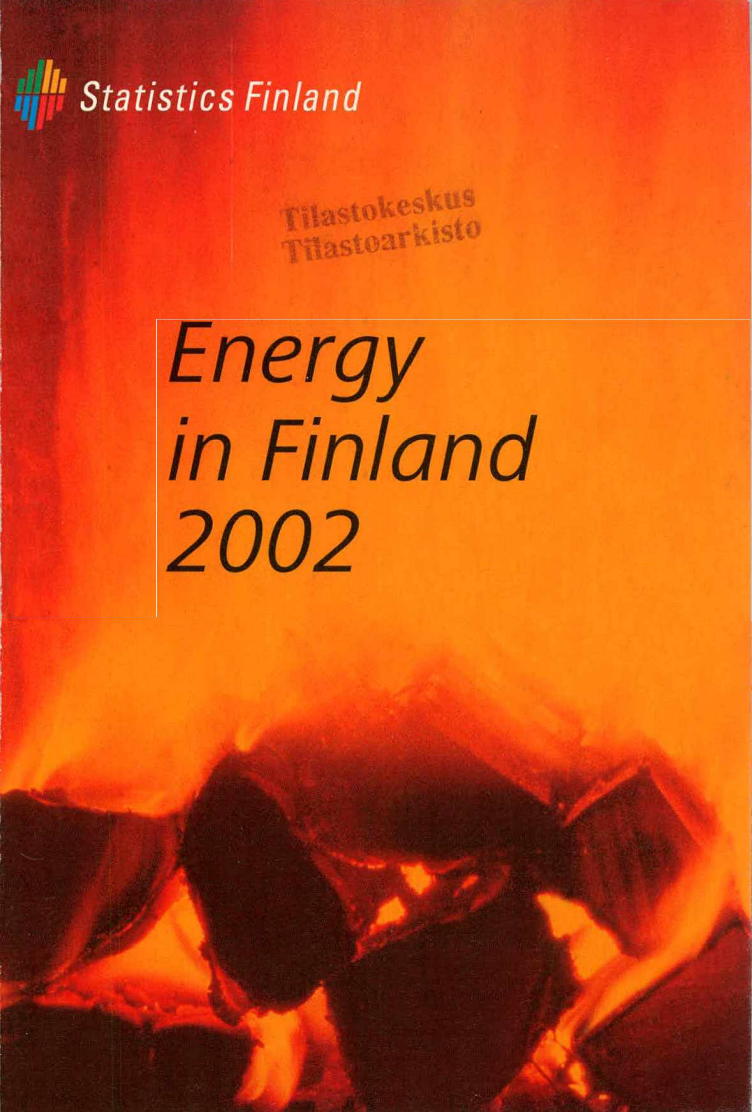
Statistics Finland

Tilastokeskus
Tilastoarkisto

Energy in Finland 2002



Finland in Brief

Area

Situated in northern Europe with an area of 338,145 km^2 of which 68% forest, 10% water, 8% cultivated land.

Population

5.2 million, with average density of 17 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°	–5.7°C	+17.0°C
Rovaniemi	66°	–14.5°C	+14.7°C

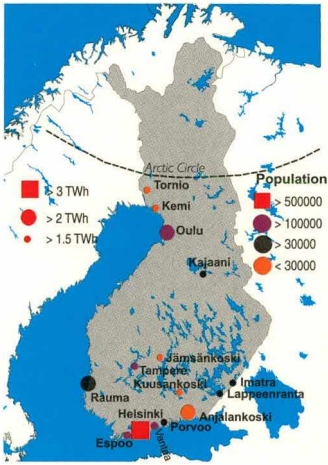
Economy in 2002

GDP totalled € 140 bil., i.e. € 26,863/capita, of which services 64.5%, secondary production 31.9% and primary production 3.6%.

Structure of Industry in 2002, Value Added Gross in Production

	bil. €	%
Total industry	**32.0**	**100**
Mining and quarrying	0.3	1
Forest industry	6.2	19
Chemical industry	3.1	10
Metal industry	3.2	10
Machinery and equipment	3.1	10
Electrical equipment	7.3	23
Other manufacturing ind.	6.3	20
Electricity, gas and water ind.	2.5	8

Municipalities with High Electricity Consumption 2002



Natural Resources

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 2002

1,403 PJ (33.5 Mtoe)
269.8 GJ/capita (6.44 toe/capita)

Electricity Consumption in 2002

83.5 TWh
16,046 kWh/capita

Contents

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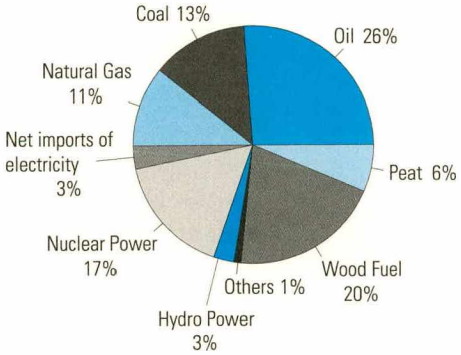
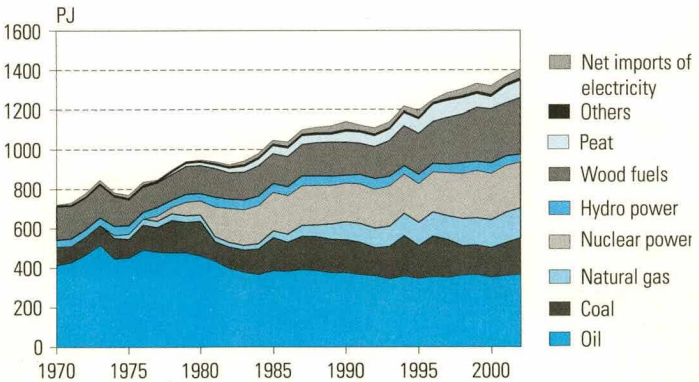
Painojussit Oy, Helsinki 2003

Total Energy Consumption by Energy Source 2002

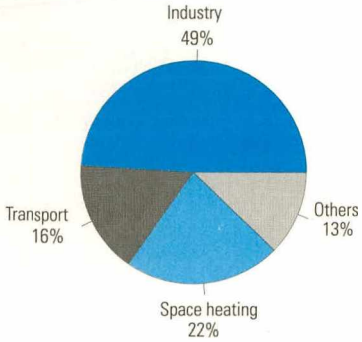


Total energy consumption in 2002 was 1 404 PJ.

Total Energy Consumption by Energy Source 1970–2002

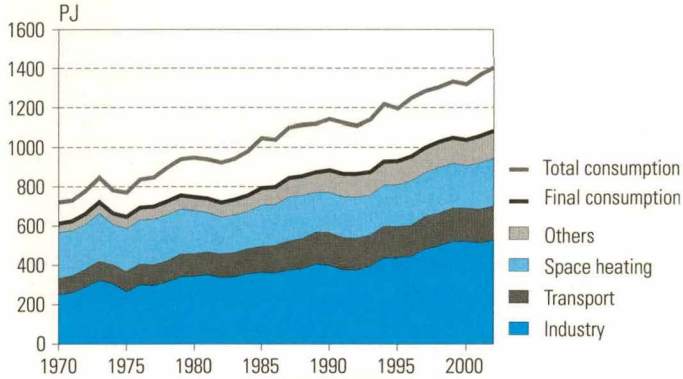


Final Energy Consumption by Sector 2002



Final energy consumption in 2002 was 1 084 PJ.

