## Energy in Sweden 2010

**OH-pictures** 



140 120 100 80 60 Percent 40 20 -20 Belgium Denmark Finland Sweden Czech Republic Austria EU-27 Total OECD Australia Spain France Irland Japan Canada Korea Poland Turkey Germany Hungary Greece Iceland Italy Norway Portugal Slovak Republic NSA United Kingdom Luxembourg Mexico Netherlands New Zeeland Switzerland

Figure 1 Changes in carbon dioxide emissions in EU and OECD states, 1990–2007

Source: OECD in figures, 2009 edition.

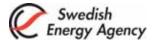
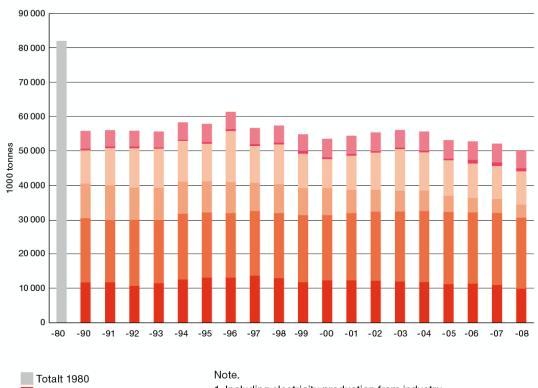


Figure 2 Carbon dioxide emissions in Sweden in 1980, 1990–2008





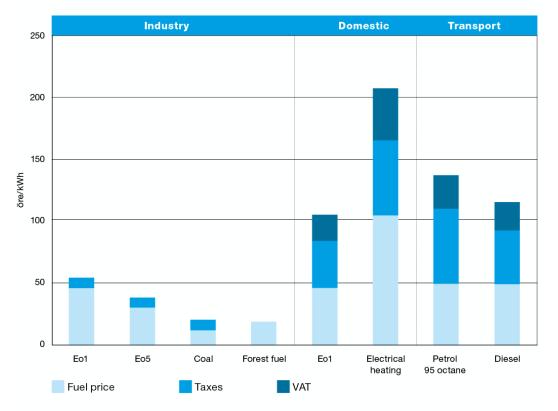
- 1. Including electricity production from industry.
- 2. Including cokeovens, refineries and waste incineration.
- 3. Including solvent and other products use.

Details are revised compared to earlier editions.

Source, 1980: Statistics Sweden, Statistical Notices, NA 18. Source, 1990-2008: Sweden's report to the UN Climate Convention, National Inventory Report 2010.



Figure 3 Total energy price for various customer categories, 2009

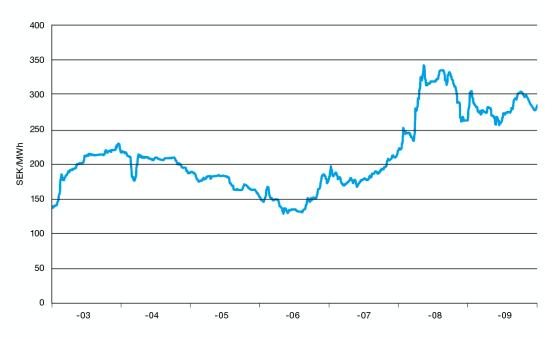


Source: SPI, Statistics Sweden and Swedish Tax Board.

Note: Prices for industry do not include any volume discounts.



**Figure 4** Average spot traded price for electricity certificates, 2003–2009



Source: Svensk Kraftmäkling.

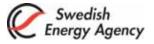


Figure 5 Prices of emission allowances, 2005–2010





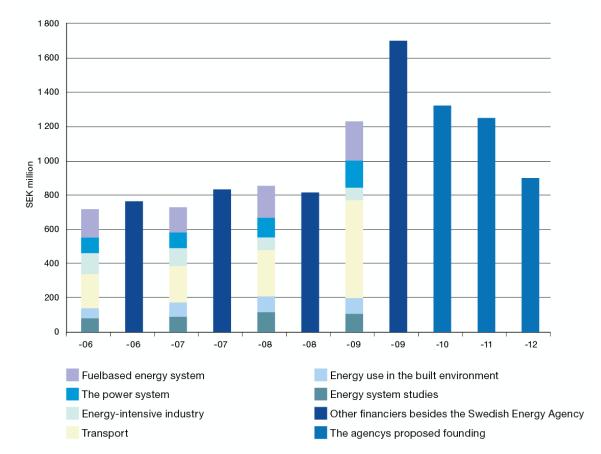


Figure 6 Research, development and demonstration funding, 2006–2012

Source: Swedish Energy Agency's Annual Report, 2009 (ER 2010:01), Budget Bill 2009/10:1 Expenditure Area 21, Energy.

Note: For 2006–2009, the figure refers to approved funding. For 2010, the figure shows proposed funding, while for 2011–2012 it is expected funding. The figures are therefore not strictly comparable between years.

