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**COMMISSION STAFF WORKING DOCUMENT****EU ENERGY POLICY DATA**

(accompanying the following documents)

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<b>COM(2006) 844 final</b>	<b>SEC(2006) 1717 SEC(2006) 1718</b>
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<b>COM(2006) 846 final</b>	<b>SEC(2006) 1715</b>
<b>COM(2006) 847 final</b>	<b>- - -</b>
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<b>COM(2007) 1 final</b>	<b>- - -</b>

## COMMISSION STAFF WORKING DOCUMENT

### EU ENERGY POLICY DATA

#### **Table of Contents:**

1.	Chapter 1: Global Energy Trends .....	3
2.	Chapter 2: The Current EU Energy Position .....	7
3.	Chapter 3: The Competitive Edge – Development of Energy Prices.....	20
4.	Chapter 4: Snapshot of Renewable Energy Sources .....	25
5.	Chapter 5: The Challenge of Climate Change .....	31
6.	Chapter 6: Comparison of Main Energy Sources .....	38
7.	Chapter 7: EU-27 and Member States Energy Factsheets .....	44

**In order to ensure comparability figures rely mostly on IEA and Eurostat and are based on 2006 data for the new EU-27. The reference year used is 2004.**

#### **Sources:**

##### **European Commission**

EUROSTAT

DG TREN

DG ENVIRONMENT

European Environmental Agency

EURATOM

European Energy and Transport: Trends to 2030 – Update 2005, DG TREN, 2006

##### **International Energy Agency**

World Energy Outlook 2006, OECD IEA, 2006

Electricity Annual Report 2005, OECD IEA, 2005

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Energy Prices and Taxes, 3Q2006, OECD IEA, 2006

##### **Other sources**

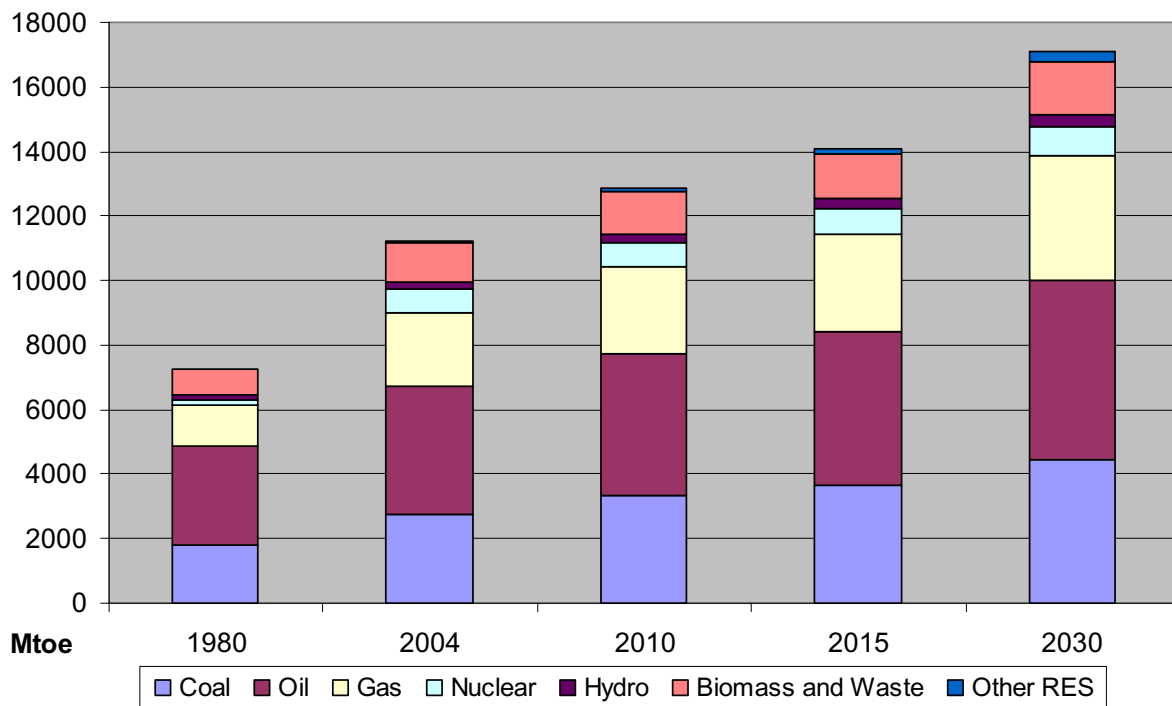
OMV, 2003

**1. CHAPTER 1: GLOBAL ENERGY TRENDS**

**List of Figures:**

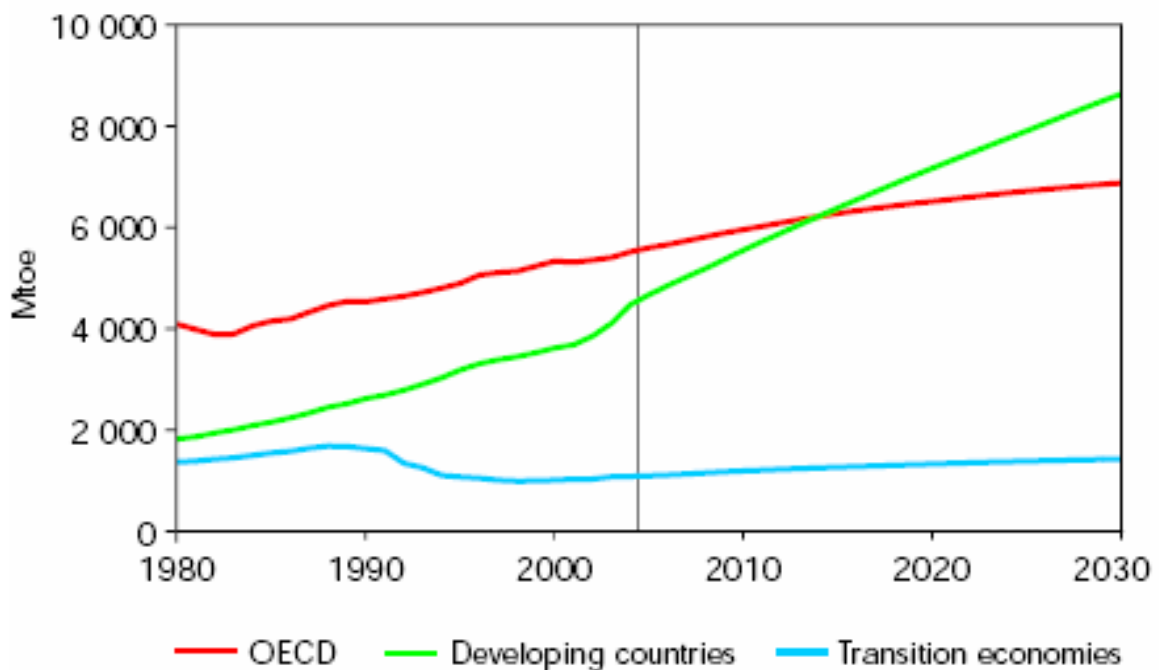
1.1.	World Primary Energy Demand 1980-2030 (IEA Reference Scenario).....	4
1.2.	World Energy Demand 2005-2030 by Region (IEA Reference Scenario).....	4
1.3.	World Incremental Electricity Generation by Fuel (IEA Reference Scenario) .....	5
1.4.	Cumulative Energy Investment in Energy Supply Infrastructure 2005-2030 (IEA Reference Scenario) .....	5
1.5.	Comparative Analysis of Energy Indicators of Major Global Energy Players (2004)	6

### 1.1. World Primary Energy Demand 1980-2030 (IEA Reference Scenario)



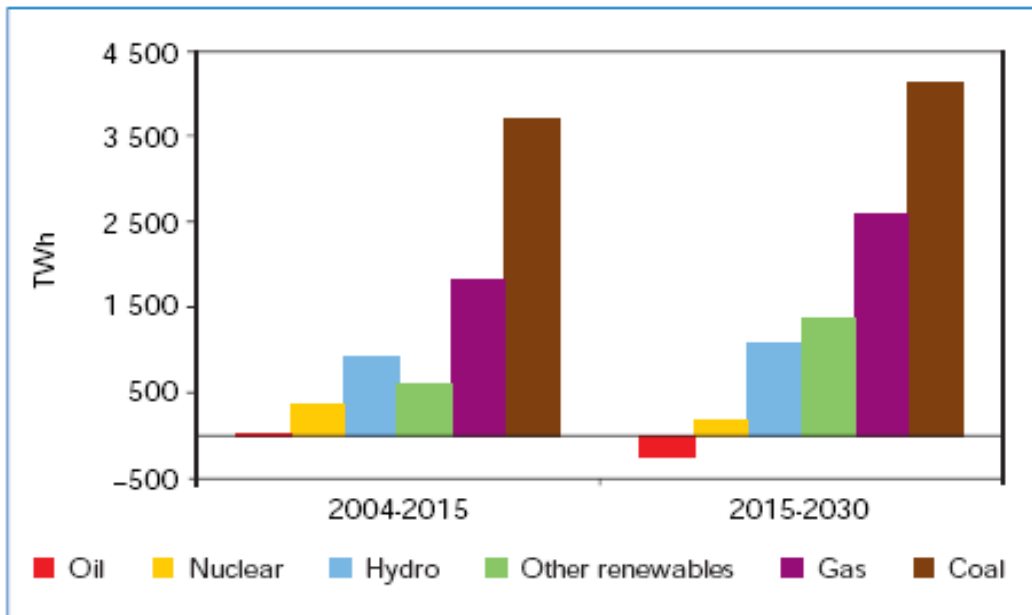
Source: WEO 2006, OECD/IEA 2006

### 1.2. World Energy Demand 2005-2030 by Region (IEA Reference Scenario)



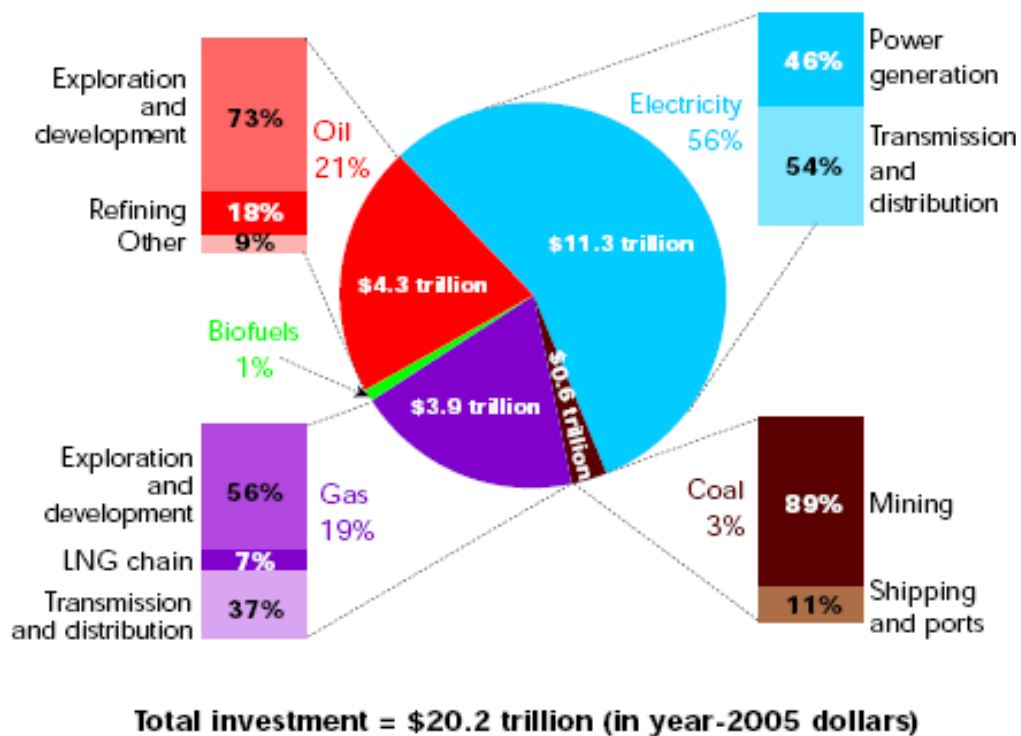
Source: WEO 2006 ©OECD/IEA 2006

### 1.3. World Incremental Electricity Generation by Fuel (IEA Reference Scenario)



Source: WEO 2006 ©OECD/IEA 2006

### 1.4. Cumulative Energy Investment in Energy Supply Infrastructure 2005-2030 (IEA Reference Scenario)



Source: WEO 2006 ©OECD/IEA 2006

### 1.5. Comparative Analysis of Energy Indicators of Major Global Energy Players (2004)

Main Energy Indicators	Brazil	China	India	Japan	Russia	USA	World	EU-27
Total Primary Energy Supply (TPES) [2004, Mtoe]	204.85	1 609.35	572.85	533.2	641.53	2 325.89	11 223.3	1 814.77
TPES/POP [toe/capita]	1.11	1.24	0.53	4.18	4.46	7.91	1.77	3.78
TPES/GDP [toe/000 2000\$]	0.31	0.94	0.99	0.11	1.95	0.22	0.32	0.2
TPES/GDP (PPP) [toe/000 2000\$ PPP]	0.15	0.23	0.18	0.16	0.49	0.22	0.21	0.16
CO <sub>2</sub> /TPES [tCO <sub>2</sub> /toe]	1.58	2.94	1.93	2.28	2.38	2.49	2.37	2.27
CO <sub>2</sub> /GDP [kgCO <sub>2</sub> /2000\$]	0.49	2.76	1.9	0.25	4.65	0.54	0.76	0.46
CO <sub>2</sub> /GDP (PPP) [kgCO <sub>2</sub> /2000\$ PPP]	0.23	0.67	0.35	0.35	1.17	0.54	0.51	0.36
Total Primary Energy Supply - Mix [2004, share in %]								
oil	42.3%	19.3%	22.2%	47.8%	20.4%	40.7%	35.2%	36.8%
gas	7.7%	2.6%	4.1%	13.2%	54.0%	22.1%	20.6%	24%
coal/solid fuels	6.9%	61.7%	34.1%	21.8%	16.2%	23.4%	24.7%	16.2%
nuclear	1.5%	0.8%	0.8%	13.8%	5.9%	9.1%	6.4%	14.4%
hydro	13.5%	1.9%	1.3%	1.5%	2.4%	1.0%	2.2%	1.54%
combined renewable + waste	26.5%	13.7%	37.4%	1.2%	1.1%	3.0%	10.5%	4.51%
geothermal/solar/wind	0.0%		0.1%	0.7%	0.1%	0.5%	0.5%	0.66%
Total Final Consumption [2004, Mtoe]	172.2	1038.4	403.3	354.3	425.2	1 600.8	7 644.4	1 177.10
Intensity of total R&D [2003, % of GDP] (1)				3.12%		2.59%		1.97%
Net Imports [Mtoe]	31.33	90.37	105.8	440.75	-511.01	714.51	4 352.7	934.51
Net Imports/TPES [%]	15.29%	5.62%	18.47%	82.66%	-79.65%	30.72%	38.8%	50%

(1) Including industry and public research. Data for EU refer to EU-25 (Source: DG RTD)

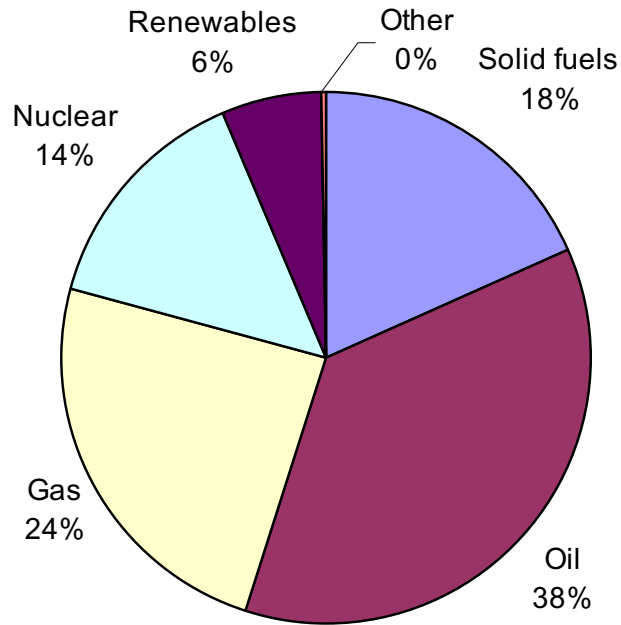
Source: European Commission DG TREN, IEA

## 2. CHAPTER 2: THE CURRENT EU ENERGY POSITION

### **List of Figures:**

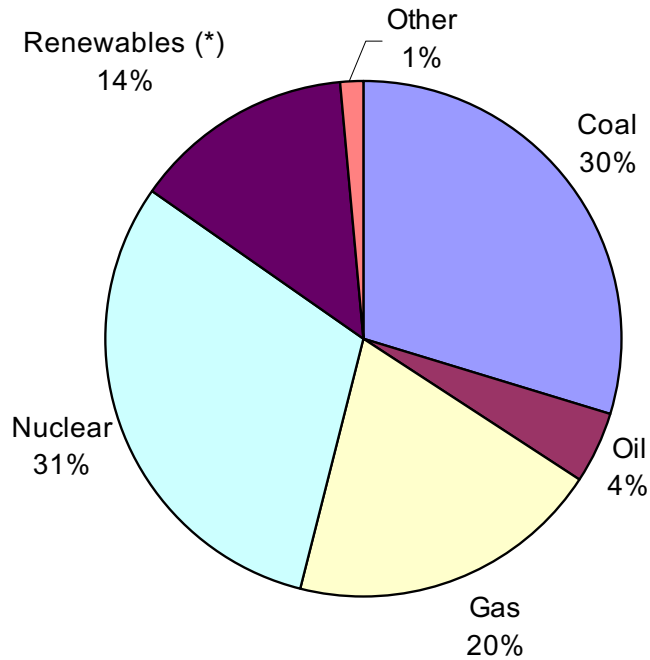
2.1.	EU-27 Total Primary Energy Supply (2004): about 1 800 Mtoe.....	8
2.2.	EU-27 Electricity Mix (2004).....	8
2.3.	EU-27 Energy Intensity .....	9
2.4.	EU-27 Import Dependency 2004 (%) .....	10
2.5.	EU-27 Energy Mix with Renewable Energy Sources (2004).....	11
2.6.	EU-27 Origin of Natural Gas (2004) .....	11
2.7.	EU-27 Origin of Oil (2004) .....	12
2.8.	EU-27 Origin of Hard Coal (2004).....	12
2.9.	EU-27 Net Imports of Fossil Fuels (Baseline Scenario).....	13
2.10.	EU-27 Development of Import Dependence up to 2030 (Baseline Scenario).....	13
2.11.	EU-27 Total Primary Energy Supply (Baseline Scenario) .....	14
2.12.	Origin of Enriched Uranium to EU-25 (2005).....	14
2.13.	EU-25 Origins of natural uranium 2005 .....	15
2.14.	EU-27 Overview of Operational and Shutdown Nuclear Power Plants .....	15
2.15.	Anticipated effects on Capacity of Coal-Fired Power Plants 2005-2050 .....	16
2.16.	Nuclear Share in Power Generation in the Member States.....	16
2.17.	EU-27 Cumulative Energy Investment Needs up to 2030 (Baseline Scenario).....	17
2.18.	EU-27 Cumulative Investments in Energy by Electricity Supply Infrastructure (2005-2030) .....	18
2.19.	EU-27 Cumulative Energy Investments (2005-2030): €1 800 billion.....	18
2.20.	EU-27 Cumulative Electricity Investments (2005-2030): €900 billion.....	19

**2.1. EU-27 Total Primary Energy Supply (2004): about 1 800 Mtoe**



*Source: European Commission DG TREN, Eurostat*

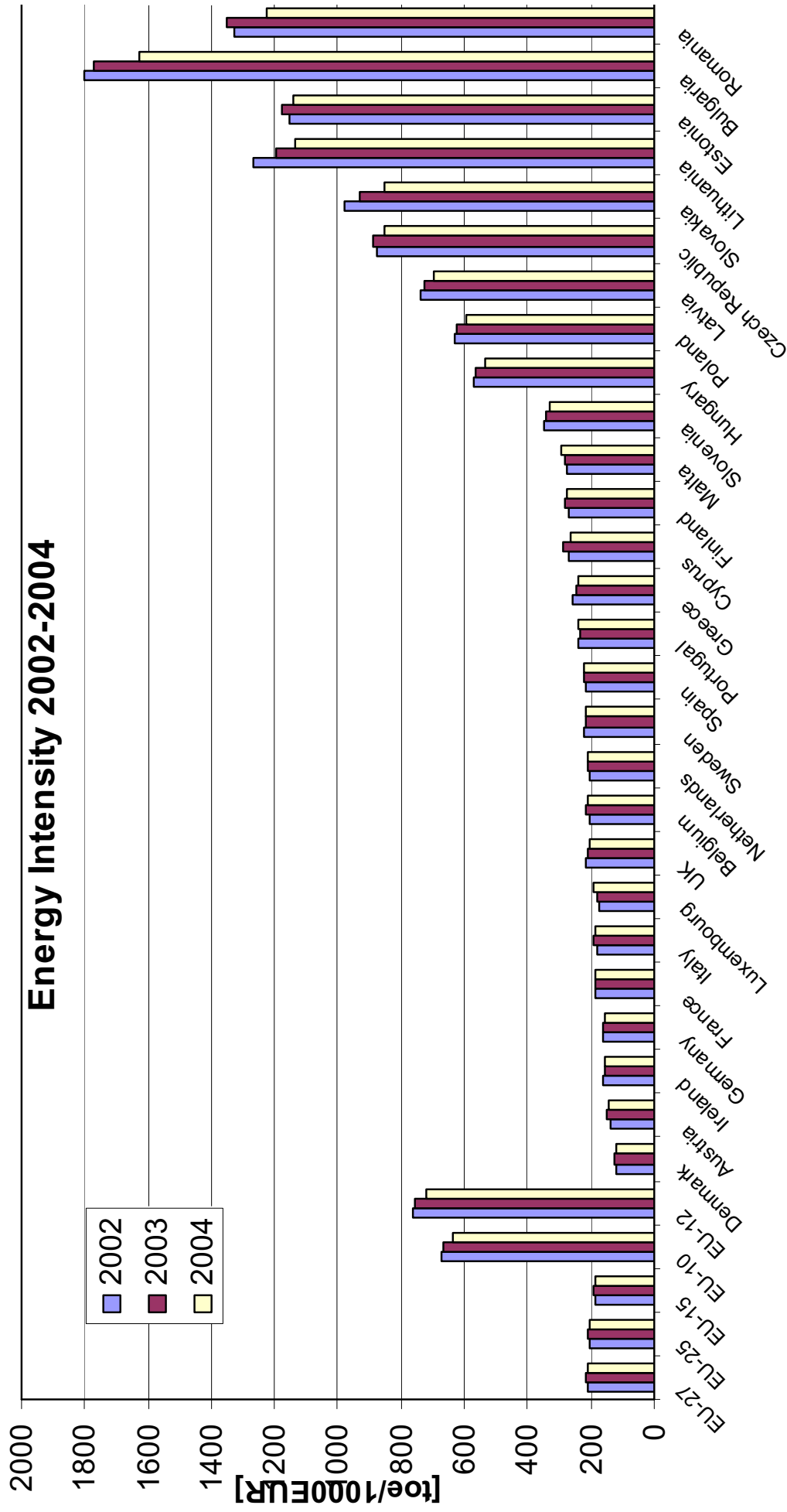
**2.2. EU-27 Electricity Mix (2004)**



*Source: European Commission DG TREN, Eurostat, \*Renewables:*

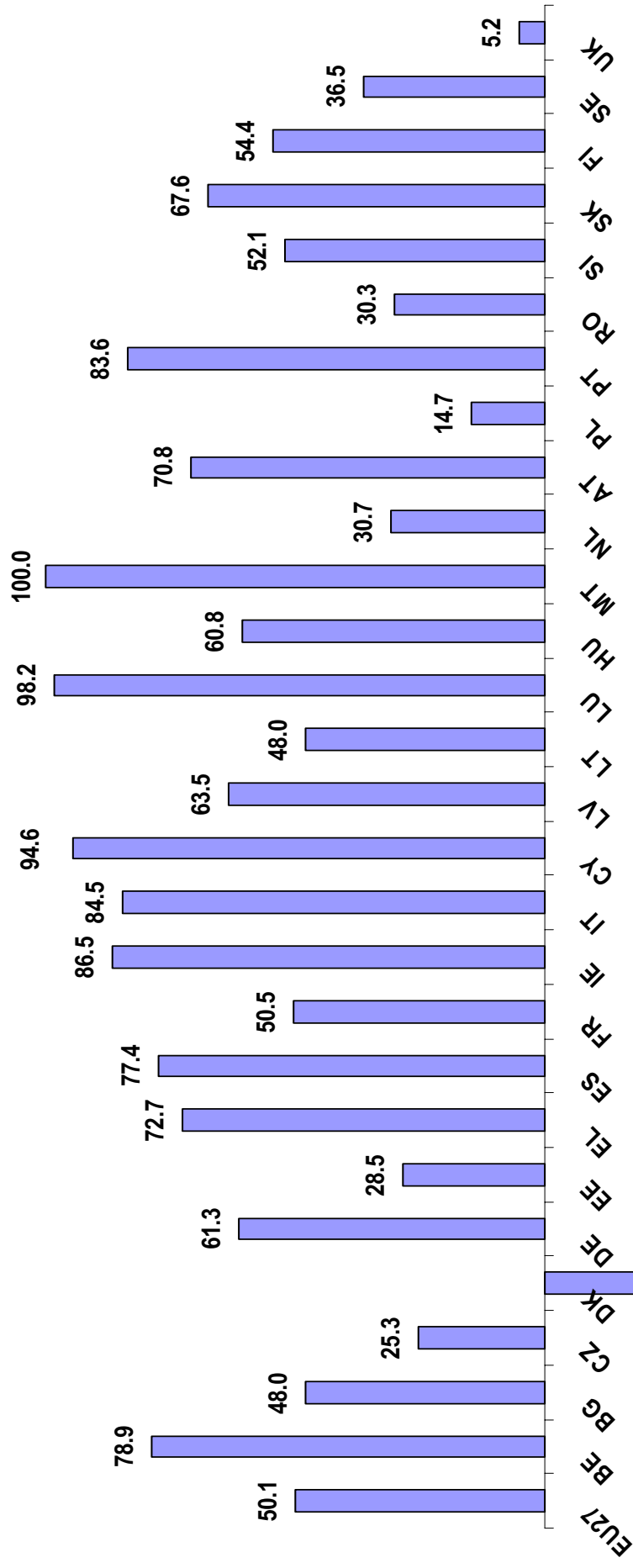


2.3. EU-27 Energy Intensity



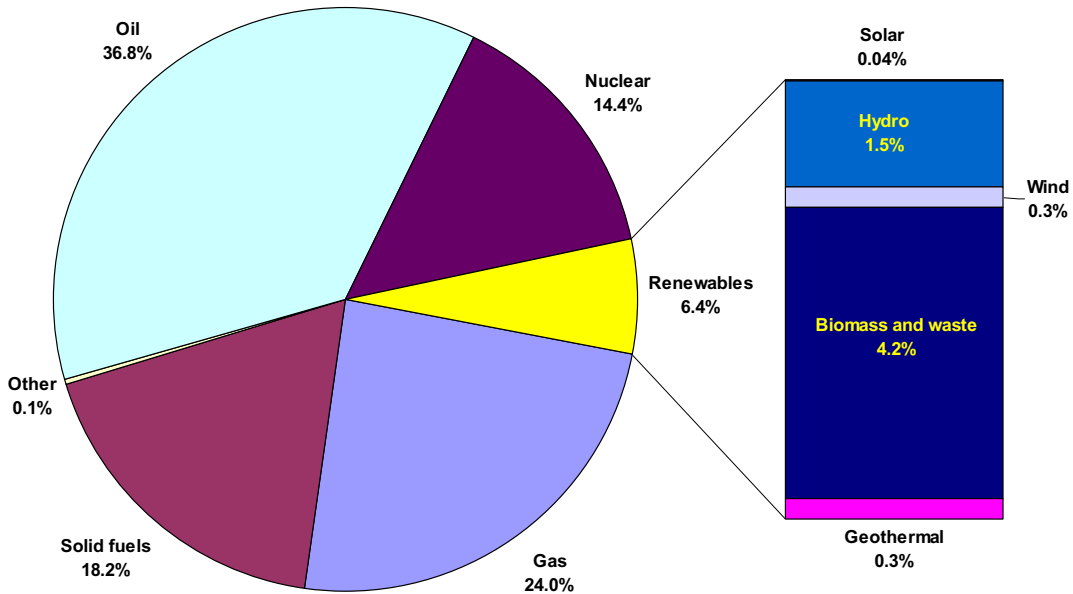
Source: Eurostat

2.4. EU-27 Import Dependency 2004 (%)



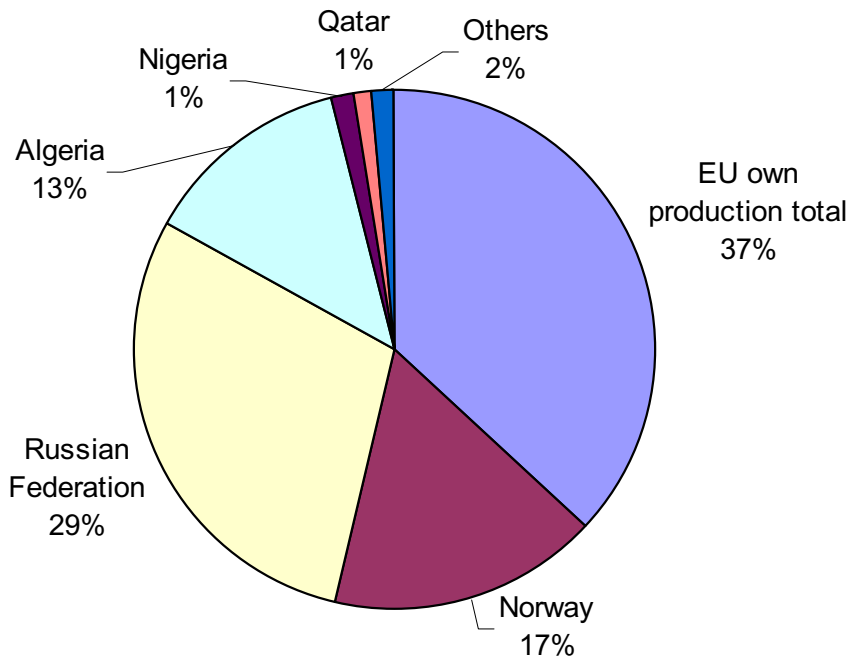
Source: Eurostat

**2.5. EU-27 Energy Mix with Renewable Energy Sources (2004)**



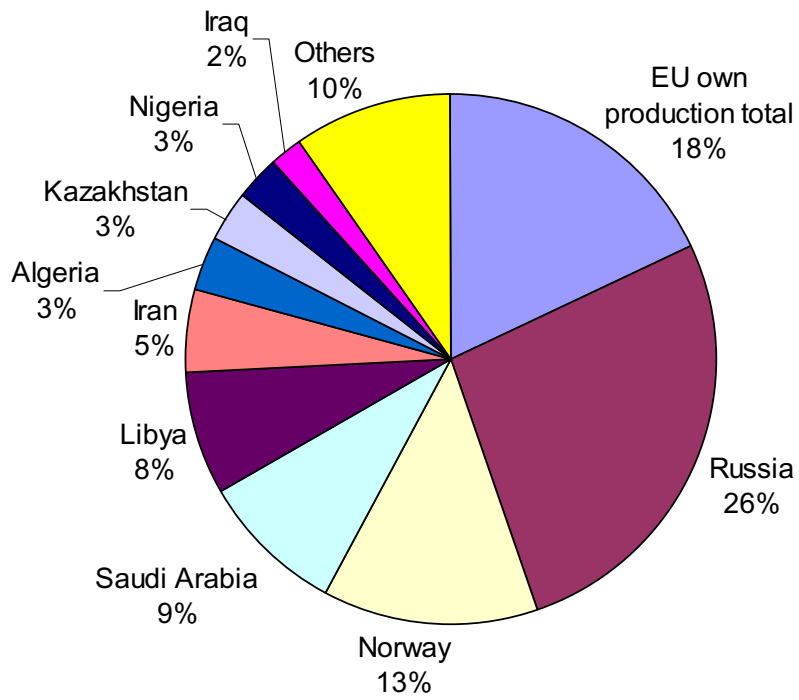
Source: European Commission DG TREN, Eurostat

**2.6. EU-27 Origin of Natural Gas (2004)**



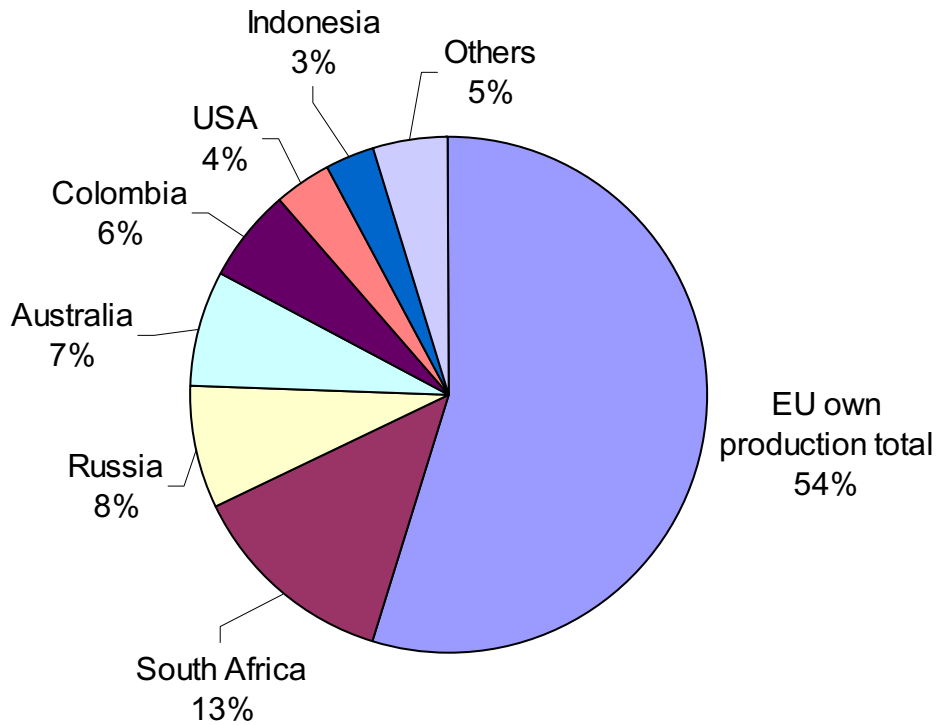
Source: European Commission DG TREN, Eurostat

**2.7. EU-27 Origin of Oil (2004)**



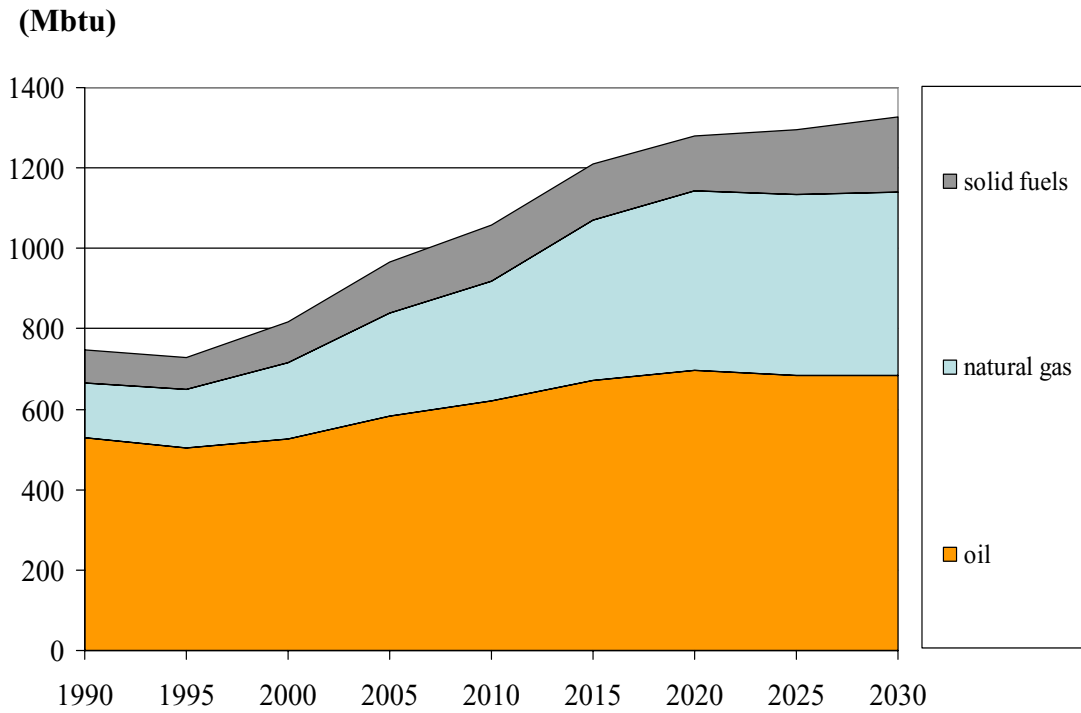
Source: European Commission DG TREN, Eurostat

