GHANA KEY ENERGY STATISTICS HANDBOOK

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2022 Edition

April 2022

| Securing Ghana's Future Energy Today

FOREWORD

The Energy Commission was established in 1997 by an Act of Parliament (ACT 541) to regulate and manage the utilization of energy resources in the republic and coordinate policies in relation to them. Specifically, the Commission as part of its mandate is to secure a comprehensive energy database for national decision making on the extent of development and utilization of energy resources available to the nation.

To fulfil this mandate, the collection, analysis and dissemination of energy statistics has always been and remain at the heart of the work of the Commission. The energy statistics produced by the Commission provides a comprehensive view on energy production, transformation and final use as well as their prices. The energy statistics publication of the Commission has been recognised the world over as the authoritative source of energy data and information on Ghana.

The statistics produced can be used to monitor changes in the production and use of energy and also provide a wider understanding of the pattern of energy use in the country. The key energy statistics presents highlights on some of the key facts and trend in energy production and use to enable researchers, policymakers and students have deeper knowledge about the energy situation in the country. It also contains information on energy efficiency, outlook and the Sustainable Development Goal (SDG 7).

I hope that the information contained in this document will not only inform but also help policy makers, researchers and others to make informed decisions to ensure that, energy is produced and used in secure, affordable, efficient and sustainable manner in line with the achievement of SDG7.

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

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

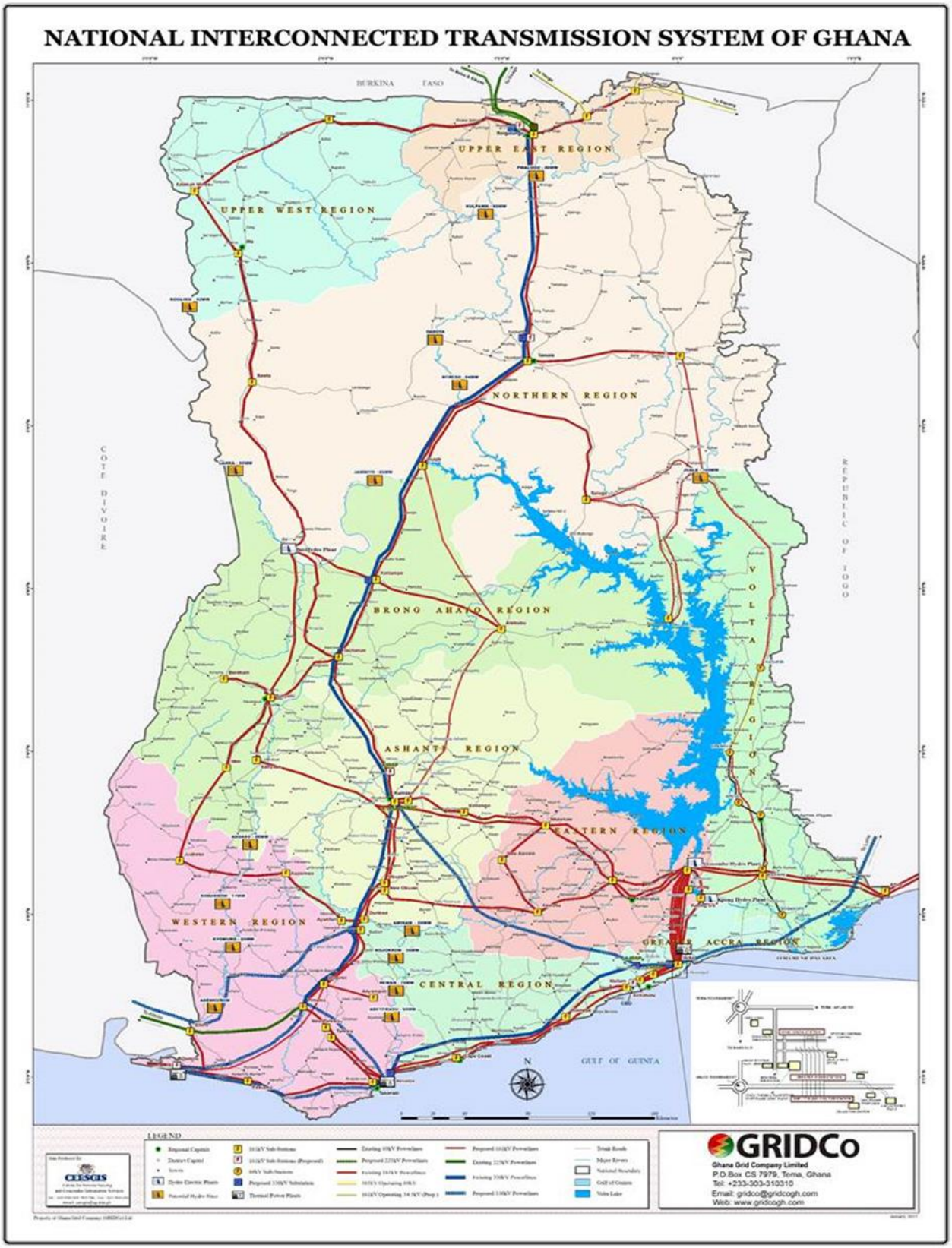
Ing. Oscar Amonoo-Neizer
Executive Secretary

Table of Content

ABBREVIATIONS AND ACRONYMS

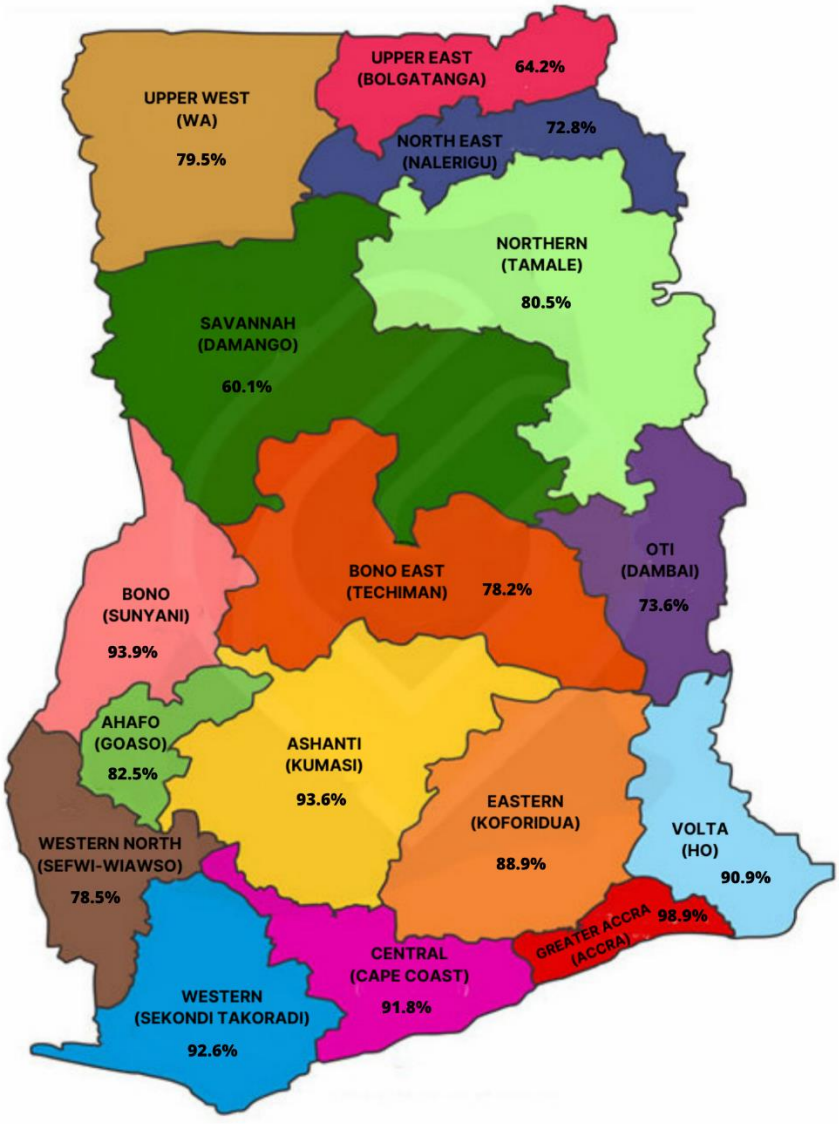
ATK	Aviation Turbo Kerosene
Bbls	Barrels
Dist. SPV	Distributed Solar PV
DPK	Dual Purpose Kerosene
ECG	Electricity Company of Ghana
EPC	Enclave Power Company Ltd
FEC	Final Energy Consumption
GNGC	Ghana National Gas Company
GNPC	National Petroleum Corporation
GRIDCo	Ghana Grid Company
GSS	Ghana Statistical Service
GWh	Gigawatt-hour
Kt	Kilotonnes
ktoe	thousand tonnes of oil equivalent
kWh	kilowatt-hour
LCO	Light Crude Oil
LPG	Liquefied Petroleum Gas
MMBtu	Million British thermal unit
MW	Megawatt
NEDCo	Northern Electricity Distribution Company
NPA	National Petroleum Authority
PURC	Public Utilities Regulatory Commission
RFO	Residual Fuel Oil
tBtu	Trillion British Thermal Units
tCO_2	Tonnes of Carbon dioxide
TES	Total Energy Supply
TFC	Total final consumption
toe	Tonnes of oil equivalent
VALCO	Volta Aluminium Company
VRA	Volta River Authority
W	Watt
W2E	Waste-to-Energy
WAGP	West African Gas Pipeline
WAPCo	West African Gas Pipeline Company

NATIONAL INTERCONNECTED TRANSMISSION SYSTEM OF GHANA



2021 ELECTRICITY ACCESS MAPS OF GHANA

PROPORTION OF POPULATION WITH ACCESS TO ELECTRICITY



2021 National population electricity access rate: 87%

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

PROPORTION OF HOUSEHOLDS WITH ACCESS TO ELECTRICITY

2021 National household electricity access rate: 86.3%

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

KEY HIGHLIGHTS

Indicator	Unit	2000	2010	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Population[1]	million	18.91	24.66	25.90	26.43	27.04	27.67	28.31	28.96	29.61	30.28	30.82	30.83*
GDP (current US$)[1]	million US$	4,983	32,197	41,271	64,832	54,058	48,595	56,010	60,327	67,299	68,338	70,029	79,083*
GDP, PPP (constant 2017 international $)[2]	million $	54,123	94,867	118,247	126,894	130,518	133,286	137,782	148,983	158,220	168,516	169,215	172,331**
Total Energy Supply	ktoe	6,255	7,001	8,121	8,723	8,907	9,296	9,302	9,150	10,791	11,094	12,038	12,371
Total Final Energy Consumed	ktoe	5,467	5,573	6,574	6,894	6,986	7,250	7,181	7,208	7,792	8,051	8,654	9,345
Total Electricity Generated	GWh	7,224	10,166	12,024	12,870	12,963	11,491	13,023	14,067	16,246	18,188	20,230	22,051
Total Electricity Consumed	GWh	6,889	8,317	9,258	10,583	10,695	10,625	12,528	13,036	14,401	15,232	16,531	18,067
Total Petroleum Products Consumed	ktoe	1,442	2,394	3,189	3,308	3,275	3,552	3,320	3,162	3,593	3,849	4,255	4,630
Total Biomass Consumed	ktoe	3,432	2,464	2,589	2,676	2,792	2,785	2,783	2,925	2,961	2,892	2,977	3,162
Energy Intensity (TES/GDP current million US$)	toe/million US$	1,255	217	197	135	165	191	166	152	160	162	175	156
Total Primary Energy Supply/capita	toe/capita	0.33	0.28	0.31	0.33	0.33	0.34	0.33	0.32	0.36	0.37	0.40	0.40
Energy use per capita (TFC/persons)	toe/capita	0.29	0.23	0.25	0.26	0.26	0.26	0.25	0.25	0.26	0.27	0.28	0.30
Total Electricity Generated/capita	kWh/capita	382	412	464	487	479	415	460	486	549	601	656	715
Total Electricity Consumed/capita	kWh/capita	364	337	357	400	396	384	443	450	486	503	536	586
Total Petroleum Products Consumed/capita	toe/capita	0.08	0.10	0.12	0.13	0.12	0.13	0.12	0.11	0.12	0.13	0.14	0.15
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

*Provisional
**Estimated
[1]GDP in current prices and Population data from Ghana Statistical Service
[2]GDP in PPP (constant 2017 international $) from World bank database

SUSTAINABLE DEVELOPMENT GOALS 7 (SDG 7) INDICATORS

Target	Indicator	Indicator Definition	Disaggregation	Unit	2010	2013	2014	2015	2016	2017	2018	2019	2020	2021
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	87
			Urban	%	83.9	88.7	91	93.6	96.6	100	100	100	100	100
			Rural	%	39.7	48.6	52.5	56.9	61.7	67	68.3	70.5	71.7	72.9
		Household with access to electricity	National	%	64.2	70.6	73.1	75.7	78.5	81.4	82.6	83.8	85.0	86.3
			Urban	%	83.8	88.6	89.8	90.7	91.4	92.0	92.8	93.6	94.4	95.2
			Rural	%	39.5	48.3	52.2	56.6	61.5	66.9	68.3	69.7	71.1	72.6
	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	0.32	0.35	0.37	0.4
			Urban	%	0.76	0.5	0.4	0.4	0.4	0.4	0.42	0.45	0.47	0.5
			Rural	%	0.27	0.1	0.1	0.1	0.1	0.2	0.20	0.20	0.20	0.2
		Proportion of population using LPG as primary source for cooking	National	%	18.2	22.3	23.2	23.9	24.3	24.5	27.1	30.1	33.3	36.9
			Urban	%	28.9	35.8	35.6	35.3	35.1	34.8	38.3	42.3	46.6	51.3
			Rural	%	4.8	5.5	6.1	6.8	7.7	8.7	9.9	11.3	13.0	14.8
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[1]	%	53.1	47.3	48.5	44.8	45.2	46.9	44.1	42.7	40.5	39.6
			National[2]	%	8.8	8.5	8.5	6.4	6.5	6.3	6.1	6.7	6.0	5.76
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 $)		National	TOE/ million US$	73.8	68.7	68.2	69.7	67.5	61.4	68.2	65.8	72.2	71.8
	Energy intensity measured in terms of final energy consumption and GDP, PPP (constant 2017 international $)		National	TOE/ million US$	58.7	54.3	53.5	54.4	52.1	48.4	49.2	47.8	51.1	54.2

[1]Includes woodfuel

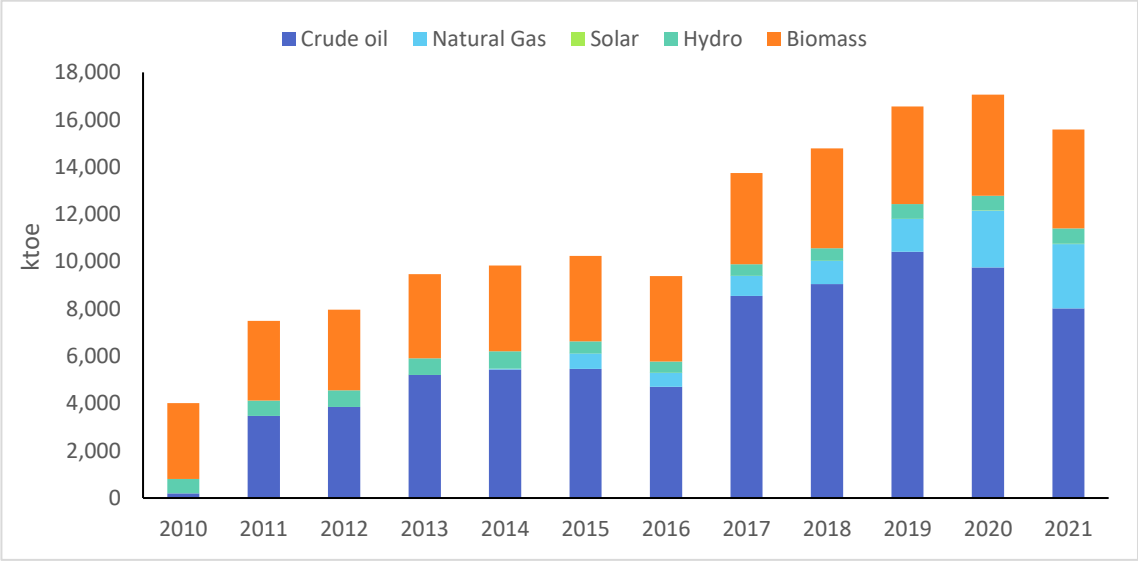
[2]Excludes woodfuel (electricity consumed from solar, biogas and hydro only)

