

## FINLAND



### Country at a glance

- Population: 5.36 million (2010) [1]
- Total area: 338,145 sq. km [2]
- Carbon emissions per capita: 11.73 metric tons (2010) [3]
- Energy consumption per capita: 80 MWh (2010) [4]
- Percentage of global carbon emissions: 0.21% (2010) [3]



### District heating hot water pipes in Finland

Underground hot water pipelines like these cover most of the Finnish residential, industrial and commercial areas. They give efficient heating to over 90% of residential apartments, commercial and industrial buildings. Most of the heat is recovered from electricity thermal generation plants, thus increasing their energy conversion efficiency from around 38% up to around 85%.

District heating pipes in Jyväskylä by Antti Leppänen. Permission Under CC BY-SA 3.0 License commons.wikimedia.org/wiki/File:District\_heating\_pipes\_in\_Jyv%C3%A4skyl%C3%A4.jpg

**Table 1 Breakdown of energy use, electricity and heat generation, 2010**

	Primary energy sourced within country		Energy imports minus exports	Primary energy used within the country <sup>(a)</sup>			Electricity Generation <sup>(b)</sup>		Heat Generation <sup>(c)</sup>		
	unit	ktoe		%	ktoe	GWh	%	GWh	%	GWh	%
Coal, including brown coal & peat		1,806	10	3,985	6,886	80,084	19	21,415	27	19,723	35
Oil fuels		40	0	9,362	9,367	108,934	26	484	1	3,932	7
Natural gas		0	0	3,836	3,836	44,617	11	11,259	14	14,178	25
Nuclear		5,942	35	0	5,942	69,103	16	22,800	28	0	0
Hydroelectric		1,111	6	0	1,111	12,924	3	12,922	16	0	0
Biofuels and waste		8,287	48	-55	8,232	95,735	23	11,171	14	19,218	34
Solar photovoltaics		0	0	0	0	5	0	5	0	0	0
Solar thermal		1	0	0	1	11	0	0	0	0	0
Tide, wave and ocean		0	0	0	0	0	0	0	0	0	0
Wind		25	0	0	25	294	0	294	0	0	0
Geothermal		0	0	0	0	0	0	0	0	0	0
Electricity (imported)		0	0	903	903	10,503	2	0	0	109	0
Sub total Renewables		9,425	55	-55	15,311	108,969	26	24,392	30	19,218	34
<b>Totals</b>		<b>17,213</b>	<b>100</b>	<b>18,031</b>	<b>36,304</b>	<b>422,211</b>	<b>100</b>	<b>80,350</b>	<b>100</b>	<b>57,161</b>	<b>100</b>

Source: Based on World Energy Statistics and Balances Database 2012, "World Energy Balances." © OECD/IEA, 2012.

Notes:

Standard conversion used is 1 ktoe = 11.63 GWh

- (a) Sum of energy sourced within country, energy imports minus exports, international marine and aviation bunkers and stock change flows.
- (b) Includes all electricity generation, including any exported.
- (c) Does not include electrical heating. Includes waste heat recovery from electricity generation plants.

**Table 2 Breakdown of transport fuel use, 2010**

(in ktoe)	Total transport mix	%	Domestic aviation	Road	%	Rail	Pipeline transport	Domestic navigation	Non-specified (transport)
Oil products	4,178	95	141	3,824	97	33	0	180	0
Natural gas	15	0	0	5	0	0	9	0	0
Biofuels and waste	122	3	0	120	3	0	0	2	0
Electricity	64	1	0	0	0	57	0	0	6
Sub total	122	3	0	120	3	0	0	2	0
Renewables									
<b>Total</b>	<b>4,378</b>	<b>100</b>	<b>141</b>	<b>3,950</b>	<b>100</b>	<b>90</b>	<b>9</b>	<b>182</b>	<b>6</b>

Source: Based on World Energy Statistics and Balances Database 2012, "World Energy Balances." © OECD/IEA, 2012.

## Stand on climate change

Finland signed the Kyoto Protocol on 29 April 1998, ratified it on 31 May 2002 and brought it into force on 16 February 2005.

## National climate change programmes

Finland's National Strategy for Adaptation to Climate Change was adopted in 2005 as an independent element of the wider National Energy and Climate Strategy.

The EU Energy Trading Scheme (ETS) 2008 gave emission allowances to some specified sectors of 37.6 million metric tons of CO<sub>2</sub> per year until 2012 [5]. In total, there were 73 million metric tons CO<sub>2</sub> per year when emissions from non-ETS sectors are added. This was sufficient to satisfy Finland's obligations during the Kyoto Protocol.

The Finnish legislation arrangements for implementing the EU ETS are:

- The "Emission Trading Act" (683/2004) enabled the utilization of Kyoto units with the ETS by companies involved in the scheme. It also specified the emission allowance allocations in the "National Allocation Plan" for 2008 to 2012 [6].
- The "Environment Protection Act" (86/2000) implements the EU Directive on "Integrated Pollution Prevention and Control" (IPPC), which obliges EU member states to integrate the control of emissions caused by industry [7].
- The "Act on the Energy Market Authority" (507/2000) was implemented by the Electricity Market Act (386/1995) and the Natural Gas Market Act (508/2000) [8,9,10].
- A Government Decree on emissions trading (194/2007) was made to enable the EU ETS [11].