**2.8. EU-27 Origin of Hard Coal (2004)**



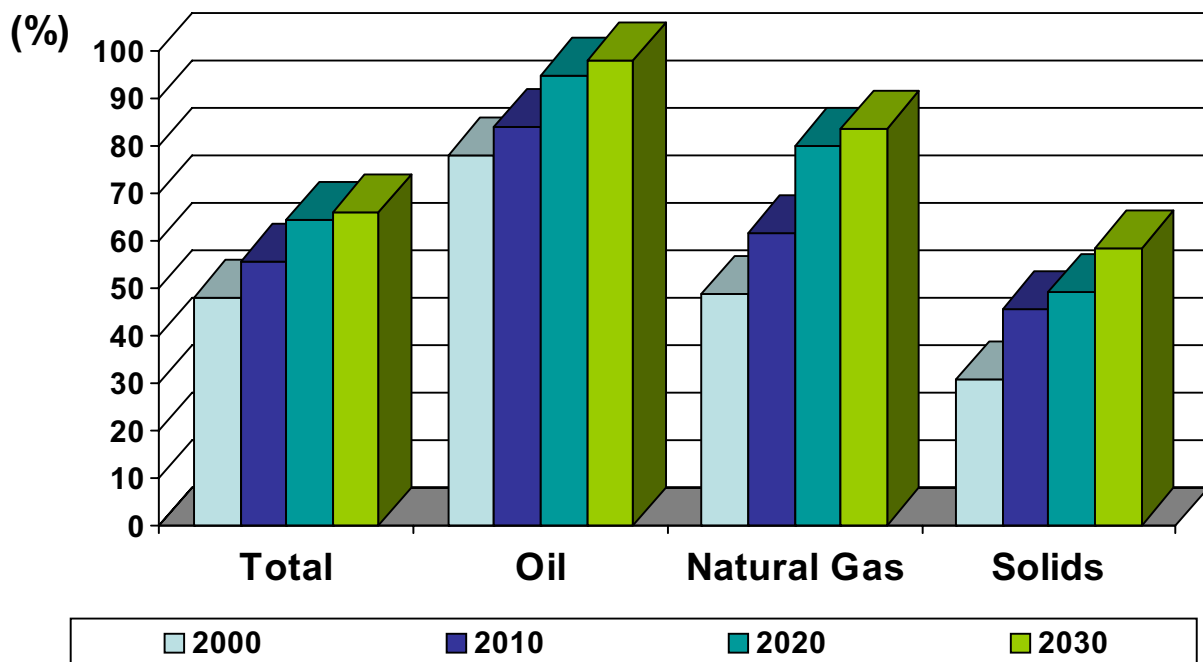
Source: European Commission DG TREN, Eurostat

## 2.9. EU-27 Net Imports of Fossil Fuels (Baseline Scenario)



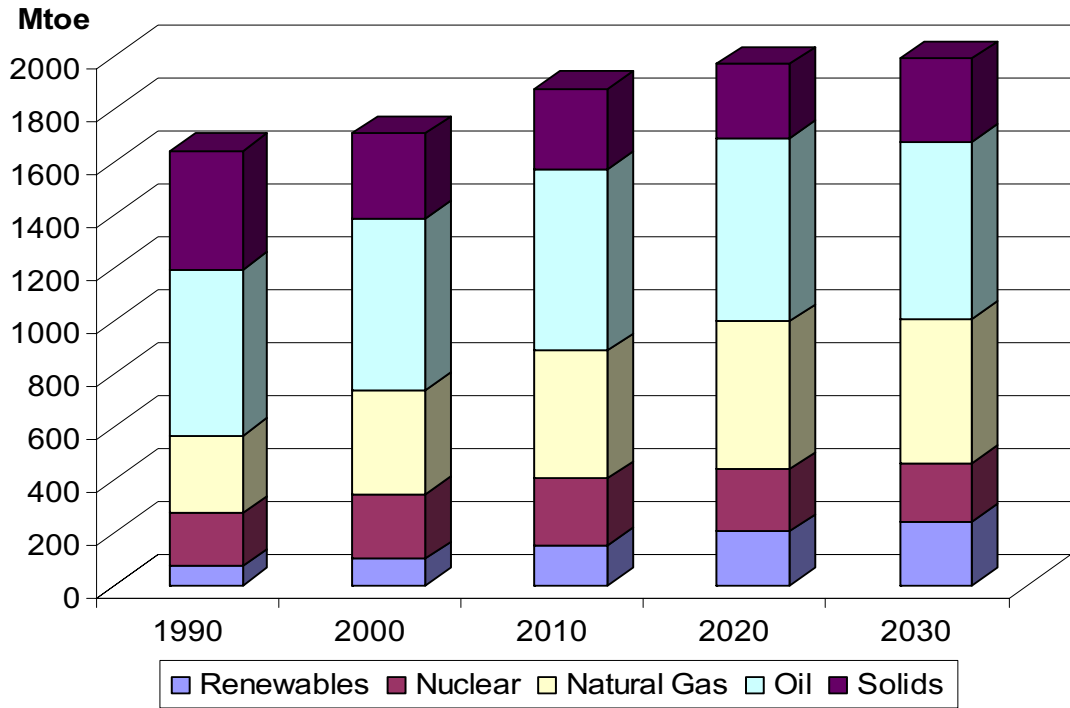
Source: European Commission DG TREN, PRIMES

## 2.10. EU-27 Development of Import Dependence up to 2030 (Baseline Scenario)



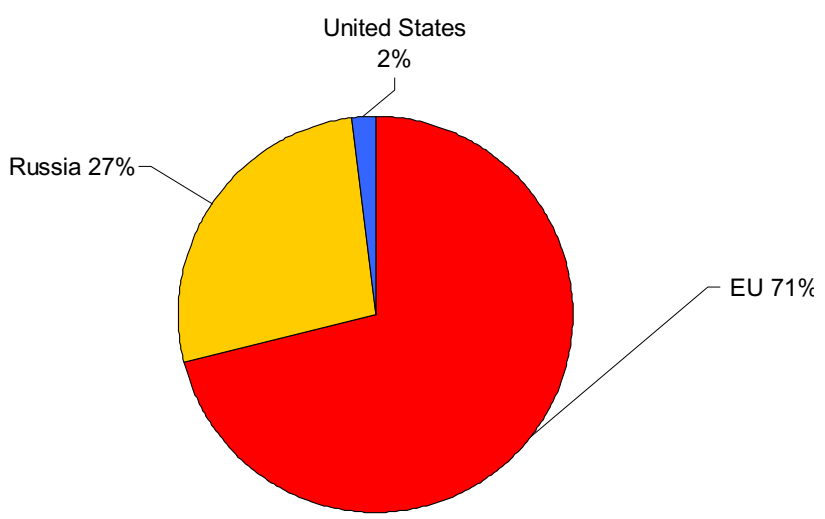
Source: European Commission DG TREN, PRIMES

**2.11. EU-27 Total Primary Energy Supply (Baseline Scenario)**



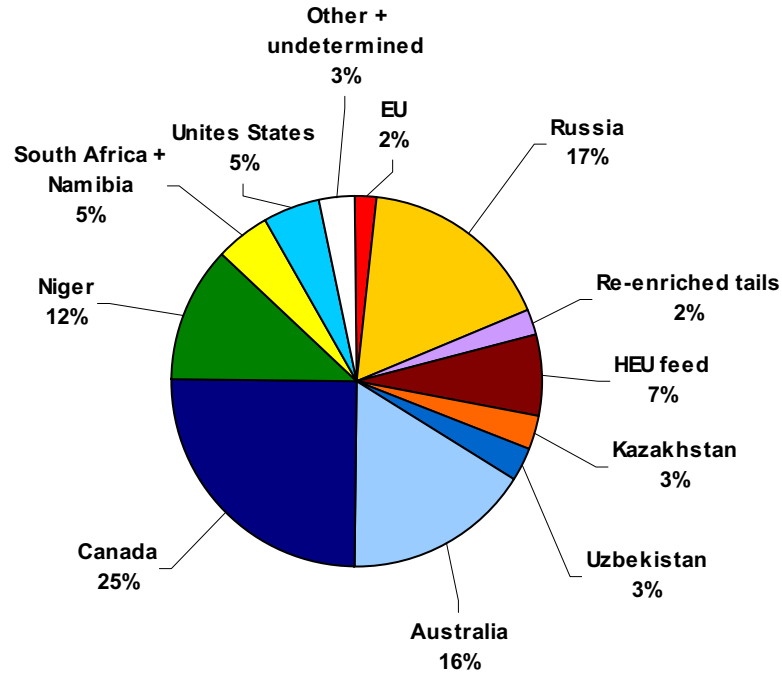
Source: European Commission DG TREN, PRIMES

**2.12. Origin of Enriched Uranium to EU-25 (2005)**



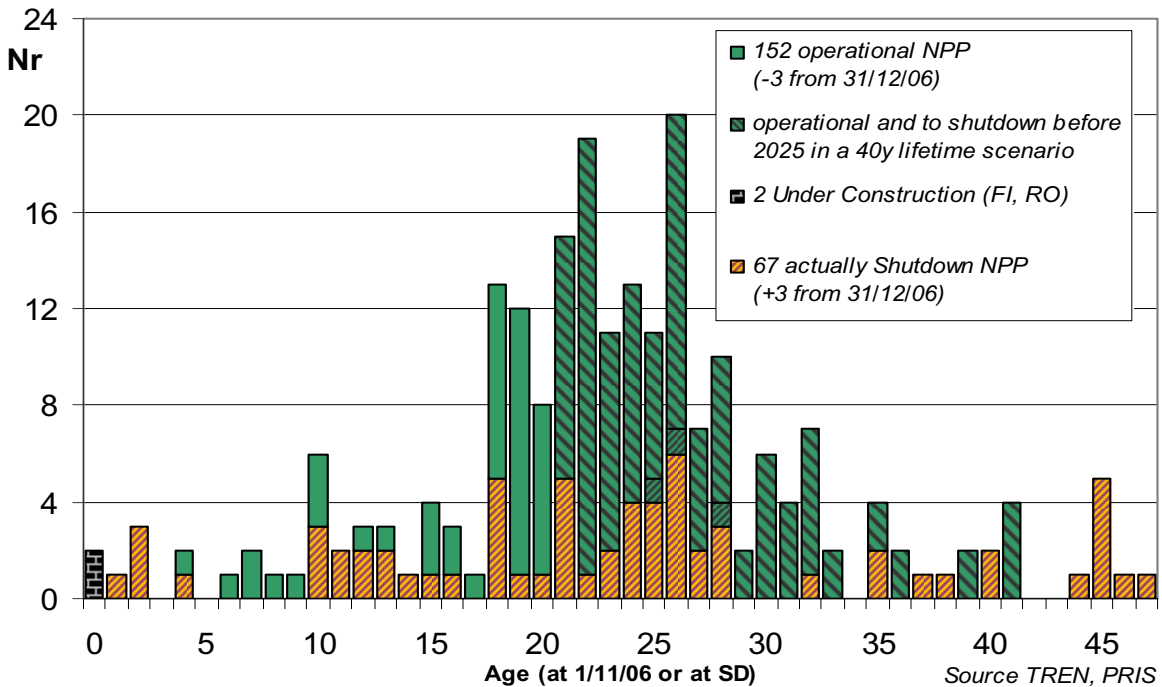
Source: European Commission DG TREN, Euratom Supply Agency

### 2.13. EU-25 Origins of natural uranium 2005



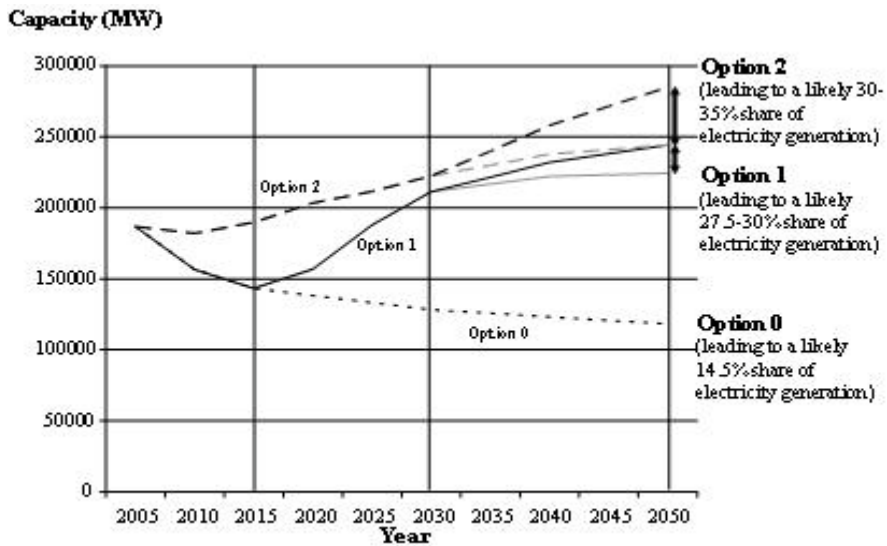
Source: European Commission DG TREN, AAE

### 2.14. EU-27 Overview of Operational and Shutdown Nuclear Power Plants



Source: European Commission DG TREN, PRIS

## 2.15. Anticipated effects on Capacity of Coal-Fired Power Plants 2005-2050



Note:

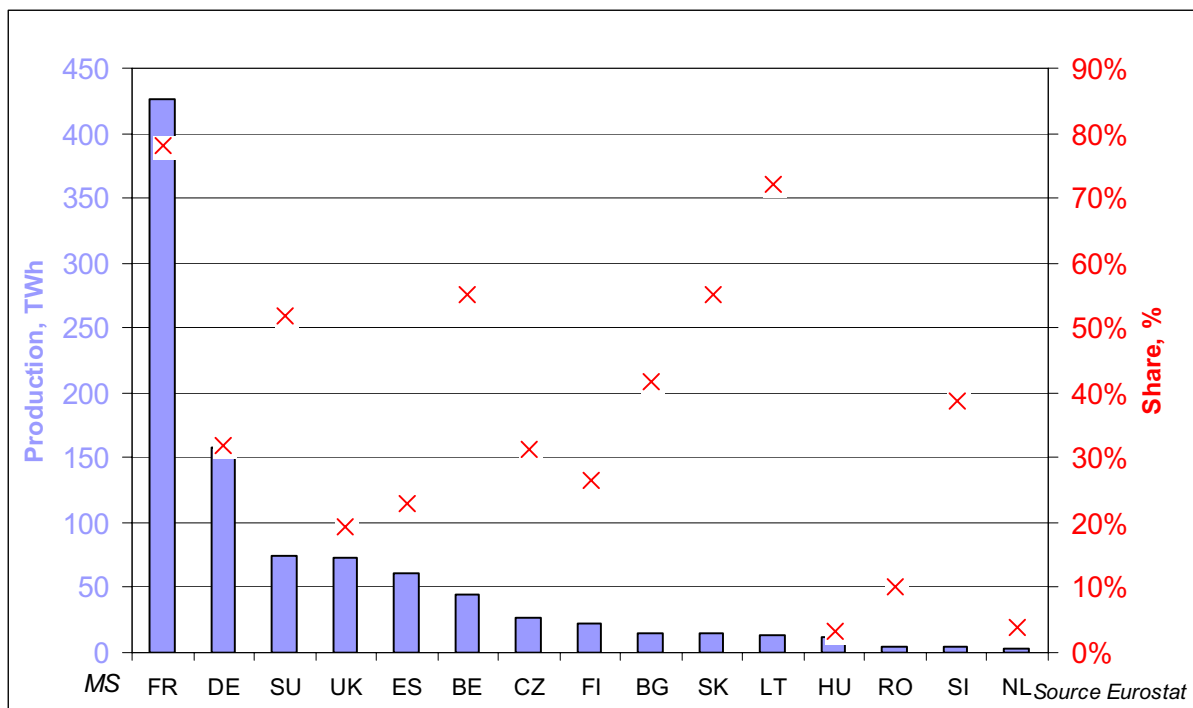
Option 0: No policy Change,

Option 1: Removal of Barriers to Sustainable Coal Technologies,

Option 2: Pro-active Introduction of Incentives for the Penetration of Sustainable Coal Technologies

Source: European Commission DG TREN

## 2.16. Nuclear Share in Power Generation in the Member States



The asterisks indicate to whether a nuclear plant is being constructed in that country or whether a project for a new plant is already in preparation or finally a decision on new build may be possible in future.

(1) \* 1 Unit under construction

(3) \*\*\* Project(s) under decision

(2) \*\* Project(s) in preparation

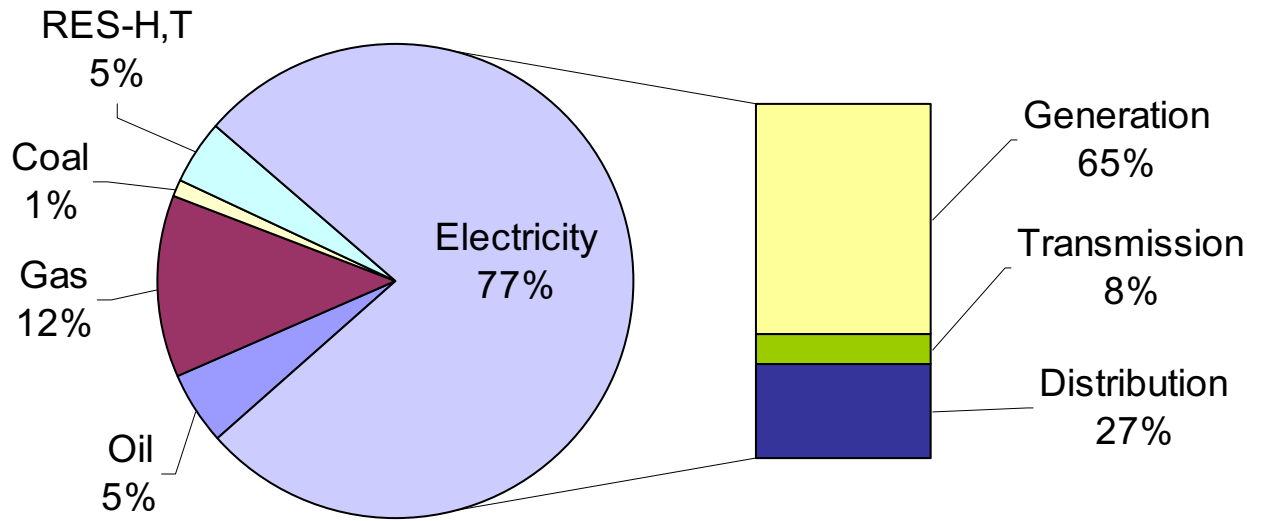


**2.17. EU-27 Cumulative Energy Investment Needs up to 2030 (Baseline Scenario)**

<b>Investment</b>		(billion EUR)	Share
<b>Oil</b> (development, exploration, refining)		90	5.1%
<b>Gas</b> (exploration and development, distribution)		221	12.3%
<b>Coal</b> (mining, shipping)		24	1.3%
<b>Renewables</b> (heating and biofuels)		78	4.4%
<b>Electricity: total investment</b>		<b>1 377</b>	<b>76.9%</b>
Of which: Generation	Total	897	50%
	<i>Gas</i>	<i>148</i>	<i>8.3%</i>
	<i>Oil</i>	<i>19</i>	<i>1%</i>
	<i>Coal</i>	<i>261</i>	<i>14.6%</i>
	<i>RES</i>	<i>327</i>	<i>18.3%</i>
	<i>Nuclear</i>	<i>141</i>	<i>7.9%</i>
Of which: Transmission		116	6.5%
Of which: Distribution		364	20.3%
<b>Total Energy Investment</b>		<b>1 790</b>	<b>100%</b>

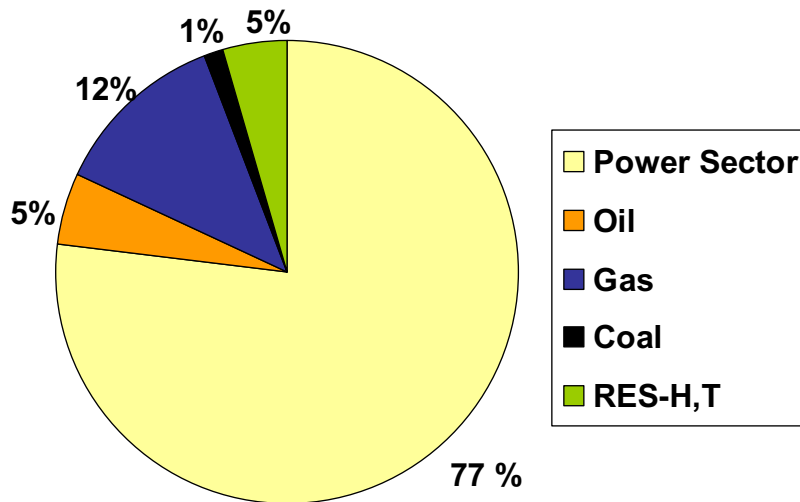
Source: European Commission DG TREN

**2.18. EU-27 Cumulative Investments in Energy by Electricity Supply Infrastructure (2005-2030)**



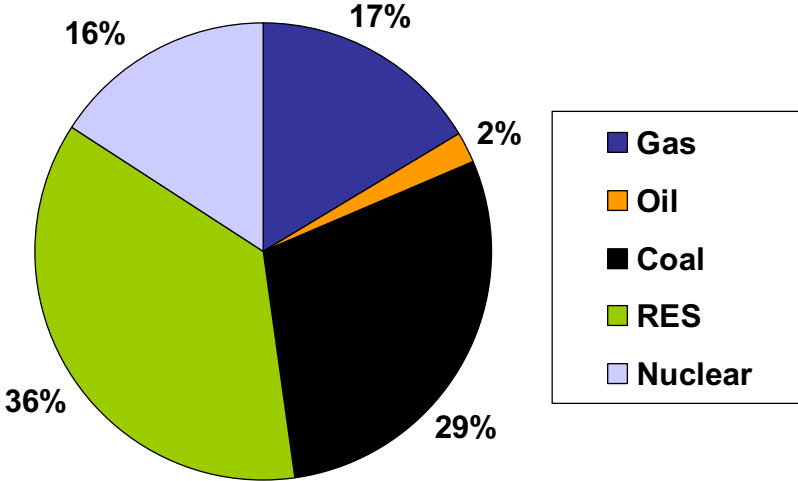
Source: European Commission DG TREN

**2.19. EU-27 Cumulative Energy Investments (2005-2030): €1 800 billion**



Source: European Commission DG TREN

2.20. EU-27 Cumulative Electricity Investments (2005-2030): €900 billion



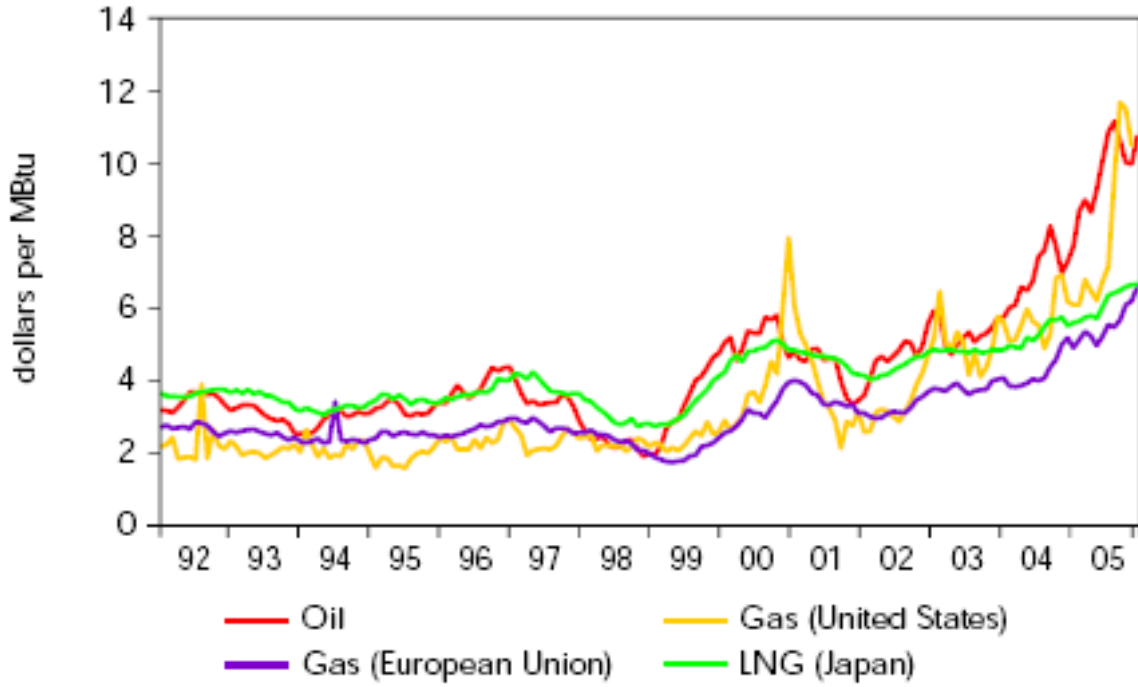
Source: European Commission DG TREN

**3. CHAPTER 3: THE COMPETITIVE EDGE – DEVELOPMENT OF ENERGY PRICES**

**List of Figures:**

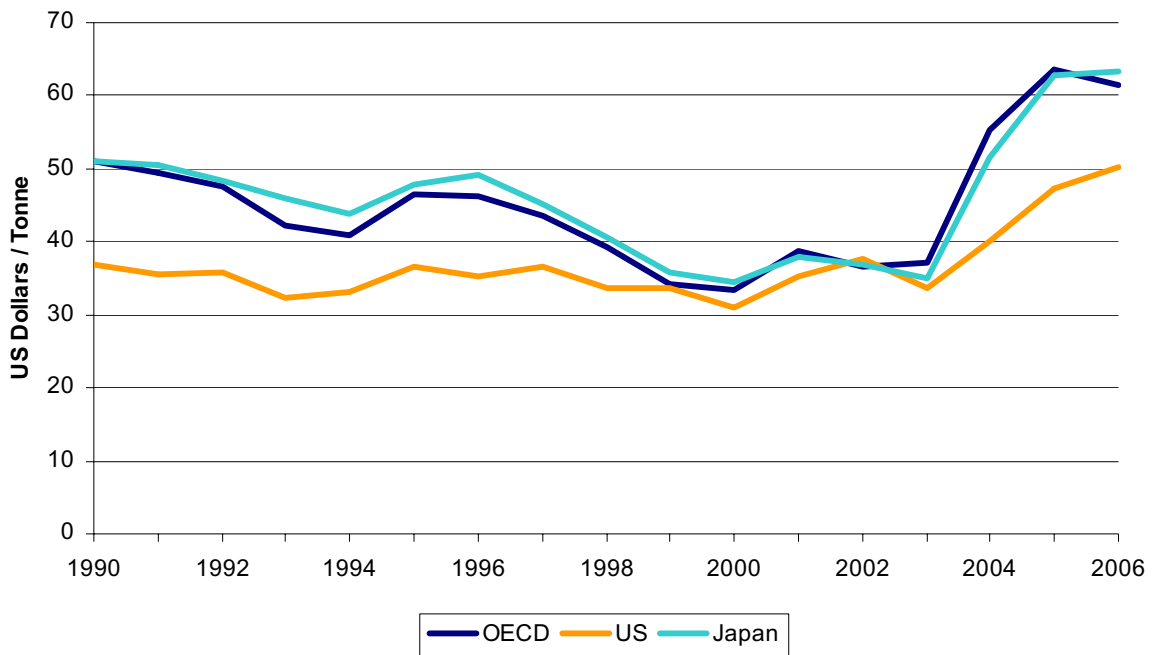
3.1.	Average Crude Oil and Natural Gas Import Prices.....	21
3.2.	Coal Import Prices .....	21
3.3.	EU, US and Japan LNG and EU Pipeline Import Prices .....	22
3.4.	EU Emission Trading Scheme: Market Volume.....	22
3.5.	EU Emission Trading Scheme: Price Development .....	23
3.6.	EU-15 Average Electricity and Gas Retail Prices 1997-2006 .....	23
3.7.	EU-15 Electricity Price Summary 1997-2006 .....	24
3.8.	EU-15 Gas Price Summary 1997-2006.....	24

### 3.1. Average Crude Oil and Natural Gas Import Prices



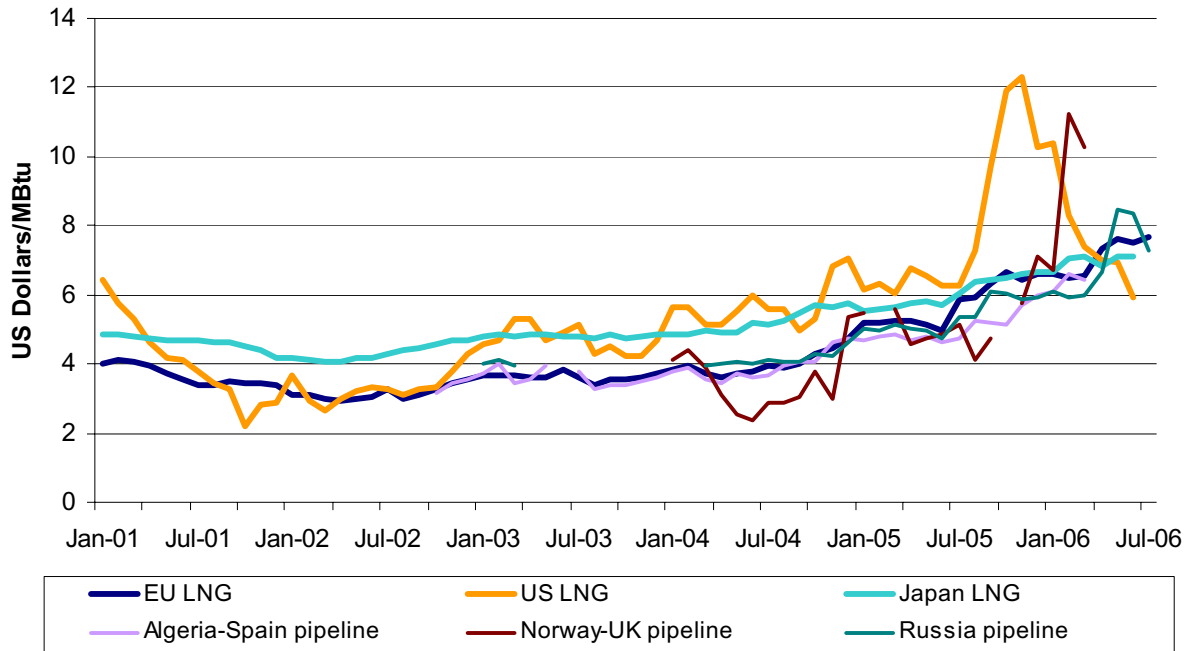
Source: WEO 2006 ©OECD/IEA 2006

### 3.2. Coal Import Prices



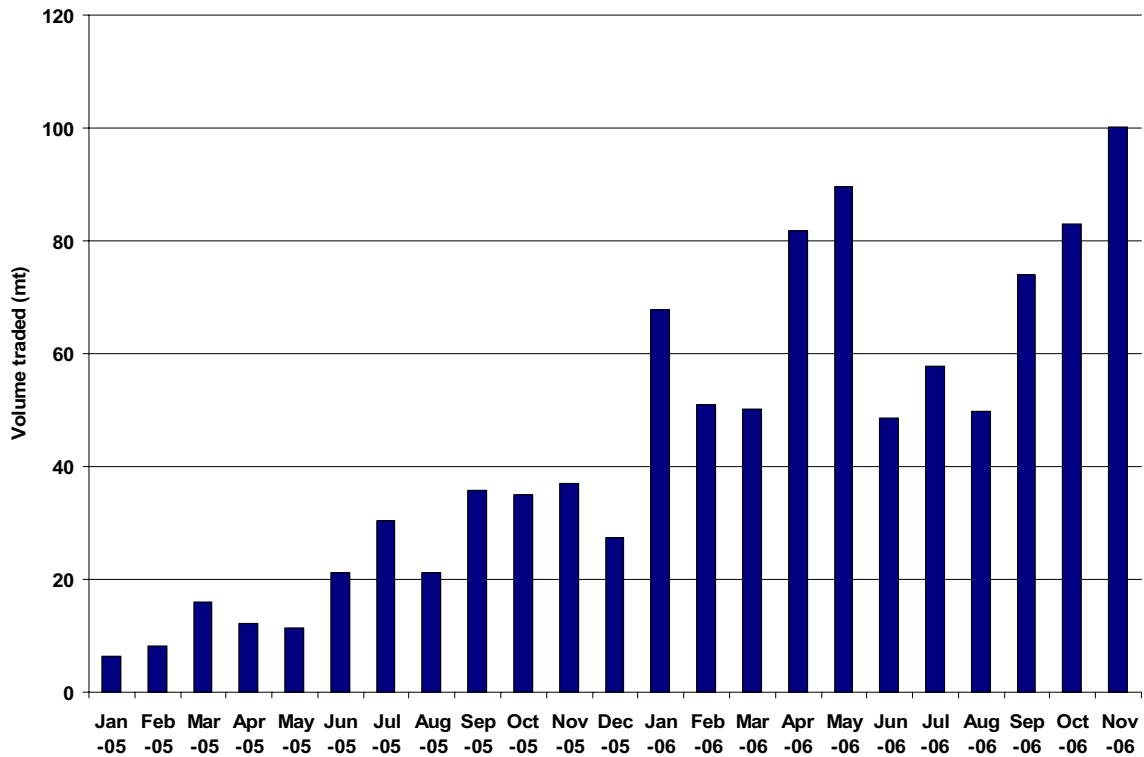
Source: Electricity Prices and Taxes 3Q2006, OECD/IEA 2006

### 3.3. EU, US and Japan LNG and EU Pipeline Import Prices



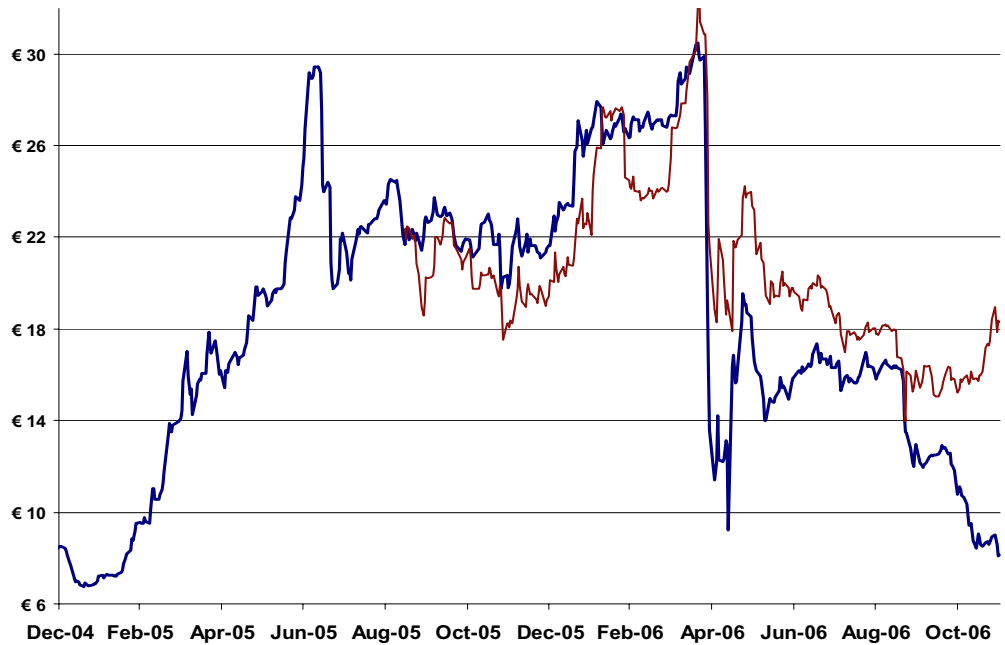
Source: Electricity Prices and Taxes 3Q2006, OECD/IEA 2006

### 3.4. EU Emission Trading Scheme: Market Volume



Source: European Commission DG ENV, Point Carbon

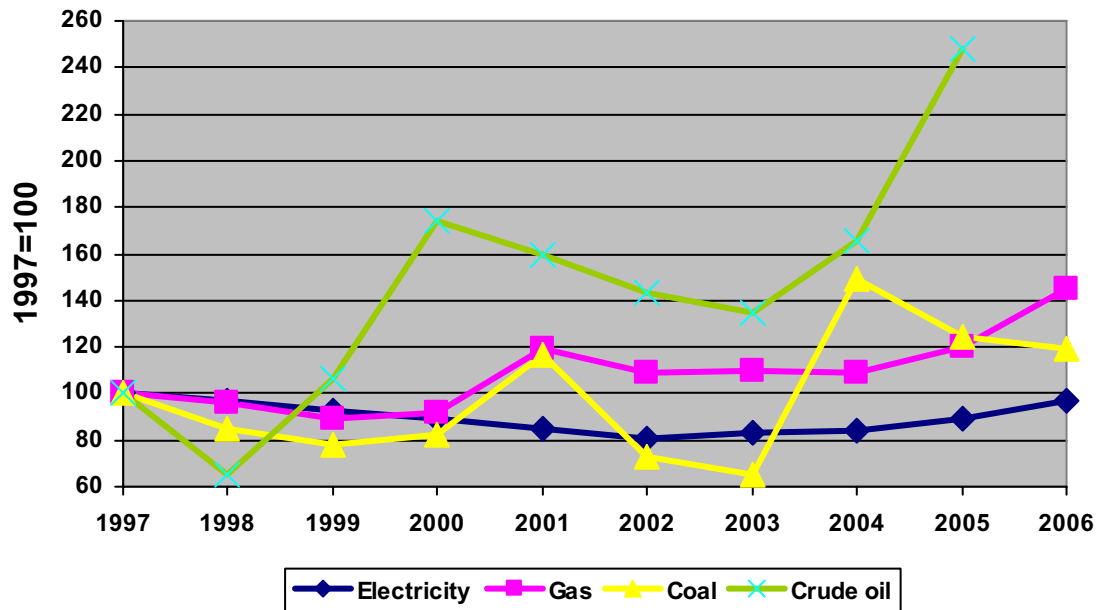
### 3.5. EU Emission Trading Scheme: Price Development



— price for allowances for use in the ETS period 2005 to 2007  
 — price for allowances for use in 2008 to 2012, for which active trading started later

Source: European Commission, DG ENV, Point Carbon

### 3.6. EU-15 Average Electricity and Gas Retail Prices 1997-2006



Weighted average of large industrial, industrial, commercial and household prices (at 1995 price levels and not including taxes).

