

COAL

IEA Coal Data System

**IEA Data Training Workshop in South Africa
Pretoria, 11-13 October 2010**

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Energy Statistics Division



International
Energy Agency

Outline

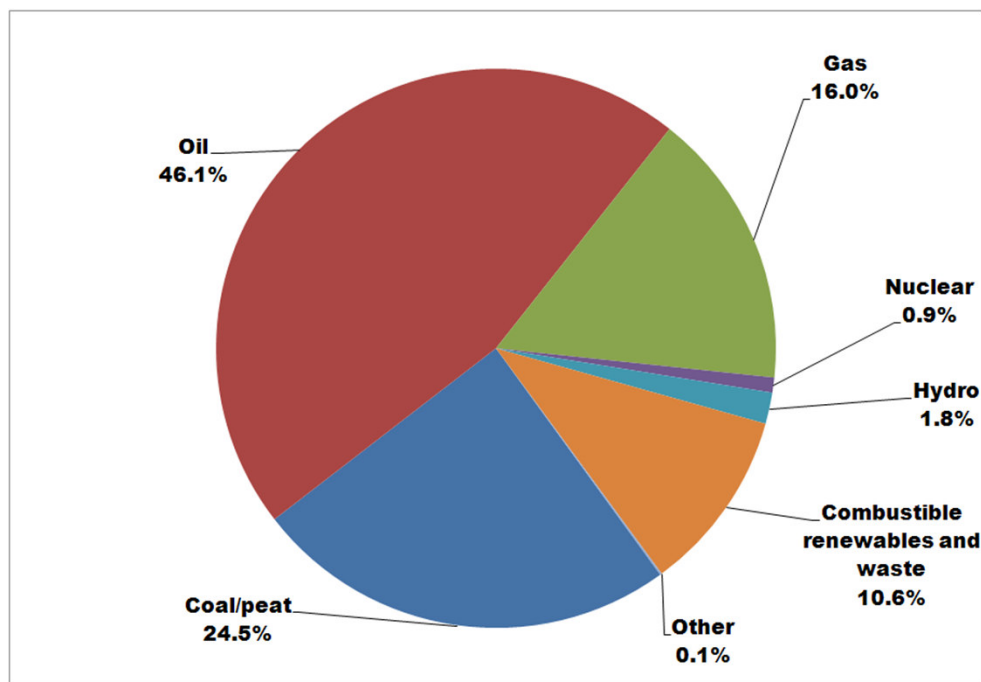
- **Overview: The Importance of Coal**
- **Coal data collection and IEA Annual Coal Questionnaire**

THE IMPORTANCE OF COAL

- **Coal provides a large share of the world energy supply**
- **Large reserves: Potential to contribute even more**
- **Must address environmental challenges**

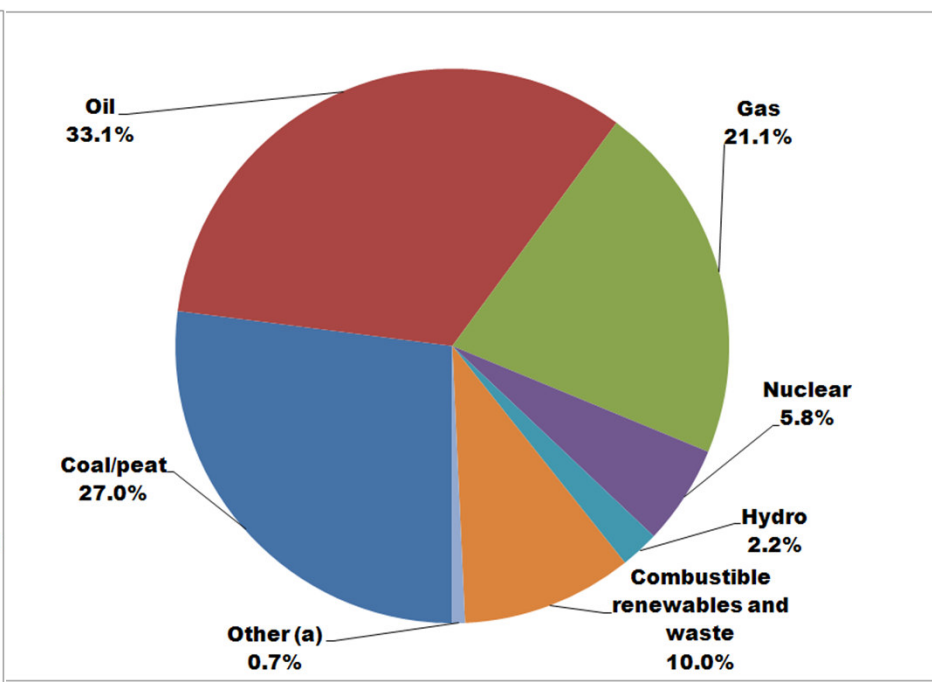
WORLD TOTAL PRIMARY ENERGY SUPPLY

1973



6,115 Mtoe

2008



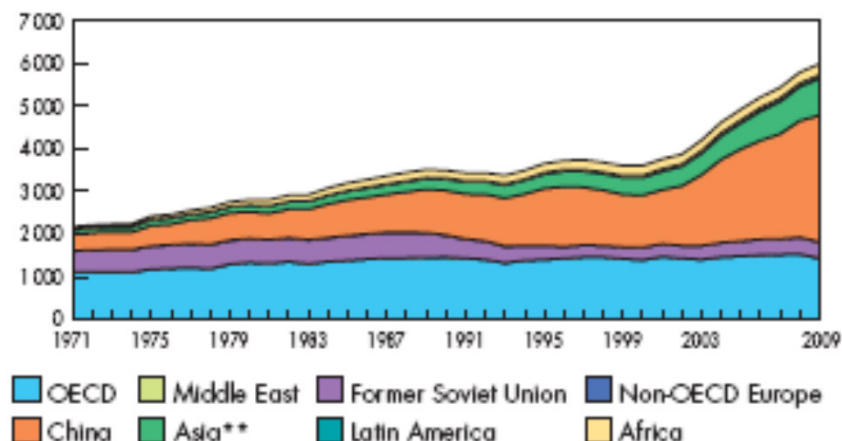
12,267 Mtoe

TPES doubled and coal more than doubled

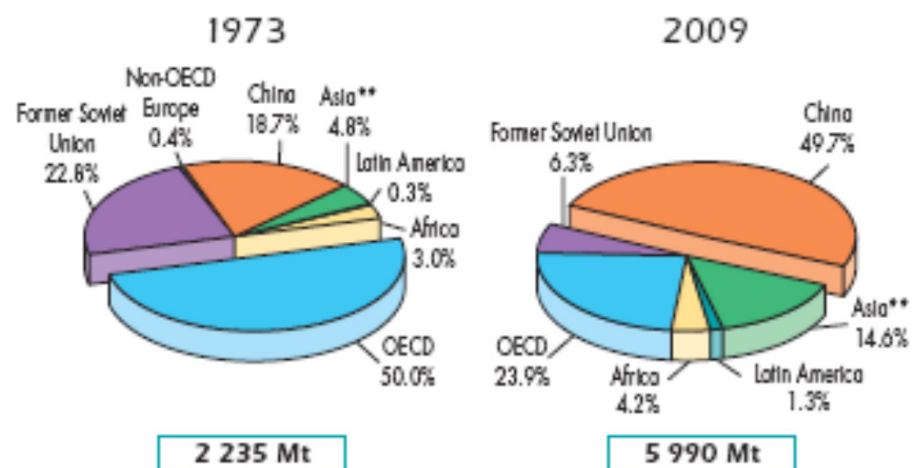
COAL production: global trends

Hard Coal Production

Evolution from 1971 to 2009 of hard coal* production by region (Mt)



1973 and 2009 regional shares of hard coal* production



*Includes recovered coal.
 **Asia excludes China.

COAL: global trade

Producers	Hard coal* (Mt)	Brown coal (Mt)
People's Rep. of China	2 971	**
United States	919	66
India	526	35
Australia	335	64
Indonesia	263	38
South Africa	247	0
Russian Federation	229	68
Kazakhstan	96	5
Poland	78	57
Colombia	73	0
Rest of the world	253	580
World	5 990	913

2009 data

*Includes recovered coal.

**Included in hard coal.

Net exporters	Hard coal (Mt)
Australia	262
Indonesia	230
Russian Federation	93
Colombia	69
South Africa	67
United States	33
Vietnam	25
Kazakhstan	22
Canada	20
Czech Republic	4
Others	11
Total	836

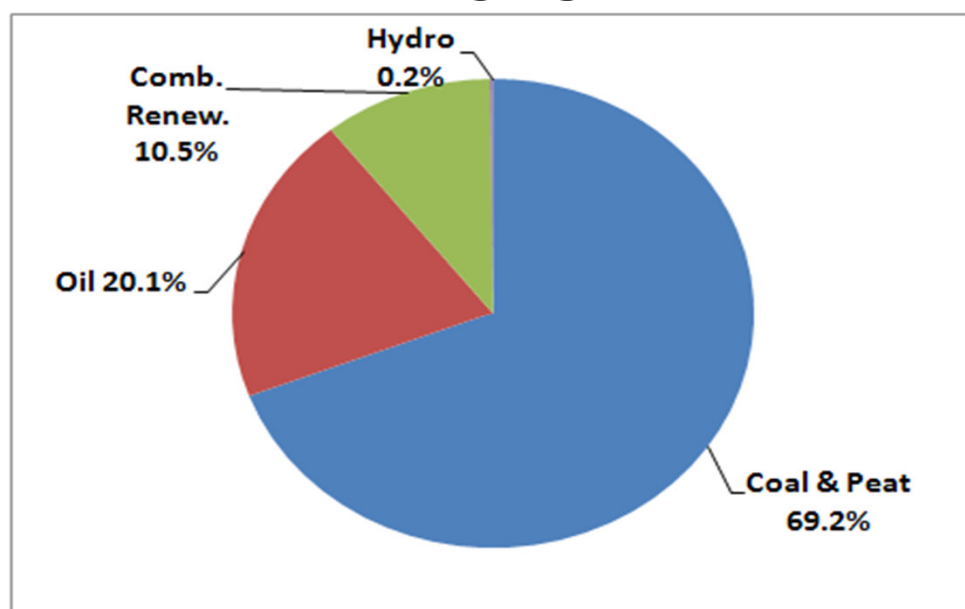
2009 data

Net Importers	Hard coal (Mt)
Japan	165
People's Rep. of China	114
Korea	103
India	66
Chinese Taipei	60
Germany	38
United Kingdom	38
Turkey	20
Italy	19
Spain	16
Others	180
Total	819

