



AFRICAN UNION

**AFRICAN ENERGY COMMISSION
COMMISSION AFRICAINE DE L'ENERGIE
COMISSAO AFRICANA D'ENERGIA
اللجنة الأفريقية للطاقة**



AFREC

KEY AFRICA ENERGY STATISTICS



**E D I T I O N
2 0 1 8**



KEY AFRICA ENERGY STATISTICS

List of Participating African Countries

Algeria	Madagascar
Angola	Malawi
Benin	Mali
Botswana	Mauritania
Burkina Faso	Mauritius
Burundi	Morocco
Cameroon	Mozambique
Cape Verde	Namibia
Central Africa	Niger
Chad	Nigeria
Comoros	Rwanda
Congo	Saharawi Republic
Congo DR	Somalia
Cote d'Ivoire	São Tome & Principe
Djibouti	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	

FORWARD

This is the 2018 publication of “Key Africa Energy Statistics” following the serial of 2017 to 2012, edition produced by the African Energy Commission (AFREC). It provides a time series data of energy supply, transformation, consumption and energy balances of Africa.

This handy, pocket-sized publication represents a summary of the main volume of the “Africa Energy Statistics 2018” which provides timely and clearly-presented data of the Africa’s energy supply and use in most cases from 2 000 to 2 016.

The Africa Energy Statistics is intended to become the Africa’s major and most authoritative source of energy statistics and reflects the real situation of the management of oil, natural gas, coal, electricity and renewable energy resources and products in the continent.

As mentioned in the main Africa Energy Databases 2018 report, a mandate was given to AFREC by its Convention to design, create and update a continental energy data base and facilitate rapid dissemination of information and exchange of information among Member States as well as among the African Regional Economic Communities (RECs) and other agencies and institutions.

Along with this copy of hard version a complementary CD-ROM, USB flash drive and Internet versions have been produced. The main report of the Africa Energy Databases 2018 presents the full time series of energy data for each African nation, each region and the whole continent.

It is our expectation that the statistics contained in this publications will prove to be useful to wide range of end-users including energy analysts, planners, policy makers, researchers and academics in Africa and around the world.

AFREC welcomes any feedback by way of comments and suggestions from the readers and end-users.

This publication is available on the AFREC’s website www.afrec-energy.org.

Unit Abbreviations

(Source: IEA)

bcm	billion cubic metres
Gcal	gigacalorie
GCV	gross calorific value
GW	gigawatt
GWh	gigawatt hour
kb/cd	thousand barrels per calendar day
kcal	kilocalorie
kg	kilogramme
kJ	kilojoule
kWh	Kilowatt hour
MBtu	million British thermal units
Mt	million tonnes
Mtoe	million tonnes of oil equivalent
PPP	Purchasing Power Parity
t	metric ton=tonne=1000kg
kt	kilotonnes
TJ	terajoule
toe	tonne of oil equivalent= 10^7 kcal
TWh	terawatt hour

TABLE OF CONTENTS

SUPPLY

1

TRANSFORMATION

2

CONSUMPTION

3

ENERGY BALANCES

4

CONVERSION FACTORS

5

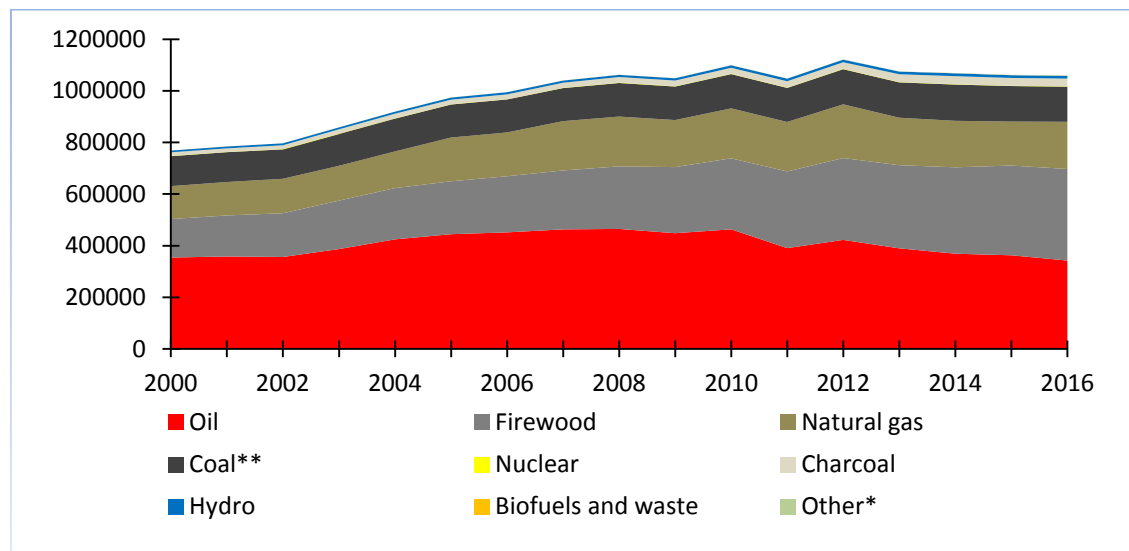
GLOSSARY

6

TOTAL PRIMARY ENERGY SUPPLY BY FUEL

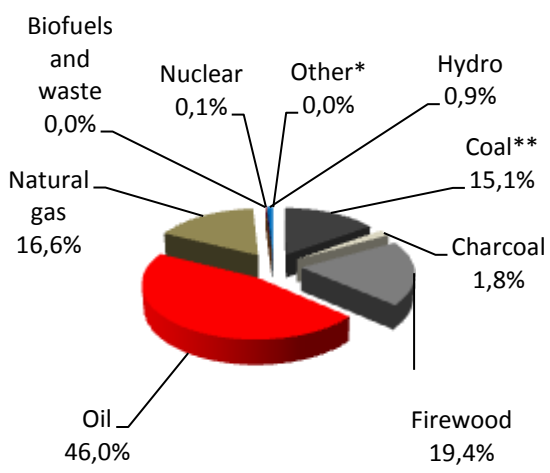
AFRICA

Africa Total Primary Energy Supply from 2 000 to 2 016 by fuel (ktoe)



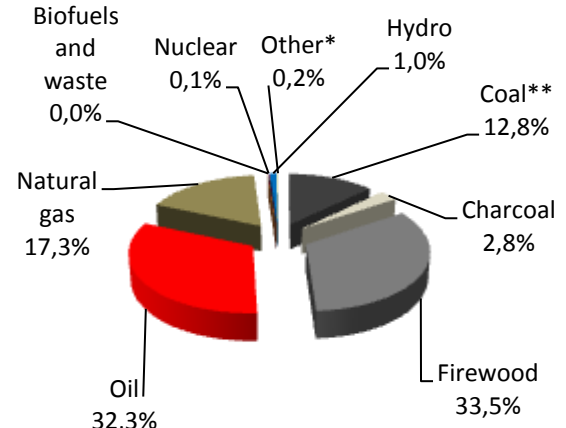
2 000 and 2 016 Fuel Shares of TPES

2 000



353 734 ktoe

2 016



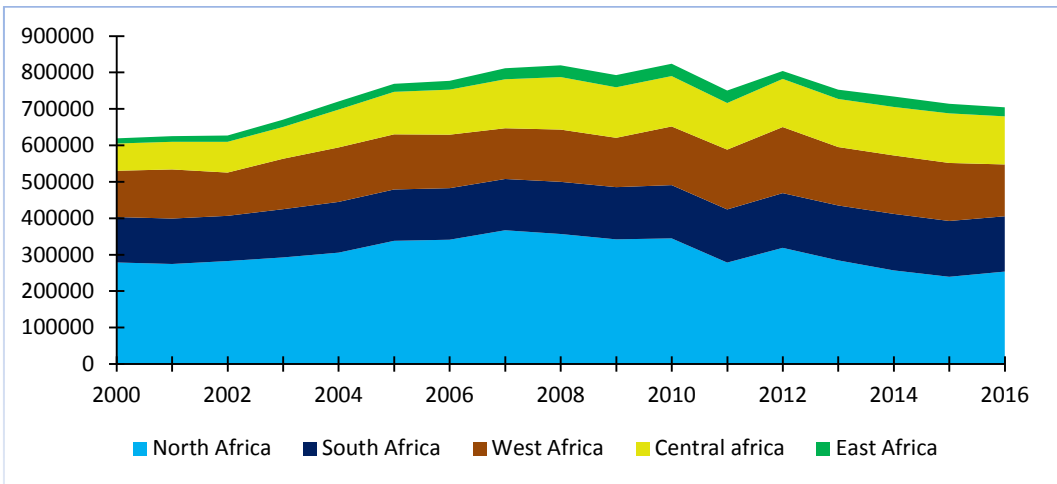
342 097 ktoe

* Other includes geothermal, solar, wind, wave, etc
** Includes steam coal, coking coal, lignite and recovered coal

TOTAL PRIMARY ENERGY SUPPLY BY REGION

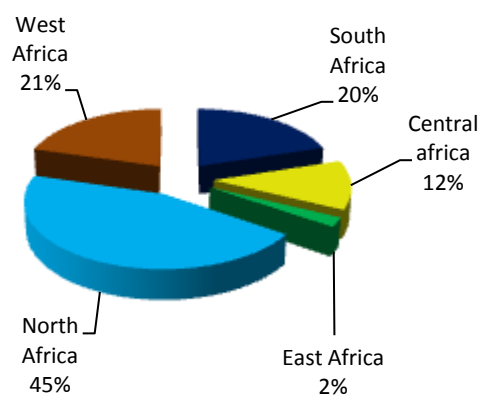
AFRICA

Africa Total Primary Energy Supply from 2 000 to 2 016
by region (ktoe)



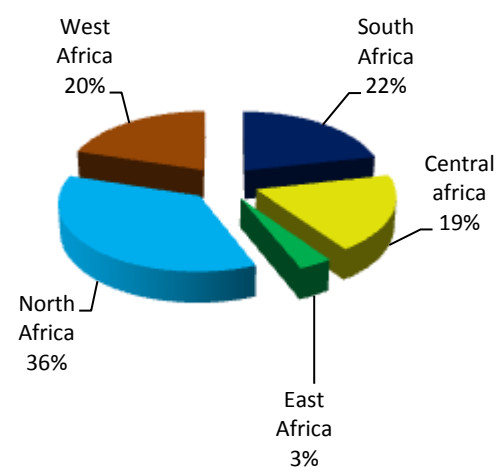
2 000 and 2 016 Regional Shares of TPES

2 000



278 643 ktoe

2 016

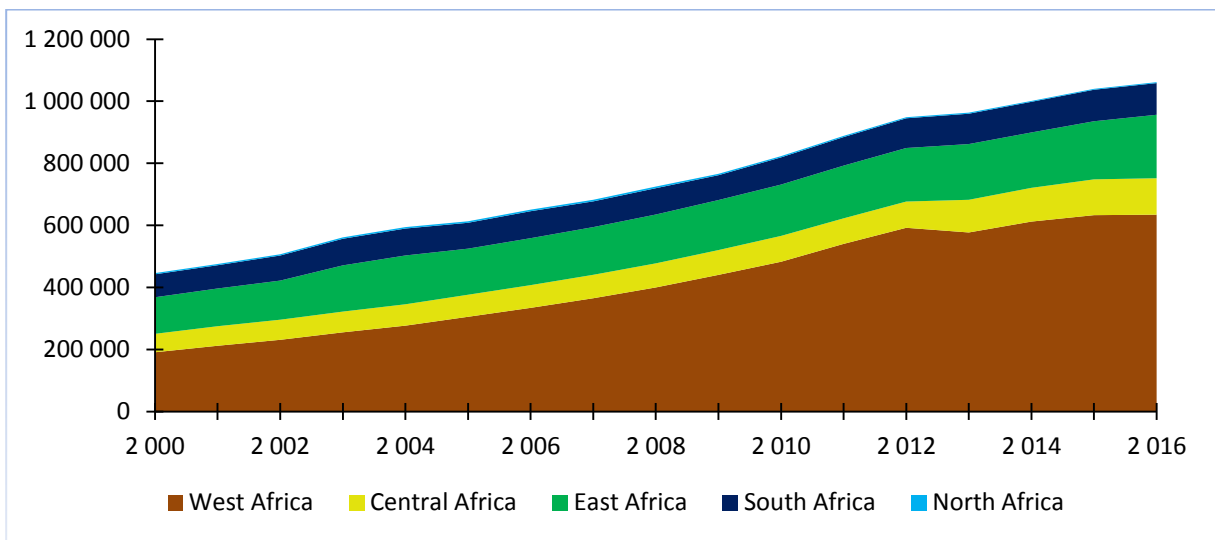


253 615 ktoe

FIREWOOD PRODUCTION

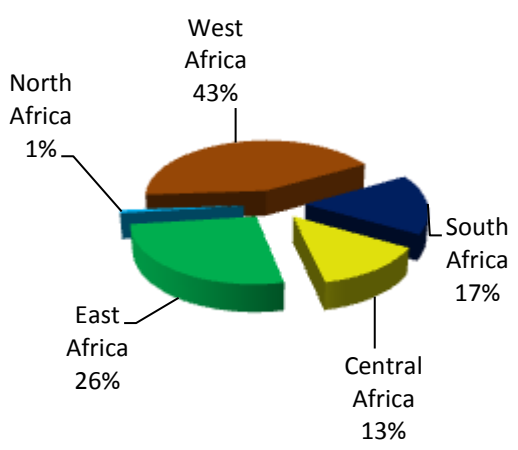
AFRICA

Firewood Production from 2 000 to 2 016
by region (kt)



