Energy in Finland

Pocketbook 2013

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

5.4 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 in 2012

Town	Latitude	January	July
Helsinki	60°	–3.4°C	+17.7°C
Sodankylä	67°	–12.5°C	+13.9°C

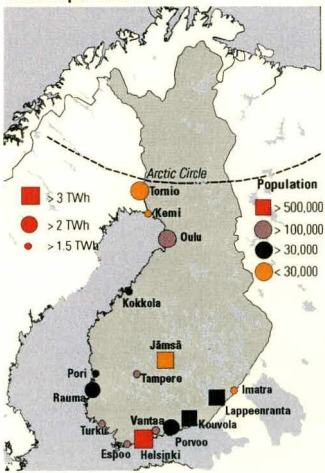
Economy

In 2012 GDP totalled € 194 bil., i.e. € 35,928/capita. In 2011 services were 69.3%, secondary production 27.8% and primary production 2.9% of the GDP.

Structure of industry, Value added gross in production in 2011*

	bil. €	%
Total industry	34.2	**100**
Mining and quarrying	0.8	2
Forest industry	4.1	12
Chemical industry	4.4	13
Metal industry	14.2	42
Basic metals and metal prod.	3.9	11
Electrical and electronics ind.	3.8	11
Other metal industry	6.5	19
Other manufacturing ind.	5.5	16
Energy supply	3.8	11
Water supply and waste management	1.5	4

Municipalities with high electricity consumption 2011



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 2012*

1,367 PJ (32.7 Mtoe)
252.6 GJ/capita (6.0 toe/capita)

Electricity consumption in 2012*

85.2 TWh
15,728 kWh/capita

Contents

The data in this pocketbook are based on the Preliminary Energy Statistics 2012 figures.

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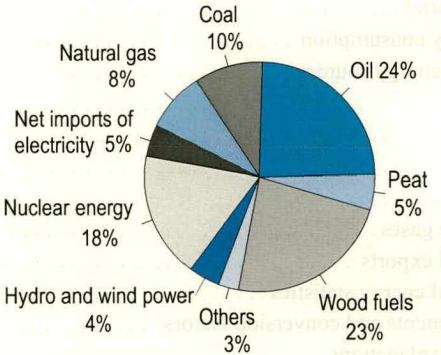
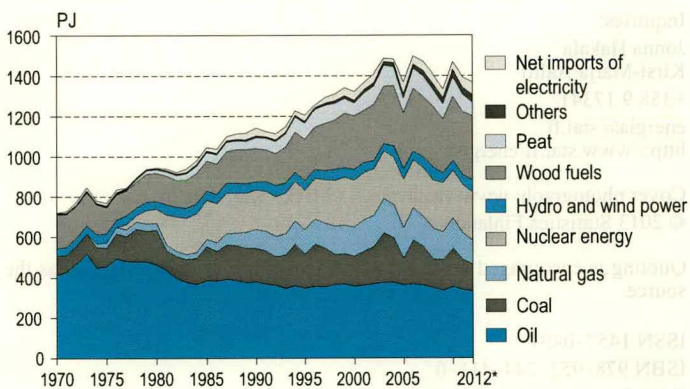
Total energy consumption by energy source 2012*

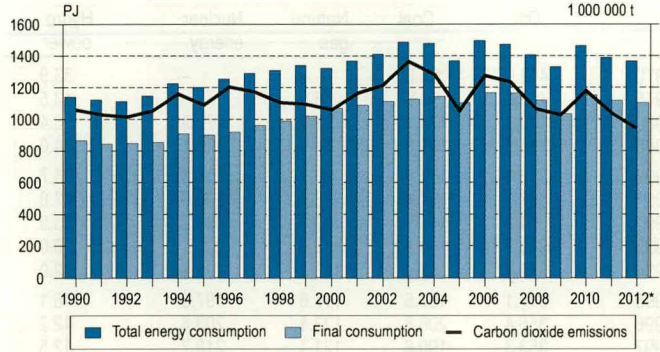


Total energy consumption in 2012* was 1 367 PJ.

Total energy consumption by energy source 1970–2012

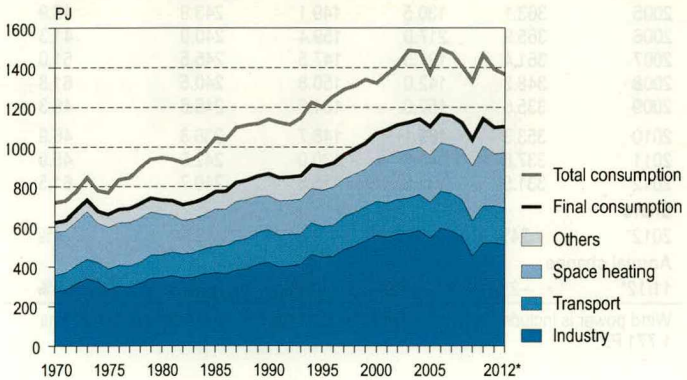


Final energy consumption 1990–2012



Final energy consumption in 2012* was 1 104 PJ.

Total energy consumption and final energy consumption by sector 1970–2012



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
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	167.6	117.6	197.8	46.1
1996	356.4	206.8	123.1	203.8	42.2
1997	353.3	190.8	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	355.8	149.2	141.9	235.4	52.3
2001	361.1	168.2	153.9	238.4	47.1
2002	367.7	185.0	152.9	233.4	38.5
2003	375.4	244.6	169.2	238.1	34.4
2004	374.8	220.6	163.0	238.0	53.9
2005	363.1	130.5	149.1	243.9	48.9
2006	365.9	217.0	159.4	240.0	41.3
2007	361.4	191.5	147.5	245.5	51.0
2008	348.2	142.0	150.8	240.5	61.8
2009	335.5	152.0	134.6	246.6	46.3
2010	353.3	189.1	148.7	238.8	46.9
2011	337.8	148.3	130.0	242.9	45.9
2012*	331.5	131.8	115.6	240.7	61.5
Share					
2012*	24%	10%	8%	18%	4%
Annual change					
11/12*	–2%	–11%	–11%	–1%	34%

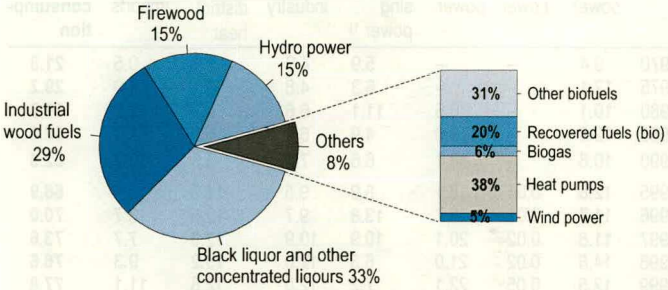
Wind power is included in hydro power. Total amount of wind power in 2012* was 1.771 PJ.