Total Energy Consumption and Final Energy Consumption by Sector 1970–2002



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
1981	433.9	100.0	25.6	150.9	48.7
1982	396.6	108.5	24.2	172.6	46.6
1983	377.2	112.7	23.5	182.4	48.4
1984	365.9	130.1	26.9	194.2	47.2
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	375.5	166.8	90.8	197.8	38.7
1991	365.3	164.0	95.7	200.8	47.0
1992	359.7	141.6	99.3	198.2	53.9
1993	344.4	163.8	102.6	205.1	48.0
1994	358.1	204.7	112.8	199.9	42.0
1995	345.7	166.6	117.2	197.8	46.1
1996	355.0	204.8	122.5	203.8	42.2
1997	352.0	190.8	120.3	218.7	42.5
1998	363.3	148.1	138.0	228.8	53.3
1999	365.1	149.6	138.0	240.7	45.3
2000	352.8	149.0	141.3	235.4	52.3
2001	359.7	167.9	153.1	238.4	47.1
2002	365.4	184.7	152.1	233.4	38.5
Share					
2002	26%	13%	11%	17%	3%
Annual change					
02/01	2%	10%	–1%	–2%	–18%

Wind power is included in hydro power. Total consumption of wind power in 2002 was 0.227 PJ.

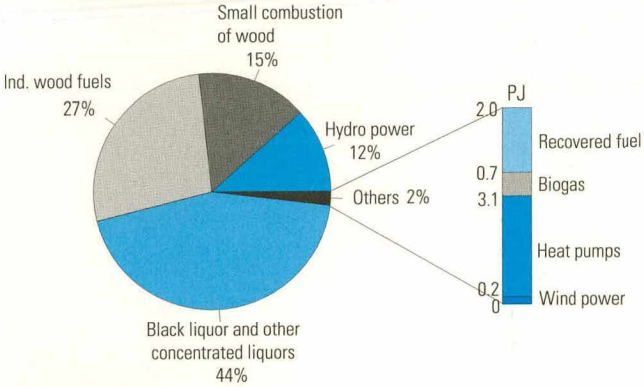
Total Energy Consumption

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	6.1	4.4	**947.0**	1980
145.1	18.8	7.8	8.1	**938.8**	1981
133.7	23.3	8.4	8.3	**922.4**	1982
141.3	30.4	8.7	17.2	**941.8**	1983
153.2	34.7	9.1	18.8	**980.0**	1984
151.3	41.1	9.7	17.0	**1 046.4**	1985
152.5	43.3	9.6	20.9	**1 037.9**	1986
158.4	45.4	9.5	20.1	**1 099.6**	1987
167.7	41.5	10.0	26.6	**1 112.0**	1988
172.0	39.5	10.0	31.9	**1 118.5**	1989
167.2	55.9	10.2	38.7	**1 141.5**	1990
158.6	56.4	9.4	25.9	**1 123.0**	1991
161.2	55.3	10.1	29.6	**1 108.8**	1992
180.5	58.4	9.2	27.1	**1 139.1**	1993
201.8	66.7	9.3	21.9	**1 217.2**	1994
207.5	74.3	9.5	30.3	**1 194.9**	1995
212.8	84.8	10.0	13.2	**1 249.0**	1996
237.2	83.3	11.0	27.6	**1 283.3**	1997
247.9	79.6	11.1	33.5	**1 303.5**	1998
270.4	70.5	12.0	40.0	**1 331.7**	1999
271.0	61.9	11.9	42.8	**1 318.4**	2000
265.4	85.9	12.5	35.9	**1 366.2**	2001
284.0	88.5	13.1	42.9	**1 402.7**	2002
					Share
20%	6%	1%	3%	**100%**	2002
				Annual	**change**
7%	3%	5%	20%	**3%**	02/01

Consumption of Renewables, PJ

	Hydro power	Industrial wood fuels	Black liquor and others	Small combustion of wood	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	0.5	**179.0**	19%
1981	48.7	33.1	68.2	43.7	0.8	**194.5**	21%
1982	46.6	29.4	60.5	43.8	1.1	**181.4**	20%
1983	48.4	30.7	66.6	44.0	1.4	**191.1**	20%
1984	47.2	34.4	74.7	44.0	1.6	**201.9**	21%
1985	44.0	31.6	75.5	44.1	2.0	**197.2**	19%
1986	44.2	31.1	77.2	44.2	1.8	**198.4**	19%
1987	49.2	32.4	81.6	44.4	1.9	**209.5**	19%
1988	47.6	35.0	88.1	44.5	1.7	**217.0**	20%
1989	46.4	36.3	91.1	44.6	1.5	**220.0**	20%
1990	38.7	36.5	86.1	44.7	1.6	**207.5**	18%
1991	47.0	32.9	80.9	44.8	1.8	**207.4**	18%
1992	53.8	32.8	83.5	44.9	1.7	**216.7**	20%
1993	48.0	40.4	95.1	45.0	1.8	**230.3**	20%
1994	42.0	52.4	104.4	45.0	1.9	**245.6**	20%
1995	46.0	53.9	109.0	44.7	3.1	**256.7**	21%
1996	42.1	56.2	109.6	46.9	3.6	**258.6**	21%
1997	42.5	61.6	128.5	47.0	3.7	**283.3**	22%
1998	53.2	64.9	135.4	47.6	3.9	**305.0**	23%
1999	45.2	81.2	142.6	46.6	4.3	**319.9**	24%
2000	52.0	82.2	143.5	45.3	4.5	**327.5**	25%
2001	46.9	83.2	133.7	48.5	5.4	**317.7**	23%
2002	38.2	89.0	145.6	49.4	6.0	**328.1**	23%

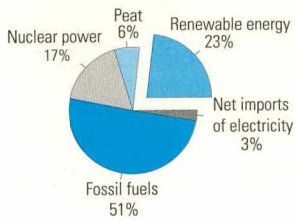
Consumption of Renewables 2002



The total consumption of renewable energy sources in 2002 was 328 PJ which is 25% of total energy consumption.

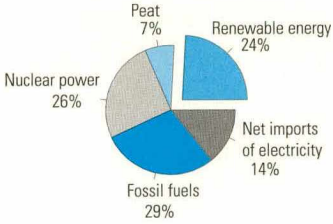
Share of Renewables 2002

In Total Energy Consumption



Total 1 404 PJ

In Electricity Consumption



Total 84 TWh

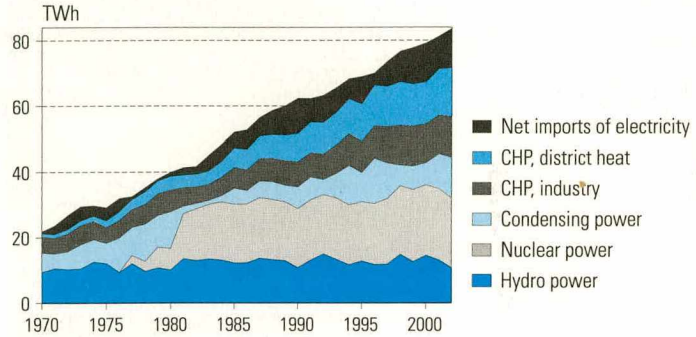
Supply and Total Consumption of Electricity, TWh

	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**
1986	12.3	0.00	18.0	4.1	6.3	6.2	5.8	**52.7**
1987	13.7	0.00	18.5	5.1	6.8	6.8	5.6	**56.4**
1988	13.2	0.00	18.4	5.4	7.1	7.1	7.4	**58.7**
1989	12.9	0.00	18.0	5.1	7.5	7.7	8.9	**60.0**
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	6.7	11.7	12.7	11.9	**79.2**
2001	13.0	0.07	21.9	10.6	11.6	14.1	10.0	**81.2**
2002	10.6	0,06	21.4	12.4	12.3	14.9	11.9	**83.5**
Share								
2002	13%	0.1%	26%	15%	15%	18%	14%	**100%**
Annual change								
02/01	–18%	–9%	–2%	17%	6%	6%	20%	**3%**

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

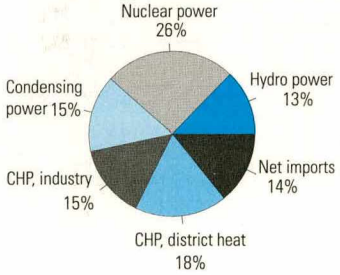
Source: Adato Energia Oy.