Sources: Ghana Statistical Service 2010 Population and Housing Census, Ghana Living Standard Survey (GLSS 6 & 7), 2021 Population and Housing Census, Ministry of Energy & Energy Commission

ENERGY SUPPLY

PRODUCTION OF PRIMARY FUELS

Production of Primary Fuels, 2010 - 2021



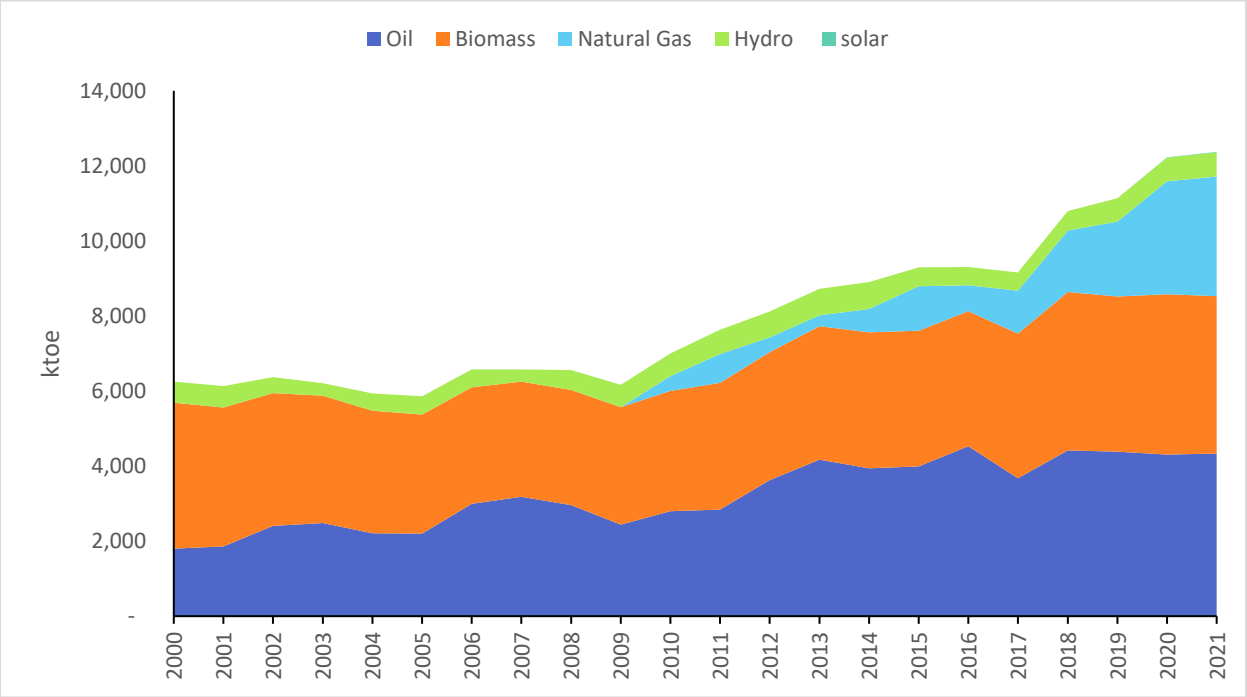
Production of Primary Fuels (ktoe)

TES	2010	2015	2016	2017	2018	2019	2020	2021
Crude Oil	199	5,458	4,706	8,547	9,054	10,410	9,752	8,022
Natural Gas	0	665	592	850	985	1,394	2,398	2,717
Solar	0	0	2	2	3	4	5	11
Hydro	601	503	478	483	517	624	627	647
Biomass	3,207	3,618	3,602	3,858	4,222	4,132	4,274	4,190
Total	4,007	10,244	9,381	13,741	14,781	16,564	17,056	15,586

Production of primary fuels increased at an average annual growth rate of 13.1%, from 4,007 ktoe in 2010 to 15,586 ktoe in 2021 largely driven by increase in crude oil production. Crude oil production increased at an average annual growth rate of by 39.9% from 2010 to 2021, reaching 8,022 ktoe in 2021.

TOTAL ENERGY SUPPLY

Total Energy Supply by Fuel, 2000 - 2021



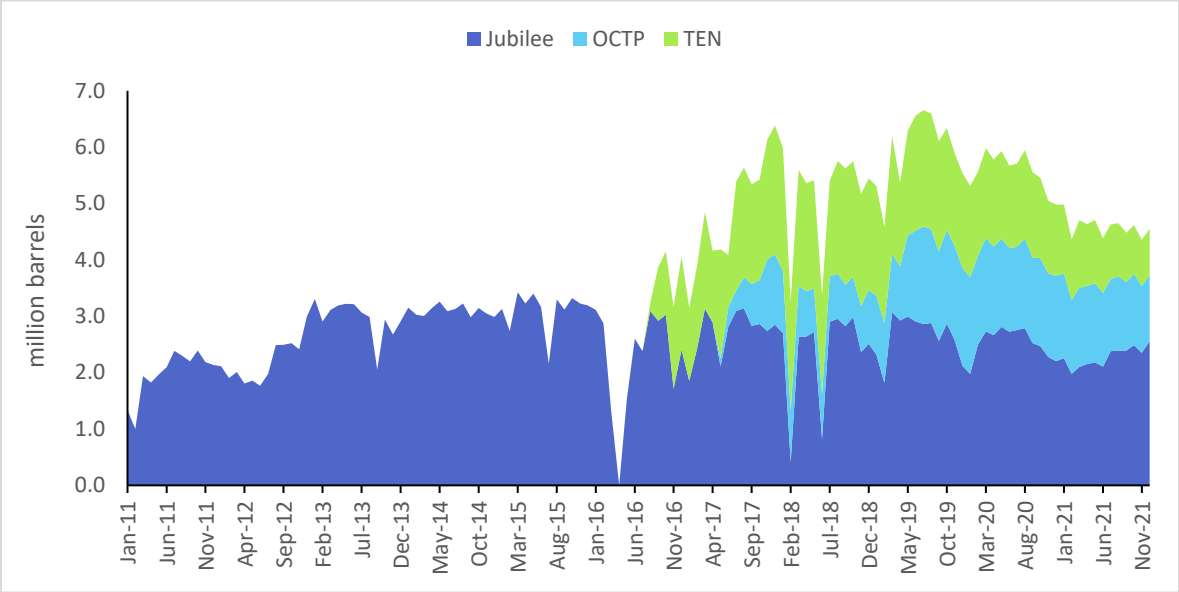
Total Energy Supply (ktoe)

TES	2000	2005	2010	2015	2020	2021
Oil	1,799	2,200	2,798	3,991	4,305	4,334
Natural Gas	-	-	394	1,185	3,014	3,189
Hydro	568	484	602	503	627	647
Solar	-	-	-	-	5	11
Biomass	3,888	3,174	3,207	3,618	4,274	4,190
Total	**6,255**	**5,858**	**7,001**	**9,296**	**12,225**	**12,371**

The country's total energy supply in 2021 was 12,371 ktoe representing an annual growth rate of 3.3% from 2000 to 2021. Prior to 2011, biomass constituted the largest share of the country's total energy supply. Subsequently, oil has become the dominant energy supply close reaching 33.9% in 2021.

CRUDE OIL PRODUCTION

Crude Oil Production, Jan 2011 – Dec 2021



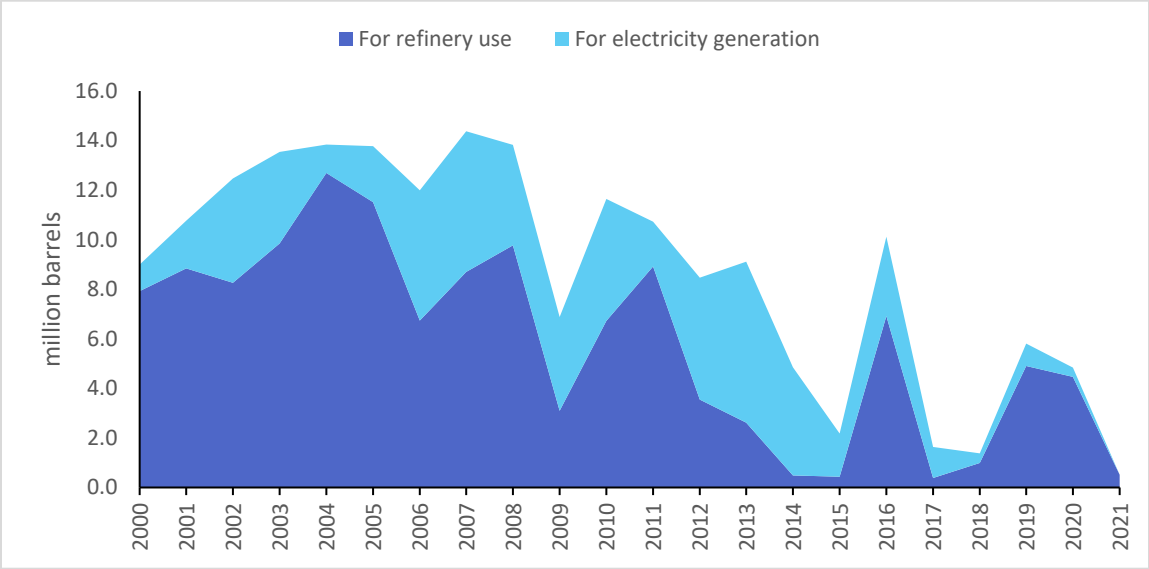
Crude Oil Production by field (mmbbls)

Year	Saltpond	Jubilee	TEN	OCTP	Total
2010	0.1	1.3	-	-	1.4
2012	0.1	26.4	-	-	26.5
2014	0.1	37.2	-	-	37.3
2016	-	27.0	5.3	-	32.3
2018	-	28.5	23.6	10.1	62.1
2020	-	30.4	17.8	18.7	66.9
2021	-	27.3	12.0	15.7	55.1

Crude oil production has been increasing at an average growth rate of 8.5% per annum from 2012 to 2021. A total of 55.1 million barrels of crude oil was produced from Ghana's three offshore producing fields in 2021. Crude oil production reduced by about 17.7% in 2021 over 2020, mainly due to the outbreak of COVID-19 pandemic.

CRUDE OIL IMPORT

Crude Oil Import, 2000 - 2021



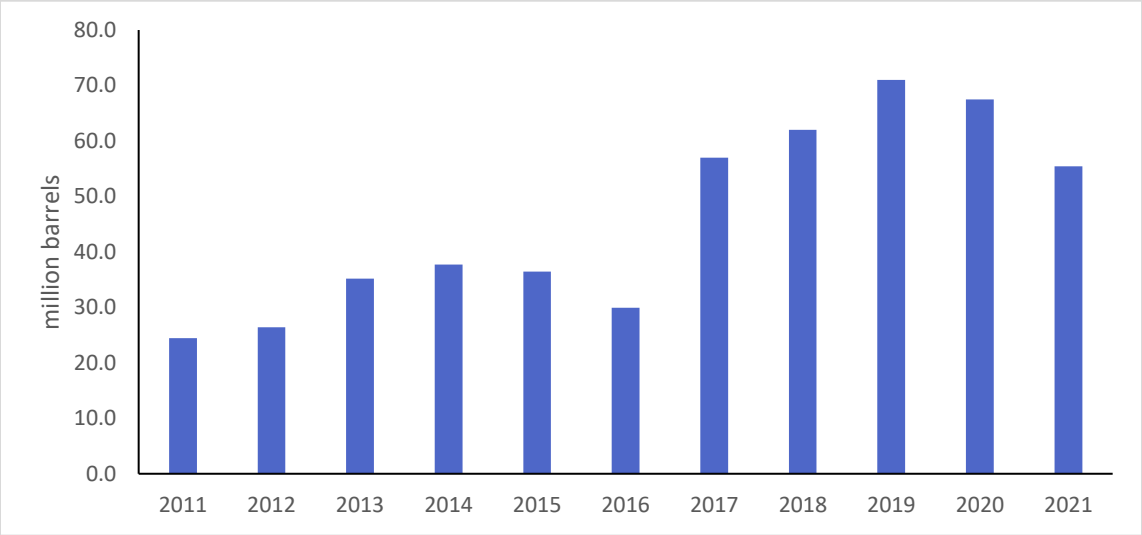
Crude Oil Import (MMBBL)

Use	2000	2005	2010	2015	2020	2021
For refinery	7.9	11.5	6.7	0.4	4.5	0.5
For electricity	1.1	2.3	4.9	1.7	0.4	0.0
Total	**9.0**	**13.8**	**11.6**	**2.2**	**4.8**	**0.5**

Total crude oil imports increased by 53.3% from 2000 to 2005 but dropped by 18.3% by the end of 2010. Crude oil import then declined drastically from 11.6 mmbls in 2010 to 0.5 mmbls in 2021 at an average annual rate of 24.7%.

CRUDE OIL EXPORT

Crude Oil Export, 2011 - 2021



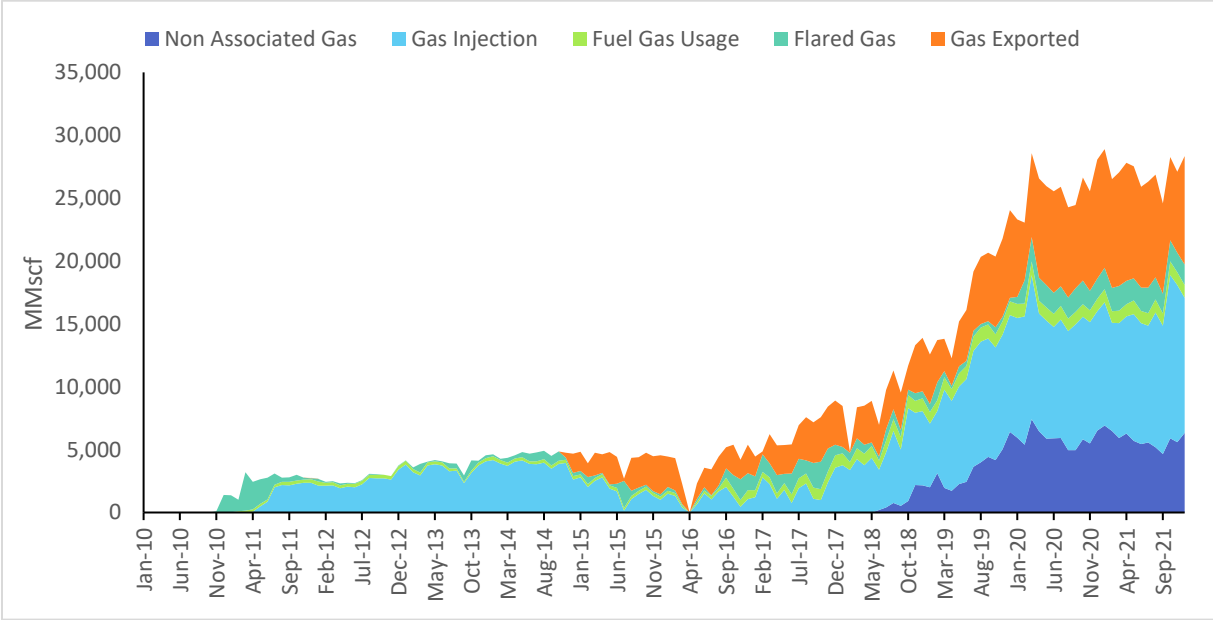
Crude Oil Export

Year	Export (Million barrels)	Total Merchandise Export (million US$)	Crude oil export as % of total merchandise export
2011	24.5	12,785.4	21.7
2012	26.4	13,552.4	22.0
2014	37.7	13,216.8	28.2
2016	29.9	11,136.9	12.1
2018	62.0	14,942.7	30.6
2020	67.5	14,471.5	20.1
2021	55.4	14,727.5	26.8

Crude oil export substantially increased in 2011 with the commencement of commercial production. It increased from 24.5 million barrels in 2011 to 55.4 million barrels in 2021, representing an average annual growth rate of 8.5%. Crude oil export witnessed a decline of 17.9% in 2021, over that of 2020 largely due to a decline in production.