Source: European Commission DG TREN, Internal Market Report

### 3.7. EU-15 Electricity Price Summary 1997-2006

1997 = 100, constant prices	July 1997	July 2000	July 2005	July 2006
Average (all consumers)	100	86	89	98
Very large	100	83	96	121
Medium industrial	100	82	94	107
Small commercial and households	100	88	86	91

*Source: Eurostat*

### 3.8. EU-15 Gas Price Summary 1997-2006

1997 = 100, constant prices	July 1997	July 2000	July 2005	July 2006
Average (all consumers)	100	92	120	153
Very large industrial users	100	98	133	201
Large industrial users	100	93	135	186
Medium industrial users	100	95	138	206
Small commercial and households	100	91	114	146

*Source: Eurostat*

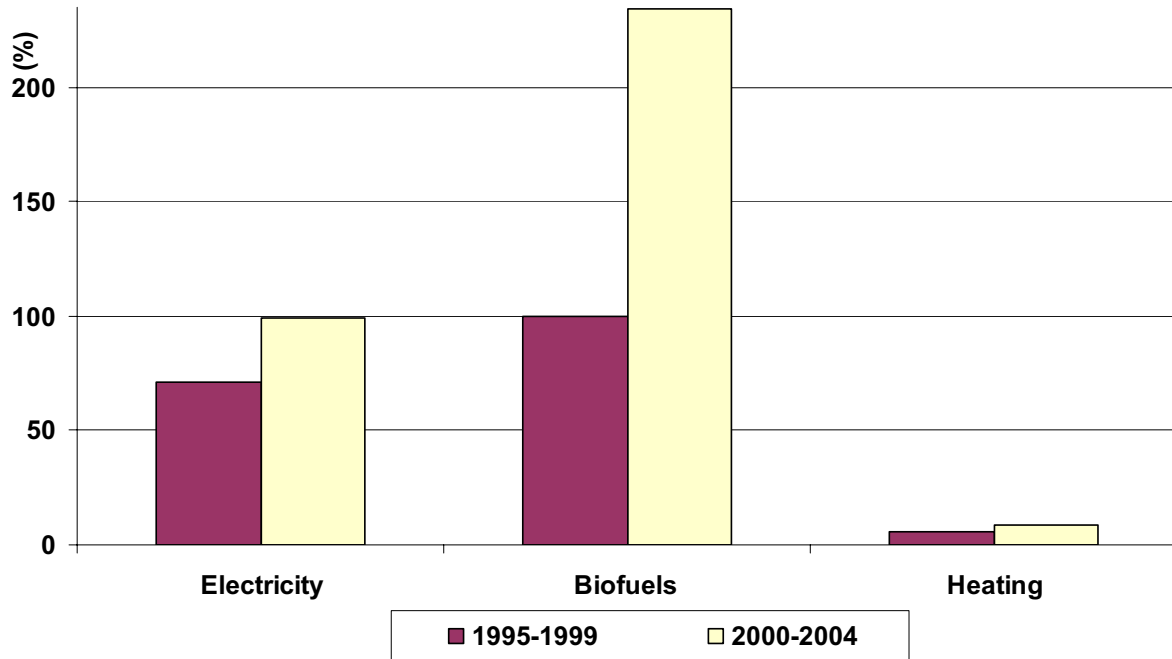


#### 4. CHAPTER 4: SNAPSHOT OF RENEWABLE ENERGY SOURCES

##### **List of Figures:**

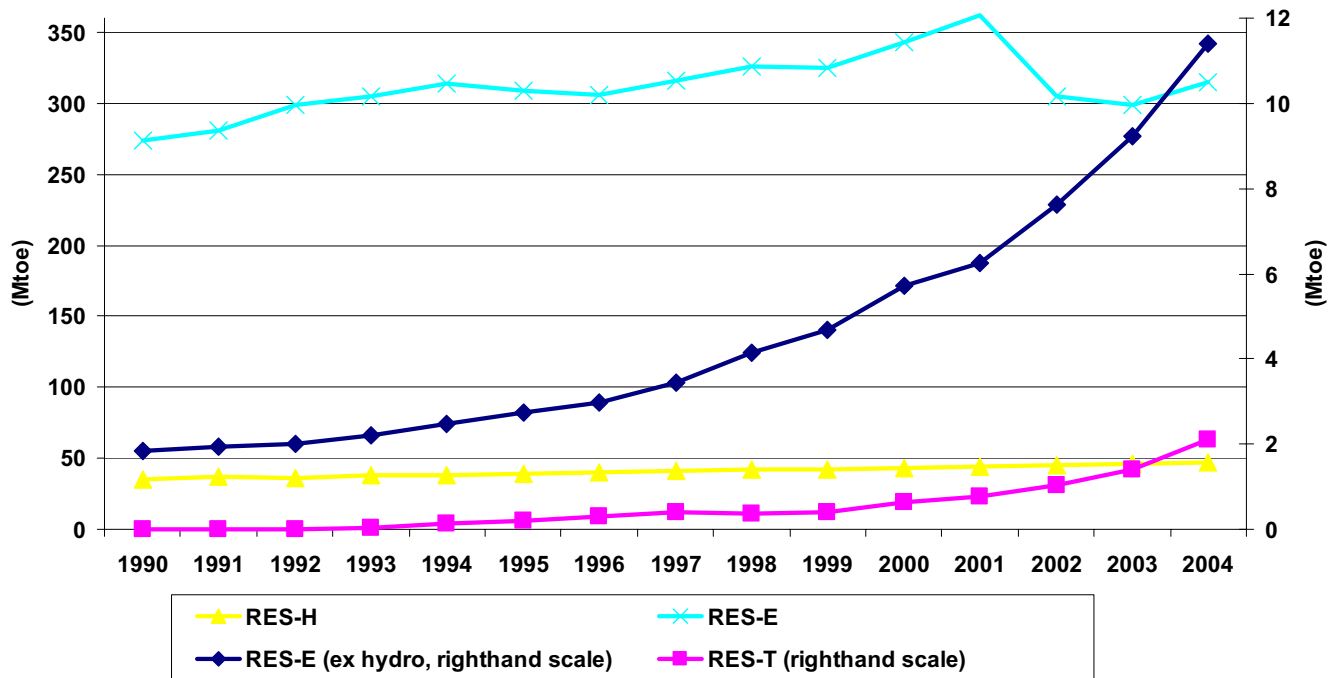
4.1.	Development of the Share of Renewable Energy Sources (RES) per Sector .....	26
4.2.	Contribution of Renewable Energy (Electricity, Transport and Heat) 1990-2004 ....	26
4.3.	Non-hydro Renewable Electricity Generation in EU-25 (1990-2005) .....	27
4.4.	Renewables Growth: Electricity Projections up to 2020 .....	27
4.5.	Renewables Growth: Heating and Cooling Projections up to 2020.....	28
4.6.	CO <sub>2</sub> Emissions Avoided due to New RES Deployment up to 2020 in EU-25 .....	28
4.7.	Development of the Biofuels Share in EU Member States.....	29
4.8.	Biomass Share of Heating in Member States.....	30
4.9.	Geothermal Share of Heating in Member States.....	30
4.10.	Solar Share of Heating in Member States .....	30

#### 4.1..... Development of the Share of Renewable Energy Sources (RES) per Sector



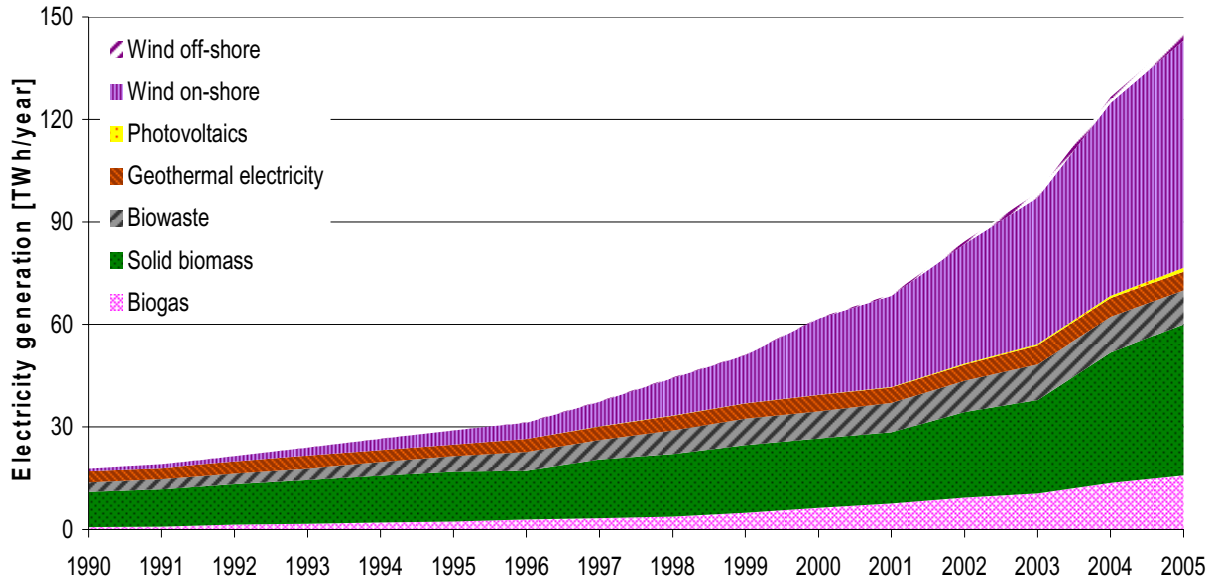
Source: European Commission DG TREN

#### 4.1. Contribution of Renewable Energy (Electricity, Transport and Heat) 1990-2004



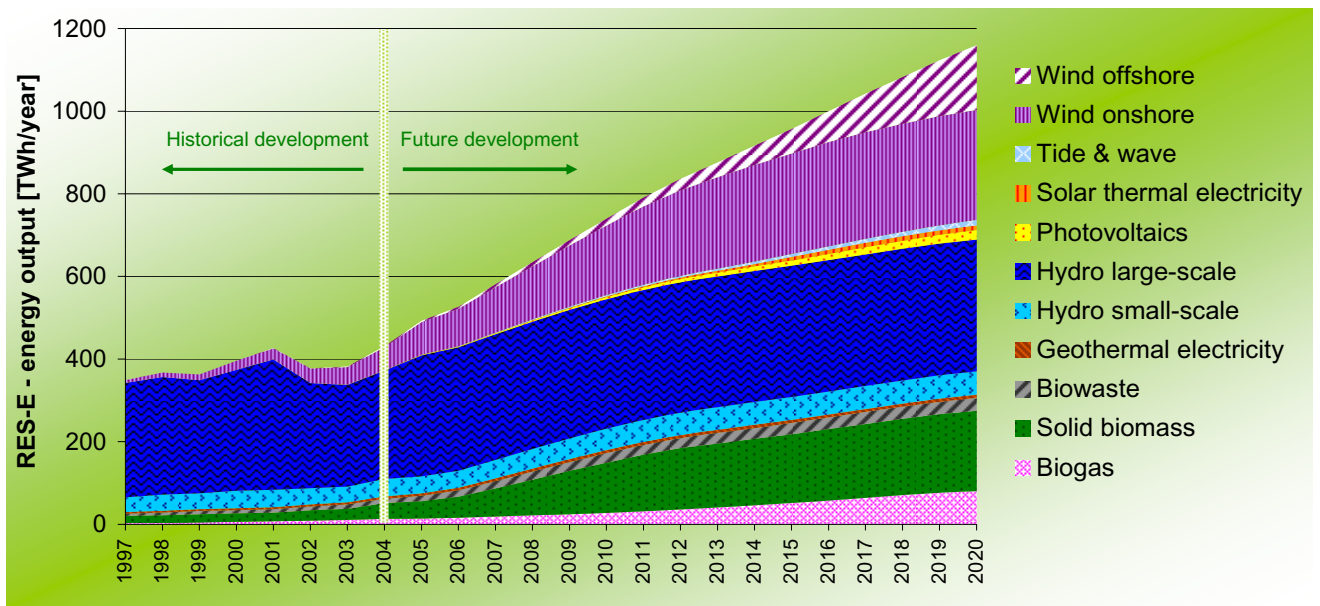
Source: European Commission, DG TREN

#### 4.2. Non-hydro Renewable Electricity Generation in EU-25 (1990-2005)



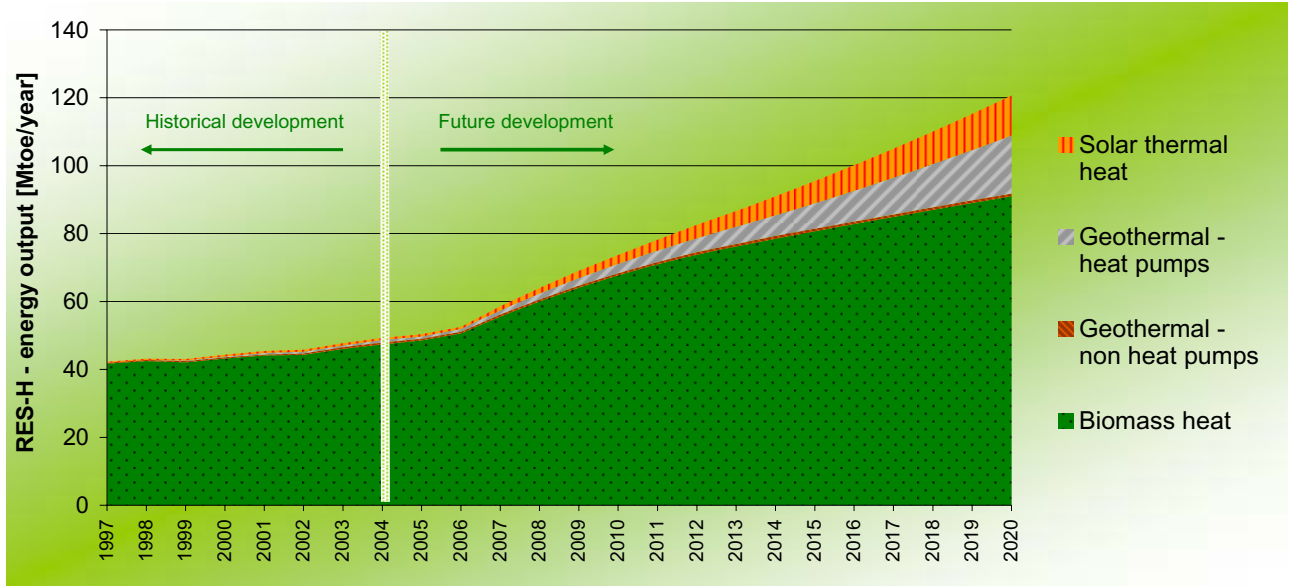
Source: European Commission, Renewables Roadmap

#### 4.3. Renewables Growth: Electricity Projections up to 2020



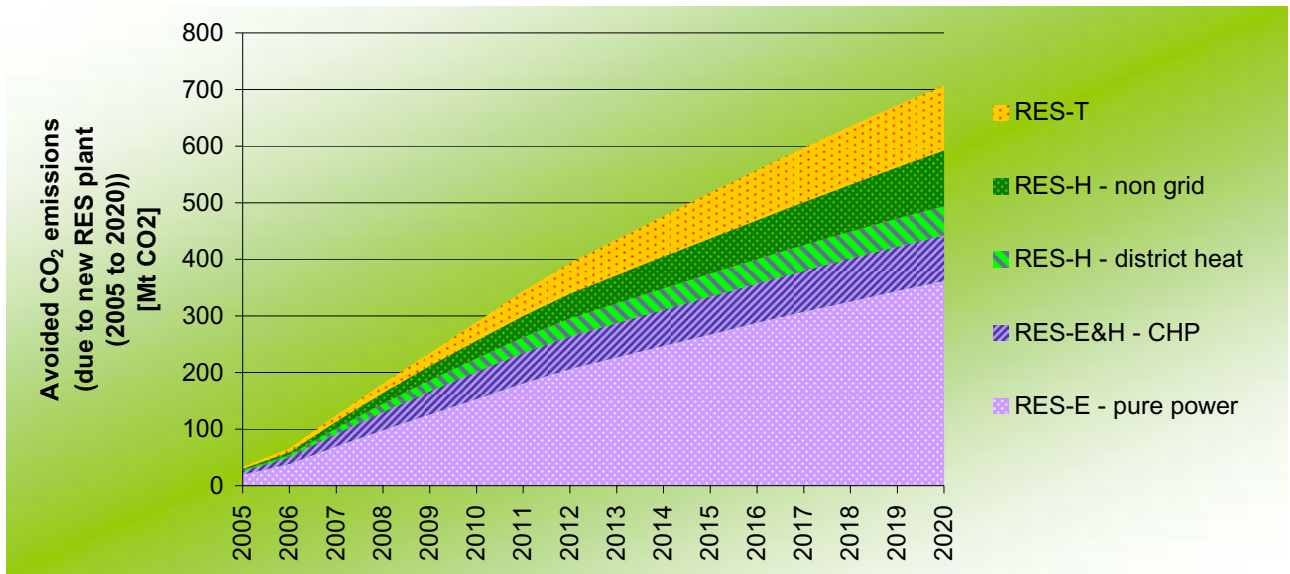
Source: European Commission, Renewables Roadmap

#### 4.4. Renewables Growth: Heating and Cooling Projections up to 2020



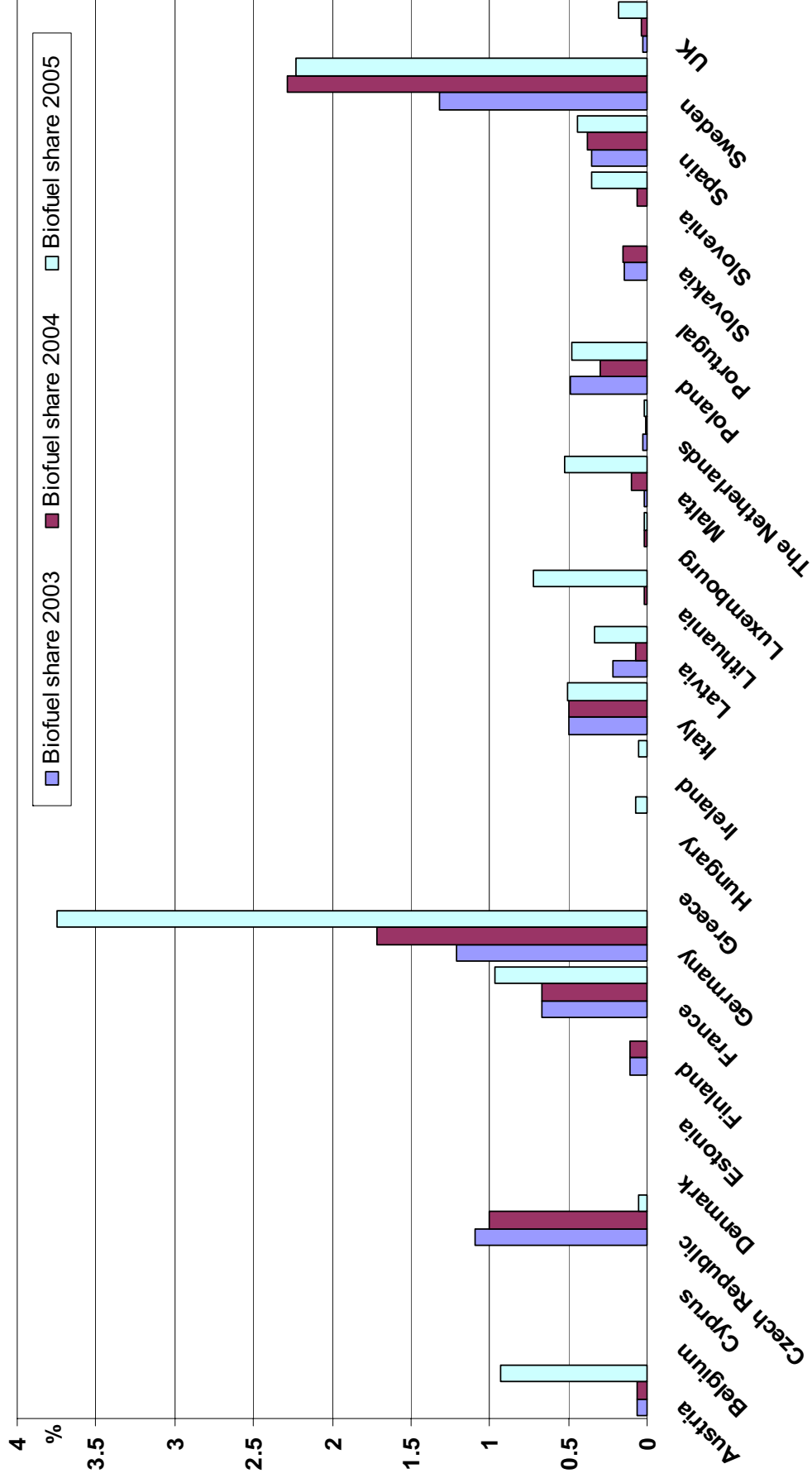
Source: European Commission, Renewables Roadmap

#### 4.5. CO<sub>2</sub> Emissions Avoided due to New RES Deployment up to 2020 in EU-25



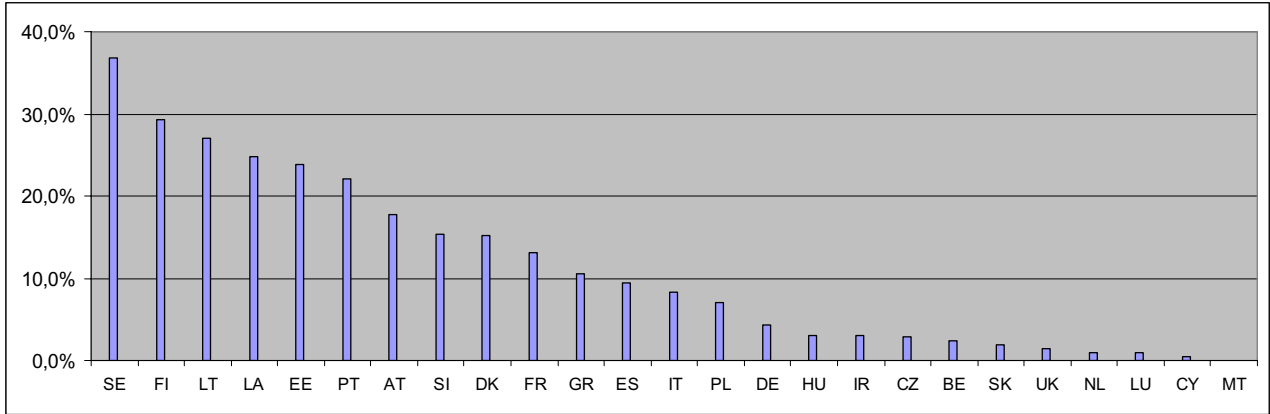
Source: European Commission, Renewables Roadmap

#### 4.6. Development of the Biofuels Share in EU Member States



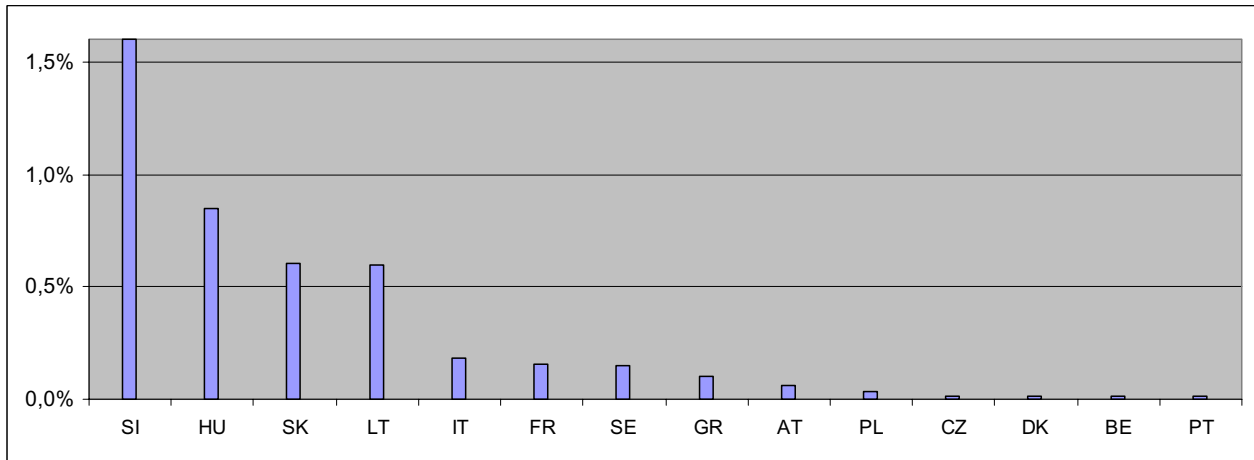
Source: European Commission DG TREN, Biofuels Progress Reports provided by Member States

#### 4.7. Biomass Share of Heating in Member States



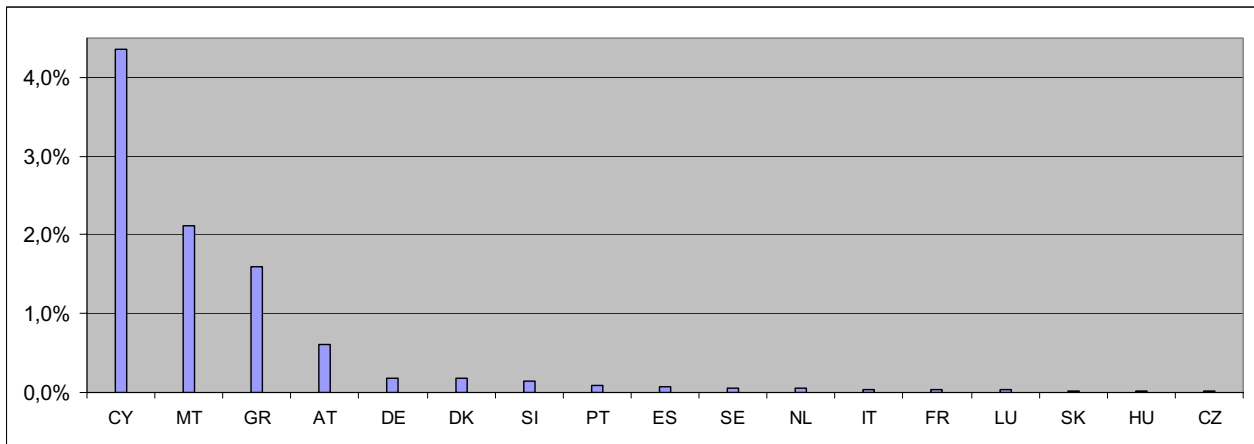
Source: Eurostat, European Commission DG TREN

#### 4.8. Geothermal Share of Heating in Member States



Source: Eurostat, European Commission DG TREN

#### 4.9. Solar Share of Heating in Member States



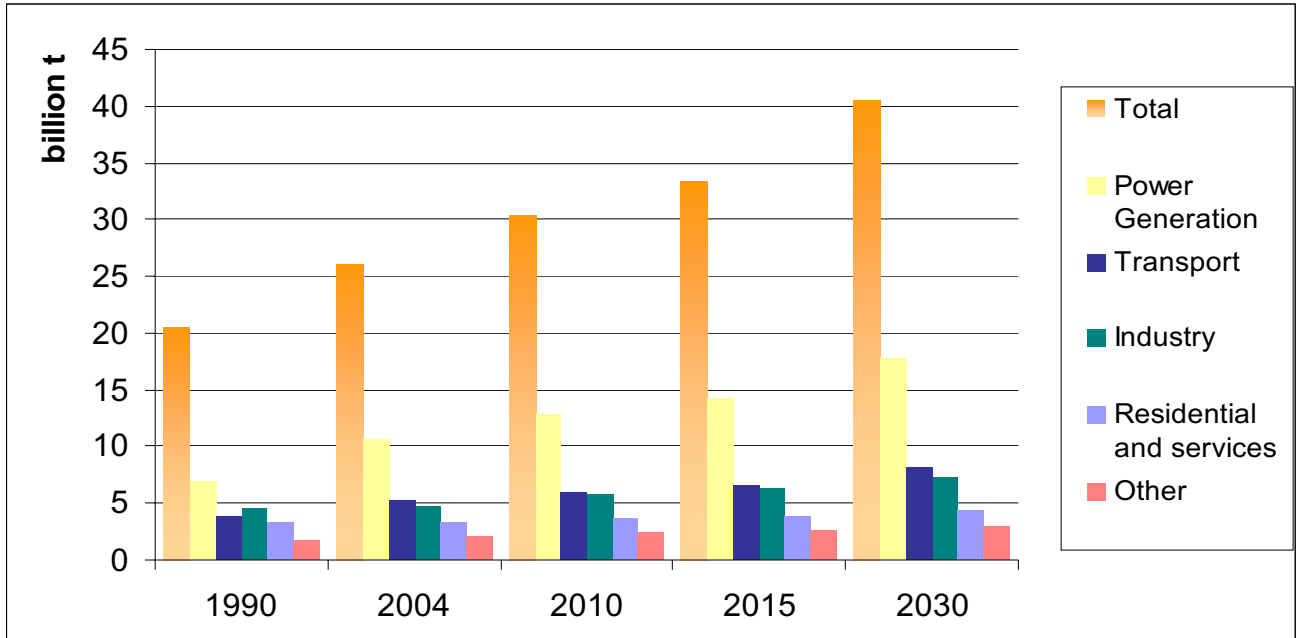
Source: Eurostat, European Commission DG TREN

**5. CHAPTER 5: THE CHALLENGE OF CLIMATE CHANGE**

**List of Figures:**

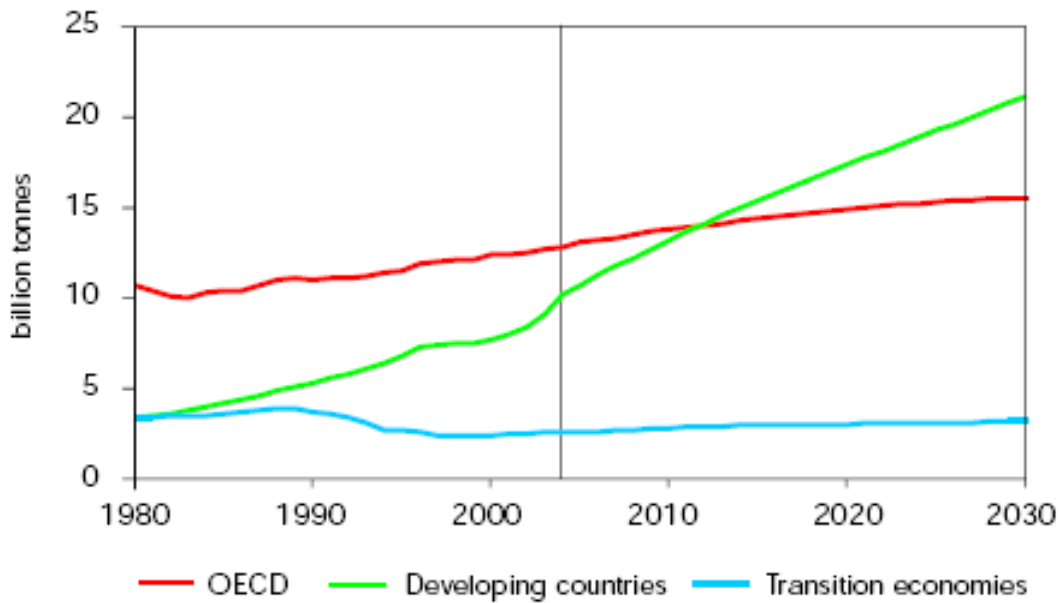
5.1.	World Energy-related CO <sub>2</sub> Emissions by Sector (IEA Reference Scenario).....	32
5.2.	Energy-related CO <sub>2</sub> Emissions by Region (IEA Reference Scenario).....	32
5.3.	EU-27 Energy- related CO <sub>2</sub> Emissions on Current Trends.....	33
5.4.	EU-25 Total Emissions of Greenhouse Gases from Fuel Combustion by Sector.....	34
5.5.	EU-25 Greenhouse Gas Emissions per Capita (1990-2004).....	35
5.6.	Summary of Planned Measures and Progress towards Targets (by Country).....	36
5.7.	EU-25 Key Figures on the Emission Trading Scheme 2005-2007 .....	37

