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Commission

Key Africa Energy Statistics 2024

AFRICAN ENERGY COMMISSION - AFREC



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FOREWORD

We are pleased to present the 2024 edition of AFREC's 'Key Africa Energy Statistics' (KAES) report, prepared with the active collaboration of African Union Member States. The data included have been jointly collected and validated to ensure reliable and credible information for decision makers.

This report highlights key trends from the updated African Energy Information System (AEIS). In 2024, biofuels and wastes continue to dominate energy consumption in Africa, accounting for 54.41% of total final energy consumption. This reflects the widespread use of traditional biomass in many countries, highlighting the urgency to diversify energy sources and modernize bioenergy consumption on the continent. However, declining biofuels and waste production in key countries such as Nigeria, Ethiopia and several others have affected total primary energy supply (TPES) and consequently final energy consumption. Fossil fuels are the main fuel for electricity generation, accounting for 75.34% of the electricity produced on the continent.

Electricity accounts for 9.37% of the energy mix, highlighting its critical role in meeting energy needs. Despite this, sustained efforts are needed to improve accessibility and develop infrastructure to increase the share of electricity in overall energy consumption.

Fossil fuels continue to occupy a significant share of the energy mix, with oil at 26.27% and natural gas at 7.38%. However, the closure of some oil refineries in the region has led to a decrease in the production of petroleum products, which has also impacted supply and consumption levels. As for coal, it only accounts for 2.57% of the energy mix, reflecting a steady decline driven by carbon footprint reduction initiatives.

Compared to the year 2000, there has been a notable increase in electricity production from renewable sources, including solar and wind, marking a strong commitment to the energy transition in Africa. Diversification of energy sources is also evident with the growth in natural gas production, while crude oil production shows a declining trend.

AFREC remains committed to providing timely and reliable data to inform decisions and guide energy policies. The KAES 2024 report is part of this effort, providing a solid evidence base validated by Member States.

We hope that this report will support your planning and decision-making efforts as we work together towards a sustainable energy future in Africa. United, we can overcome the challenges and build the Africa we want.

RASHID Ali Abdallah (Mr.)
Executive Director, African Energy Commission (AFREC)

ABBREVIATIONS



Mcm	Million cubic meters
Gcal	Giga calorie
GCV	Gross calorific value
GW	Gigawatt
GWh	Gigawatt hour
kcal	Kilocalorie
kg	Kilogram
kJ	Kilojoule
kWh	Kilowatt hour
MBtu	Million British thermal units
Mt	Million tons
Mtoe	Million tons of oil equivalent
t	Metric ton=ton=1000kg
kt	Kilotons
TJ	Tera joule
toe	Ton of oil equivalent =107 kcal
Kb/cd	Thousand barrels per calendar day
TWh	Terawatt hour
USD	United States Dollar

LIST OF PARTICIPATING AFRICAN COUNTRIES



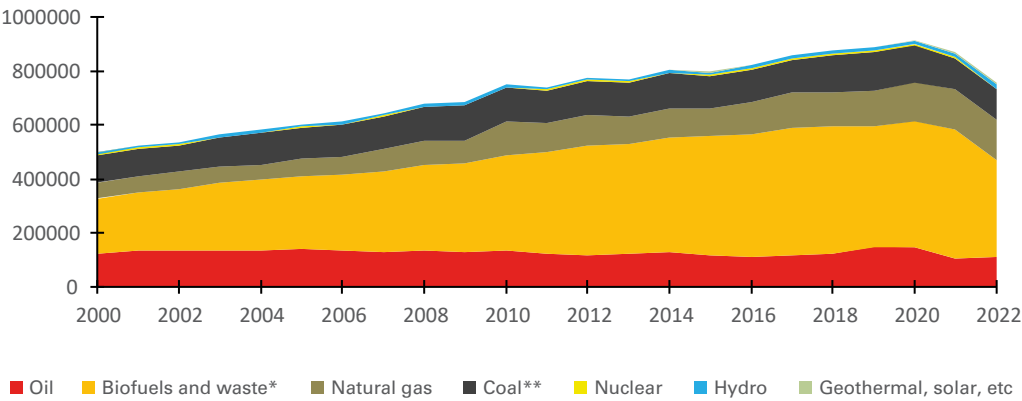
Algeria	Madagascar
Angola	Malawi
Benin	Mali
Botswana	Mauritania
Burkina Faso	Mauritius
Burundi	Morocco
Cameroon	Mozambique
Cape Verde	Namibia
Central African Republic	Niger
Chad	Nigeria
Comoros	Rwanda
Congo, Republic	Saharawi Republic
Cote d'Ivoire	Somalia
Djibouti	São Tome & Principe
Democratic Republic of the Congo	Senegal
Egypt	Seychelles
Equatorial Guinea	Sierra Leone
Eritrea	South Africa
Ethiopia	South Sudan
Gabon	Sudan
Gambia	Kingdom of Eswatini
Ghana	Tanzania
Guinea	Togo
Guinea Bissau	Tunisia
Kenya	Uganda
Lesotho	Zambia
Liberia	Zimbabwe
Libya	

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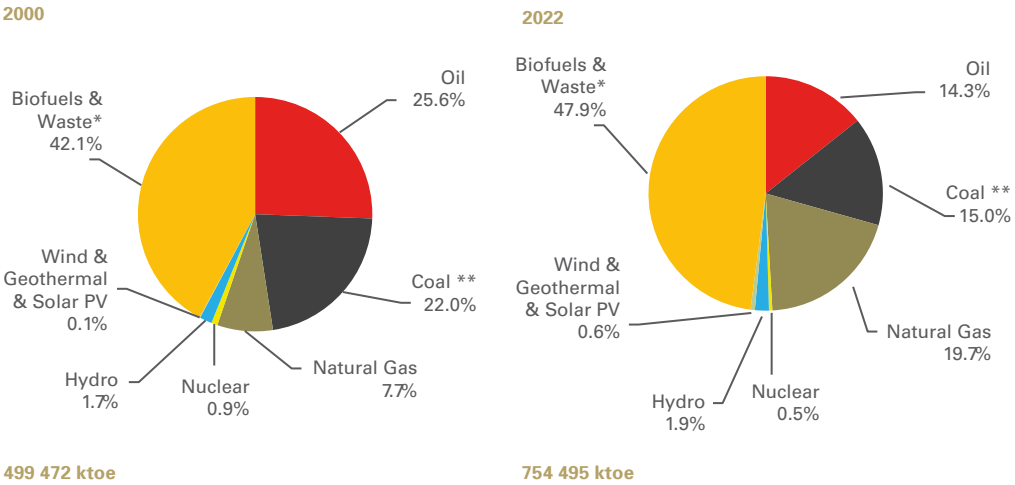
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TOTAL PRIMARY ENERGY SUPPLY BY FUEL

Total Primary Energy Supply (TPES) from 2000 to 2022 by fuel (ktoe)



2000 and 2022 Fuel Shares of TPES

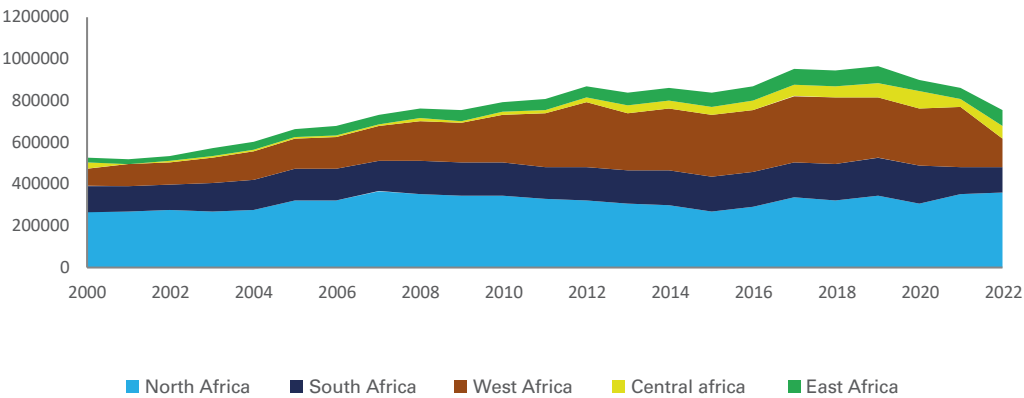


* Includes firewood, charcoal, biogas, agro residues, waste, and others biomass

** Includes steam coal, coking coal, lignite and recovered coal

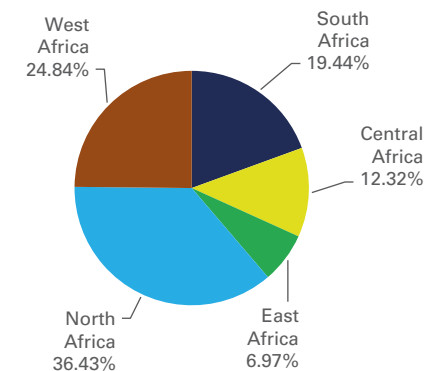
TOTAL PRIMARY ENERGY SUPPLY BY REGION

TPES from 2000 to 2022 by region (ktoe)



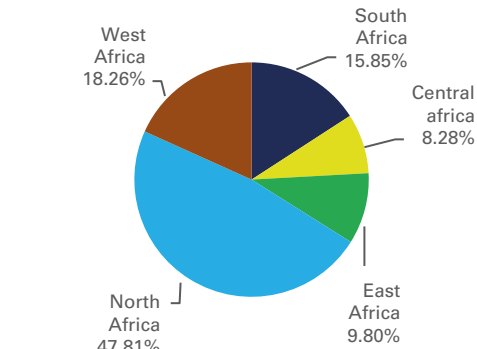
2000 and 2022 Regional Shares of TPES

2000



499 472 ktoe

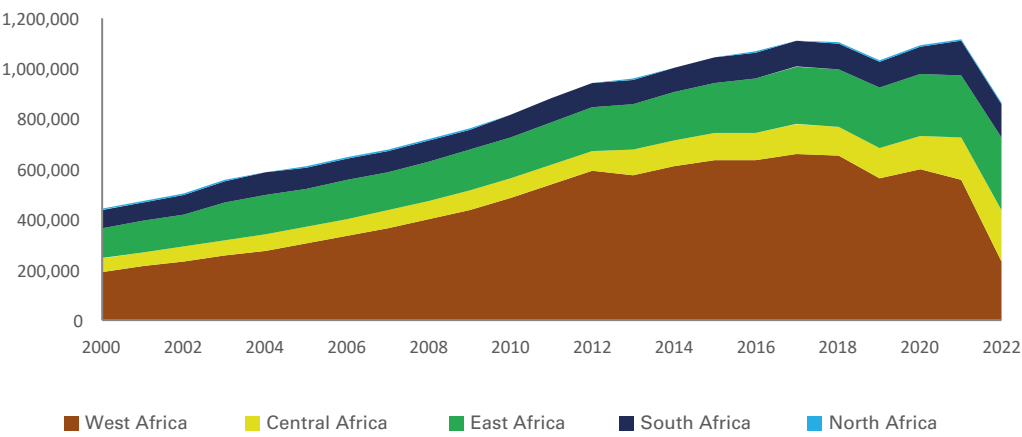
2022



754 495 ktoe

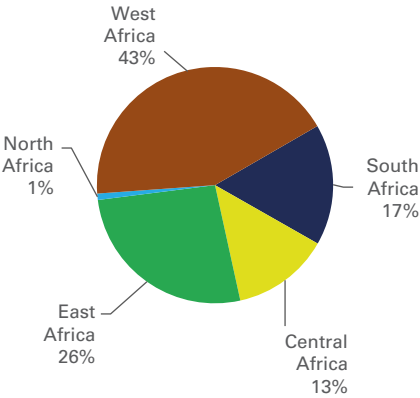
FIREWOOD PRODUCTION

Firewood Production from 2000 to 2022 by region (kt)

