



Energy in Sweden 2018

An overview

An overall picture of the energy situation in Sweden

The Swedish Energy Agency is responsible for the official energy statistics in Sweden. We gather these statistics to provide an overall picture of the energy situation and the progress in the energy area in Sweden. This means we have access to timelines of statistics starting as early as 1970.

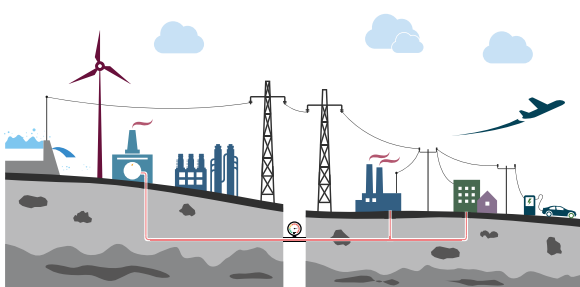
The statistics are compiled through a system which consists of everything energy related. An energy system provides an overview of supplied energy, energy production, transmission of energy and energy consumption.

Supplied primary energy



Biofuels, water, wind, sun, coal, crude oil, natural gas and nuclear fuel

Transformation and transmission



Electricity- and heat generation and processing of feedstock

Final energy consumption



Industry, transport, residential and service

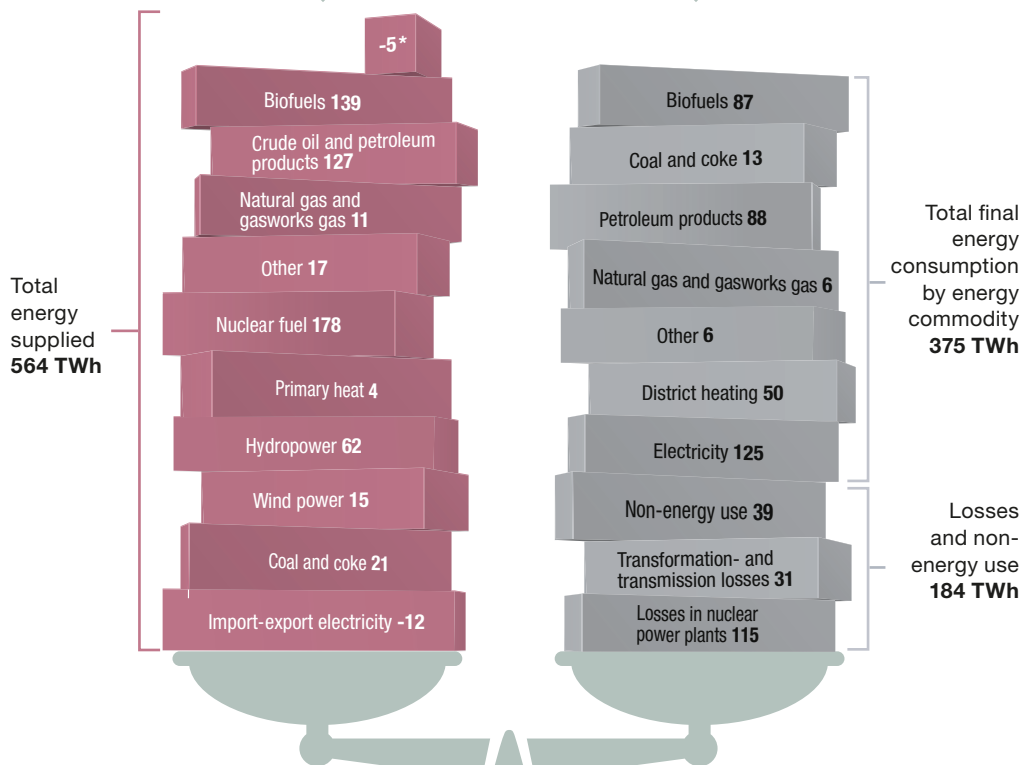
In Sweden we use domestic renewable energy sources as water, wind, sun and biofuels. We also import nuclear fuels and fossil fuels such as oil and natural gas.

The energy system is always in balance. The energy input is always equal to the energy used, including losses.

The amount of energy supplied within the Swedish energy system has been about the same since the mid-1980s between 550 to 600 TWh per year.