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	6.0	4.4	**946.9**	1980
151.3	41.1	9.1	17.0	**1 045.8**	1985
167.2	53.3	9.8	38.7	**1 141.4**	1990
158.6	56.0	8.9	25.9	**1 124.7**	1991
161.2	58.7	9.6	29.6	**1 113.5**	1992
180.5	64.5	8.7	27.1	**1 147.3**	1993
201.8	73.7	8.9	21.9	**1 226.2**	1994
207.5	79.4	9.8	30.3	**1 203.2**	1995
212.8	87.5	9.9	13.2	**1 255.6**	1996
237.2	88.0	12.1	27.6	**1 291.1**	1997
247.6	80.7	13.8	33.5	**1 309.2**	1998
272.8	71.8	14.6	40.0	**1 340.7**	1999
268.0	62.5	15.3	42.8	**1 323.1**	2000
261.6	86.9	17.1	35.9	**1 370.2**	2001
282.9	91.6	17.8	42.9	**1 412.6**	2002
288.0	101.2	19.8	17.5	**1 488.2**	2003
302.3	89.7	21.7	17.5	**1 481.5**	2004
281.2	69.1	23.4	61.3	**1 370.6**	2005
315.5	93.8	23.1	41.0	**1 497.0**	2006
302.7	102.5	25.4	45.2	**1 472.6**	2007
306.3	81.6	30.3	46.0	**1 407.5**	2008
270.6	72.0	32.4	43.5	**1 333.3**	2009
321.4	94.5	35.7	37.8	**1 466.3**	2010
316.3	84.9	36.2	49.9	**1 392.3**	2011
318.7	66.0	38.7	62.8	**1 367.4**	2012*
					Share
23%	5%	3%	5%	**100%**	2012*
					Annual change
1%	–22%	7%	26%	–2%	11/12*

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	..	0.4	..	**178.9**	19%
1985	44.0	31.6	75.5	44.1	..	1.4	..	**196.5**	19%
1990	38.7	36.5	86.1	44.7	0.3	1.2	0.0	**207.4**	18%
1991	47.0	32.9	80.9	44.8	0.3	1.2	0.0	**207.2**	18%
1992	53.8	32.8	83.5	44.9	0.4	1.2	0.0	**216.6**	19%
1993	48.0	40.4	95.1	45.0	0.3	1.3	0.0	**230.2**	20%
1994	42.0	52.4	104.4	45.0	0.3	1.4	0.0	**245.5**	20%
1995	46.0	53.9	109.0	44.7	0.3	1.4	0.7	**256.0**	21%
1996	42.1	56.2	109.6	46.9	0.3	1.5	0.7	**257.5**	21%
1997	42.5	61.6	128.5	47.0	0.5	1.5	0.9	**282.5**	22%
1998	53.2	64.7	135.4	47.6	1.1	1.6	0.9	**304.5**	23%
1999	45.2	83.7	142.6	46.5	1.8	1.7	1.1	**322.5**	24%
2000	52.0	84.7	137.9	45.4	2.3	1.5	1.4	**325.2**	25%
2001	46.9	83.7	126.7	51.1	3.0	1.6	1.2	**314.3**	23%
2002	38.2	90.0	140.1	52.8	2.8	1.6	1.5	**327.1**	23%
2003	34.0	93.3	141.2	53.5	3.5	1.7	2.2	**329.5**	22%
2004	53.5	100.2	148.2	53.8	4.1	1.9	2.6	**364.4**	25%
2005	48.3	95.0	132.1	54.1	4.7	2.3	3.2	**339.8**	25%
2006	40.7	103.6	156.0	55.9	4.2	3.1	3.2	**366.6**	24%
2007	50.4	93.2	153.1	56.4	5.0	3.8	3.6	**365.5**	25%
2008	60.9	103.7	143.7	58.9	5.9	6.7	7.8	**387.7**	28%
2009	45.3	97.7	110.2	62.7	5.6	9.5	11.7	**342.6**	26%
2010	45.9	116.1	135.7	69.6	6.1	11.0	11.7	**396.0**	27%
2011	44.2	121.8	135.1	59.4	5.8	12.5	14.8	**393.6**	28%
2012*	59.7	119.8	136.6	62.3	6.8	13.1	14.7	**413.0**	30%

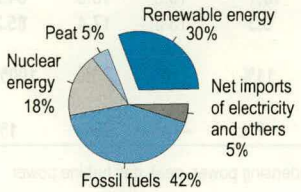
Renewable energy 2012*



The total consumption of renewable energy in 2012* was 413 PJ which is 30% of total energy consumption.

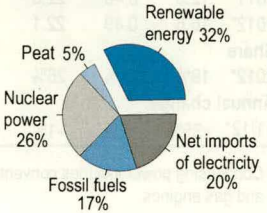
Renewable energy 2012*

In total energy consumption



Total 1 367 PJ

In electricity supply



Total 85 TWh

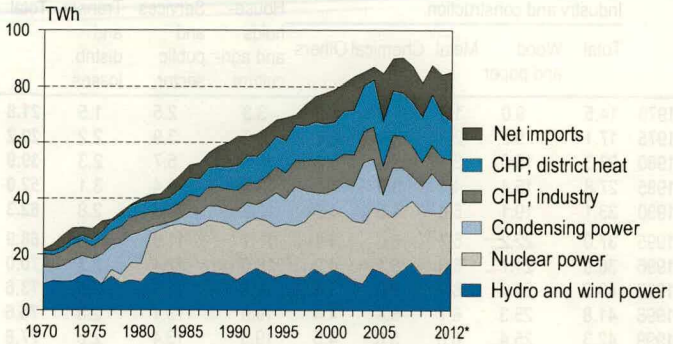
Supply and total consumption of electricity, TWh

	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	–	18.1	6.6	7.7	8.5	10.7	**62.3**
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	11.5	15.3	12.6	**90.4**
2008	16.9	0.26	22.1	8.8	11.1	15.4	12.8	**87.2**
2009	12.6	0.28	22.6	9.0	8.9	15.9	12.1	**81.3**
2010	12.7	0.29	21.9	14.2	10.3	17.8	10.5	**87.7**
2011	12.3	0.48	22.3	9.8	10.1	15.5	13.9	**84.2**
2012*	16.6	0.49	22.1	5.7	9.3	13.5	17.4	**85.2**
Share								
2012*	19%	1%	26%	7%	11%	16%	20%	**100%**
Annual change								
11/12*	35%	2%	–1%	–42%	–7%	–13%	26%	**1%**

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

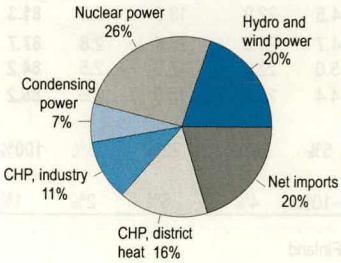
Sources: Finnish Energy Industries, Statistics Finland and Technical Research Centre of Finland VTT (wind power).

