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Country Factsheet Finland

Accompanying the document

COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE, THE COMMITTEE OF THE REGIONS AND THE EUROPEAN INVESTMENT BANK

State of the Energy Union

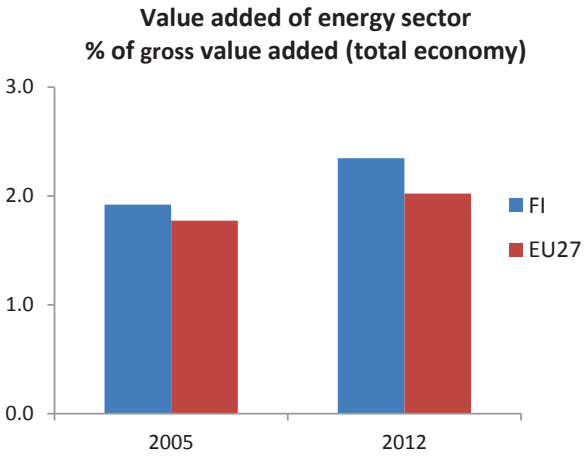
{COM(2015) 572}
{SWD(2015) 208 à 209}
{SWD(2015) 217 à 222}
{SWD(2015) 224 à 243}

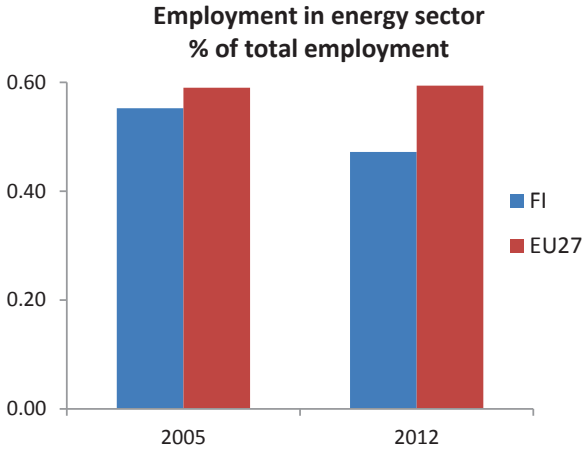
Towards an Energy Union
Finland

Macroeconomic relevance of energy

IMPORTANCE OF THE ENERGY SECTOR

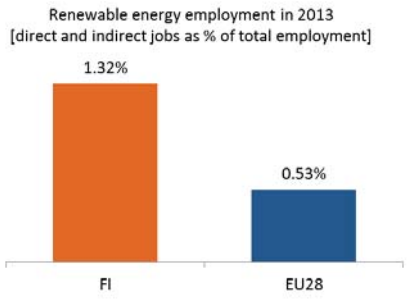
The value added of the energy sector amounted to 1.9% of GVA in 2005 in Finland, expanding to 2.3% in 2012. Its share is higher than the EU-average. The share of the energy sector in total employment is on the other hand lower than average. It has fallen since 2005, resulting in 0.47% of total employment in 2012.





Source: EUROSTAT – National Accounts

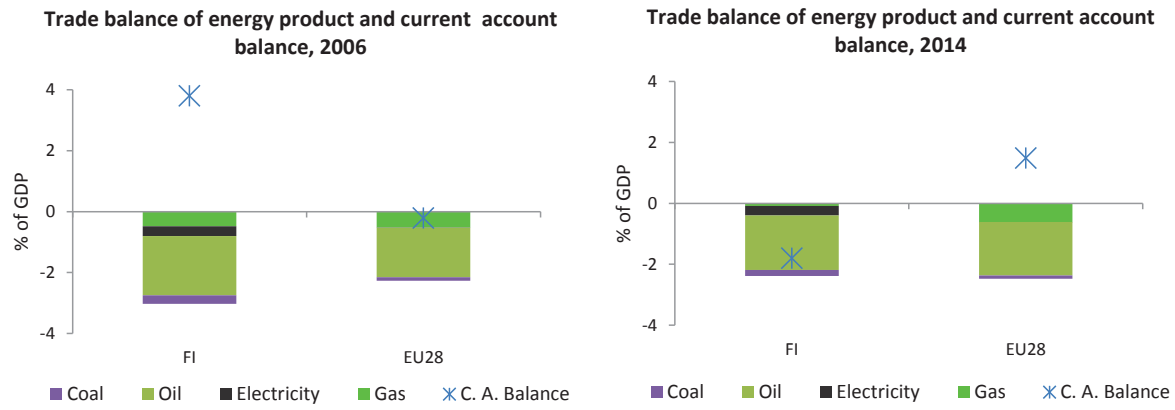
According to EurObserv'ER, in 2013, the share of direct and indirect renewable energy related employment in total employment of the economy in Finland was at about 1.32%, above the EU average of 0.53%.