2009 data

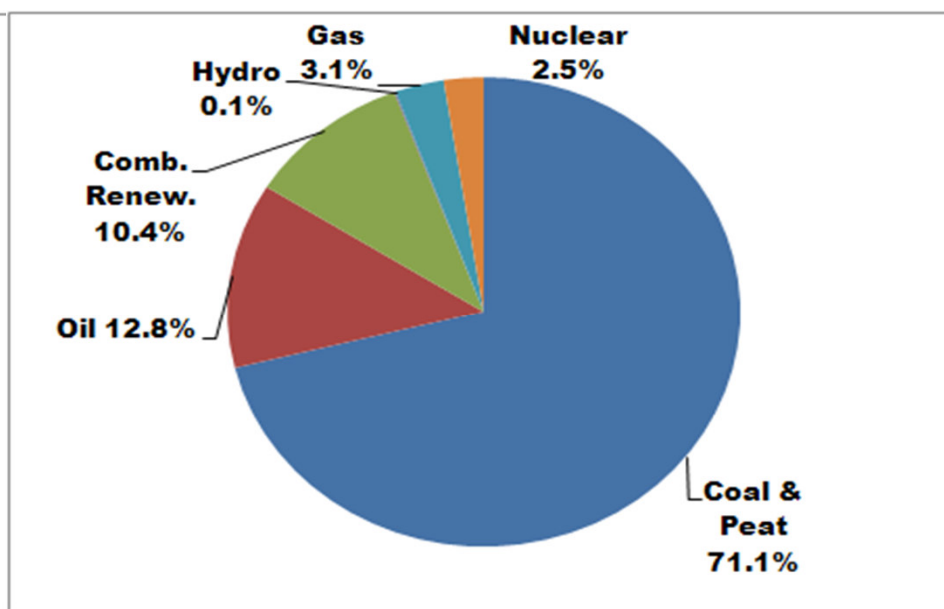
SOUTH AFRICA TOTAL PRIMARY ENERGY SUPPLY

1973



48,882 ktoe

2008

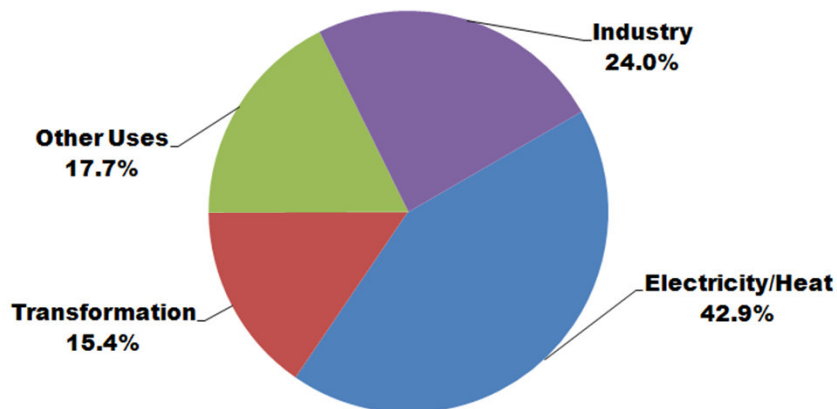


134,798 ktoe

TPES up almost three times, Coal dominant

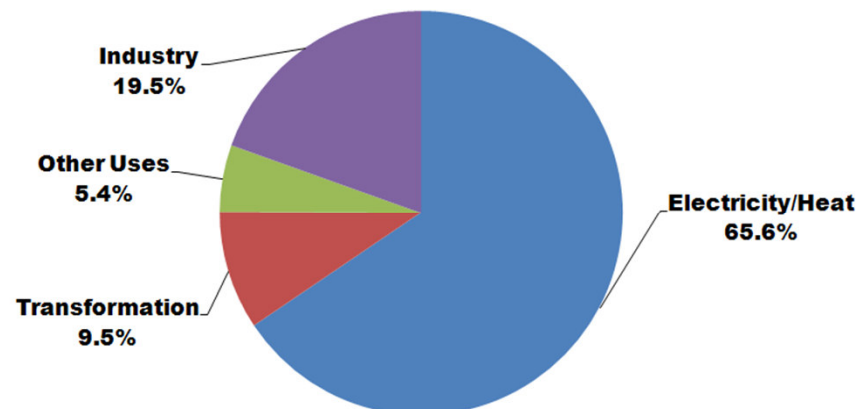
WORLD USES OF COAL

1973



1,489 Mtoe

2008

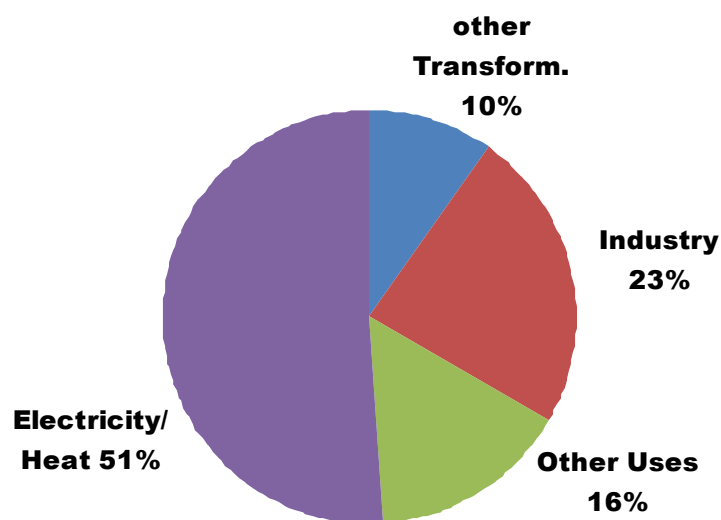


3,304 Mtoe

Coal and coal products increasingly used for electricity generation

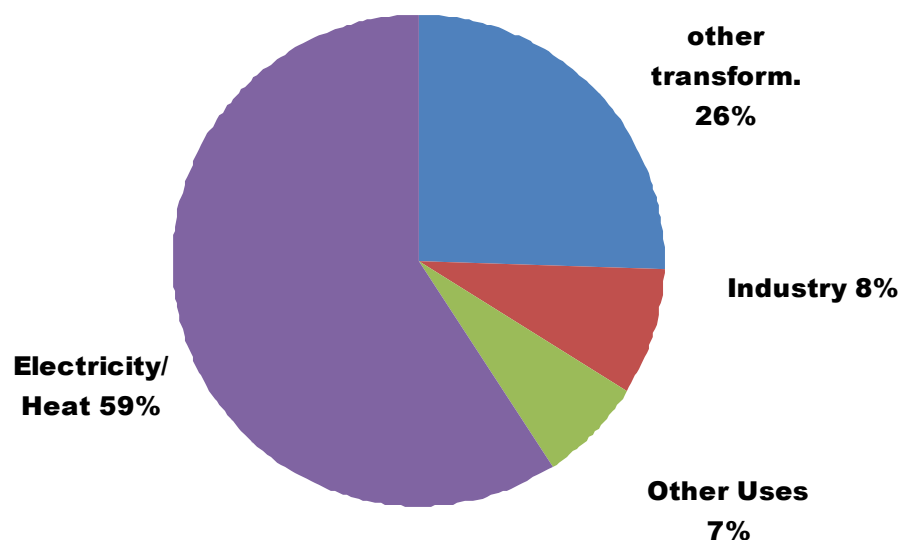
SOUTH AFRICA USES OF COAL

1973



42,869 ktoe

2008

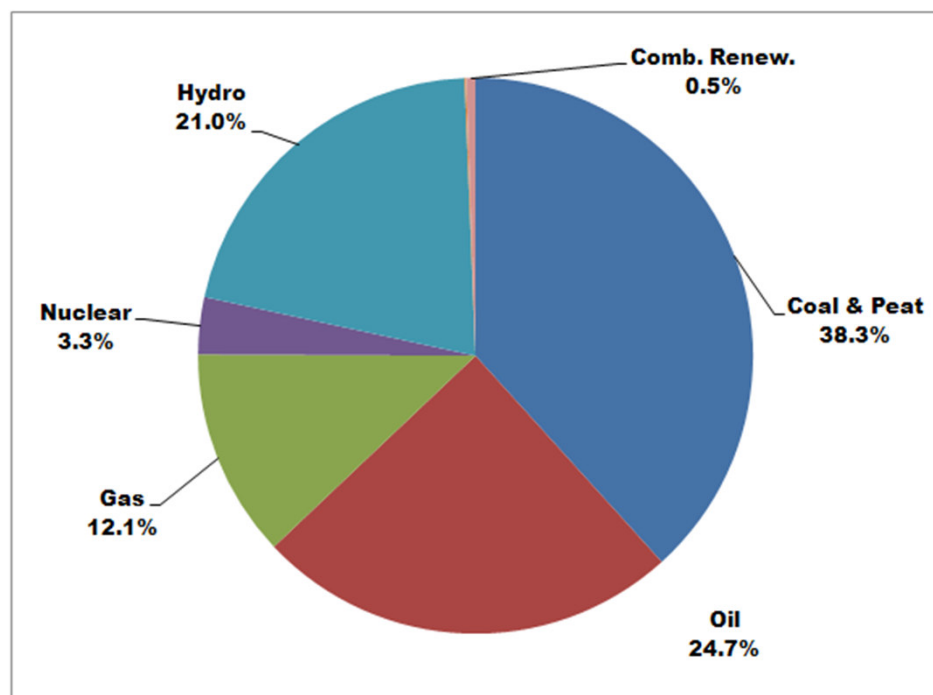


93,023 ktoe

Coal and coal products increasingly used for electricity generation; liquefaction