### 5.1. World Energy-related CO<sub>2</sub> Emissions by Sector (IEA Reference Scenario)



Source: WEO 2006 ©OECD/IEA 2006

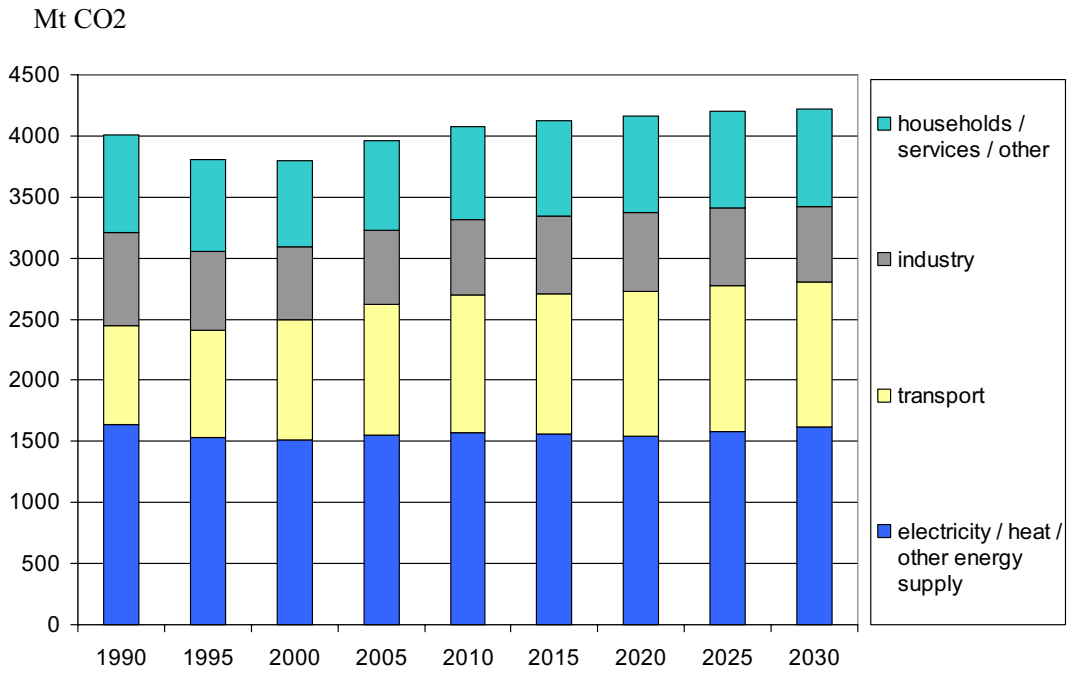
### 5.2. Energy-related CO<sub>2</sub> Emissions by Region (IEA Reference Scenario)



Source: WEO 2006 ©OECD/IEA 2006

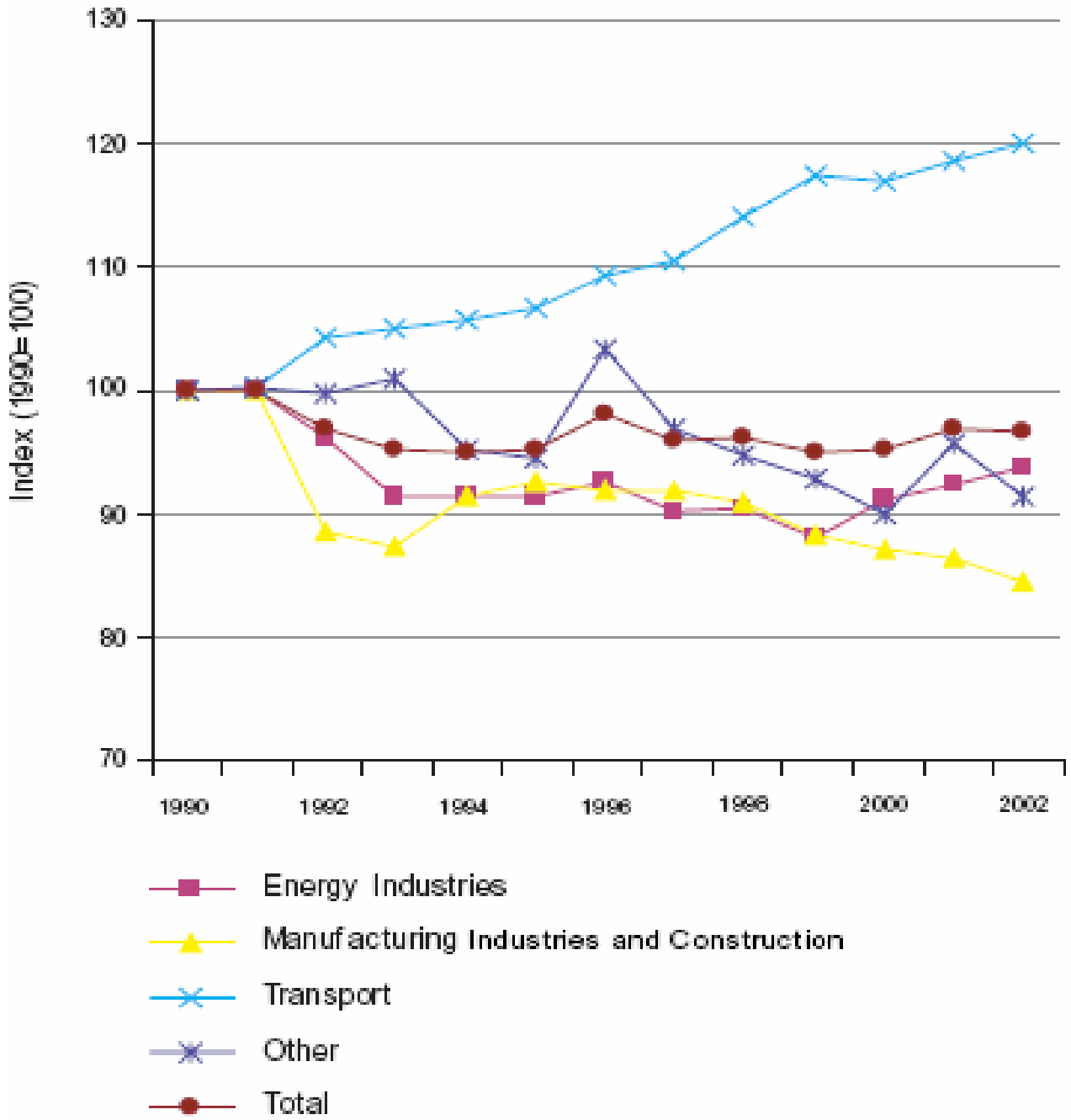


### 5.3. EU-27 Energy- related CO<sub>2</sub> Emissions on Current Trends



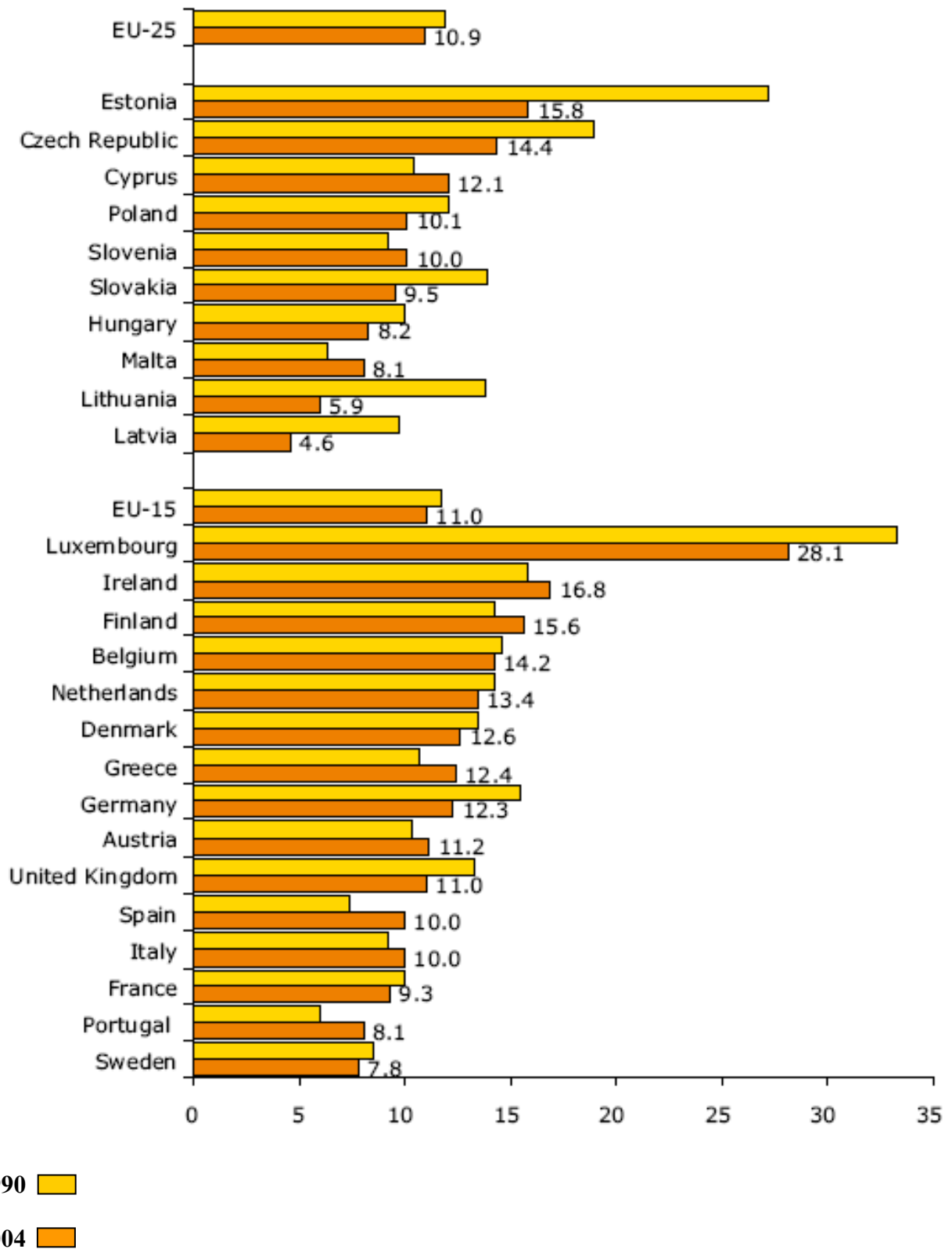
Source: European Commission DG TREN, Eurostat

5.4. EU-25 Total Emissions of Greenhouse Gases from Fuel Combustion by Sector



Source: Eurostat

5.5. EU-25 Greenhouse Gas Emissions per Capita (1990-2004)



Source: EEA Report No 9/2006

## 5.6. Summary of Planned Measures and Progress towards Targets (by Country)

Country	EU burden sharing or Kyoto target	Measures with quantified 2010 reductions projections				Kyoto target projected to be reached?
		Existing policies and measures	Additional policies and measures	Use of Kyoto mechanisms	Net removal from carbon sinks <sup>(11)</sup>	
EU-15	- 8.0 %	X	X	X	X	Yes
<b>EU-15 Member States</b>						
Austria	- 13.0 %	X	X	X	X	No
Belgium	- 7.5 %	X	X	X		No
Denmark	- 21.0 %	X	NA	X	X	No
Finland	0 %	X	X	X		Yes
France	0 %	X	X		X	Yes
Germany	- 21.0 %	X	X			Yes
Greece	+ 25.0 %	X	X			Yes
Ireland	+ 13.0 %	X	NA	X	X	No
Italy	- 6.5 %	X	X	X	X	No
Luxembourg	- 28.0 %	X		X		Yes
Netherlands	- 6.0 %	X	X	X	X	Yes
Portugal	+ 27.0 %	X	X	X	X	No
Spain	+ 15.0 %	X	NA	X	X	No
Sweden	+ 4.0 %	X			X	Yes
United Kingdom	- 12.5 %	X	X		X	Yes
<b>New Member States</b>						
Czech Republic	- 8.0 %	X	X		X	Yes
Cyprus	NR	NR	NR	NR	NR	NR
Estonia	- 8.0 %	X	X			Yes
Hungary	- 6.0 %	X	X			Yes
Latvia	- 8.0 %	X	X			Yes
Lithuania	- 8.0 %	X				Yes
Malta	NR	NR	NR	NR	NR	NR
Poland	- 6.0 %	X				Yes
Slovenia	- 8.0 %	X	X		X	Yes
Slovakia	- 8.0 %	X	X			Yes
<b>Acceding countries <sup>(12)</sup></b>						
Bulgaria	- 8.0 %	X	X			Yes
Romania	- 8.0 %	X	X			Yes
Croatia	- 5.0 %	NA	NA			NA
Turkey	NR	NR	NR			NR
<b>Other EEA member countries</b>						
Iceland	+ 10.0%	X	NA			Yes
Liechtenstein	- 8.0 %	X	NA			No
Norway	+ 1.0 %	X	X			No
Switzerland	- 8.0 %	X	X			Yes

**Note:** X — reported; NA — no information was available; NR — not relevant since no Kyoto target

Source: EEA Report No 9/2006

## 5.7. EU-25 Key Figures on the Emission Trading Scheme 2005-2007

Member State	Number of installations covered <sup>(1)</sup>	CO <sub>2</sub> allowances per year of the period 2005 to 2007 <sup>(2)</sup> (million allowances)	Verified emissions (million tonnes of CO <sub>2</sub> )	ETS share in total greenhouse gas emissions <sup>(3)</sup>
<b>EU-15</b>				
Austria	199	32.6	33.4	36.6 %
Belgium	310	59.8	55.4	37.4 %
Denmark	384	31.0	26.5	38.9 %
Finland	595	44.5	33.1	40.6 %
France	1 087	150.5	131.3	23.3 %
Germany	1 850	495.0	474.0	46.7 %
Greece	140	71.1	71.3	51.8 %
Ireland	109	19.2	22.4	32.7 %
Italy	950	207.5	223.6	38.6 %
Luxembourg	15	3.2	2.6	20.5 %
Netherlands	210	86.4	80.4	36.9 %
Portugal	244	36.8	36.4	43.1 %
Spain	825	162.1	182.9	42.9 %
Sweden	705	22.5	19.3	27.8 %
United Kingdom	775 <sup>(4)</sup>	209.3	242.5	36.8 %
<b>EU-10</b>				
Cyprus	13	5.6	5.1	57.3 %
Czech Republic	395	96.6	82.5	56.1 %
Estonia	44	18.7	12.6	59.3 %
Hungary	234	30.2	26.0	31.3 %
Latvia	94	4.0	2.9	26.7 %
Lithuania	99	11.4	6.6	32.5 %
Malta	2	2.1	n.a. <sup>(5)</sup>	65.6 %
Poland	1 088	239.1	200.8 <sup>(6)</sup>	52.0 %
Slovakia	175	30.3	25.2	49.5 %
Slovenia	98	8.6	8.7	43.4 %

- Notes:** (1) Exact numbers vary slightly continuously due to closures and new entrants. The number of installations and verified emissions are taken from the CITL as of 5 September 2006. In Poland, Malta and Cyprus the registry is either not yet functional or only few operators have opened an account. For these countries the final allocation decision was used as data source.
- (2) The average amount of CO<sub>2</sub> allowances 2005–2007 excludes the national new entrants reserves and takes into account temporary exclusion and opt-ins of installations in accordance with Articles 24 and 27 of the Emissions Trading Directive.
- (3) The ETS share is calculated as verified emissions in 2005 divided by 2004 national greenhouse gas emissions.
- (4) The number of covered installations will be higher in 2007, as some installations were only opted out for 2005 and 2006.
- (5) Malta has not yet submitted its verified emissions. For the calculation of the share the total national allocation has been used. For Member States where verified emissions for more than 1 % of allocated allowances are missing the emissions for the outstanding installations have been estimated for the calculation of the share.
- (6) This figure comprises verified emissions of 793 installations. For a further 295 installations, which receive an annual average allocation of 3,284,285 allowances no verified emission figures were available at the time of writing this report.

**Source:** Community Independent Transaction Log (CITL); first national allocations plans of Member States; EC 2005e.

Source: EEA Report No 9/2006

**6. CHAPTER 6: COMPARISON OF MAIN ENERGY SOURCES**

**List of Figures:**

6.1.	Energy Sources for Electricity Generation .....	39
6.2.	Energy Sources for Heating .....	42
6.3.	Fuels for Road Transport .....	43

### 6.1. Energy Sources for Electricity Generation

Energy sources	Technology considered for the cost estimate	2005 Cost	Projected Cost 2030	GHG emissions (Kg CO <sub>2</sub> eq/MWh) <sup>(4)</sup>	EU-27 Import dependency <sup>(5)</sup>		Efficiency <sup>(6)</sup>	Fuel price sensitivity	Proven reserves / Annual production <sup>(7)</sup>
		(€/MWh)	(€/MWh with €20-30/t/CO <sub>2</sub> )		Source IEA <sup>(1)</sup>	2005			
Natural gas	Open cycle gas turbine	45 – 70 <sup>(2)</sup>	55 - 85	440	57%	84%	40%	Very high	64 years
	CCGT (Combined Cycle Gas Turbine)	35 - 45	40 - 55	400			50%	Very high	
Oil	Diesel engine	70 - 80	80 - 95	550	82%	93%	30%	Very high	42 years
Coal	PF (Pulverised Fuel with flue gas desulphurisation)	30 - 40	45 - 60	800			40-45%	medium	155 years
	CFBC (Circulating fluidized bed combustion)	35 - 45	50 - 65	800	39%	59%	40-45%	medium	
	IGCC (Integrated Gasification Combined Cycle)	40 - 50	55 - 70	750			48%	medium	
Nuclear	Light water reactor	40 - 45	40 - 45	15	Almost 100% for uranium ore		33%	low	Reasonable reserves: 85 years <sup>(8)</sup>
Biomass	Biomass generation plant	25 - 85	25 - 75	30	nil		30 - 60%	medium	R e n e w a b l e
	On shore	35 - 175	28 - 170	30					
Wind	Off shore	35 - 110 <sup>(3)</sup>	28 - 80 <sup>(3)</sup>	10	nil		95-98%	nil	I
	Large	50 - 170	50 - 150	20					
Hydro	Small (<10MW)	60 - 150 <sup>(3)</sup>	40 - 120 <sup>(3)</sup>	39	nil		95-98%	nil	E
	Photovoltaic	25 - 95	25 - 90	5					
Solar		45 - 90	40 - 80	100					N
		140 - 430	55 - 260						

### **Nota 1:**

Costs are calculated at the boundary of the power plant (ex factory), without transmission and distribution costs.

Costs cover investments, operation & maintenance and fuel costs. Investment costs include construction cost, refurbishment costs and decommissioning cost. For nuclear fuel, costs include all the steps from mining to disposal of spent fuel.

Plants are operating on base load conditions with 2006 fuel prices (coal ~ 2€/GJ; gas ~ 4€/GJ; oil ~ 6€/GJ), no cogeneration and no carbon price included. 2030 costs with CCS include capture, transportation and storage.

Intermittent energy sources are without any additional costs for the stand-by generation (back up)

#### Sources for generation costs:

2005 costs: IEA: Projected cost of generating electricity - IEA, NEA 2005 (European projects only)

2030 costs: IEA: Energy Technology Perspectives - IEA 2006

With 10% discount rate and  $1\text{€} = \$1.25$

Regarding 2030 costs for fossil fuel based generation; additional costs for CO<sub>2</sub> emissions have been calculated and added, on the basis of €20 and €30/tCO<sub>2</sub>, to the current generation costs.

With complementary data from

- The Energy Review Report 2006 – DTI (UK)
- The cost of generating electricity - Royal Academy of engineering 2004(UK)
- Study of reference costs for power generation – Industry Ministry; DGEMP 2004(FR)

For intermittent renewable energy sources, the main driving factor for costs calculations is the "capacity factor" (The capacity factor of a power plant is the amount of electricity that it produces over a period of time, divided by the amount of electricity it could have produced the time). The capacity factor varies widely from site to site, especially for wind power and solar power, explaining the wide range of generation costs.



**Nota 2:** For the open gas cycle turbine, cost figures are from the Royal academy of engineering

**Nota 3:** Green X Project

**Nota 4:** The total rate of GHG emission is the sum of the emission during operation (fuel combustion), upstream (construction, mining) and downstream (decommissioning, spent fuel) activities

Source for GHG emissions: Greenhouse gas emissions of electricity generation chains: Assessing the difference; IAEA bulletin 42/2/2000

**Nota 5:** Import dependency for fossil fuels relate to broad energy sources and not specific derived fuels; numbers are given for coal plus lignite, oil and natural gas rather than for e.g. diesel; import dependency 2005: preliminary statistics; 2030: baseline modelling results (European Energy and Transport Trends to 2030 – update 2005)

**Nota 6:** Efficiency is the ratio expressed in percent of energy output to the energy input (calorific value of fuel for thermal plants)

**Nota 7:** The [proven reserves / annual production] ratio represents the length of time that those proven reserves would last if the annual production were to continue at the same level

Sources: World Energy Outlook 2006 - AIE (oil, gas, coal)

Uranium 2005: Resources, Production and Demand – NEA (for uranium)

**Nota 8:** According to the IAE WEO 2006 "identified conventional uranium resources are sufficient for several decades of operation at current usage rates." The "Uranium 2005: resources, production and demand" published by the OECD mentions 85 years of 2004 world nuclear electricity generation with identified resources.

## 6.2. Energy Sources for Heating

Energy sources	EU-25 market share by energy source	Market price (€/toe)	Lifecycle cost (€/toe)	GHG emissions (t CO <sub>2</sub> eq/toe)	EU-27 import dependence	
					2005	2030
Fossil fuels	Heating gas oil	525 (€0.45/l)	300-1300	3.1	82%	93%
	Natural gas	230 – 340 (€20-30/MWh)		2.1	57%	84%
	Coal	70 (€100/tce)		4	39%	59%
Biomass	Wood chips	280	545-1300	0.4	0	?
	Pellets	540	630-1300	0.4	0	?
Electricity		550 – 660 (€50-60/MWh)	550 - 660	0 to 12	<1%	?
Solar		/	680-2320	Very low	0	0
Geothermal		/	230-1450	Very low	0	0

Data from:

- EIE Project K4 RES-H
- Green X model

### 6.3. Energy Sources for Road Transport

	Market price (€/toe)	CO <sub>2</sub> emissions (t CO <sub>2</sub> /toe) <sup>1</sup>	Import dependence	
			2005	2030
<b>Petrol and diesel</b>	398-582 <sup>2</sup>	3.6-3.7	82%	93%
<b>Natural gas</b>	230-340 (NB: requires a specially adapted vehicle and a dedicated distribution system)	3.0	57%	84%
<b>Domestic biofuel</b>	609-742	1.9-2.4	0%	0%
<b>Tropical bio-ethanol</b>	327-540	0.4	100%	100%
<b>Second-generation biofuel</b>	898-1 109	0.3-0.9	/	15%

Source: JRC well-to-wheels report.

<sup>1</sup> Figures given for biofuels are those for the cheapest production techniques

<sup>2</sup> Assuming oil price of \$48/barrel and \$70/barrel respectively

## 7. CHAPTER 7: EU-27 AND MEMBER STATES ENERGY FACTSHEETS

### Introduction:

**Total primary energy supply** – shows the share of energy sources in the energy mix. It is the quantity of energy consumed within the borders of a country. It is calculated using the formula: primary production + recovered products + imports + stock changes - exports - bunkers (i.e. quantities supplied to sea-going ships).

**Total final consumption – (Mtoe)** - is the energy finally consumed in the transport, industrial, commercial, agricultural, public and household sectors. It excludes deliveries to the energy conversion sector and to the energy industries themselves.

**Electricity mix** – shows the share of the various energy sources used for electricity generation.

**Electricity generation – (TWh)** – is the quantity of electricity consumed within the borders of a country.

**Indigenous production** - shows the share of energy sources extracted and used from domestic natural sources. The precise definition depends on the fuel involved.

**Coal** - quantities of fuels extracted or produced, calculated after any operation to remove inert matter. In general, production includes the quantities consumed by the producer during the production process (e.g. for heating or operation of equipment and auxiliaries) plus any quantities supplied to other on-site producers of energy for conversion or other uses.

**Crude oil** - quantities of fuels extracted or produced within national boundaries, including off-shore production. Production includes only marketable production and excludes any quantities returned to formation. Production includes all crude oil, natural gas liquids (NGL), condensates and oil from shale and tar sands, etc.

**Natural gas** - quantities of dry gas, measured after purification and extraction of natural gas liquids and sulphur. Production includes only marketable production, and excludes any quantities re-injected, vented and flared, and any extraction losses. Production includes all quantities used within the natural gas industry, in gas extraction, pipeline systems and processing plants.

**Nuclear** - quantities of heat produced in a reactor. Production is the actual heat produced or the heat calculated on the basis of the gross electricity generated and the thermal efficiency of the nuclear plant. All nuclear production is set as fully indigenous.

### **Renewables**

**Geothermal** - quantities of heat extracted from geothermal fluids. Production is calculated on the basis of the difference between the enthalpy of the fluid produced in the production borehole and that of the fluid disposed of via the re-injection borehole.

**Biomass/Waste** - in the cases of municipal solid wastes (MSW), wood, wood wastes and other solid wastes, production is the heat produced after combustion and corresponds to the heat content (NCV) of the fuel. In the case of anaerobic digestion of wet wastes, production is the heat content (NCV) of the biogases produced. Production includes all quantities of gas consumed in the installation for the fermentation processes, and excludes all quantities of flared gases. In the case of biofuels, production is the heat content (NCV) of the fuel.

**Hydro** – electricity generated by hydro power plant includes small hydro. Tide, Wave, Ocean power plants are included as well, because Eurostat is using it in this way.

**Wind** - electricity generated by onshore and offshore wind power plants. Figures are set for the end of 2004, while there was a significant increase of new installed Wind Power Plants in 2005.

**Net imports by fuels (Mtoe)** – share of all energy sources imported, excluding all nuclear, which is set as indigenous by Eurostat. Net electricity imports are included.

**Imports of crude oil** – imported crude oil divided by countries of origin. EU-27 is counted without imports inside the EU.

**Imports of natural gas** - imported natural gas divided by countries of origin. EU-27 is counted without imports inside the EU.

**Imports of hard coal** - imported hard coal divided by countries of origin. EU-27 is counted without imports inside the EU.

### Abbreviations

Mtoe – million tonnes of oil equivalent.

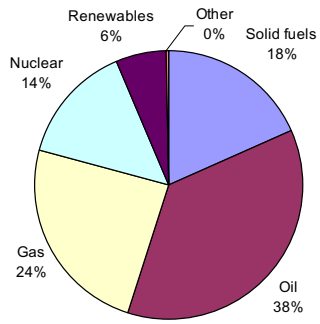
TWh – Terawatt hours.

### Sources

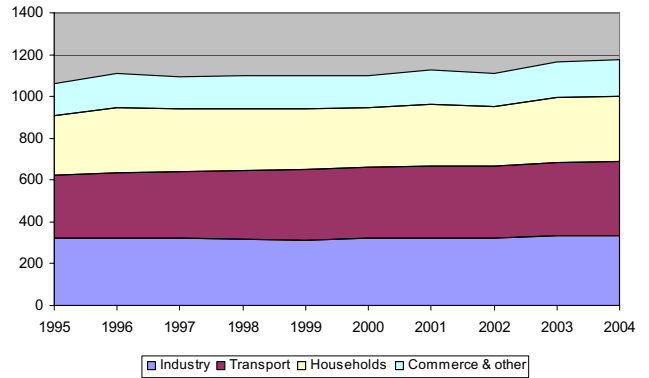
All data are 2004 data from Eurostat, unless otherwise stated.

# EU-27

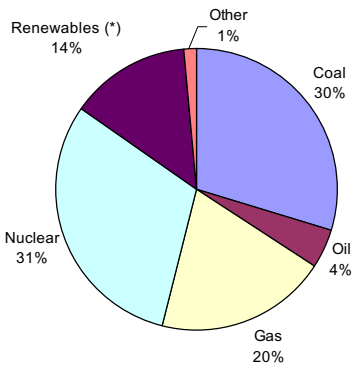
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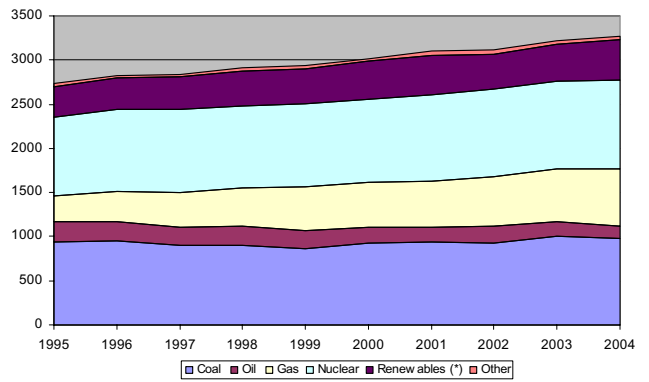
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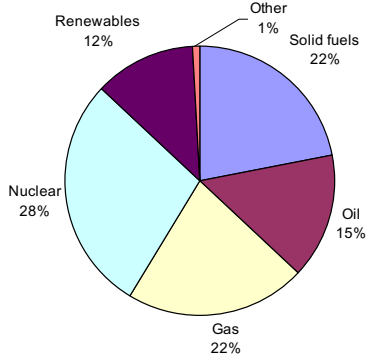
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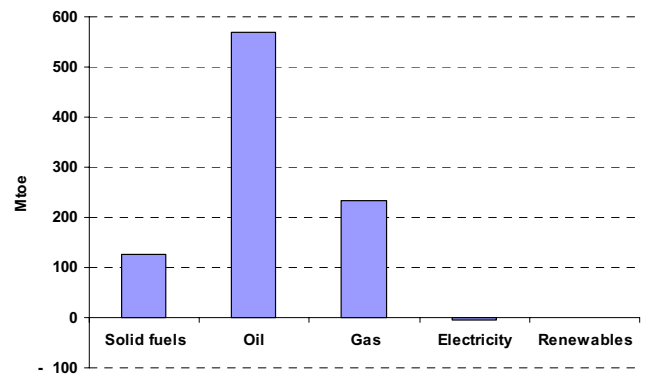
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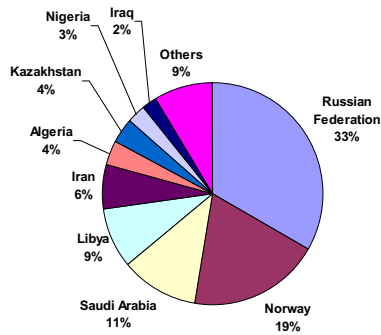
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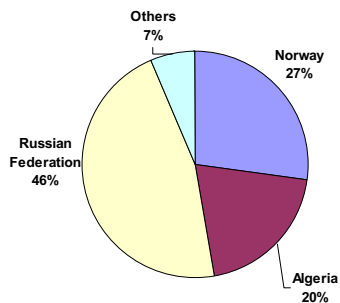
### NET IMPORT BY FUELS



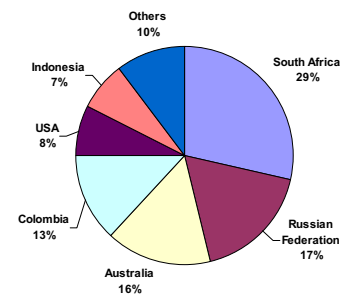
### IMPORTS OF CRUDE OIL



### IMPORTS OF NATURAL GAS

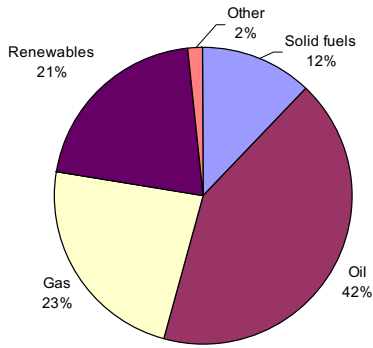


### IMPORTS OF HARD COAL

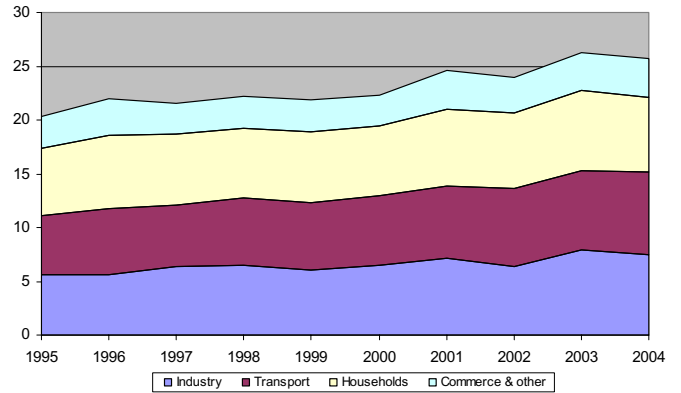


# AUSTRIA

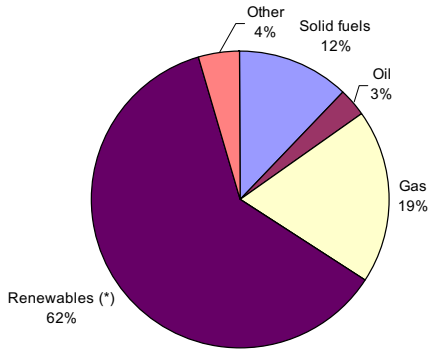
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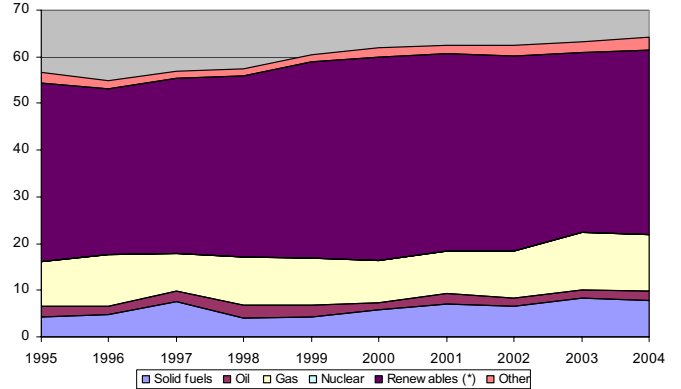
**TOTAL FINAL CONSUMPTION (Mtoe)**



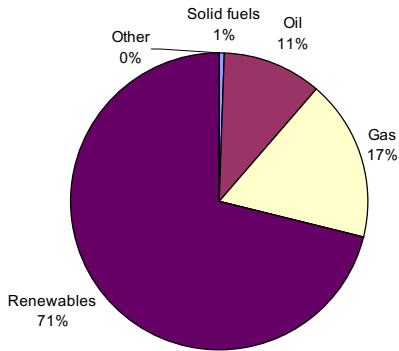
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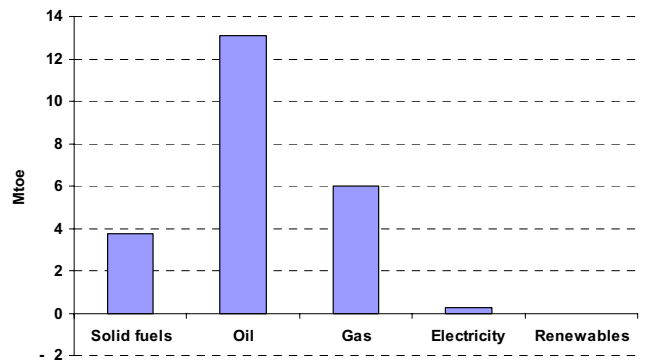
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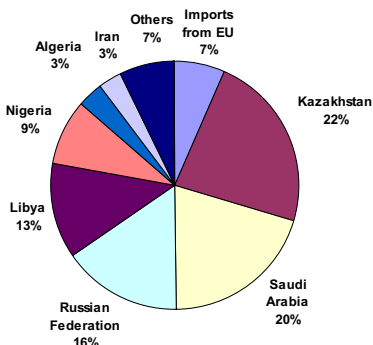
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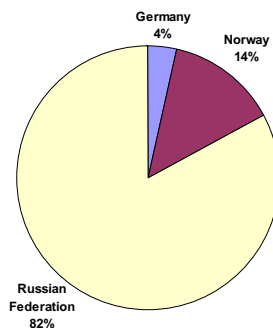
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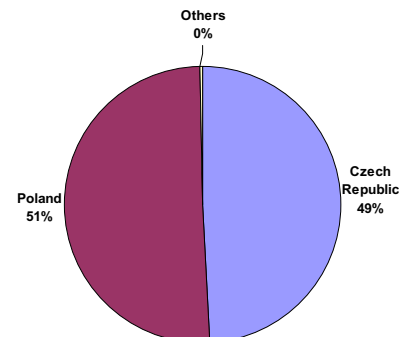
**IMPORTS OF CRUDE OIL**



