European Environment Agency

Country profile – Finland

The section 'Key climate- and energy-related data' was prepared by the EEA. It includes the latest data available as of 31 July 2014

The section 'Climate and energy policy framework' was prepared by eclareon and Ecologic Institute, Germany. It includes the latest information on national policies and measures available as of 31 May 2014.

For methodological details and other country profiles, see www.eea.europa.eu/themes/climate/country-profiles.

Key climate- and energy-related data — Finland

Key data on GHG emissions	2005	2011	2012	2013	EU 2012
Total GHG emissions (UNFCCC, Kyoto Protocol) (Mt CO_2-eq.)	68.6	66.9	61.0	60.6	4 544.2
GHG per capita (t CO_2-eq./cap.)	13.1	12.4	11.3	11.2	9.0
GHG per GDP (g CO_2-eq./PPS in EUR)	510	427	383	383	350
Share of GHG emissions in total EU-28 emissions (%)	1.3%	1.5%	1.3%	1.4%	100%
EU ETS verified emissions (Mt CO2-eq.)	33.1	35.1	29.5	31.5	1 848.6
Share of EU ETS emissions in total emissions (%)	48%	52%	48%	52%	41%
ETS emissions vs allowances (free, auctioned, sold) (%)	– 25.9%	– 7.7%	– 22.7%	– 20.8%	– 14.1%
Share of CERs & ERUs in surrendered allowances (%)	0.0%	11.1%	27.8%	n.a.	26.4%
Non-ETS (ESD) emissions, adjusted to 2013–2020 scope (Mt CO2-eq.)	33.0	29.8	29.5	28.9	2 566.6

Key data on renewable energy	2005	2010	2011	2012	EU 2012
Share of renewable energy in gross FEC (%)			32.7%	34.3%	14.1%
() = including all biofuels consumed in transport	(28.9%)	(32.4%)			
Share of renewable energy for electricity (%)	26.9%	27.6%	29.4%	29.5%	23.5%
Share of renewable energy for heating and cooling (%)	39.3%	44.1%	45.7%	48.1%	15.6%
Share of renewable energy for transport (%)			0.4%	0.4%	5.1%
() = including all biofuels consumed (%)	(0.4%)	(3.8%)			

Key data on energy consumption	2005	2010	2011	2012	EU 2012
Primary energy consumption (Mtoe)	33.4	35.8	34.4	33.1	1 584.8
Primary energy consumption per capita (Mtoe/cap.)	6.4	6.7	6.4	6.1	3.1
Final energy consumption (Mtoe)	25.3	26.4	25.1	25.3	1 104.5
Final energy consumption per capita (Mtoe/cap.)	4.8	4.9	4.7	4.7	2.2
Efficiency of conventional thermal electricity and heat production (%)	78.8%	74.7%	75.7%	79.8%	50.0%

Energy consumption per dwelling by end use	2005	2009	2010	2011	EU 2011
Total energy consumption per dwelling (toe/dwelling)	2.13	2.23	2.20	2.18	1.42
Space heating and cooling (toe/dwelling)	1.43	1.53	1.50	1.50	0.96
Water heating (toe/dwelling)	0.30	0.32	0.32	0.32	0.18
Cooking (toe/dwelling)	n.a.	0.03	0.03	0.02	0.08
Electricity (lighting, appliances) (toe/dwelling)	0.40	0.35	0.35	0.33	0.20

Progress towards GHG targets (under the Effort Sharing Decision, i.e. non-ETS emissions)

2013 ESD target (% vs base year)	– 5.9%	2020 ESD target (% vs base year)	– 16.0%
2013 ESD emissions (% vs base year)	– 13.2%	2020 ESD projections WEM (% vs base year)	– 11.6%
		2020 ESD projections WAM (% vs base year)	– 14.9%

Based on approximated emission estimates for 2013, emissions covered by the Effort Sharing Decision (ESD) (i.e. in the sectors which are not covered by the EU ETS) are expected to be below the annual ESD target in 2013. Projections (adjusted by EEA) indicate that 2020 ESD emissions are expected to be above the 2020 ESD target, despite the implementation of measures planned until 2013. However, national projections indicate ESD emissions lower than the 2020 target.