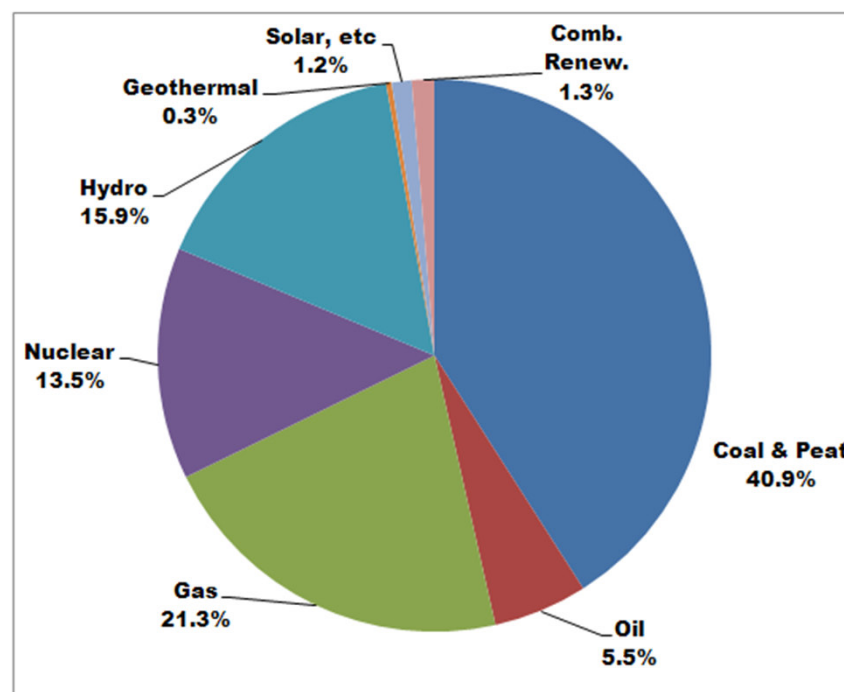
WORLD FUEL SHARES OF ELECTRICITY

1973



6 116 Twh

2008

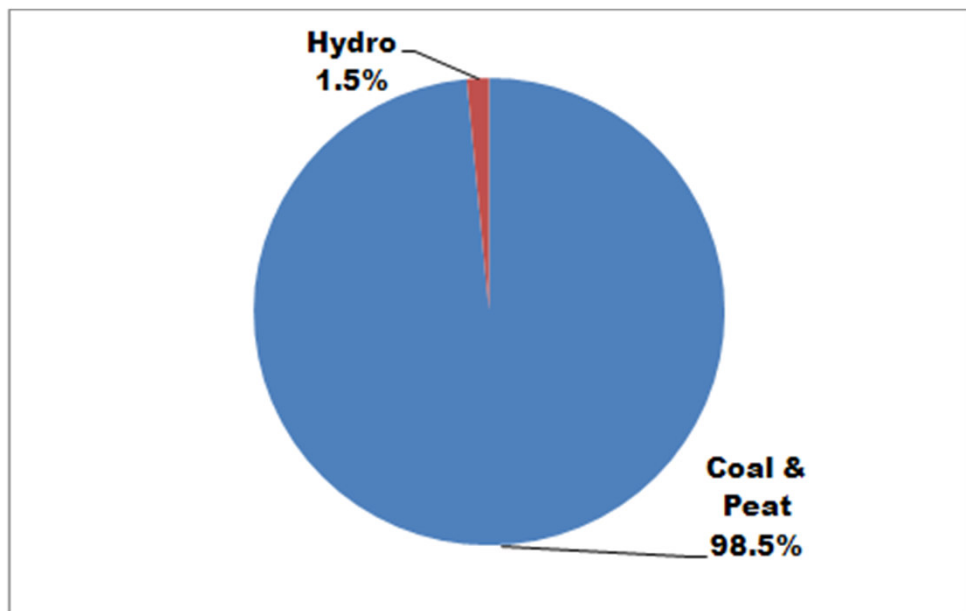


20 181 Twh

**Electricity generation more than tripled; coal still dominant;
Oil substituted by gas and nuclear**

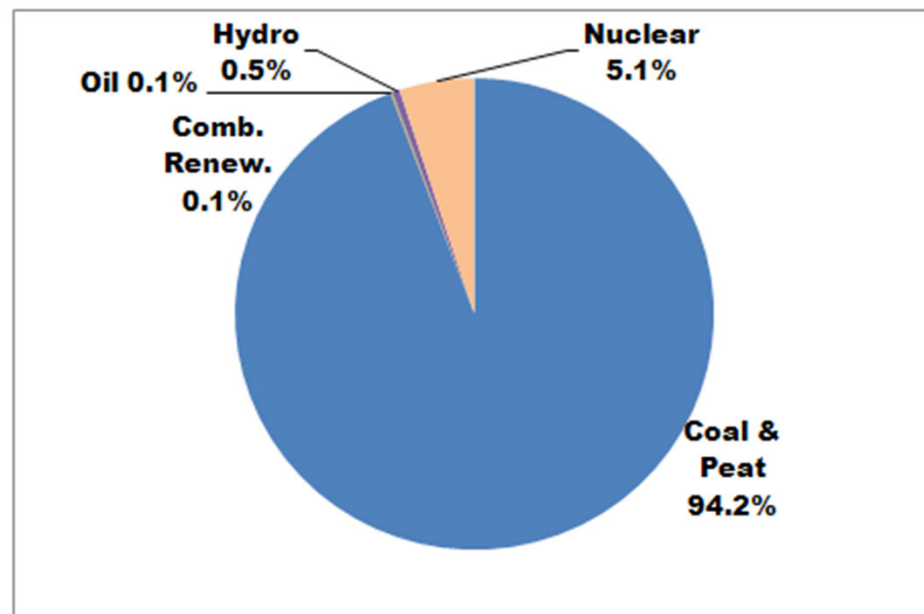
SOUTH AFRICA FUEL SHARES OF ELECTRICITY

1973



64,390 Gwh

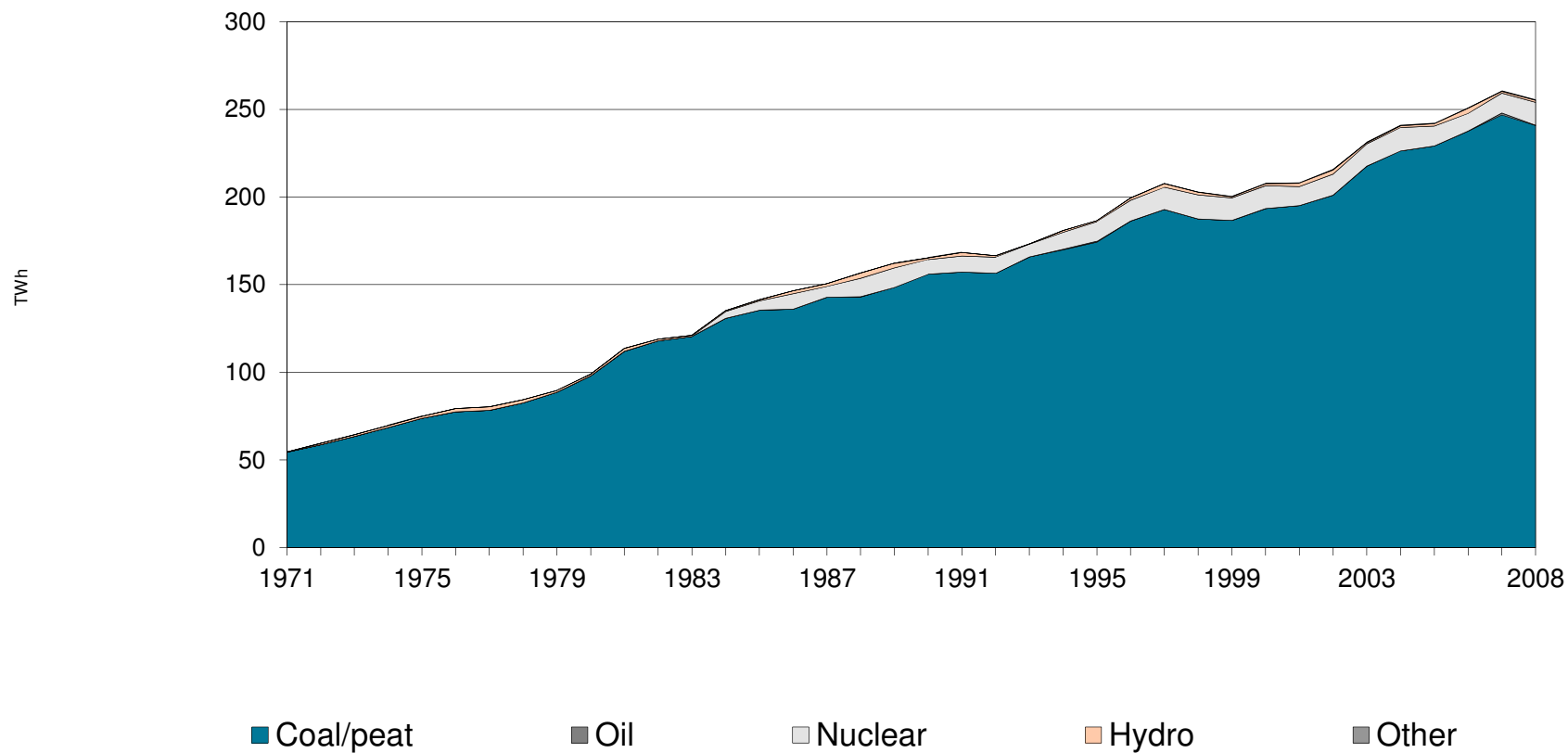
2008



255,519 Gwh

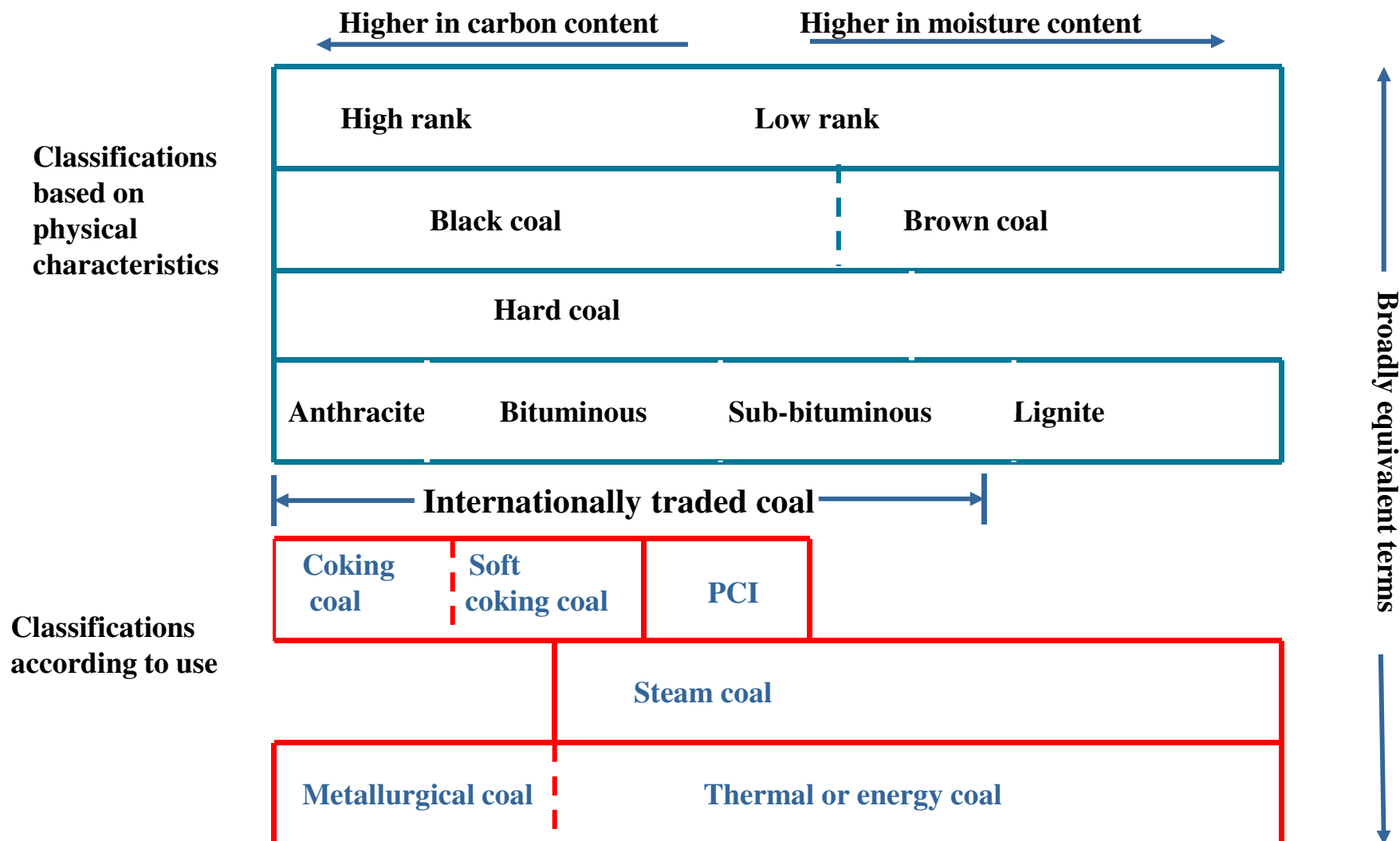
Electricity generation up almost 3 times, coal dominant; nuclear

South Africa: electricity generation in time



DATA COLLECTION: COAL

COMMONLY USED COAL CLASSIFICATIONS



COAL AS AN ENERGY COMMODITY

■ Coal characteristics

- Ash, volatile matter, sulphur, nitrogen, trace elements**
- Blended to produce different performance characteristics**
- Soft coking coal and steam coal prices have been related**

■ Pulverized Coal Injection

PRIMARY AND DERIVED COAL PRODUCTS

PRIMARY FUELS	Anthracite	SOLID FOSSIL FUELS
	Coking Coal	
	Other Bituminous Coal	
	Sub-bituminous Coal	
	Lignite/Brown Coal	
	Peat	
DERIVED and MANUFACTURED PRODUCTS	Patent Fuels	
	Coke Oven Coke	
	Gas Coke	
	BKB/Peat Briquettes	
	Coal Tar	
	Gas Works Gas	MANUFACTURED GASES
	Coke Oven Gas	
	Blast Furnace Gas	
	Oxygen Steel Furnace Gas	

PRIMARY COAL DEFINITIONS

- **Hard Coal**
 - **Gross calorific value greater than 23,865 kJ/kg**
 - **Mean random reflectance of vitrinite of at least 0.6**
 - **Anthracite**
 - **Bituminous**
 - **Coking coal**
- **Sub-Bituminous Coal**
 - **Gross calorific value 17,435 - 23,865 kJ/kg**
 - **Mean random reflectance of vitrinite less than 0.6**
- **Lignite/Brown Coal**
