



**ECOWAS
CEDEAO**



ECOWAS KEY ENERGY FACTS AND FIGURES

Second Edition



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Map

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Data sources:

This document is based on energy statistics provided by national focal points designated by the ministries/national agencies responsible for energy statistics in ECOWAS Member States and compiled on the ECOWAS Energy Information System: website <https://eis.ecowas.int>. However, some missing data has been estimated on the basis of previous statistics. These are in red font in the document.

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ABBREVIATIONS AND ACRONYMS

%	Per cent
AFREC	African Energy Commission
CO2	Carbon Dioxide
ECOWAS	Economic Community of West African States
EIS	Energy Information System
GDP	Gross Domestic Product
Gg	Giga (10 ⁹) gramme
GWh	Giga Watts-hour
kg	kilogramme
ktoe	thousand tonnes of oil equivalent
LPG	Liquefied Petroleum Gas
Mtoe	Million tonnes of oil equivalent
PV	Photovoltaic
RE	Renewable Energy
t	tonne
TES	Total Energy Supply
TFC	Total Final Consumption
toe	tonnes of oil equivalent



FOREWORD

In 2023, the ECOWAS Authority of Heads of State and Government adopted the updated Regional Energy Policy, which includes «improving governance and performance in the energy sector» among its strategic objectives. In this context, **improving energy information** appears to be crucial for guiding public and economic policies and ensuring optimal investment planning in the region. This ambition guided the ECOWAS Commission's Directorate of Energy and Mines (DEM) in the development of a publication entitled «**ECOWAS Key Energy Facts and Figures**». This initiative, the first edition of which was published in 2023, is part of the need to communicate reliable energy data, a crucial aspect for decision-making processes and energy resource management in the region. The publication provides information on energy supply, transformation, consumption, trade and key environmental and sustainable development indicators in the region.

This second edition of ECOWAS Key Energy Facts and Figures presents consolidated energy data for the region up to 2023. These data are derived from information made available by ECOWAS Member States and generated by the

ECOWAS Energy Information System (ECOWAS-EIS, www.eis.ecowas.int). The entire ECOWAS energy system is summarised in the energy flow diagram, which allows for the analysis of, among other things, energy production by source and energy consumption by sector, based on the various energy forms.

The methodology used complies with international guidelines on energy statistics, which are universally recognised and adopted by African countries through the African Energy Commission (AFREC). It should be noted that the methodology implemented takes into account the specific characteristics of the region for the entire data collection and processing process.

The ECOWAS Commission's Directorate of Energy and Mines hopes that this publication will serve as a reference for the general public and all decision-makers, including analysts, planners, investors, researchers, academics, technical and financial partners. In doing so, it will enable them to make informed decisions that will contribute to achieving the Vision set out in the ECOWAS Updated Energy Policy, namely:

« **A Community with access to modern, affordable, reliable and sustainable energy services for improved living standards and socio-economic development** ».



1. TOTAL ENERGY SUPPLY



1. TOTAL ENERGY SUPPLY

ECOWAS total energy supply includes biomass, crude oil and petroleum products, natural gas, hydroelectricity, coal, solar and other renewable energy sources.

Total energy supply (TES) is the sum of primary production and imports, minus exports and international bunkers, plus net stocks.

$$\text{Total Energy Supply (TES)} = \text{production} + \text{imports} - \text{exports} - \text{international bunkers} + \text{net stocks}$$

In **2023**, the total energy supply in the ECOWAS region is estimated at **175,700 ktoe**.

This supply is dominated by

biomass energy which represents

• **61.6 %**



followed by **crude oil and petroleum products**

• **23.1%**



natural gas

• **13.1%**



Other **renewable energy** account for only

• **1.4 %**

of ECOWAS's total energy supply.



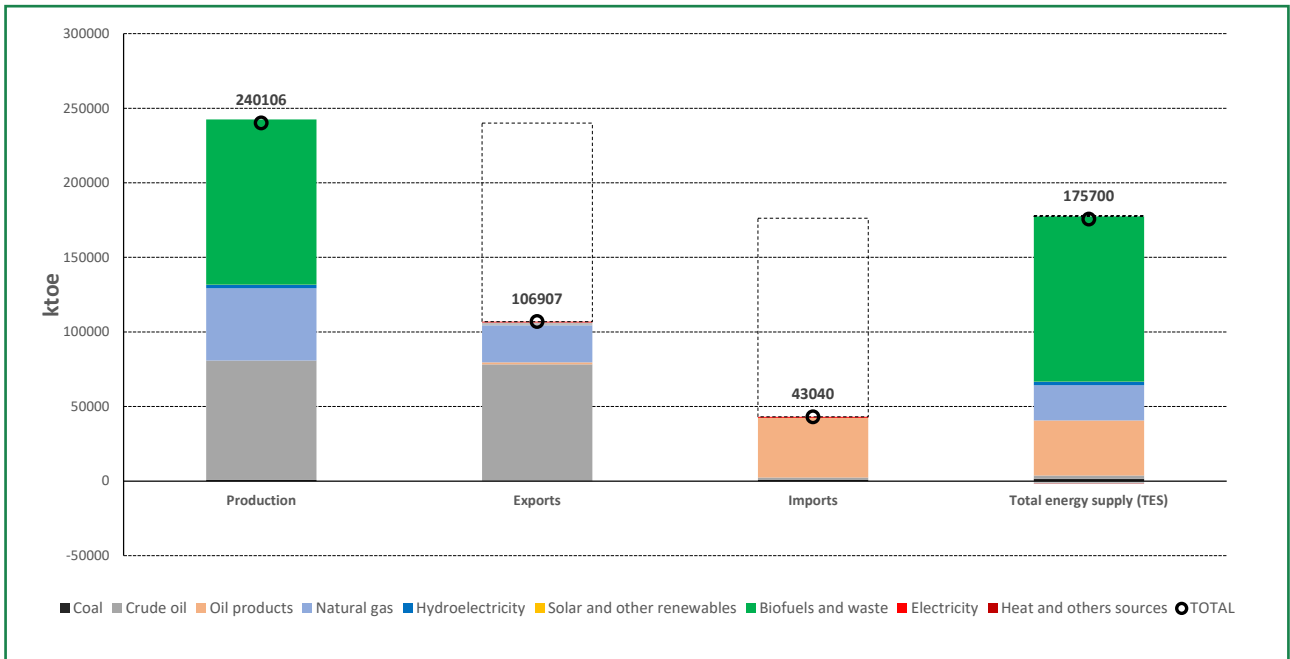


Figure 1 : Total Energy Supply in ECOWAS in 2023

Between 2019 and 2023, total energy supply increased from 138,565 ktoe to 175,700 ktoe.

6.1 % Average annual increase in energy supply between 2019 and 2023

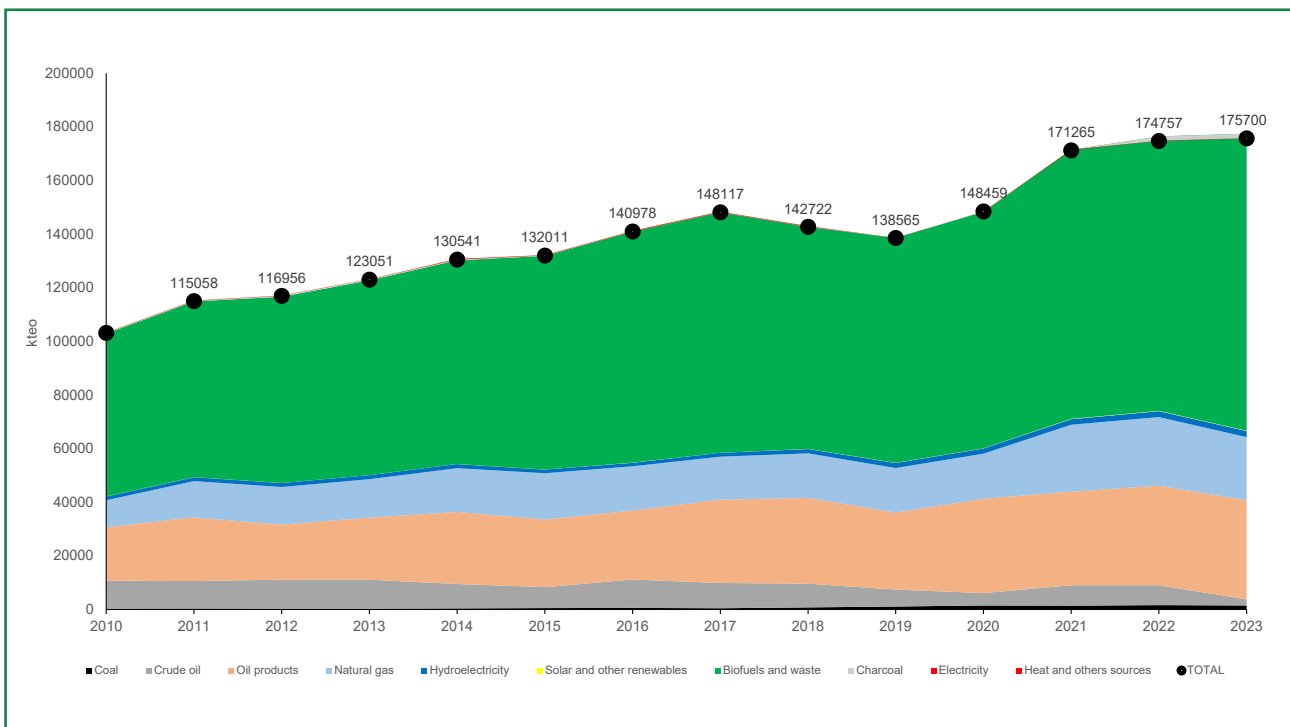


Figure2 : Evolution of total energy supply in ECOWAS

Wind and solar photovoltaic energy significantly increased from **655 GWh in 2019** to **1,853 GWh in 2023**, representing an average annual growth of **29.7%** in electricity production.

