



AFRICAN UNION



ENERGY

2012

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

AFREC

**KEY AFRICA
ENERGY STATISTICS**



AFRICAN ENERGY COMMISSION
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AFREC

**KEY
AFRICA ENERGY
STATISTICS**



2 0 1 2

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	Swaziland
Ghana	Tanzania
Guinea	Togo
Guinea Bissau	Tunisia
Kenya	Uganda
Lesotho	Zambia
Liberia	Zimbabwe
Libya	

FORWARD

This is the 2012 publication of “Key Africa Energy Statistics” and the first ever 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” which also the first produced by AFREC and will provide timely and clearly-presented data of Africa’s energy supply and use in most cases from 2000 to 2010.

The Africa Energy Statistics is intended to become the Africa’s major and most authoritative source of energy statistics and reflect 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 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 hard copy version of the Key Africa Energy Statistics a complementary CD-ROM and Internet versions are available. The main report of Africa Energy Statistics presents the full time series energy data for each African nation, 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
TJ	terajoule
toe	tonne of oil equivalent= 10^7 kcal
TWh	terawatt hour

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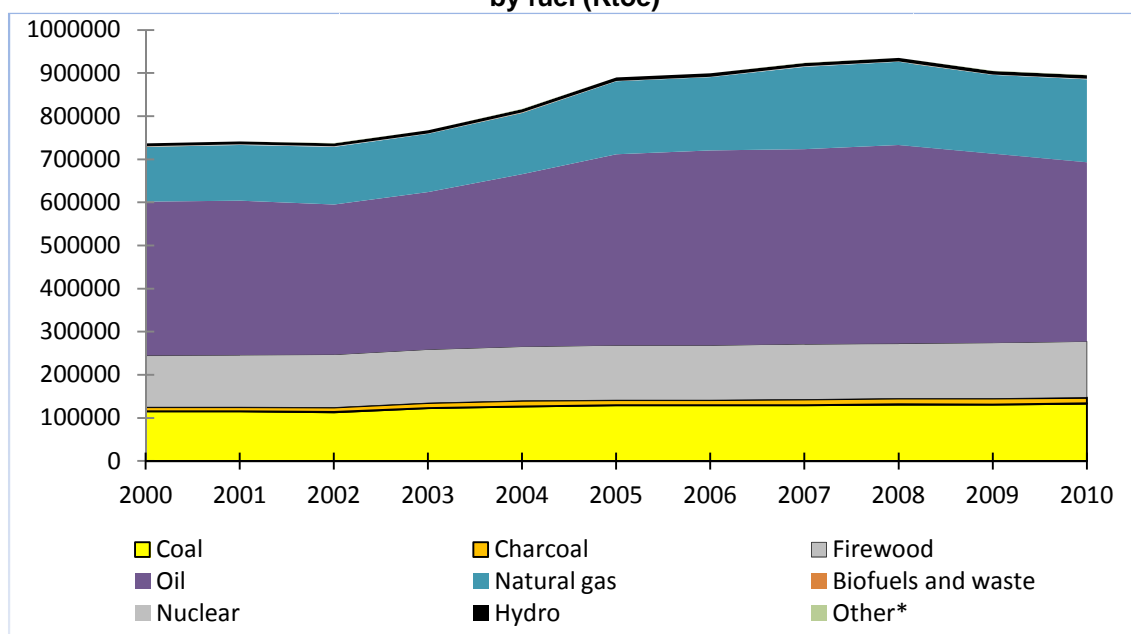
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TOTAL PRIMARY ENERGY SUPPLY BY FUEL

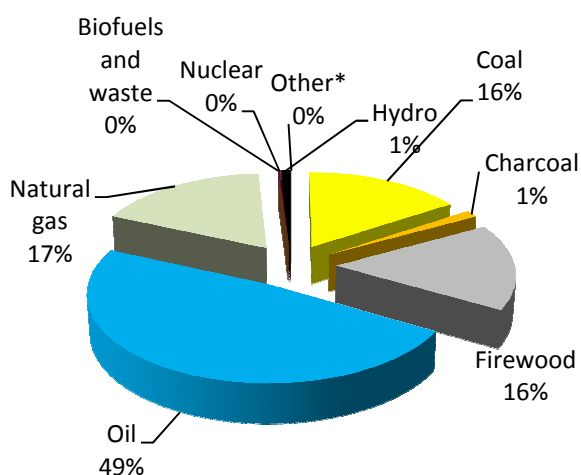
AFRICA

Africa Total Primary Energy Supply from 2000 to 2010 by fuel (Ktoe)



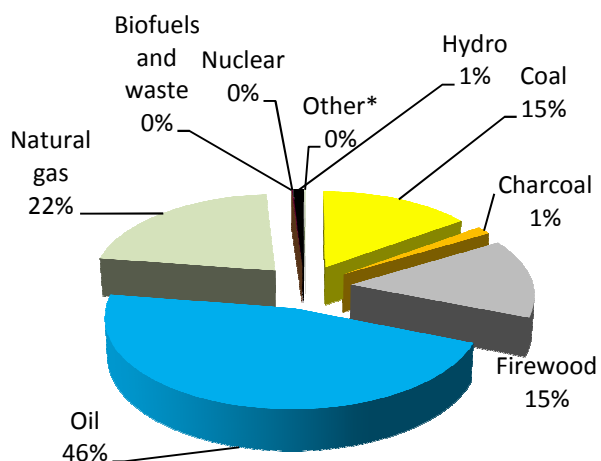
2000 and 2010 Fuel Shares of TPES

2000



356 367 Ktoe

2010



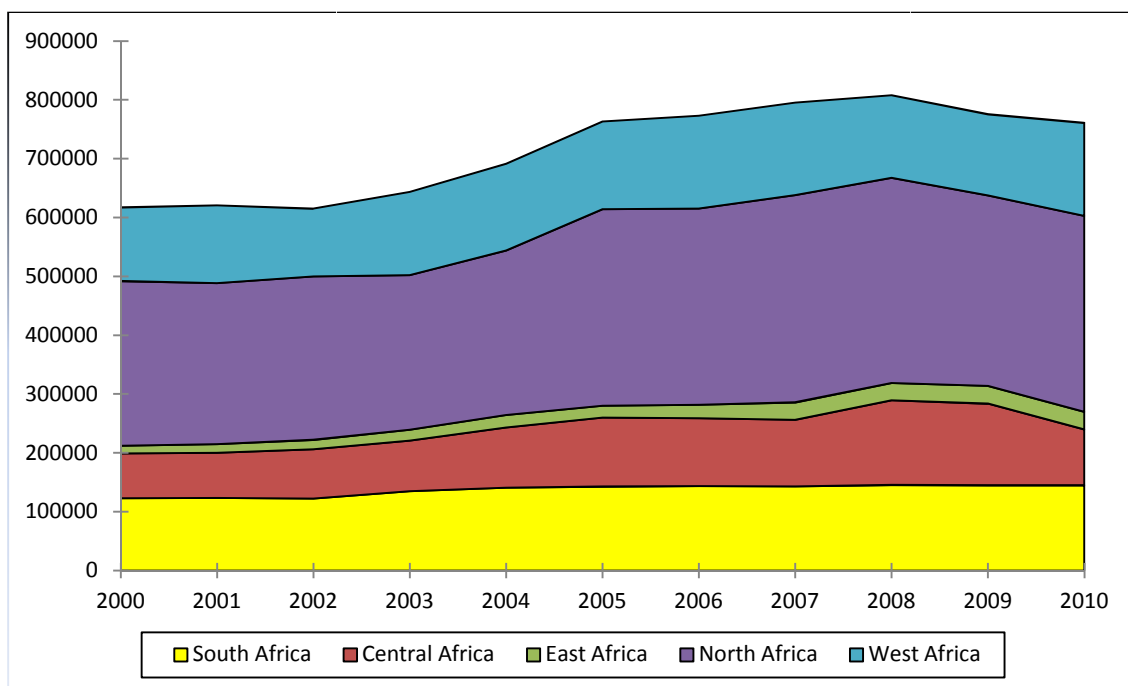
415 538 Ktoe

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

TOTAL PRIMARY ENERGY SUPPLY BY REGION

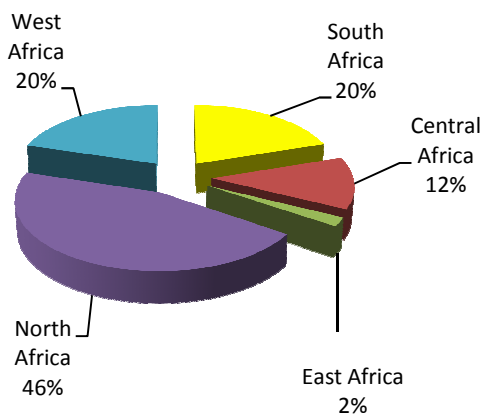
AFRICA

Africa Total Primary Energy Supply from 2000 to 2010
by region (Ktoe)



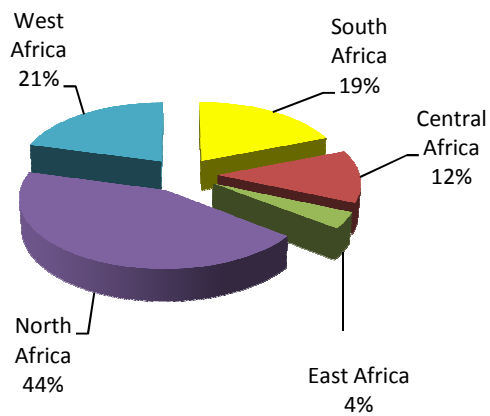
2000 and 2010 Regional Shares of TPES

2000



279 947 Ktoe

2010

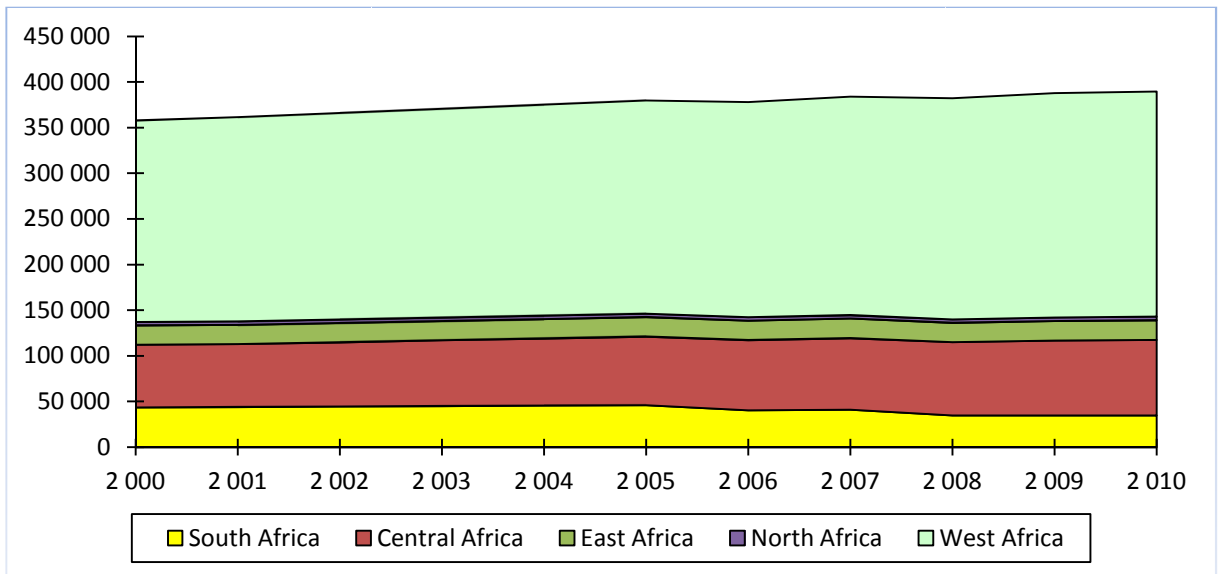


333 210 Ktoe

FIREWOOD PRODUCTION

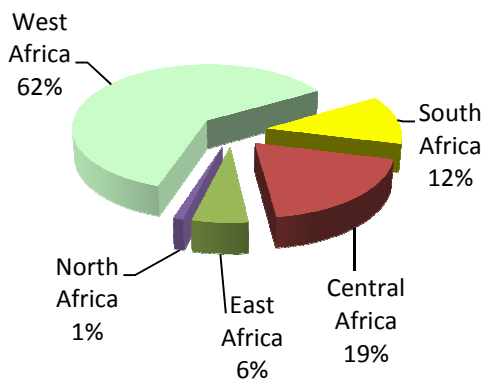
AFRICA

Firewood Production from 2000 to 2010
by region (Kt)