 - **Gross calorific value less than 17,435 kJ/kg**
 - **Mean random reflectance of vitrinite less than 0.6**

HARD COAL DEFINITIONS

■ **Anthracite**

- **Gross calorific value is greater than 23,865 kJ/kg**
- **Less than 10% volatile matter**
- **High carbon content (about 90% fixed carbon)**
- **Mean random reflectance of vitrinite at least 2.0%**
- **Non-agglomerating**

■ **Coking Coal**

- **Bituminous coal that allows its use to produce coke**
- **Gross calorific value is greater than 23,865 kJ/kg**
- **Mean random reflectance of vitrinite of at least 0.6**

■ **Other Bituminous Coal**

- **Coal used for steam raising purposes**
- **Higher volatile matter (more than 10%)**
- **Lower carbon content (less than 90% fixed carbon)**
- **Gross calorific value is greater than 23,865 kJ/kg**
- **Mean random reflectance of vitrinite of at least 0.6**

UPGRADED COALS

■ Patent Fuels

- Manufactured from hard coal fines
- With the addition of a binding agent
- Patent fuel produced may be higher than the amount of coal used

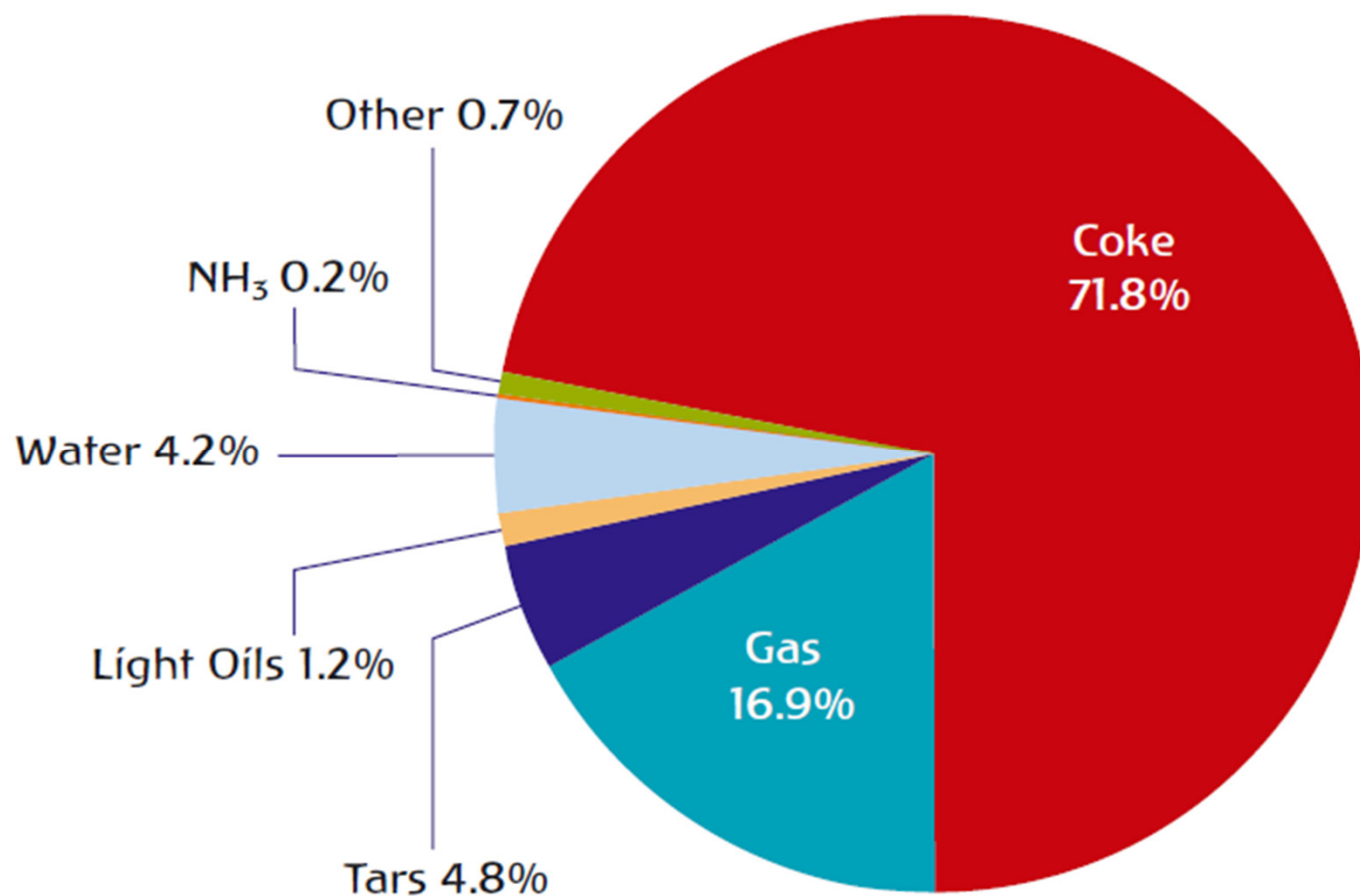
■ BKB (Brown Coal Briquettes)

- A composite fuel manufactured from lignite/brown coal
- Produced under high pressure without a binding agent
- Includes peat briquettes, dried lignite fines and dust

COKE OVEN COKE

- **A solid product**
 - **From carbonized coal, principally coking coal**
 - **At high temperature**
 - **Low in moisture and volatile matter**
 - **Used mainly in the iron and steel industry**
- **Requires inputs of coal to coke ovens in the Transformation sector**
- **Inputs of other fuels may also be reported on the other questionnaires**

