organisation
for conscious
consumerism

Netherlands Country Profile

Transaction to Carbon

Carbon Intensity Factors

Based on the Environmentally Extended Input–Output analysis -EEIO Hybrid Approach

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Authors

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About OfCC (Organization of Conscious Consumerism)

As a non-profit organization, we envision to enable the development of an impact economy driven by conscious consumerism. Our mission is to accelerate the adoption of conscious consumerism through incentives in behavioral change and transparency in sustainability data, leading to positive social, economic, and environmental impacts.

Our data- and technology-driven concepts aim to bring new insights into the process, from shifts in individual consumption behaviors to systemic change. The open standards, methodologies, and open data concepts we establish, in collaboration with our scientific and industry partners, serve the common good of our society. We are an independent non-profit organization owned by ecolytiq GmbH, Berlin.

Disclaimer

For further information or questions regarding the estimations, please contact: Gracia Lanza, Ph.D., Team Lead Research at gracia.castillo@ecolytiq.com

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The carbon Intensity Factor for Netherlands was developed using a hybrid EEIO methodology for 51 categories. This document outlines the estimated factors, and the source of information explains the input data used for each factor.

The document is structured as follows:

1. General Information

At the beginning of 2022, there were 8,1 million private households in the Netherlands, 3,2 million of which were single-person households. Regarding energy, electricity generation comes primarily from gas (52%) and coal (27%), but wind and solar power are growing rapidly (IEA, 2020). As fossil fuels are used in electricity production, this leads to emissions of CO2 (CBS, 2022). Thus, we use the emission factor estimated by the CBS to evaluate energy and climate policy, which calculates fossil energy consumption and CO2 emissions per unit of electricity produced.

2. Benchmarks

Benchmark values for specific categories are shown in Table 1.

Table 1. Benchmarks Values per Category

	Description	Citizen/ Household/Country	Year	Value	Unit	Source
1	Average Carbon FP	Citizen	2021	9,53	tonnes CO2e per capita	(OECD.Stat, 2023)
2	Total GHG Emissions	Country	2021	167153,25	tonnes CO2e, thousands	(OECD.Stat, 2023)

3. Carbon Intensity Factor

The amount of emissions of carbon dioxide (CO_2) and/or equivalent carbon dioxide (CO_2e) released per unit of another variable such as gross domestic product (GDP), output energy use, or transport (Allwood et al., 2014). For Transaction to Carbon (TtC) analysis, emissions in carbon dioxide equivalent are monetized, thus are per unit local currency.

