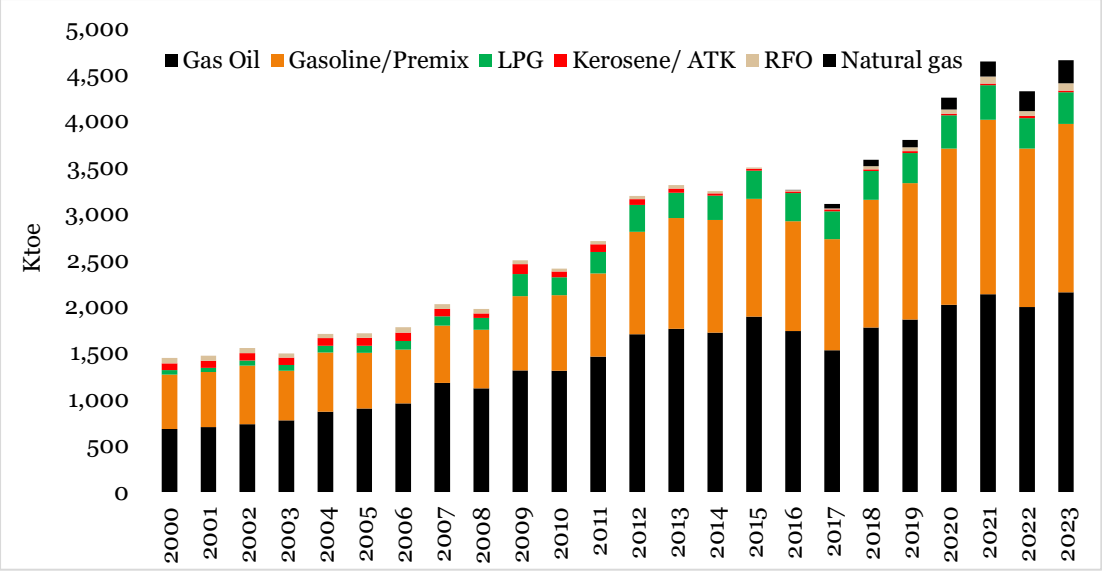


Figure 4.7: Final Energy Consumption of Petroleum Products by Fuel

4.8 Final Consumption of Petroleum Products by Sector

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 3,603 ktoe in 2023. This represents a threefold increase over the period. The industrial sector has also seen significant growth in petroleum consumption, increasing from 125 ktoe in 2000 to 768 ktoe in 2023.

In contrast, the residential sector's consumption of petroleum products has demonstrated a relatively stable trend over the years, with minor fluctuations observed. Similarly, while the service sector has experienced consistent growth, its pace has been slower compared to the residential and industrial sectors. Meanwhile, agricultural consumption has remained relatively stable. Overall, there is a discernible trend of increasing energy consumption across most sectors, particularly evident in the industrial and transportation sectors.

Table 4.8 presents the consumption of petroleum products by sector from 2000 to 2023.

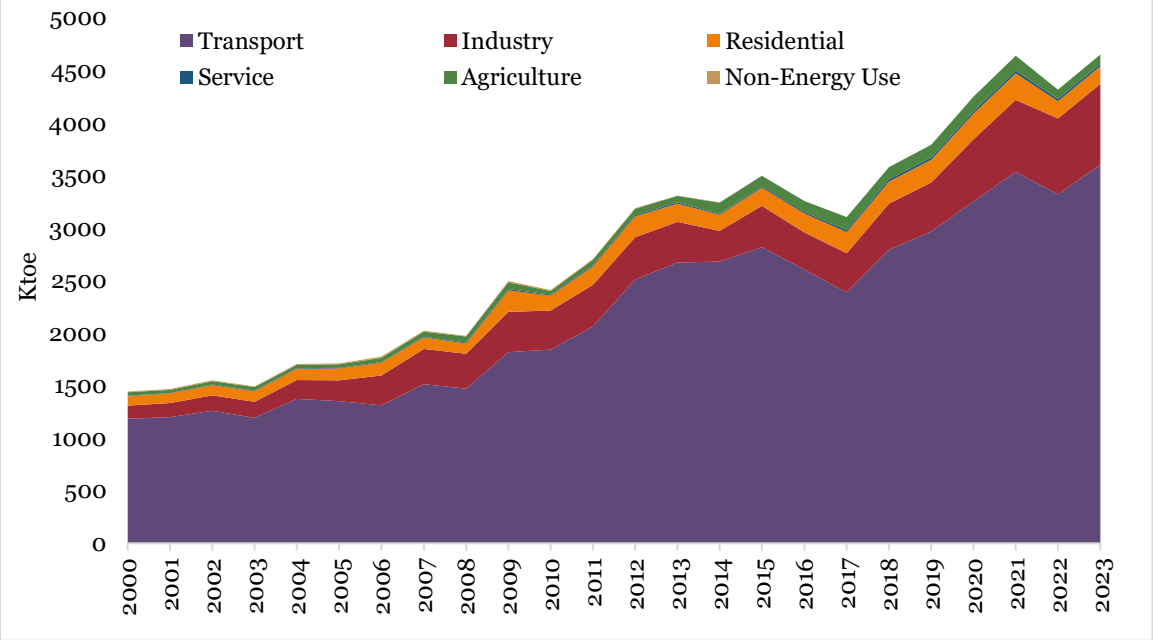


Figure 4.8: Final Energy Consumption of Petroleum Products by Sector

Table 4.6: Petroleum Product Consumption by Sector (Ktoe)

