

# AFREC

## KEY AFRICA ENERGY STATISTICS

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2013



# 2013

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



KEY AFRICA ENERGY STATISTICS

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**KEY AFRICA  
ENERGY STATISTICS**

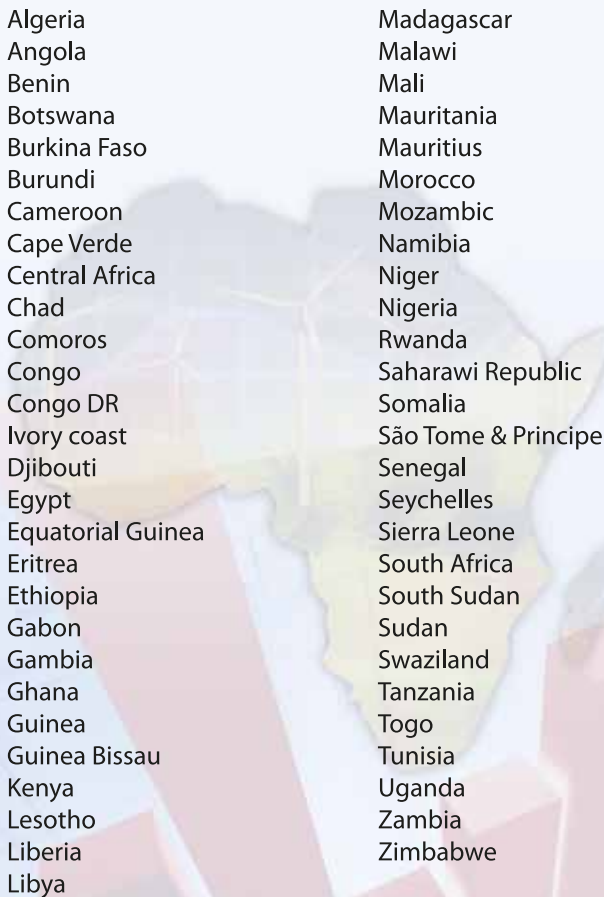
# KEY AFRICA ENERGY STATISTICS



2013



# List of Participating African Countries



Algeria  
Angola  
Benin  
Botswana  
Burkina Faso  
Burundi  
Cameroon  
Cape Verde  
Central Africa  
Chad  
Comoros  
Congo  
Congo DR  
Ivory coast  
Djibouti  
Egypt  
Equatorial Guinea  
Eritrea  
Ethiopia  
Gabon  
Gambia  
Ghana  
Guinea  
Guinea Bissau  
Kenya  
Lesotho  
Liberia  
Libya  
Madagascar  
Malawi  
Mali  
Mauritania  
Mauritius  
Morocco  
Mozambique  
Namibia  
Niger  
Nigeria  
Rwanda  
Saharawi Republic  
Somalia  
São Tome & Príncipe  
Senegal  
Seychelles  
Sierra Leone  
South Africa  
South Sudan  
Sudan  
Swaziland  
Tanzania  
Togo  
Tunisia  
Uganda  
Zambia  
Zimbabwe

# AFREC

## FORWARD

This is the 2013 publication of “Key Africa Energy Statistics” following the 2012 edition produced by the African Energy Commission (AFREC). It provides a time series data of energy supply, transformation, consumption and energy balances of all African countries.

This handy, pocket-sized publication represents a summary of the main volume of the “Africa Energy Statistics 2013” which provides timely and clearly-presented data of the Africa’s energy supply and use in most cases from 2000 to 2011.

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 Statistics 2013 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 and Internet versions have been produced. The main report of the Africa Energy Statistics 2013 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](http://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	ton=tonne=1000kg
TJ	terajoule
toe	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**

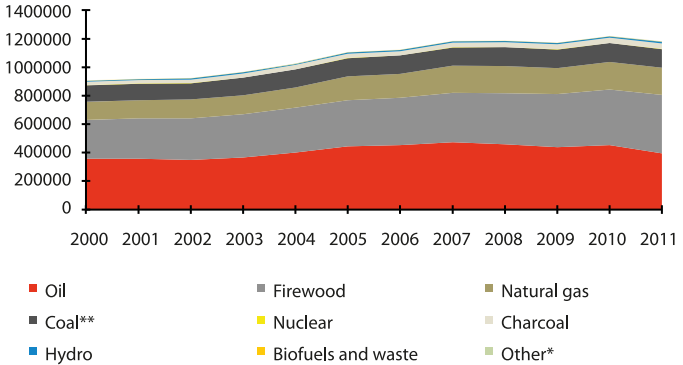
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# TOTAL PRIMARY ENERGY SUPPLY BY FUEL

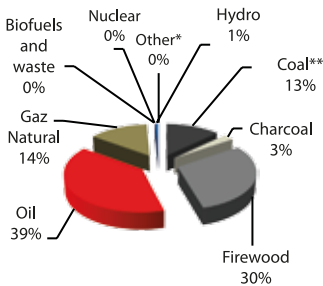
## AFRICA

Africa Total Primary Energy Supply from 2000 to 2011 by fuel (ktoe)



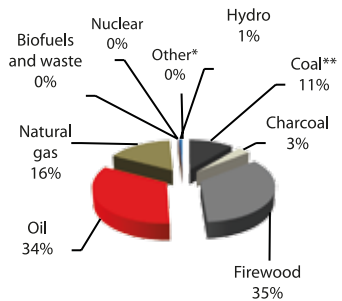
2000 and 2011 Fuel Shares of TPES

2000



356 367 ktoe

2011



408 288 ktoe

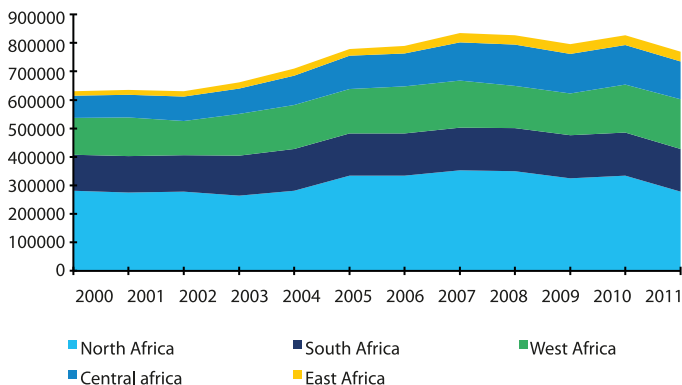
\* Other includes geothermal, solar, wind, wave, etc

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

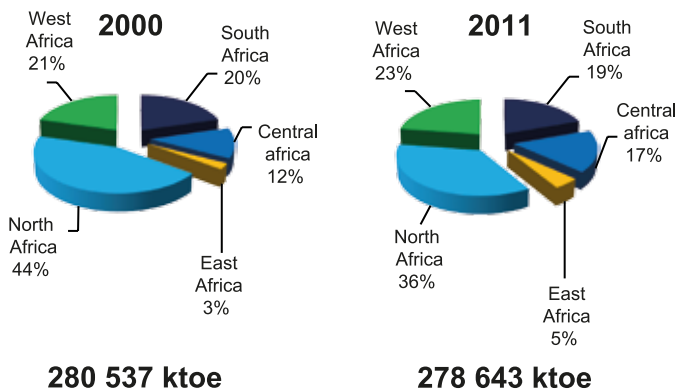
# TOTAL PRIMARY ENERGY SUPPLY BY REGION

## AFRICA

Africa Total Primary Energy Supply from 2000 to 2011  
by region (ktoe)

