



# Energy in Sweden 2022

An overview

# An overview of energy 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 system and the progress in the energy area in Sweden. This means we have access to timelines starting as early as 1970.

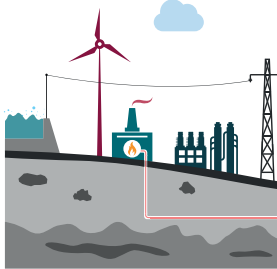
Energy statistics show an overall picture of the energy system consisting of the supply, transformation, distribution and consumption of energy.

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 feedstocks

Final energy consumption



Industrial, transport, residential and service sectors

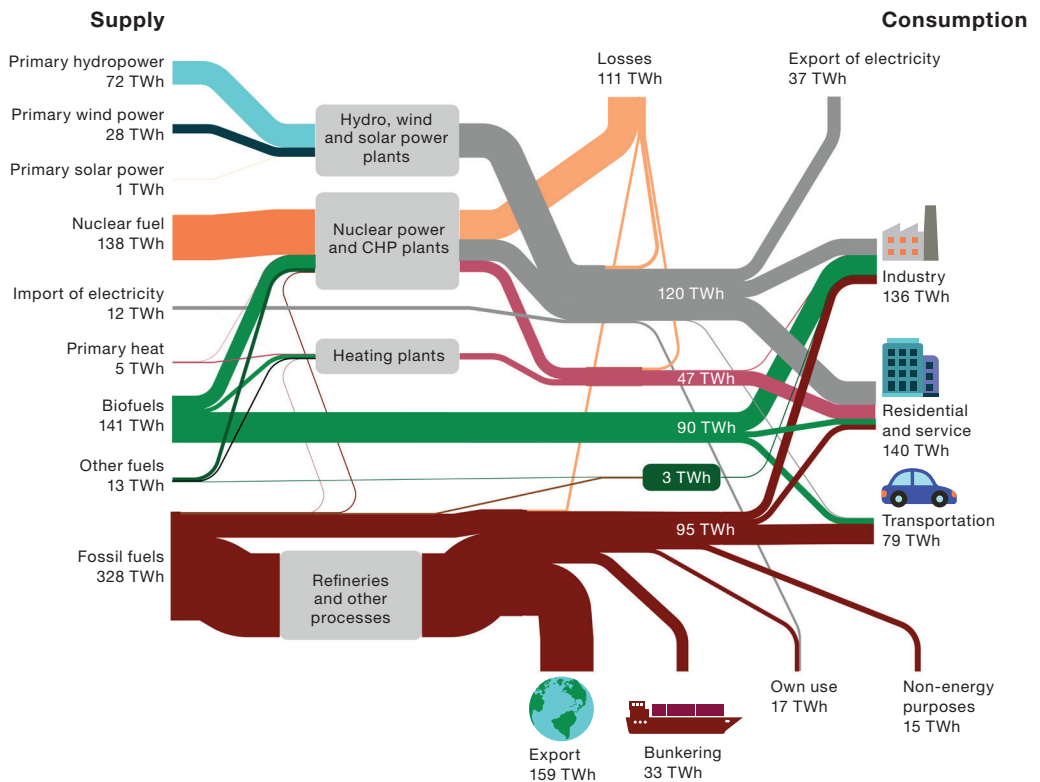
## About Energy in Sweden 2022

The energy statistics in this publication extended in most cases to 2020. Possible impact from events that took place after 2020, for example Russia's invasion of Ukraine or higher energy prices, is thus not yet visible in the energy statistics. Note that the figures in this publication are rounded.

# A balanced energy system

In Sweden we use domestic renewable energy sources such as hydro, wind, solar and biofuels. We also import nuclear fuels, biofuels and fossil fuels such as oil and natural gas. The energy system in Sweden can be divided into supply and consumption. The diagram illustrates energy system flows for 2020.