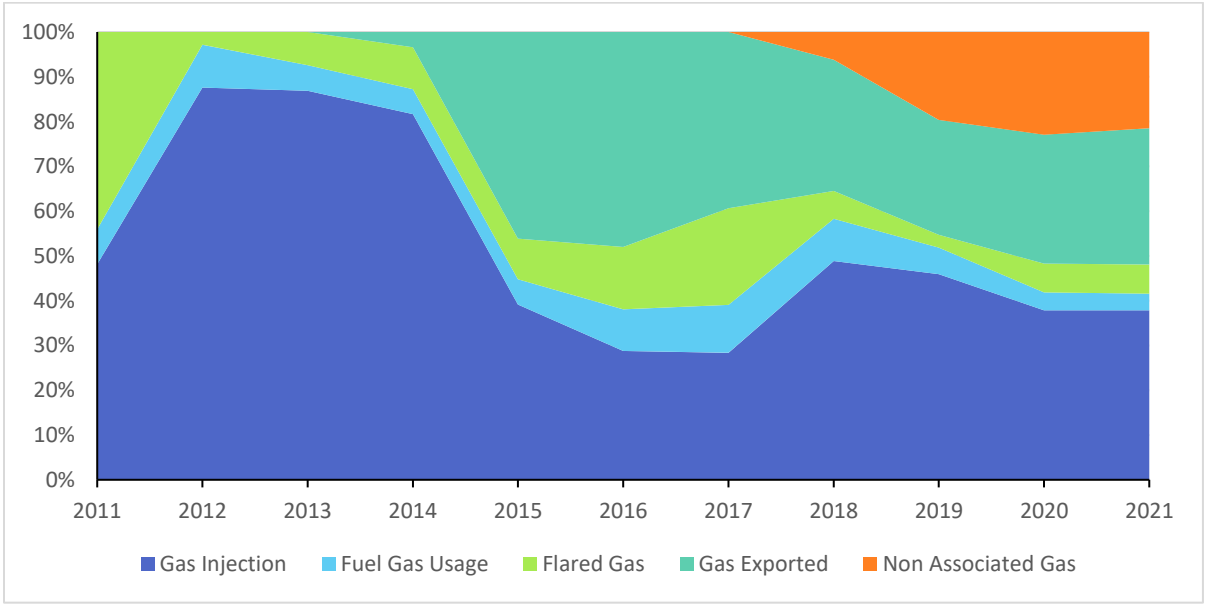
NATURAL GAS PRODUCTION

Natural Gas Extracted and Utilisation, Nov 2010 – Dec 2021



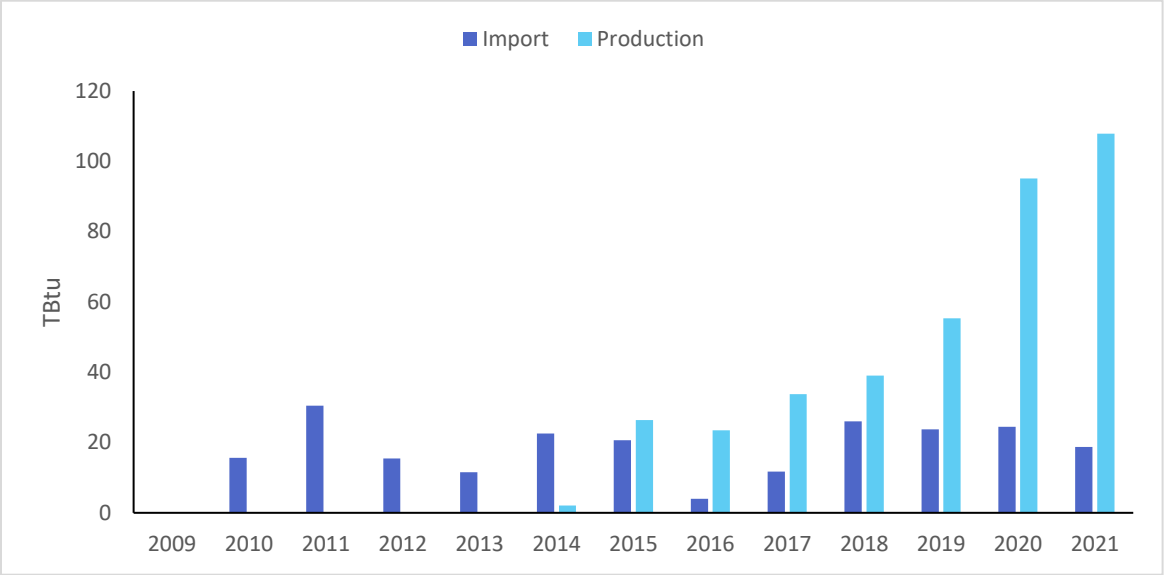
NB: All raw natural gas produced before November 2014 was used on the FPSO. It was injected, flared or used as fuel on the FPSO. Gas exported is the quantity transported through pipelines from the FPSO to the Gas processing plant.

Share in Annual Natural Gas Utilization



NATURAL GAS SUPPLY

Natural Gas Supply, 2009 - 2021



NB: Production includes natural gas production form GNGC and non-associated gas. Import is from Nigeria through the West Africa Gas pipelines.

Natural Gas Supply by Source

	Share (%) of total Supply							
	2014	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**
Import	91.7	43.9	14.6	25.8	40.0	30.0	20.4	14.8
Production	8.3	56.1	85.4	74.2	60.0	70.0	79.6	85.2

The total gas supplied to the country's consuming facilities was 127 tBtu in 2021. Around 18.7 tBtu (14.8%) of this volume was imported from Nigeria via the West African Gas Pipeline (WAGP), representing a decrease of 23.5% over the import volume in 2020. The remainder (85.2%) was supplied from indigenous sources. Gas supply from indigenous sources (Atuabo and non-associated gas) witnessed its greatest boost in 2021, with a total of 107.8 tBtu. The bulk of imported and indigenous gas is utilised by mainly the electricity generation system.

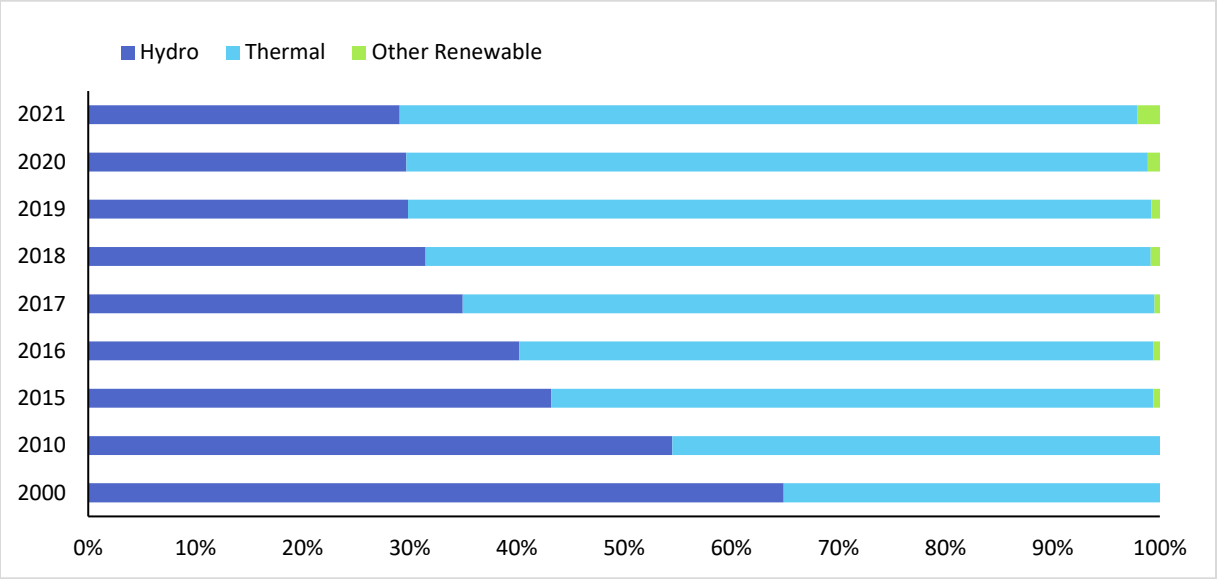
INSTALLED ELECTRICITY GENERATION CAPACITY

Installed Generation Capacities as at end of December 2021 (MW)

Plant	Installed Capacity	Dependable Capacity
Hydro Power Plants		
Akosombo	1,020	900
Kpong	160	140
Bui	404	360
Total Hydro	**1,584**	**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
Trojan	44	39.6
Amandi	203	190
AKSA	370	350
Cenpower	360	340
Early Power / Bridge	144	140
Genser[2]	155	131
Total Thermal	**3,753**	**3,481**
Other Renewables		
On-grid		
VRA Solar (Navrongo)[2]	2.5	2
VRA Solar (Lawra)[2]	6.5	4.5
VRA Solar (Kaleo)[2]	13	10
BXC Solar[2]	20	16
Meinergy[2]	20	16
Bui Solar[2]	50	46
Safisana Biogas[2]	0.1	0.1
Tsatsadu Hydro	0.05	0.05
Distributed Solar PV	30.9	-
Total Other Renewables On-grid	**143.05**	**95**
Off-grid		
Solar	7.42	-
Wind	0.02	-
Total Other Renewables Off-grid	**7.44**	**-**
Mini-grid		
Solar	0.31	-
Wind	0.01	-
Total Other Renewables Mini-grid	**0.33**	**-**
Total Other Renewables	**150.82**	**95**
Total	**5,487.82**	**4,975**

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

Installed Electricity Generation Capacity



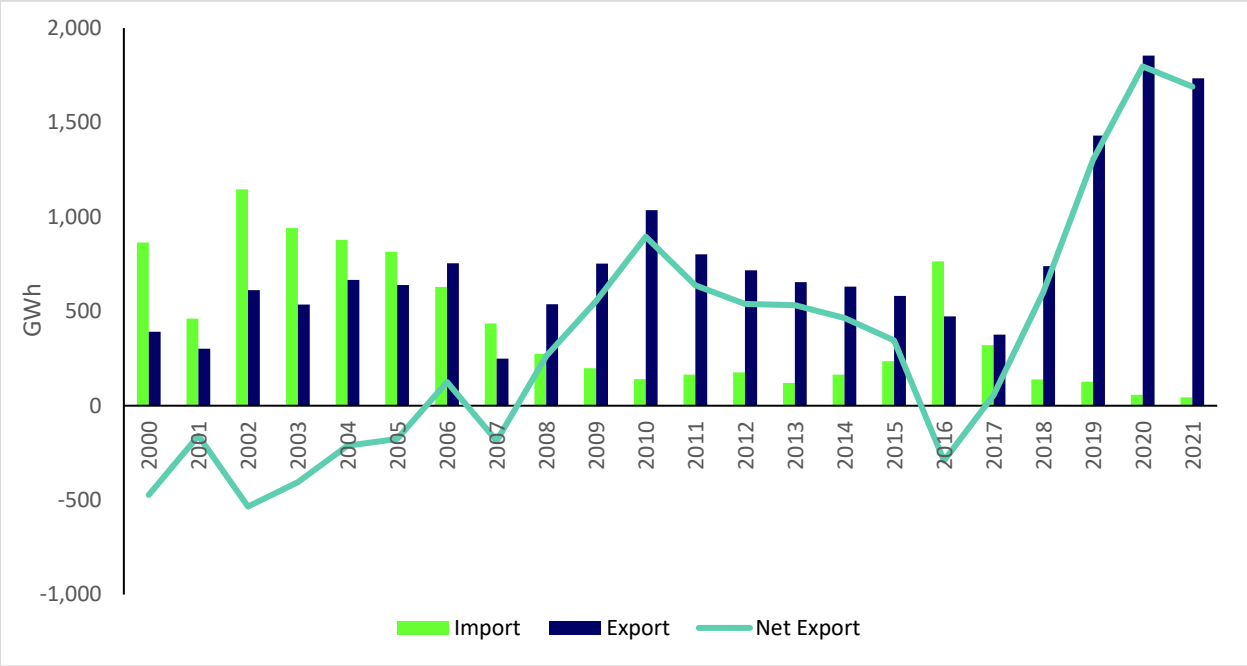
Share of Installed Electricity Generation Capacity

Generation Source	Shares (%)					
	2000	2005	2010	2015	2020	2021
Hydro	64.9	68.2	54.5	43.2	29.7	29.1
Thermal	35.1	31.8	45.5	56.2	69.2	68.9
Other Renewables	0.0	0.0	0.0	0.6	1.1	2.1
Total	**100**	**100.0**	**100**	**100**	**100**	**100**

Total installed grid electricity generation capacity, excluding off-grid and mini-grid renewable facilities, increased from 2,165 MW in 2010 to 5,481 MW in 2021, representing an annual average growth of 8.8%. The long-term dependable capacity increased at an average annual growth rate of approximately 8.9% from 1,940 MW in 2010 to 4,975 MW in 2021.

ELECTRICITY IMPORT AND EXPORT

Electricity Import and Export, 2000 - 2021



NB: negative net export means net import

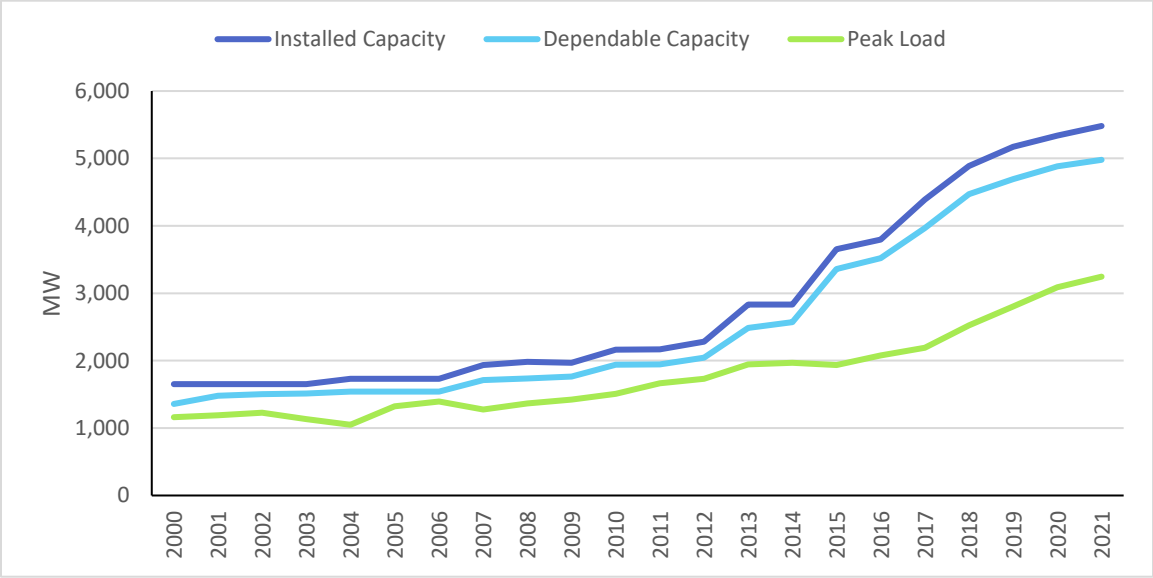
Electricity Import and Export (GWh)

	2000	2005	2010	2015	2020	2021
Import	864	815	140.7	235.5	58.3	43.7
Export	392	639	1,036.3	581.4	1,855.1	1,734
Net Export	-472	-176	895.6	345.8	1,796.8	1,690.3

The electricity exported in 2021 was 1,734 GWh representing 6.5% reduction over that of 2020. Electricity imports also, reduced from 58.3 GWh in 2020 to 43.7 GWh in 2021, representing a decline of 25%.