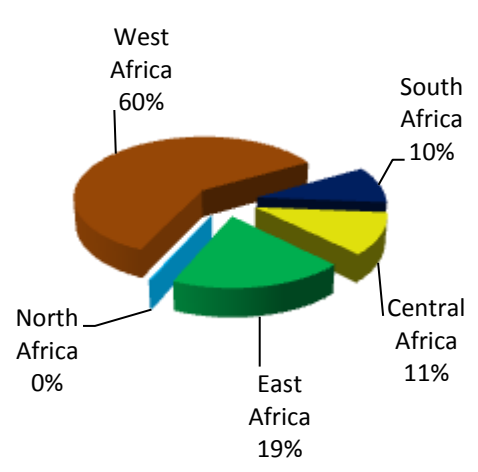
2 000 and 2 016 Regional Shares of Firewood Production

2 000



190 937 kt

2 016



634 325 kt

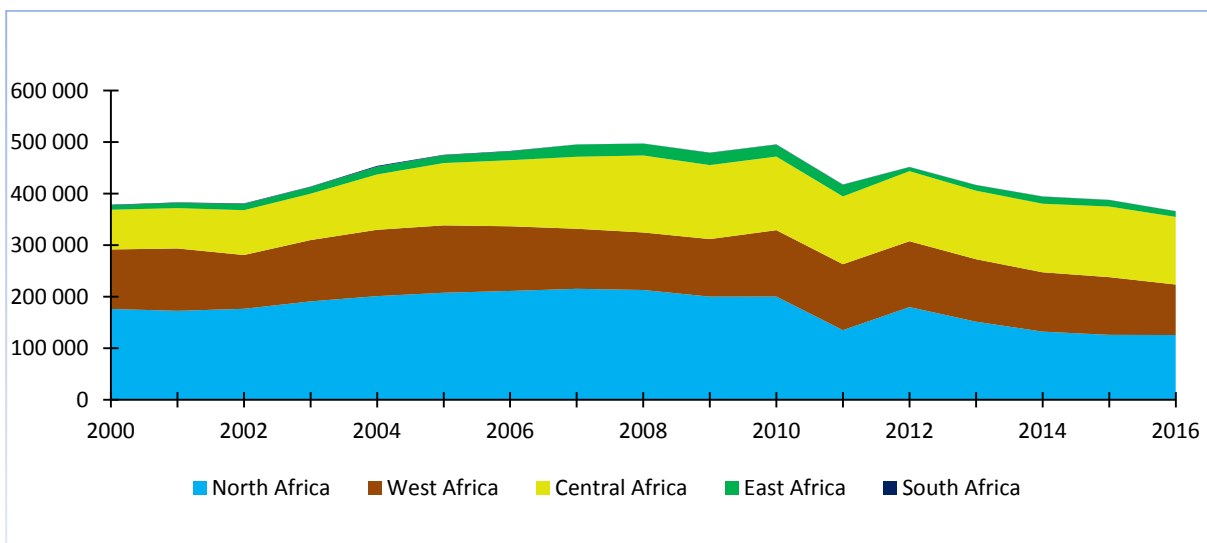
Producers of firewood from 2 016

Producers	kt
Nigeria	529 236
Ethiopia	95 742
Congo DR	83 922
Uganda	36 813
Kenya	34 131
Mozambique	18 825
Côte d'Ivoire	18 745
Zambia	18 659
South Africa	16 887
Zimbabwe	16 785
Madagascar	16 535
Sudan	15 050
Burkina Faso	13 392
Tanzania	11 951
Ghana	11 878
Guinea	11 700
Mali	10 145
Togo	8 851
Somalia	8 106
Sierra Leone	7 690
Benin	6 670
Malawi	6 490
Chad	5 617
Burundi	5 566
Congo	5 369
Niger	5 156
Cameroon	4 665
Rwanda	4 298
Liberia	4 146
Angola	4 029
Namibia	3 001
Tunisia	2 908
Central Africa	2 821
Mauritania	2 411
Lesotho	2 348
Senegal	1 451
Guinea Bissau	1 392
Eritrea	1 373
Eswatini	1 351
Gambia	1 344
Botswana	837
Other Africa	3 083
Africa	1 031 373

CRUDE OIL PRODUCTION

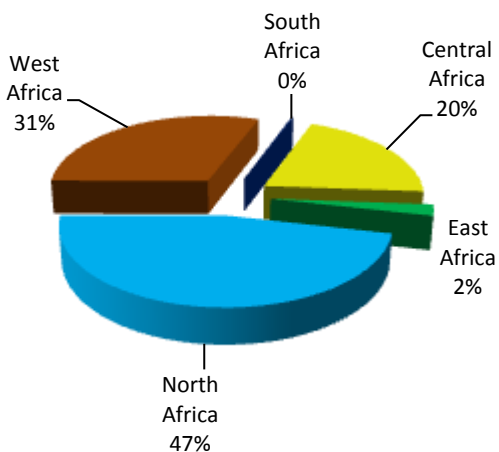
AFRICA

Crude Oil* Production from 2 000 to 2 016
by region (kt)



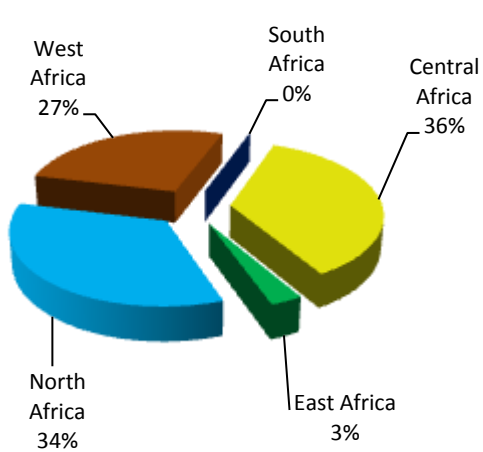
2 000 and 2 016 Regional Shares of Crude Oil* Production

2 000



176 369 kt

2 016



131 244 kt

* Include crude oil, NGL, additives and other hydrocarbons

Producers, Net Exporters and Net Importers of Crude Oil* from 2 016

Producers	kt
Nigeria	90 364
Angola	85 152
Algeria	68 869
Egypt	34 164
Libya	20 317
Congo	12 760
Equatorial Guinea	11 115
Gabon	9 993
Chad	6 554
South Sudan	5 891
Sudan	5 099
Cameroon	4 673
Ghana	4 614
Tunisia	2 434
Côte d'Ivoire	2 013
Congo DR	996
Niger	736
Mauritania	310
South Africa	256
Morocco	5
Africa	366 315

Net exporters	kt
Nigeria	87 089
Angola	81 915
Algeria	30 203
Libya	16 152
Equatorial Guinea	12 477
Congo	11 944
Egypt	10 235
Gabon	9 446
Chad	6 142
South Sudan	5 821
Cameroon	2 868
Ghana	2 826
Congo DR	996
Tunisia	928
Mauritania	194
Africa	279 235

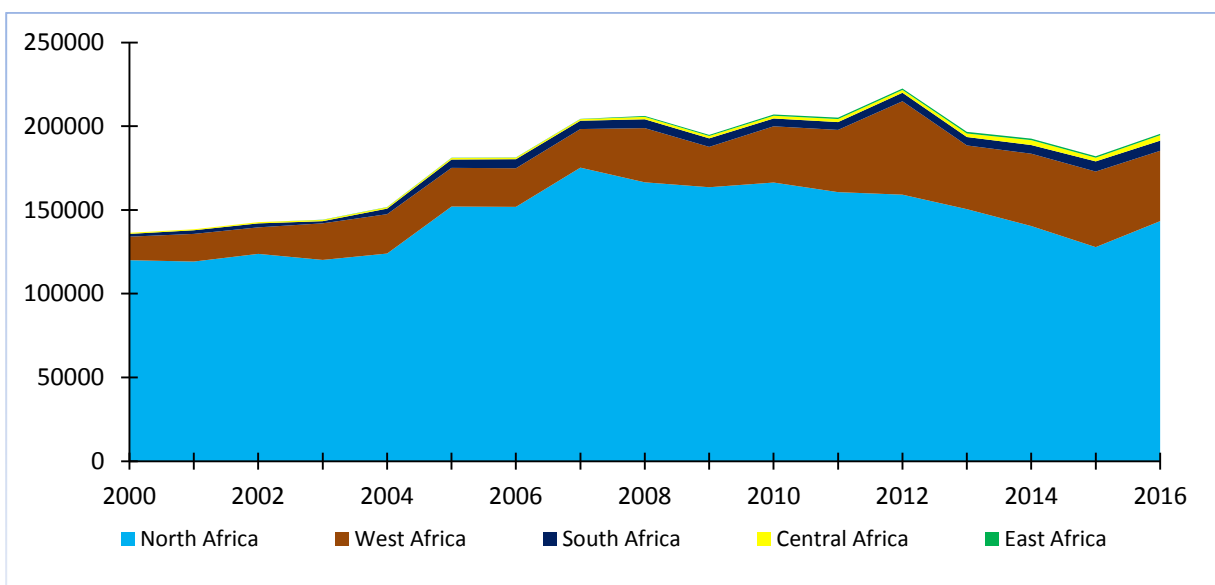
Net Importers	kt
South Africa	23 242
Senegal	1 162
Kenya	739
Côte d'Ivoire	550
Zambia	484
Sudan	154
Africa	26 331

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

NATURAL GAS PRODUCTION

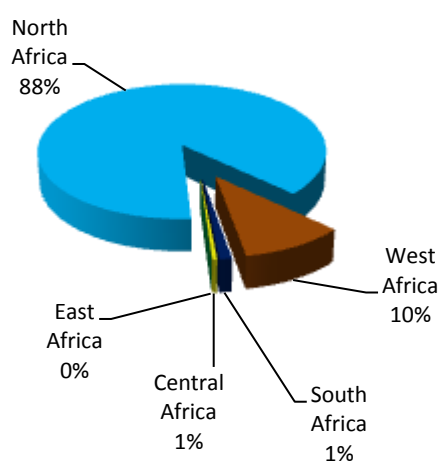
AFRICA

Natural gas production from 2 000 to 2 016
by region (Million cubic meters)



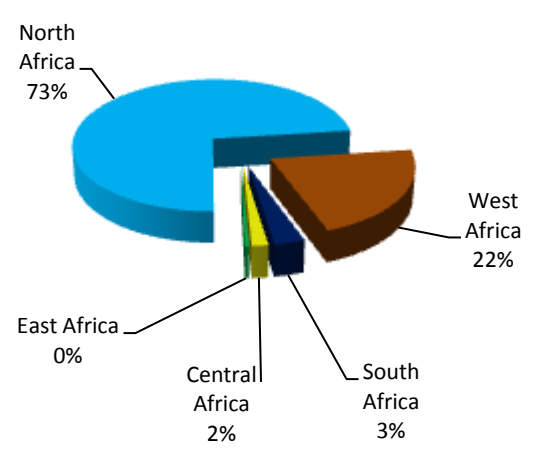
2 000 and 2 016 Regional Shares of Natural Gas Production

2 000



120 017 Mcm

2 016



143 337 Mcm

Producers, Net Exporters and Net Importers* Of Natural Gas from 2 016

Producers	Mcm
Algeria	95 678
Nigeria	39 096
Egypt	35 273
Libya	9 607
Mozambique	4 959
Tunisia	2 708
Côte d'Ivoire	2 239
Angola	1 659
South Africa	1 092
Tanzania	826
Ghana	632
Gabon	534
Cameroun	529
Equatorial Guinea	267
Congo	253
Morocco	72
Senegal	22
Africa	195 446