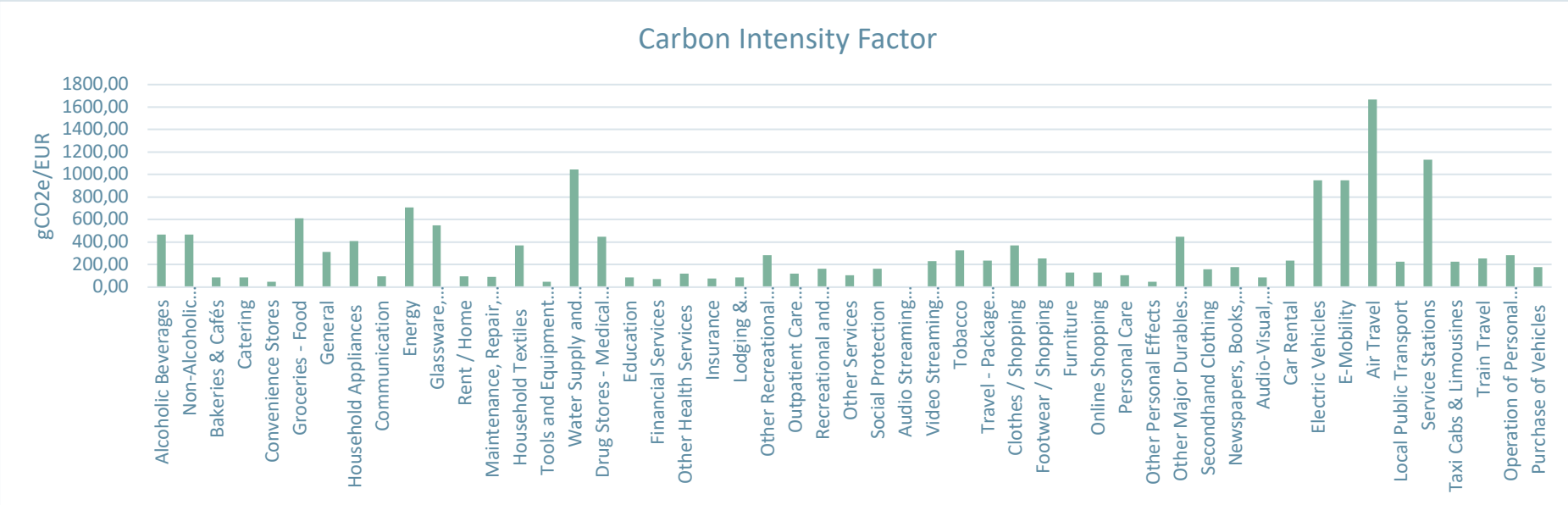
3.1 Methodology

To estimate carbon intensity factors, we followed the EEIO-Hybrid approach from the Open standard framework for consumer carbon calculations based on payment transactions (Lanza et al., 2023). The EEIO-hybrid applies the top-down approach commonly called the Environmentally Extended Input-Output approach, or EEIO. We use the EXIOBASE GMRIO (EXIOBASE 3), a global, detailed, Multi-Regional Environmentally Extended Supply-Use Table (MR-SUT) and Input-Output Table (MR-IOT) which provides data linked to numerous greenhouse gases (GHG) (Stadler et al., 2021). The foundation of the database is the monetary supply-use tables (MSUTs) at the national level. A detailed industry and product output per country data is gathered from several national account databases. The coefficient for technical data is collected from national statistical agencies. The final product is a consistent 163 industry by 200 products classification and the analysis of energy, emission, water, material, land, waste, and employment accounts. Of relevance to our methodology is the stressor coefficient that accounts for the environmental impact per unit of economic activity (the final demand of the product at current prices). EXIOBASE reports specific industry emission factors using the Third Revision of the International Standard Industrial Classification of all Economic Activities (Department of International Economic and Social Affairs, 1990).

EXIOBASE provides aggregated inputs that go into several different consumer purchases. To associate the emissions per monetary value from the EXIOBASE with individual consumption, we use the Classification of Individual Consumption by Purpose (COICOP). COICOP is an international standard classification with comparable household consumption data for various countries. The association is performed through a concordance matrix linking each COICOP product group to one or more EXIOBASE reference products. The hybrid approach refers to the use of input-output analysis as some commodity flows (usually electricity and fuels) are expressed in physical units (kWh, GJ, kg) instead of monetary units (Hertwich, 2005). This is the case for the following categories: energy, service stations, and taxi. For these categories, LCA emission data is applied because the EEIO assumes homogeneity regarding prices and products, and services, which can lead to biased estimations. For Netherlands, carbon intensity factors were estimated for 51 categories (Table 2).

3.2 Carbon Intensity Factors per Category[1]

This chart shows carbon intensities for Netherlands in gCO_2e/EUR across different consumption categories.



[1] CIF functional units is based on market price.

Table 2. Detailed Factors per Category

No.	Categories	Emission Intensity (gCO_2e/EUR)
1.	Alcoholic Beverages	467,51
2.	Non-Alcoholic Beverages	467,51
3.	Bakeries & Cafés	84,40
4.	Catering	84,40
5.	Convenience Stores	47,54
6.	Groceries - Food	610,44
7.	General	291,81
8.	Household Appliances	407,65
9.	Communication	95,19
10.	Energy	592,94
11.	Glassware, Tableware, and Household Utensils	548,63
12.	Rent / Home	96,49
13.	Maintenance, Repair, and Security	88,62
14.	Household Textiles	369,80
15.	Tools and Equipment for House and Garden	47,54
16.	Water Supply and Miscellaneous Services	1045,62
17.	Drug Stores - Medical Products, Appliances, and Equipment	448,37
18.	Education	87,72
19.	Financial Services	74,03
20.	Other Health Services	118,56

No.	Categories	Emission Intensity (gCO_2e/EUR)
21.	Insurance	78,93
22.	Lodging & Accommodation	84,40
23.	Other Recreational Items and Equipment, Gardens, and Pets	283,99
24.	Outpatient Care Services	118,56
25.	Recreational and Cultural Services	165,28
26.	Other Services	103,21
27.	Social Protection	165,41
28.	Audio Streaming Services	6,20
29.	Video Streaming Services	202,28
30.	Tobacco	327,48
31.	Travel - Package Holidays	237,25
32.	Clothes / Shopping	372,03
33.	Footwear / Shopping	253,47
34.	Furniture	128,45
35.	Online Shopping	129,72
36.	Personal Care	103,21
37.	Other Personal Effects	47,54
38.	Other Major Durables for Recreation and Culture	448,37
39.	Secondhand Clothing	156,25
40.	Newspapers, Books, and Stationery	178,47
41.	Audio-Visual, Photographic and Information Processing Equipment	85,53
42.	Car Rental	235,11

No.	Categories	Emission Intensity (gCO_2e/EUR)
43.	Electric Vehicles	442,11
44.	E-Mobility	442,11
45.	Air Travel	1666,78
46.	Local Public Transport	226,24
47.	Service Stations	1175,43
48.	Taxi Cabs & Limousines	226,24
49.	Train Travel	255,74
50.	Operation of Personal Transport Equipment	283,85
51.	Purchase of Vehicles	177,69

Please refer to the OfCC for an explanation of each of the categories.

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