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# Assessment of climate change policies in the context of the European Semester

## Country Report: Finland



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The report provides an overview of current emission trends and progress towards targets as well as policy developments that took place over the period from February 2013 to November 2013.

Please feel free to provide any comments or suggestions to the authors through the contacts listed above.

## Short summary

**Background:** Finland's cold climate, long distances, and energy intensive industries (e.g. paper/pulp) result in a high energy intensity of the economy. The energy mix is quite diverse with half of the energy coming from fossil fuels, about 22% from biomass and about 17% from nuclear. Climate change and particularly energy efficiency are well integrated in Finland's policy mix and Finland wants to become a carbon neutral society by 2050. In 2013, the National Climate and Energy Strategy was published outlining measures until 2020; the Climate Act is expected to come in 2015.

**Non-ETS emission reduction target:** The Finnish 2020 target is -16% (compared to 2005) and emissions were reduced by 9% between 2005 and 2011. According to the latest national projections submitted to the Commission and when existing measures are taken into account, the target is expected to be missed by a margin of 4 percentage points: -12 % in 2020 compared to 2005.

### Key indicators 2011:

GHG emissions	FI	EU
ESD EU 2020 GHG target (comp. 2005)	-16%	
ESD GHG emissions in 2011 (comp.2005)	-9%	-9%
Total GHG emissions 2012 (comp.2005)	-11%	-12%
GHG emissions/capita (tCO <sub>2</sub> eq)	12.5	9.0

→ **40% higher** per capita emissions than EU average

GHG emissions per sector	FI	EU
Energy/power industry sector	37%	33%
Transport	20%	20%
Industry (incl. industrial processes)	23%	20%
Agriculture (incl. forestry & fishery)	11%	12%
Residential & Commercial	4%	12%
Waste & others	3%	3%

→ **Energy/power industry** sector followed by Industry and Transport

Energy	FI	EU
EU 2020 RES target	+38%	
Primary energy consumption/capita (toe)	6.6	3.4
Energy intensity (kgoe/1000 €)	212	144
Energy to trade balance (% of GDP)	-3.9%	-3.2%

→ Around **double** as high per capita consumption, around **50% higher** energy intensity and **higher** contribution of energy to trade balance than EU average.

Taxes	FI	EU
Share of environmental taxes (% of GDP)	3.1%	2.4%
Implicit tax rate on energy (€/toe)	130	184

→ **Slightly higher** share of environmental taxes and around **30% lower** implicit tax rate on energy than EU average.

**Key policy development in 2013:** In the building sector, certification of energy performance (EPCs) for buildings is now mandatory. Support schemes became more focused on specific types of buildings and the funding was marginally increased. In the transport sector, amendments to the Car Tax Act in January 2013 increased the tax, which is differentiated according to emissions per kilometre. An adjustment of the Land Use and Building Act was adopted in August 2013, which facilitates the construction of wind power plants in industrial harbour areas. Finland also started a subsidy programme for offshore wind energy development projects.

**Key challenges:** One of the main challenges in Finland is the high energy intensity of the economy. In comparison to other EU Member States, in particular the energy intensity of the industry is by far the highest and also the carbon intensity is well above EU average. The energy consumption per dwelling is also much higher than the EU average and also higher when compared e.g. to Sweden. The rate of energy efficient modernisations is particularly low and only little progress can be reported since 2007. While there are already measures in both sectors, more could be done to decrease energy intensity and related greenhouse gas (GHG) emissions.

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## I Background on climate and energy policies

Finland has a long tradition of climate policy, the backbone of which is its long-term “National Climate and Energy Strategy”. This policy document presents concrete measures through 2020 and an outlook up to 2050. The strategy was published for the first time in 2001 and was last updated in March 2013. The strategy is complemented by an action plan encompassing a variety of topics, including the use of forest and adaptation to climate change. The Action Plan is scheduled to be published in spring 2014 and outlines measures that would enable Finland to reach its target of becoming a carbon neutral society and reducing its greenhouse gas emissions by at least 80% by 2050. The government is also developing a Climate and Energy Roadmap until 2050, which sets targets for Finland’s progress towards becoming a carbon neutral society. The process is highly inclusive, engaging Ministries, specialists, industries, and also ordinary citizens. The long-term climate and energy strategy is implemented through several legislative acts and carried out in projects and sub-projects, which are described below in greater detail. A Climate Act is also under development and will outline a framework to steer the reduction of emissions not covered under the emissions trading system. The introduction of the Climate Act is expected in 2015.

The importance of climate change and green growth is also reflected by ongoing public debate, in which both topics are broadly discussed from very different angles. The introduction of a climate panel (“Ilmastopaneeli”) in late 2011 was intended to promote dialogue between science and policy. The climate panel has created substantial discussion among policy makers and the wider public and several reports have been published on climate and energy issues. Political discussion about climate change takes place at the national level and less at regional and local levels. At the same time, however, there are several local initiatives to curb greenhouse gas emissions. For this reason, cooperation between the regional and local levels with the state level is seen as a key factor in achieving nation-wide climate policy goals. Nearly all Finnish regions have prepared their own climate strategies, which primarily aim at using practical innovations and promoting sustainable consumption to increase economic activity and create local jobs, but also to reach nation-wide climate goals (Energia- ja ilmastostrategia 2013).

Green growth and clean technology is a priority in Finland that reflects the country’s interpretation of climate change which is not exclusively an environmental topic but an economic one as well. This is made evident, with for instance, the objective of the current Government to make Finland a leader in sustainable extractive industries, bringing climate and economic aspects together. The Ministry for Employment and the Economy (Työ- ja elinkeinoministeriö – TEM), which is mainly responsible for energy policies, describes Finnish energy policy priorities as follows: “Finnish energy policy rests on three fundamentals: energy, economy and the environment. Securing energy supply, competitive energy prices and meeting the EU’s common energy and climate goals are core elements” (TEM L 2013).