**IMPORTS OF NATURAL GAS**



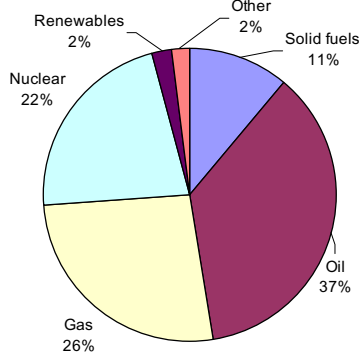
**IMPORTS OF HARD COAL**



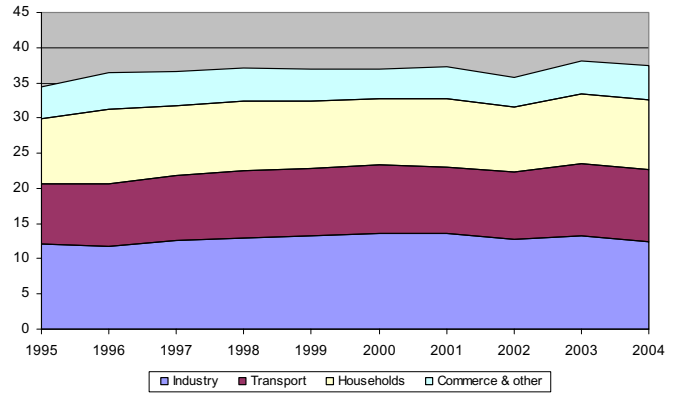
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# BELGIUM

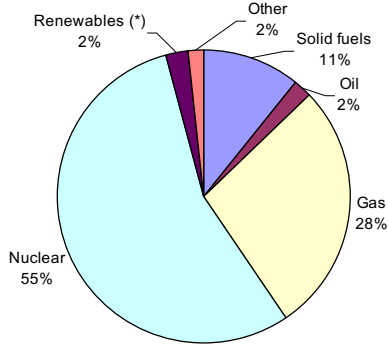
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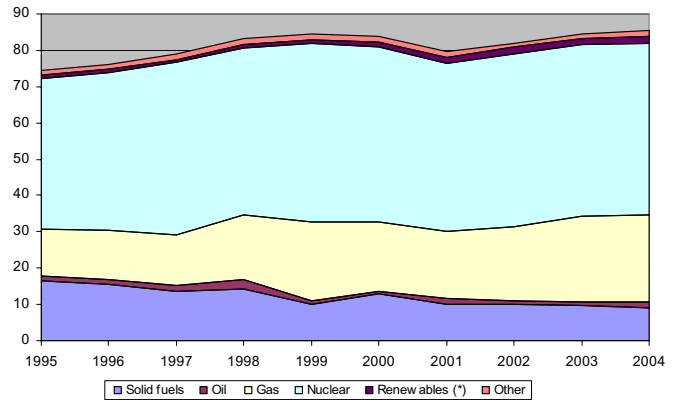
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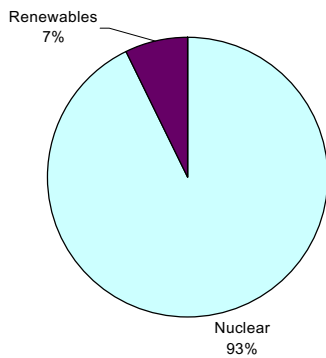
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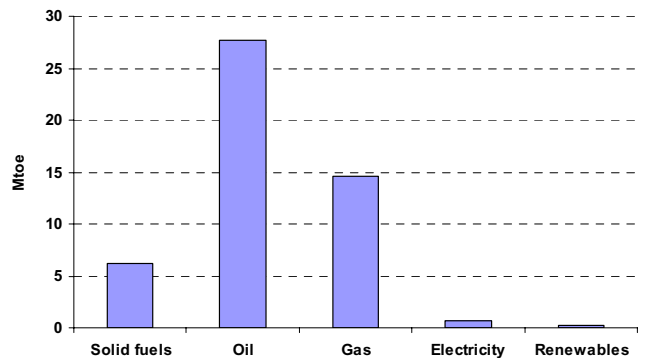
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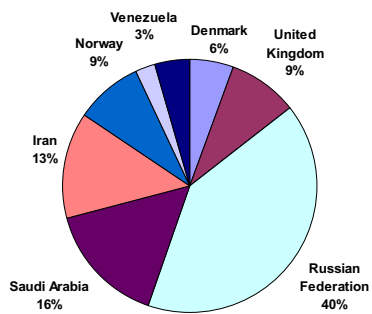
**INDIGENOUS PRODUCTION**



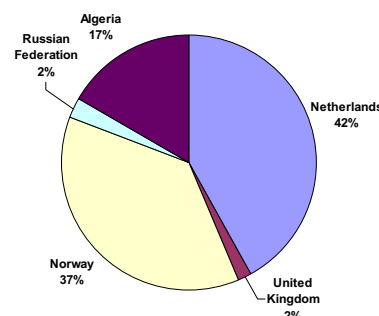
**NET IMPORTS BY FUELS**



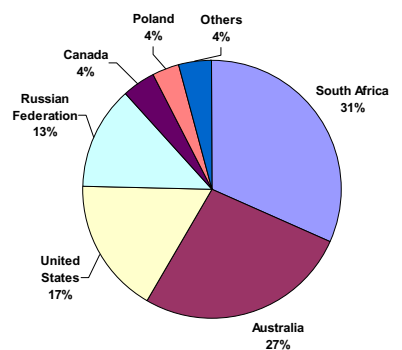
**IMPORTS OF CRUDE OIL**



**IMPORTS OF NATURAL GAS**

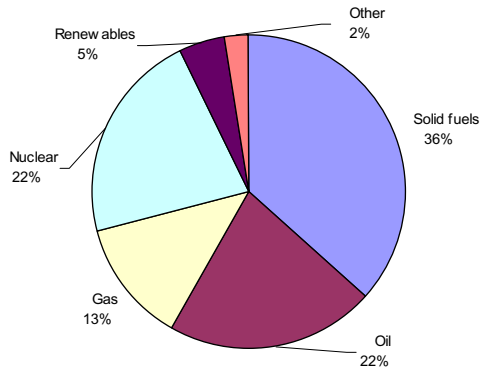


**IMPORTS OF HARD COAL**

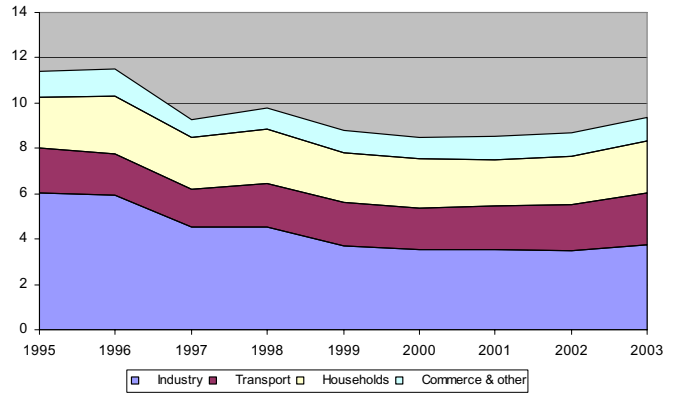


# BULGARIA

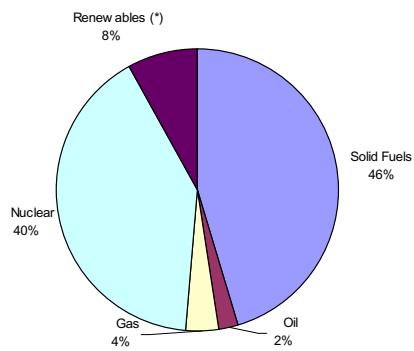
**TOTAL PRIMARY ENERGY SUPPLY (ENERGY MIX)**



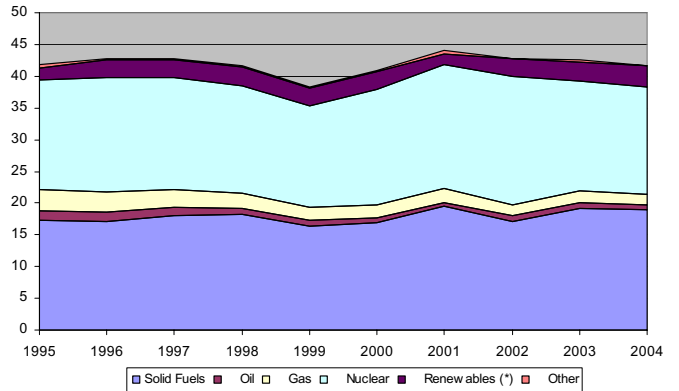
**TOTAL FINAL CONSUMPTION (Mtoe)**



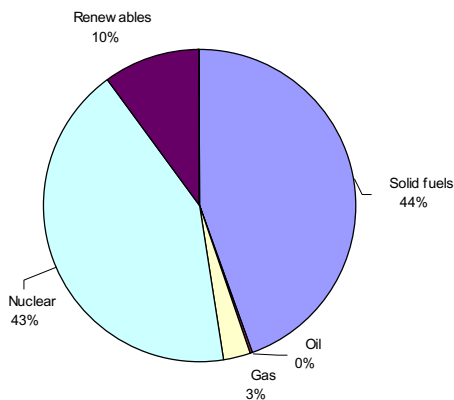
**ELECTRICITY MIX**



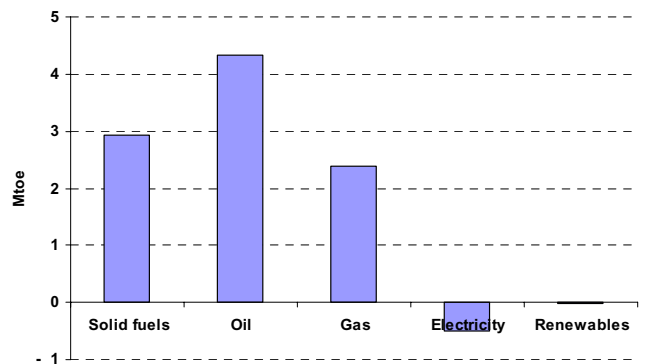
**ELECTRICITY GENERATION (TWh)**



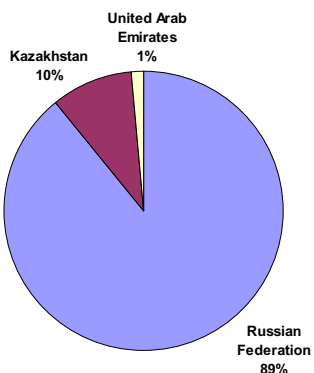
**INDIGENOUS PRODUCTION**



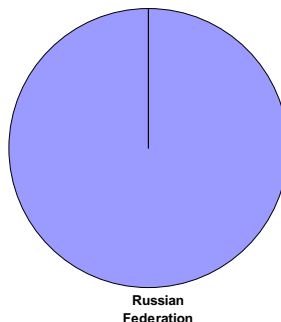
**NET IMPORTS BY FUELS**



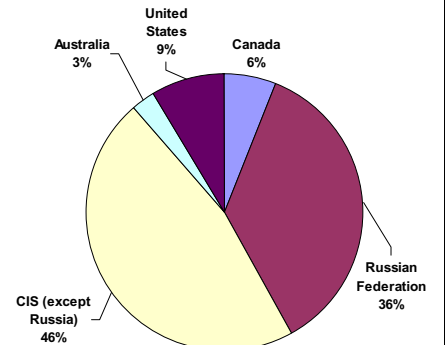
**IMPORTS OF CRUDE OIL**



**IMPORTS OF NATURAL GAS**



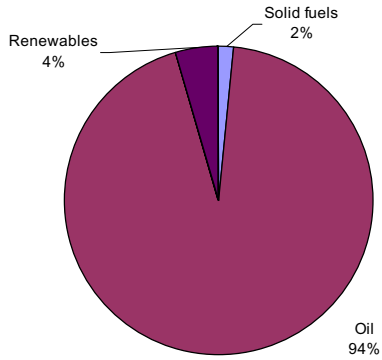
**IMPORTS OF HARD COAL**



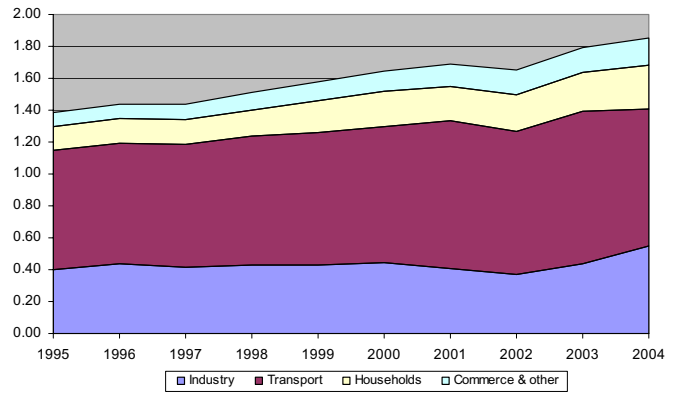


# CYPRUS

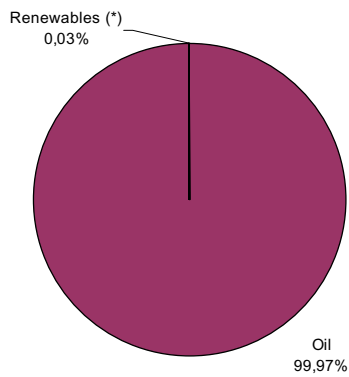
**TOTAL PRIMARY ENERGY SUPPLY (ENERGY MIX)**



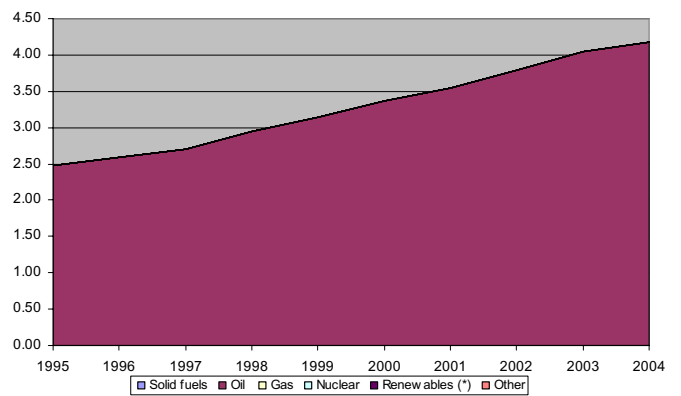
**TOTAL FINAL CONSUMPTION (Mtoe)**



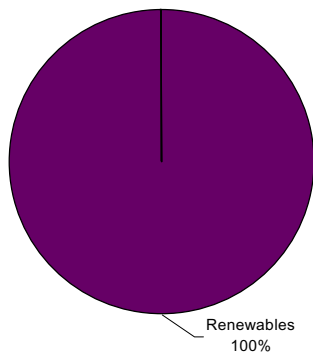
**ELECTRICITY MIX**



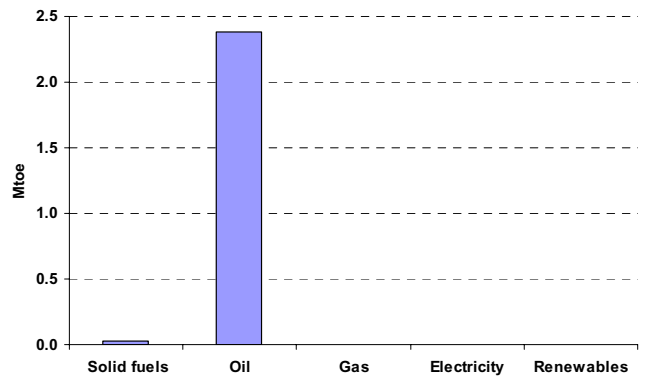
**ELECTRICITY GENERATION (TWh)**



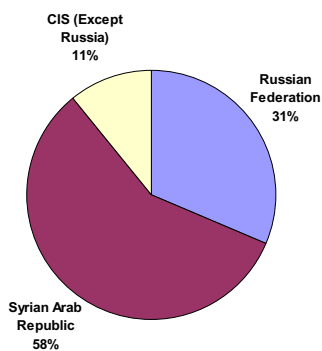
**INDIGENOUS PRODUCTION**



**NET IMPORTS BY FUELS**



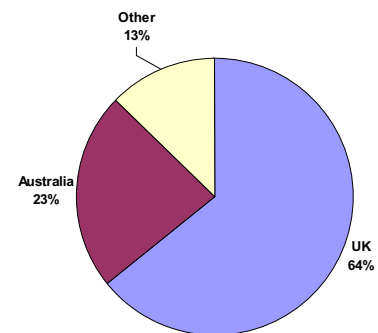
**IMPORTS OF CRUDE OIL**



**IMPORTS OF NATURAL GAS**

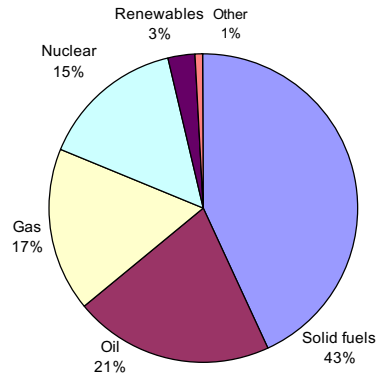
No imports

**IMPORTS OF HARD COAL**

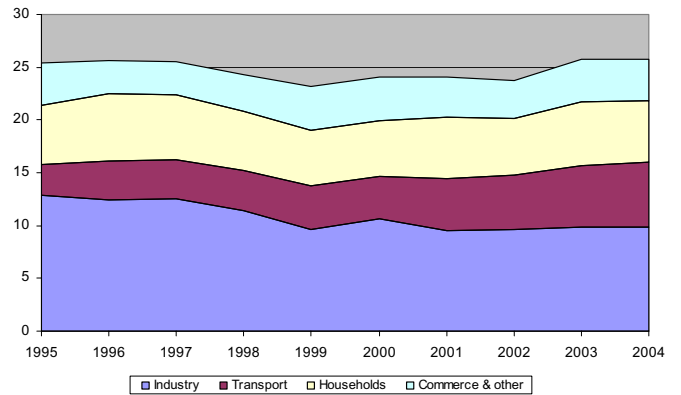


# CZECH REPUBLIC

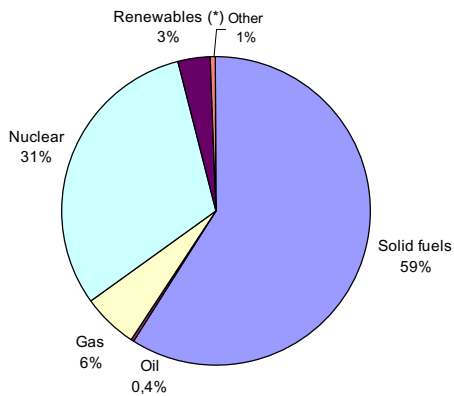
**TOTAL PRIMARY ENERGY SUPPLY (ENERGY MIX)**



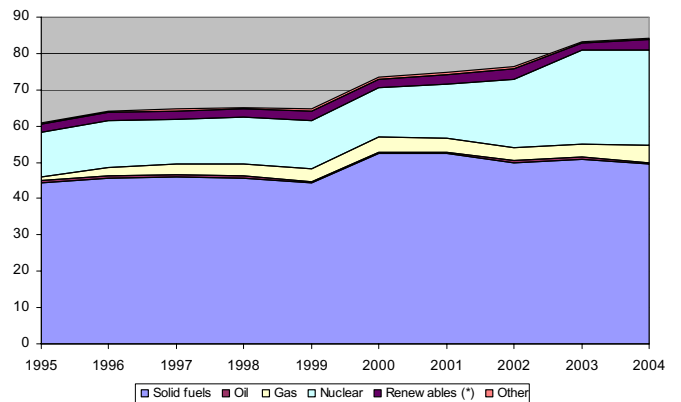
**TOTAL FINAL CONSUMPTION (Mtoe)**



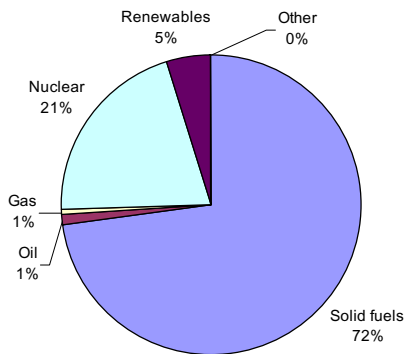
**ELECTRICITY MIX**



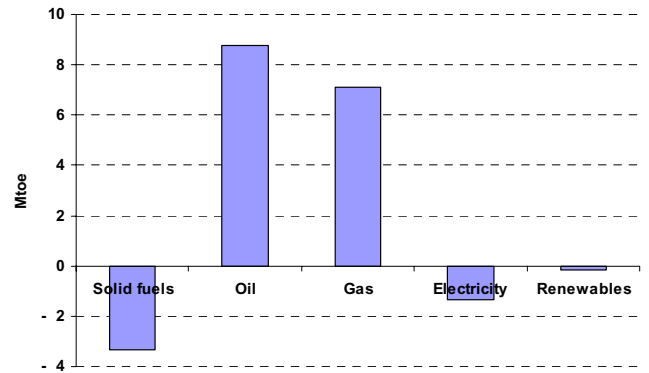
**ELECTRICITY GENERATION (TWh)**



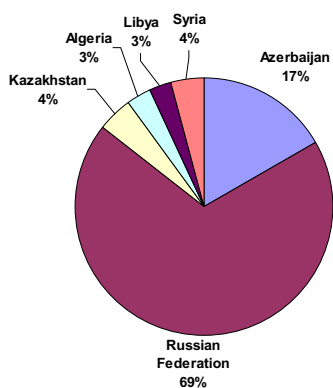
**INDIGENOUS PRODUCTION**



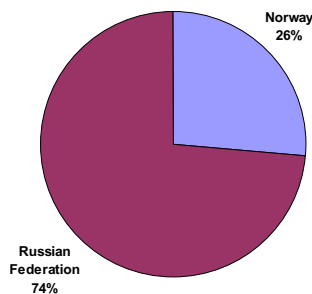
**NET IMPORTS BY FUELS**



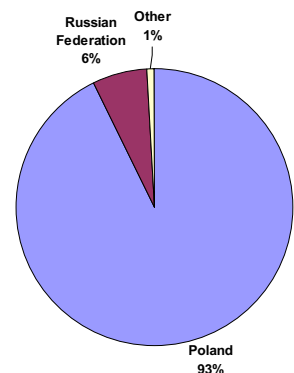
**IMPORTS OF CRUDE OIL**



**IMPORTS OF NATURAL GAS**

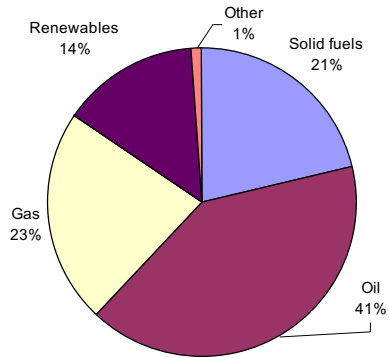


**IMPORTS OF HARD COAL**

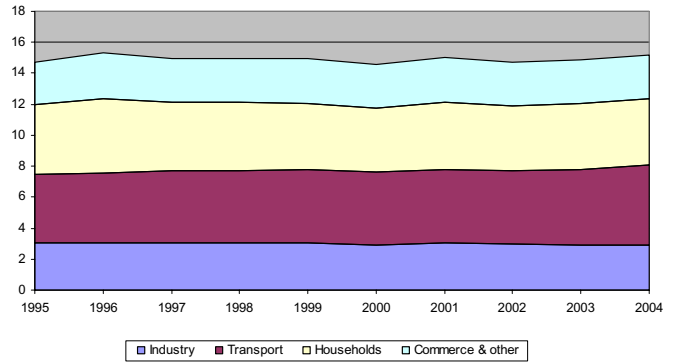


# DENMARK

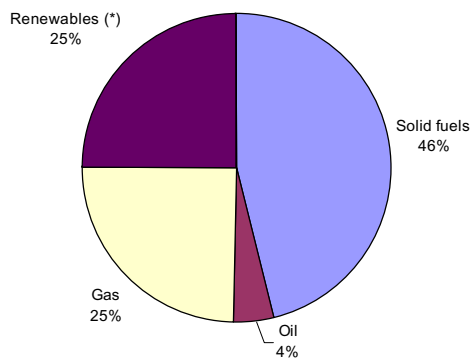
**TOTAL PRIMARY ENERGY SUPPLY (ENERGY MIX)**



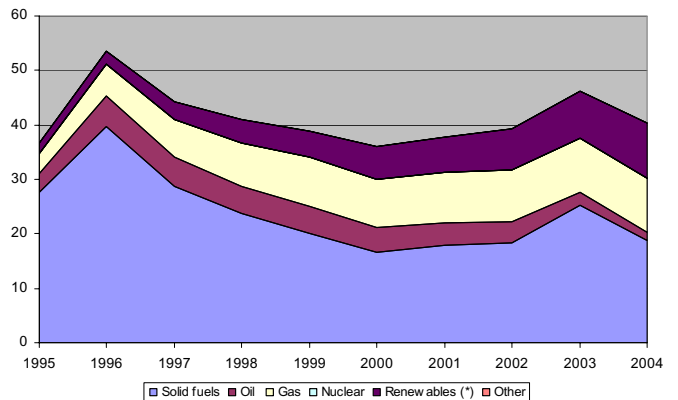
**TOTAL FINAL CONSUMPTION (Mtoe)**



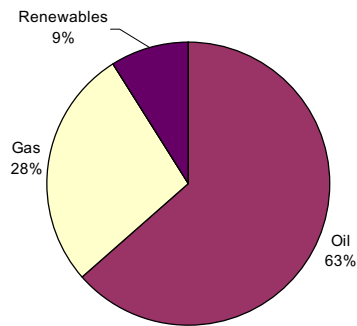
**ELECTRICITY MIX**



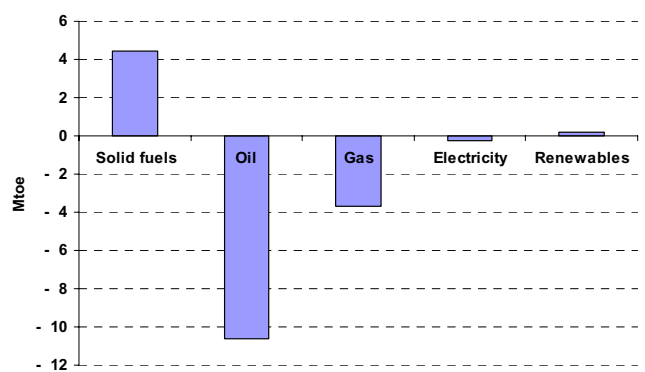
**ELECTRICITY GENERATION (TWh)**



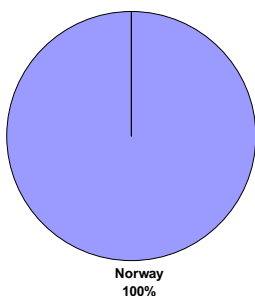
**INDIGENOUS PRODUCTION**



**NET IMPORTS BY FUELS**

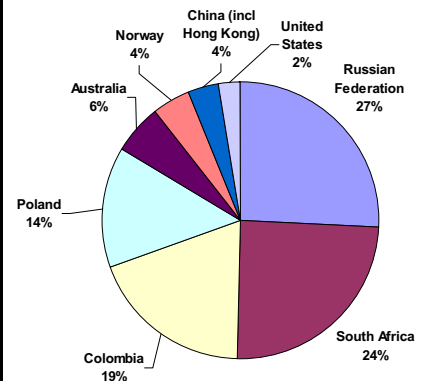


**IMPORTS OF CRUDE OIL**



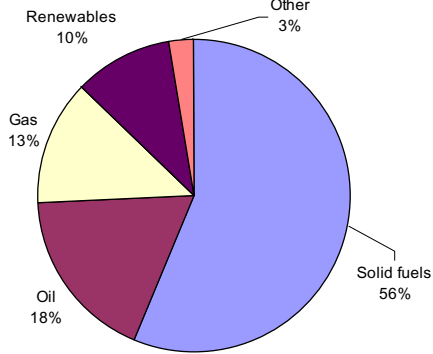
**IMPORTS OF NATURAL GAS**  
No imports

**IMPORTS OF HARD COAL**

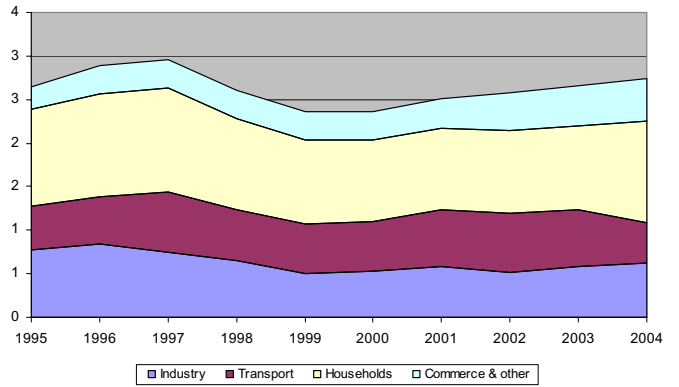


# ESTONIA

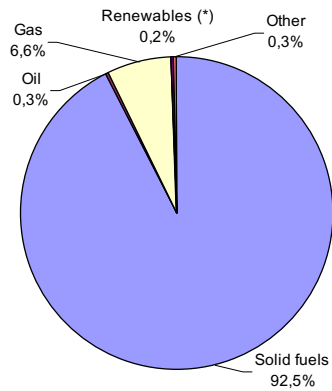
**TOTAL PRIMARY ENERGY SUPPLY (ENERGY MIX)**



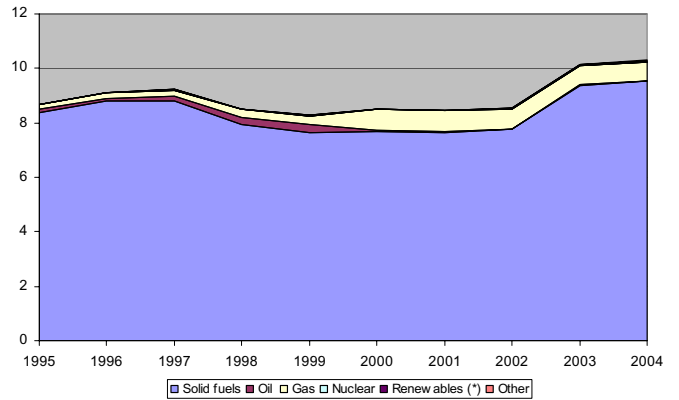
**TOTAL FINAL CONSUMPTION (Mtoe)**



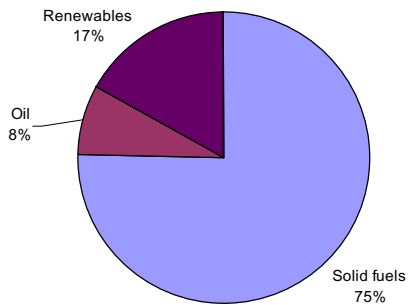
**ELECTRICITY MIX**



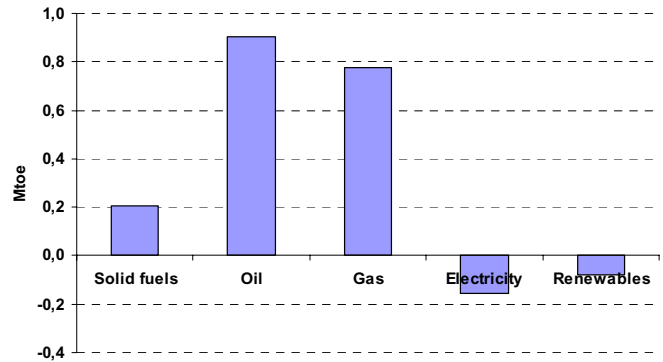
**ELECTRICITY GENERATION (TWh)**



**INDIGENOUS PRODUCTION**

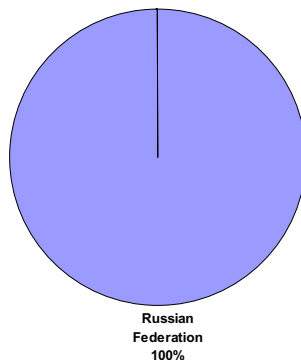


**NET IMPORTS BY FUELS**



**IMPORTS OF CRUDE OIL**  
No imports

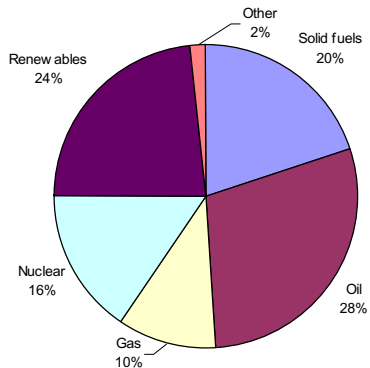
**IMPORTS OF NATURAL GAS**



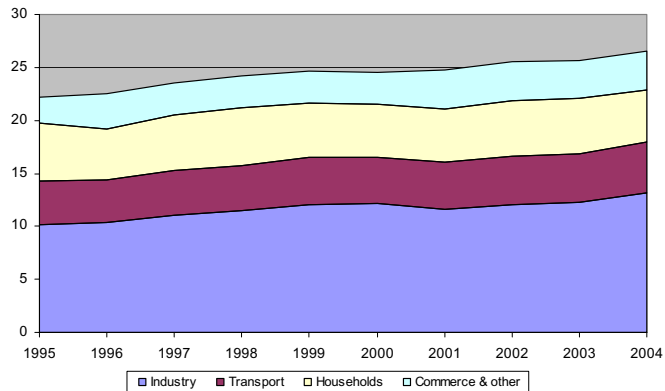
**IMPORTS OF HARD COAL**  
No imports

# FINLAND

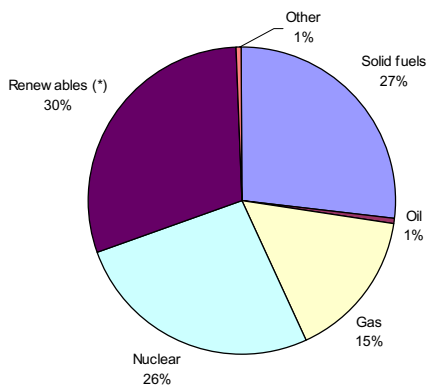
### TOTAL PRIMARY ENERGY SUPPLY (ENERGY MIX)



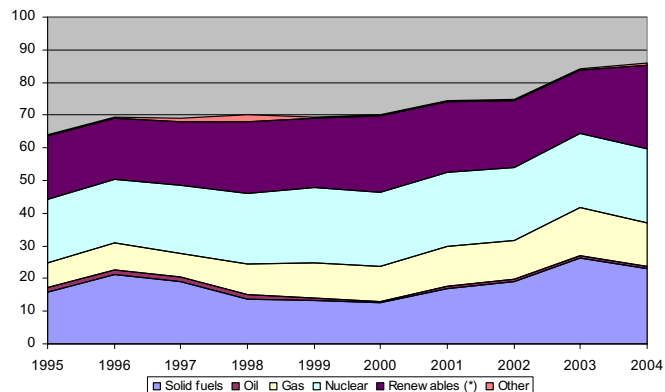
### TOTAL FINAL CONSUMPTION (Mtoe)



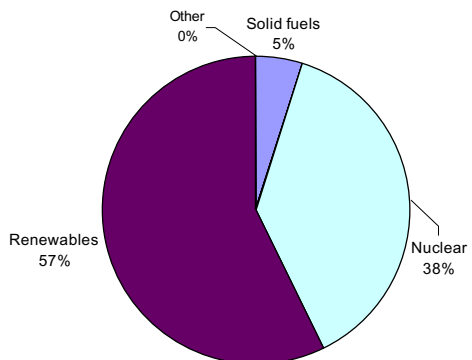
### ELECTRICITY MIX



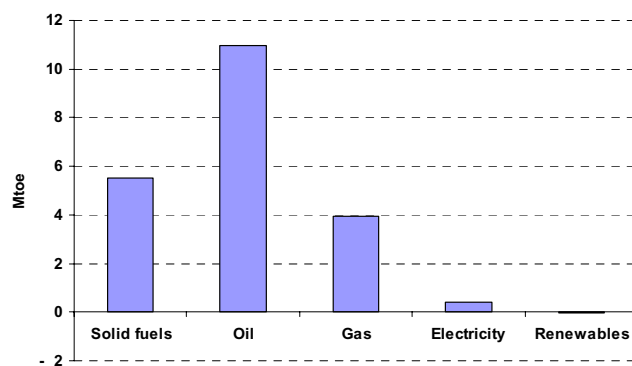
### ELECTRICITY GENERATION (TWh)