Progress towards renewable energy targets

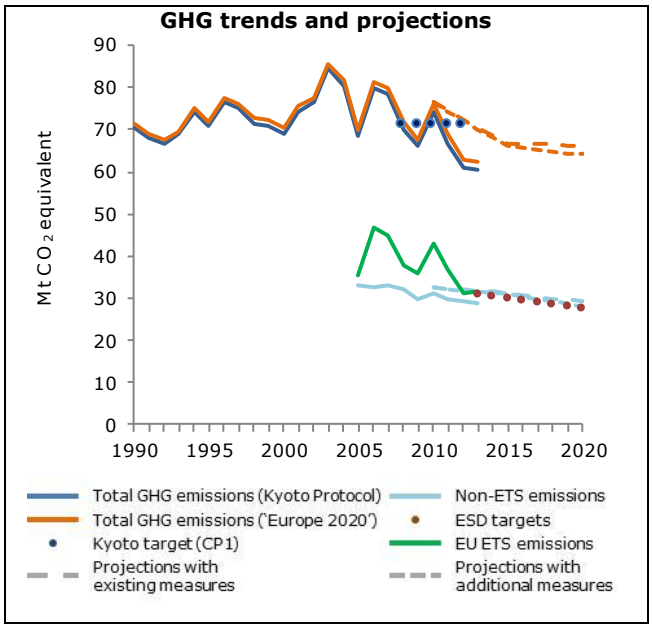
2012 RES share in gross final energy consumption (%)	34.3%	2011–2012 indicative share from RES Directive (%)	30.4%
2020 RES target	38.0%	2012 expected share from NREAP (%)	31.0%

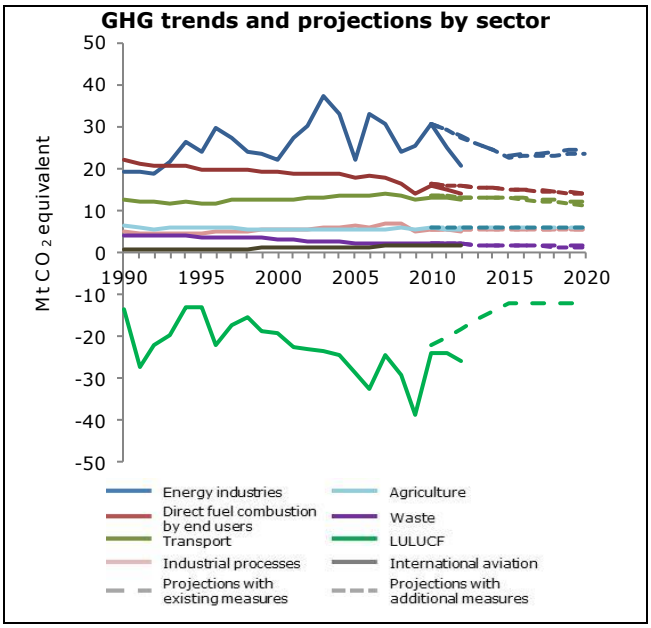
The average share of renewable sources in gross final energy consumption for 2011–2012 was 33.5% (8.8 Mtoe), which is higher than the indicative RED target for 2011–2012 (30.4%). At the same time, the share of renewables in 2012 (34.3 %) is higher than the expected 2012 NREAP target (31.0 %). Over the period 2005–2012 the observed average annual growth rate in renewable energy consumption amounted to 2.7%. In order to reach its 2020 NREAP target, Finland needs an average annual growth rate of 2.2% in the run-up to 2020. In absolute terms, this is equivalent to 1.1 time its cumulative effort so far.