GENERATION CAPACITY AND PEAK LOAD

Installed Capacity, Dependable Capacity and Peak Load, 2000 - 2021



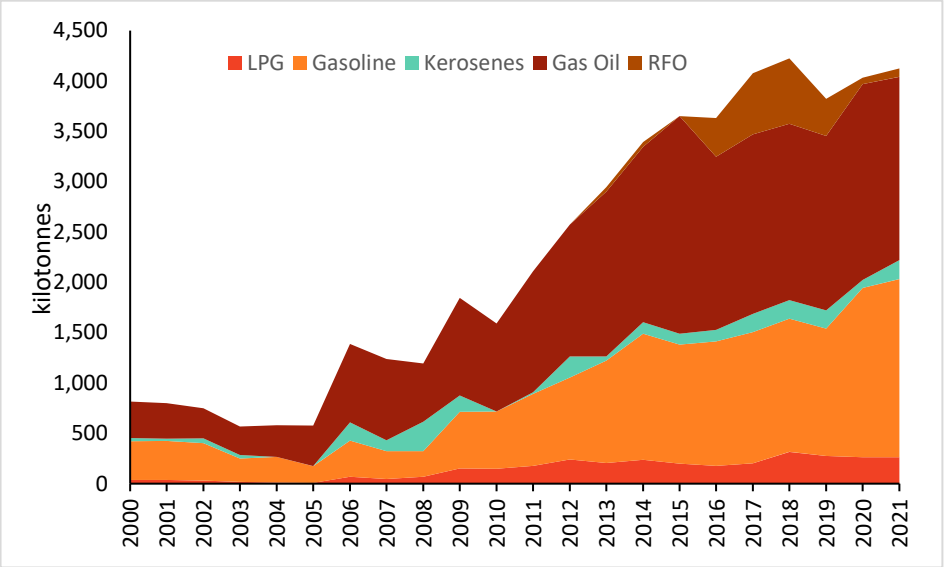
Generation Capacity and Peak Load (MW)

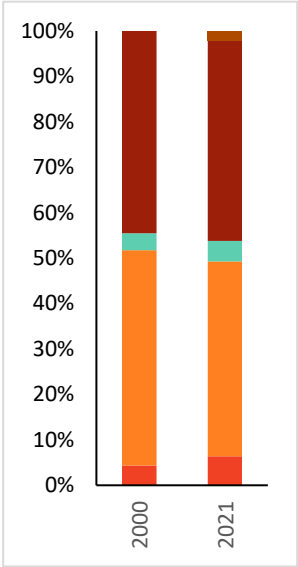
	2000	2005	2010	2015	2020	2021
Installed Capacity	1,652	1,730	2,165	3,656	5,336	5,449
Dependable Capacity	1,358	1,540	1,940	3,359	4,881	4,975
Peak Load	1,161	1,325	1,506	1,933	3,090	3,246

System peak load (Ghana Load at Peak + VALCO load + export load) increased from 1,161 MW in 2000 to 3,246 MW in 2021, representing an average annual growth rate of 4.8%. The system peak load witnessed an increase of 5% in 2021 over 2020. The total dependable capacity, increased from 1,358 MW in 2000 to 4,975 MW in 2021 at an average annual growth rate of 6.4%.

PETROLEUM PRODUCT IMPORT

Trend in Petroleum Product Import, 2000 - 2021





Kerosenes =ATK + DPK + Kerosene

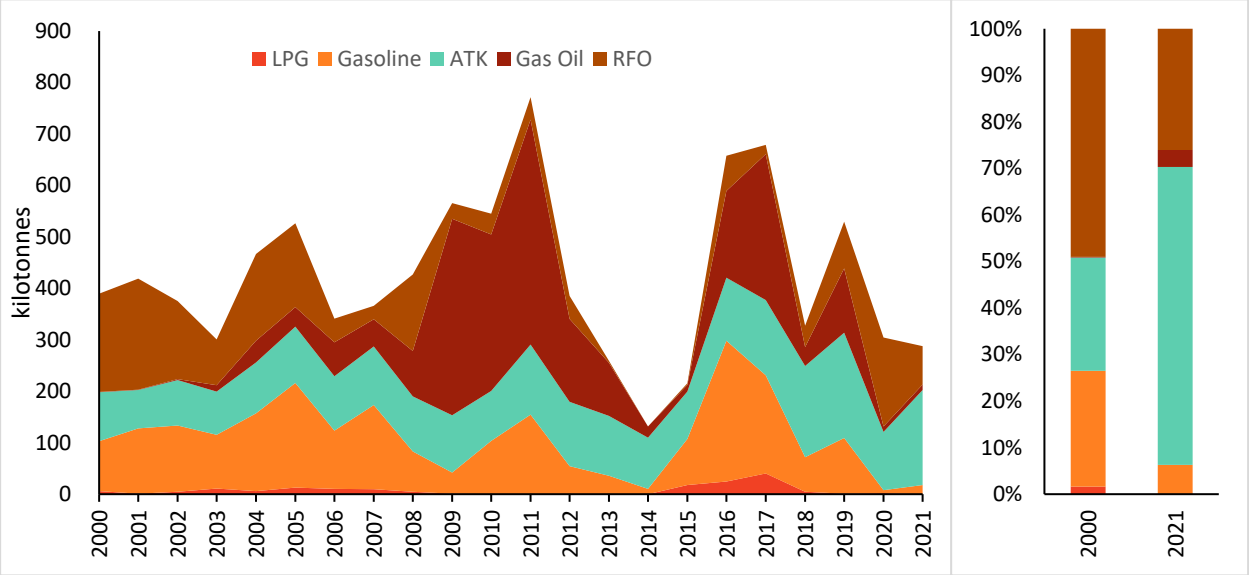
Petroleum Product Import (kilotonnes)

	2000	2005	2010	2015	2020	2021
LPG	35	7	148	198	262	263
Gasolines	387	167	570	1,182	1,682	1,769
Kerosenes	30	-	-	109	80	188
Gas Oil	363	404	872	2,161	1,947	1,820
RFO	-	-	-	-	63	85
Total	**816**	**578**	**1,590**	**3,650**	**4,033**	**4,126**

Importation of gasoline and gasoil increased at an average annual growth rate of 7.5% and 8%, respectively, from 2000 to 2021. ATK recorded a drastic increase of about 137% in 2021 from the 2020 import volume. RFO import volumes, on the other hand increased by 40% in 2021 from the preceding year's volume.

PETROLEUM PRODUCT EXPORT

Petroleum Product Export, 2000 - 2021



Petroleum Product Export (kilotonnes)

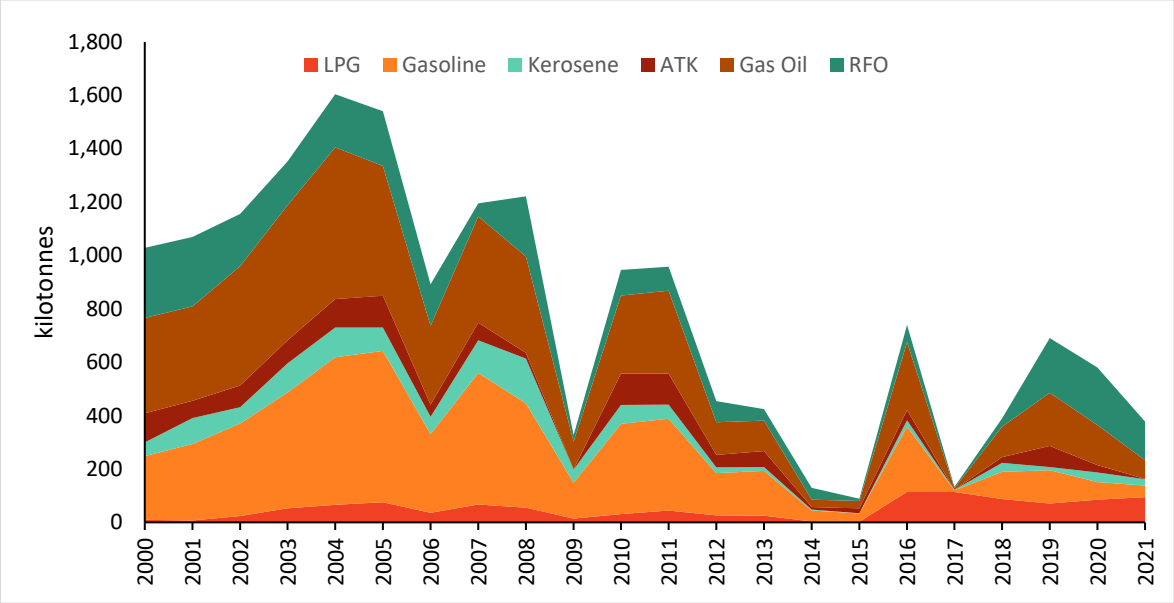
	2000	2005	2010	2015	2020	2021
LPG	6	13	0	18	3	0.04
Gasolines	97	204	104	90	5	18
ATK	95	110	97	92	113	184
Gas Oil	1	38	304	13	10	10
RFO	191	163	41	3	173	75
Total	**389**	**526**	**545**	**215**	**305**	**288**

LPG export decreased at an average annual rate of 21.2%, from 6 kt in 2000 to 0.04 kt in 2021. ATK export (including volumes transferred to aircrafts engaged in international aviation bunkering) increased from 95 kt in 2000 to 184 kt in 2021 at an annual growth rate of 3.2%. Volumes of RFO export decreased at an average annual rate of 4.4% from 2000 to 2021.

TRANSFORMATION

REFINERY PRODUCTION

Refinery Production by Production (2000-2021)



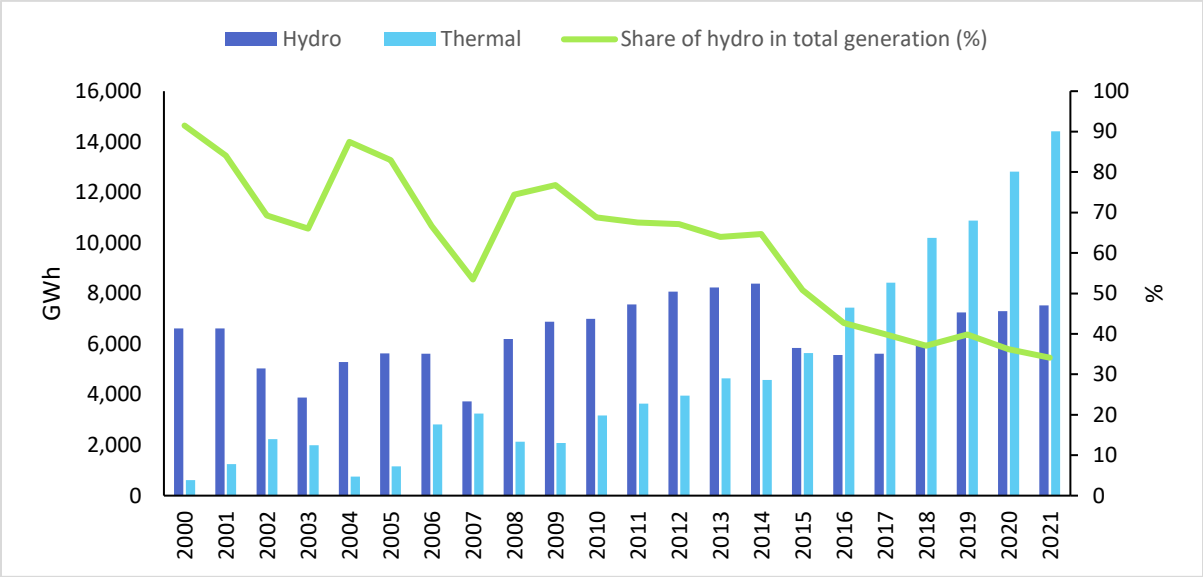
Refinery Production by Product (kilotonnes)

	2000	2005	2010	2015	2020	2021
LPG	9.7	75.3	31.6	2.0	84.9	94.9
Gasolines	238.6	567.1	337.7	31.8	66.5	43.5
Kerosene	51.8	87.7	71.0	0.2	35.5	23.6
ATK	108.3	119.0	116.7	18.2	27.6	0.7
Gas Oil	358.1	486.3	292.6	28.0	149.6	70.0
Fuel Oils	261.9	205.4	96.8	8.9	216.1	145.4
Total	**1,028.4**	**1,540.8**	**946.4**	**89.1**	**580.2**	**378.1**

Production of petroleum products reduced, by almost two-thirds, from 1,028 kt in 2000 to 378 kt in 2021. The lowest level of production of petroleum products in the country was recorded in 2015, with a production level of 89 kt.

ELECTRICITY PRODUCTION

Electricity Production, 2000 - 2021



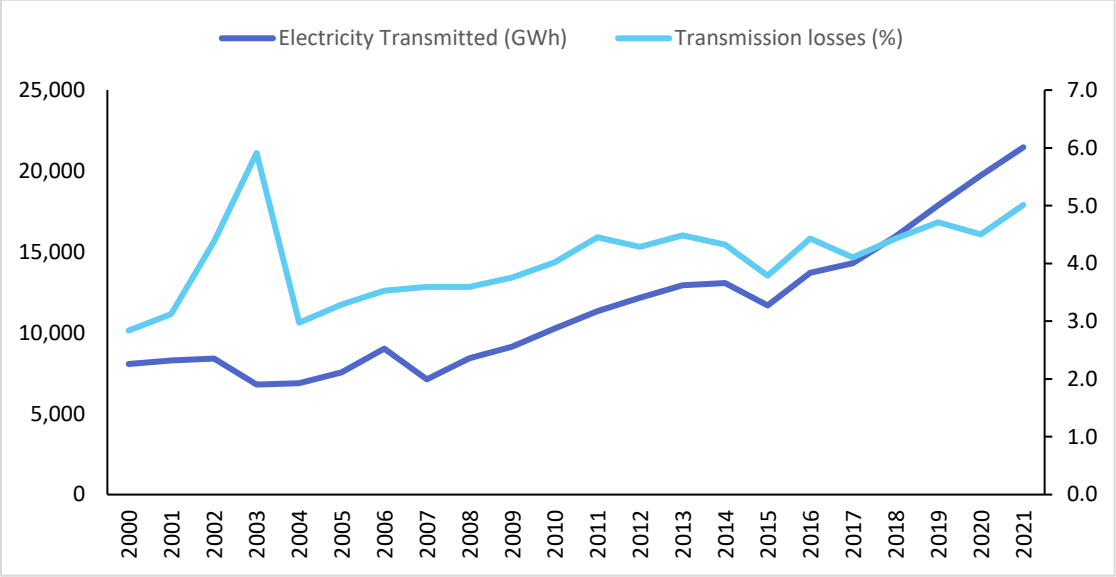
Share (%) of Electricity Production

	2000	2005	2010	2015	2020	2021
Hydro	91.5	82.9	68.8	50.9	36.2	34.1
Thermal	8.5	17.1	31.2	49.1	63.6	65.3
Renewables	-	-	-	0.03	0.3	0.6
Total	**100**	**100**	**100**	**100**	**100**	**100**

Total electricity generation increased from 7,224 GWh in 2000 to 22,051 GWh in 2021, representing an average annual increase of 5.5%. The share of hydro in the total electricity generation decreased from 92% in 2000 to 34.1% in 2021 whilst that of thermal increased from 8% in 2000 to 65.3% in 2021. Generation from renewable sources increased from 3 GWh in 2013 to 122 GWh by the end of 2021.