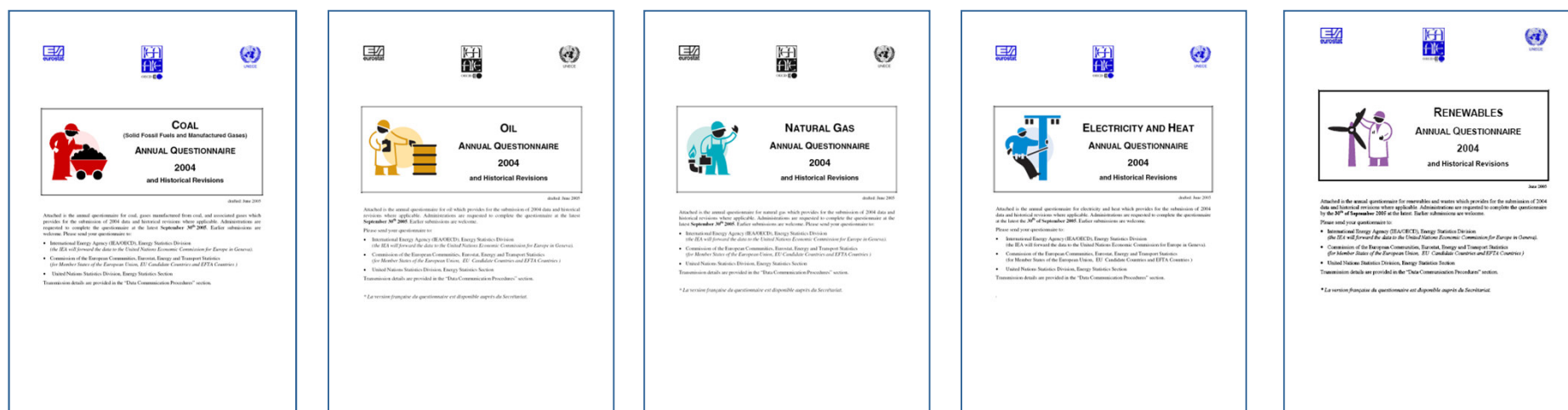
TYPICAL MASS YIELDS FROM COKE OVENS



OTHER COAL DERIVED GASES

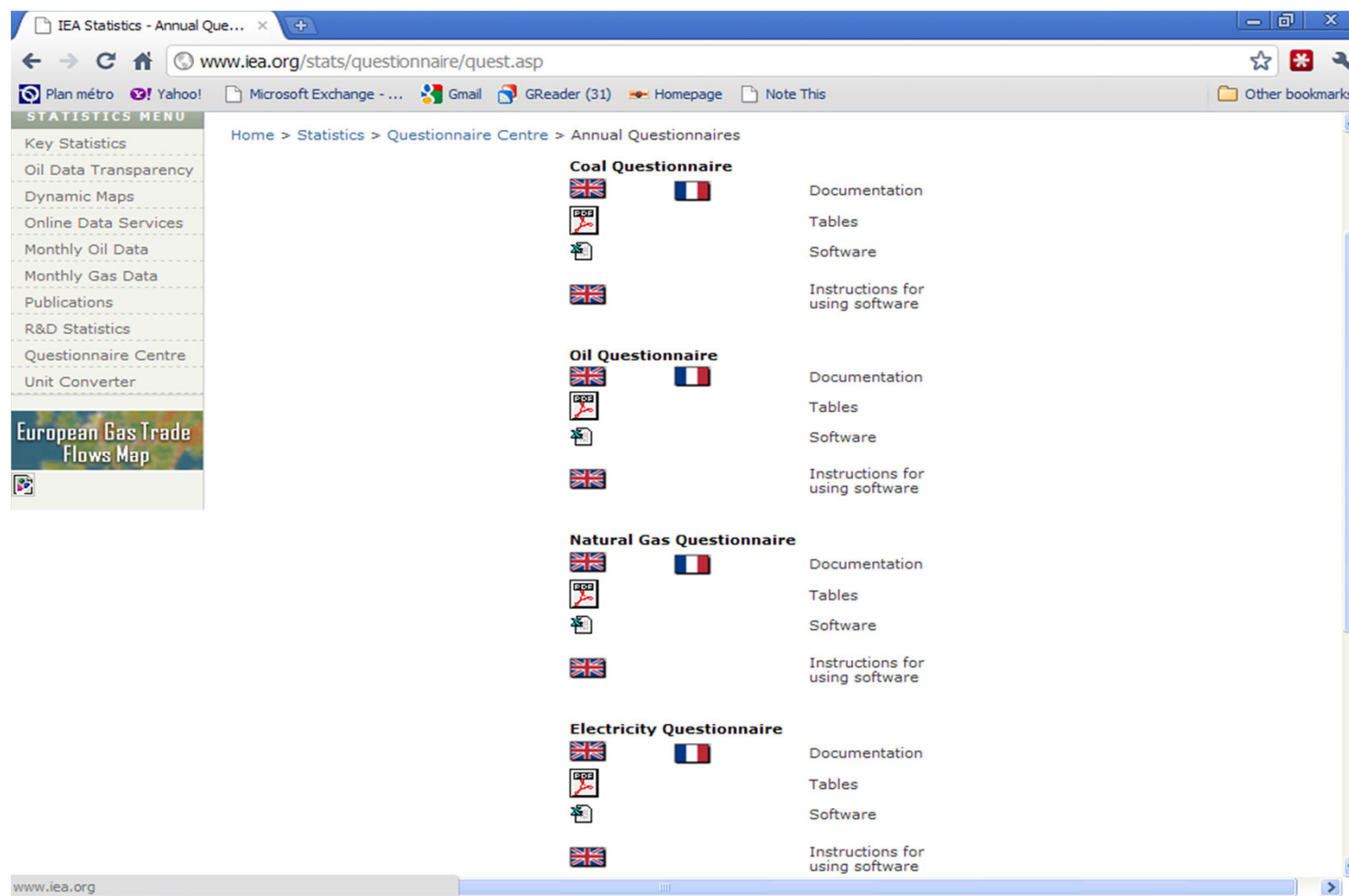
- **Gas Work Gas**
 - **Produced in plants whose main purpose is to manufacture, transport and distribute gas.**
- **Blast Furnace Gas**
 - **Produced during combustion of coke in blast furnaces in iron and steel industry**
- **Oxygen Steel Furnace Gas**
 - **By-product of the production of steel in an oxygen furnace**
 - **Also known as converter gas, LD gas or BOS gas**

How OECD countries data are collected



Five annual (detailed) energy questionnaires

IEA/EUROSTAT/UNECE Annual Energy Questionnaires



<http://www.iea.org/stats/questionnaire/quest.asp>



International
Energy Agency

EDC (Energy Data Centre)

“A tool to build on our common objective of continuously improving the overall timeliness, the completeness and the consistency of energy statistics”



Energy Data Center

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Notify quest. completed

Coal ▶

Electricity and heat ▶

Natural Gas ▶

Oil ▶

Renewables ▶

Time series

Forms ▶

Remarks

TIME SERIES: COAL

Available Time Series

[Anthracite](#)

[Coking Coal](#)

[Bituminous Coal](#)

[Sub-bituminous Coal](#)

[Lignite/Brown Coal](#)

[Peat](#)

[Patent Fuel](#)

[Coke - Oven Coke](#)

[Gas Coke](#)

[Coal Tar](#)

[BKB-PB](#)

[Gas Works Gas](#)

[Coke Oven Gas](#)

[Blast Furnace Gas](#)

[Oxygen Steel Furnace Gas](#)

INTERNET INTERFACE

- **Easy to access and use (menu-driven)**
- **Enter data by hand or download file**
- **Records the history of changes**
- **Can add comments**
- **Can be accessed by several people**
- **In a secured mode**
- **Submit to various organisations (e.g. Eurostat for EU countries, OLADE for OLADE countries)**

Products for which IEA collects data

- **Coal** (17 products)
- **Natural gas**
- **Crude oil and petroleum products** (25 products)
- **Nuclear energy**
- **Renewable energy** (19 products)
- **Waste energy** (3 products)
- **Electricity**
- **Heat**
- **TOTAL: over 75 products**

Flows for which IEA collects data



- Production
- + Import
- Export
- International bunkers
- + Stock changes

= Domestic supply

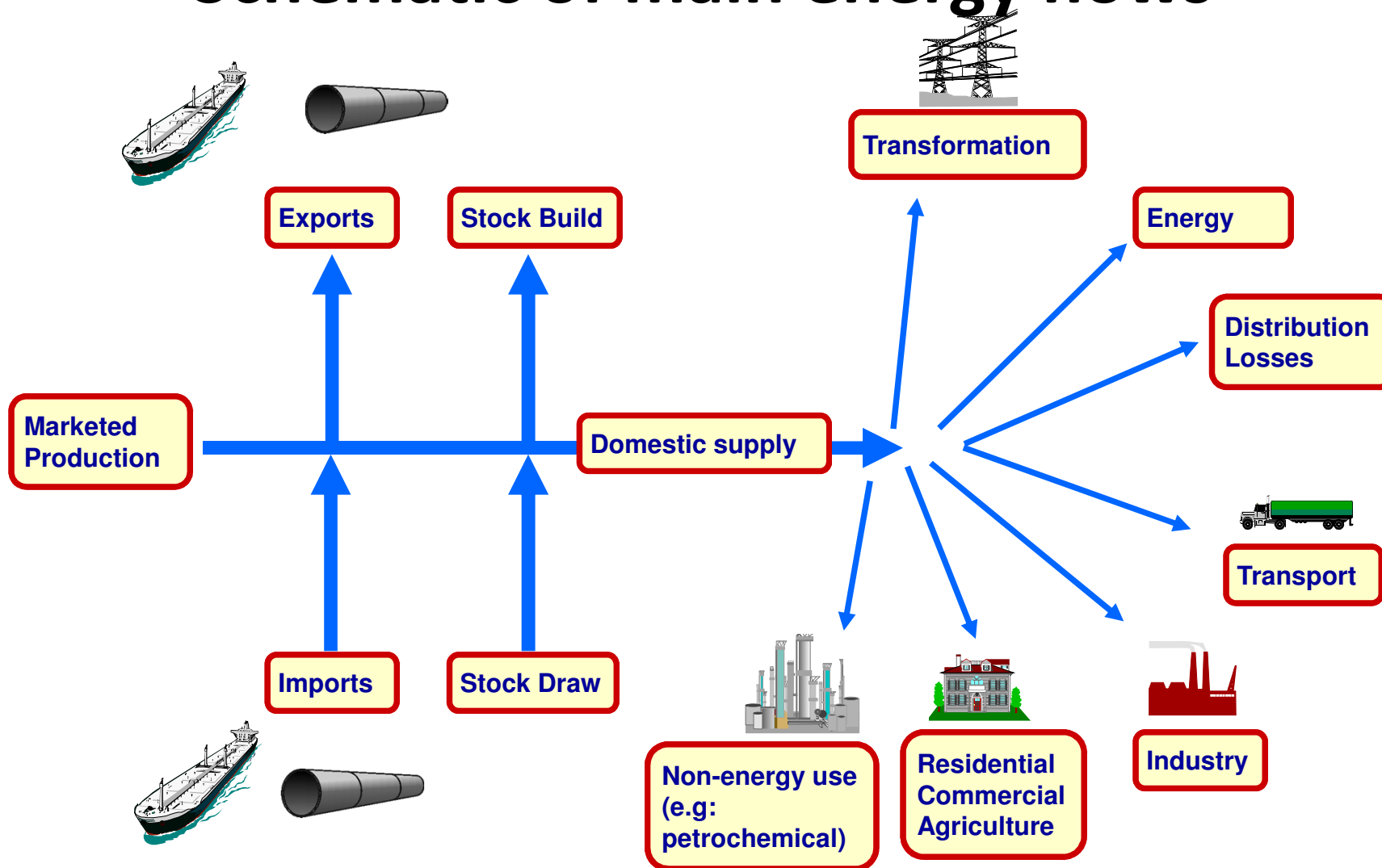


- Statistical differences
- + Transformation (*18 sub-sectors*)
- + Energy industry own use (*16 sub-sectors*)
- + Losses
- + Final Consumption
 - Industry (*13 sub-sectors*)
 - Transport (*7 sub-sectors*)
 - Other (*4 sub-sectors*)
 - Non energy uses