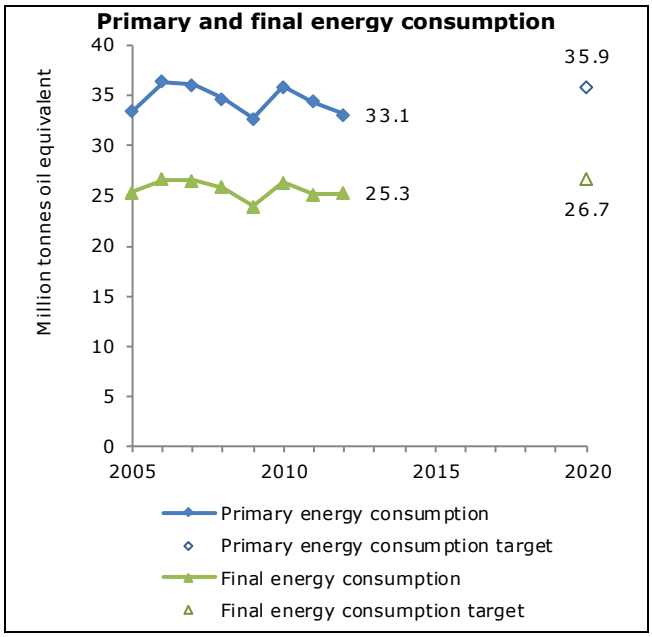
Progress towards energy efficiency targets

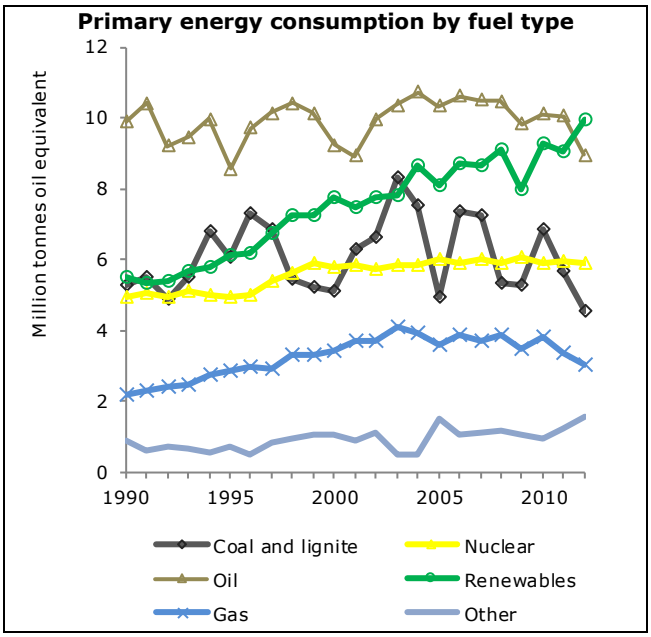
Primary energy consumption:		Final energy consumption:	
2005–2012 average annual change	-0.1%	2005–2012 average annual change	0.0%
2012–2020 average annual change to target	1.0%	2012–2020 average annual change to target	0.7%

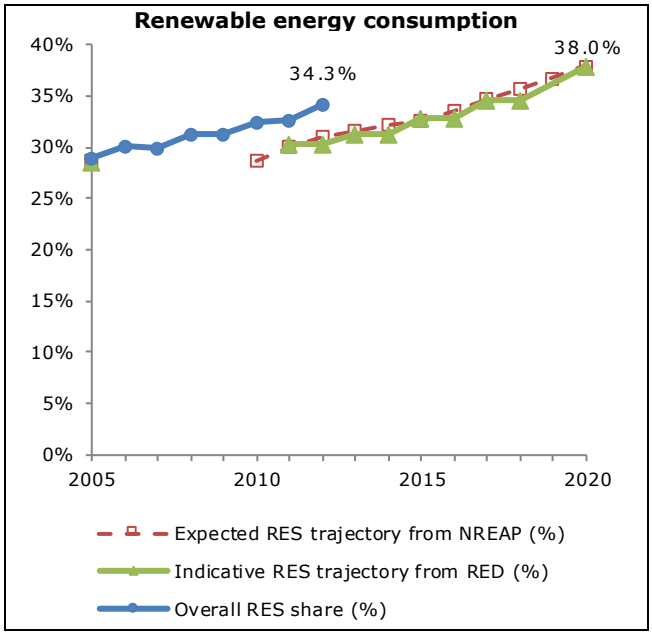
Finland has positive targets for primary and final energy consumption for 2020, compared to 2005. Over the period 2005 and 2012, primary energy consumption actually decreased while the final energy consumption remained stable. This development results from energy efficiency policies, combined with decreased activity in industry. For example, both efficiency in conversion and energy efficiency in industry increased over the period. Adressing energy consumption in the transport and residential sectors (where electricity consumption increased by 9 % between 2005 and 2012) could contribute to further reducing energy consumption.