Year	Residential	Industry	Service	Agriculture	Transport	Non-Energy Use	Total
2000	88	125	5	33	1,186	7	1,445
2001	90	135	5	29	1,200	8	1,467
2002	100	146	6	29	1,261	9	1,550
2003	100	153	7	31	1,195	8	1,494
2004	106	179	5	30	1,375	9	1,705
2005	112	199	6	34	1,351	10	1,712
2006	121	284	7	40	1,314	10	1,775
2007	110	334	8	48	1,515	9	2,023
2008	99	332	7	59	1,472	5	1,973
2009	204	383	13	65	1,819	13	2,496
2010	144	372	8	35	1,842	7	2,408
2011	176	398	11	48	2,061	10	2,704
2012	198	401	12	62	2,510	5	3,189
2013	173	385	12	61	2,673	4	3,308
2014	153	292	11	106	2,679	1	3,243
2015	172	392	13	100	2,819	-	3,497
2016	179	352	14	104	2,606	-	3,255
2017	202	370	18	125	2,389	-	3,104
2018	210	440	19	118	2,793	-	3,581
2019	218	466	20	122	2,967	-	3,793
2020	243	592	23	137	3,252	-	4,248
2021	252	685	25	144	3,534	-	4,640
2022	165	720	21	89	3,322	-	4,317
2023	167	768	22	91	3,603	-	4,651

SECTION 5: BIOMASS

5.1 Woodfuel Production

The total wood supply stood at 3,944 Ktoe in 2023, which has increased from 3,891 Ktoe in 2000, representing an average annual growth rate of 0.1% (Table 5.1). Wood for charcoal production in Ghana rose until 2017, peaking at 2,433 Ktoe, then decreased to 1,952 Ktoe in 2021, with a 17% increase in 2022 but a 4% decrease in 2023. Conversely, wood for firewood declined from 2,742 Ktoe in 2000 to 1,386 Ktoe in 2010, gradually rising to 1,830 Ktoe in 2020, but experienced a 9.2% decrease in 2023 compared to 2022.

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	29	3,999
2023	2,378	1,537	29	3,944

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.

