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| Securing Ghana's Future Energy Today

FOREWORD

The 2021 National Energy Statistics provides a time series data on Ghana's energy supply and use situation largely from 2000 to 2020. It contains data on energy production, import, export, and consumption. Information on the country's progress towards achieving the Sustainable Development Goals (SDG 7) has been added to this publication

This publication was prepared with data from the main 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). The cooperation and assistance of all these agencies and entities are gratefully acknowledged.

We expect that the statistics contained in this publication would be useful to a wide range of users including planners, policymakers, researchers, and students.

We are very much appreciative of the feedback received from users. These have been used to update and improve the information provided in this year's publication. The 2021 National Energy Statistics, therefore, override those of previous years.

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

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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 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				
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	6.29	Barrels
Natural Gas	1	GJ	1.05	MMBtu
	1.05	MMBtu	1.07	MSCF
	1	MMBtu	27.10	cubic metre (m3)
	1	MMBtu	5.82	bbl. of crude oil equivalent
	1000	m^3	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

Low side reflecting average dry wood and corresponding Charcoal in the forest zones and the high side reflecting 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

Average	It is a measure of central tendency. It could be mean, median or mode depending upon the distribution of the data. For a normal distribution set, the mean, median and mode are the same.
Electricity Plants	It refers to powerplants designed to produce only electricity.
Final Energy Consumption	It refers to all fuel and energy delivered to final users for their energy use
Import and export	It comprises of quantities of fuels entering or leaving the national territorial
International Aviation Bunkers	It covers quantities of fuels delivered to airplanes of any nationality for consumption during international flights
International Marine Bunkers	It covers quantities of fuels delivered to ships of any nationality for consumption during international voyages
Own Use	It is the primary and secondary energy consumed by transformation industries for heating, pumping, lighting and other purposes
Production	It covers the capture, extraction or manufacture of fuels or energy in forms that are ready for general use
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
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 for 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

SECTION 1: ELECTRICITY ACCESS MAP OF GHANA

Figure 1.1: Population with access to electricity by region

2020 National population electricity access rate: 85.33%

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

SECTION 2: ENERGY SUPPLY AND FINAL CONSUMPTION

2.1 Total Energy Supply

The total energy supply is the sum of imported energy and energy extracted from natural resources (energy production), less exports and international bunkers after adjusting for stock changes. The total energy supply in the country reached about 12,038 ktoe in 2020 representing a compound annual growth rate (CAGR) of 3.3% from 2000 to 2020. In comparison, the total energy supply in 2000 was about 6,255 ktoe (Table 2.1).

Biomass constituted the largest share of the country's total energy supply from 2000 to 2011, though oil has become the dominant fuel and an integral part of the Ghanaian economy in the last eight (8) years as illustrated in Fig 2.1. Biomass accounted for approximately 36% of the total energy supply in 2020, followed by oil and natural gas with shares of 34% and 25%, respectively.

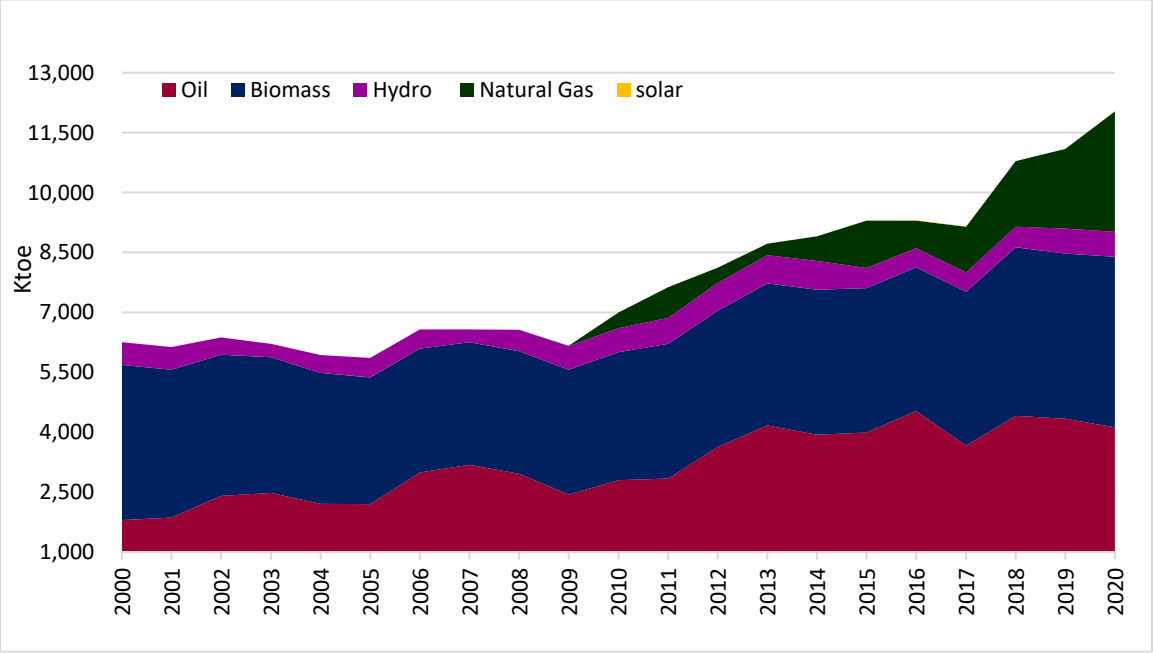

Figure 2.1: Total Energy Supply

Table 2.1: Total Energy Supply (ktoe)

Year	Oil		Natural Gas		Hydro		Solar		Biomass		Total
	ktoe	%	ktoe	%	ktoe	%	ktoe	%	ktoe	%	ktoe
2000	1,799	29	-	-	568	9	-	-	3,888	62	6,255
2001	1,861	30	-	-	568	9	-	-	3,703	60	6,132
2002	2,403	38	-	-	433	7	-	-	3,539	56	6,375
2003	2,481	40	-	-	334	5	-	-	3,395	55	6,210
2004	2,206	37	-	-	454	8	-	-	3,273	55	5,933
2005	2,200	38	-	-	484	8	-	-	3,174	54	5,858
2006	2,994	46	-	-	483	7	-	-	3,100	47	6,577
2007	3,185	48	-	-	321	5	-	-	3,068	47	6,574
2008	2,959	45	-	-	533	8	-	-	3,070	47	6,562
2009	2,440	40	5	0	591	10	-	-	3,127	51	6,163
2010	2,798	40	394	6	602	9	-	-	3,207	46	7,001
2011	2,843	37	769	10	650	9	-	-	3,371	44	7,633
2012	3,629	45	389	5	694	9	-	-	3,409	42	8,121
2013	4,169	48	292	3	708	8	-	-	3,554	41	8,723
2014	3,938	44	619	7	721	8	-	-	3,629	41	8,907
2015	3,991	43	1,185	13	503	5	-	-	3,618	39	9,296
2016	4,529	49	692	7	478	5	2	0	3,601	39	9,302
2017	3,661	40	1,146	13	483	5	2	0	3,858	42	9,150
2018	4,408	41	1,641	15	517	5	3	0	4,222	39	10,791
2019	4,341	39	1,993	18	624	6	4	0	4,132	37	11,094
2020	4,118	34	3,014	25	627	5	4.89	0	4,274	36	12,038

2.2 Total Final Consumption by Fuel

This section covers all fuels and energy delivered to users for both their energy and non-energy uses, excluding transformation processes. The country's total final consumption (TFC) in 2020 was 8,591 ktoe, up by compound annual growth rate (CAGR) of 2.3% from its 2000 level of 5,478 Ktoe (Table 2.2). As illustrated in Fig 3.2, final electricity and petroleum consumption increased by compound annual growth rate (CAGR) of 4.5% and 5.5%, respectively, whilst biomass consumption declined by 0.7% during the period under review (2000-2020).

Comparing 2020 to 2019, the final energy consumption increased by 603 Ktoe, representing an annual increase of 7.5%.

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

Year	Electricity[1]		Petroleum[2]		Biomass		Total
	Ktoe	%	Ktoe	%	Ktoe	%	Ktoe
2000	592	*11*	1,453	*27*	3,432	*63*	5,478
2001	613	*12*	1,476	*28*	3,238	*61*	5,327
2002	582	*11*	1,550	*30*	3,082	*59*	5,214
2003	446	*9*	1,501	*31*	2,925	*60*	4,872
2004	456	*9*	1,707	*34*	2,839	*57*	5,001
2005	510	*10*	1,716	*35*	2,745	*55*	4,971
2006	621	*12*	1,891	*36*	2,671	*52*	5,183
2007	539	*10*	2,149	*41*	2,594	*49*	5,282
2008	621	*12*	2,103	*40*	2,518	*48*	5,242
2009	641	*11*	2,626	*46*	2,493	*43*	5,761
2010	715	*13*	2,493	*44*	2,464	*43*	5,672
2011	790	*13*	2,840	*46*	2,576	*42*	6,206
2012	796	*12*	3,268	*49*	2,589	*39*	6,653
2013	910	*13*	3,320	*48*	2,676	*39*	6,906
2014	920	*13*	3,288	*47*	2,792	*40*	6,999
2015	914	*13*	3,555	*49*	2,785	*38*	7,254
2016	1,077	*15*	3,282	*46*	2,783	*39*	7,143
2017	1,121	*16*	3,162	*44*	2,925	*41*	7,209
2018	1,238	*16*	3,593	*46*	2,960	*38*	7,792
2019	1,310	*16*	3,849	*48*	2,892	*36*	8,051
2020	1,422	*17*	4,193	*49*	2,977	*35*	8,591

[1]Includes commercial losses
[2]Petroleum consumption from 2016 onwards includes natural gas used in industry

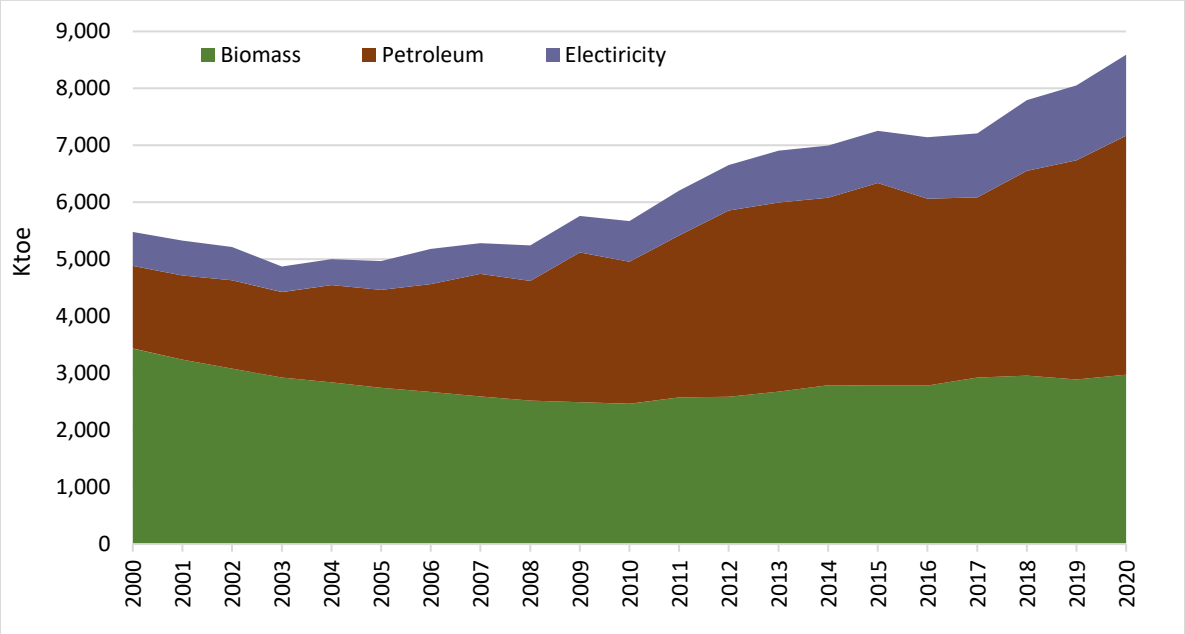

Figure 2.2: Trend in Final Energy Consumption by Fuel

2.3 Total Final Consumption by Sector

Energy consumption by the various sectors of the economy (industry, residential, etc.), increased over the period (Table 2.3). The residential sector is, by far, the largest final consumer of energy, consuming about 3,477 ktoe in 2020, representing 40.5% of total final energy consumption in 2020. The transport sector closely follows the residential sector as the most energy-consuming sector, accounting for about 38.3% of total final energy consumption in 2020, compared to 21% in 2000. The share of industry, service and agriculture sectors increased to 14.2%, 5.0%, and 1.8% of final energy consumption in 2020 respectively, compared to 13.5%, 2.2%, and 1.3% in 2000 respectively.

Table 2.3: Final Energy Consumption by Sectors (ktoe)

Year	Residential	Industry	Service	Agriculture	Transport	Non-Energy Use	Total
2000	3,390	741	121	71	1,149	7	5,478
2001	3,218	749	123	65	1,164	8	5,327
2002	3,085	708	127	64	1,221	9	5,214
2003	2,945	559	132	66	1,162	8	4,872
2004	2,883	569	135	66	1,338	9	5,001
2005	2,814	613	145	69	1,320	10	4,971
2006	2,751	820	137	71	1,393	10	5,183
2007	2,656	800	130	84	1,604	9	5,282
2008	2,605	839	135	90	1,567	5	5,242
2009	2,713	857	165	99	1,914	13	5,761
2010	2,653	811	253	71	1,877	7	5,672
2011	2,790	928	268	89	2,121	10	6,206
2012	2,809	906	286	110	2,536	5	6,653
2013	2,900	952	330	109	2,611	4	6,906
2014	2,962	942	355	106	2,633	1	6,999
2015	3,057	973	252	101	2,871	1	7,254
2016	3,066	974	368	105	2,630	1	7,143
2017	3,231	1,023	377	126	2,437	12	7,206
2018	3,390	1,112	360	119	2,797	13	7,792
2019	3,341	1,158	401	123	3,014	14	8,051
2020	3,477	1,220	433	153	3,293	15	8,591

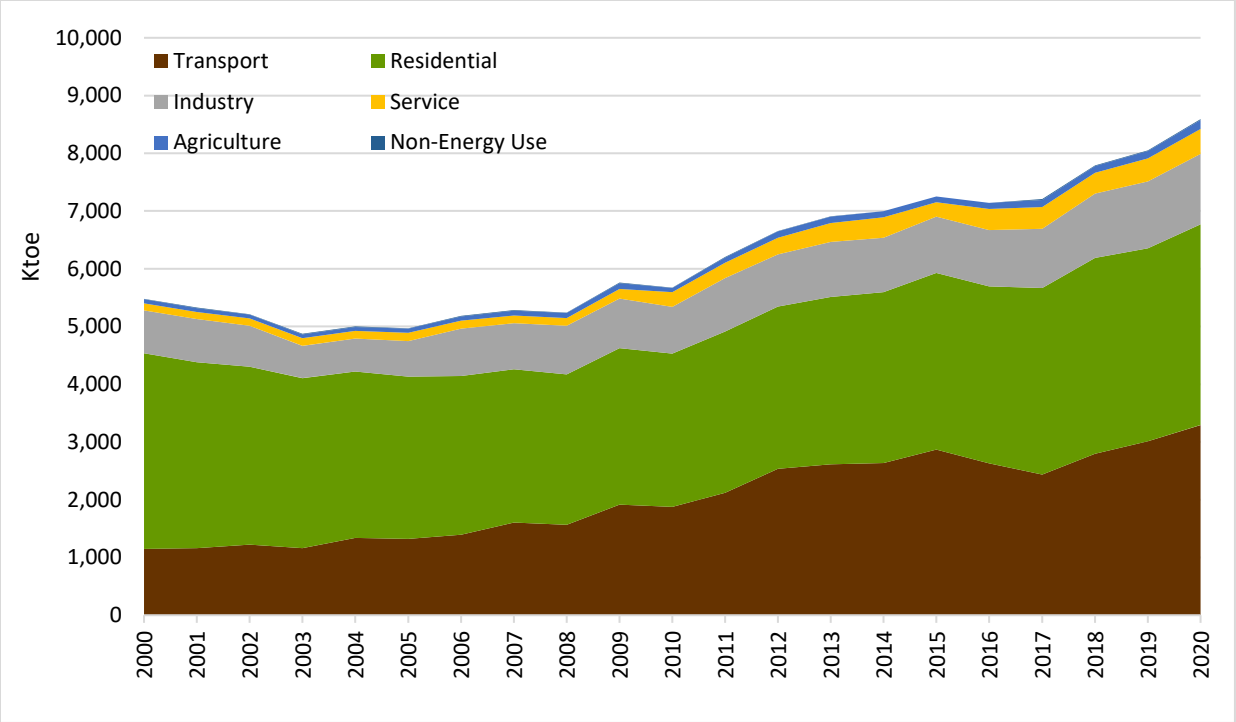

Figure 2.3: Final Energy Consumed by Sectors

SECTION 3: ELECTRICITY

3.1 Installed Electricity Generation Capacity

The total installed electricity generation capacity, including distributed generation, increased from 2,165 MW in 2010 to 5,288 MW in 2020, representing an annual average growth of 9.3%. The long-term dependable capacity increased at a compound annual growth rate (CAGR) of approximately 9.6% from 1,940 MW in 2010 to 4,842 MW in 2020 (Table 3.1).