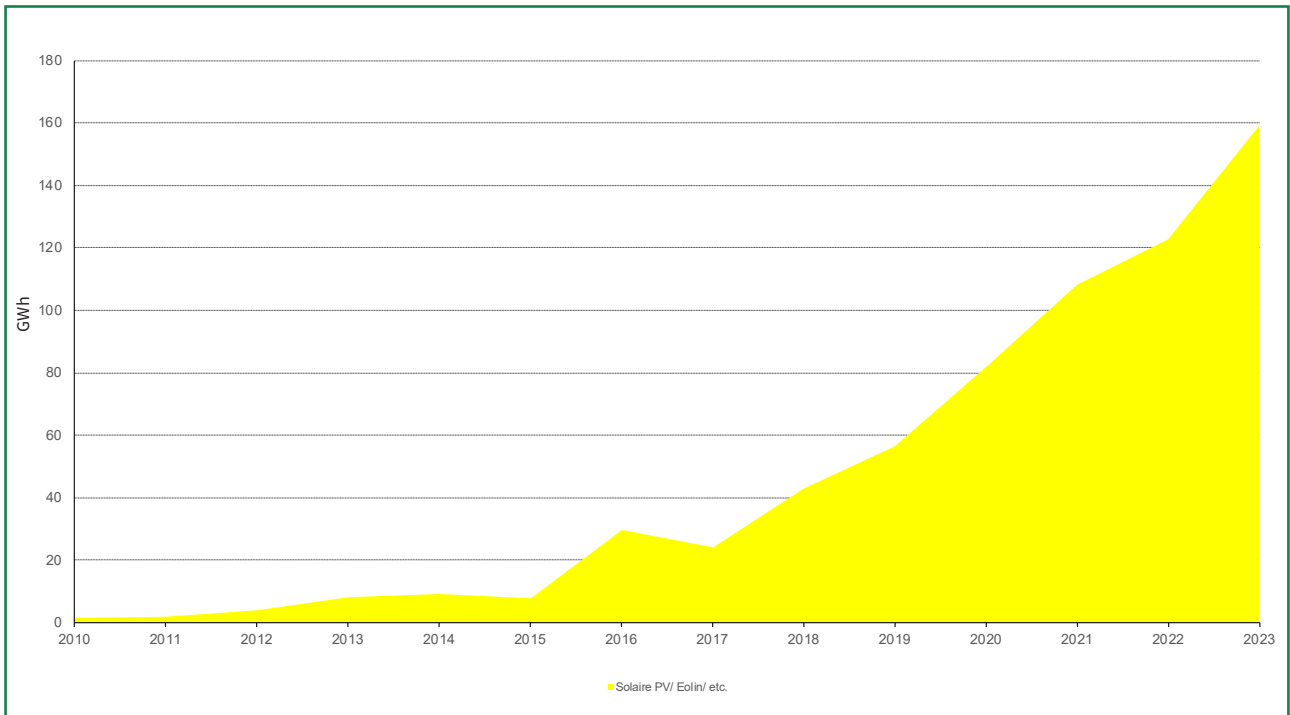


Figure 3 : Evolution of electricity production from solar and wind sources in ECOWAS

Table 1 shows the evolution of total energy supply between 2019 and 2023 for each member state. Statistics for some ECOWAS countries between 2019 and 2021 are produced based on historical data from member states and will be automatically updated online as soon as the data becomes available.

Table 1 : Total Energy Supply by Country (ktoe)

Member States	2019	2020	2021	2022	2023
BENIN	4,627	4,810	5,073	5,149	5,682
CAPE VERDE	195	277	299	325	357
IVORY COAST	10,529	11,193	14,254	14,872	15,477
GAMBIA	700	660	669	702	705
GHANA	12,012	12,773	12,591	12,416	12,975
GUINEA	4,222	4,309	4,303	4,841	4,765
GUINEA-BISSAU	471	498	509	510	505
LIBERIA	1,466	1,444	1,426	1,671	1,511
NIGERIA	83,061	106,111	106,879	104,883	110,834
SENEGAL	4,957	4,466	4,986	5,523	5,742
SIERRA LEONE	3,545	3,911	4,404	3,960	4,880
TOGO	3,567	3,730	33,843	3,966	4,114
ECOWAS ¹	138,565	148,459	171,265	174,757	175,700
(ECOWAS - AES) ²	122,077	131,024	155,855	158,715	163,711

1.1. PRIMARY PRODUCTION

In **2023**, ECOWAS's primary energy production is **approximately 242,492 ktoe**.

Biomass energy

• **46%**



Crude oil

• **33%**



Natural gas

• **20%**



¹Trade between Member States is not considered to be ECOWAS supplies, so the sum of Member States' supplies will differ from that of the region.

²In 2023, the consolidated statistics of the ECOWAS SIE included the three states of the Alliance of Sahel States (AES) that were still members of ECOWAS.

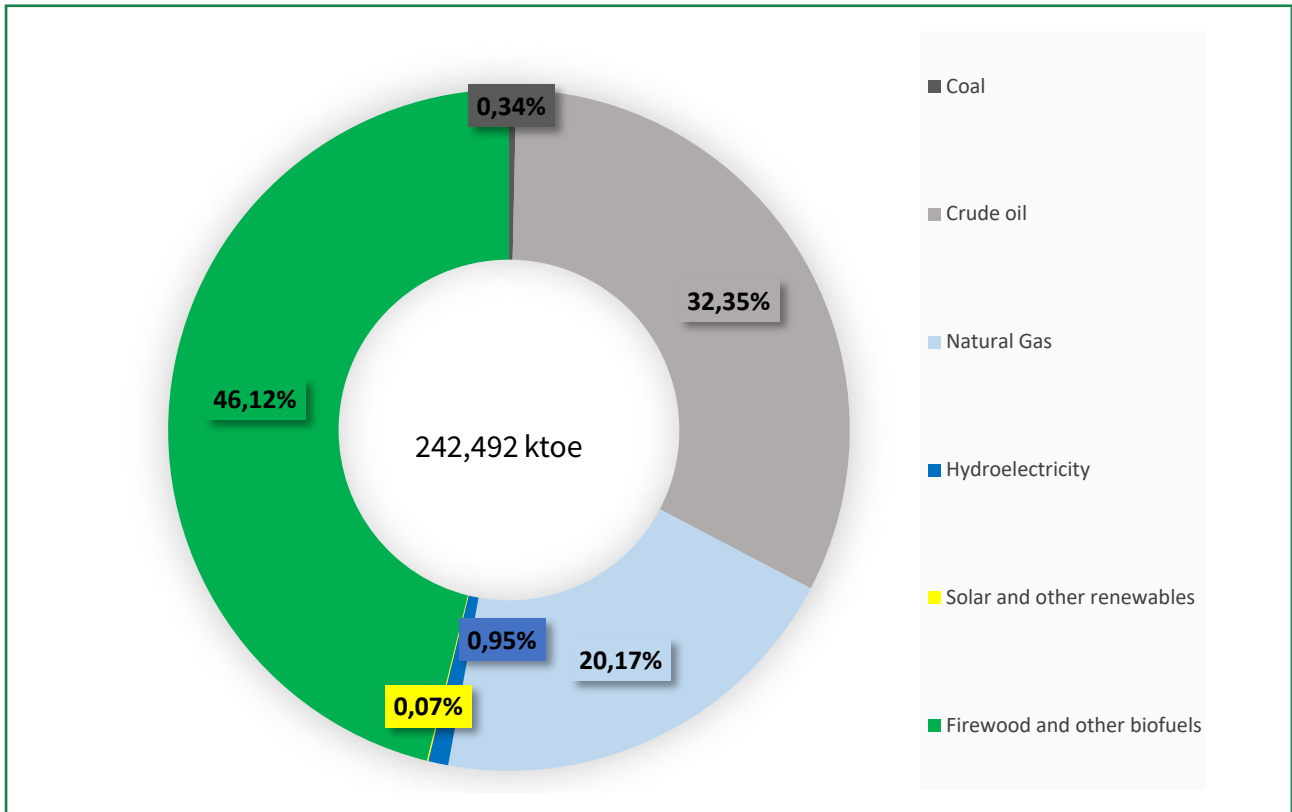


Figure 4 : Structure of Primary Energy Production in the ECOWAS Region in 2023

1.2. FOREIGN TRADE

Unlike primary energy production, biomass remains marginal in ECOWAS’s trade with the rest of the world. Crude oil and natural gas are the commodities mainly exported. Petroleum products are mainly imported due to insufficient refining capacity and the low efficiency of most existing refineries.