Net exporters	Mcm
Algeria	54 510
Nigeria	22 575
Libya	4 657
Mozambique	4 162
Angola	883
Africa	86 786

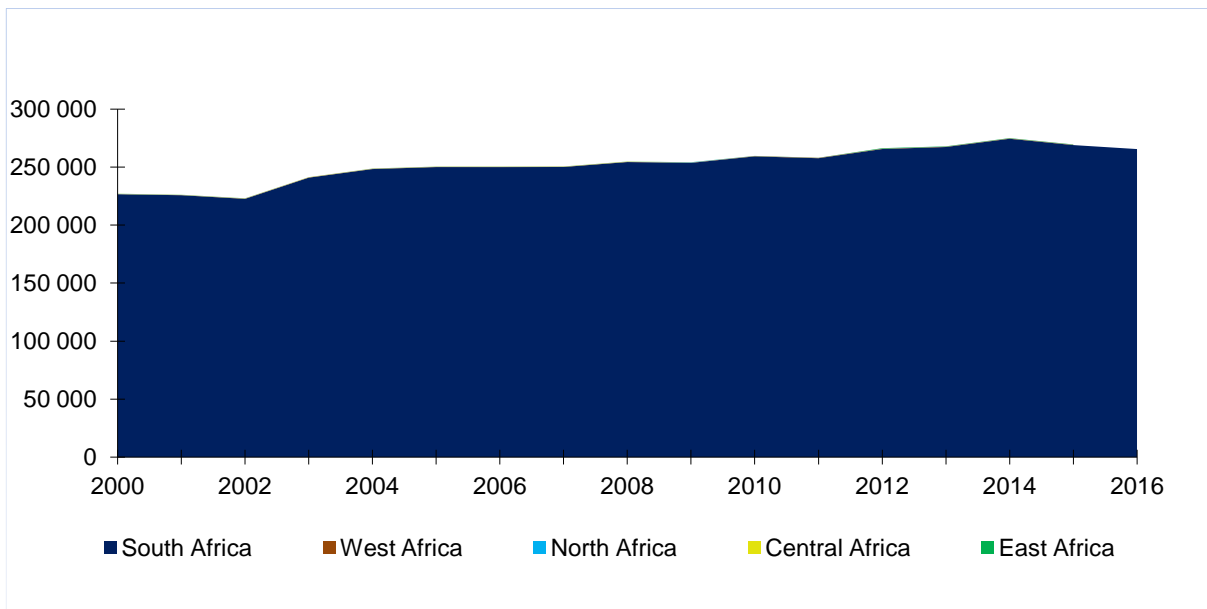
Net importers	Mcm
Egypt	17 958
South Africa	4 162
Tunisia	3 486
Morocco	1 154
Ghana	108
Congo DR	1
Africa	26 868

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

COAL* PRODUCTION

AFRICA

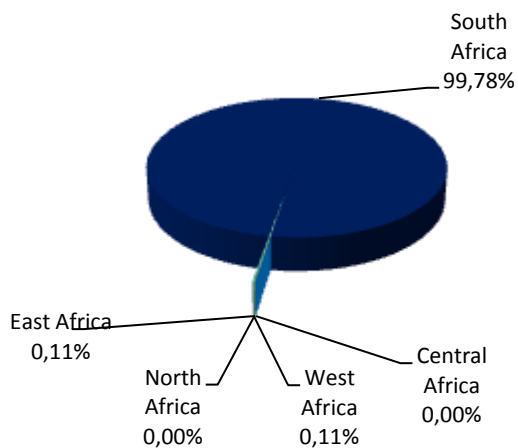
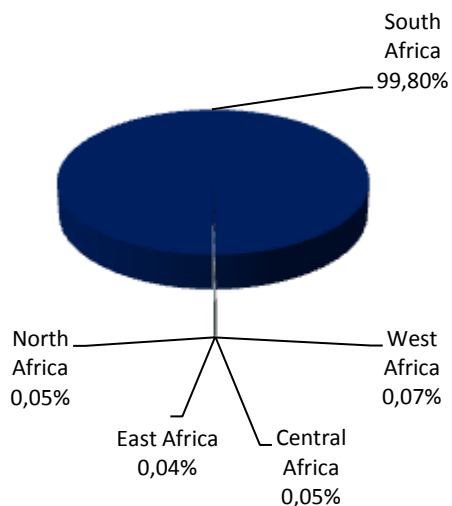
Coal* Production from 2 000 to 2 016
by region (kt)



2 000 and 2 016 Regional Shares of Coal* Production

2 000

2 016



226 635 kt

265 605 kt

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

Producers, Net Exporters and Net Importers of Coal* from 2 016

Producers	kt
South Africa	255 309
Mozambique	6 066
Botswana	1 877
Zimbabwe	1 636
Eswatini	330
Zambia	328
Tanzania	276
Niger	247
Malawi	58
Nigeria	46
Ethiopia	23
Africa	266 196

Net exporters	kt
South Africa	69 414
Mozambique	9 237
Eswatini	351
Zimbabwe	254
Botswana	205
Africa	79 461

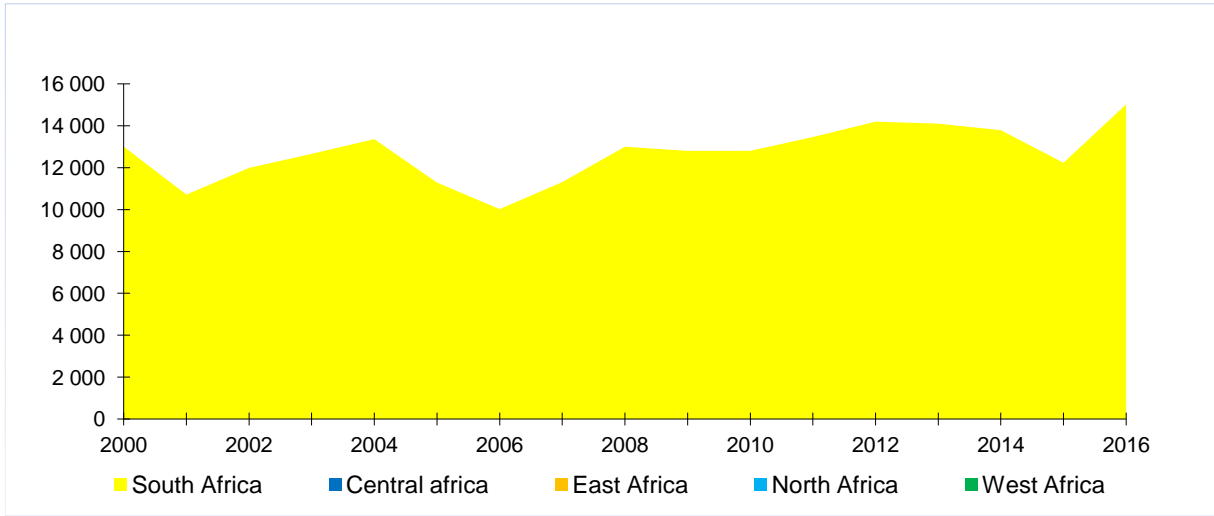
Net importers	kt
Morocco	6 724
Mauritius	926
Senegal	737
Kenya	557
Ethiopia	442
Egypt	257
Benin	120
Algeria	98
Madagascar	15
Africa	9 876

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

NUCLEAR PRODUCTION

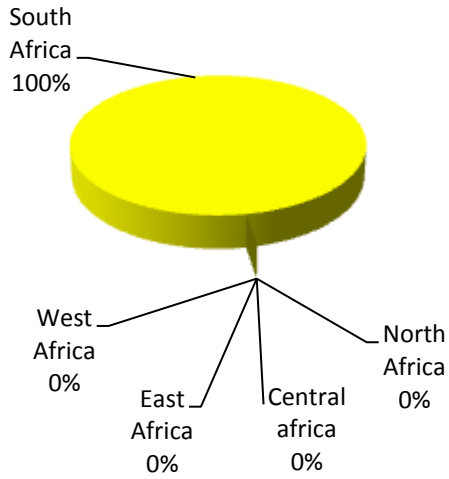
AFRICA

Nuclear Production from 2 000 to 2 016
by region (GWh)



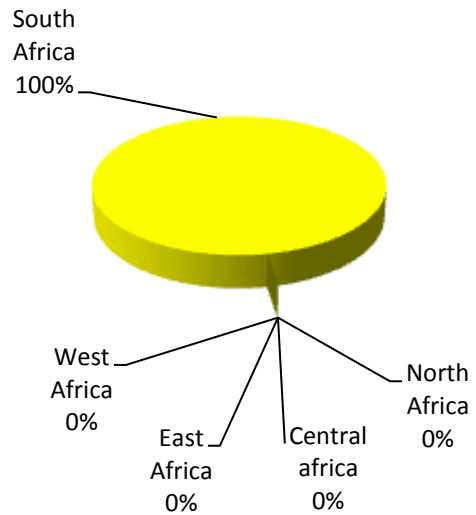
2 000 and 2 016 Regional Shares of Nuclear Production

2 000



13 010 GWh

2 016



15 026 GWh

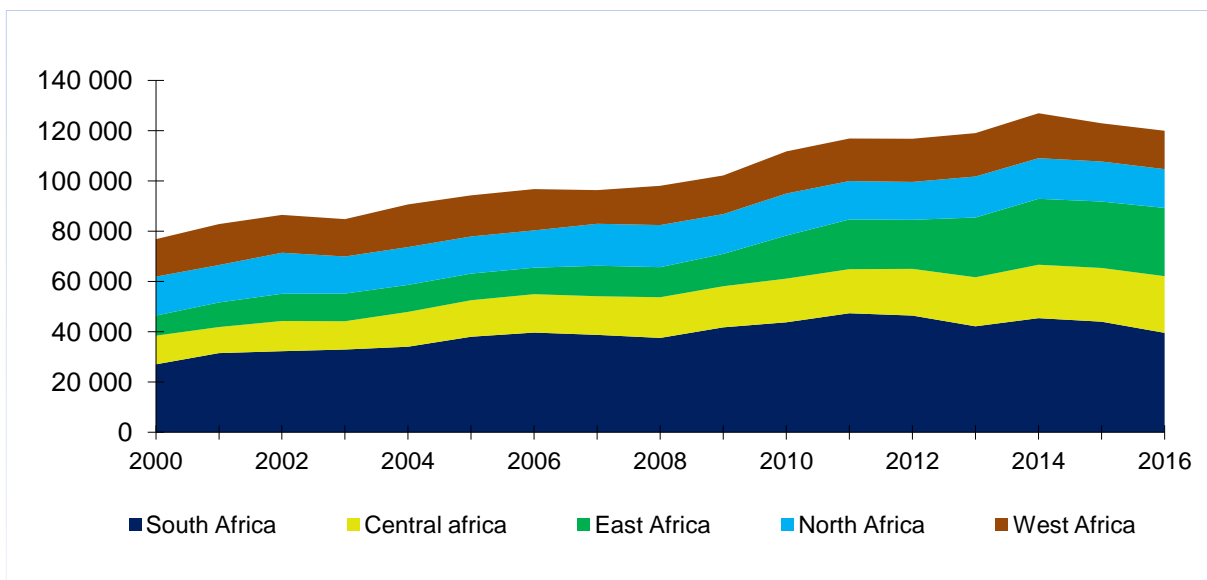
Producers of Nuclear Electricity from 2 016

Producers	GWh
South Africa	15 026
Africa	15 026

HYDRO PRODUCTION

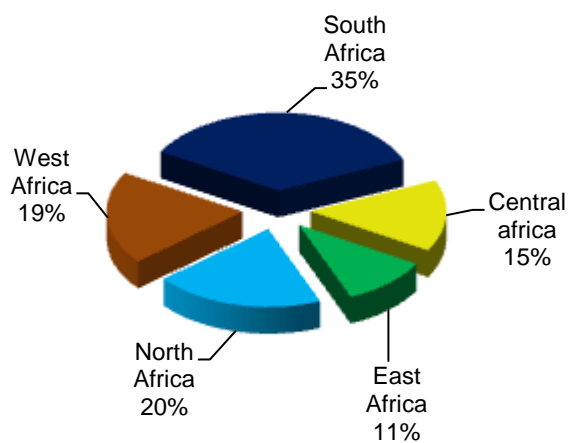
AFRICA

Hydro production from 2 000 to 2 016
by region (GWh)