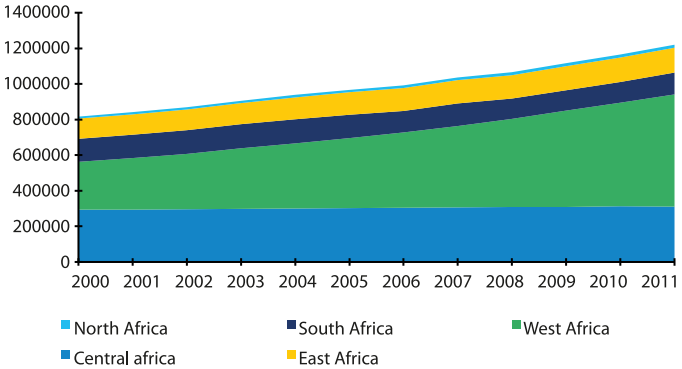


2000 and 2011 Regional Shares of TPES

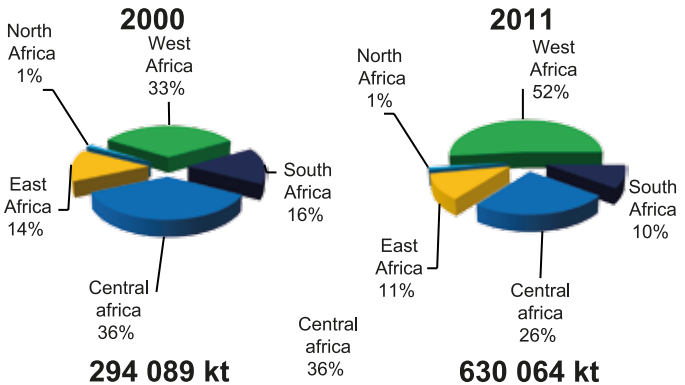


## AFRICA

Firewood Production from 2000 to 2011  
by region (kt)



2000 and 2011 Regional Shares of Firewood Production

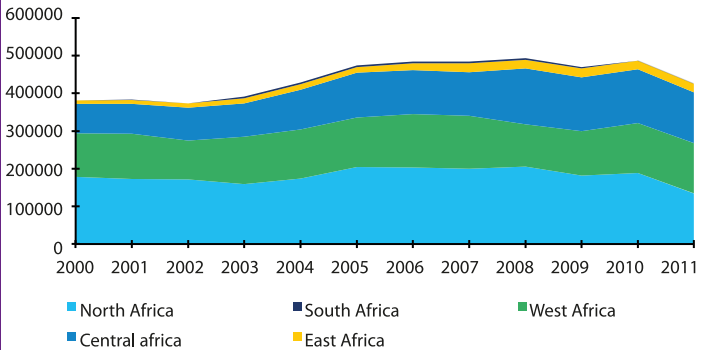


Producers	KT
Nigeria	443 130
Ethiopia	74 113
Niger	68 674
Congo DR	53 862
ivory coast	20 657
Mozambique	17 468
Uganda	16 109
Zimbabwe	12 785
Cameroon	11 944
Ghana	9 500
Chad	9 134
Burundi	8 246
Mali	8 006
Togo	5 886
Benin	5 847
Burkina Faso	5 762
Senegal	4 961
Sudan	4 363
Rwanda	4 128
Tunisia	3 107
Congo	2 777
Central Africa R	2 658
Guinea Bissau	786
Mauritius	19
<b>AFRICA</b>	<b>793 921</b>

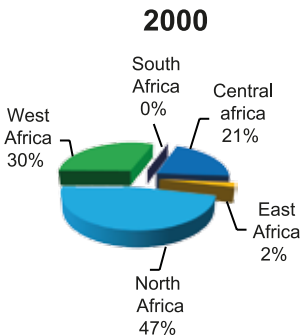
# CRUDE OIL PRODUCTION

## AFRICA

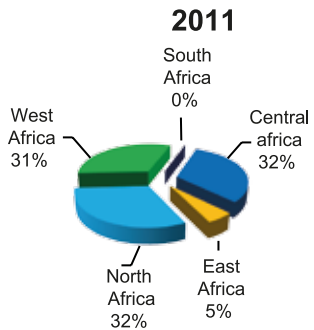
Crude Oil\* Production from 2000 to 2011  
by region (kt)



2000 and 2011 Regional Shares of Crude Oil\* Production



**177 908 kt**



**134 411 kt**

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

## Producers, Net Exporters and Net Importers of Crude Oil\* from 2011

Producers	kt
Nigeria	127 517
Angola	81 603
Algeria	72 284
Egypt	34 863
Libya	24 018
South sudan	17 500
Congo	14 913
Guinea Equatorial	14 869
Gabon	12 636
Chad	5 224
Sudan	5 132
Ghana	3 394
Tunisia	3 236
Cameroon	3 083
Ivory coast	1 678
Congo DR	1 205
Mauritania	387
South Africa	140
Niger	93
Morocco	10
Ethiopia	5
<b>AFRICA</b>	<b>423 790</b>

Net exporters	kt
Nigeria	121 395
Angola	78 893
Algeria	38 164
Libya	18 920
South Sudan	17 470
Equatorial Guinea	15 800
Congo	13 851
Gabon	11 750
Sudan	9 982
Egypt	7 377
chad	5 132
Tunisia	2 705
Ghana	1 993
Congo DR	1 227
Cameroon	996
Mauritania	387
Mozambic	31
<b>AFRICA</b>	<b>346 073</b>

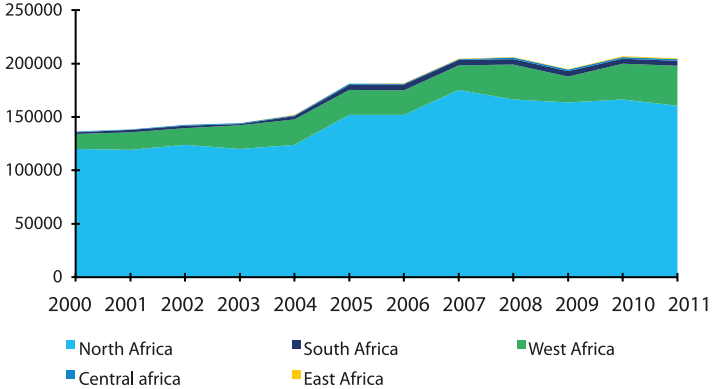
Net importers	kt
South Africa	21 023
Morocco	7 079
Kenya	1 772
Senegal	738
Ivory coast	714
Zambia	668
<b>AFRICA</b>	<b>31 994</b>

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

# NATURAL GAS PRODUCTION

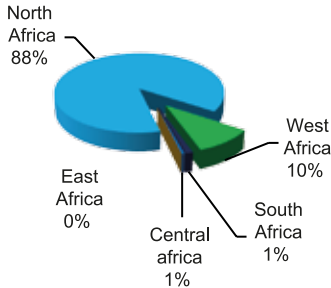
## AFRICA

Natural gas production from 2000 to 2011 by region (Million cubic meters)