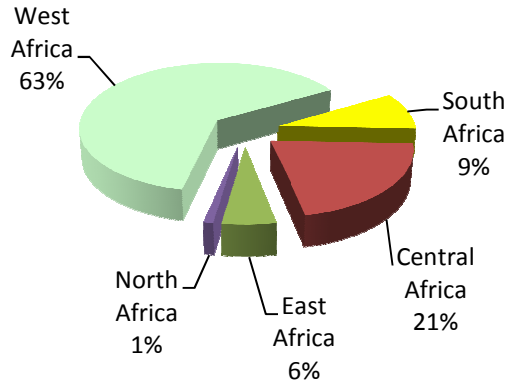
2000 and 2010 Regional Shares of Firewood Production

2 0 0 0



220 617 Kt

2 0 1 0



246 567 Kt

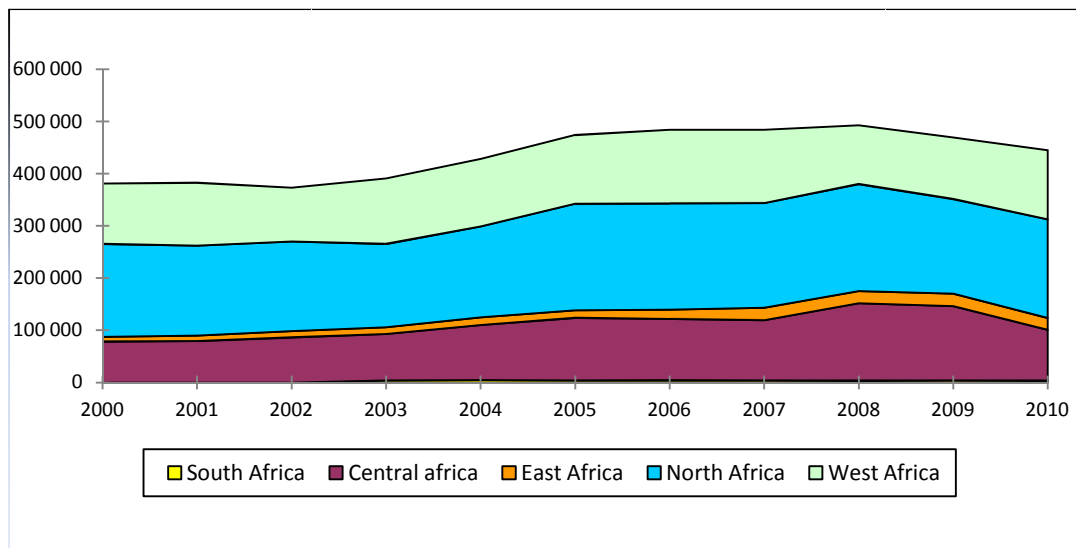
Producers of firewood from 2010

Producers	Kt
Nigeria	143380
Niger	68414
Congo DR	52793
Uganda	16109
Zimbabwe	12785
Cameroon	11944
Ghana	9400
Mozambique	9186
Zambia	9078
Burundi	8246
Mali	7837
Benin	5762
Burkina Faso	5762
Togo	5625
Sudan	4363
Rwanda	4128
Madagascar	3822
Tunisia	3289
Central Africa	3180
Congo	2482
Ethiopia	1008
Egypt	656
Guinea Bissau	387
Africa	389 636

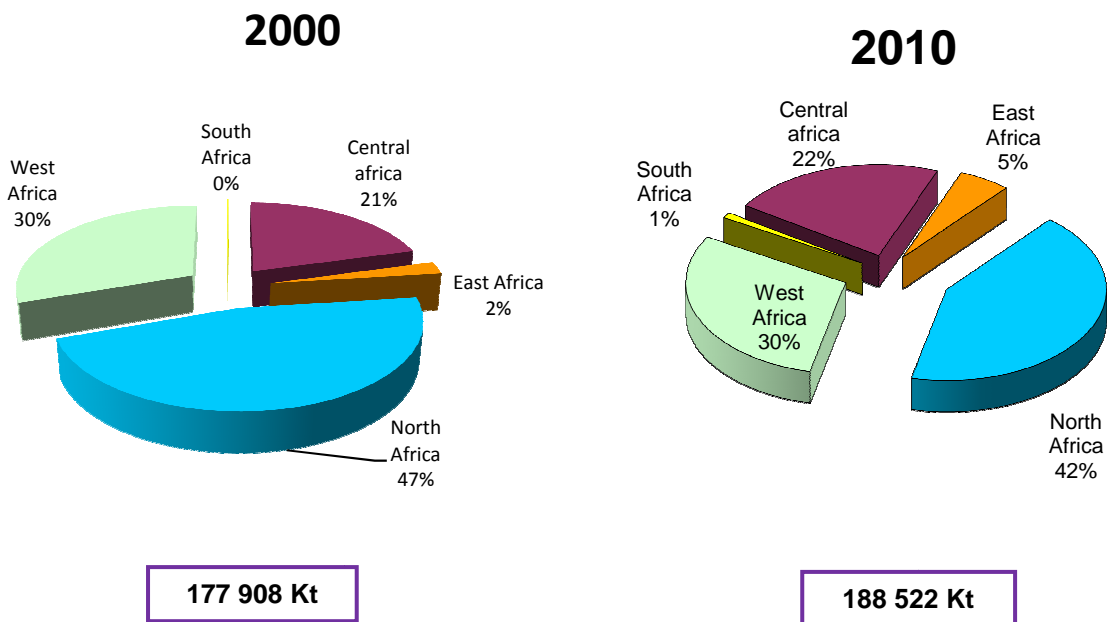
CRUDE OIL PRODUCTION

AFRICA

Crude Oil* Production from 2000 to 2010
by region (Kt)



2000 and 2010 Regional Shares of Crude Oil* Production



* Include crude oil, NGL, additives and other hydrocarbons

Producers, Net Exporters and Net Importers of Crude Oil* from 2010

Producers	Kt
Nigeria	129970
Libya	78425
Algeria	78120
Angola	43432
Egypt	28280
Sudan	23081
Equatorial Guinea	15406
Congo	15274
Gabon	12370
Chad	6059
South Africa	4143
Tunisia	3697
Cameroon	3263
Côte d'Ivoire	1989
Congo DR	1054
Mauritania	392
Africa	444955

Net exporters	Kt
Nigeria	113 567
Angola	88 622
Libya	51 727
Algeria	44 896
Equatorial Guinea	15 406
Congo	12 936
Gabon	11 276
Chad	5 986
Sudan	5 950
Cameroon	3 991
Tunisia	2 129
Egypt	1 815
Congo DR	1 109
Africa	359 410

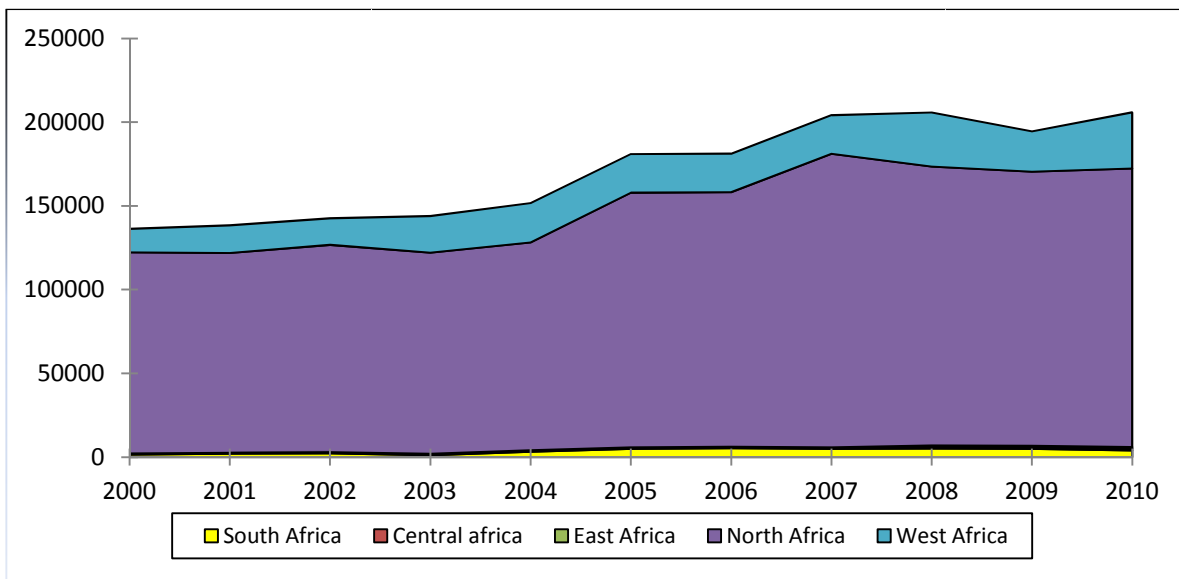
Net Importers	Kt
South Africa	25 040
Morocco	4 786
Kenya	1 628
Ghana	981
Côte d'Ivoire	780
Senegal	655
Zambia	508
Africa	34378

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

NATURAL GAS PRODUCTION

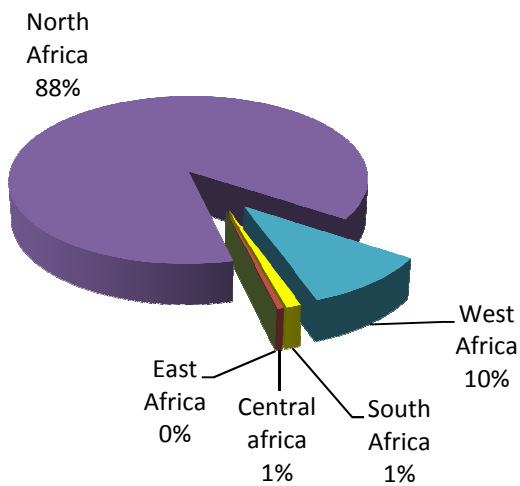
AFRICA

Natural gas production from 2000 to 2010 by region (Million cubic meters)



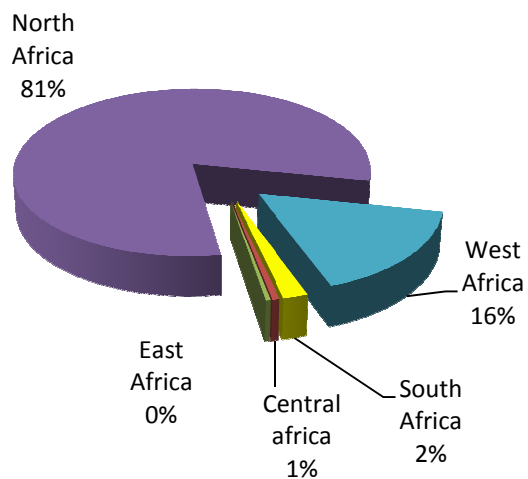
2000 and 2010 Regional Shares of Natural Gas Production