Installed thermal generation capacity in 2000 was 580 MW. It increased to 985 MW as at the end of 2010, increasing further to 3,649 MW as at the end of 2020, at a compound annual growth rate of 14%. The trend on the growth of the installed electricity generation capacity is presented in Figure 3.1.

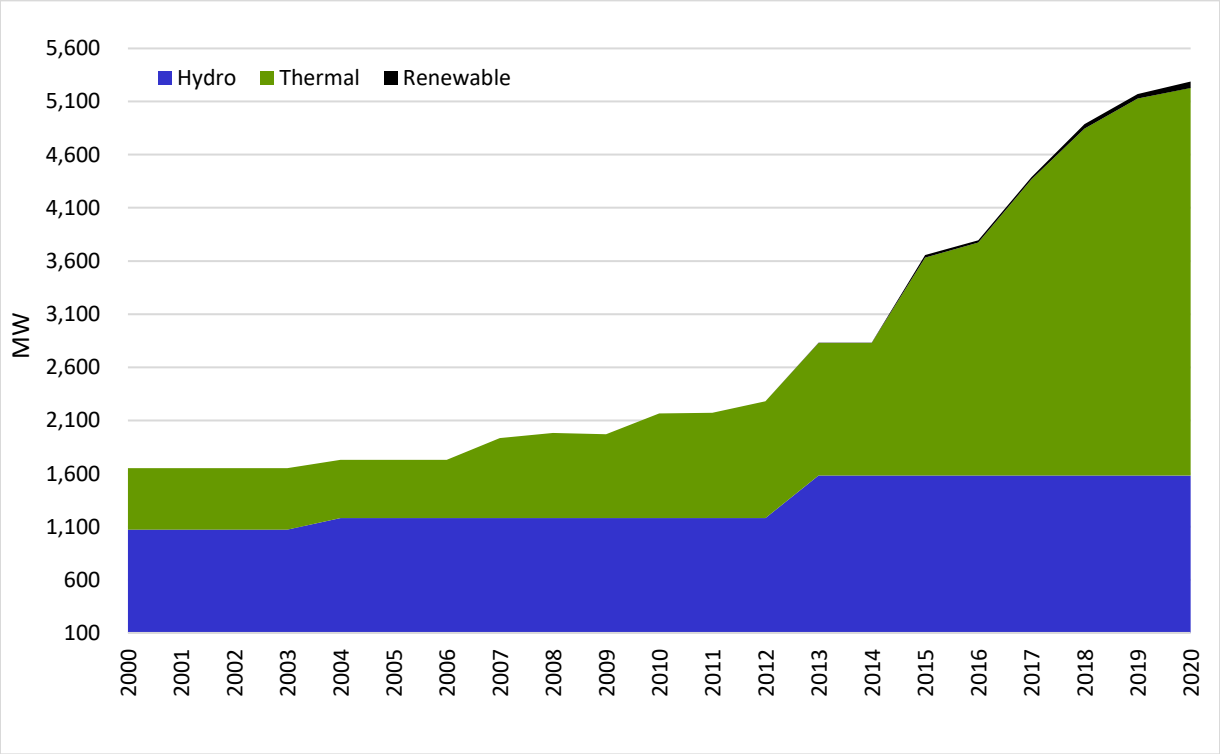

Figure 3.1: Installed Generating Capacity (2000-2020)

Table 3.1: 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	3	2,831	1,380	1,105	2	2,487
2014	1,580	1,248	3	2,831	1,380	1,187	2	2,569
2015	1,580	2,053	23	3,656	1,380	1,957	22	3,359
2016	1,580	2,192	23	3,795	1,380	2,119	22	3,521
2017	1,580	2,785	23	4,388	1,380	2,568	18	3,966
2018	1,580	3,266	43	4,889	1,380	3,058	34	4,472
2019	1,580	3,549	43	5,172	1,365	3,296	34	4,695
2020	1,580	3,649	59	5,288	1,400	3,395	34	4,842

[1]Solar and waste

On the other hand, installed grid-connected renewable capacity increased considerably from 2.5 MW in 2014 to about 59 MW as of 2020.

Table 3.2: 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	4,000	-	256	11	29,090
2016	1,238	-	2,626	-	-	-	-	-	-	3,865
2017	678	-	4,266	-	-	-		58		5,002
2018	4	-	6,641	20,000	-	-	-	-	-	26,645
2019	-	-	6,426		-	45	-	-	-	6,471
2020	-	-	6,472	16540						23,012
Total	**7,273**	**20**	**28,068**	**59,040**	**100**	**4,045**	**0**	**314**	**11**	**98,871**

Note: This excludes large hydro (Akosombo, Kpong and Bui)

Source: Ministry of Energy & Energy Commission

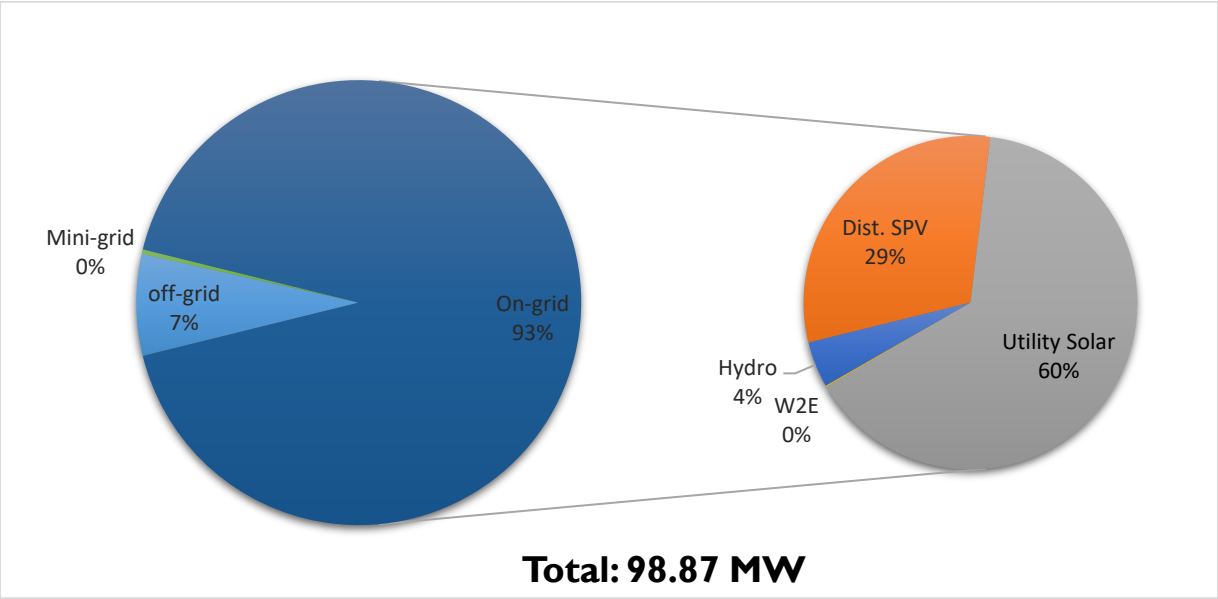

Figure 3.2: Renewable Energy Installed Capacity

The list of power plants including distributed generation in Ghana as of the end of December 2020, is shown in Table 3.3.

Table 3.3: Installed Generation Capacities in Ghana as of 2020 (MW)

Plant	Installed Capacity	Dependable Capacity
Hydro Power Plants		
Akosombo	1,020	900
Kpong	160	140
Bui	400	360
Tsatsadu Mini Hydro	0.045	0.045
Sub-total	**1,580**	**1,400**
Thermal Power Plants		
Takoradi Power Company (TAPCO)	330	300
Takoradi International Company (TICO)	340	320
Tema Thermal 1 Power Plant (TT1PP)	110	100
Tema Thermal 2 Power Plant (TT2PP)	87	70
Cenit Energy Ltd	110	100
Kpone Thermal Power Plant	220	200
Ameri Plant	250	230
Sunon Asogli Power (Ghana) Ltd	560	520
Karpowership	470	450
Amandi	203	190
AKSA	370	350
Cenpower	360	340
Early Power / Bridge	144	140
Genser[2]	95	85
Sub-total	**3,649**	**3,395**
Renewables		
VRA Solar (Navrongo)[2]	3	2
VRA Solar (Lawra)[2]	7	5
BXC Solar[2]	20	16
Meinergy[2]	20	16
Bui Solar[2]	10	8
Safisana Biogas[2]	0.10	0.10
Sub-total	59	47
Total	**5,288**	**4,842**

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

3.2 Electricity Generation

The electricity generation mix in Ghana has mainly been from hydro and thermal sources. The share of renewable is gradually increasing due to continuous decline in cost and concerted effort to diversify the mix. In 2000, hydro plants generated the highest proportion (about 92%) of electricity requirement whereas thermal plants generated the remaining 8%. However, in 2020, the generation mix stood at approximately 36.2% of hydro against 63.6% of thermal and 0.3% of renewables.

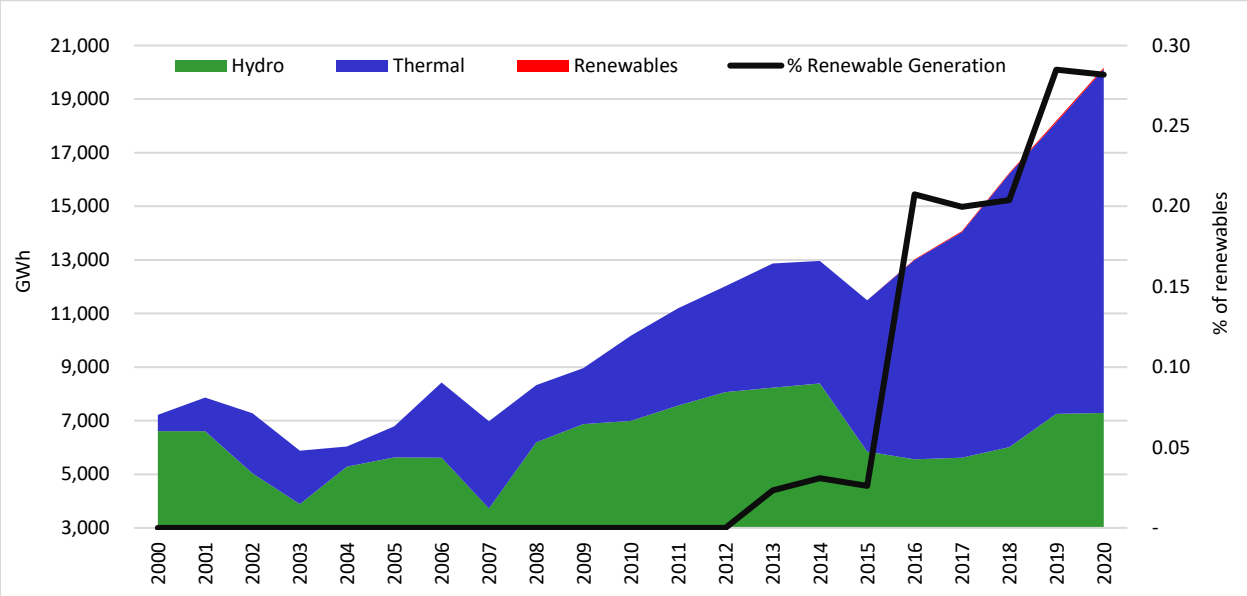

Figure 3.3: Electricity Generation (2000-2020)

Total electricity generation almost doubled from 10,166 GWh in 2010 to 20,170 GWh in 2020, representing an annual average growth rate of 7.1%. The total electricity generated in 2020 was made up of 7,293 GWh from hydro generation, 12,820 GWh from thermal generation and 57 GWh from renewable sources, totaling 20,170 GWh.

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

Source: GRIDCo and ECG

3.3 Electricity Export and Import

There has been tremendous growth in electricity export over the last five years. This was primarily due to increased supply to Burkina Faso. The electricity exported was 25.9% higher in 2020 than in 2019 (Table 3.5). Electricity imports on the other hand, reduced steadily. It decreased from 320 GWh in 2017 to 58 GWh in 2020 representing a compound annual reduction of 43.4%.

As of the end of 2020, electricity imports constituted 0.3% of the total electricity generated. Ghana has been a net exporter of electricity for three consecutive years. The net export registered in 2020 was the highest, increasing by 33.8% over 2019.