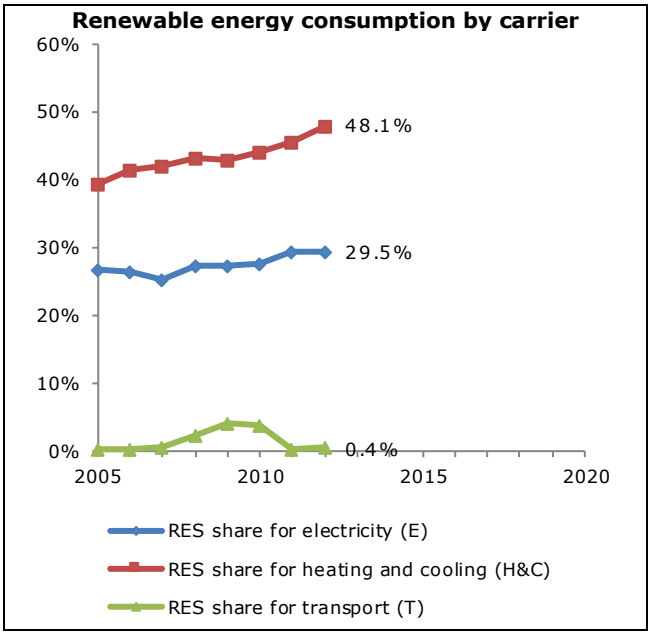

GHG trends and projections
Mt CO2 equivalent
Total GHG emissions (Kyoto Protocol)
Total GHG emissions ('Europe 2020')
Kyoto target (CP1)
Projections with existing measures
Non-ETS emissions
ESD targets
EU ETS emissions
Projections with additional measures


GHG trends and projections by sector
Mt CO2 equivalent
Energy industries
Direct fuel combustion by end users
Transport
Industrial processes
Projections with existing measures
Agriculture
Waste
LULUCF
International aviation
Projections with additional measures


Primary and final energy consumption
Million tonnes oil equivalent
33.1
25.3
35.9
26.7
Primary energy consumption
Primary energy consumption target
Final energy consumption
Final energy consumption target


Primary energy consumption by fuel type
Million tonnes oil equivalent
Coal and lignite
Oil
Gas
Nuclear
Renewables
Other


Renewable energy consumption
34.3%
38.0%
Expected RES trajectory from NREAP (%)
Indicative RES trajectory from RED (%)
Overall RES share (%)


Renewable energy consumption by carrier
48.1%
29.5%
0.4%
RES share for electricity (E)
RES share for heating and cooling (H&C)
RES share for transport (T)

Climate and energy policy framework

Challenges and opportunities
Due to its cold climate, long distances and energy-intensive industries, the energy intensity of Finland's economy is the highest in the EU-15, and little progress has been made in recent years. In particular, the energy consumption of buildings is high and even increased from 2005 to 2011, while the electricity consumption of households has increased as well. In addition, relatively low energy prices do not incentivise energy efficiency (Kozluk, 2011; EEW, 2013). Improving energy efficiency, in particular in the industrial and building sectors, could save energy costs, reduce import dependence and generate opportunities for construction-related green jobs, while reducing emissions from energy use. In 2013, a government working group published a report ('Strategisen tutkimus- ja arviointisuunnitelman tuloksia') revealing that environmentally harmful subsidies in Finland amount to EUR 3 billion, and that these subsidies are significantly higher than those for climate measures. Subsidies to the energy sector that have a harmful effect on the environment are mainly tax exemptions or reduced rates on certain industrial activities or fuels. Reducing these environmentally harmful subsidies could incentivise less carbon-intensive energy use and provide additional tax revenues that could be used to facilitate low-carbon investments in industry — thus not raising the overall tax levels of the sectors concerned.
While Finland has a long tradition of using renewable energy sources, mainly biomass and hydro, there are still challenges for reducing emissions in the energy supply, such as administrative barriers in relation to the construction of wind turbines, as well as the high use of emissions-intensive peat. Addressing these issues could help to reduce greenhouse gas (GHG) emissions from energy production and strengthen Finland's clean-tech sector, which is forecast to create 40 000 jobs by 2020 and have a turnover of EUR 40 billion by 2018 (TEM, 2012).