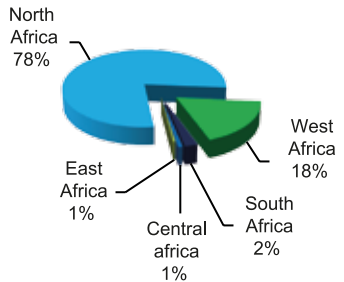
2000 and 2012 Regional Shares of Natural Gas Production

2000



120 017 Mcm

2011



160 652 Mcm

## Producers, Net Exporters and Net Importers\* Of Natural Gas from 2011

Producers	Mm <sup>3</sup>
Algeria	83 374
Egypt	66 920
Nigeria	34 702
Libya	7 625
Mozambique	3 341
Tunisia	2 673
Ivory coast	1 553
South Africa	1 321
Tanzania	858
Angola	850
Cameroon	765
Guinea Equatorial	308
Gabon	243
Congo	166
Morocco	146
Ghana	59
Senegal	38
Congo DR	8
<b>AFRICA</b>	<b>204 951</b>

Net exporters	Mm <sup>3</sup>
Algeria	52 017
Nigeria	22 663
Egypt	8 347
Mozambique	3 137
Libya	2 348
<b>AFRICA</b>	<b>88 512</b>

Net importers	Mm <sup>3</sup>
South Africa	3 246
Tunisia	2 374
Morocco	822
Ghana	797
<b>AFRICA</b>	<b>7 238</b>

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





## Producers, Net Exporters and Net Importers of Coal\* from 2011

Producers	Kt
South Africa	252 757
Zimbabwe	2 996
Botswana	788
Mozambique	648
Swaziland	481
Niger	264
Tanzania	83
Malawi	50
Nigeria	32
Zambia	1
<b>AFRICA</b>	<b>258 100</b>

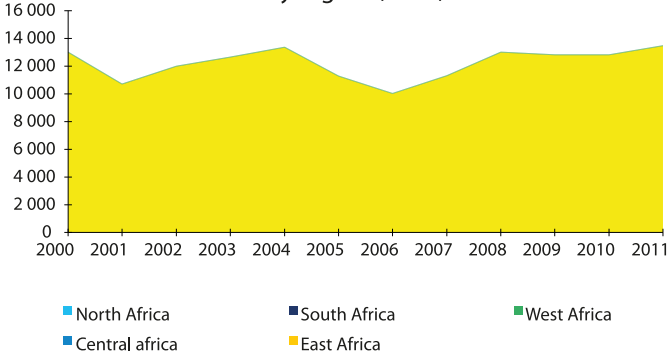
Net importers	Kt
Morocco	4 860
Egypt	987
Mauritius	660
Algeria	438
Kenya	383
Senegal	357
Ethiopia	141
Madagascar	15
Namibia	13
Botswana	3
<b>AFRICA</b>	<b>7 857</b>

Net exporters	Kt
South Africa	68 351
Swaziland	481
Zimbabwe	201
Mozambic	102
<b>AFRICA</b>	<b>69 135</b>

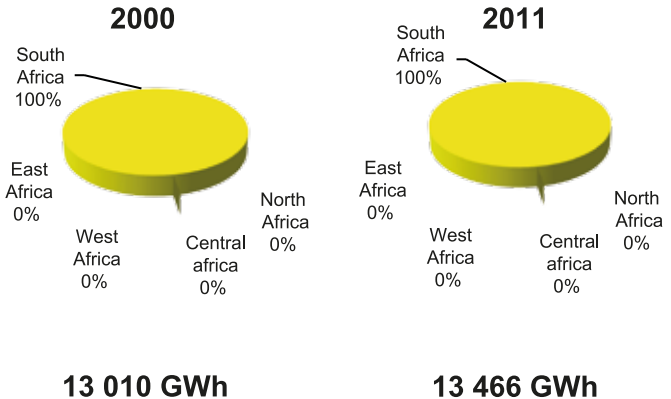
\*Includes steam coal, coking coal, lignite and recovered coal

## AFRICA

Nuclear Production from 2000 to 2011  
by region (GWh)



2000 and 2011 Regional Shares of Nuclear Production

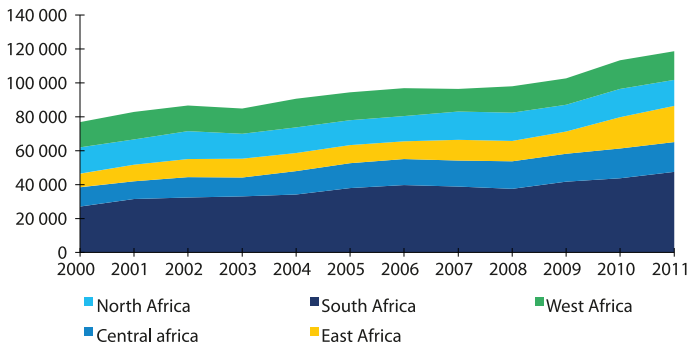


## Producers of Nuclear Electricity from 2011

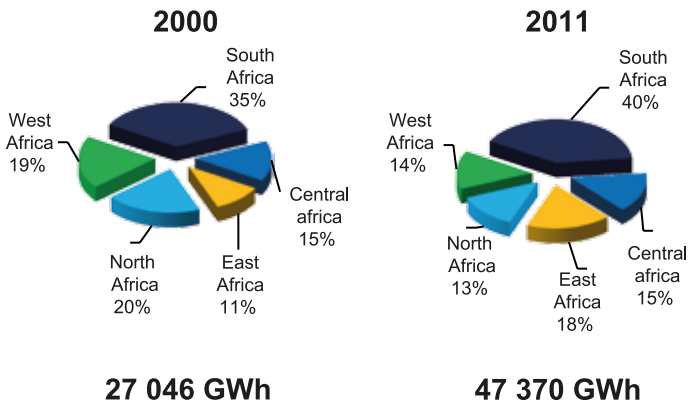
<b>Producers</b>	<b>GWh</b>
South Africa	13 466
<b>AFRICA</b>	<b>13 466</b>

## AFRICA

Hydro production from 2000 to 2011  
by region (GWh)