Electricity Supply 1970–2002

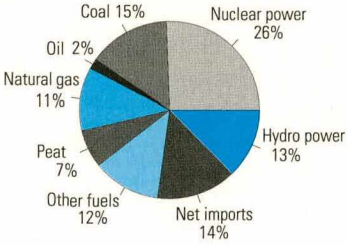


Electricity Supply 2002

By Mode of Production



By Source



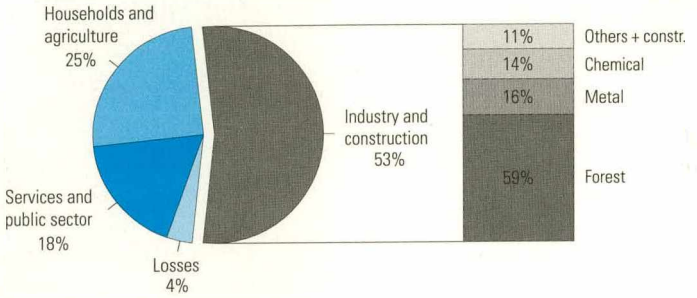
Total electricity supply in 2002 was 83.5 TWh.

Electricity Consumption by Sector, TWh

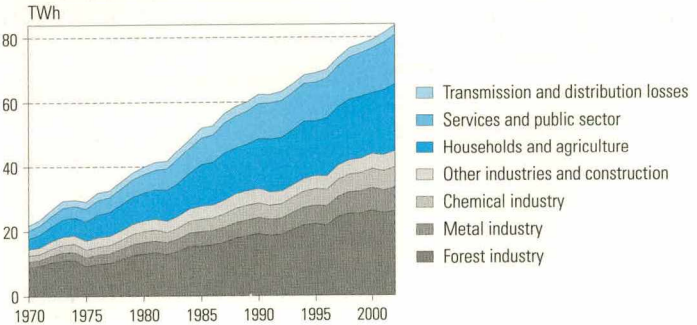
	Industry and construction					House-holds and agri-culture	Services and public sector	Transm. and distrib. losses	**Total**
	Total	Forest	Metal	Chemical	Others + const-ruction				
1970	14.5	9.0	1.8	1.8	1.9	3.3	2.5	1.5	**21.8**
1975	17.1	9.2	2.7	2.4	2.7	6.0	3.9	2.2	**29.2**
1980	23.3	13.0	3.6	3.4	3.3	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**
1986	28.1	15.7	4.5	3.8	4.0	13.2	8.6	2.8	**52.7**
1987	29.6	16.6	4.6	4.1	4.3	14.5	9.4	3.0	**56.4**
1988	31.5	17.8	4.8	4.5	4.4	14.4	9.8	3.0	**58.7**
1989	32.4	18.5	4.9	4.6	4.5	14.5	10.2	2.9	**60.0**
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	5.0	20.8	15.2	2.9	**83.5**
Share									
2002	53%	31%	9%	7%	6%	25%	18%	4%	**100%**
Annual Change									
02/01	3%	3%	3%	5%	1%	3%	4%	0%	**3%**

Sources: Adato Energia Oy; Fortum Power and Heat Oy;
Statistics on the Structure of Industry/Statistics Finland.

Electricity Consumption by Sector 2002



Electricity Consumption by Sector 1970–2002



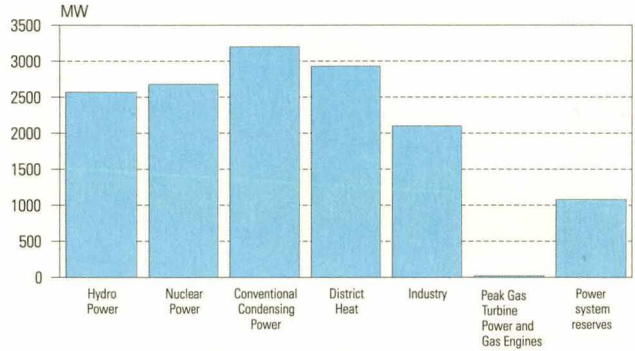
Energy Sources in Electricity Generation, PJ

	Hydro power	Nuclear energy	Hard coal	Oil	Natural gas	Peat	Other fuels	Net imports of electr.	**Total**
1970	33.9	–	41.8	32.1	–	..	17.9	1.9	**127.6**
1975	43.5	–	40.2	38.2	8.9	..	14.6	14.4	**159.8**
1980	36.4	72.3	102.7	26.8	12.6	..	29.2	4.4	**284.4**
1985	44.0	196.1	60.9	7.7	9.7	8.9	22.7	17.0	**367.2**
1990	38.7	197.8	61.3	9.7	24.8	17.2	29.1	38.7	**417.3**
1995	46.1	197.8	65.0	7.5	37.1	36.3	36.6	30.3	**456.6**
1996	42.2	203.8	106.1	8.7	40.4	40.8	38.1	13.2	**493.2**
1997	42.5	218.7	90.3	6.8	33.2	36.6	44.6	27.6	**500.2**
1998	53.3	228.8	53.0	8.2	37.2	32.9	48.9	33.5	**495.9**
1999	45.3	240.7	57.0	8.1	38.3	28.4	50.7	40.0	**508.7**
2000	52.3	235.4	60.2	7.5	41.3	21.7	53.7	42.8	**514.9**
2001	47.1	238.4	77.4	6.6	48.2	41.1	56.6	35.9	**551.4**
2002	38.5	233.4	97.6	8.9	46.2	42.6	57.9	42.9	**568.0**

Source: Adato Energia Oy.

Electricity generation capacities in peak load period

Simultaneously Available Capacity of Power Plants at Beginning of Year 2004



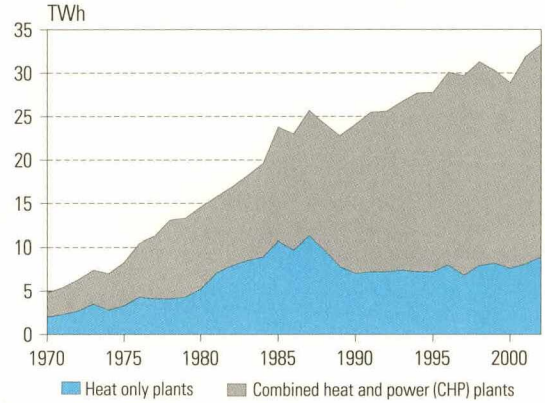
Capacity of Power Plants 13 500 MW

Production and Consumption of District Heat, TWh

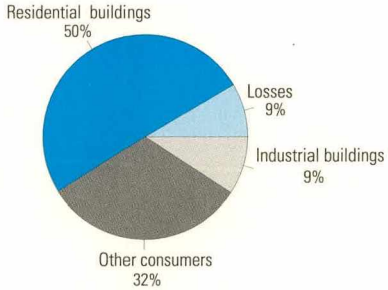
	Net production of district heat			Network and measuring losses	Consumption of district heat			
	Heat only plants	CHP plants	**Total**		Residential buildings	Industrial buildings	Other consumers	**Total**
1970	2.0	2.8	**4.8**	0.3	..	0.6	..	**4.5**
1975	3.3	5.0	**8.2**	0.6	4.7	0.9	2.0	**7.7**
1980	5.2	9.4	**14.6**	1.3	7.8	1.4	4.1	**13.3**
1981	7.1	8.7	**15.7**	1.5	8.5	1.4	4.4	**14.3**
1982	7.9	9.0	**16.9**	1.8	9.2	1.4	4.5	**15.1**
1983	8.5	9.7	**18.2**	2.0	9.6	1.5	5.1	**16.2**
1984	8.9	10.7	**19.6**	2.1	10.3	1.6	5.5	**17.5**
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	7.6	21.3	**28.9**	2.4	14.8	2.6	9.0	**26.4**
2001	8.1	23.8	**31.8**	2.7	16.1	2.9	10.2	**29.2**
2002	8.9	24.4	**33.3**	2.8	16.7	3.1	10.6	**30.4**

Sources: Finnish District Heating Association and since 1995 also Association of Finnish Local and Regional Authorities.