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	106	1,036	930
2011	81	691	610
2012	128	667	539
2013	27	530	503
2014	51	522	471
2015	223	587	364
2016	745	187	-558
2017	320	268	-52
2018	140	740	600
2019	127	1,430	1,303
2020	58	1,801	1,743

Source: GRIDCo

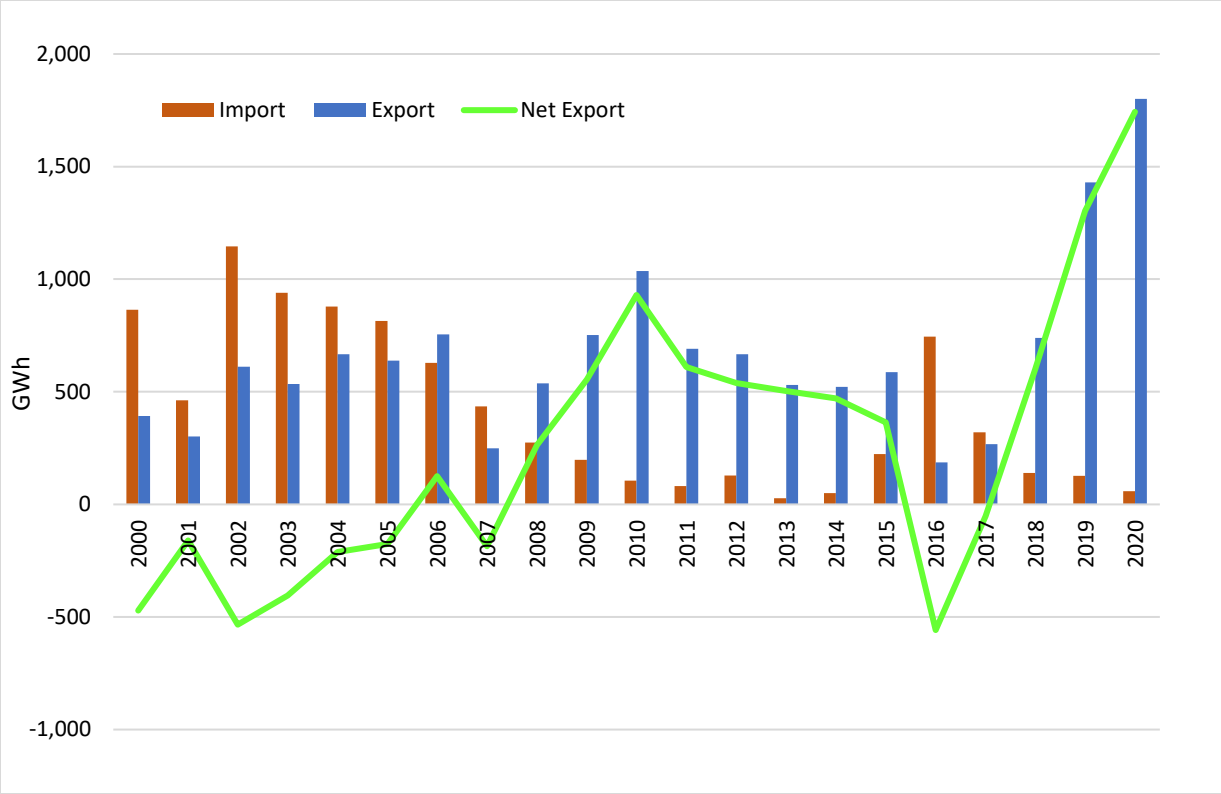

Figure 3.4: Electricity Import and Export

3.4 Peak Load

The peak load (Ghana Load at Peak + VALCO load + export load) increased by about 166% from 2000 to 2020. It increased from 1,161 MW in 2000 to 3,090 MW in 2020, representing a compound growth rate of 5% (Table 3.6). Ghana or domestic Peak Load (ECG +NEDCo +Mines + Direct Customers of VRA), on the other hand, increased by about 248% over the same period. The system peak load increased by 10.2%, while, Ghana or domestic Peak Load increased by 9.3% in 2020 over 2019. The trend in the system and domestic peak load recorded over the period is presented in Figure 3.5.

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

[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

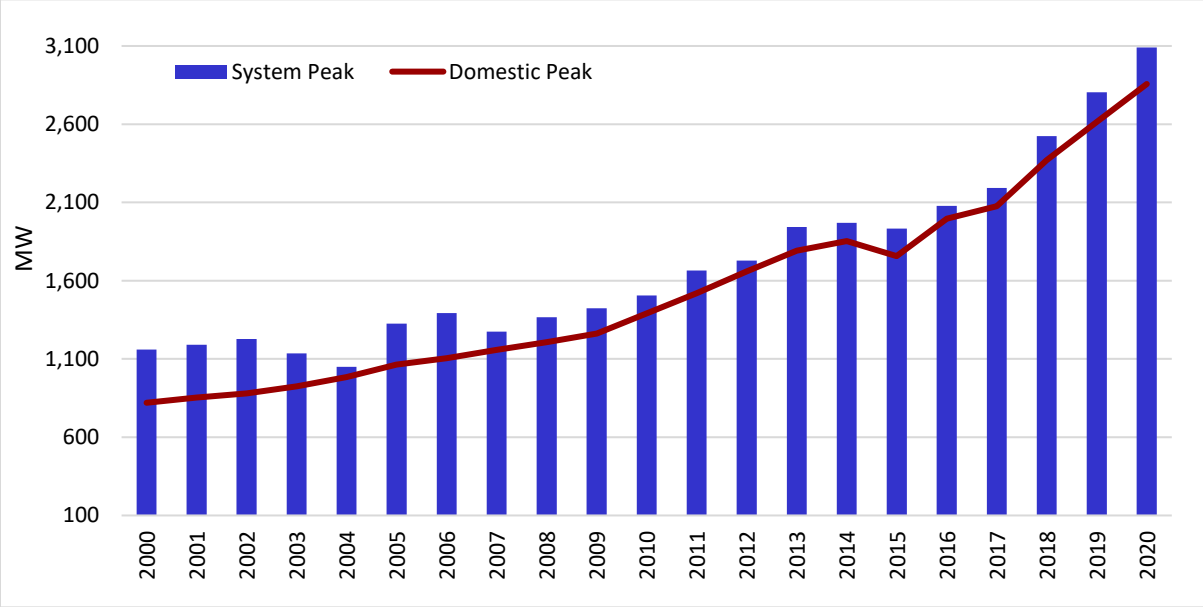

Figure 3.5: System and Ghana Peak Load

3.5 Electricity Demand and Supply Nexus

Ghana experienced an increase of about 166% in system peak load over the last 20 years. This translates into a compound annual growth rate of about 5%. On the other hand, generation capacity has more than doubled over the same period. The installed generation capacity decreased by 2.2% in 2020 over the 2019 value of 5,172 MW, whereas peak demand increased by 10.2% in 2020 over the 2019 value of 2,804 MW.

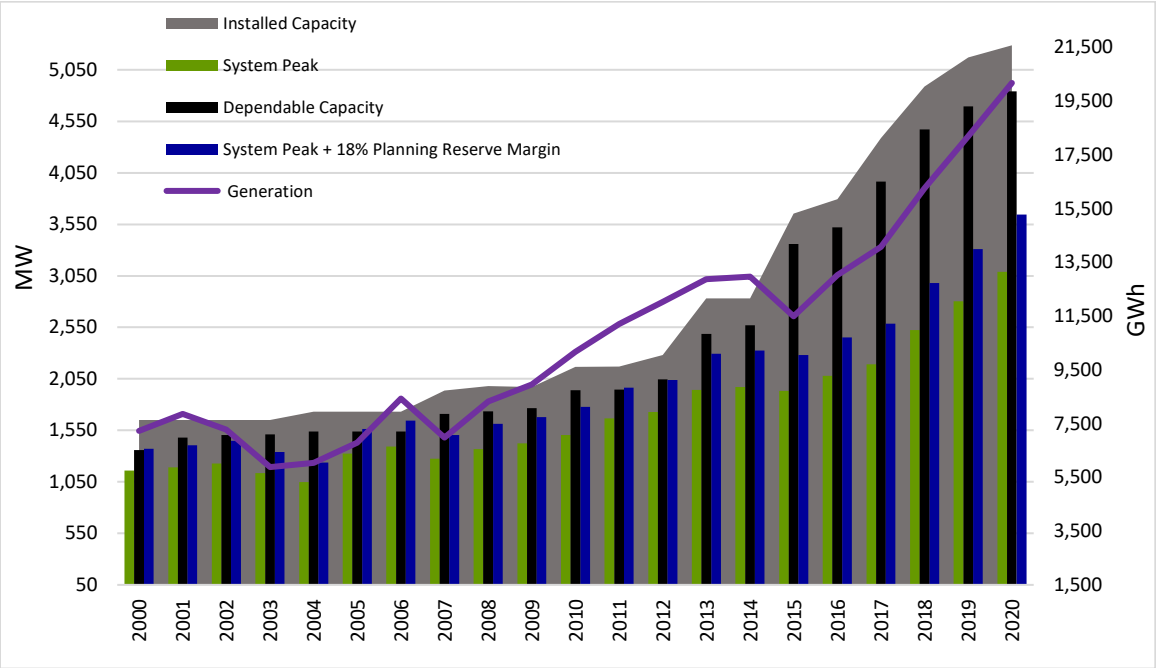

Figure 3.6: Trend in Installed and Dependable Capacity, Peak Load and Generation

3.6 Electricity Transmitted and Losses

Table 3.7 presents the total electricity transmitted as well as transmission losses recorded over the period. The total electricity transmitted increased by about 144% from 2000 to 2020. The energy transmitted in 2020 grew by 10.2% over 2019.

Transmission losses have increased by a compound annual growth rate of 7% from 2000 to 2020. Comparing 2019 to 2020, the total system transmission loss increased by about 5.3% (Table 3.7). Losses have surpassed the PURC benchmark of 4.1%, since 2016, except for 2017.

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	10,232	380	3.7
2011	11,174	531	4.8
2012	12,116	522	4.3
2013	12,927	570	4.4
2014	13,069	565	4.3
2015	11,692	402	3.4
2016	13,700	607	4.4
2017	14,308	540	3.8
2018	15,960	707	4.4
2019	17,887	843	4.7
2020	19,717	888	4.5

Source: GRIDCo

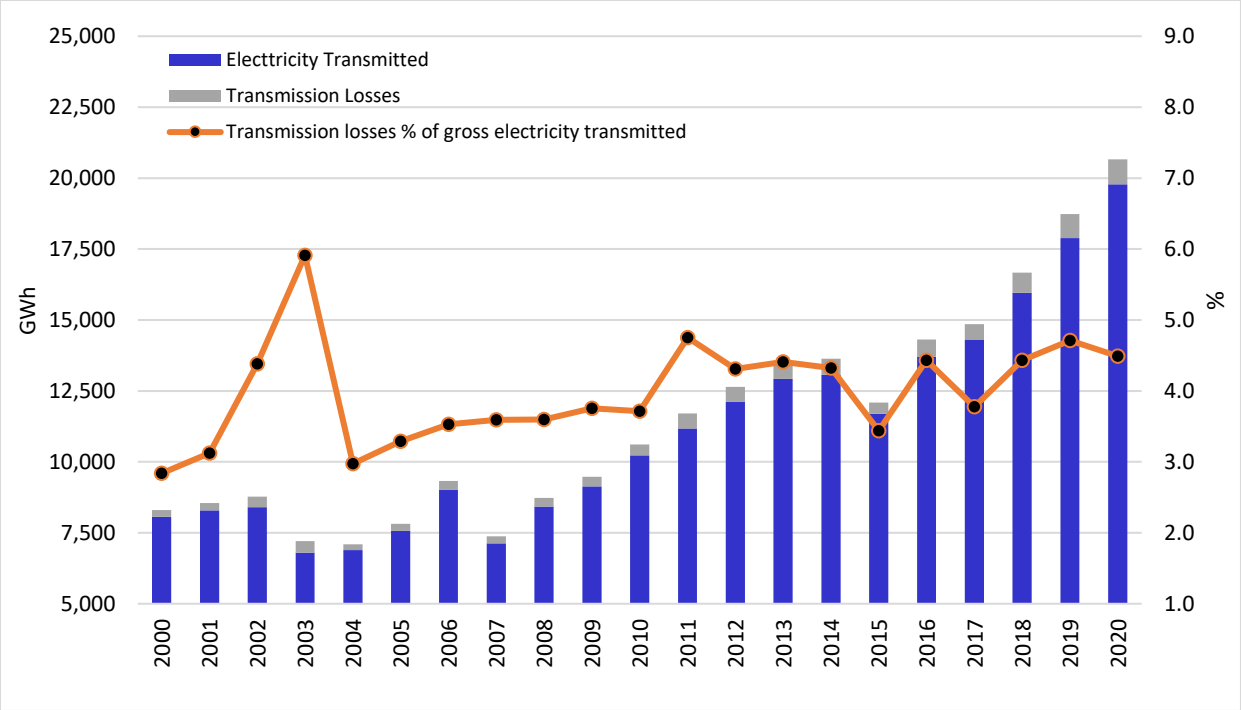

Figure 3.7: Electricity Transmitted and Transmission Losses

3.7 Electricity Purchase, Sales and Losses by Distribution Utilities

Table 3.8 shows the electricity purchases and sales by the Electricity Company of Ghana (ECG), Northern Electricity Distribution Company (NEDCo) and Enclave Power Company. ECG and NEDCo total purchases grew at an average annual growth rate of 6% and 8%, respectively during the period under review. Having acquired a distribution license in 2015, EPC, has since registered an average annual growth of about 16%. The total electricity purchase by distribution utilities in 2020 was 14,524 GWh against sales of 10,717 GWh.

Total sales of ECG, NEDCo and EPC increased from 7,575 GWh, 889 GWh and 155 GWh in 2017 to 9,333 GWh, 1,148 GWh and 237 GWh in 2020. ECG remains the largest buyer, taking 87% of total purchases whereas NEDCo and EPC acquired 11% and 2% of the total purchases respectively.

The corresponding distribution losses were 3,374 GWh (88.6%), 428 GWh (11.3%) and 5 (0.1%) GWh in 2020 for ECG, NEDCo and EPC, respectively.

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	27.03	330	232	98	29.70	-	-	-	-	4,319	3,142	1,176	27.23
2001	4,175	3,080	1,095	26.23	355	251	104	29.30	-	-	-	-	4,530	3,331	1,199	26.47
2002	4,326	3,200	1,126	26.03	383	265	118	30.81	-	-	-	-	4,709	3,466	1,244	26.42
2003	4,496	3,343	1,153	25.65	426	283	143	33.57	-	-	-	-	4,922	3,625	1,296	26.33
2004	4,818	3,539	1,279	26.55	473	323	150	31.71	-	-	-	-	5,291	3,862	1,429	27.01
2005	5,045	3,760	1,285	25.47	501	312	189	37.72	-	-	-	-	5,546	4,072	1,474	26.58
2006	5,253	3,978	1,275	24.27	507	356	151	29.78	-	-	-	-	5,760	4,334	1,426	24.76
2007	5,146	3,909	1,237	24.04	494	366	128	25.91	-	-	-	-	5,640	4,275	1,365	24.20
2008	5,799	4,317	1,482	25.56	529	392	137	25.90	-	-	-	-	6,328	4,709	1,619	25.58
2009	6,052	4,483	1,570	25.94	566	413	153	27.03	-	-	-	-	6,618	4,896	1,723	26.04
2010	6,771	4,756	2,015	29.76	635	511	124	19.53	-	-	-	-	7,406	5,266	2,139	28.88
2011	7,259	5,050	2,209	30.43	719	581	138	19.19	-	-	-	-	7,978	5,631	2,347	29.42
2012	7,944	5,823	2,121	26.70	822	658	165	20.07	-	-	-	-	8,766	6,480	2,286	26.08
2013	8,479	6,496	1,983	23.39	937	737	200	21.34	-	-	-	-	9,416	7,233	2,183	23.18
2014	8,370	6,262	2,108	25.19	998	759	239	23.95	-	-	-	-	9,368	7,020	2,347	25.05
2015	7,544	5,831	1,713	22.71	1,013	720	294	29.02	102	96	6	6.17	8,659	6,646	2,013	23.25
2016	9,316	7,115	2,201	23.63	1,123	763	360	32.05	108	100	8	7.01	10,546	7,977	2,568	24.35
2017	9,783	7,575	2,208	22.57	1,224	889	335	27.38	157	155	3	1.68	11,165	8,618	2,546	22.80
2018	10,901	8,251	2,649	24.30	1,318	910	408	30.98	161	160	4	2.68	12,379	9,321	3,062	24.73
2019	11,535	8,685	2,850	24.71	1,413	1,010	403	28.53	235	229	6	2.59	13,183	9,924	3,260	24.72
2020	12,706	9,333	3,374	26.55	1,576	1,148	428	27.17	242	237	5	2.12	14,524	10,717	3,807	26.21