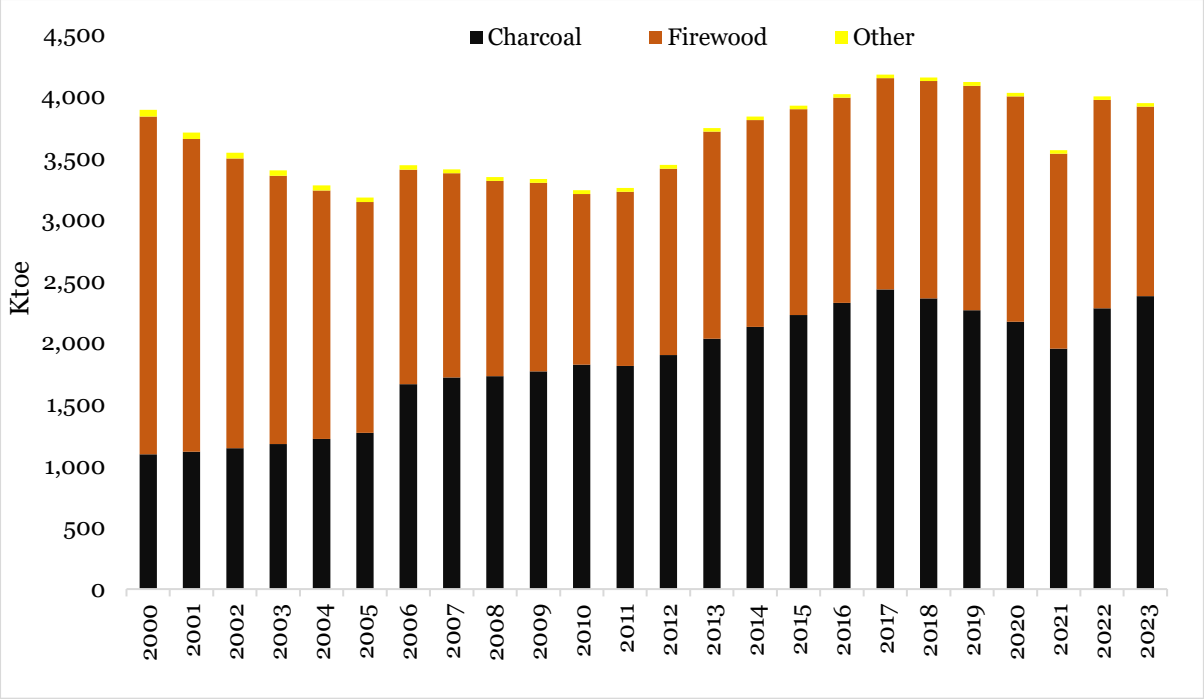


Figure 5.1: Trend in Biomass Production

5.2 Charcoal Import and Export

Ghana's imports and exports of charcoal from 2000-2023 are presented in Table 5.2. Charcoal imports increased annually by 26.4% from 0.003 ktoe (4.2 tonnes) in 2010 to 0.063 ktoe (80.2 tonnes) in 2021. Charcoal exports, on the other hand, decreased from 2.34 ktoe in 2000 to 0.7 ktoe in 2023.

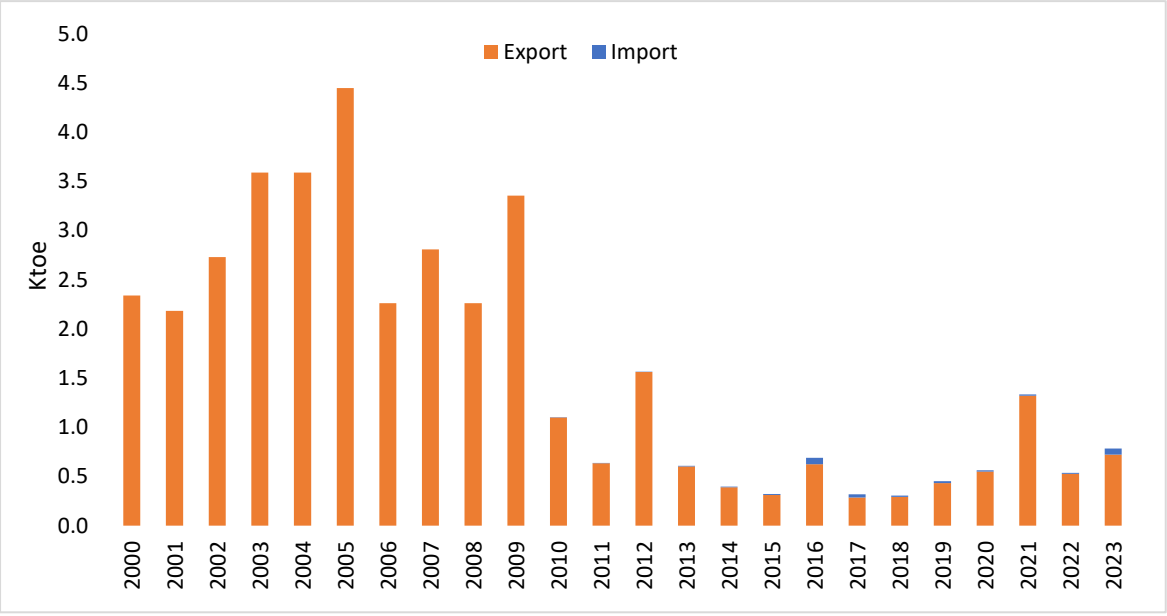


Figure 5.2: Trend in Charcoal Import and Export

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	0.01	0.5
2023	0.06	0.7

Source: Energy Commission

5.3 Woodfuel Consumption

The total consumption of woodfuel has declined, dropping from 3,432 ktoe in 2000 to 2,845 ktoe by 2023, with an average annual decline rate of 0.8%, driven by reductions in residential charcoal consumption (Table 5.3). While residential consumption decreased over the period, industrial consumption exhibits some variations but shows a downward trend since 2020. However, service sector consumption fluctuates, with a notable decrease in later years. Despite some variations, the total woodfuel consumption shows a downward trajectory over the period.

