



Towards the next generation of the European food supply chain: The ENOUGH Emissions Database

Part 2: Boundaries

Several trusted inventories have established emissions databases for a large number of countries e.g. FAO STATS, EDGAR. However, inventories often apply different boundaries which makes the figures difficult to compare. In ENOUGH, clear boundaries are identified within the food supply chain. Uncertainty calculations are performed, and emissions figures compared with those obtained in the existing inventories.



ENOUGH food supply chain sectors

In ENOUGH, we are developing a robust methodology to calculate the emissions from the food supply chain sectors including: **agriculture and fishing, manufacture of food products and beverages, packaging, warehousing and storage, transport, retail, food service and hospitality, domestic food related activities and food loss and waste.**

Emissions are calculated for both perishable (needing refrigeration) and non-perishable food and beverages (which can be stored at ambient temperature) for human consumption.

Geographical Boundaries

European Union, European Economic Area and the UK: for all the project demonstrators and emissions quantification work. To calculate the emissions from the food supply chain, a number of representative European countries are selected including **the UK, Norway, France, Italy, Germany, Austria, Lithuania, Poland, Hungary and Belgium.** We do not include emissions related to chain before arriving or once leaving the European borders.

Supply chain Boundaries

In **agriculture and fishing**, only emissions from energy consumption of the farm equipment are calculated. Those from fertilizers, chemicals and land use change are excluded.

In **manufacture of food products and beverages**, only emissions from energy use in processes are calculated, those from manufacturing and end of Life (EOL) of primary materials are excluded.

In **packaging**, both emissions from raw materials and packaging manufacturing are included, those from packaging EOL and recycling are excluded.



ENOUGH representative countries

In **warehousing and storage**, emissions from energy consumption related to food and refrigerant leakage are calculated.

In **transport**, fuel consumption by refrigerated and non- refrigerated land, air and maritime vehicles are calculated, alongside refrigerant leakage from Transport Refrigerated Units (TRUs). This also includes last mile delivery and domestic car food transport.

In **Retail**, emissions from energy consumption related to food (including food services integrated onto the retailer) and refrigerant leakage are calculated.

For both **domestic**, and **food and beverage service and hospitality** sectors, energy consumption from cooking and refrigeration, as well as emissions from refrigerant leakage are calculated.

In **food loss and waste**, methane emissions from solid waste disposal on land, biological treatment of solid waste, wastewater handling related to food and waste incineration are included. Human waste is excluded.

Emissions from **refrigerants** are those associated to the refrigerant leakage from the moment it is filled in the equipment until its disposal.

Find more about this study from the original publication: [10.18462/iir.nh3-co2.2023.0033](https://doi.org/10.18462/iir.nh3-co2.2023.0033)