2000



120017 Mcm

2010



166370 Mcm

Producers, Net Exporters and Net Importers* Of Natural Gas from 2010

Producers	Mcm
Algeria	86211
Egypt	61598
Nigeria	31920
Libya	15328
Tunisia	3185
Mozambique	3171
Côte d'Ivoire	1570
South Africa	926
Tanzania	764
Angola	669
Cameroun	306
Gabon	179
Congo	54
Morocco	48
Senegal	24
Congo DR	9
Africa	205962

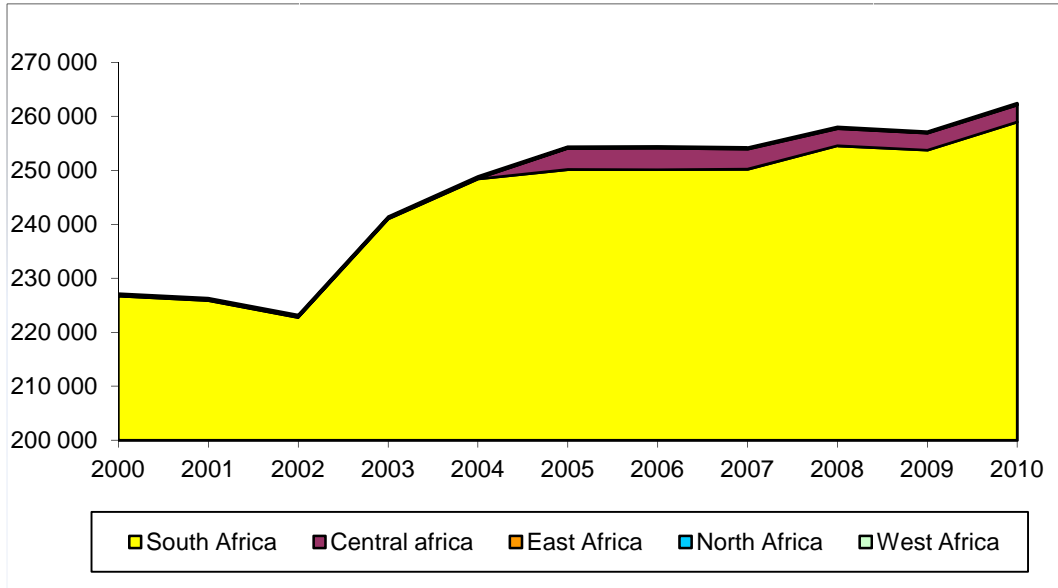
Net exporters	Mcm
Algeria	59 044
Nigeria	23 306
Egypt	15 397
Libya	8 770
Mozambique	3 033
Africa	109 551

Net importers	Mcm
South Africa	4 080
Tunisia	2 211
Morocco	583
Ghana	116
Chad	24
Africa	6 991

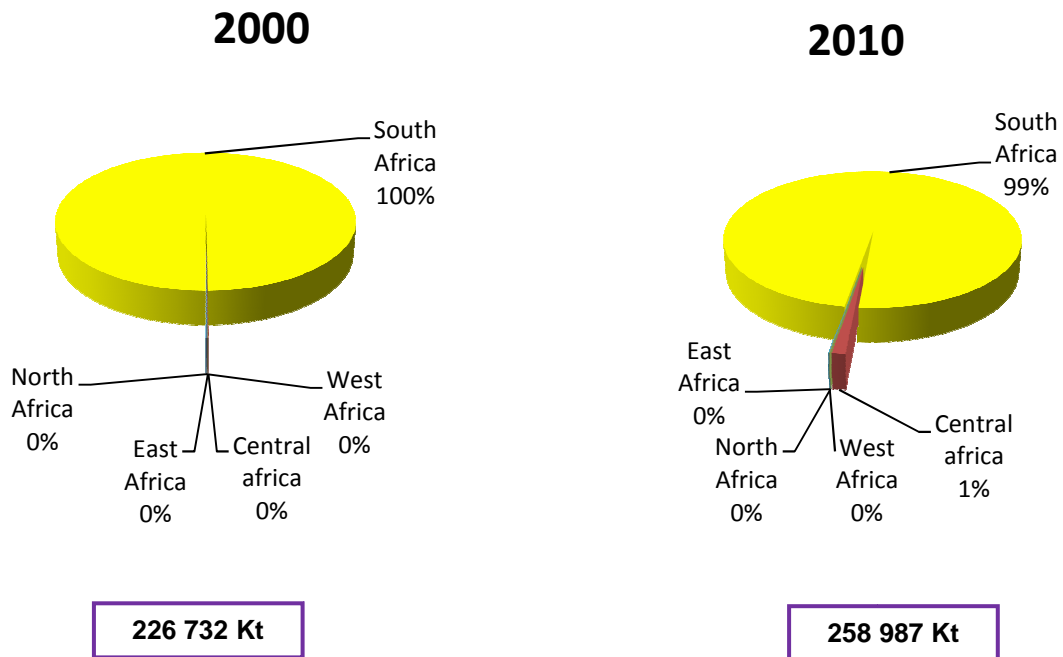
* Net exports and net imports include pipeline gas and LNG.

COAL PRODUCTION

AFRICA Coal* Production from 2000 to 2010 by region (Kt)



2000 and 2010 Regional Shares of Coal* Production



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

Producers, Net Exporters and Net Importers* of Coal* from 2010

Producers	Kt
South Africa	254727
Zimbabwe	2997
Botswana	814
Swaziland	351
Niger	198
Congo DR	147
Tanzania	105
Malawi	55
Mozambique	42
Egypt	24
Nigeria	9
Zambia	1
Africa	259470

Net exporters	Kt
South Africa	68168
Egypt	12
Morocco	12
Africa	68192

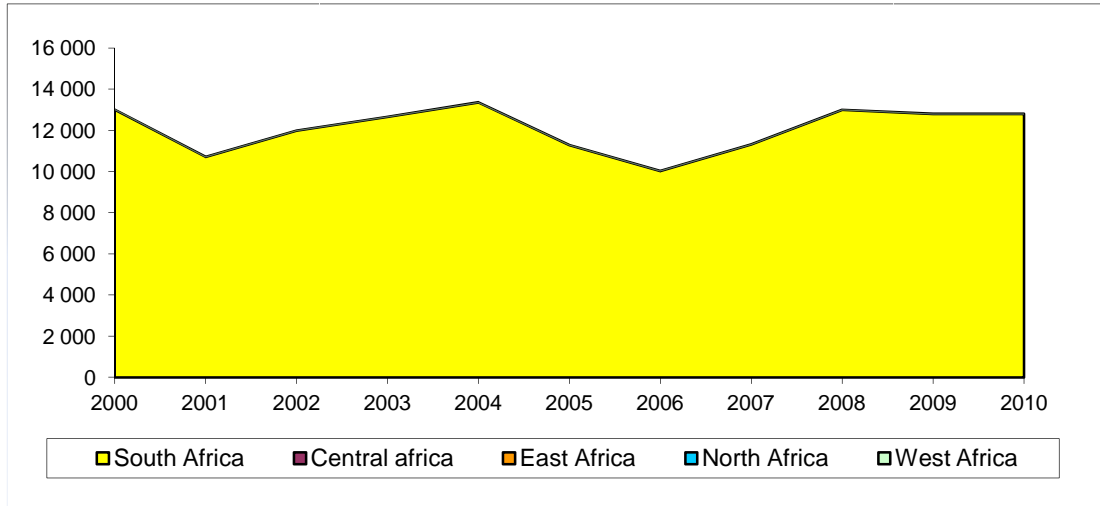
Net importers	Kt
Morocco	3131
Egypt	1297
Mozambique	730
Mauritius	661
South Africa	496
Algeria	166
Namibia	143
Kenya	103
Swaziland	52
Malawi	35
Ethiopia	25
Congo DR	17
Botswana	3
Africa	6859

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

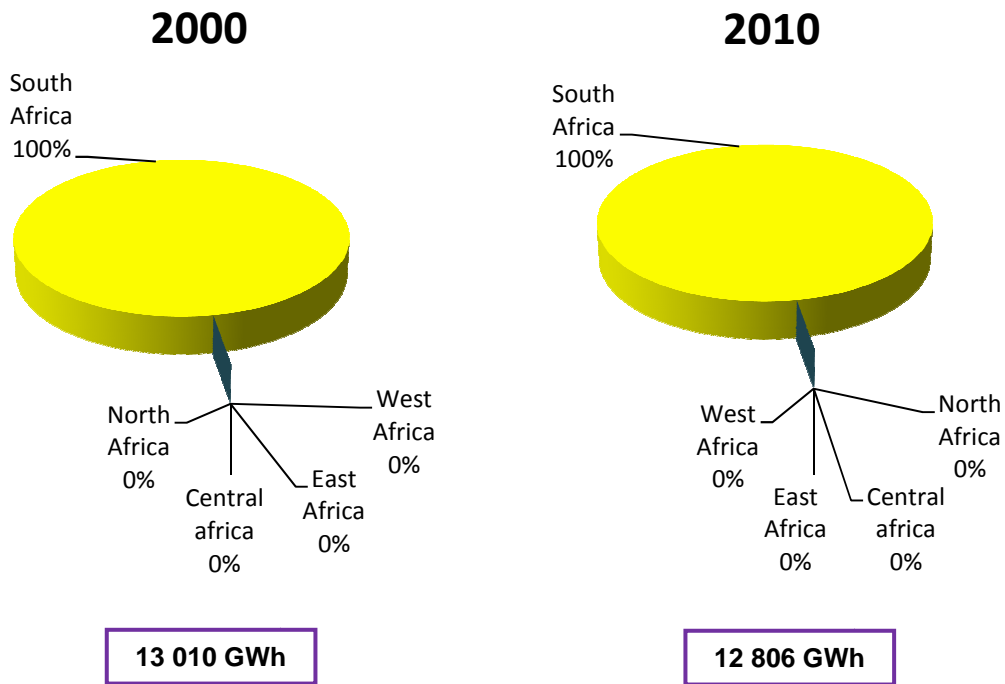
NUCLEAR PRODUCTION

AFRICA

Nuclear Production from 2000 to 2010
by region (GWh)



2000 and 2010 Regional Shares of Natural Gas Production



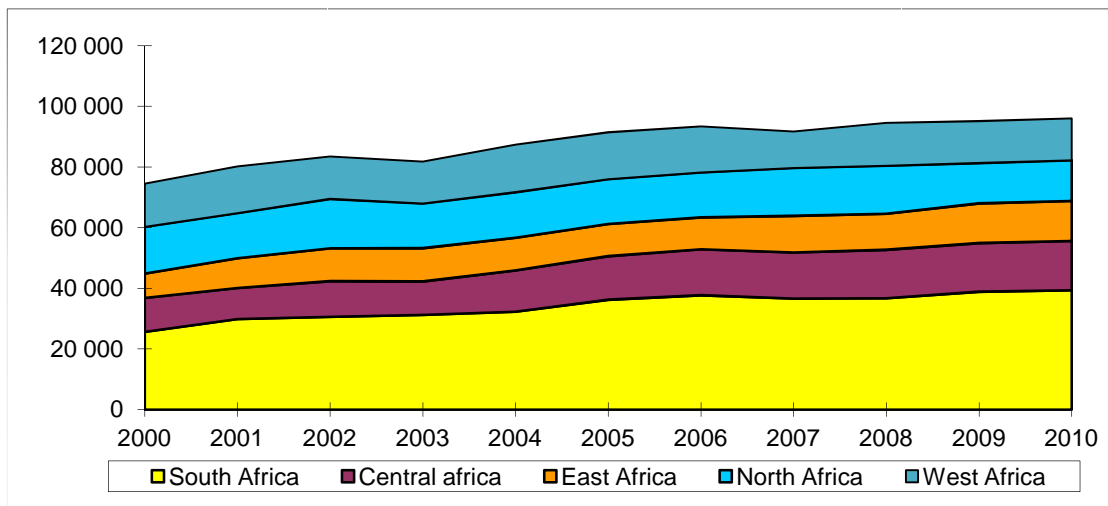
Producers of Nuclear Electricity from 2010