The main exporters of crude oil in the region are Nigeria, Ghana and Côte d’Ivoire.

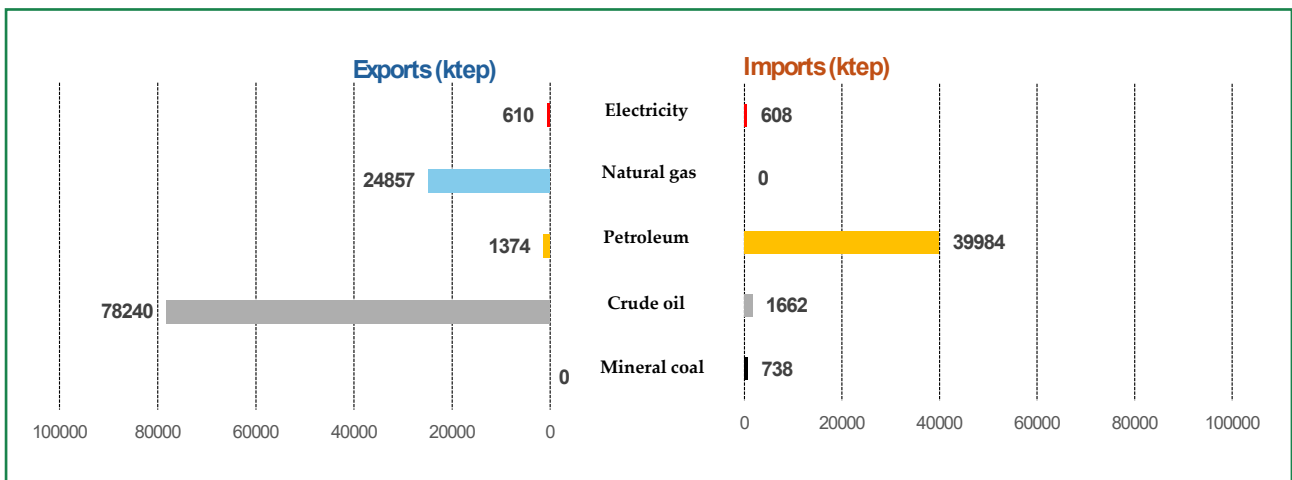


Figure 5 : Energy Trade Between ECOWAS and the Rest of the World in 2023



2. ENERGY TRANSFORMATION



2. ENERGY TRANSFORMATION

2.1. ELECTRICITY GENERATION

In the ECOWAS region, electricity is generated in power stations (main activity producers) and by self-producers (private electricity generation units intended mainly for self-consumption). Apart from uranium, most energy sources are used for electricity generation in the ECOWAS region.

Table 2 : Energy Sources For Electricity Generation (ktoe) in 2023

	Coal	Crude oil and petroleum products	Natural gas	Hydro	Solar and other renewable energies
Public power stations	169	1,557	11,424	2,284	146
Self-producers	210	6,912	24	0	14

In **2023**, **natural gas** remains the **main source** of electricity generation (**45 %**) in the ECOWAS region, followed by

Petroleum products

• **32 %**



Hydroelectricity

• **21 %**



Solar photovoltaic and other renewable energy

• **1 %**

of ECOWAS's electricity generation.



The region's electricity production in **2023** is approximately **127,643 GWh (10,975 ktoe)**. The most efficient fuel-based electricity generation technology is natural gas, with an efficiency of **43% in 2023**.

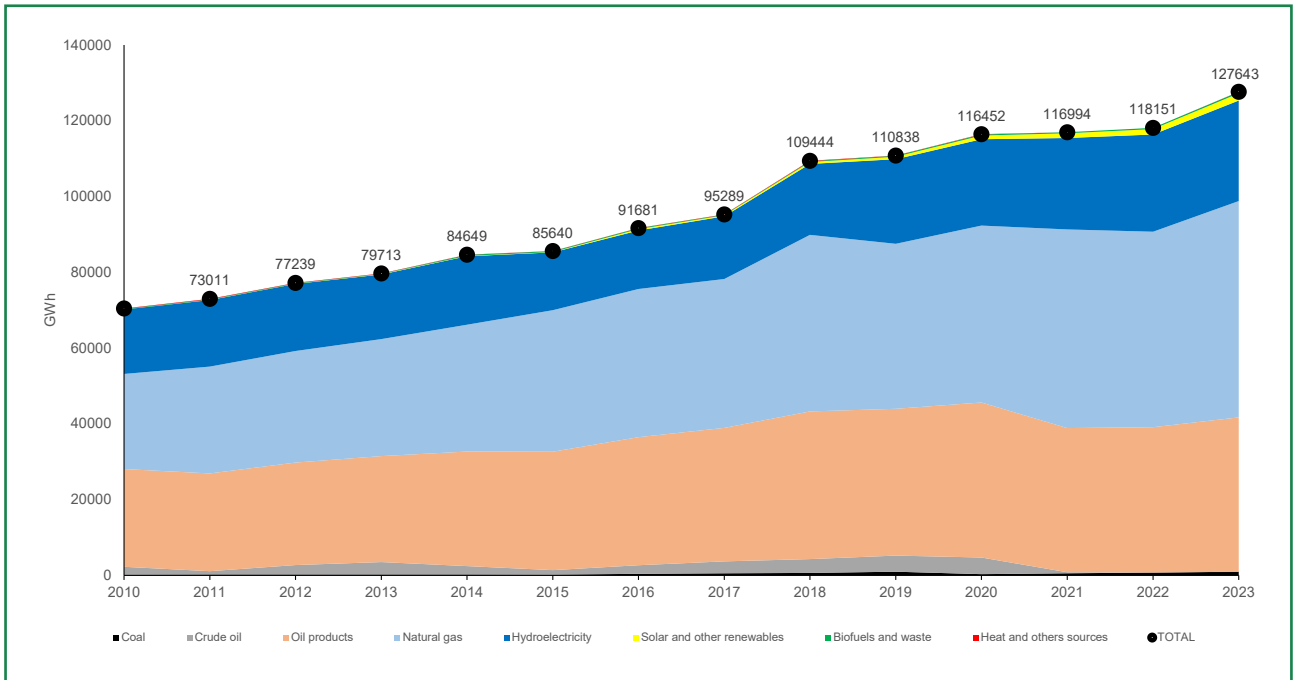




Figure 6 : Evolution of Electricity Production (GWh) in the Region

2.2. PRODUCTION OF PETROLEUM PRODUCTS

Despite its marginal crude oil production (1.9% of the region’s crude oil production).

 Côte d'Ivoire nevertheless ranks first in the refining industry (petroleum products) with **52 %** 

The other refining countries are




 Nigeria • **26 %**  Senegal • **13 %**  Ghana • **2 %**

Table 3 : ECOWAS Refinery Efficiency in 2023

Refined crude oil (ktoe)	Production of petroleum products (ktoe)	Average refinery efficiency (%)
12 355	9 486	77

77 % Average efficiency of oil refineries in the ECOWAS region in 2023

Periods of sharp decline in the production of petroleum products in the ECOWAS region are mostly linked to operational challenges at refineries in Nigeria.

Furthermore, between 2022 and 2023, there was a substantial decline in regional refining efficiency due to low refining efficiency in some countries.