In terms of energy security, Finland is one of the few countries in the EU building new nuclear power plants to achieve its energy policy targets. It also has a long tradition of using renewable energy sources, mainly biomass and hydro. One third of the country’s total energy consumption comes from renewable. However, there are still some challenges, with for instance, administrative barriers in relation to the construction of wind energy plants or the fact that the use of peat for energy production remains high.

As for green jobs, there are several sources of (sometimes conflicting) data. According to a report that was published in late 2012, the turnover of the renewable energy sector was €905 million (an increase of 14.4% from the previous year.) and employment in that sector provided 6188 jobs in 1371 workplaces in Finland (Varsinais-Suomen ELY-keskus 2012). Other sources show that the share of employment in water collection, sewerage, waste collection, and remediation activities in Finland in 2011 was above 2%, and that the share of employment in the renewable energy sector as a percentage share of total employment in 2010 was below 8% (Green Jobs, 2012). A study conducted for DG Employment found that the impact of the Renewable Energy Package 2010 was positive for direct employment (e.g. in forestry, construction and energy) and indirect employment (e.g. in private and public services) but that the net impact was lower employment overall: 4000 fewer jobs when compared to the “business as usual” scenario (OECD 2012, p. 117-121). Renewable energy and clean-tech are defined as key priorities for the Finnish industry and a key to strike a balance between climate and environmental objectives and economic competitiveness. The national Climate and Energy plan foresees to steer climate and energy policy together with innovation and to direct significant resources into R&D activities, which is again expected to stimulate the employment market and create additional jobs. The Ministry of Employment and the Economy expects 40,000 jobs in the cleantech sector by 2020, with a turnover of €40 billion by 2018 (TEM f 2012).

## 2 GHG projections

### Background information

In 2011, Finland emitted 67.0 Mt CO<sub>2</sub>eq (UNFCCC inventory 2011); a 5% (0.2 million tonnes) reduction compared to 1990 levels. Methane (CH<sub>4</sub>) emissions have gone down by 33 per cent from the 1990 level, whereas nitrous oxide (N<sub>2</sub>O) emissions have decreased by 29 per cent. In 2011, the F-gas emissions (HFCs, PFCs and SF<sub>6</sub>) were nearly eleven times higher than the emissions for 1995 (the base year for F-gas emissions) (UNFCCC, 2013).

Similar to other industrialised countries, Finland’s largest source of GHG emissions is the energy sector. The cold climate, long distances and energy-intensive industries all contribute to the high emissions volumes of the energy sector (UNFCCC, 2013). Emissions in that sector have increased by almost 60% between 1990 and 2010 driven by an increased national demand for electricity coupled with Finland’s high dependency on fossil fuels and peat. From 2010 to 2011, emissions were slightly reduced. A sharp decline of emissions were observed for energy use since 1990 due to improvements in energy efficiency and the shift from oil heating to district and electric heating. These developments even outweighed the increasing demand for energy in the manufacturing industry and the growing number of dwellings in Finland. Emissions from transport grew 6% from 1990 to 2010 due to the growth in traffic volume. A slight decrease could be observed from 2010 to 2011. Increasing emissions from industrial processes from 1990 to 2005 can be explained by the growth in production chemicals, iron and steel. From 2011 to 2012 total GHG emissions are expected to have decreased in particular through the reduction of emissions from energy supply and use (including transport) and from industrial processes while emissions from agriculture are expected to rise (early estimates for 2012 provided by EEA 2013c).

## Progress on GHG target

There are two sets of targets to evaluate: 1) the Kyoto Protocol targets for the period 2008-12 (which has just ended) and 2) the 2020 targets for emissions not covered by the EU ETS.

Under the Kyoto-Protocol, the emission reduction target for Finland in the period 2008-2012 is to return to the base year emissions with 1990 being the base year for CO<sub>2</sub>, CH<sub>4</sub> and N<sub>2</sub>O and 1995 for F-gases. An evaluation of the latest complete set of greenhouse gas data (for the year 2011; there is only preliminary data for 2012) shows that Finland's emissions have decreased on average by 5.6% compared to the Kyoto base year (EEA 2013a). Finland is thus expected to meet its commitment by a comfortable margin through direct domestic emission reductions.

By 2020, Finland needs to reduce its emissions not covered by the EU ETS by 16% compared to 2005, according to the Effort Sharing Decision (ESD) <sup>(1)</sup>. The latest data for 2012 suggests that Finland is on track at present to meet the Annual Emissions Allocation <sup>(2)</sup> for the year 2013. However, national projections (EEA 2013b) show that the country will fail to meet its 2020 target with existing measures by about 4 percentage points and with additional measures by about 1 percentage point (see Table 1).

**Table 1: GHG emission developments, ESD-targets and projections (in Mt CO<sub>2</sub>eq)**

	1990	2005	2010	2011	2012*	ESD target**		2020 Projections***	
						2013	2020	WEM	WAM
Total	70.4	68.7	74.5	67.0	61.4				
Non-ETS (% from 2005)		34.8	33.2	31.9	31.6 -9%	32.7 -6%	27.7 -16%	29 -12%	28 -15%
Energy supply (% share of total)	19.2 27%	21.9 32%	30.5 41%	24.6 37%					
Energy use (w/o transport) (% share of total)	20.5 29%	16.5 24%	14.7 20%	13.7 20%					
Transport (% share of total)	12.8 18%	13.7 20%	13.4 18%	13.2 20%					
Industrial processes (% share of total)	5.1 7%	6.4 9%	5.8 8%	5.6 8%					
Agriculture (% share of total)	6.7 9%	5.8 8%	6.0 8%	5.9 9%					

Source: UNFCCC inventories; EEA (2013b); Calculations provided by the EEA and own calculations.