Electricity supply 1970–2012

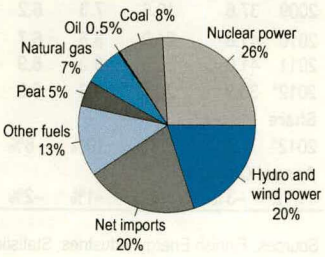


Electricity supply 2012*

By mode of production



By source



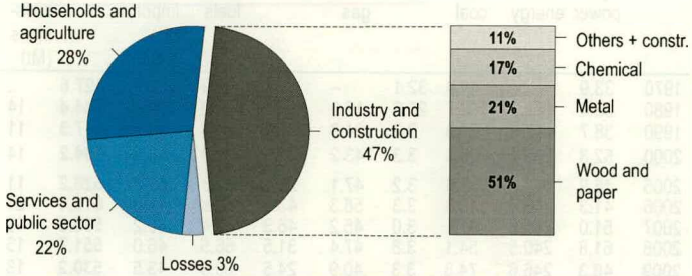
Total electricity supply in 2012* was 85.2 TWh

Electricity consumption by sector, TWh

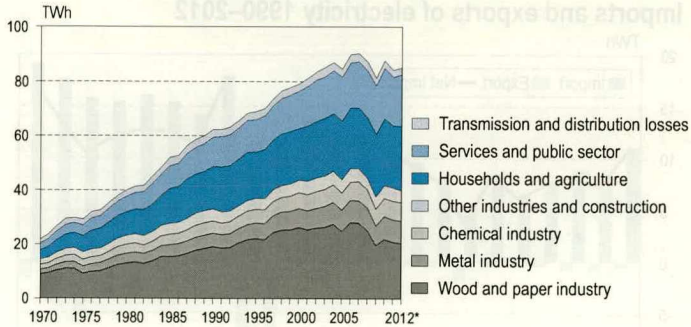
	Industry and construction					Households and agriculture	Services and public sector	Transm. and distrib. losses	Total
	Total	Wood and paper	Metal	Chemical	Others				
1970	14.5	9.0	1.8	1.8	1.9	3.3	2.5	1.5	**21.8**
1975	17.1	9.2	2.7	2.4	2.7	6.0	3.9	2.2	**29.2**
1980	23.3	13.0	3.6	3.4	3.3	8.6	5.7	2.3	**39.9**
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**
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	27.9	8.3	7.0	4.8	22.4	16.9	3.0	**90.4**
2008	44.6	25.2	8.4	6.6	4.4	22.1	17.3	3.3	**87.2**
2009	37.6	19.6	7.3	6.2	4.5	22.9	18.0	2.8	**81.3**
2010	41.8	21.9	8.5	6.7	4.7	24.5	18.6	2.8	**87.7**
2011	41.0	20.9	8.3	6.9	5.0	22.8	17.9	2.5	**84.2**
2012*	39.9	20.5	8.2	6.8	4.4	23.8	18.9	2.6	**85.2**
Share									
2012*	47%	24%	10%	8%	5%	28%	22%	3%	**100%**
Annual Change									
11/12*	–3%	–2%	–1%	–2%	–10%	4%	5%	2%	1%

Sources: Finnish Energy Industries, Statistics Finland

Electricity consumption by sector 2012*



Electricity consumption by sector 1970–2012

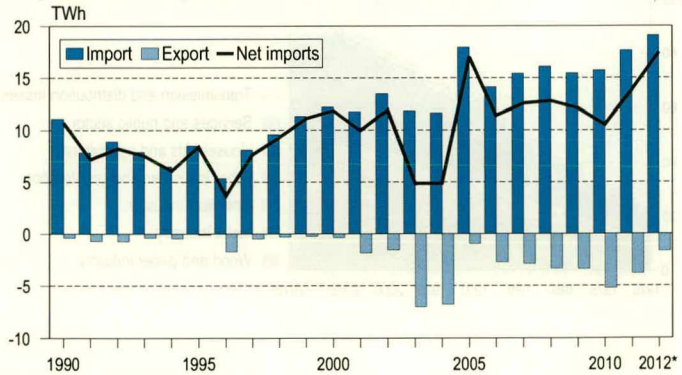


Energy sources in electricity generation, PJ

	Hydro power	Nuclear energy	Hard coal	Oil	Natural gas	Peat	Other fuels	Net imports of electr.	**Total**	CO_2 emis-sions (Mt)
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
1990	38.7	197.8	61.3	9.7	24.8	17.2	29.1	38.7	**417.3**	11
2000	52.3	235.4	55.4	3.3	43.2	21.5	50.3	42.8	**504.2**	14
2005	48.9	243.9	37.6	3.2	47.1	25.4	60.8	61.3	**528.2**	11
2006	41.3	240.0	119.8	3.3	58.3	43.0	68.8	41.0	**615.4**	21
2007	51.0	245.5	97.1	3.0	45.2	46.3	62.4	45.2	**595.8**	19
2008	61.8	240.5	54.1	3.8	47.4	31.5	66.5	46.0	**551.7**	13
2009	46.3	246.6	74.3	3.3	40.9	24.5	50.9	43.5	**530.2**	13
2010	46.9	238.8	103.2	2.8	46.9	38.5	66.1	37.8	**581.0**	17
2011	46.0	243.0	72.7	2.3	41.7	33.9	58.3	49.9	**547.9**	13
2012*	61.5	240.7	82.0	2.9	42.4	23.6	48.3	62.8	**564.1**	9

Wind power is included in hydro power.
Sources: Finnish Energy Industries, Statistics Finland and Technical Research Centre of Finland VTT (wind power).

Imports and exports of electricity 1990–2012



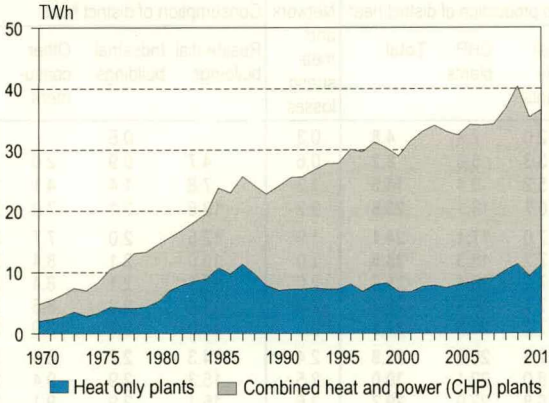
Source: Finnish Energy Industries

Production and consumption of district heat, TWh

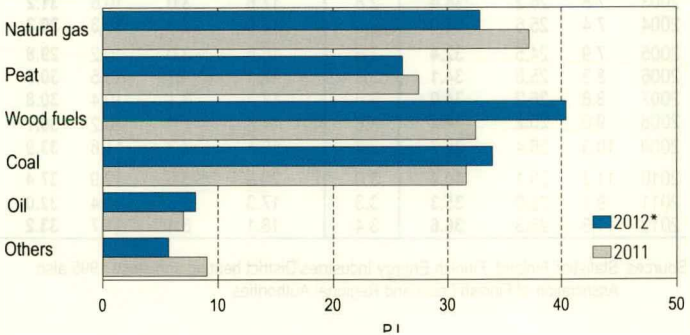
	Net production of district heat			Network and measuring losses	Consumption of district heat			
	Heat only plants	CHP plants	**Total**		Residential buildings	Industrial buildings	Other consumers	**Total**
1970	2.0	2.8	**4.8**	0.3	..	0.6	..	**4.5**
1975	3.3	5.0	**8.2**	0.6	4.7	0.9	2.0	**7.7**
1980	5.2	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**
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	6.8	22.2	**29.1**	2.8	14.9	2.6	8.8	**26.3**
2001	6.7	24.7	**31.4**	2.2	16.2	2.9	10.1	**29.2**
2002	7.6	25.4	**33.0**	3.0	16.6	3.0	10.4	**30.0**
2003	7.8	26.2	**34.0**	2.8	17.6	3.0	10.6	**31.2**
2004	7.4	25.6	**33.0**	2.7	17.0	2.9	10.3	**30.3**
2005	7.9	24.5	**32.4**	2.6	16.6	3.0	10.2	**29.8**
2006	8.3	25.8	**34.1**	3.5	17.1	3.1	10.5	**30.7**
2007	8.8	25.2	**34.0**	3.3	17.3	3.1	10.4	**30.8**
2008	9.0	25.2	**34.2**	3.6	17.6	2.9	10.2	**30.7**
2009	10.3	26.4	**36.7**	2.8	19.1	3.3	11.6	**33.9**
2010	11.3	29.1	**40.4**	3.0	20.9	3.6	12.9	**37.4**
2011	9.3	26.0	**35.3**	3.3	17.3	3.3	11.4	**32.0**
2012*	11.3	25.3	**36.6**	3.4	18.1	3.4	11.7	**33.2**