Production of District Heat 1970–2002

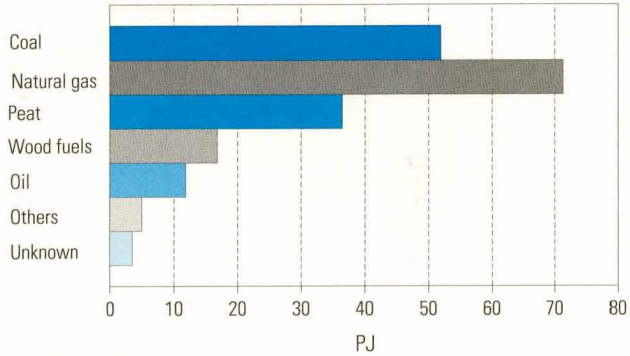


District Heat Use 2002



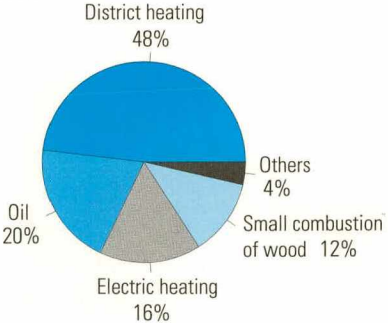
District heat use in 2002 was 33,3 TWh.

Fuel Consumption in Production of District Heat and Combined Production of District Heat and Electricity 2002



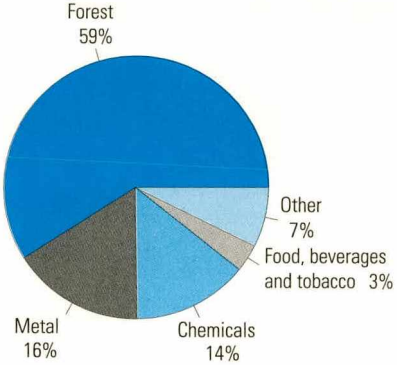
Total fuel consumption in production of district heat and combined production of district heat and electricity in 2002 was 198 PJ (55.1 TWh).

Heating of Residential, Commercial and Public Buildings 2002



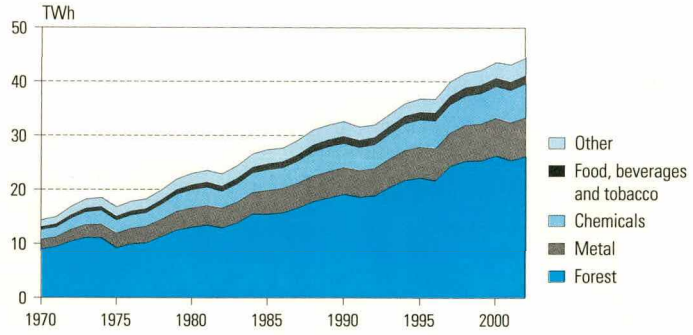
Total heating energy was 55.0 TWh. Heating energy for buildings is calculated by subtracting boiler losses from fuels according to their default efficiences (see page 38).

Electricity Consumption by Branch of Industry 2002

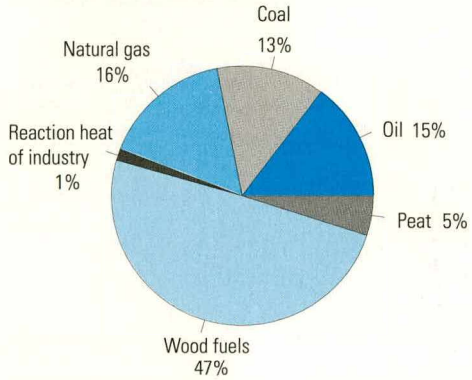


Total electricity consumption by industry in 2002 was 44.3 TWh.

Electricity Consumption by Branch of Industry 1970–2002

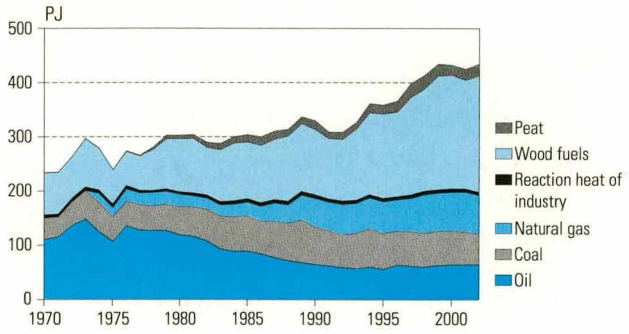


Fuel Consumption in Industry 2002



Total fuel consumption in industry in 2002 was 434 PJ.

Fuel Consumption in Industry 1970–2002

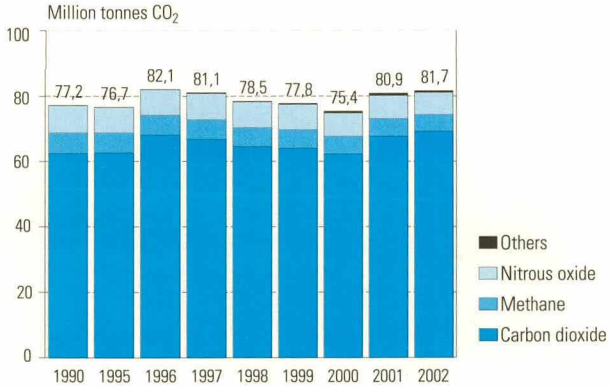


Greenhouse Gas Emissions 1990 and 2002 (1 000 tonnes)

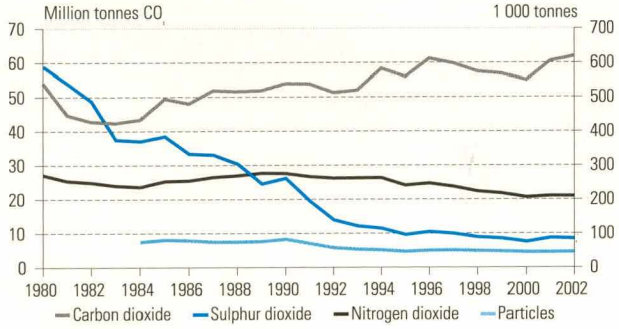
The Gases Included in the Kyoto Protocol