\* proxies for 2012 emissions summarised by EEA (2013b)

<sup>1</sup> Decision No 406/2009/EC of the European Parliament and of the Council of 23 April 2009 on the effort of Member States to reduce their greenhouse gas emissions to meet the Community's greenhouse gas emission reduction commitments up to 2020.

<sup>2</sup> Commission decision of 26 March 2013 on determining Member States' annual emission allocations for the period from 2013 to 2020 pursuant to Decision No 406/2009/EC of the European Parliament and of the Council. Online available at: <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2013:090:0106:0110:EN:PDF>



\*\* The ESD target for 2013 and for 2020 refer to different scopes of the ETS: the 2013 target is compared with 2012 data and is therefore consistent with the scope of the ETS from 2008-2012; the 2020 target is compared to 2020 projections and is therefore consistent with the adjusted scope of the ETS from 2013-2020. 2005 non-ETS emissions for the scope of the ETS from 2013-2020 amounted to 33 Mt CO<sub>2</sub>eq.

\*\*\* Projections with existing measures (WEM) or with additional measures (WAM).

Legend for colour coding: green = target is being (over)achieved; orange = not on track to meet the target

Total greenhouse gas emissions (GHG) and shares of GHG do not include emissions and removals from LULUCF (carbon sinks) and emissions from international aviation and international maritime transport.

National projections of GHG emissions up to 2020 need to be prepared by the Member States in accordance with the EU Monitoring Mechanism <sup>(3)</sup> every two years, and the latest submission was due in 2013. The projections need to be prepared reflecting a scenario that estimates total GHG emissions reductions in line with policies and measures that have already been implemented (with existing measures, WEM), and an additional scenario that reflects developments with measures and policies that are in the planning phase (with additional measures, WAM) may also be submitted.

In the following two tables, these measures have been summarised with a focus on national measures and those EU instruments expected to reduce emissions the most. Please note that the table includes also measures that address GHG emissions covered under the ETS such as measures reducing emissions from electricity generation (e.g. feed-in tariffs). An update on the status of the policies and measures is included in order to assess the validity of the scenarios.

**Table 2: Existing and additional measures as stated in the 2013 GHG projections**

Existing Measures (only important national measures)	Status of policy in November 2013
Energy Promoting the use of woodchips. Act on the production subsidy for electricity produced from renewable energy (feed-in tariff) (1396/2010).	The Act entered into force on 1 January 2011. Last amendment entered into force on 1 July 2013.
Renewed building Regulations (2012): Provides minimum standards for new buildings.	Tighter energy regulations for new buildings and renovations came into force on 1 July 2012 for new buildings and 1 January 2013 for existing buildings.
Energy Efficiency State subsidies for residential buildings for energetic rehabilitation and for the use of renewable heat. Subsidies may be given to housing companies, to low-income families for offsetting material costs and to households in general to transferring to renewable energies. Support is provided for energy audits and energy analysis projects.	Implemented.
Voluntary Energy Efficiency Agreements covering industries, municipal sector, oil sector, real estate sector, transport, farms	In force through 2016.

<sup>3</sup> Decision No 280/2004/EC of the European Parliament and of the Council of 11 February 2004 concerning a mechanism for monitoring Community greenhouse gas emissions and for implementing the Kyoto Protocol.

Transport	Act on Biofuel Distribution Obligation (446/2007 with amendments 1420/2010 and 394/2013)	The amended act is in force.
	Car Tax Act (Ajoneuvoverolaki) differentiated according to emissions (gCO <sub>2</sub> /km)	In force. The latest amendments (increase of the tax) entered into force 1 January 2013.
	Voluntary energy efficiency agreement in the transport sector on goods transport and logistics, and on public transport services	The agreement on goods transport and logistics encompasses 750 companies with 4150 cars. The public transport agreement was joined by 11 companies with a fleet of 550 cars.
	Public Transport Act (Joukkoliikennelaki) 869/2009 (creation of an operational environment to provide basic public transport services) and state aid for public transport services in big cities	Act in force, latest amendments came into force 1 January 2013 and 1 July 2013.
Other non-ETS sectors	Environmental Protection Act/Regulation of F-gases; modification 7.11.2008/681	Environment Protection Act (no.86/2000) and regulation concerning F-gases (no.681/2008) are in force. New Environmental Protection Act is expected to be in force in June 2014.
	Government decree on landfills (861/1997, revised 2006) and biowaste strategy (2004) to minimise organic waste transported to landfills	In force. In addition, in May, the Government issued two decrees restricting the disposal of organic waste to landfills and regulating the use of such waste in landfills (Act no.331/2013) (see Chap.4, waste).
	Increase the area of multiannual crops on organic soils.	Implemented.

Source: Reporting of MS in accordance with Decision No 280/2004/EC about their GHG emission projections up to 2020, May 2013.

Additional Measures (only important national measures)		Status of policy in November 2013
Other non-ETS sectors	General Waste reform (submitted as bill to Parliament (He 199/2010)) to reduce production of waste, amount of organic waste transported to landfills, to promote recycling and reuse	New Waste Act and regulations completing it (implementing the waste reform) entered into force on 1 May 2012 (laws no. 646-666/2011). New act no. 331/2013 aimed at reducing organic waste disposal to landfills entered into force on 1 June 2013.
	Economic instrument to reduce F-gas emissions: mandatory registry used to collect taxes or apply fees combined with a deposit for gases with undesirable characteristics	Not implemented. The updated national Energy and Climate Strategy states that the need for additional measures to reduce F-gases and their exact formulation needs to be further studied.

Source: Reporting of MS in accordance with Decision No 280/2004/EC about their GHG emission projections up to 2020, May 2013.

When looking at the current state of implementation, most WEM policies and instruments are in force. Most recently, significant progress has been made on legislative changes implementing stricter energy efficiency requirements. However, it is too early to assess the real impact of these measures on the Finnish energy portfolio and reduction of GHG emissions. Additional measures can be expected in the transport sector. However, even

under consideration of additional measures, the projections show that Finland is expected to miss its GHG emissions reduction target, albeit by a small margin.