2000 and 2012 Regional Shares of Hydro Production

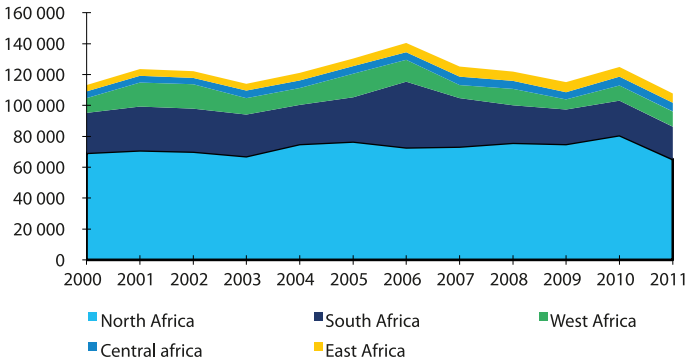


## Producers of Hydro Electricity from 2011

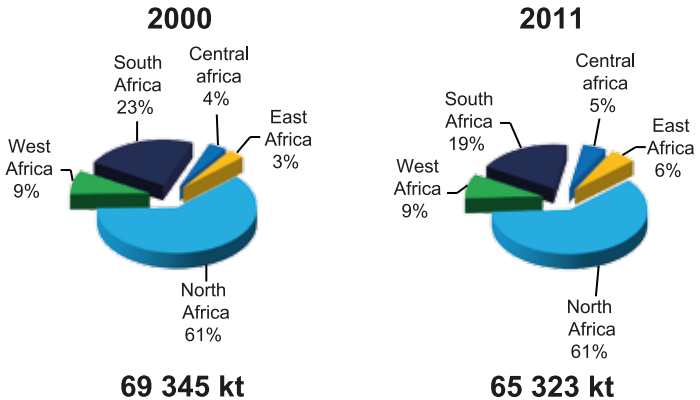
Producers	GWh	Producteurs	GWh
Mozambic	16 567	Swaziland	212
Egypt	13 046	Algeria	173
Zambia	11 134	Burundi	150
Sudan	7 884	Rwanda	149
South Africa	7 858	Central Africa R	139
Ghana	7 561	Mauritania	110
Congo DR	7 235	Togo	103
Ethiopia	6 485	Mauritius	98
Zimbabwe	5 844	Burkina Faso	82
Nigeria	5 650	Tunisia	54
Cameroon	4 217	Guinea Equatorial	14
Angola	4 007	South Sudan	14
Kenya	3 451	Somalia	11
Morocco	2 005	São Tomé & Príncipe	10
Tanzania	1 983	Comoros	5
Madagascar	1 967	Benin	1
Ivory coast	1 774	<b>AFRICA</b>	<b>118 720</b>
Malawi	1 733		
Uganda	1 514		
Namibia	1 386		
Gabon	981		
Congo	791		
Mali	724		
Lesotho	566		
Guinea	519		
Senegal	257		
Sierra Leone	257		

## AFRICA

Refinery Production from 2000 to 2011  
by region (kt)



2000 and 2012 Regional Shares of Refinery Production



## Producers, Net Exporters and Net Importers of Oil Products in 2011

Producers	Kt
Egypt	26 083
Algeria	25 665
South Africa	20 356
Morocco	7 476
Nigeria	5 868
Libya	5 402
Sudan	4 354
Côte d'Ivoire	2 236
Cameroon	1 948
Angola	1 935
Kenya	1 661
Ghana	958
Gabon	922
Senegal	702
Tunisia	697
Zambia	628
Congo	575
Chad	106
Niger	57
<b>AFRICA</b>	<b>107 629</b>

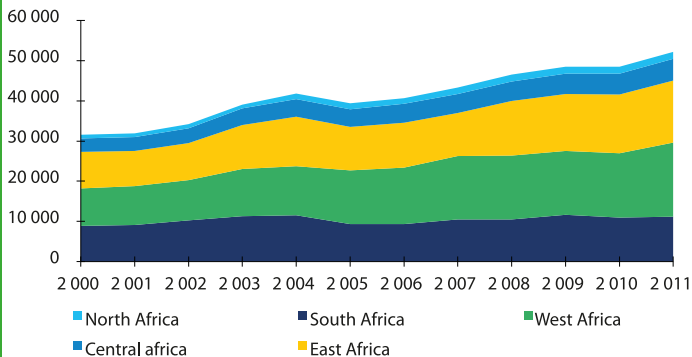
Net exporters	Kt
Algeria	17 407
Ivory coast	1 915
Gabon	499
Congo	452
Cameroon	311
<b>AFRICA</b>	<b>20 584</b>

Net importers	kt
Nigeria	7 584
Egypt	6 815
Morocco	6 495
South Africa	4 472
Tunisia	3 336
Kenya	2 608
Libya	2 544
Angola	2 464
Ethiopia	2 125
Tanzania	1 967
Ghana	1 904
Benin	1 648
Mauritius	1 171
Uganda	1 149
Senegal	1 127
Namibia	993
Botswana	930
Mali	882
Mauritania	882
Congo DR	871
Mozambique	850
Sudan	678
Zimbabwe	665
Madagascar	654
Togo	622
Burkina Faso	583
Guinea	480
South Sudan	418
Djibouti	404
Niger	380
Malawi	364
Seychelles	287
Sierra Leone	266
Swaziland	238
Guinea Equatorial	228
Rwanda	198
Lesotho	190
Liberia	190
Gambia	172
Eritrea	158
Zambia	140
Cape Verde	132
Somalia	120
Chad	88
Saharawi Republic	81
Burundi	80
Central Africa R	59
Guinea Bissau	51
São Tomé & Príncipe	40
Comoros	37
<b>AFRICA</b>	<b>53 237</b>

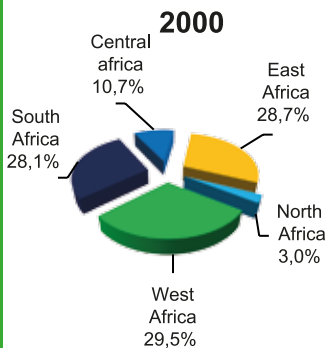


## AFRICA

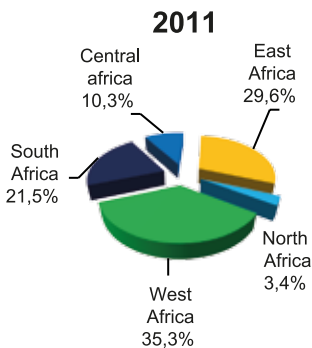
Charcoal production from 2000 to 2011  
by region (kt)



2000 and 2011 Regional Shares of Charcoal Production



**9 320 kt**



**18 393 kt**

## Producers of Charcoal from 2011

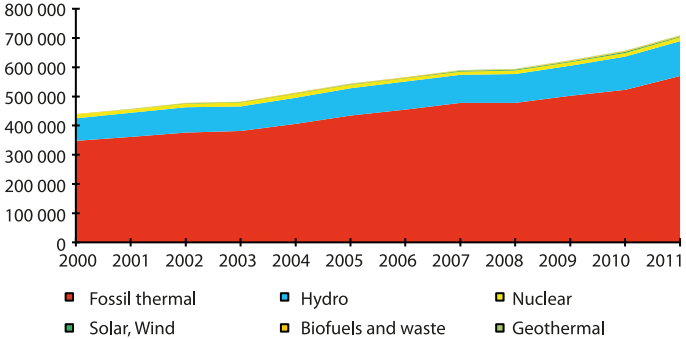
Producers	Kt
Ethiopia	5 335
Nigeria	3 483
Kenya	3 193
Liberia	3 039
Ghana	2 275
Sudan	1 907
Malawi	1 886
South Africa	1 723
Guinea	1 663
Tanzania	1 585
Ivory coast	1 273
Angola	1 221
Lesotho	1 178
Zambia	1 052
Chad	815
Burkina Faso	785
Congo DR	753
Madagascar	740
Somalia	711
Uganda	688
Cape Verde	643
Togo	579
Senegal	561
Mozambique	464
Mali	445
Niger	430