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
2023	2,466	103	277	2,845

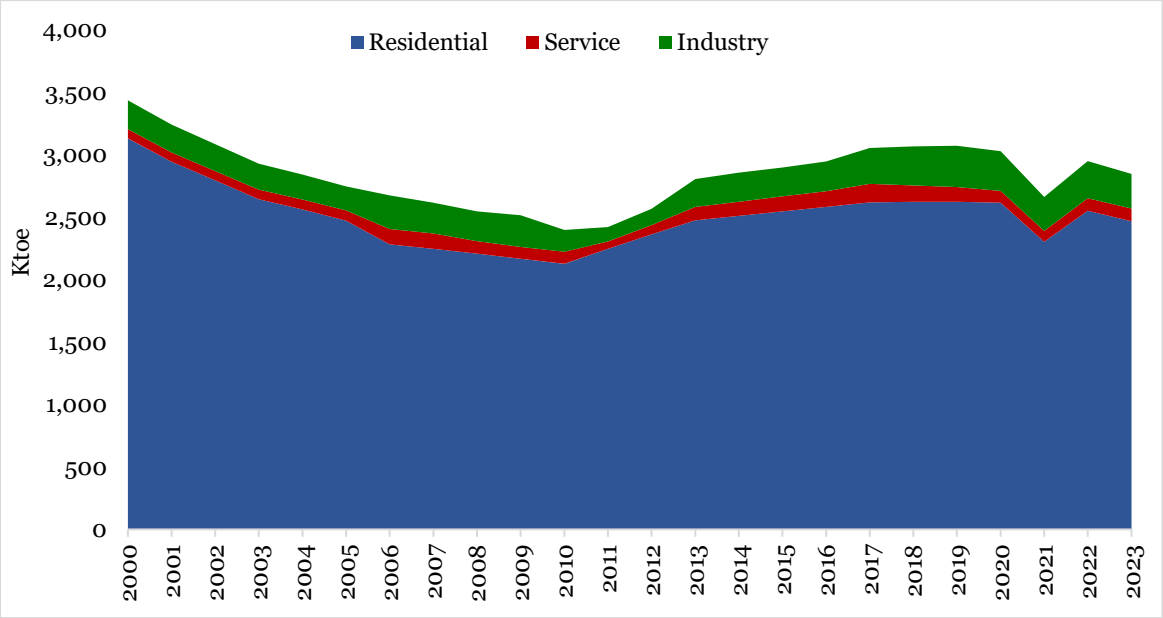


Figure 5.3: Trend in Biomass Consumption by Sector

SECTION 6: ENERGY BALANCES AND INDICATORS

6.1 Energy Balance

The country's energy balance for 2023 and 2022 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 energy-related and macroeconomic indicators.

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 relating to the SDGs. 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, 2023 (ktoe)

Supply and Consumption	Crude Oil	Natural Gas	Petroleum Products	Wood	Charcoal	Solar	Hydro	Electricity	Total
Production	6,818	2,895	-	3,944	-	13	790	-	14,460
Imports	433	593	4,836	-	0.06	-	-	6.8	5,869
Exports	-6,661	-	-7	-	-0.7	-	-	-217	-6,886
International Marine Bunkers	-	-	-4	-	-	-	-	-	-3.6
International Aviation Bunkers	-	-	-188	-	-	-	-	-	-188
Stock changes	-223	-	-173.0	-	-	-	-	-	-396
TES	**367**	**3,487**	**4,465**	**3,944**	**-0.7**	**13**	**790**	**-211**	**12,855**
Transfers	-105	-	112	-	-	-	-	-	7.3
Statistical differences	1.7	12	275	-	-	-	-	-	286
Transformation (Electricity plants)	-64.55	-3,228	-25	-	-	-13	-790	2,086	-2,034
Transformation (Oil refineries)	-199	-	165.8	-	-	-	-	-	-33.5
Other transformation	-	-	-	-2,378	1,280	-	-	-	-1,098
Energy industry own use	-	-	49	-	-	-	-	20	69
Losses	-	-	-	-	-	-	-	235	235
TFC	**-**	**247**	**4,394**	**1,566**	**1,279**	**-**	**-**	**1,621**	**9,107**
Residential	-	-	167	1,270	1,196	-	-	643	3,276
Industry	-	247	511	276	0.48	-	-	709	1,745
Commerce & Service	-	-	22	20	83	-	-	264	389
Agriculture & Fisheries	-	-	91	-	-	-	-	3.4	94
Transport	-	-	3,603	-	-	-	-	1.0	3,604
Non-Energy Use	-	-	-	-	-	-	-	-	-

*Table 6.2: Energy Balance, 2022 (ktoe)**

Supply and Consumption	Crude Oil	Natural Gas	Petroleum Products	Wood	Charcoal	Solar	Hydro	Electricity	Total
Production	7,325	2,970	-	3,999	-	14	704	-	15,013
Imports	32	502	4,217	-	0.01	-	-	3.2	4,754
Exports	-7,269	-	-13	-	-0.5	-	-	-190	-7,473
International Marine Bunkers	-	-	-2.4	-	-	-	-	-	-2.4
International Aviation Bunkers	-	-	-194	-	-	-	-	-	-194
Stock changes	66.9	-	-9.7	-	-	-	-	-	57.3
TES	**154**	**3,472**	**3,998**	**3,999**	**-1**	**14**	**704**	**-187**	**12,154**
Transfers	-123	-	132	-	-	-	-	-	8.6
Statistical differences	33	32	64	-	-	-	-	-	62
Transformation (Electricity plants)	-21.89	-3,226	48	-	-	-14	-704	1,992	-1,926
Transformation (Oil refineries)	-43.0	-	39.9	-	-	-	-	-	-3.1
Other transformation	-	-	-	-2,279	1,226	-	-	-	-1,053
Energy industry own use	-	-	50	-	-	-	-	13	63
Losses	-	-	-	-	-	-	-	230	230
TFC	**-**	**214**	**4,103**	**1,721**	**1,226**	**-**	**-**	**1,562**	**8,826**
Residential	-	-	165	1,400	1,148	-	-	611	3,324
Industry	-	214	506	297	0.34	-	-	694	1,711
Commerce & Service	-	-	21	23	77	-	-	254	376
Agriculture & Fisheries	-	-	89	-	-	-	-	2.8	92
Transport	-	-	3,322	-	-	-	-	0.9	3,322
Non-Energy Use	-	-	-	-	-	-	-	-	-

