Future in our hands
January — 2021

Extended summary — Consumption-based carbon footprint account for Norway

By Kjartan Steen-Olsen, Christian Solli og Hogne Nersund Larsen

Extended summary

In this report a consumption-based carbon footprint account for Norway is presented. Traditionally, national emission accounting has taken a territorial perspective, focusing on the emissions physically taking place within the county's borders. National emission accounting from a consumption-based perspective involves a redistribution of all global emissions, allocating them to countries not based on where the emissions take place but based on where the driving consumption activities occur. The underlying assumption is that all manmade greenhouse gas emissions directly or indirectly can be linked to the final consumption of goods and services.

The analysis was performed using an environmentally extended input-output model based on data from Statistics Norway (SSB) and the European statistical office, Eurostat. The model is based on the national input-output table for Norway, produced and submitted annually to Eurostat by SSB. Since compiling data and preparing the tables is time-consuming, SSB produces these tables with a two-year delay. The input-output table is an aggregated overview of the combined flows of goods and services between the various actors of the economy, described as a set of around sixty economic sectors. Additionally, an analogous table describing the use of imported products. From tables submitted by member countries, Eurostat produces an aggregate input-output table for al EU member states combined. In our model, the Norwegian IOT is combined with the EU IOT to form a two-region input-output model that can be used to model upstream effects of consumption in Norway. Finally, the model is extended with greenhouse gas emission data by sector from Eurostat, both for Norway and for the EU combined.

Based on this multiregional input-output model, the Norwegian carbon footprint for 2017 was estimated to 58,2 million tonnes CO_2-equivalents ($MtCO_2e$), corresponding to 11,1 tCO_2e per person. 42 % of these emissions consisted of emissions abroad, occurring in the supply chains of products ultimately consumed in Norway.

Consumption in private households contributed 64 % of the footprint (7,1 tCO_2e/p). The remainder consisted of consumption by the public sector and by non-profit organizations serving households, as well as from capital investments. Drawing on data from SSB's consumer expenditure survey, which provides detailed information on Norwegian households' consumption activities, the household carbon footprint was further analyzed. The analysis showed that 39 % of the footprint was related to various forms of transport activities. There was also a large contribution (24 %) from the broad category "Food and drinks".

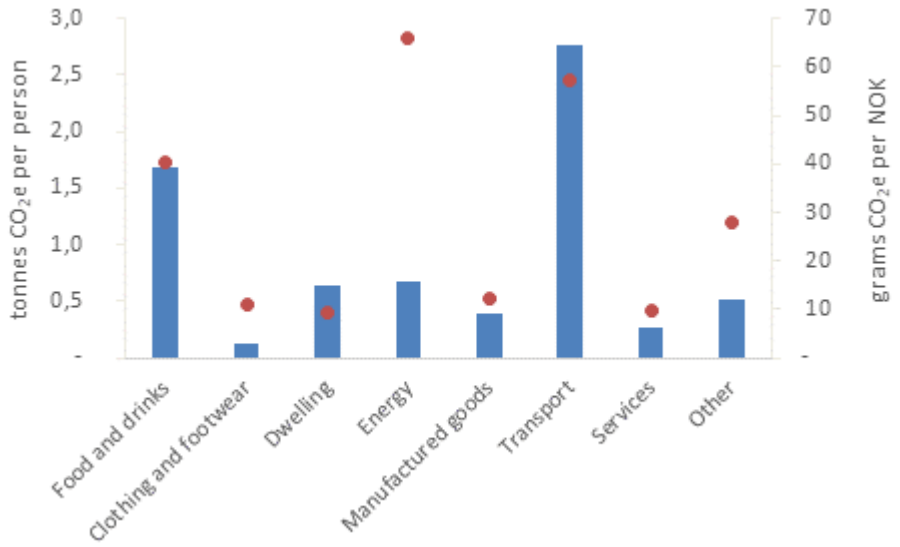

Figure 0E. Household carbon footprint (blue columns, left axis) and average emission intensity of consumption (red markers, right axis).

A household's carbon footprint is closely related to its combined income. We estimate that the 10 % most affluent households had an average carbon footprint almost twice the national average, due in a large part to particularly high emissions from transport and travel activities.

Households consisting of couples with children had an average carbon footprint that was 23 % higher than the average for couples without children; however, this was mainly due to a correspondingly higher level of income. From a regional perspective, households in Oslo and Akershus had the highest footprint, again due to higher income: The emissions intensity of consumption, that is, emissions per NOK spent, was in fact the lowest among all the regions.

Several key assumptions and methodological choices made in the assessment influences the results. Firstly, the carbon intensity of electricity consumption is based on a geographical electricity mix, meaning Norwegian consumption is mainly assumed to be based no hydropower. No adjustments have been made to account for trading of guarantees of origin. Furthermore, a contribution from biogenic CO_2 has been included, for instance from firewood consumption in households. Finally, an adjustment has been made to account for additional warming effects from high-altitude CO_2 emissions, i.e. from flying.

Future in our hands

Mariboes gate 8, 0183 Oslo
(+47) 22 03 31 50 - post@framtiden.no
www.framtiden.no