## Energy system 2020



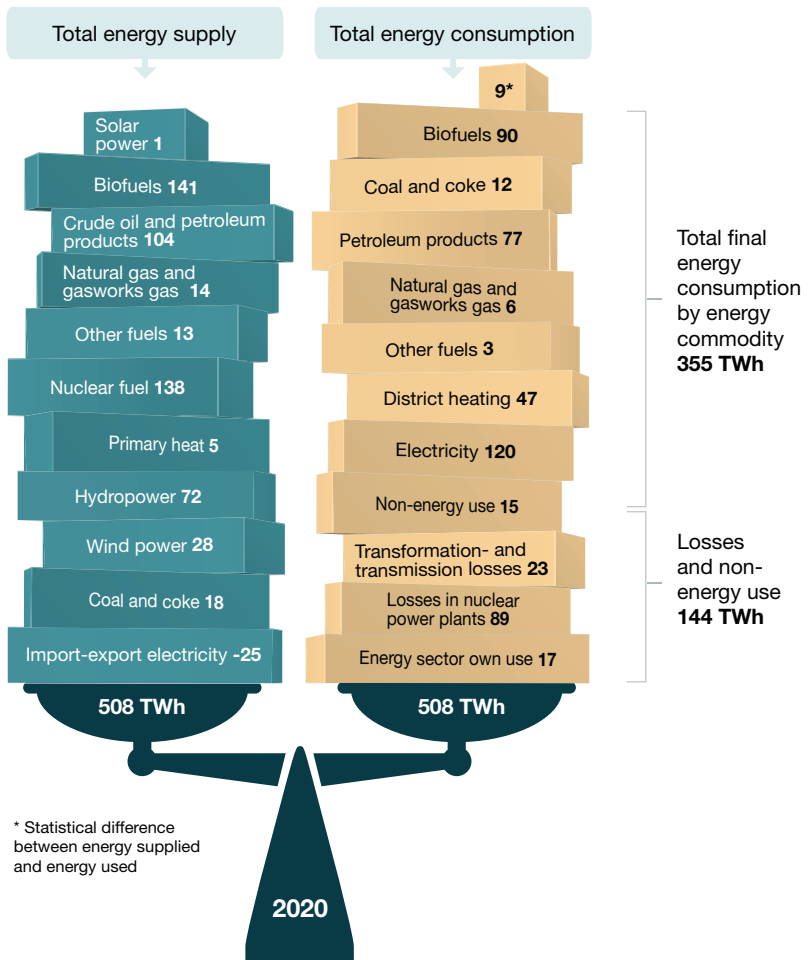
Remark: The diagram includes the total quantity of fossil fuels supplied to the Swedish energy system, 328 TWh. Of these, 159 TWh are exported and 33 TWh go to bunkers in international maritime and aviation transport, leaving 136 TWh of fossil fuels for final use in Sweden.

# The energy balance of Sweden in 2020

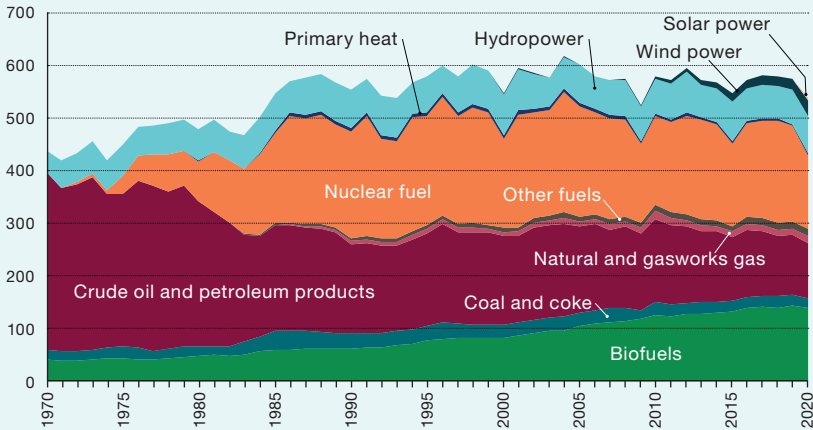
The energy system is always in balance. Energy input is always equal to the energy use, including losses.

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

In 2020 the total energy supply in Sweden amounted to 508 TWh.



## Total supplied energy 1970–2020, TWh



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

Remarks: 1) Other fuels are included in biofuels until 1983. 2) Domestic aviation fuel is included

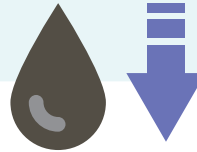
in crude oil and petroleum products until 1989. 3) Nuclear fuel is calculated according to the method used by the UN/ECE for calculating supplied energy from nuclear power.

4) Primary heat refers to heat pumps in district heating.

5) Wind power is included in hydropower until 1989.



The supply of biofuels has tripled over the last 40 years.



During the same time span, the supply of crude oil and petroleum products has decreased by more than half. The main reason is that residential buildings and facilities are rarely heated using oil today.