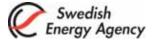
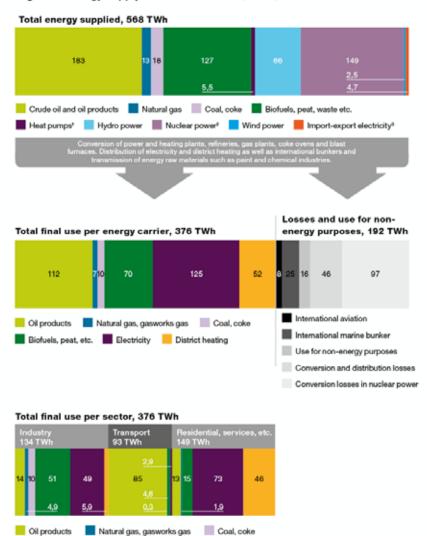


Figure 7 Energy supply and use in Sweden, 2009, TWh





Biofuels, peat, etc. Electricity District heating



These are large heat pumps in the energy sector.
 Nuclear power is shown as gross power, i.e. as the nuclear fuel energy input, in accordance with the UN/ECE guidelines.
 Net import of electricity is treated as supply.

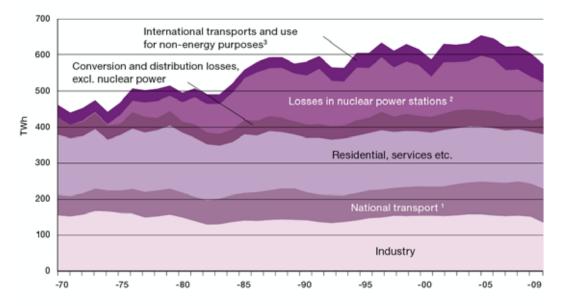
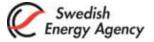
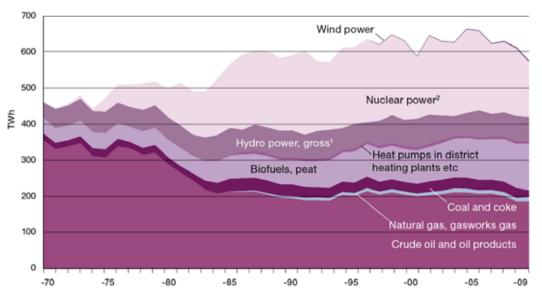


Figure 8 Sweden's total energy use, 1970-2009

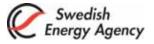
Note: 1. Foreign aviation included in this item until and including 1989. 2. Nuclear power is shown as gross power, i.e. as the nuclear fuel energy input, in accordance with the UN/ECE guidelines. 3. Foreign aviation included in this item from and including 1990.



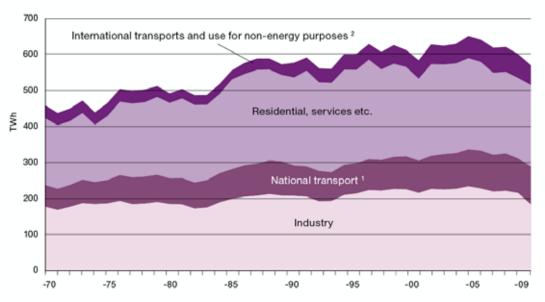
**Figure 9** Total energy supply in Sweden, 1970–2009, excluding net electricity exports



Note: 1. Includes wind power until and including 1996. 2. Nuclear power is shown as gross power, i.e. as the nuclear fuel energy input, in accordance with the UN/ECE guidelines.



**Figure 10** Total energy use in Sweden, 1970–2009. Conversion losses in the production sector are apportioned to end users



Note: 1. Foreign aviation included in this item until and including 1989. 2. Foreign aviation included in this item from and including 1990.

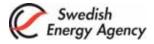
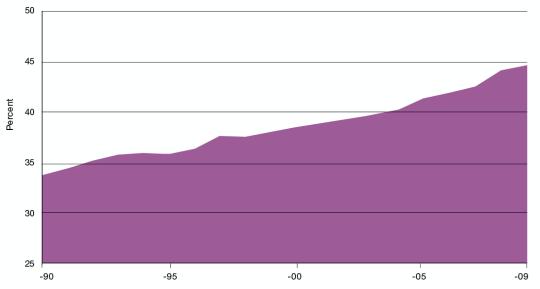


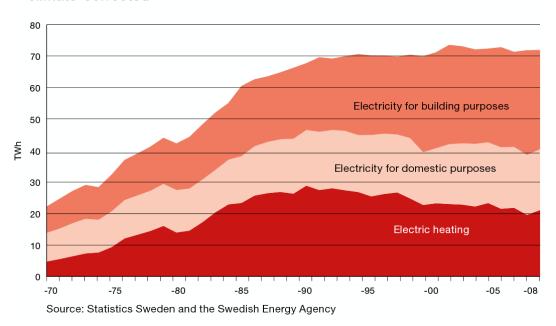
Figure 11 Sweden's total proportion of renewable energy use, 1990–2009



Note: The proportion for 2009 is based on short-term statistics, and is therefore subject to change.

