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Country Factsheet Sweden

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

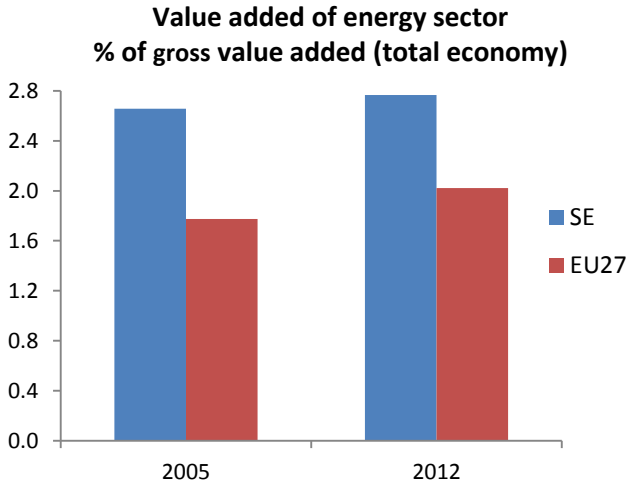
{COM(2015) 572}
{SWD(2015) 208 à 209}
{SWD(2015) 217 à 239}
{SWD(2015) 241 à 243}

Towards an Energy Union
Sweden

Macroeconomic relevance of energy

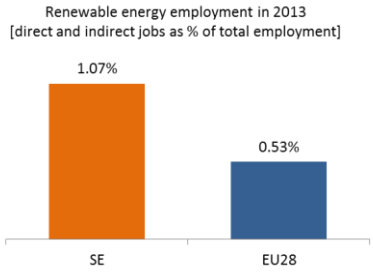
IMPORTANCE OF THE ENERGY SECTOR

The value added of the energy sector in Sweden was 2.7% in 2012, which is higher than the EU-average. The share of the energy sector of the GVA has also remained relatively stable since 2005.



Source: EUROSTAT – National Accounts

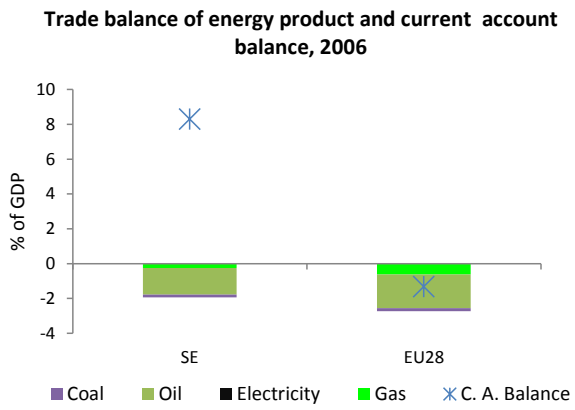
According to EurObserv'ER, in 2013, the share of direct and indirect renewable energy related employment in total employment of the economy in Sweden was at about 1.07%, above the EU average of 0.53%.

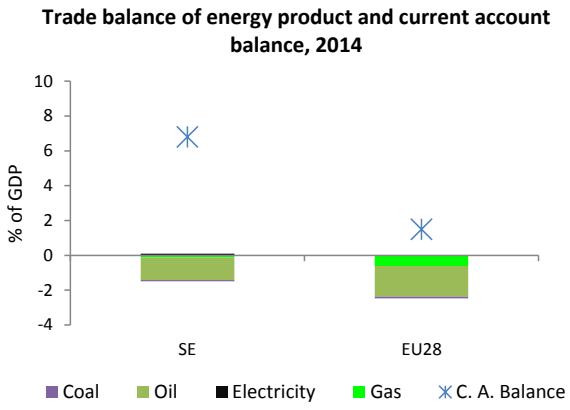


Source: European Commission, based on EurObserv'ER and EUROSTAT

TRADE BALANCE OF ENERGY PRODUCTS

Sweden has negative energy trade balance, and is dependent on import of fossil fuels. The overall energy trade deficit amounted to 1.7 % in 2006, which had fallen slightly to 1.4% of GDP in 2014. This change is mainly due the weather related net flow of the electricity trade in the corresponding year. In terms of the overall current account, Sweden is recording surpluses amounting to 6.8% of GDP in 2014.





