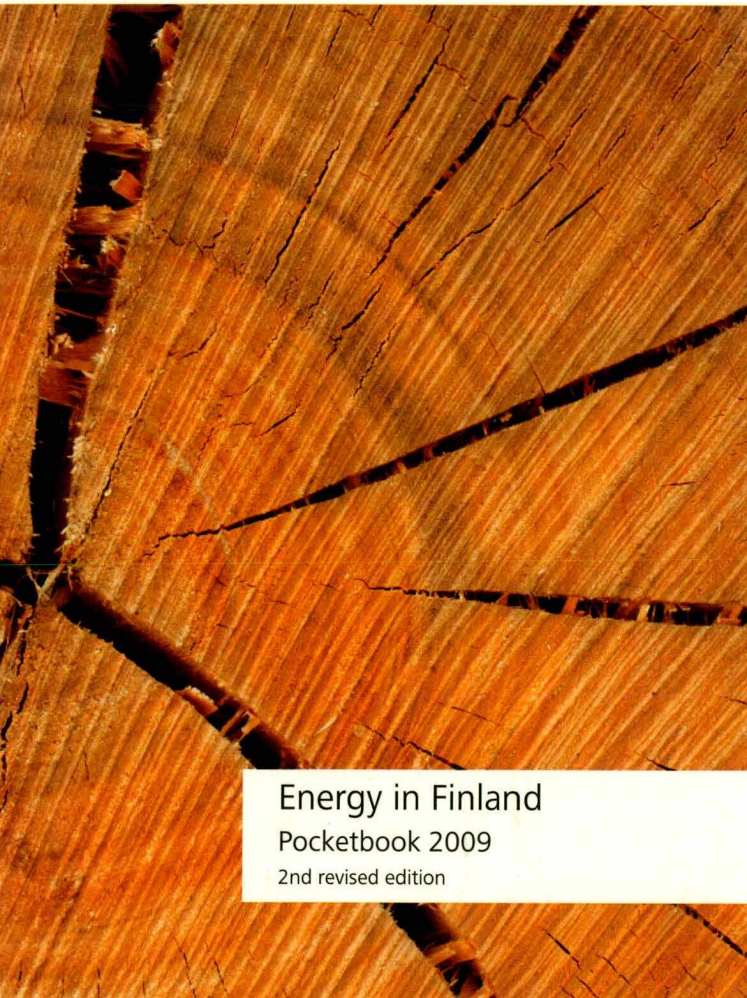


Energy in Finland

Pocketbook 2009

2nd revised edition

Finland in brief

Area

Situated in northern Europe with an area of 338,145 km^2 of which 78% forest, 10% water, 8% cultivated land.

Population

5.3 million, with average density of 18 persons per square kilometre. More than two-thirds of the population reside in the southern third of the country.

Average temperatures

Town	Latitude	January	July
Helsinki	60°	–4.2°C	+17.2°C
Rovaniemi	66°	–11.7°C	+14.9°C

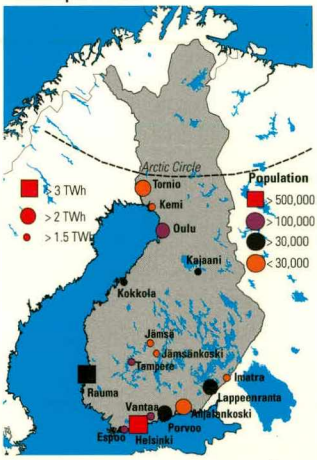
Economy

In 2008 GDP totalled € 186 bil., i.e. € 35,041/capita. In 2007 services were 50.3%, secondary production 47.1% and primary production 2.7% of the GDP.

Structure of industry, Value added gross in production in 2008*

	bil. €	%
Total industry	41.1	**100**
Mining and quarrying	0.5	1
Wood and paper industry	5.6	14
Chemical industry	4.2	10
Metal industry	20.2	49
Machinery and equipment	5.8	14
Electrical equipment	9.1	22
Other metal industry	5.2	13
Other manufacturing ind.	7.1	17
Electricity, gas and water ind.	3.5	9

Municipalities with high electricity consumption 2007



Productive forestland is the most valuable natural resource of Finland. The indigenous energy resources in the country are hydro power, wood and peat. Finland also has some rich deposits of metallic ores from which copper, zinc, iron, and nickel are extracted.

Total energy consumption in 2008*

1,400 PJ (33.4 Mtoe)
263.6 GJ/capita (6.3 toe/capita)

Electricity consumption in 2008*

87.0 TWh
16,367 kWh/capita

Contents

The data in this pocketbook are based on the Preliminary Energy Statistics 2008 figures.

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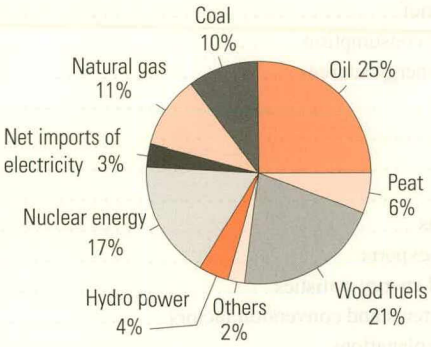
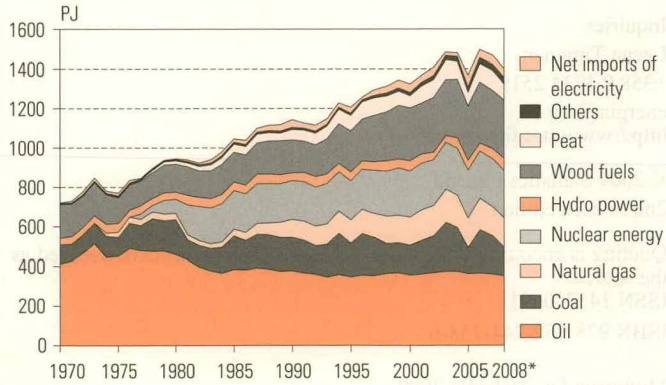
Total energy consumption by energy source 2008

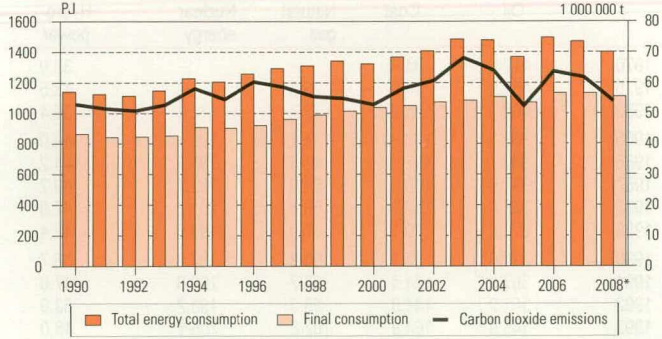


Total energy consumption in 2008* was 1 400 PJ.

Total energy consumption by energy source 1970–2008

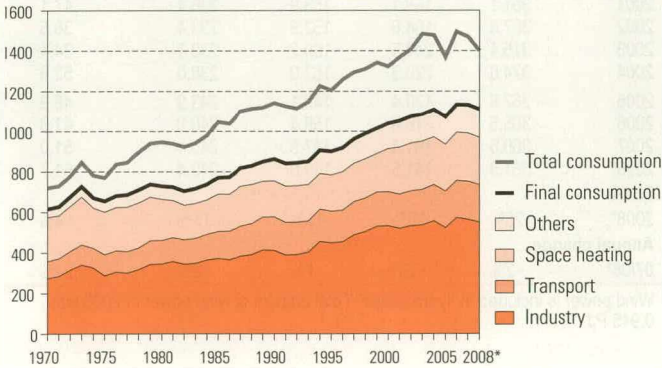


Final energy consumption by sector 2008



Final energy consumption in 2008* was 1 110 PJ.
The scale for CO_2 emissions has been corrected in this 2nd edition.