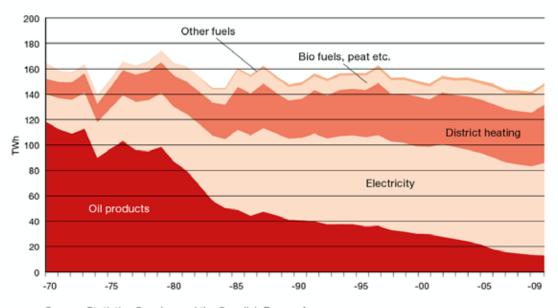


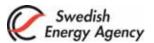
**Figure 12** Electricity use in the residential and services sector, 1970-2008, climate-corrected





**Figure 13** Final energy use within the residential and service sectors etc, 1970–2009





Coal and coke

Coal and coke

Biofuel, peat, etc District heating

Electricity

Oil products

Natural gas and gasworks gas

-95

-00

-05

-09

Figure 14 Final energy use in industry, 1970-2009

Source: Statistics Sweden and the Swedish Energy Agency.

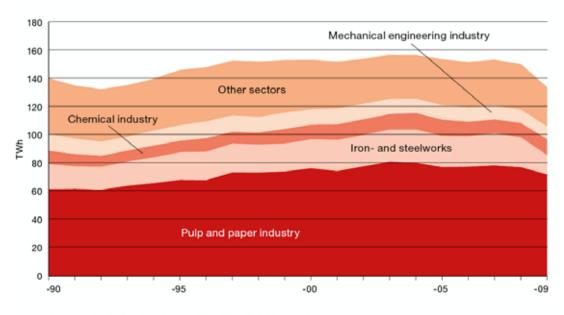
-80

0 <del>-7</del>0

-75



Figure 15 Energy use in industry per sector 1990-2009





Other industries

Mechanical engineering industry

Chemical industry

Iron- and steelworks

Pulp and paper industry

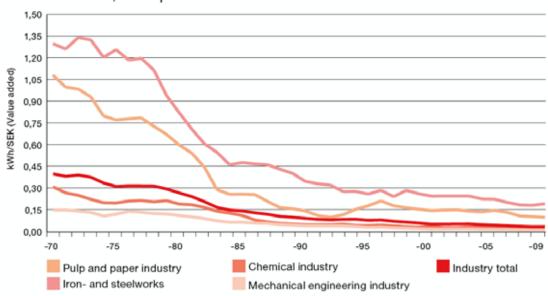
-00

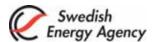
-05

Figure 16 Use of electricity in industry 1970-2009

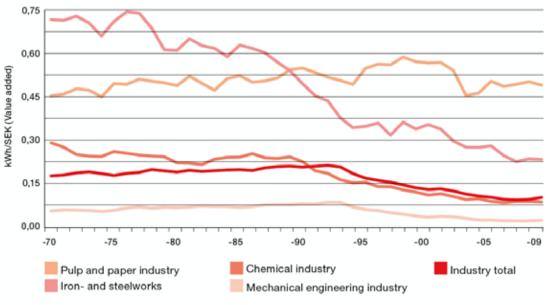


**Figure 17** Specific use of oil in industry, 1970–2009, kWh per SEK of value added, 2000 price levels





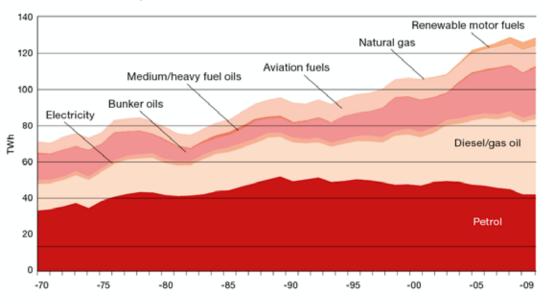
**Figure 18** Specific electricity use in industry 1970–2009, kWh per SEK of value added, 2000 price levels

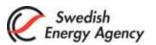


Source figure 17-18: Statistics Sweden and the Swedish Energy Agency.



**Figure 19** Final energy use in the transport sector 1970–2009, including international transports

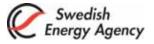




5,0 4,5 4,0 FAME 3,5 3,0 Biogas ₹ 2,5 2,0 1,5 Ethanol 1,0 0,5 0,0 -01 -02 -03 -04 -05 -06 -07 -00 -08 -09

Figure 20 Final energy use of renewable motor fuels, 2000-2009

Source: Statistics Sweden, the Swedish Energy Agency and the Swedish Gas Association.