### 3 Evaluation of National Reform Programme 2013 (NRP)

In April of each year, Member States are required to prepare their National Reform Programmes (NRPs), which outline the country's progress regarding the targets of the EU 2020 Strategy. The NRPs describe the country's national targets under the Strategy and contain a description of how the country intends to meet these targets. For climate change and energy, three headline targets exist: 1) the reduction of GHG emissions, 2) the increase of renewable energy generation, and 3) an increase in energy efficiency.

The Finnish NRP on climate and energy reflects that the reduction of GHG emissions and climate change is integrated in the country's long-term development and economic growth. In February 2013, the Government started work on the Climate Act, which will guide the Government and the Parliament towards emission reduction targets in a cost-effective, systematic and predictable manner. In addition, the NRP focuses on energy efficiency and security of supply, which will be guaranteed through the promotion of renewable energies, but also with the construction of two additional nuclear power plants.

In the following table, the main policies and measures as outlined in the NRP of April 2013 have been summarised, and their current status (implemented, amended, abolished, or expired) is given, with specifics on latest developments.

**Table 3: Main policies and measures as outlined in the NRP, April 2013**

Update Climate and Energy Strategy and implementation of strategy	
Status as stated in the NRP	To be done in 2013
Status as per Nov 2013	The strategy was updated in March 2013, accompanying action plan to be released in Spring 2014.
Description of policy or measure	The long-term climate and energy strategy has been defined in separate strategy papers in 2001, 2005 and 2008. The latest strategy was accepted by the Government on the 20 <sup>th</sup> March 2013. The strategy describes climate and energy policy measures in detail until 2020, and in brief thereafter, up to 2050. The document contains strategic focus points covering a wide range of issues, including energy and climate policy beyond 2020, energy efficiency, greenhouse gas emission reduction, consumer guidance, and reduction of energy produced from peat. The strategy also contains an action plan to reduce the use of mineral oil in Finland's energy production to less than 17% by 2025 – this is to be accomplished mainly by promoting the use of biofuels in transport and heating. Wind energy production goals are set at 9 TWh for 2025, to be achieved through the simplification of administrative procedures and making it easier to obtain permits. The strategy will be accompanied by an action plan with concrete measures, which will be released in spring 2014.

### Implement tighter building regulations

Status as stated in the NRP	Regulations for new buildings came into force in July 2012
Status as per Nov 2013	Tighter energy regulations for new buildings and for renovations to existing buildings came into force on 1 July 2012 and 1 January 2013, respectively. On 1 June 2013 the laws concerning energy efficiency certificates entered into force.
Description of policy or measure	This measure refers to implementation of the Directive on Energy Performance of Buildings, which required a number of legislative changes in Finland. The new rules represent a change in the way energy efficiency is calculated, and require certification of energy performance (as completed via third party assessment) for new and existing buildings.

### Prepare a proposal for a Climate Act

Status as stated in the NRP	No specific timeline given
Status as per Nov 2013	A ministerial working group is preparing a draft of the Climate Act. Key elements include an 80% emissions reduction target for the year 2050, as well as regulatory and procedural aspects. The act would cover both mitigation and adaptation (Ympäristö k 2013). In the beginning of June another important benchmark in the elaboration of the climate law was passed - a comprehensive 180-page study analyzing the interaction between the climate law and other applicable legal provisions was published. Its purpose was to systematically review all the legislation that is relevant in terms of the goals of the Climate Act and identify applicable legislation, which would need to be brought up to date or replaced to avoid duplication and overlapping. The Climate Act is expected to enter into force in April 2015.
Description of policy or measure	The purpose of the Climate Act is to steer the reduction of emissions arising from outside the emissions trading scheme.

### Overhaul forest legislation

Status as stated in the NRP	No specific timeline given
Status as per Nov 2013	The cornerstone of Finnish forest policy is the National Forest Programme 2015, approved on 16 December 2010. Several of its measures are implemented on an ongoing basis but no comprehensive overhaul of the plan occurred in 2013.
Description of policy or measure	The aim of the overhaul as stated in Finland's reform programme is to strengthen the economic base of forestry and forest industry, and to secure both biodiversity and the interests of the national economy, users of wood, and forest owners.  Forests cover more than 70 per cent of the land area of Finland. A total of 20.3 million hectares is available for wood production, 61 per cent of this privately owned. The forest is an important resource both for environmental and climate change issues (the sustainability of the forest serves to preserve Finland's carbon sink capacity), but also for economic reasons, as the forest industry is an important employer.

**Identify subsidies harmful to the environment and decide on the reallocation of subsidies**

Status as stated in the NRP To be done in 2013

Status as per Nov 2013 Ongoing

Description of policy or measure

A working group, led by the Ministry of Finance, has gone through existing subsidies and identified which are environmentally harmful. Most subsidies that were discussed are tax subsidies. Currently ministries are discussing how subsidies should be restructured. In June the Ministry of Environment published a report on environmentally harmful subsidies, revealing that the amount of environmentally harmful subsidies in Finland amounts to € 3 billion and is mainly in the form of indirect subsidies. The subsidies are principally directed to the energy, transport and agriculture sectors, result in an increase of fossil fuels and have a negative impact on climate. The report shows that for example the energy sector subsidies are significantly higher than those for climate measures. The report also reveals that some transport and housing measures result in greater car dependency.

**Make an interim review of the Climate Policy for Transport Programme**

Status as stated in the NRP To be done in 2013

Status as per Nov 2013 The review was published on 13 December 2012

Description of policy or measure

“Climate Policy Programme for the Ministry of Transport and Communications’ administrative sector for 2009-2020 - a progress report 2012” (“Liikenne- ja viestintäministeriön hallinnon alan ilmastopoliittinen ohjelma 2009–2020. Seuranta 2012”), tracks development of road transport and emissions as well as the growing passenger volumes of public transport.