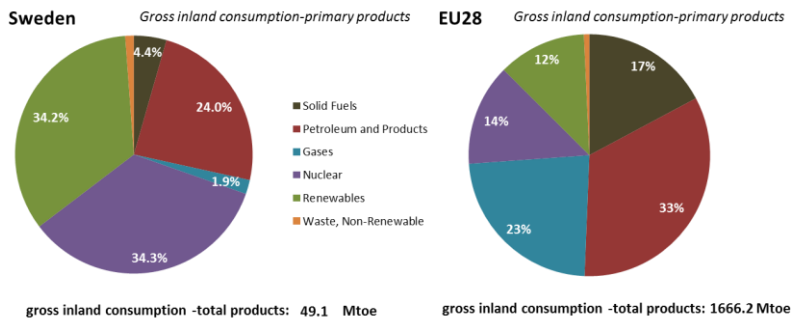
Source: EUROSTAT
Note: Current account balance for EU28 from European Commission (AMECO)

1. Energy Security, solidarity and trust

ENERGY MIX

The energy mix of Sweden differs substantially from the one of the EU-28 average and most other Member States, with much higher share of nuclear and renewable energy in both electricity and heating. Compared to 1995, the share of renewable energy increased more than the EU average (from 25% to 34% of gross inland consumption; the share of renewables in final energy consumption is substantially higher, see section 4), while the share of gases increased twofold, from 1 to 2%. The main decrease concerns the use of solid fuels and petroleum and products (1 and 9 percentage points respectively). The transition to an energy system less dependent on fossil fuels started several decades ago, with transport remaining the only sector that is highly dependent on fossil fuels. This is largely due to the developments of bioenergy, which has driven the transition away from fossil fuels in heating in particular.

Gross inland energy consumption in 2013



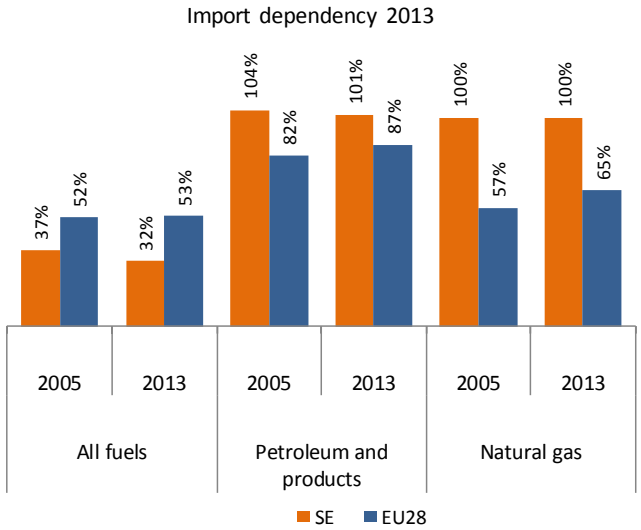
Source: European Commission, based on EUROSTAT

IMPORT DEPENDENCY

Since 2005, energy import dependency[1] decreased in Sweden, contrary to the trend in EU-28. Most significant decreases concern solid fuels, while the import dependency for petroleum products and

[1] Note: A dependency rate in excess of 100% indicates that energy products have been stocked.

natural gas remained at 100%. Sweden imports all its natural gas from Denmark[2]. Sweden has however domestic production of biogas (some 1.7 TWh). Overall the country supplier concentration index is above EU average. The energy trade deficit (expressed as percentage of GDP) is lower in Sweden than for most EU countries.



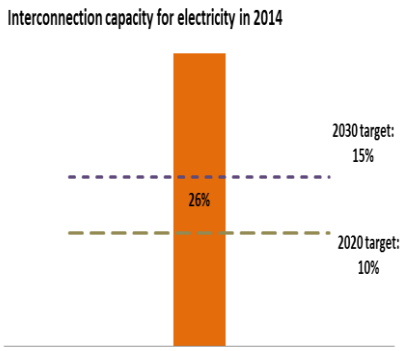
Top non-EU gas suppliers in 2013 (% in total imports)

Sweden		European Union	
country	[%]	country	[%]
	-	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"

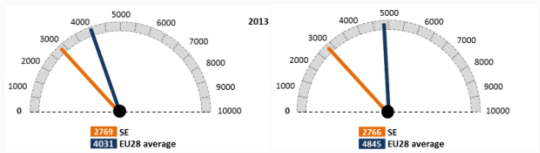
The interconnection capacity for electricity was 26% in 2014 for Sweden, well beyond the 2020 and 2030 targets of 10 and 15%. The implementation of Projects of Common Interest ("PCI") until 2020 will further increase this level. The Nordbalt project will interconnect Sweden and Lithuania through a submarine cable. Its commissioning is foreseen for the turn of the year 2015/16. Sweden is also developing an internal over-head line connecting Ekhyddan to Nybro/Hemsjö. This line would ensure the safe operation of the NordBalt interconnector and maintain the grid transfer capacity. The commissioning is foreseen for 2023.