Total energy consumption and final energy consumption by sector 1970–2008



Total energy consumption by energy source, PJ

	Oil	Coal	Natural gas	Nuclear energy	Hydro power
1970	412.9	94.8	–	–	33.9
1975	451.0	94.8	26.5	–	43.5
1980	460.3	176.2	32.2	72.3	36.4
1985	385.3	167.8	34.1	196.1	44.0
1986	382.1	147.7	41.3	196.3	44.2
1987	391.6	168.5	54.6	202.2	49.2
1988	385.9	172.7	58.8	201.2	47.6
1989	375.0	170.1	77.0	196.5	46.4
1990	377.8	167.4	90.8	197.8	38.7
1991	367.5	164.4	95.7	200.8	47.0
1992	361.2	141.9	99.3	198.2	53.9
1993	345.9	164.8	102.6	205.1	48.0
1994	359.2	205.5	113.3	199.9	42.0
1995	347.1	168.8	117.6	197.8	46.1
1996	356.4	208.8	123.1	203.8	42.2
1997	353.3	192.0	121.1	218.7	42.5
1998	364.7	148.0	138.7	228.8	53.3
1999	366.7	149.9	138.9	240.7	45.3
2000	355.7	148.9	141.9	235.4	52.3
2001	361.1	168.1	153.9	238.4	47.1
2002	367.6	184.6	152.9	233.4	38.5
2003	375.4	244.5	169.2	238.1	34.4
2004	374.6	220.3	163.0	238.0	53.9
2005	362.8	130.4	149.1	243.9	48.9
2006	365.5	216.8	159.4	240.0	41.3
2007	360.5	191.4	147.5	245.4	51.0
2008*	351.9	141.5	149.0	240.4	61.7
Share					
2008*	25%	10%	11%	17%	4%
Annual change					
07/08*	–2%	–26%	1%	–2%	21%

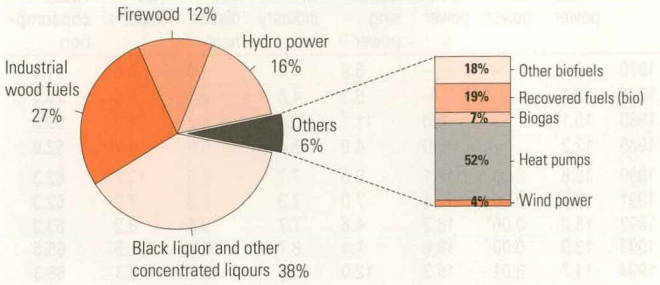
Wind power is included in hydro power. Total amount of wind power in 2008 was 0.945 PJ.

Wood fuels	Peat	Others	Net imports of electricity	**Total**	
170.1	0.9	6.0	1.9	**720.5**	1970
130.7	1.7	7.2	14.4	**769.8**	1975
142.1	17.1	6.3	4.4	**947.2**	1980
151.3	41.1	10.3	17.0	**1 047.0**	1985
152.5	43.3	10.1	20.9	**1 038.5**	1986
158.4	45.4	10.2	20.1	**1 100.3**	1987
167.7	41.5	10.6	26.6	**1 112.5**	1988
172.0	39.5	10.5	31.9	**1 119.0**	1989
167.2	53.3	10.8	38.7	**1 142.4**	1990
158.6	56.0	10.1	25.9	**1 125.9**	1991
161.2	58.7	10.7	29.6	**1 114.6**	1992
180.5	64.5	9.9	27.1	**1 148.5**	1993
201.8	73.7	10.1	21.9	**1 227.4**	1994
207.5	79.4	10.9	30.3	**1 205.5**	1995
212.8	87.5	11.0	13.2	**1 257.9**	1996
237.2	88.0	13.2	27.6	**1 293.5**	1997
247.6	80.7	15.1	33.5	**1 310.5**	1998
273.2	71.8	15.6	40.0	**1 342.1**	1999
268.2	61.9	16.4	42.8	**1 323.4**	2000
258.5	85.9	18.6	35.9	**1 367.6**	2001
278.4	89.7	19.7	42.9	**1 407.8**	2002
283.6	99.2	22.3	17.5	**1 484.1**	2003
297.4	88.8	24.7	17.5	**1 478.2**	2004
275.6	68.8	27.2	61.3	**1 368.0**	2005
309.1	93.6	28.0	41.0	**1 494.9**	2006
295.3	102.3	31.0	45.2	**1 469.7**	2007
296.0	80.7	33.2	46.0	**1 400.4**	2008*
					Share
21%	6%	2%	3%	**100%**	2008*
				Annual	**change**
0%	–21%	7%	2%	–5%	07/08*

Renewable energy, PJ

	Hydro power	Wood fuels in industry and energy production	Black liquor and others	Small scale combustion of wood	Recovered fuels (bio fraction)	Heat pumps	Others	**Total**	Share of total energy consumption
1970	33.9	20.2	57.7	92.2	..	..	..	**204.0**	28%
1975	43.5	14.8	48.3	67.6	..	..	..	**174.3**	23%
1980	36.4	31.1	67.4	43.6	..	0.7	..	**179.2**	19%
1985	44.0	31.6	75.5	44.1	..	2.6	..	**197.8**	19%
1986	44.2	31.1	77.2	44.2	..	2.3	..	**199.0**	19%
1987	49.2	32.4	81.6	44.4	..	2.6	..	**210.1**	19%
1988	47.6	35.0	88.1	44.5	..	2.3	0.0	**217.6**	20%
1989	46.4	36.3	91.1	44.6	..	2.0	0.0	**220.5**	20%
1990	38.7	36.5	86.1	44.7	0.3	2.2	0.0	**208.4**	18%
1991	47.0	32.9	80.9	44.8	0.3	2.4	0.0	**208.4**	19%
1992	53.8	32.8	83.5	44.9	0.4	2.4	0.0	**217.8**	20%
1993	48.0	40.4	95.1	45.0	0.3	2.5	0.0	**231.4**	20%
1994	42.0	52.4	104.4	45.0	0.3	2.6	0.0	**246.7**	20%
1995	46.0	53.9	109.0	44.7	0.3	2.5	0.7	**257.0**	21%
1996	42.1	56.2	109.6	46.9	0.3	2.7	0.7	**258.6**	21%
1997	42.5	61.6	128.5	47.0	0.5	2.8	0.9	**283.6**	22%
1998	53.2	64.7	135.4	47.6	1.1	3.0	0.9	**305.8**	23%
1999	45.2	84.0	142.6	46.6	1.4	3.1	1.1	**323.8**	24%
2000	52.0	84.9	137.9	45.3	1.9	2.9	1.4	**326.3**	25%
2001	46.9	83.9	126.7	47.8	2.5	3.6	1.2	**312.8**	23%
2002	38.2	89.6	140.1	48.7	2.4	4.0	1.5	**324.5**	23%
2003	34.0	93.7	141.2	48.7	3.2	4.5	2.2	**327.5**	22%
2004	53.5	100.8	148.2	48.5	3.6	5.4	2.6	**362.5**	25%
2005	48.3	95.2	132.1	48.2	4.5	6.3	3.2	**338.0**	25%
2006	40.7	103.9	156.0	49.1	3.8	8.4	3.2	**365.2**	24%
2007	50.4	93.6	153.1	48.6	4.6	10.0	3.4	**363.7**	25%
2008*	60.8	104.0	145.0	47.0	4.6	12.3	7.1	**380.8**	27%

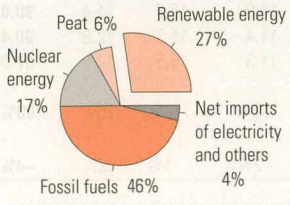
Renewable energy 2008



The total consumption of renewable energy in 2008* was 381 PJ which is 27% of total energy consumption.