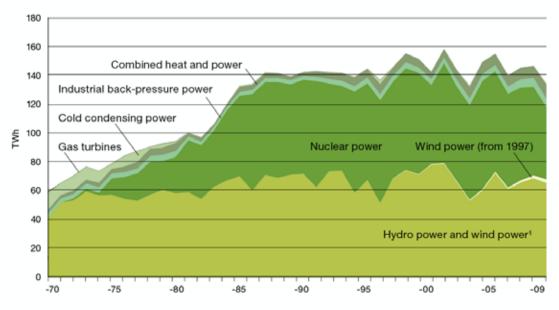


160 Distribution losses 140 District heating, refineries 120 100 ž Residential, services etc 80 60 Transport 40 Industry 20 -70 -75 -80 -85 -90 -95 -00 -05

Figure 21 Electricity use in Sweden, by sectors, 1970–2009



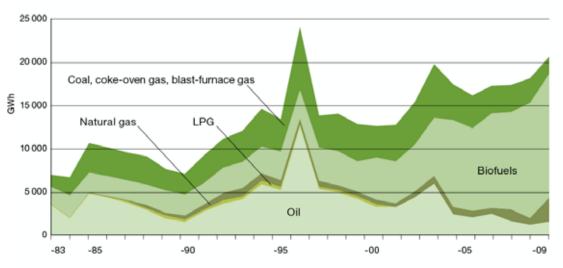
**Figure 22** Electricity production in Sweden, by types of production plant, 1970–2009



Note: 1. Windpower is included in the series up and until year 1996.



Figure 23 Fuel input for electricity production (excluding nuclear fuel), 1983–2009





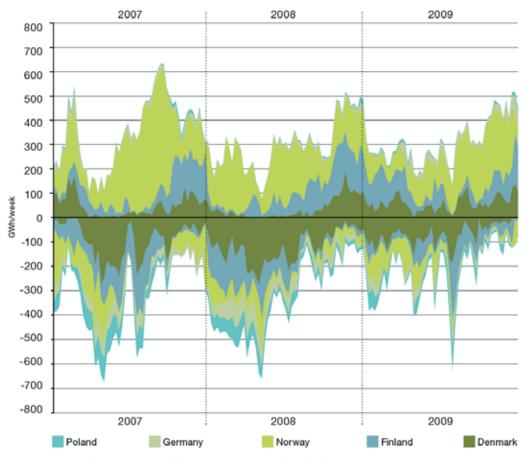
2 500
2 500
1 500
-82 -85 -90 -95 -00 No, of wind power plants

Figure 24 Wind power production, 1982-2009

Source: Wind power statistics, 2009, ES 2010:03



Figure 25 Swedish electricity import (+) and export (-), January 2007–December 2009



Source: Svensk Energi, additional processing by the Swedish Energy Agency.

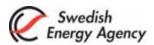
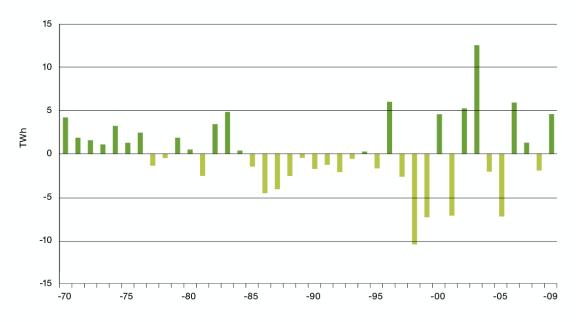
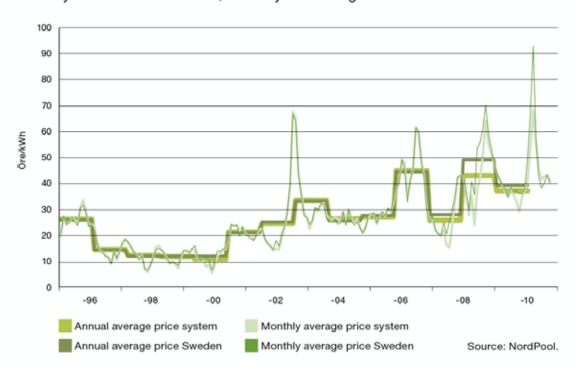


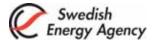
Figure 26 Sweden's net import (+) and net export (-) of electricity, 1970–2009





**Figure 27** Spot prices on Nord Pool. Monthly and annual average prices for the system and for Sweden, January 1996–August 2010



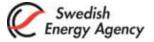


1,4 1,2 1,0 0,6 Taxes 0,4 Selling price minus spot price 0,2 Spot price on the market -00 -80 -85 -90 -95 -05 -09

Figure 28 Real price of electricity (2009 price level), 1980-2009

Source: Statistics Sweden, Bank of Sweden, Nordpool.