Gas plays only a marginal role in Sweden: and all gas is supplied via one interconnector with Denmark. However, the risk of gas supply disruption is not very high because Swedish gas network functions as prolongation of the Danish system and relies on storage, mainly in Denmark, to balance seasonal demand fluctuations. However several new LNG terminals are planned, including one in Gothenburg (labelled as a PCI) which would contribute to flexibility for the Swedish gas market. Its commissioning is foreseen for 2018.

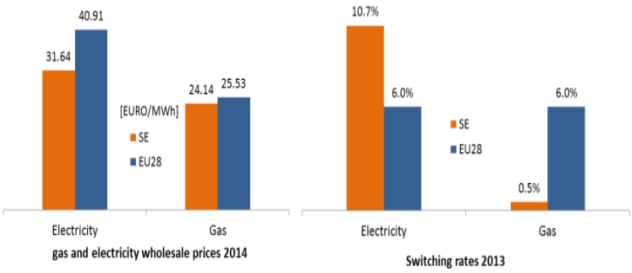
[2] Top non-EU gas suppliers table is based on EUROSTAT data. The share of imports from non-EU countries is calculated as the ratio between volumes of imports from that specific non-EU supplier and total imports (from EU and non-EU countries).

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 Swedish electricity market is part of the integrated Nordic power market. In 2012, electricity production was dominated by three companies, together controlling 79% of the generation. However, due to the connection with Nord Pool, the actual number of players active on the wholesale market is higher. Regarding gas markets, at wholesale level, two operators are active. There is no wholesale market hub as all gas is imported.

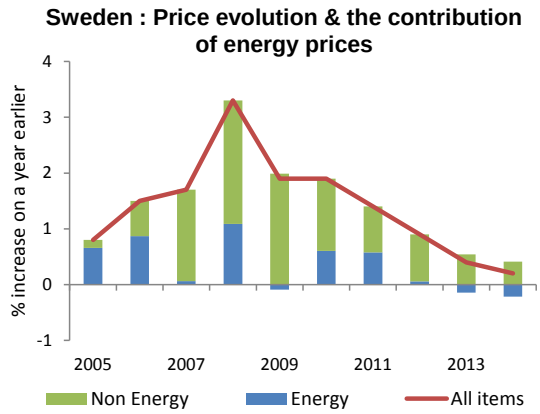
Wholesale gas and electricity prices are both below EU average.

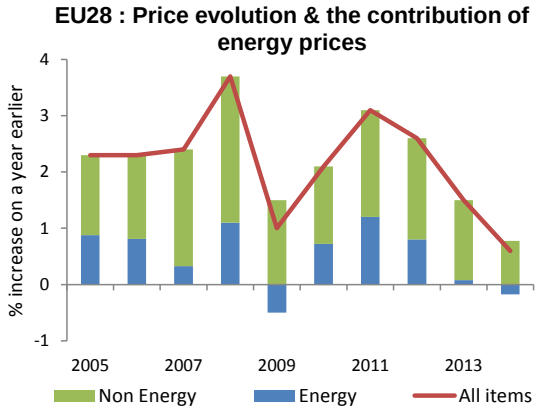
Sweden has the most nationwide electricity suppliers of any Member State (123[3]). Retail market concentration is low for both electricity and gas and is characterised by a high level of competition. The final retail electricity price correlates well with the wholesale spot market price, and retail electricity prices for both households and industry are below the EU average, while retail prices for gas are amongst the highest in the EU.

The switching rate for electricity consumers is well above the EU average, suggesting a dynamic retail market in Sweden[4]. The switching rate for gas is low, in part explained by the small size and geographic scope of the gas market. Swedish Distribution System Operators have been obliged to provide monthly meter readings to households and hourly readings to industrial customers since 2009. Since October 2012 Distribution System Operators are obliged to provide hourly meter readings to households requesting them.

CONTRIBUTION OF ENERGY TO CONSUMER PRICE EVOLUTION

The inflation has overall been lower in Sweden than on average in the EU over the observed period, and prices have fallen gradually since 2010. This development has also been underpinned by a falling contribution of energy prices to the price developments.