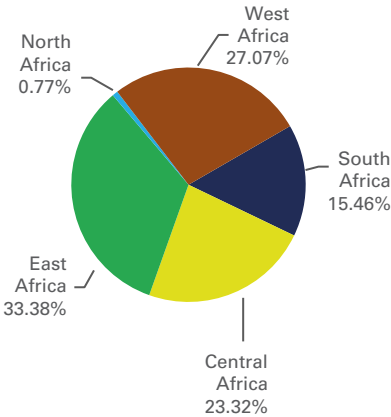


2000 and 2022 Regional Shares of Firewood Production

2000



2022



442 824 kt

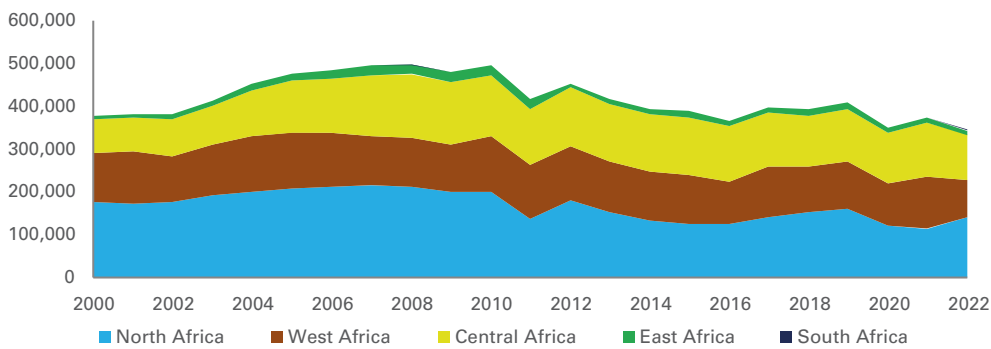
867 202 kt

PRODUCERS OF FIREWOOD FROM 2022

Producers	kt	Producer	kt
1. DR Congo	108 091	26. Zambia	8 502
2. Nigeria	91 977	27. Togo	8 213
3. Ethiopia	89 755	28. Burundi	7 257
4. Tanzania	80 967	29. Chad	6 707
5. Uganda	55 264	30. Rwanda	5 597
6. Kenya	41 792	31. Sudan	5 116
7. Eswatini	28 873	32. Senegal	5 064
8. Côte d'Ivoire	26 331	33. Liberia	4 953
9. Cameroon	24 938	34. Central African Republic	3 768
10. Mozambique	21 425	35. Morocco	3 421
11. South Africa	19 216	36. Tunisia	3 250
12. Madagascar	19 185	37. Mauritania	2 998
13. Gabon	19 034	38. South Sudan	2 506
14. Guinea	18 971	39. Gambia	1 989
15. Zimbabwe	18 298	40. Namibia	1 961
16. Burkina Faso	14 741	41. Lesotho	1 918
17. Angola	13 616		
18. Ghana	13 331	Other Africa	8 316
19. Congo	12 313	Africa	867 202
20. Mali	11 929		
21. Niger	11 824		
22. Sierra Leone	11 760		
23. Somalia	11 498		
24. Malawi	11 468		
25. Benin	9 069		

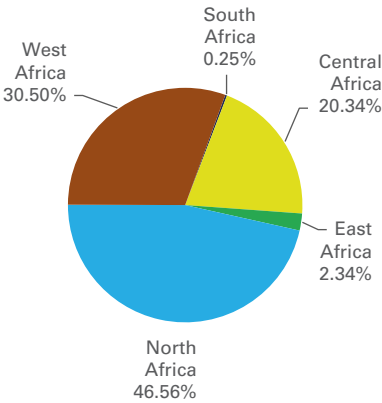
CRUDE OIL PRODUCTION

Crude Oil* Production from 2000 to 2022 by region (kt)

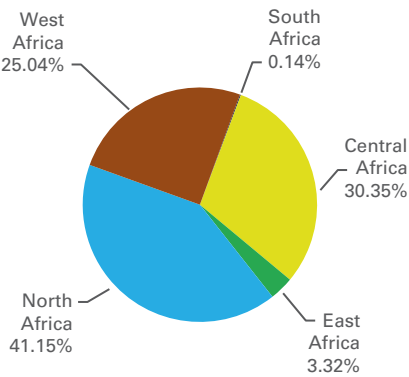


2000 and 2022 Regional Shares of Crude Oil* Production

2000



2022



378 776 kt

344 381 kt

* Include crude oil, NGL, additives and other hydrocarbons

PRODUCERS. NET EXPORTERS AND NET IMPORTERS OF CRUDE OIL* FROM 2022

Producers

kt

1. Nigeria	76 525
2. Algeria	62 066
3. Angola	59 686
4. Libya	46 564
5. Egypt	31 322
6. Congo	15 200
7. Gabon	12 499
8. South Sudan	8 589
9. Ghana	7 177
10. Tchad	7 000
11. Guinea Equatorial	5 400
12. Cameroon	3 300
13. Sudan	2 849
14. Tunisia	1 758
15. DR Congo	1 448
16. Côte d'Ivoire	1 291
17. Niger	866
18. Mozambique	428
19. Mauritania	359
20. South Africa	49
21. Tanzania	3
21. Morocco	2

Africa

344 381

Net Exporters

1. Nigeria	77 488
------------	--------

2. Angola	55 790
3. Libya	40 977
4. Algeria	21 752
5. Congo	14 360
6. Gabon	11 536
7. South Sudan	8 589
8. Ghana	7 096
9. Chad	6 300
10. Guinea Equatorial	5 650
11. Cameroon	3 300
12. DR Congo	1 448
13. Mozambique	408
14. Tunisia	319
15. Mauritania	188

Africa

255 201

Net Importers

kt

1. South Africa	8 338
2. Egypt	4 042
3. Côte d'Ivoire	3 543
4. Sudan	1 180
5. Senegal	637
6. Zambia	46

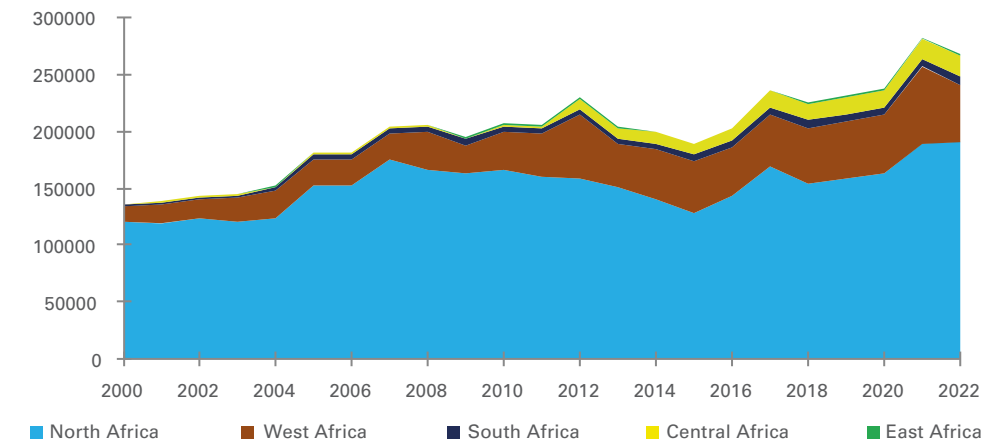
Africa

17 786

* Include crude oil, NGL, additives and other hydrocarbons.

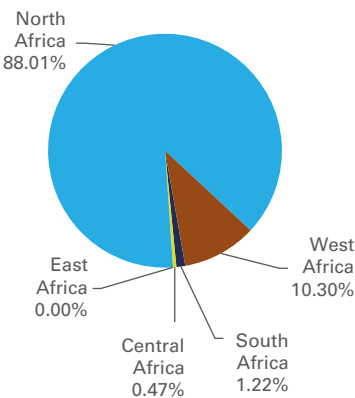
NATURAL GAS PRODUCTION

Natural gas production from 2000 to 2022 by region (Mcm)



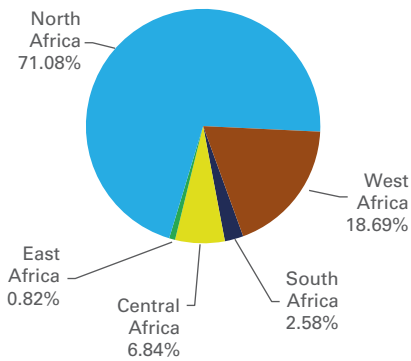
2000 and 2022 Regional Shares of Natural Gas Production

2000



136 368 Mcm

2022



268 457 Mcm

PRODUCERS, NET EXPORTERS AND NET IMPORTERS* OF NATURAL GAS FROM 2022

Producers TJ

1. Algeria	4 010 769
2. Egypt	2 868 341
3. Nigeria	1 736 836
4. Libya	494 000
5. Guinea Equatorial	276 961
6. Mozambique	269 323
7. Angola	254 144
8. Ghana	124 365
9. Cameroon	119 027
10. Côte d'Ivoire	101 563
11. Tunisia	98 234
12. Tanzania	86 454
13. Congo	43 004
14. Gabon	23 719
15. Morocco	2 724
16. Rwanda	2 296
17. Niger	1 890
18. South Africa	1 604
19. Senegal	193

Africa 10 515 447

Net Exporters TJ

1. Algeria	1 942 805
2. Nigeria	1 262 008
3. Mozambique	225 711
4. Angola	198 968

5. Guinea Equatorial	185 112
6. Libya	171 000

Africa 3 985 604

Net Importers TJ

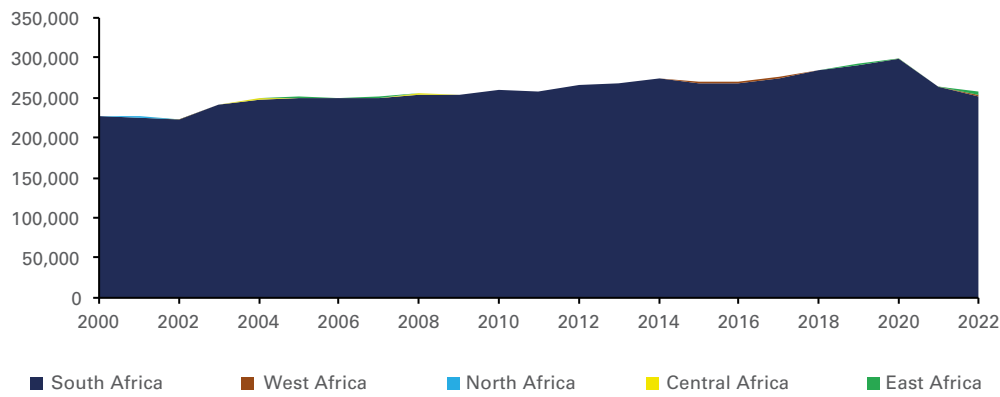
1. South Africa	187 485
2. Tunisia	158 746
3. Ghana	21 013
4. Togo	7 648
5. Benin	6 903
6. Morocco	6 184
7. Egypt	413

Africa 388 392

* Net exports and net imports include pipeline gas and LNG.

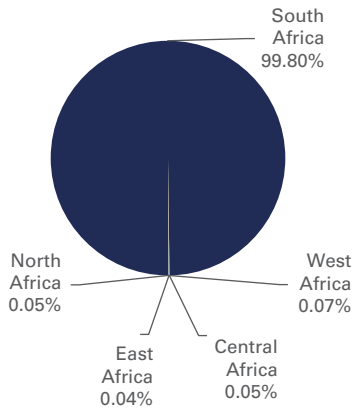
COAL* PRODUCTION

Coal* Production from 2000 to 2022 by region (kt)



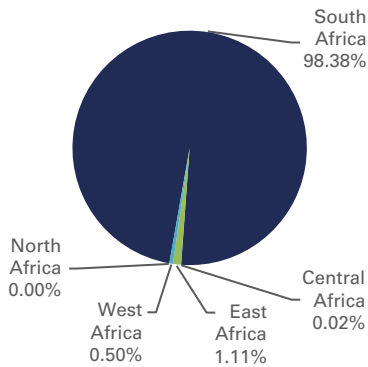
2000 and 2022 Regional Shares of Coal* Production

2000



227 126 kt

2022



256 917 kt

* Includes steam coal, coking coal, lignite and recovered coal, etc.