	Carbon dioxide (CO_2)		Methane (CH_4)		Nitrous oxide (N_2O)		Others (HFC, PFC, SF_6)	
	1990	2002	1990	2002	1990	2002	1990	2002
Fuel combustion	53 900	62 000	19	23	4	5	–	–
Fugitive emissions from fuels	3 500	3 500	1	1	–	–	–	–
Industrial processes	1 200	1 000	0	1	5	4	0.004	0.2
Agriculture	3 200	2 100	98	84	16	12	–	–
Waste	–	–	182	134	0	0	–	–
Others	600	700	–	–	0	0	–	–
Total	62 500	69 300	302	243	25	22	0.004	0.2
Emissions, million tonnes of CO_2 equivalent	62.5	69.2	6.3	5.1	7.9	6.8	0.07	0.5

Greenhouse Gas Emissions 1990 and 1995–2002

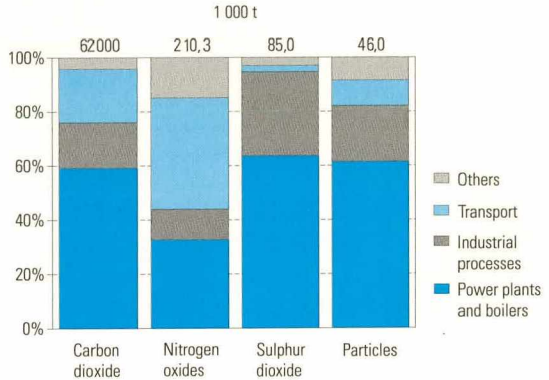


Emissions from Energy Production and Consumption 1980–2002



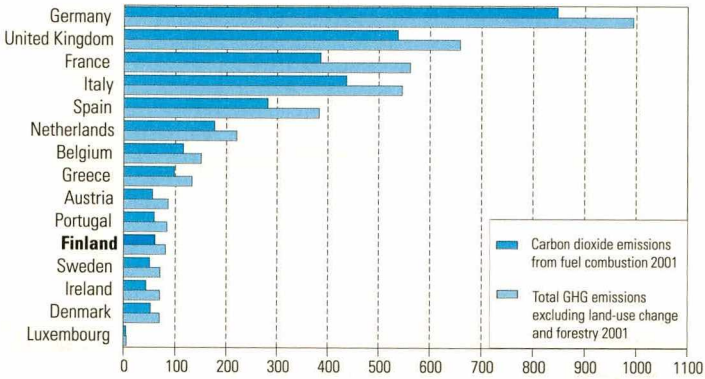
Sulphur dioxide and particles include also emissions from processes. The left-hand side scale is for carbon dioxide.

Air Emissions by Sector 2002

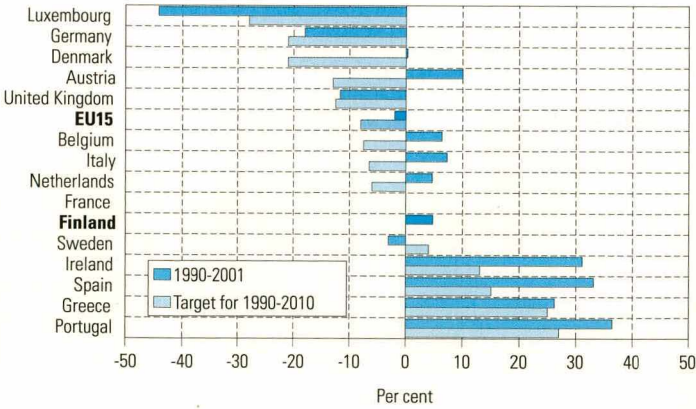


Sulphur dioxide and particles include also emissions from processes.

Greenhouse gas and carbon dioxide emissions from fuel combustion in EU countries



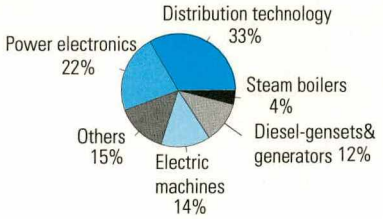
Change in actual GHG emissions and the EU Member States' commitments



Imports and Exports of Energy and Energy Technology 2002

	Imports	Exports
Coal	226 € mil. 5 008 000 t	0.2 € mil. 2 000 t
Natural gas	444 € mil. ..	
Crude oil	2 269 € mil. 11 747 000 t	
Other petroleum products	811 € mil. 3 660 000 t	1 519 € mil. 5 379 000 t
Nuclear fuel	58 € mil. 99 t	
Electricity	270 € mil. 13 723 GWh	66 € mil. 1 811 GWh
Others	32 € mil.	12 € mil.
Total	**4 111 € mil.**	**1 597 € mil.**
Energy technology total	**2 229 € mil.**	**2 948 € mil.**

Exports of Energy Technology



Energy Imports 2002

		Russia	Norway	Denmark	United Kingom	EU15	OECD	Total Amount	Total Value mil. €
Hard coal	1 000 t	2 473	–	242	1	8	1 629	**4 530**	**175**
Coke	1 000 t	–	–	–	–	0	20	**478**	**51**
Natural gas	mil. m^3	..	–	–	–	–	–	**..**	**444**
Crude oil	1 000 t	6 270	2 710	1 799	–	2 959	4 758	**11 747**	**2 269**
Motor gasoline	mil. l	11	–	356	11	11	367	**385**	**83**
Middle distillates	1 000 t	1 164	–	18	193	293	462	**1 682**	**370**
Heavy fuel oil	1 000 t	176	246	64	241	566	630	**807**	**127**
LPG	1 000 t	24	0	47	3	14	61	**155**	**37**
Other petroleum prod.	1 000 t	395	1	4	27	133	207	**641**	**166**
Methanol	1 000 t	204	–	0	0	0	0	**204**	**32**
MTBE	1 000 t	71	–	–	5	15	15	**86**	**28**
Peat	1 000 t	0	0	–	4	4	4	**5**	**0**
Nuclear fuel	t	24	–	–	36	75	75	**99**	**58**
Electricity	GWh	7 643	1	1	5 778	5 779	5 780	**13 723**	**270**
Value	mil. €	2 321	563	484	237	961	1 543		**4 111**

Import of wood fuels is excluded.

Source: Board of Customs/Foreign Trade Statistics.

In addition, energy technology imports totalled € 2 229 million in 2002.

Source: Etlatieto Oy.

Energy Exports 2002

		Sweden	United States	France	United Kingdom	EU15	OECD	Total Amount	Total Value mil. €
Coke	1 000 t	–	–	–	–	0	2	**2**	**0**
Motor gasoline	mil. l	1 028	1 540	96	520	1 759	3 644	**3 668**	**759**
Jet fuel	1 000 t	128	–	–	–	136	136	**143**	**28**
Middle distillates	1 000 t	794	–	661	244	1 921	1 925	**1 933**	**501**
Heavy fuel oil	1 000 t	0	–	8	–	28	28	**28**	**5**
LPG	1 000 t	0	–	–	–	0	18	**18**	**4**
Other petroleum prod.	1 000 t	87	0	5	34	408	433	**506**	**222**
Peat	1 000 t	54	1	29	12	133	146	**151**	**12**
Electricity	GWh	1 806	–	2	–	1 808	1 808	**1 811**	**66**
Value	mil. €	550	315	184	180	1 108	1 515		**1 597**