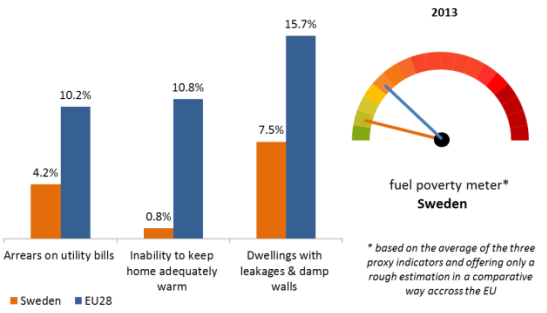


[3] http://www.ei.se/sv/elpriskollen/elbolag/.

[4] 10th Consumer Markets Scoreboard (June 2014), http://ec.europa.eu/consumers/consumer_evidence/consumer_scoreboards/10_edition/index_en.htm

Source: DG ECFIN based on Eurostat

VULNERABLE CONSUMERS

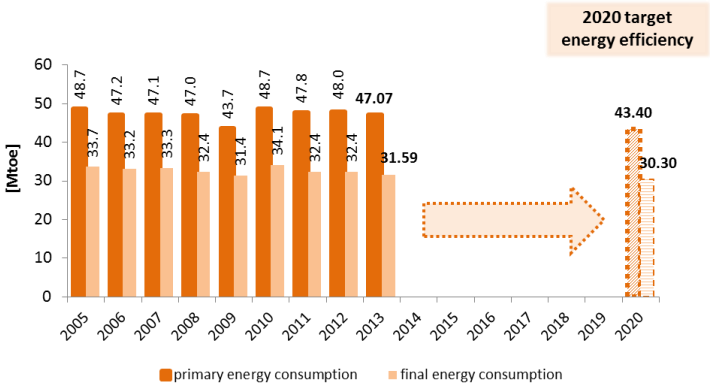


Source: European Commission, based on on EUROSTAT SILC survey

Based on a EUROSTAT survey on income and living conditions, three proxy indicators are used to consider fuel poverty. They indicate that while present, the problem is quite limited in Sweden. Since 2011, there is a definition of vulnerable consumers within the national legislation. This category of consumer is protected in the Swedish electricity and gas markets by social legislation giving consumer the right to receive assistance with their payment of electricity and natural gas supplies as part of a broader approach to ensure social protection.

3. Energy Efficiency and moderation of energy demand

ENERGY EFFICIENCY TARGET 2020
(43.4 Mtoe primary energy and 30.3 Mtoe final energy)



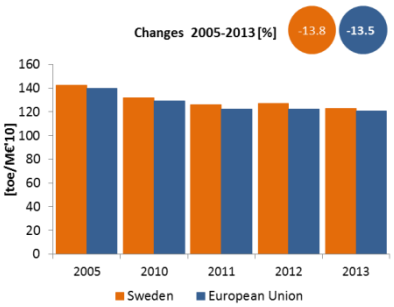
Source: European Commission, based on EUROSTAT and on national energy efficiency targets as declared by the MS under the Energy Efficiency Directive

Sweden's 2020 energy efficiency target is 43.4 Mtoe expressed in primary energy consumption (30.3 Mtoe expressed in final energy consumption). Both primary and final energy consumption show clear signs of decoupling from GDP with a flat or even decreasing development over the last decade. Sweden's primary energy consumption was 47.1 Mtoe in 2013. The need for further measures depends on whether one or more nuclear reactors are shut down before 2020.

ENERGY INTENSITY

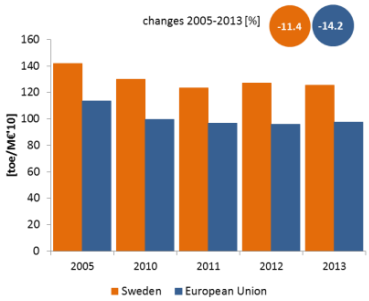
Primary energy intensity in Sweden is in line with EU average, and has decreased at a similar pace since 2005. Energy intensity in the industrial sector remains above EU average primarily due to a relatively higher share of energy intensive industry.