Producers	GWh
South Africa	12806
Africa	12806

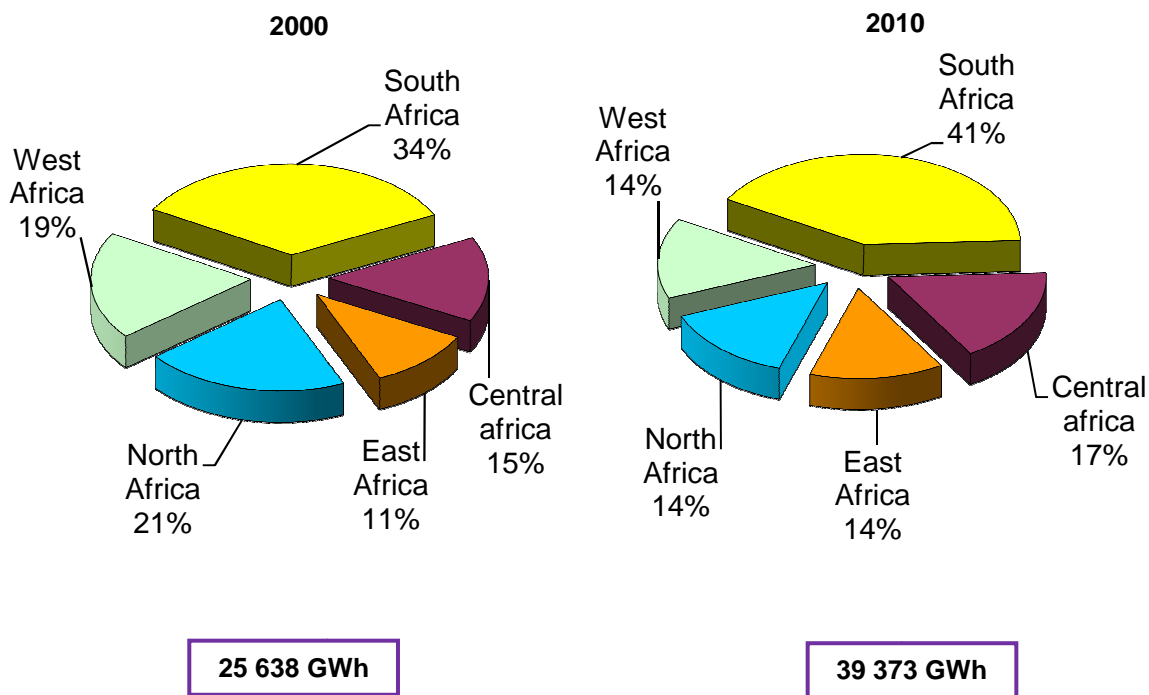
HYDRO PRODUCTION

AFRICA

Hydro production from 2000 to 2010
by region (GWh)



2000 and 2010 Regional Shares of Hydro Production

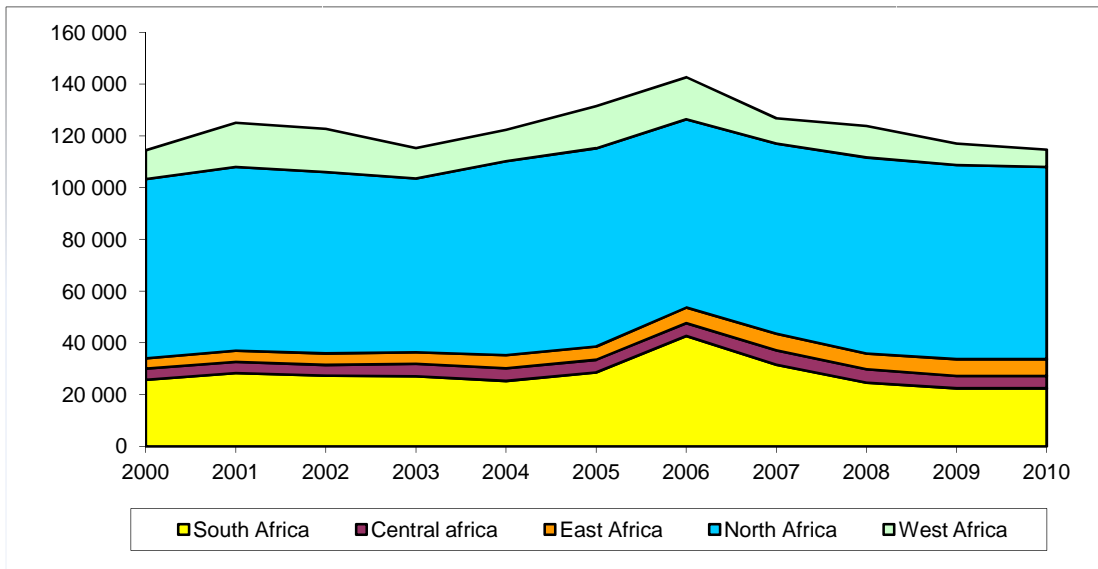


Producers of Hydro Electricity from 2010

Producers	GWh
Mozambique	16640
Egypt	13046
Zambia	10276
Congo DR	7520
Ghana	6877
Nigeria	4529
Zimbabwe	4202
South Africa	4194
Cameroon	4016
Ethiopia	3524
Sudan	3236
Angola	3173
Tanzania	2784
Kenya	2170
Côte d'Ivoire	2117
Malawi	1543
Uganda	1485
Namibia	1429
Gabon	886
Madagascar	700
Mali	695
Algeria	342
Congo DR	330
Swaziland	288
Senegal	239
Burundi	230
Central Africa	135
Mauritius	101
Africa	96012

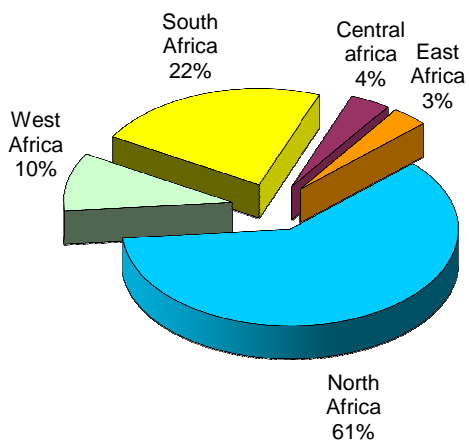
REFINING BY REGION

AFRICA
Refinery Production from 2000 to 2010
by region (Kt)



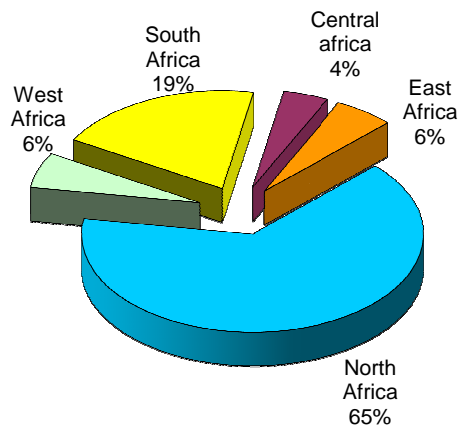
2000 and 2010 Regional Shares of Refinery Production

2000



69 345 Kt

2010



74 275 Kt

Producers, Net Exporters and Net Importers of Oil Products in 2010

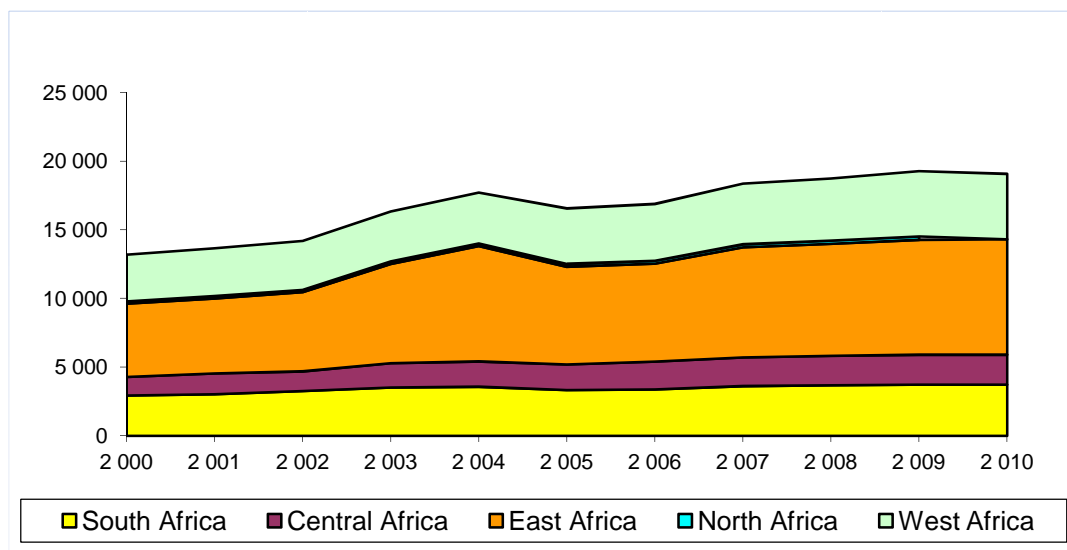
Net importers	Kt
South Africa	8 316
Nigeria	6 495
Morocco	6 321
Tunisia	3 166
Ethiopia	2 225
Benin	1 808
Kenya	1 783
Tanzania	1 649
Angola	1 540
Ghana	1 379
Senegal	1 028
Namibia	1 014
Botswana	832
Mali	781
Mozambique	733
Sudan	606
Zimbabwe	586
Uganda	504
Congo DR	503
Madagascar	429
Togo	311
Niger	305
Swaziland	201
Africa	42 515

Net exporters	Kt
Algeria	16 316
Libya	5 523
Egypt	4 929
Côte d'Ivoire	2 195
Sudan	606
Cameroon	357
Congo	167
Gabon	103
Africa	30 196