Source: European Commission, based on EurObserv'ER and EUROSTAT

TRADE BALANCE OF ENERGY PRODUCTS

Finland is a net importer of fossil fuels and normally also of electricity. The trade deficits in the energy products appear to be relatively stable over time. Finland had a current account surplus up until 2010; thereafter a deficit has been recorded. The contribution of the energy trade has remained negative throughout this period, and was slightly below the EU-average in 2014.



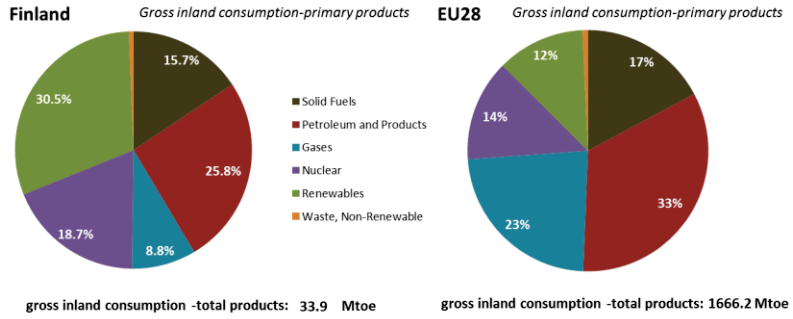
Source: EUROSTAT
Note: Current account balance for EU28 from European Commission (AMECO)

1. Energy Security, solidarity and trust

ENERGY MIX

The energy mix of Finland differs from the one of the EU28, with the notable difference of a much higher share of renewable energy in gross inland energy consumption and – to a lesser extent - nuclear. Compared to 1995, the share of renewable energy in gross inland consumption sharply increased, more than EU average (from 21% to 30%[1] of the energy mix), while the share of gases only slightly decreased (by 1 percentage point). The main decrease concerns the use of solid fuels (by 6 percentage points).

Gross inland energy consumption in 2013



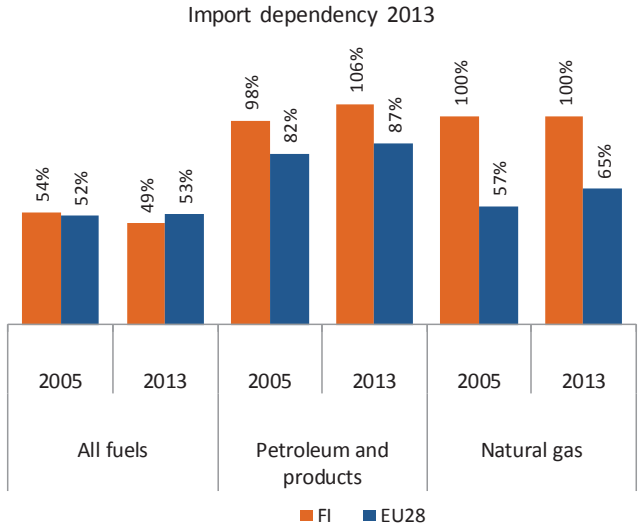
Source: European Commission, based on EUROSTAT

IMPORT DEPENDENCY

Finland has an overall import dependency[2] below the EU28, while importing 100% of its crude oil and gases. Crude oil is refined in Finland and 90% of it is then exported. Moreover, Finland is solely dependent on gas imports from Russia[3] (although gas represents only 9% of gross inland consumption). Overall, the supply concentration index is high for Finland. The energy trade deficit is slightly below EU average.

1 Equivalent to 37% of final energy consumption.
2 An import dependency rate in excess of 100% indicates that energy products have been stocked
3 Top non-EU gas suppliers table is based on EUROSTAT data. The share of imports from non-EU countries is calculated as the ratio between volumes of imports from that specific non-EU supplier and total imports (from EU and non-EU countries).

Finland is reliant on electricity imports during peak demand periods. It will continue to be reliant until and to some extent also after the 1600 MW nuclear power plant, Olkiluoto 3, is complete (with the start of electricity production planned in late 2018).



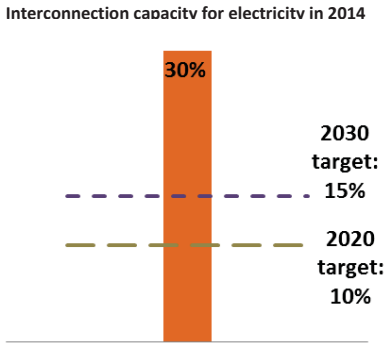
Top non-EU gas suppliers in 2013 (% in total imports)

Finland		European Union	
country	[%]	country	[%]
Russia	100.0	Russia	39.0
		Norway	29.5
		Algeria	9.7
		Qatar	6.7

Source: European Commission, based on EUROSTAT

2. A fully-integrated internal energy market

INTERCONNECTIONS



Source: European Commission based on ENTSO-E scenario outlook and adequacy forecast 2014