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

Production of district heat 1970–2012

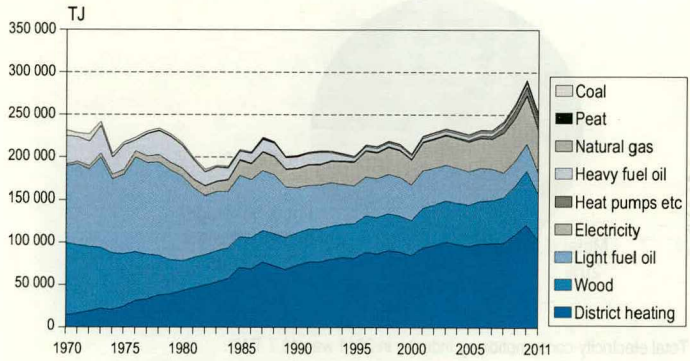


Fuel consumption in production of district heat 2011–2012

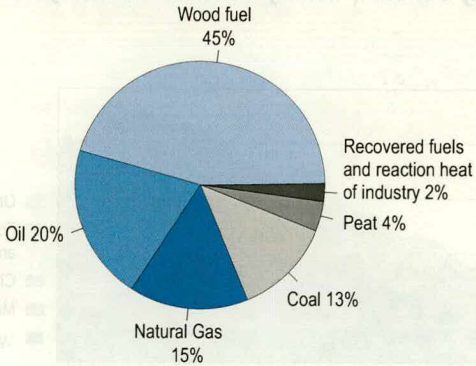


Sources: Statistics Finland, Finnish Energy Industries

Consumption of energy for heating residential, commercial and public buildings 1970–2011

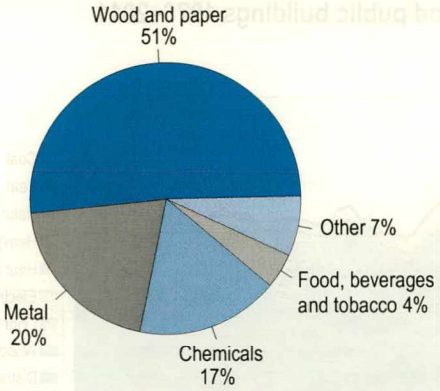


Fuel consumption in industry 2011



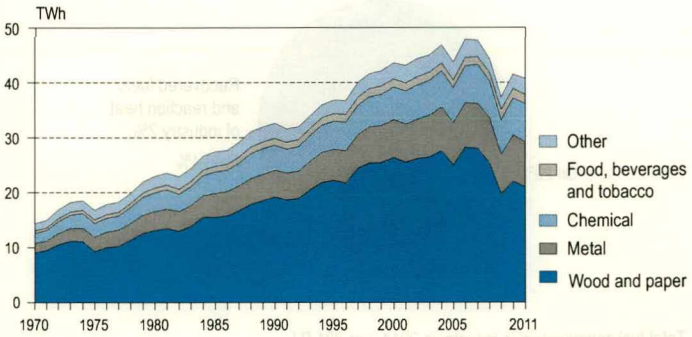
Total fuel consumption in industry in 2011 was 381 PJ.

Electricity consumption by branch of industry 2011



Total electricity consumption by industry in 2011 was 40.7 TWh.

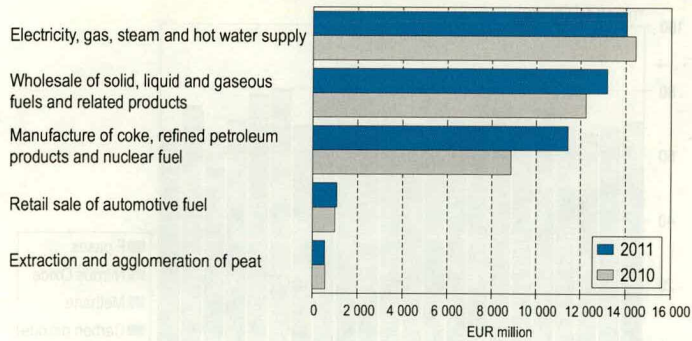
Electricity consumption by branch of industry 1970–2011



Enterprises in energy sector in 2011

	Number of enterprises	Turnover, EUR mil.	Employees	Staff expenses, EUR mil.
Wholesale of solid, liquid and gaseous fuels and related products	138	13 164	1 227	91
Electricity, gas, steam and hot water supply	747	14 044	12 676	796
Extraction and agglomeration of peat	457	549	1 421	59
Retail sale of automotive fuel	802	1 062	4 252	123
Manufacture of coke, refined petroleum products and nuclear fuel	14	11 425	2 429	179

Turnover of enterprises in energy sector 2010–2011



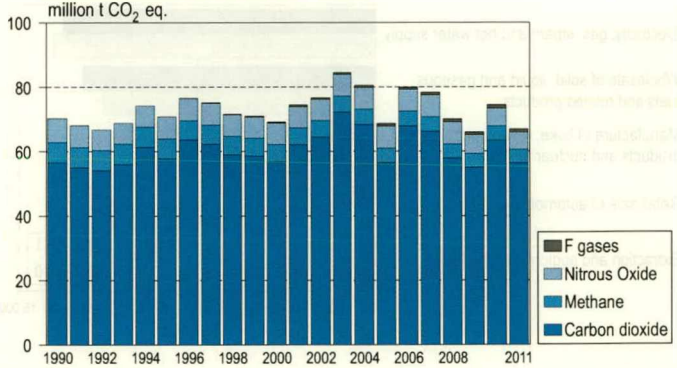
Source: Statistics Finland, Financial statements of enterprises.

Greenhouse gas emissions 1990–2012

The gases included in the Kyoto Protocol

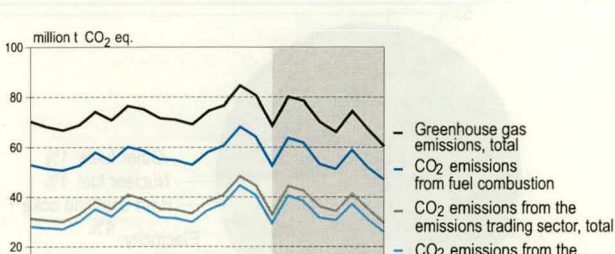
	1990	1995	2000	2005	2007	2008	2009	2010	2011	2012*
	million tonnes of CO_2 equivalent									
Energy	54.5	56.1	54.5	54.0	63.3	54.8	52.7	60.6	53.4	48.5
Industrial prosesses	5.1	4.7	5.6	6.4	6.8	7.2	5.3	5.8	5.6	5.0
Solvent and other product use	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Agriculture	6.7	6.1	5.9	5.8	5.8	5.9	5.8	6.0	5.9	5.8
Waste	4.0	3.9	3.3	2.4	2.4	2.3	2.2	2.2	2.1	2.1
Total emission without land use, land use change and forestry	**70.4**	**70.9**	**69.3**	**68.7**	**78.4**	**70.2**	**66.1**	**74.5**	**67.0**	**61.4**
Land use, land use change and forestry	–15.2	–14.1	–20.5	–29.9	–25.7	–29.6	–39.3	–24.6	–24.6	–24.8