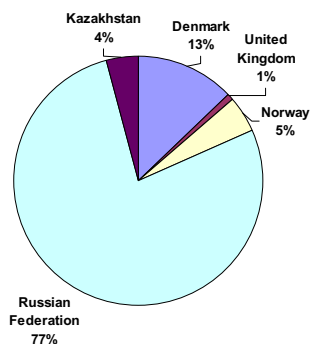
### INDIGENOUS PRODUCTION



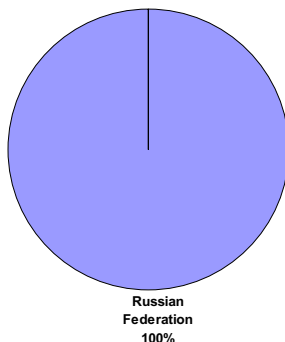
### NET IMPORTS BY FUELS



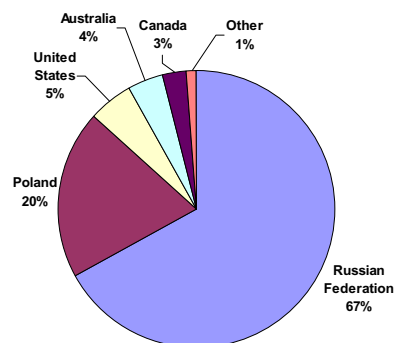
### IMPORTS OF CRUDE OIL



### IMPORTS OF NATURAL GAS

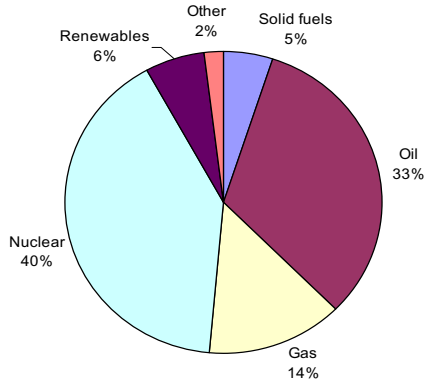


### IMPORTS OF HARD COAL

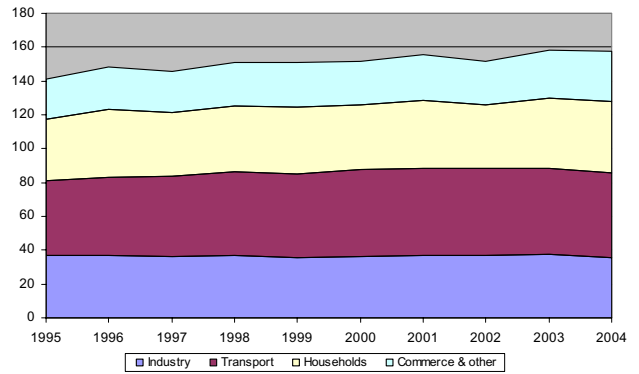


# FRANCE

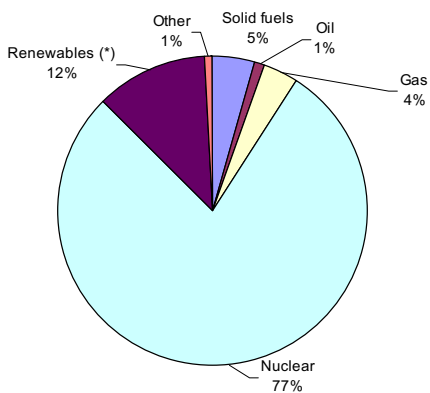
**TOTAL PRIMARY ENERGY SUPPLY (ENERGY MIX)**



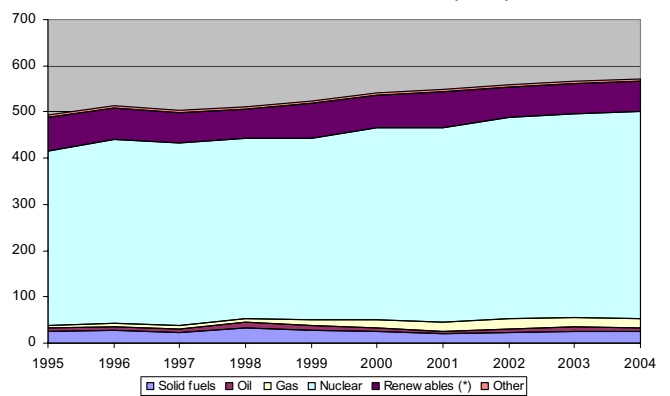
**TOTAL FINAL CONSUMPTION (Mtoe)**



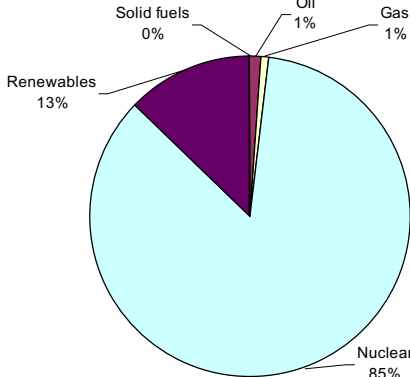
**ELECTRICITY MIX**



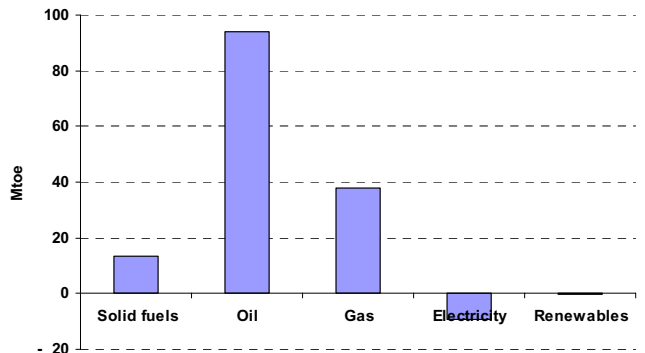
**ELECTRICITY GENERATION (TWh)**



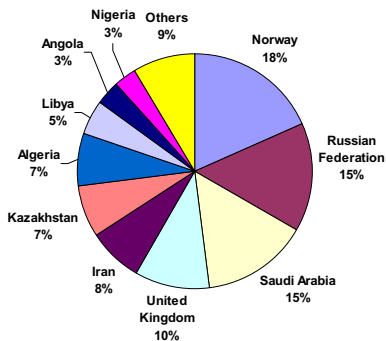
**INDIGENOUS PRODUCTION**



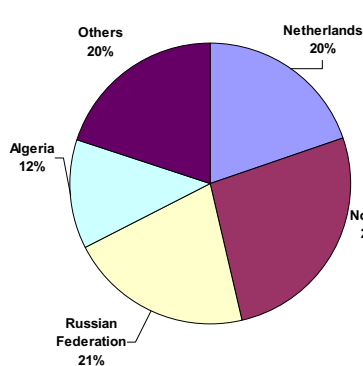
**NET IMPORTS BY FUELS**



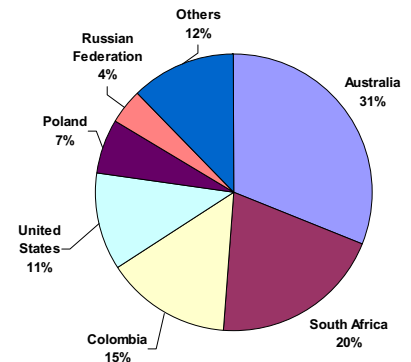
**IMPORTS OF CRUDE OIL**



**IMPORTS OF NATURAL GAS**

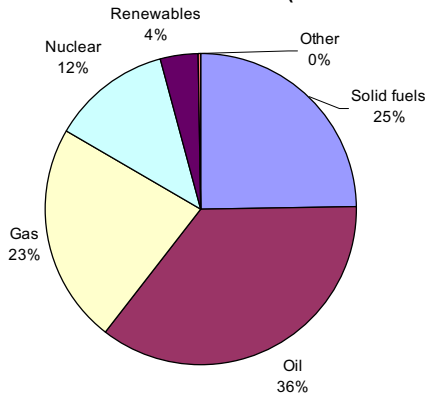


**IMPORTS OF HARD COAL**

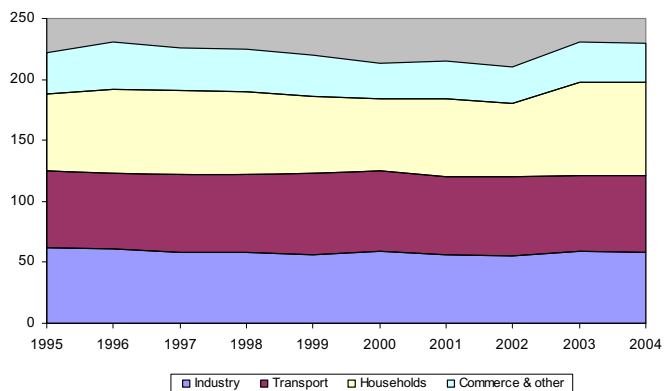


# GERMANY

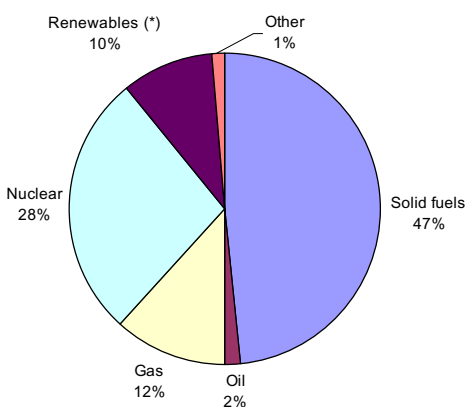
**TOTAL PRIMARY ENERGY SUPPLY (ENERGY MIX)**



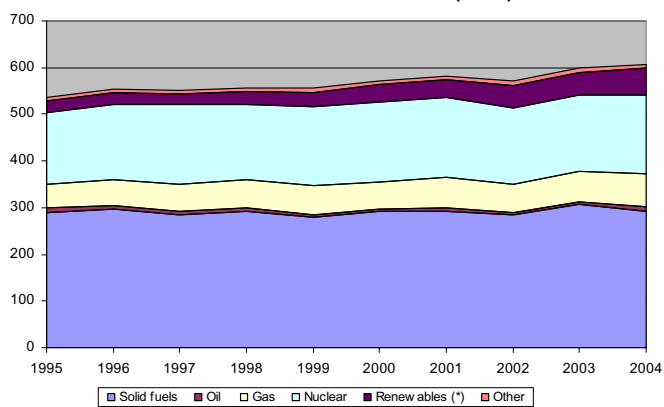
**TOTAL FINAL CONSUMPTION (Mtoe)**



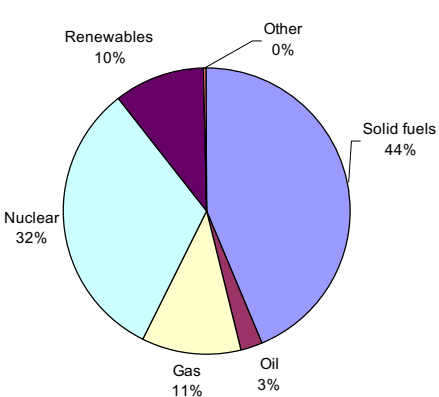
**ELECTRICITY MIX**



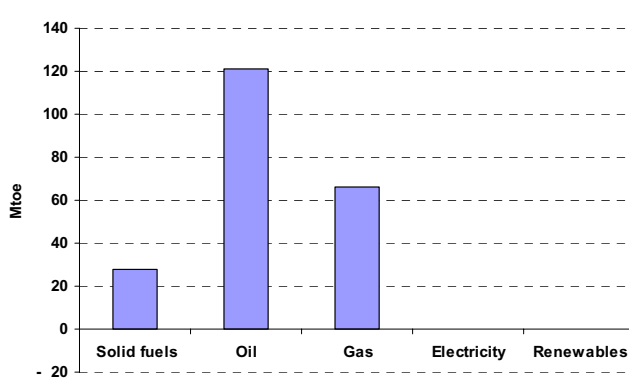
**ELECTRICITY GENERATION (TWh)**



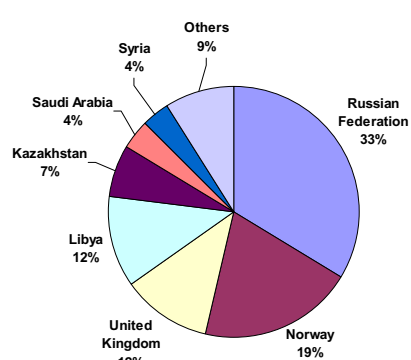
**INDIGENEOUS PRODUCTION**



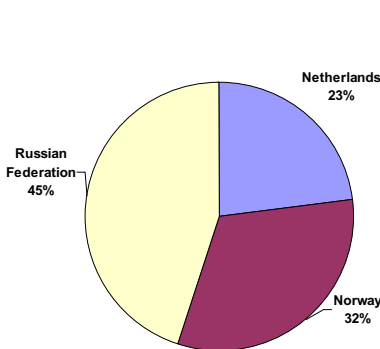
**NET IMPORTS BY FUELS**



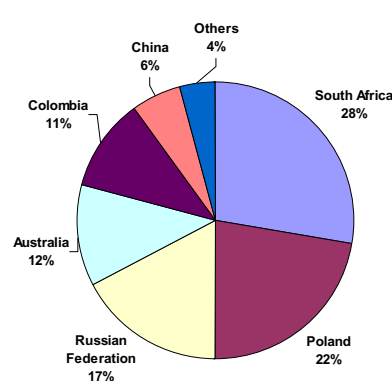
**IMPORTS OF CRUDE OIL**



**IMPORTS OF NATURAL GAS**

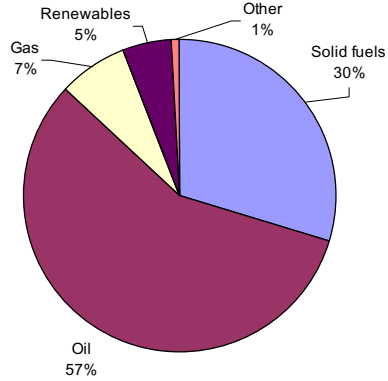


**IMPORTS OF HARD COAL**

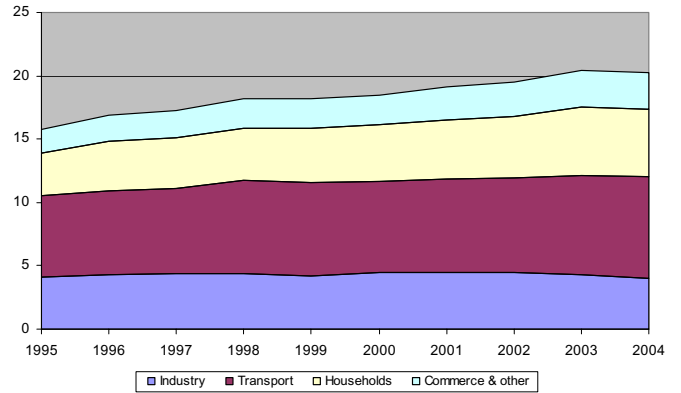


# GREECE

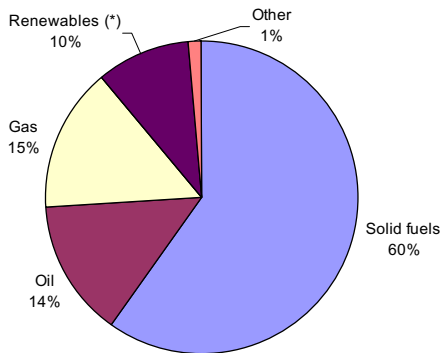
**TOTAL PRIMARY ENERGY SUPPLY (ENERGY MIX)**



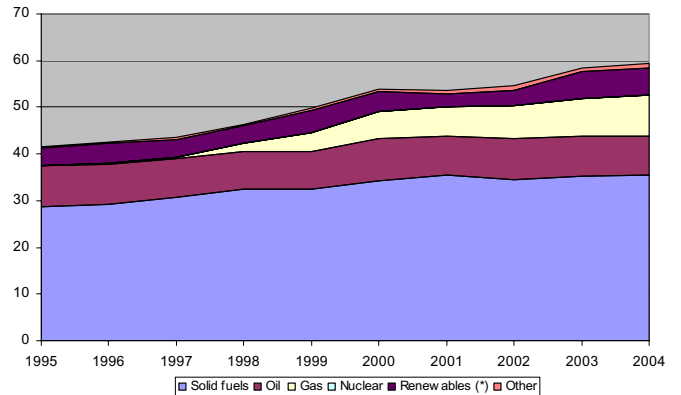
**TOTAL FINAL CONSUMPTION (Mtoe)**



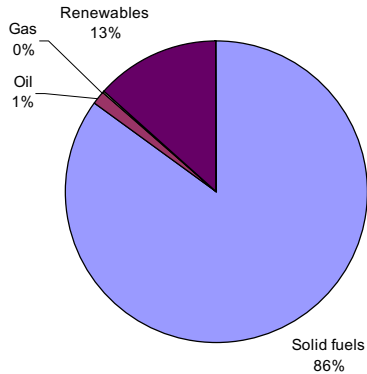
**ELECTRICITY MIX**



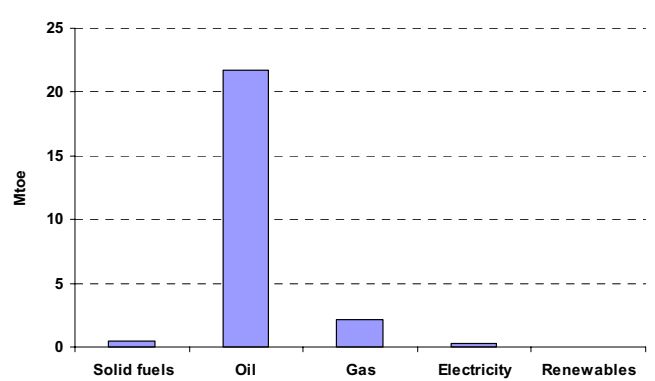
**ELECTRICITY GENERATION (TWh)**



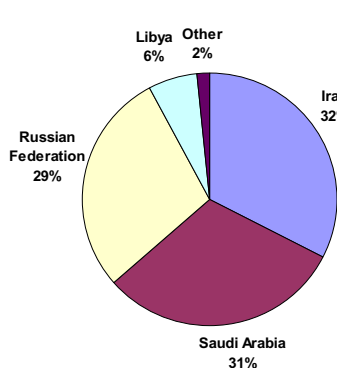
**INDIGENOUS PRODUCTION**



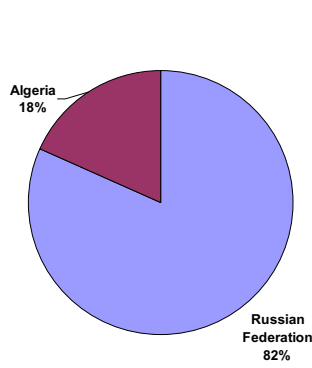
**NET IMPORTS BY FUELS**



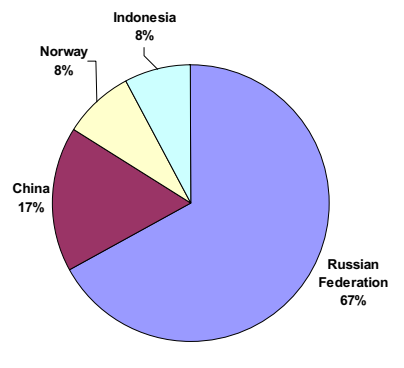
**IMPORTS OF CRUDE OIL**



**IMPORTS OF NATURAL GAS**



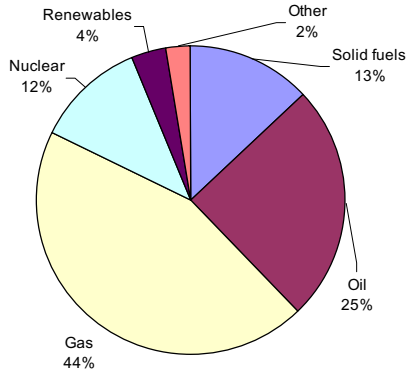
**IMPORTS OF HARD COAL**



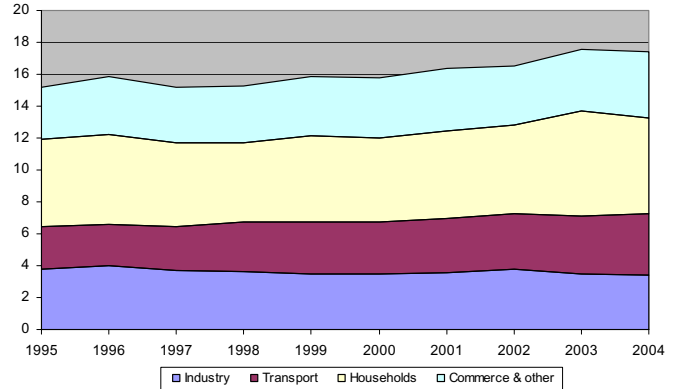


# HUNGARY

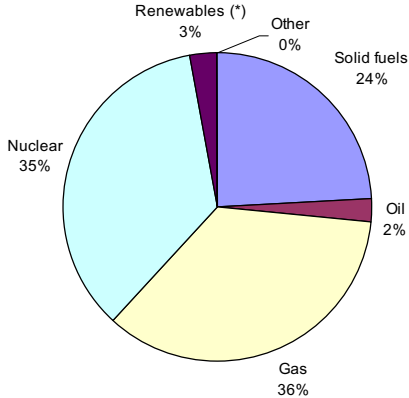
**TOTAL PRIMARY ENERGY SUPPLY (ENERGY MIX)**



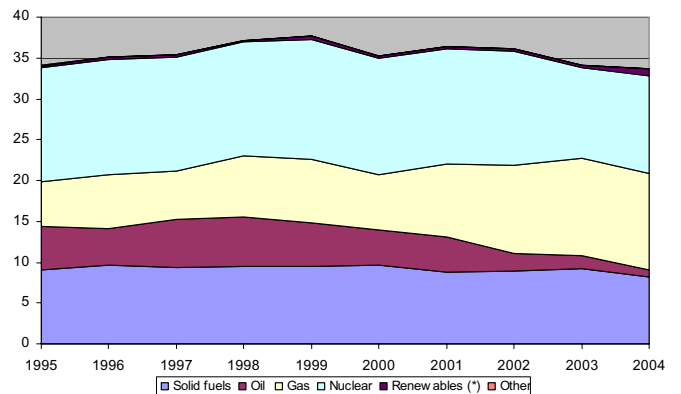
**TOTAL FINAL CONSUMPTION (Mtoe)**



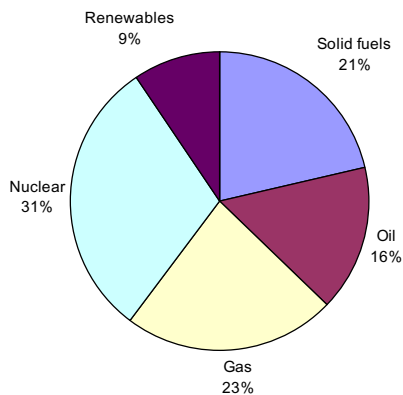
**ELECTRICITY MIX**



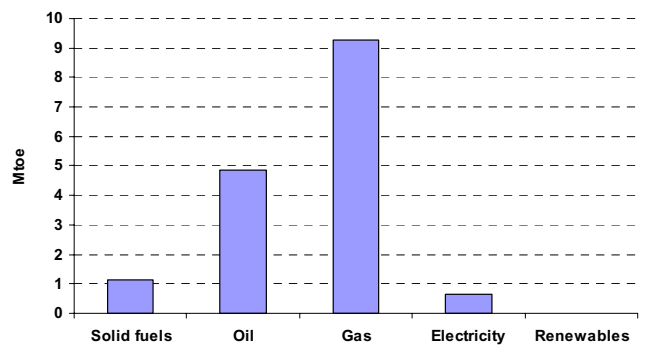
**ELECTRICITY GENERATION (TWh)**



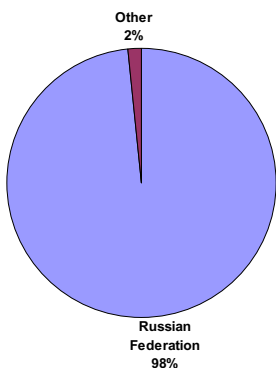
**INDIGENOUS PRODUCTION**



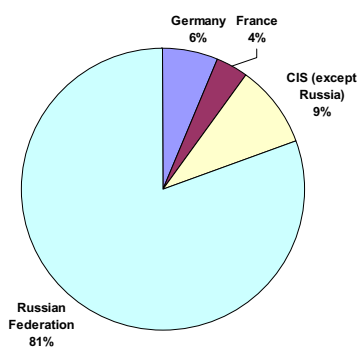
**NET IMPORTS BY FUELS**



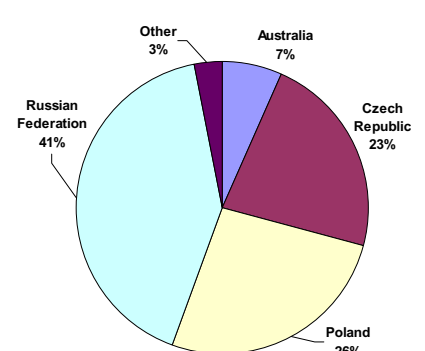
**IMPORTS OF CRUDE OIL**



**IMPORTS OF NATURAL GAS**

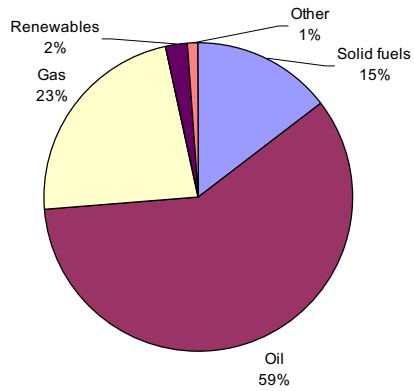


**IMPORTS OF HARD COAL**

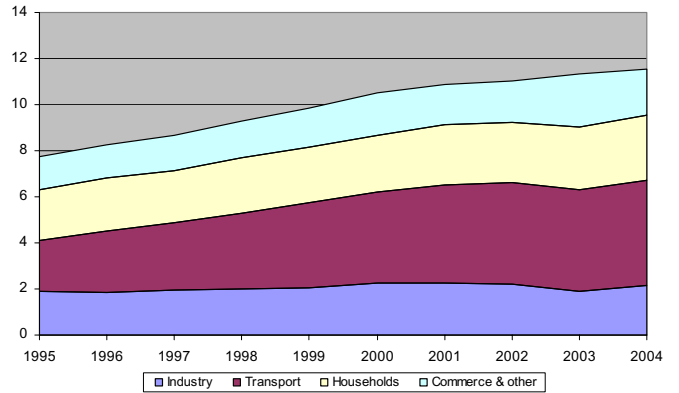


# IRELAND

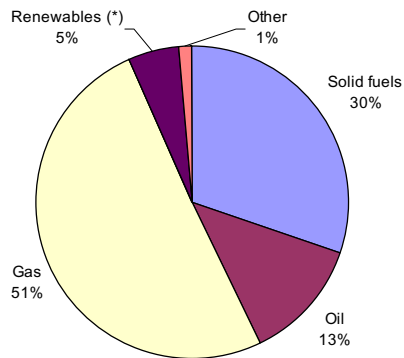
**TOTAL PRIMARY ENERGY SUPPLY (ENERGY MIX)**



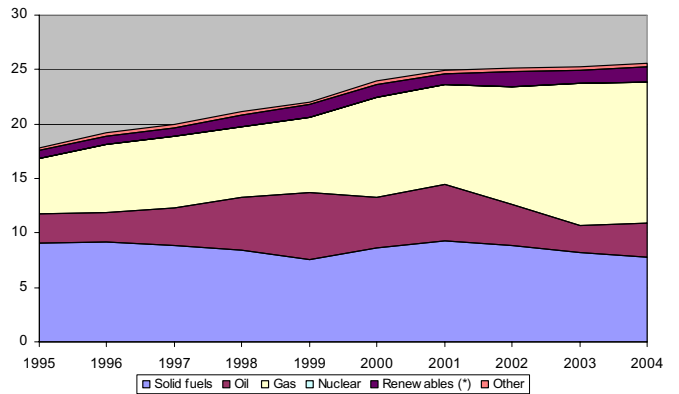
**TOTAL FINAL CONSUMPTION (Mtoe)**



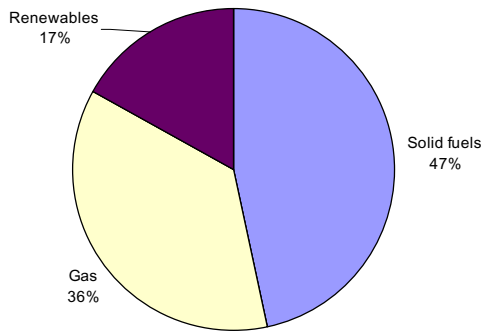
**ELECTRICITY MIX**



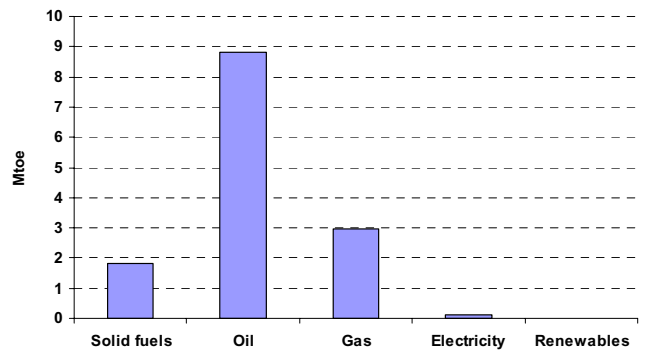
**ELECTRICITY GENERATION (TWh)**



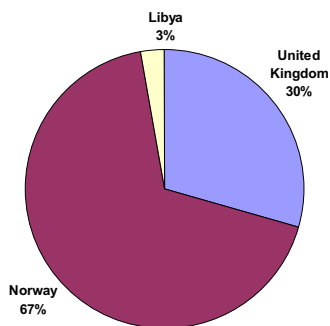
**INDIGENOUS PRODUCTION**



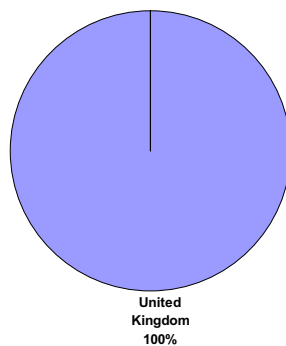
**NET IMPORTS BY FUELS**



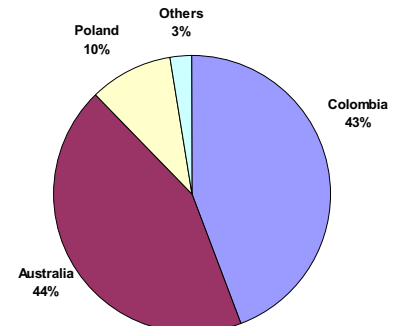
**IMPORTS OF CRUDE OIL**



**IMPORTS OF NATURAL GAS**

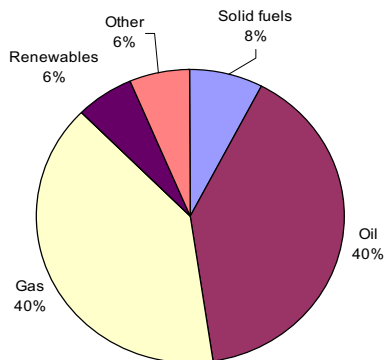


**IMPORTS OF HARD COAL**

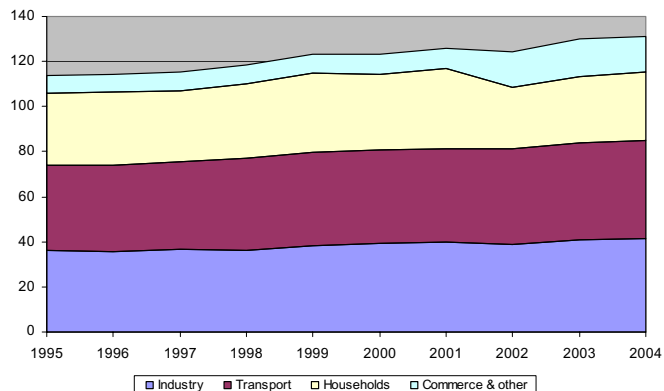


# ITALY

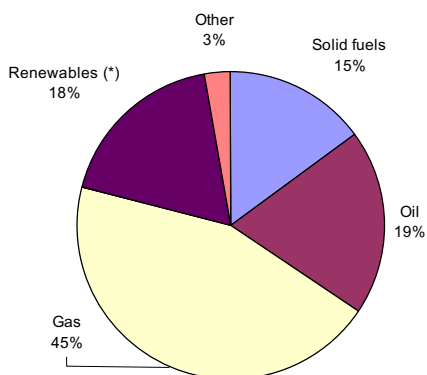
**TOTAL PRIMARY ENERGY SUPPLY (ENERGY MIX)**