ELECTRICITY TRANSMISSION

Electricity Transmitted, 2000 - 2021



Electricity Transmitted and Transmission Losses

	2000	2005	2010	2015	2020	2021
Electricity Transmitted (GWh)	8,067	7,565	10,267	11,692	19,717	21,466
Transmission Losses (GWh)	229	249	413	443	888	1,076
Transmission Losses (%)	2.8	3.3	4.0	3.8	4.5	5.0

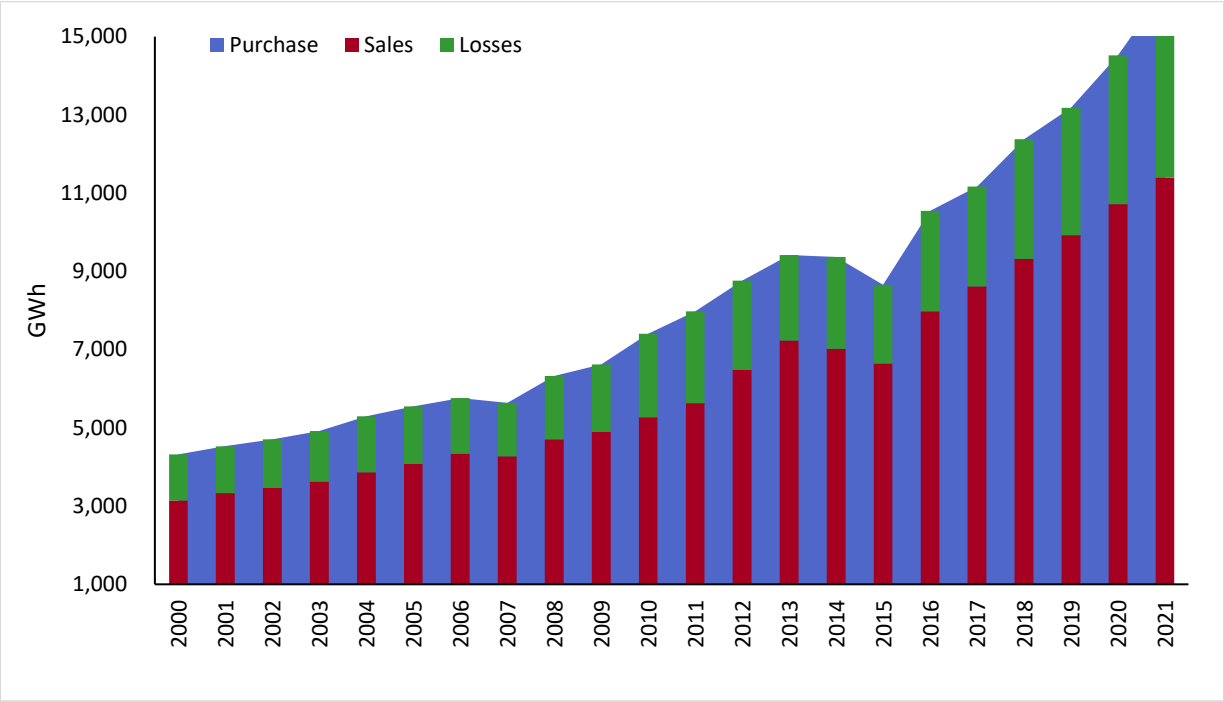
The total electricity transmitted in 2021 was 21,466 GWh, representing an 8.9% increase over that of 2020. This was made up of 7,520.7 GWh (35%) from hydro generation, 13,849 GWh (64.5%) from thermal generation[1], 52.8 GWh (0.3%) from Solar (directly connected to the NITs) and 43.7 GWh (0.2%) import.

The total transmission losses recorded in 2021 was about 1,076 GWh which is 5% of the total energy transmitted in the 2021 (21,466 GWh).

[1] Excluding Genser (distributed generation)

ELECTRICITY DISTRIBUTION

Electricity Purchases and Sales by Distribution Utilities, 2000 - 2021



Sales and Distribution Losses

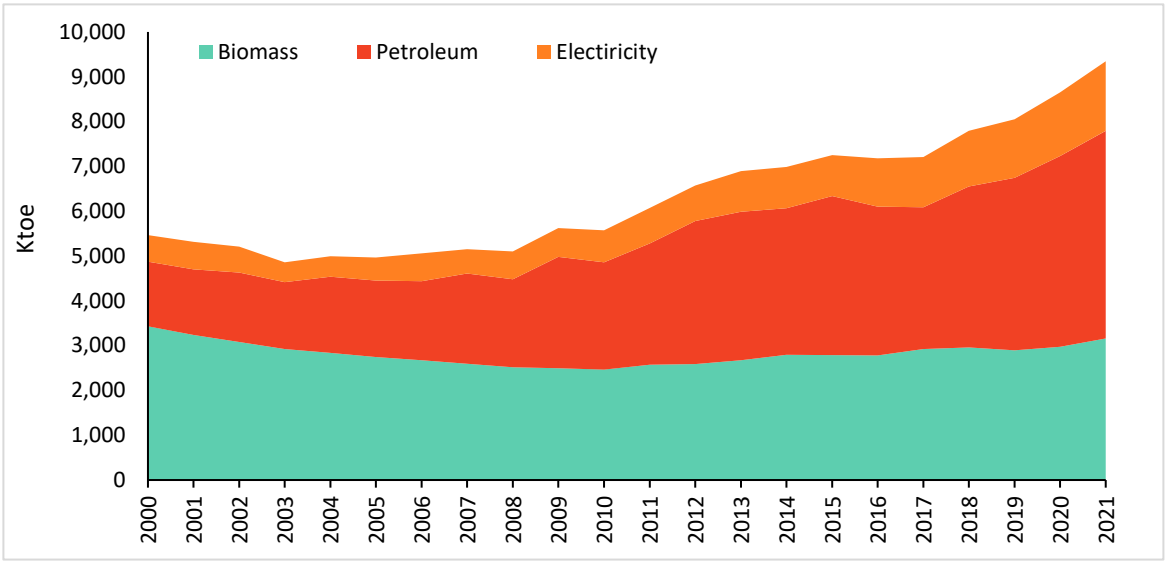
Year	Purchases (GWh)	Sales (GWh)	Distribution Losses[1]	
			GWh	%
2000	4,319	3,142	1,176	27.2
2005	5,546	4,072	1,474	26.6
2010	7,406	5,266	2,139	28.9
2015	8,659	6,646	2,013	23.3
2020	14,524	10,717	3,807	26.2
2021	16,219	11,394	4,809	29.7

[1]Distrubution losses is made up of both technical and commercial losses

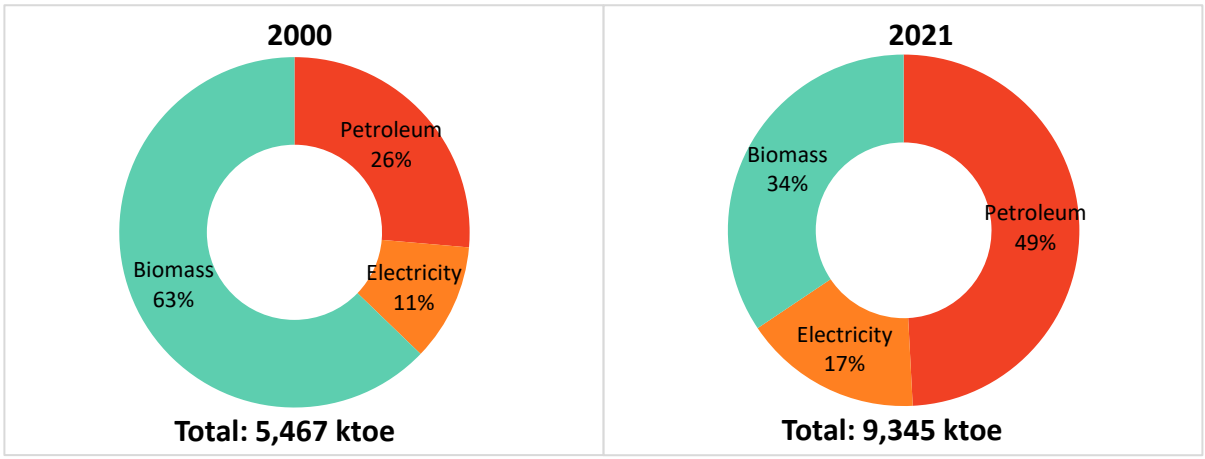
FINAL ENERGY CONSUMPTION

FINAL ENERGY CONSUMPTION

Final Energy Consumption by fuel Type (2000-2021)

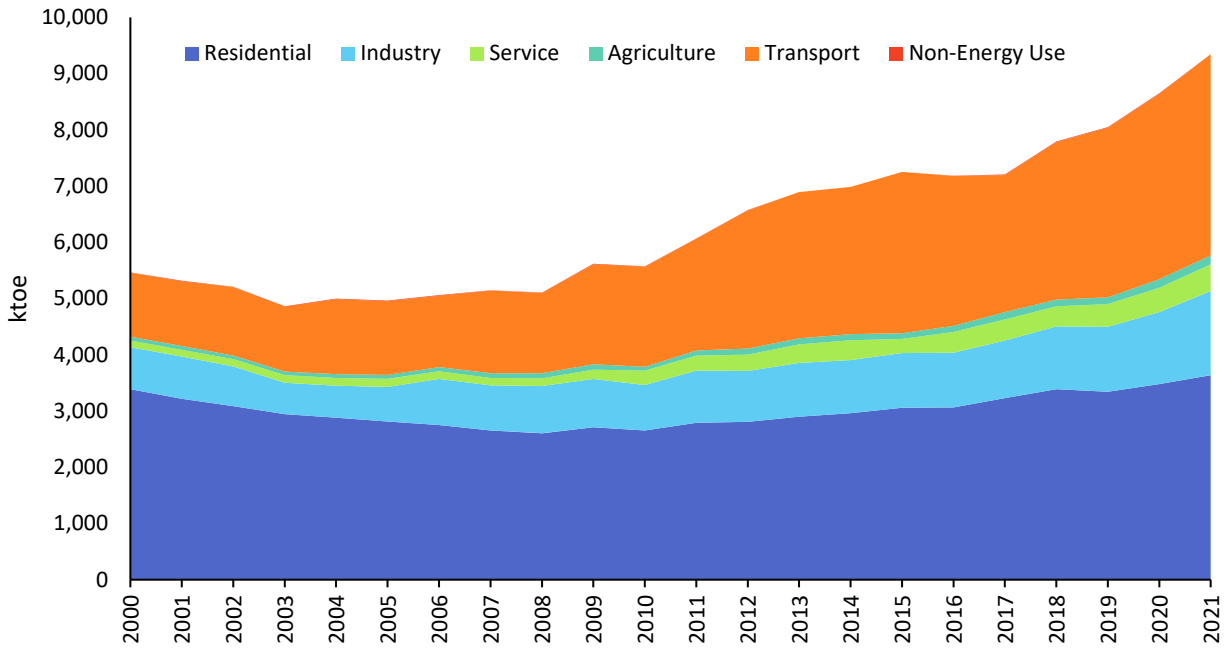


2000 and 2021 Share of Final Energy Consumption by Fuel Type

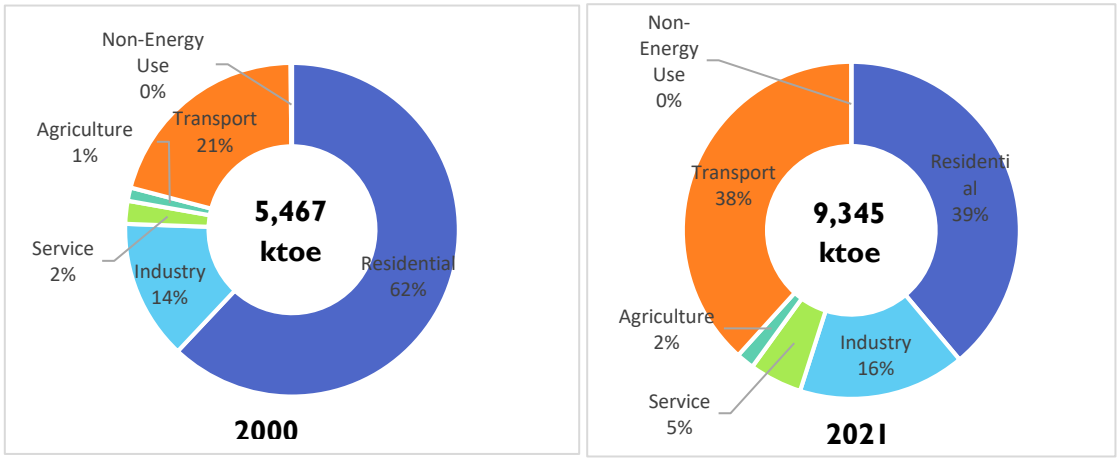


Final energy consumption increased at an annual average growth rate of 2.6%, from 5,467 ktoe in 2000 to 9,345 ktoe in 2021. The share of biomass in total final energy consumed decreased from 63% in 2000 to 34% in 2021.

Final Energy Consumption by Sector

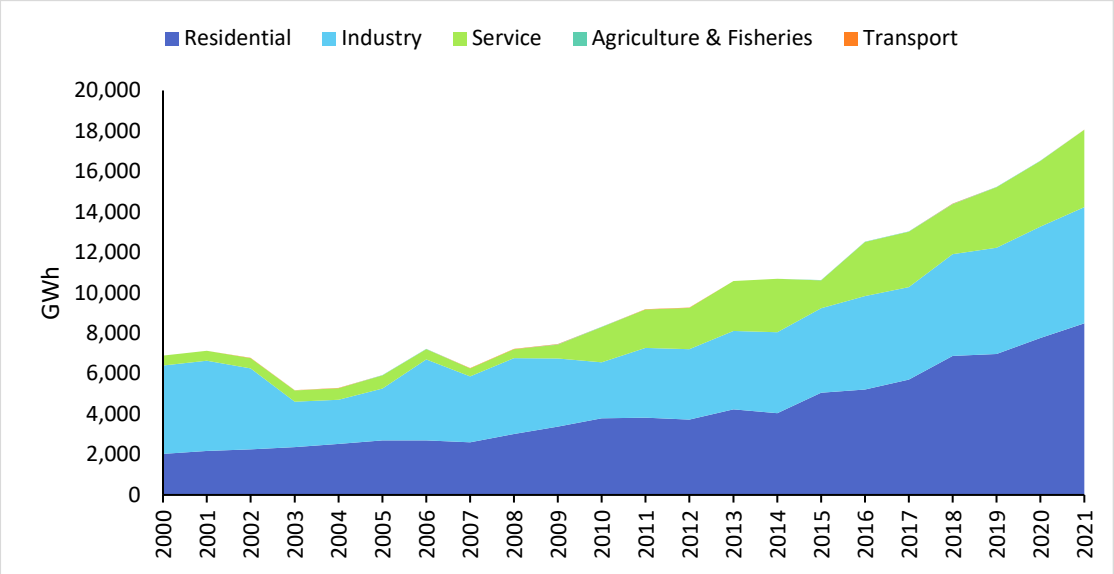


2000 and 2021 Share of Final Energy Consumption by Sector

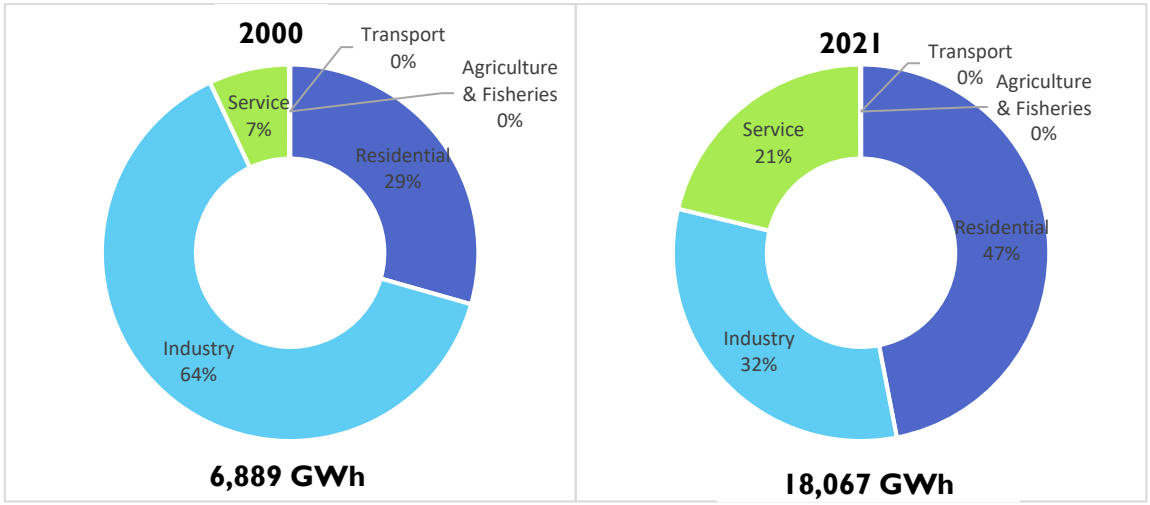


Final energy consumed by the residential sector in 2000 was 3,390 ktoe representing 61.9% of the total final energy consumed. In 2021, however, final energy consumed by the residential sector reduced marginally to 3,636 ktoe representing 38.9% of total final energy consumed by all sectors of the economy. Final energy consumed by the transport sector, increased from 1,149 ktoe in 2000, representing 21.0% of total energy consumed, to 3,578 ktoe in 2021, representing 38.3% of total energy consumed by all sectors.