**Prepare a review of material efficiency potential, innovation needs, impacts and indicators in collaboration with stakeholders**

Status as stated in the NRP To be done in 2013

Status as per Nov 2013

In September the Ministry of the Environment published a report by the Environmental Centre, University of Oulu and Motiva on the material efficiency potential in Finland and ways of increasing it by 2030.

Description of policy or measure

The goal of the review is to improve the sustainable use of natural resources and material efficiency in Finland, as overall consumption of natural resources has grown in recent decades and is fairly high by international comparisons. The study used indicators from key industries on their total raw material consumption, including oil imports and analysed the life cycle and GHG emissions generated by the production and the value added in Finland as well as its impact on employment. The study showed that most raw materials were used by construction, metal, the forestry industry and oil-refining. The largest share of GHG emissions stem from energy production, construction, oil refining, paper and metal industry. The gains from efficiency for industry can be as high as 10-20%.

### Increase taxation of transport fuels in stages

Status as stated in the NRP	First tax increase to occur in 2013
Status as per Nov 2013	Taxes on traffic fuels are differentiated according to their CO <sub>2</sub> emissions, the latest increase took place on 1 January 2013.
Description of policy or measure	In recent years, the Finnish government has introduced several taxes to steer the emission of CO <sub>2</sub> . Tax adjustments for natural gas will take place in stages up to 2015. A low, ascending energy tax for peat is being introduced in stages by 2015.

## 4 Policy development

This section covers significant developments made in key policy areas between February 2013 and November 2013. It does not attempt to describe every instrument in the given thematic area.

### Horizontal Issues

As explained in the background, Finland's long-term climate goals are continuously updated in the National Climate and Energy Strategy. The last update was released in March 2013 and foresees Finland becoming a carbon-neutral society and reducing its CO<sub>2</sub> emissions by 80-95% by 2050.

The goal of the long-term strategy is to ensure that the country reaches its 2020 climate and energy targets and those established for 2050. The new strategy contains 120 strategic points and covers a wide range of issues, among others, it includes energy and climate policy beyond 2020, energy efficiency, greenhouse gas emission reduction, consumer guidance, and reduction of energy produced from peat. The two underlying themes of the strategy are cost-effective sustainable energy production and security of supply. The strategy also contains an action plan to reduce the use of mineral oil in Finland's energy production to less than 17% by 2025 – this is to be accomplished mainly by promoting the use of biofuels in transport and heating. Wind energy production goals are set at 9 TWh for 2025, to be achieved through the simplification of administrative procedures and making the process to obtain permits easier. The strategy is to be accompanied by an action plan, which foresees concrete measures to arrive at the set targets. The expected release of the action plan is Spring 2014. The Government is also currently preparing the Climate and Energy Roadmap 2050 and the Climate Act, the latter of which is expected to enter into force by 2015 and aims at creating a common framework for policy makers on climate change and steer the reduction of emissions not covered under the ETS system.

In October 2013, a new regulation on environmental requirements for power plants with a production capacity below 50 MW (750/2013) was approved. It applies to solid, liquid and gas-fuelled power generation units and will replace the earlier applicable regulation from 2010. Among other things the updated regulation clarifies the height and the chimney design principles and specifies emission limit values. Slight changes also apply to liquid fuel handling and storage and monitoring requirements. The new regulation entered into force on 1 November 2013 (Ympäristö n, 2013).

A cross-cutting programme targeted at cutting not just energy use, but resource use more generally called "More from Less – Wisely" was introduced in June 2013. The programme

seeks to promote material and energy efficiency in the public sector as well as in companies and households. It is based on three underlying pillars – wise energy use and smart housing, sustainable food production and transport. Among a range of possible actions, the Government intends to reform the work traffic related tax measures (i.e. free parking, use of company car, travel expenses) and to promote energy efficient renovations and the use of renewable energies in housing. The programme consists to a large extent of information measures and coalition-building amongst government ministries, research institutions, citizens and the private sector and it funds pilot projects. The programme, which aims to take a holistic approach involving green growth concepts, is led by the Ministry of the Environment, the Ministry of Employment, and the Economy in conjunction with research institutions, the Finnish Funding Agency for Technology and Innovation (Tekes) and the Finnish Innovation Fund Sitra.

### **Environmental Taxation**

In Finland, the share of environmental tax revenues in total tax revenues was at 7.18% in 2011, and thus above the EU average. Compared to the country's GDP, these revenues were at 3.12%, which is the 5th highest value in the EU. Since 1990, Finland has a carbon tax in place, which applies to fossil fuels. While the rate has been increased over the years, fuels for electricity generation are exempt and some reduction rates apply for the industrial sector as well as for household heating. Finland has an implicit tax rate on energy, with a value of approximately 130 € per tonne of oil equivalent (toe).

In recent years, the Finnish government has introduced several taxes to reduce CO<sub>2</sub> emissions. In January 2011, the system of energy taxation in place since 1990 was changed. The revised fuel tax has an energy component and a CO<sub>2</sub> component, which is based on a life-cycle approach to emissions. The reform raised the tax rates on fuels for non-road vehicles (including boat and airplane fuel) considerably. The CO<sub>2</sub> tax rate for traffic fuels was also increased. To balance the new energy component, the relative weight of CO<sub>2</sub> in the total tax for coal, natural gas and fuel oils was reduced. Tax adjustments for natural gas will take place in stages up to 2015. A low, ascending energy tax for peat is being introduced in stages through 2015. The Finnish Car Tax Act and the vehicle tax were revised and the tax increased by law in 2011. The reform of the two taxes entered into force on 1 March 2012 and 1 January 2013, respectively.