PRODUCERS, NET EXPORTERS AND NET IMPORTERS OF COAL* FROM 2022

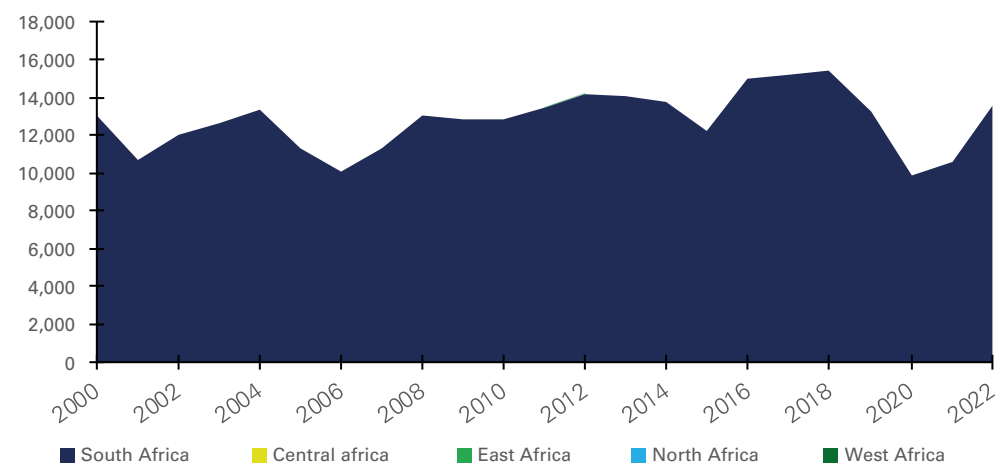
Producers	kt	Net Importers	kt
1. South Africa	230 526	1. Morocco	10 762
2. Mozambique	14 251	2. Egypt	3 376
3. Zimbabwe	3 941	3. Kenya	1 161
4. Tanzania	2 511	4. Senegal	890
5. Botswana	2 134	5. Mauritius	586
6. Zambia	1 560	6. Ethiopia	448
7. Nigeria	1 049	7. Madagascar	391
8. Ethiopia	330	8. Algeria	265
9. Eswatini	277	9. Benin	179
10. Niger	235	10. Lesotho	45
11. Malawi	62	11. Zambia	35
12. Rwanda	41	12. Rwanda	32
		13. Guinea	20
		14. Namibia	14
		15. Libya	1
Africa	256 917		

Net Exporters	kt	Africa	18 205
1. South Africa	75 039		
2. Mozambique	14 237		
3. Botswana	584		
4. Zimbabwe	549		
5. Eswatini	201		
6. Nigeria	92		
Africa	90 702		

* Includes steam coal, coking coal, lignite and recovered coal, etc.

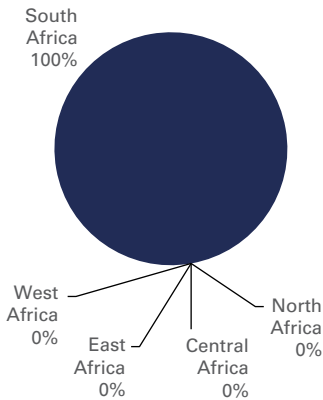
NUCLEAR PRODUCTION

Nuclear Production from 2000 to 2022 by region (GWh)



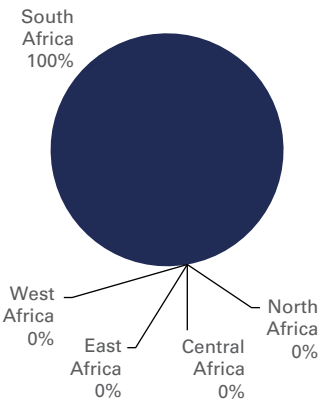
2000 and 2022 Regional Shares of Nuclear Production

2000



13 010 GWh

2022



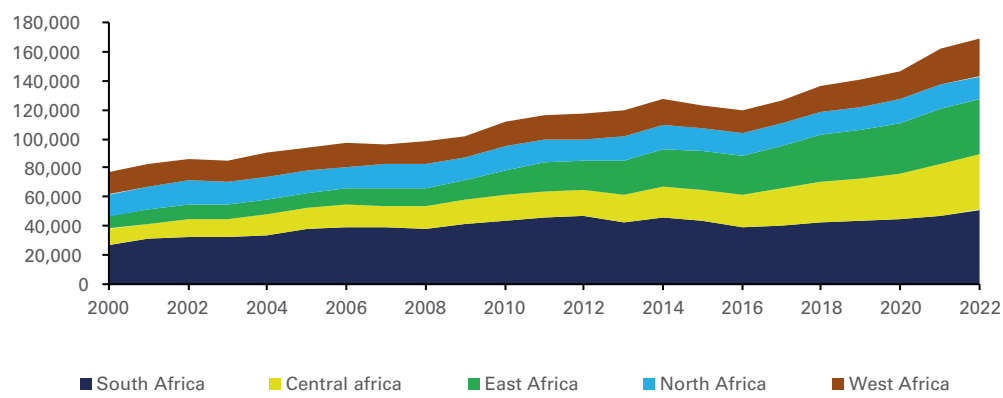
13 591 GWh

PRODUCERS OF NUCLEAR ELECTRICITY FROM 2022

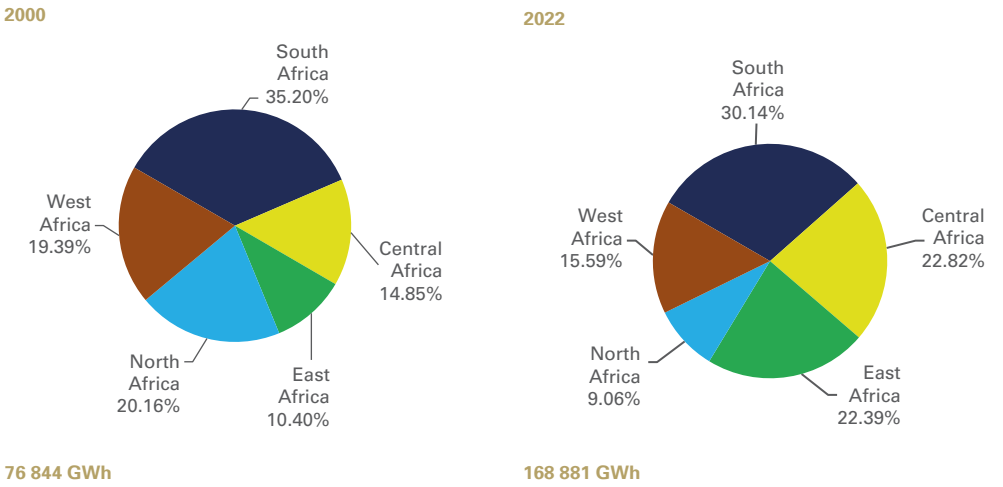
Producers	GWh
1. South Africa	13 591
Africa	13 591

HYDRO PRODUCTION

Hydro production from 2000 to 2022 by region (GWh)



2000 and 2022 Regional Shares of Hydro Production

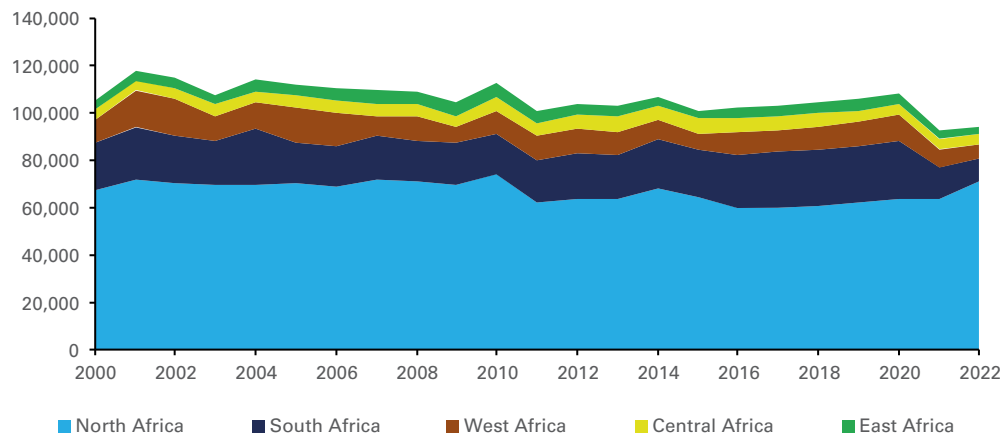


PRODUCERS OF HYDRO ELECTRICITY FROM 2022

Producers	GWh	Producers	GWh
1. Zambia	17 089	23. Namibia	781
2. Mozambique	16 173	24. Rwanda	598
3. DR Congo	14 992	25. Guinea Equatorial	549
4. Egypt	14 917	26. Lesotho	480
5. Ethiopia	14 882	27. Morocco	350
6. Angola	13 902	28. Sierra Leone	346
7. Sudan	12 044	29. Senegal	345
8. Nigeria	9 204	30. Eswatini	282
9. Ghana	8 192	31. Mauritania	270
10. South Africa	7 462	32. Burundi	216
11. Zimbabwe	5 897	33. Libéria	177
12. Cameroon	5 745	34. Central African Republic	154
13. Uganda	4 983	35. Burkina Faso	136
14. Kenya	3 344	36. Mauritius	128
15. Guinea	2 931	37. Togo	78
16. Côte d'Ivoire	2 864	38. São Tomé & Príncipe	18
17. Tanzania	2 555	39. Algeria	16
18. Mali	1 787	40. Tunisia	15
19. Malawi	1 755	41. Comoros	7
20. Gabon	1 254		
21. Congo	1 119		
22. Madagascar	844		
		Africa	168 881

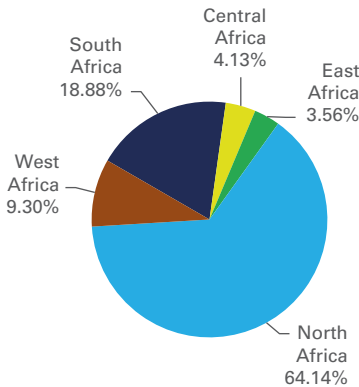
REFINING BY REGION

Refinery Production from 2000 to 2022 by region (kt)



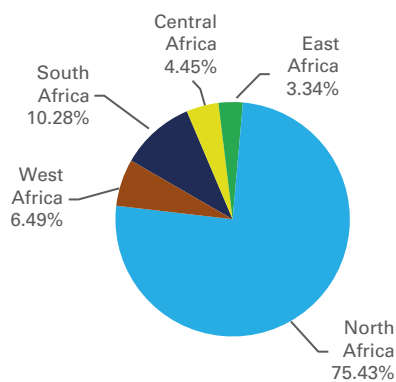
2000 and 2022 Regional Shares of Refinery Production

