

Municipal consumption-based inventories of GHG emissions

A base for just and sustainable climate neutral Nordic municipalities



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<https://pub.norden.org/nord2023-021>

Local emission inventories for consumption-based impacts as a base for just and sustainable climate neutral Nordic municipalities

Mikael Hildén, Katarina Axelsson, Ragnhild Børke, Anders Branth Pedersen, Borgar Aamaas, Laura Saikku, Hans Sanderson

To be able to reduce global emissions of greenhouse gases (GHG) effectively and justly the consumption patterns that maintain the high global emission levels need to be recognised. Actions that address consumption are important to ensure a sustainable and just transition to a low-carbon economy. Inventories of consumption-based emissions support such actions, but municipalities need more data and experience to develop and use such inventories in their climate action.



Overview

Many Nordic municipalities have set ambitious goals for the reduction of greenhouse gases and strive to reach climate-neutrality in the coming decades. The targets, and consequently the tracking of emission reductions, have so far mainly been based on a territorial or area-based approach, which documents where greenhouse gases are emitted, as in the standard country-wide emission inventories reported to the UNFCCC.^[1] This approach is a cornerstone in global climate policy, but it is also relevant to track emissions according to the location of the consumption of goods and services that drive the emissions. The consumption-based approaches strive to capture emissions that are imported and embodied in the consumption.

Consumption-based inventories show that the consumption of goods and services in the Nordic countries generates significant emission outside the national borders. These embodied emissions are caused by fossil fuel-based energy sources along the supply chains and by other GHGs emitted from especially the food production sector. In the Nordic countries the share of imported embodied CO₂ emissions in final consumption varied from nearly 60 % for Iceland to 45 % for Finland in 2015.^[2] The variation is explained by differences in, for example, industrial structure. At the level of municipalities, the share of embodied emissions may differ from the national average, for example, due to differences in the use of energy and the production of goods within the municipal borders.

Nordic municipalities can have a key role in mitigating consumption-based GHG emissions by introducing measures to reduce emissions from their own (in-house) consumption. They may also facilitate more responsible consumption patterns in the whole municipality as a society including all actors. Consumption-based emission inventories support this work. One key challenge for detailed inventories is to collect data and estimate impacts from local consumption throughout the value chains. The Greenhouse Gas Protocol for cities (GPC^[3]) provides a good starting point but does currently not provide detailed guidance for comprehensive consumption-based assessments. As the same challenges are encountered by municipalities in all Nordic countries and beyond, a transnational exchange of experiences is highly beneficial to accelerate climate policy learning.

1. <https://www.ipcc.ch/report/2019-refinement-to-the-2006-ipcc-guidelines-for-national-greenhouse-gas-inventories/>

2. N. Yamano and J. Guilhoto 2020. CO₂ emissions embodied in international trade and domestic final demand: Methodology and results using the OECD InterCountry Input-Output Database. OECD Science, Technology and Industry Working Papers 2020/11.

3. <https://ghgprotocol.org/greenhouse-gas-protocol-accounting-reporting-standard-cities>

The aim of this policy brief

With funding from the Nordic Council of Ministers, we have explored municipalities' current practices in estimating and acting on consumption-based emissions in four Nordic countries: Denmark, Finland, Norway, and Sweden. In this policy brief, we summarise our findings about some of the key barriers that prevent municipalities in these four countries from making progress toward mitigating consumption-based impacts. We also provide recommendations for developing a more systematic approach to consumption-based emissions.

Key terms

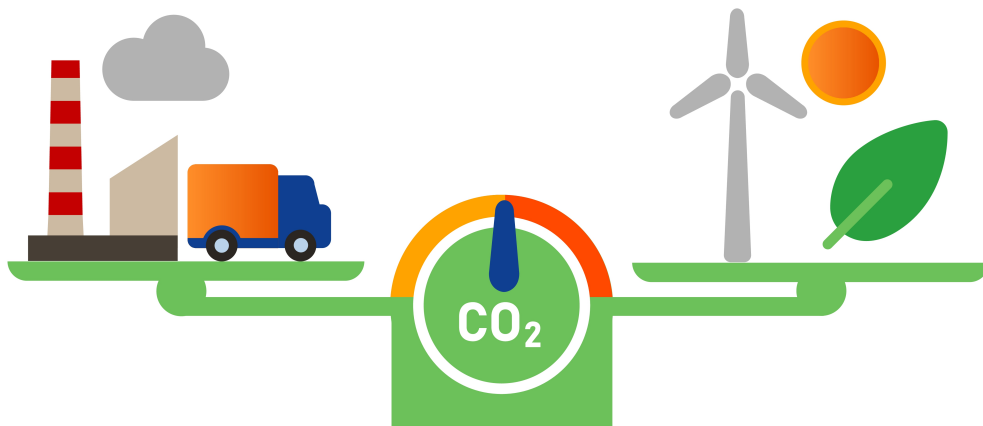
Territorial or Area-based inventory: An inventory of GHGs that are emitted within a specified geographic area, e.g., a country or a municipality.^[4]

Consumption-based inventory: An inventory in which all GHG emissions are allocated to products or services and accounted for in the geographic area where the final consumption of those products and services takes place by all actors.