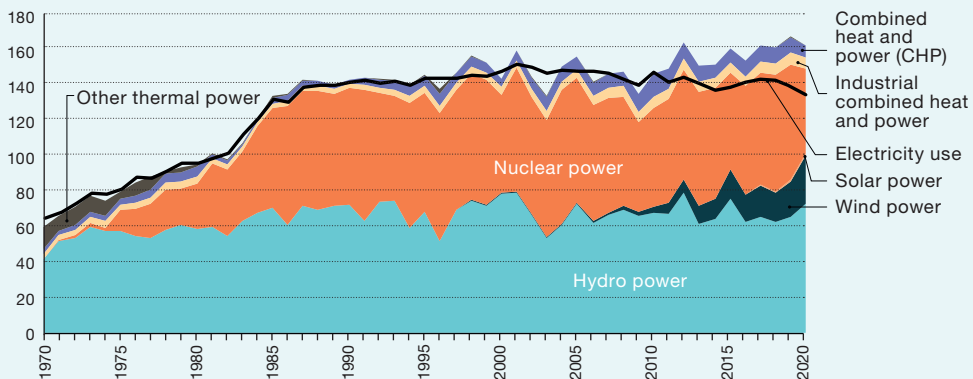
During the same time span, the supply of crude oil and petroleum products has decreased by more than half. The main reason is that residential buildings and facilities are rarely heated using oil today.



# 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, wind power has increased significantly over the last ten years.

## Electricity use and electricity generation per type of power 1970–2020, TWh



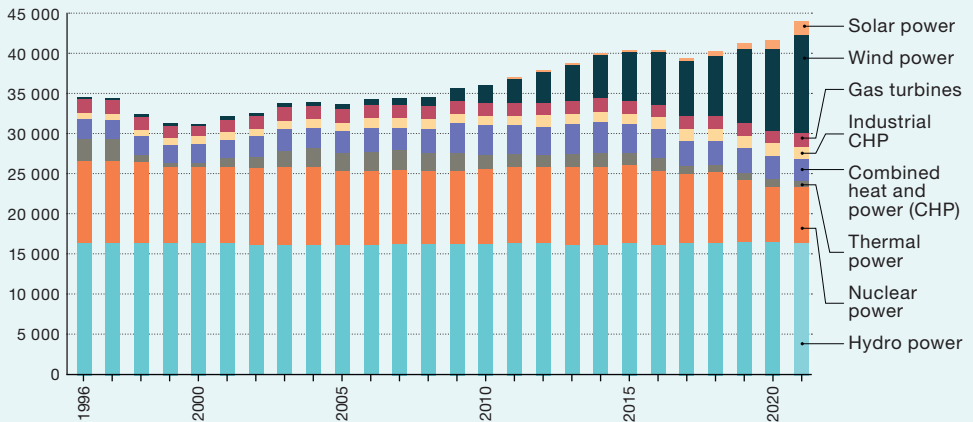
Sources: The Swedish Energy Agency and SCB (Statistics Sweden).  
Remark: Electricity generation for own use is not included.

Electricity generation in 2020 was 161 TWh. It consisted of 29 per cent nuclear power, 45 per cent hydropower, 17 per cent wind power and 1 per cent solar power. Combustion-based power provided the majority of the remaining 8 per cent, primarily from combined heat and power plants and industrial processes.

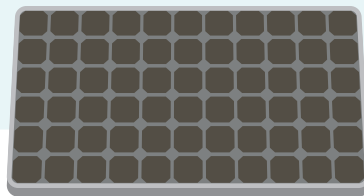
Electricity use reached its highest level in 2001, at 150 TWh. Since then electricity use has declined, amounting to 135 TWh in 2020.

The residential and service sector uses the most electricity, 70 TWh, followed by the industrial sector, 47 TWh, and the transport sector, 3 TWh.

## Installed electricity generation capacity by type of power 1996–2021, MW

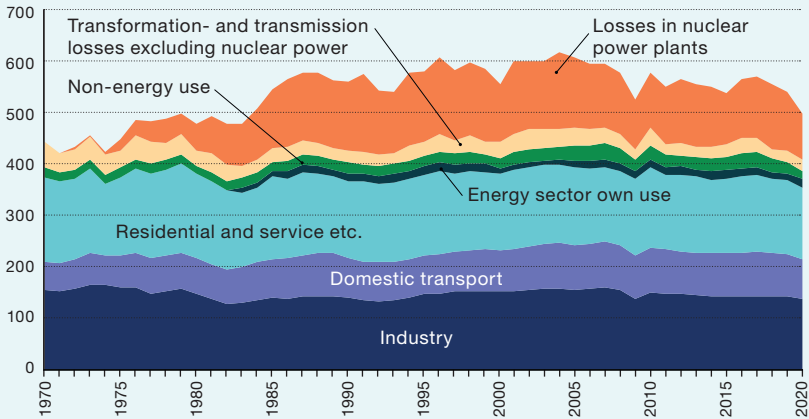


Source: Swedenergy – Energiföretagen Sverige. Note that not all installed electricity generation capacity is available at the same time. Availability also varies between the different types of power, as they are weather-dependent in a variety of ways.



