

Nordic CO₂ emissions 2009

The Nordic CO₂ emissions from point sources larger than 100 000 t/a amounted to almost 156 Mt in 2009. This figure includes emissions from heat and power production, iron and steel production, cement and lime production, pulp and paper production, oil and gas activities (onshore and offshore), waste treatment or incineration, production of chemicals and non-ferrous metal production. The emissions are illustrated in the map below.

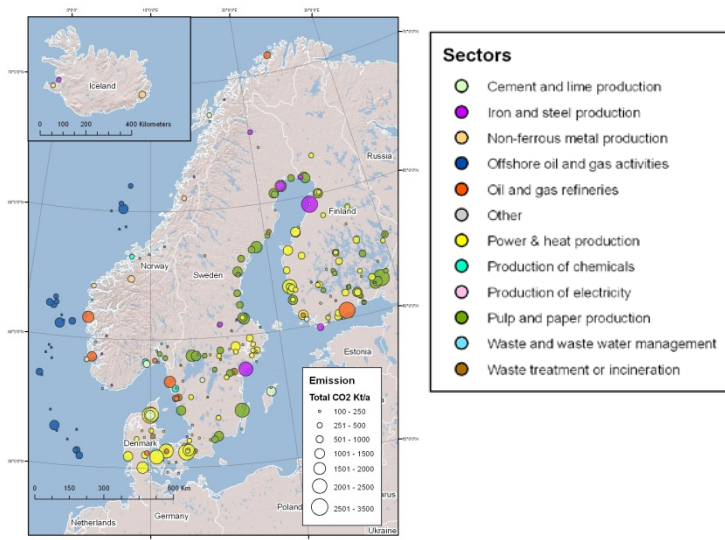


Figure 1 Nordic CO₂ emissions by sector and emission rate

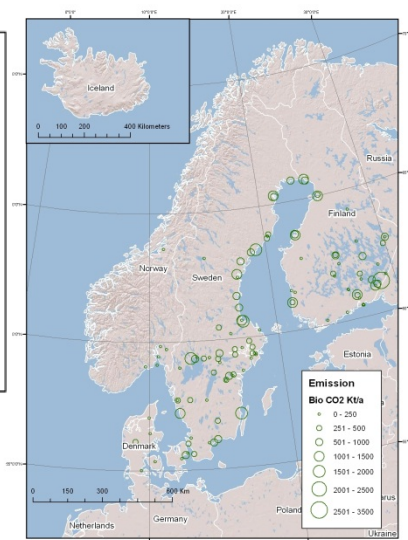


Figure 2 Biogenic emissions

Source: VTT. Background maps attributed to ESRI and its data providers. GIS analysis and map composition: IVL Swedish Research Institute Ltd.

The total CO₂ emissions from large point sources (> 100 000 t/a) is illustrated in figures 1 and 2 below. The CO₂ emission levels from 2007 to 2009 dropped by 11 Mt. The major drops are identified in power and heat production, pulp and paper production and in iron and steel production, where all three sector emissions have decreased about 3 Mt each (see figure 2).

Sweden and Iceland experienced an increase in CO₂ emissions over the two-year period. For Sweden the growth has been small with 1,2% increase. For Iceland, the increase looks like it has been significant, with a doubling of emissions. The Alcoa Fjarðaál plant did increase the aluminium production significantly between 2007 and 2008, and as a result the facility was added to the database, adding 500 000 Mt/a to the statistics. However, the total emissions from Iceland were not doubled as the illustration may suggest, since the database only addresses emissions above 100 000 t/a.