4. Part of the municipal inventories, for example those provided for municipalities in Finland https://www.hiilineutraalisuomi.fi/en-US/Emissions_and_indicators include part of the emissions related to the use of energy, hence these inventories are called usage-based.

General observations:

1. International guidance on consumption-based inventories has been developed and is available. Municipalities are progressing in making emission inventories, but practical applications of consumption-based inventories are still only in the development phase.
2. Municipalities express that they need national support to develop consistent and coherent consumption-based emission inventories. Consumption-based inventories should complement territorial inventories. The differences between the two are highly instructive when developing and guiding climate policies.
3. The first steps towards consumption-based emission inventories are easiest to take in the municipalities' own operations and in using average consumption data for citizens compiled at the national level and the reported consumption-based emissions of companies located in the municipality.



The Nordic countries and municipalities aim to be forerunners in mitigating climate change

The national targets to reduce emissions are reflected in goals set by ambitious Nordic municipalities. In Finland, legislation sets a requirement for municipalities to set quantitative emission reductions. In all the Nordic countries, many municipalities act as green frontrunners and have set goals that even exceed those of the national goals.

A minority of municipalities track consumption-based emissions – but many plans to initiate work

In Norway, about a third of the municipalities monitored the consumption-based emissions of their own organization, whereas the share was less than 20 percent in the other countries. Depending on the country, currently only 10 to 25 percent of municipalities compiled wider consumption-based emissions within the municipality. The demand for such data is likely to increase leading to a need for municipal guidance and services that enable standardized calculations



The survey

An online survey was distributed to municipalities to explore the development, challenges, use, and aspirations concerning consumption-based inventories. The survey was distributed the official addresses of the municipalities and via the national municipal association in the case of Denmark. In Sweden, the survey was also distributed with support from the County Administrative Board and in Finland the survey was complemented with telephone interviews. Responses were obtained from 52 municipalities in Denmark (53% of all municipalities), 71 in Finland (23%), 71 in Norway (20%) and 68 in Sweden (24%). Especially in Finland and Norway it is likely that the sample is biased towards the municipalities with active climate engagement. The total number (n) of responding Nordic municipalities = 262.

General guidance on developing consumption-based inventories is available

Detailed data collection for consumption-based emissions is a resource-demanding task and relative few municipalities have the capacity to undertake it. General average estimates of the consumption-based emissions are, however, provided at national level for most Nordic countries. Local emissions from the use of grid-based energy can often be obtained from general data.

Municipality-specific household surveys can provide data on citizens' consumption-based emissions. Such data has been collected by consultants or research organisations for specific case studies but is not available nationwide.

Municipalities can take part in wider national or regional-level efforts and benefit from collaboration and work done by statistical offices and academia. In Sweden and Finland, for instance, consumption-based estimates have been provided for all municipalities as part of separately funded research initiatives. Regularly updated municipal-level consumption-based inventories are, however, still lacking. The Global Protocol for Community-Scale Greenhouse Gas Inventories^[5] aims at developing further guidance on consumption-based inventories of GHG emissions at the municipal level.

5. Global Protocol for Community-Scale Greenhouse Gas Inventories - An Accounting and Reporting Standard for Cities

Version 1.1. https://ghgprotocol.org/sites/default/files/standards/GPC_Full_MASTER_RW_v7.pdf

The use of consumption-based emission inventories

As part of the survey, we asked how the municipality would use the information on consumption-based emissions, should they have access to it. An overwhelming majority (close to 90 % across all four countries) of the respondents considered that consumption-based data could potentially be used to identify and prioritise actions that would reduce emissions (Figure 1).