Electricity and Heat outputs

TOTAL: 95 FLOWS

Schematic of main energy flows



Units for energy reporting

- **“Natural” units**

Gas: cubic meters or TJ;

Coal: tonnes;

Oil: tonnes, barrels

- **Energy units**

Measure the heat content of fuels

TJ, tonnes of oil equivalent (toe), GWh, ...

- **Calorific value (Heating value)**

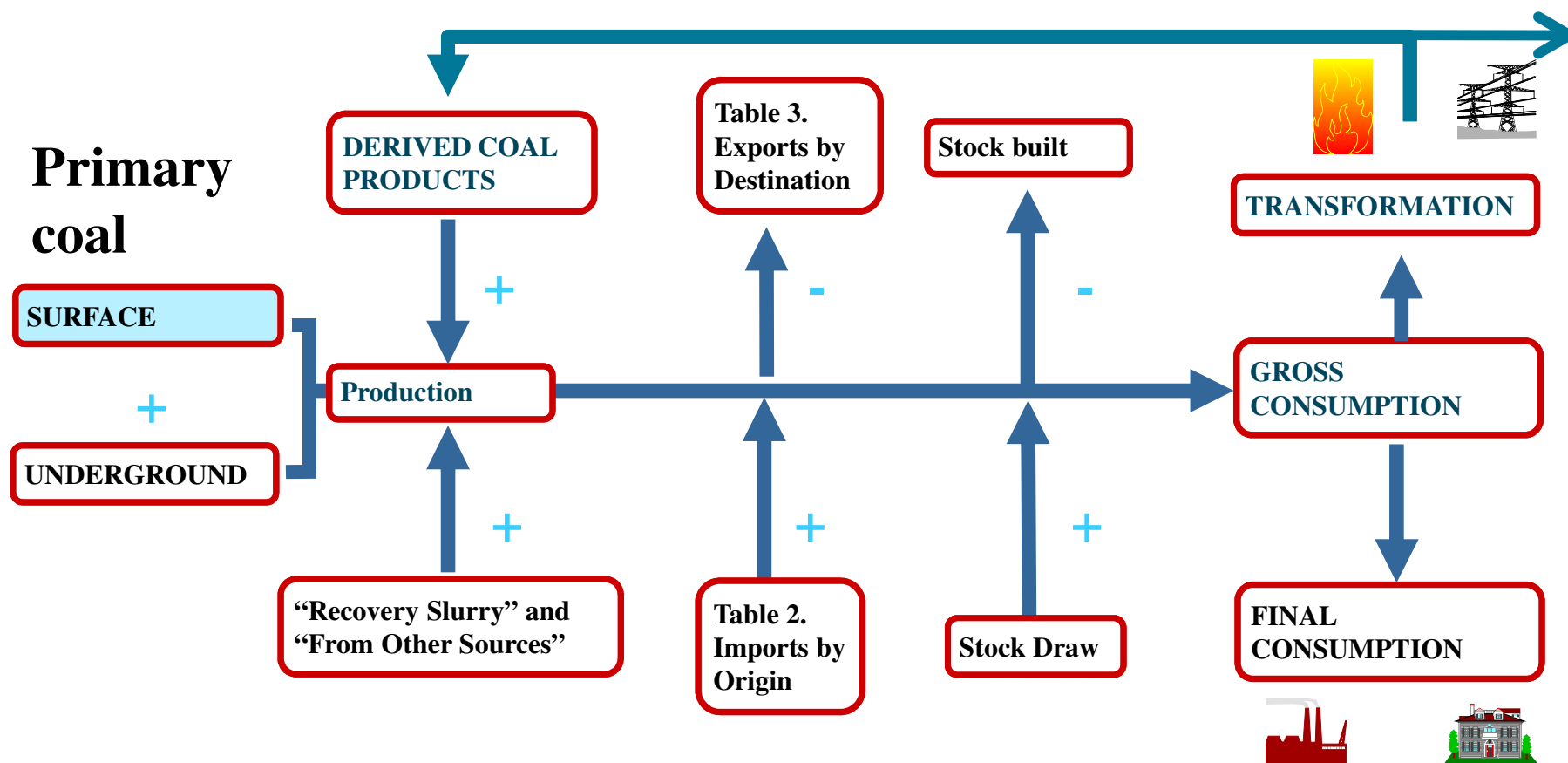
energy content per unit mass or per unit volume (e.g.
toe/t, kJ/m³)

STRUCTURE OF THE COAL QUESTIONNAIRE

- **Table 1. Supply, Transformation, Energy and Final Consumption**
- **Table 2. Imports by Origin**
- **Table 3. Exports by Destination**
- **Table 4. Calorific Values**

TABLE 1. COAL FLOW

Electricity
and Heat



SUMMARY FLOWS FROM TABLE 1

Domestic Supply

Production
+Import
-Export
**-International Marine
Bunkers**
+Stock Changes

Gross Consumption

Transformation Sector (*14 sub-sectors*)
+Energy Sector (*10 sub-sectors*)
-Distribution Losses
+Final Consumption
+Industry Sector (*13 sub-sectors*)
+Transport (*3 sub-sectors*)
+Other Sectors (*5 sub-sectors*)
+Non Energy Uses

Domestic Supply - Gross Consumption = Statistical Difference

TRANSFORMATION vs. ENERGY

■ **Transformation**

- **Fuel used for the primary or secondary conversion of energy**
- **Transformed to make derived energy products**

■ **Energy**

- **Fuels consumed by the energy industry to support**
- **fuel extraction**
- **plant operations of transformation activities**

TABLE 1. SUPPLY AND TRANSFORMATION SECTOR

Chile		Coking Coal	Other Bituminous Coal	Sub-bituminous Coal
SUPPLY AND TRANSFORMATION SECTOR		10 ³ t B	10 ³ t C	10 ³ t D
Indigenous Production	1	0	667	0
Underground Production	2	0	667	0
Surface Production	3	0	0	0
From Other Sources	4	0	0	0
Total Imports (Balance)	5	718	6,384	0
Total Exports (Balance)	6	0	0	0
International Marine Bunkers	7	0	0	0
Stock Changes (National Territory)	8	-43	0	0
Inland Consumption (Calculated)	9	675	7,051	0
Statistical Differences	10	0	456	0
MEMO ITEM: From other sources				
From Other Sources - Oil	11			
From Other Sources - Natural Gas	12			
From Other Sources - Renewables	13			
Transformation Sector				
Main Activity Producer Electricity Plants	14	675	5,972	0
Main Activity Producer CHP Plants	15	0	5,965	0
Main Activity Producer Heat Plants	16	0	0	0
Autoproducer Electricity Plants	17	0	0	0
Autoproducer CHP Plants	18	0	7	0
Autoproducer Heat Plants	19	0	0	0
Patent Fuel Plants (Transformation)	20	0	0	0
Coke Ovens (Transformation)	21	0	0	0
BKB Plants (Transformation)	22	675	0	0
Gas Works (Transformation)	23	0	0	0
Blast Furnaces (Transformation)	24	0	0	0
Coal Liquefaction Plants (Transformation)	25	0	0	0
For Blended Natural Gas	26	0	0	0
Non-specified (Transformation)	27			
	28	0	0	0

TABLE 1. ENERGY SECTOR AND FINAL CONSUMPTION

Chile		Coking Coal	Other Bituminous Coal	Sub-bituminous Coal
SUPPLY AND TRANSFORMATION SECTOR		10 ³ t	10 ³ t	10 ³ t
		B	C	D
ENERGY SECTOR AND FINAL CONSUMPTION				
Energy Sector	29	0	0	0
Own Use in Electricity, CHP and Heat Plants	30	0	0	0
Coal Mines	31	0	0	0
Patent Fuel Plants (Energy)	32	0	0	0
Coke Ovens (Energy)	33	0	0	0
BKB Plants (Energy)	34	0	0	0
Gas Works (Energy)	35	0	0	0
Blast Furnaces (Energy)	36	0	0	0
Petroleum Refineries	37	0	0	0
Coal Liquefaction Plants (Energy)	38	0	0	0
Non-specified (Energy)	39	0	0	0
Distribution Losses	40	0	0	0
Total Final Consumption	41	0	623	0
Total Non-Energy Use	42	0	0	0
Non-Energy Use Industry/Transformation/Energy	43	0	0	0
Of which: Non-Energy Use-	44	0	0	0
Non-Energy Use in Transport	45	0	0	0
Non-Energy Use in Other Sectors	46	0	0	0