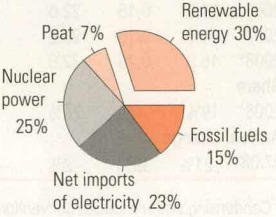
Renewable energy 2008

In total energy consumption



Total* 1 400 PJ

In electricity supply



Total* 87 TWh

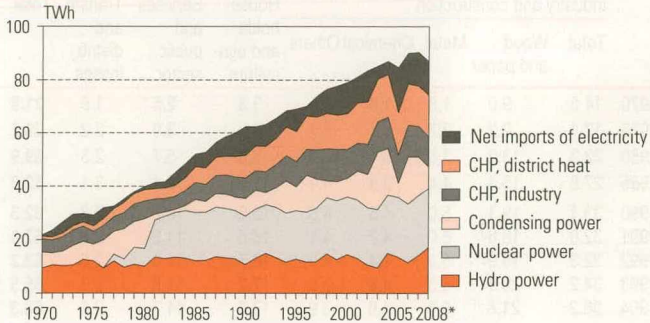
Supply and total consumption of electricity, TWh

	Hydro power	Wind power	Nuclear power	Condensing power [1]	CHP industry	CHP district heat	Net imports	**Total consumption**
1970	9.4	–	–	5.9	4.9	1.0	0.5	**21.8**
1975	12.1	–	–	6.3	4.8	2.1	4.0	**29.2**
1980	10.1	–	6.6	11.1	6.6	4.2	1.2	**39.9**
1985	12.2	–	18.0	4.9	6.4	5.9	4.7	**52.0**
1990	10.8	0.00	18.1	6.6	7.7	8.5	10.7	**62.3**
1991	13.1	0.00	18.4	7.0	7.3	9.3	7.2	**62.3**
1992	15.0	0.00	18.2	4.6	7.7	9.5	8.2	**63.2**
1993	13.3	0.00	18.8	7.4	8.7	9.8	7.5	**65.5**
1994	11.7	0.01	18.3	12.0	9.5	10.7	6.1	**68.3**
1995	12.8	0.01	18.1	8.9	9.5	11.3	8.4	**68.9**
1996	11.7	0.01	18.7	13.8	9.7	12.5	3.7	**70.0**
1997	11.8	0.02	20.1	10.9	10.9	12.3	7.7	**73.6**
1998	14.8	0.02	21.0	6.3	12.0	13.2	9.3	**76.6**
1999	12.5	0.05	22.1	7.2	12.0	12.8	11.1	**77.8**
2000	14.5	0.08	21.6	6.9	10.8	13.4	11.9	**79.2**
2001	13.0	0.07	21.9	10.8	10.4	15.1	10.0	**81.2**
2002	10.6	0.06	21.4	12.4	11.3	15.8	11.9	**83.5**
2003	9.5	0.09	21.8	21.5	11.3	16.2	4.9	**85.2**
2004	14.9	0.12	21.8	17.4	11.7	16.3	4.9	**87.0**
2005	13.4	0.17	22.4	5.3	10.6	15.8	17.0	**84.7**
2006	11.3	0.15	22.0	17.6	11.9	15.7	11.4	**90.0**
2007	14.0	0.19	22.5	14.4	11.4	15.3	12.6	**90.4**
2008*	16.9	0.25	22.0	8.2	11.3	15.5	12.8	**87.0**
Share								
2008*	19%	0%	25%	9%	13%	18%	15%	**100%**
Annual change								
07/08*	21%	39%	–2%	–43%	–2%	1%	2%	**–4%**

[1] Condensing power includes conventional condensing power, peak gas turbine power and gas engines.

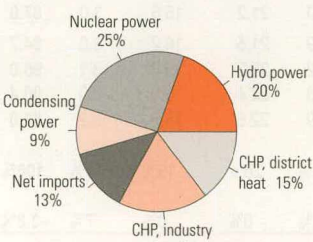
Source: Finnish Energy Industries, Confederation of Finnish Industry and Employers, Statistics Finland/Statistics on the Structure of Industry

Electricity supply 1970–2008

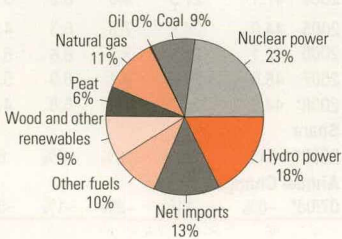


Electricity supply 2008

By mode of production



By source



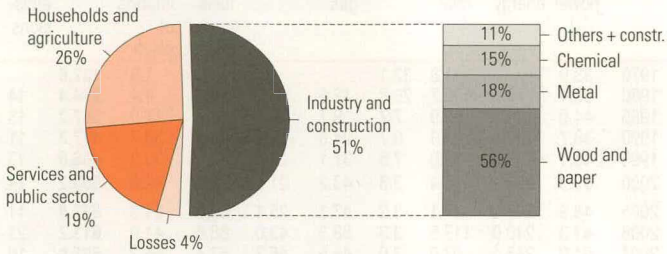
Total electricity supply in 2008 was 87 TWh (preliminary).

Electricity consumption by sector, TWh

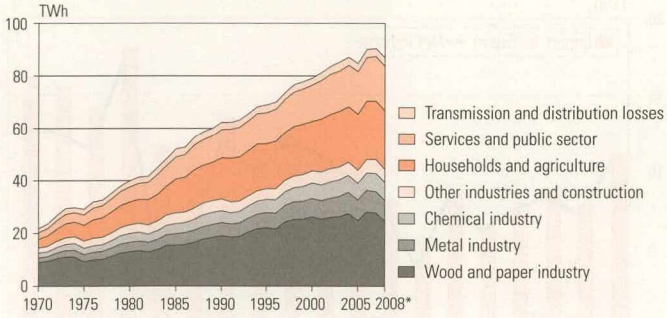
	Industry and construction					House-holds and agri-culture	Services and public sector	Transm. and distrib. losses	Total
	Total	Wood and paper	Metal	Chemical	Others				
1970	14.5	9.0	1.8	1.8	1.9	3.3	2.5	1.5	**21.8**
1975	17.1	9.2	2.7	2.4	2.7	6.0	3.9	2.2	**29.2**
1980	23.3	13.0	3.6	3.4	3.3	8.6	5.7	2.3	**39.9**
1985	27.8	15.4	4.4	3.8	4.1	12.8	8.4	3.1	**52.0**
1990	33.1	19.1	5.0	4.5	4.5	15.6	10.8	2.8	**62.3**
1991	32.0	18.6	5.0	4.2	4.1	16.5	11.2	2.6	**62.3**
1992	32.3	18.9	5.1	4.4	4.0	16.7	11.4	2.8	**63.2**
1993	34.2	20.5	5.3	4.6	3.8	17.2	11.5	2.7	**65.5**
1994	36.2	21.8	5.5	4.9	3.9	17.8	11.7	2.6	**68.3**
1995	37.0	22.2	5.7	5.0	4.1	17.1	11.9	3.0	**68.9**
1996	36.9	21.7	6.0	5.1	4.2	18.0	12.4	2.7	**70.0**
1997	40.2	24.4	6.2	5.2	4.4	18.2	12.6	2.5	**73.6**
1998	41.8	25.3	6.7	5.4	4.4	19.0	13.1	2.8	**76.6**
1999	42.3	25.4	6.8	5.6	4.5	19.3	13.4	2.8	**77.8**
2000	43.8	26.3	7.0	5.9	4.6	19.0	13.8	2.6	**79.2**
2001	43.3	25.4	7.0	5.9	4.9	20.2	14.7	2.9	**81.2**
2002	44.6	26.1	7.2	6.2	5.1	20.8	15.2	2.9	**83.5**
2003	45.2	26.4	7.7	6.3	4.9	21.3	15.3	3.4	**85.2**
2004	47.1	27.5	8.0	6.5	5.0	21.2	15.8	3.0	**87.0**
2005	44.0	24.9	7.8	6.3	4.9	21.5	16.2	3.0	**84.7**
2006	48.1	28.1	8.2	6.6	5.2	22.2	16.6	3.1	**90.0**
2007	48.0	27.7	8.1	6.9	5.3	22.4	16.9	3.0	**90.4**
2008*	44.3	24.7	7.9	6.8	4.9	22.5	16.9	3.2	**87.0**
Share									
2008*	51%	28%	9%	8%	6%	26%	19%	4%	**100%**
Annual Change									
07/08*	–8%	–11%	–2%	–1%	–8%	0%	0%	7%	**–3.8%**

Sources: Finnish Energy Industries, Confederation of Finnish Industry and Employers, Statistics Finland/Statistics on the Structure of Industry