Climate and energy strategies
Finland has a long-term National Climate and Energy Strategy that was first published in 2001. A 2013 update outlines measures that would enable Finland to become a carbon-neutral society and reduce its carbon dioxide (CO_2) emissions by 80–95 % by 2050. The two underlying themes of the Strategy are cost-effective sustainable energy production and security of supply. The Strategy will be accompanied by an action plan, which is expected in spring 2014. The government is also currently preparing a Climate and Energy Roadmap 2050 and a Climate Act. The Climate Act will outline a framework to steer the reduction of emissions not covered under the Emissions Trading System (ETS) and is expected in 2015. The Roadmap will set targets for Finland's progress towards becoming a carbon-neutral society and is being carried out in a highly inclusive process, engaging a variety of stakeholders. Moreover, nearly all Finnish regions have prepared their own climate strategies (Kansallinen energia- ja ilmastostrategia, 2013).

Renewable energy
Finland has a high share of renewables, in particular woody biomass. Since early 2011, the main promotion scheme for electricity from renewable sources in Finland is a feed-in tariff (FIT) for electricity from wind, biomass and biogas, which varies depending on the technology and only applies to large installations. In contrast to most other support schemes in the EU, the Finnish FIT is not funded through the final consumers via a surcharge, but through the budget of the Energy Agency, with EUR 82.4 million foreseen in 2014. Finland also offers grants of up to 40 % of the investment costs for renewable power implementation and research projects via its Energy Aid Scheme. To achieve wind energy production goals of 6 TWh for 2020 and 9 TWh for 2025, Finland is also aiming to simplify administrative procedures and the permitting process. For example, the Land Use and Building Act was adjusted in 2013 to facilitate the construction of wind turbines in industrial harbour areas. The government also has a budget of EUR 20 million to support offshore wind projects and in March 2014 made a proposal to allow offshore projects to receive support through the FIT.
The Finnish government has proposed to introduce a tax (Voimalaitosvero) on domestic hydro, wind and nuclear power plants, with an exemption for smaller plants, in order to tax 'windfall profits'. The government's reasoning for the proposed tax is related to the increased price of electricity in the Nordic countries since the implementation of the EU ETS. Since these energy sources produce little to no GHG emissions they benefit most from higher prices (Energiateollisuus, 2013). The proposed tax is expected to increase the fiscal revenue of the government by EUR 50 million annually, but is being challenged by state-owned energy company Fortum (Fortum, 2013).
Renewable heat is mainly promoted with a 'heat bonus' allocated to cogeneration plants working on biogas and wood fuel. Finland also launched an energy efficiency promotion campaign in April 2014 to improve awareness of renewable heating efficiency (Ympäristö, 2014).

Energy efficiency
Finland has an Action Plan on energy efficiency and building matters (ERA17) containing proposals for a wide range of intervention areas. During 2013–2014 the focus is on improving energy efficiency assessment tools, promoting combined heat and power production, and trainings. Energy **taxation** is rather low with the level of tax rates on energy being below the EU average. Since 1990, Finland has a carbon tax on fossil fuels based on Law on Electricity and Fossil Fuel Taxation (Laki sähkön ja eräiden polttoaineiden valmisteverosta) with exemptions for heavy fuel oil, electricity and liquefied petroleum gas. The rate has been increased over the years from EUR 1.20 to 20/tCO_2 (Elbeze and de Perthius, 2011). In January 2011, the fuel tax was revised to include both an energy component and a CO_2 component, while the relative weight of CO_2 in the total tax for some fuels was reduced. The reform raised tax rates on fuels for non-road vehicles and traffic fuels.
Combined heat and power generation, a prior area of action under the ERA17, is supported by a fixed 'heat bonus' given to biogas and wood-fuelled plants.
There is an agreement with **industries** and business to increase energy efficiency, including a target of 9 % energy saving from 2008–2016 with financial support provided for investments and energy auditing (EEW, 2013; Odyssee, 2012). Finland has indicated that it plans to achieve its required savings of 1.5 % between 2014 and 2020 under the Energy Efficiency Directive through voluntary energy efficiency contracts.
In the **building** sector, energy efficiency requirements for construction are updated on a regular basis (Acts 422/2011, 181/2013 and 176/2013). The new rules represent a change in the way energy efficiency is calculated and require certification of energy performance for new and existing buildings. Additional new requirements will come into effect in