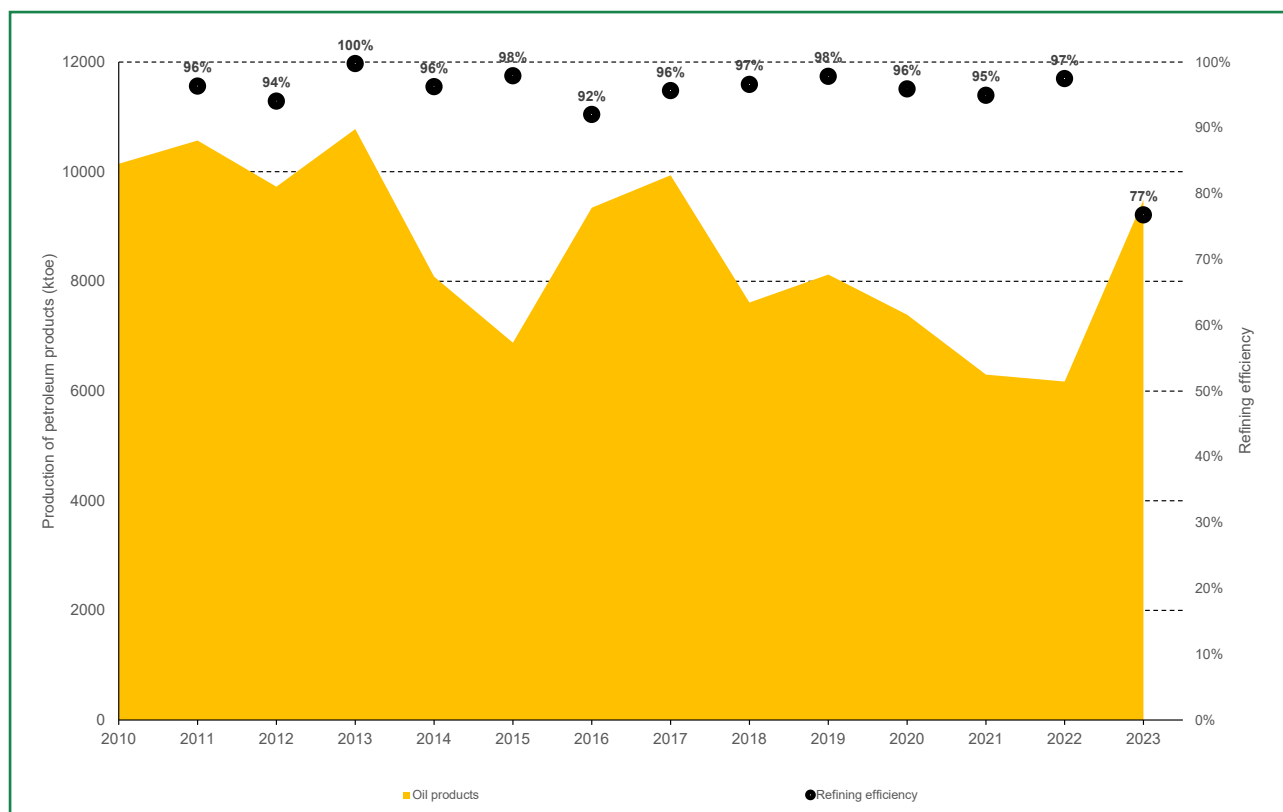


Figure 7 : Evolution of Petroleum Products Production (ktoe) in the Region

2.3. CHARCOAL PRODUCTION

Despite the use of LPG for cooking, charcoal remains the dominant cooking fuel in the region. The region produces almost all its charcoal needs.

Between 2010 and 2023, charcoal production in the region increased from 7,189 ktoe to 21,462 ktoe. However, the sharp increase between 2019 and 2020 (7,772 to 16,465 ktoe), may be attributed to increased consumption of charcoal per household in Nigeria from 0.04 toe in 2019 to 0.19 toe in 2020, following an update of data from new household surveys. During the same year, 2020, countries such as Côte d'Ivoire, Ghana and Senegal stood at 0.18, 0.14 and 0.17 toe respectively.



Figure 8 : Evolution of Charcoal Production (ktoe) in the ECOWAS Region

In **2023**, the energy efficiency of charcoal production in the ECOWAS region is estimated at **around 42%**. In terms of mass, this corresponds to an efficiency of **19%**.

In 2023, 100 kg of firewood is used to produce 19 kg of charcoal.

Table 4 : Average Charcoal Production per Country and per Capita (kg)

Member States	Average annual charcoal production per capita
BENIN	46.5
CAPE VERDE	1.7
CÔTE D'IVOIRE	73.6
GAMBIA	32.1
GHANA	54.2
GUINEA	16.8
GUINEA-BISSAU	18.8
LIBERIA	61.2
NIGERIA	87.8
SENEGAL	26.0
SIERRA LEONE	58.3
TOGO	97.7
ECOWAS	67.6
(ECOWAS - AES)³	76.7

In 2023, Togo, Nigeria and Côte d'Ivoire record the highest per capita charcoal production while Cabo Verde, has the lowest (1.7 kg) in the region due to the widespread use of clean cooking technologies in the country.

The average per capita charcoal production in the region is 68 kg

³En 2023, les statistiques consolidées du SIE-CEDEAO intégraient les trois Etats de l'Alliance des Etats du Sahel (AES) qui étaient encore membres de la CEDEAO.



3. FINAL CONSUMPTION



3. FINAL CONSUMPTION

ECOWAS final energy consumption is presented by energy source and sector.

3.1. CONSUMPTION BY SOURCES

Total final consumption in ECOWAS in **2023** reached **137 million toe**.
It comprises

biomass (firewood, waste,
charcoal, etc.)

• **58.3 %**



petroleum products

• **29.0 %**



natural gas

• **6.3 %**



electricity

• **6.1 %**



Coal

• **0.3 %**



of final energy consumption.

**In 2023, electricity accounts for only 6% of ECOWAS's
final energy consumption.**

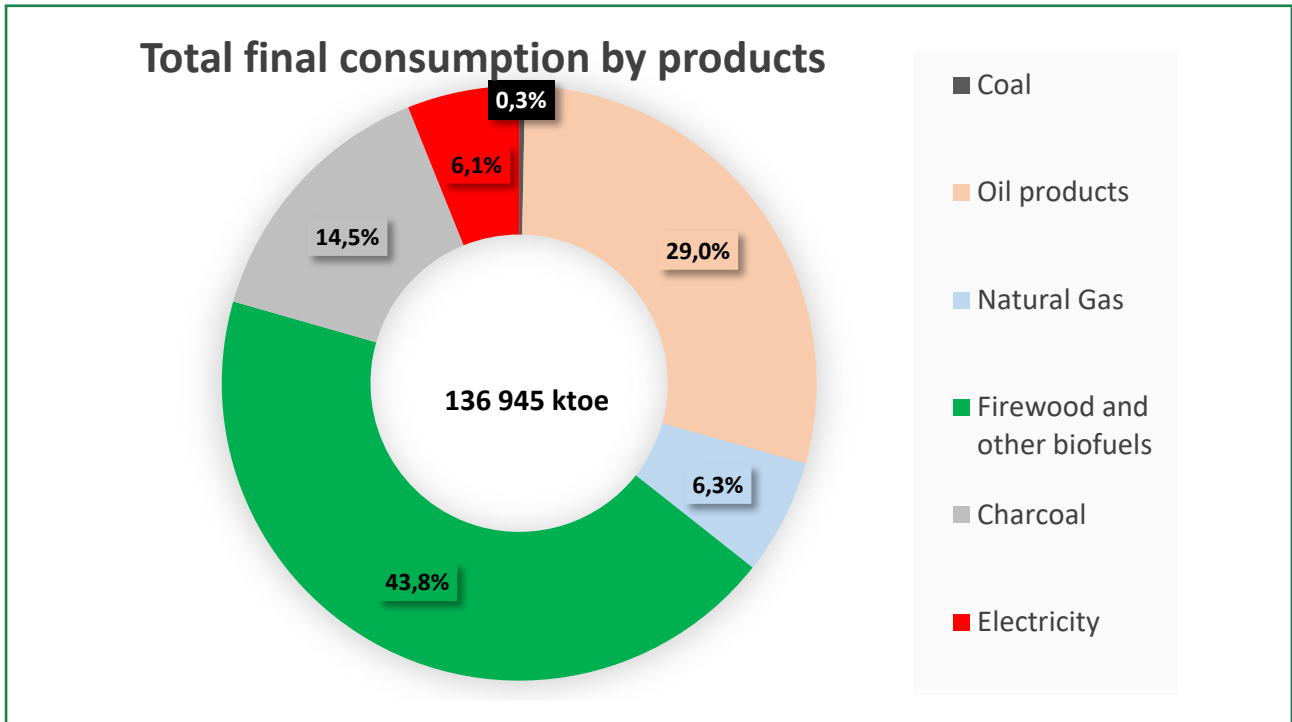


Figure 9 : Total Final Consumption by Source in 2023

3.2. CONSUMPTION BY SECTOR

Total final consumption in ECOWAS is dominated by **the residential sector (53.1%)** and **transport (22%)**.