Primary energy intensity of the economy



Source: European Commission based on EUROSTAT

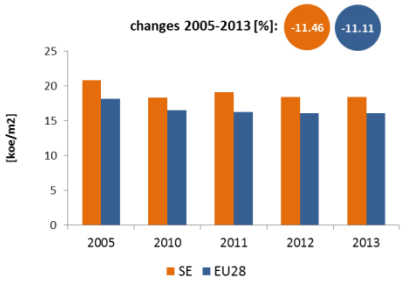
Final energy intensity in industry



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

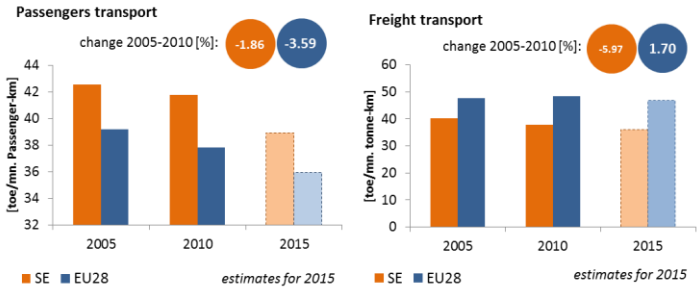
Specific energy consumption by households is above EU average driven by high demand for space heating and decreased at a similar pace than the EU average. At the same time, Sweden has decreased the use of fossil fuels for heating purposes drastically over the last decades, resulting in significantly lower CO2 emissions. The specific energy intensity of passenger cars only slightlty decreased between 2005 and 2010, and remains above EU average due to a preference for larger and less fuel-efficient cars. The specific energy intensity for freight transport has slightly decreased between 2005-2010.

Final energy consumption per m2 in residential sector, climate corrected[5]



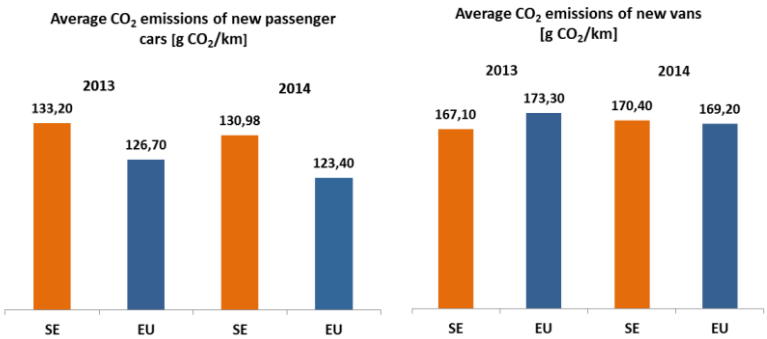
Source: European Commission based on Odyssee database

Specific energy intensity for passenger cars and freight transport[6]



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

EU legislation sets mandatory CO_2 emission reduction targets for new cars and vans. By 2021, the fleet average to be achieved by all new cars is 95 grams of CO_2 per kilometre. For new vans, the fleet average is set at 147 g/km by 2020.



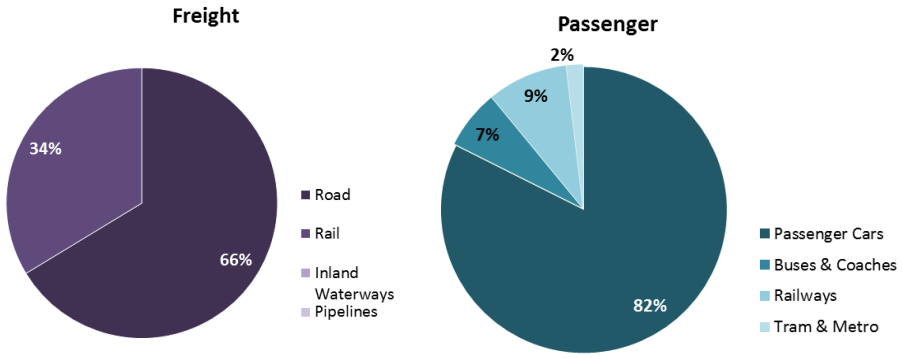
Source: European Environmental Agency. 2014 values are provisional. 2013 EU average refers to EU-27.

5 Sweden has a more restrictive measure for calculating the surface of residential housing than in some other Member States, impacting the figure for energy consumption per m2.

6 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.

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. Compared to the European average, Sweden reports a higher use of rail in freight transport.

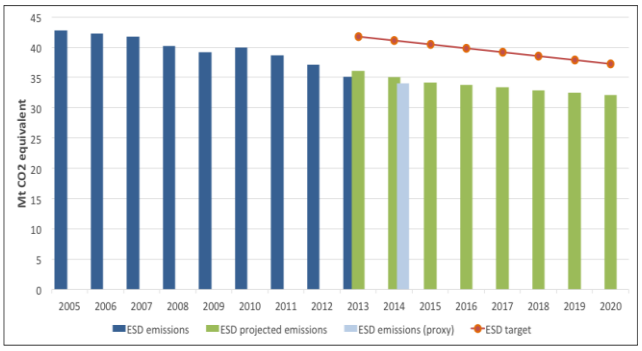
Modal shares Sweden



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. Decarbonisation of the economy

NON-ETS GHG EMISSION REDUCTION TARGET 2020 (-17% by 2020 as compared to 2005 in the non-ETS sector)