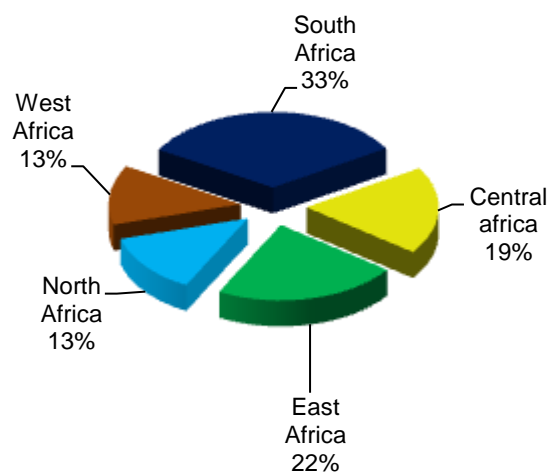
2 000 and 2 016 Regional Shares of Hydro Production

2 000



27 046 GWh

2 016



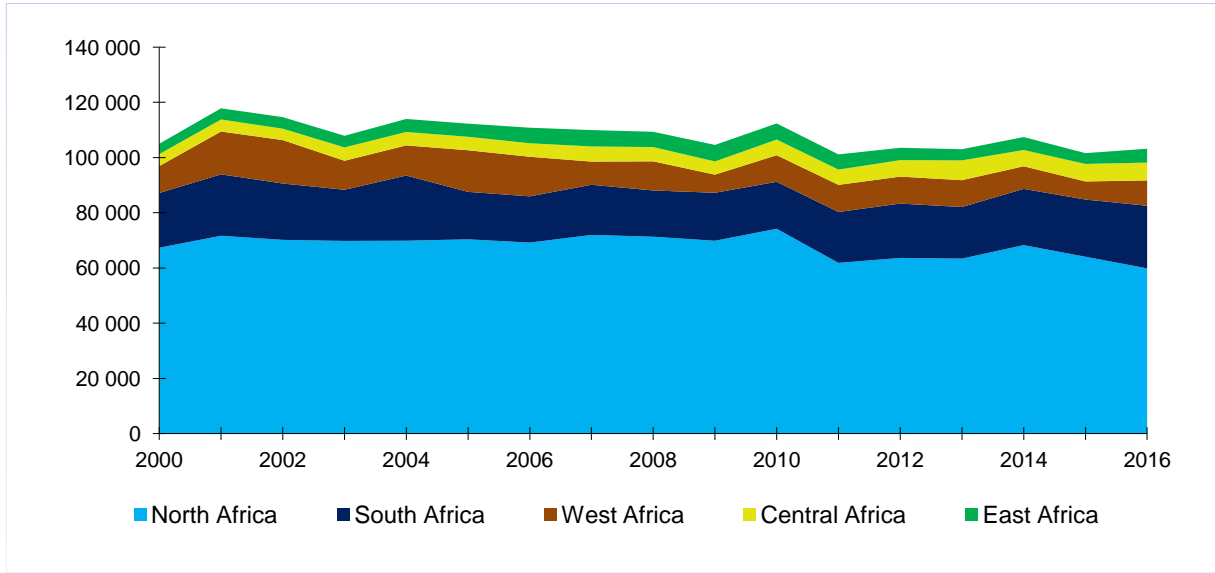
39 582 GWh

Producers of Hydro Electricity from 2 016

Producers	GWh
Mozambique	15 609
Egypt	13 491
Zambia	11 049
Ethiopia	10 351
Congo DR	9 099
Sudan	8 025
Angola	5 815
Ghana	5 582
Nigeria	5 582
Cameroon	4 611
South Africa	3 994
Kenya	3 960
Zimbabwe	3 024
Malawi	2 702
Uganda	2 475
Tanzania	2 326
Morocco	1 662
Côte d'Ivoire	1 511
Namibia	1 396
Madagascar	1 047
Congo	959
Gabon	930
Mali	789
Guinea	725
Equatorial Guinea	571
Lesotho	420
Senegal	349
Togo	233
Eswatini	221
Rwanda	219
Algeria	218
Sierra Leone	203
Mauritania	199
Burundi	184
Central Africa	142
Mauritius	116
Burkina Faso	102
Tunisia	66
São Tomé & Príncipe	12
Somalia	12
Comoros	5
Africa	119 985

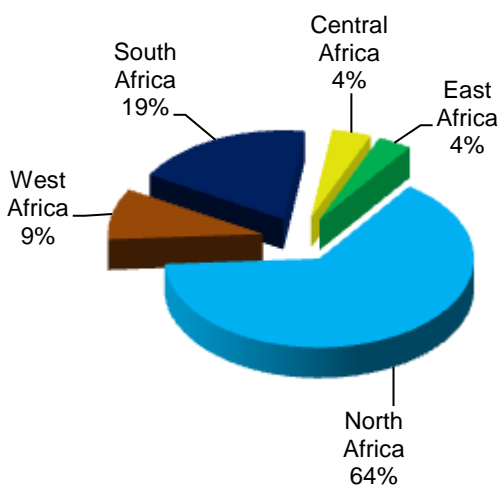
REFINING BY REGION

AFRICA
Refinery Production from 2 000 to 2 016
by region (kt)



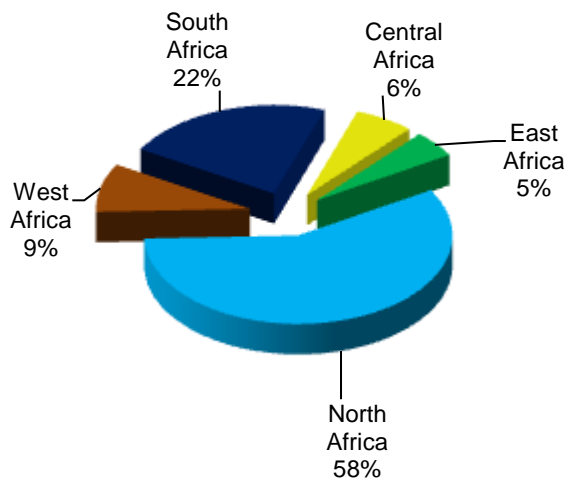
2 000 and 2 016 Regional Shares of Refinery Production

2 000



67 350 kt

2 016



59 869 kt

Producers, Net Exporters and Net Importers of Oil Products in 2 016

Producers	kt
Algeria	29 874
Egypt	24 800
South Africa	22 237
Soudan	4 330
Libya	4 025
Nigeria	3 401
Côte d'Ivoire	3 229
Angola	2 640
Cameroon	1 596
Tunisia	1 171
Senegal	1 124
Gabon	826
Ghana	790
Congo	746
Kenya	693
Chad	661
Niger	620
Zambia	449
Africa	103 211

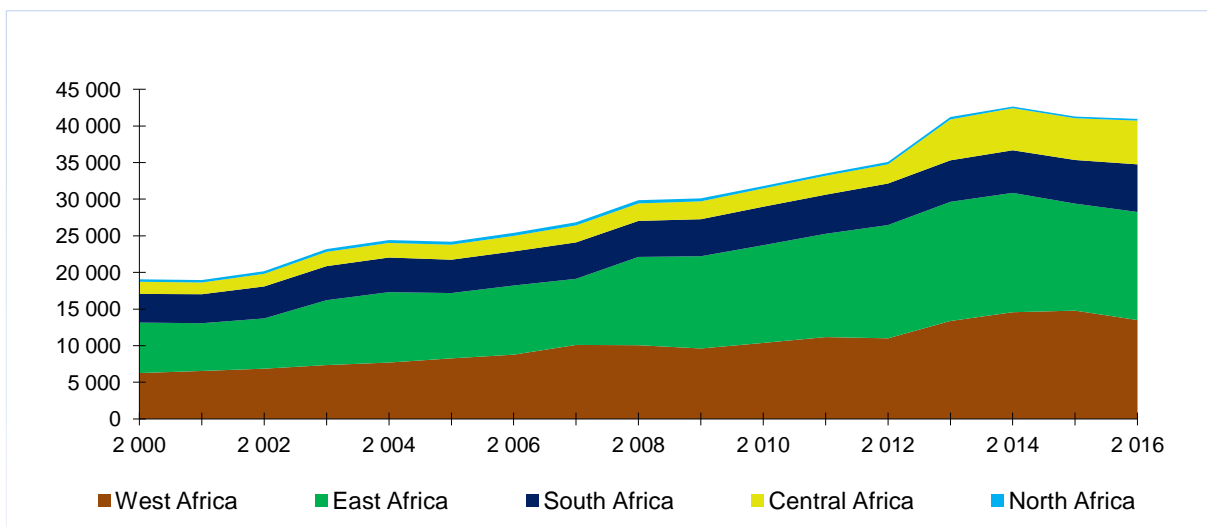
Net exporters	kt
Algeria	19 773
Côte d'Ivoire	1 117
Niger	184
Chad	5
Africa	21 079

Net importers	kt
Nigeria	18 535
Egypt	13 645
Morocco	12 512
Libya	5 707
Kenya	4 630
Angola	3 744
Ethiopia	3 643
Tunisia	3 322
Uganda	3 245
South Africa	3 053
Tanzania	2 900
Ghana	2 831
Mozambique	1 941
Benin	1 748
Mali	1 492
Mauritius	1 318
Namibia	1 268
Senegal	1 262
Sudan	1 184
Burkina Faso	1 106
Zimbabwe	1 095
Botswana	1 041
Guinea	973
Mauritania	861
Madagascar	816
Congo DR	743
Togo	680
Zambia	585
South Sudan	553
Djibouti	511
Malawi	415
Sierra Leone	356
Seychelles	340
Eswatini	307
Cameroon	296
Equatorial Guinea	292
Gabon	255
Rwanda	236
Gambia	222
Eritrea	203
Cape Verde	200
Liberia	194
Lesotho	180
Somalia	135
Saharawi Republic	85
Burundi	79
Central Africa	58
São Tomé & Príncipe	57
Guinea Bissau	55
Comoros	38
Congo	16
Africa	100 962

CHARCOAL PRODUCTION

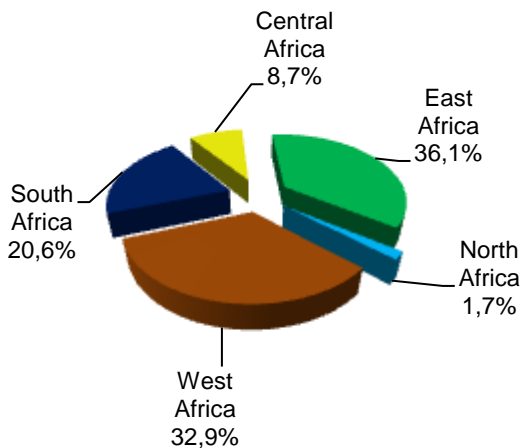
AFRICA

Charcoal production from 2 000 to 2 016
by region (kt)



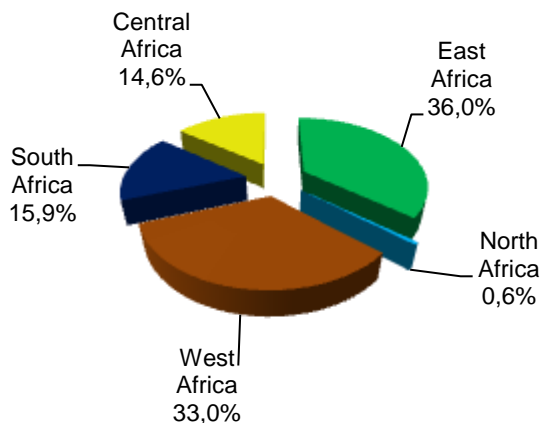
2 000 and 2 016 Regional Shares of Charcoal Production