Note: The prices of electricity for domestic users and for industry have been weighted in proportion to the respective sector proportions.



70 60 50 Losses TWh 30 Residential, service etc 20 Industry 10 -70 -75 -80 -85 -90 -95 -00 -05 -09

Figure 29 Use of district heating, 1970–2009

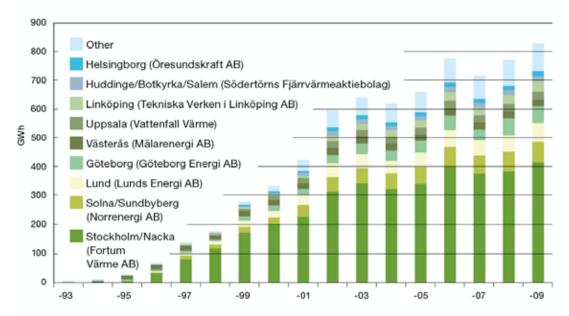


70 Waste heat 60 Heat pumps 50 Electric boilers TWh 40 Coal, including coke oven gas, b-f gas 30 Biofuels, waste, peat etc, Natural gas, including LPG 20 10 0 -70 -75 -85 -90 -95 -00 -05 -80 -09

Figure 30 Energy input for district heating, 1970–2009



Figure 31 Supply of district cooling, 1993–2009



Source: Swedish District Heating Association.



\$ 000 \$ 4 000 2 000 1 000

-95

Residential and service

-00

-05

-09

Transport

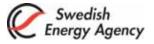
Figure 32 Final use of natural gas in Sweden, 1985–2009, by user sector

Source: Statistics Sweden and the Swedish Energy Agency.

-90

-85

Industry



14
12
10
10
8
8
4

Figure 33 Import price of natural gas, 1999-2009

Source: IEA Energy Prices & Taxes, Quarterly Statistics, Second Quarter 2010.

-02

-03

-04

Import through pipe USA

-06

-07

-08

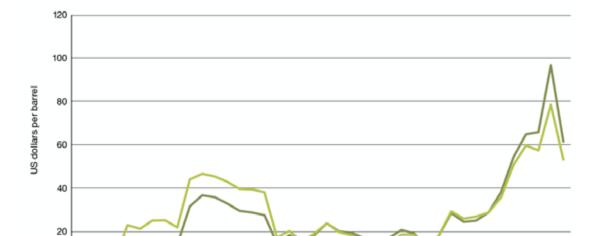
Import LNG to Japan

-99

-00

Avarage importprice to EU





-90

Real price<sup>2</sup>

-00

-05

-09

Figure 34 Nominal and real prices of light crude oil, 1970–2009

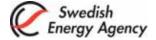
- 1) Due to revision of statistics at Bp the timeseries has been revised back to 1984.
- 2) Global real prices deflated with MUV-index from The World Bank.

Source: www.bp.com and the World Bank.

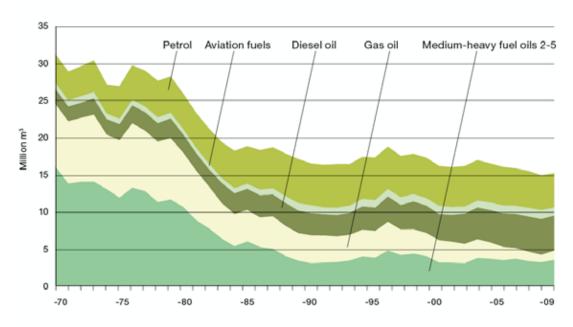
-75

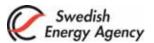
Nominal price 1

-70

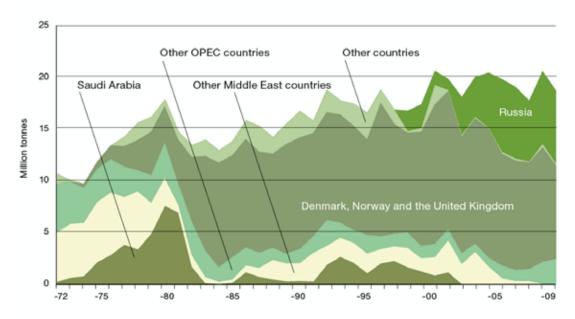


**Figure 35** Use of oil products in Sweden, including international transport, 1970–2009





**Figure 36** Swedish net imports of crude oil and oil products, by country of origin, 1972–2009



Source: Statistics Sweden and the Swedish Energy Agency.

Note: Until and including 1997, imports from Russia is included in the category other countries.