TABLE 1. ENERGY END USE SPECIFICATION

Chile		Coking Coal	Other Bituminous Coal	Sub-bituminous Coal
SUPPLY AND TRANSFORMATION SECTOR		10 ³ t B	10 ³ t C	10 ³ t D
Final Energy Consumption	47	0	623	0
Industry Sector	48	0	599	0
Iron and Steel	49	0	0	0
Chemical (including Petrochemical)	50	0	0	0
Non-Ferrous Metals	51	0	0	0
Non-Metallic Minerals	52	0	322	0
Transport Equipment	53	0	0	0
Machinery	54	0	0	0
Mining and Quarrying	55	0	81	0
Food, Beverages and Tobacco	56	0	0	0
Paper, Pulp and Printing	57	0	12	0
Wood and Wood Products	58	0	0	0
Construction	59	0	0	0
Textiles and Leather	60	0	0	0
Non-specified (Industry)	61	0	174	0
Transport Sector	62	0	0	0
Rail	63	0	0	0
Domestic Navigation	64	0	0	0
Non-specified (Transport)	65	0	0	0
Other Sectors	66	0	24	0
Commercial and Public Services	67	0	6	0
Residential	68	0	0	0
Agriculture/Forestry	69	0	0	0
Fishing	70	0	18	0
Non-specified (Other)	71	0	0	0

STATISTICAL DIFFERENCE

■ Inland Consumption (calculated):	7,051
■ Transformation Sector:	-5,972
■ Energy Sector:	- 0
■ Distribution Losses:	- 0
■ Total Final Consumption:	- 623
■ Statistical Difference:	456
(6.5% of consumption)	

Example: COKE OVEN DATA

Chile		Coking Coal	Other Bituminous Coal	Coke Oven Coke	Coal Tar	Gas Works Gas	Coke Oven Gas	Blast Furnace Gas
		10 ³ t	10 ³ t	10 ³ t	10 ³ t	TJ (gross)	TJ (gross)	TJ (gross)
SUPPLY AND TRANSFORMATION SECTOR		B	C	H	I	L	M	N
Indigenous Production	1	0	667	497	18	1,185	4,598	5,230
Underground Production	2	0	667					
Surface Production	3	0	0					
From Other Sources	4	0	0	0	0	0	0	0
Total Imports (Balance)	5	718	6,384	0	0	0	0	0
Total Exports (Balance)	6	0	0	12	0	0	0	0
International Marine Bunkers	7	0	0	0	0	0	0	0
Stock Changes (National Territory)	8	-43	0	29	-1	-119	0	0
Inland Consumption (Calculated)	9	675	7,051	514	17	1,066	4,568	5,230
Statistical Differences	10	0	456	0	0	0	0	0
MEMO ITEM: From other sources								
From Other Sources - Oil	11			0	0	0	0	0
From Other Sources - Natural Gas	12			0	0	0	0	0
From Other Sources - Renewables	13			0	0	0	0	0
Transformation Sector	14	675	5,972	491	0	0	959	0
Main Activity Producer Electricity Plants	15	0	5,965	0	0	0	0	0
Main Activity Producer CHP Plants	16	0	0	0	0	0	0	0
Main Activity Producer Heat Plants	17	0	0	0	0	0	0	0
Autoproducer Electricity Plants	18	0	7	0	0	0	0	0
Autoproducer CHP Plants	19	0	0	0	0	0	0	0
Autoproducer Heat Plants	20	0	0	0	0	0	0	0
Coke Ovens (transformation)	21	0	0	0	0	0	0	0
BKB Plants (Transformation)	22	675	0	0	0	0	0	0
Gas Works (Transformation)	23	0	0	0	0	0	0	0
Blast Furnaces (Transformation)	24	0	0	0	0	0	0	0
Coal Liquefaction Plants (Transformation)	25	0	0	491	0	0	959	0
For Blended Natural Gas	26	0	0	0	0	0	0	0
Non-specified (Transformation)	27	0	0	0	0	0	0	0
	28	0	0	0	0	0	0	0

Example: COKE OVEN DATA

Chile		Coking Coal	Other Bituminous Coal	Coke Oven Coke	Coal Tar	Gas Works Gas	Coke Oven Gas	Blast Furnace Gas
		10 ³ t	10 ³ t	10 ³ t	10 ³ t	TJ (gross)	TJ (gross)	TJ (gross)
SUPPLY AND TRANSFORMATION SECTOR		B	C	H	J	L	M	N
ENERGY SECTOR AND FINAL CONSUMPTION								
Energy Sector	29	0	0	0	17	0	476	3,454
Own Use in Electricity, CHP and Heat Plants	30	0	0	0	0	0	0	0
Coal Mines	31	0	0	0	0	0	0	0
Patent Fuel Plants (Energy)	32	0	0	0	0	0	0	0
Coke Ovens (Energy)	33	0	0	0	0	0	476	3,454
BKB Plants (Energy)	34	0	0	0	0	0	0	0
Gas Works (Energy)	35	0	0	0	0	0	0	0
Blast Furnaces (Energy)	36	0	0	0	17	0	0	0
Petroleum Refineries	37	0	0	0	0	0	0	0
Coal Liquefaction Plants (Energy)	38	0	0	0	0	0	0	0
Non-specified (Energy)	39	0	0	0	0	0	0	0
Distribution Losses	40	0	0	0	0	0	0	1,044
Total Final Consumption	41	0	623	23	0	1,066	3,133	732
Total Non-Energy Use	42	0	0	0	0	0	0	0
Non-Energy Use Industry/Transformation/Construction	43	0	0	0	0	0	0	0
Of which: Non-Energy Use-Chemical/Petrochem	44	0	0	0	0	0	0	0
Non-Energy Use in Transport	45	0	0	0	0	0	0	0
Non-Energy Use in Other Sectors	46	0	0	0	0	0	0	0

Example: COKE OVEN DATA

Chile		Coking Coal	Other Bituminous Coal	Coke Oven Coke	Coal Tar	Gas Works Gas	Coke Oven Gas	Blast Furnace Gas
		10 ³ t	10 ³ t	10 ³ t	10 ³ t	TJ (gross)	TJ (gross)	TJ (gross)
SUPPLY AND TRANSFORMATION SECTOR		B	C	H	J	L	M	N
ENERGY END USE SPECIFICATION								
Final Energy Consumption	47	0	623	23	0	1,066	3,133	732
Industry Sector	48	0	599	23	0	0	3,133	732
Iron and Steel	49	0	0	0	0	0	3,133	732
Chemical (including Petrochemical)	50	0	0	0	0	0	0	0
Non-Ferrous Metals	51	0	0	0	0	0	0	0
Non-Metallic Minerals	52	0	332	0	0	0	0	0
Transport Equipment	53	0	0	0	0	0	0	0
Machinery	54	0	0	0	0	0	0	0
Mining and Quarrying	55	0	81	19	0	0	0	0
Food, Beverages and Tobacco	56	0	0	0	0	0	0	0
Paper, Pulp and Printing	57	0	12	0	0	0	0	0
Wood and Wood Products	58	0	0	0	0	0	0	0
Construction	59	0	0	0	0	0	0	0
Textiles and Leather	60	0	0	0	0	0	0	0
Non-specified (Industry)	61	0	174	4	0	0	0	0
Transport Sector	62	0	0	0	0	0	0	0
Rail	63	0	0	0	0	0	0	0
Domestic Navigation	64	0	0	0	0	0	0	0
Non-specified (Transport)	65	0	0	0	0	0	0	0
Other Sectors	66	0	24	0	0	1,066	0	0
Commercial and Public Services	67	0	6	0	0	575	0	0
Residential	68	0	0	0	0	491	0	0
Agriculture/Forestry	69	0	0	0	0	0	0	0
Fishing	70	0	18	0	0	0	0	0
Non-specified (Other)	71	0	0	0	0	0	0	0



International
Energy Agency

Checks: COKE OVEN DATA

	COKE OVENS	Chile	
	Outputs	2008	Source of Data
1	Coke Oven Coke.Indigenous Production	497	Table 1, Row 6, Column H
2	Coke Oven Coke.From Other Sources	-	
3	Coke Oven Coke.NCV	27 350	Table 4, Row 7, Column H
4	Coke Oven Coke Production TJ	13 593	Row 6 x Row 9
5	Coke Oven Cole From Other Sources TJ	--	
6	Coal Tar.Indigenous Production	18	Table 1, Row 6, Column J
7	Coal Tar.From Other Sources	-	
8	Coal Tar.NCV	41 338	Table 4, Row 7, Column J
	Coal Tar Production TJ	744	Row 11 x Row 13
	Coal Tar From Other Sources TJ	--	
	Coke Oven Gas (TJ Net) Indigenous Production	4 111	90% x (Table 1, Row 6, Column M)
	Coke Oven Gas (TJ Net) From Other Sources	--	
13	Inputs		
14	NATGAS		
15	OIL		
16	COAL		
17	Coking Coal.Coke Ovens (Transformation)	675	Table 1, Row 23, Column B
18	Coking Coal.NCV	22 310	Table 4, Row 13, Column B
19	Coking Coal TJ Transformation	19 318	Row 17 x Row 18
20	Coke Oven Gas (TJ Net) Energy	428	Table 1, Row 44, Column M
21	Blast Furnace Gas TJ Energy	3 454	Table 1, Row 44, Column N
22	REN		
23	ELE		
24			
25	Transformation Total %	95.5	$(4+5+9+10+11+12) / 19$
26	Coke Oven Coke.Production %	70.4	Row 4 / Row 19
27	Coke Oven Coke.From Other Sources %	0.0	
28	Coal Tar.Production %	3.9	Row 9 / Row 19
29	Coal Tar.From Other Sources %	0.0	
30	Coke Oven Gas.Production %	21.3	Row 11 / Row 19
31	Coke Oven Gas.From Other Sources %	0.0	
32			
33	TRANSFORMATION + ENERGY TOTAL %	79.5	$(4+5+9+10+11+12) / (19+20+21)$