More and more solar cells are being installed in Sweden. Between 2020 and 2021, the number of grid-connected PV (photovoltaic) systems increased by 46 per cent. By the end of 2021, the total number of systems in Sweden amounted to 92,359 with a total installed power of 1,587 MW.

## Total final energy use, 1970–2020, TWh



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

Remarks: 1) Foreign aviation was included in final energy use until 1989.

2) Own use within the energy sector was included in transformation- and transmission losses until 1982.

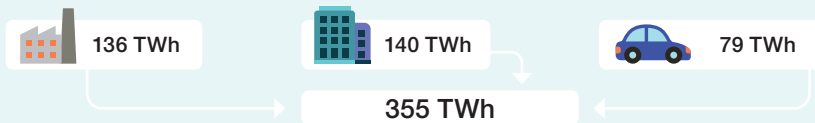
3) Losses in nuclear power plants are calculated according to the method used by the UN/ECE to calculate supplied energy from nuclear power.

Energy use has historically been at an even level despite that we have had a population growth. In the last 20 years, energy use has slightly decreased.



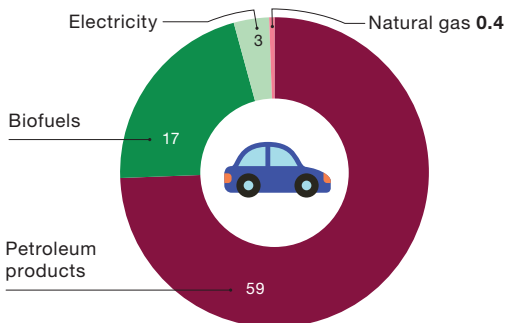
Energy consumption is affected by factors such as the weather, the economy, improved energy efficiency, energy prices and other events in the outside world.



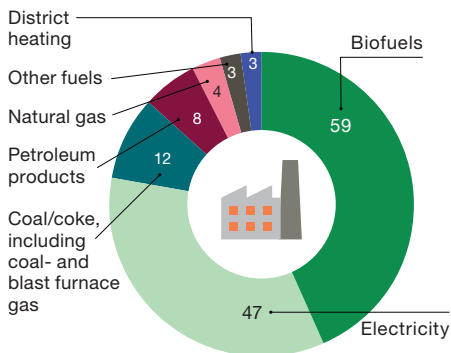


### Final energy use in the transport sector 2020, TWh

- Petroleum products, mainly gasoline and diesel, provided more than 75 per cent of the energy used in the transport sector in 2020.
- During the last fifteen years, the amount of biofuels has increased significantly.
- Road transport accounted for 94 per cent of the final domestic transport sector energy use followed by rail transport (3.3 per cent), shipping (2.2 per cent) and aviation (0.9 per cent).

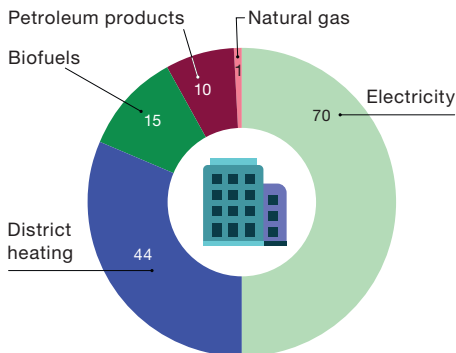


### Final energy use in the industrial sector 2020, TWh



- The pulp and paper industry accounts for more than half of the final energy use within the industrial sector. Mainly biofuels and electricity are used in pulp and paper industrial processes.
- The use of fossil fuels such as natural gas, petroleum products, and coal and coke are decreasing. However, their use is still extensive, especially within the iron and steel industry.

### Final energy use in the residential and service sector 2020, TWh



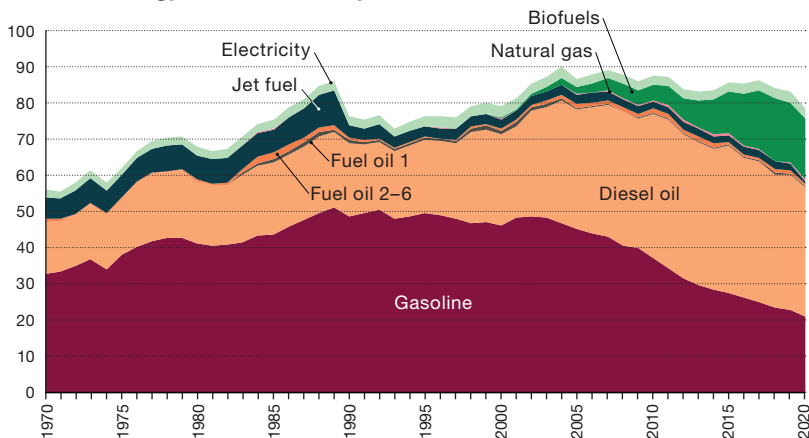
- Electricity and district heating account for more than 80 per cent of the energy used in the residential and service sector.
- Electricity is the most common energy carrier for heating in houses, followed by biofuels and district heating. In multi-dwelling buildings and nonresidential facilities district heating is by far the most common energy carrier.
- Petroleum products can be used for heating but are mainly used for machinery in agriculture, forestry, fishing and construction.