[5] Distribution Losses include technical and commercial losses

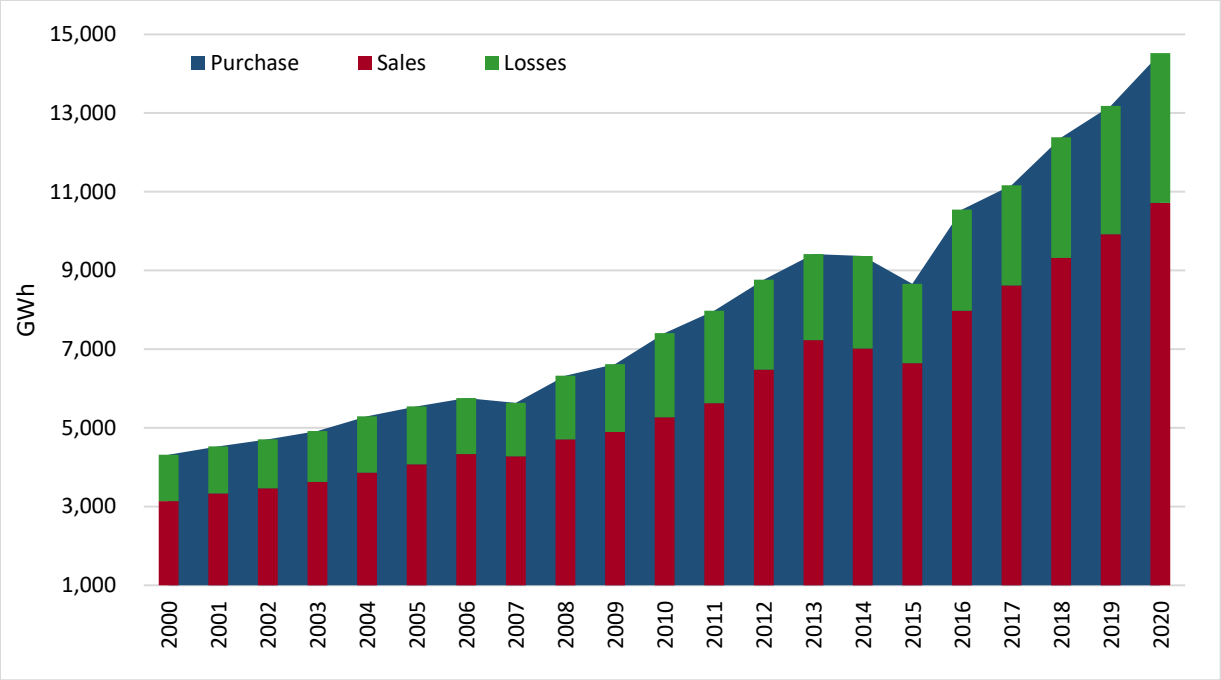

Figure 3.8: DISCO's Purchases, Sales and Losses

3.8 Electricity Consumption

Table 3.9 shows the final electricity consumption by the various sectors of the economy. Total electricity consumption increased by about 140% from 2000 to 2020. The growth in consumption decreased by about 25% in 2003 from 6889 GWh in 2000 and further declined in 2015 by about 0.7% from 2014. However, final electricity consumption increased by 2.2% in 2004 over the consumption in 2003, increasing further by about 17.9% in 2016 over the consumption in 2015. The decline in 2003 and 2015 was attributed to supply-side constraints resulting in a reduction in total electricity generation.

Electricity consumption by the industrial and residential sectors accounted for 33.3% and 47% of the total electricity consumed in 2020 respectively, compared to about 34.5% and 46% of the final electricity consumption in 2019. The trend in electricity consumption by the various sectors is presented in Figure 3.9.

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	6,877	5,029	2,475	10	9	14,401
2019	6,968	5,260	2,982	11	10	15,232
2020	7,765	5,499	3,242	12	12	16,531

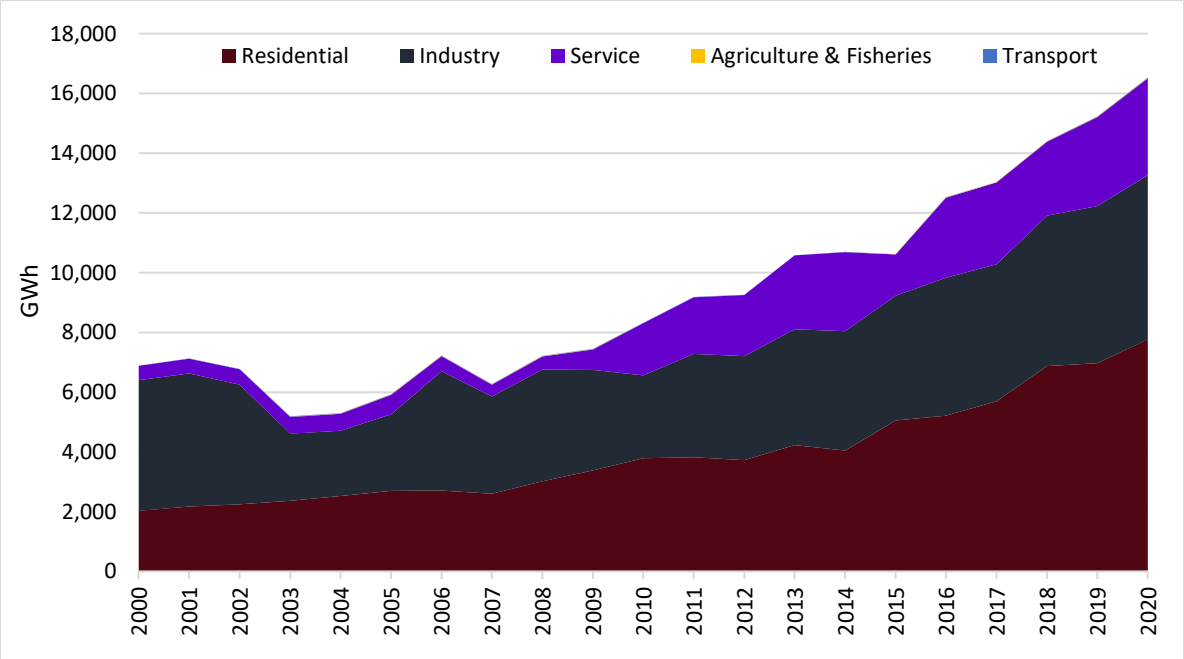

Figure 3.9: Electricity Consumption by Sectors

3.9 Customer Population by classification

The total customer population in 2020 was five million and eleven thousand. From 2000 to 2020, ECG and NEDCO customers have grown at a rate of 8.3% and 11.4%, respectively. EPC customer population has, also, increased at a rate of 15.1% from 2015 to 2020. ECG remains the largest service provider of electricity in Ghana with about 80.1% of the total customer in 2020, whereas NEDCo and EPC had 19.9% and 0.003%, respectively of the total customer population. The total population of residential, non-residential and Special Load Tariff (SLT) customers increased at a compound annual growth of 9%, 7.5% and 3.5% respectively from 2000 to 2020. Out of the total population of about 5 million people in 2020, about 85.3%, 14.6% and 0.04% is made up of residential, non-residential and SLT customers respectively.

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

Source: ECG, EPC & NEDCo

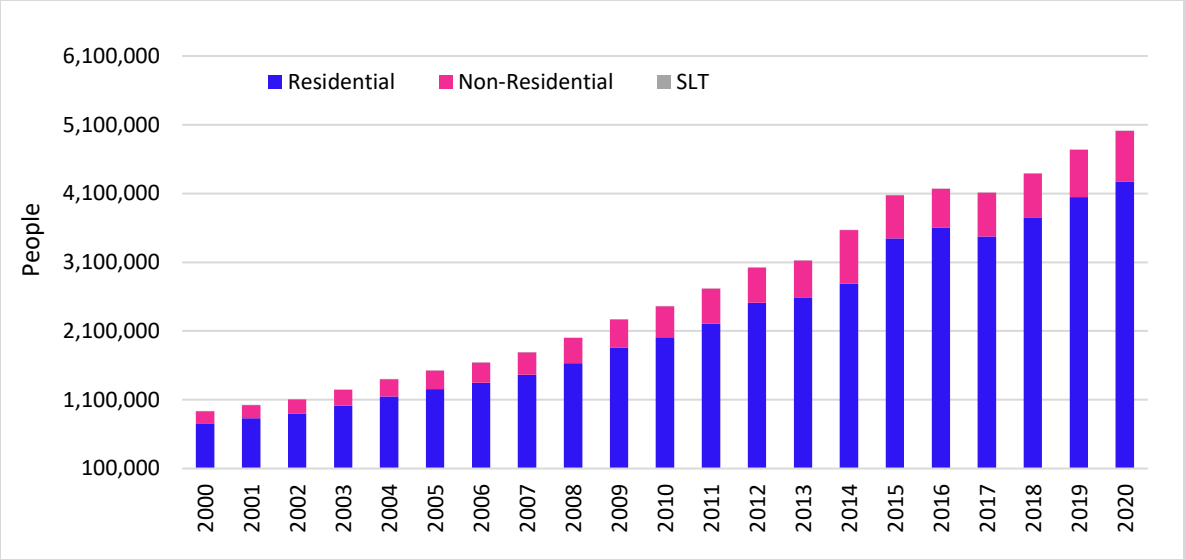

Figure 3.10: Customer Population

3.10 Dam Headwater level

The water levels of the two major dams in the country, the Akosombo and Bui, have remained largely above their respective minimum levels of 240 ft and 550 ft respectively as shown in Figure 3.11 and Figure 3.12 respectively. Tables 3.11 and 3.12 show the summary of Akosombo and Bui dam water levels.

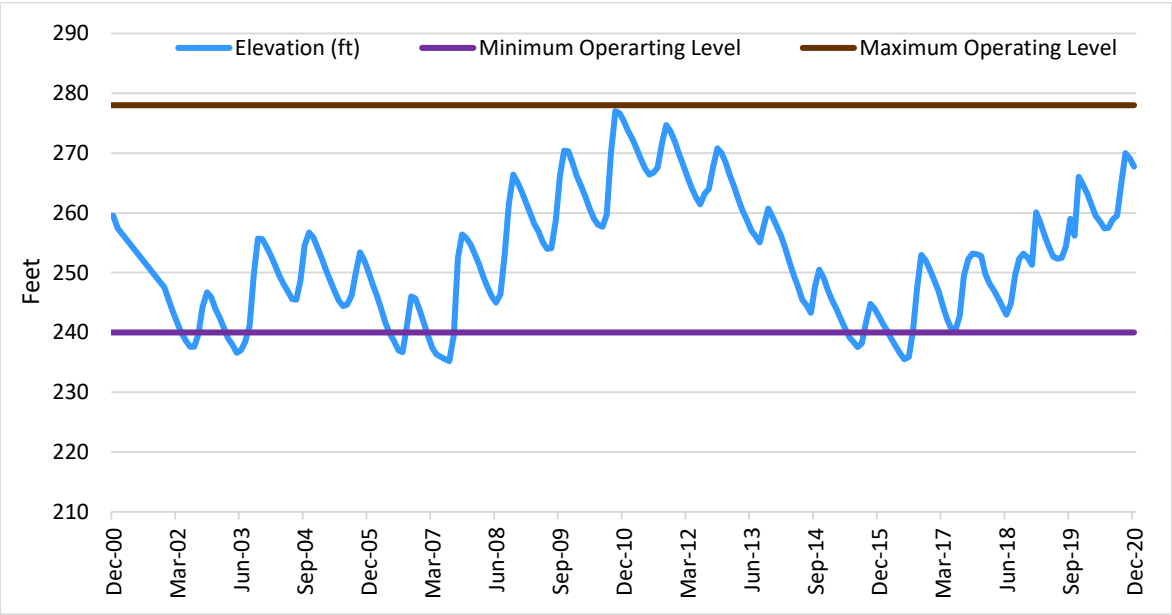

Figure 3.11: Trend in Akosombo Headwater Level

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

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

Month	2014	2015	2016	2017	2018	2019	2020
Jan	576	582	586	577	577	573	588
Feb	571	578	580	573	573	566	582
Mar	565	574	574	565	565	561	575
Apr	559	571	565	562	562	557	570
May	554	567	554	559	559	554	564
Jun	551	563	552	557	557	554	561
Jul	552	558	552	557	557	558	559
Aug	554	555	554	559	559	565	559
Sep	559	561	563	564	564	586	563
Oct	572	575	581	576	576	600	573
Nov	584	592	585	579	579	597	570
Dec	584	591	581	576	576	592	565

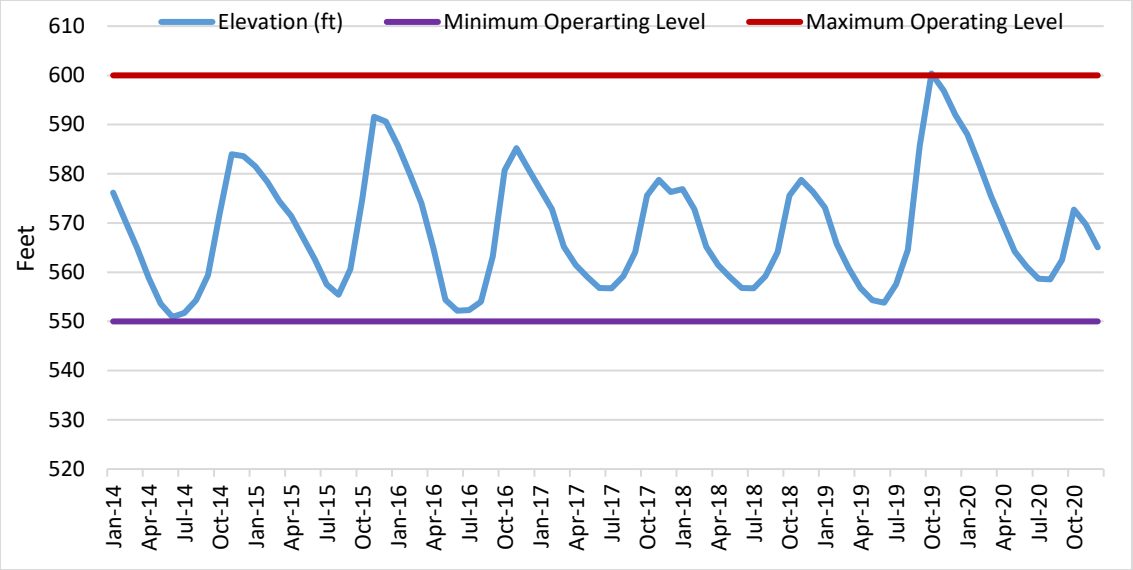

Figure 3.12: Trend in Bui Dam Headwater Level

3.11 Electricity Distribution Reliability Indices

Reliability of a power distribution system is defined as the ability to deliver uninterrupted service to customers. Reliability Indices for frequency and duration are used to quantify the performance of the utility systems. Reliability indices for ECG and NEDCo is presented in Table 3.13.

The System Average Interruption Frequency Index (SAIFI) is a measure of the number of interruptions recorded for the distribution system during a year. As presented in Table 3.13, ECG and NEDCo have both exceeded the maximum number of outages permitted per year according to the regulatory benchmark (per L.I 1935) from 2015 to 2020.

Also, the System Average Interruption Duration Index (SAIDI) provides information about the average duration of interruptions recorded for a distribution system during a year. In 2015 and 2016, ECG exceeded the 48 hours and 144 hours maximum average duration of outage permitted per year in the metropolitan and rural operational areas respectively. The 72 hours maximum average duration of outage permitted per year for an urban area was not exceeded in 2015 though in 2016, the maximum average was exceeded. The average duration of interruptions in the urban area did not the 72 hours maximum as per the regulatory benchmark in L.I 1935 in 2015.

The interruptions of electricity supply for the distribution system within the various operational areas did not exceed the respective regulatory benchmark from 2018 to 2020. Considering the period, 2016-2018, the total average duration of interruption for the NEDCo distribution system was below the total average duration permitted per year. The cumulative electricity interruptions in 2020 did not exceed the benchmarks specified in the L.I 1935, for an urban area and a rural area, with the exception of the metropolitan area where an average duration of 65 hours was experienced, exceeding forty-eight hours.