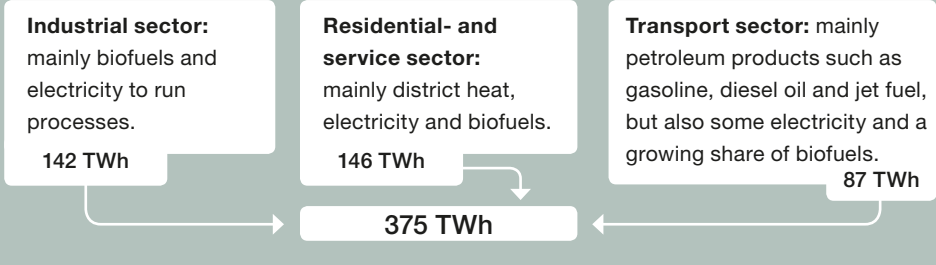
In 2016 the total energy supply in Sweden amounted to 564 TWh.

Here follows the energy balance of Sweden in 2016:

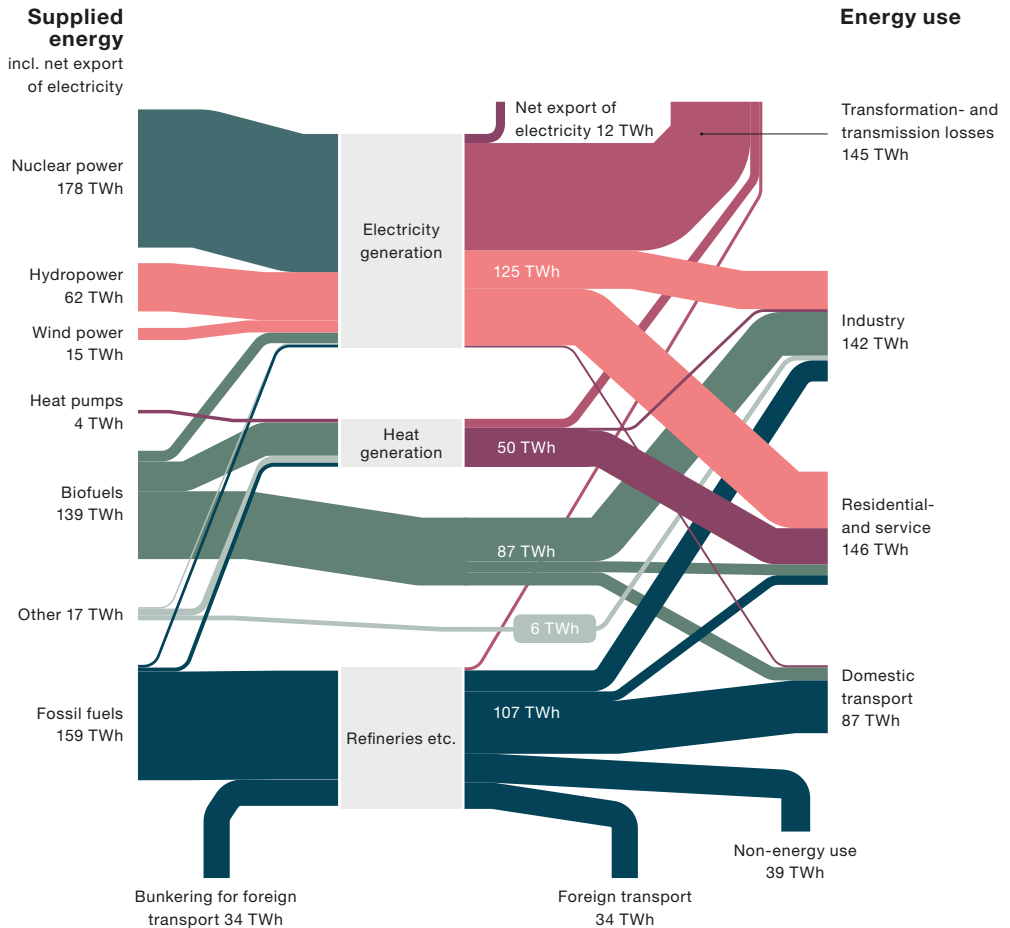


* Statistical difference between energy supplied and energy used

Sweden's final energy use is divided into three user sectors:



The energy system 2016



Swedish energy policies stem from the energy policies of the EU

The Swedish energy policies aims to gather ecological sustainability, competitiveness and security of supply. Our energy policies are based on lawmaking within the EU.