2 000



6 224 kt

2 016



13 502 kt

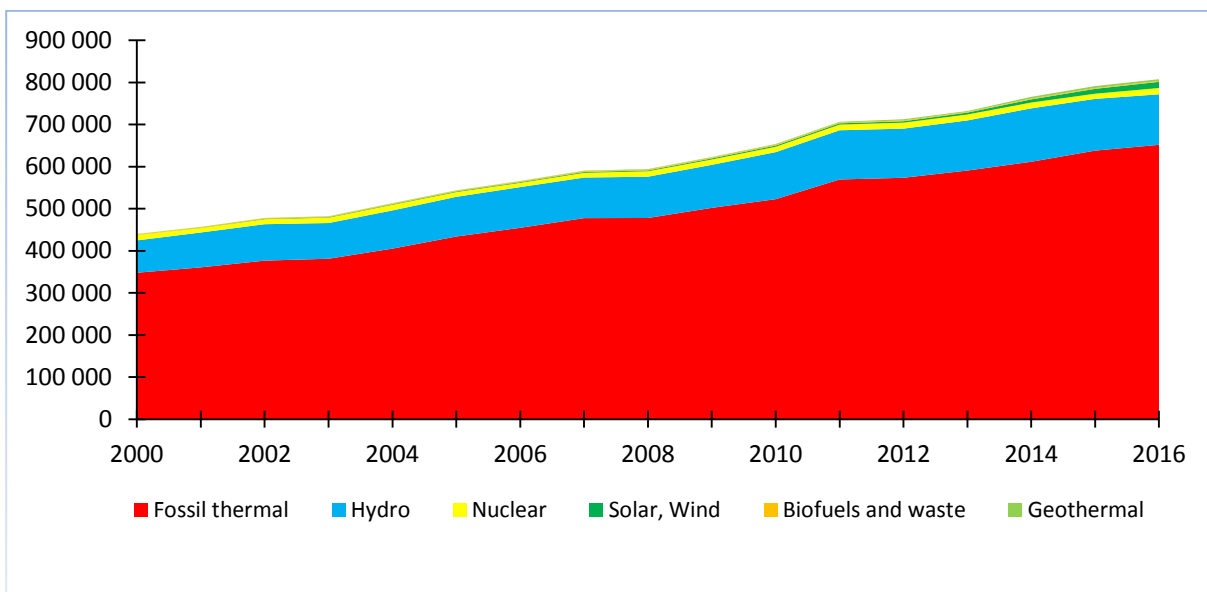
Producers of Charcoal from 2 016

Producers	kt
Ethiopia	6 425
Nigeria	4 445
Congo DR	4 074
Sudan	1 977
Guinea	1 950
Tanzania	1 925
Uganda	1 800
Madagascar	1 560
Côte d'Ivoire	1 498
Mozambique	1 468
South Africa	1 414
Somalia	1 225
Ghana	1 174
Kenya	1 157
Zambia	1 041
Burkina Faso	884
Togo	698
Malawi	565
Benin	549
Mali	532
Cameroon	486
Niger	479
Chad	468
Sierra Leone	442
Angola	358
Liberia	291
Burundi	264
Mauritania	217
Congo	213
Tunisia	211
Senegal	200
Eritrea	182
Namibia	161
Lesotho	107
Guinea Bissau	77
Botswana	75
Gambia	67
Djibouti	53
Eswatini	50
Rwanda	48
Comoros	47
Gabon	22
Morocco	19
Central Africa	14
Zimbabwe	12
South Sudan	11
São Tomé & Príncipe	11
Equatorial Guinea	11
Algeria	2
Libya	1
Mauritius	1
Cape Verde	1
Africa	40 960

ELECTRICITY GENERATION BY FUEL

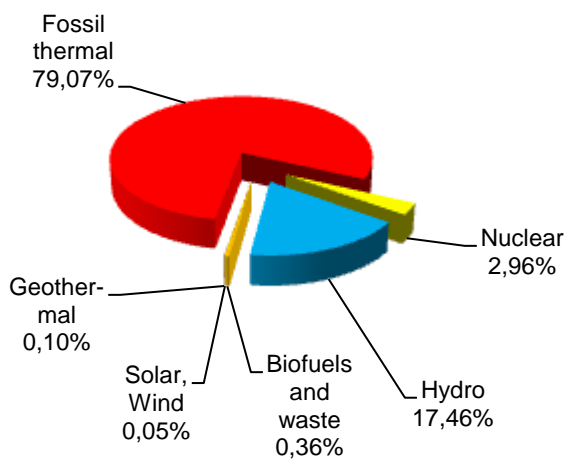
AFRICA

Electricity Generation from 2 000 to 2 016
by fuel (GWh)



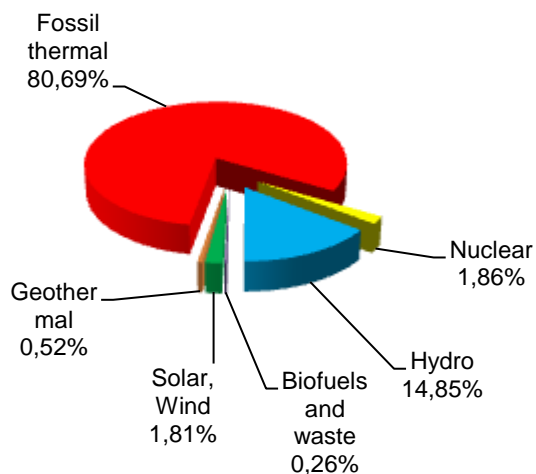
2 000 and 2 016 Fuel Shares of Electricity Generation

2 000



347 982 GWh

2 016



651 902 GWh

Electricity Production by Fuel from 2 016

Solar, Wind, Geothermal, Biofuels and waste	GWh
South Africa	7 060
Kenya	4 391
Morocco	3 404
Egypt	2 226
Ethiopia	814
Mauritius	565
Tunisia	558
Eswatini	352
Côte d'Ivoire	301
Uganda	232
Sudan	229
Zimbabwe	126
Algeria	116
Nigeria	85
Cameroon	78
Senegal	69
Mali	65
Tanzania	48
Namibia	47
Cape Verde	38
Congo DR	30
Togo	29
Madagascar	28
Mauritania	27
Ghana	27
Seychelles	18
Malawi	14
Gabon	14
Sierra Leone	11
Libya	8
Guinea	8
Central Africa	7
Gambia	6
Benin	6
Rwanda	5
Angola	5
Botswana	5
Niger	5
Djibouti	3
Zambia	3
Guinea Bissau	3
South Sudan	2
Eritrea	2
Liberia	1
Mozambique	1
Burundi	1
Africa	21 074

Hydro	GWh
Mozambique	15 609
Egypt	13 491
Zambia	11 049
Ethiopia	10 351
Congo DR	9 099
Sudan	8 025
Angola	5 815
Ghana	5 582
Nigeria	5 582
Cameroon	4 611
South Africa	3 994
Kenya	3 960
Zimbabwe	3 024
Malawi	2 702
Uganda	2 475
Tanzania	2 326
Morocco	1 662
Côte d'Ivoire	1 511
Namibia	1 396
Madagascar	1 047
Congo	959
Gabon	930
Mali	789
Guinea	725
Equatorial Guinea	571
Lesotho	420
Senegal	349
Togo	233
Eswatini	221
Rwanda	219
Algeria	218
Sierra Leone	203
Mauritania	199
Burundi	184
Central Africa	142
Mauritius	116
Burkina Faso	102
Tunisia	66
São Tomé & Príncipe	12
Somalia	12
Comoros	5
Africa	119 985

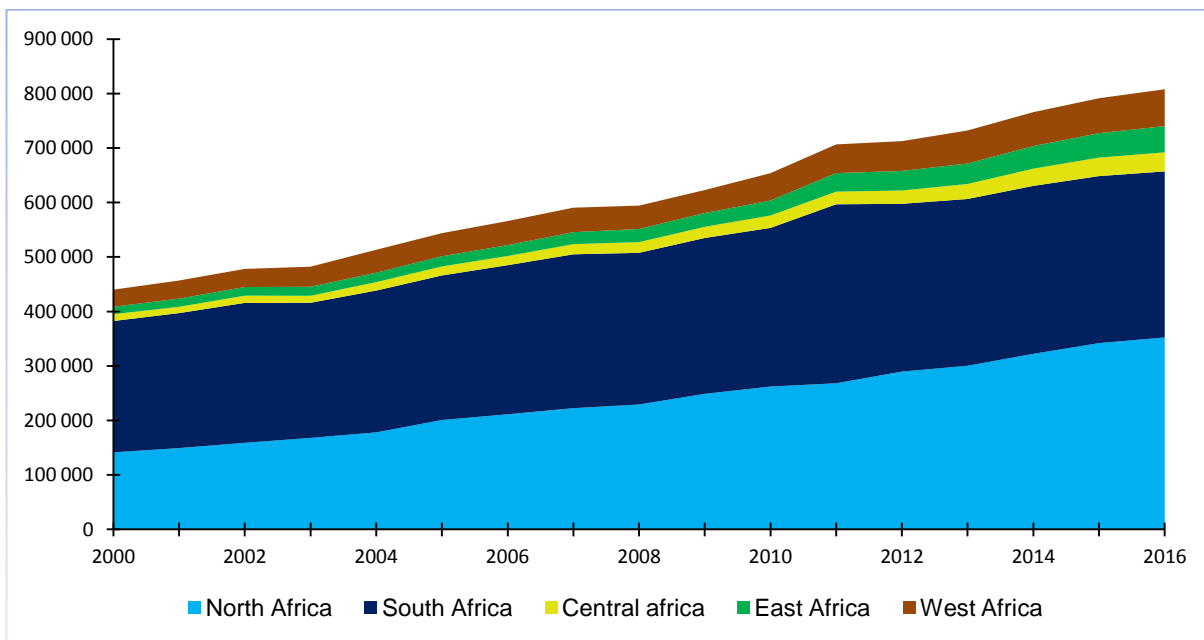
Nuclear	GWh
South Africa	15 026
Africa	15 026

Fossil fuel	GWh
South Africa	226 667
Egypt	178 641
Algeria	70 663
Libya	36 422
Morocco	25 776
Nigeria	25 311
Tunisia	19 002
Côte d'Ivoire	8 551
Ghana	7 435
Sudan	6 378
Tanzania	4 586
Angola	4 546
Senegal	3 981
Zimbabwe	3 947
Cameroon	3 753
Mozambique	3 123
Botswana	2 686
Mauritius	2 378
Gabon	2 148
Kenya	2 020
Burkina Faso	1 801
Madagascar	1 691
Mali	1 543
Congo	794
Zambia	670
Uganda	659
Guinea	569
Niger	521
Mauritania	519
South Sudan	437
Seychelles	435
Eritrea	419
Equatorial Guinea	411
Somalia	394
Djibouti	370
Benin	335
Eswatini	331
Cape Verde	330
Gambia	316
Rwanda	315
Chad	294
Sierra Leone	164
Guinea Bissau	153
Liberia	112
Saharawi Republic	106
Comoros	65
Namibia	62
Togo	23
São Tomé & Príncipe	19
Rép. Dém. du Congo	14
Malawi	8
Burundi	4
Ethiopia	4
Central Africa	1
Africa	651 902

ELECTRICITY GENERATION BY REGION

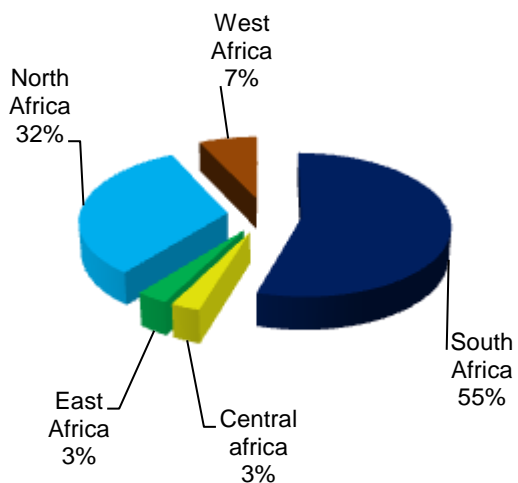
AFRICA

Electricity Generation from 2 000 to 2 016
by region (GWh)



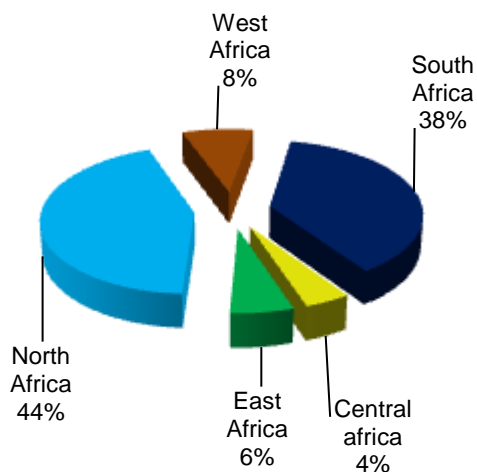
2 000 and 2 016 Regional Shares of Electricity Generation