Electricity consumption by sector 2008



Electricity consumption by sector 1970–2008

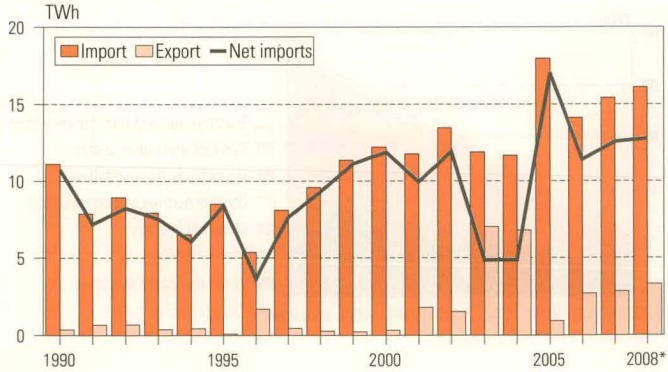


Energy sources in electricity generation, PJ

	Hydro power	Nuclear energy	Hard coal	Oil	Natural gas	Peat	Other fuels	Net imports of electr.	**Total**	CO_2 emis-sions
1970	33.9	–	41.8	32.1	–	..	17.9	1.9	**127.6**	..
1980	36.4	72.3	102.7	26.8	12.6	..	29.2	4.4	**284.4**	14
1985	44.0	196.1	60.9	7.7	9.7	8.9	22.7	17.0	**367.2**	13
1990	38.7	197.8	61.3	9.7	24.8	17.2	29.1	38.7	**417.3**	11
1995	46.1	197.8	65.0	7.5	37.1	36.3	36.6	30.3	**456.6**	13
2000	52.3	235.4	54.4	3.3	43.2	21.5	50.3	42.8	**503.2**	14
2005	48.9	243.9	37.1	3.2	47.1	25.4	60.9	61.3	**527.8**	11
2006	41.3	240.0	117.5	3.3	58.3	43.0	68.8	41.0	**613.2**	21
2007	51.0	245.4	97.0	3.0	45.5	46.3	62.4	45.2	**595.9**	18
2008*	61.7	240.4	60.2	2.2	49.0	38.0	50.3	46.0	**547.9**	12

Source: Finnish Energy Industries

Imports and exports of electricity 1990–2008



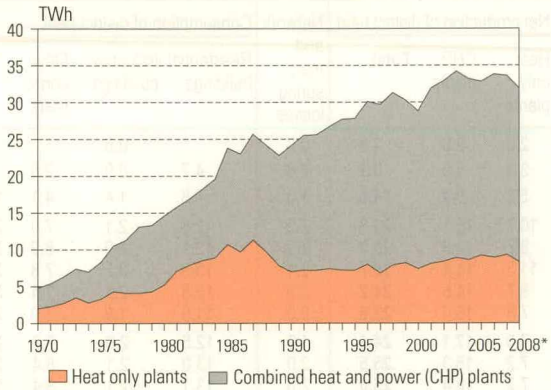
Source: Finnish Energy Industries

Production and consumption of district heat, TWh

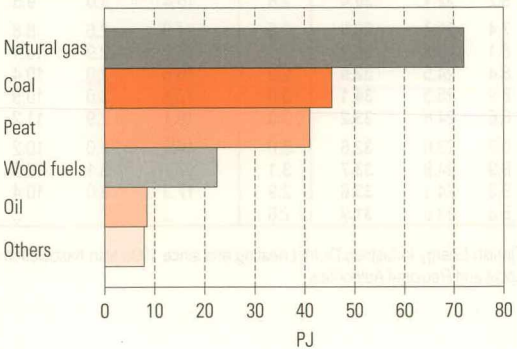
	Net production of district heat			Network and measuring losses	Consumption of district heat			
	Heat only plants	CHP plants	**Total**		Residential buildings	Industrial buildings	Other consumers	**Total**
1970	2.0	2.8	**4.8**	0.3	..	0.6	..	**4.5**
1975	3.3	5.0	**8.2**	0.6	4.7	0.9	2.0	**7.7**
1980	5.2	9.4	**14.6**	1.3	7.8	1.4	4.1	**13.3**
1985	10.7	13.1	**23.8**	2.2	12.6	2.1	7.0	**21.7**
1986	9.7	13.3	**23.0**	2.0	12.1	1.9	6.9	**21.0**
1987	11.3	14.4	**25.7**	2.1	13.5	2.2	7.8	**23.6**
1988	9.7	14.5	**24.2**	2.0	12.8	2.1	7.4	**22.2**
1989	7.8	15.0	**22.8**	2.0	11.9	1.9	7.0	**20.9**
1990	7.0	17.1	**24.1**	1.9	12.5	2.0	7.7	**22.3**
1991	7.2	18.3	**25.5**	2.0	13.0	2.1	8.4	**23.5**
1992	7.2	18.4	**25.6**	2.0	13.1	2.1	8.4	**23.6**
1993	7.4	19.3	**26.7**	2.0	13.9	2.3	8.5	**24.6**
1994	7.2	20.5	**27.6**	2.3	14.0	2.4	8.9	**25.3**
1995	7.2	20.6	**27.8**	2.4	14.3	2.7	8.4	**25.4**
1996	8.0	22.1	**30.0**	2.5	15.3	2.9	9.4	**27.6**
1997	6.8	22.9	**29.7**	2.6	15.1	2.9	9.1	**27.1**
1998	7.9	23.4	**31.3**	2.7	15.6	3.0	9.9	**28.5**
1999	8.2	22.1	**30.4**	2.6	15.4	3.0	9.5	**27.8**
2000	7.4	21.4	**28.8**	2.5	14.9	2.6	8.8	**26.3**
2001	8.1	23.8	**31.9**	2.7	16.2	2.9	10.1	**29.1**
2002	8.4	24.5	**32.9**	2.9	16.6	3.0	10.4	**30.0**
2003	8.9	25.3	**34.1**	3.0	17.4	3.0	10.9	**31.2**
2004	8.6	24.6	**33.2**	3.0	16.1	2.9	11.2	**30.3**
2005	9.2	23.6	**32.8**	3.0	16.6	3.0	10.2	**29.8**
2006	8.9	24.9	**33.7**	3.1	17.1	3.1	10.5	**30.7**
2007	9.3	24.3	**33.6**	2.9	17.3	3.0	10.4	**30.7**
2008*	8.3	23.6	**31.9**	2.8	..	..	..	**29.1**

Sources: Finnish Energy Industries/District heating and since 1995 also Association of Finnish Local and Regional Authorities

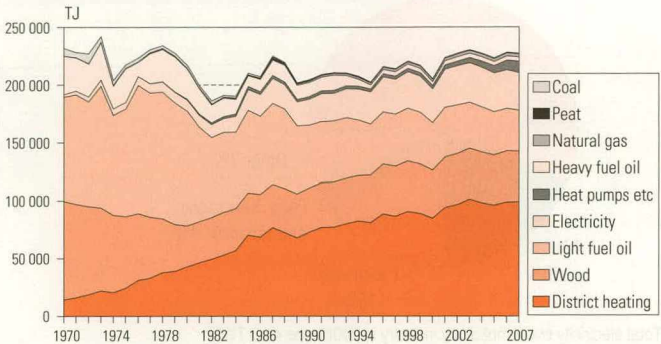
Production of district heat 1970–2008



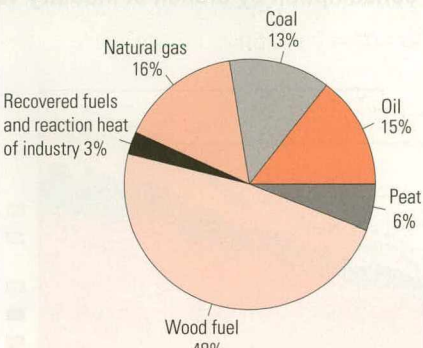
Fuel consumption in production of district heat and combined production of district heat and electricity 2008



Consumption of energy for heating residential, commercial and public buildings 1970–2007

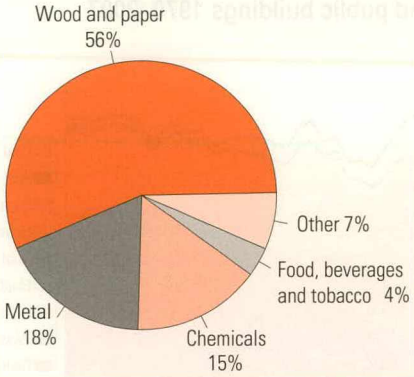


Fuel consumption in industry 2007



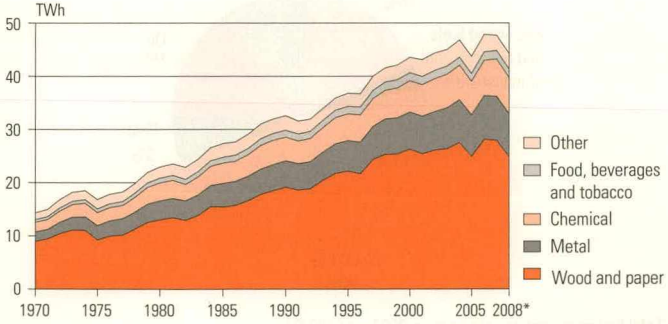
Total fuel consumption in industry in 2007 was 402 PJ.