### **Energy Efficiency**

Finland's economy was the 12th most energy intensive country in 2011 in the EU, with a value well above the EU average. Compared to the other countries of the EU15 of pre-2004, Finland has in fact the most energy intensive economy. Energy intensity in the Finnish economy decreased between 2005 and 2010 by approximately 5%. This is one of the five worst values in the EU. The EU average was at 12%. Final energy consumption was only 1% lower in 2011 than in 2005, likely influenced by the global economic crisis: a decrease in industrial consumption was partially counterbalanced by increases in the transport and service sectors. The reduction in energy use seems to have accelerated between 2010 and 2011, when energy consumption decreased by 5% and thus somewhat more than the EU average (Eurostat, 2013a).

Finland's industrial sector increased its energy efficiency from 2000 to 2010 by 10% which is about the EU average. The lion's share of this improvement has taken place in the paper industry, which dominates Finland's industrial sector. However, in the last

years, especially the steel sector has shown declining energy efficiency. In the household sector, energy efficiency increased by 16% between 1995 and 2010 (Odyssee 2012).

Finland promotes efficiency measures in several overarching programmes. ERA17 is an Action Plan (toimintaohjelma) on energy-efficiency and building matters, which operates at both national and regional levels. Published in 2010, it contains proposals for a wide range of intervention areas including decentralized electricity production, construction, real estate management and land use. Some of the ideas have been adopted into the current government's agenda, while others are already being implemented in separate projects, the longest of which run through 2017. Examples include measures encouraging studies and conferences on promoting micro solar energy solutions in zero-energy buildings, implemented jointly by TEM, Ministry of the Environment and Tekes. During 2013-2014 the focus under the ERA17 programme is on improving energy efficiency assessment tools, promoting combined heat and power production and trainings.

Finland transposed the EU Energy Performance of Buildings Directive, which entered into force for new buildings in July 2012 and for the renovation of existing buildings in January 2013. Buildings now also require a certification for energy performance. The laws applicable to energy efficiency certificates entered into force on 1 June 2013. The new rules represent a change in the way energy efficiency is assessed: total energy consumption of a building is taken into account, the upper limit for energy efficiency is calculated based on the construction type expressed through a so-called e-coefficient. The e-coefficient takes into account various types of resource use, allowing district heating and renewable energy sources (such as pellets and geothermal energy) to reflect positively in the building's overall energy efficiency rating. The new law also gives more design freedom by taking into account net energy used inside a building -, in addition to heating, the e-coefficient applies to ventilation, lightning and hot water.

Support for more energy efficiency in the construction sector was strengthened by higher energy efficiency requirements under several acts that came into force in 2012 (422/2011) and 2013 (181/2013 and 176/2013). Additional new requirements will come into effect in 2014 and later. From June 2014, for example, higher technical standards will be applicable for apartment buildings, office buildings and other types of business buildings. Further, a new Technical guidance of construction 2015 is due to come into force in the middle of the year 2015. Currently TEM is developing legal acts to achieve that from 2017 all new public buildings would be zero-energy buildings (Ympäristö Kiinteistö- ja rakennusalan energiätehokkuutta ja kestäväää rakentamista koskevia säädöksiä. Ympäristöministeriö, "Tiekartta" 2013-2020, 2013).

Aside from standards, Finland also subsidised household energy efficiency improvements through a grant scheme for repairs to buildings that involves an act (1184/2005) and a decree (128/2006). The grants subsidise various energy efficiency improvements in heating systems such as insulation materials and new windows, and also support connection to the district heating network and energy auditing. The grant can finance up to 25% of the total cost of the action undertaken. Subsidies for such energy efficiency measures in residential buildings ended on 1 January 2013, but continue for some conservation measures for row houses and blocks of flats. In the middle of September, the Ministry of the Environment presented its budget for the year 2014, which will be €267 Million, a €5.5 Million increase compared to the previous year. One of the main focus points of the 2014 Ministry's budget is energy efficient reconstruction and renovation in large apartment buildings and office buildings for public sector. The grant scheme is



continuously updated and the most recent amendments to these acts entered into force on the 15<sup>th</sup> of January 2013.

### **Renewable Energy**

Finland's energy sector exhibits a high percentage of renewable sources, which increased from 28.6% to 31.8% between 2005 and 2011. Finland is thus making some progress towards its 38% target for 2020 but needs to increase the speed at which it is deploying renewable energy capacity. Its electricity sector also has a high share of renewable generation, but increased only slightly from 26.9% in 2005 to 29.2% in 2011 (Eurostat, 2013b).

Since early 2011, the main promotion scheme for electricity from renewable sources in Finland is a premium feed-in tariff for electricity from wind, biomass and biogas. The support rate varies depending on the technology – electricity from biogas receives €ct 8.35 per kWh with a possible heat bonus €ct 5 per kWh, electricity from biomass receives €ct 1.8 - 8.35 per kWh with a possible heat bonus of €ct 2 per kWh, and wind receives €ct 8.35 - 10.53 per kWh. In contrast to most other support schemes in the European Union, the Finnish premium feed-in tariff is not funded through the final consumers via the electricity bill but through the budget of the Energy Market Authority. The foreseen budget for the scheme amounts to €34 million. The premium feed-in-tariff has led to the development of large wind power projects which has led to an incremental increase of installed wind power: 96 MW in 2010; 199 MW in 2011; and 288 MW at the end of 2012. The tariff only applies to large installations in wind, biomass and biogas – not to photovoltaics or for instance to biomass plants with a nominal capacity of less than 100 kW.

The burdensome administrative procedures on wind power plant development have for long been considered one of the main non-cost barriers to the development of the sector. Questions concerning administrative barriers and also the economic benefits of (offshore) wind plants, have been addressed in a series of studies, political debates and conferences. At the end of June 2013, the Ministry of Employment and the Economy set up a working group to address the challenges posed by wind plants to radar and surveillance systems, including possible problems caused by off-shore wind parks to maritime surveillance.