Greenhouse gas emissions by gases 1990–2011

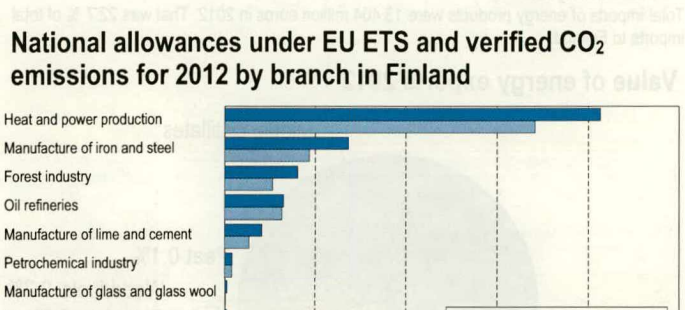


Source: Statistics Finland, Greenhouse Gas Inventory

Finland's greenhouse gas emissions 1990–2012



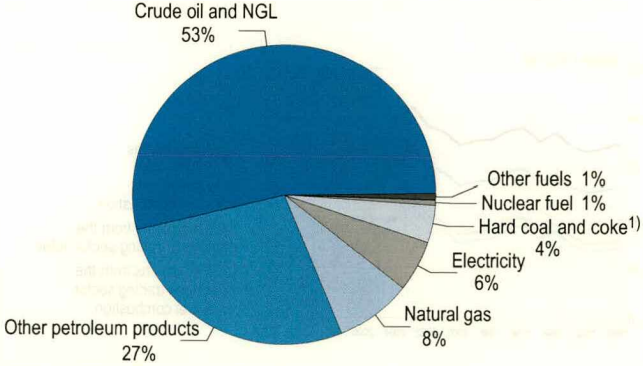
National allowances under EU ETS and verified CO_2 emissions for 2012 by branch in Finland



Total allowances in 2012 were 37.5 million tonnes and verified CO_2 emissions in 2012 were 29.5 million tonnes.

Source: European Commission

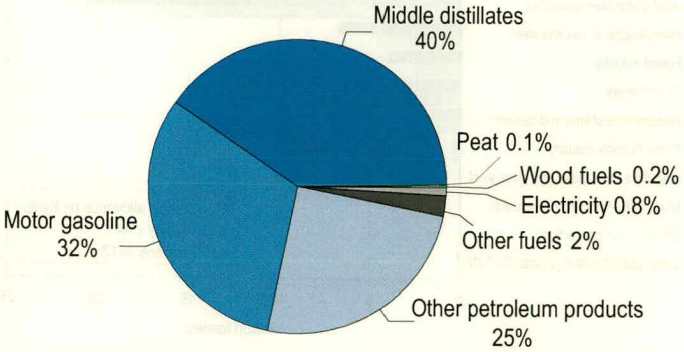
Value of energy imports 2012



1) includes coking coal

Total imports of energy products were 13 404 million euros in 2012. That was 22.7 % of total imports to Finland.

Value of energy exports 2012



Total exports of energy products were 6 341 million euros in 2012. That was 11.2 % of total exports from Finland.

Source: Finnish Customs /Foreign Trade Statistics

Energy imports 2012

		Russia	Sweden	Norway	Nether-land	Kazak-stan	Other countries	Total Amount	Total Value mil. €
Hard coal	1 000 t	2 556	0	–	11	48	170	**2 785**	**233**
Coke	1 000 t	–	–	–	–	–	320	**320**	**94**
Coking coal	1 000 t	66	–	–	–	–	1 104	**1 170**	**199**
Natural gas	mil. m³	3 490	–	–	–	–	0	**3 490**	**1 104**
Crude oil[1)]	1 000 t	9 387	0	1 641	–	60	0	**11 089**	**7 159**
Motor gasoline	1 000 t	–	49	2	8	–	5	**63**	**52**
Middle distillates	1 000 t	1 682	265	–	6	81	326	**2 360**	**1 697**
Heavy fuel oil	1 000 t	10	174	–	260	267	83	**794**	**464**
LPG	1 000 t	185	0	76	0	29	0	**290**	**187**
Other petroleum prod.	1 000 t	542	65	9	54	24	858	**1 551**	**1 280**
Methanol	1 000 t	424	0	–	5	–	1	**430**	**87**
MTBE	1 000 t	–	0	–	0	–	0	**0**	**0**
Peat	1 000 t	6	63	0	0	–	16	**85**	**3**
Wood fuels[2)]	1 000 t	242	0	–	0	–	39	**282**	**12**
Nuclear fuel	tU	11	20	–	–	–	19	**51**	**75**
Electricity	TWh	4	14	0	–	–	1	**19**	**759**
Value	mil. €	9 158	1 043	1 229	248	319	1 409		**13 404**

[1)] Includes natural gas condensate
[2)] Includes wood pellets and other wood fuels

Source: Finnish Customs /Foreign Trade Statistics; Natural gas: Statistics Finland

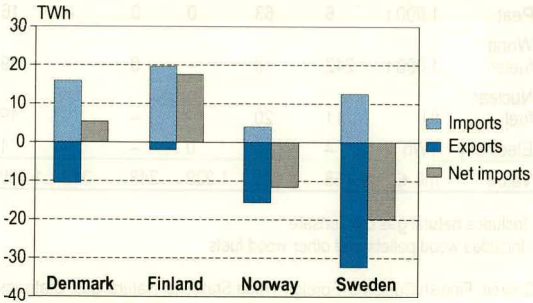
Energy exports 2012

		Sweden	Nether-lands	Belgium	Canada	Russia	Other countries	Total Amount	Total Value mil. €
Motor gasoline	1 000 t	450	272	–	213	4	1 552	**2 490**	**2 003**
Middle distillates	1 000 t	1 358	166	48	0	27	1 523	**3 122**	**2 544**
Heavy fuel oil	1 000 t	11	580	260	–	0	245	**1 096**	**541**
Other petroleum prod.	1 000 t	180	168	348	0	111	388	**1 194**	**971**
Peat	1 000 t	15	14	7	0	0	47	**83**	**9**
Wood fuels[1)]	1 000 t	94	–	–	–	0	23	**117**	**12**
Electricity	TWh	3	–	–	–	–	2	**2**	**52**
Value	mil. €	1 685	699	475	177	335	2 970		**6 341**

[1)] Includes wood pellets and other wood fuels

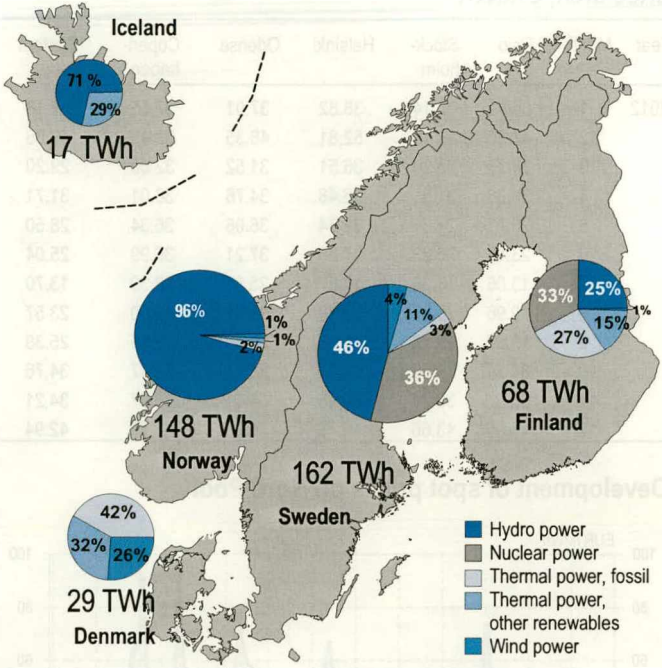
Source: Finnish Customs /Foreign Trade Statistics