The average duration of interruptions for customers interrupted during a year is measured using the Customer Average Interruption Duration Index (CAIDI). From the Table 3.13, the average duration of interruptions experienced by customers from 2015 to 2020 did not exceed the regulatory benchmark of eight hours, in a metropolitan area, twelve hours, in an urban area, and twenty-four hours, in a rural area. The average duration of interruptions NEDCo customers experienced was 1.4 hours in 2020, relatively consistent with previous years. Over the years, ECG customers have experienced an average duration of 1.3-2 hours of interruptions, however, in 2020, an average of 6.2 hours was recorded.

Table 3.13: Electricity Distribution Reliability Indices

Reliability Index	Area	Regulatory Benchmarks per L.I 1935	2015		2016		2017		2018		2019		2020	
			ECG	NEDCo	ECG	NEDCo	ECG	NEDCo	ECG	NEDCo	ECG	NEDCo	ECG	NEDCo
System Average Interruption Frequency Index (SAIFI)	Metro	6	74	N/A	60	42	48	132	28	146	27	42	16	51
	Urban	6	74		89		88		57		45	60	26	34
	Rural	6	109		108		104		61		60	53	34	48
System Average Interruption Duration Index (SAIDI)	Metro	48 hours	161	N/A	130	41	77	117	44	123	38	61	24	65
	Urban	72 hours	13		146		115		71		63	85	43	45
	Rural	144 hours	203		156		135		76		80	75	52	80
Customer Average Interruption Duration Index (CAIDI)	Metro	8 hours	2	N/A	2	1	2	1	2	1	1	1	6	1
	Urban	12 hours	2		2		1		1		1	1	7	1
	Rural	24 hours	2		2		1		1		1	1	6	2

SECTION 4: PETROLEUM

Ghana currently has three offshore producing fields; Jubilee, Tweneboa, Enyere and Ntomme (TEN) and Sankofa and Gye Nyame Field. In 2007, the Jubilee field became Ghana's first major commercial discovery. Before the discovery of Jubilee fields, Ghana had been producing oil, albeit on a limited scale, since the 1980s from the Saltpond Fields.

4.1 Crude Oil Production

Table 4.1 indicates the quantity of crude oil produced in the country from 2002 to 2020. From 2011 to 2020, when commercial production began, crude oil production has been increasing at a compound annual growth rate of 12.2%. A total of 66,927 thousand barrels of crude oil was produced from Ghana's three off shore producing Fields in 2020. Crude oil production reduced marginally by about 6.3% in 2020 over 2019, mainly due to the outbreak of COVID-19 pandemic. This is the first year-on-year reduction since 2016, when crude oil production reduced from 37,458 thousand barrels in 2015 to 32,298 thousand barrels in 2016 (Figure 4.1).

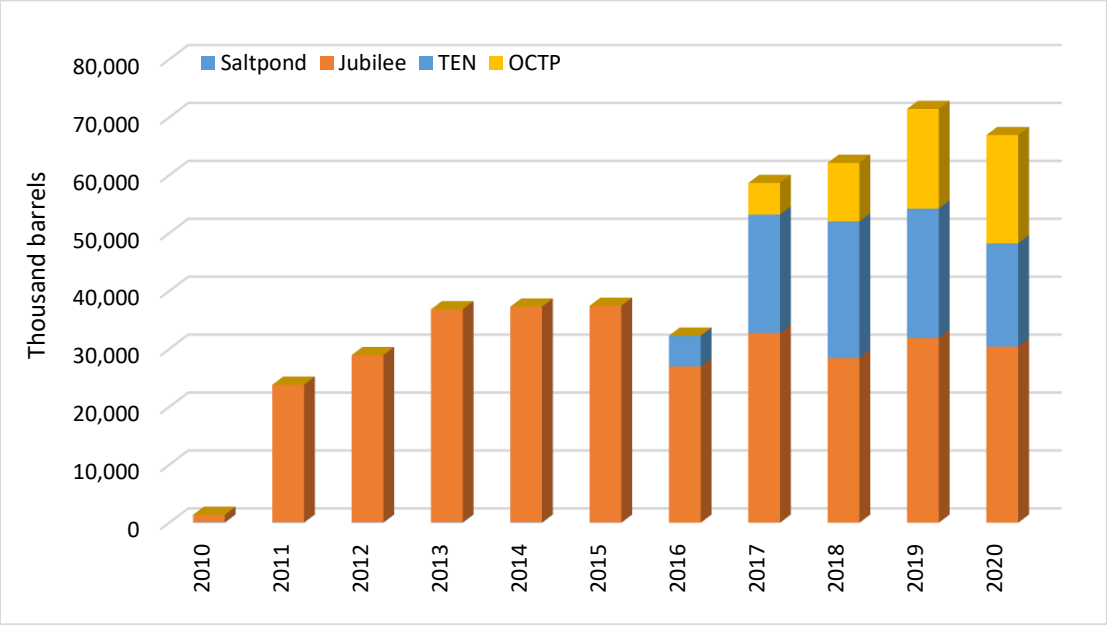

Figure 4.1: Trend in Crude Oil Production

Table 4.1: Crude Oil Production (thousand barrels)

Year	Saltpond	Jubilee	TEN	OCTP	Total
2002	62	-	-	-	62
2003	72	-	-	-	72
2004	160	-	-	-	160
2005	82	-	-	-	82
2006	160	-	-	-	160
2007	189	-	-	-	189
2008	214	-	-	-	214
2009	173	-	-	-	173
2010	98	1,268	-	-	1,365
2011	76	23,758	-	-	23,833
2012	105	28,831	-	-	28,937
2013	98	36,760	-	-	36,859
2014	97	37,202	-	-	37,299
2015	47	37,412	-	-	37,458
2016	-	26,982	5,316	-	32,298
2017	-	32,750	20,453	5,456	58,658
2018	-	28,462	23,557	10,116	62,135
2019	-	31,915	22,319	17,205	71,440
2020	-	30,425	17,803	18,700	66,927

Source: Petroleum Commission & Ghana National Petroleum Corporation

4.2 Crude Oil Import and Export

Despite recent discoveries, Ghana remains an importer of crude oil. For economic reasons, Ghana has traditionally preferred to export its higher-grade oil and imports its crude oil requirements. Total crude oil imports increased by 53.8% from 2000 to 2008 but dropped by 50.3% in 2009. Crude oil import declined drastically by about 58.4% from 2010 to 2020.

Crude oil import for power generation reduced from six thousand, four hundred and ninety-five (6,495) thousand barrels in 2013 to three hundred and eighty-two (382) thousand barrels, representing a reduction of about 94.1% (Table 4.2). This is due to improved gas supply from indigenous sources for power generation.

Crude oil export substantially increased in 2011 with the commencement of commercial production. It increased from 24,731 thousand barrels in 2011 to 37,703 thousand barrels in 2014, at a compound annual growth rate of 15.1%.

It, however, reduced marginally by 3.3%, to 36,460 thousand barrels in 2015 (Table 4.2). Crude oil export, then increased at a compound annual growth rate of 13.1%, to 67,458 thousand barrels in 2020.

The total crude oil exported was 67,458 thousand barrels in 2020. Crude oil export witnessed a decline of 5% in 2020, over that of 2019.

Table 4.2: 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	24,731
2012	3,541	4,926	8,467	26,431
2013	2,621	6,495	9,116	36,048
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

Source: NPA & Petroleum Commission

Figure 4.2 shows the trend in crude oil import and export from 2000 to 2020.

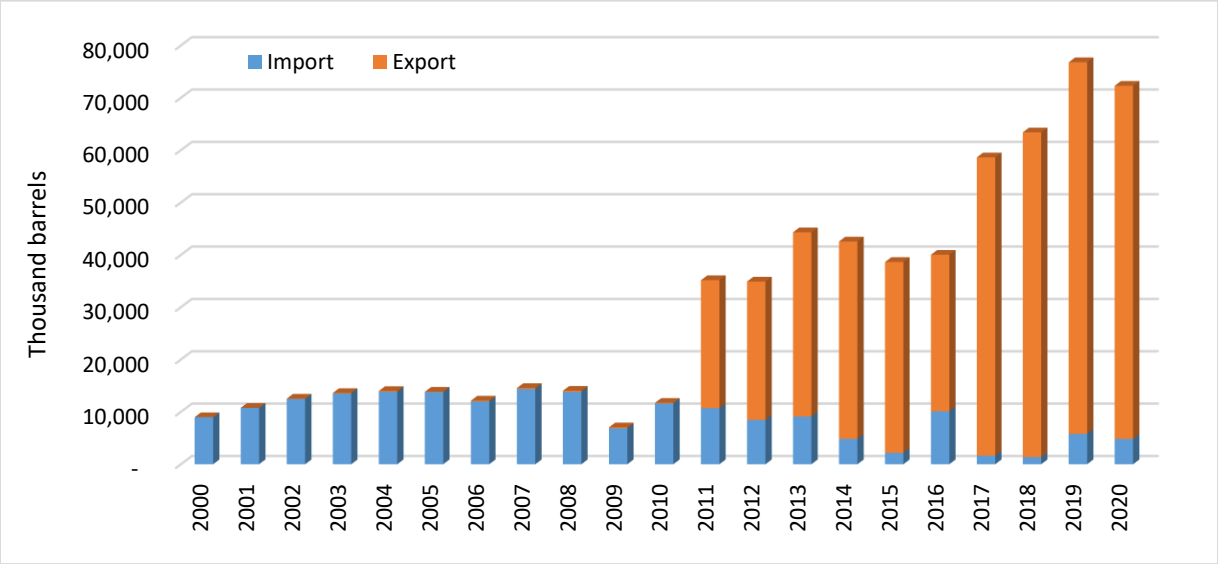

Figure 4.2: Trend in Crude Oil Import and Export

4.3 Natural Gas Production and Import

Ghana started full commercial natural gas production from the Jubilee field in 2014 with a production volume of about 2 tBtu. Production of natural gas since then has increased significantly. Gas production witnessed its greatest boost since its inception with a total of 95.2 tBtu of Associated Gas (AG) and Non-Associated Gas (NAG) produced from all production fields in 2020 (Table 4.3).

Natural gas is imported from Nigeria via the West African Gas Pipeline (WAGP). However, imports of natural gas have been declining over the years as production from indigenous sources increases (Figure 4.3). The bulk of gas imported is utilised for electricity generating, with only a small proportion, less than 2%, used for non-power activities. In 2020, a total of 24.4 tBtu was imported, an annual increase of 2.5% over the import volume in 2019.

Table 4.3: Natural Gas Production and Import

Year	Production[1] (tbtu)	Import[2] (tbtu)
2009	-	0.2
2010	-	15.6
2011	-	30.5
2012	-	15.4
2013	-	11.6
2014	2.0	22.5
2015	26.4	20.6
2016	23.5	4.0
2017	33.7	11.7
2018	39.1	26.0
2019	55.3	23.8
2020	95.2	24.4

[1]Include natural gas production from GNGC and non-associated gas
[2]Natural gas delivered through WAGP
Source: GNGC & VRA

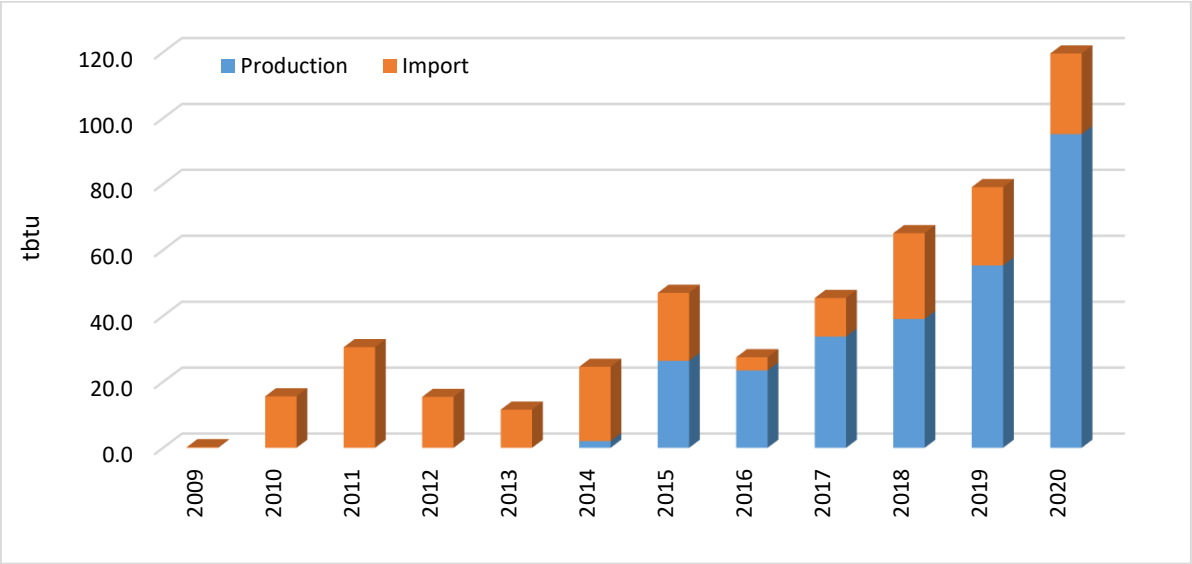

Figure 4.3: Trend in Natural Gas Production and Import

4.4 Petroleum Products Production

The production of petroleum products reduced by almost two-fold, from 1,028 kt in 2000 to 580 kt in 2020. The lowest level of production of petroleum products in the country was recorded in 2015 with a production level of 89 kt (Table 4.4).

Production volumes of LPG, kerosene and RFO increased by 21.4%, 191.7% and 5.4% respectively in 2020 over 2019 production volumes as against the declines of 47.2%, 65% and 24.2% recorded for gasoline, ATK and gasoil respectively over the 2019 volumes.

Table 4.4: 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	6	4	133
2018	88	102	33	22	114	32	390
2019	70	125	12	80	198	205	690
2020	85	66	35	28	150	216	580

Source: TOR, GNGC & NPA

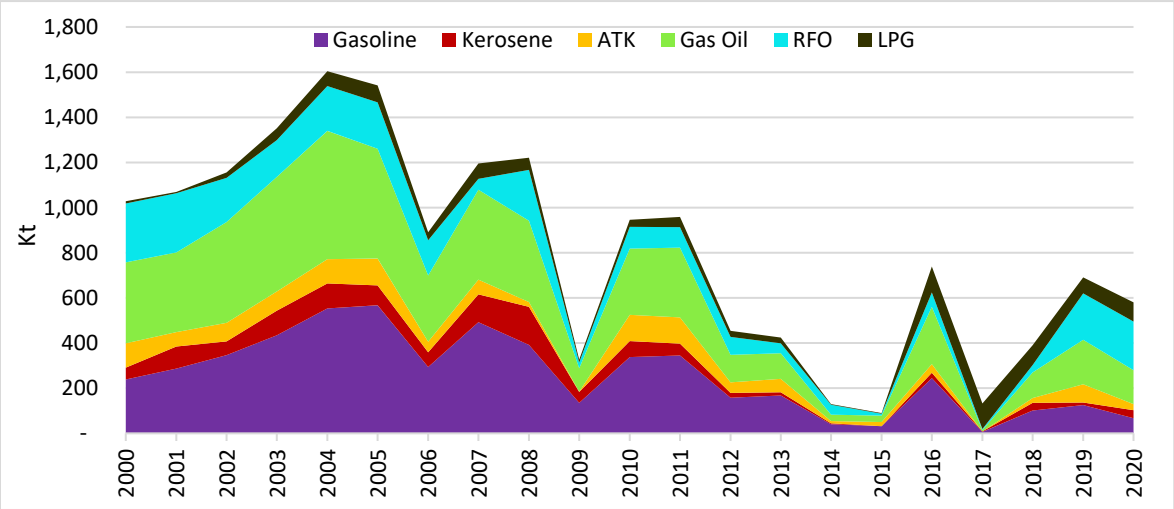

Figure 4.4: Trend in Production of Petroleum Products

4.5 Petroleum Products Import

Table 4.5 presents import data for the period 2000 to 2020. The table shows that the imports volumes for gasoline and gasoil have increased significantly over the period. Importation of gasoline and gasoil increased at a compound annual growth rate of 7.4% and 8.7% respectively from 2000 to 2020. ATK grew at 6.6% from 2006 to 2019 whilst HFO import increased by 42.3% from 2013 to 2019. ATK recorded a drastic reduction of about 55.8% in 2020 from the 2019 import volume, mainly due to the outbreak of the COVID-19 pandemic. Similarly, HFO import volumes dropped by 82.8%. This is due to the increased utilization of natural gas by thermal power plants. Import of LPG rose at a compound annual growth rate of 10.6% from 2000 to 2020. The total volume of petroleum products imported in 2020 was 3,965 kilotonnes, a 385.9% increase over the 2000 volume.