- reduce greenhouse gas emissions by 20 per cent
- reduce energy use by 20 per cent by improved energy efficiency
- share of renewable energy shall be at least 20 per cent of final energy use
- share of renewable energy in the transport sector shall be at least 10 per cent

EU goals by 2020

- share of renewable energy shall be at least 50 per cent of total energy use by 2020
- share of renewable energy in the transport sector shall be at least 10 per cent by 2020
- energy use shall be 20 per cent more efficient compared to 2008 by 2020
- greenhouse gas emissions shall be 40 per cent lower compared to 1990 by 2020 (applies to operations not covered by the EU ETS (EU Emissions Trading System))
- net zero emissions compared to 1990 by 2040, of which at least 85 per cent of the emissions reductions shall be in Sweden
- 70 per cent lower greenhouse gas emissions from domestic transport (excluding domestic flight) by 2030 compared to 2010

Swedish climate- and energy goals

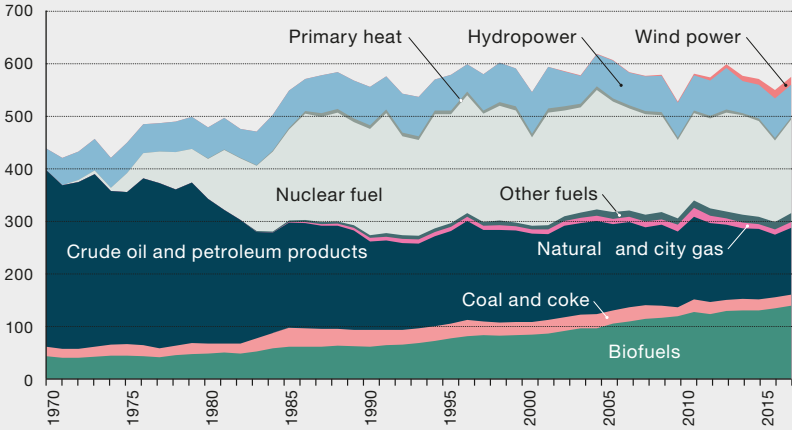
- 100 per cent renewable electricity generation by 2040 (not a stop date forbidding nuclear power)
- 50 per cent more efficient energy use by 2030 compared to 2005

Targets of the energy agreement

There are plenty of instruments guiding towards the goals. Using statistics, we can see the development over time in different areas and different sectors, which indicate whether Sweden is on course to reach its goals or if additional measures are needed in terms of revised control means.



Total supplied energy 1970–2016, TWh

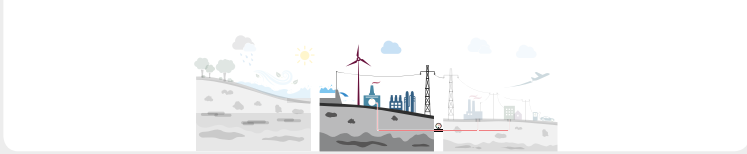


Sources: Swedish Energy Agency and SCB (Statistics Sweden).

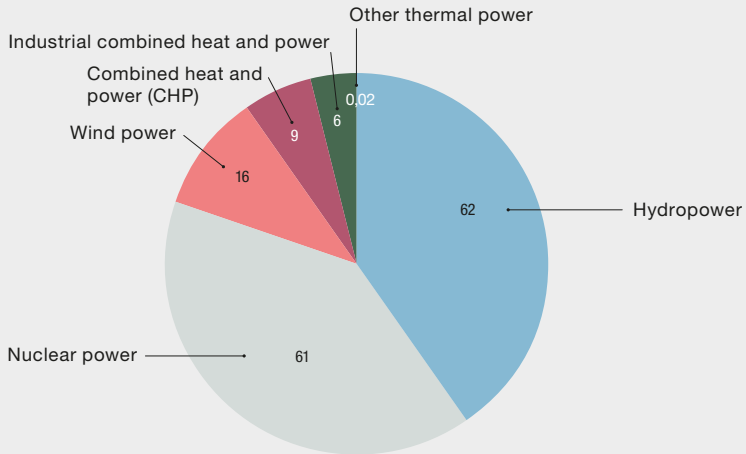
Remarks: 1) Other fuels are included in biofuels before 1983. 2) Jet fuel for domestic flight is included in crude oil and petroleum products until 1989. 3) Nuclear fuel is calculated according to the method used by UN/ECE to calculate supplied energy from nuclear power. 4) Primary heat refers to heat pumps in district heating. 5) Wind power is included in hydropower until 1989.