As a direct follow-up to the report in June 2013, the Act no.490/2013 was adopted with the aim of overcoming obstacles to wind power plant construction caused by possible disturbances wind turbines may have on radars. The Act concerns the development of the wind power park in the Bay of Bothnia, which encompasses 2,425 m<sup>2</sup> and is located in the municipalities of Hailuoto, Lumijoki, Raahe, Siikajoki and Pyhäjoki, in the central part of Finland. According to the Act, a compensation fee of € 50,000 per turbine would have to be paid by wind power producers intending to construct in the aforementioned Bay. These payments would take the form of tax-like fees and would be made to the Energy Market Authority, the responsible institution for handling feed-in-tariffs. The compensation sum is estimated to reach a total of €18.5 million, which could then be used to finance the additional necessary radars. This is expected to create security for investors and boost the development of the Bothnia Bay wind power park. These changes have to be seen in the framework of renewable energy targets, according to which the production of electricity from wind is expected to rise to 6 TWh by 2020 and to 9 TWh by 2025, which would require around 700 new turbines to be constructed. It is

estimated that the future wind farms in the Bay of Bothnia could contribute over 1 TWh. As a second example, at the end of August the Government proposed an amendment to the Land Use and Building Act, which aims at facilitating the construction of wind power plants in already existing industrial and harbour areas.

In October 2013, a new wind farm was opened in Raahe, located on the coast by the Gulf of Bothnia. The opening of the new wind farm follows recent legislative changes aimed at easing wind power plant construction and investor confidence (Keravan energia, 2013). Moreover, on 6 November 2013, Finland's Ministry of Employment and the Economy announced that six companies (Innopower Ltd; Mervento Ltd; Rajakiiri Ltd; Suomen Hyötytuuli Ltd; Suomen Merituulivoima Ltd; and joint-venture which will be established by Propel Voima Ltd ja Lumituuli Ltd) have applied for a total of nine different demonstration projects for producing offshore wind energy in Finland. State budget for the support of projects is €20 million. Most locations of the proposed projects are between 2 - 9 kilometres from the coast of Finland. The Ministry of Employment and the Economy will consider applications during 2013 and will decide which projects will go to the second stage of the application process (TEM, 2013).

The Finnish government has proposed to introduce a Windfall tax (*Voimalaitosvero*) on domestic hydro, wind and nuclear power plants. The "windfall profits" earned by energy power plants in operation before the EU Emissions Trading System (EU ETS) are subject to the proposed tax. Small power plants would be exempt from the proposed tax. The Government's reasoning for proposing the introduction of the windfall tax is related to the increased price of electricity in the Nordic countries since the implementation of the EU ETS. Since nuclear energy, wind and hydro power produce no carbon dioxide emissions, they benefit most from higher prices. The proposed tax is expected to increase the fiscal revenue of the government by € 50 million annually. Half of this would be paid by Fortum (Finland's state owned energy company). On 23 November 2013, Fortum submitted a complaint to the European Commission arguing that the proposed measure would confer an unfair advantage on those carbon-free plants that are exempt. Moreover, Fortum argued that imposing such a tax is a violation of the EU tax law and energy policy which is aimed at producing more electricity from renewable energy sources (Fortum's complain concerning state aid, 2013). The government's proposal has also received severe criticism from the Finnish Energy Industry Association that considers it harmful to the overall investment climate (Energiateollisuus, 2013).

Beyond the tariffs, Finland also offers grants and subsidies for renewable power projects and research via its "Energy Aid Scheme". All types of renewable energy projects are eligible, including solar, hydro, and geothermal – and not just projects involving actual stationary sources of renewable power, but even research projects involving renewable energy can apply for subsidies. A company or entity receiving a subsidy must bear at least 25% of the total project costs, but the grant covers up to 40% of investment costs for selected applicants.

Recent amendments to the above-mentioned grant scheme for energy efficiency also extended its support to renewable energy, focusing on renovations of single-family houses with the purpose of deploying renewable technologies.

### **Energy Networks**

The Estlink project is an interconnection between Estonia and Finland to secure power supply and to integrate Baltic and Nordic Energy Markets. Estlink 1 (350 MW capacity) is

in operation since December 2007. The Estlink 2 (600 MW capacity) is an underwater cable stretching some 170 km between the two countries, of which 147 km is underwater. The responsible ministry on Finland's side is the Ministry of Employment and the Economy. Costs for the construction are estimated at €430 million. Construction of the cable is currently finished and functional tests started in November 2013. The final acceptance and full operation date of the EstLink 2 is scheduled for February 2014.

Since 2009, the Finnish government has been pushing through legislation on the large scale introduction of electricity smart meters. As a consequence, by 2014 almost all end-users should have smart meters installed. The smart meter rollout is the first step toward developing the energy infrastructure for smart grids. Current discussions around smart grids take place within the Ministry of Employment and the Economy and centre around how to incentivise incorporation of micro-systems systems into the existing distribution grid.

### **Transport**

Emissions from transport have increased between 1990 and 2011 but show a slight downward trend since 2005. Their proportion among Finland's total emissions is fluctuating and amounted to 20% in 2011. Average emissions for newly registered cars are high in Finland with a level of 139.1 CO<sub>2</sub>/km. This level is the 11<sup>th</sup> highest in the EU but has decreased at a higher rate than the EU average between 2005 and 2012 (Eurostat 2013a).

By 2020, Finland aims for the vehicle fleet to achieve average CO<sub>2</sub> emissions of 137.9 g/km. Measures to achieve these goals include basing Finland's vehicle taxes largely on CO<sub>2</sub> emissions. For passenger cars and vans, a tax has to be paid before the first registration or use based on the value of the vehicle and the CO<sub>2</sub> emissions emitted per km. Finland introduced also a ownership tax, which is based on CO<sub>2</sub> emissions only (ACEA 2012). As a part of the new Climate and Energy Strategy, the impact assessment of introducing road-charges is foreseen. While both petrol and diesel tax rates are well above the EU average, around €180/1000 litres lower tax rates for diesel are striking. Both taxes on petrol and diesel include taxes on CO<sub>2</sub> components (European Commission 2013).