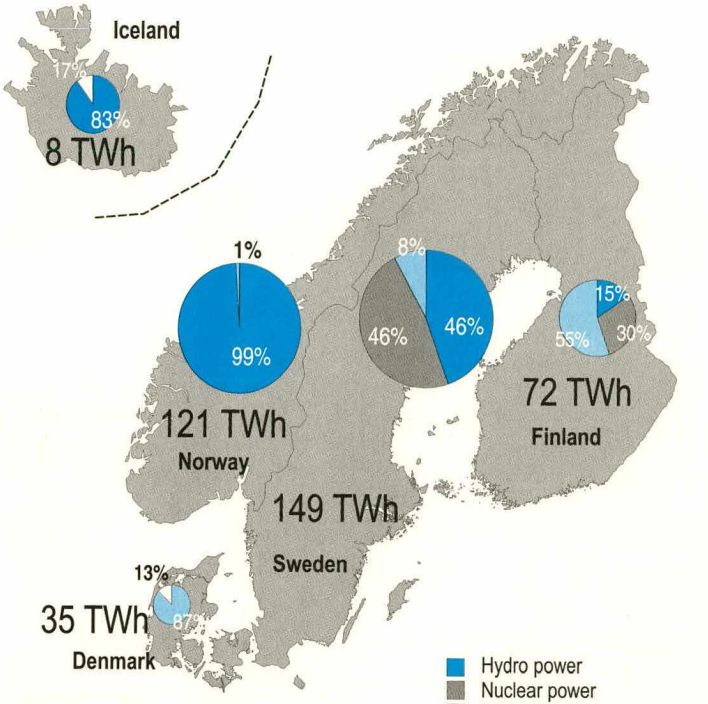
Export of wood fuels is excluded.

Source: Board of Customs/Foreign Trade Statistics.

In addition, energy technology exports totalled € 2 948 million in 2002.

Source: Etlatieto Oy.

Electricity Generation in Nordic Countries 2002



Electricity Consumption in Nordic Countries 2002, TWh

Iceland	8
Norway	121
Sweden	149
Finland	84
Denmark	35

Source: Nordel Annual Report 2002.

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	23.08	27.62	27.28	25.47	28.59	26.91	123 622
2002	1	24.23	24.89	24.91	23.49	27.14	24.53	12 394
	2	20.25	20.40	20.41	20.12	20.45	20.30	10 007
	3	18.61	18.62	18.62	18.96	18.66	18.60	10 808
	4	17.39	17.39	17.39	22.01	22.39	17.39	9 060
	5	15.05	15.76	15.85	18.06	16.01	15.27	8 948
	6	14.66	19.83	19.93	22.88	20.22	16.43	8 397
	7	14.59	17.00	18.39	19.44	18.98	15.66	8 487
	8	19.43	22.52	22.76	23.61	24.77	20.27	8 507
	9	24.15	25.82	25.81	28.72	26.67	24.65	8 830
	10	31.29	31.63	31.54	29.68	31.70	31.34	11 928
	11	43.14	43.25	43.25	35.85	43.25	43.22	12 535
	12	75.23	73.42	67.68	42.50	71.91	74.49	13 722
2003	1	72.89	70.31	69.84	47.17	70.24	71.68	13 500
	2	48.46	48.17	47.01	44.31	48.74	48.25	11 596
	3	40.52	38.50	37.57	34.80	38.49	39.51	11 754
	4	32.74	30.10	29.61	27.52	30.10	31.53	9 878
	5	29.71	29.46	28.06	28.50	29.46	29.51	8 865
	6	24.01	26.67	26.16	26.75	26.67	24.81	7 358
	7	27.50	28.16	28.14	32.92	28.82	27.65	7 280
	8	33.24	33.31	31.25	35.89	34.61	33.01	7 688
	9	32.46	32.75	29.93	34.60	32.75	32.31	7 927

Sources: Nordel and EL-EX NordPool.

Total Consumption of Energy in OECD Countries, PJ

	1973	1980	1990	1999	2000	2001
Australia	2 410	2 950	3 670	4 500	4 600	4 840
Austria	910	980	1 050	1 210	1 200	1 290
Belgium	1 940	1 930	2 040	2 460	2 480	2 470
Canada	6 740	8 080	8 750	10 230	10 510	10 390
Czech Republic	1 900	1 980	1 980	1 600	1 690	1 730
Denmark	830	830	760	840	810	830
Finland	890	1 060	1 220	1 400	1 380	1 420
France	7 390	7 860	9 510	10 680	10 780	11 120
Germany	14 150	15 090	14 910	14 300	14 380	14 700
Greece	520	660	930	1 110	1 160	1 200
Hungary	890	1 190	1 190	1 060	1 040	1 060
Iceland	50	60	90	130	140	140
Ireland	300	360	440	580	600	630
Italy	5 400	5 820	6 390	7 140	7 190	7 200
Japan	13 550	14 510	18 280	21 590	21 950	21 800
Luxembourg	190	150	150	150	150	160
Mexico	2 310	4 140	5 190	6 280	6 310	6 380
Netherlands	2 610	2 720	2 780	3 080	3 160	3 230
New Zeeland	350	390	590	720	760	770
Norway	610	780	900	1 120	1 080	1 110
Poland	3 900	5 150	4 180	3 920	3 770	3 790
Portugal	300	430	720	1 020	1 030	1 040
Republic of Korea	910	1 730	3 880	7 490	8 000	8 160
Slovakia	650	860	900	730	730	780
Spain	2 190	2 870	3 820	4 960	5 200	5 330
Sweden	1 650	1 670	1 950	2 110	1 990	2 140
Switzerland	830	870	1 050	1 120	1 110	1 170
Turkey	1 020	1 320	2 220	2 970	3 240	3 030
United Kingdom	9 240	8 430	8 880	9 700	9 680	9 850
United States	72 700	75 850	80 700	94 110	96 460	95 520
EU 15	**48 510**	**50 850**	**55 530**	**60 730**	**61 210**	**62 590**
OECD Total	**157 330**	**170 720**	**189 100**	**218 290**	**222 580**	**223 270**

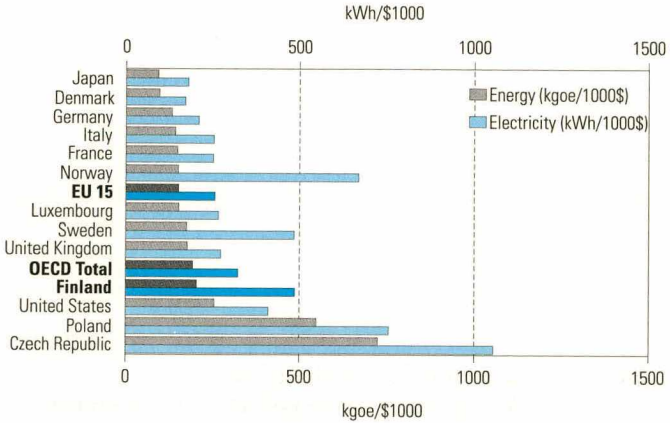
Source: Energy Balances of OECD Countries 2000–2001, IEA/OECD.