Producteurs	Kt
Sierra Leone	382
Benin	252
Namibie	245
Cameroon	219
Congo	209
Tunisia	191
Rwanda	169
Eritrea	139
Guinea Bissau	87
Morocco	17
Zimbabwe	9
Central Africa R	6
Mauritius	1
<b>AFRICA</b>	<b>40 208</b>

# ELECTRICITY GENERATION BY FUEL

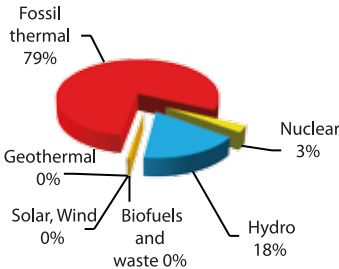
## AFRICA

Electricity Generation from 2000 to 2011  
by fuel (GWh)



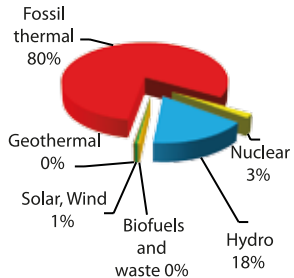
2000 and 2011 Fuel Shares of Electricity Generation

2000



347 982 GWh

2011



569 955 GWh

# Electricity Production from Fossil Fuel from 2011

Fossil fuel	GWh
South Africa	257 857
Egypt	132 045
Algeria	51 062
Libya	28 649
Morocco	22 308
Nigeria	21 384
Tunisia	16 332
Ivory coast	4 261
Tanzania	4 205
Ghana	3 639
Sudan	3 416
Zimbabwe	2 917
Senegal	2 651
Kenya	2 569
Mauritius	1 736
Angola	1 644
Cameroon	1 537
Madagascar	1 482
Mali	953
Gabon	851
Zambia	781
Botswana	694
Ethiopia	564
Uganda	547
Burkina Faso	530
Congo	502
Guinea	450
Seychelles	400
Guinea Equatorial	396
Niger	342
Eritrea	335
Djibouti	325
Swaziland	315
Somalia	312
Cape Verde	280
Mauritania	268
Chad	203
Gambia	203

Fossil fuel	GWh
Rwanda	190
South Sudan	158
Benin	153
Guinea Bissau	101
Saharawi Republic	90
Comoros	55
Sierra Leone	45
Liberia	39
Namibia	39
Congo DR	35
Togo	34
Central Africa R	25
Mozambique	20
São Tomé & Príncipe	18
Malawi	6
Burundi	2
<b>AFRICA</b>	<b>569 955</b>

Nuclear	GWh
South Africa	13 466
<b>AFRICA</b>	<b>13 466</b>

# Electricity Production from Fossil Fuel from 2011

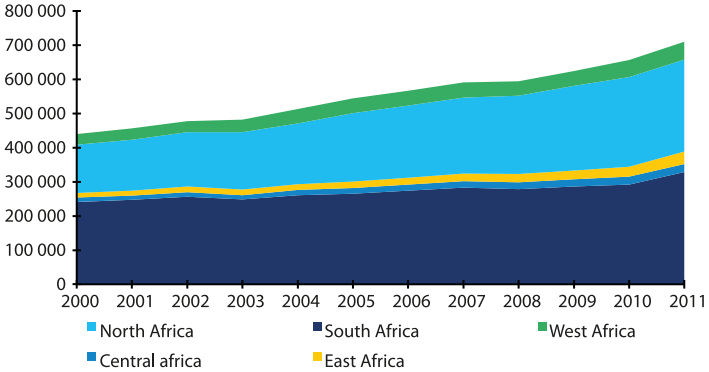
Hydro	GWh
Mozambique	16 567
Egypt	13 046
Zambia	11 134
Sudan	7 884
South Africa	7 858
Ghana	7 561
Congo DR	7 235
Ethiopia	6 485
Zimbabwe	5 844
Nigeria	5 650
Cameroon	4 217
Angola	4 007
Kenya	3 451
Morocco	2 005
Tanzania	1 983
Madagascar	1 967
Ivory coast	1 774
Malawi	1 733
Uganda	1 514
Namibia	1 386
Gabon	981
Congo	791
Mali	724
Lesotho	566
Guinea	519
Senegal	257
Sierra Leone	257
Swaziland	212
Algeria	173
Burundi	150
Rwanda	149
Central Africa R	139
Mauritania	110
Togo	103
Mauritius	98
Burkina Faso	82
Tunisia	54
Guinea Equatorial	14
South Sudan	14
Somalia	11
São Tomé & Príncipe	10
Comoros	5
Benin	1
<b>AFRICA</b>	<b>118 720</b>

Solar, wind, Geothermal, Biofuels and waste	GWh
Kenya	1 855
Egypt	1 577
Morocco	692
Mauritius	672
South Africa	404
Ethiopia	260
Sudan	208
Swaziland	173
Ivory coast	173
Uganda	162
Mozambique	147
Cameroon	120
Tunisia	109
Tanzania	106
Algeria	78
Senegal	56
Mali	52
Zimbabwe	40
Madagascar	20
Gabon	13
Libya	9
Cape Verde	7
Malawi	6
Botswana	5
Guinea	4
Eritrea	4
Angola	3
Congo DR	3
Djibouti	2
Gambia	2
Togo	2
Zambia	2
Rwanda	1
Central Africa R	1
Benin	1
Burundi	1
Seychelles	1
<b>AFRICA</b>	<b>6 969</b>

# ELECTRICITY GENERATION BY REGION

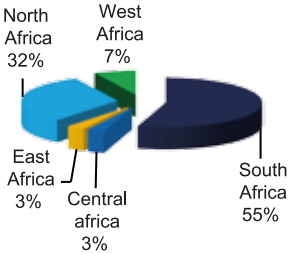
## AFRICA

Electricity Generation from 2000 to 2011  
by region (GWh)



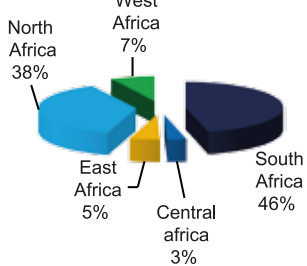
2000 and 2011 Regional Shares of Electricity Generation

### 2000



241 026 GWh

### 2011



328 606 GWh

# Producers, Net Exporters and Net Imports of Electricity from 2011

Producers	GWh
South Africa	279 585
Egypt	146 668
Algeria	51 313
Libya	28 657
Nigeria	27 034
Morocco	25 005
Tunisia	17 909
Mozambique	16 734
Zambia	11 916
Sudan	11 508
Ghana	11 200
Zimbabwe	8 800
Kenya	7 875
Ethiopia	7 308
Congo DR	7 273
Tanzania	6 294
Ivory coast	6 208
Cameroon	5 874
Angola	5 654
Madagascar	3 469
Senegal	2 965
Mauritius	2 506
Uganda	2 222
Gabon	1 845
Malawi	1 745
Mali	1 729
Namibia	1 424
Congo	1 293
Guinea	973
Swaziland	700
Botswana	699
Burkina Faso	612
Lesotho	566
Guinea Equatorial	410
Seychelles	401
Mauritania	378
Niger	342
Rwanda	340
Eritrea	339
Djibouti	327
Somalia	323
Sierra Leone	302
Cape Verde	287
Gambia	205