Source: The Swedish Energy Agency

# Fossil fuels are declining in the transport sector

The use of petrol and diesel in Sweden has decreased by more than 25 per cent over the past fifteen years. The use of biofuels was 17 TWh in 2020, which is more than one fifth of the transport sector's energy use.

**Final energy use in the transport sector, domestic, 1970–2020, TWh**



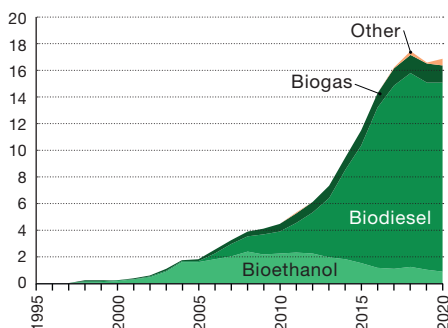
Sources: The Swedish Energy Agency, SCB (Statistics Sweden), Swedish Transport Agency.

Remark: Until 1989 all jet fuel was included in domestic aviation, however from 1990 and onwards the jet fuel was divided into domestic- and foreign energy use. The change meant that domestic energy use decreased in 1990, when a larger share of energy use was allocated to foreign aviation than before.



The use for electricity in the transport sector was 2.9 TWh in 2020, of which 2.4 TWh was used in rail traffic and 0.5 TWh was used in road traffic. The use of electricity in road traffic has increased significantly in recent years and is expected to continue to increase due a growing share of recharge-able vehicles in the vehicle fleet.

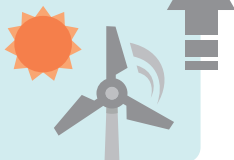
**Use of biofuels in the transport sector, domestic, 1995–2020, TWh**



# Energy prices and energy markets

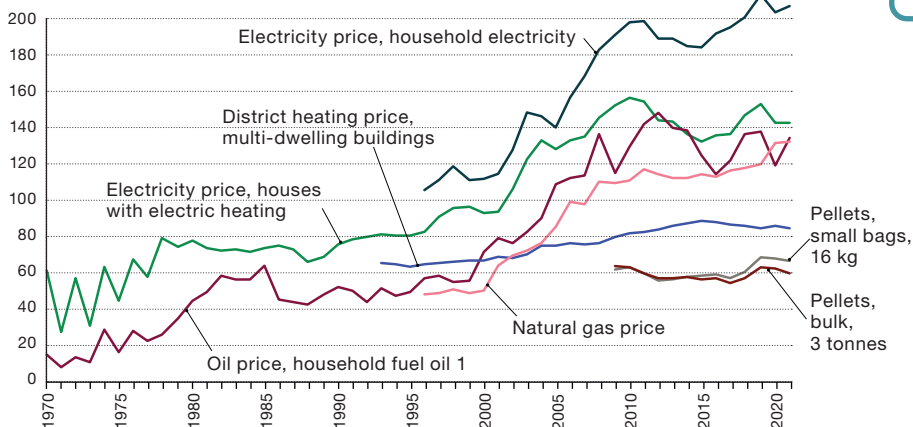
The electricity system in Sweden has historically been built on large scale, centralised production (hydropower and nuclear power) with an electricity flow from producer to consumer. This allows for electricity production to be adjusted.

Because of a greater use of wind and solar power, decentralised and variable generation within the electricity system has increased. This imposes new demands on flexibility due to the need for a balance between generation and consumption in the electricity system. The electricity grid also requires improvements as consumers can now produce electricity, forcing flows in both directions.



Energy prices for household customers 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 from 1970, including taxes and VAT, in 2021 price levels, öre/kWh**

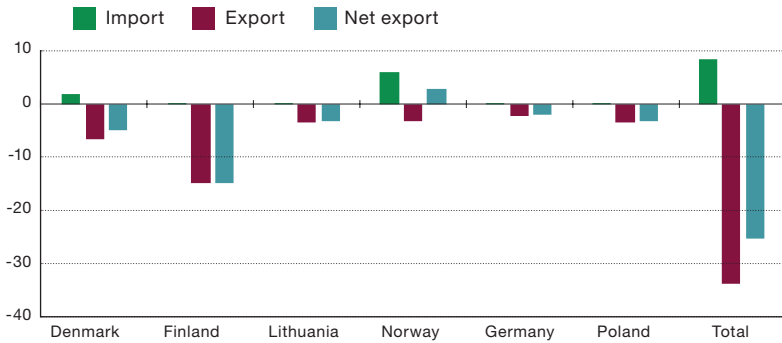


Sources: The Swedish Energy Agency, Statistics Sweden (SCB), Swedish Petroleum and Biofuels Institute (SPBI). Remark: Prices are presented in 2021 price levels; consumer price index is used for recalculating of prices.