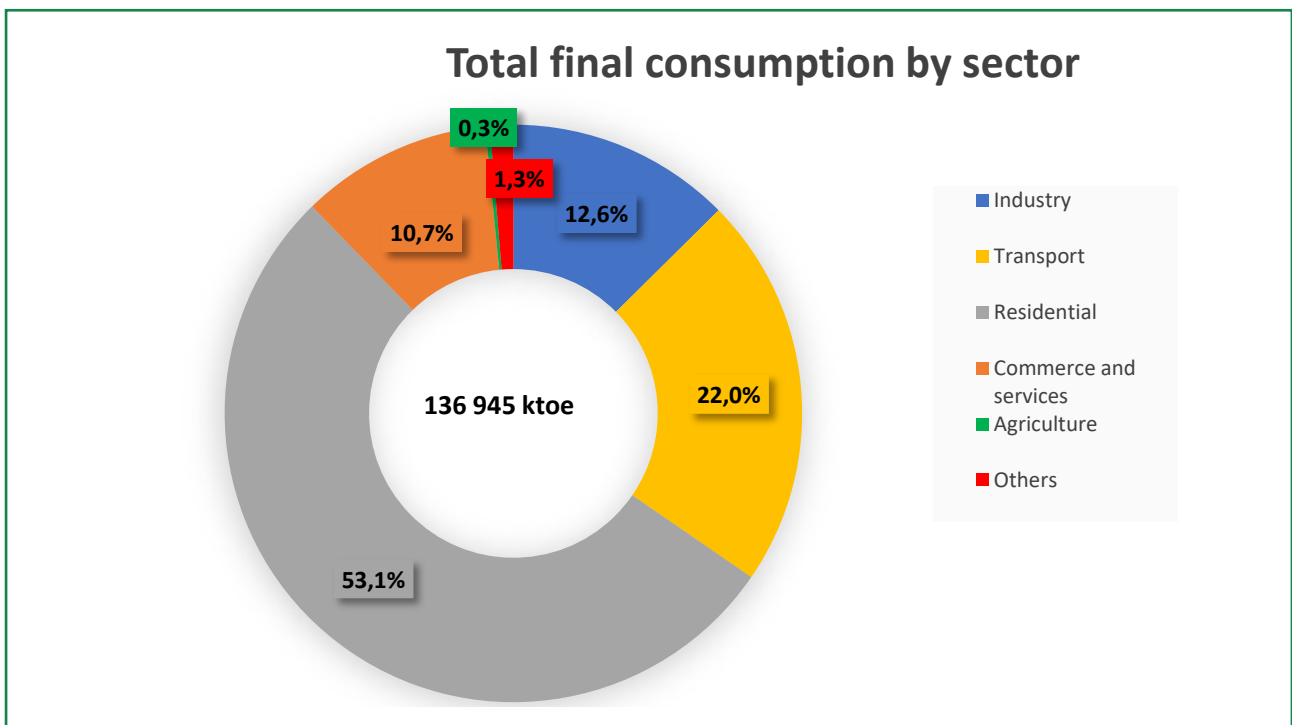


Figure 10 : Total Final Consumption by Sector in 2023

Energy consumption in the agricultural sector is marginal (0.3%) and reflects the low level of mechanisation in agriculture in the region. **Industry accounts** for only 12.6%, reflecting the region’s lower level of industrialisation compared to **Europe (40.5%)** and the **United States of America (68%)**.

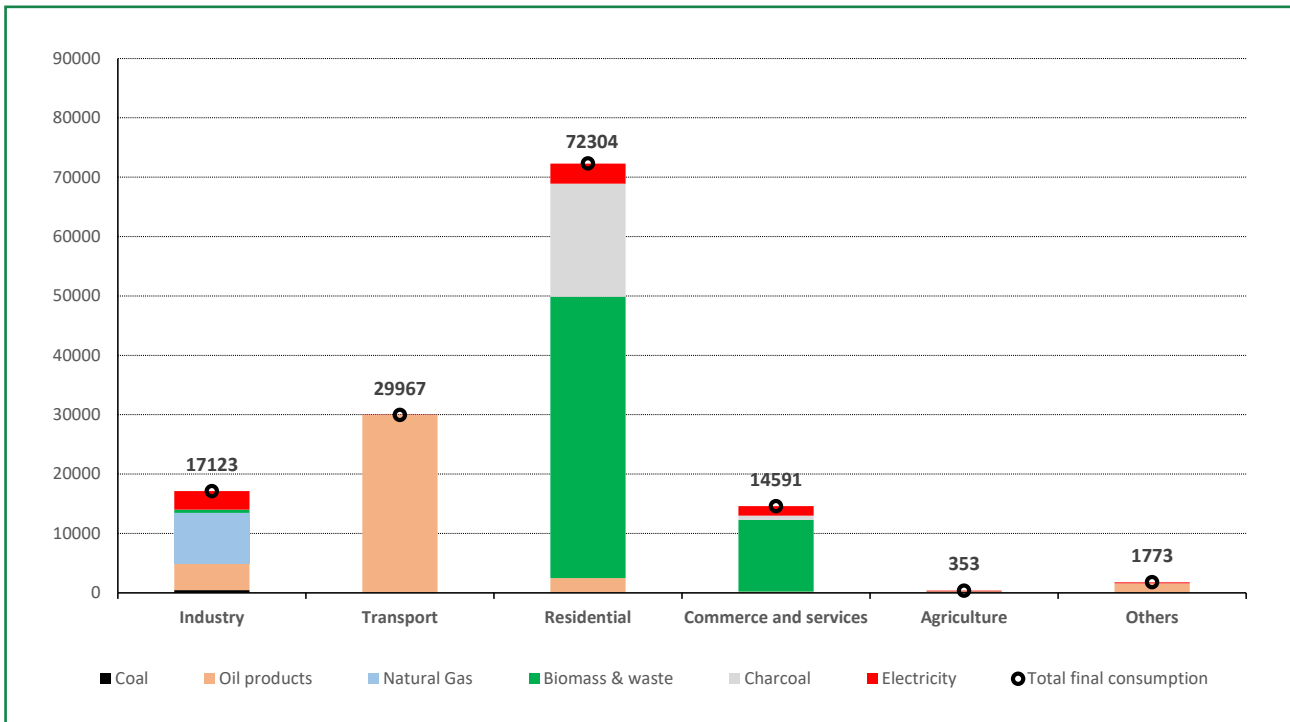


Figure 11 : Final Energy Consumption by Sector and Source in 2023



4. ENVIRONMENTAL AND SUSTAINABLE ENERGY INDICATORS



4. ENVIRONMENTAL AND SUSTAINABLE ENERGY INDICATORS

4.1. SUSTAINABLE ENERGY INDICATORS

Between 2019 and 2023, the dynamics of the main sustainable energy indicators in the ECOWAS region show significant progress, particularly in terms of household access to electricity and the contribution of renewable energy to electricity production. The share of renewable energy in electricity production increased by an average of 1.9% over the same period.

Table 5 : Selected Sustainable Energy Indicators for ECOWAS

	2019	2020	2021	2022	2023
Total energy supply per capita (toe)	0.36	0.38	0.36	0.42	0.41
Household access to electricity (%)	54.4	55.8	56.1	56.5	57.7
Per capita electricity consumption (kWh)	247.9	255.3	268.6	249.0	262.7
Average daily LPG consumption (kg/household)	0.11	0.2	0.32	0.27	0.30
Share of renewable energies in electricity generation (%)	21.0	20.7	20.2	23.21	22.6

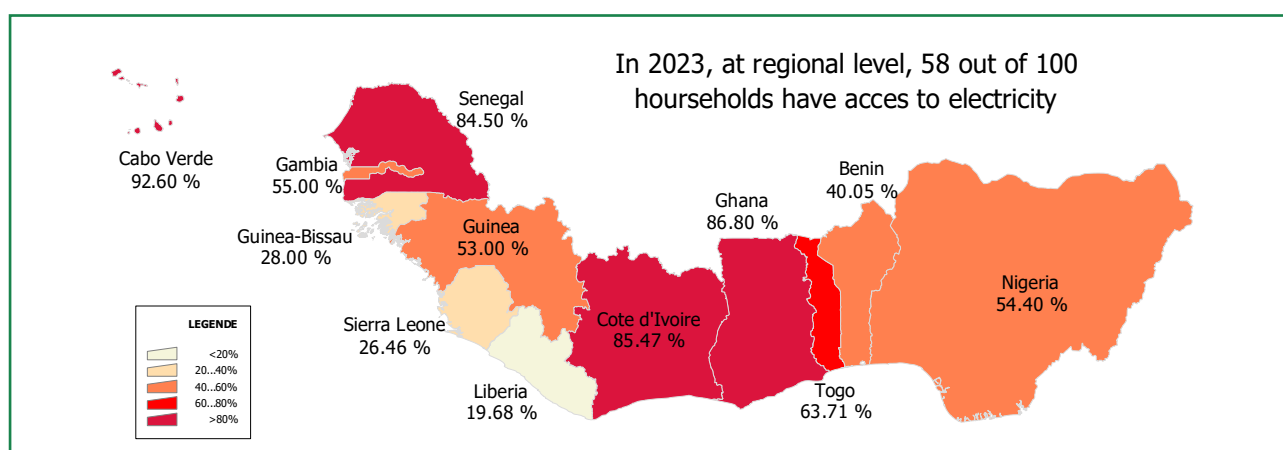


Figure 12 : Map of Household Access to Electricity in ECOWAS

4.2. ENVIRONMENTAL INDICATORS

Carbon dioxide (CO₂) emissions in the ECOWAS region, calculated according to the recommendations of the Intergovernmental Panel on Climate Change (IPCC), increased by **4.4% per year** between 2019 and 2023.