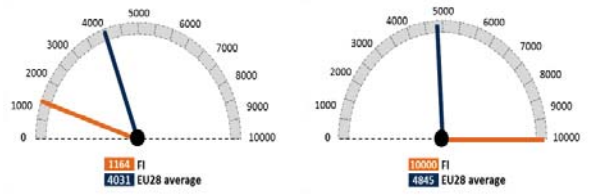
Note: Reference to 2030 target is based on October 2014 European Council conclusions stating that "the Commission will also report regularly to the European Council with the objective of arriving at a 15% target by 2030"

The interconnection capacity for electricity in Finland is at 30%, well above the 2020 and 2030 targets. The second interconnector with Estonia, Estlink2 (supported under the European Energy Programme for Recovery), started operation at the beginning of 2014. The new cable tripled the interconnection capacity with Estonia, thus improving the connection with the Baltic States.

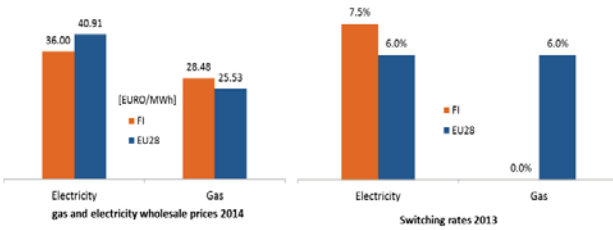
The Finnish natural gas market is isolated as it is fully dependent on gas imports from Russia. Two projects out of the 33 key security of supply infrastructure projects listed in the European Energy Security Strategy (EESS) are relevant for Finland and address the issue. These are the regional Baltic LNG terminal and the Finland–Estonia gas interconnector 'Balticconnector', which are key in ending Finland's energy isolation in the gas sector and diversifying gas sources and counterparts. Several (both on-grid and off-grid) smaller scale LNG terminals are also under preparation/construction in Finland.

ELECTRICITY AND GAS MARKETS

Market concentration index for power generation (left) and gas supply (right) (2013) (Herfindahl index – 10000 means monopoly)



Sources: European Commission based on ESTAT, CEER and Platts Power Vision



Sources:ESTAT and European Commission Calculations

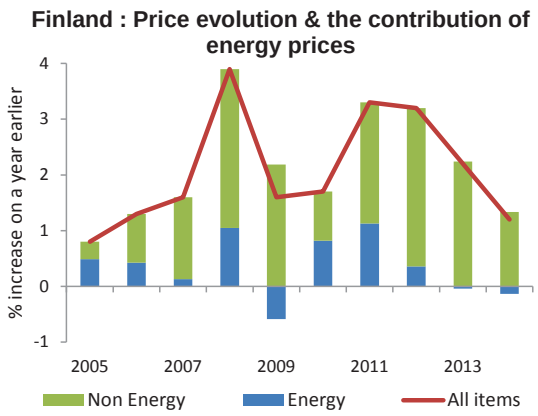
The concentration of the power generation market is much below EU average while concentration on gas markets is at the maximum level. Gasum Oy acts as the sole importer and transmission system operator on the basis of long term supply contracts.

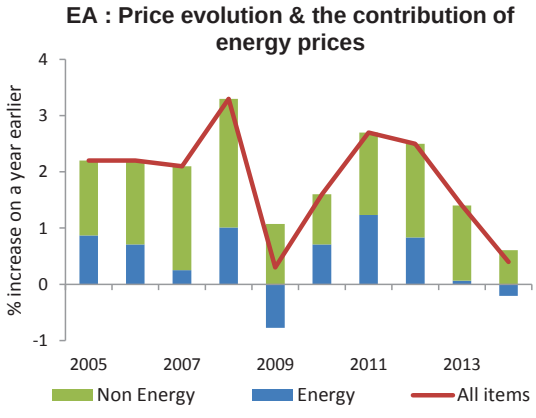
Wholesale electricity prices are slightly below EU average while wholesale gas prices are above the EU average.

The annual switching rate has settled at a level of 7-8%. One of the strengths of the Finnish retail market is smart metering. The rate of smart metering reached 97% by the end of 2013. They have enabled advantageous spot price-based electricity contracts and also energy demand response and other innovative services. There is no switching on the gas market as gas retailers in Finland have a monopoly within their own distribution network. Gas is used by industry and energy production and only marginally by households.

CONTRIBUTION OF ENERGY TO CONSUMER PRICE EVOLUTION

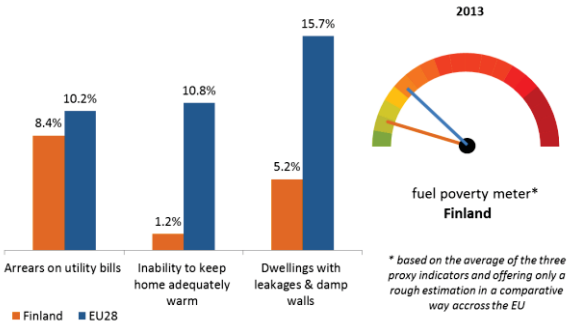
Inflation in Finland was lower than on average in the EU before the crisis, but since 2011 the development of the rate is close to the Euro area-average. Energy prices are contributing, but have played a somewhat less of a role in recent years for the overall price development in Finland as compared to other Euro area countries. The share of energy products in the households' consumption basket is smaller in Finland than in the EU or the Euro area on average.





