

# Consumption Compass: a summary of the methods used

(In Swedish: Konsumtionkompassen)

A digital tool for addressing consumption-based  
emissions at the local level

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Mahboubeh Rahmati-Abkenar  
Katarina Axelsson  
Rok Grah  
Elena Dawkins

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## Overview

[The Consumption Compass](#)<sup>1</sup> is a free Excel-based tool, launched in April 2022, that provides consumption-based emissions estimates (CO<sub>2</sub>e) at the municipal and postcode level for all of Sweden's municipalities.

The tool also supports data analysis, comparisons, and a decision-support function to help municipalities understand impacts of consumption at the local level and prioritize actions to reduce them. This document summarizes the methodological approaches behind the tool and briefly describes how the model for downscaling Sweden's total consumption-based emissions (CO<sub>2</sub>e) to municipal and postcode levels has been set up. It also includes an overview of the data and data sources used.

## Methods summary

The Consumption Compass downscales greenhouse gas emissions from consumption to municipality and postcode levels. At the national level, Statistics Sweden (SCB) provides statistics about Swedish households' consumption using the Classification of Individual Consumption According to Purpose (COICOP) system. COICOP is a UN<sup>2</sup> statistical classification system used internationally for estimating households' consumption of different consumption categories. The COICOP categories can be used to relate to the total greenhouse gas emissions generated for producing and using the same consumption items (final consumption). In Sweden, there are 111 COICOP categories for which there are corresponding greenhouse gas emissions at the national level. This data is complemented by other datasets to allow breakdown from national to the postcode level. In doing this, two basic approaches are applied (see annex 1 for additional details):

A: **Bottom-up approach**, where the actual consumption has been measured, then greenhouse gas footprints estimated from that. The only dataset for which we have access to bottom-up data is on the use of personal vehicles. For this dataset, we have access to detailed data at the postcode level about distance driven on an annual basis as well as the type of fuels used. The emissions from the use of personal vehicles have been applied to direct emissions from personal vehicles (14% of total emissions). **See Table 1** for references.

B: **Top-down approach**, where the data at the national or municipal level has been downscaled based on four different approximations, described below. **See Table 1** for references and **Annex 1** for additional details about which consumption categories have been calculated using each approach:

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<sup>1</sup> <https://www.sei.org/projects-and-tools/tools/konsumtionskompassen/>

<sup>2</sup> UN (2018), Classification of Individual Consumption According to Purpose (COICOP) [https://unstats.un.org/unsd/class/revisions/coicop\\_revision.asp](https://unstats.un.org/unsd/class/revisions/coicop_revision.asp)

### 1. MOSAIC profile data (48% of total emissions)

60 COICOP categories are downscaled using so-called MOSAIC profile data on consumption within different lifestyle groups. This data is produced by the company InsightOne and builds on socio-economic data and survey-based estimates using the consumption patterns of 44 consumer profiles across Sweden. The dataset includes annual household spending per lifestyle group and has been used as the basis to distribute the emissions per postcode.

With regard to food-related emissions, these are calculated using a mixture of MOSAIC data and data from the online tool [Klimatkalkylatorn](#).<sup>3</sup> The Klimatkalkylatorn data builds on findings from consumer profiles generated when users respond to questions about their lifestyle and consumption habits. As of April 2022, Klimatkalkylatorn's database contained over 800 000 user profiles across all of Sweden's municipalities. To estimate food-related emissions, we build on expenditure data from MOSAIC, and data on households' diets at the postcode level from the Klimatkalkylatorn database.

### 2. Household expenditure survey (8% of total emissions)

We downscaled 18 COICOP categories based on SCB's household expenditure survey from 2009, then used these data to distribute the national emissions from the year 2019 for these 18 different COICOP groups to the municipal level on the basis of different municipality groups, according to the municipality classification system developed by the Swedish Association of Local Authorities and Regions (SKR).<sup>4</sup> Then, we used per capita disposable income as a proxy to downscale these emissions to the postcode level, with the exception of two categories, for which disposable income is not a good proxy; that is, actual rental costs and rental costs paid by tenant-owners. For these two categories, consumption impacts were distributed equally per capita with the municipality class (i.e. not influenced by income) because statistics offer limited support for determining how income relates to residents' choice of rental or owner-occupied accommodation in Sweden, where it is common that both low and high-income groups live in rental apartments.