Electricity Consumption in OECD Countries, TWh

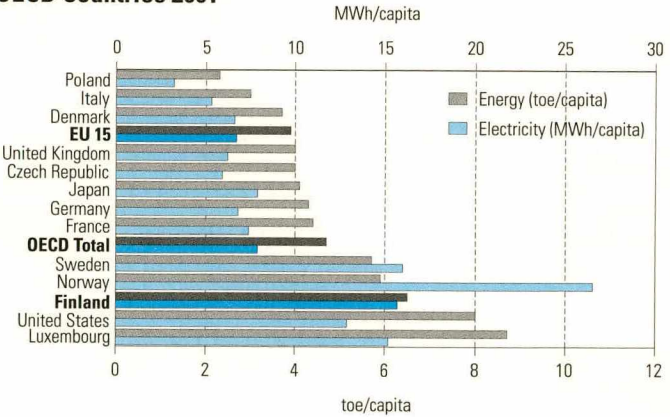
	1973	1980	1990	1999	2000	2001
Australia	52.5	82.1	134.3	175.5	179.9	188.0
Austria	25.9	33.7	44.0	50.9	53.6	57.4
Belgium	35.8	44.9	59.1	76.1	79.2	79.8
Canada	223.2	307.5	431.0	487.1	503.4	501.0
Czech Republic	34.1	43.1	53.0	51.2	52.3	53.8
Denmark	16.1	22.0	29.5	32.6	33.0	33.6
Finland	27.2	37.6	59.5	75.0	76.4	78.1
France	160.0	231.7	323.3	401.0	410.7	421.3
Germany	337.6	419.2	481.0	488.4	505.4	516.9
Greece	13.0	20.3	29.7	42.3	45.0	46.4
Hungary	18.6	26.9	33.0	31.1	30.9	32.2
Iceland	2.1	2.9	3.9	6.5	7.1	7.4
Ireland	6.2	8.7	12.0	18.9	20.3	21.0
Italy	125.8	163.6	218.8	267.3	279.3	285.5
Japan	421.7	520.2	765.1	953.5	949.8	929.4
Luxembourg	3.0	3.6	4.1	5.5	5.7	5.6
Mexico	31.6	57.2	100.2	155.6	166.4	168.9
Netherlands	46.1	58.9	75.5	97.6	100.8	103.0
New Zeeland	15.9	19.5	27.8	32.4	33.8	34.3
Norway	61.0	75.1	97.4	109.0	110.5	113.3
Poland	69.0	99.7	112.5	107.0	108.8	109.1
Portugal	8.3	14.6	24.0	36.7	38.9	40.5
Republic of Korea	12.8	32.7	94.4	241.8	233.5	250.4
Slovakia	..	..	..	22.7	22.5	24.3
Spain	60.7	92.0	129.2	181.7	194.7	207.3
Sweden	69.4	86.1	130.7	128.7	131.1	135.0
Switzerland	29.0	35.3	47.0	52.1	52.4	54.0
Turkey	10.4	20.4	46.8	91.2	98.3	97.1
United Kingdom	242.5	243.3	284.4	329.9	340.4	343.4
United States	1 715.9	2 099.8	2 712.6	3 430.1	3 589.6	3 434.1
EU 15	**1 177.7**	**1 480.2**	**1 904.6**	**2 232.7**	**2 314.5**	**2 374.9**
OECD Total	**3 875.6**	**4 902.6**	**6 563.7**	**8 179.5**	**8 453.6**	**8 372.1**

Sources: Electricity Information 2001, IEA/OECD;
Energy Statistics of OECD Countries 2000–2001, IEA/OECD.

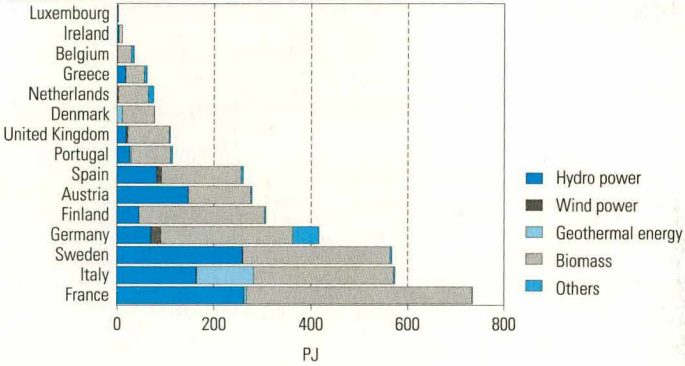
Consumption of Energy and Electricity per GDP-unit in Some OECD Countries 2001



Consumption of Energy and Electricity per Capita in Some OECD Countries 2001

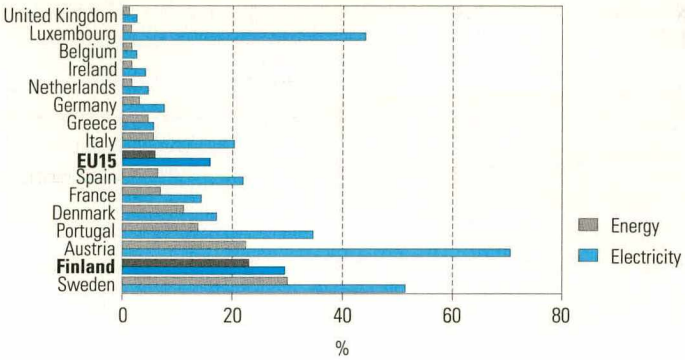


Production of Renewable Energy in EU Countries 2001



Renewable Energy in EU Countries 2001

Share in Primary Energy Supply and Electricity Generation



Includes energy produced from waste.

Source: Energy Balances of OECD Countries 2000–2001, IEA/OECD.

Consumer Prices of Fuel in Some European Countries in December 2002

	Natural gas [1]				Motor gasoline, unleaded	Diesel fuel [2]	Light fuel oil	Heavy fuel oil [3]
	Household		Industry					
	4 652 kWh/a	34 890 kWh/a	11.63 GWh/a	116.30 GWh/a				
	€ /MWh		€ /MWh		c/l	c/l	c/l	c/l
Austria	55	41	29	25	87	72	40	20
Belgium	62	36	23	19	96	72	30	18
Denmark	65	65	23	20	109	86	73	51
Finland	..	..	29	22	104	79	39	23
France	57	37	22	18	102	79	40	21
Germany	62	40	33	27	104	84	37	18
Greece	..	..	..	..	72	63	32	22
Ireland	58	27	20	18	87	79	45	..
Italy	50	65	25	21	105	87	86	22
Luxembourg	44	25	23	20	77	64	31	20
Netherlands	34	42	..	..	114	79	60	24
Norway	..	..	..	..	119	109	66	..
Portugal	44	25	23	20	77	64	31	20
Spain	56	43	18	17	80	68	38	18
Sweden	71	62	41	35	99	83	67	52
United Kingdom	36	24	23	21	115	117	31	23

[1] Price on 1st January.

[2] The considerable fluctuations in diesel oil prices depend on different taxation systems for heavy traffic in different countries.

[3] The price of heavy fuel oil does not include value added tax or sales tax if any.

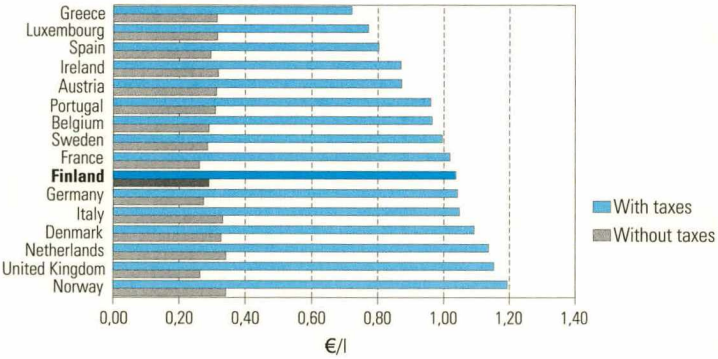
Sources: Finnish Oil and Gas Federation and Energy prices 2002, Eurostat.