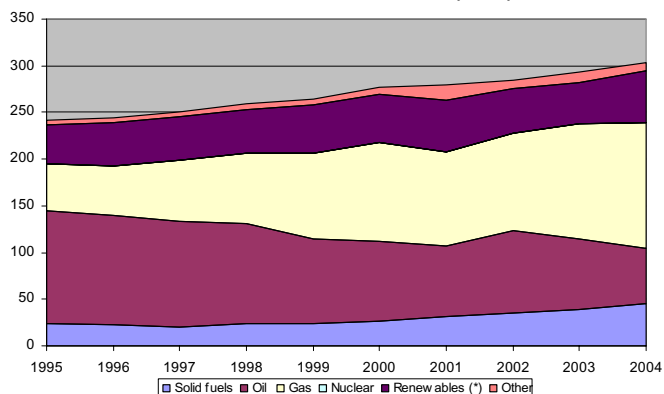
**TOTAL FINAL CONSUMPTION (Mtoe)**



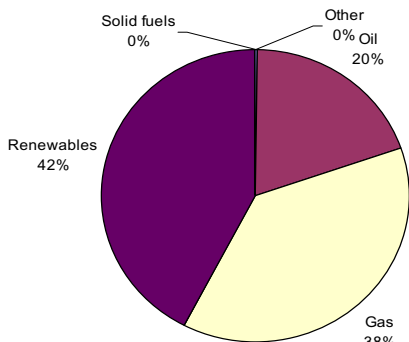
**ELECTRICITY MIX**



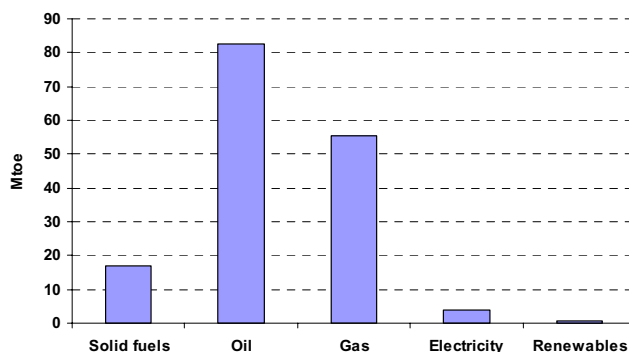
**ELECTRICITY GENERATION (TWh)**



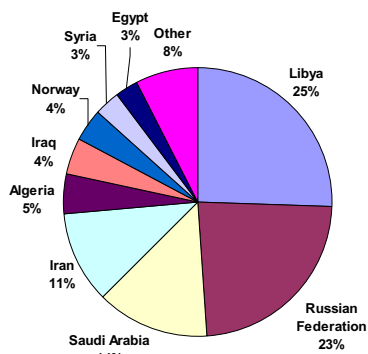
**INDIGENOUS PRODUCTION**



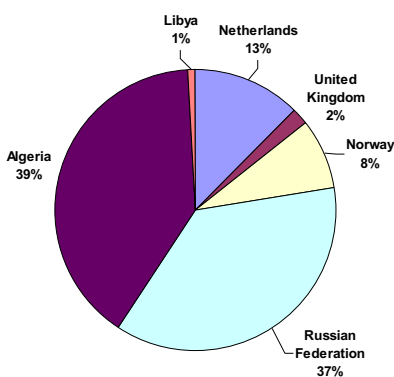
**NET IMPORTS BY FUELS**



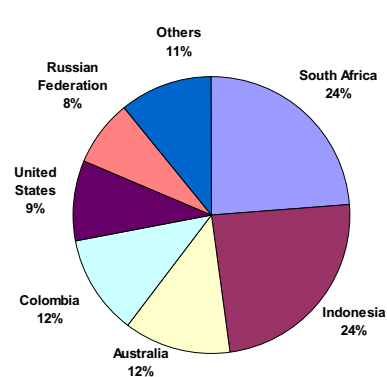
**IMPORTS OF CRUDE OIL**



**IMPORTS OF NATURAL GAS**

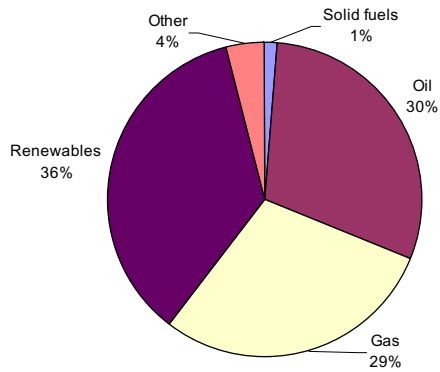


**IMPORTS OF HARD COAL**

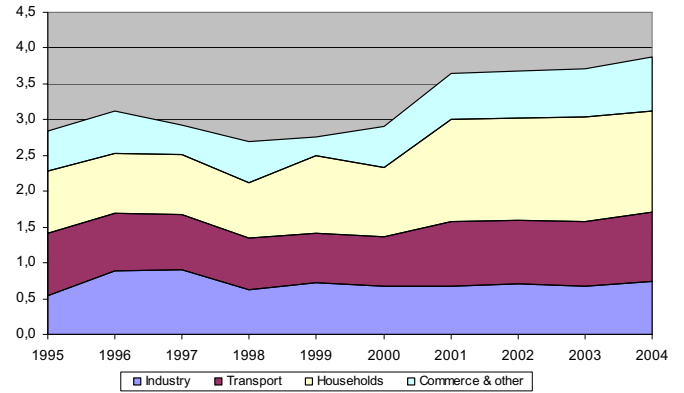


# LATVIA

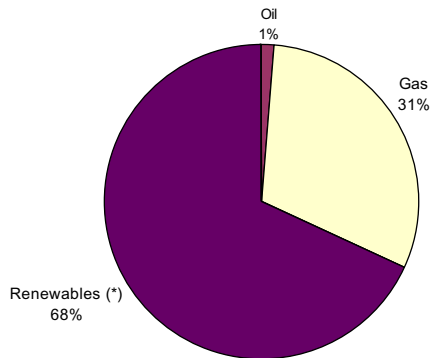
**TOTAL PRIMARY ENERGY SUPPLY (ENERGY MIX)**



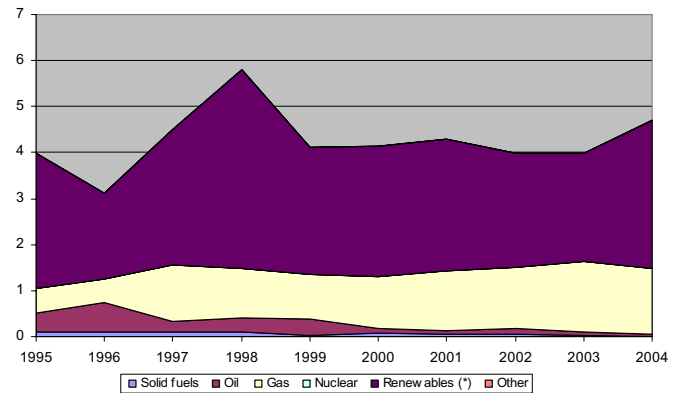
**TOTAL FINAL CONSUMPTION (Mtoe)**



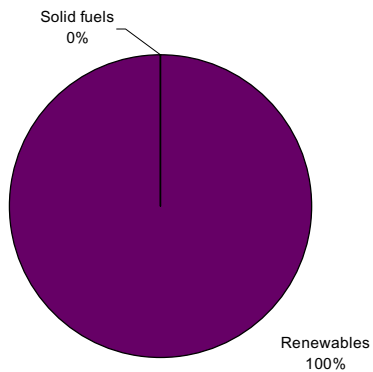
**ELECTRICITY MIX**



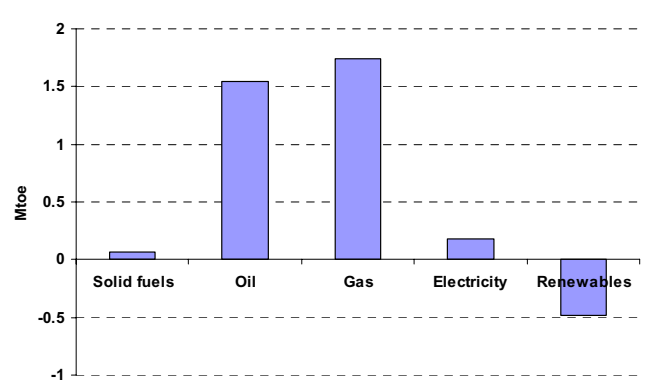
**ELECTRICITY GENERATION (TWh)**



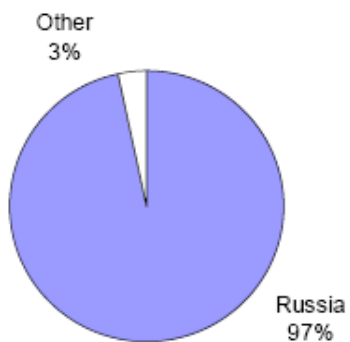
**INDIGENOUS PRODUCTION**



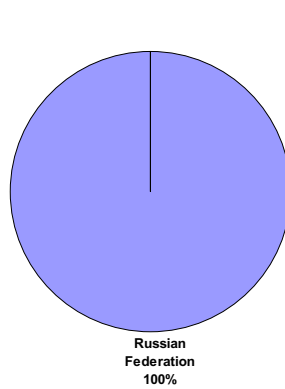
**NET IMPORTS BY FUELS**



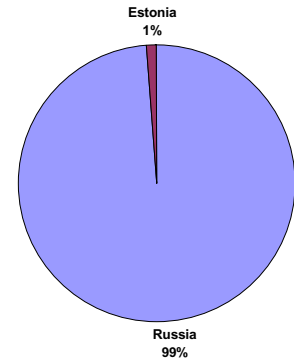
**IMPORTS OF CRUDE OIL**



**IMPORTS OF NATURAL GAS**

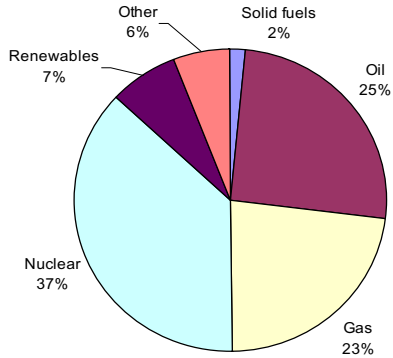


**IMPORTS OF HARD COAL**

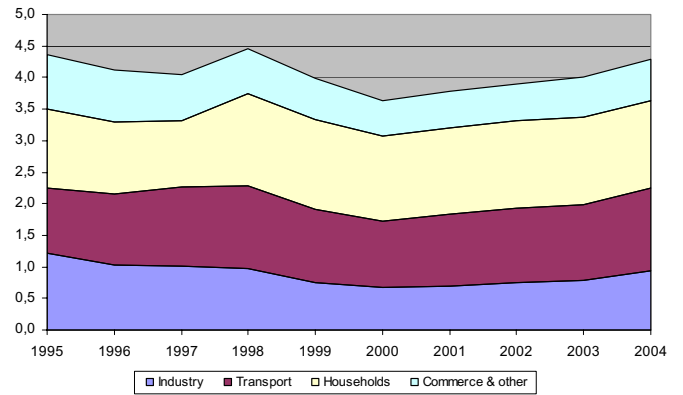


# LITHUANIA

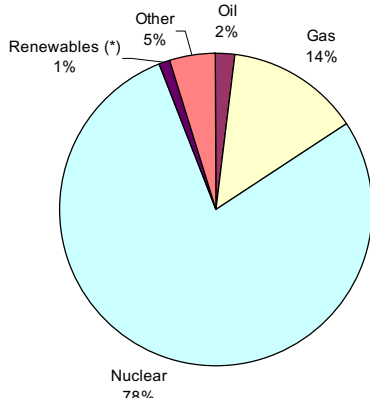
**TOTAL PRIMARY ENERGY SUPPLY (ENERGY MIX)**



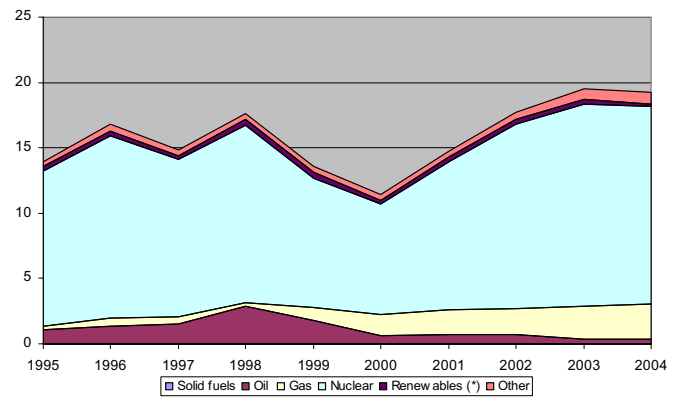
**TOTAL FINAL CONSUMPTION (Mtoe)**



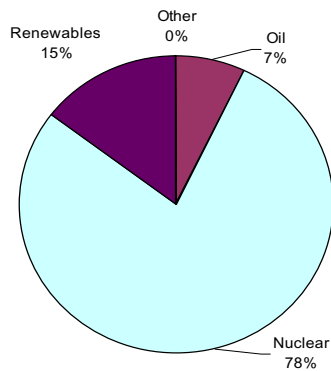
**ELECTRICITY MIX**



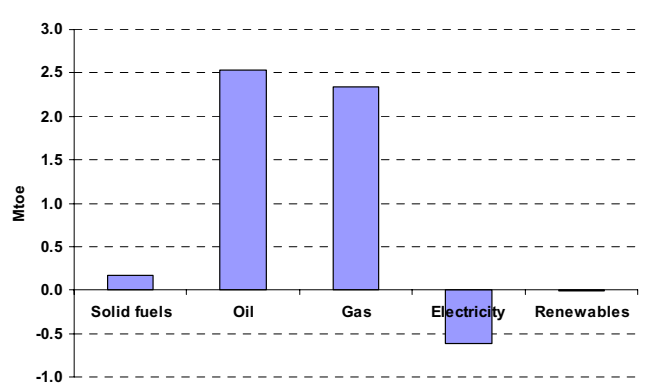
**ELECTRICITY GENERATION (TWh)**



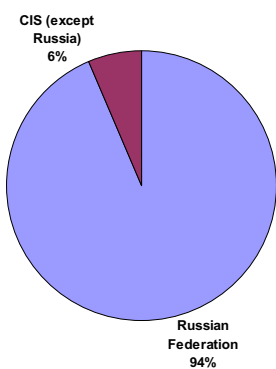
**INDIGENOUS PRODUCTION**



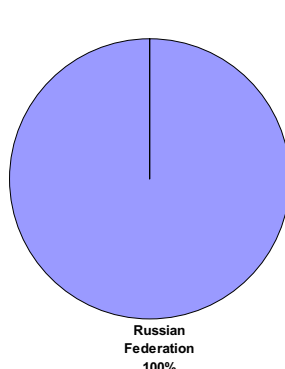
**NET IMPORTS BY FUELS**



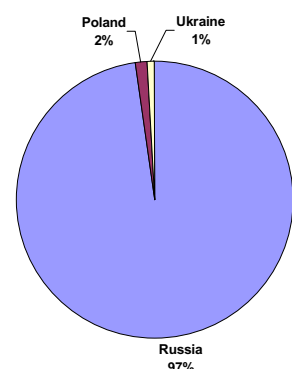
**IMPORTS OF CRUDE OIL**



**IMPORTS OF NATURAL GAS**

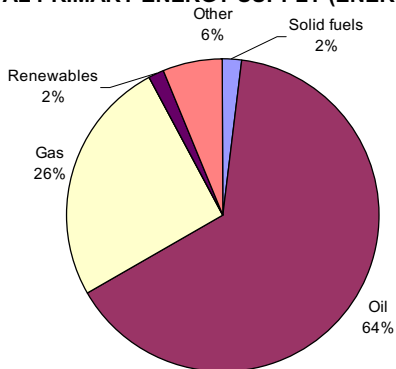


**IMPORTS OF HARD COAL**

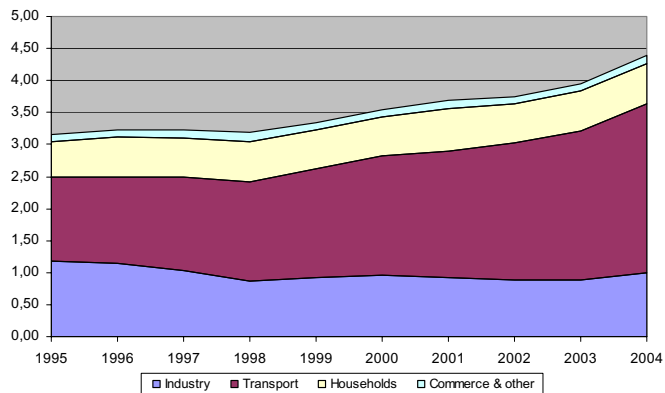


# LUXEMBOURG

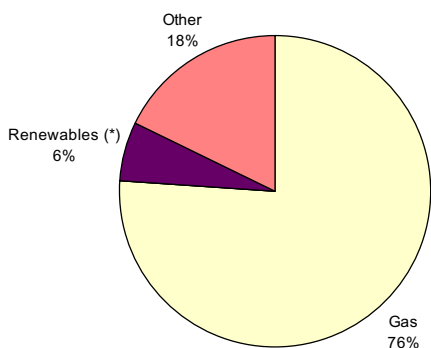
**TOTAL PRIMARY ENERGY SUPPLY (ENERGY MIX)**



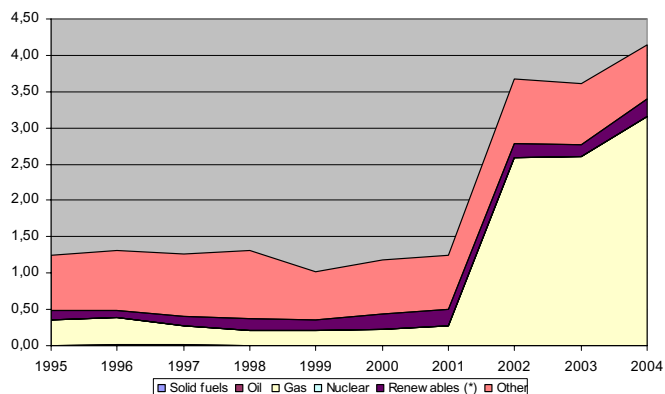
**TOTAL FINAL CONSUMPTION (Mtoe)**



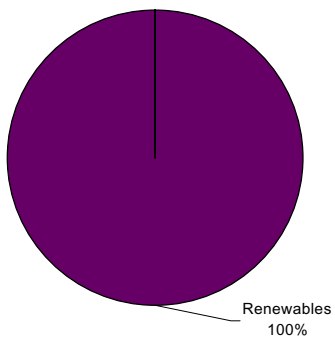
**ELECTRICITY MIX**



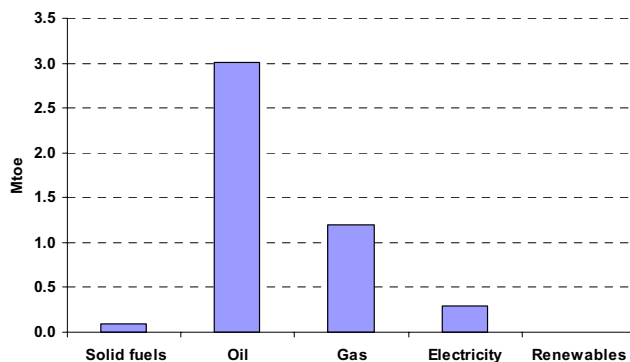
**ELECTRICITY GENERATION (TWh)**



**INDIGENOUS PRODUCTION**



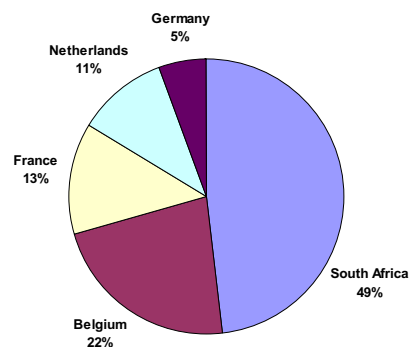
**NET IMPORTS BY FUELS**



**IMPORTS OF CRUDE OIL**  
No crude import

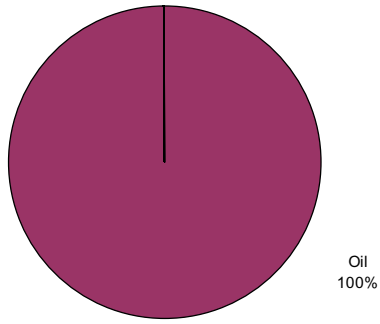
**IMPORTS OF NATURAL GAS**  
Member State declares imports of natural gas only as a total non broken down by country of origin (Eurostat)

**IMPORTS OF HARD COAL**

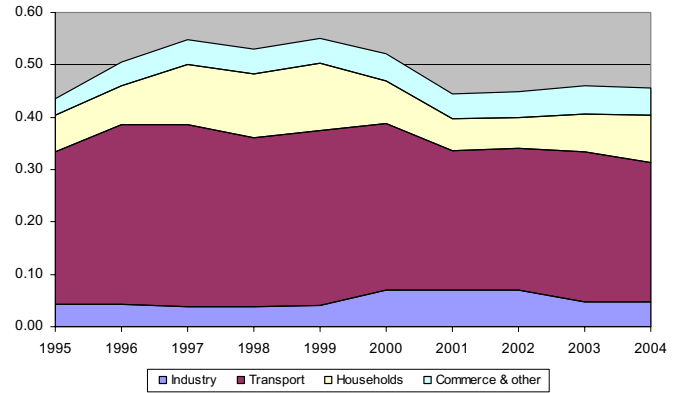


# MALTA

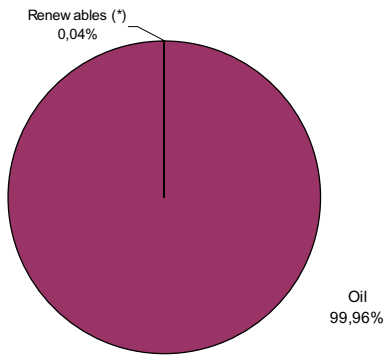
**TOTAL PRIMARY ENERGY SUPPLY (ENERGY MIX)**



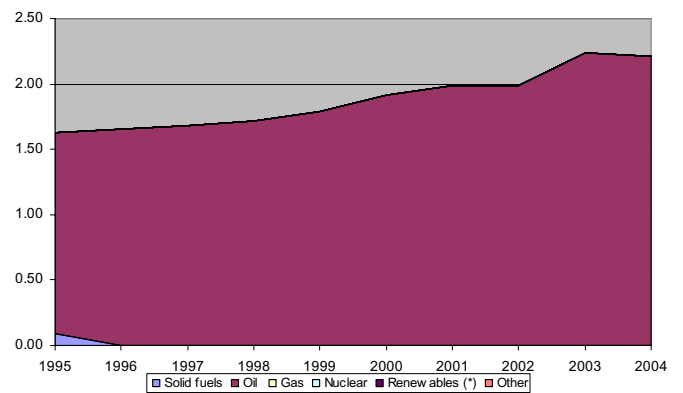
**TOTAL FINAL CONSUMPTION (Mtoe)**



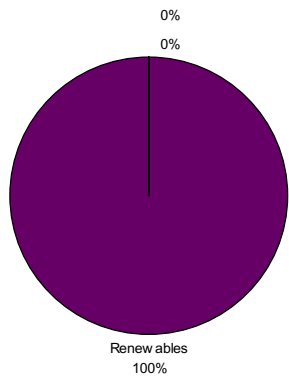
**ELECTRICITY MIX**



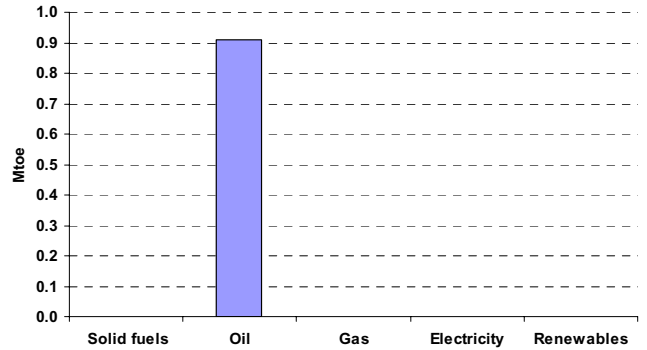
**ELECTRICITY GENERATION (TWh)**



**INDIGENOUS PRODUCTION**



**NET IMPORTS BY FUELS**



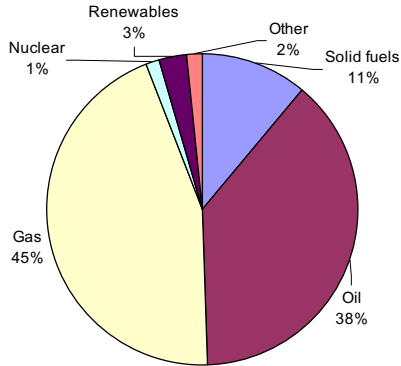
**IMPORTS OF CRUDE OIL**  
No Crude Import

**IMPORTS OF NATURAL GAS**  
No imports

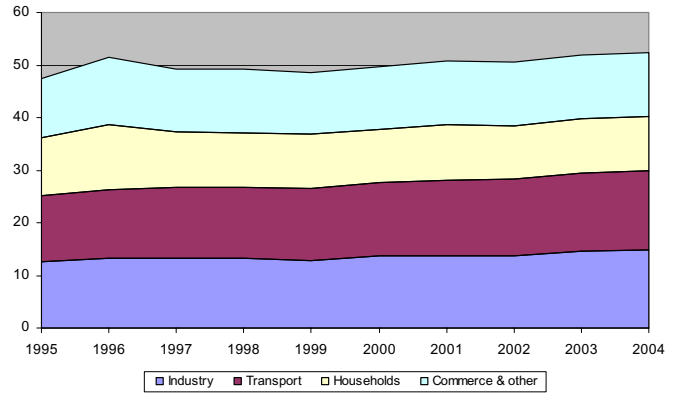
**IMPORTS OF HARD COAL**  
No imports

# NETHERLANDS

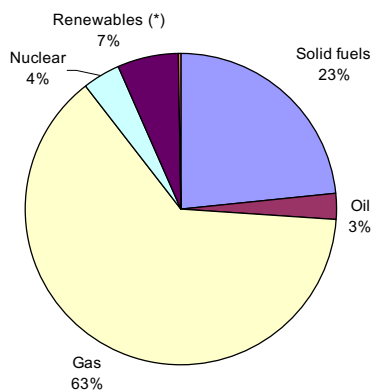
**TOTAL PRIMARY ENERGY SUPPLY (ENERGY MIX)**



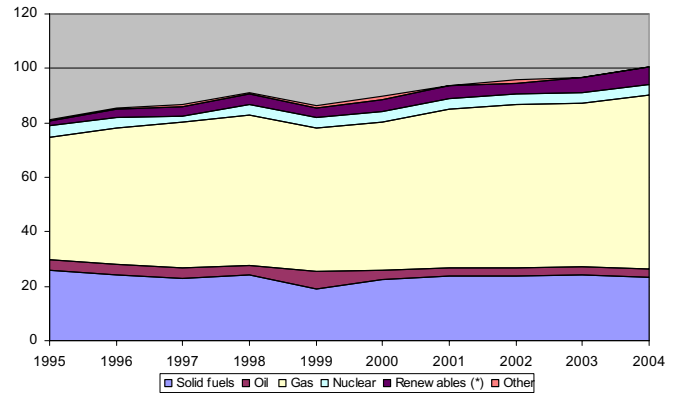
**TOTAL FINAL CONSUMPTION (Mtoe)**



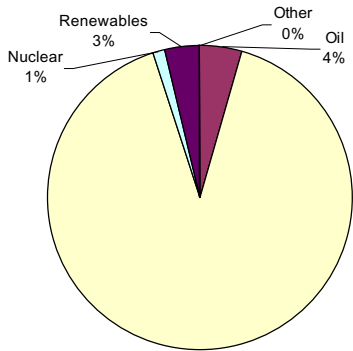
**ELECTRICITY MIX**



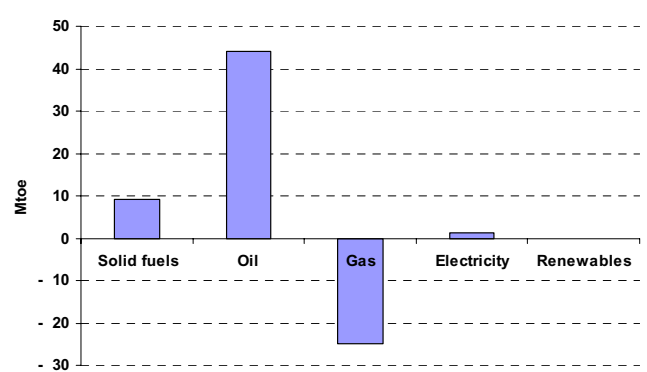
**ELECTRICITY GENERATION (TWh)**



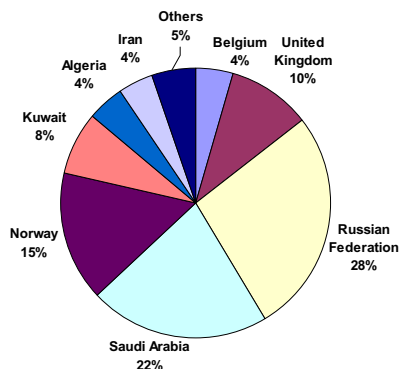
**INDIGENEOUS PRODUCTION**



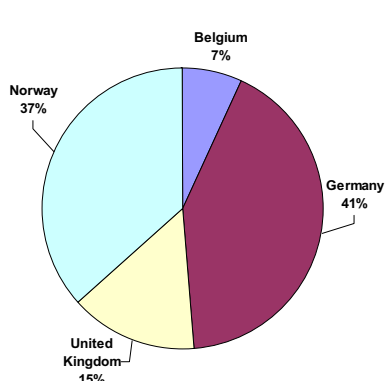
**NET IMPORTS BY FUELS**



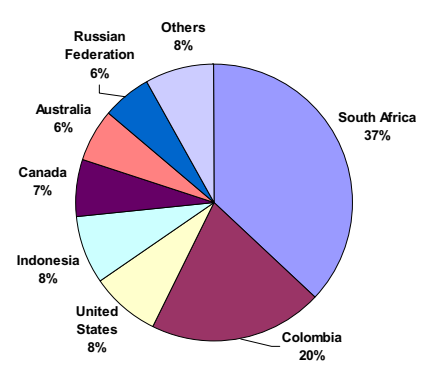
**IMPORTS OF CRUDE OIL**



**IMPORTS OF NATURAL GAS**



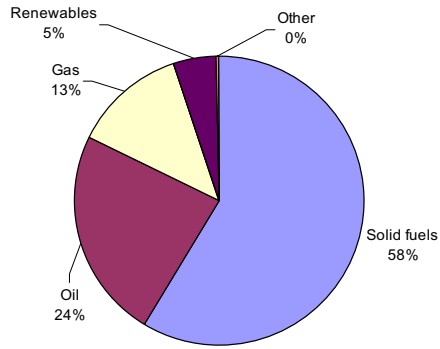
**IMPORTS OF HARD COAL**



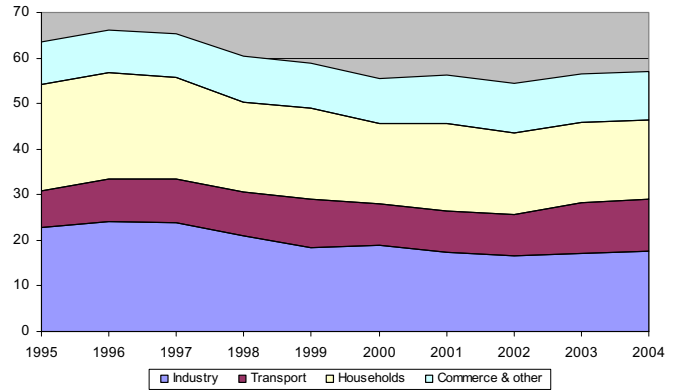


# POLAND

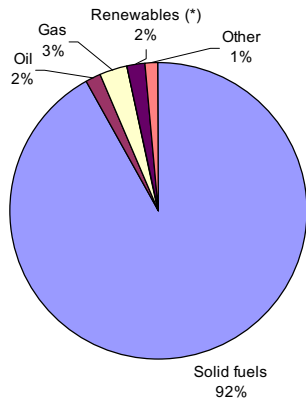
**TOTAL PRIMARY ENERGY SUPPLY (ENERGY MIX)**