2014 and a new technical guidance on construction is due to come into force in the middle of the year 2015. Finland subsidises energy efficiency improvements of residential buildings through a continuously updated grant scheme (Act 1184/2005 and Decree 128/2006). These subsidies ended in January 2013, but continue for some conservation measures for row houses and blocks of flats. Energy-efficient reconstruction and renovation of large apartment buildings and office buildings for the public sector are a main focus of the 2014 Ministry of the Environment budget. Finland is also developing legal acts to achieve that from 2017 all new public buildings will be zero-energy.

Transport

Finland's vehicle taxes are largely based on CO_2 emissions: for passenger cars and vans, a tax is paid before the first registration or use based on the value of the vehicle and the CO_2 emissions per kilometre. Finland also has an ownership tax based exclusively on CO_2 emissions (ACEA, 2012), which is, however, lower than the EU average. Petrol and diesel tax rates are, in contrast, well above the EU average and include taxes on CO_2 components (European Commission, 2013). In 2013, a Finnish government working group on transport proposed a kilometre tax on vehicles that is not yet in force (LVM, 2013). Renewables in transport are promoted through a biofuel quota: petrol and diesel must meet minimum energy content obligations for biofuels of 6 % for 2011–2014, followed by a phased increase to 20 % by 2020.

Finland's Transport Environmental Strategy 2013–2020 aims to decrease CO_2 emissions by gathering better transport data, increasing cost effectiveness and supporting the use of new low-emission technologies. The 2013 Second Generation Strategy for Intelligent Transport guides projects from 2013–2017 with an estimated budget of EUR 300 million. Under the government's framework policy decision 'More for Less - Wisely!', transport efficiency is a key pillar with an emphasis on developing public transport. Voluntary energy efficiency agreements for transport are also in place. The agreement on goods transport and logistics encompasses 750 companies with 4 150 cars. The public transport agreement was joined by 11 companies with a fleet of 550 cars (TEM, 2014a).

Agriculture

For the first time, the Rural Development Programme for 2014–2020 incorporates climate change measures regarding plant production. The recommendations of the Common Agricultural Policy (CAP) mostly regarding manure management and agricultural soils were implemented in Governmental Decision No 488/2010 and should lead to decreasing emissions. Current legislation and recommended good agricultural practice mainly concerns the storage of waste from animal production and the integration of waste into agricultural land. The Ministry of the Environment is also providing subsidies to help improve the recycling of manure through projects related to reducing emissions and developing biogas production.

Waste

A New Waste Act and corresponding regulations came into force on 1 May 2012 (laws no 646–666/2011) and the Government Decree on waste (179/2012) foresees that by 2016 more than 50 % of all organic waste will be recycled. In addition, the Government Decree on landfills (861/1997, revised 2006) and a biowaste strategy (2004) aim to minimise organic waste transported to landfills. In May 2013, the government issued two decrees restricting the disposition of organic, construction and demolition waste to landfills (Act no 331/2013). A Waste Tax Act also applies to waste fractions that could be technically and environmentally recovered, but are landfilled. In addition, a national material efficiency programme was prepared (Ympäristö, 2013).

Land use, land-use change and forestry

Forests cover more than 70 % of the land area of Finland and according to the National Climate and Energy Strategy, wood is the single most important raw material for achieving the 2020 renewable energy target. The aim is to raise the share of wood chips in heat and electricity production from about 16 to 25 TWh by 2020. Finland's comprehensive National Forest Programme 2015 (NFP), adopted on 16 December 2010, sets out plans, regulations and measures pertaining to forest management and the forest products industry. The NFP also indicates that forest management and forest-related industries are important employers in Finland.

In January 2014, amendments to the Forest Act, Forest Management Act, Law on Prevention of Forest Damage and the Wood Product's Measurement Act came into force, cancelling the forest management tax and providing forest owners with more freedom and flexibility to decide about the management of their forest.

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