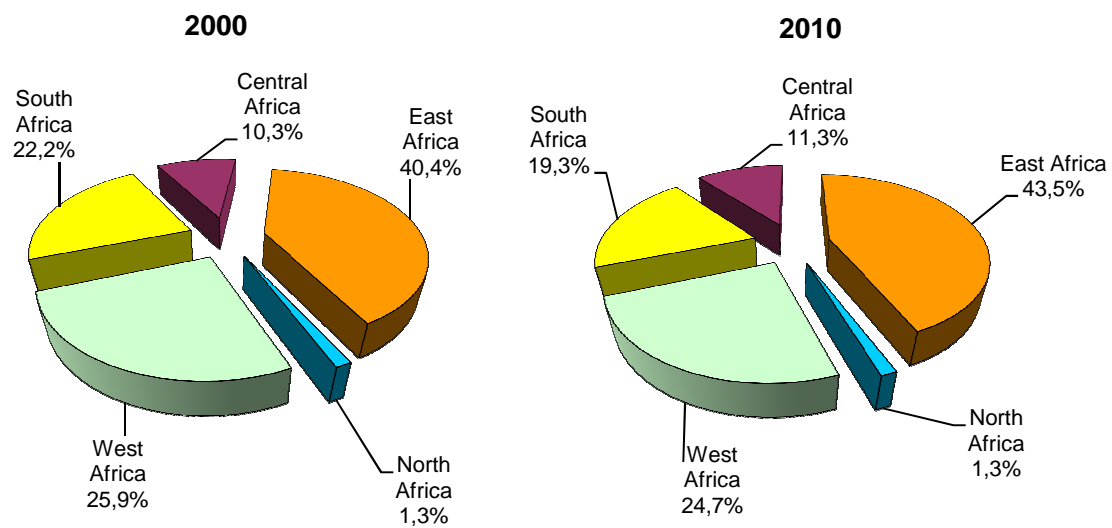
CHARCOAL PRODUCTION

AFRICA

Charcoal production from 2000 to 2010
by region (kt)



2000 and 2010 Regional Shares of Charcoal Production



5 333 Kt

8 399 Kt

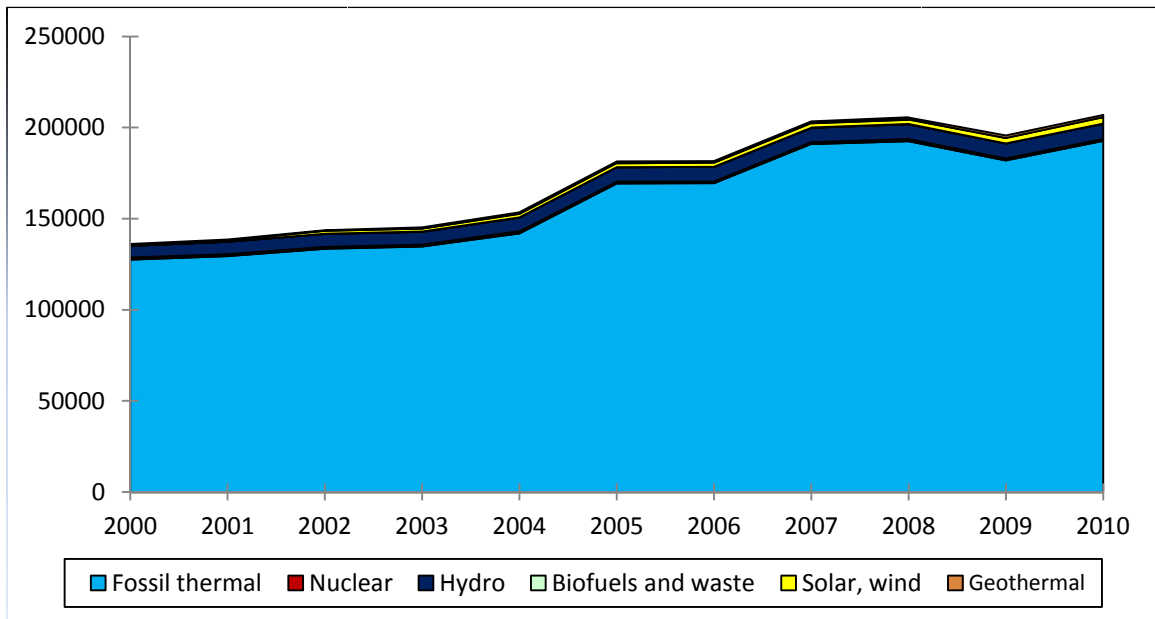
Producers of Charcoal from 2010

Producers	Kt
Kenya	3039
Soudan	1813
South Africa	1648
Tanzania	1553
Ethiopia	1178
Côte d'Ivoire	1135
Nigeria	1105
Angola	1096
Zambia	980
Ghana	711
Congo DR	704
Uganda	688
Mozambique	643
Senegal	562
Togo	556
Madagascar	452
Mali	430
Tunisia	245
Benin	236
Cameroon	214
Congo	169
Eritrea	128
Niger	38
Mauritius	1
Africa	19324

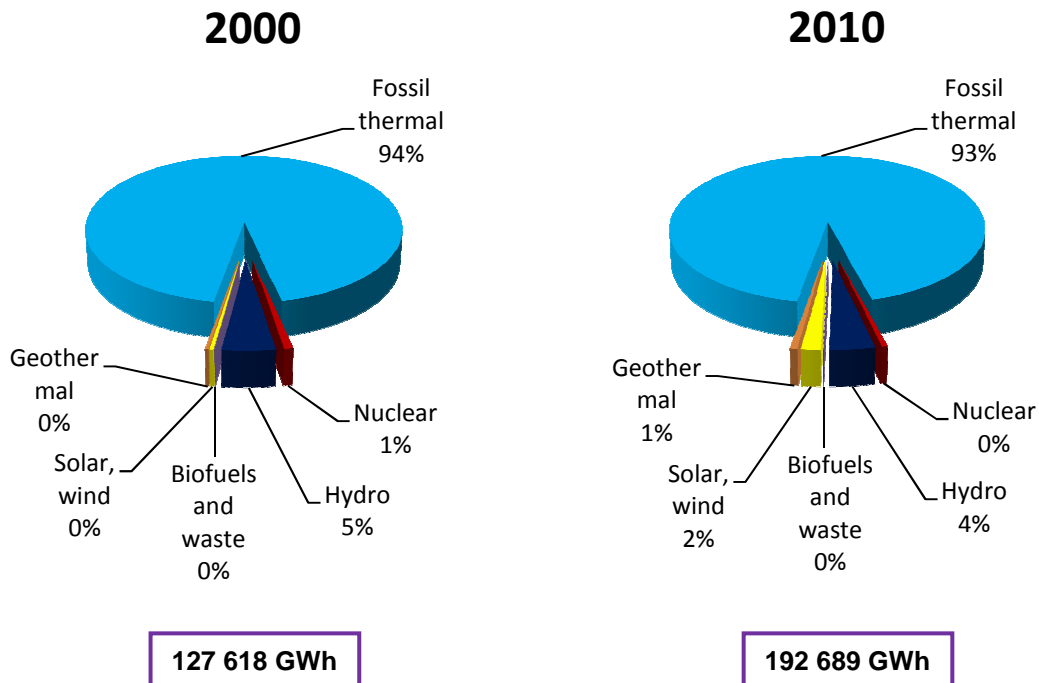
ELECTRICITY GENERATION BY FUEL

AFRICA

Electricity Generation from 2000 to 2010
by fuel (GWh)



2000 and 2010 Fuel Shares Of Electricity Generation



Electricity Production from Fossil Fuel from 2010

Hydro	GWh
Mozambique	16950
Egypt	12863
Zambia	10276
Congo DR	7520
Ghana	6877
Nigeria	4529
Zimbabwe	4202
South Africa	4194
Cameroon	4016
Ethiopia	3524
Sudan	3236
Angola	3173
Tanzania	2784
Kenya	2170
Côte d'Ivoire	2117
Namibia	1429
Africa	89 860

Oil	GWh
South Africa	222603
Egypt	125004
Algeria	42427
Libya	30426
Morocco	18412
Nigeria	15248
Tunisia	15075
Zimbabwe	3676
Côte d'Ivoire	3656
Sudan	3137
Kenya	3029
Senegal	2250
Ghana	2081
Tanzania	1844
Cameroon	1716
Africa	490584

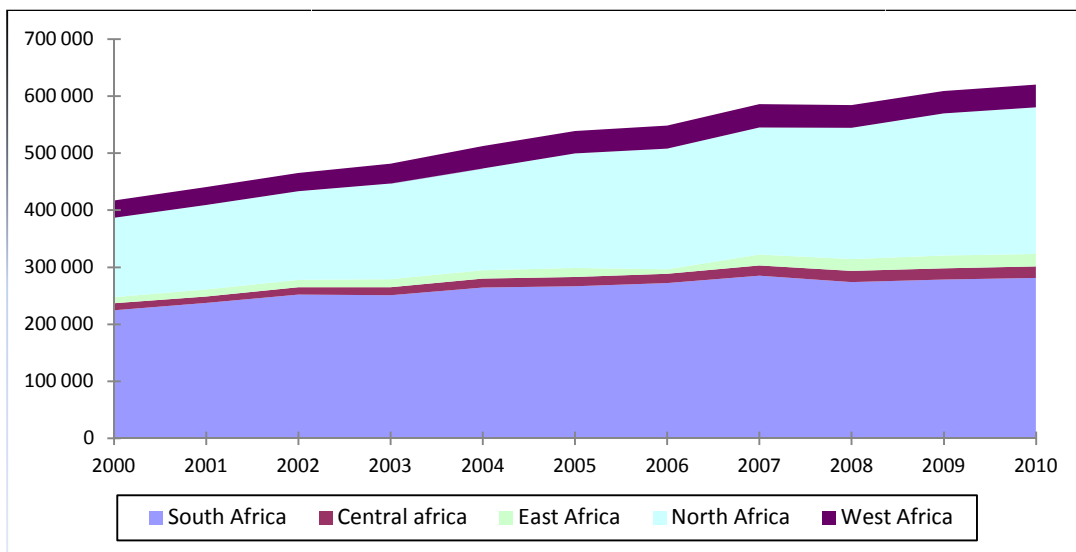
Nuclear	GWh
South Africa	12806
Africa	12806

Solar, wind and others	GWh
Egypt	1704
South Africa	564
Morocco	391
Tunisia	97
Senegal	50
Eritrea	2
Africa	3503

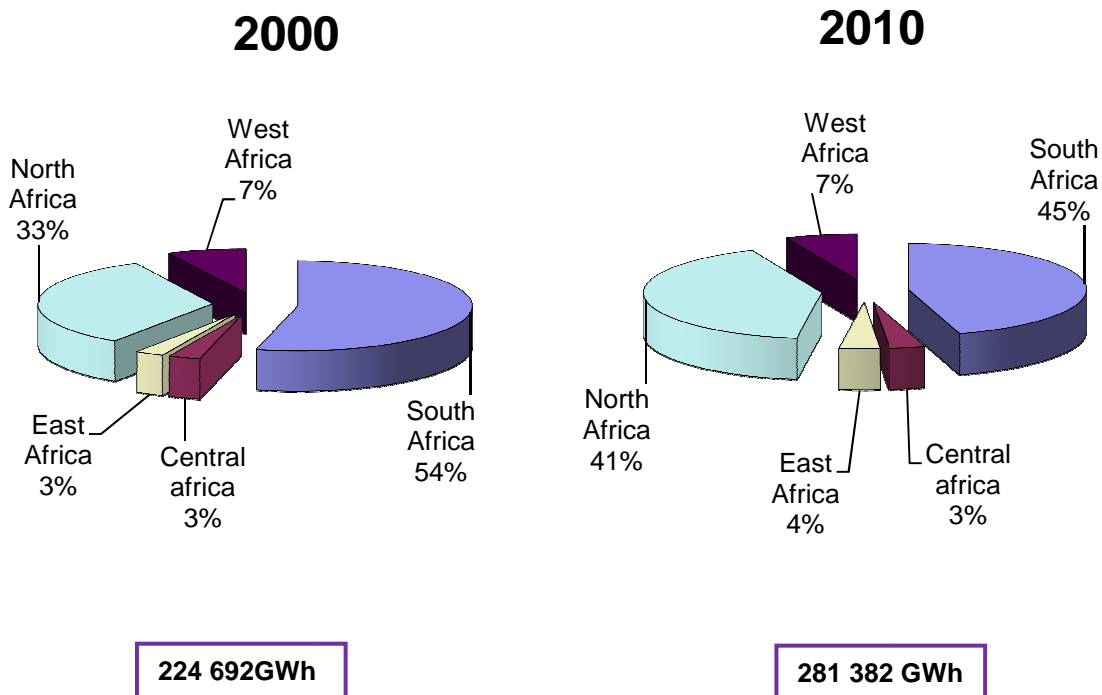
ELECTRICITY GENERATION BY REGION

AFRICA

Electricity Generation from 2000 to 2010
by region (GWh)