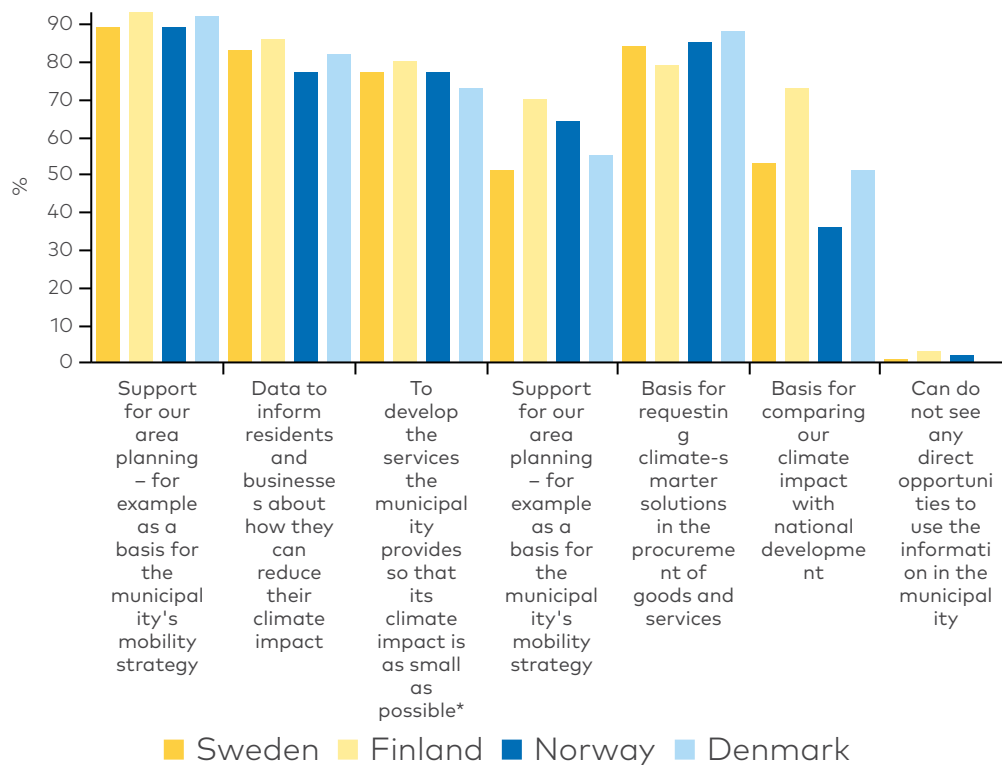


Fig 1. The possible use of information about the municipality's consumption-based climate impact.

[note, there were slight translational variations in the exact linguistic formulation of the question in the national surveys]

* The services the municipality provides (school, elderly care, social security, etc.)

Most of the respondents reported that they have opportunities to influence consumption-based emission from the municipality as a society by co-operating with both residents and businesses, in addition to work on the municipality's own activities (70–98 percent of respondents) (Figure 2).

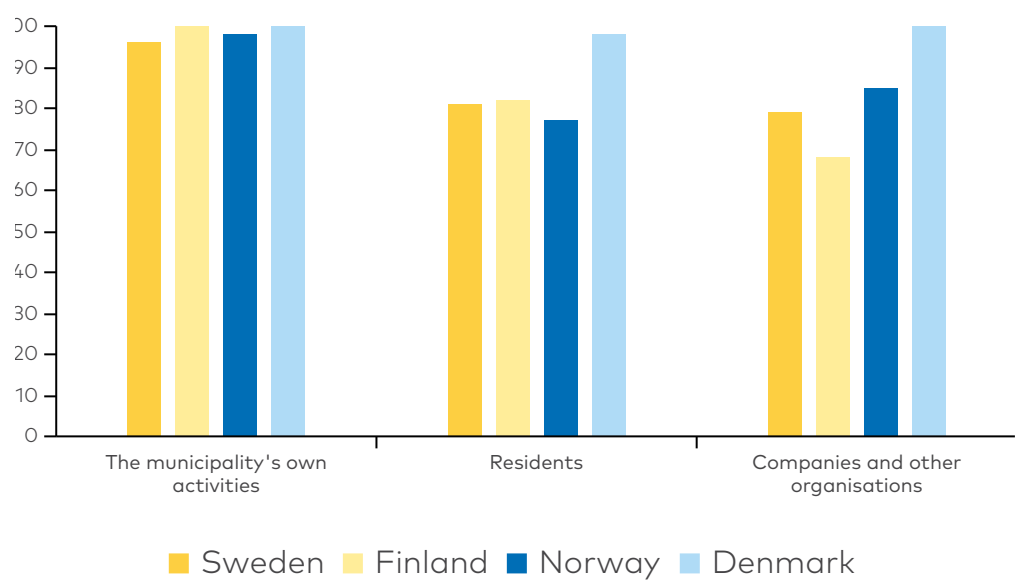


Fig 2. Which actors can/should the municipality include and cooperate with in order to reduce total emissions from consumption in the municipality as a whole?