Table 6 : Environmental Indicators in ECOWAS

	2019	2020	2021	2022	2023
CO ₂ emissions from the energy sector (Gg CO ₂)	206,360	213,655	218,376	219,794	245,228
CO ₂ emissions per capita (t CO ₂ /capita)	0.54	0.54	0.53	0.52	0.55
CO ₂ emissions per GDP (t CO ₂ / Thousand US\$ 2015)	0.37	0.37	0.35	0.34	0.36
CO ₂ emissions per energy consumption (t CO ₂ /toe)	1.48	1.31	1.28	1.26	1.40
CO ₂ intensity of electricity production (t CO ₂ /GWh)	534.92	582.73	424.58	452.65	446.62

The transport sector, particularly road transport, is the main source of CO₂ emissions in ECOWAS.

Table 7 : Change in CO₂ Emissions by Sector (Gg CO₂)

	2019	2020	2021	2022	2023
Electricity production	59,440	62,230	58,239	53,481	57,008
Production of petroleum products	26,712	23,650	27,445	19,431	28,615
Other energy industries ⁴	8,165	8,978	193	16,146	15,553
Buildings: residential and services	13,016	22,179	30,295	6,256	7,202
Transport	79,026	83,522	94,032	84,813	88,316
Manufacturing and construction	21,036	24,846	14,634	39,100	38,516
Other sectors	369		656	568	715

⁴The other energy industries" sector represents all energy industries that are not classified. The level of energy consumption in this sector depends on the level of detail of the data collection.

In 2023, the transport sector accounts for 37% of CO₂ emissions in ECOWAS.

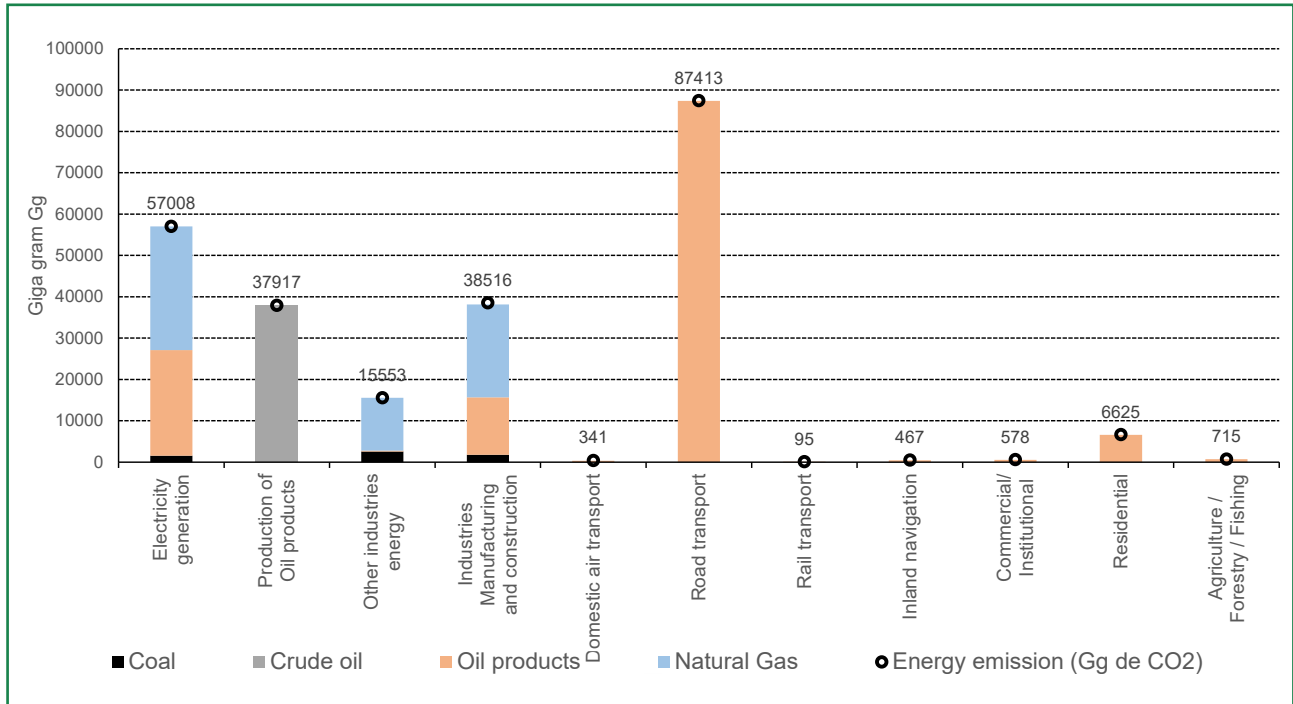


Figure 13 : CO₂ Emissions by Sector and Source in 2023

5. 2023 ECOWAS SIMPLIFIED ENERGY BALANCE (ktoe)



Table 8 : Simplified 2023 Energy Balance for ECOWAS

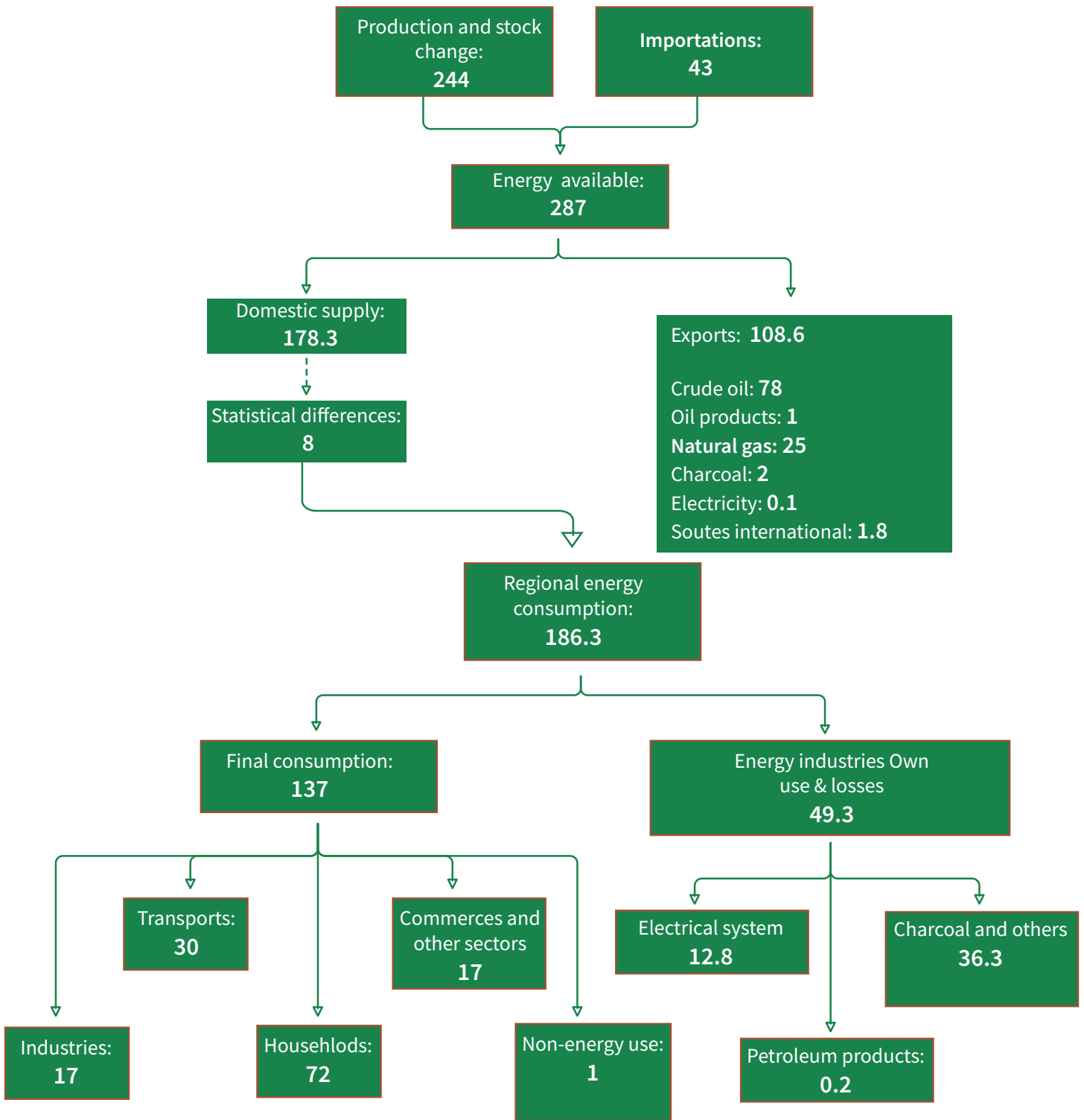
2023 balance	Coal	Crude oil	Petroleum products	Natural gas	Biomass & waste	Charcoal	RE ⁵	Electricity	Heat	TOTAL
Production	820	77,673		48,423	110,746		2,444		-	240,106
Imports	738	1,662	39,984					608	-	43,040
Exports		- 78,240	- 1,374	- 24,857				-610	-	- 106,907
International cargo			- 1,670						-	- 1670
Stock variation	- 8	1,143	-5						-	1,130
TES⁶	1,550	2,238	36,935	23,566	110,746		2,444	- 2	-	175,700
Transfers			131						-	131
Statistical difference	- 86	10,117	1,757	1,566	1,288			- 1,306	-	13,337
Transformation	- 1,029	- 12,355	1,019	- 12,843	- 52,059		- 2,444	10,975	-	- 47,274
Public power station	- 169		- 1,557	- 11,424			- 2,431	8,486	-	- 7,094
Self-producers of electricity	- 210		- 6,912	- 24	- 1,126		- 13	2,489	-	- 5,795
Refineries		- 12,355	9,486						-	- 2,869
Charcoal production units					- 50,933	21,462			-	- 29,471
Other processing	- 650		1	- 1,395					-	- 2,044
Use in the energy sector			- 64	- 3,498				- 110	-	- 3,672
Transport and distribution losses			- 16	- 184				- 1,220	-	- 1,421
TFC⁷	434		39,763	8,607		19,827		8,337	-	136,945
Industries			4,435	8,607		1		3,106	-	17,123
Transport			29,966					2	-	29,967
Residential			2,472		47,387	19,062		3,383	-	72,304
Services			217		12,043	753		1,579	-	14,591
Agriculture			233		7	11		102	-	353
Other sectors			1,607					166	-	1,773
Non-energy uses			834						-	834