*** Revised**

Table 6.3: Energy Indicators

Indicator	Unit	2000	2010	2015	2016	2017	2018	2019	2020	2021	2022	2023
Population	million	18.9	24.7	27.7	28.3	29.0	29.6	30.3	30.8	30.8	31.4	32.3
GDP (current US$)[1]	million US$	4,983	32,197	48,595	56,010	60,327	67,299	68,338	70,029	79,524	74,266	76,374
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	192,674
Total Energy Supply	ktoe	6,146	6,988	9,663	9,694	9,801	10,949	11,296	12,030	11,822	12,342	13,218
Total Final Energy Consumed	ktoe	5,468	5,471	7,222	7,193	7,214	7,809	8,114	8,644	8,802	8,826	9,107
Total Electricity Generated	GWh	7,224	10,166	11,490	13,023	14,068	16,246	18,197	20,165	22,060	23,172	24,264
Total Electricity Consumed	GWh	6,869	7,760	9,640	11,548	12,304	13,558	14,562	15,936	17,465	18,172	18,849
Total Petroleum Products Consumed	ktoe	1,445	2,408	3,497	3,255	3,104	3,581	3,793	4,248	4,640	4,317	4,641
Total Biomass Consumed	ktoe	3,432	2,395	2,896	2,945	3,053	3,063	3,069	3,026	2,660	2,946	2,845
Energy Intensity (TES/GDP current million US$)	toe/million US$	1,233.5	217.0	198.8	173.1	162.5	162.7	165.3	171.8	148.7	166.2	173.1
Energy Intensity in PPP (TES/ GDP in PPP)	toe/million $	113.6	73.7	72.5	70.4	65.8	69.2	67.0	71.0	66.2	67.0	68.6
Energy Intensity in PPP (FEC/ GDP in PPP)	toe/million $	101.0	57.7	54.2	52.2	48.4	49.4	48.1	51.0	49.32	47.91	47.27
Total Primary Energy Supply/capita	toe/capita	0.33	0.28	0.35	0.34	0.34	0.37	0.37	0.39	0.38	0.39	0.41
Energy use per capita (TFC/persons)	toe/capita	0.29	0.22	0.26	0.25	0.25	0.26	0.27	0.28	0.29	0.28	0.28
Total Electricity Generated/capita	kWh/capita	382.0	412.3	415	460	486	549	601	654	715	739	752
Total Electricity Consumed/capita	kWh/capita	363.2	314.7	348	408	425	458	481	517	566	580	584
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	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	0.09
Total Electricity Consumed/GDP	kWh/US$ 1,000 of GDP	1,378.5	241.0	198.4	206.2	204.0	201.5	213.1	227.6	219.6	244.7	246.8
Total Energy Supply/GDP	toe/US$ 1,000 of GDP	1,233.5	217.0	198.8	173.1	162.5	162.7	165.3	171.8	148.7	166.2	173.1
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	58.3	58.1	60.8
Grid Emission Factor (wind/solar projects) *	tCO2/MWh	-	0.38	0.30	0.56	0.55	0.41	0.38	0.33	0.37	0.33	0.32
Grid Emission Factor (all other projects) *	tCO2/MWh	-	0.53	0.33	0.54	0.55	0.49	0.44	0.38	0.43	0.37	0.37

NB: * The figures have been revised. Grid emission factor is the amount of CO_2 emitted per unit of electricity generated and supplied into the national electricity grid. In simple terms, its measures the carbon intensity of the national electricity grid. Project activities displacing electricity from the grid can use this emission factor to estimate the CO_2 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	2023
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	88.85
			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	76.2
		Households with access to electricity	National	%	64.2	75.7	78.5	81.4	81.6	82.5	82.8	86.3	86.8	87.5
			Urban	%	83.8	90.7	91.4	92	92.2	92.6	93	95.2	95.8	96.6
			Rural	%	39.5	56.6	61.5	66.9	68.1	70.4	71.5	72.6	73.6	74.5
	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	0.4	0.4	0.5
			Urban	%	0.76	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.5	0.6
			Rural	%	0.27	0.1	0.1	0.2	0.2	0.3	0.3	0.2	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	44.1
			Urban	%	28.9	35.3	35.1	34.8	34.6	34.3	34.1	51.3	56.1	60.3
			Rural	%	4.8	6.8	7.7	8.7	9.9	11.3	12.8	14.8	16.5	18.7
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]	%	52.2	45.9	46.9	48.2	44.8	44.0	40.8	36.1	39.8	38.1
			National[2]	%	8.4	5.8	5.9	5.9	5.6	6.2	5.8	5.9	6.4	6.8
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 $)		National	TOE/ million US$	73.7	72.5	70.4	65.8	69.2	67.0	71.0	66.2	67.0	68.6
	Energy intensity measured in terms of final energy consumption and GDP, PPP (constant 2017 international $)		National	TOE/ million US$	57.7	54.2	52.2	48.4	49.4	48.1	51.0	49.3	47.9	47.3

[1]Includes woodfuel
[2]Excludes 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. As of August, 2023, the yearly average crude oil price was US$80.71/bbls. Table 7.1 shows the monthly average crude oil price from 2001 to 2023.