Electricity Consumption by Sector

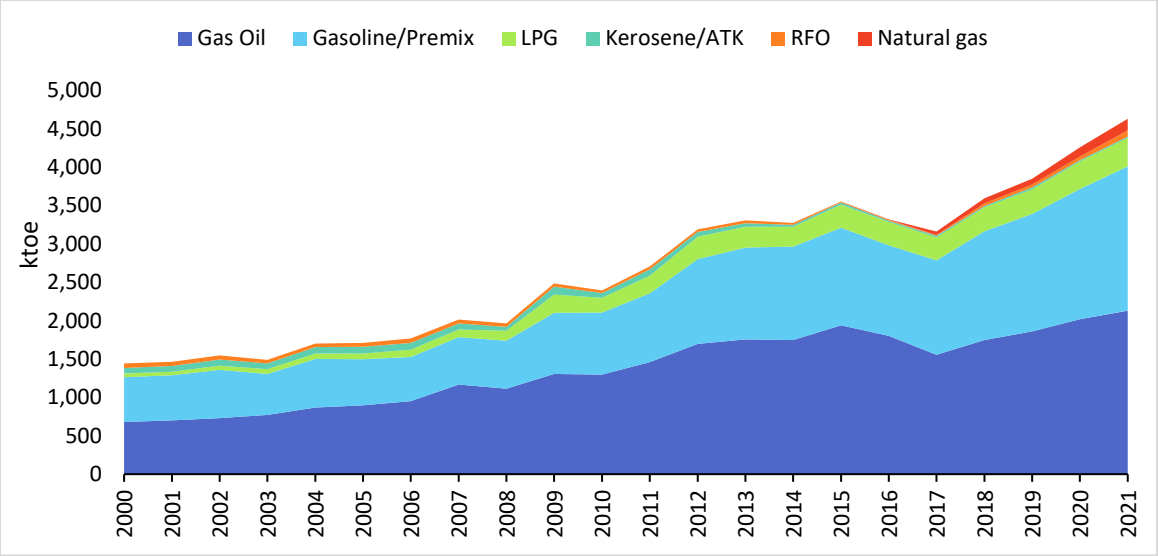


2000 and 2021 Share of Electricity Consumption by Sector

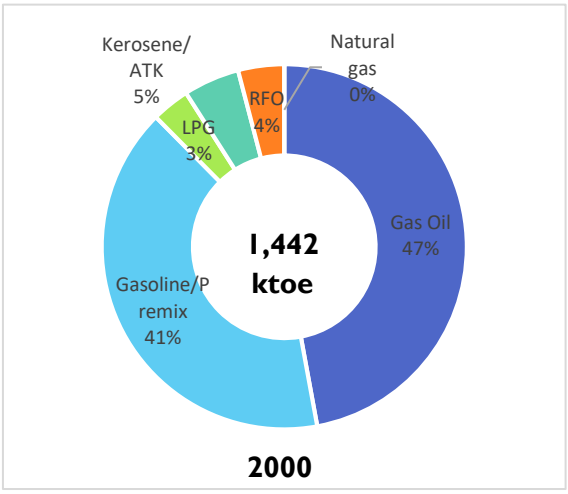


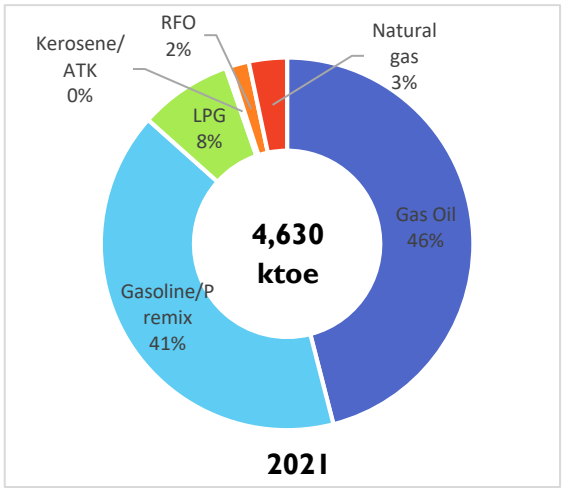
In 2000, the industrial and residential sectors consumed 4,380 GWh and 2,026 GWh of electricity respectively, representing 64% and 29% of total electricity consumed respectively. However, in 2021, the share of residential in final electricity consumption increased to 47%, representing 8,484 GWh, followed by the industrial sector with a share of 31.8% representing 5,746 GWh.

Petroleum Product Consumption by fuel type (2000 to 2021)



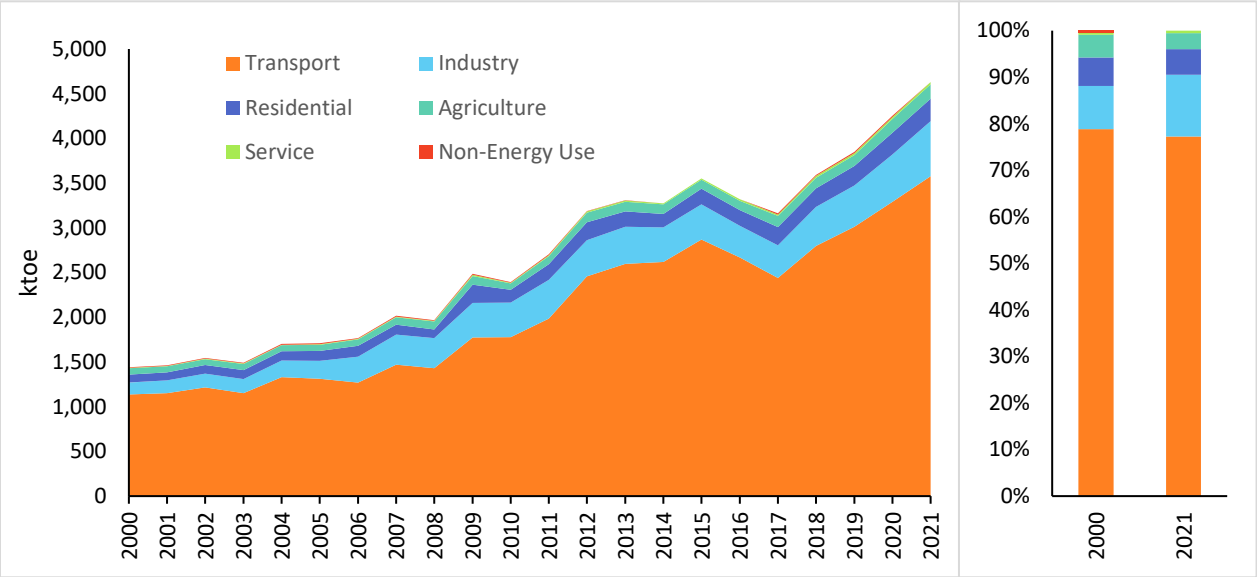
2000 and 2021 Share of Petroleum Products Consumption





Total petroleum products consumed increased at an annual average growth rate of 5.7% from 1,442ktoe in 2000 to 4,630ktoe in 2021. The share of gas oil in final petroleum product consumption average about 51.6% from 2000 to 2021 whilst LPG share of final petroleum product consumed increased from 3.4% in 2000 to 8.1% in 2021.

Petroleum Product Consumption by Sector (2000 to 2021)



Petroleum Product Consumption by Sector (Ktoe)

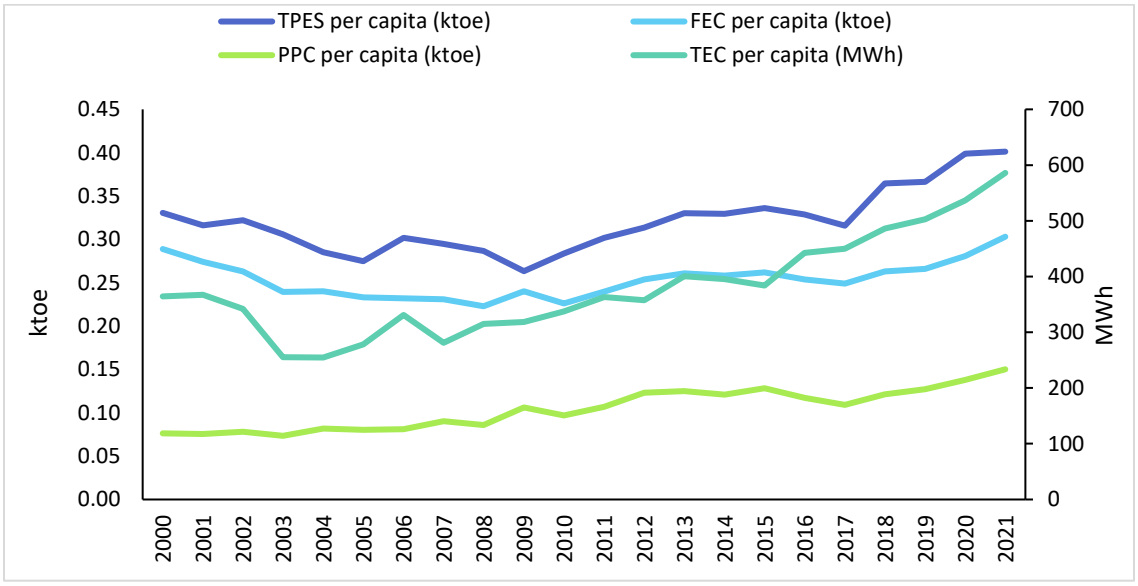
	2000	2005	2010	2015	2020	2021
Residential	88	112	144	174	242	252
Industry	134	201	386	396	531	615
Service	5	6	8	14	23	25
Agriculture	70	68	71	100	152	160
Transport	1,136	1,312	1,776	2,867	3,292	3,577
Non-Energy Use	7	10	7	1	15	0
Total	1,442	1,708	2,394	3,552	4,255	4,630

In 2000, 1,136 ktoe of petroleum products were consumed by the transport sector representing 79% of the total petroleum products consumed. It tripled to 3,577 ktoe in 2021, representing 77.3% of the total petroleum product consumed. The share of total petroleum products consumed in the industrial sector in 2000 was 9.3%, increasing to 13.3% in 2021. Consumption of petroleum products in the residential sector which is largely LPG, increased from 88 ktoe (6.1% of total consumption) in 2000 to 252 ktoe (5.4% of total consumption) in 2021.

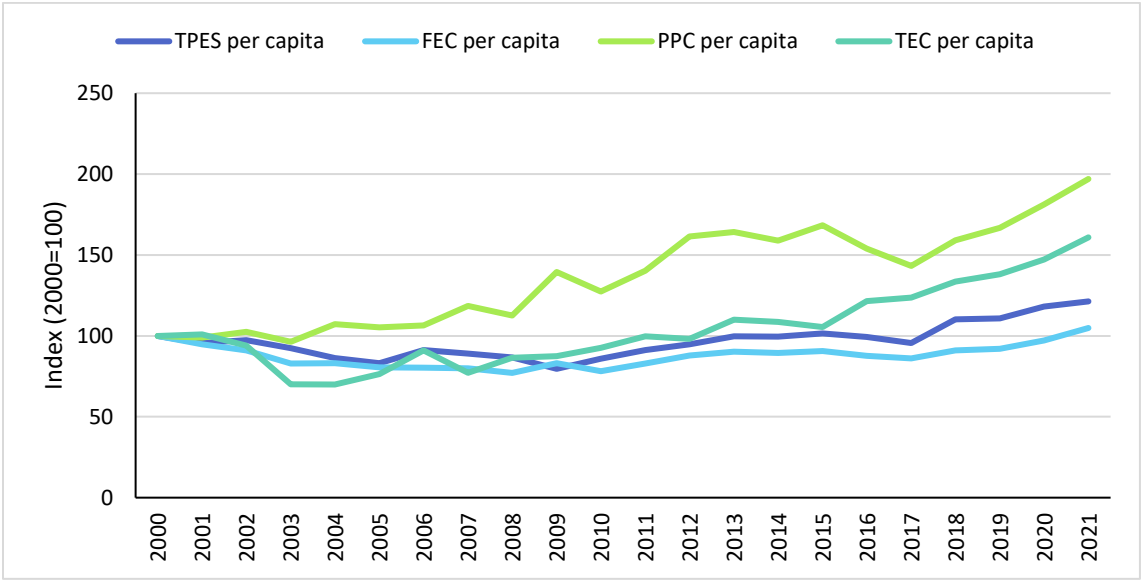
ENERGY INDICATORS

ENERGY SUPPLY AND CONSUMPTION PER CAPITA

Energy Supply and Consumption per capita, 2000 - 2021

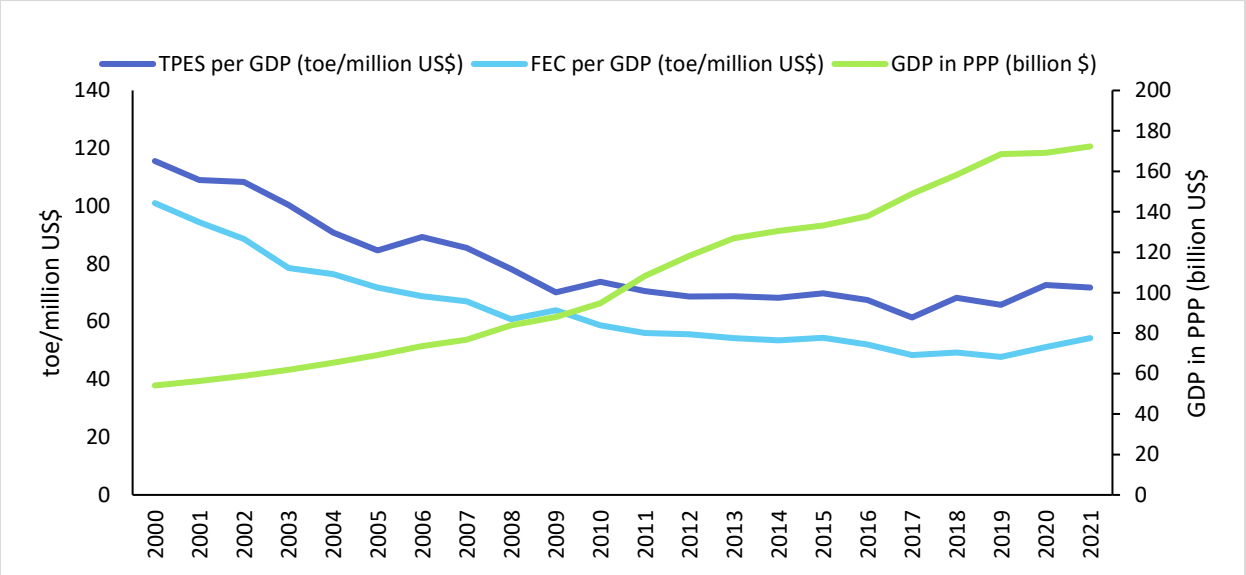


Energy Supply and Consumption per capita Index (2000=100)

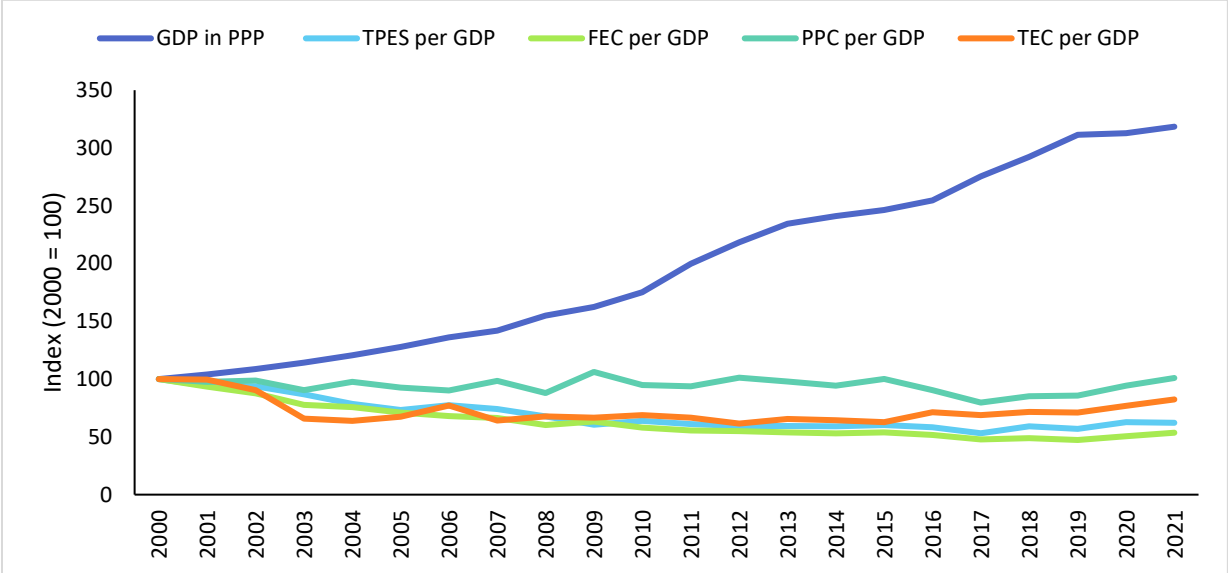


ENERGY SUPPLY AND CONSUMPTION PER GDP

Energy Supply and Consumption per GDP, 2000 - 2021



Energy Supply and Consumption per GDP, Index (2000 = 100)