2000



105 011 kt

2022



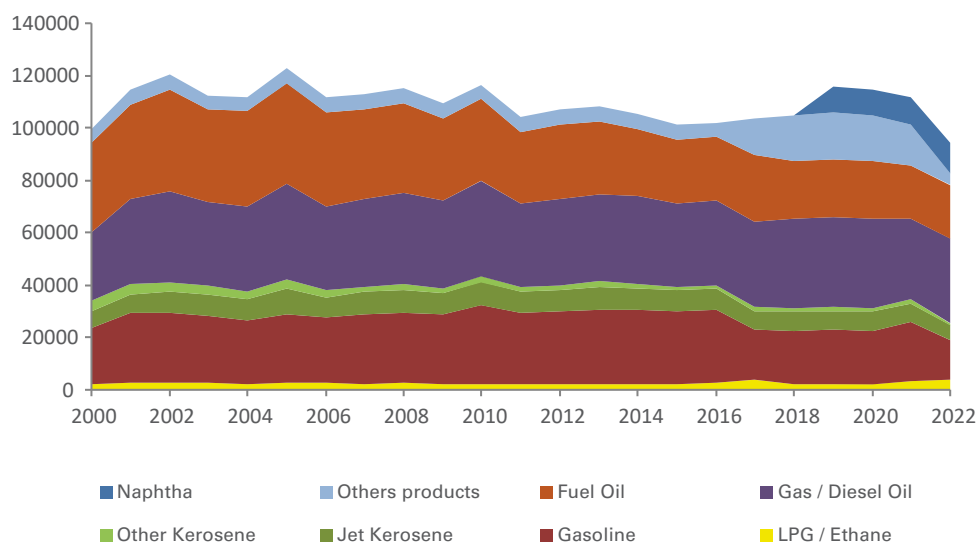
94 188 kt

PRODUCERS, NET EXPORTERS AND NET IMPORTERS OF OIL PRODUCTS IN 2022

Producers	kt	Net Importers	kt
1. Egypt	35 168	1. Nigeria	23749
2. Algeria	29 097	2. Morocco	13523
3. South Africa	9 624	3. Kenya	4867
4. Libya	5 340	4. Ethiopia	4627
5. Côte d'Ivoire	4 574	5. Ghana	4062
6. Sudan	3 147	6. Tanzania	3854
7. Angola	2 101	7. South Africa	3823
8. Tunisia	1 445	8. Libya	3342
9. Chad	905	9. Tunisia	2897
10. Gabon	882	10. Senegal	2703
11. Niger	766	11. Angola	2427
12. Senegal	412	12. Guinea	2143
13. Nigeria	324	13. Mali	2116
14. Congo	305	14. Sudan	2044
15. Zambia	58	15. Cameroon	2010
16. Ghana	40		
		Others	24 717
Africa	94 188	Africa	102 904
Net Exporters	kt		
1. Algeria	19 454		
2. Egypt	3 069		
3. Côte d'Ivoire	1 171		
4. Guinea Equatorial	328		
5. Chad	14		
Africa	24 036		

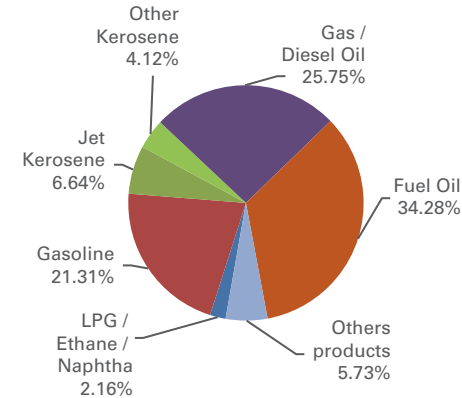
REFINING BY PRODUCT

Refinery Production from 2000 to 2022 by product (kt)



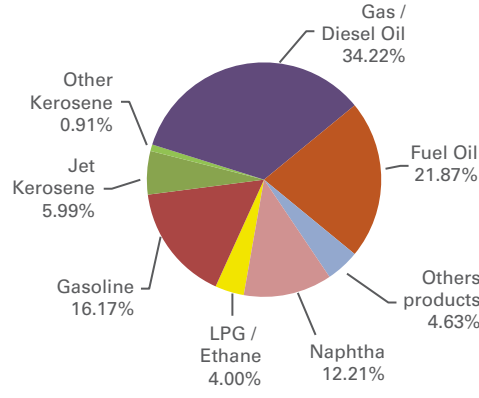
2000 and 2022 Shares of Refinery Production by Product

2000



105 011 kt

2022



94 188 kt

REFINERY CAPACITY OF OIL PRODUCTS IN 2022

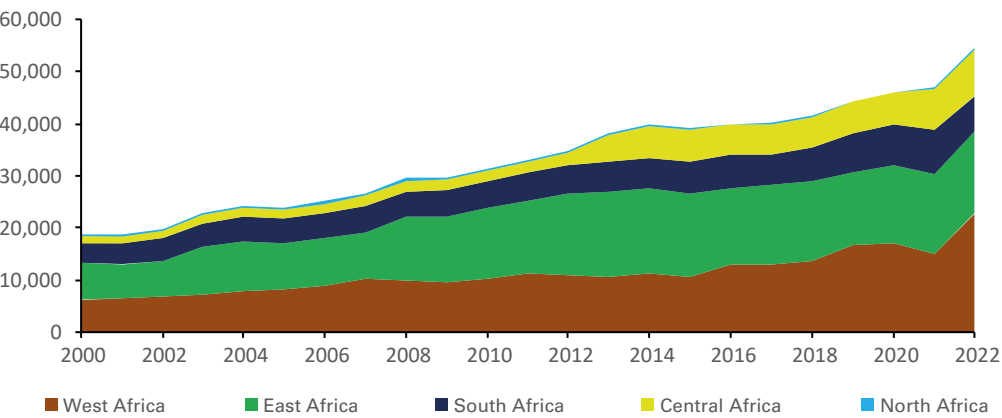
Refining Capacity kbpd

1. Nigeria	1 155
2. Egypt	675
3. Algeria	576
4. South Africa	497
5. Libya	380
6. Sudan	105
7. Côte d'Ivoire	70
8. Angola	55
9. Ghana	45
10. Tunisia	34
11. Senegal	27
12. Zambia	24
13. Congo	21
14. Gabon	21
15. Niger	20
16. Chad	20

Africa **3 725**

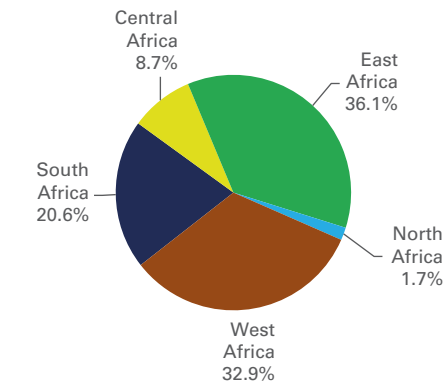
CHARCOAL PRODUCTION

Charcoal production from 2000 to 2022 by region (kt)



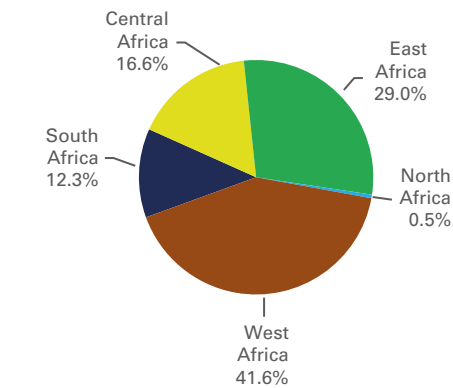
2000 and 2022 Regional Shares of Charcoal Production

2000



18 790 kt

2022



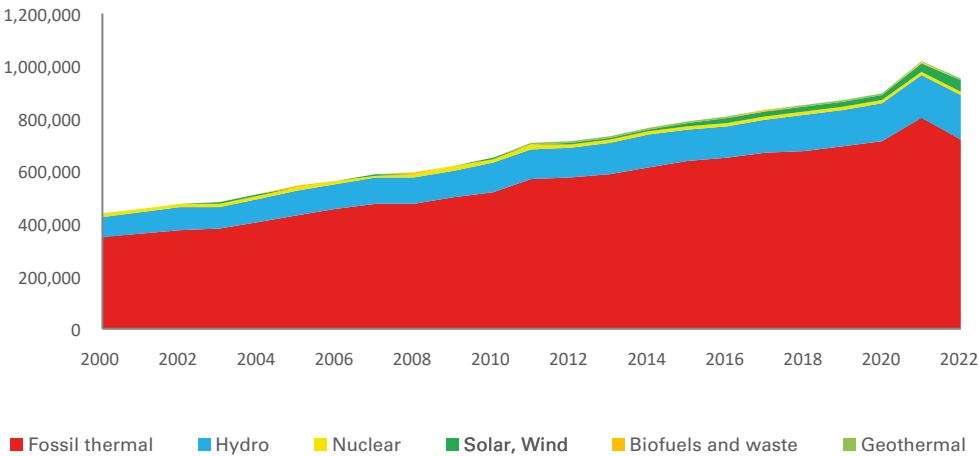
54 515 kt

PRODUCERS OF CHARCOAL FROM 2022

Producers	kt	Producers	kt
1. Nigeria	11 355	26. Namibia	384
2. DR Congo	5 248	27. Gabon	379
3. Ethiopia	5 130	28. Burundi	305
4. Tanzania	3 914	29. Malawi	289
5. Uganda	3 297	30. Mauritania	266
6. Côte d'Ivoire	2 254	31. Tunisia	247
7. Guinea	2 242	32. Eritrea	210
8. Madagascar	1 745	33. Zimbabwe	157
9. Somalia	1 708	34. Botswana	108
10. Congo	1 627	35. Gambia	101
11. Ghana	1 533	36. Djibouti	70
12. Kenya	1 399	37. Niger	66
13. South Africa	1 390	38. Rwanda	62
14. Zambia	1 390	39. Comoros	60
15. Mozambique	1 099	40. Eswatini	59
16. Burkina Faso	951	41. South Sudan	57
17. Togo	785	42. Sudan	51
18. Liberia	736	43. Guinea Bissau	41
19. Mali	657	44. Morocco	22
20. Sierra Leone	605	45. Sao Tome & Principe	16
21. Benin	596	46. Guinea Equatorial	15
22. Chad	542	47. Central Africa Republic	14
23. Senegal	476	48. Libya	1
24. Angola	443	49. Cape Verde	1
25. Cameroon	412		
		Africa	54 515

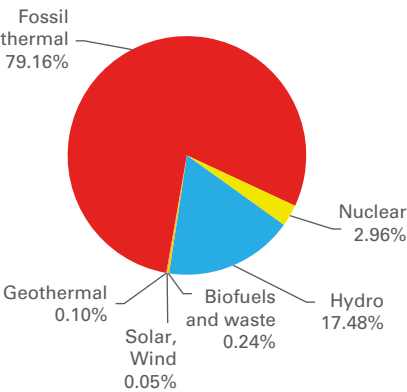
ELECTRICITY GENERATION BY FUEL

Electricity Generation from 2000 to 2022 by fuel (GWh)



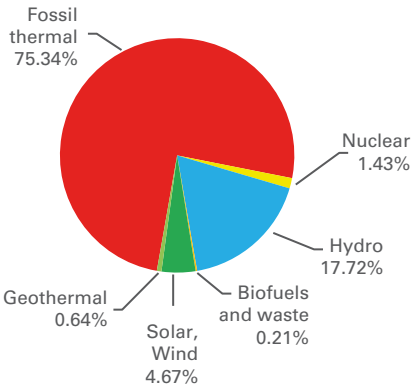
2000 and 2022 Fuel Shares of Electricity Generation