[note, there were slight translational variations in the exact linguistic formulation of the question in the national surveys]

The survey also showed that many municipalities already include climate criteria in their in-house public procurement. More accurate and detailed consumption-based information can strengthen climate friendly economic steering and prioritisation. Inventories of emissions of residents and businesses can help the municipality guide residents and businesses to reach reductions and thus support the municipalities on a path towards a responsible, just and sustainable society.

The challenges and ways to overcome them

Consumption-based emission inventories are useful but also resource intensive to develop. Resources are needed to establish an inventory, and special skills are needed to compile and interpret the data. In all four countries human and financial resources, and competence development were identified as key needs (by 70–80 % of respondents) for the municipality to be able to initiate or step-up work on consumption-based CO₂e emission inventories.

Legislation supporting a focus on sustainable consumption was also seen as a relevant precondition (60–70 % of respondents). This could include, for example, guidance on procurement.

We organized and hosted workshops in three countries, a pan-Nordic workshop, as well as a global workshop during the UN Stockholm 50+ conference, which collectively illuminated specific challenges for creating and maintaining comprehensive consumption-based inventories. During these workshops, many participants mentioned the lack of data and methodological issues as barriers for developing municipal inventories. More standardized methods can solve some of these issues. However, some participants at the workshops also noted that detailed monitoring at the municipal level may not be needed for action; they argued that a broad overview of emissions is sufficient to guide the adoption and implementation of policies.

Despite the potential use of consumption-based information, the participants of the workshops noted that lack of political support may limit the possibilities to take action on consumption-based emissions in the municipality. This often results in limited resources being allocated to develop the knowledge, data and tools which are needed. Pioneer municipalities are important for overcoming the barriers by demonstrating how to produce and use consumption-based information on emissions. An initial step is often to examine the consumption-based emissions of the municipality's own activities. This strengthens the capacity to deal with consumption-based data and methodological issues such as the specification system boundaries. It also provides the municipality information that can be used directly to improve procurement and support the management system of the municipality.

For wider application and use of consumption-based emission data, it is essential to create and maintain services that give all municipalities access to reliable proxy-data which can be used instead of detailed data collected in the municipality. Comparable and transparent information is key as there is currently a very diverse

'market' with a wide range of different emission calculators that are based on various assumptions and limitations. It is essential that municipalities can base their actions on coherent and reliable information on consumption-based emissions. The inventories should include both in-house operations and the municipality as a society. In particular, the methods for inventories that cover the whole municipality need to be developed further.



Recommendations

1. Ensure support and encouragement for the development and practical application of municipal consumption-based emission estimates with the aim to establish harmonized approaches in the EU and beyond.
2. Develop coherent and transparent estimates at the national level that can be used to support municipalities in compiling consumption-based inventories both for the municipality as an organization and as a society. The national-level service should also include a repository for all estimates that have been made, with sufficient metadata to ensure reliability. Extensive exchange across countries should be encouraged by using standardised methodologies.
3. Studies on the use and role of consumption-based emission data in municipal climate policy should be encouraged. Such studies could, for example, explore how such information could be used in specific applications such as procurement or in guiding major sectors such as construction, education or health care to lower their carbon footprint.

6. https://research-and-innovation.ec.europa.eu/funding/funding-opportunities/funding-programmes-and-open-calls/horizon-europe/eu-missions-horizon-europe/climate-neutral-and-smart-cities_en

4. The EU Mission: Climate-Neutral and Smart Cities^[6] provides opportunities to test how consumption-based inventories can be used in efforts to achieve sustainable and just climate neutrality at the municipal level. Participant cities should therefore be encouraged to explore consumption-based approaches and report on experiences.



7. https://research-and-innovation.ec.europa.eu/funding/funding-opportunities/funding-programmes-and-open-calls/horizon-europe/eu-missions-horizon-europe/climate-neutral-and-smart-cities_en

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Nord 2023:021

ISBN 978-92-893-7629-7 (PDF)

ISBN 978-92-893-7630-3 (ONLINE)

<http://dx.doi.org/10.6027/nord2023-021>

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Layout: Ida-Lina Strang

All images are from Colorbox

Published: 21/6/2023

Nordic co-operation

Nordic co-operation is one of the world's most extensive forms of regional collaboration, involving Denmark, Finland, Iceland, Norway, Sweden, the Faroe Islands, Greenland, and Åland.

Nordic co-operation has firm traditions in politics, the economy, and culture. It plays an important role in European and international collaboration, and aims at creating a strong Nordic community in a strong Europe.

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Nordic Council of Ministers

Nordens Hus

Ved Stranden 18

DK-1061 Copenhagen

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