Transport is seen as a key field in which further energy efficiency and emission reductions can be obtained. In a report, "Future possibilities in transport" *Tulevaisuuden käyttövoimat liikenteessä* published by the Ministry of Transport and Communications working group, it is proposed to abandon the use of fossil fuels in passenger car traffic by 2050. An intermediate target foresees that by 2030 all cars registered in Finland would be suitable for the use of alternative fuels and that their energy efficiency levels would doubled compared to 2013. As for heavy traffic, the share of bio fuels, both fluid and gaseous, should form at least 70% by 2050. Moreover, 70% of urban public transport should function on emission free energy. The report also foresees measures to reduce emissions from maritime and aviation transport through combining measures to increase energy efficiency and the use of biofuels. Terminal transport in airports and harbours should achieve near zero-emission by already 2030.

A working group set up by the Ministry of Transport and Communications recommended in November 2012 to increase the maximum weight and dimensions allowed for heavy weight vehicles. Since 1 October 2013, the Government follows the working group's recommendations and aims at boosting the competitiveness of logistics in Finland and

bringing the sectors' costs to a comparable level to other EU countries. According to the Act, the maximum permissible weight for vehicles will increase from 4.2 meters to 4.6 meters and mass from 60 tonnes to 76 tonnes. The estimated savings over a period of 20 years are expected to be € 1.6 - 3.2 billion.

In June 2013, the Ministry of Transport and Communications published the "Second Generation Strategy for Intelligent Transport" (*Toisen sukupolven älystrategia liikenteelle*). The new strategy aims to increase transport information services, improve the productivity and efficiency of the transport system, and promote development of information and communications technology innovations. The strategy will guide projects from 2013 to 2017 that the Ministry estimates will cost € 300 million. Such projects include creating a snapshot of and control systems for the transport system, as well as building a unified public transportation system. Better information services for transport will be put into place. Other key projects will concentrate on intelligent traffic monitoring, development of safety systems and ensuring interoperability of the different means of transport. The strategy encourages the cooperation of the public and private sector and underlines the opportunity this represents for Finnish companies that already possess significant know-how in the area of intelligent transport. Under the Government's framework policy decision "More for Less - Wisely!" transport efficiency is a key pillar. Emphasis is put on developing public transport, a reform is foreseen concerning the benefits and financial incentives of work-based traffic in order to promote the use of public transport, but also walking and cycling. This reform will be accompanied by an awareness raising campaign. Current biofuel obligations constitute Finland's implementation of EU biofuels directive (2003/30/EC) and have been in force since 2008 – they set an annual minimum share of biofuels, measured from the total energy content of petrol, diesel and biofuels delivered for consumption. Amendments to these rules came into force on 1 January 2011, specifying further obligations for fuel-mixing: six per cent for 2011–2014, followed by a phased increase to 20% by 2020.

## **Waste**

The New Waste Act and following regulations came into force on 1 May 2012 (laws no. 646-666/2011). The Government decree on waste (179/2012) foresees that by 2016 more than 50% of all organic waste will be recycled. In addition, in May 2013, the Government issued two decrees restricting the disposition of organic waste to landfills and regulating the use of such waste in landfills (Act no.331/2013). The restrictions will be applied from 1 January 2016 onwards and for construction and demolition waste from 1 January 2020 onwards.

In October 2013, the working group on energy efficiency and material use handed in its proposals for the Guidelines for material use and efficiency to the Ministry of the Environment. The guidelines are linked to the currently ongoing preparation of the national material efficiency programme and focus on measures that promote more efficient use of building materials through waste reduction and improved recycling (Ympäristö n, 2013).

## **Land Use, Land Use Change and Forestry**

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 (including furniture and paper products)

affecting emissions from the category land use, land use change and forestry (LULUCF, or carbon sinks). The plan includes several measures implemented on an ongoing basis at the national and regional level that pertain to green growth and job creation in the forest and natural resources sector and also have implications for emissions, as forests are carbon sinks. For example, a recent NFP activity was a workshop on "New economic incentives for natural forest management" which took place in October 2012. The annual budget of the NFP and its many programmes fluctuates (it depends partly on industry contributions, which vary over time) but is estimated at €600-800 million. NFP estimates indicate that in 2009, approximately 83,000 people were employed in forest management and forest-related industries including furniture.

According to the national climate and energy strategy wood is the single most important raw material in the pursuit of 2020 renewable energy targets. The aim is to raise the part of wood chips in heat and electricity production from about 16 TWh to 25 TWh by 2020. Considering these goals the Government has submitted a proposal to the Parliament to amend the Forest Act and change the applicable harvesting rules. The aim is to allow the private forest owners better manage their forests and guarantee the supply of raw material and smooth the current fluctuations in the supply.

### Adaptation

At the end of August the Government made a proposal to the Parliament to amend the Water Act in order to improve the preparedness for floods, droughts and other extreme changes in water conditions. This legislative change is a part of a wider scheme designated to contribute to climate change adaptation.

## 5 Policy progress on past CSRs

As part of the European Semester, Country Specific Recommendations (CSRs) for each MS are provided by the EU Commission in June of each year for consideration and endorsement by the European Council). The recommendations are designed to address the major challenges facing each country in relation to the targets outlined in the EU 2020 Strategy. In the following table, those CSRs that are relevant for climate change and energy that were adopted in 2013 are listed, and their progress towards their implementation is assessed.

Existing Country Specific Recommendations	Progress
Continue diversification of the industry towards less energy intensive sectors	There is an agreement with industries and business to increase energy efficiency, including a target of 9% energy saving between 2008 and 2016. Subsidies are provided for investments and energy auditing (EEW 2013, Odyssee 2012). However, no specific developments could be identified in 2013.

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