2000



439 488 GWh

2022



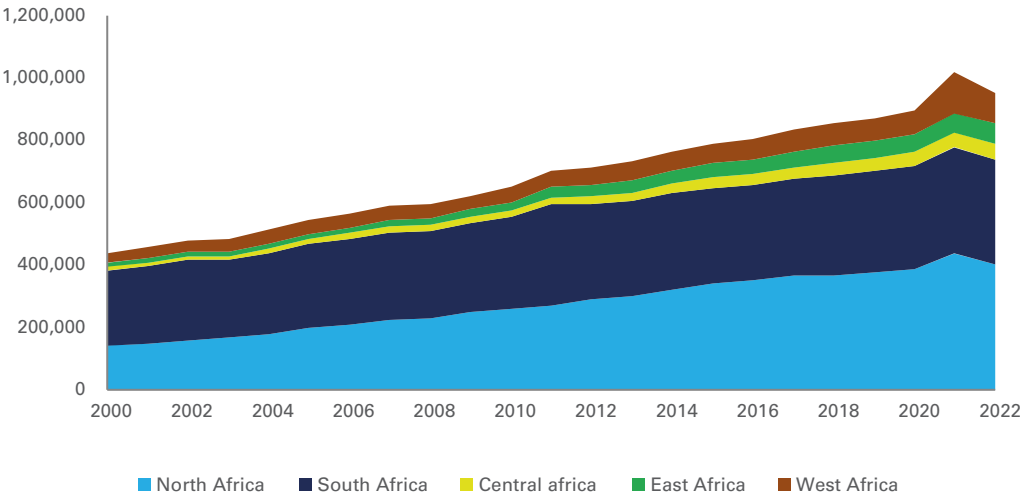
952 909 GWh

ELECTRICITY PRODUCTION BY FUEL FROM 2022

Nuclear	GWh	Hydro	GWh	Fossil fuel	GWh
1. South Africa	13 591	1. Zambia	17 089	1. South Africa	230 873
Africa	13 591	2. Mozambique	16 173	2. Egypt	186 258
		3. DR Congo	14 992	3. Algeria	90 550
Solar, Wind, Geothermal, Biofuels and waste	GWh	4. Egypt	14 917	4. Libya	36 346
1. South Africa	17 673	5. Ethiopia	14 882	5. Morocco	33 937
2. Egypt	10 604	6. Angola	13 902	6. Nigeria	27 046
3. Kenya	8 849	7. Sudan	12 044	7. Tunisia	20 552
4. Morocco	8 106	8. Nigeria	9 204	8. Ghana	14 967
5. Senegal	990	9. Ghana	8 192	9. Côte d'Ivoire	9 284
6. Tunisia	855	10. South Africa	7 462	10. Sudan	7 275
7. Algeria	665	11. Zimbabwe	5 897	11. Tanzania	6 698
8. Ethiopia	561	12. Cameroon	5 745	12. Senegal	6 422
9. Namibia	379	13. Uganda	4 983	13. Cameroon	5 358
10. Somalia	177	14. Kenya	3 344	14. Angola	4 557
11. Mauritius	170	15. Guinea	2 931	15. Mali	4 445
12. Malawi	167	16. Côte d'Ivoire	2 864	16. Mozambique	3 913
13. Ghana	161	17. Tanzania	2 555	17. Zimbabwe	3 068
14. Cape Verde	160	18. Mali	1 787	18. Botswana	2 728
15. Zambia	143	19. Malawi	1 755	19. Mauritius	2 521
16. Cameroon	108	20. Gabon	1 254	20. Congo	2 190
17. Uganda	99	21. Congo	1 119	21. Zambia	2 167
18. Togo	84	22. Madagascar	844	22. Madagascar	1 858
19. Burkina Faso	69	23. Namibia	781	23. Kenya	1 743
20. Mozambique	68	24. Rwanda	598	24. Burkina Faso	1 563
		25. Guinea Equatorial	549	25. Gabon	1 512
				26. Benin	1 221
Others Africa	441	Others Africa	3 018	Others Africa	8 817
Africa	50 529	Africa	168 881	Africa	717 869

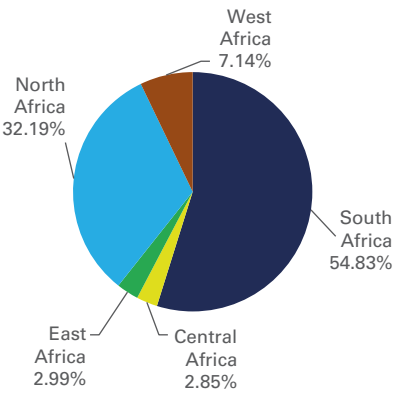
ELECTRICITY GENERATION BY REGION

Electricity Generation from 2000 to 2022 by region (GWh)



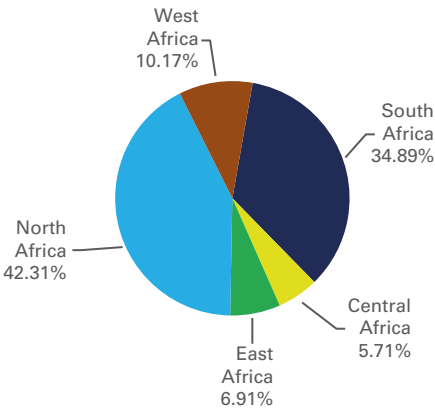
2000 and 2022 Regional Shares of Electricity Generation

2000



439 568 GWh

2022



952 909 GWh

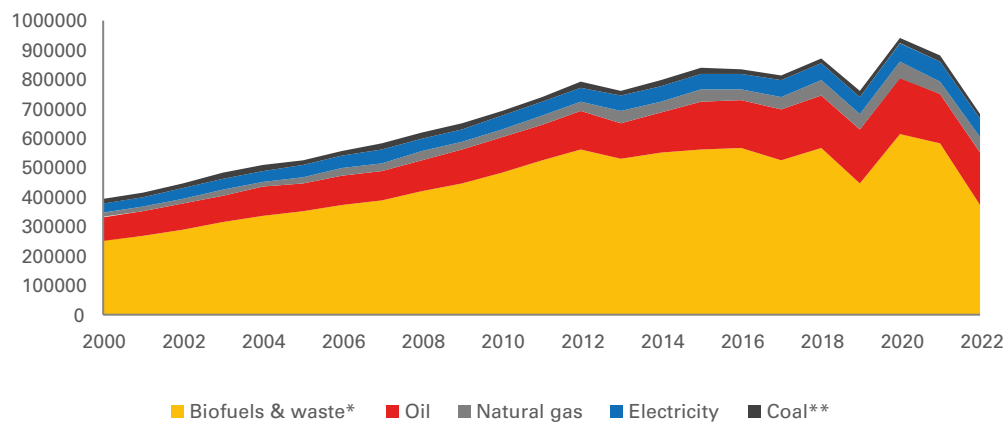
PRODUCERS, NET EXPORTERS AND NET IMPORTS OF ELECTRICITY FROM 2022

Producers	GWh				
1. South Africa	269 984	37. Togo	856	11. Côte d'Ivoire	357
2. Egypt	211 779	38. Eswatini	688	12. Congo	216
3. Algeria	91 231	39. Seychelles	662		
4. Morocco	42 393	40. Cape Verde	659	Africa	21 377
5. Libya	36 357	41. South Sudan	608		
6. Nigeria	36 299	42. Niger	522		
7. Ghana	23 321	43. Lesotho	480	Net Importers	GWh
8. Tunisia	21 422	44. Sierra Leone	456		
9. Mozambique	20 252	45. Eritrea	421	1. Namibia	2 748
10. Zambia	19 399	46. Chad	410	2. Tunisia	2 573
11. Soudan	19 325	47. Liberia	377	3. Zimbabwe	1 909
12. Angola	18 459	48. Gambia	359	4. Botswana	1 826
13. Ethiopia	15 477	49. Burundi	302	5. Burkina Faso	1 725
14. DR Congo	15036	50. Guinea Bissau	288	6. Morocco	1 397
15. Kenya	13936	51. Central African Republic	156	7. DR Congo	1 378
16. Côte d'Ivoire	12315	52. São Tomé & Príncipe	118	8. Niger	1 164
17. Cameroon	11218	53. Comoros	117	9. Togo	1 126
18. Tanzania	9304	54. Djibouti	36	10. Eswatini	902
19. Zimbabwe	9016			11. Benin	833
20. Senegal	7849			12. Libya	815
21. Mali	6346	Africa	952 909	13. Djibouti	691
22. Uganda	5524			14. Lesotho	507
23. Congo	3309			15. Senegal	391
24. Guinea	3254	Net Exporters	GWh	16. Gabon	312
25. Mauritius	3119			17. Libéria	256
26. Gabon	2776	1. South Africa	3 925	18. Burundi	159
27. Madagascar	2768	2. Mozambique	3 191	19. Tanzania	157
28. Botswana	2735	3. Zambia	2 905	20. Kenya	132
29. Malawi	2087	4. Algeria	2 572	21. Guinea Bissau	72
30. Burkina Faso	1768	5. Nigeria	2 317	22. Cameroon	65
31. Guinee Equatorial	1580	6. Ghana	2 177	23. Rwanda	24
32. Somalia	1253	7. Ethiopia	1 642	24. Guinea	19
33. Benin	1239	8. Egypt	1 267	25. Malawi	5
34. Namibia	1180	9. Mali	411		
35. Rwanda	1071	10. Uganda	397	Africa	21 186
36. Mauritania	1013				

CONSUMPTION

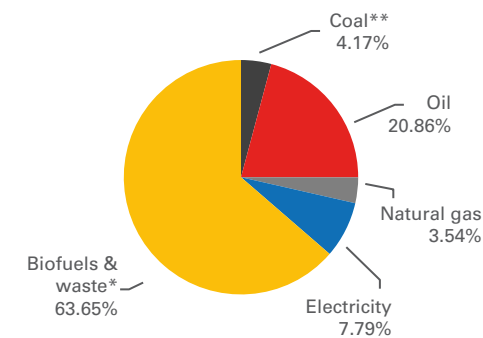
TOTAL FINAL CONSUMPTION BY FUEL

Total Final Consumption (TFC) from 2000 to 2022 by fuel (ktoe)



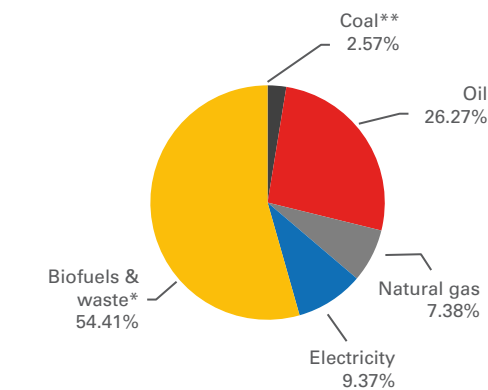
2000 and 2022 Fuel Shares of Total Final Consumption

2000



394 280 ktoe

2022



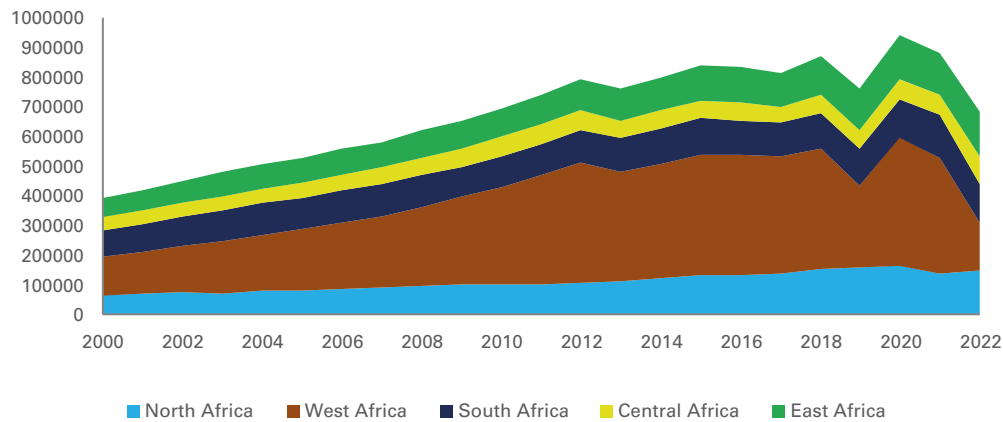
504 955 ktoe

* Includes firewood, charcoal, biogas, agro-residues and waste

** Includes steam coal, coking coal, lignite and recovered coal.

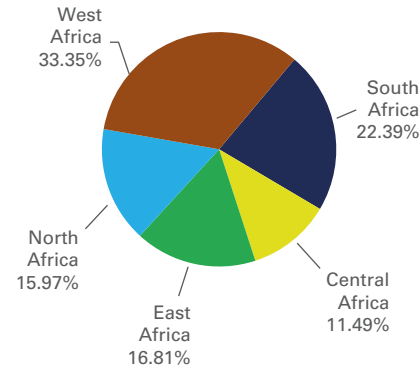
TOTAL FINAL CONSUMPTION BY REGION

TFC from 2000 to 2022 by region (ktoe)