Imports and exports of electricity in Nordic countries 2012



Source: Swedenergy, Norwegian Water Resources and Energy Directorate

Electricity generation in Nordic Countries 2012

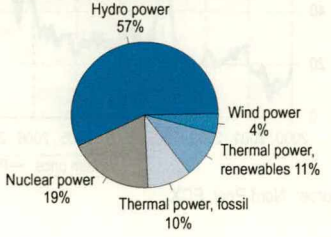


Electricity consumption in Nordic Countries 2012, TWh

Sweden	142
Norway	128
Finland	85
Denmark	34
Iceland	17
Total	**406**

Source: Entso-e: Statistical Yearbook 2011, Monthly Statistics 2012

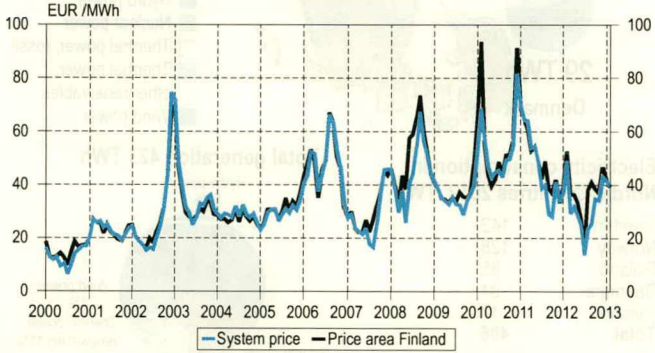
Total generation 423 TWh



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

Year	Month	Oslo	Stock-holm	Helsinki	Odense	Copen-hagen	System
2012	1	36.45	37.14	38.82	37.01	37.65	37.18
	2	47.20	48.40	52.81	48.35	53.43	49.06
	3	28.76	28.30	36.51	31.52	32.00	29.20
	4	30.36	31.51	36.48	34.76	36.01	31.71
	5	26.71	29.31	33.34	36.06	36.34	28.50
	6	23.40	26.23	27.38	37.21	36.99	25.04
	7	13.06	13.36	13.67	25.55	28.39	13.70
	8	19.96	26.02	38.18	39.01	40.00	23.57
	9	18.67	29.18	41.03	37.40	37.85	25.38
	10	34.34	34.69	38.57	38.11	38.17	34.76
	11	33.97	33.74	36.95	34.91	36.07	34.21
	12	42.56	43.66	46.79	36.86	38.76	42.94

Development of spot prices on Nord Pool

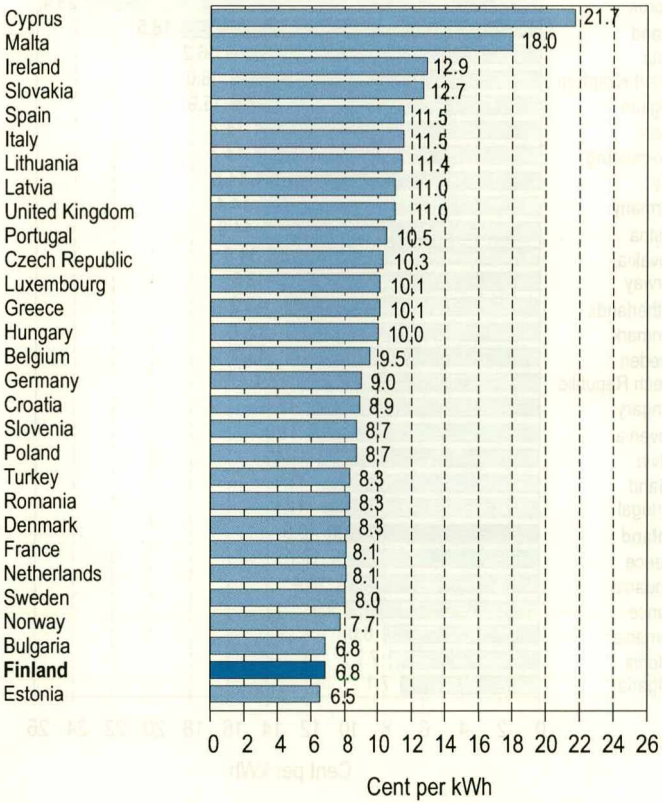


Source: Nord Pool, ECX

Electricity prices for households on the 2nd half of 2012

Households annual consumption of 2 500 – 5 000 kWh. Prices without taxes.

Electricity prices for industry on the 2nd half of 2012



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	2005	2010	2011
Germany	15 040	14 930	14 330	14 390	14 490	14 070	13 240
France	8 540	9 530	10 100	10 790	11 580	11 200	10 860
United Kingdom	8 530	8 820	9 290	9 700	9 770	8 890	8 320
Italy	5 590	6 440	6 820	7 360	7 860	7 350	7 240
Spain	3 170	3 800	4 280	5 190	6 040	5 440	5 380
Poland	..	4 340	4 190	3 760	3 900	4 260	4 280
Netherlands	2 550	2 810	3 070	3 210	3 460	3 640	3 400
Belgium	1 840	2 040	2 270	2 480	2 470	2 580	2 500
Sweden	1 960	1 980	2 110	2 000	2 170	2 160	2 070
Czech Republic	..	2 090	1 750	1 730	1 900	1 880	1 810
Romania	..	2 610	1 980	1 540	1 650	1 490	1 520
Finland	1 120	1 210	1 240	1 380	1 470	1 570	1 500
Austria	990	1 060	1 140	1 220	1 440	1 470	1 420
Greece	990	940	1 000	1 180	1 310	1 210	1 170
Hungary	..	1 220	1 100	1 060	1 160	1 090	1 060
Portugal	520	740	860	1 050	1 150	1 020	1 000
Bulgaria	..	1 180	980	780	840	750	810
Denmark	820	750	850	830	830	850	800
Slovakia	..	890	750	750	800	750	730
Ireland	370	430	460	600	630	630	580
Lithuania	..	670	370	300	370	290	300
Slovenia	..	240	250	270	310	300	300
Estonia	..	430	220	210	230	260	260
Luxembourg	130	150	140	150	200	190	190
Latvia	..	330	190	160	190	190	180
Cyprus	..	70	80	100	110	110	110
Malta	..	20	30	30	40	40	50
EU 27	**..**	**69 720**	**69 840**	**72 220**	**76 400**	**73 660**	**71 080**
United States	..	54 160	..	64 740	..	62 810	..
Japan	..	12 560	..	14 450	..	13 590	..
Canada	..	6 660	..	7 940	..	8 210	..
OECD Total	**..**	**130 190**	**..**	**152 690**	**..**	**154 540**	**..**