2000 and 2010 Regional Shares Of Electricity Generation



Producers, Net Exporters and Net Imports of Electricity

Producers	GWh
South Africa	240167
Egypt	139000
Algeria	42769
Libya	30426
Morocco	21785
Nigeria	19777
Mozambique	16966
Tunisia	14954
Zambia	10308
Ghana	8958
Zimbabwe	7878
Congo DR	7526
Kenya	6875
Sudan	6372
Côte d'Ivoire	5894
Cameroon	5741
Africa	585396

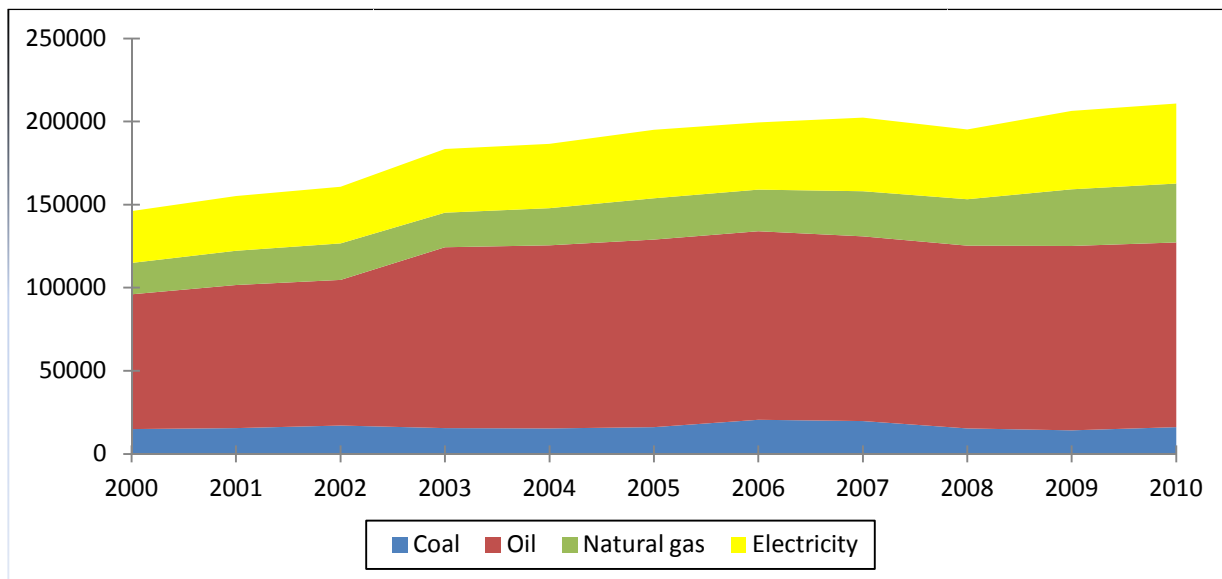
Net exporters	GWh
South Africa	13 589
Mozambique	12 075
Egypt	1 595
Congo DR	887
Ghana	554
Côte d'Ivoire	484
Libya	51
Algeria	36
Uganda	7
Africa	29 278

Net importers	GWh
Zimbabwe	5 444
Morocco	4 623
Botswana	2 887
Namibia	2 058
Benin	935
Swaziland	909
Togo	683
Niger	535
Congo	440
Senegal	253
Zambia	179
Tanzania	136
Burundi	84
Tunisia	47
Kenya	11
Africa	19 224

TOTAL FINAL CONSUMPTION BY FUEL

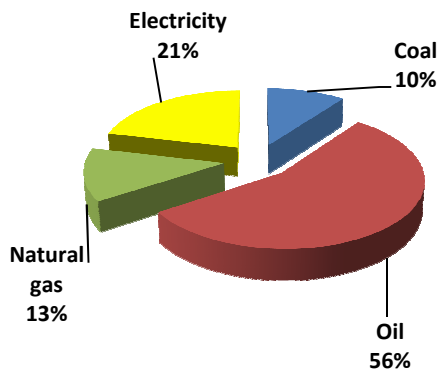
AFRICA

Total final consumption from 2000 to 2010
by fuel (Ktoe)



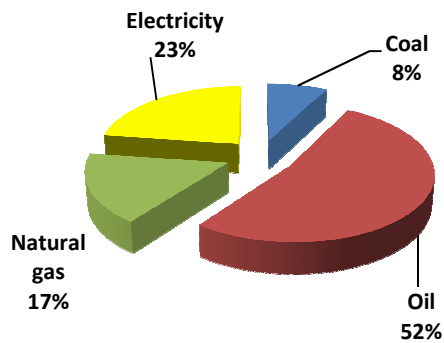
2000 and 2010 Fuel Shares Of Total Final Consumption

2000



81188 Ktoe

2010

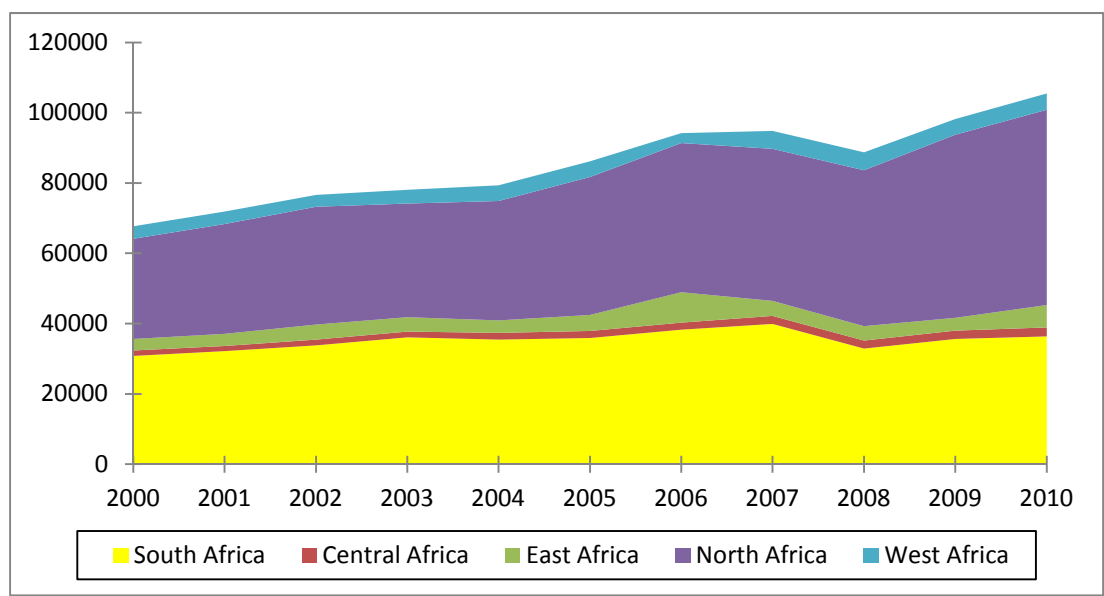


111016 Ktoe

TOTAL FINAL CONSUMPTION BY REGION

AFRICA

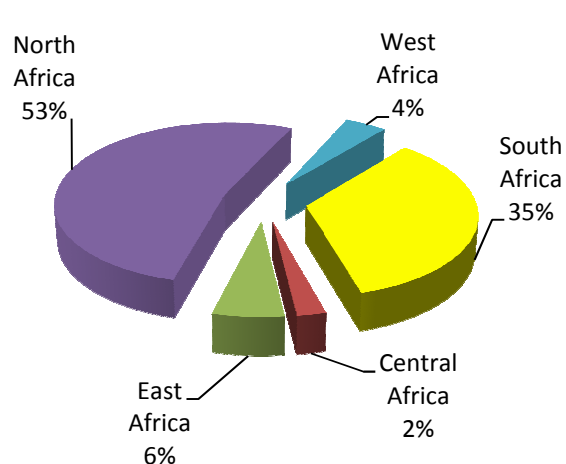
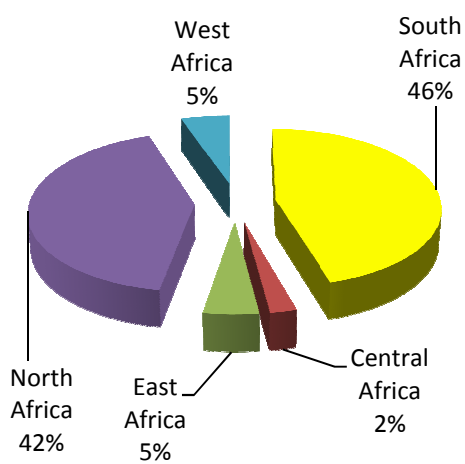
Total final consumption from 2000 to 2010
by region (Ktoe)



2000 and 2010 Regional Shares Of Total Final Consumption

2000

2010



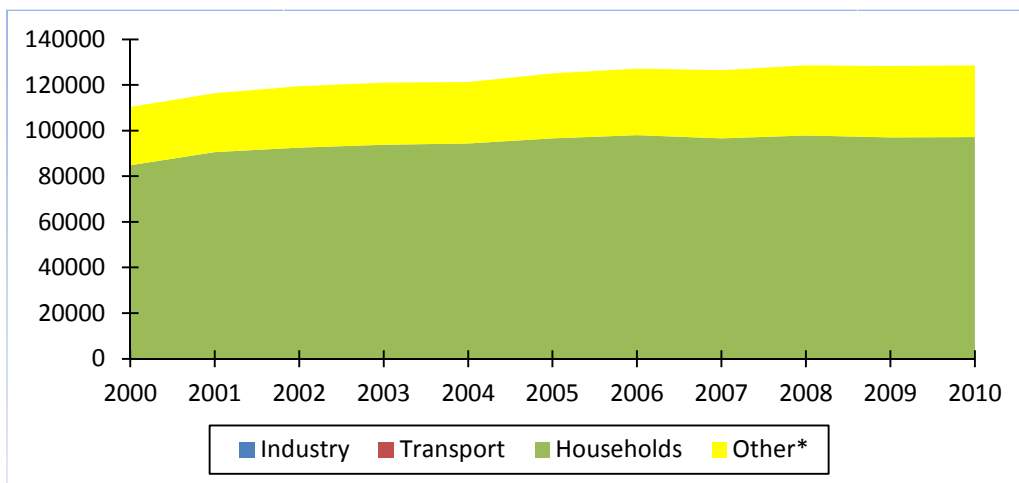
30837 Ktoe

55559 Ktoe

TOTAL FINAL CONSUMPTION BY SECTOR

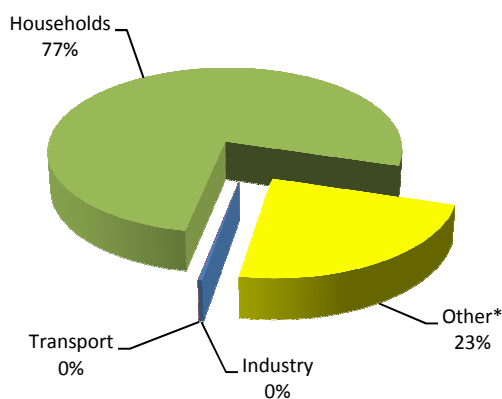
Firewood

Total Final Consumption from 2000 to 2010
by sector (Ktoe)