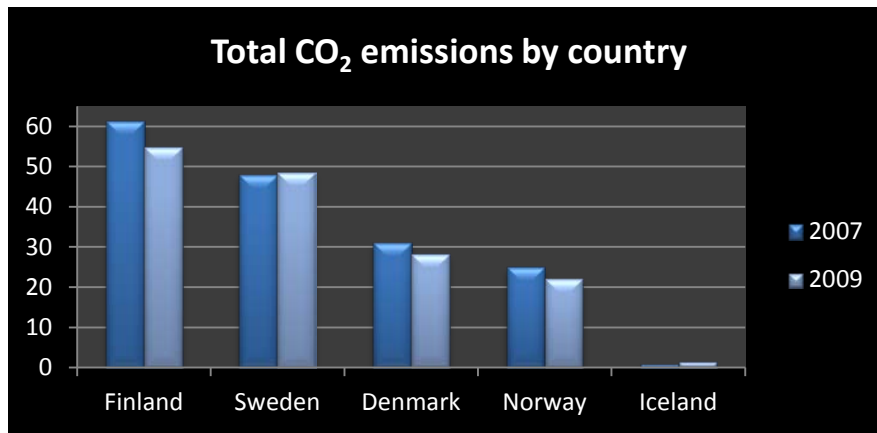


Figure 3 Total Nordic emissions (> 0,1 Mt/a)

All countries experienced an increase in the share of biogenic CO₂ emissions compared to 2007. Currently, Sweden has the largest share of biogenic CO₂ in the total emissions, with more than half originating from biomass fuels.

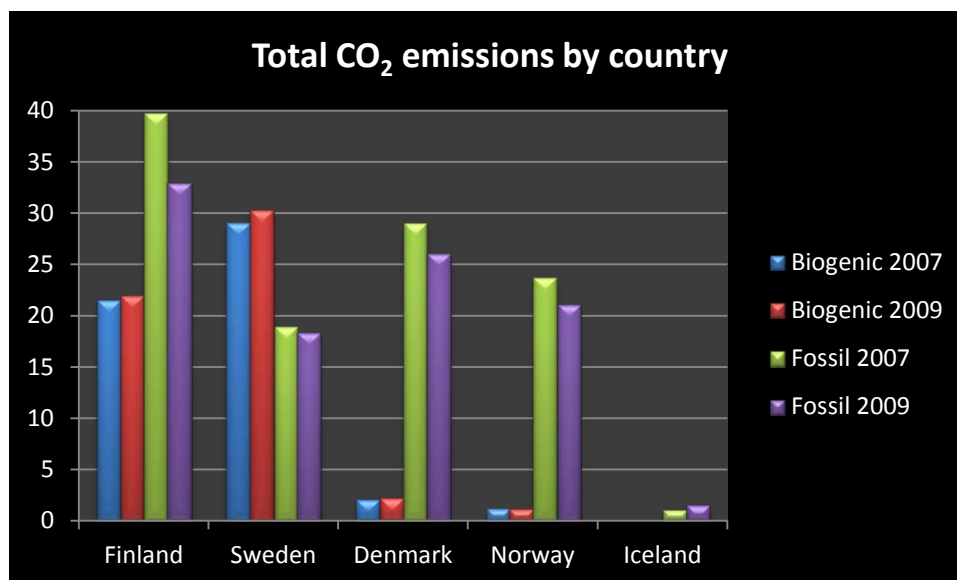


Figure 4 Total CO₂ emissions by country, divided into fossil based and biogenic based