Table 4.5: Petroleum Products Import (kt)

Year	LPG	Gasoline	Kerosene	ATK	Gas Oil	DPK	HFO	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	1,742	-	366	3,829
2020	262	1,625	-	80	1,937	-	63	3,965

Source: National Petroleum Authority

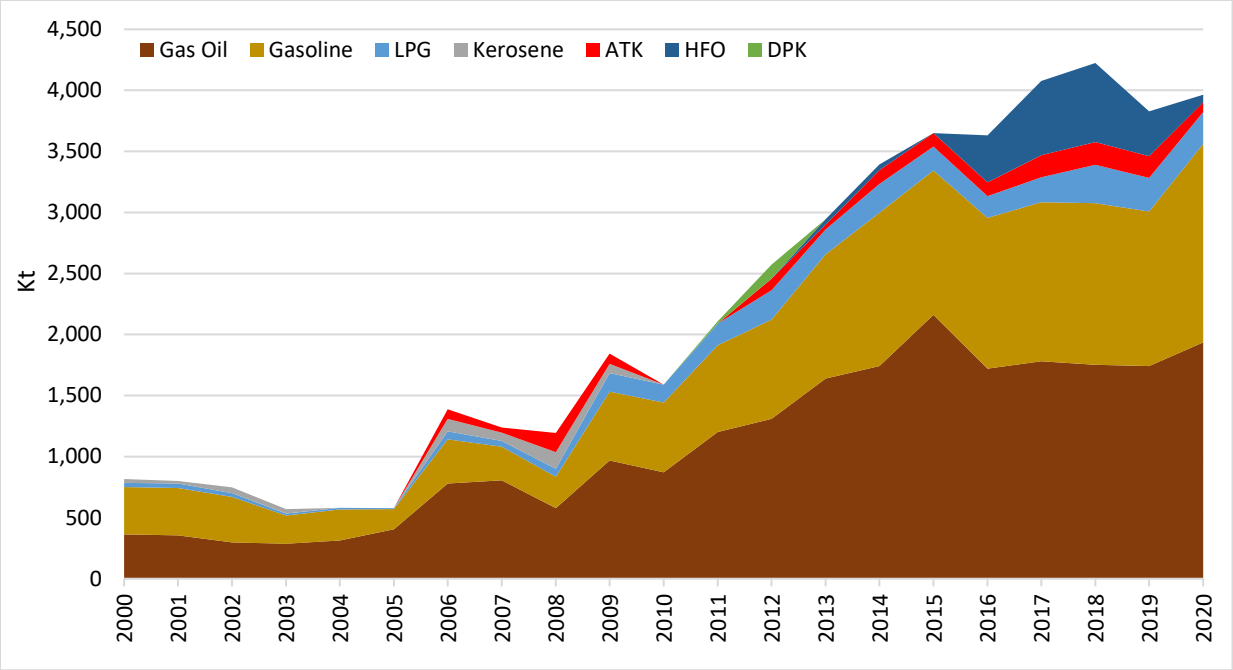

Figure 4.5: Trend in Petroleum Product Import

4.6 Petroleum Products Export

Petroleum products export is presented in Table 4.6. LPG export decreased at a compound annual growth rate of 3.4%, from 6 kt in 2000 to 3 kt in 2020. However, there has been significant reduction over the last three (3) years. ATK export (including volumes transferred to aircrafts engaged in international aviation bunkering) increased from 95 kt in 2000 to 205 kt in 2019. However, it reduced to 113 kt in 2020, representing a reduction of about 44.9%. The reduction in 2020 was due to restrictions imposed on international travels as result of the outbreak of the COVID-19 pandemic. Also, fuel oil export volumes decreased at a compound annual rate of 0.5% from 2000 to 2020. The highest quantity fuel oil exported was 216 kt in 2001 (Figure 4.6).

Gasoil and Gasoline export (including gasoil supplies to ships engaged in international marine bunkering) increased by 28.9% and 0.6%, respectively, from 2000 to 2019. However, in 2020, export volumes of gasoil and gasoline reduced substantially in 2020 by 92% and 95.4%, respectively, over 2019.

Table 4.6: Petroleum Products Export (kt)

Year	LPG	Gas Oil[1]	Fuel Oil	ATK[2]	Gasolines	Total
2000	6	1	191	95	97	389
2001	1	1	216	75	127	419
2002	4	2	152	88	129	375
2003	11	12	89	84	104	301
2004	6	42	169	99	151	467
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	-	304	41	97	104	545
2011	-	437	44	136	155	772
2012	-	162	45	125	54	385
2013	-	104	4	116	36	259
2014	-	22	-	100	10	131
2015	-	14	-	92	10	116
2016	25	173	70	123	272	662
2017	40	279	53	135	184	692
2018	5	45	41	177	67	336
2019	1	125	66	205	108	505
2020	3	10	173	113	5	305

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

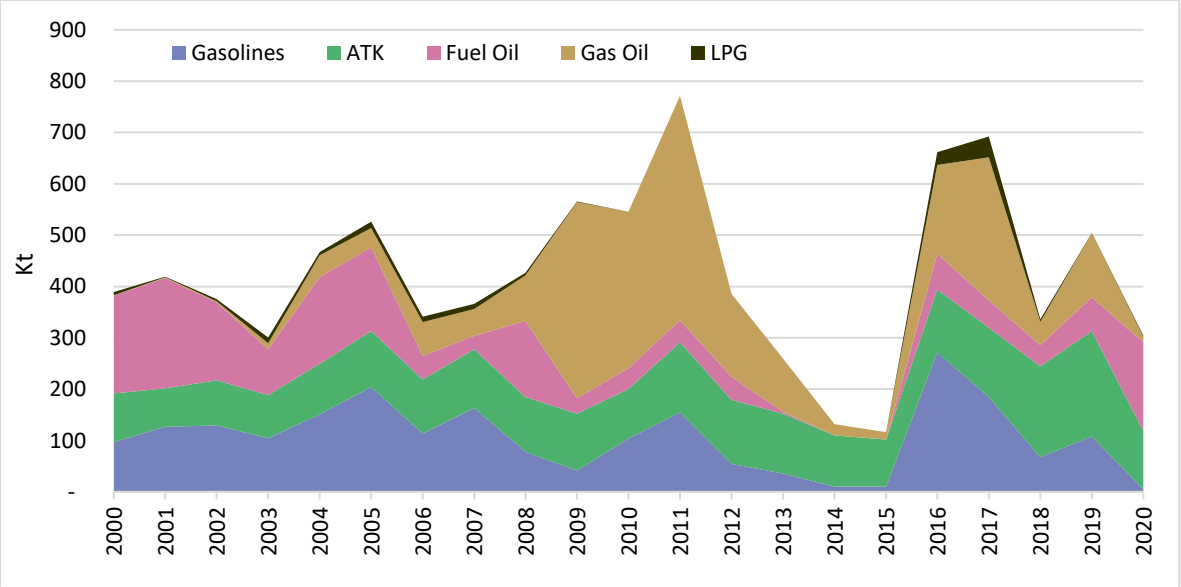

Figure 4.6: Trend in the Export of Petroleum Products

4.7 Final Consumption of Petroleum Products

Petroleum products consumption by fuel and sector are presented in Tables 4.7 and 4.8, respectively. In the last ten years, final consumption of petroleum products has increased above the 2000's level. It increased at a compound annual growth rate of 5.6%, from 1,442 ktoe in 2000 to 4,255 ktoe in 2020. Gasoline and gasoil constitute an average of 36.4% and 51.8% of the total petroleum products consumed in the country over the last 20 years respectively.

Table 4.7: Petroleum Products Consumption by Fuels (Ktoe)

Year	LPG	Gasoline / Premix	Kerosene / ATK	Gas Oil	RFO	Natural Gas	Total
2000	49	584	72	679	59	-	1,442
2001	46	591	74	699	54	-	1,464
2002	54	628	79	732	53	-	1,546
2003	61	535	77	770	47	-	1,491
2004	71	634	84	866	47	-	1,701
2005	76	599	86	898	49	-	1,708
2006	95	574	88	953	59	-	1,769
2007	101	616	77	1,170	53	-	2,016
2008	127	627	49	1,114	49	-	1,966
2009	238	796	106	1,306	41	-	2,487
2010	193	810	62	1,297	32	-	2,394
2011	232	895	82	1,460	36	-	2,705
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	1,747	26	-	3,275
2015	301	1,271	26	1,941	13	-	3,552
2016	304	1,181	17	1,800	13	5	3,320
2017	299	1,229	21	1,557	10	46	3,162
2018	311	1,417	17	1,748	35	65	3,593
2019	324	1,531	22	1,859	40	74	3,849
2020	359	1,699	15	2,017	47	118	4,255

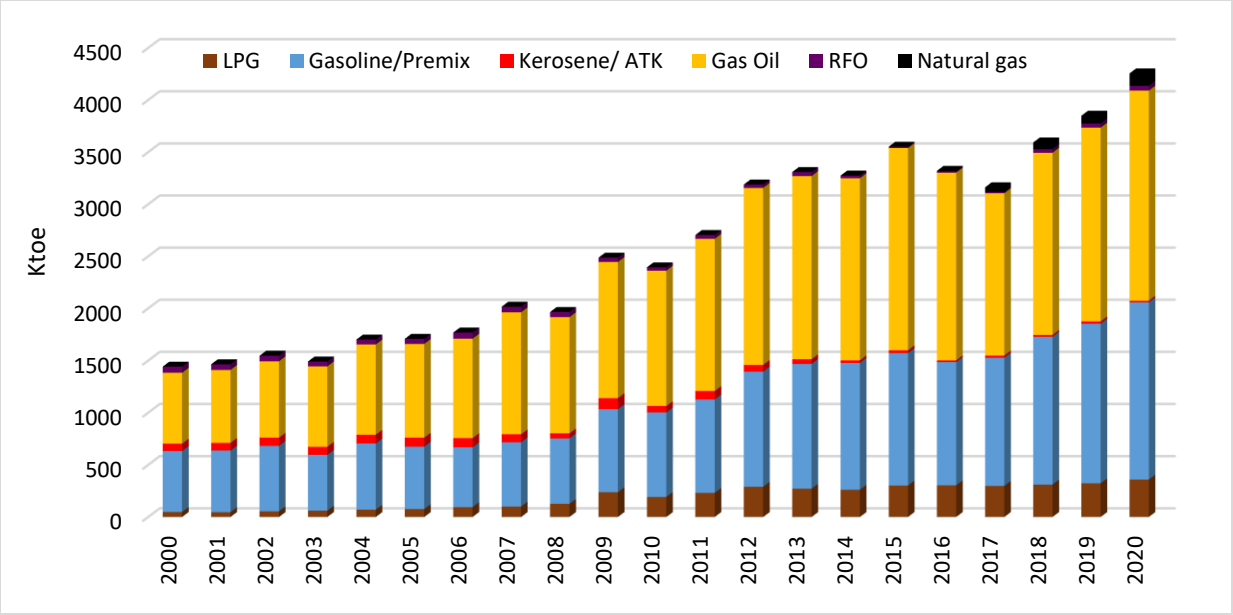

Figure 4.7: Final Energy Consumption of Petroleum Products by Fuel, 2000-2020

The consumption of petroleum products by sector is shown in Figure 4.8. The transport sector remains the main consumer of petroleum products with an annual average growth rate of 5.5% from 2000 to 2020. Table 4.8 presents consumption of petroleum products by sector from 2000 to 2020.

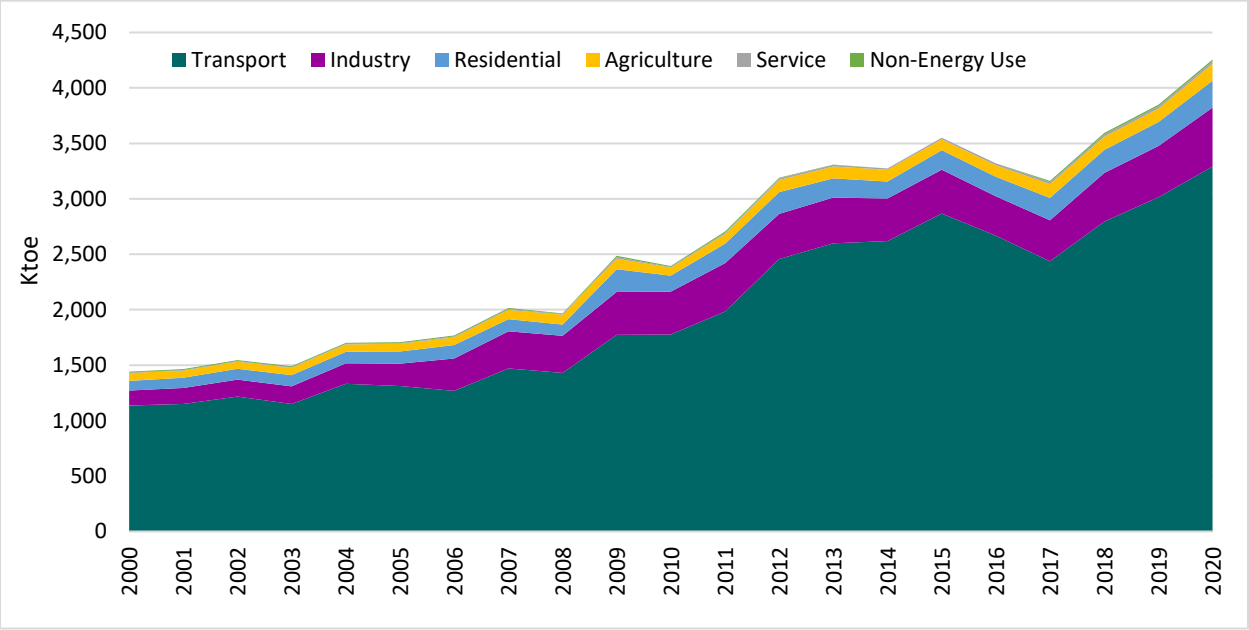

Figure 4.8: Final Energy Consumption of Petroleum Products by Sector, 2000-2020

Table 4.8: Petroleum Product Consumption by Sector (Ktoe)

Year	Residential	Industry	Service	Agriculture	Transport	Non-Energy Use	Total
2000	88	134	5	70	1,136	7	1,442
2001	90	145	5	65	1,151	8	1,464
2002	100	151	6	64	1,217	9	1,546
2003	100	160	7	65	1,150	8	1,491
2004	106	183	5	66	1,332	9	1,701
2005	112	201	6	68	1,312	10	1,708
2006	121	290	7	71	1,270	10	1,769
2007	110	337	8	83	1,469	9	2,016
2008	99	337	7	89	1,429	5	1,966
2009	204	386	13	97	1,774	13	2,487
2010	144	386	8	71	1,776	7	2,394
2011	176	434	11	89	1,984	10	2,705
2012	198	407	12	110	2,456	5	3,189
2013	173	412	12	109	2,598	4	3,308
2014	153	384	11	106	2,619	1	3,275
2015	174	396	14	100	2,867	1	3,552
2016	177	356	15	104	2,667	1	3,320
2017	202	367	17	125	2,438	12	3,162
2018	210	437	19	118	2,796	13	3,593
2019	217	462	20	122	3,013	14	3,849
2020	242	531	23	152	3,292	15	4,255

SECTION 5: BIOMASS

5.1 Woodfuel Production

The main supply of biomass is in the form of charcoal, firewood, and others (saw dust, saw mill residue, etc.) as illustrated in Figure 5.1. The quantity of wood used for firewood has been reducing steadily from about 2,742 ktoe in 2000 to 1,438 ktoe in 2020, at a compound annual growth rate of 3.2%. As of 2020, about 33.6% of the total wood supply is used for firewood compared to 70.5% in 2000. Wood use for charcoal production has, on the other hand, been increasing at a compound annual growth rate of 4.8% from 1,094 ktoe in 2000 to 2,807 ktoe in 2020. As of 2020, 65.67% of the total wood supply is used for charcoal production compared to 28% in 2000. Total biomass supply increased at an annual average growth rate of 0.5% from 2000 to 2020.

