ETIP Bioenergy
European Technology and Innovation Platform

Bioenergy in Sweden

OVERVIEW

Bioenergy is the leading source of energy in Sweden of which 125 TWh was produced in 2014; which is 34.3% of the total Swedish energy use (Figure 1). Likewise, in 2014, bioenergy surpassed crude oil as the leading source of energy (Svebio, 2014).

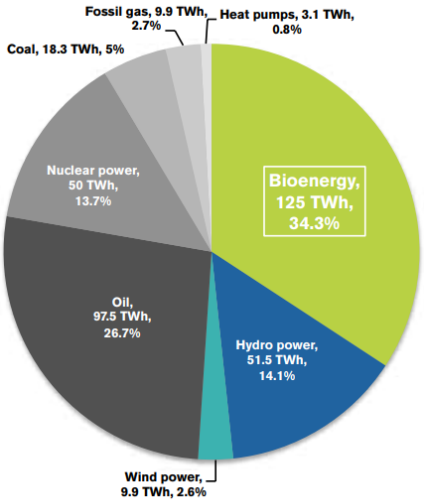

Figure 1: Energy use in Sweden in 2014, (TWh), Source: Svebio, 2014.

Heat generation

Biomass for heating is the largest and most common type of bioenergy used in Sweden (Svebio, 2021). Over the last 30 years, biomass has taken over as fuel in Swedish district heating. Fossil fuels dominated in the 1980s, but in 2014 bioenergy and other fuels (peat and waste) accounted for 75% of consumed fuels (Figure 2).

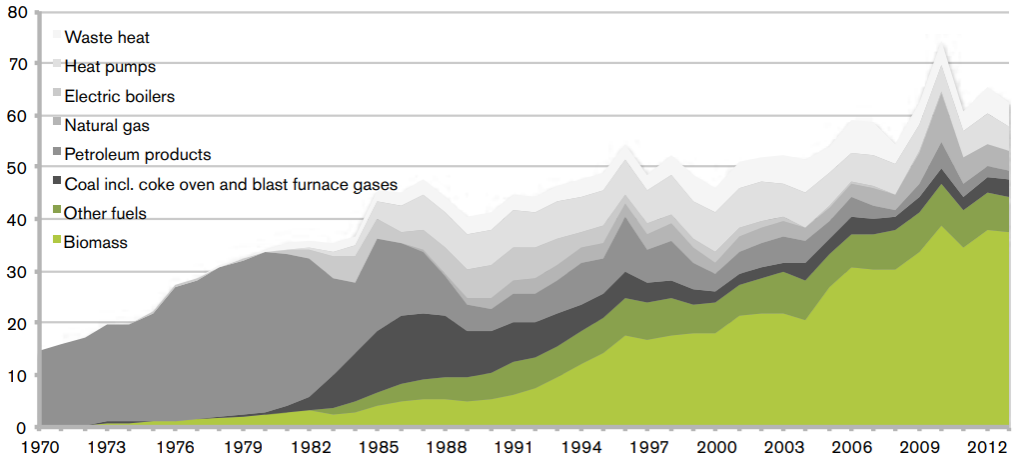

Figure 2: Energy supply to district heating, 1970-2013, (TWh), Source: Svebio, 2014.

ETIP Bioenergy
European Technology and Innovation Platform

Electricity generation

In 2016, Sweden produced 152.9 billion kWh and used 133.5 billion kWh of electricity, exporting 26.02 billion kWh (CIA-The World Factbook, 2021). Nuclear power and hydropower are the two largest sources of electricity, whilst biopower only made up 6% of total electricity production in 2014.

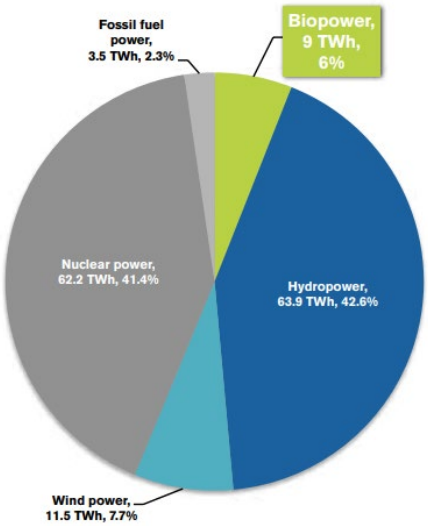

Figure 3: Electricity production in 2014, (TWh), Source: Svebio, 2014.