2 000



241 026 GWh

2 016



352 359 GWh

Producers, Net Exporters and Net Imports of Electricity from 2 016

Producers	GWh
South Africa	252 747
Egypt	194 358
Algeria	70 997
Libya	36 430
Nigeria	30 978
Morocco	30 842
Tunisia	19 626
Mozambique	18 733
Soudan	14 631
Ghana	13 044
Zambia	11 722
Ethiopia	11 169
Kenya	10 371
Angola	10 366
Côte d'Ivoire	10 363
Congo DR	9 143
Cameroun	8 442
Zimbabwe	6 976
Tanzania	6 960
Senegal	4 399
Uganda	3 365
Gabon	3 092
Mauritius	3 059
Madagascar	2 765
Malawi	2 725
Botswana	2 691
Mali	2 396
Burkina Faso	1 903
Congo	1 753
Namibia	1 505
Guinea	1 301
Equatorial Guinea	982
Eswatini	904
Mauritania	745
Rwanda	540
Niger	526
Seychelles	454
South Sudan	439
Eritrea	421
Lesotho	420
Somalia	406
Sierra Leone	378
Djibouti	373
Cape Verde	368
Benin	341
Gambia	322
Chad	294
Togo	285
Burundi	189
Guinea Bissau	156
Central Africa	151
Liberia	113
Saharawi republic	106
Comoros	70
São Tomé & Príncipe	31
Africa	807 866

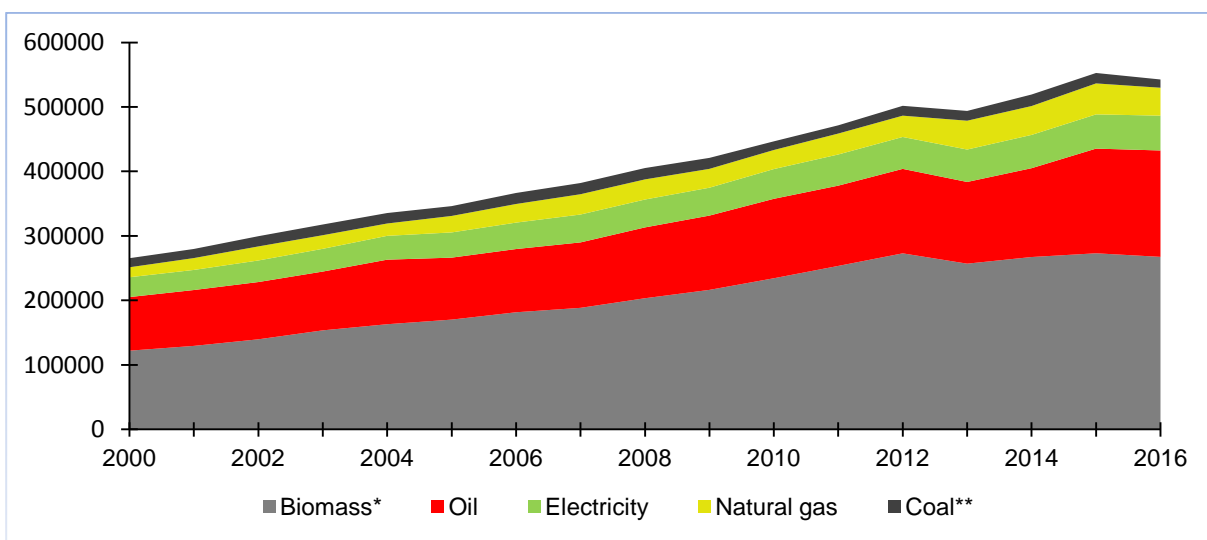
Net importers	GWh
Morocco	5 154
Namibia	2 974
Zimbabwe	1 851
Botswana	1 673
Zambia	1 391
Togo	1 140
Benin	1 088
Niger	779
Mali	663
Eswatini	549
Burkina Faso	423
Libya	376
Gabon	344
Senegal	297
Lesotho	248
Kenya	162
Burundi	105
Tanzania	102
Rwanda	98
Cameroon	55
Africa	19 473

Net exporters	GWh
South Africa	5 994
Mozambique	4 341
Côte d'Ivoire	1 858
Egypt	693
Congo DR	400
Ghana	324
Algeria	250
Ethiopia	179
Tunisia	121
Uganda	96
Congo	4
Africa	7 465

TOTAL FINAL CONSUMPTION BY FUEL

AFRICA

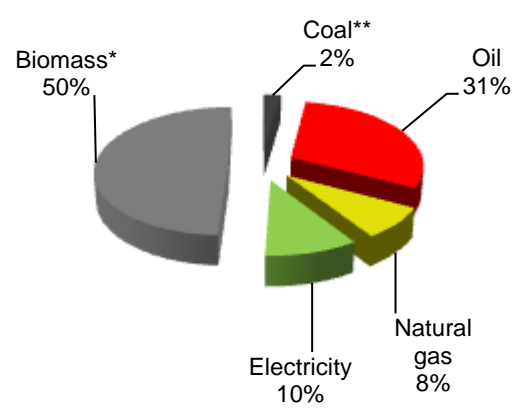
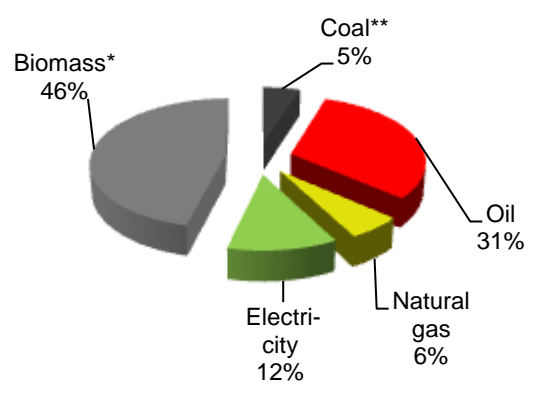
Total final consumption from 2 000 to 2 016
by fuel (ktoe)



2 000 and 2 016 Fuel Shares of Total Final Consumption

2 000

2 016



122 112 ktoe

267 566 ktoe

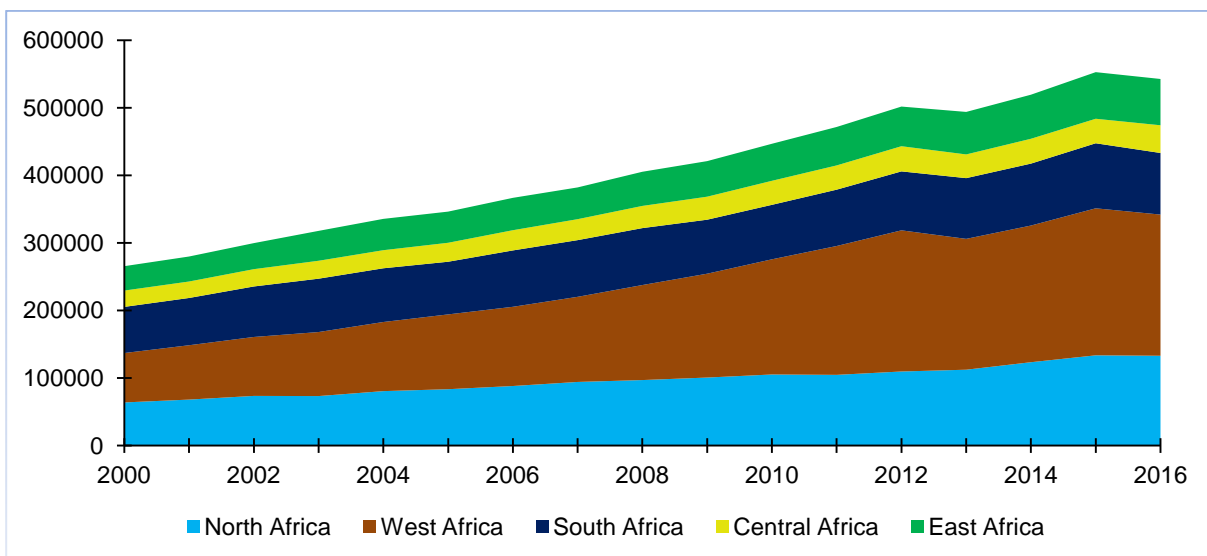
* includes firewood and charcoal

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

TOTAL FINAL CONSUMPTION BY REGION

AFRICA

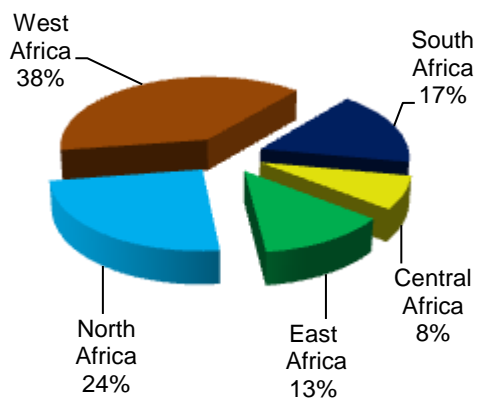
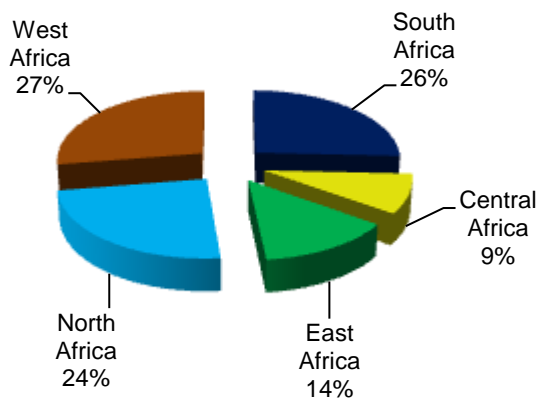
Total final consumption from 2 000 to 2 016
by region (ktoe)



2 000 and 2 016 Regional Shares of Total Final Consumption

2 000

2 016



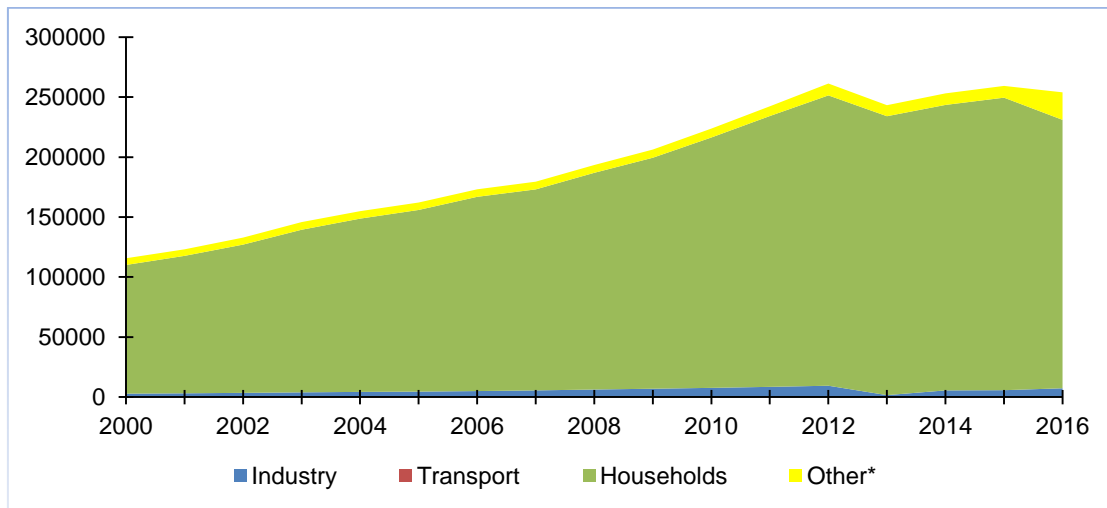
73 158 ktoe

208 993 ktoe

TOTAL FINAL CONSUMPTION BY SECTOR

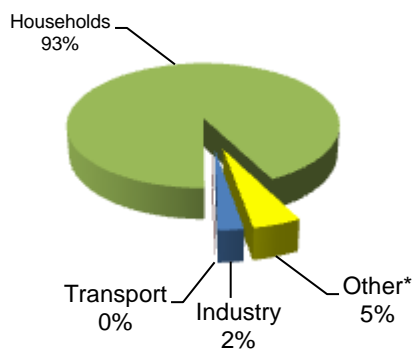
Firewood

Total Final Consumption from 2 000 to 2 016
by sector (ktoe)



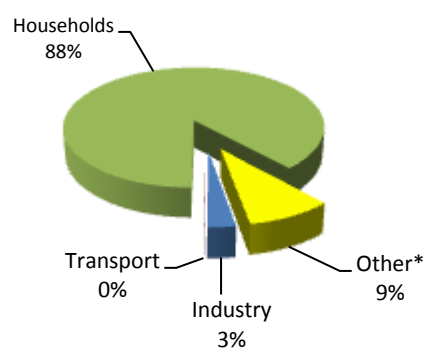
2 000 and 2 016 shares of Africa firewood consumption