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	1,325	1,742	35	3,102
2007	1,391	1,644	33	3,068
2008	1,474	1,566	31	3,070
2009	1,577	1,520	30	3,127
2010	1,687	1,490	30	3,207
2011	1,805	1,535	31	3,371
2012	1,859	1,520	30	3,409
2013	1,989	1,535	30	3,554
2014	2,049	1,550	30	3,629
2015	2,043	1,545	30	3,618
2016	2,033	1,540	29	3,602
2017	2,324	1,505	29	3,858
2018	2,731	1,463	28	4,222
2019	2,684	1,418	29	4,132
2020	2,807	1,438	29	4,274

NB: 2007-2009 figures extrapolated from 2003 field survey data; 2011-2020 figures extrapolated from 2010 field survey data and include saw dust, sawmill residue, etc

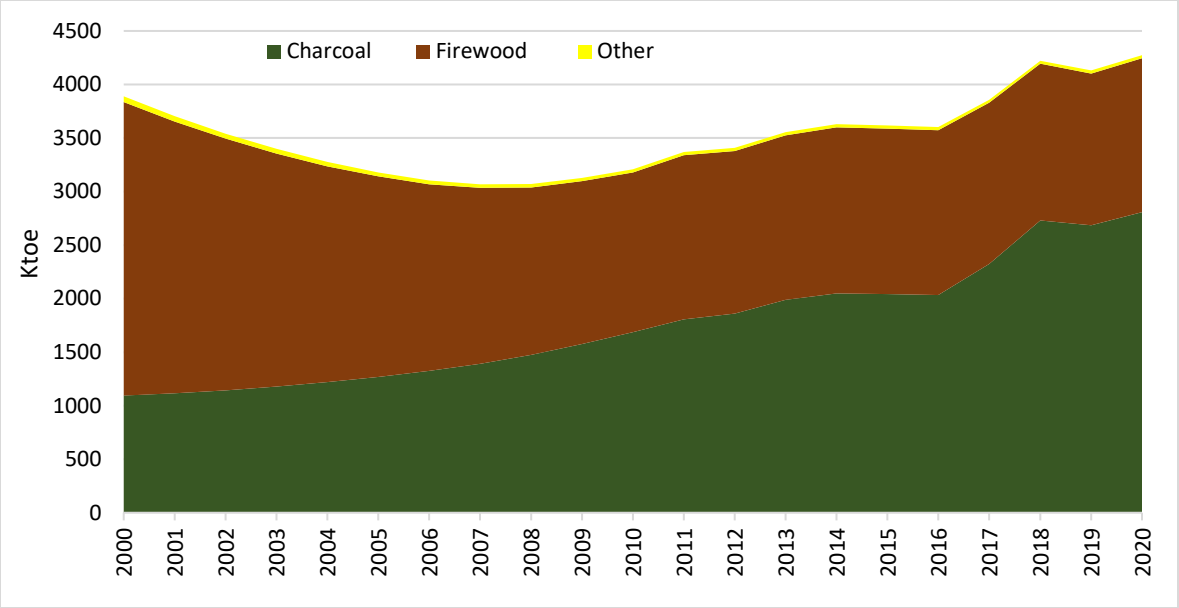

Figure 5.1: Trend in Biomass Production

5.2 Charcoal Import and Export

Ghana's imports and exports of charcoal from 2000-2020 is presented in Table 5.2. Charcoal import increased by 18.6% over the decade from 0.003 ktoe (4.2 tonnes) in 2010 to 0.018 ktoe (23.1 tonnes) in 2020. The year with the highest import of charcoal was 2016 registering an import value of 0.06 ktoe (82.6 tonnes). Charcoal export on the other hand, reduced an annual average rate of about 7%, from 2000 to 2020.

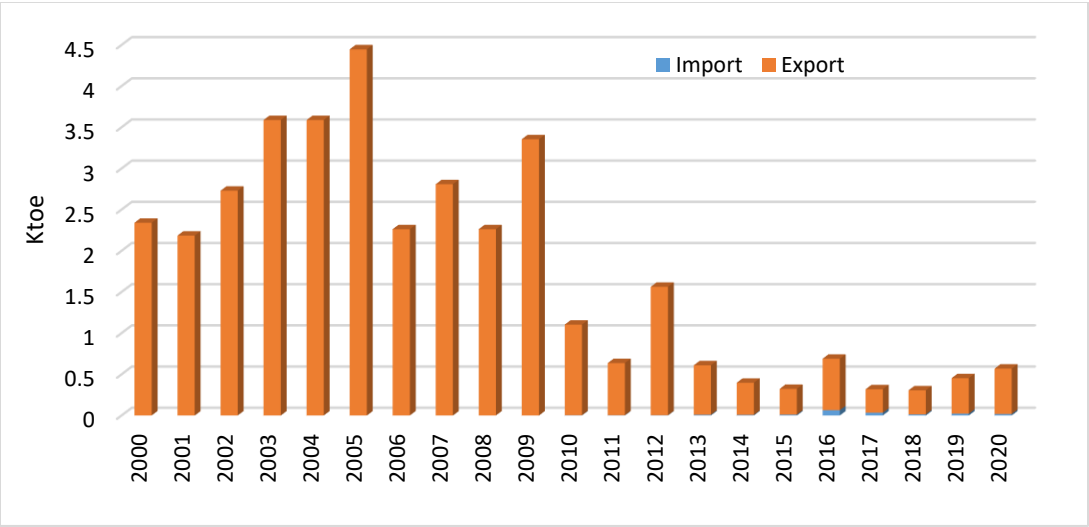

Figure 5.2: Trend in Charcoal Import and Export

Table 5.2: Charcoal Import and Export (ktoe)

Years	Import	Export
2000	-	2.34
2001	-	2.18
2002	-	2.73
2003	-	3.59
2004	-	3.59
2005	-	4.45
2006	-	2.26
2007	-	2.81
2008	-	2.26
2009	-	3.35
2010	0.00	1.10
2011	0.00	0.63
2012	0.00	1.56
2013	0.01	0.60
2014	0.01	0.39
2015	0.01	0.31
2016	0.06	0.62
2017	0.03	0.28
2018	0.01	0.29
2019	0.02	0.43
2020	0.02	0.55

5.3 Woodfuel Consumption

The consumption of biomass declined from 3,432 ktoe in 2000 to 2,977 ktoe in 2020, representing an annual average rate of 0.7% during the 20-year period (Table 5.3). The residential sector is the largest consumer of biomass in the country since 2000. It accounted for about 86.2% of biomass consumed in 2020, followed by the industrial sector and service sector with 9.37% and 4.4% of total consumption respectively.

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	2,398	87	186	2,671
2007	2,322	89	183	2,594
2008	2,247	90	181	2,518
2009	2,218	93	183	2,493
2010	2,183	95	186	2,464
2011	2,285	93	197	2,576
2012	2,291	98	200	2,589
2013	2,363	106	207	2,676
2014	2,461	117	214	2,792
2015	2,448	119	217	2,785
2016	2,440	122	221	2,783
2017	2,539	124	262	2,925
2018	2,589	128	243	2,961
2019	2,524	124	244	2,892
2020	2,567	131	279	2,977

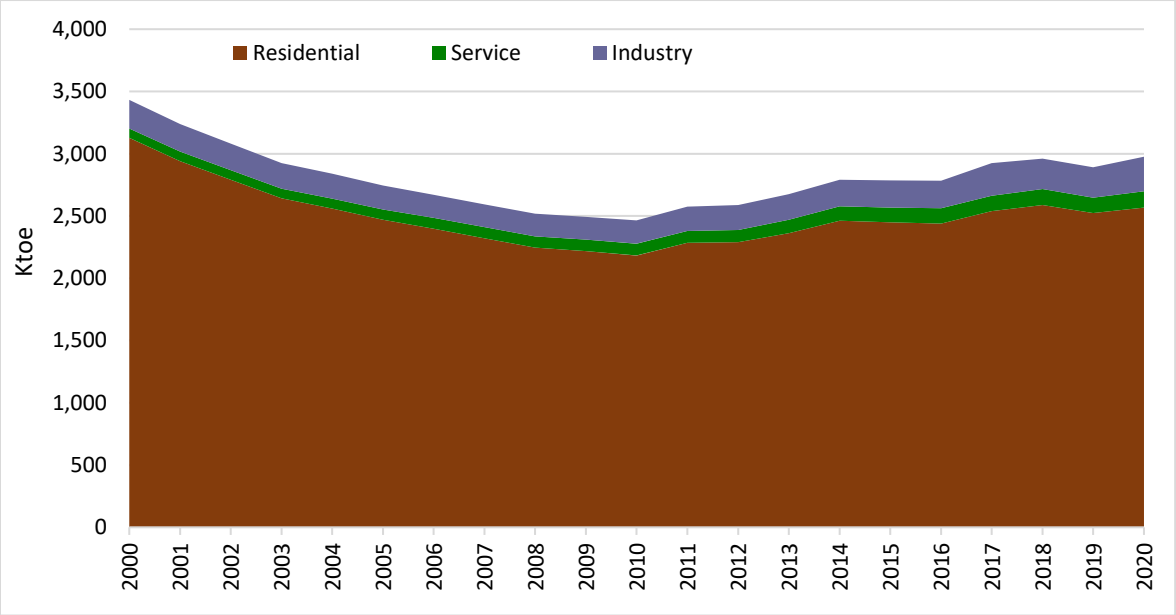

Figure 5.3: Trend in Biomass Consumption by Sector

SECTION 6: ENERGY BALANCES AND INDICATORS

6.1 Energy Balance

The country's energy balance for 2020 and 2019 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 of time, 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 characteristic 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 with respect to 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, includes statistical indicators on Social, Economic and Environment. While the importance of these various indicators is recognised, this section focuses on indicators with respect to 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, 2020 (ktoe)

Supply and Consumption	Crude Oil	Natural Gas	Petroleum Products	Wood	Charcoal	Solar	Hydro	Electricity	Total
Production	9,752	2,398		4,274	-	5	627	-	17,056
Imports	706	616	4,107	-	0.02	-	-	5	5,434
Exports	-9,830	-	-181	-	-1	-	-	-155	-10,166
Intl. Marine Bunkers	-	-	-5	-	-	-	-	-	-5
Intl. Aviation Bunkers	-	-	-117	-	-	-	-	-	-117
Stock changes	-91	-	-222	-	-	-	-	-	-314
TES	**537**	**3,014**	**3,581**	**4,274**	**-1**	**5**	**627**	**-150**	**11,887**
Transfers	-85	-	90	-	-	-	-	-	5
Statistical differences	-184	194	-109	-	-	-	-	-	-99
Electricity plants	-53	-2,764	-107	-	-	-5	-627	1,735	-1,822
Oil refineries	-516	-	498	-	-	-	-	-	-18
Other transformation	-	-	-	-2,807	1,511	-	-	-	-1,297
Energy industry own use	-21	-	-34	-	-	-	-	-53	-108
Losses	-45	-	-	-	-	-	-	-111	-156
TFC	**-**	**56**	**4,137**	**1,467**	**1,510**	**-**	**-**	**1,422**	**8,591**
Residential	-	-	242	1,163	1,404	-	-	668	3,477
Industry	-	56	413	275	4	-	-	473	1,220
Commerce & Service	-	-	23	29	102	-	-	279	433
Agriculture & Fisheries	-	-	152	-	-	-	-	1	153
Transport	-	-	3,292	-	-	-	-	1	3,293
Non-Energy Use	-	-	15	-	-	-	-	-	15

*Table 6.2: Energy Balance, 2019 (ktoe)**

Supply and Consumption	Crude Oil	Natural Gas	Petroleum Products	Wood	Charcoal	Solar	Hydro	Electricity	Total
Production	10,410	1,394		4,132	-	4	624	-	16,564
Imports	847	599	3,943	-	0.02	-	-	11	5,400
Exports	-10,344	-	-298	-	-0.43	-	-	-123	-10,765
Intl. Marine Bunkers	-	-	-7	-	-	-	-	-	-7
Intl. Aviation Bunkers	-	-	-211	-	-	-	-	-	-211
Stock changes	-14	-	16	-	-	-	-	-	2
TES	**899**	**1,993**	**3,442**	**4,132**	**-0.41**	**4**	**624**	**-112**	**10,982**
Transfers	-67	-	71	-	-	-	-	-	4
Statistical differences	-7	44	-128	-	-	-	-	-	5,278
Electricity plants	-139	-1,875	-405	-	-	-4	-624	1,564	-1,482
Oil refineries	-631	-	632	-	-	-	-	-	0.3
Other transformation	-	-	0	-2,684	1,444	-	-	-	4,129
Energy industry own use	-23	-	-93	-	-	-	-	-40	-157
Losses	-45	-	0	-	-	-	-	-102	-147
TFC	**-**	**74**	**3,775**	**1,448**	**1,444**	**-**	**-**	**1,310**	**8,051**
Residential	-	-	217	1,181	1,343	-	-	599	3,341
Industry	-	74	388	240	4	-	-	452	1,158
Commerce & Service	-	-	20	27	97	-	-	256	401
Agriculture & Fisheries	-	-	122	-	-	-	-	1	123
Transport	-	-	3,013	-	-	-	-	1	3,014
Non-Energy Use	-	-	14	0	0	0	0	0	14