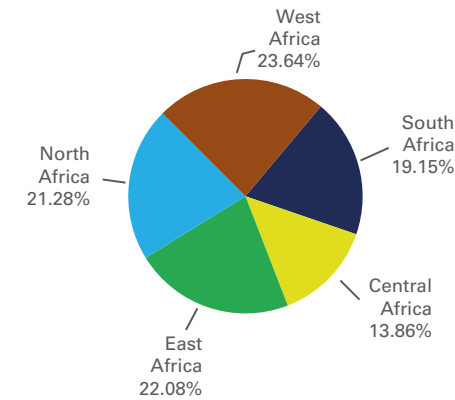
2000 and 2022 Regional Shares of TFC

2000



394 280 ktoe

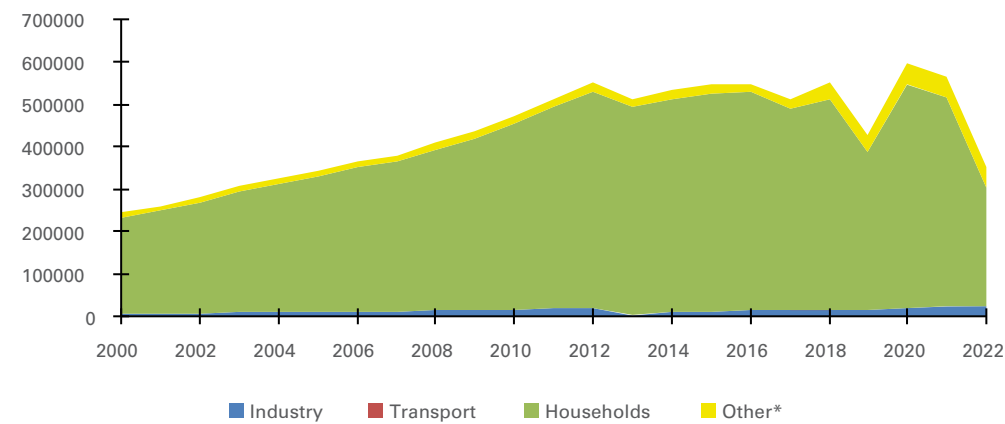
2022



504 955 ktoe

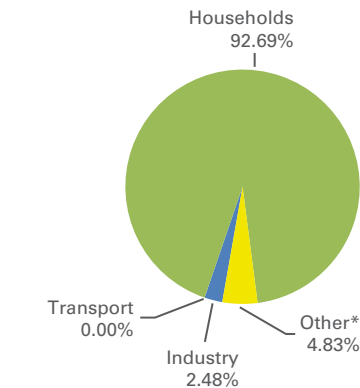
TOTAL FINAL CONSUMPTION BY SECTOR

Firewood
TFC from 2000 to 2022 by sector (ktoe)



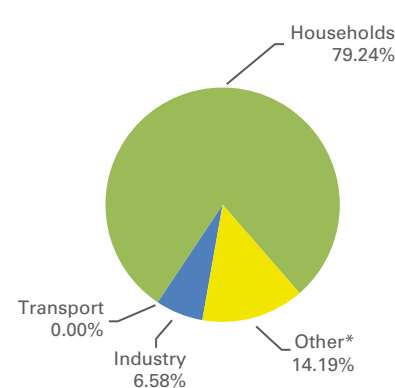
2000 and 2022 shares of Africa firewood consumption

2000



243 762 ktoe

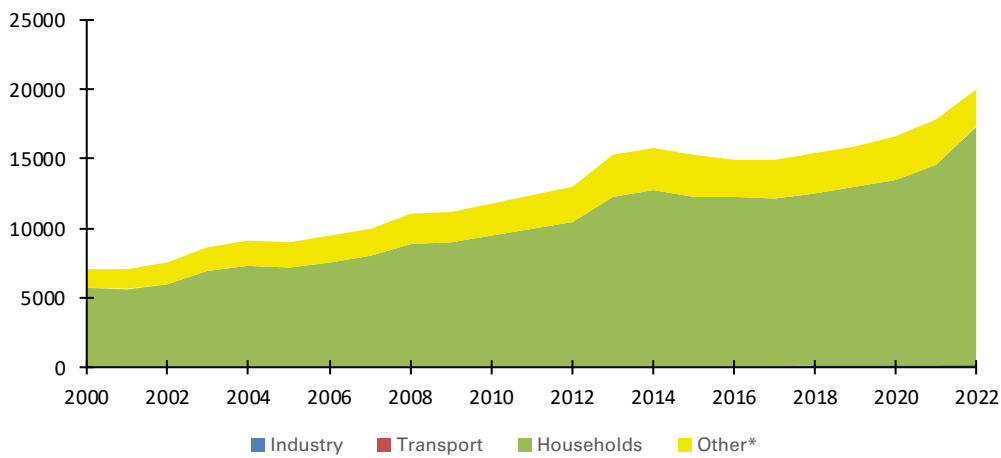
2022



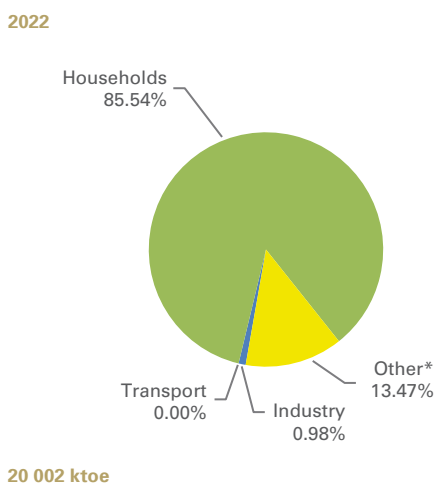
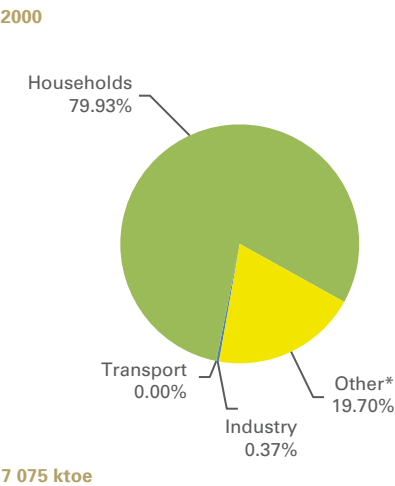
351 300 ktoe

* Includes agriculture, commercial, public service, and other non-specified

Charcoal
TFC from 2000 to 2022 by sector (ktoe)



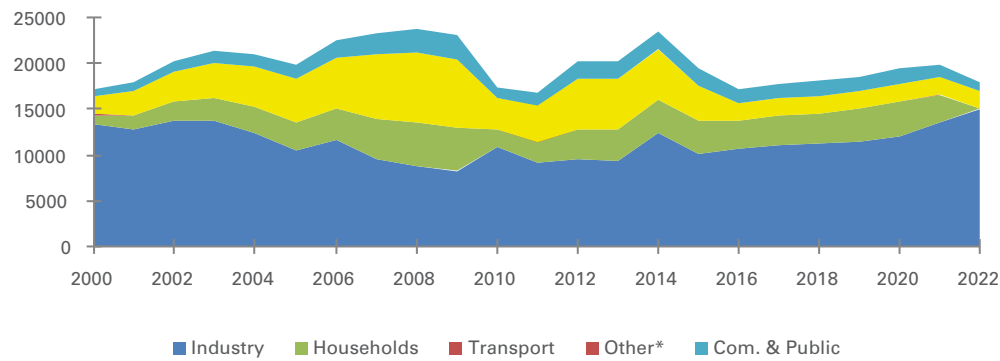
2000 and 2022 shares of Africa charcoal consumption



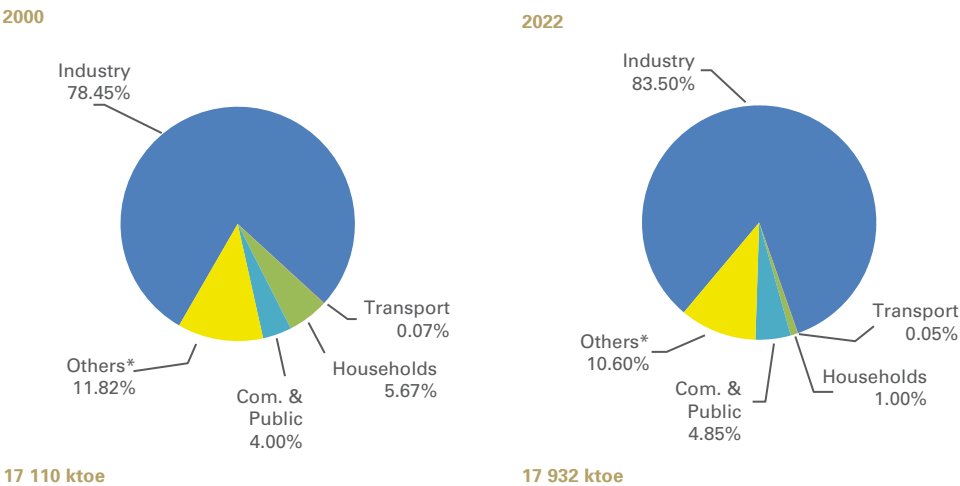
* Includes agriculture, commercial, public service, and non-specified other

CONSUMPTION

Coal**
TFC from 2000 to 2022 by sector (ktoe)

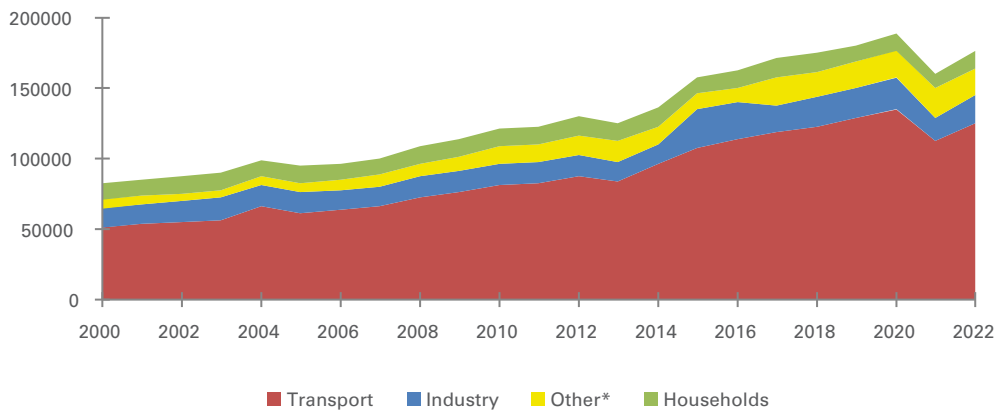


2000 and 2022 shares of Africa coal** consumption

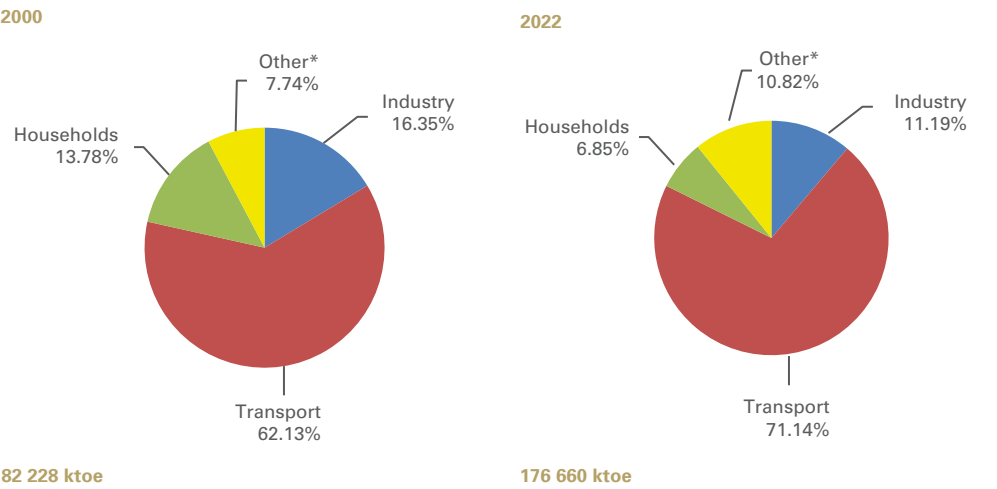


* Includes agriculture, commercial, public service, and other non-specified
** Includes steam coal, coking coal, lignite and recovered coal
*** Includes agriculture, other (non-specified) and non-Energy Use