Producteurs	GWh
Chad	203
South Sudan	172
Central Africa R	165
Benin	155
Burundi	153
Togo	139
Guinea Bissau	101
Saharawi Republic	90
Comoros	60
Liberia	39
São Tomé & Príncipe	28
<b>AFRICA</b>	<b>710 525</b>

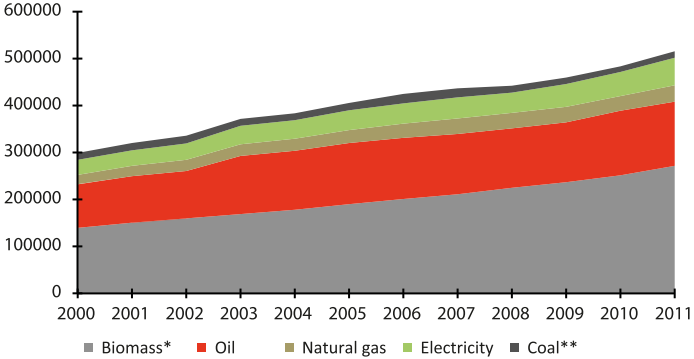
Net importers	GWh
Morocco	4 607
Botswana	3 180
Namibia	2 404
Benin	931
Togo	853
Niger	604
Zimbabwe	601
Swaziland	564
Burkina Faso	495
Senegal	257
Lesotho	247
Mauritania	127
Burundi	80
Rwanda	72
Tanzania	55
Congo	27
<b>AFRICA</b>	<b>15 104</b>

Net exporters	GWh
Mozambique	4 096
South Africa	3 074
Egypt	1 610
Côte d'Ivoire	615
Ghana	610
Zambia	573
Ethiopia	332
Algeria	142
Congo DR	127
Libya	69
Uganda	46
Tunisia	30
Kenya	5
<b>AFRICA</b>	<b>11 329</b>

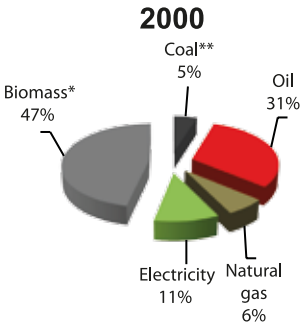
# TOTAL FINAL CONSUMPTION BY FUEL

## AFRICA

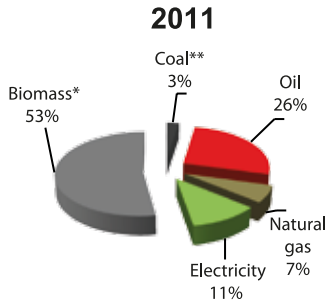
Total final consumption from 2000 to 2011 by fuel (ktoe)



2000 and 2011 Fuel Shares of Total Final Consumption



**139 660 ktoe**



**271 530 ktoe**

\* includes firewood and charcoal

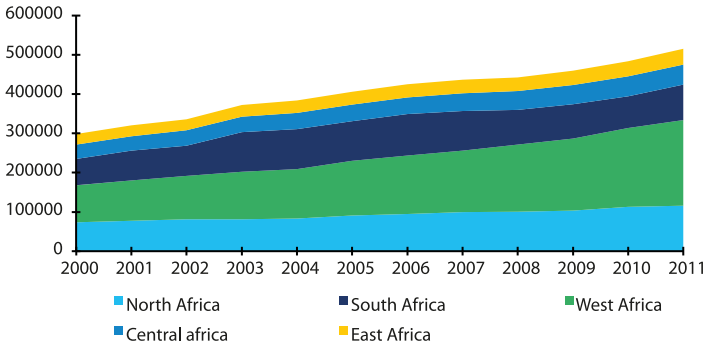
\*\* Includes steam coal, coking coal, lignite and recovered coal



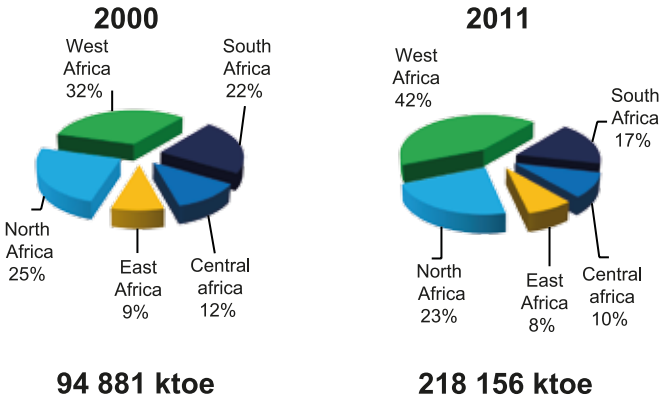
# TOTAL FINAL CONSUMPTION BY REGION

## AFRICA

Total final consumption from 2000 to 2011  
by region (ktoe)



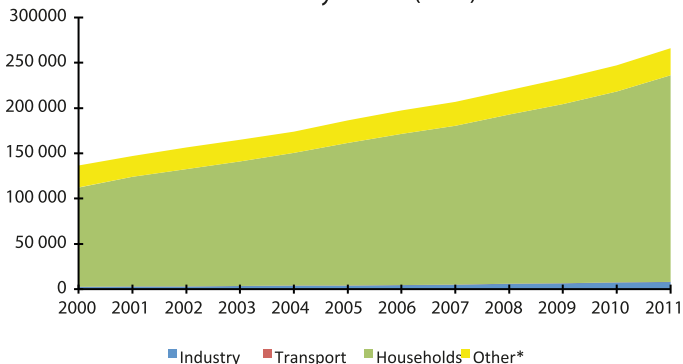
2000 and 2011 Regional Shares of Total Final Consumption



# TOTAL FINAL CONSUMPTION BY SECTOR

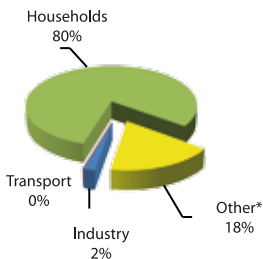
## Firewood

Total Final Consumption from 2000 to 2011  
by sector (ktoe)



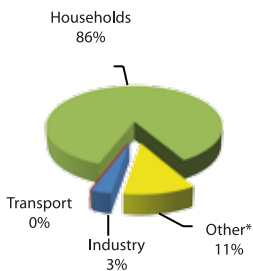
2000 and 2011 shares of Africa firewood consumption

2000



109 812 ktoe

2011

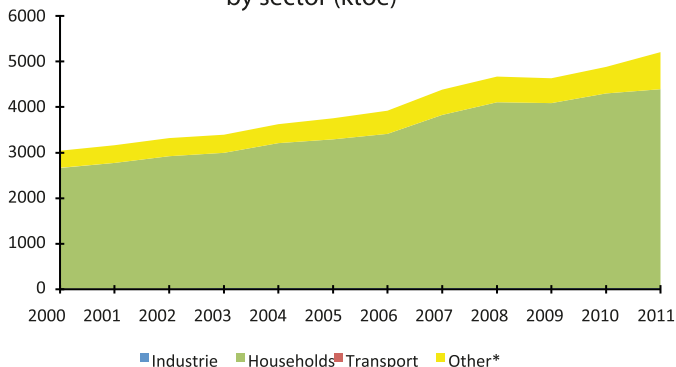


228 153 ktoe

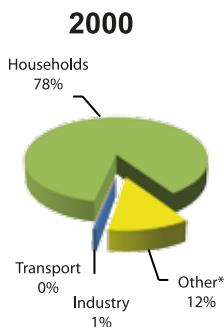
\* Includes agriculture, commercial, public service, and non-specified other