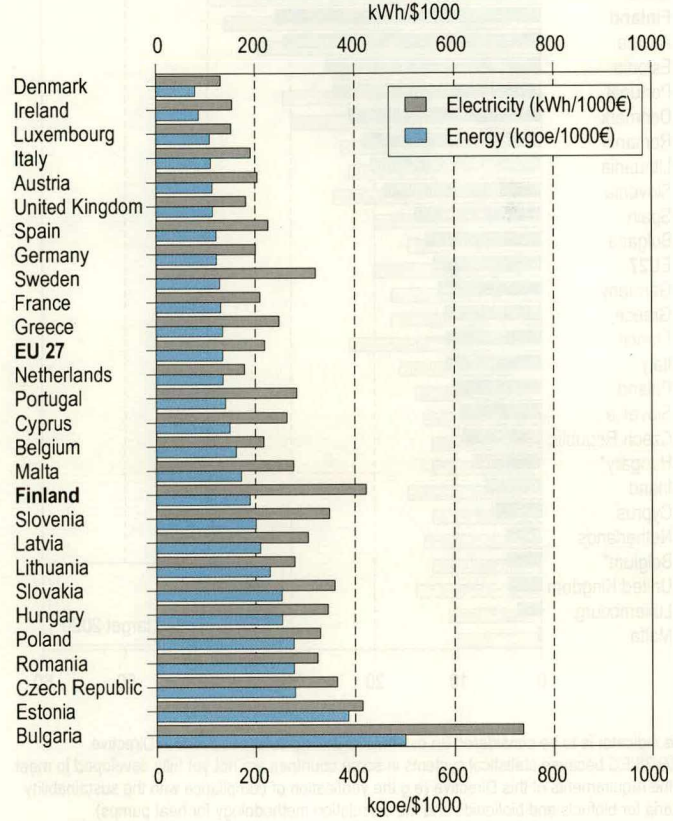
Source: Eurostat, IEA /Energy Balances of OECD Countries 2012 Edition

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

	1985	1990	1995	2000	2005	2010	2011
Germany	424.6	455.1	451.2	483.5	521.0	529.0	521.5
France	252.9	302.2	342.9	384.9	422.8	444.1	419.7
United Kingdom	242.1	274.4	294.7	329.4	348.7	328.8	318.0
Italy	173.7	214.6	238.3	273.0	300.9	299.3	301.8
Spain	102.8	125.8	140.9	188.5	242.2	244.8	239.9
Sweden	113.6	120.3	124.6	128.7	130.7	131.2	124.6
Poland	92.1	96.2	89.7	98.6	105.4	119.0	121.9
Netherlands	61.5	73.5	82.7	97.8	104.5	106.9	107.5
Finland	48.5	58.9	65.2	75.7	80.7	83.5	80.2
Belgium	48.4	58.0	68.4	77.5	80.2	83.3	80.1
Austria	37.0	42.8	46.7	51.5	58.3	61.3	61.5
Czech Republic	43.3	48.2	48.1	49.4	55.3	57.2	56.7
Greece	23.8	28.5	34.1	43.2	50.9	53.1	51.8
Portugal	17.4	23.5	28.8	38.4	46.3	49.9	48.4
Romania	..	54.2	36.4	33.9	38.9	41.3	42.7
Hungary	30.2	31.6	27.7	29.4	32.3	34.2	34.5
Denmark	25.4	28.4	30.9	32.5	33.5	32.1	31.4
Bulgaria	..	35.3	28.7	24.3	25.7	27.1	28.4
Ireland	9.8	11.9	14.9	20.3	24.4	25.4	24.9
Slovakia	21.5	23.4	21.7	22.0	22.9	24.1	24.8
Slovenia	..	9.2	9.3	10.5	12.7	12.0	12.6
Lithuania	..	12.0	6.4	6.2	8.0	8.3	8.6
Estonia	..	7.0	4.6	5.0	6.0	6.9	6.6
Luxembourg	3.8	4.1	5.0	5.8	6.2	6.6	6.5
Latvia	..	8.3	4.5	4.5	5.7	6.2	6.2
Cyprus	..	1.8	2.2	3.0	4.0	4.9	4.7
Malta	..	0.9	1.3	1.6	2.0	1.6	1.8
EU 27	**1 772.3**	**2 150.3**	**2 249.7**	**2 518.9**	**2 770.0**	**2 822.1**	**2 767.5**
United States	..	2 923.9	..	3 857.5	4 049.4	4 143.4	..
Japan	..	801.3	..	1 011.6	1 047.9	1 069.8	..
Canada	..	477.7	..	522.8	559.5	516.6	..
OECD Total	..	**6 944.9**	..	**9 173.6**	**9 801.9**	**10 245.9**	..

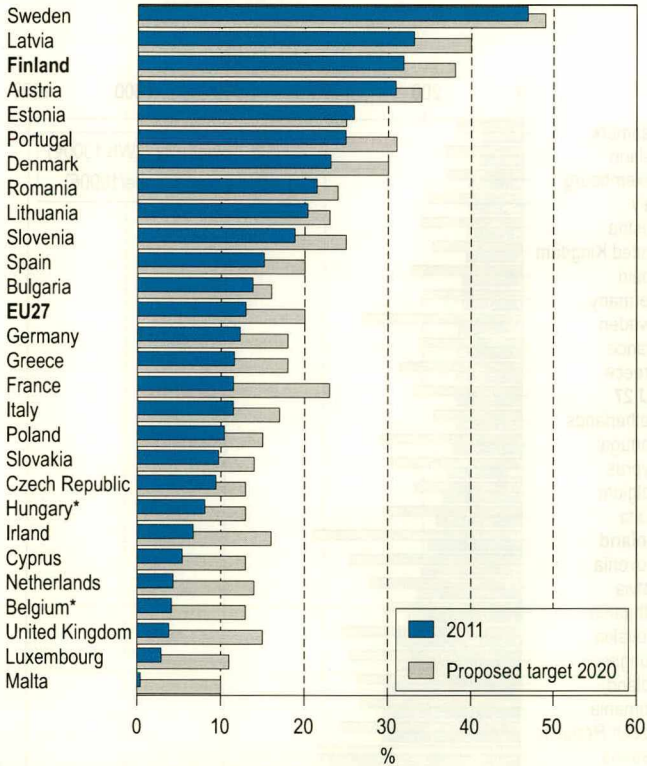
Source: Eurostat, IEA /Energy Statistics of OECD Countries 2012 Edition

Consumption of energy and electricity per GDP-unit in EU countries 2011



Source: Eurostat

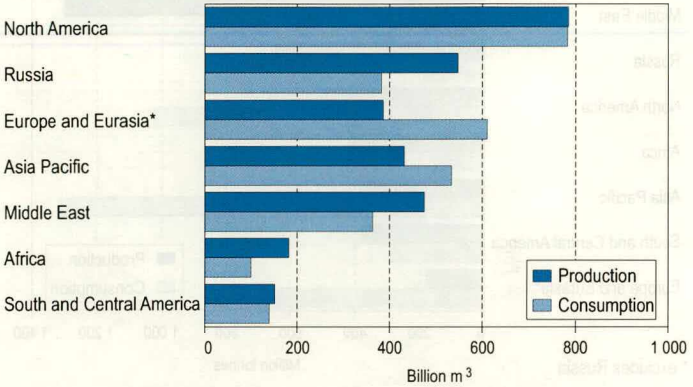
Share of renewable energy in gross final energy consumption in 2011, and the target for 2020



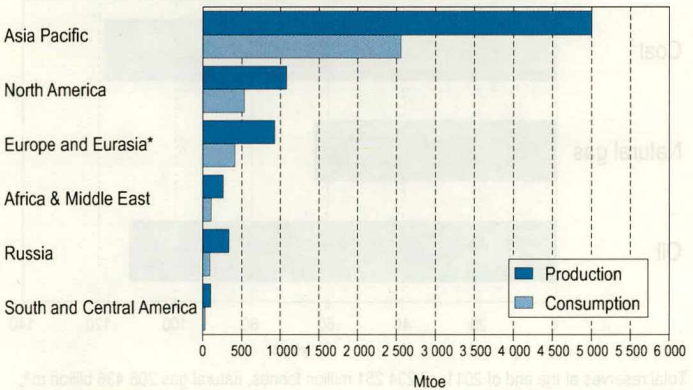
This indicator is to be considered an estimate of the indicator described in Directive 2009/28/EC because statistical systems in some countries are not yet fully developed to meet all the requirements of this Directive (e.g.the verification of compliance with the sustainability criteria for biofuels and bioliquids and the calculation methodology for heat pumps).