Over the last 30 years we have seen a steadily increasing supply of biofuels.

During the same time span the supply of crude oil and petroleum products has decreased considerably. The main reason is heating of residential buildings and facilities is rarely done using oil anymore.



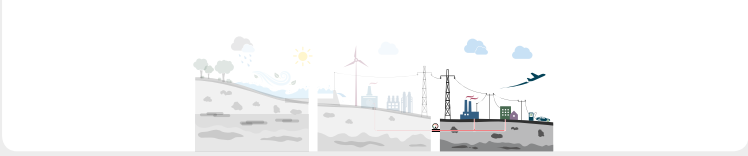
Electricity generation 2016, TWh



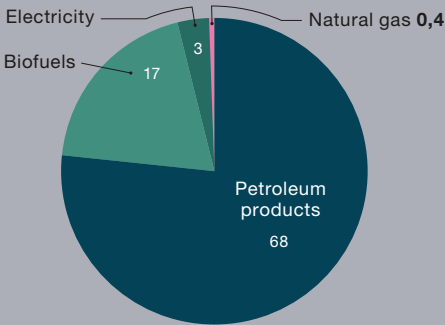
Sources: Swedish Energy Agency and SCB (Statistics Sweden).
Remarks: Electricity generation for own use is not included.

Currently 58 per cent of Swedish electricity generation originates from renewable energy sources such as hydropower, wind power, biofuels and solar power.

An increasing amount of solar PV cells is installed in Sweden. Between 2016 and 2017 the number of grid connected solar PV systems increased by over 52 per cent. By the end of 2017 total number of systems amounted to about 15 300, with a total installed power of 231 MW.



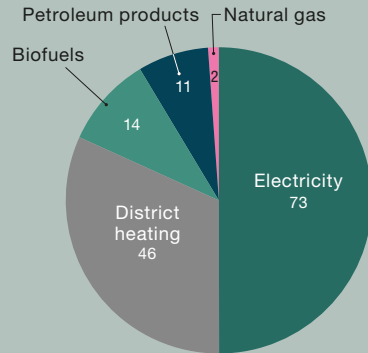
Final energy use in the transport sector, TWh, 2016



Source: Swedish Energy Agency

Petroleum products, mainly gasoline and diesel accounted for 78 per cent of the energy use in the transport sector in 2016. The last few years the amount of biofuels has increased significantly. Road transport accounted for 94 per cent of the final domestic energy use followed by rail transport (3 per cent), aviation (2,5 per cent) and shipping (0,5 per cent).

Final energy use in the residential- and service sector, TWh, 2016



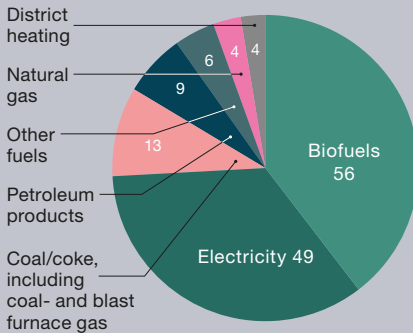
Source: Swedish Energy Agency

Electricity and district heating account for more than 80 per cent of the energy use in the residential and service sector.

Electricity is the most common energy carrier for heating in houses, followed by biofuels and district heating. In multi-dwelling buildings and non-residential facilities district heating is by far the most common energy carrier.

Petroleum products are used for heating but are mainly used for machinery in agriculture, forestry, fishing and construction.

Final energy use in the industry sector, TWh, 2016



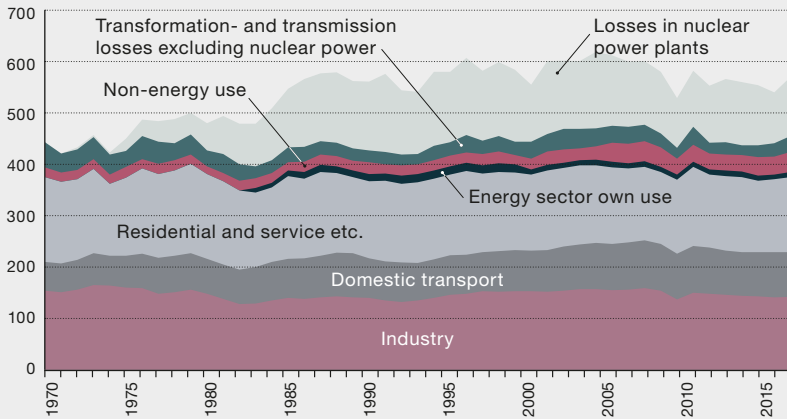
Source: Swedish Energy Agency

The pulp- and paper industry accounts for more than half of the final energy use within the industry sector. Mainly biofuels and electricity are used in pulp and paper industrial processes.