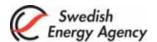
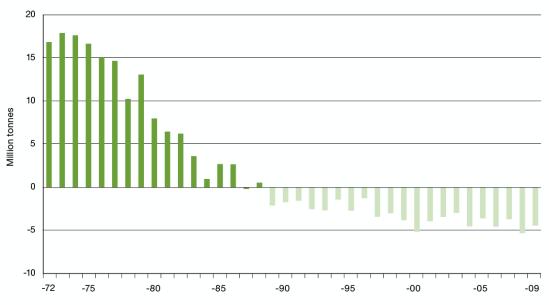


Figure 37 Net imports (+) and exports (-) of refinery products, 1972–2009



Source: Statistics Sweden and the Swedish Energy Agency.



160
140
120
100
80
40
20

Figure 38 Coal prices in the EU, USA and Japan, 1999-2009

Source: IEA Energy Prices & Taxes, Quarterly Statistics, Second Quarter 2010.

USA

-03

Japan

-04

-05

-06

-07

0

-99

-00

Avarage price EU

-01



3 000 Horticulture 2 500 2 000 1000 tonnes 1 000 Industry Combined heat and power stations 500 Heating plants 0 -00 -05 -90 -95 -09

Figure 39 Use of energy coal in Sweden, 1985-2009

Source: Statistics Sweden and the Swedish Energy Agency.

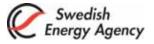
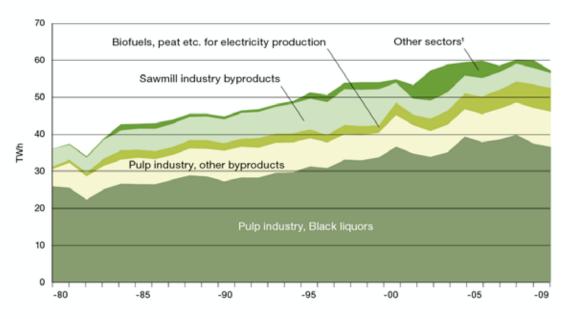


Figure 40 Use of biofuels, peat etc. in industry, 1980-2009



Source: Statistics Sweden and the Swedish Energy Agency

Note: 1. The short term statistics for other sectors is continously underestimated. Other sector includes food, chemical and manufacturing (engineering) industry among others

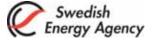
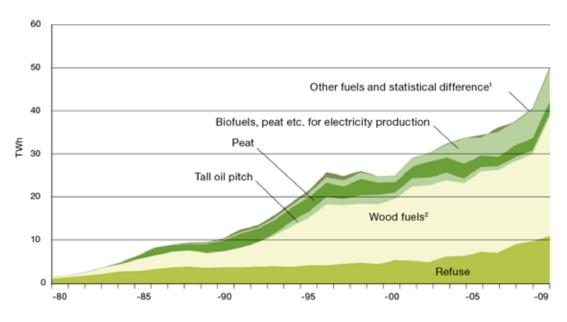


Figure 41 Use of biofuels, peat etc. in district heating plants, 1980-2009



Source: Statistics Sweden and the Swedish Energy Agency

Notes: 1. The difference is due to two different statistical sources. 2. The short-term statistics is continuously overestimated.

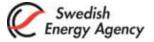
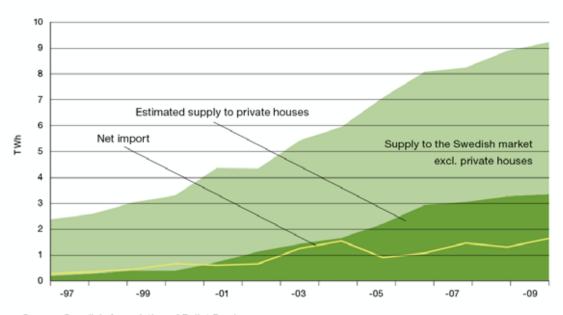


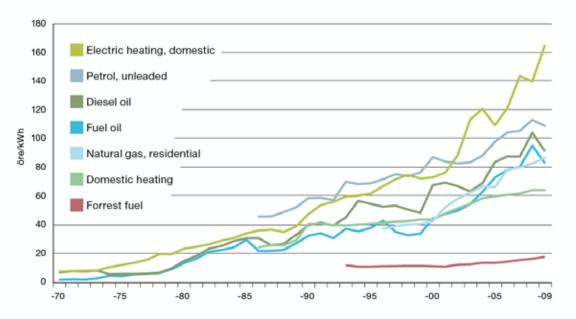
Figure 42 Supply of pellets to the Swedish market, 1997–2009



Source: Swedish Association of Pellet Producers

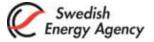


Figure 43 Actual commercial energy prices in Sweden, including tax, 1970-2009



Source: Swedish Petroleum Institute, Statistics Sweden, Swedish Energy Agency and Eurostat.

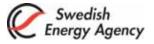
Note: Unless outherwise stated, prices and taxes for 1993 are for supplies for non-industrial use. VAT is included in district heating, domestic electric heating and natural gas for domestic use.