Other notable legislations are:

- An Act on the energy certification of buildings [12].
- A Ministry of the Environment Decree on "Energy Certification of Buildings" [13].
- A "National Building Code" under the Building Energy Efficiency Policy (BEEP) Program for reducing overall energy demand [14].
- A provision in the Renewable Energy Act to promote use of biofuels in transport. Under this provision, the annual minimum share of biofuels consumption for transport had to be 5.75% in 2010 [15].

A long-term "Climate and Energy Strategy" was approved in 2008. The policies and measures proposed are for the period 2008 to 2020.

On 15 October 2009, the government adopted the "Foresight Report" on the Long-term Climate and Energy Policy. It hopes to reduce Finland's greenhouse gas emissions by at least 80% by 2050 from the 1990 level.

The policies for 2007 to 2020 are as follows:

Energy Sector:

- Increasing the share of renewable energy from solar and wind sources from the present 25% to 38% of total energy production by 2020.

- A tax on energy levied on transport, heating fuels and electricity is divided into “basic tax” and “surtax”. The basic tax is collected only on gasoline and diesel oil based on their quality and environmental characteristics. A surtax is collected on other oil products, other fossil fuels and electricity based on their carbon content.
- A scheme for voluntary agreements for energy conservation for the period of 2008 to 2016. Energy audits are also included in this scheme.
- Feed-in tariffs for electricity from wind power and from biogas. This feed-in tariff will promote the construction of wind power in line with the Long-term Climate and Energy Strategy.

#### Energy Efficiency sector:

- An energy efficiency classification for cars was introduced.
- A tightening of the energy regulations for new buildings will be implemented in two phases over the next few years.
- Subsidies for renovations that improve energy efficiency have been introduced.

#### Transport sector:

- Energy efficiency agreements were introduced for goods and public transport services. These agreements were revised in 2007 and 2008 to meet the requirements of Directive 2006/32/EC [16] and aim for a 9% improvement by 2016.
- Financial instruments such as fuel taxation and road charges to encourage a reduced use of high fuel consumption vehicles along with promotion of public transport.
- The introduction of electric cars and new vehicle technologies to reduce CO<sub>2</sub> emissions of vehicles to less than 138g/km.
- Vehicle taxation to be based upon vehicle emissions.
- Increased investment in public transport and new transport routes.

#### Renewable sources sector:

- Reduction of energy consumption together with the increasing use of renewables including wood-based fuels, liquid biofuels, wind power and heat pumps.
- A guaranteed price for wind power initially at EUR 83.5/MWh. The difference between the market price and guaranteed price would be paid to wind power producers as feed-in tariffs.
- Increase in sustainable biofuel production from waste or other raw materials provided they do not compete with food production.

### Ministries involved in climate change/energy policy making:

Ministries involved	Web links
The Helsinki Commission	<a href="http://www.helcom.fi/helcom/en_GB/aboutus/">www.helcom.fi/helcom/en_GB/aboutus/</a>
Ministry of Employment and The Economy	<a href="http://www.tem.fi/?l=en">www.tem.fi/?l=en</a>
Ministry of Foreign Affairs	<a href="http://formin.finland.fi/public/default.aspx?culture=en-US&amp;contentlan=2">formin.finland.fi/public/default.aspx?culture=en-US&amp;contentlan=2</a>
Ministry of Transport and Communications	<a href="http://www.lvm.fi/web/en/home">www.lvm.fi/web/en/home</a>
Ministry of Agriculture and Forestry	<a href="http://www.mmm.fi/en/index/frontpage.html">www.mmm.fi/en/index/frontpage.html</a>
Ministry of Education and Culture	<a href="http://www.minedu.fi/OPM/?lang=en">www.minedu.fi/OPM/?lang=en</a>
Ministry of Finance	<a href="http://www.vm.fi/vm/en/01_main/index.jsp">www.vm.fi/vm/en/01_main/index.jsp</a>
Ministry of the Environment	<a href="http://www.ymparisto.fi/default.asp?node=5295&amp;lan=en">www.ymparisto.fi/default.asp?node=5295&amp;lan=en</a>

### Education institutes involved in climate change/energy policy making:

Ministries involved	Web links
Finnish Meteorological Institute	<a href="http://en.ilmatieteenlaitos.fi/">en.ilmatieteenlaitos.fi/</a>
The Finnish Funding Agency for Technology and Innovation	<a href="http://www.tekes.fi/en/community/Home/351/Home/473">www.tekes.fi/en/community/Home/351/Home/473</a>
Institute for Economic Research	<a href="http://www.vatt.fi/en/">www.vatt.fi/en/</a>
VTT Technical Research Centre of Finland	<a href="http://www.vtt.fi/?lang=en">www.vtt.fi/?lang=en</a>
Finnish Environment Institute	<a href="http://www.environment.fi/default.asp?contentid=425807&amp;lan=EN">www.environment.fi/default.asp?contentid=425807&amp;lan=EN</a>

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