The use of fossil fuels; natural gas, petroleum products, coal and coke are decreasing. However, the use is still extensive, especially within the iron- and steel industry.



Total final energy use, 1970–2016, TWh



Sources: Swedish Energy Agency and SCB (Statistics Sweden).

Remarks: 1) Foreign flight is included in final energy use until 1989. 2) Own use within the energy sector is included in transformation- and transmission losses until 1982. 3) Losses in nuclear power plants is calculated according to the method used by UN/ECE to calculate supplied energy from nuclear power.

Energy use in Sweden has decreased during the 2000s with an exception for 2010 which was an unusually cold year.

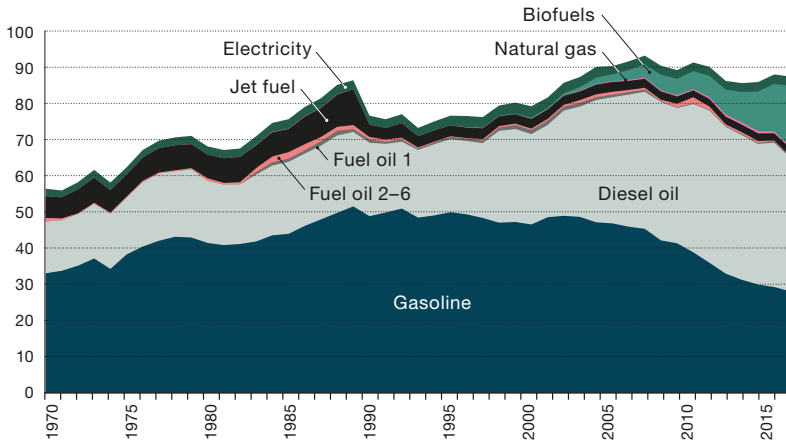
The biggest decline in energy use is due to smaller losses in nuclear power plants which is a consequence of decommissioned nuclear reactors.

An increasing amount of biofuel is used in the transport sector

Energy use in domestic transport amounted to 87 TWh in 2016.

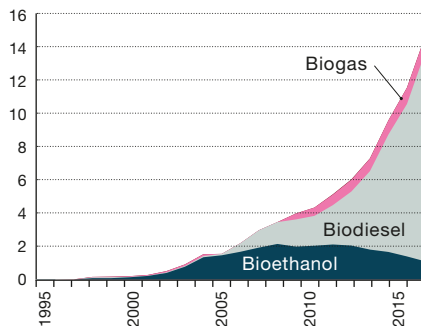
In 2016 road transport accounted for 94 per cent of energy use in the transport sector in Sweden.

Final energy use in the transport sector, domestic, 1970–2016, TWh



Sources: Swedish Energy Agency, SCB (Statistics Sweden), Swedish Transport Agency.
 Remark: Until 1989 all jet fuel was included in domestic flight, however from 1990 and onwards the jet fuel was divided into domestic- and foreign energy use.

Use of biofuels in the transport sector, domestic, 1995–2016, TWh



A clear trend of an increased use of biofuels within the transport sector can be seen, especially from biodiesel. The use of biofuels amounted to almost 15 TWh in 2016 which corresponds to 19 per cent of the transport sector's energy use.