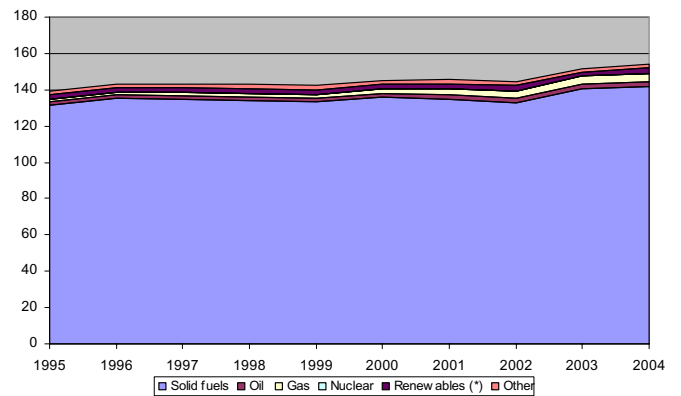
**TOTAL FINAL CONSUMPTION (Mtoe)**



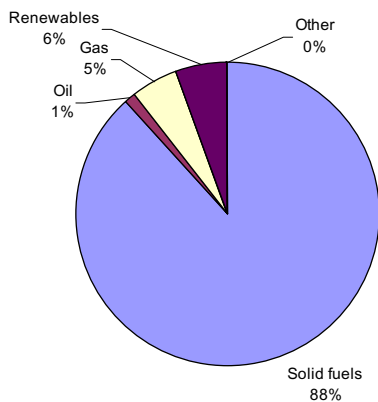
**ELECTRICITY MIX**



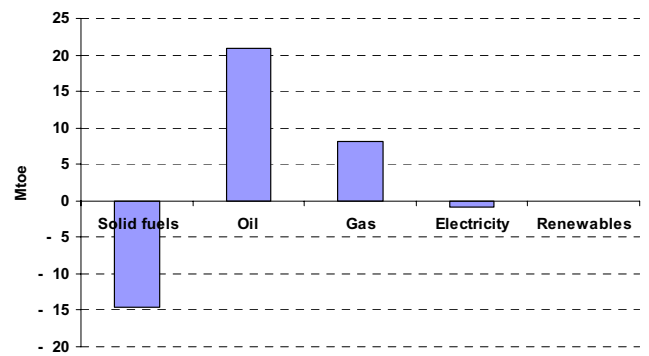
**ELECTRICITY GENERATION (TWh)**



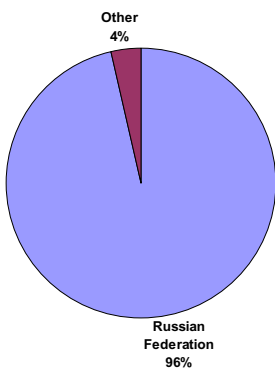
**INDIGENEOUS PRODUCTION**



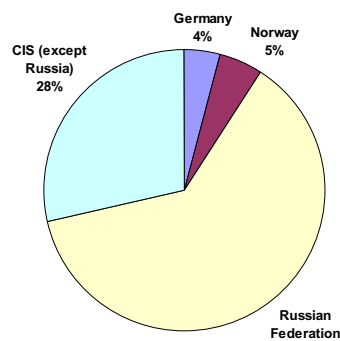
**NET IMPORTS BY FUELS**



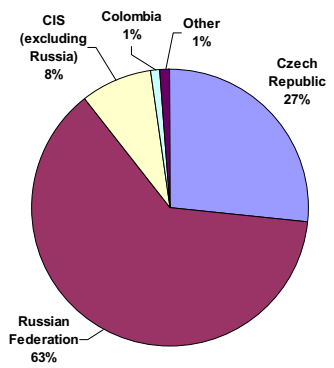
**IMPORTS OF CRUDE OIL**



**IMPORTS OF NATURAL GAS**

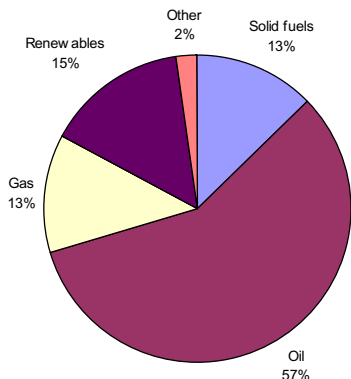


**IMPORTS OF HARD COAL**

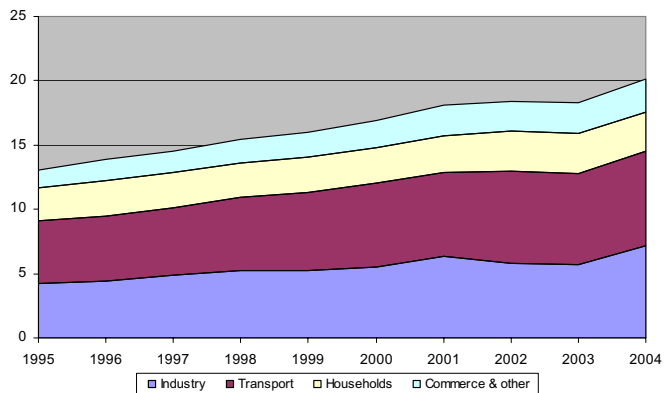


# PORTUGAL

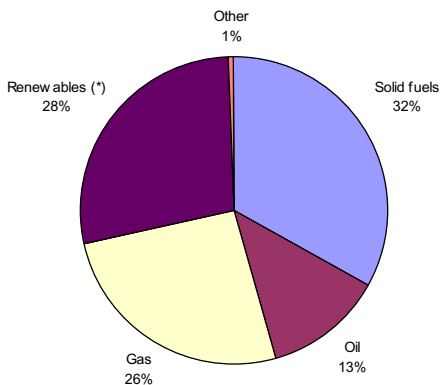
**TOTAL PRIMARY ENERGY SUPPLY (ENERGY MIX)**



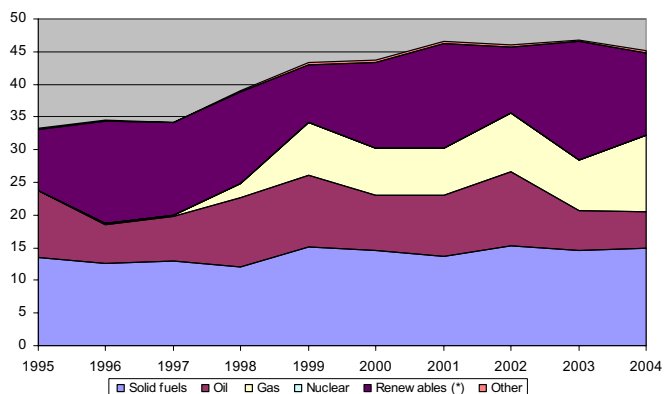
**TOTAL FINAL CONSUMPTION (Mtoe)**



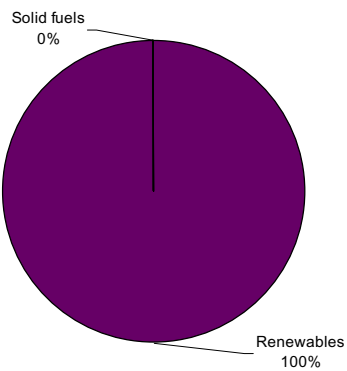
**ELECTRICITY MIX**



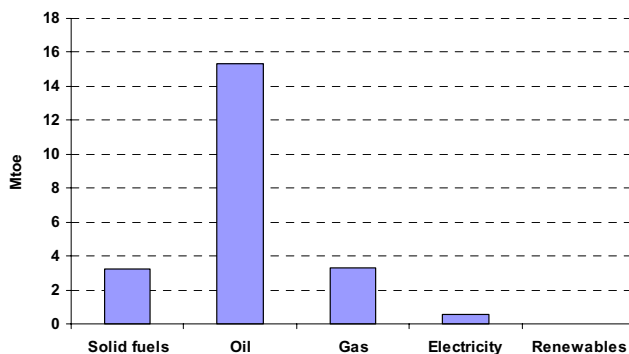
**ELECTRICITY GENERATION (TWh)**



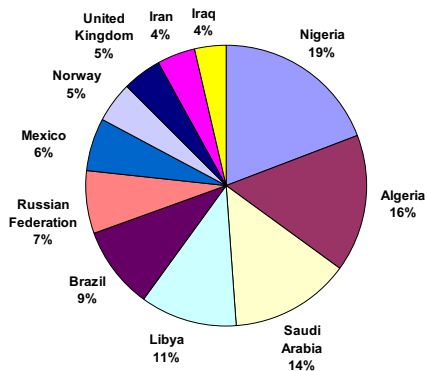
**INDIGENOUS PRODUCTION**



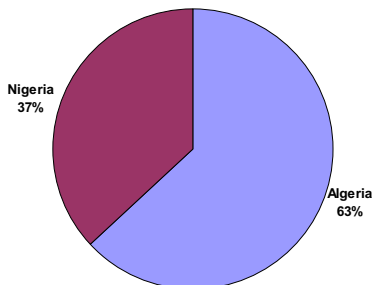
**NET IMPORTS BY FUELS**



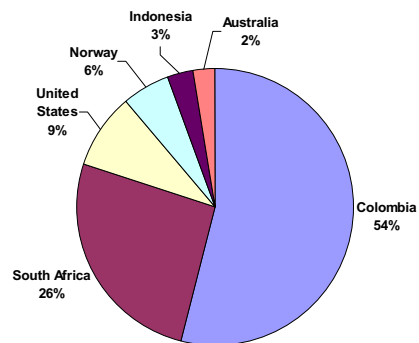
**IMPORTS OF CRUDE OIL**



**IMPORTS OF NATURAL GAS**

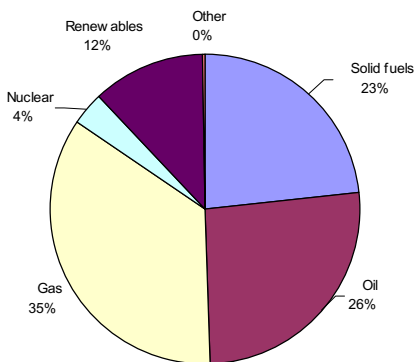


**IMPORTS OF HARD COAL**

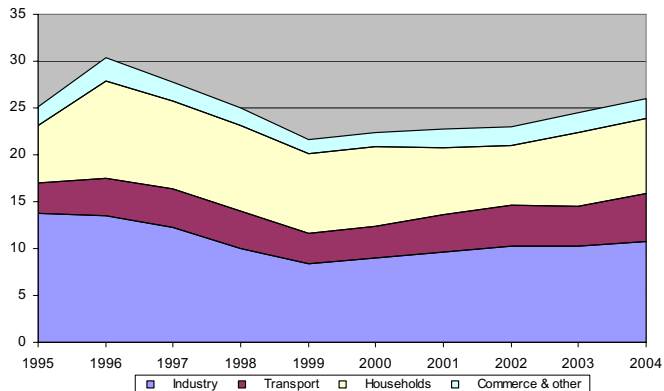


# ROMANIA

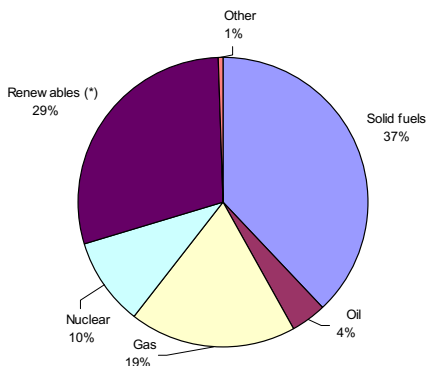
**TOTAL PRIMARY ENERGY SUPPLY (ENERGY MIX)**



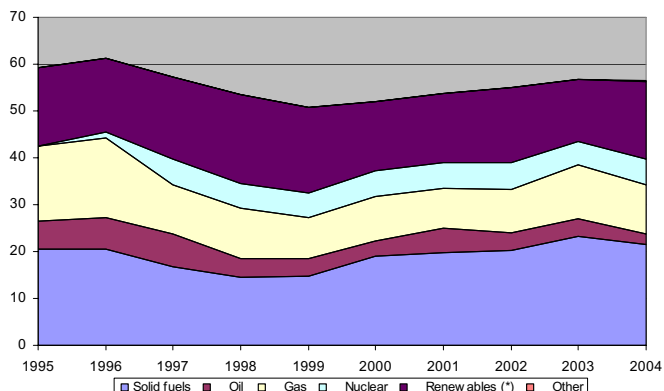
**TOTAL FINAL CONSUMPTION (Mtoe)**



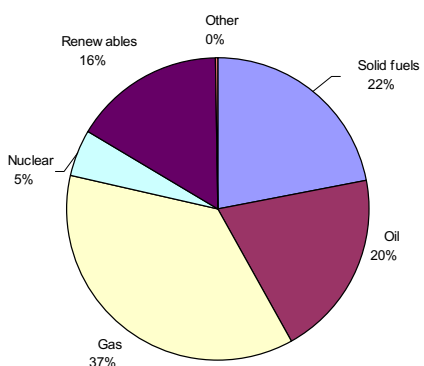
**ELECTRICITY MIX**



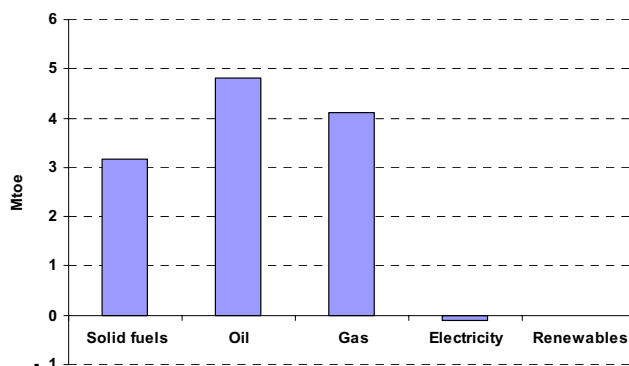
**ELECTRICITY GENERATION (TWh)**



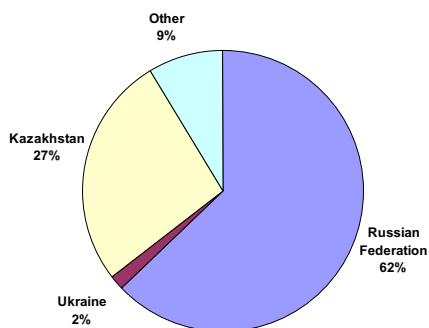
**INDIGENOUS PRODUCTION**



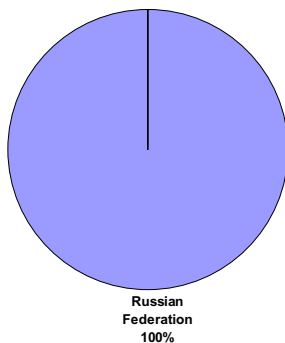
**NET IMPORTS BY FUELS**



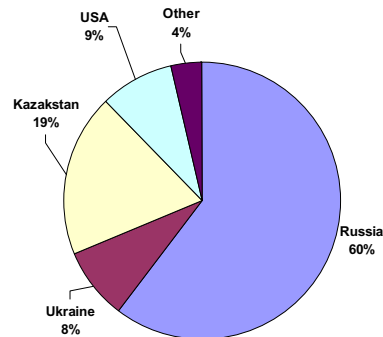
**IMPORTS OF CRUDE OIL**



**IMPORTS OF NATURAL GAS**

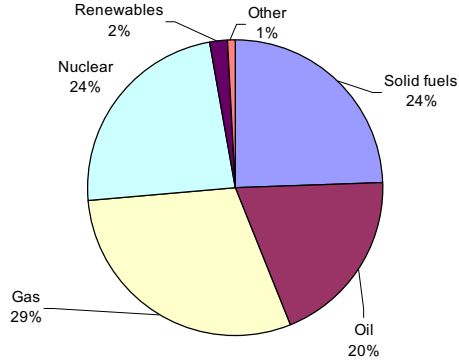


**IMPORTS OF HARD COAL**

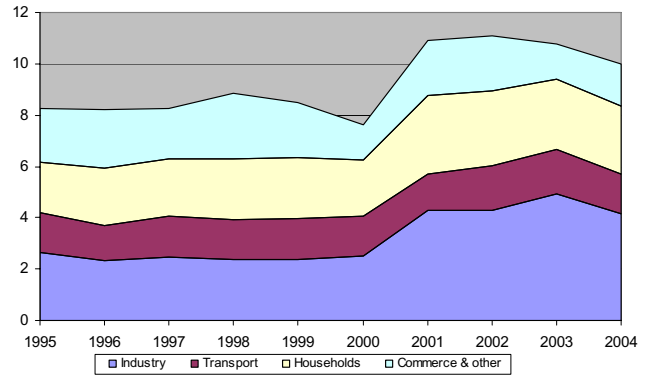


# SLOVAKIA

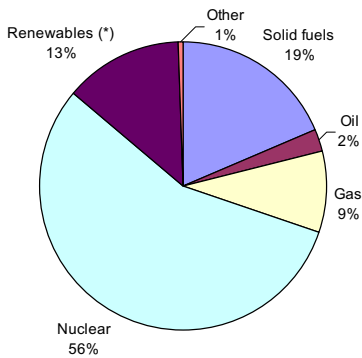
**TOTAL PRIMARY ENERGY SUPPLY (ENERGY MIX)**



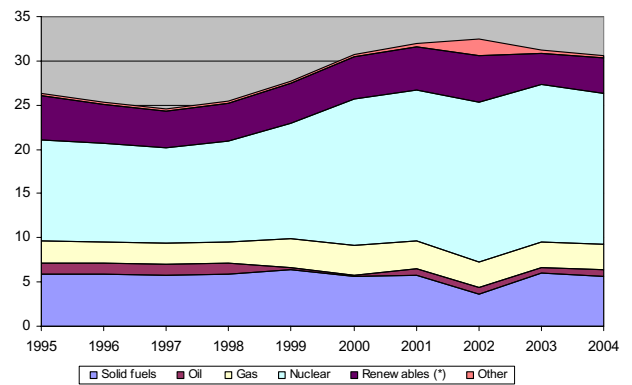
**TOTAL FINAL CONSUMPTION (Mtoe)**



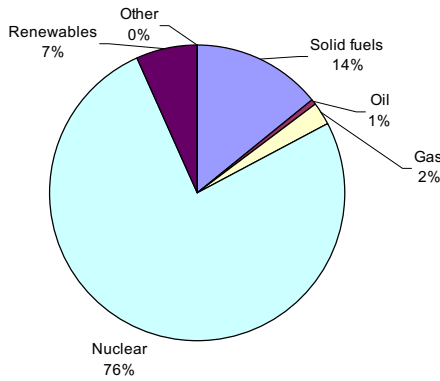
**ELECTRICITY MIX**



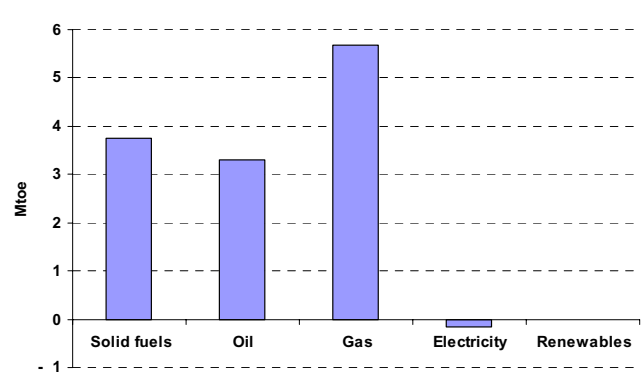
**ELECTRICITY GENERATION (TWh)**



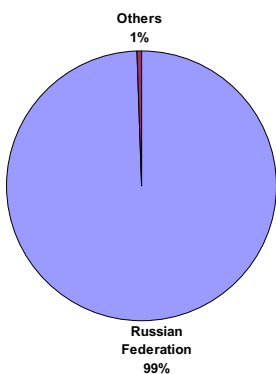
**INDIGENOUS PRODUCTION**



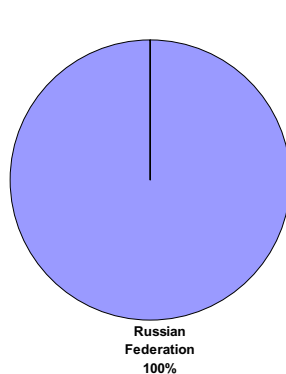
**NET IMPORTS BY FUELS**



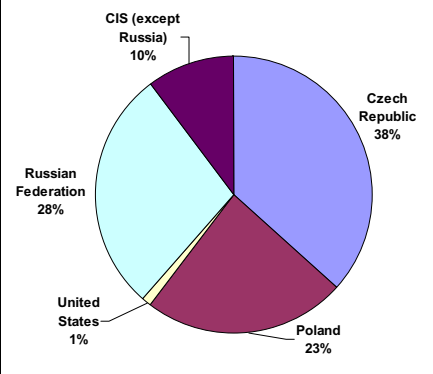
**IMPORTS OF CRUDE OIL**



**IMPORTS OF NATURAL GAS**

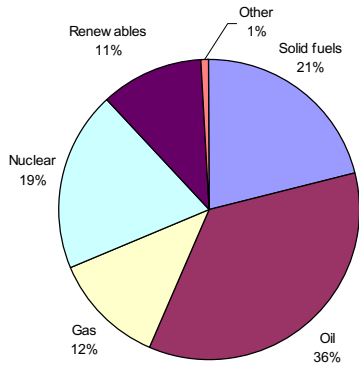


**IMPORTS OF HARD COAL**

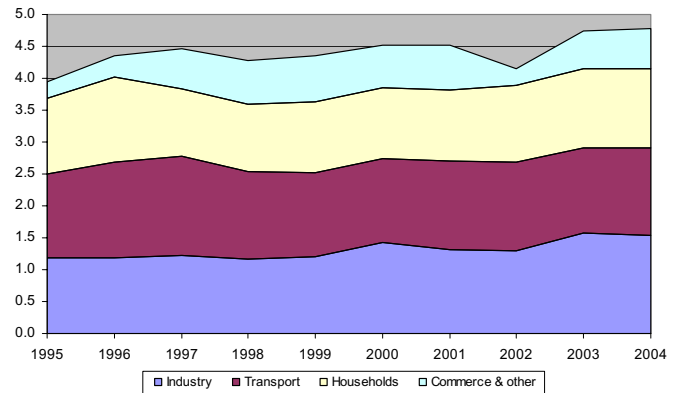


# SLOVENIA

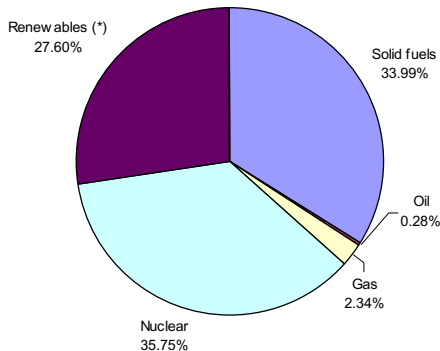
**TOTAL PRIMARY ENERGY SUPPLY (ENERGY MIX)**



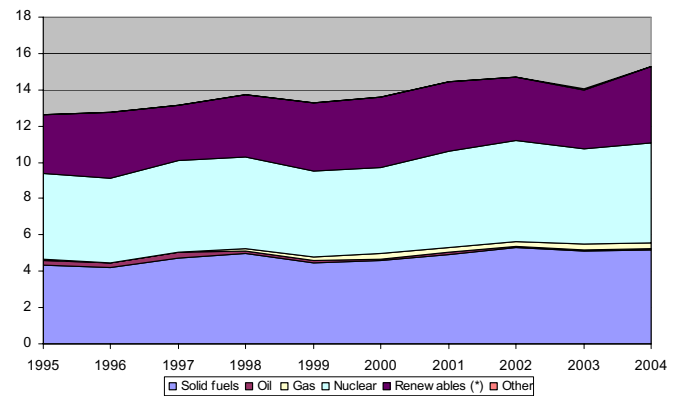
**TOTAL FINAL CONSUMPTION (Mtoe)**



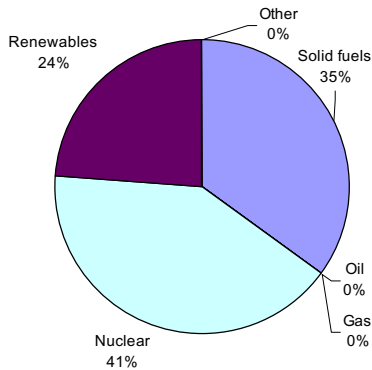
**ELECTRICITY MIX**



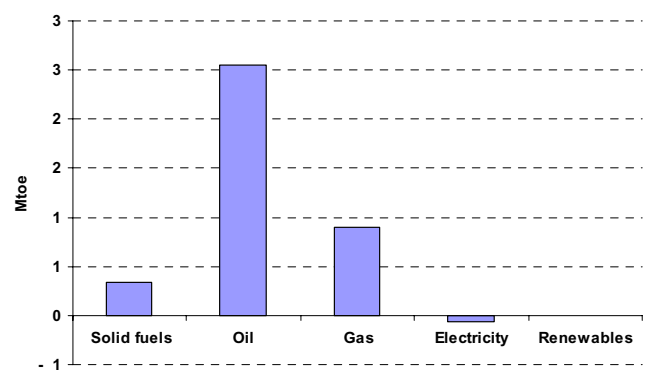
**ELECTRICITY GENERATION (TWh)**



**INDIGENOUS PRODUCTION**

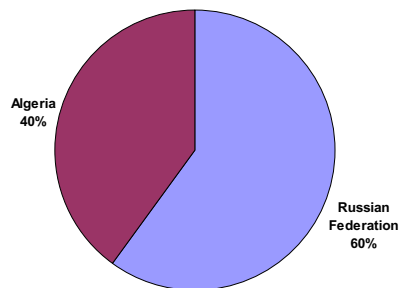


**NET IMPORTS BY FUELS**

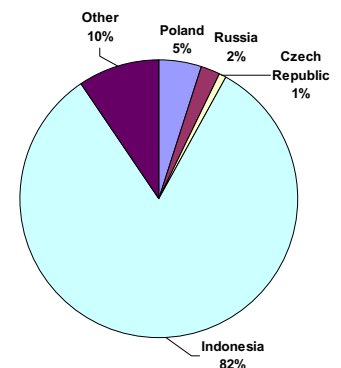


**IMPORTS OF CRUDE OIL**  
No crude imports

**IMPORTS OF NATURAL GAS**

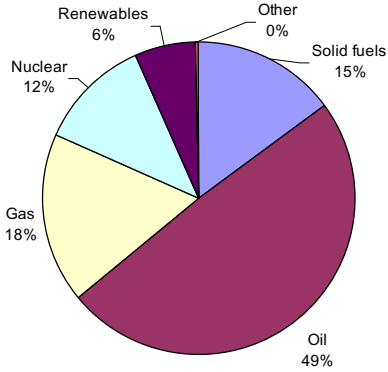


**IMPORTS OF HARD COAL**

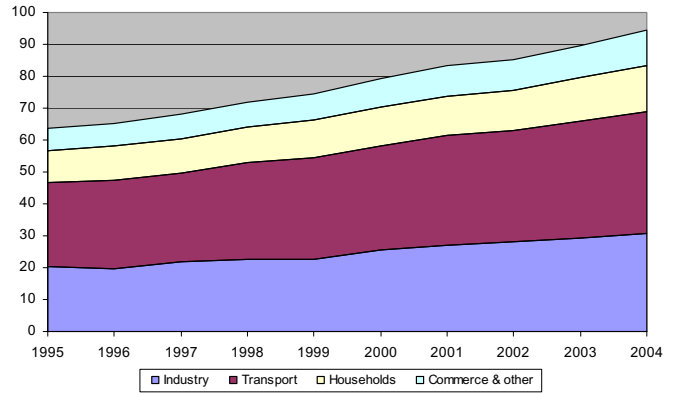


# SPAIN

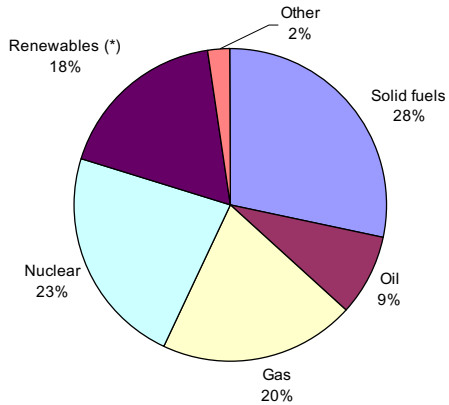
**TOTAL PRIMARY ENERGY SUPPLY (ENERGY MIX)**



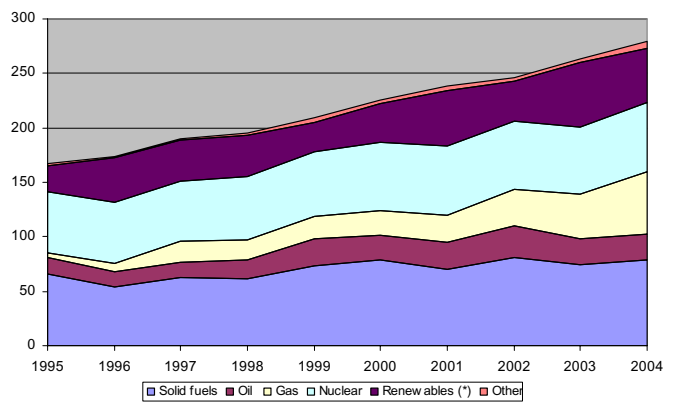
**TOTAL FINAL CONSUMPTION (Mtoe)**



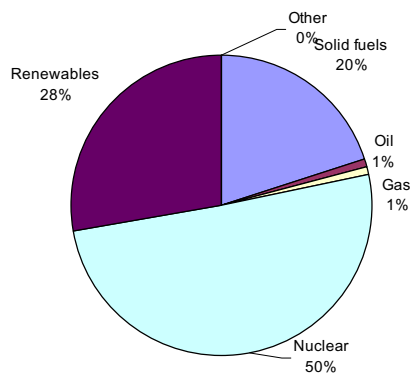
**ELECTRICITY MIX**



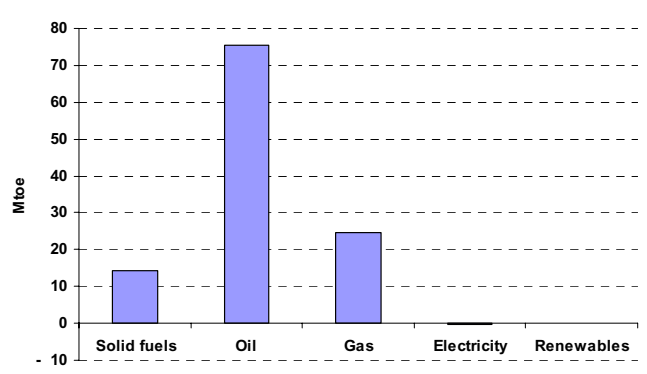
**ELECTRICITY GENERATION (TWh)**



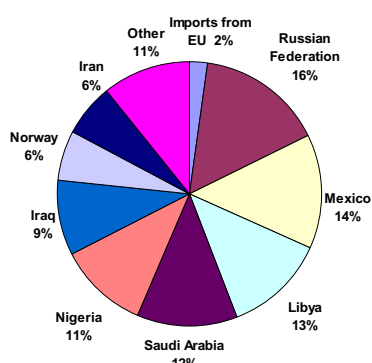
**INDIGENOUS PRODUCTION**



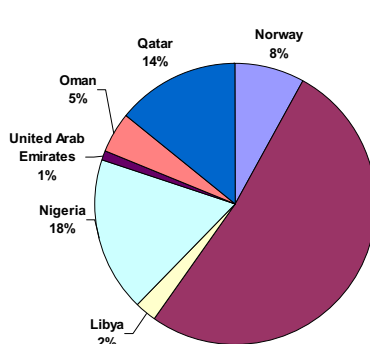
**NET IMPORTS BY FUELS**



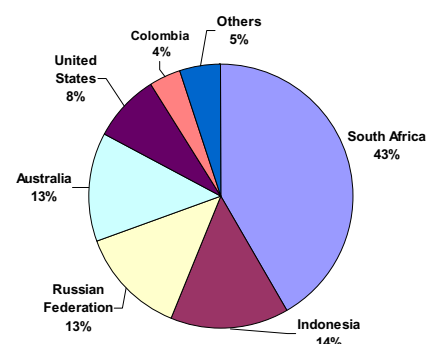
**IMPORTS OF CRUDE OIL**



**IMPORTS OF NATURAL GAS**

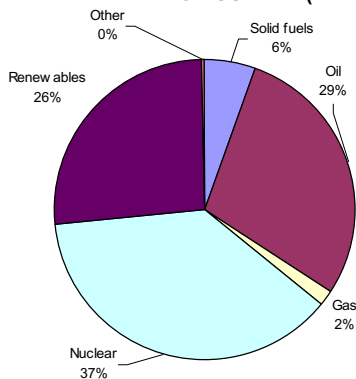


**IMPORTS OF HARD COAL**

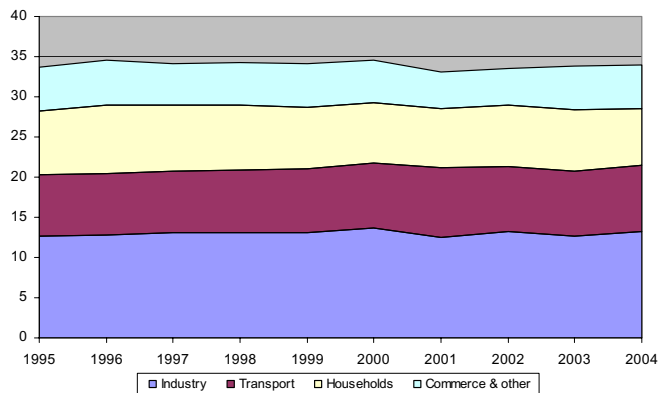


# SWEDEN

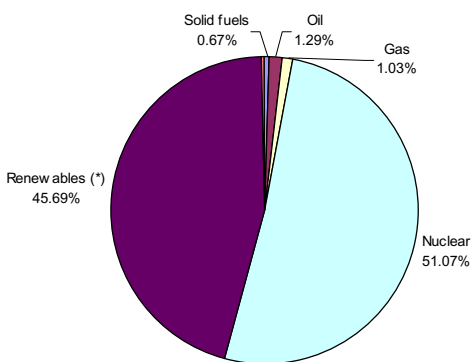
**TOTAL PRIMARY ENERGY SUPPLY (ENERGY MIX)**



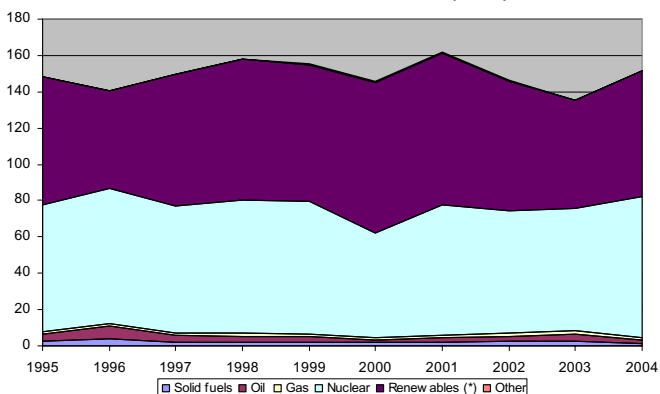
**TOTAL FINAL CONSUMPTION (Mtoe)**



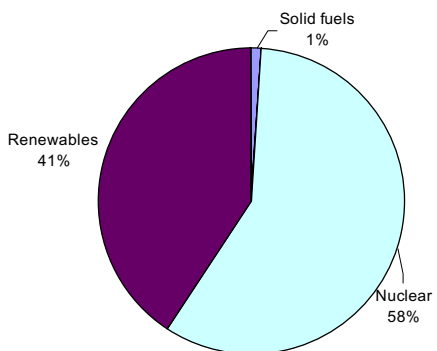
**ELECTRICITY MIX**



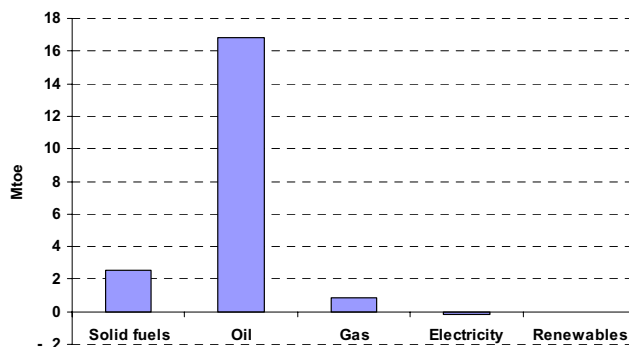
**ELECTRICITY GENERATION (TWh)**



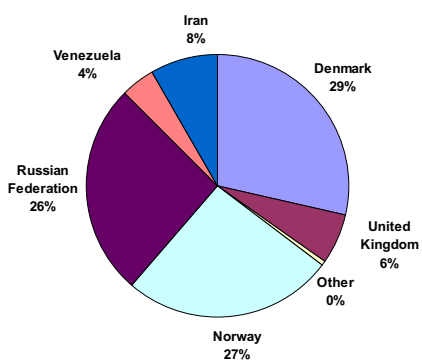
**INDIGENOUS PRODUCTION**



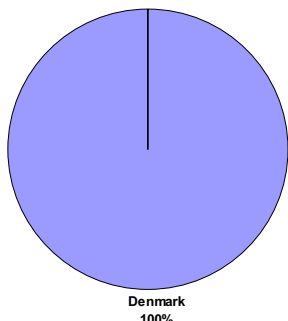
**NET IMPORTS BY FUELS**



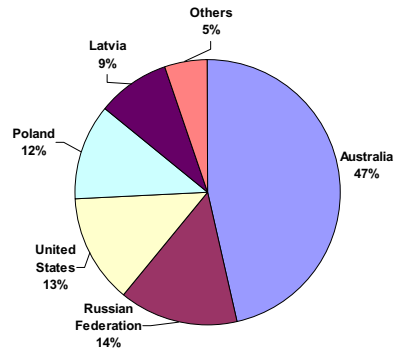
**IMPORTS OF CRUDE OIL**



**IMPORTS OF NATURAL GAS**

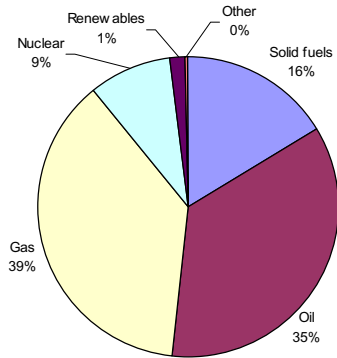


**IMPORTS OF HARD COAL**

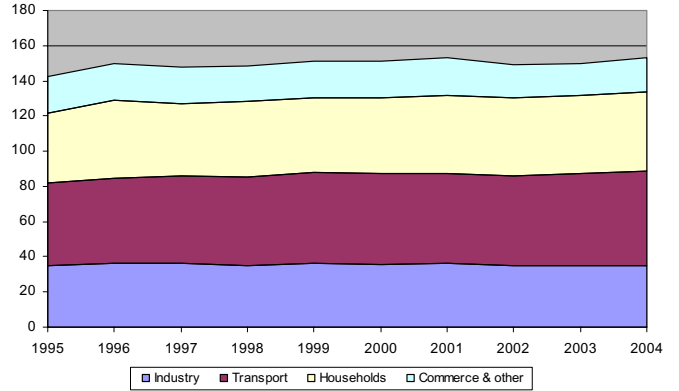


# UNITED KINGDOM

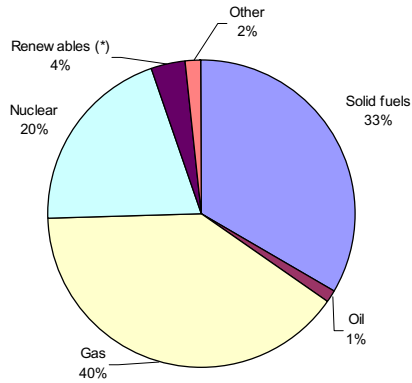
**TOTAL PRIMARY ENERGY SUPPLY (ENERGY MIX)**



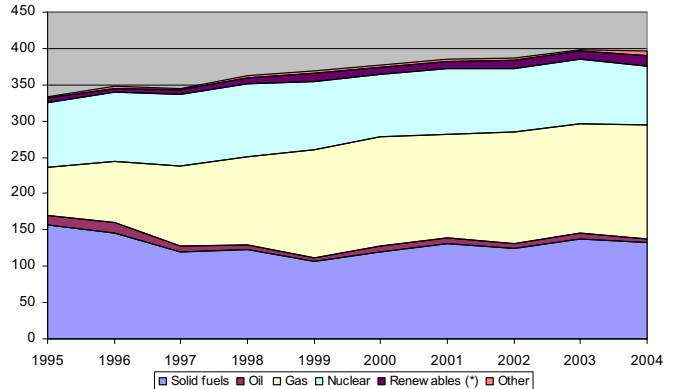
**TOTAL FINAL CONSUMPTION (Mtoe)**



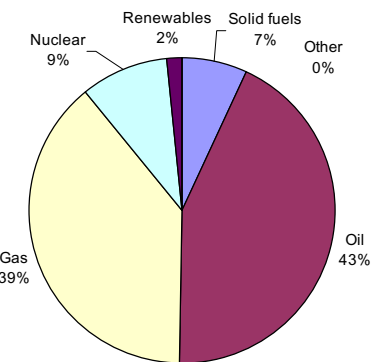
**ELECTRICITY MIX**



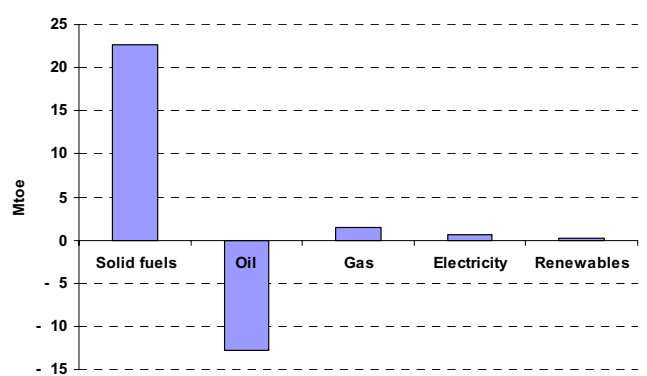
**ELECTRICITY GENERATION (TWh)**



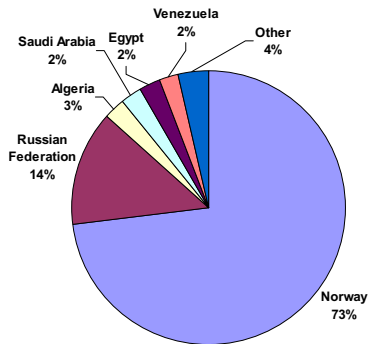
**INDIGENOUS PRODUCTION**



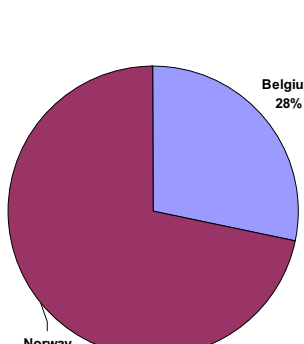
**NET IMPORTS BY FUELS**



**IMPORTS OF CRUDE OIL**



**IMPORTS OF NATURAL GAS**



**IMPORTS OF HARD COAL**