⁵RE: Renewable energy (solar, hydroelectricity, wind power and others)⁶TES: Total energy supply⁷TFC: Total final consumption



6. 2023 ECOWAS ENERGY FLOWS SUMMARY







7. 2023 ECOWAS ENERGY FLOWS DIAGRAM (ktoe)



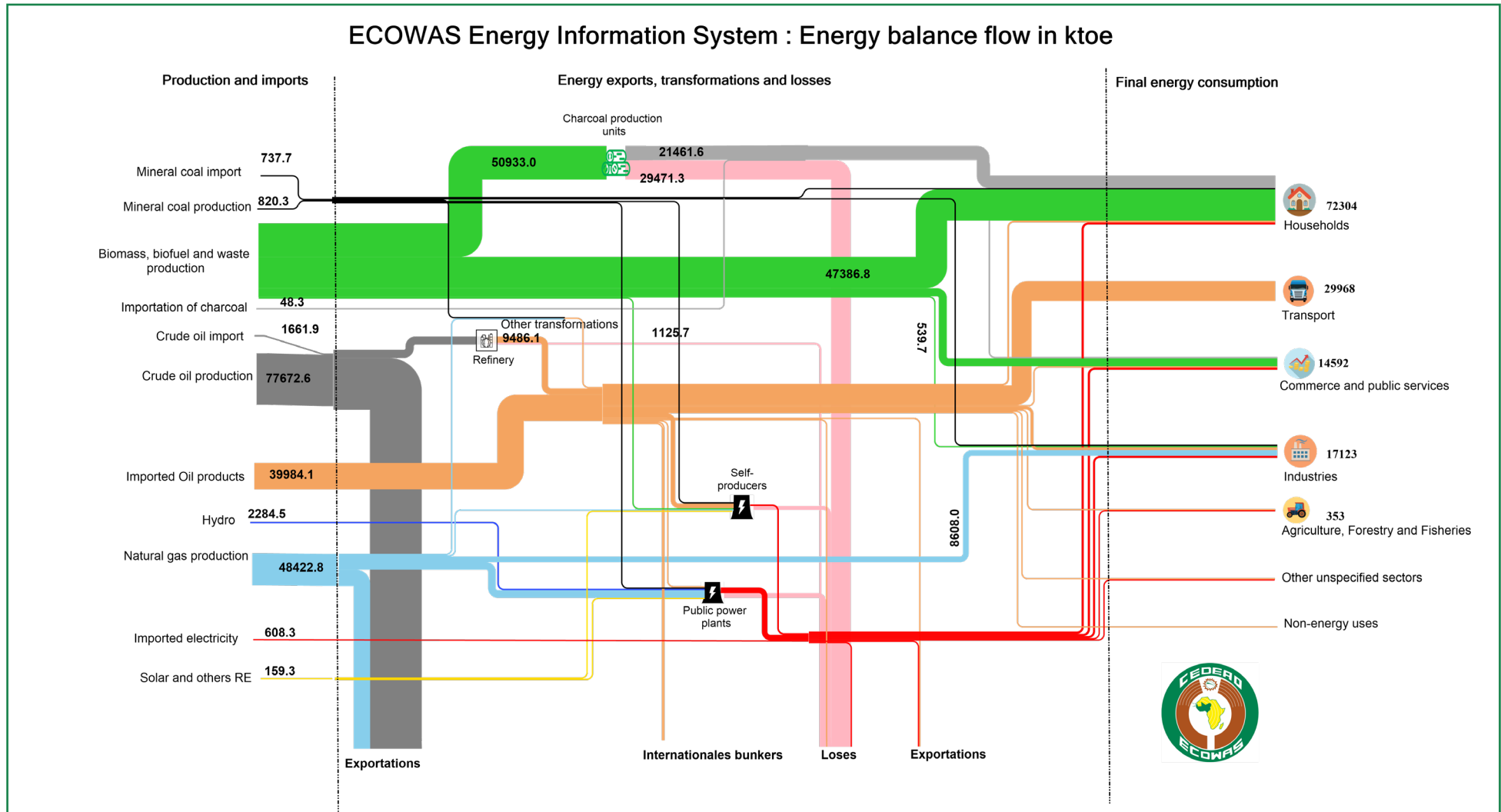


Figure 14 : Diagram of ECOWAS energy flows in 2023⁸

⁸The energy flow diagram is a visualisation of the energy system from supply (upstream) to final consumption (downstream). It is derived from the energy balance



8. KEY ENERGY INDICATORS IN THE ECOWAS REGION BETWEEN 2019 AND 2023



Table 9 : Key Energy Indicators 2019-2023

	2019	2020	2021	2022	2023	2024Pro*	Average growth 2019-2023
Population (millions)	385.2	395.8	408.38	419.34	431.85	444.37	2.9 %/an
Total primary energy supply / ATEP (Ktoe)	138,565	162,485	171,265	174,757	175,700	186,445	6.1 %/an
Electricity consumption (GWh)	95,599	95,964	98,589	104,406	113,431	118,386	4.8 %/an
CO ₂ emissions (tonnes of CO ₂)	206,360	213,655	218,377	219,794	245,228	256,039	4.4 %/an
ATEP/Population (toe/capita)	0.36	0.41	0.42	0.42	0.41	0.42	3.3 %/an
ATEP/GDP (toe/thousand US\$ 2015)	0.25	0.28	0.28	0.27	0.27	0.28	1.9 %/an
Per capita electricity consumption (kWh/capita)	247.9	242.5	241.4	249.0	262.7	266.54	1.5 %/an
Share of renewable energy in electricity production	21.0 %	21.2 %	22.0 %	23.2 %	22.6 %	23.0 %	1.9 %/an
National electrification rate	54.4 %	55.8 %	55.5 %	56.5 %	57.7 %	60.0 %	1.5 %/an
Installed capacity (MWe)	25,012.56	24,911.58	25,140.33	25,140.33	25,140.33	25,207.23	0.1 %/an
Hydropower	5,311.0	5,471.79	5,471.79	5,471.79	5,471.79	5,512.74	0.7 %/an
Solar photovoltaic	269.04	348.66	438.41	438.41	438.41	495.33	13.0 %/an
Tidal/wave energy, biomass, etc.	15.10	45.10	45.10	45.10	45.10	59.29	31.5 %/an
Wind energy	26.00	79.55	79.55	79.55	79.55	105.21	32.3 %/an
Conventional fuels and similar	19,391.42	18,966.48 ⁹	19,105.48	19,105.48	19,105.48	19,034.66	- 0.4 %/an