Source:DG ECFIN based on Eurostat

VULNERABLE CONSUMERS

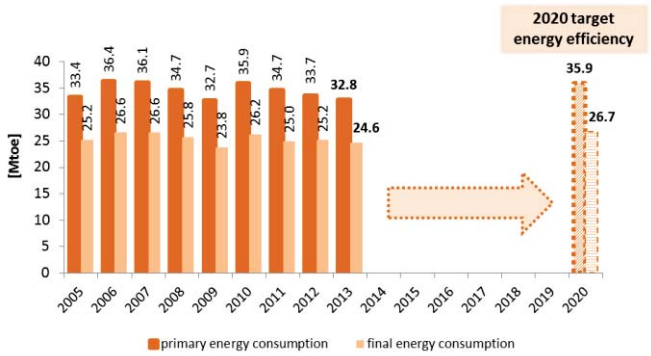


Source: European Commission, based on on EUROSTAT SILC survey

Based on a EUROSTAT survey on income and living conditions, three proxy indicators are used to assess fuel poverty. They indicate that it is less of a stringent issue in Finland than in the rest of the EU. Social assistance is a last-resort form of income security in Finland and used to address consumer vulnerability. It is based on the client's essential expenses, which include electricity and heating bills.

3. Energy Efficiency and moderation of energy demand

ENERGY EFFICIENCY TARGET 2020
(35.9 Mtoe primary energy and 26.7 Mtoe final energy)



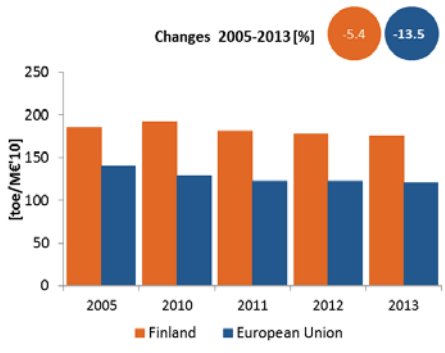
Source: European Commission, based on EUROSTAT and on national energy efficiency targets as declared by the MS under the Energy Efficiency Directive

Finland's 2020 energy efficiency target is 35.9 Mtoe expressed in primary energy consumption (26.7 Mtoe expressed in final energy consumption). Even if Finland's current primary energy consumption (32.8 Mtoe in 2013) is below its 2020 target, the margin is small and additional efforts are needed to keep the primary energy consumption at this level or to minimise its increase when the GDP increases again during the next five year period.

ENERGY INTENSITY

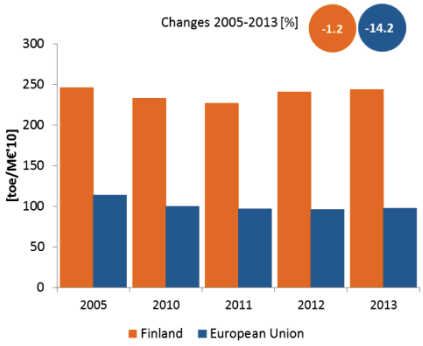
Primary energy intensity in Finland is above EU average, and has decreased at a slower pace since 2005. This is even more striking in the industrial sector, due to Finland's sectoral specialisation in energy intensive industries.

Primary energy intensity of the economy



Source: European Commission based on EUROSTAT and European Commission/AMECO

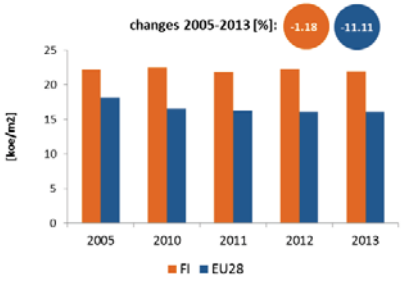
Final energy intensity in industry



Source: European Commission based on EUROSTAT and European Commission/AMECO

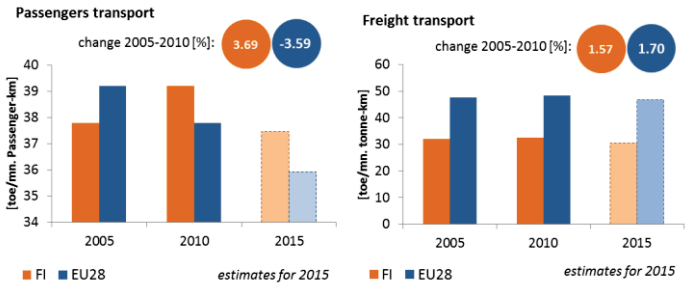
Specific energy consumption by households is above EU average and decreased at a much slower pace than the EU average.The specific energy intensity of passengers cars increased slightly between 2005 and 2010 which reflects a less efficient usage of cars. The specific energy intensity for freight transport increased slightly between 2005 and 2010, but it remains below EU average.