Oil
TFC from 2000 to 2022 by sector (ktoe)



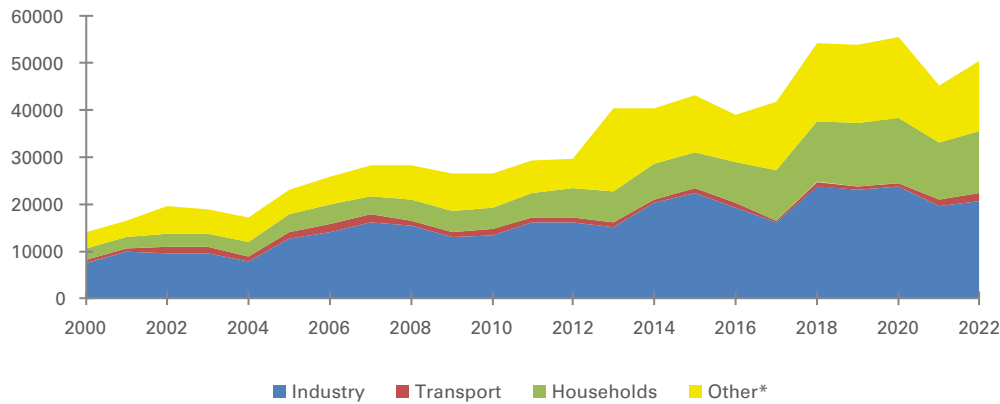
2000 and 2022 Shares of Africa Oil Consumption



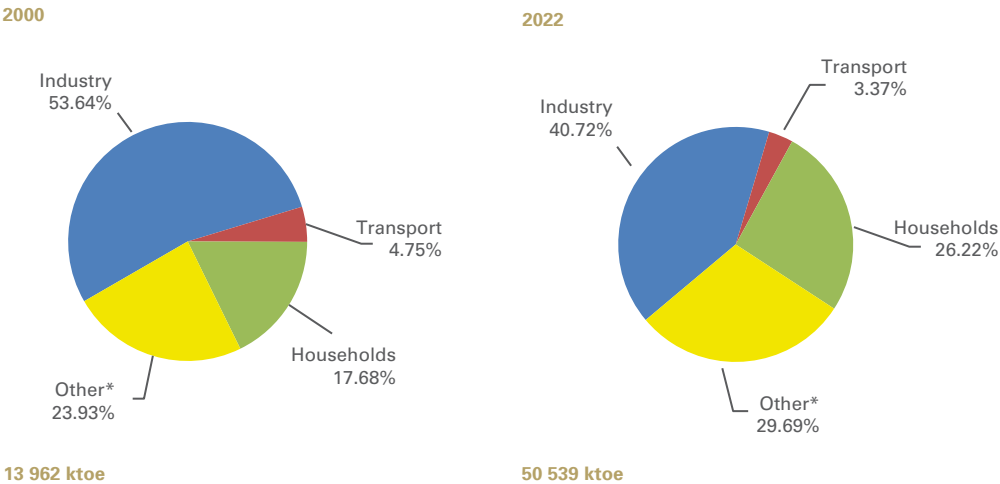
* Includes agriculture, commercial, public service and other non-specified

CONSUMPTION

Natural gas
TFC from 2000 to 2022 by sector (ktoe)

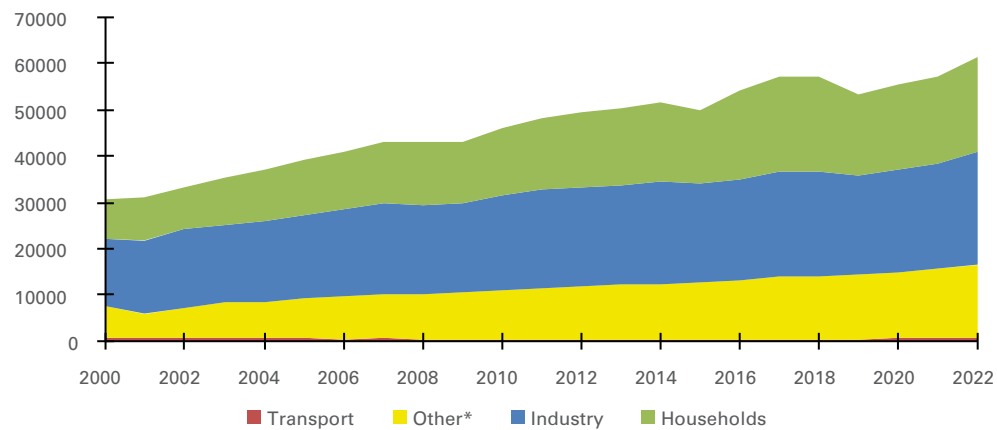


2000 and 2022 Shares of Africa Natural Gas Consumption

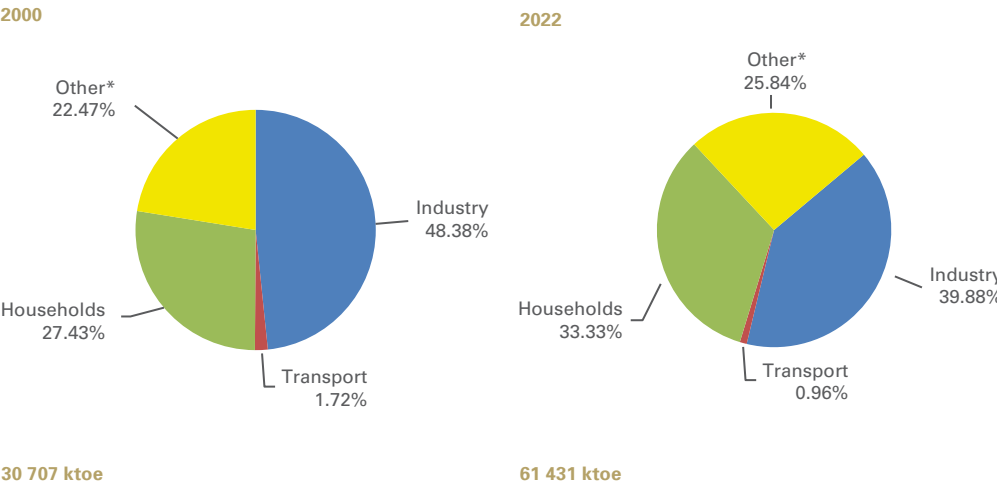


* Includes agriculture, commercial, public service and non-specified other

Electricity
TFC from 2000 to 2022 by sector (ktoe)



2000 and 2022 shares of Africa electricity consumption



* Includes agriculture, commercial, public service and non-specified other

SIMPLIFIED ENERGY BALANCE TABLE. 2000

Thousand Tonnes of Oil Equivalent (ktoe)		Crude Oil ₁	Oil Products	Coal / peat ₂	Natural Gas	Nuclear	Hydro	Wind & Geothermal & Solar PV	Biofuels and Waste	Electricity	Total
PRIMARY SUPPLY	Production	361 087	-	117 811	34 537	3 390	6 698	394	162 066	-	685 982
	Imports	22 288	34 534	4 108	847	-	-	-	4 397	2 636	68 810
	Exports	-265 250	-48 292	-36 006	-5 072	-	-	-	-	-1 445	-356 064
	Intl. Marine Bunkers	-	2 402	-	-	-	-	-	-	-	2 401
	Intl. Aviation Bunkers	-	-5 417	-	-	-	-	-	-	-	-5 417
	Stock Changes	-877	637	934	-	-	-	-	-	-	694
	TPES ₃	117 248	-16 135	86 846	30 312	3 390	6 698	394	166 463	1 191	396 406
TRANSFORMATION	Transfers	-12 686	21 505	-	-	-	-	-	-	-	8 819
	Statistical difference.	-2 917	-5 799	-46	-1 447	-	-	-	23 297	260	14 040
	Transformation	-100 266	84 907	- 74 204	-16 162	- 3 390	- 6 698	-394	- 48 777	37 853	-127 131
	Electricity Producers	-143	-11 172	-53 406	-14 765	-3 390	- 6 698	- 394	-1 193	37 853	-53 306
	Petroleum Refineries	-100 123	96 019	-	-	-	-	-	-	-	-4 104
	Charcoal Plants	-	-	-	-	-	-	-	-47 584	-	-47 584
	Gas-To-Liquids	-	-	-	-	-	-	-	-	-	-
FINAL CONSUMPTION	Coal-To-Liquids	-	-	-	-	-	-	-	-	-	-
	Blast Furnaces	-	-	-	-	-	-	-	-	-	-
	Other Transformation	-	60	-20 798	-1 398	-	-	-	-	-	-22 136
	Energy Industry Own Use	-406	-389	- 28	-4 029	-	-	-	-	-3 784	-8 608
	Losses	-947	-2	-2 044	0	-	-	-	-	-4 817	-5 766
	TFC ₄	26	84 687	12 689	8 673	-	-	-	140 983	30 704	277 762
	Industry	26	13 009	6 782	4 712	-	-	-	5 586	14 854	44 970
FINAL CONSUMPTION	Transport	-	52 866	8	0	-	-	-	-	529	53 403
	Households	-	12 200	789	445	-	-	-	124 412	8 332	146 178
	Com. & Public Service	-	1 537	566	40	-	-	-	2 426	3 993	8 561
	Agriculture/Forestry	-	2 592	351	-	-	-	-	-	918	3 861
	Others (Non Specified)	-	872	5	493	-	-	-	8 558	2 078	12 006
	Non-Energy Use	-	1 611	4 187	2 984	-	-	-	-	-	8 783

1. Includes crude oil, NGL, refinery feedstock, additives and other hydrocarbons
2. Includes steam coal, coking coal, lignite and recovered coal
3. Total Primary Energy Supply
4. Total Final Consumption

SIMPLIFIED ENERGY BALANCE TABLE. 2022

Thousand Tonnes of Oil Equivalent (ktoe)		Crude Oil ₁	Oil Products	Coal / peat ₂	Natural Gas	Nuclear	Hydro	Wind & Geothermal & Solar PV	Biofuels and Waste	Electricity	Total
PRIMARY SUPPLY	Production	321 615	-	131 257	226 041	3 541	14 521	9 042	289 980	-	995 998
	Imports	16 611	127 364	9 302	8 349	-	-	-	-	1821	163 447
	Exports	-238 328	-38 974	-46 339	-85 675	-	-	-	-	-1838	-411 154
	Intl. Marine Bunkers	-	-8 147	-	-	-	-	-	-	-	-8 147
	Intl. Aviation Bunkers	-	-6 775	-	-	-	-	-	-	-	-6 775
	Stock Changes	7090	5 777	-	46	-	-	-	-	-	12 914
	TPES ₃	106 988	79 245	94 221	148 762	3 541	14 521	9 042	289 980	-17	746 283
TRANSFORMATION	Transfers	-10 215	4 153	-	-	-	-	-	-	-	-6 063
	Statistical difference.	-2 770	19 151	17 709	-6 605	-	-	-	-617	-5 746	21 121
	Transformation	-94 003	72 240	-82 161	-75 348	-3 541	-14 521	-9 042	-163 360	81 932	-287 805
	Electricity Producers	-857	-12 590	-69 320	-73 399	-3 541	-14 521	-9 042	-13 884	81 932	-115 223
	Petroleum Refineries	-93 145	84 830	-	-	-	-	-	-	-	-8 315
	Charcoal Plants	-	-	-	-	-	-	-	-149 476	-	-149 476
	Gas-To-Liquids	-	-	-	-	-	-	-	-	-	-
	Coal-To-Liquids	-	-	-	-	-	-	-	-	-	-
	Blast Furnaces	-	-	-	-	-	-	-	-	-	-
	Other Transformation	-	-	-12 841	-1 949	-	-	-	-	-	-14 791
FINAL CONSUMPTION	Energy Industry Own Use	-	-553	-15 199	-15 194	-	-	-	-	-5 554	-36 500
	Losses	-	-66	-	-1 107	-	-	-	-	-11 115	-12 288
	TFC ₄	-	174 170	14 569	50 506	-	-	-	206 210	59 500	504 955
	Industry	-	19 066	12 415	20 564	-	-	-	11 356	22 002	85 404
	Transport	-	121 617	7	1 704	-	-	-	-	528	123 856
	Households	-	14 768	149	13 245	-	-	-	165 882	21 129	215 172
	Com. & Public Service	-	4 631	722	2 249	-	-	-	28 972	12 346	48 920
	Agriculture/Forestry	-	3 323	-	750	-	-	-	-	1 573	5 646
	Others (Non Specified)	-	1 288	1 277	11 995	-	-	-	-	1 922	16 482
	Non-Energy Use	-	9 477	-	-	-	-	-	-	-	9 477