# Energy around the World

In 2021, Sweden had a net export of 25 TWh of electricity. Most of this was exported to Finland, but also to Denmark, Lithuania and Poland. Imported electricity in 2021 mainly came from Norway and Denmark.

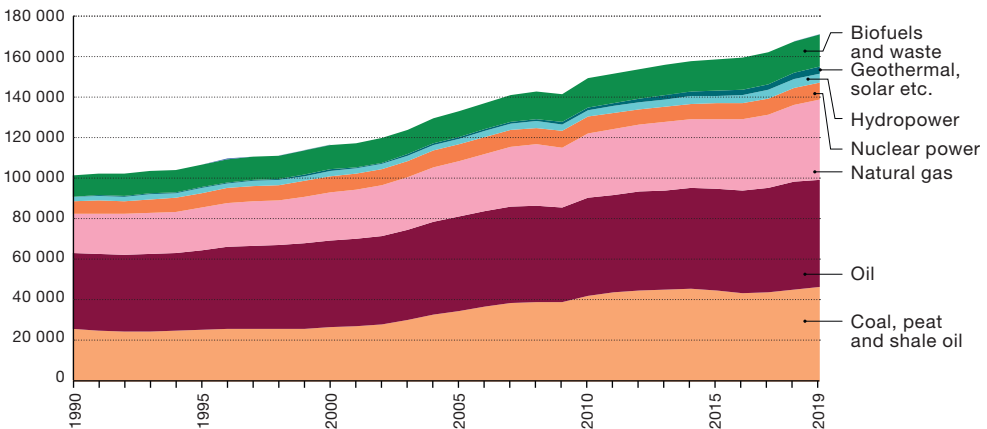
## Import and export of electricity 2021, TWh



Trading between Sweden and its neighbouring countries varies throughout the year as well as year to year due to price disparities between different countries.

The Global energy supply amounted to 171,500 TWh in 2019 of which 14 per cent came from renewable energy sources.

## Global sources of energy per fuel type 1990–2019, TWh



Source: IEA. The Swedish Energy Agency adaptation

# Swedish energy policies stem from the energy policies of the EU

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



## Swedish energy targets

### Energy targets achieved by 2020

- ✓ Energy consumption shall be 20 per cent more efficient compared to 2008 by 2020.
- ✓ Share of renewable energy shall be at least 50 per cent of total energy consumption by 2020.
- ✓ Share of renewable energy in the transport sector shall be at least 10 per cent by 2020.

### Remaining energy targets

- 50 per cent more efficient energy consumption by 2030 compared to 2005.
- 100 per cent of electricity production shall be from renewable sources by 2040. This is however not a cut-off date, banning nuclear power.



## EU energy targets

### Energy targets achieved by 2020

- ✓ Reduce energy use by 20 per cent through 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.

### Targets by 2030

- Reduce energy consumption by 32.5 per cent through increased energy efficiency.
- At least 32 per cent of energy consumption provided from renewable sources.
- At least 14 per cent of energy consumption by the transport sector provided from renewable sources.

## Statistics and policy instruments

There are plenty of instruments guiding the Swedish energy system towards the targets. Using statistics, we can see the development over time in different areas and different sectors. The development seen indicates whether Sweden is on course to reach its targets or if additional measures are needed in terms of revised instruments.

For more information about the Swedish and EU energy and climate targets, please visit our webpage: [www.energimyndigheten.se/energiklimatmal](http://www.energimyndigheten.se/energiklimatmal)

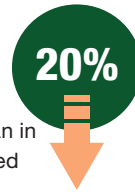
# Indicators are a roadmap to achieving Swedish energy targets



## Energy efficiency targets

*By 2020, energy consumption shall be 20 per cent more efficient than in 2008.*

- By 2020, the energy intensity was 23 per cent lower than in 2008, measured as energy supplied per GDP unit in fixed prices. The target has thus been achieved
- The decrease is due to both an increase in GDP and a reduction in supplied energy.