### 3. Other available datasets (22% of total emissions)

Four COICOP categories have been downscaled by using other datasets. For electricity, district heating, and direct heating the data is available at the municipality level in kWh. The electricity and direct heating data at the municipal level have been downscaled to postcode level by using dwelling size as a proxy. The district heating data at the municipal level has been downscaled to postcode level by using the Swedish National Board of Housing, Building and Planning's [Boverket's] data about Energy declarations as a proxy. Air transport emissions have been calculated building

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<sup>3</sup> [www.klimatkalkylatorn.se](http://www.klimatkalkylatorn.se)

<sup>4</sup> Sveriges Kommuner och Regioner (2017), Kommungruppsindelningen 2016, <https://webbutik.skr.se/sv/artiklar/kommungruppsindelning-2017.html>

on data from the Swedish Environmental Protection Agency about Sweden’s total air travel emissions at the national level. This data is distributed to the municipalities based on travel behaviour reported through the *Klimatkalkylatorn* data (currently over 800 000 user profiles collected at postcode level) and weighted by disposable income of each postcode as a proxy.

**4. Income (8% of total emissions)**

29 COICOP categories, for which no detailed data is available, have been downscaled to postcode level by using per capita disposable income as a proxy. Most of the COICOP categories distributed through this method contribute to lower levels of consumption-based emissions.

See Annex 1 for a detailed list of all consumption categories that belong to each one of the methodological approaches described above.

**Data description and data sources**

Table 1 summarizes the data and data sources used. All data is based on the year 2019 unless otherwise stated.

**Table 1. Datasets used in the Consumption Compass [Konsumtionskompassen]**

Data name	Description	Geographical level	Source
MOSAIC <sup>1</sup> profile data	Socio-demographic data on 44 lifestyle profiles. Including income and expenditures on different items.	Postcode (more than 10 000 in Sweden)	InsightOne
Household expenditure on goods and services	Total Swedish expenditures (SEK) in COICOP <sup>2</sup> classification	National	Statistics Sweden (SCB)
Household emissions on goods and services	Total Swedish emissions (kg CO2e) in COICOP classification.	National	SCB
Household expenditure survey	Average household expenditures (SEK). Concordance matrix to COICOP done in-house.	Municipal class (urban vs rural divide)	SCB (2009)

Average grocery prices	Used to correct for variation of grocery prices between regions of same products.	Regional	Pensioners Organization (PRO)
Total air travel emissions	Total air travel emissions of Swedish residents, including connecting flights and high- altitude effect.	National	Swedish Environmental Protection Agency (SEPA)
Air travel distance	Yearly per capita distance (km) travelled by airplane.	Municipal	Klimatkalkylatorn – an individual climate footprint calculator for Sweden (more than 800 000 responses) Data collected between 2017 and 2022.
Food diets	Data on the variation of food diets (i.e. the proportions of people with different types of diet).	Municipal	InsightOne, based on data from the Swedish Transport Agency [Transportstyrelsen]
Direct car emissions	Emissions (kg CO <sub>2</sub> e) of household-owned cars	Postcode	InsightOne
Number of household-owned vehicles	Number of household owned vehicles (motorbikes, tractors, etc)	Municipal	SCB
Mileage of vehicles	Yearly mileage (km) of various household owned vehicles (motorbikes, etc)	National	SCB/STEM
Energy consumption	Energy consumption (MWh)	Municipal	SCB
Electricity consumption	Electricity consumption (MWh)	Municipal	Boverket
District heating consumption	Energy declaration (kWh)	Postcode	

Direct heating emissions	Emissions (kg CO <sub>2</sub> e) from in-house/direct heating.	Municipal	SCB
Emissions factors	Per COICOP category (kg CO <sub>2</sub> e/SEK)	National	SCB

<sup>1</sup>MOSAIC – <https://insightone.se/en/mosaic/>.

<sup>2</sup>COICOP is the UN Classification of Individual Consumption According to Purpose.

## Annex 1

List of consumption categories for which associated greenhouse gas emissions have been estimated by the two different approaches described in the methods summary above.

### A. Bottom-up approach (14% of total emissions)

For direct emissions from personal vehicles, actual consumption has been measured, then GHG footprints estimated from that measurement. This approach has been applied to **direct emissions from personal vehicles**

### B. Top-down approach

Where the data at the national or municipal level has been downscaled based on four different approximations, given below:

#### 1. MOSAIC profile data. 60 consumption categories (48% of total emissions):

0111 bread and cereals

0112 meat

0113 fish and seafood

0114 milk, cheese and eggs

0115 oils and fats

0116 fruit

0117 vegetables

0118 sugar, jam, honey, chocolate and confectionery

0119 salt, spices, sauces and homogenized baby food

0121 coffee, tea and cocoa

0122 mineral waters, soft drinks, fruit and vegetable juices

0211 spirits

0212 wine

02131 high-alcoholic beer

02132 low alcoholic beer

022 tobacco

0311 clothing material

0312 garments

0313 other articles of clothing and clothing accessories

0321 shoes and other footwear

0322 repair and hire of footwear

043 materials and services for the maintenance and repair of the dwelling

0511 furniture and furnishings

0512 carpets and other floor coverings

0513 repair of furniture, furnishings and floor coverings

0551 major tools and equipment

0552 small tools and miscellaneous accessories

0562 domestic services and household services

0611 pharmaceutical products

0711 motor cars

0721 spare parts and accessories for personal transport equipment

0722 fuels and lubricants for personal transport equipment

0731 passenger transport by railway

0732 passenger transport by road

0734 passenger transport by sea and inland waterway

0735 combined passenger transport

0736 other purchased transport services, removal and storage services

0811 postal services

0911 equipment for the reception, recording and reproduction of sound and pictures

0912 photographic and cinematographic equipment and optical instruments

0913 information processing equipment, PCs and misc. accessories calculators, typewriters

0914 recorded and unrecorded tapes, cassettes, diskettes and CD-ROMs, unexposed films

0915 repair of audio-visual, photographic and information processing equipment

0931 games, toys and hobbies

0932 equipment for sport, camping and open-air recreation

0933 plants and flowers, Christmas trees, specially treated soils, pots and potholders.

0941 recreational and sporting services, participation fee



0942 cultural services

0943 games of chance, service charges

0951 books including schoolbooks excluding stamp collections

0952 newspapers and periodicals

0953 miscellaneous printed matter

096 package holidays

111 catering services

112 accommodation services

1211 hairdressing salons and personal grooming establishments

1212 electric appliances for personal care

1213 other appliances, articles and products for personal care

1231 jewellery, clocks and watches incl. Repair

house heating

***2. Household expenditure survey, 18 COICOP categories (8% of total emissions):***

0411 actual rentals paid by tenants, exclusive of heating [Swe. Faktisk hyra i hyresrätter, kallhyra]

0412 rentals actually paid by tenant-owners [Swe. Bostadsrätt, nyttjandevärde kallhyra]

0452 gas

0453 liquid fuels, domestic heating and lighting oils

0454 solid fuels, coal, coke, briquettes, firewood, charcoal, peat and the like

0531 major household appliances whether electric or not

0532 small electric household appliances

0561 non-durable household goods as cleaning and maintenance products

0712 motorcycles

0713 bicycles

0723 maintenance and repair of personal transport equipment

0921 major durables for outdoor recreation

0922 musical instruments and major durables for indoor recreation

0923 maintenance and repair of other major durables for recreation and culture

0934 pets and related products

0935 veterinary and other services for pets

0954 stationery and drawing materials

1232 personal effects other. E.g. suitcases, perambulators, etc

**3. Other available datasets, 4 COICOP categories (22% of total emissions):**

0451 electricity

0455 heat energy purchased from district heating plants

0733 passenger transport by air

Direct heating emissions

**4. Income, 29 COICOP categories (8% of total emissions):**

023 narcotics

0314 cleaning, repair and hire of clothing

0421 imputed rentals of owner-occupiers, exclusive of heating [Swe. Småhus, nyttjandevärde kallhyra]

0422 imputed rentals for secondary residences, exclusive of heating [Swe. Fritidshus, nyttjandevärde kallhyra]

052 household textiles

0533 repair of household appliances

054 glassware, tableware and household utensils

0612 other medical products

0613 therapeutic appliances and equipment incl. eyeglasses

0621 outpatient medical services

0622 dental services

0623 paramedical services

063 hospital services incl. medical fee

07241 driving lessons, driving tests and driving licences

07242 roadworthiness tests

07243 toll bridge fee

07244 parking

07245 tax benefit cars and hire of personal transport equipment without drivers

0812 telephone and telefax equipment

0813 telephone and telefax services

101 education

122 prostitution

12401 wet-nurses, crèches, play schools and other child-minding facilities

12402 care and help for elderly

12403 personal assistance in social protection

12404 individual social protection

125 insurance

126 financial services n.e.c

127 fees for legal services, employment agencies, etc.

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Stockholm Environment Institute  
Linnégatan 87D, Box 24218  
104 51 Stockholm, Sweden  
Tel: +46 8 30 80 44

**Contact:**

katarina.axelsson@sei.org  
visit us: sei.org  
@SEIresearch  
@SEIclimate

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