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
2023	83.94	83.92	79.65	82.74	75.68	74.98	80.16	84.63					80.71

Source: Bank of Ghana

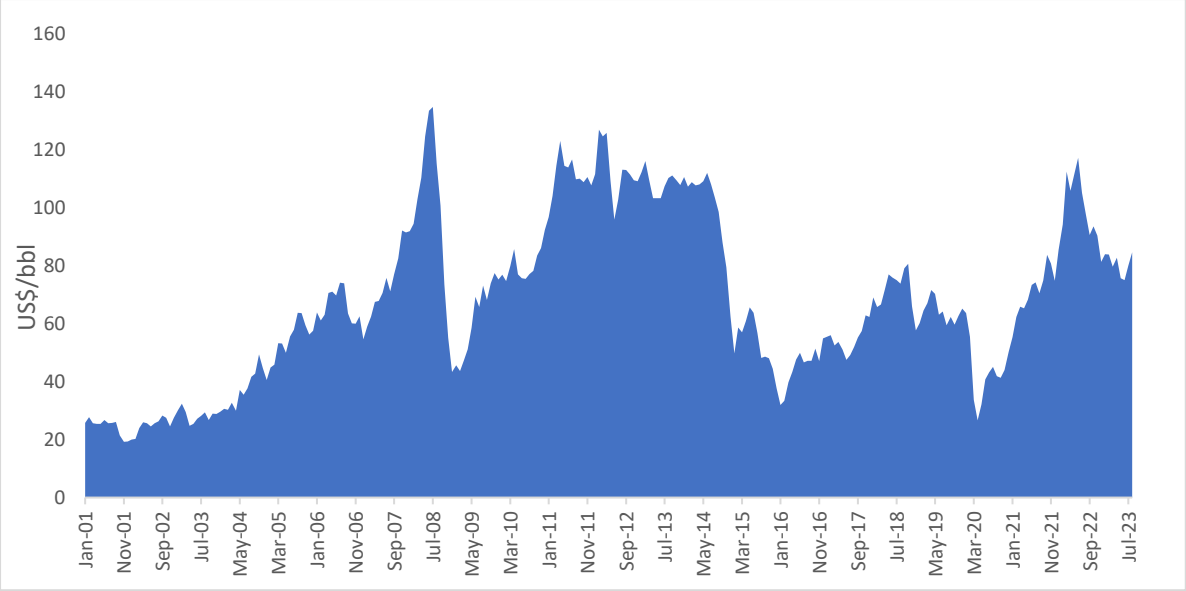


Figure 7.1: Trend in Average Crude Oil Prices

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.