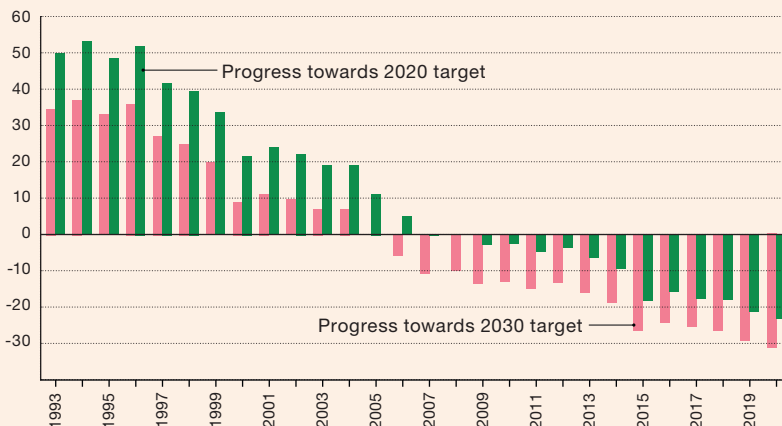


*By 2030, energy consumption shall be 50 per cent more efficient than in 2005.*

- The energy intensity in 2020 was 31 per cent less than in 2005.



## Normal year adjusted energy intensity in relation to base years 2005 and 2008 respectively in fixed prices, 1993–2020, in per cent





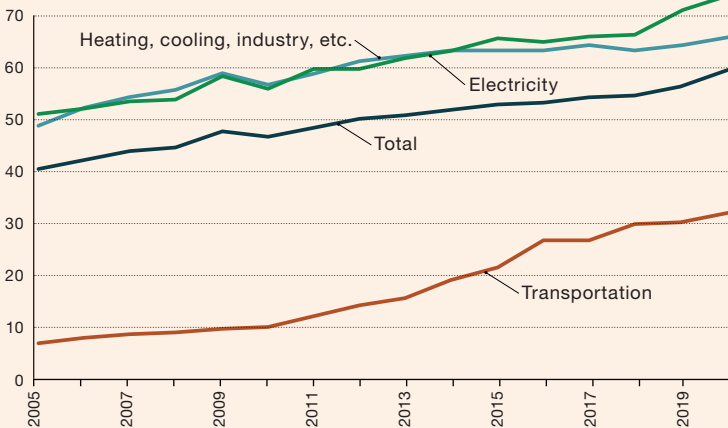
## Renewable energy target

*The share of renewable energy shall be at least 50 per cent of energy consumption by 2020.*



- The consumption of renewable energy in relation to final energy consumption has increased every year since 2011 and was just under 60 per cent in 2020. The target has thus been achieved.
- The increase in the past year is mainly due to increased electricity production from wind power, but also a higher use of biofuels.
- Sweden's high share of renewable energy is due to an extensive use of biofuels in the industrial sector and for district heating generation, as well as a large share of electricity generation coming from hydropower.

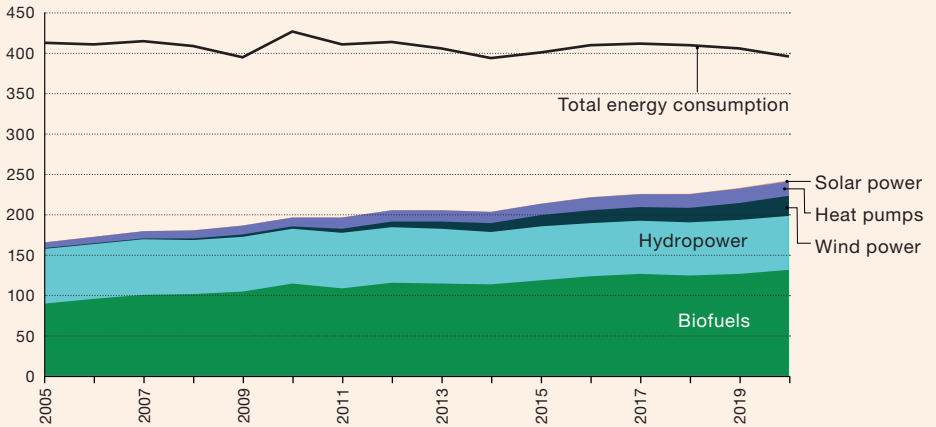
## The share of renewable energy in total plus in some sectors in accordance with the Renewables Directive, 2005–2020, in per cent



Sources: The Swedish Energy Agency and Eurostat.