Source: SIE-ECOWAS

Pro*: Provisional

⁹In 2020, certain capacities were demobilise

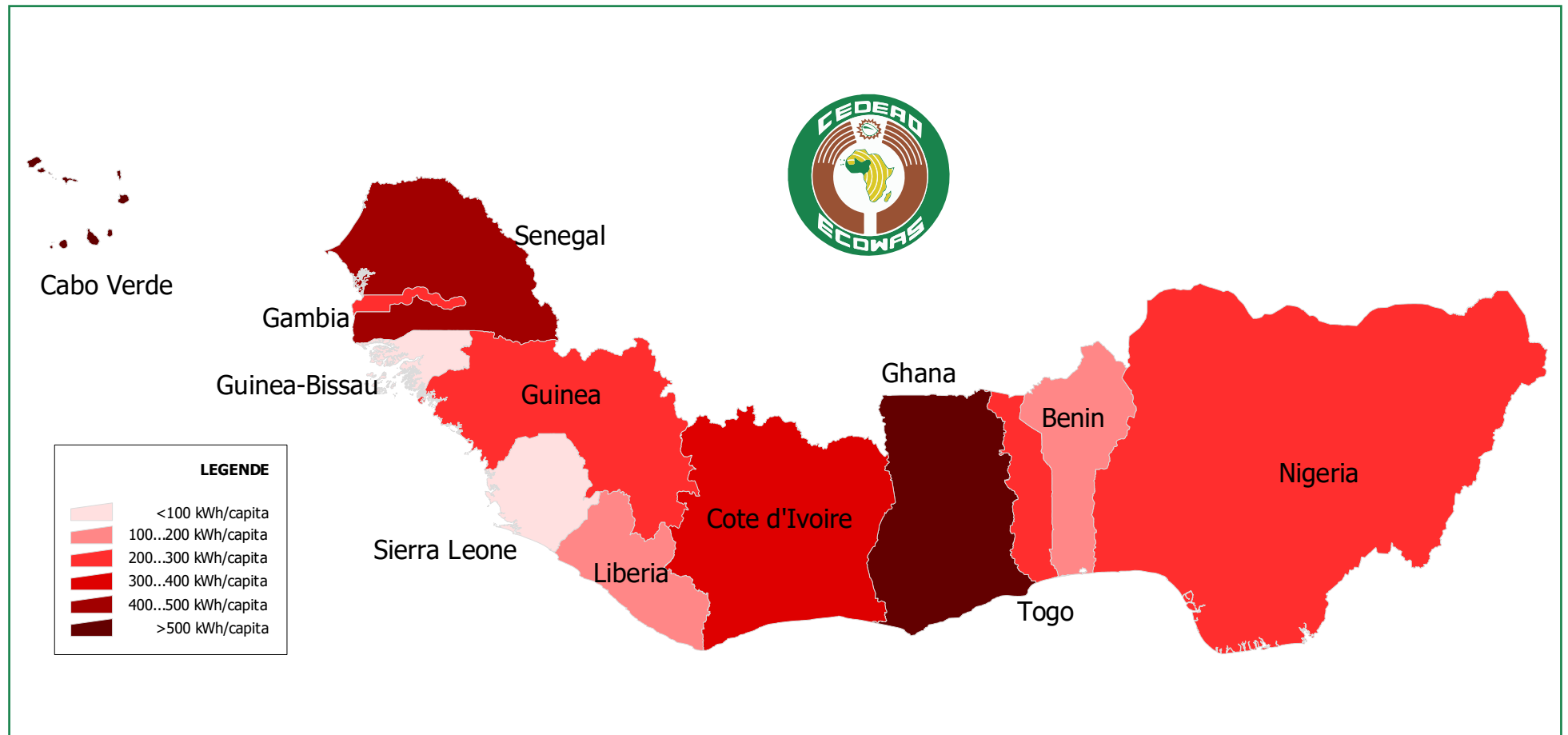


Figure15 : Map of electricity consumption per capita in ECOWAS in 2023.

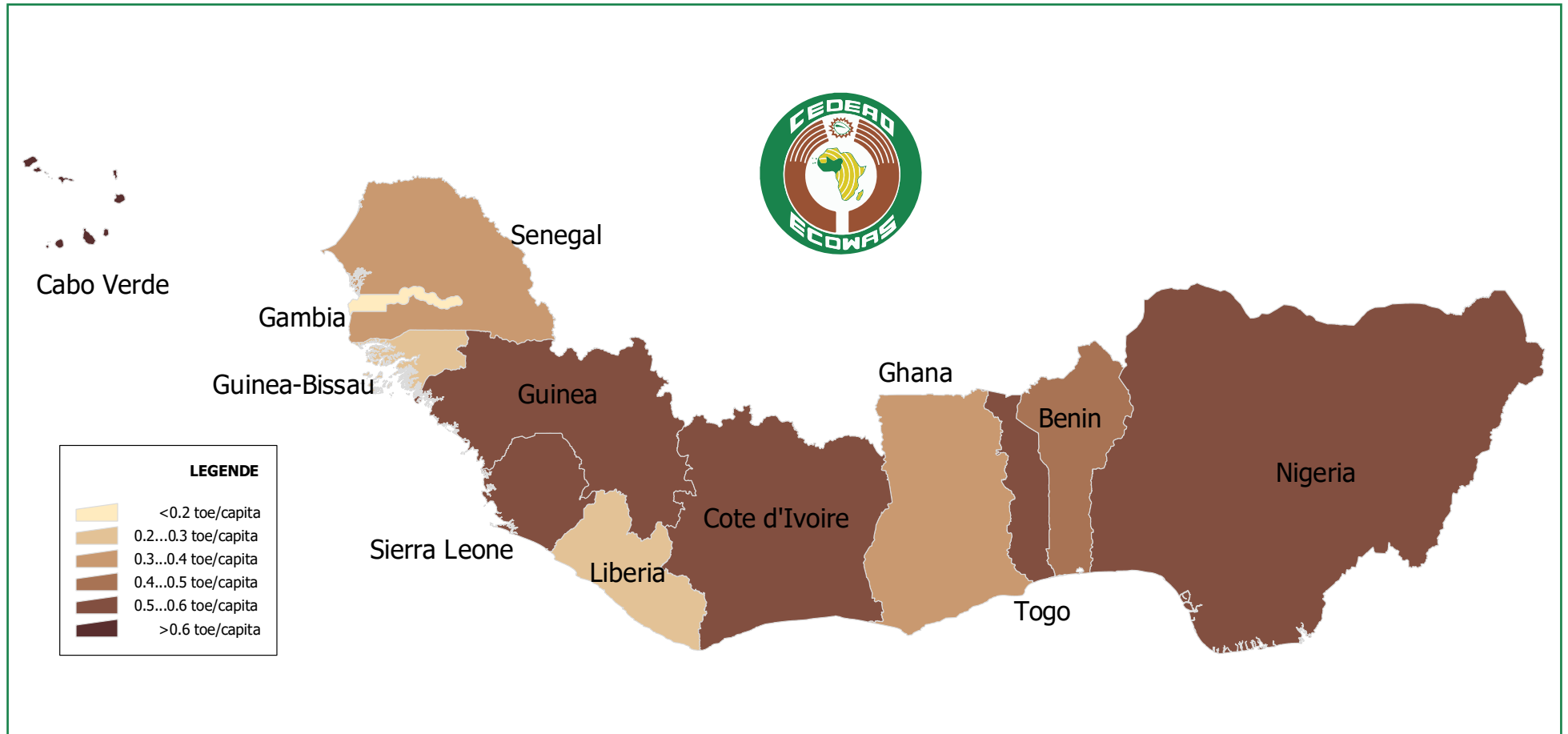


Figure16 : Map of energy consumption per capita in ECOWAS in 2023



9. KEY DEFINITIONS AND TERMINOLOGY



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- **Total energy supply (TES):** production + imports - exports - net international bunkers + net stock.
- **Net Stock:** Sum of stock changes from all ECOWAS member states
- **Final consumption:** Energy available for consumption after deducting energy losses. It is the energy consumed by final users.
- **Electricity access rate:** Number of households with access to electricity / Total number of households, expressed as a percentage (%)
- **Transformation:** The transformation product is the result of the process of transforming an energy product. These products cover the production of derivative products (secondary products, by-products and co-products), for example the conversion of wood into charcoal or crude oil into petroleum products.
- **Export:** It comprises all fuel and other energy products leaving the ECOWAS territory.
- **Import:** It comprises all fuel and other energy products entering the ECOWAS territory.



**ECOWAS
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Economic Community of West African States