Final energy consumption per m2 in residential sector, climate corrected



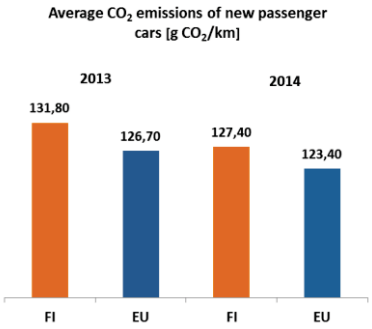
Source: European Commission based on Odyssee database

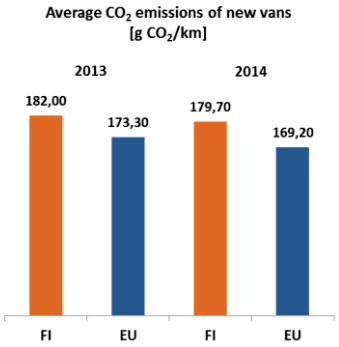
Specific energy intensity for passenger cars and freight transport[4]



Source: PRIMES model background data and estimations based on EU Commission and EU MS inputs

EU legislation sets mandatory CO2 emission reduction targets for new cars and vans. By 2021, the fleet average to be achieved by all new cars is 95 grams of CO2 per kilometre. For new vans, the fleet average is set at 147 g/km by 2020.

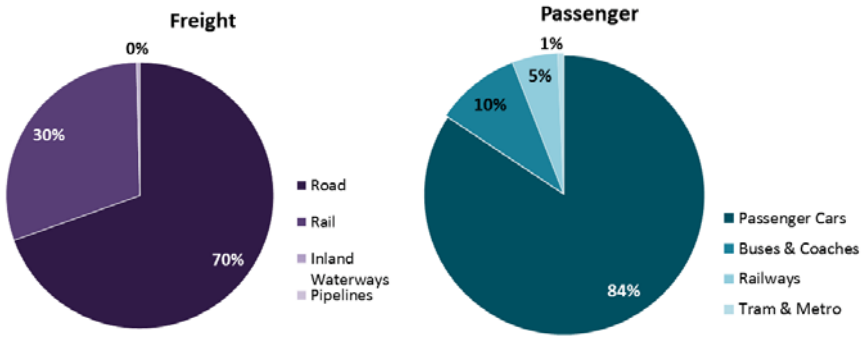




Source: European Environmental Agency. 2014 values are provisional. 2013 EU average refers to EU-27

Regarding transport performance, in EU-28 the inland freight modal shares are 71% by road, 17% by rail, 7% by inland waterways and 5% by pipelines. The respective inland passenger modal shares are 82% by private car, 9% by buses and coaches, 7% by railways and 2% by tram and metro.

Modal shares Finland

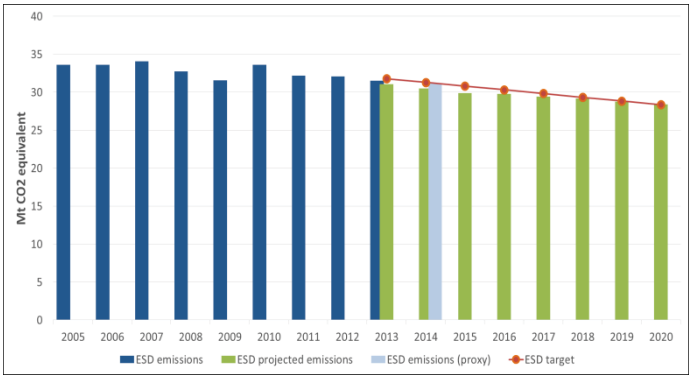


Source: Eurostat and EU transport in figures 2015. Data refers to 2013. Modal shares based on tonne-kilometres for freight sector and passenger-kilometres for passenger sector, freight data based on activity within country territory. Estimates are made when data is missing.

[4] Statistics on energy demand for passengers and freight transport are not available and model estimates have been used instead. These issues should be borne in mind when comparing energy intensity in freight or passenger transport between Member States, which should be regarded as merely indicative.