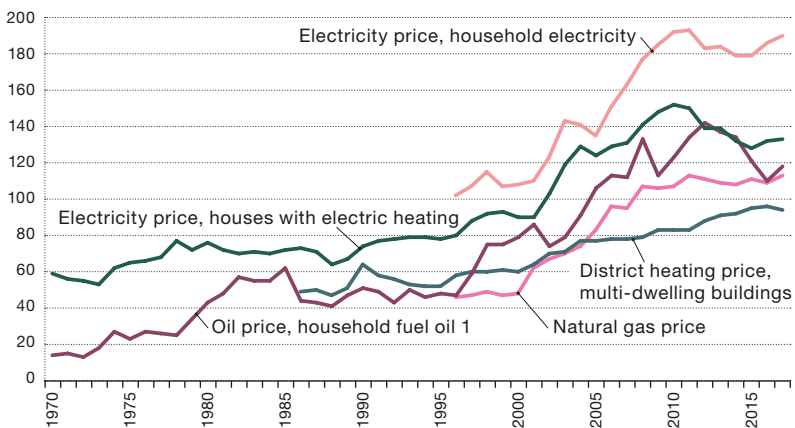
Energy prices and energy markets

Because of a greater use of wind and solar power the decentralized and variable production within the electricity system has increased. This imposes new demands on flexibility and balancing of the grid as there always needs to be a balance between production and use in the electricity system.

The electricity system in Sweden has historically been built on large scale, centralized production (hydropower and nuclear power) with an electricity flow from the producer to the consumer where the production has been regulated.

Energy prices for household costumers were relatively stable during the second half of the 1990s and then increased significantly during the first decade of the 2000s. Increasing fuel prices and energy taxes are the main reasons for the increasing prices.

Energy prices for households and facilities 1970–2017, in 2017 price levels, öre/kWh

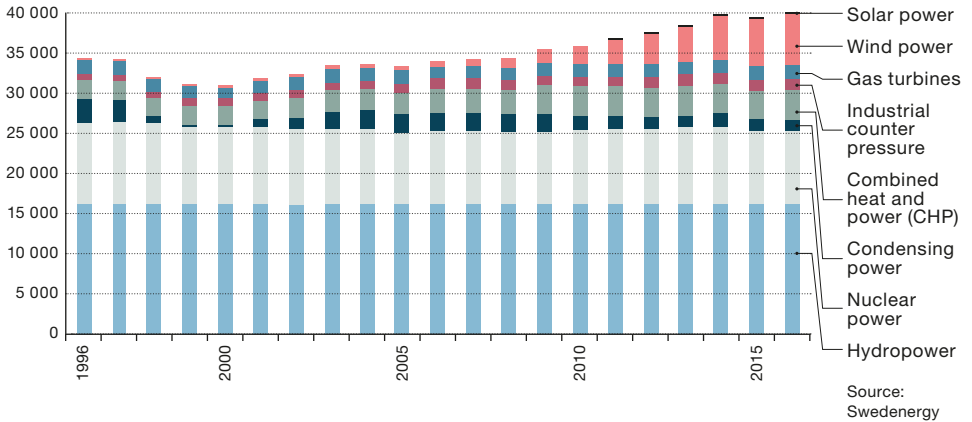


Sources: Swedish Energy Agency, Statistics Sweden (SCB), Swedish Petroleum and Biofuels Institute (SPBI). Remark: Prices are presented in 2017 price levels; consumer price index is used for recalculating of prices.

Electricity generation and electricity use

Electricity generation in Sweden mainly comes from hydropower and nuclear power. This has been the case since the 1980s. However, the last ten years has seen a significant increase in wind power.

Installed electricity generation capacity by type of power 1996–2016, MW

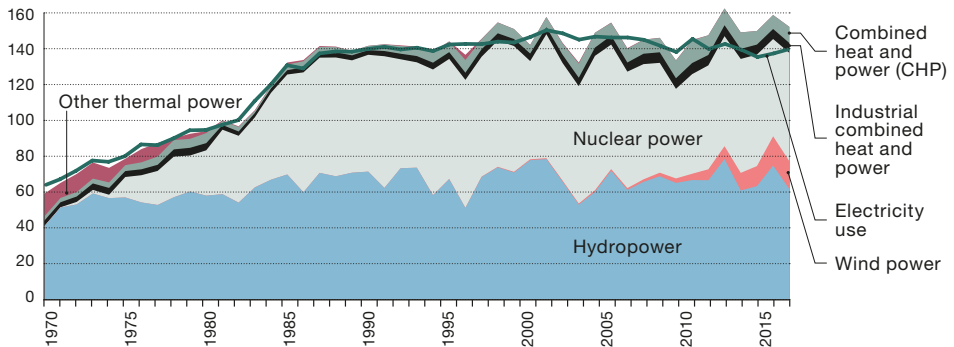


In 2016 electricity generation consisted of 41 per cent hydropower, 40 per cent nuclear power and 10 per cent wind power. The remaining 9 per cent was mainly combustion-based generation, primarily in combined heat and power plants and in industrial processes.