## Charcoal

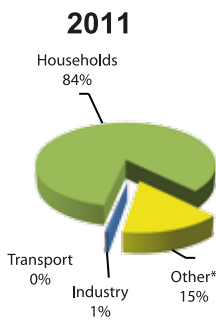
Total Final Consumption from 2000 to 2011  
by sector (ktoe)



2000 and 2011 shares of Africa charcoal consumption



**2 650 ktoe**

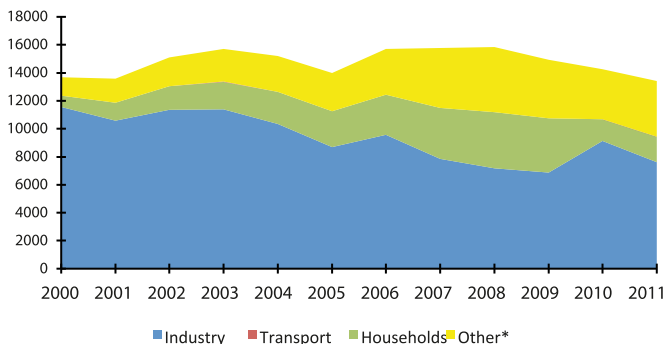


**4 364 ktoe**

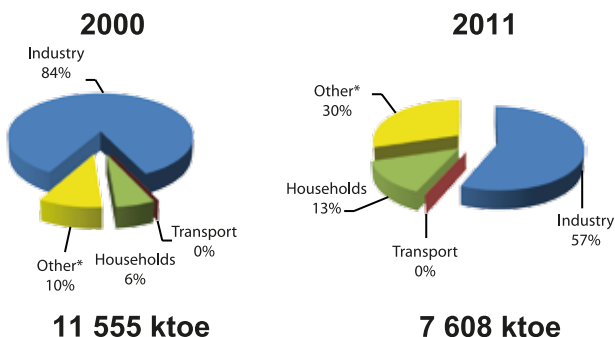
\* Includes agriculture, commercial, public service, and non-specified other

## Coal\*\*

Total Final Consumption from 2000 to 2011 by sector (ktoe)



2000 and 2011 shares of Africa coal\*\* consumption

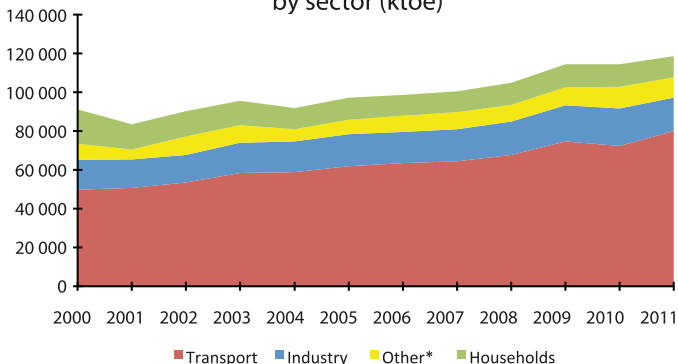


\* Includes agriculture, commercial, public service, and non-specified other

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

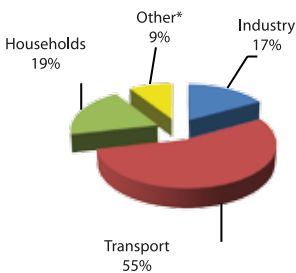
## Oil

Total Final Consumption from 2000 to 2011  
by sector (ktoe)



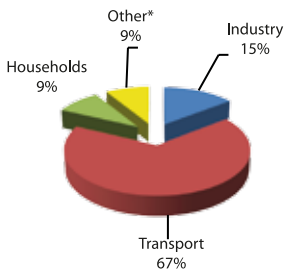
2000 and 2011 Shares of Africa Oil Consumption

2000



49 699 ktoe

2011

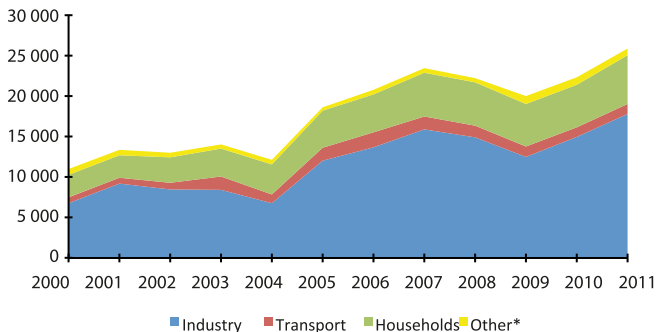


79 928 ktoe

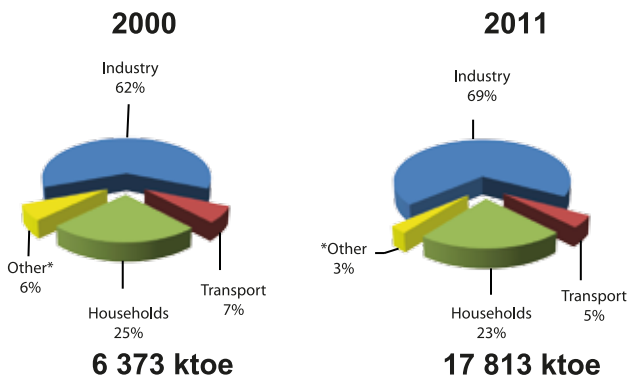
\* Includes agriculture, commercial, public service, and non-specified other

## Natural gas

Total Final Consumption from 2000 to 2011  
by sector (ktoe)



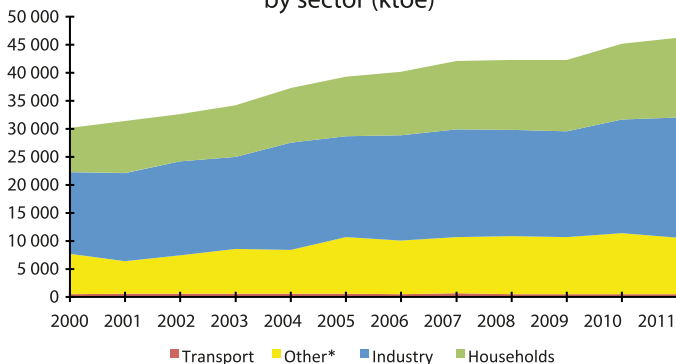
2000 and 2011 Shares of Africa Natural Gas Consumption



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

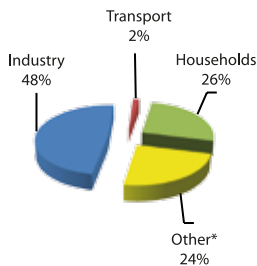
## Electricity

Total Final Consumption from 2000 to 2011  
by sector (ktoe)