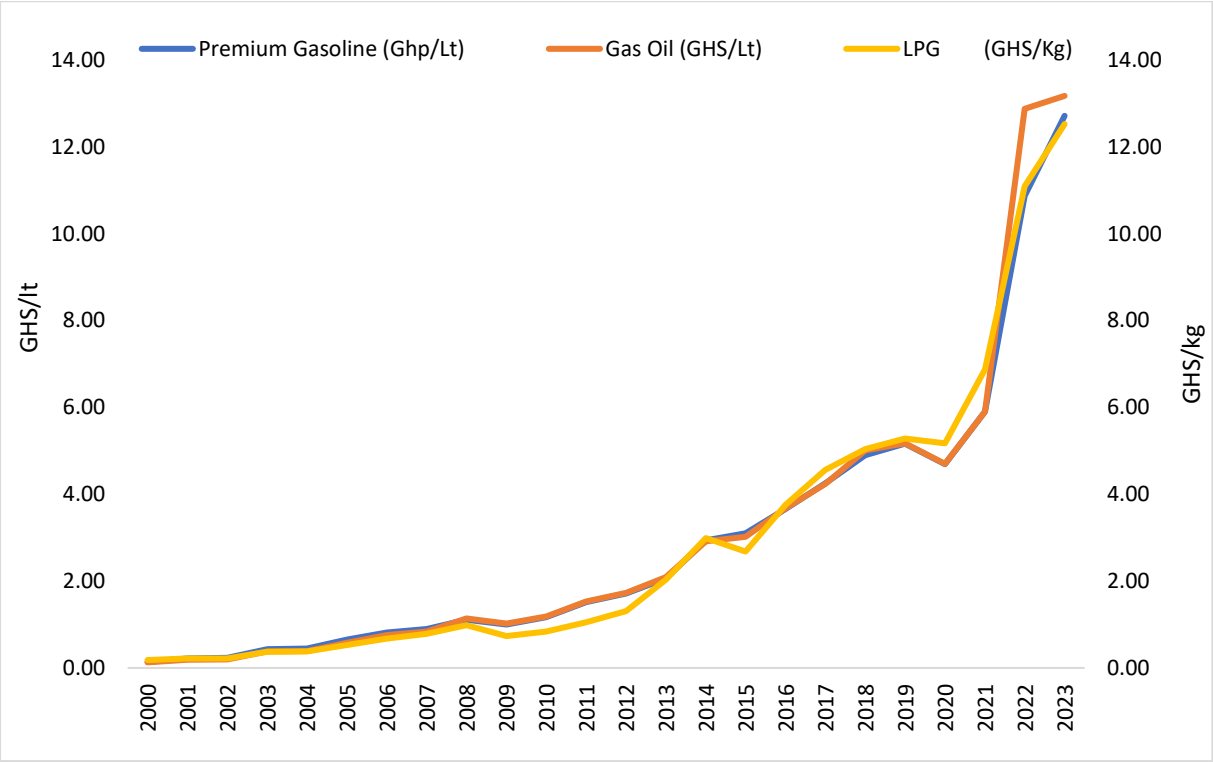


Figure 7.2: Trend in petroleum products prices

Table 7.2: Average Ex-pump Prices for Petroleum Products

Year	Premium Gasoline (GHS/Lt)	Gas Oil (GHS/Lt)	Kerosene (GHS/Lt)	LPG (GHS/Kg)
2000	0.14	0.13	0.13	0.18
2001	0.22	0.19	0.19	0.22
2002	0.23	0.20	0.20	0.22
2003	0.44	0.38	0.38	0.37
2004	0.44	0.39	0.39	0.38
2005	0.65	0.58	0.50	0.52
2006	0.81	0.76	0.62	0.67
2007	0.90	0.84	0.74	0.78
2008	1.11	1.14	1.07	0.98
2009	1.00	1.02	0.79	0.73
2010	1.17	1.18	0.91	0.84
2011	1.52	1.53	0.91	1.05
2012	1.71	1.73	0.91	1.31
2013	2.06	2.09	1.27	2.03
2014	2.94	2.91	2.85	2.99
2015	3.10	3.02	2.97	2.68
2016	3.66	3.67	2.83	3.76
2017	4.25	4.23	3.47	4.56
2018	4.90	5.01	4.33	5.04
2019	5.17	5.17	4.71	5.28
2020	4.69	4.70	4.25	5.17
2021	5.90	5.90	5.61	6.88
2022	10.87	12.87	11.96	11.09
2023	12.71	13.17	15.26	12.52

Source: NPA

7.3 Average Electricity Price

The average electricity price of consumers in the regulated market consists of the following three categories: residential, non-residential and Special Load Tariff (SLT). The average electricity price increased at an annual average growth rate of 20%, from 2000 to 2023 (Table 7.3). Comparing 2022 to 2023, there was an increase of 71% in the average electricity price (GH₵/kWh). Additionally, the average electricity price by customer-type is presented in Table 7.4.

Table 7.3: Average Electricity Price

Year	GH₵/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	0.71	0.15
2019	0.70	0.13
2020	0.74	0.13
2021	0.75	0.13
2022	0.79	0.10
2023	1.35	0.12

Table 7.4: Average Electricity Price by Customer Class

Year	Ghc/kWh			US$/kWh		
	Residential	Non-Residential	SLT	Residential	Non-Residential	SLT
2018	0.62	0.89	0.78	0.13	0.19	0.17
2019	0.58	1.03	0.70	0.11	0.20	0.14
2020	0.62	1.16	0.76	0.11	0.21	0.14
2021	0.61	1.13	0.78	0.11	0.20	0.13
2022	0.69	1.05	0.83	0.08	0.13	0.10
2023	1.23	1.74	1.32	0.11	0.16	0.12