NB: TPES = Total Primary Energy Supply;
PPC = Petroleum Product Consumption;
GDP in PPP = Gross Domestic Product in Purchasing Power parity
FEC = Final Energy Consumption
TEC = Total Electricity Consumption

ENERGY BALANCE

2021 Energy Balance, ktoe

Supply and Consumption	Crude Oil	Natural Gas	Petroleum Products	Wood	Charcoal	Solar	Hydro	Electricity	Total
Production	8,120	2,717	-	4,190	-	11	647	-	15,685
Imports	75	471	4,275	-	-	-	-	4	4,825
Exports	-8,075	-	-96	-	1	-	-	-149	-8,318
Intl. Marine Bunkers	-	-	-7	-	-	-	-	-	-7
Intl. Aviation Bunkers	-	-	-190	-	-	-	-	-	-190
Stock changes	29	-	203	-	-	-	-	-	232
TES	**149**	**3,189**	**4,186**	**4,190**	**1**	**11**	**647**	**-145**	**12,227**
Transfers	-98	-	105	-	-	-	-	-	7
Statistical differences	-297	291	-11	0	3	0	0	0	-15
Electricity plants	-52	-2,745	-79	-	-	-11	-647	1,896	-1,637
Oil refineries	-242	-	285	-	-	-	-	-	43
Other transformation	-	-	-	-2,225	1,198	-	-	-	-1,027
Energy industry own use	24	-	32	-	-	-	-	62	118
Losses	30	-	-	-	-	-	-	135	165
TFC	**-**	**153**	**4,477**	**1,965**	**1,197**	**-**	**-**	**1,553**	**9,345**
Residential	-	-	252	1,542	1,113	-	-	729	3,636
Industry	-	153	462	384	3	-	-	494	1,497
Commerce & Service	-	-	25	39	81	-	-	329	474
Agriculture & Fisheries	-	-	160	-	-	-	-	0	161
Transport	-	-	3,577	-	-	-	-	0	3,578
Non-Energy Use	-	-	0.00021	-	-	-	-	-	0

2020 Energy Balance, ktoe

Supply and Consumption	Crude Oil	Natural Gas	Petroleum Products	Wood	Charcoal	Solar	Hydro	Electricity	Total
Production	9,841	2,398		4,274	-	5	627	-	17,145
Imports	706	616	4,177	-	0.02	-	-	5	5,504
Exports	-9,830	-	-181	-	-1	-	-	-160	-10,171
Intl. Marine Bunkers	-	-	-5	-	-	-	-	-	-5
Intl. Aviation Bunkers	-	-	-117	-	-	-	-	-	-117
Stock changes	7	-	-223	-	-	-	-	-	-215
TES	**724**	**3,014**	**3,651**	**4,274**	**-1**	**5**	**627**	**-155**	**12,140**
Transfers	-88	-	95	-	-	-	-	-	6
Statistical differences	0	132	-35	0	0	0	0	0	97
Electricity plants	-53	-2,764	-107	-	-	-5	-627	1,734	-1,822
Oil refineries	-516	-	498	-	-	-	-	-	-18
Other transformation	-	-	-	-2,807	1,511	-	-	-	-1,297
Energy industry own use	21	-	34	-	-	-	-	49	104
Losses	45	-	-	-	-	-	-	110	155
TFC	**-**	**118**	**4,137**	**1,467**	**1,510**	**-**	**-**	**1,421**	**8,653**
Residential	-	-	242	1,163	1,404	-	-	668	3,477
Industry	-	118	413	275	4	-	-	473	1,282
Commerce & Service	-	-	23	29	102	-	-	279	433
Agriculture & Fisheries	-	-	152	-	-	-	-	1	153
Transport	-	-	3,292	-	-	-	-	1	3,293
Non-Energy Use	-	-	15	-	-	-	-	-	15

ENERGY PRICES

CRUDE OIL PRICES

Average Crude Oil Prices ($/bbls), Jan 2001 – Dec 2021

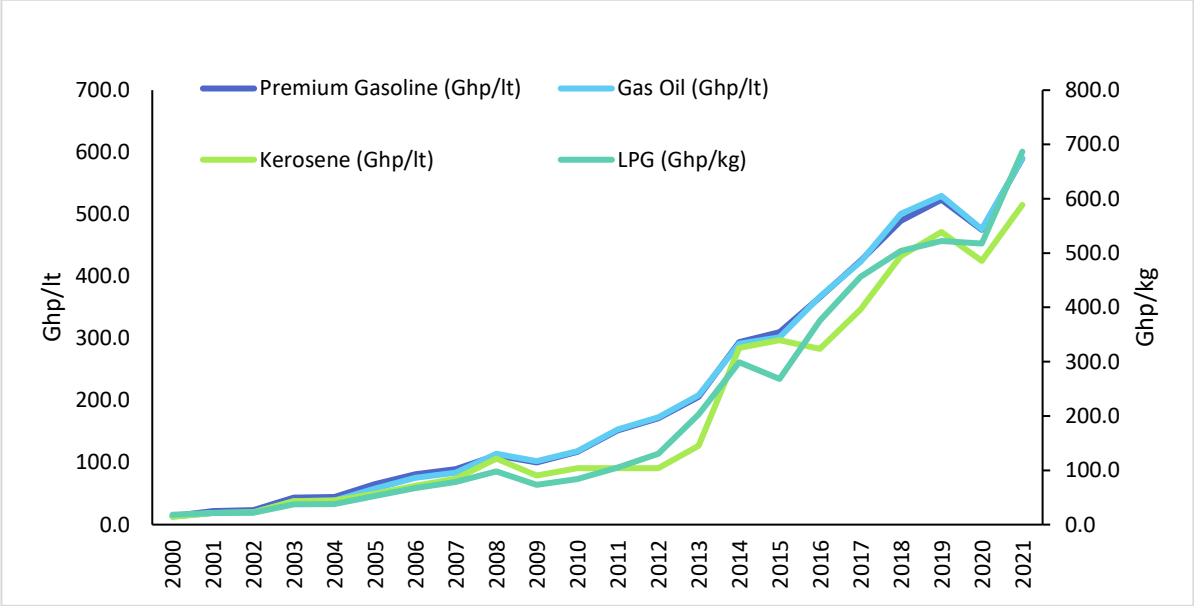
Monthly Average Crude Oil Prices ($/bbls)

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2000	27.3	29.5	29.8	25.7	28.7	31.8	29.7	31.3	33.9	33.1	34.4	28.4
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
2010	76.9	74.7	79.9	85.7	77	75.7	75.5	77.1	78.2	83.5	86.1	92.4
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	73.9	79.1	80.6	66	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	41.9	41.4	44	50.2
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

As of December 2021, the average price of crude oil stood at 74.8 U.S. dollars per barrel, an increase of 24.6 U.S. dollars compared to the December, 2020. Furthermore, over the period observed, the international prices of crude oil fluctuated but increased generally. In 2021, the highest and lowest crude oil price was 83.8 and 55.3 U.S. dollars per barrel respectively, which occurred in October and January.

PETROLEUM PRODUCTS PRICES

Petroleum Products Prices, 2000 - 2021



NB: prices are in Ghp/litre except for LPG, which is in Ghp/kg

Petroleum Product Prices

Year	Premium Gasoline (Ghp/lt)	Gas Oil (Ghp/lt)	Kerosene (Ghp/lt)	LPG (Ghp/kg)
2000	13.7	12.8	12.8	18.2
2005	65.0	57.8	49.7	52.4
2010	117.0	118.1	91.0	83.8
2015	310.1	301.9	296.9	268.3
2020	475.1	476.2	425.1	517.8
2021	589.9	589.8	515.1*	686.8

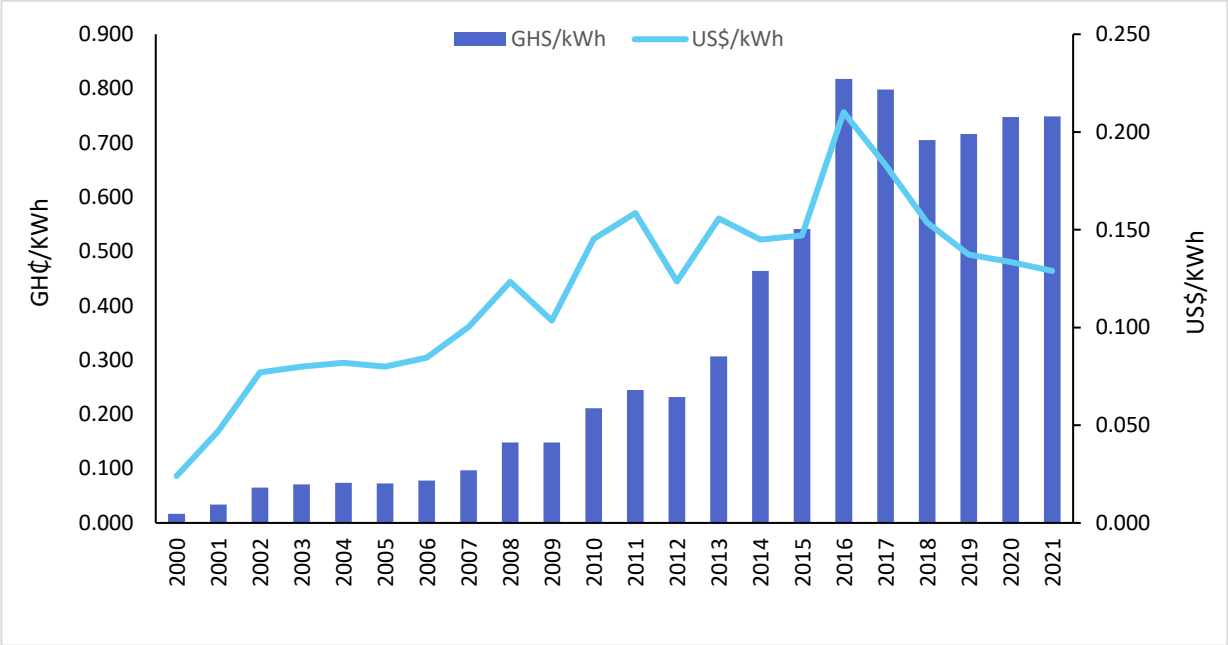
**Indicative ex-pump price*

Average ex-pump prices of petroleum products specifically petrol, diesel, kerosene and LPG increased from Ghp13.7/litre, Ghp12.8/litre, Ghp 12.8/litre and Ghp 18.2/kg respectively in 2000 to Ghp 589.9/litre, Ghp 589.8/litre, Ghp 515.1/litre and Ghp 686.8/kg respectively as at the end of 2021.

Electricity Tariff by Customer Class

Tariff Category	Effective dates								
	Dec, 2011	Oct, 2013	Oct, 2014	Dec, 2015	Oct, 2018	Jul, 2019	Oct, 2019	Oct, 2020	Jan, 2021
Residential									
0 - 50 (Exclusive)	10	16	21	34	28	31	33	33	33
51 - 300 (GHp/kWh)	18	31	41	67	56	62	65	65	65
301 - 600 (GHp/kWh)	23	41	54	87	72	80	85	85	85
600+ (GHp/kWh)	25	45	59	97	80	89	94	94	94
Service Charge for Lifeline Consumers (GHp/month)	165	296	388	633	213	213	213	213	213
Service Charge for Other Residential Consumers (GHp/month)	165	296	388	633	633	704	746	746	746
Non-Residential									
0 -300 (GHp/kWh)	25	45	59	97	68	75	80	80	80
301 - 600 (GHp/kWh)	27	48	63	102	72	80	85	85	85
600+ (GHp/kWh)	42	76	100	163	114	126	134	134	134
Service Charge (GHp/month)	276	493	646	1055	1055	1173	1243	1243	1243
SLT - Low Voltage									
Maximum Demand (GHp/kVA/month)	1543	2760	3617	5910	5910	-	6960	6960	6960
Energy Charge (GHp/kWh)	26	47	62	101	76	99	89	89	105
Service Charge (GHp/month)	1102	1972	2584	4221	4221	4693	4971	4971	4971
SLT - Medium Voltage									
Maximum Demand (GHp/kVA/month)	1323	2366	3100	5065	5065	-	5966	5966	5966
Energy Charge (GHp/kWh)	20	37	48	78	59	75	69	69	80
Service Charge (GHp/month)	1543	2760	3617	5910	5910	6570	6960	6960	6960
SLT - High Voltage									
Maximum Demand (GHp/kVA/month)	1323	2366	3100	5065	5065	-	5966	5966	5966
Energy Charge (GHp/kWh)	19	34	44	72	54	79	63	63	83
Service Charge (GHp/month)	1543	2760	3617	5910	5910	6570	6960	6960	6960
SLT-High Voltage - Mines									
Capacity Charge (GHp/KVA/Month)	1543	2760	3617	5910	5910	-	6960	6960	6960
Energy Charge (GHp/kWh)	30	53	70	114	103	249	121	121	264
Service Charge (GHp/Month)	1543	2760	3617	5910	5910	6570	6960	6960	6960

Average Electricity End-User Tariff (2000-2021)



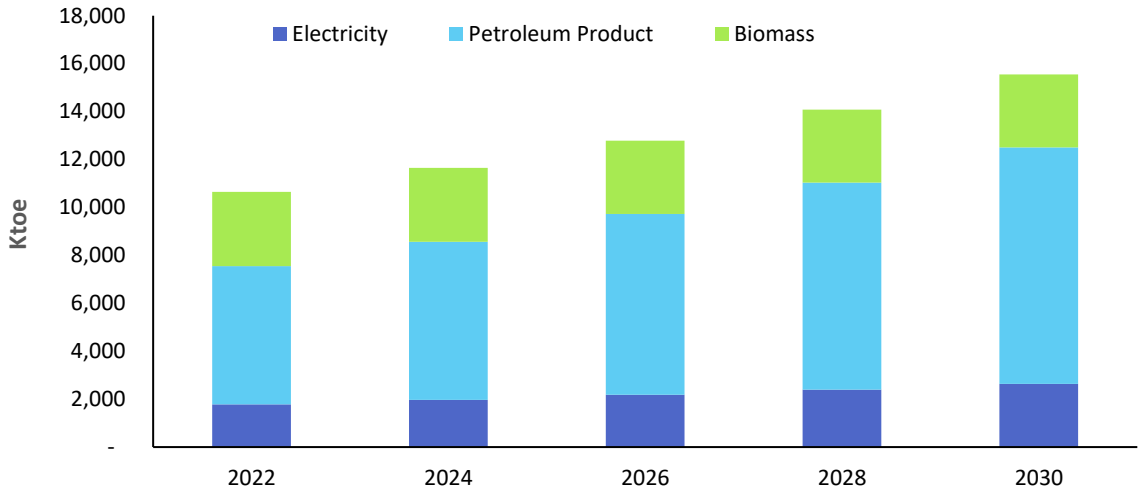
Average Electricity End-User Tariff (2000-2021)

Year	GH₵/kWh	US$/kWh
2000	0.017	0.024
2005	0.073	0.080
2010	0.211	0.145
2015	0.541	0.147
2020	0.747	0.134
2021	0.749	0.129