Electricity consumption by branch of industry 2008



Total electricity consumption by industry in 2008* was 44.3 TWh.

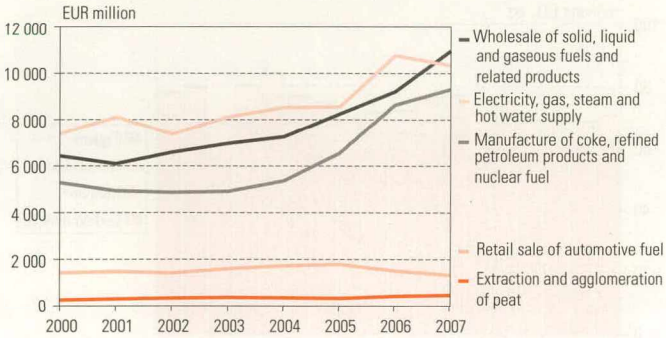
Electricity consumption by branch of industry 1970–2008



Enterprises in energy sector in 2007

	Number of enterprises	Turnover, EUR mil.	Employees	Staff expenses, EUR mil.
Wholesale of solid, liquid and gaseous fuels and related products	155	10 957	1 962	118
Electricity, gas, steam and hot water supply	703	10 327	12 991	719
Extraction and agglomeration of peat	538	461	1 420	53
Retail sale of automotive fuel	907	1 316	5 232	140
Manufacture of coke, refined petroleum products and nuclear fuel	12	9 309	2 376	151

Turnover of enterprises in energy sector 2000–2007



Source: Statistics Finland, Financial statements of enterprises.

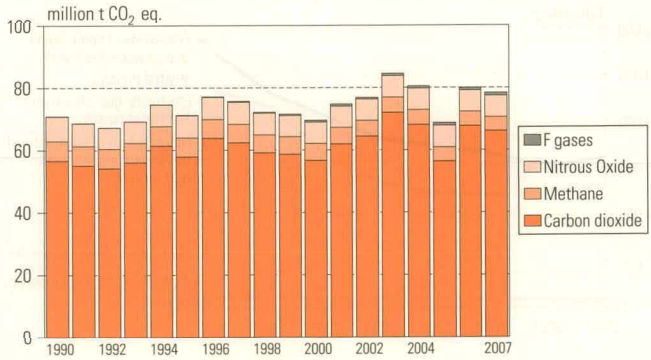
Greenhouse gas emissions 1990, 1995, 2000–2007

The gases included in the Kyoto Protocol

	1990	1995	2000	2001	2002	2003	2004	2005	2006	2007
	million tonnes of CO_2 equivalent									
Energy	54.6	56.3	54.6	59.9	62.5	70.0	65.9	54.3	65.6	63.6
Industrial prosesses	5.0	4.6	5.5	5.6	5.4	5.9	6.2	6.2	6.1	6.7
Solvent and other product use	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Agriculture	7.1	6.3	6.0	5.9	5.8	5.7	5.6	5.6	5.6	5.5
Waste	4.0	3.9	3.3	3.2	3.0	2.8	2.7	2.5	2.5	2.4
Total emission without land use, land use change and forestry	**70.9**	**71.2**	**69.5**	**74.7**	**76.8**	**84.5**	**80.5**	**68.7**	**79.9**	**78.3**
Land use, land use change and forestry	–17.8	–16.6	–18.4	–21.5	–22.5	–22.5	–23.3	–28.3	–32.2	–25.3

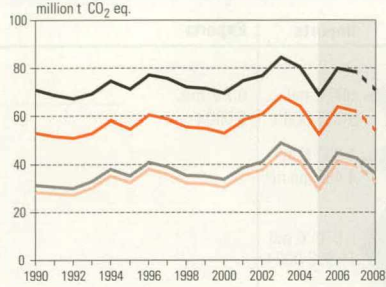
The unit has been corrected in this 2nd edition.

Greenhouse gas emissions by gases 1990–2007

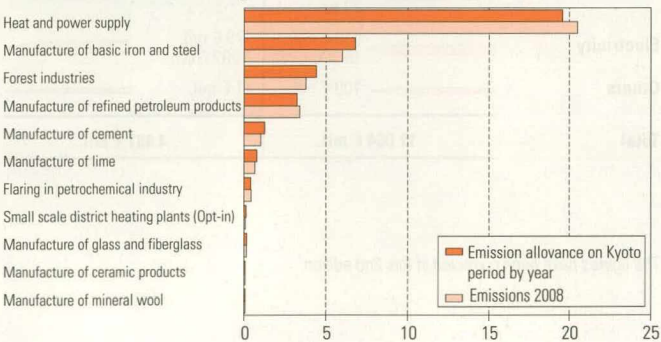


Source: Statistics Finland, Greenhouse Gas Inventory

Finland's greenhouse gas emissions 1990–2008



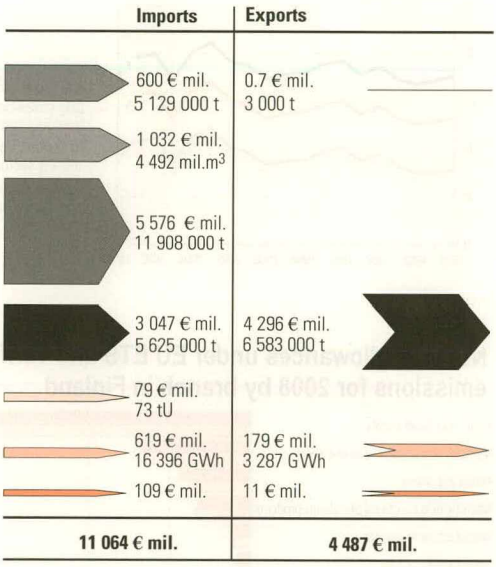
National allowances under EU ETS and verified CO_2 emissions for 2008 by branch in Finland



Total allowance were 36.5 million tonnes and verified CO_2 emissions in 2008 were 36.2 million tonnes.

Source: Energy Market Authority

Imports and exports of energy 2008



The figures have been corrected in this 2nd edition.

Energy imports 2008

		Russia	Norway	Kazak-stan	Sweden	Great Britain	Other countries	Total Amount	Total Value mil. €
Hard coal	1 000 t	3 370	46	33	1	0	745	**4 594**	**447**
Coke	1 000 t	..	..	..	..	..	..	**534**	**154**
Natural gas	mil. m^3	4 492	–	–	–	–	–	**4 492**	**1 032**
Crude oil	1 000 t	9 863	1 180	244	..	335	286	**11 908**	**5 576**
Motor gasoline	1 000 t	–	–	–	7	0	87	**95**	**57**
Middle distillates	1 000 t	2 047	–	200	122	0	404	**2 773**	**1 561**
Heavy fuel oil	1 000 t	29	87	–	327	0	357	**800**	**295**
LPG	1 000 t	10	137	40	7	20	0	**215**	**130**
Other petroleum prod.	1 000 t	751	8	318	29	80	557	**1 742**	**1 005**
Methanol	1 000 t	386	–	–	0	0	0	**387**	**90**
MTBE	1 000 t	5	–	–	2	0	10	**18**	**14**
Peat	1 000 t	7	0	–	113	–	87	**207**	**6**
Nuclear fuel	tU	13	–	–	38	–	22	**73**	**79**
Electricity	GWh	10 883	167	–	3 096	–	2 251	**16 396**	**619**
Value	mil. €	7 881	788	439	381	259	1 316		**11 064**

Imports of wood fuels is excluded.

Source: Board of Customs /Foreign Trade Statistics

The table has been corrected in this 2nd edition.