1. Includes crude oil, NGL, refinery feedstock, additives and other hydrocarbons
2. Includes steam coal, coking coal, lignite and recovered coal
3. Total Primary Energy Supply
4. Total Final Consumption

CONVERSION FACTORS FOR ENERGY

	TJ	Gcal	Mtoe	MBtu	GWh
TJ	1	238.8	2.388×10^6	947.8	0.2778
Gcal	4.1868×10^3	1	10^7	3.968	1.163×10^3
Mtoe	4.1868×10^4	10^7	1	3.968×10^7	11630
MBtu	1.0551×10^3	0.252	2.52×10^8	1	2.931×10^4
GWh	3.6	860	8.6×10^5	3412	1

CONVERSION FACTORS FOR MASS

	kg	t	lt	st	lb
kilogram (kg)	1	0.001	9.84×10^{-4}	1.102×10^{-3}	2.2046
ton (t)	1 000	1	0.984	1.1023	2 204.6
long ton (lt)	1 060	1.016	1	1.120	2 240.0
short ton (st)	907.2	0.9072	0.893	1	2 000.0 ⁴
pound (lb)	0454	4.54×10^{-4}	4.46×10^{-4}	5.0×10^{-4}	1

CONVERSION FACTORS FOR VOLUME

	gal U.S.	gal U.K.	bbl	Ft ³	l	m ³
U.S. gallon (gal)	1	0.8327	0.02381	0.1337	3.785	0.0038
U.K. gallon (gal)	1.201	1	0.02859	0.1605	4.5466	0.0045
barrel (bbl)	42.0	34.97	1	5.615	159.0	0.159
cubic foot (ft ³)	7.48	6.229	0.1781	1	28.3	0.0283
litre(l)	0.2642	0.220	0.0063	0.0353	1	0.001
cubic metre (m ³)	264.2	220.0	6.289	35.3147	1 000	1

Coal/peat

Coal/peat includes all coal primary (including hard coal and lignite) and derived fuels (including patent fuel, coke oven coke, gas coke, BKB, gas works gas, coke oven gas, blast furnace gas and other recovered gases). Peat is also included in this category.

Hard coal

Hard coal comprises anthracite coking coal and other bituminous coal

Steam coal

Steam coal comprises anthracite, other bituminous coal and sub-bituminous coal.

Crude oil

Crude oil comprises crude oil, natural gas liquids, refinery feedstock and additives as well as other hydrocarbons.

Oil products

Oil products comprise refinery gas liquids, refinery feedstock and additives as well as other hydrocarbons.

Oil products

Oil products comprises refinery gas, ethane, LPG, aviation gasoline, motor gasoline, jet fuels, kerosene, gas/diesel oil, fuel oil, naphtha, white spirit, lubricants, bitumen, paraffin waxes, petroleum coke and other oil products.

Natural gas

Natural gas includes both “associated” and “non-associated” gas.

Nuclear

Nuclear shows the primary heat equivalent of the electricity produced by a nuclear power plant with an average thermal efficiency of 33%

Hydro

Hydro shows the energy content of the electricity produced in hydro power plants, hydro output excludes output from pumped storage plants.

Biofuels and waste

Biofuels and waste comprises solid biofuels liquid biofuels, biogases, industrial waste and municipal waste. Biofuels are defined as any plant matter used directly as fuel or converted into fuels (e.g. charcoal) or electricity and/or heat. Included here are wood, vegetal waste (including wood waste and crops used for energy production), ethanol, animal materials/ wastes and sulphite lyes. Municipal waste comprises wastes produced by residential, commercial, and public services that are collected by local authorities for disposal in a central location for the production of heat and/or power.

Other

Other includes geothermal, solar, wind, tide/wave/ocean energy, electricity, and heat. Unless the actual efficiency of the geothermal process is known, the quantity of geothermal energy entering electricity generation is inferred from the electricity production at geothermal plants assuming an average thermal efficiency of 10% For solar, wind and tide/Wave/ocean energy, the quantities entering electricity generation are equal to the electrical energy generated. Direct use of geothermal and solar heat is also included here. Electricity is accounted for at the same heat value as electricity in final consumption (i.e. 1GWh = 0.000086 Mtoe). Heat includes heat that is produced for sale and is accounted for in the transformation sector.

Production

Production is the production of primary energy, i.e. hard coal, lignite, peat, crude oil, NGLs, natural gas, biofuels and waste, nuclear, hydro, geothermal, solar and the heat from heat pumps that is extracted from the ambient environment production is calculated after removal of impurities (e.g. sulphur from natural gas).

Imports and exports

Imports and exports comprise amounts having crossed the national territorial boundaries of the country, whether or not customs clearance has taken place.

a) Oil and natural gas

Quantities of crude oil and oil products imported or exported under processing agreements (i.e. refining on account) are included. Quantities of oil in transit are excluded. Crude oil, NGL and natural gas are reported as coming from the country of origin; refinery feedstock and oil products are reported as coming from the country of last consignment. Re-exports of oil imported for processing within bonded areas are shown as exports of product from the processing country to the final destination.

b) Coal/peat

Imports and exports comprise the amount of fuels obtained from or supplied to other countries, whether or not there is an economic or customs union between the relevant countries. Coal in transit is not included.

c) Electricity

Amounts are considered as imported or exported when they have crossed the national territorial boundaries of the country.

International marine bunkers

International marine bunkers cover those quantities delivered to ships of all flags that are engaged in international navigation. The international navigation may take place at sea, on inland lakes and waterways, and in coastal waters. Consumption by ships engaged in domestic navigation is excluded. The domestic/International split is determined on the basis of port of departure and port of arrival, and not by the flag or nationality of the ship. Consumption by fishing vessels and by military forces is also excluded.

International aviation bunkers

International aviation bunkers covers deliveries of aviation fuels to aircraft for international aviation. Fuels used by airlines for their road vehicles are excluded. The domestic/International split should be determined ON THE BASIS OF DEPARTURE AND LANDING LOCATIONS AND NOT BY THE NATIONALITY OF THE AIRLINE; For many countries this incorrectly excludes fuel used by domestically owned carriers for their international departures.

Stock changes

Stock changes reflects the difference between opening stock levels on the first day of the year and closing levels on the last day of the year of stocks on national territory held by producers, importers, energy transformation industries and large consumers. A stock build is shown as a negative number, and a stock draw as a positive number.

Total primary energy supply (TPES)

Total primary energy supply (TPES) is made up of production + imports – exports – international marine bunkers – international aviation bunkers ± stock changes. For the world total, international marine bunkers and international aviation bunkers are not subtracted from TPES.

Transfers

Transfers includes both inter-product transfers, products transferred and recycled products.

Statistical differences

Statistical differences include the sum of the unexplained statistical differences for individual fuels, as they appear in the basic energy statistics. It also includes the statistical differences that arise because of the variety of conversion factors in the coal/peat and oil columns.

Electricity plants

Electricity plants refer to plants which are designed to produce electricity only. If one or more units of the plant is a CHP unit (and the inputs and outputs cannot be distinguished on a unit basis) then the whole plant is designated as a CHP plant. Both main activity producers and auto producer plants are included here.

Combined heat and power plants

Combined heat and power plants refers to plants which are designed to produce both heat and electricity. Sometimes referred to as cogeneration power stations. If possible, fuel inputs and electricity/heat outputs are on a unit basis rather than on a plan basis. However, if data are not available on a unit basis, the convention for defining a CHP plant noted above is adopted. Both main activity producers and auto producer plants are included here.

Blast furnaces

Blast furnaces contain inputs to and outputs of fuels from blast furnaces.

Gas works

Gas works is treated similarly to electricity generation, with the quantity produced appearing as a positive figure in the coal/peat column or the natural gas column after blending with natural gas, inputs as negative entries in the coal/peat and oil products columns, and conversion losses appearing in the total column.

Coke ovens

Coke ovens contain losses in transformation of coal from primary to secondary fuel and from secondary to tertiary fuels (hard coal to coke and patent fuel, lignite to BKB, etc.).

Oil refineries

Oil refineries show the use of primary energy for the manufacture of finished oil products and the corresponding output. Thus, the total reflects transformation losses. In certain cases the data in the total column are positive numbers. This can be due to either problem in the primary refinery balance or to the fact that the IEA uses regional net calorific values for oil products.

Petrochemical plants

Petrochemical plants covers backflows returned from the petrochemical industry. Note that backflows from oil products that are used for non-energy purposes (i.e white spirit and lubricants) are not included here, but in non-energy use.

Liquefaction plants

Liquefaction plants include diverse liquefaction processes, such as coal liquefaction plants and gas-to-liquid plants.

Other transformation

Other transformation covers non-specified transformation not shown elsewhere, such as the transformation of primary solid biofuels into charcoal.

Energy industry own use

Energy industry own use contains the primary and secondary energy consumed by transformation industries for heating, pumping, traction and lighting purposes (ISIC 05. 06. 19 and 35. Group 091 and Classes 0892 and 0721).

Losses

Losses include losses in energy distribution, transmission, and transport.

Total final consumption (TFC)

Total final consumption (TFC) is the sum of consumption by the different end-use sectors; Backflows from the petrochemical industry are not included in final consumption.

Industry

Industry consumption is specified in the following subsectors (energy used for transport by industry is not included here but reported under transport):

- Iron and steel industry [ISIC Group 241 and Class 2431];
- Chemical and petrochemical industry [ISIC Divisions 20 and 21] excluding petrochemical feedstock;
- Non-ferrous metals basic industries [ISIC Group 242 and class 2432];
- Non-metallic minerals such as glass, ceramic, cement, etc. [ISIC Division 23];
- Transport equipment [ISIC Divisions 29 and 30].
- Machinery comprises fabricated metal product, machinery, and equipment other than transport equipment [ISIC Divisions 25 to 28]

Industry (ctd.)

- Mining (excluding fuels) and quarrying [ISIC Divisions 07 and 08 and Group 099];
- Food and tobacco [ISIC Divisions 10 and 12];
- Paper, pulp and printing [ISIC Divisions 17 and 18];
- Wood and wood products (other than pulp and paper) [ISIC Division 16];
- Construction [ISIC Divisions 41 and 43];
- Textile and leather [ISIC Divisions 13 to 15];
- Non-specified (any manufacturing industry not included above) [ISIC Divisions 22, 31 and 32].

Transport

Transport includes all fuels used for transport [ISIC Divisions 39 to 51]. It includes transport in industry and covers domestic aviation, road, rail, pipeline transport, domestic navigation and non-specified transport. Fuel used for ocean, coastal and inland fishing (included under fishing and military consumption (included in other non-specified) are excluded from transport.

Please note that international marine and international aviation bunkers are also included here for world total.

Other

Other covers residential, commercial, and public services [ISIC Divisions 33, 36-39, 45-47, 52, 53, 56, 58-66, 68-75, 77-82, 84 (excluding Class 8422) 85-88, 90-99], agriculture/forestry [ISIC Divisions 01 and 02] fishing [ISIC Division 03] and non-specified consumption.

Non-energy use

Non-energy use covers those fuels that are used as raw materials in the different sectors and are not consumed as a fuel or transformed into another fuel. Non-energy use also includes petrochemical feedstock. Non-energy use is shown separately in final consumption under the heading non-energy use.



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2024



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