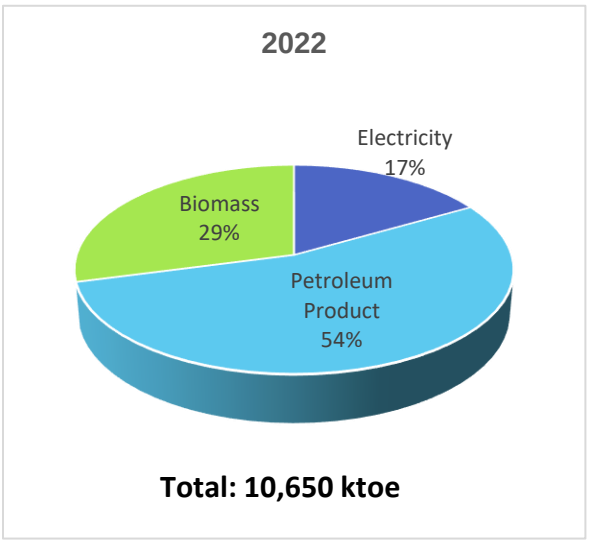
ENERGY OUTLOOK

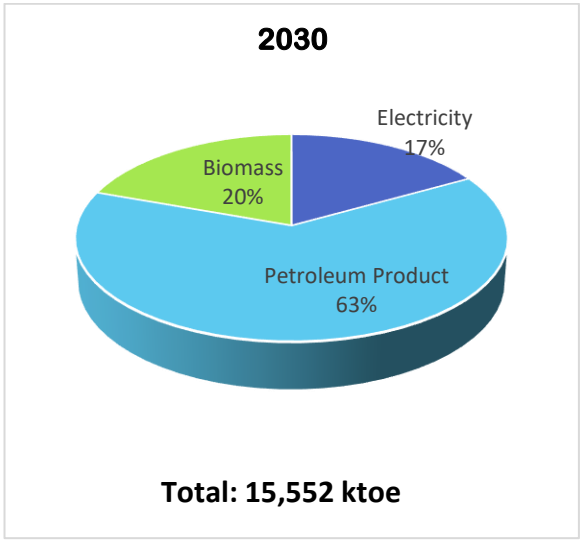
OUTLOOK FOR ENERGY DEMAND

Outlook for Energy Demand by Fuels (Business-as-Usual Scenario)



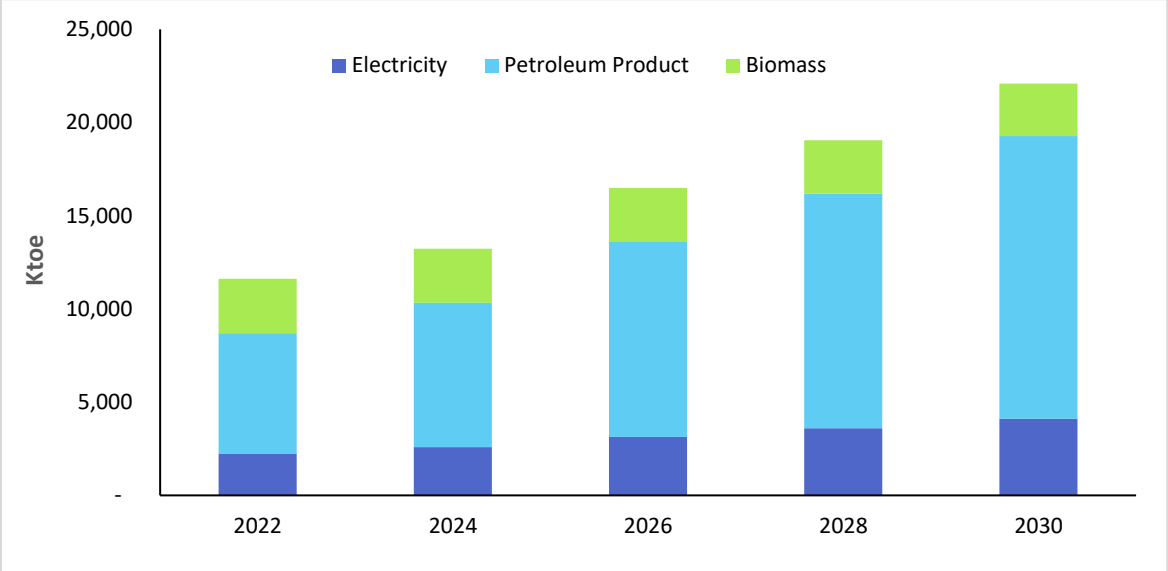
2022 and 2030 Shares of Energy Demand by Fuels (Business-as-Usual Scenario)



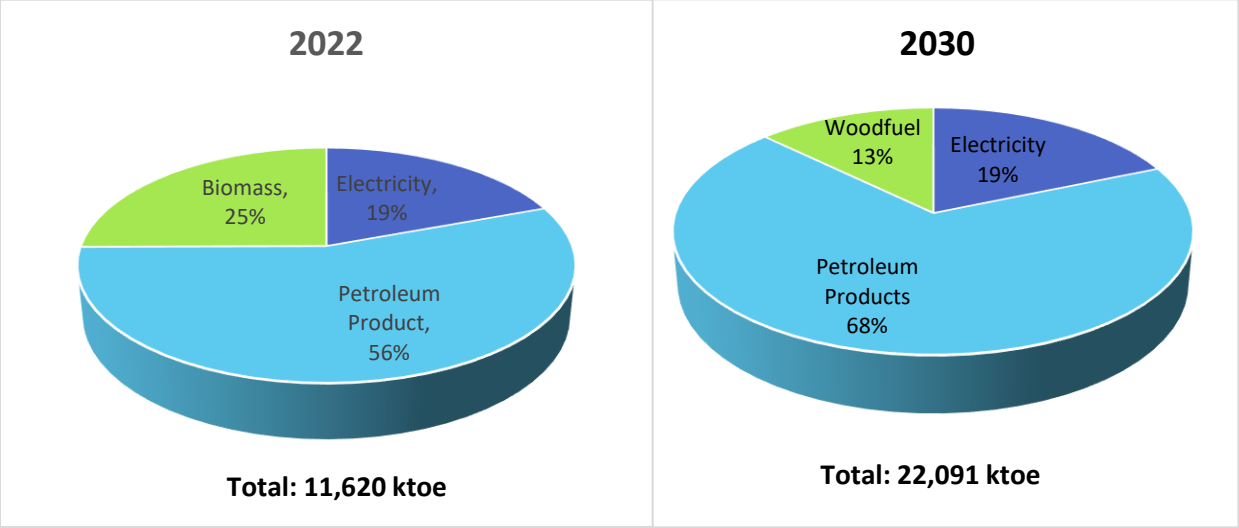


NB: The Business-as-Usual scenario describes a socio-economic outlook based on trends from the historical past until 2030.

Outlook for Energy Demand by Fuels (Accelerated Economic Growth Scenario)

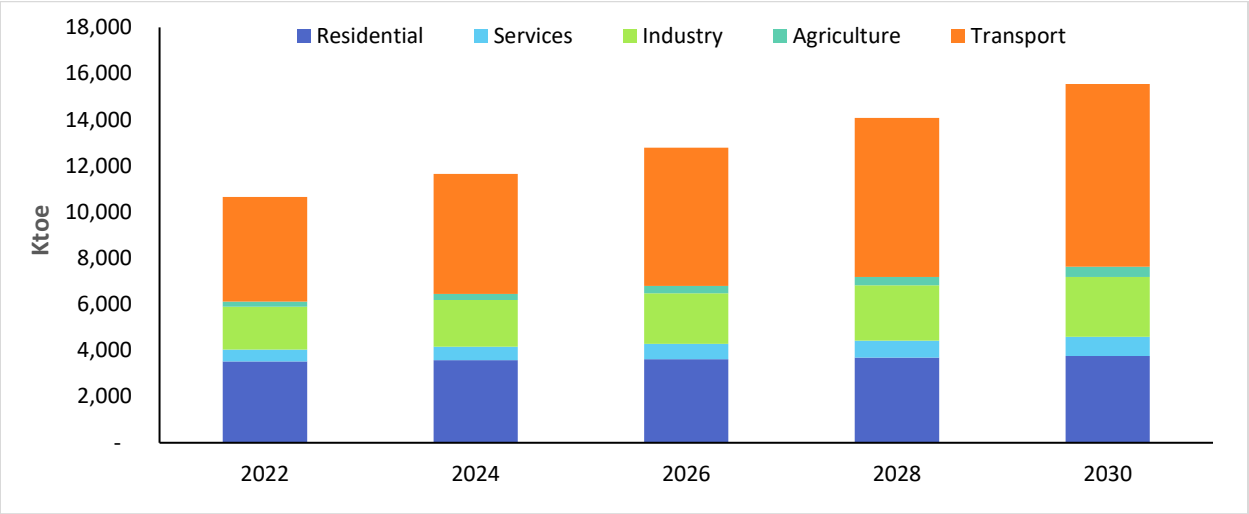


2022 and 2030 Shares of Energy Demand by Fuels (Accelerated Economic Growth Scenario)

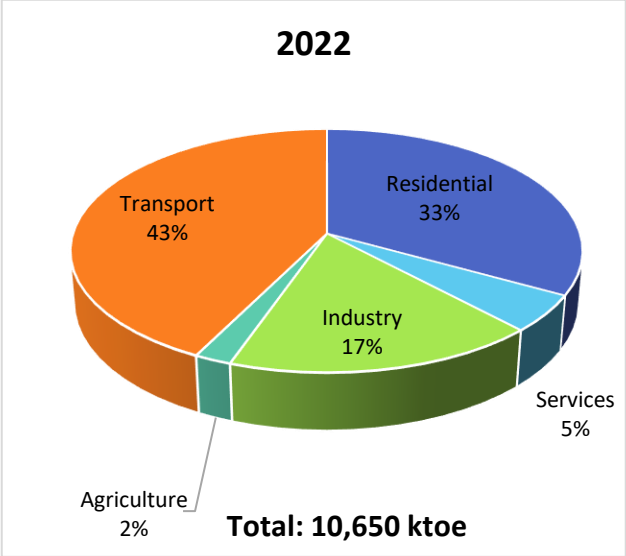


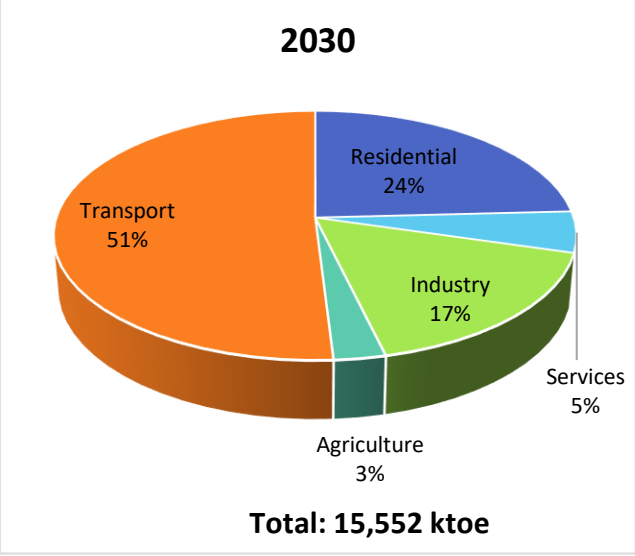
***NB**: The Accelerated Economic Growth scenario considers the objectives of the Ghana Shared Growth and Development Agenda, Medium-Term National Development Policy Framework (2018-2021) and the Coordinated Programme for Economic and Social Development Policies (2017-2024), which included project and programmes in the industrial and agricultural sectors such as the 'One District-One Factory' initiative and the 'planting for food and jobs' policy.*

Outlook for Energy Demand by Sectors (Business-as-Usual Scenario)



Outlook for Energy Demand by Sectors (Business-as-Usual Scenario)





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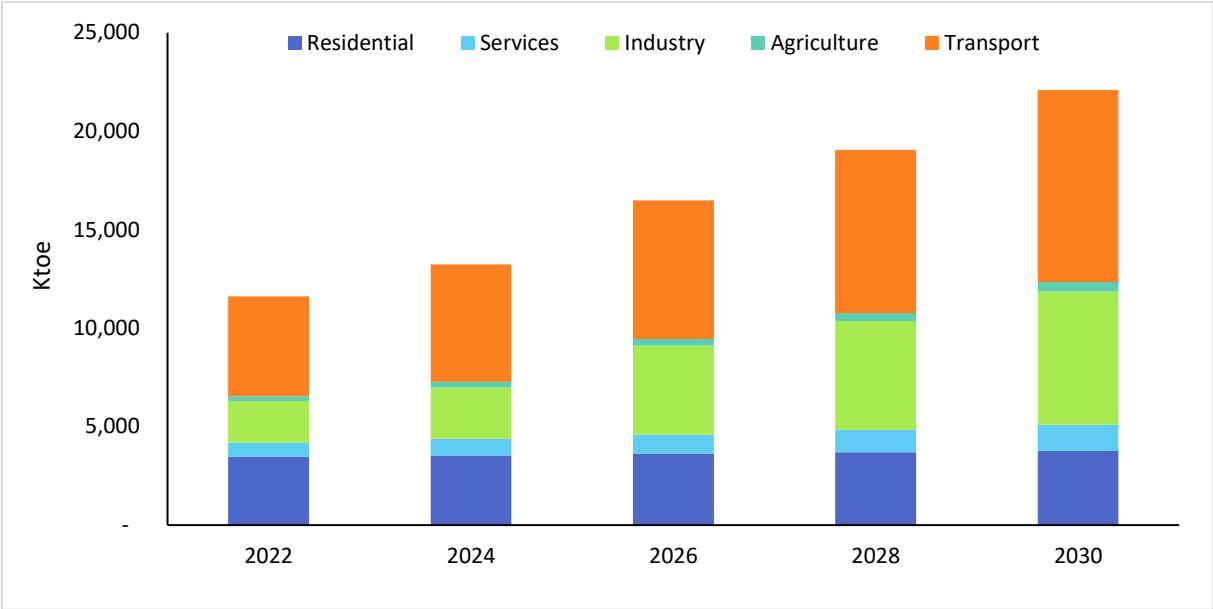
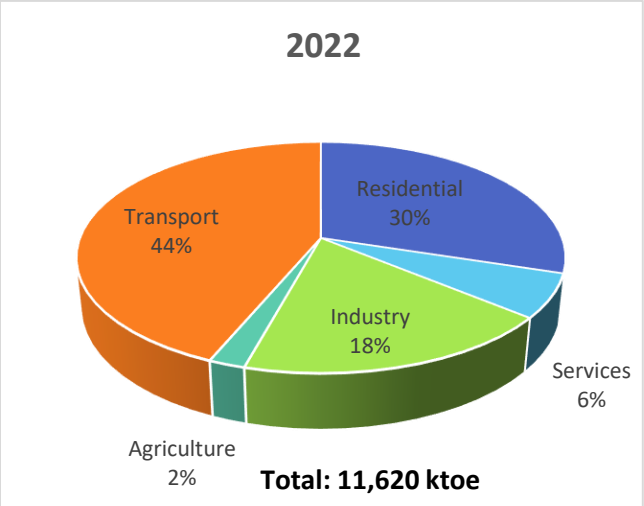
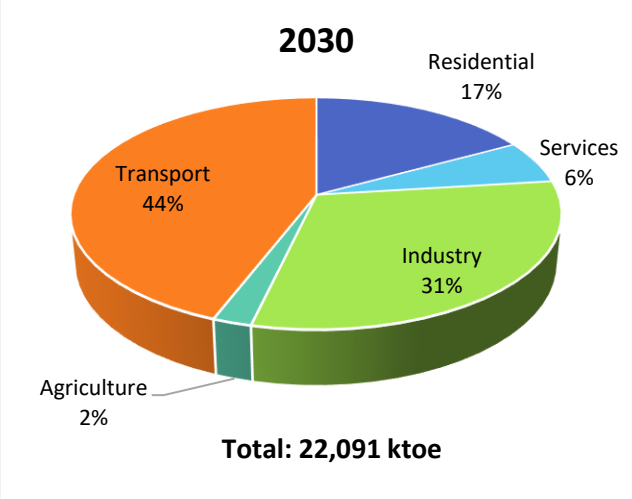
Outlook for Energy Demand by Sectors (Accelerated Economic Growth Scenario)



2022 and 2030 Outlook for Energy Demand by Sectors (Accelerated Economic Growth Scenario)





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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

NOTES

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