TABLES 2 & 3: ORIGIN/DESTINATION TRADE

Table 2
Imports
66 Countries
of Origin

Table 3
Exports
73 Countries
of Destination
5 'Other'
Regions

TABLE 2. IMPORTS BY ORIGIN

Chile		Anthracite	Coking Coal	Other Bituminous Coal	Sub-bituminous Coal	Lignite/Brown Coal	Patent Fuel	Coke Oven Coke	Coal Tar	BKB/PB
		10 ³ t	10 ³ t	10 ³ t	10 ³ t	10 ³ t	10 ³ t	10 ³ t	10 ³ t	10 ³ t
		A	B	C	D	E	F	G	H	I
Albania	1	0	0	0	0	0	0	0	0	0
Armenia	2	0	0	0	0	0	0	0	0	0
Australia	3	0	421	196	0	0	0	0	0	0
Austria	4	0	0	0	0	0	0	0	0	0
Azerbaijan	5	0	0	0	0	0	0	0	0	0
Belarus	6	0	0	0	0	0	0	0	0	0
Belgium	7	0	0	0	0	0	0	0	0	0
Bosnia and Herzegovina	8	0	0	0	0	0	0	0	0	0
Bulgaria	9	0	0	0	0	0	0	0	0	0
Canada	10	0	297	122	0	0	0	0	0	0
China, People's Republic	11	0	0	0	0	0	0	0	0	0
Colombia	12	0	0	4,433	0	0	0	0	0	0
Croatia	13	0	0	0	0	0	0	0	0	0
Cyprus	14	0	0	0	0	0	0	0	0	0
Czech Republic	15	0	0	0	0	0	0	0	0	0
Denmark	16	0	0	0	0	0	0	0	0	0
Estonia	17	0	0	0	0	0	0	0	0	0
Finland	18	0	0	0	0	0	0	0	0	0
France	19	0	0	0	0	0	0	0	0	0
Georgia	20	0	0	0	0	0	0	0	0	0
Germany	21	0	0	0	0	0	0	0	0	0
Greece	22	0	0	0	0	0	0	0	0	0
Hungary	23	0	0	0	0	0	0	0	0	0
Iceland	24	0	0	0	0	0	0	0	0	0
Indonesia	25	0	0	528	0	0	0	0	0	0
Ireland	26	0	0	0	0	0	0	0	0	0
Israel	27	0	0	0	0	0	0	0	0	0
Italy	28	0	0	0	0	0	0	0	0	0

TABLE 3. EXPORTS BY DESTINATION

Chile		Anthracite	Coking Coal	Other Bituminous Coal	Sub-bituminous Coal	Lignite/Brown Coal	Patent Fuel	Coke Oven Coke	Coal Tar	BKB/PB
		10 ³ t	10 ³ t	10 ³ t	10 ³ t	10 ³ t	10 ³ t	10 ³ t	10 ³ t	10 ³ t
		A	B	C	D	E	F	G	H	I
Albania	1	0	0	0	0	0	0	0	0	0
Algeria	2	0	0	0	0	0	0	0	0	0
Argentina	3	0	0	0	0	0	0	0	0	0
Armenia	4	0	0	0	0	0	0	0	0	0
Australia	5	0	0	0	0	0	0	0	0	0
Austria	6	0	0	0	0	0	0	0	0	0
Azerbaijan	7	0	0	0	0	0	0	0	0	0
Belarus	8	0	0	0	0	0	0	0	0	0
Belgium	9	0	0	0	0	0	0	0	0	0
Bosnia and Herzegovina	10	0	0	0	0	0	0	0	0	0
Brazil	11	0	0	0	0	0	0	0	0	0
Bulgaria	12	0	0	0	0	0	0	0	0	0
Canada	13	0	0	0	0	0	0	0	0	0
Chile	14	0	0	0	0	0	0	0	0	0
China, People's Republic	15	0	0	0	0	0	0	0	0	0
Chinese Taipei	16	0	0	0	0	0	0	0	0	0
Croatia	17	0	0	0	0	0	0	0	0	0
Cyprus	18	0	0	0	0	0	0	0	0	0
Czech Republic	19	0	0	0	0	0	0	0	0	0
Denmark	20	0	0	0	0	0	0	0	0	0
Egypt	21	0	0	0	0	0	0	0	0	0
Estonia	22	0	0	0	0	0	0	0	0	0
Finland	23	0	0	0	0	0	0	0	0	0
France	24	0	0	0	0	0	0	0	0	0

TABLE 4. CALORIFIC VALUES

15 Primary and derived coal products

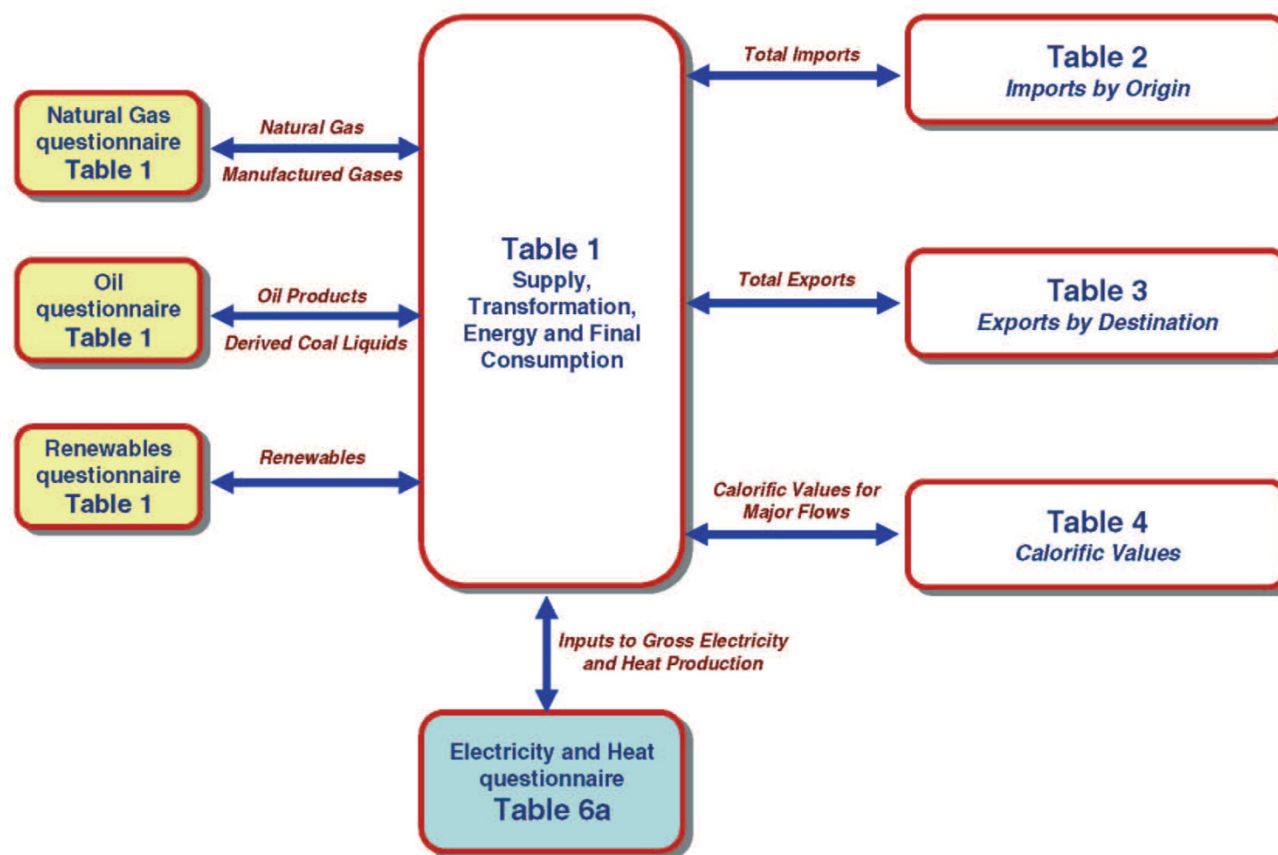
- **Production**
- **Imports**
- **Exports**
- **Used in Coke Ovens**
- **Used in Blast Furnaces**
- **Used in main Activity Plants**
- **Used in Industry**
- **For Other Uses**

TABLE 4. CALORIFIC VALUES

Chile		Anthracite	Coking Coal	Other Bituminous Coal	Sub-bituminous Coal	Lignite/Brown Coal	Peat	Patent Fuel	Coke Oven Coke	Gas Coke	Coal Tar	BKB/PB*
		MJ/tonne	MJ/tonne	MJ/tonne	MJ/tonne	MJ/tonne	MJ/tonne	MJ/tonne	MJ/tonne	MJ/tonne	MJ/tonne	MJ/tonne
		A	B	C	D	E	F	G	H	I	J	K
Production	gross 1	0		17,348	0	0	0	0	28,790	0	43,514	0
	net 2	0		16,481	0	0	0	0	27,350	0	41,338	0
Imports	gross 3	0	30,125	24,404	0	0	0	0	0	0	0	0
	net 4	0	28,619	23,801	0	0	0	0	0	0	0	0
Exports	gross 5	0	0	0	0	0	0	0	20,913	0	0	0
	net 6	0	0	0	0	0	0	0	19,867	0	0	0
Used in coke ovens	gross 7	0	30,125	0	0	0	0	0	0	0	0	0
	net 8	0	28,619	0	0	0	0	0	0	0	0	0
Used in blast furnaces	gross 9	0	0	0	0	0	0	0	28,790	0	43,514	0
	net 10	0	0	0	0	0	0	0	27,350	0	41,338	0
Used in Main Activity Plants	gross 11	0	0	24,404	0	0	0	0	0	0	0	0
	net 12	0	0	23,801	0	0	0	0	0	0	0	0
Used in industry	gross 13	0	0	26,748	0	0	0	0	28,790	0	0	0
	net 14	0	0	25,411	0	0	0	0	27,350	0	0	0
For Other Uses	gross 15	0	30,125	0	0	0	0	0	0	0	0	0
	net 16	0	28,619	0	0	0	0	0	0	0	0	0

RELATIONSHIPS OF ANNUAL COAL QUESTIONNAIRE

Table Relations within the Coal Questionnaire



DATA QUALITY CHECKS

- **Integers, negative numbers, sums**
- **Percentage differences with prior year**
- **Comparisons to other questionnaires**
- **Calorific values**
- **Net vs. gross calorific values**
- **Statistical difference**
- **Transformation efficiency rates**
- **Shares of coke oven outputs**
- **Shifts in product classification**
- **Breaks in series**
- **Trade data coincides with trade partners**

South Africa DATA ISSUES

- **Coal trade data by type**
- **Inputs and outputs of coke ovens/blast furnace industry**
- **Input to (and output of) Liquefaction**

IEA data dissemination

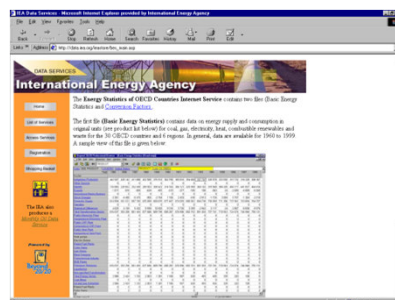
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Thank you