Consumer Prices of Electricity in Some European Countries in January 2003, c/kWh

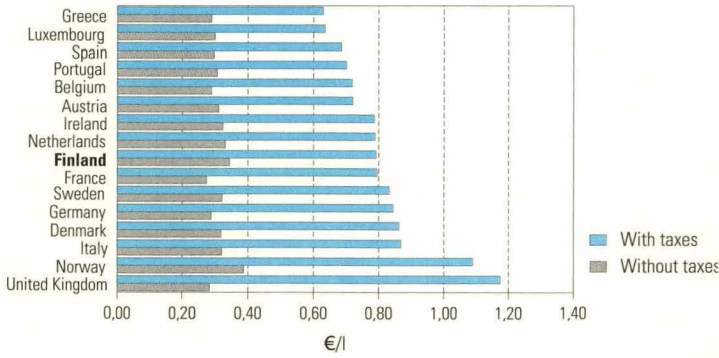
	Household	Industry		
Annual consumption	3 500 kWh	1.25 GWh	10 GWh	24 GWh
Power		0.5 MW	2.5 MW	4 MW
Austria	13.5	..	..	..
Belgium	13.8	10.8	8.5	7.1
Denmark	23.0	11.7	..	..
Finland	9.9	8.1	7.3	6.9
France	11.5	7.6	6.5	5.7
Germany	16.5	12.0	8.0	7.5
Greece	6.5	7.2	6.6	5.6
Ireland	11.8	10.3	8.3	7.4
Italy	19.8	12.4	11.3	9.9
Luxembourg	13.4	..	..	..
Netherlands	17.6	..	..	..
Norway	21.1	7.9	6.0	5.1
Portugal	13.2	7.7	7.1	5.9
Spain	10.6	7.0	6.1	5.8
Sweden	13.5	7.6	6.9	6.7
United Kingdom	10.6	..	..	..

Sources: Electricity prices for EU industry on 1 January 2003, Eurostat;
Electricity prices for EU households on 1 January 2003, Eurostat.

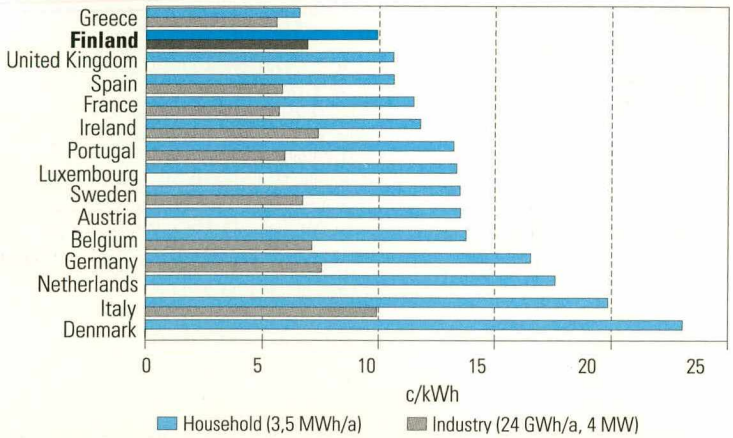
Consumer Prices of Unleaded Petrol in Some European Countries in December 2002



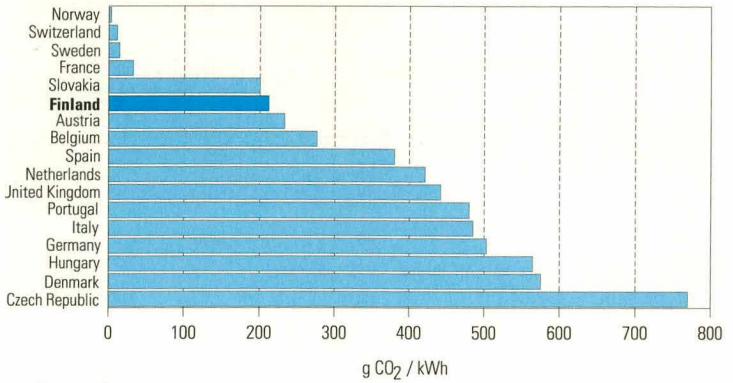
Consumer Prices of Diesel Fuel in Some European Countries in December 2002



Consumer Prices of Electricity in Some European Countries in January 2003



Carbon Dioxide Intensity in Power Generation in Some European Countries 2001



Source: Eurprog

Net Heat Contents and Densities of Energy Sources

Fuels	Unit	Net heat content		Density
		GJ	MWh	t/m^3
Crude oil	t	41.8	11.6	0.86
Heavy fuel oil	t	41.1	11.4	0.98
Light fuel oil	t	42.5	11.8	0.85
Diesel fuel	t	41.5	11.5	0.85
Jet fuel	t	43.3	12.0	0.80
Lamp kerosine	t	42.6	11.8	0.80
Other kerosines	t	43.1	12.0	0.81
Naphtha	t	44.4	12.3	0.70
Motor gasolines	t	43.8	12.2	0.75
Aviation gasolines	t	43.8	12.2	0.71
LPG	t	46.3	12.9	0.51
Refinery gases	t	51.9	14.4	
Hard coal	t	25.5	7.1	
Coke	t	29.3	8.1	
Anthracite	t	33.5	9.3	
Natural gas	1 000 m^3 (0°C)	36.0	10.0	
Blast furnace gas	1 000 m^3	3.8	1.1	
Coke oven gas	1 000 m^3	16.7	4.6	
Town gas	1 000 m^3	15.5	4.3	
Black liquor	t (dry matter)	11.7	3.3	
Sulphite liquors	t (dry matter)	12.0	3.3	
Birch firewood	stacked m^3	5.4	1.5	
Pine and spruce	stacked m^3	4.4	1.2	
Mixed firewood	stacked m^3	4.5	1.3	
Chips	loose m^3	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 gasoline	72.7
Diesel fuel	73.0
Light fuel oil	74.1
Residual fuel oil	77.4
Jet fuel	71.5
LPG	63.1
Other fuels	60–77.4
Hard coal	94.6
Coke	108
Natural gas	56.1
Peat	106
Bark, wood fuel	109.6
Industrial wood residue	109.6
Black liquor	110

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:

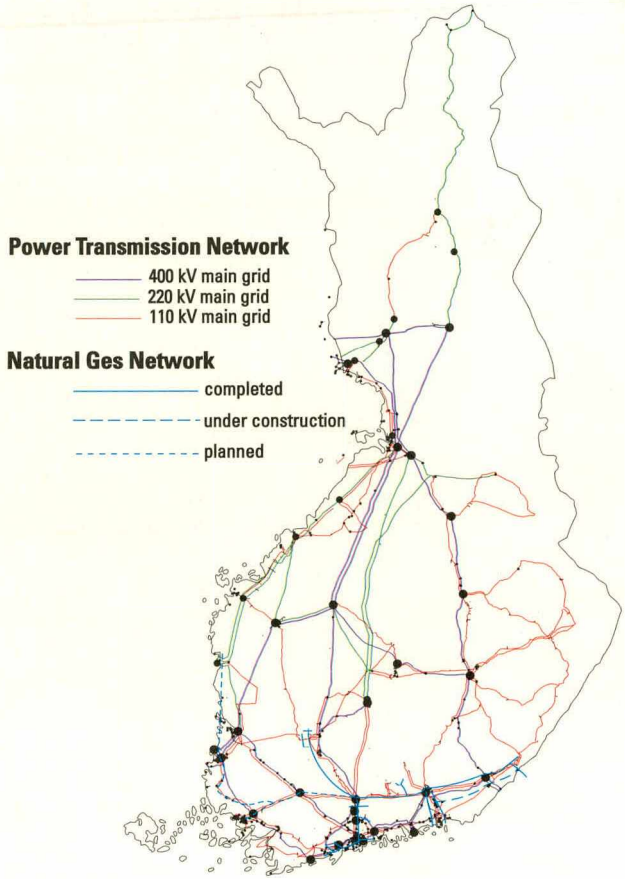
Small combustion of wood	55%
Peat	60%
Coal	60%
Heavy fuel oil	83%
Light fuel oil	78%
Natural gas	90%
District heating	100%
Electric heating	100%

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

Power Transmission and Natural Gas Networks 2002



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