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

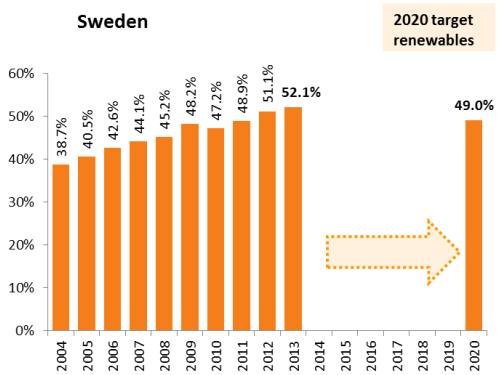
ESD (Effort Sharing Decision) emissions are the emissions from sectors not covered by the EU ETS.

Sweden has decreased its emissions by 24% between 2005 and 2014.

According to its 2015 projections, Sweden is on track to reach its 2020 target, with an 11% margin between the projected emissions and its target as compared to 2005.

Non-ETS Emissions (vs. 2005)	Projections/proxy	target
Projections with existing measures 2020	-28%	-17%
Proxy 2014	-24%	-8%

RENEWABLE ENERGY SHARE TARGET 2020 (49%)



Source: European Commission based on EUROSTAT

With a renewable energy share of 52% in 2013, Sweden already exceeded its target of 49% in 2020.

The main measure to increase the share of renewable energy is a certificate system established together with Norway, which favours low-cost and relatively mature renewable technologies, which results in a relatively low impact on electricity prices. The volumes covered by the certificate system will increase, while the support for offshore wind will be strengthened.

Sweden is one of the few Member States that have already reached the 10% 2020 target for renewables in transport. Data from the Swedish authorities show that the share was 18.7% in 2014.

GREENHOUSE GAS EMISSION INDICATORS

- In Sweden the transport sector is the largest in terms of share of total emissions. This is partly explained by the very limited use of fossil fuels in other parts of the economy. However, Sweden is the country with the highest use of renewable energy in fuel consumption in transport.
- GHG emissions from electricity generation and heating are very low, due to a significant reduction of the use of fossil fuels in those sectors over the last decades.
- The carbon intensity of the economy in 2013 was the lowest in the EU, and 44% lower than the EU average, as a result of the energy mix (e.g. due to the high share of renewables).
- In 2014, the revenues from the auctioning of ETS allowances amounted to almost EUR 33.6 million, out of which 56% are used or planned to be used for energy and climate related purposes.

Largest Sectors of GHG Emissions in 2012 (*)	SE	EU Average
Energy/power industry	19%	33%
Transport	33%	20%
Industry	26%	19%
Agriculture (incl. forestry & fishery)	16%	12%
Residential & Commercial	3%	13%
Waste	3%	3%

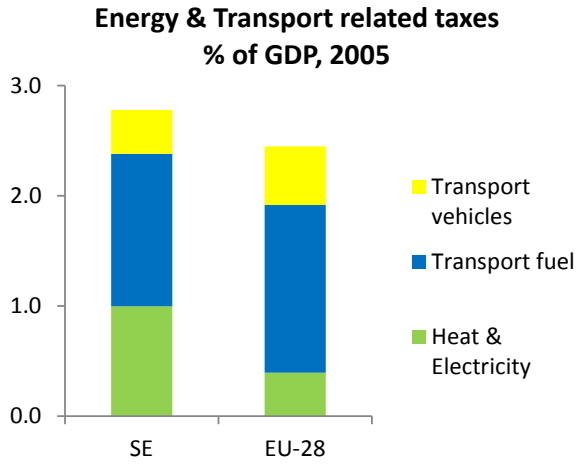
GHG Emissions	SE	EU
EU ETS auctioning revenues in 2014 (EUR millions)	33.6	3205
Share of ETS emissions in 2013	37%	42%
GHG emissions/capita (tCO_2equivalent) in 2013	5.8	8.5
Carbon intensity of the economy in 2013 (tCO_2equivalent/(EUR millions)	146	328