1,2 1,0 0,8 SEK/kWh 0,6 0,4 0,2 -80 -85 -90 -95 -00 -05 -09 Price level 2009 Nominal price

Figure 44 Price of purchased energy (relative to 2009 price level)

Source: Statistics Sweden, Bank of Sweden and IEA Energy Prices and Taxes.



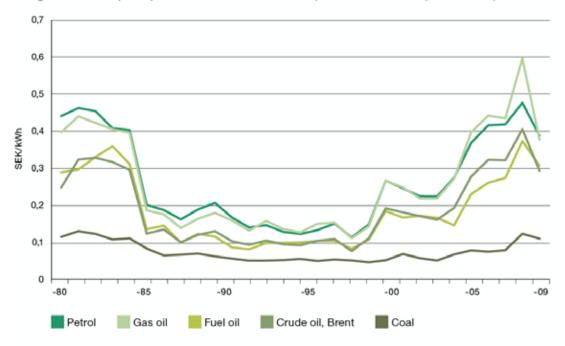
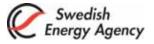


Figure 45 Import price trends 1980-2009 (relative to 2009 price level)

Source: Statistics Sweden, Bank of Sweden and IEA Energy Prices and Taxes



160 000 Other1 140 000 Hydro power 120 000 Nuclear power 100 000 Natural gas ₹ 80 000 60 000 40 000 20 000 Coal and coke -90 -00 -09

Figure 46 Total world energy supply, 1990-2009

Source: IEA Energy Balances of Non-OECD Countries, 2010 och BP Statistical Review of World Energy, 2010.

Note: 1. There is no statistics for renewable fuels year 2009.



60 000 50 000 40 000 OECD North America **≨** 30 000 Asia excl China 20 000 China EU Africa 10 000 Others Russia -95 -90 -00 -05 -09

Figure 47 Global supply of oil 1990-2009

Sources: Energy Balances of Non-OECD Countries 2010, Energy Balances of OECD Countries 2010 and BP Statistical Review of World Energy, 2010.

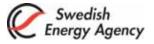
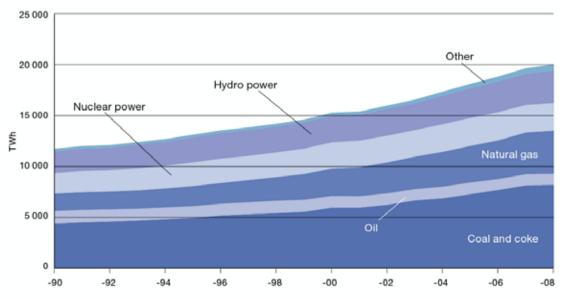
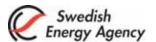


Figure 48 World power generation by energy resource, 1990-2008



Source: IEA Energy Balances of Non-OECD Countries 2010.



60 000 50 000 40 000 kWh/person 30 000 20 000 10 000 Spain celand Canada Finland Sweden USA Japan Belgium France taly Poland Norway OECD totalt Switzerland Netherlands Germany United Kingdom Biofuel and waste Nuclear power Hydro power etc. Fossil-fuelled power Wind power

Figure 49 Specific electricity production per inhabitant by power source, 2009

Source: Electricity information 2010 IEA/OECD.



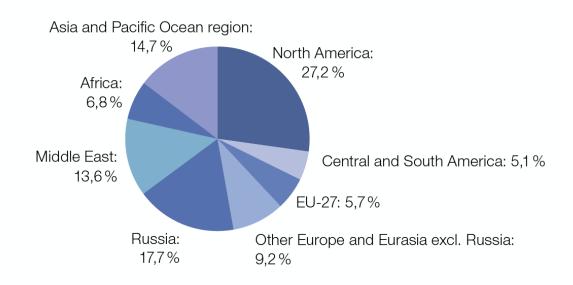
35 000 30 000 25 000 20 000 ž 15 000 10 000 Russia 5 000 Others 0 -00 -06 -92 -94 -96 -98 -02 -04 -90 -08 -09

Figure 50 Global supply of gas 1990-2009

Sources: IEA Energy Balances of Non-OECD Countries, 2010, IEA Energy Balances of OECD Countries, 2010. For 2009, BP Statistical Review of World Energy, 2010.



Figure 51 World production of natural gas, 2009



Source: The BP Statistical Review of World Energy 2010, www.bp.com



45 000
40 000
35 000
Russia
China
30 000
20 000
15 000
Asia excl China

Figure 52 Global supply of coal 1990-2009

5 000

0 F

-92

-94

-96

Source: IEA Energy Balances of Non-OECD Countries, 2010. IEA Energy Balances of OECD countries, 2010. For 2009, BP Statistical Review of World Energy, 2010.