Historically electricity use was at its highest in 2001 when it was 150 TWh. Since then electricity use has declined.

Most electricity is used in the residential- and service sector (73 TWh), followed by the industrial sector (49 TWh) and the transport sector (2,6 TWh).

Electricity use and electricity generation per type of power 1970–2016, TWh



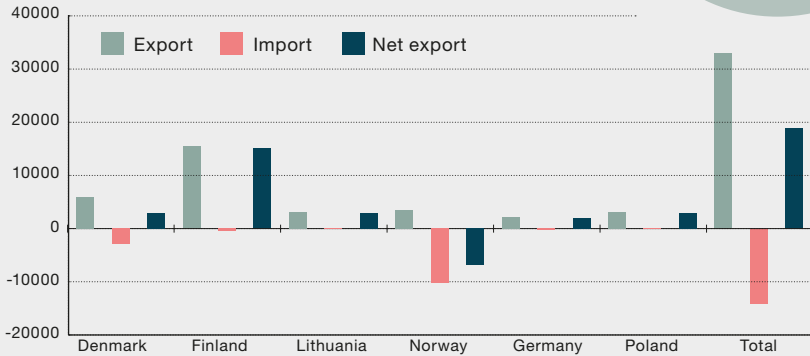
Sources: Swedish Energy Agency and SCB (Statistics Sweden).
Remark: Electricity generation for own use is not included.

Energy in the World

In 2016 Sweden had a net export of 11,7 TWh of electricity. Most of this was exported to Finland, but also Poland, Lithuania and Germany. The imported electricity in 2016 mainly came from Norway and Denmark.

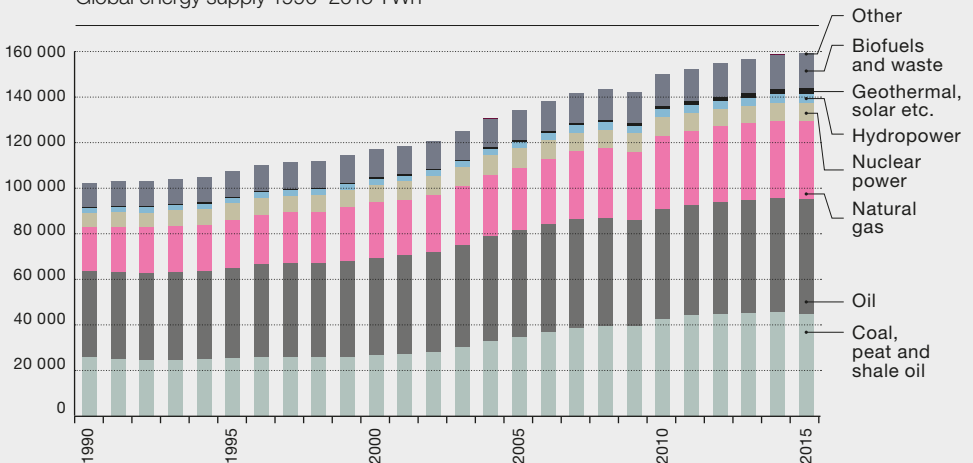
Trading between Sweden and its neighboring countries varies from year to year as well as during the year, as a result of price differences between different electricity areas.

Import and export of electricity, GWh, 2017



Global energy supply amounted to 159 000 TWh in 2015 of which 14 per cent came from renewable energy sources.

Global energy supply 1990–2015 TWh





A sustainable energy system benefits society

The Swedish Energy Agency has an overall picture of the supply and use of energy in society. We work for a sustainable energy system, combining ecological sustainability, competitiveness and security of supply. The Agency:

- Develops and disseminates knowledge about a more efficient energy use to households, industry, and the public sector.
- Finances research for new and renewable energy technologies, smart grids, and vehicles and transport fuels of the future.
- Supports commercialisation and growth of energy related cleantech.
- Participates in international collaboration with the aim of attaining Swedish energy and climate objectives.
- Manages instruments such as the Electricity Certificate System and the EU Emission Trading System.
- Provides energy system analysis, energy forecasts and official energy statistics.



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