Energy exports 2008

		Sweden	USA	Poland	Russia	Belgium	Other countries	Total Amount	Total Value mil. €
Coke	1 000 t	–	–	–	0	–	3	**3**	**1**
Motor gasoline	1 000 t	608	1 206	–	7	–	449	**2 270**	**1 398**
Jet fuel	1 000 t	–	–	–	0	–	0	**0**	**0**
Middle distillates	1 000 t	1 083	0	1 033	0	–	956	**3 072**	**2 060**
Heavy fuel oil	1 000 t	86	0	–	0	88	342	**515**	**159**
LPG	1 000 t	1	–	–	–	–	3	**4**	**3**
Other petroleum prod.	1 000 t	102	17	21	131	311	140	**722**	**677**
Peat	1 000 t	33	1	0	0	12	92	**138**	**11**
Electricity	GWh	3 216	–	–	–	–	71	**3 287**	**179**
Value	mil. €	1 351	774	672	244	243	1 203		**4 487**

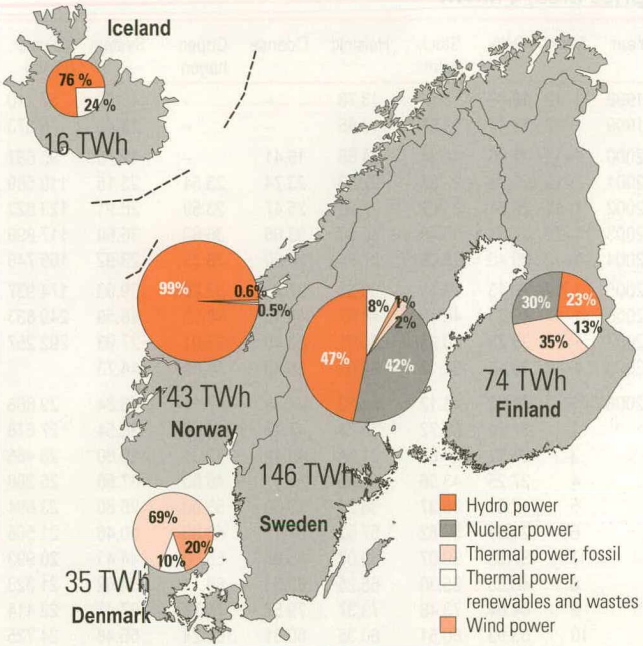
Exports of wood fuels is excluded.

Source: Board of Customs /Foreign Trade Statistics

The table has been corrected in the 2nd edition.

Next page: Wind power is shown separately in the graphs of this 2nd edition.

Electricity generation in Nordic Countries 2008

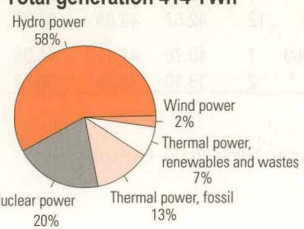


Electricity consumption in Nordic Countries 2008, TWh

Sweden	144
Norway	129
Finland	87
Denmark	36
Iceland	17
Total	**413**

Source: Nordel Annual Report 2008

Total generation 414 TWh

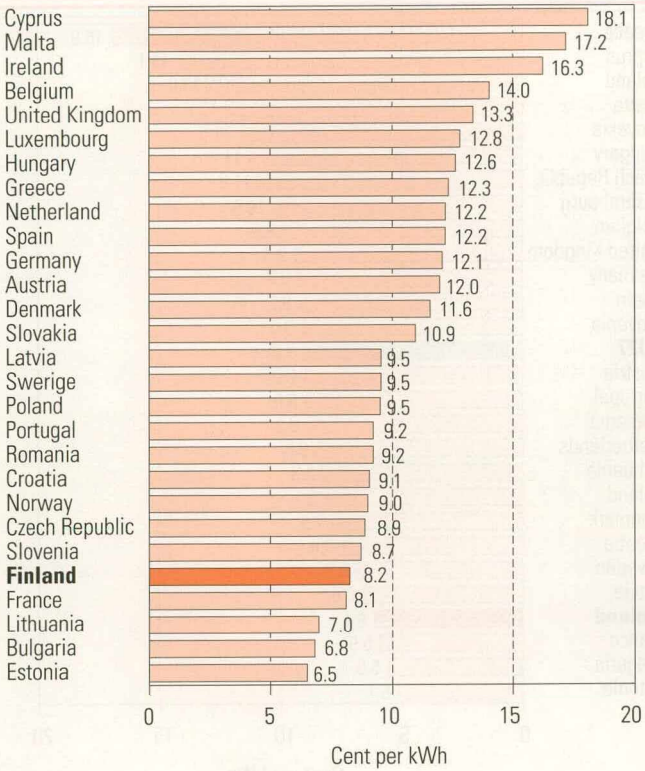


Spot prices of the Nordic Power Exchange NordPool by price area, € /MWh

Year	Month	Oslo	Stock-holm	Helsinki	Odense	Copen-hagen	System	Volume (GWh)
1998	1–12	13.73	13.54	13.78	–	–	13.78	57 240
1999	1–12	13.10	13.58	13.65	–	–	13.46	75 373
2000	1–12	12.06	14.24	14.88	16.41	–	12.75	95 687
2001	1–12	23.08	22.86	22.83	23.74	23.54	23.15	110 589
2002	1–12	26.57	27.62	27.28	25.47	28.59	26.91	123 622
2003	1–12	37.11	36.49	35.30	33.68	36.80	36.69	117 899
2004	1–12	29.40	28.08	27.68	28.80	28.35	28.92	165 748
2005	1–12	29.13	29.76	30.53	37.23	33.80	29.33	174 937
2006	1–12	49.23	48.12	48.57	44.18	48.53	48.59	249 833
2007	1–12	25.78	30.25	30.01	32.40	33.01	27.93	292 257
2008	1–12	39.15	51.12	51.02	56.43	56.64	44.73	
2008	1	45.32	46.12	46.12	47.34	47.11	45.84	29 666
	2	37.04	39.72	39.74	47.13	43.69	38.54	27 678
	3	26.52	31.87	31.94	40.18	32.31	29.60	28 466
	4	27.25	43.56	43.56	54.11	46.80	37.86	25 286
	5	12.64	38.37	38.37	53.30	53.50	25.80	23 894
	6	24.99	57.62	57.62	67.11	68.86	40.46	21 506
	7	37.38	59.07	59.07	65.96	65.00	44.43	20 993
	8	48.83	65.30	65.25	63.93	66.11	54.62	21 323
	9	64.04	73.48	73.37	79.57	75.77	67.47	22 414
	10	53.93	60.51	60.35	60.81	66.24	56.48	24 725
	11	49.36	52.92	52.45	51.69	59.20	51.27	26 568
	12	42.67	44.83	44.36	46.20	54.97	44.52	..
2009	1	40.76	41.12	41.08	42.34	45.14	41.41	..
	2	38.10	38.46	38.33	38.57	40.07	38.21	..

Sources: Nordel and EL-EX NordPool

Electricity prices for households on the 2nd half of 2008



Households annual consumption of 3 500 - 15 000 kWh. Prices without taxes.

Electricity prices for industry on the 2nd half of 2008

Electricity prices to industrial consumers with annual consumption of 500–2 000 MWh.
Prices without taxes.

Total energy consumption of in EU and some of the OECD countries, PJ

	1985	1990	1995	2000	2004	2005	2006
Germany	15 040	14 920	14 210	14 280	14 670	14 530	14 610
France	8 540	9 530	10 110	10 870	11 530	11 570	11 430
United Kingdom	8 530	8 850	9 150	9 710	9 740	9 770	9 610
Italy	5 590	6 430	6 770	7 240	7 760	7 840	7 790
Spain	3 170	3 760	4 310	5 180	5 920	6 050	6 020
Poland	..	4 190	4 190	3 810	3 870	3 930	4 110
Netherlands	2 550	2 850	3 120	3 230	3 510	3 450	3 370
Belgium	1 840	2 040	2 300	2 570	2 570	2 560	2 530
Sweden	1 960	1 980	2 110	2 010	2 200	2 160	2 130
Czech Republic	..	2 050	1 740	1 700	1 920	1 900	1 940
Romania	..	2 670	1 970	1 550	1 660	1 640	1 710
Finland	1 120	1 220	1 220	1 360	1 570	1 450	1 580
Austria	990	1 060	1 130	1 220	1 390	1 430	1 430
Greece	990	940	1 010	1 180	1 290	1 310	1 320
Hungary	..	1 200	1 080	1 050	1 110	1 170	1 160
Portugal	520	730	860	1 050	1 110	1 130	1 060
Bulgaria	0	1 170	980	780	790	840	860
Denmark	820	750	850	820	840	830	880
Slovakia	..	880	740	730	800	800	790
Ireland	370	430	450	600	660	630	650
Lithuania	..	670	360	300	380	360	350
Slovenia	..	230	260	270	300	310	310
Estonia	..	420	220	200	240	230	230
Luxembourg	130	150	140	150	190	200	200
Latvia	..	330	190	160	180	190	190
Cyprus	..	..	80	100	100	100	110
Malta	..	20	30	30	40	40	40
EU 27	**..**	**..**	**69 600**	**72 130**	**76 350**	**76 440**	**76 420**
United States	..	80 650	..	96 410	..	98 050	97 160
Japan	..	18 650	..	22 050	..	22 120	22 090
Canada	..	8 770	..	10 550	..	11 460	11 290
OECD Total	**..**	**189 320**	**..**	**222 960**	**..**	**232 530**	**231 840**