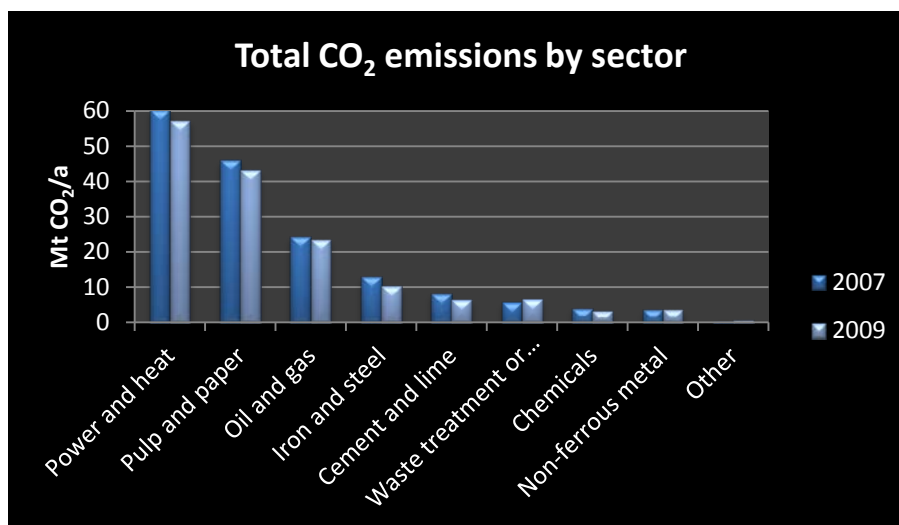


Figure 5 Comparison of CO₂ emissions in 2007 and 2009 for major Nordic industry sectors

Table 1 Share of biogenic CO₂ in total [%]

Country	Biogenic CO ₂ 2007	Biogenic CO ₂ 2009
Finland	35,2	40,1
Sweden	60,5	62,2
Denmark	6,8	7,7
Norway	5,1	5,3
Iceland	0,0	0,0

All countries except Sweden have experienced a decline in iron and steel production from 2007 to 2009. The two largest iron and steel plants in the Nordic countries, the Ruukki Metals plant in Raahе, Finland, and the SSAB plant in Oxelösund, Sweden, have both reduced production. As a consequence, their CO₂ emissions have reduced. The most drastic decline is seen at the Ruukki plant, with a reduction of 1,3 Mt/a. In Sweden, some facilities increased their emissions slightly in spite of worldwide economic downturns. These are the SSAB Tunnpåt facility in Luleå and the KLAB mine in Kiruna. Iron and steel production in Norway also has also decreased from 2007, and the decreased production at the Elkem plant in Bjølvefossen, Ålvik, has excluded the facility from the emission database for point sources larger than 100 000 t/a. Also Iceland experienced a decrease in iron and steel production activities, with corresponding emission reduction of just above 20%.

Also heat and power production has decreased, and the share of biogenic CO₂ emissions from this sector has increased in all countries. Norway and Iceland have very small CO₂ emissions associated to power and heat production.

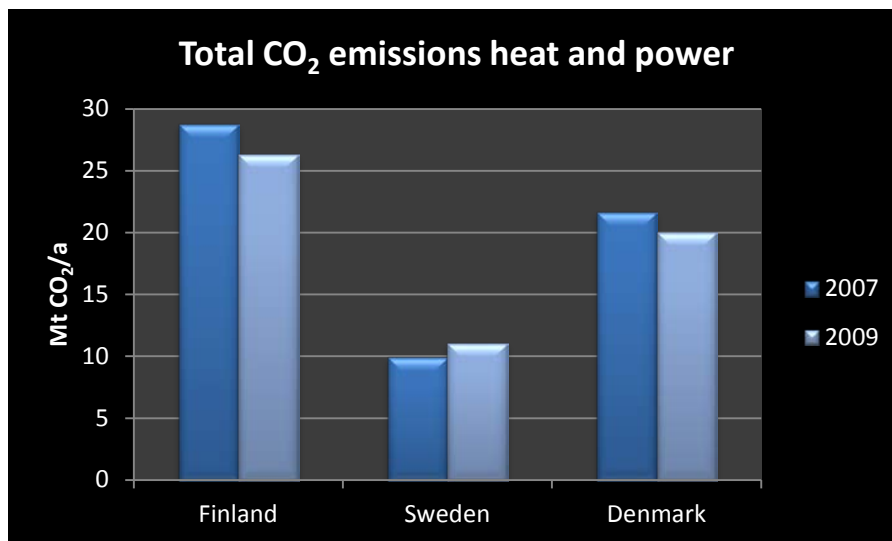


Figure 6 Comparison of overall CO₂ emissions of heat and power production in 2007 and 2009