2 000



107 225 ktoe

2 016

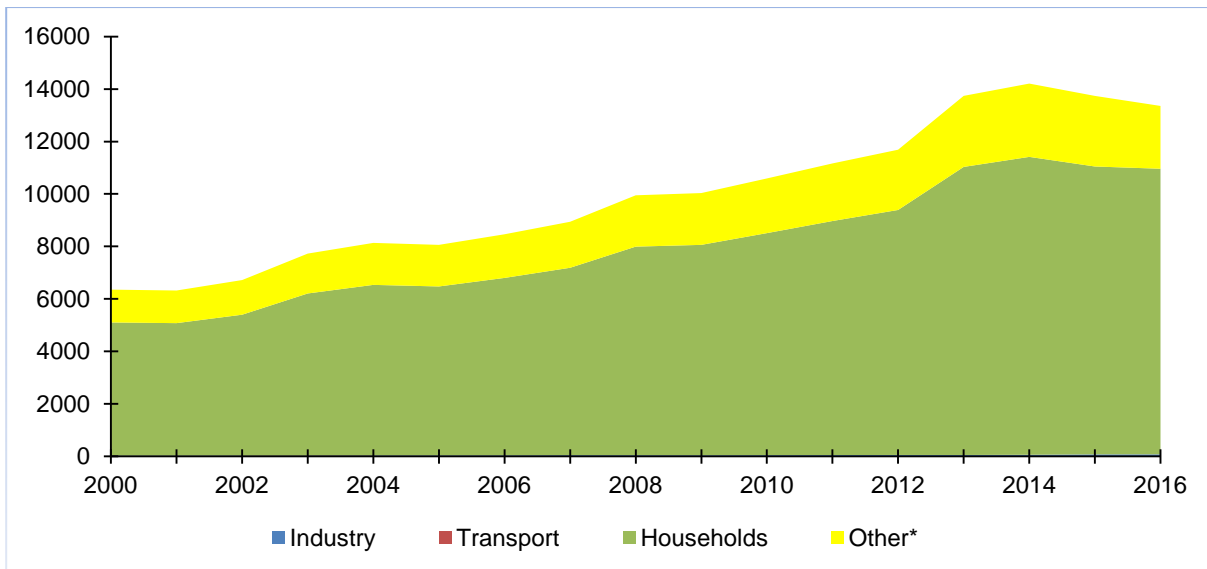


223 642 ktoe

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

Charcoal

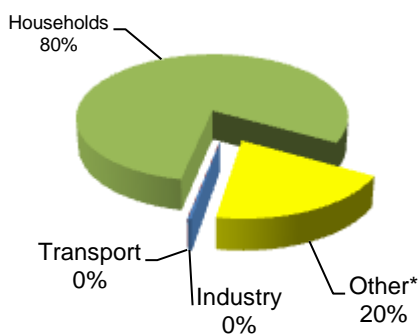
**Total Final Consumption from 2 000 to 2 016
by sector (ktoe)**



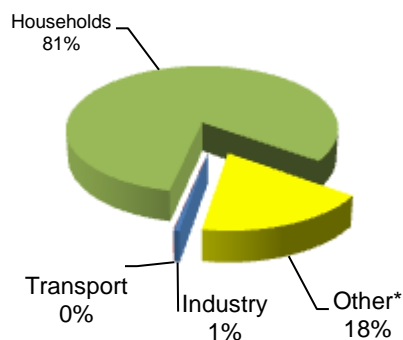
2 000 and 2 016 shares of Africa charcoal consumption

2 000

2 016



5 075 ktoe

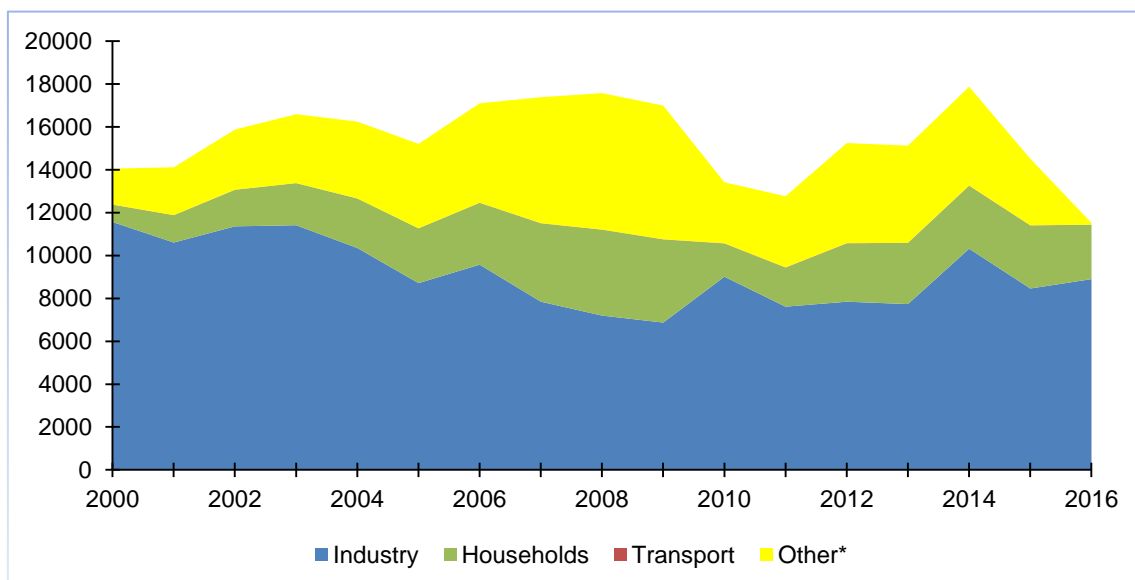


10 885 ktoe

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

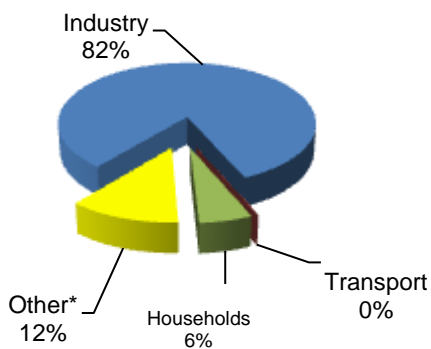
Coal**

**Total Final Consumption from 2 000 to 2 016
by sector (ktoe)**



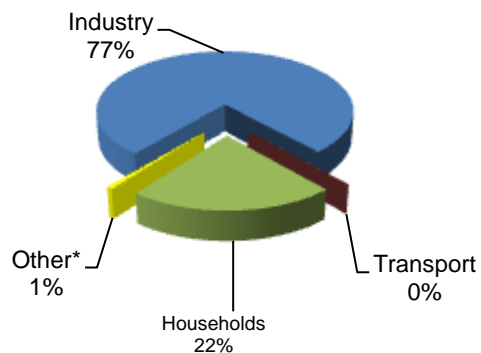
2 000 and 2 016 shares of Africa coal consumption**

2 000



11 555 ktoe

2 016



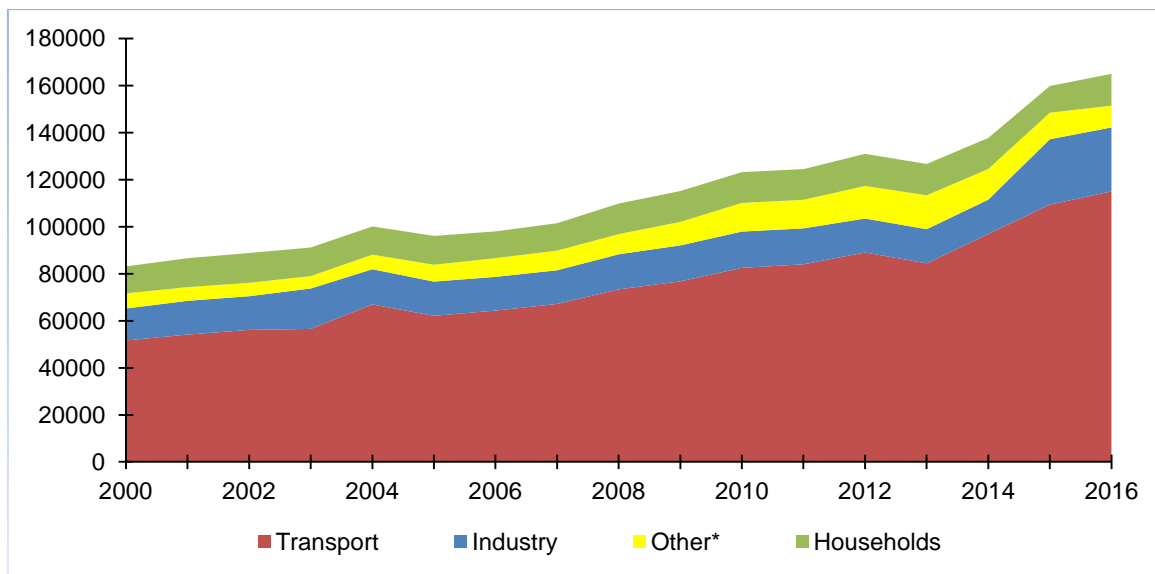
8 892 ktoe

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

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

Oil

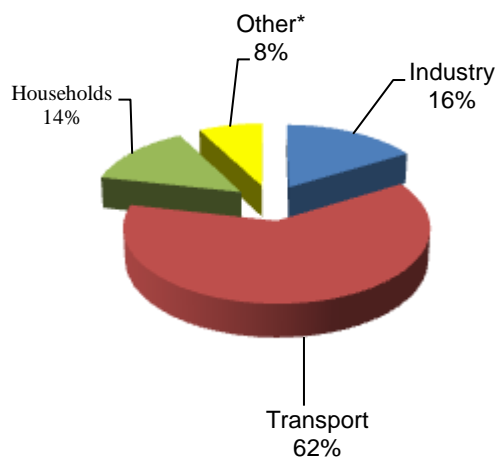
**Total Final Consumption from 2 000 to 2 016
by sector (ktoe)**



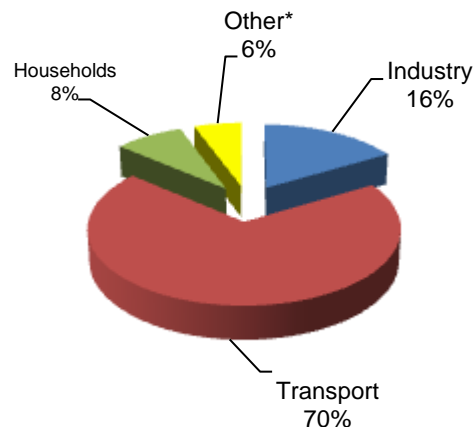
2 000 and 2 016 Shares of Africa Oil Consumption