4. Decarbonisation of the economy

NON-ETS GHG EMISSION REDUCTION TARGET 2020 (-16% by 2020 as compared to 2005 in the non-ETS sector)



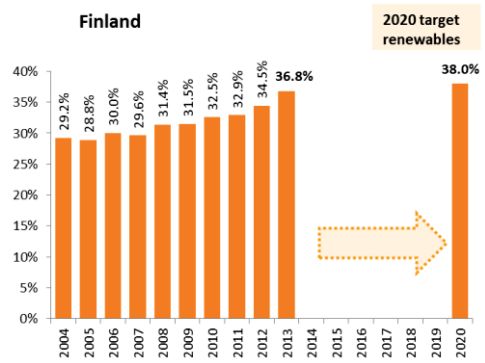
Source: European Commission based on EEA. Based on preliminary inventory data.

ESD (Effort Sharing Decision) emissions are the emissions not covered by the EU ETS

Finland has decreased its emissions by 8% between 2005 and 2014 (based on 2014 approximated data). According to its 2015 projections Finland is on track to reach its 2020 target.

Non-ETS Emissions (vs. 2005)	Projections/proxy	target
Projections with existing measures 2020	-16%	-16%
Proxy 2014	-8%	-7%

RENEWABLE ENERGY SHARE TARGET 2020 (38%)



Source: European Commission based on EUROSTAT

Finland is one of the EU leading users of renewable energy, which provided almost 37% of total energy consumption in 2013[5], 5.4% higher than the National Renewable Energy Action Plan trajectory. The most important renewable sources of energy are bioenergy and hydropower. Finland is well on track, and even above, in attaining its renewable energy target. In transport, Finland is also one of the few countries on track towards achieving the 10% target by 2020, with a share of renewables in transports of 9.9% in 2013[6] and a national target of 20% by 2020.

GREENHOUSE GAS EMISSION INDICATORS

- In 2014, the revenues from the auctioning of ETS allowances amounted to EUR 63.5 million, out of which almost 50% are used or planned to be used for energy and climate related purposes.

5 Latest Eurostat data: 36.8%

6 Eurostat

Largest Sectors of GHG Emissions in 2012 (*)	Finland	EU Average
Energy/power industry	34%	33%
Transport	21%	20%
Industry	23%	19%
Agriculture (incl. forestry & fishery)	12%	12%
Residential & Commercial	5%	13%
Waste & others	5%	3%

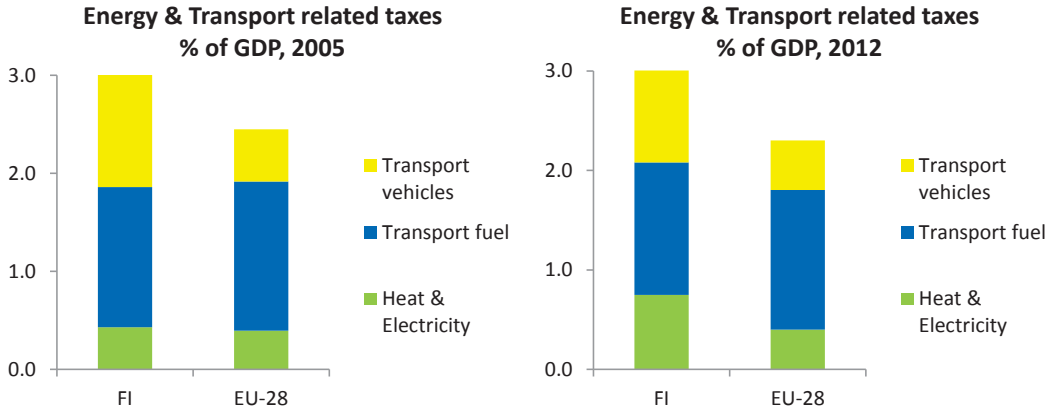
(*)Sectoral breakdown for 2013 data not available.

GHG Emissions	Finland	EU
EU ETS auctioning revenues in 2014 (EUR millions)	63.5	3205
Share of ETS emissions in 2013	50%	42%
GHG emissions/capita in 2013 (tCO_2equivalent)	11.7	8.5
Carbon intensity of the economy in 2013 (tCO_2equivalent/EUR millions)	339	328

Source: European Commission based on EEA

ENERGY & TRANSPORT TAXATION

Energy and transport related taxes as a share of GDP in Finland is higher than for the EU-average. The taxation of transport fuel as a share of GDP is in line with the EU-average, while both taxation of transport vehicles, and electricity and heating fuels is above average. The overall tax burden in 2012 has been stable since 2005 in relation to GDP, but the composition has changed. Taxation of transport vehicles and fuel has fallen somewhat as a share of GDP, which has been compensated by an increased tax burden on electricity and heating fuels.