Note: Revised figures relative to those shown in previous edid

-00

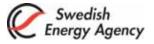
-02

-04

-06

-08 -09

-98



20 000 18 000 16 000 14 000 12 000 Asia excl China 10 000 EU. 8 000 China Africa 6 000 Russia 4 000 Others 2 000 0 -90 -94 -96 -98 -00 -02 -04 -06

Figure 53 Global supply of renewable energy 1990-2008

-92

Source: IEA Energy Balances of Non-OECD Countries, 2010. IEA Energy Balances of OECD Countries, 2010.

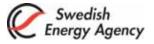
-08



18 000 16 000 Others 14 000 Africa 12 000 Latin America 10 000 Asia excl China 8 000 6 000 4 000 North Aamerica 2 000 0 -90 -92 -94 -96 -98 -00 -02 -04 -06 -08

Figure 54 World power use by region 1990-2008

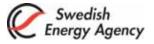
Sources: IEA Energy Balances of Non OECD Countries 2010, IEA Energy Balances of OECD Countries 2010.



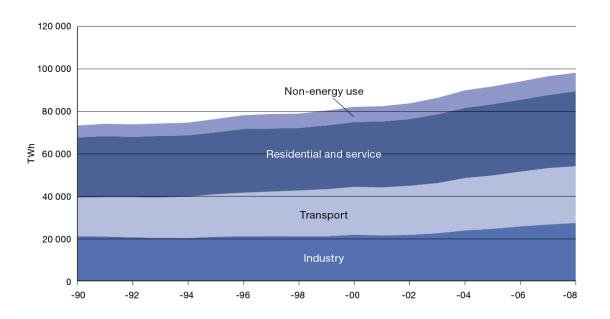
100 000 90 000 80 000 70 000 kWh/per capita 60 000 50 000 40 000 30 000 20 000 10 000 The World USA ndia EU -27 China Africa Middle East Latin America Total 1990 Total 2008

Figure 55 Regional energy use for 1990 and 2008

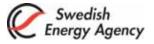
Sources: IEA Energy balances of Non OECD Countries 2010, IEA Energy Balances of OECD Countries 2010. Note: Figures for all years have been revised relative to those shown in previous edition.



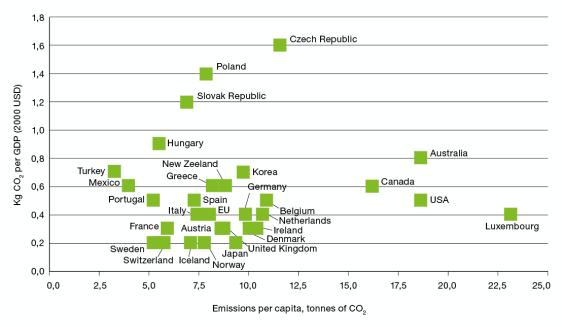
**Figure 56** Total world energy use per sector 1990-2008



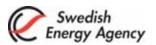
Source: IEA Energy Balances of Non-OECD Countries 2010, IEA Energy Balances of OECD countries 2010.



**Figure 57** Emissions of carbon dioxide in total, per capita and per GDP in EU and OECD countries, 2007



Source: OECD in figures - 2009 edition.



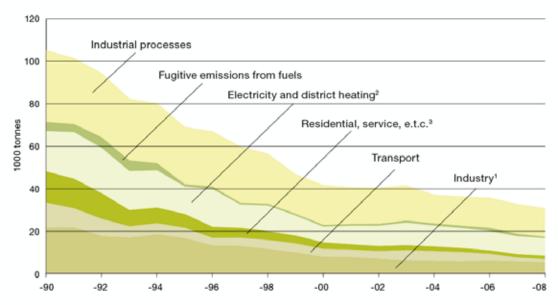
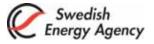


Figure 58 Emissions of sulphur dioxide (SO<sub>2</sub>) in Sweden 1990–2008

Source: Swedens reporting to the UN CLRTAP, Swedish Environmental Agency 2010, Processed by the Swedish Energy Agency.

Note. Details are revised compared to earlier editions. 1. Including electricity production from industry and hazardous waste incineration. 2. Including coke-oven plants and and refineries. 3. Including agriculture, forestry and fishing.



350 Industrial processes Fugitive emissions 300 Electricity and district heating<sup>2</sup> Residential, service, e.t.c.3 250 Transport Industry1 1000 tonnes 200 150 100 50 0 -90 -92 -94 -96 -98 -00 -02 -04 -06 -08

Figure 59 Emissions of nitrogen oxides in Sweden 1990-2008

Source: Swedens report to the UN CLRTAP, Swedish Environmental Protection Agency 2010, Data processed by the Swedish Energy Agency. Note: Details are revised compared to earlier editions.

1. Including electricity production from industry and hazardous waste incineration. 2. Including coke-oven plants and refineries. 3 Including agriculture, forestry and fishing.