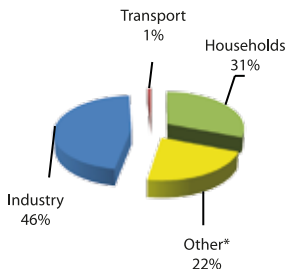
2000 and 2011 shares of Africa electricity consumption

2000



14 585 ktoe

2011



21 453 ktoe

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

## SIMPLIFIED ENERGY BALANCE TABLE 2000

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	356 367	0	116 021	114 822	3 390	6 607	394	274 756	0	872 357
	Imports	31 549	27 002	3 926	6 912	0	0	0	0	1 162	70 550
	Exports	-270 377	-40 488	-38 798	-78 983	0	0	0	0	-1 124	-429 769
	Intl. Marine Bunkers	0	0	0	0	0	0	0	0	0	0
	Intl. Aviation Bunkers	0	0	0	0	0	0	0	0	0	0
	Stock Changes	-1 457	728	931	0	0	0	0	0	0	202
	TPES	116 081	-12 758	82 081	42 752	3 390	6 607	394	274 756	38	513 340
	Transfers	0	0	0	0	0	0	0	0	0	0
	.Statistical diff	71	-193	-84	-748	0	0	0	29 639	676	29 360
TRANSFORMATION	Transformation	-114 906	115 366	-67 268	-21 983	-3 390	-6 607	-394	-161 083	37 840	-222 425
	Electricity Producers	-233	-12 429	-67 268	-21 983	-3 390	-6 607	-394	-1 391	37 840	-75 856
	Petroleum Refineries	-114 672	127 795	0	0	0	0	0	0	0	13 123
	Charcoal Plants	0	0	0	0	0	0	0	-159 693	0	-159 693
	Gas-To-Liquids	0	0	0	0	0	0	0	0	0	0
	Coal-To-Liquids	0	0	0	0	0	0	0	0	0	0
	Blast Furnaces	0	0	0	0	0	0	0	0	0	0
	.Other Transf	0	0	0	0	0	0	0	0	0	0
		Energy Ind. Own Use	-434	-1 976	-28	-9 994	0	0	0	0	-3 726
	Losses	-756	0	0	-143	0	0	0	0	-4 643	-5 542
FINAL CONSUMPTION	TFC	56	100 439	14 701	9 884	0	0	0	143 311	30 186	298 576
	Industry	56	16 989	11 555	6 095	0	0	0	2 584	14 585	51 864
	Transport	0	54 778	10	663	0	0	0	0	522	55 972
	Households	0	19 454	805	2 484	0	0	0	115 641	7 883	146 267
	Com. & Public	0	1 039	568	41	0	0	0	0	3 810	5 458
	Agriculture/Forestry	0	3 337	0	0	0	0	0	0	0	3 337
	(Others (Non Specified	0	4 835	750	600	0	0	0	25 086	3 386	34 658
	Non-Energy Use	0	6	1014	0	0	0	0	0	0	1 019



## SIMPLIFIED ENERGY BALANCE TABLE 2011

Thousand Tonnes of Oil Equivalent (ktoe)		Crude Oil	Oil Products	Coal/Peat	Natural Gas	Nucléaire	Hydro	Wind & Geothermal & Solar PV	Biofuels and Waste	Electricity	Total
PRIMARY SUPPLY	Production	395 772	0	131 861	172 570	3 509	10 208	1 581	410 382	0	1 125 883
	Imports	29 879	68 713	4 014	6 095	0	0	0	0	1	108 701
	Exports	-317 590	-23 255	-35 320	-74 527	0	0	0	0	-1	-450 693
	Intl. Marine Bunkers	0	0	0	0	0	0	0	0	0	0
	Intl. Aviation Bunkers	0	0	0	0	0	0	0	0	0	0
	Stock Changes	-3 720	0	-23	-17	0	0	0	0	0	-3 760
	TPES	104 342	45 458	100 532	104 120	3 509	10 208	1 581	410 382	0	780 131
Transfers	0	0	0	0	0	0	0	0	0	0	
Statistical diff.	-1 071	-333	-92	-577	0	0	0	107 518	-2 199	103 245	
TRANSFORMATION	Transformation	-102 749	104 119	-87 005	-50 396	-3 509	-10 208	-1 581	-180 915	60 972	-271 270
	Electricity Producers	-241	-17 474	-69 215	-48 277	-3 509	-10 208	-1 581	-2 094	60 972	-91 625
	Petroleum Refineries	-102 508	121 593	0	0	0	0	0	0	0	19 085
	Charcoal Plants	0	0	0	0	0	0	0	-178 821	0	-178 821
	Gas-To-Liquids	0	0	0	0	0	0	0	0	0	0
	Coal-To-Liquids	0	0	0	0	0	0	0	0	0	0
	Blast Furnaces	0	0	0	0	0	0	0	0	0	0
	Other Transf.	0	0	-17 790	-2 119	0	0	0	0	0	-19 909
Energy Ind. Own Use	-117	-2 008	-33	-13 748	0	0	0	0	-4 271	-20 176	
Losses	-290	-18	0	-223	0	0	0	0	-6 849	-7381	
FINAL CONSUMPTION	TFC	114	147 219	13 402	39 176	0	0	0	336 985	47 654	584 549
	Industry	114	19 042	7 608	16 032	0	0	0	8 180	21 453	72 429
	Transport	0	88 096	13	1 121	0	0	0	0	451	89 682
	Households	0	12 012	1 817	5 425	0	0	0	237 754	14 220	271 228
	Com. & Public	0	1 636	1 108	137	0	0	0	31 393	7 802	42 075
	Agriculture/Forestry	0	6 450	552	36	0	0	0	0	1 535	8 572
	Others (Non Specified)	0	18 160	1 220	8 307	0	0	0	59 657	2 193	89 537
	Non-Energy Use	0	1 822	1 085	8 119	0	0	0	0	0	11 026

## General Conversion Factors for Energy

To:	TJ	Gcal	Mtoe	MBtu	GWh
From:	Multiply by :				
TJ	1	238.8	$2.388 \times 10^{-5}$	947.8	0.2778
Gcal	$4.1868 \times 10^{-3}$	1	$10^{-7}$	3.968	$1.163 \times 10^{-3}$
Mtep	$4.1868 \times 10^4$	$10^7$	1	$3.968 \times 10^7$	11630
MBtu	$1.0551 \times 10^{-3}$	0.252	$2.52 \times 10^{-8}$	1	$2.931 \times 10^{-4}$
GWh	3.6	860	$8.6 \times 10^{-5}$	3412	1

## Conversion Factors for Mass

To:	kg	t	lt	st	lb
From:	Multiply by :				
kilogramme (kg)	1	0.001	$9.84 \times 10^{-4}$	$1.102 \times 10^{-3}$	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 <sup>4</sup>
pound (lb)	0454	$4.54 \times 10^{-4}$	$4.46 \times 10^{-4}$	$5.0 \times 10^{-4}$	1

## Conversion Factors for Volume

To:	gal U.S.	gal U.K.	bbl	Ft <sup>3</sup>	l	m <sup>3</sup>
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 <sup>3</sup> )	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 <sup>3</sup> )	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 plan 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.

### **Energy industry own use**

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.