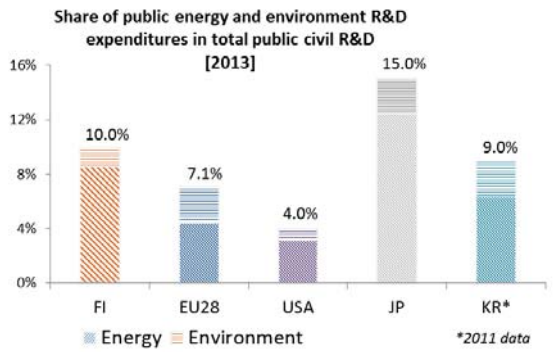


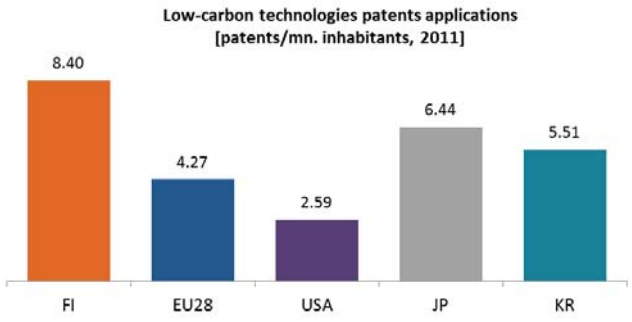
Source: Eurostat

5. Research, innovation and competitiveness

RESEARCH AND INNOVATION

Finland is above EU average, the US and South Korea in terms of public support share allocated to research and innovation in the field of energy and environment. In terms of intensity of low-carbon technologies patents, Finland performs much better than the EU average and main worldwide partners.





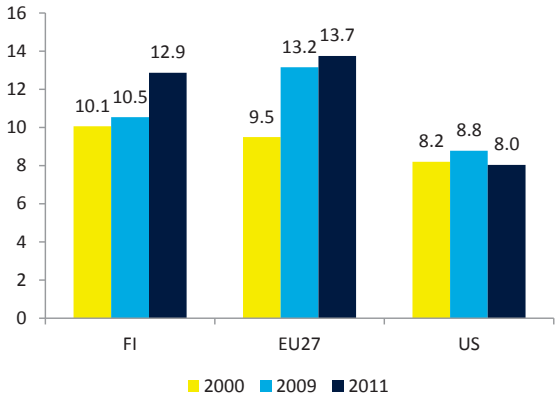
Source: European Commission based on EUROSTAT

COMPETITIVENESS

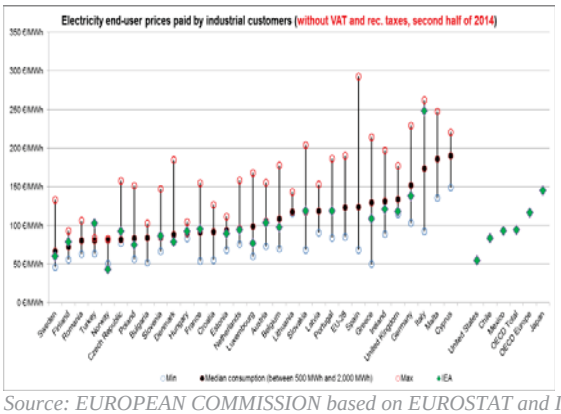
The real unit energy costs in Finland have increased but remain slightly below the EU average, while higher than in the US. This development reflects the fact that real energy prices have increased in Finland over the past ten years, while energy intensity of the manufacturing sector has improved. It remains, however, higher than in the EU, but lower than in the US.

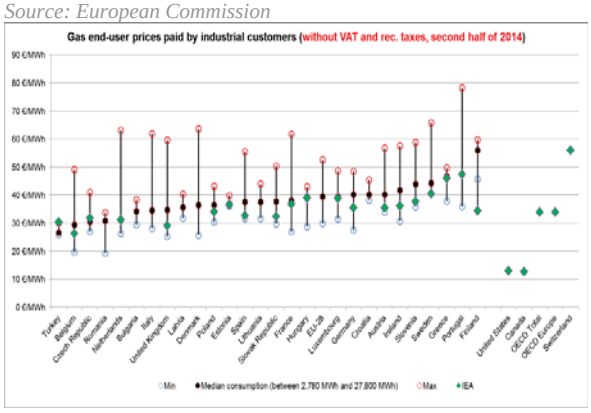
Although lower than the EU average, energy prices remain higher than in the US. Significant discrepancies can be noted between electricity and gas prices paid by industrial users. Electricity prices are among the lowest in the EU, while gas prices are among the highest.

Real unit energy costs (% of value added)



Source: European Commission





Source: EUROPEAN COMMISSION based on EUROSTAT and IEA

6. Post-2020 Energy and Climate policy Strategy

COMPREHENSIVE MEDIUM TO LONG-TERM STRATEGY (post-2020) FOR CLIMATE AND ENERGY

- Finland's medium-term climate and energy objectives are outlined in the 2013 updated "*National Energy and Climate Strategy",* which outlines concrete measures to reach the 2020 targets and includes an outlook for post 2020.
- The Strategy involves various concrete targets to be achieved by 2020: final annual energy consumption is to be capped through energy efficiency measures to 310 TWh, consumption of

heating energy will be reduced by 9%, use of mineral oil will be reduced by 20% (so that by 2025 the oil's share of total energy consumption will be below 17%). Wind-power permitting will be facilitated to increase its electricity generation to 6 TWh by 2020 and to 9 TWh by 2025. The use of peat for energy will be reduced by a third by 2025. Coal is planned to be mostly phased-out by emission-free energies by 2025. The role of forest-based biomass and other bioenergy is emphasised, particularly in efforts to replace the use of fossil fuels and peat in combined heat and power (CHP) production, which forms an important element in Finland's energy economy and energy policy.