Biofuels

Biofuels accounted for 18.6 % of all fuels supplied to vehicles operating in Sweden in 2016 (Svebio, 2021). The use of biofuels for transport in Sweden has increased steadily since 2001 (Figure 4). Together with renewable electricity for railroads, renewable fuels had reached the 10% EU target for 2020 during 2012, eight years ahead of time (Svebio, 2014). The goal is to reduce emissions from transport by 70% by 2030 and then completely switch to a fossil free traffic (ibid.). Hydrotreated vegetable oil diesel is identified to be the reason for the rapid growth in biofuels. Moreover, rapeseed-derived diesel is also being used extensively. Bio-methane accounts for 80% of the fuel blend in natural gas vehicles (ibid.), whilst the use of ethanol has decreased. According to Svebio, Sweden has not reached its full potential in regards to biofuels, as the use of ethanol and rapeseed-derived diesel were held back by taxation. Furthermore, the ethanol bled should be increased from E5 to E10, thereby naturally increasing the use of biofuels.

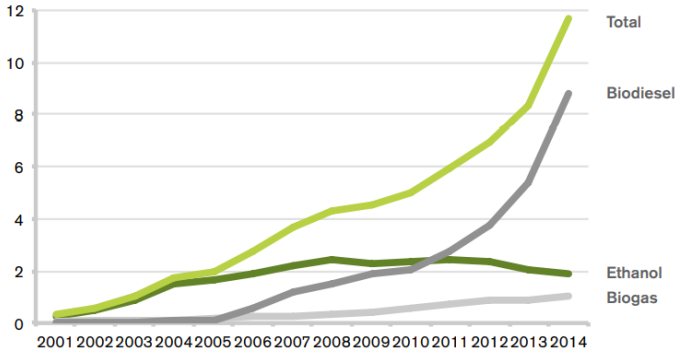

Figure 4: Use of biofuels for transport, 2001-2014, (TWh), Source: Svebio, 2014.

ETIP Bioenergy
European Technology and Innovation Platform

GHG savings by bioenergy

Bioenergy makes a significant contribution to climate protection. Biomass releases only about the amount of CO_2 that the plants previously absorbed during the period of growth. Greenhouse gas emissions by the Swedish economy and households decreased by about 4% in 2019 compared to the previous year (Statistics Sweden, 2019).

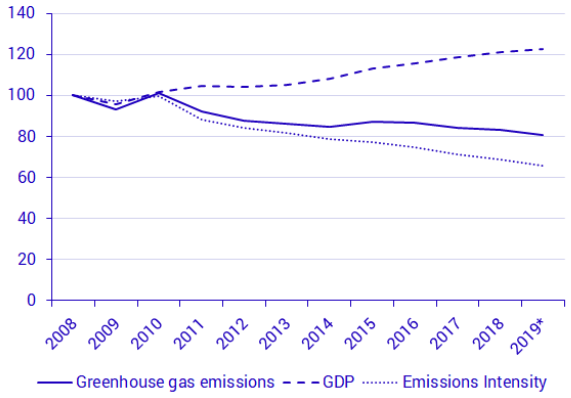

Figure 5: Greenhouse gas emissions, GDP and emissions intensity 2008–2019, Source: Statistics Sweden, 2019.

EXAMPLES OF DEMOPLANTS

Operator: RenFuel
Location: Backhammar
Process: bio-oil production facilities
TRL: 6-7
Start-up year: 2016
Installed capacity [t/y]: 3,200
Link: https://renfuel.se/?lang=en

Operator: RenFuel
Location: Vallvik
Process: bio-oil production facilities
TRL: 8
Start-up year: 2021
Installed capacity [t/y]: 77,000
Link: https://renfuel.se/?lang=en

Operator: Domsjoe Fabriker
Process: fermentative alcohol production facilities
TRL: 8
Installed capacity [t/y]: 19,000
Link: http://www.domsjo.adityabirla.com/en/Sidor/Startpage.aspx

Operator: SEKAB
Process: fermentative alcohol production facilities
TRL: 8
Start-up year: 2004
Installed capacity [t/y]: 160
Link: https://www.sekab.com/en/this-is-how-it-works/biorefinery-demo-plant/

ETIP Bioenergy
European Technology and Innovation Platform

SOURCES

- CIA-The World Factbook (2021): Sweden, https://www.cia.gov/the-world-factbook/countries/sweden/
- EU Comission (2020): Communication from the Commission to the European Parliament, the Council, The European Economic and Social Committee and the Committee of the Regions, https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52020DC0562
- Statistics Sweden (2019), https://www.scb.se/en/finding-statistics/statistics-by-subject-area/environment/environmental-accounts-and-sustainable-development/system-of-environmental-and-economic-accounts/pong/statistical-news/environmental-accounts--emissions-to-air-q4-2019/
- Swedish Bioenergy Association-Svebio (2014): Bioenergy the Swedish experience-How bioenergy became the largest energy source in Sweden, https://www.svebio.se/app/uploads/2017/06/Bioenergy_Swedish_experice_3rded_web-1.pdf
- Swedish Bioenergy Association-Svebio (2021), https://www.svebio.se/en/about-bioenergy/

FURTHER INFORMATION

- ETIP Bioenergy, https://www.etipbioenergy.eu/current-status-of-advanced-biofuels-demonstrations-in-europe
- Swedish Energy Agency, http://www.energimyndigheten.se/en/

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 825179