2 000

2 016



51 670 ktoe

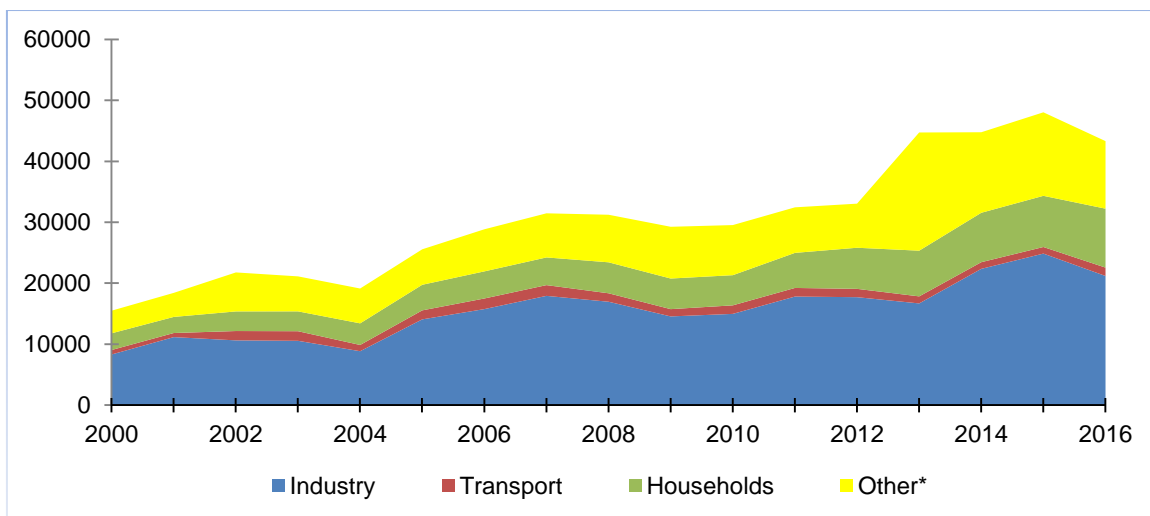


115 024 ktoe

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

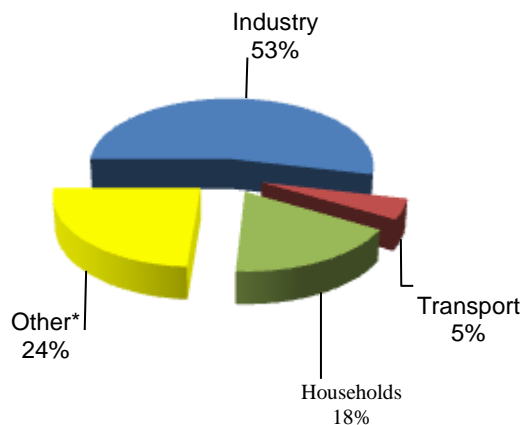
Natural gas

**Total Final Consumption from 2 000 to 2 016
by sector (ktoe)**



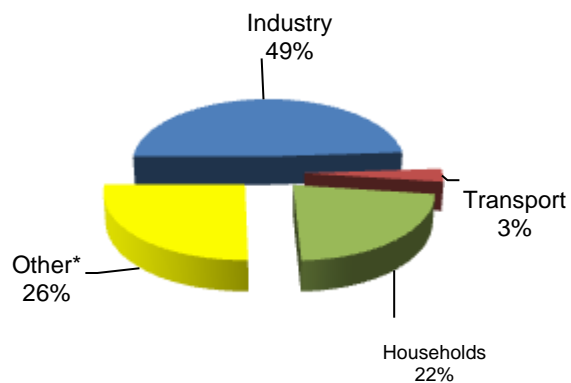
2 000 and 2 016 Shares of Africa Natural Gas Consumption

2 000



8 316 ktoe

2 016

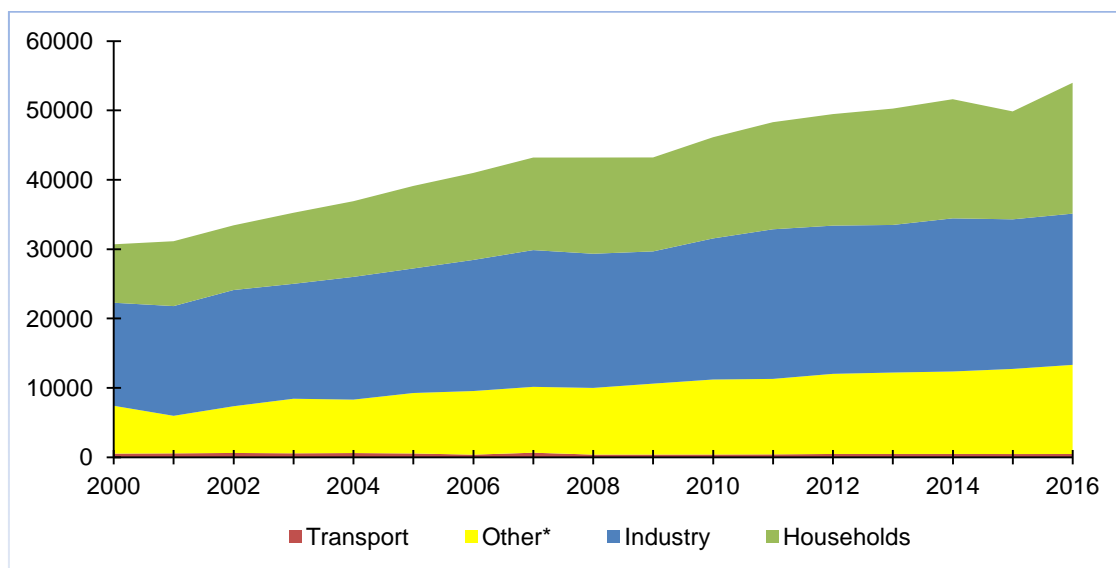


21 191 ktoe

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

Electricity

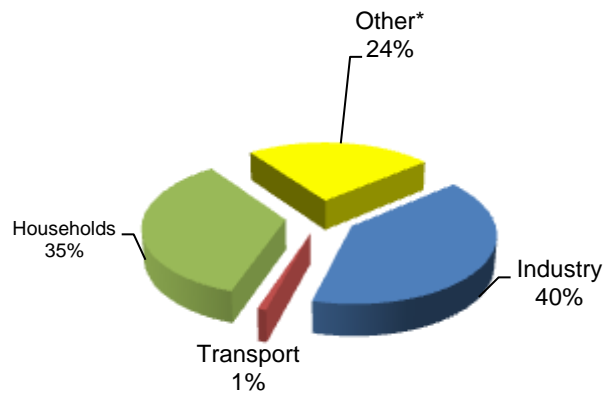
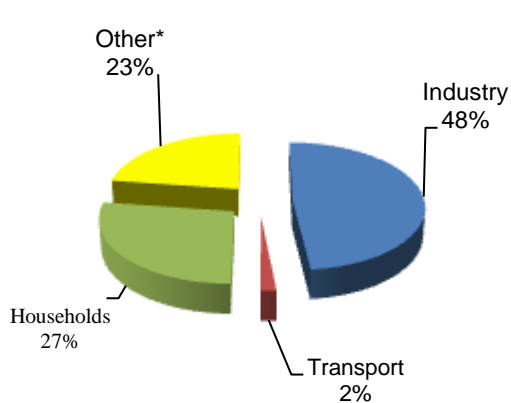
**Total Final Consumption from 2 000 to 2 016
by sector (ktoe)**



2 000 and 2 016 shares of Africa electricity consumption

2 000

2 016



14 852 ktoe

21 803 ktoe

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

SIMPLIFIED ENERGY BALANCE TABLE

AFRICA

2 000

Thousand Tonnes of Oil Equivalent (ktoe)		Crude Oil	Oil Products	Coal / peat	Natural Gas	Nuclear	Hydro	Wind & Geothermal & Solar PV	Biofuels and Waste	Electricity	Total
PRIMARY SUPPLY	Production	353 734	-	116 021	114 822	3 390	6 607	394	150 556	-	745 525
	Imports	25 682	23 037	3 250	1 563	-	-	-	-	1 129	54 661
	Exports	-279 749	-36 492	-35 919	- 58 226	-	-	-	-	-1 124	- 411 509
	Intl. Marine Bunkers	-	-	-	-	-	-	-	-	-	-
	Intl. Aviation Bunkers	-	-	-	-	-	-	-	-	-	-
	Stock Changes	7 938	646	931	-	-	-	-	-	-	9 515
	TPES	107 605	-12 809	84 283	58 159	3 390	6 607	394	150 556	6	398 191
	Transfers	-	-	-	-	-	-	-	-	-	-
	Statistical difference.	1 449	1 633	- 899	-12 086	-	-	-	1 598	1 224	-7 080
TRANSFORMATION	Transformation	-107 808	94 305	- 67 268	- 21 983	- 3 390	- 6 607	-394	- 50 464	37 840	-125 769
	Electricity Producers	- 233	-11 037	-67 268	- 21 983	-3 390	- 6 607	- 394	-1 391	37 840	-74 463
	Petroleum Refineries	-107 574	105 342	-	-	-	-	-	-	-	-2 233
	Charcoal Plants	-	-	-	-	-	-	-	-49 073	-	-49 073
	Gas-To-Liquids	-	-	-	-	-	-	-	-	-	-
	Coal-To-Liquids	-	-	-	-	-	-	-	-	-	-
	Blast Furnaces	-	-	-	-	-	-	-	-	-	-
	Other Transformation	-	-	-	-	-	-	-	-	-	-
	Energy Industry Own Use	-434	-1 755	- 28	-9 994	-	-	-	-	-3 726	-15 936
	Losses	-756	-	-2 044	-143	-	-	-	-	-4 643	-7 586
FINAL CONSUMPTION	TFC	56	81 375	14 046	13 953	-	-	-	129 731	30 701	269 862
	Industry	56	13 292	11 555	7 485	-	-	-	2 997	14 852	50 236
	Transport	-	50 569	10	663	-	-	-	-	529	51 770
	Households	-	11 212	805	2 467	-	-	-	118 390	8 332	141 205
	Com. & Public Service	-	1 133	419	1 655	-	-	-	7 219	3 928	14 355
	Agriculture/Forestry	-	2 392	251	-	-	-	-	-	929	3 573
	Others (Non Specified)	-	2 770	-	1 684	-	-	-	1 125	2 132	7 711
	Non-Energy Use	-	6	1 006	-	-	-	-	-	-	1 012

SIMPLIFIED ENERGY BALANCE TABLE

AFRICA

2016

Thousand Tonnes of Oil Equivalent (ktoe)		Crude Oil	Oil Products	Coal / peat	Natural Gas	Nuclear	Hydro	Wind & Geothermal & Solar PV	Biofuels and Waste	Electricity	Total
PRIMARY SUPPLY	Production	342 097	-	135 997	164 566	3 915	10 317	4 877	354 906	-	1 016 676
	Imports	24 590	101 280	5 046	22 623	-	-	-	-	1 674	155 213
	Exports	-260 774	-21 145	-40 596	-73 074	-	-	-	-	-642	-396 231
	Intl. Marine Bunkers	-	-4 955	-	-	-	-	-	-	-	-4 955
	Intl. Aviation Bunkers	-	-6 152	-	-	-	-	-	-	-	-6 152
	Stock Changes	899	-353	2 235	-	-	-	-	-	-	2 781
	TPES	106 813	68 675	102 681	114 115	3 915	10 317	4 877	354 906	1 033	767 331
Transfers	-	-	-	-	-	-	-	-	-	-	
Statistical difference.	3 191	8 326	2 565	48	-	-	-	-4 888	-3 016	6 227	
TRANSFORMATION	Transformation	-108 765	85 710	-81 698	-61 391	-3 915	-10 317	-4 877	-126 006	69 464	-241 795
	Electricity Producers	-1 482	-17 827	-68 857	-58 620	-3 915	-10 317	-4 877	0	69 464	-96 430
	Petroleum Refineries	-107 283	103 537	-	-	-	-	-	-	-	-3 746
	Charcoal Plants	-	-	-	-	-	-	-	-126 006	-	-126 006
	Gas-To-Liquids	-	-	-	-40	-	-	-	-	-	-40
	Coal-To-Liquids	-	-	-	-	-	-	-	-	-	-
	Blast Furnaces	-	-	-	-	-	-	-	-	-	-
	Other Transformation	-	-	-12 841	-2 731	-	-	-	-	-	-15 573
Energy Industry Own Use	-538	-1 189	-10 775	-13 280	-	-	-	-	-4 527	-30 309	
Losses	-696	-58	-	-511	-	-	-	-	-8 967	-10 232	
FINAL CONSUMPTION	TFC	6	161 464	12 773	38 980	-	-	-	284 276	53 987	551 486
	Industry	6	26 601	8 892	19 072	-	-	-	7 568	21 803	83 942
	Transport	-	112 574	3	1 236	-	-	-	-	476	114 288
	Households	-	13 231	2 539	8 702	-	-	-	247 894	18 861	291 227
	Com. & Public Service	-	1 757	1 260	1 496	-	-	-	28 814	9 175	42 502
	Agriculture/Forestry	-	4 595	-	499	-	-	-	-	1 799	6 893
	Others (Non Specified)	-	1 863	80	7 977	-	-	-	-	1 872	11 792
	Non-Energy Use	-	843	-	-	-	-	-	-	-	843

CONVERSION FACTORS

(Source: IEA)

General Conversion Factors for Energy

To:	TJ	Gcal	Mtoe	MBtu	GWh
From:	Multiply by :				
TJ	1	238.8	2.388×10^{-5}	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

To:	kg	t	lt	st	lb
From:	Multiply by :				
kilogramme (kg)	1	0.001	9.84×10^{-4}	1.102×10^{-3}	2.2046
tonne (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

To:	gal U.S.	gal U.K.	bbl	Ft ³	l	m ³
From:	Multiply by :					
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

GLOSSARY

(Source: IEA)

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 plant 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.

A F R E C



www.afrec-energy.org

Address : 02, Rue Chenoua, BP 791
Hydra, 16035
Alger, Algérie

Tel. Bureau : +213 21 69 48 68
Fax : +213 21 69 20 83
E-mail : afrienergy@yahoo.com