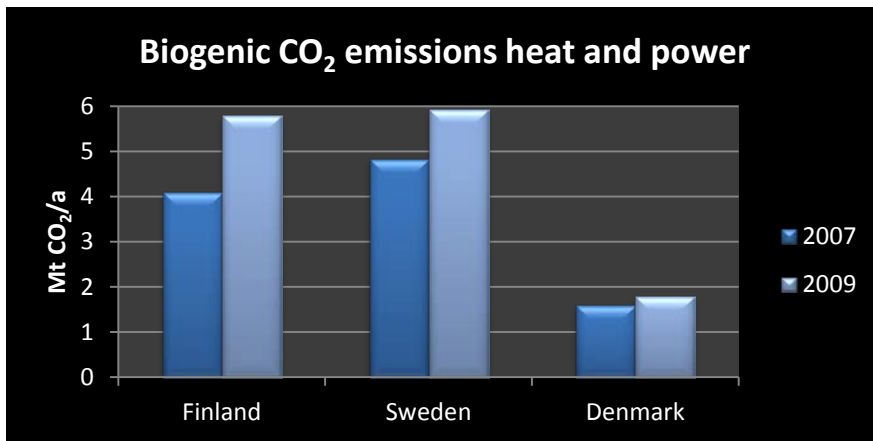


Figure 7 Comparison of biogenic CO₂ emissions from heat and power production in 2007 and 2009

The CO₂ emissions from pulp and paper industry decrease as well around 3 Mt/a. This is a consequence of reduced production due to market fluctuations and shutdown of some of the Nordic mills during the two-year period. Figures 5 and 6 illustrate the reductions for pulp and paper by country.

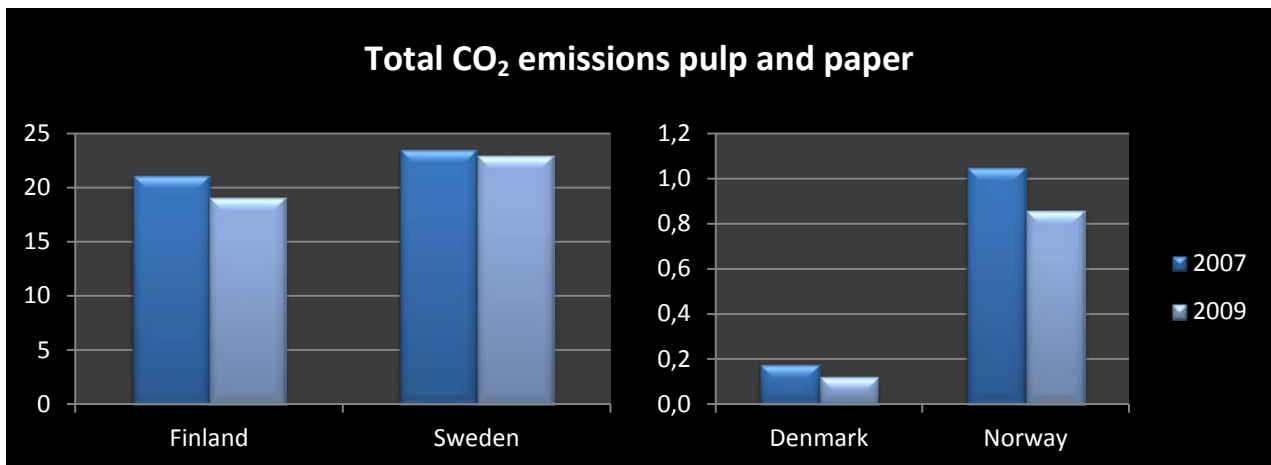


Figure 8 Total CO₂ emissions from Nordic pulp and paper industry

Finland was the only country who increased the share of biofuels in pulp and paper production. The share of biogenic CO₂ emissions from pulp and paper production in Finland in 2009 was 84,6%, compared to 79,2% in 2007.