Source: Eurostat

Gas production and consumption by region in 2011



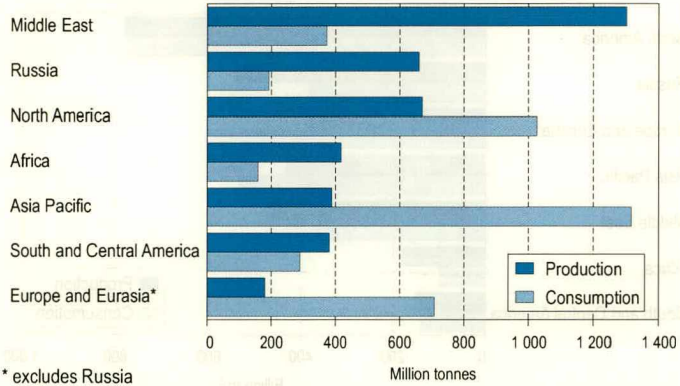
Coal production and consumption by region in 2011



* excludes Russia

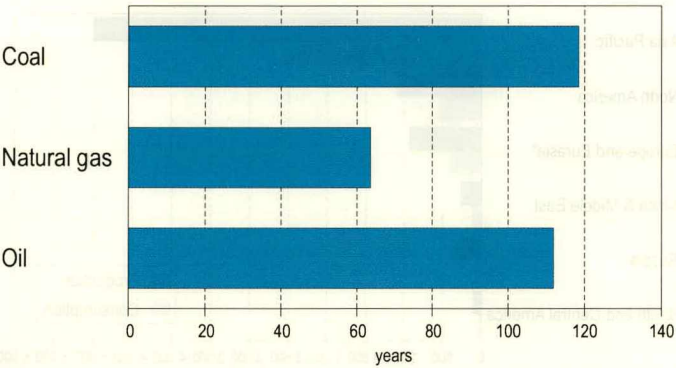
Source: BP statistical review of world energy June 2012

Oil production and consumption by region in 2011



* excludes Russia

World oil, natural gas and coal reserve sufficiency



Total reserves at the end of 2011: oil 234 251 million tonnes, natural gas 208 436 billion m^3, coal 860 938 million tonnes.

Source: BP statistical review of world energy June 2012

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	42.9	11.9	0.84
Kerosenes	t	43.3	12.0	0.80
Other kerosenes	t	43.1	12.0	0.81
Naphtha	t	44.3	12.3	0.70
Motor gasolines	t	42.2	11.7	0.75
Aviation gasolines	t	43.7	12.1	0.71
LPG	t	46.2	12.8	0.51
Refinery gases	t	50.0	13.9	
Hard coal	t	25.0	6.9	
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)	11.5	3.2	
Wood pellets	t	15–18		
Bark	t	5–11		
Sawdust	t	6–10		
Forest residue chips	t	6–11		
Whole tree chips	t	7–11		
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	69.0	Default bio share 8%
Diesel fuel	68.7	Default bio share 7%
Light fuel oil	72.5	Default bio share 2%
Heavy fuel oil	78.8	
Kerosenes	73.2	
LPG	65.0	
Other oils	71.3–79.2	
Hard coal	93.3	
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	

Source: Statistics Finland/Fuel Classification 2013
www.tilastokeskus.fi/polttoaineluokitus

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

Electricity network information

	1990	2000	2011	2012
Transformer substations, number				
High voltage substations	715	591	966	984
Distribution substations	114 019	124 851	129 848	133 138
Lengths of low voltage lines (0.4 kV - 1 kV), km				
Overhead lines	162 076	158 576	150 212	148 769
Cables (inc. sea cable)	45 705	63 327	85 753	89 235
Cabling rate	22%	29%	36%	38%
Lengths of medium voltage lines (over 1 kV - 70 kV), km				
Overhead lines	122 329	121 754	121 640	121 191
Cables (inc. sea cable)	10 586	12 116	15 929	17 005
Cabling rate	8%	9%	12%	12%
Lengths of high voltage lines (110 kV - 400 kV), km				
110 kV	14 000	15 050	15 697	15 754
220 kV	2 471	2 510	2 568	2 568
400 kV	3 164	3 926	4 586	4 586

Source: Energy Market Authority

Energy statistics by Statistics Finland

Energy online service

The Energy online service provides information on the energy industry as an extensive compilation of Excel tables and statistical graphs. The service is in Finnish, English or Swedish, and is updated annually.

The Energy online service is available at
http://pxweb2.stat.fi/Sahkoiset_julkaisut/energia2012/.

Energy in Finland

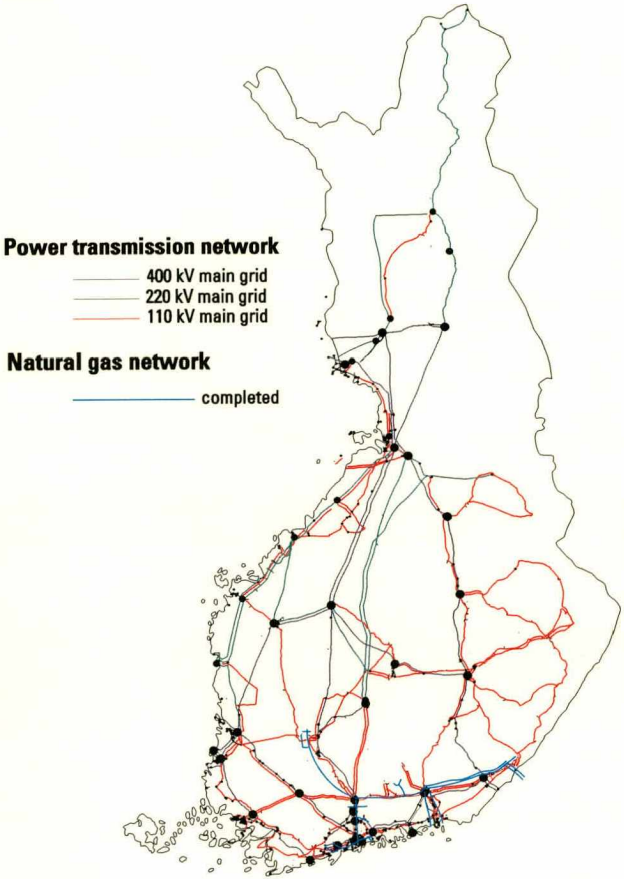
Statistical pocketbook on energy statistics.

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

The updated statistics, latest tables and figures on

- consumption of hard coal
- energy consumption in households
- energy prices
- energy supply and consumption
- energy in manufacturing
- production of electricity and heat

Power transmission and natural gas networks 2012



Source: Fingrid Oyj, Gasum Oy

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