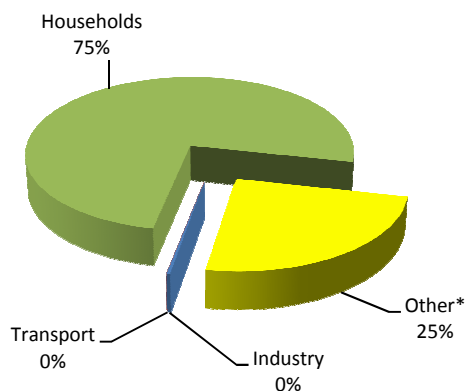
2000 and 2010 shares of Africa firewood consumption

2000



84 570 Ktoe

2010

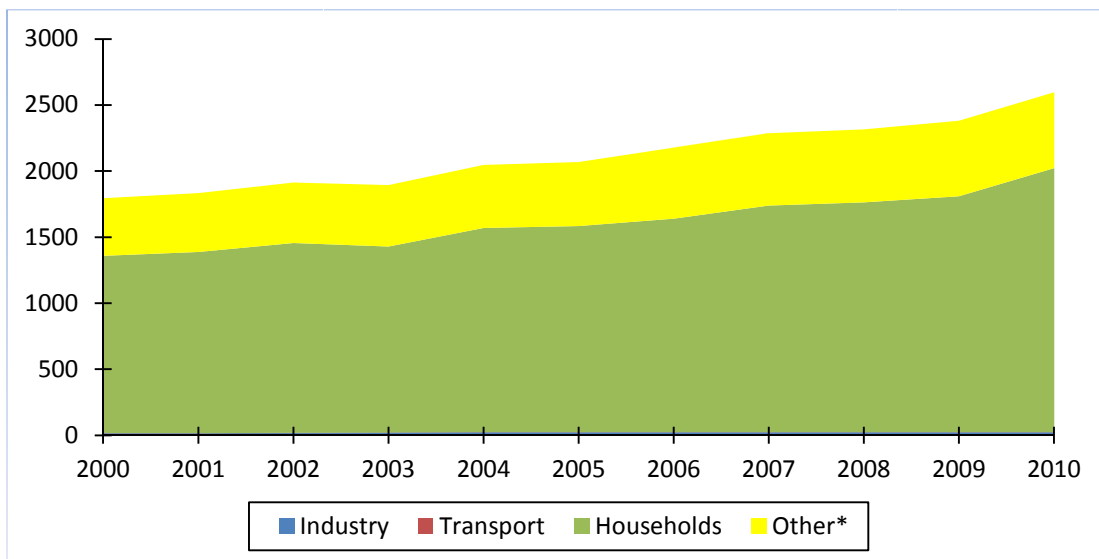


96 842 Ktoe

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

Charcoal

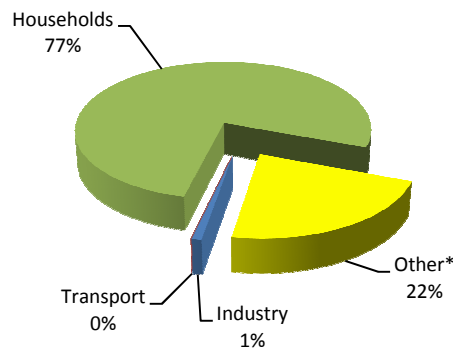
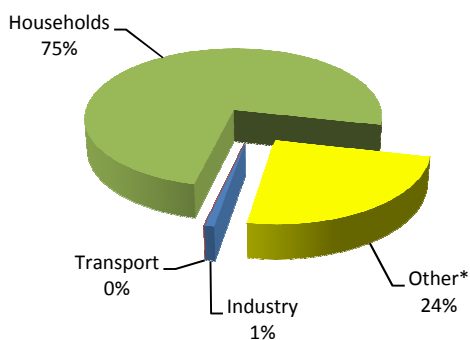
Total Final Consumption from 2000 to 2010 by sector (Ktoe)



2000 and 2010 shares of Africa charcoal consumption

2000

2010



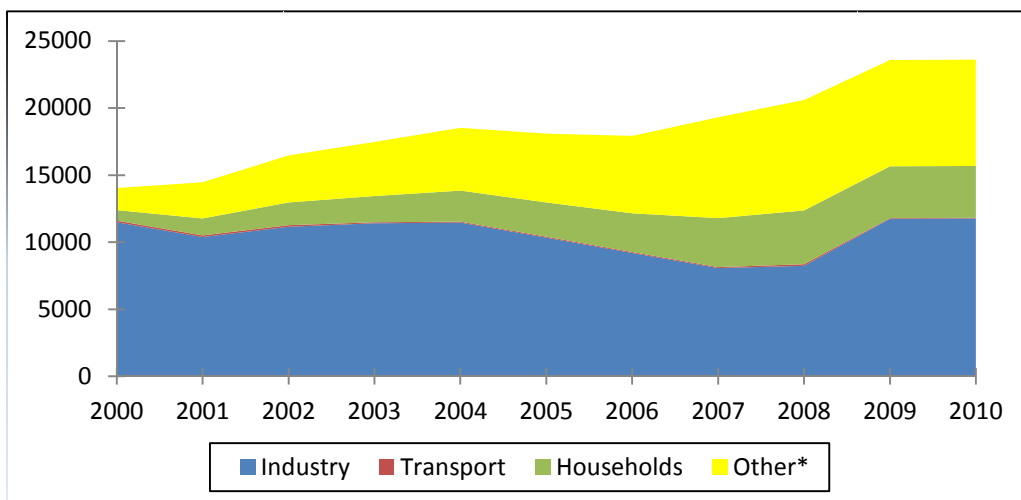
1 342 Ktoe

2 000 Ktoe

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

Coal

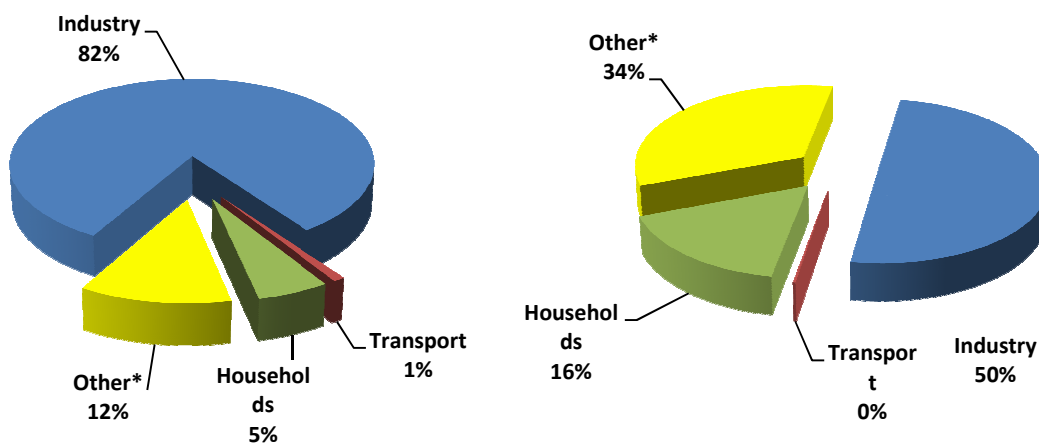
Total Final Consumption from 2000 to 2010 by sector (Ktoe)



2000 and 2010 shares of Africa coal consumption

2000

2010



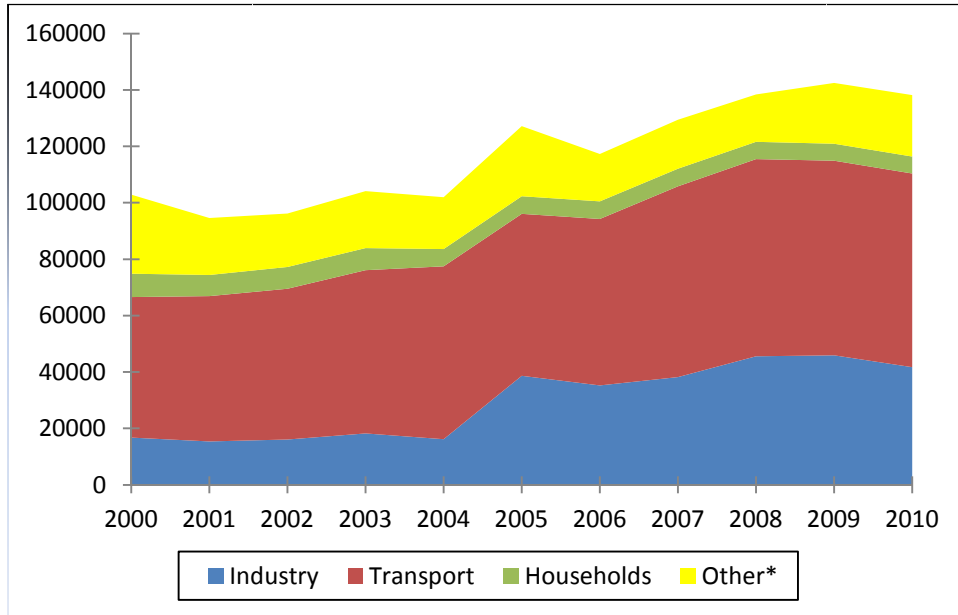
11474 Ktoe

11767 Ktoe

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

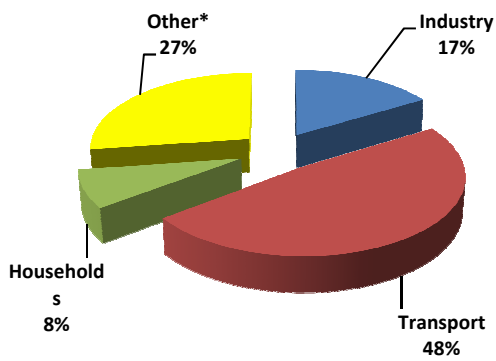
Oil

Total Final Consumption from 2000 to 2010 by sector (Ktoe)



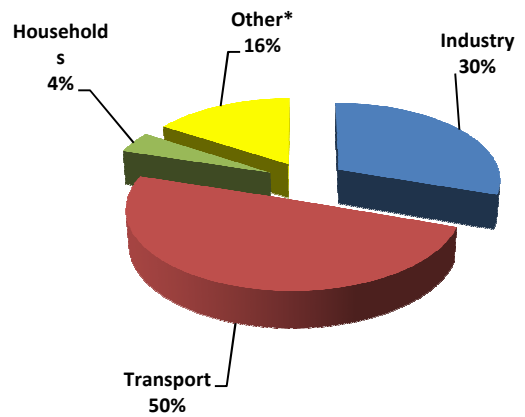
2000 and 2010 Shares of Africa Oil Consumption