- Following the Strategy update, the parliamentary "*Energy and Climate Roadmap 2050*" was published in November 2014. The roadmap, which outlines Finland's energy and climate policy goals for 2050, serves as a strategic guide for achieving the long-run objective of a carbon-neutral society.
- A new *Climate Act* has been approved by the Parliament in March 2015. The *Act* sets the framework necessary (albeit not binding to private companies, persons or municipalities) to reducing emissions by at least 80% of the 1990 level by 2050. However, no interim target or distinction between ETS and non-ETS has been set.
- "*Report on Energy Policy Options*" of March 2015 by the Finnish Ministry of Employment and the Economy (MEE Publications: Energy and the climate 25/2015) outlines the Finnish energy policy options and development scenarios for the coming years.

NATIONAL TARGETS, especially for 2030

Objectives, 2030-2050	Targets	Comments
GHG reduction	No (2030) Yes (2050)	Carbon-neutral society objective by 2050
Renewable energy	No (2030) Yes (2050)	Increase share of renewable energy to 60% by 2050
Energy Efficiency / savings	No (2030) Yes (2050)	Reduce energy intensity of the economy by at least 50% by 2050

7. Regional cooperation

Finland is part of the Nordic and Baltic wholesale electricity markets, which includes the Nord Pool spot market, and cooperates with its Nordic and Baltic neighbours on the advanced integration of energy markets of Finland, Sweden, Denmark, Norway, Estonia, Latvia and Lithuania.

Regional cooperation on infrastructure development is necessary to optimise the identification of regional infrastructure priorities and to coordinate cross-border investments. Finland is a member of two Regional Groups which have been established under the TEN-E Regulation: the Baltic Energy Market Interconnection Plan (BEMIP) Regional Groups for electricity and gas.

EU Member States cooperation in the energy sector in the Baltic Sea region has brought many benefits for the participating countries. The work and achievements within the framework of the Baltic Energy Market Interconnection Plan (BEMIP) agreed in June 2009 and with subsequent amendments in 2011 and 2013 respectively proved that enhanced regional cooperation can be a catalyst for positive developments both in energy infrastructure projects or market related aspects. The MoU on reinforced BEMIP was signed on 8 June 2015 with the overall goal to ensure further market and system integration of the Baltic States into European Continental network and ensure its full market functioning also strengthening the organisational structure of the BEMIP. The new MoU and Action Plan also foresees regional cooperation in new energy policy areas, including electricity and gas markets, security of supply, power generation, renewable energy and energy efficiency.

Additionally, *Regional Gas Market Coordination Group* was established on February 12, 2015 to facilitate creation of the effectively functioning regional gas market, consisting from the representatives of the ministries responsible for energy policy, the national regulatory authorities of the energy sector and the operators of the key gas infrastructure in the Baltic States and Finland.

8. Cohesion policy contribution

The EU Cohesion policy provides investment possibilities to implement energy policy objectives in Finland which will be complemented by national public and private co-financing, aiming at optimal leverage. It also ensures integrated territorial solutions to challenges by supporting capacity building, technical assistance and territorial cooperation, including the Baltic Sea Region macro-regional strategy in which Finland takes part.

Internal Energy Market: Over 2014-2020, EU Cohesion Policy will invest some EUR 3 million in smart electricity distribution grids in Finland.

Energy efficiency: Over 2014-2020, EU Cohesion Policy will invest some EUR 76 million in energy efficiency demonstrations in public infrastructure and in SMEs in Finland. A further estimated EUR 8 million will be invested in supporting the move towards an energy-efficient, decarbonised transport sector.

Decarbonisation: Common result indicator on GHG reduction not used for FI. No EU Cohesion Policy investments in renewable energy infrastructure envisaged in FI over 2014-2020; research and innovation in the area of renewable energy may be supported.

Research, Innovation and Competitiveness: Over 2014-2020, EU Cohesion Policy will invest significantly in R&I and in SME competitiveness in Finland. This will be based on the regional strategies for smart specialisation. For Finland, the strategies include a focus on energy efficiency improvements in activities, production, products/services of enterprises as well as research and innovation on energy efficiency, renewable energies and material efficiency. At this stage, at least EUR 90 million is foreseen for investments in R&I and adoption of low-carbon technologies in Finland, but this might increase further in line with the evolving content of the smart specialisation strategy.