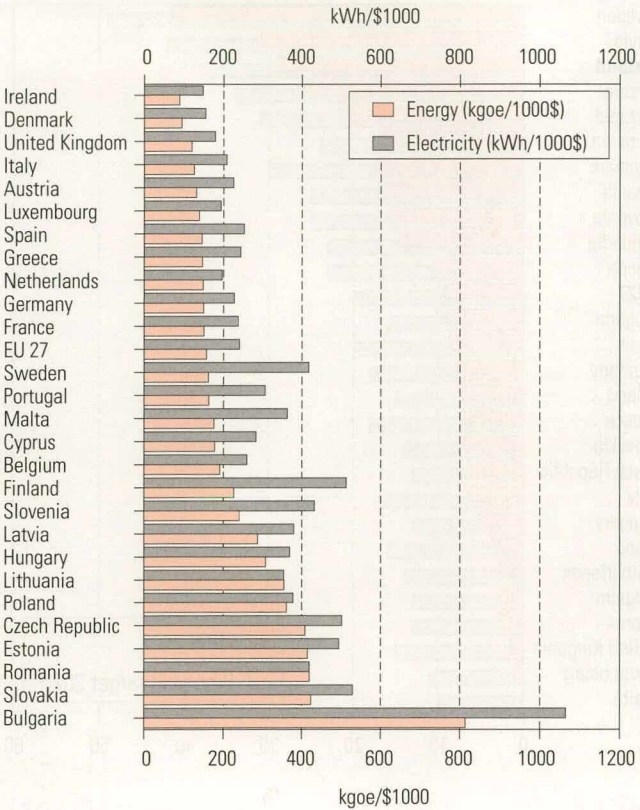
Source: Eurostat, IEA /Energy Balances of OECD Countries 2005–2006

Electricity consumption in EU and some of the OECD countries, TWh

	1985	1990	1995	2000	2004	2005	2006
Germany	424.6	446.5	452.6	482.6	513.3	517.5	528.0
France	252.9	301.9	342.6	384.9	422.9	425.5	429.9
United Kingdom	242.1	274.4	293.9	329.4	339.0	344.9	342.8
Italy	173.7	214.1	237.7	272.5	295.0	300.4	308.3
Spain	102.8	125.8	140.9	188.5	230.7	242.2	249.9
Sweden	113.6	120.3	124.6	128.7	130.4	132.4	130.8
Netherlands	61.5	73.5	83.1	97.9	103.1	104.5	106.0
Poland	92.1	96.1	89.6	96.7	99.8	98.8	103.0
Finland	48.5	58.9	65.2	75.4	83.1	80.9	85.8
Belgium	48.4	58.0	68.4	77.5	80.6	80.2	82.6
Austria	37.0	42.2	46.0	51.4	55.1	56.2	57.9
Czech Republic	43.3	48.2	48.0	49.4	53.8	55.2	57.0
Greece	23.8	28.5	34.1	43.2	49.7	50.9	52.5
Portugal	17.4	23.5	28.8	38.4	44.7	46.3	47.8
Romania	..	54.6	36.4	33.9	38.7	38.8	40.9
Denmark	25.4	29.3	30.9	32.5	33.0	33.5	34.1
Hungary	30.2	31.6	27.7	29.4	31.8	32.3	33.2
Bulgaria	..	35.3	28.7	24.1	24.9	25.7	26.9
Slovakia	21.5	23.4	21.7	22.0	24.0	22.9	23.6
Ireland	9.8	11.9	14.9	20.3	23.1	24.4	25.9
Slovenia	..	9.7	9.4	10.5	12.5	12.7	13.2
Lithuania	..	12.0	6.3	6.2	7.6	7.9	8.4
Luxembourg	3.8	4.1	5.0	5.7	6.4	6.2	6.5
Estonia	..	6.8	4.5	5.0	5.9	6.0	6.5
Latvia	..	8.3	4.4	4.4	5.4	5.7	6.1
Cyprus	..	1.8	2.2	3.0	3.7	4.0	4.2
Malta	..	0.9	1.3	1.6	1.8	1.7	1.9
EU 27	1 772.3	**2 141.6**	**2 248.9**	**2 515.2**	**2 720.1**	**2 757.7**	**2 813.4**
United States	..	2 923.9	..	3 857.3	..	4 049.4	4 052.2
Japan	..	801.3	..	1 011.3	..	1 047.9	1 050.1
Canada	..	447.6	..	522.7	..	559.5	547.0
OECD Total	..	**7 054.1**	..	**9 072.5**	..	**9 801.9**	**9 872.2**

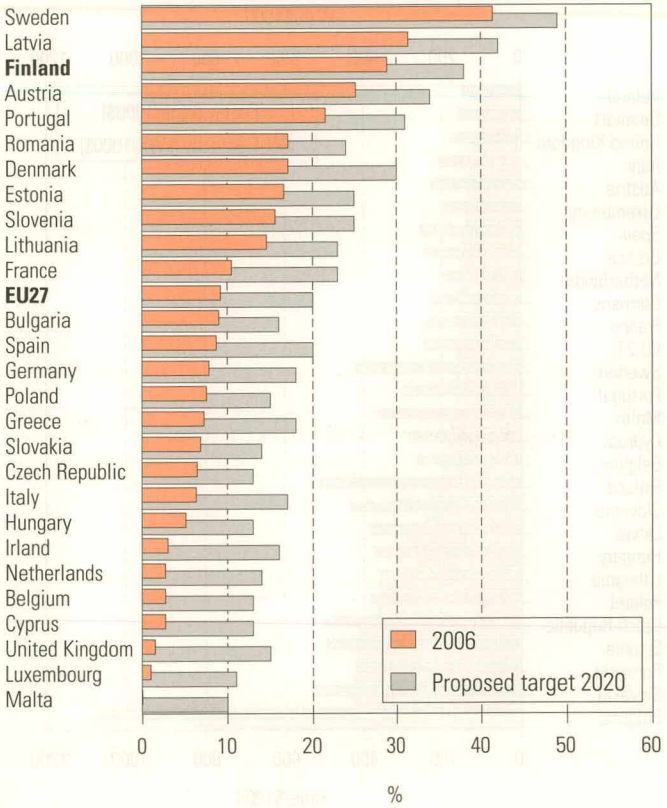
Source: Eurostat, IEA /Energy Balances of OECD Countries 2005–2006

Consumption of energy and electricity per GDP-unit in EU countries 2006



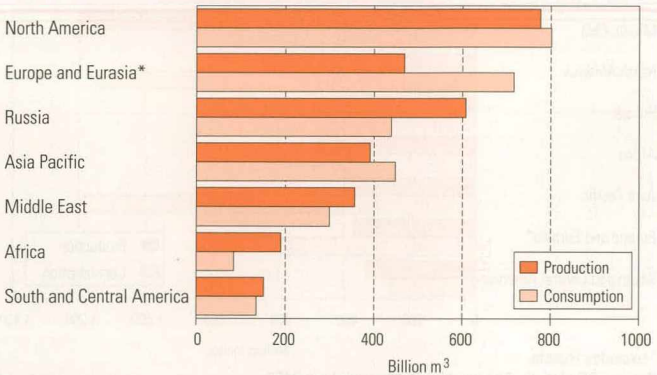
Source: Eurostat

Renewable energy as a proportion of final energy consumption in 2006, and the target for 2020