2000



49821 Ktoe

2010

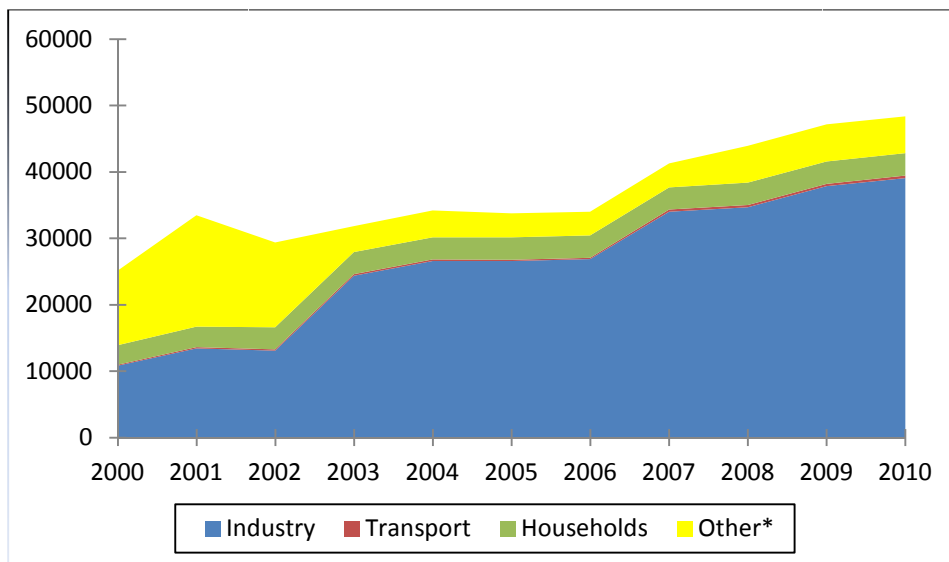


68596 Ktoe

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

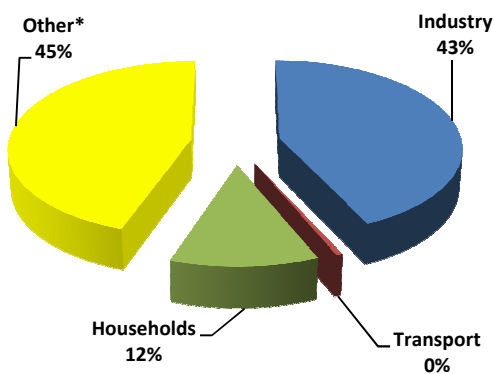
Natural gas

Total Final Consumption from 2000 to 2010 by sector (Ktoe)



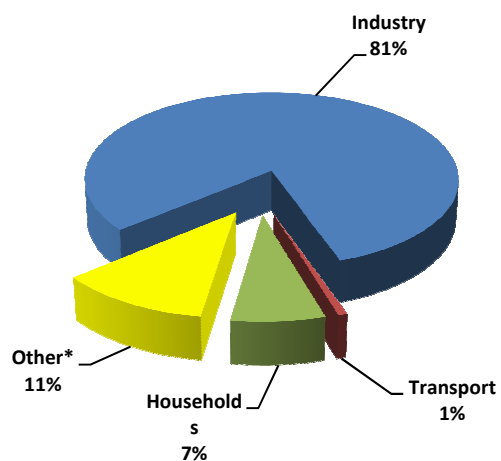
2000 and 2010 Shares of Africa Natural Gas Consumption

2000



11257 Ktoe

2010

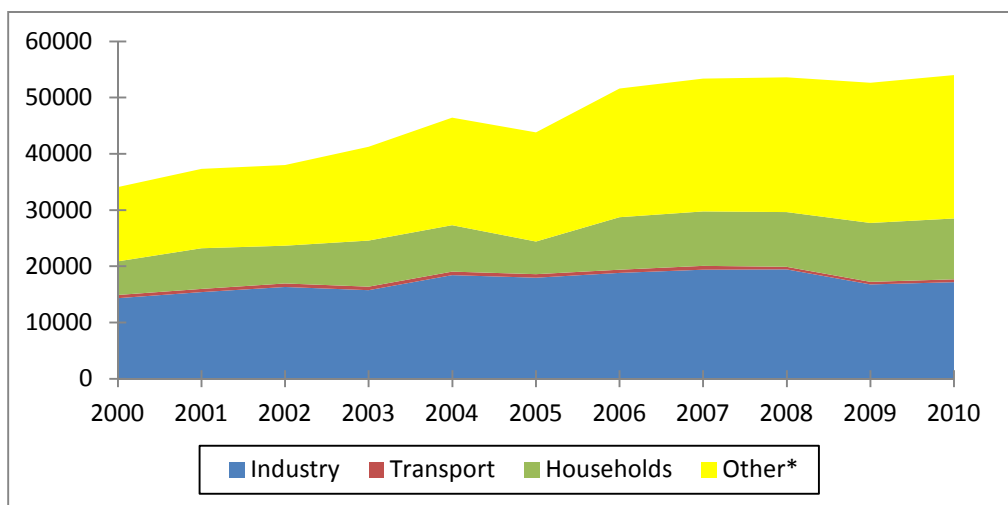


39092 Ktoe

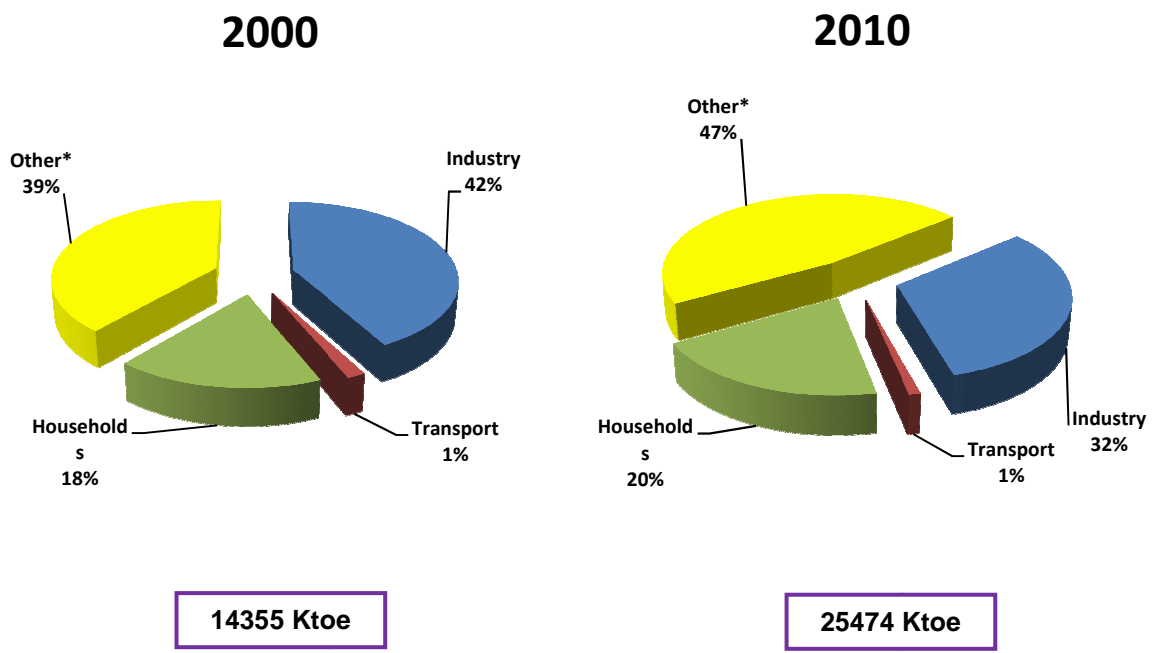
* Includes agriculture, commercial, public service, and non-specified other

Electricity

Total Final Consumption from 2000 to 2010 by sector (Ktoe)



2000 and 2010 shares of Africa electricity consumption



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

SIMPLIFIED ENERGY BALANCE TABLE

AFRICA

2000

(Mtoe)

SUPPLY and CONSUMPTION	Crude Oil	Oil Products	Coal/peat	Natural Gas	Nuclear	Hydro	Biofuels and Waste	Other*	Total
Production	356,37	-	116,07	114,86	3,39	6,41	113,45	0,41	710,96
Imports	30,43	47,76	3,72	2,56	-	-	-	1,44	85,90
Exports	-	-40,75	-0,02	-55,54	-	-	-45,75	-1,46	-
Intl. marine bunkers	270,38	-	-	-	-	-	-	-	413,89
Intl. aviation bunkers	-	-	-	-	-	-	-	-	-
Stock changes	-	-	-14,33	0,10	-	-	-	-	-14,23
TPES	116,42	7,00	105,45	61,98	3,39	6,41	67,70	0,40	368,75
Transfers	-	-	-	-	-	-	-	-	-
Statistical diff.	-0,95	-0,13	0,46	-0,55	-	-	16,96	-3,22	12,56
Transformation	-	106,66	-51,69	-38,78	-3,39	-6,41	-27,35	36,90	-99,51
Electricity producers	115,46	-22,73	-51,69	-38,78	-3,39	-6,41	-0,91	36,90	-87,00
Petroleum refineries	-	129,40	-	-	-	-	-	-	13,93
Charcoal plants	115,46	-	-	-	-	-	-26,44	-	-26,44
Gas-to-liquids	-	-	-	-	-	-	-	-	-
Coal-to-liquids	-	-	-	-	-	-	-	-	-
Blast furnaces	-	-	-	-	-	-	-	-	-
Other transf.	-	-	-	-	-	-	-	-	-
Energy Ind. own use	-	-	-	-	-	-	-	-	-
Losses	-	-	-	-	-	-	-	-	-
TFC	-	113,53	54,22	22,65	-	-	57,31	34,08	281,80
Industry	-	18,60	11,47	9,77	-	-	0,95	14,36	55,15
Transport	-	54,91	0,13	0,12	-	-	-	0,54	55,70
Households	-	9,11	0,79	2,64	-	-	55,23	6,00	73,76
Other	-	30,92	41,83	10,13	-	-	1,12	13,19	97,19

*Other includes geothermal, solar, wind, electricity and heat, etc.

SIMPLIFIED ENERGY BALANCE TABLE

AFRICA

2010

(Mtoe)

SUPPLY and CONSUMPTION	Crude Oil	Oil Products	Coal/peat	Natural Gas	Nuclear	Hydro	Biofuels and Waste	Other*	Total
Production	415,54	-	134,09	173,42	3,34	8,26	131,17	1,47	867,29
Imports	32,11	20,30	3,50	5,89	-	-	-	1,65	63,45
Exports	-	-34,11	-34,84	-92,24	-	-	-49,09	-2,52	-
Intl. marine bunkers	329,22	-	-	-	-	-	-	-	542,02
Intl. aviation bunkers	-	-	-	-	-	-	-	-	-
Stock changes	-	-	-15,81	0,18	-	-	-	-	-15,63
TPES	118,42	-13,81	86,95	87,24	3,34	8,26	82,08	0,61	373,09
Transfers	-	-	-	-	-	-	-	-	-
Statistical diff.	-0,16	65,13	18,00	-0,49	-	-	34,52	-8,35	108,66
Transformation	-	101,09	-61,61	-43,19	-3,34	-8,26	-41,61	61,76	-
Electricity producers	118,26	-28,47	-61,61	-43,19	-3,34	-8,26	-	61,76	113,44
Petroleum refineries	-	129,56	-	-	-	-	-	-	-83,13
Charcoal plants	118,26	-	-	-	-	-	-41,61	-	11,30
Gas-to-liquids	-	-	-	-	-	-	-	-	-41,61
Coal-to-liquids	-	-	-	-	-	-	-	-	-
Blast furnaces	-	-	-	-	-	-	-	-	-
Other transf.	-	-	-	-	-	-	-	-	-
Energy Ind. own use	-	-	-	-	-	-	-	-	-
Losses	-	-	-	-	-	-	-	-	-
TFC	-	152,41	43,34	43,56	-	-	74,99	54,02	368,32
Industry	-	46,07	23,61	35,18	-	-	2,05	17,20	124,12
Transport	-	75,61	11,77	0,31	-	-	-	0,51	88,20
Households	-	6,71	0,05	3,05	-	-	68,33	10,83	88,97
Other	-	24,02	7,91	5,01	-	-	4,61	25,47	67,03

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 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.

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.