*** revised**

Table 6.3: Energy Indicators

Indicator	Unit	2000	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Population[1]	million	18.9	24.7	25.3	25.9	26.4	27.0	27.7	28.3	29.0	29.6	30.3	31.0
GDP (current US$)[1]	million US$	4,983	32,197	39,337	41,271	64,832	51,033	46,719	54,349	58,768	65,316	67,235	72,340
GDP, PPP (constant 2011 international $)[2]	million $	42,784	74,992	85,526	93,474	100,309	103,216	105,464	109,100	117,985	125,374	132,772	139,406*
Total Energy Supply	ktoe	6,255	7,001	7,633	8,121	8,723	8,907	9,296	9,302	9,150	10791	11094	12038
Total Final Energy Consumed	ktoe	5,478	5,672	6,206	6,653	6,906	6,999	7,254	7,143	7,209	7,792	8,051	8,654
Total Electricity Generated	GWh	7,224	10,166	11,200	12,024	12,870	12,963	11,491	13,023	14,067	16,246	18,188	20,230
Total Electricity Consumed	GWh	6,889	8,317	9,187	9,258	10,583	10,695	10,625	12,528	13,036	14,401	15,232	16,531
Total Petroleum Products Consumed	ktoe	1,442	2,394	2,705	3,189	3,308	3,275	3,552	3,320	3,162	3,593	3,849	4,255
Total Biomass Consumed	ktoe	3,432	2,464	2,576	2,589	2,676	2,792	2,785	2,783	2,925	2,961	2,892	2,977
Energy Intensity (TES/GDP current million US$)	toe/million US$	1,255	217	194	197	135	175	199	171	156	165	165	166
Energy Intensity in PPP (TES/ GDP in PPP)	toe/million $	146	93	89	87	87	86	88	85	78	86	84	86
Energy Intensity in PPP (FEC/ GDP in PPP)	toe/million $	128	76	73	71	69	68	69	65	61	62	61	62
Total Primary Energy Supply/capita	toe/capita	0.33	0.28	0.30	0.31	0.33	0.33	0.34	0.33	0.32	0.36	0.37	0.39
Energy use per capita (TFC/persons)	toe/capita	0.29	0.23	0.25	0.26	0.26	0.26	0.26	0.25	0.25	0.26	0.27	0.28
Total Electricity Generated/capita	kWh/capita	382	412	443	464	487	479	415	460	486	549	601	654
Total Electricity Consumed/capita	kWh/capita	364	337	363	357	400	396	384	443	450	486	503	534
Total Petroleum Products Consumed/capita	toe/capita	0.08	0.10	0.11	0.12	0.13	0.12	0.13	0.12	0.11	0.12	0.13	0.14
Total Biomass Consumed/capita	toe/capita	0.18	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
Total Electricity Consumed/GDP	kWh/US$ 1,000 of GDP	1,382	258	234	224	163	210	227	231	222	220	227	229
Total Energy Supply/GDP	toe/US$ 1,000 of GDP	1,255	217	194	197	135	175	199	171	156	165	165	166
Total Petroleum Products Consumed/GDP	toe/US$ 1,000 of GDP	289	74	69	77	51	64	76	61	54	55	57	59
Grid Emission Factor (wind/solar projects)	tCO2/MWh	-	0.35	0.32	0.35	0.35	0.32	0.28	0.39	0.43	0.46	0.39	0.36
Grid Emission Factor (all other projects)	tCO2/MWh	-	0.51	0.44	0.48	0.46	0.36	0.31	0.43	0.47	0.53	0.45	0.40

[1]GDP in current prices and Population data from Ghana Statistical Service

[2]GDP in PPP (constant 2011 international $) from World bank database

*2020 GDP in PPP (constant 2011 international $) estimated

NB: Grid emission factor is the amount of CO2 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 CO2 emissions impacts of the project.

Table 6.4: Sustainable Development Goals (SDG7) Indicators

Target	Indicator	Indicator Definition	Disaggregation	Unit	2010	2013	2014	2015	2016	2017	2018	2019	2020
7.1 Ensure universal access to affordable, reliable and modern energy services.	7.1.1 Proportion of population with access to electricity	Proportion of population with access to electricity	National	%	64.4	70.8	80.5	83.2	83.6	84.1	84.3	85	85.3
			Urban	%	83.9	88.7	91	93.6	96.6	100	100	100	100
			Rural	%	39.7	48.6	52.5	56.9	61.7	67	68.3	70.5	71.7
		Household with access to electricity	National	%	64.2	70.6	73.1	75.7	78.5	81.4	81.6	82.5	82.8
			Urban	%	83.8	88.6	89.8	90.7	91.4	92	92.2	92.6	93
			Rural	%	39.5	48.3	52.2	56.6	61.5	66.9	68.1	70.4	71.5
	7.1.2 Proportion of population with primary reliance on clean fuels and technology	Proportion of population using Electricity as primary source for cooking	National	%	0.54	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
			Urban	%	0.76	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.4
			Rural	%	0.27	0.1	0.1	0.1	0.1	0.2	0.2	0.3	0.3
		Proportion of population using LPG as primary source for cooking	National	%	18.2	22.3	23.2	23.9	24.3	24.5	24.8	25.1	25.3
			Urban	%	28.9	35.8	35.6	35.3	35.1	34.8	34.6	34.3	34.1
			Rural	%	4.8	5.5	6.1	6.8	7.7	8.7	9.9	11.3	12.8
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[3]	%	53.0	47.4	48.8	44.8	39.5	47.3	44.3	42.5	40.4
			National[4]	%	8.4	8.5	8.5	5.9	6.8	5.7	5.5	6.5	6.0
7.3. Double the global rate of improvement in energy efficiency.	Energy intensity measured in terms of total energy supply and GDP, PPP (constant 2011 international $)		National	TOE/million US$	93	87	86.3	88.1	85.3	78.6	86.1	84.1	87.4
	Energy intensity measured in terms of final energy consumption and GDP, PPP (constant 2011 international $)		National	TOE/million US$	76	68.8	67.8	68.8	65.5	61.1	62.1	60.6	62.1

[1]Includes woodfuel
[2]Excludes woodfuel (electricity consumed from solar, biogas and hydro only)

Sources: Ghana Statistical Service 2010 Population and Housing Census, Ghana Living Standard Survey (GLSS 6 & 7), Ministry of Energy & Energy Commission

SECTION 7: ENERGY PRICES

7.1 Crude Oil Prices

Crude oil price was 32.8% lower than 2019 average price. It averaged US$ 43.16 per barrel in 2020, reaching its lowest price since 2004. The lowest and highest monthly average price for 2020 was recorded in April and January respectively. Table 7.1 shows the monthly average crude oil price from 2001 to 2020. Table 7.1 below shows the monthly average crude oil price from 2001 to 2020.

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

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
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
2002	20	20.2	24	26	25.7	24.5	25.7	26.3	28.3	27.5	24.5	27.5
2003	30.2	32.4	29.5	24.8	25.4	27.2	28.2	29.4	26.8	29	28.8	29.6
2004	30.6	30.3	32.7	30	37.1	35.5	37.7	41.7	42.8	49.4	44.6	40.6
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
2006	63.9	61.1	63.1	70.6	71	69.7	74.2	73.9	63.5	60.1	60	62.5
2007	54.6	59	62.4	67.5	67.9	70.6	75.8	71.2	77	82.5	92.1	91.5
2008	91.9	94.5	103	110.4	124.6	133.5	134.8	115.2	100.8	73.6	55.1	43.3
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
2010	76.9	74.7	79.9	85.7	77	75.7	75.5	77.1	78.2	83.5	86.1	92.4
2011	96.8	104.1	114.6	123.1	114.5	113.9	116.7	109.8	110	108.8	110.6	107.7
2012	111.6	127	124.6	125.9	109.4	95.9	102.8	113.2	113	111.5	109.5	109.2
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
2014	107.3	108.8	107.7	108.1	109.2	112	108.2	103.5	98.6	88.1	79.4	62.4
2015	49.7	58.7	57	60.9	65.6	63.8	56.8	48.2	48.6	48.1	44.4	37.7
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
2017	55.5	56	52.5	53.7	51.1	47.5	49.2	51.9	55.2	57.5	62.9	62.3
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
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
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

Source: Bank of Ghana

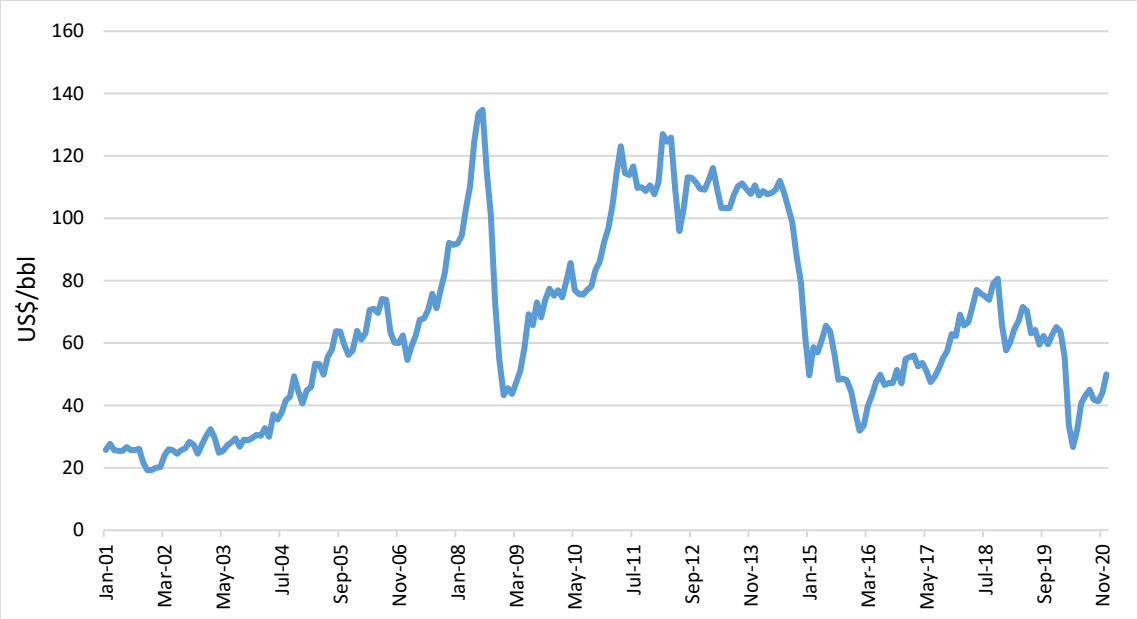

Figure 7.1: Trend in Average Crude Oil Prices

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.

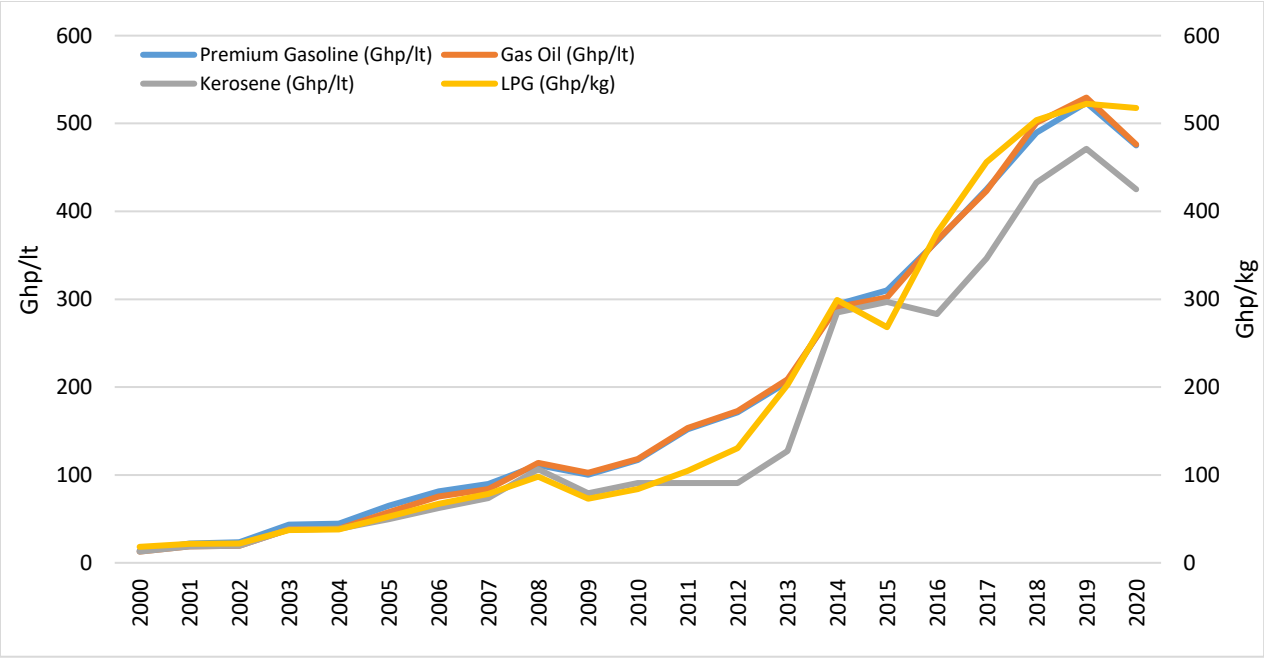

Figure 7.2: Trend in petroleum products prices

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	523.6	529.5	471.2	522.5
2020	475.1	476.2	425.1	517.8

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 20.8%, from 2000 to 2020 (Table 7.3). Comparing 2019 to 2020, there was an increase of about 4.3%, in the average electricity end-user tariff (GHS/kWh).

Table 7.3: Average Electricity End-User Tariff

Year	GHS/kWh	US$/kWh
2000	0.017	0.024
2001	0.034	0.047
2002	0.065	0.077
2003	0.071	0.080
2004	0.074	0.082
2005	0.073	0.080
2006	0.078	0.084
2007	0.097	0.100
2008	0.148	0.123
2009	0.148	0.104
2010	0.211	0.145
2011	0.245	0.158
2012	0.232	0.124
2013	0.307	0.156
2014	0.464	0.145
2015	0.541	0.147
2016	0.817	0.210
2017	0.798	0.183
2018	0.705	0.154
2019	0.716	0.137
2020	0.747	0.134

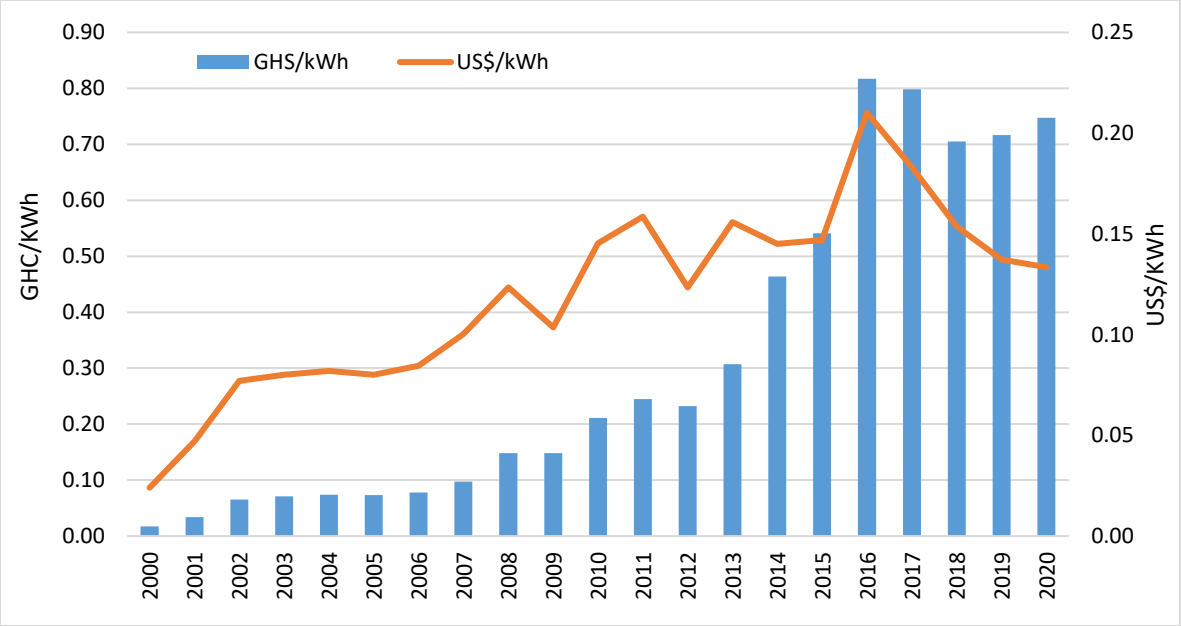

Figure 7.3: Trend in Average Electricity End-User Tariff

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