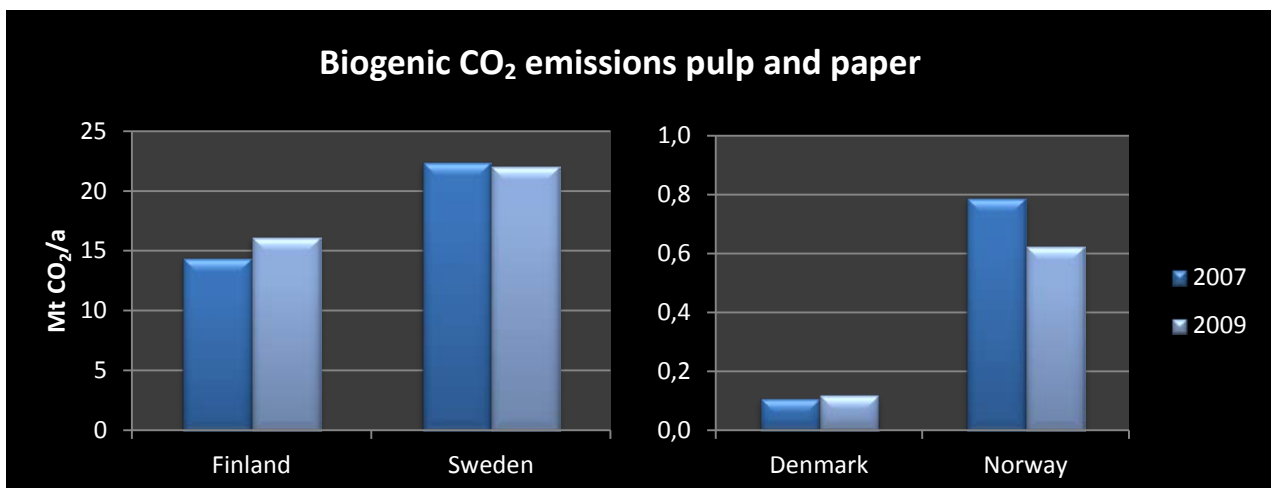


Figure 9 Share of biogenic CO₂ emissions from pulp and paper production in 2007 and 2009

Norway saw a decrease in emissions from oil and gas activities compared to 2007. One of the largest point sources of CO₂ emissions in Norway, the LNG plant Snøhvit in Hammerfest, had a major down-time in 2009. From mid-August and throughout the rest of the year major repairs, such as replacement of heat exchangers, were carried out. The down-time resulted in a major temporary reduction in CO₂ emissions, down by about 50% from 2007, to 0,8 Mt in 2009. The total drop in petroleum-based CO₂ emissions for Norway was 5,4% in 2009 compared to 2007. Also for Denmark a drop in petroleum-based CO₂ emissions of 6,8% was registered. Finland increased petroleum-based CO₂ emissions significantly, with 9,9%, while Sweden did not experience any significant changes.

For cement production, most of the reductions in CO₂ emissions from 2007 to 2009 are due to reduced production rates because of decrease in demand (due to global economic recession). Production rates declined from 2007 to 2008, and fell even further in 2009. As of 2010 and 2011 the production rates are rising again.

Waste treatment and incineration was the only sector that experienced an increase in CO₂ emissions from 2007 to 2009.

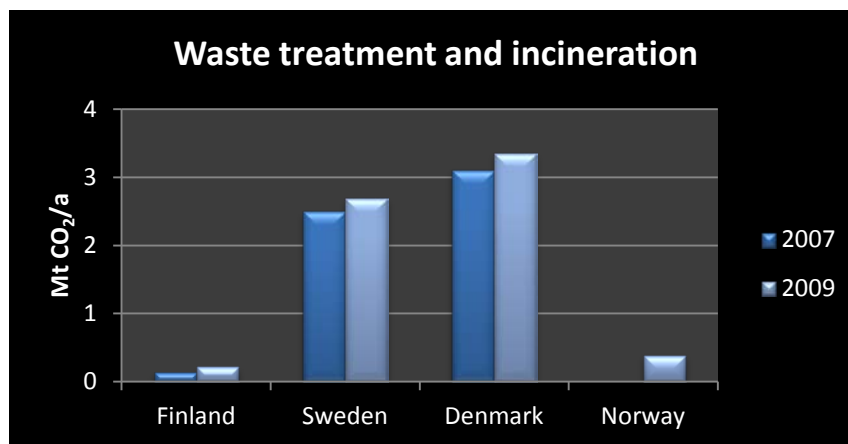


Figure 10 Waste treatment and incineration in 2007 and 2009