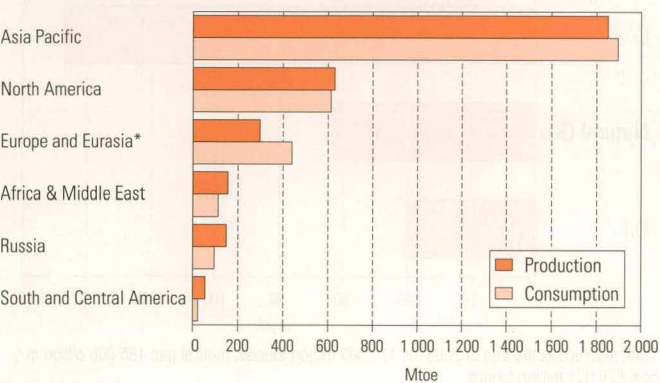
Source: European Commission/DG TREN

Gas production and consumption by region in 2007



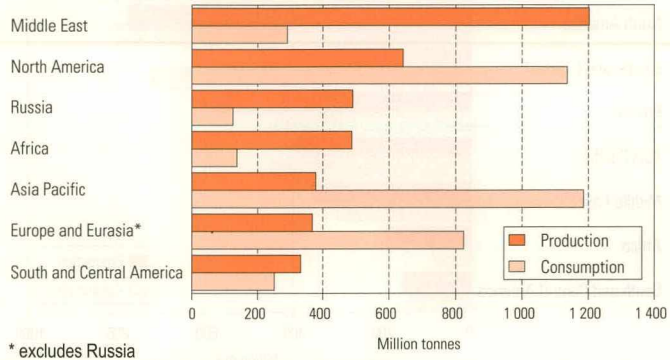
* excludes Russia
Source: BP statistical review of world energy June 2008

Coal production and consumption by region in 2007



* excludes Russia
Source: BP statistical review of world energy June 2008

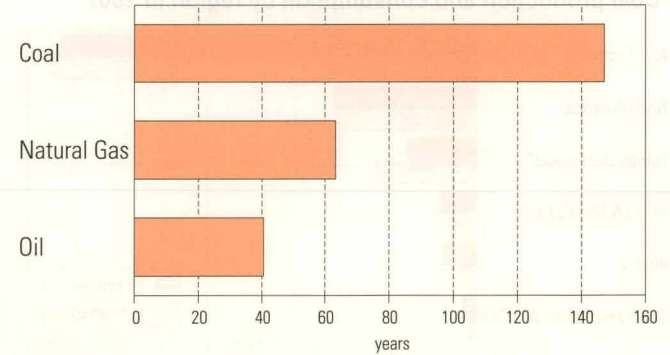
Oil production and consumption by region in 2007



* excludes Russia

Source: BP statistical review of world energy June 2008

World oil, natural gas and coal reserve sufficiency



Total reserves at the end of 2008: oil 170 800 million tonnes, natural gas 185 000 billion m^3, coal 826 001 million tonnes.

Source: BP statistical review of world energy June 2008

Net heat contents and densities of energy sources

Fuels	Unit	Net heat content		Density
		GJ	MWh	t/m³
Crude oil	t	41.8	11.6	0.86
Heavy fuel oil	t	41.1	11.4	0.98
Light fuel oil	t	42.7	11.9	0.85
Diesel fuel	t	42.8	11.9	0.84
Kerosines	t	43.3	12.0	0.80
Other kerosines	t	43.1	12.0	0.81
Naphtha	t	44.3	12.3	0.70
Motor gasolines	t	43.0	11.9	0.75
Aviation gasolines	t	43.7	12.1	0.71
LPG	t	46.2	12.8	0.51
Refinery gases	t	51.9	14.4	
Hard coal	t	25.5	7.1	
Coke	t	29.3	8.1	
Natural gas	1 000 m³ (0°C)	36.0	10.0	
Blast furnace gas	1 000 m³	3.8	1.1	
Coke oven gas	1 000 m³	16.7	4.6	
Black liquor	t (dry matter)	11.7	3.3	
Wood pellets	t	15–18		
Bark	t	5–11		
Sawdust	t	6–10		
Forest residue chips	t	6–10		
Whole tree chips	t	7–10		
Chips	loose m³	3.3	0.9	
Milled peat	t	10.1	2.8	0.32
Sod peat	t	12.3	3.4	0.38

Conversion factors between energy units

	toe	MWh	GJ	Gcal
toe	1	11.63	41.868	10
MWh	0.086	1	3.6	0.86
GJ	0.02388	0.2778	1	0.2388
Gcal	0.1	1.163	4.1868	1

Example: 1 toe (tonne of oil equivalent) = 11.63 MWh

Prefix

k = kilo	= 10^3	= 1 000
M = mega	= 10^6	= 1 000 000
G = giga	= 10^9	= 1 000 000 000
T = tera	= 10^{12}	= 1 000 000 000 000
P = peta	= 10^{15}	= 1 000 000 000 000 000

Carbon dioxide factors for some fuels

	g CO_2 /MJ
Motor gasolines	72.9
Diesel fuel	73.6
Light fuel oil	74.1
Heavy fuel oil	78.8
Jet fuel	73.2
LPG	65.0
Other oils	71.3–79.2
Hard coal	94.6
Coke	108.0
Natural gas	55.04
Milled peat	105.9
Bark, wood fuel	109.6
Industrial wood residue	109.6
Black liquor	109.6

Note

Hydro power, wind power and imported electricity have been made commensurate with fuels according to directly obtained electricity (at the efficiency ratio of 100 per cent) and nuclear power at the efficiency ratio of 33 per cent.

Calculation method for heating energy

Net heating energy for buildings is calculated by subtracting boiler losses from fuels according to the following default efficiencies:

Small combustion of wood	55%
Peat	60%
Coal	60%
Heavy fuel oil	83%
Light fuel oil	78%
Natural gas	90%
District heating	100%
Electric heating	100%

Sources: Technical Research Centre of Finland (VTT) and Tampere University of Technology.

Explanation of symbols

..	Data not available
–	Magnitude zero
0	Magnitude less than half of unit employed
*	Preliminary
----------	Break in the time series

Energy statistics by Statistics Finland

Preliminary energy statistics
(Energiaennakko)

Preliminary data on energy statistics.
Data published in March.

Energy statistics publication and EnergyCD
(Energiatilasto ja EnergiaCD)

Annual publication containing detailed basic statistics on energy in Finland. Includes data on energy consumption and supply, consumption of electricity and district heat, foreign trade, energy prices and emissions etc.

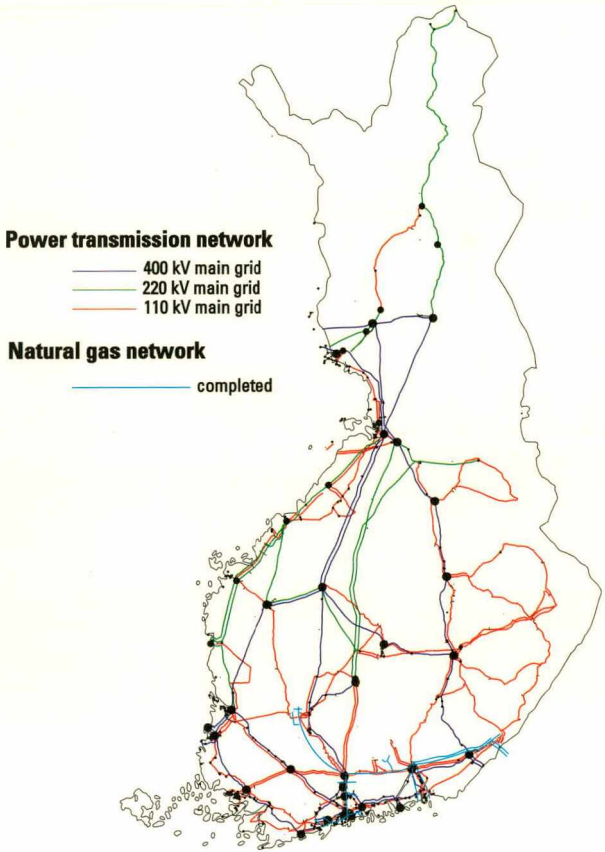
Energy in Finland

Statistical pocketbook on energy statistics.

Internet www.stat.fi/energy
(www.tilastokeskus.fi/energia)

The updated statistics on consumption of hard coal, energy supply, consumption and prices as well as production of electricity and heat. Latest tables and figures.

Power transmission and natural gas networks 2008



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