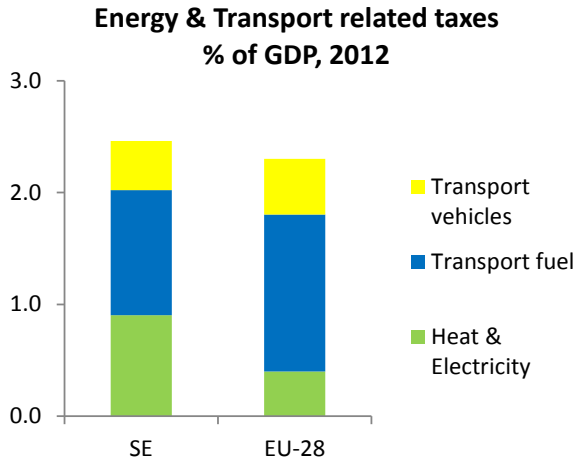
Source: European Commission based on EEA
(*) Sectoral breakdown for 2013 data not available

ENERGY & TRANSPORT TAXATION

Energy and transport related taxes as a share of GDP is somewhat higher than the EU-average. This is

mainly explained by a high tax burden on electricity and heating fuels, while in fact both the taxation on transport fuel and on transport vehicles is above average. The overall tax burden has fallen since 2005, possibly reflecting both the growth of GDP and the pursued climate and energy policy.



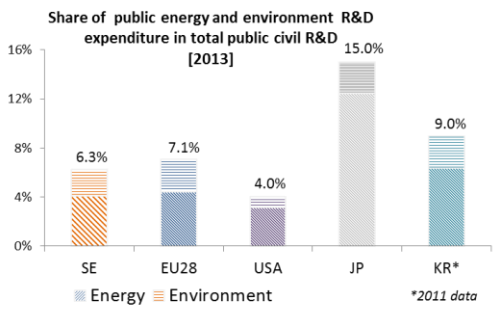


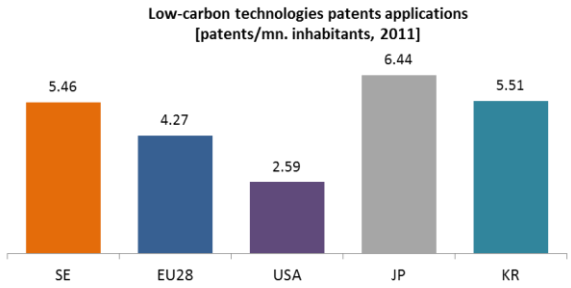
Source: Eurostat

5. Research, innovation and competitiveness

RESEARCH AND INNOVATION

Sweden is near the EU average, above the US and below Japan and South Korea with regard to the share of energy and environment in public support to research and innovation. In terms of intensity of low-carbon technologies patents, Sweden performs better than most of the EU countries and main worldwide partners.





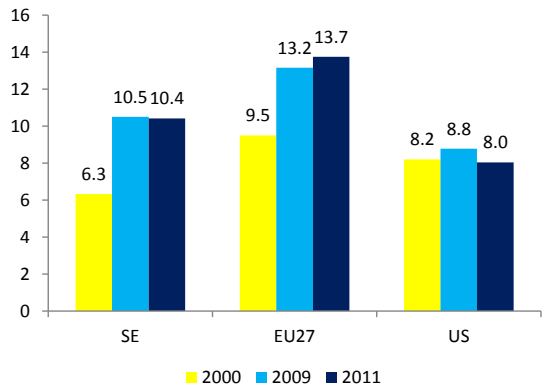
Source: European Commission based on EUROSTAT

COMPETITIVENESS

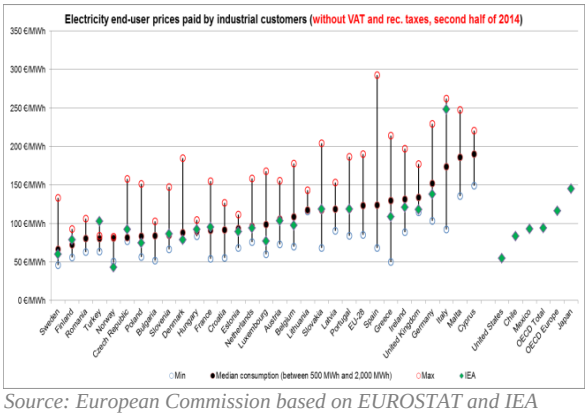
The real unit energy costs[7] have remained lower in Sweden than in the EU, while it is now higher than in the US. This reflects that the energy intensity[8] of Sweden's manufacturing sector is slightly higher than the EU average, but lower compared to the US, while real energy prices have increased from a low level in the last ten years.

Sweden experiences the lowest electricity prices paid by industrial customers in the EU. Such prices are also lower than the OECD average and only slightly higher than the US. Conversely, gas prices paid by industrial customers are higher than EU and OECD averages.