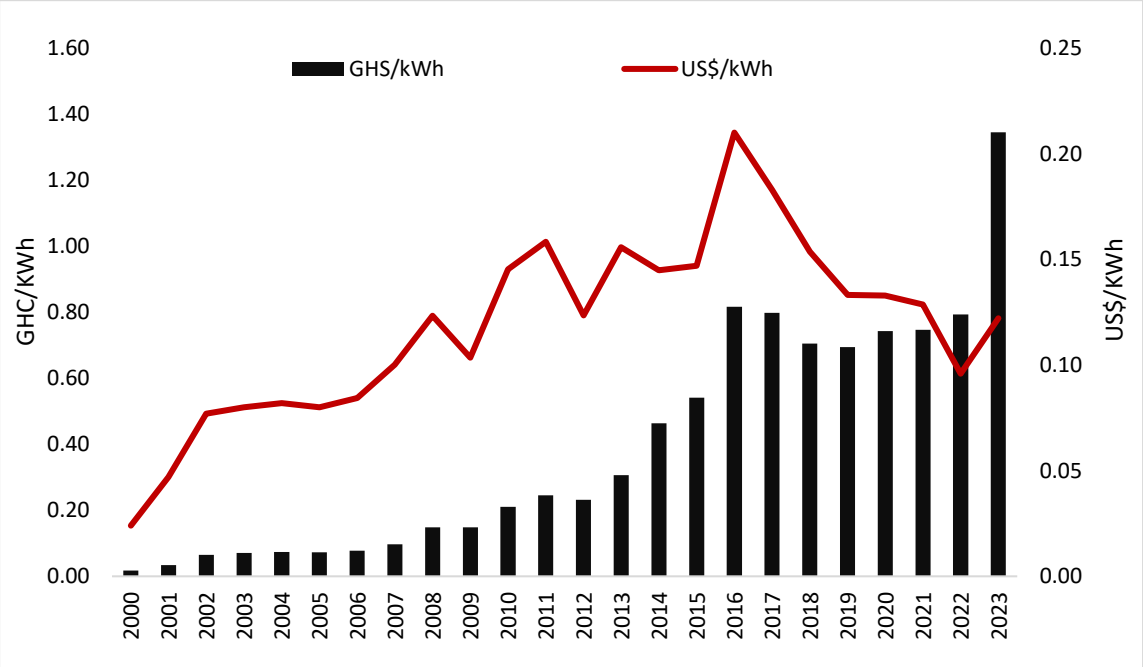


Figure 7.3: Trend in Average Electricity Price

Table 7.5: Electricity Tariff by Customer Class

Tariff Category	Effective Date													
	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	Dec, 2023
Residential														
0-30 (Exclusive)	-	-	-	-	-	-	-	-	-	-	-	-	42	63
0 - 50 (Exclusive)	16	17	19	21	21	21	34	28	31	33	33	33	-	-
31 - 300 (GHp/kWh)	-	-	-	-	-	-	-	-	-	-	-	-	89	140.6
51 - 300 (GHp/kWh)	31	35	39	41	42	42	67	56	62	65	65	65		
301 - 600 (GHp/kWh)	41	45	50	54	55	55	87	72	80	85	85	85	116	182.4
600+ (GHp/kWh)	45	50	56	59	61	61	97	80	89	94	94	94	128	202.7
Service Charge for Lifeline Consumers (GHp/month)	296	325	364	388	398	398	633	213	213	213	213	213	213	-
Service Charge for Other Residential Consumers (GHp/month)	296	325	364	388	398	398	633	633	704	746	746	746	1073	1073
Non-Residential														
0 -300 (GHp/kWh)	45	50	56	59	61	61	97	68	75	80	80	80	84	126.9
301 - 600 (GHp/kWh)	48	53	59	63	65	65	102	72	80	85	85	85	89	135.1
600+ (GHp/kWh)	76	83	93	100	102	102	163	114	126	134	134	134	133	201.6
Service Charge (GHp/month)	493	541	606	646	663	663	1,055	1,055	1,173	1,243	1,243	1,243	1,243	1,243
SLT - Low Voltage														
Maximum Demand (GHp/kVA/month)	2,760	3,029	3,395	3,617	3,712	3,712	5,910	5,910	-	6,960	6,960	6,960	6,960	6,960
Energy Charge (GHp/kWh)	47	52	58	62	63	63	101	76	99	89	89	105	133	200.9
Service Charge (GHp/month)	1,972	2,164	2,425	2,584	2,651	2,651	4,221	4,221	4,693	4,971	4,971	4,971	50,000	50,000
SLT - Medium Voltage														
Maximum Demand (GHp/kVA/month)	2,366	2,596	2,910	3,100	3,182	3,182	5,065	5,065	-	5,966	5,966	5,966	5,966	-
Energy Charge (GHp/kWh)	37	40	45	48	49	49	78	59	75	69	69	80	100	152.5
Service Charge (GHp/month)	2,760	3,029	3,395	3,617	3,712	3,712	5,910	5,910	6,570	6,960	6,960	6,960	50,000	50,000
SLT - High Voltage														
Maximum Demand (GHp/kVA/month)	2,366	2,596	2,910	3,100	3,182	3,182	5,065	5,065	-	5,966	5,966	5,966	5,966	-
Energy Charge (GHp/kWh)	34	37	41	44	45	45	72	54	79	63	63	83	75	160.1
Service Charge (GHp/month)	2,760	3,029	3,395	3,617	3,712	3,712	5,910	5,910	6,570	6,960	6,960	6,960	50,000	50,000
SLT-High Voltage - Mines														
Capacity Charge (GHp/KVA/Month)	2,760	3,029	3,395	3,617	3,712	3,712	5,910	5,910	-	6,960	6,960	6,960	6,960	-
Energy Charge (GHp/kWh)	53	58	66	70	72	72	114	103	249	121	121	264	264	399.9
Service Charge (GHp/Month)	2,760	3,029	3,395	3,617	3,712	3,712	5,910	5,910	6,570	6,960	6,960	6,960	50,000	50,000

Source: PURC


ENERGY COMMISSION