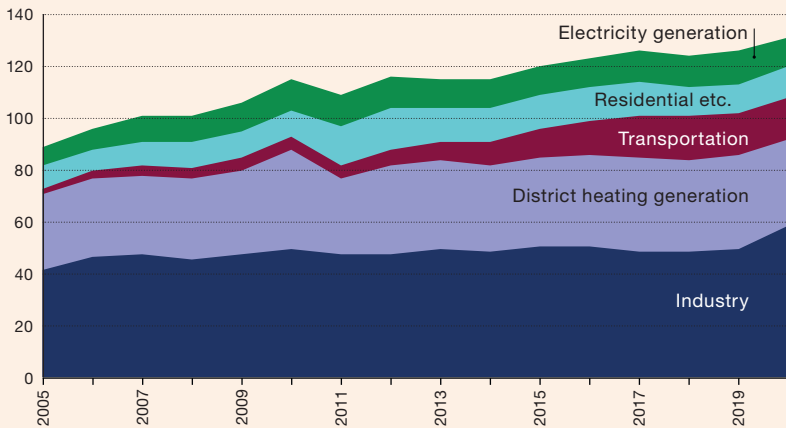
Note: Share of renewables in transportation in accordance with the calculation method in the Renewables Directive.

## Renewable energy and energy consumption in accordance with the Renewables Directive, 2005–2020, TWh



Sources: The Swedish Energy Agency and Eurostat.

## Use of biofuels per sector, 2005–2020, TWh



Sources: The Swedish Energy Agency and Eurostat.



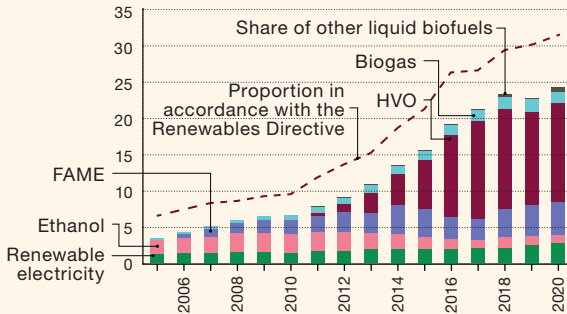


## The renewable energy target for the transport sector

The share of renewable energy in the transport sector shall be at least 10 per cent by 2020.



### The share of renewables in the transport sector 2005–2020, in per cent

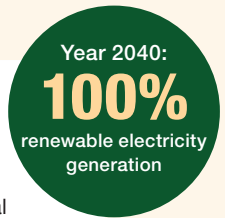


The transport sector is using more and more renewable energy over time. In 2020, the share of renewable energy amounted to 24 per cent for domestic transportation. The target has thus been achieved.



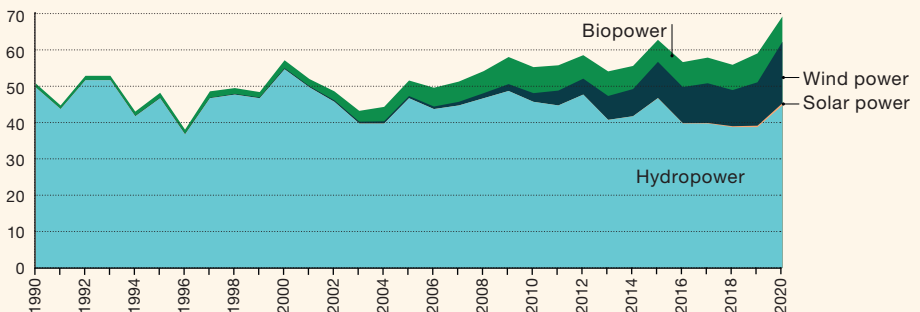
## The 100 per cent renewable electricity generation target

Electricity generation shall be 100 per cent from renewable sources by 2040, but this is not a cut-off date, banning nuclear power.



The share of renewable electricity generation in relation to the total electricity generation varies between the years. In 2020, the proportion was 69 per cent, which is 10 percentage points higher than last year. In general, Sweden's high share of renewable electricity is due to the fact that a large part of electricity is produced by hydropower.

### The share of renewable electricity in relation to total electricity generation 1990–2020, in per cent



Sources: The Swedish Energy Agency

Note: Not adjusted according to a normal year, i.e. does not take into account the annual variation in precipitation and wind, which in turn affect hydropower and wind power.



The Swedish Energy Agency is leading society's transition to a sustainable energy system.

We contribute with facts, knowledge, and analysis of supply and use of energy in the society, as well as work towards security of energy supply.

Research on new and renewable energy technologies, smart grids, as well as vehicles and transport fuels of the future receives funding from us. We also support business development that allows commercialisation of energy related innovations, and ensure that promising cleantech solutions can be exported.

Official energy statistics, and the management of instruments such as the Electricity Certificate System and the EU Emission Trading System, are our responsibility.

Furthermore, we participate in international collaboration with the aim of attaining Swedish energy and climate objectives, and develop and disseminate knowledge for a more efficient energy use to households, industry, and the public sector.



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