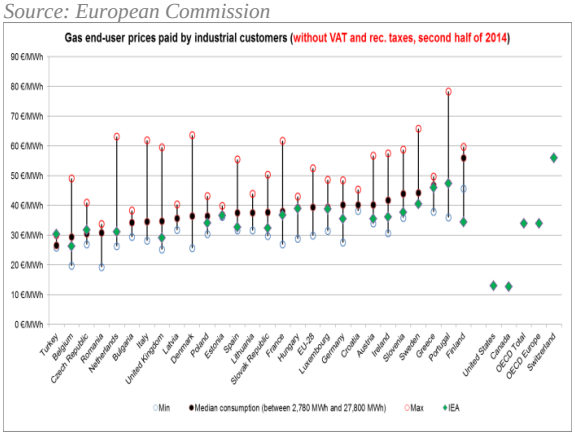
Real unit energy costs (% of value added)



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

- The 2009 *Sustainable Energy and Climate Policy for the Environment, Competitiveness and Long-term Stability* focuses on 2020, but includes some objectives for post-2020, such as a long-term priority for the vehicle fleet to be independent of fossil fuels by 2030, a 2050 vision for GHG emissions, reduction of dependence on nuclear power and hydropower by developing renewable electricity from cogeneration, wind power and other renewable power production and improvements in energy efficiency.
- *Sweden has set up Parliamentary Commission including all relevant parties in the Swedish Parliament, chaired by the Energy Minister. It is tasked to propose new guidelines for Sweden´s energy policy post 2025 by early 2017*
- Several steps have been taken by Sweden or are underway to prepare a low-carbon development strategy for 2050, such as the appointment by the Government of a Committee to develop a strategy for implementing the vision of zero net emissions in 2050 (results work expected in February 2017).

7 This indicator measures the amount of money spent on energy sources needed to obtain one unit of value added.

8 The energy intensity presented here is derived from Use Tables of WIOD, see "Energy Economic Developments in Europe SWD(2014)19".

NATIONAL TARGETS, especially for 2030

Objective, 2030-2050	Targets	Comments
GHG reduction	No	No targets but a vision of 'no net emissions' of greenhouse gases
Renewable energy	No	Strategy includes as priority that the vehicle fleet will be independent from fossil fuels by 2030
Energy Efficiency / savings	No	

7.Regional cooperation

Sweden is a member of two Regional Groups which have been established under the TEN-E Regulation to optimise regional cooperation on infrastructure development: the Baltic Energy Market Interconnection Plan (BEMIP) Regional Groups for electricity and gas. Sweden also takes part in North Seas Countries Offshore Grid Initiative.

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.

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

Sweden is the only EU Member State that has a formal cooperation with another state (Norway) to meet its 2020 target under the Renewable Energy Directive. This cooperation mechanism is based on a tradable certificate system. The demand for electricity certificates is created by the obligation that electricity suppliers are required to purchase certificates corresponding to a proportion of their electricity sales and/or electricity use.

8. Cohesion policy contribution

The EU Cohesion policy provides for investment possibilities to implement energy policy objectives in Sweden 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 Sweden takes part.

Energy efficiency: Over 2014-2020, EU Cohesion Policy will invest some EUR 86 million in energy efficiency improvements in public and residential buildings and in SMEs in Sweden. A further

estimated EUR 82 million will be invested in supporting the move towards an energy-efficient, decarbonised transport sector. These investments are expected to contribute to around 10 000 households with improved energy consumption classification and a decrease of around 40 000 000 kWh per year of decreased primary energy consumption of public buildings, as well as to around 80 km of reconstructed or upgraded railway lines.

Decarbonisation: Overall, the EU Cohesion Policy investments in Sweden over 2014-2020 are expected to contribute to an estimated annual decrease of GHG of around 6 000 tonnes of CO2eq. Over 2014-2020, EU Cohesion Policy will invest some EUR 5 million in renewable energy in Sweden. This funding will be complemented by national public and private co-financing, aiming at optimal leverage.

Research, Innovation and Competitiveness: Over 2014-2020, EU Cohesion Policy will invest significantly in R&I and in SME competitiveness in Sweden. This will be based on the national strategy as well as regional strategies for smart specialisation. For Sweden, the strategies include a focus on support for networks, clusters and incubators for SMEs working with energy efficiency and a key issue is the increased potential for commercialisation of innovation in the energy sector. In addition, development of strategies and plans for sustainable and energy efficient urban planning, favouring energy conservation and non-fossil energy, will be supported. At this stage, at least EUR 91 million is foreseen for investments in R&I and adoption of low-carbon technologies in Sweden, but this might increase further in line with the evolving content of the smart specialisation strategy.