

Review of Emission Factors 2019

Summary

This publication records the emission factors that the Climate Neutral Group is using for footprint calculations in 2019 and for calculations of 2019 emissions done in subsequent years. The list of 2018 emission factors is used for calculating 2018 emissions after the end of that year.

During the year, questions are regularly asked about the emission factors used by the Climate Neutral Group and proposals for changes are submitted to us. In addition, there are regularly reviews in the literature with new proposals for emission factors. To keep a handle on these continuous improvements, the Climate Neutral Group has chosen to present one update per year. We have documented our method in our Emission Factors Procedure.

Introduction

The use of the correct emission factors is essential for good CO₂ footprint calculations. Because there are regularly new emission factors published, for example due to changes in fuel composition or the efficiency of incinerators, it is necessary to keep track of developments in this area. The emission factors procedure states that the Climate Neutral Group publishes an annual review of the emission factors. This document is the result of that review.

In December 2014, as the final result of the Emission Factors Green Deal, the first National List of Emission Factors was made public (www.co2emissiefactoren.nl). The purpose of this list is, among other things, to make CO₂ footprint calculations more comparable. Because the Climate Neutral Group supports this goal, we are using the National List of Emission Factors as the basis for this review. This means that we are using the factors wherever possible and documenting any differences.

The National List is updated at irregular times, but because CNG makes footprints annually, we determine the emission factors that we use once per calendar year.

Emission Factors 2018 and 2019.

In the Appendix is a table with the emission factors that we are using within the Netherlands for 2018 and 2019. **The most important points are explained below.**

Energy Use

Grey Electricity

As long as the Dutch coal-fired power stations are still running, the emission factor for grey electricity remains unchanged. (0.649 kg CO₂/kWh in 2018 and 0.649 kg CO₂/kWh in 2019).

Green Electricity



The emission factor for green electricity is 0 in 2019, the same as it was in 2018. This does not apply to green electricity from biomass. Electricity from biomass can come from many types of biomass and the emission factor is highly dependent on the type of biomass used and its origin. If the origin of the biomass is unknown, we calculate the CO₂ footprints for the year 2019 with a conversion factor of 0.075 kg CO₂/kWh, following the National List of Emission Factors.

In addition, the Climate Neutral Group makes a distinction between good and bad green electricity certificates, or Guarantees of Origin (GOs), according to the following table:

Guarantees of Origin	Emission Factors 2018
Hydropower from Iceland and Scandinavia	The 'grey' electricity factor is used: 0.649 kg CO ₂ /kWh
All other GOs	Green electricity produced by: Water, wind or sun: 0 kg CO ₂ /kWh Biomass: 0.075 kg CO ₂ /kWh

Transport and Transportation

Fuels - Cars, Public Transportation, Freight

Here we use the factors as described by the National List of Emission Factors. For a complete description of the CO₂ footprint, we use the WTW (Well To Wheel) factors, which means that the energy use for the production of fuel is included. There are a couple of significant differences compared to 2018, in particular for tram and metro (decreases of 27% and 28% respectively). There are also new emission factors for grey and green hydrogen, per vehicle kilometre and per litre.

The Dutch Railways (NS and other providers, in a purchasing collective) use only green electricity. The emission factor for rail transport of passengers and freight (in the Netherlands), with an unknown train type, has therefore decreased by 84%. However, this factor has not been completely reduced to zero because there are train companies (other than the NS-Dutch Railways) that do not use green electricity. The factor for the High Speed Line (HSL), which runs partly outside the Netherlands, is unchanged.

Air Travel

The National List includes factors for short, medium length and long flights. The proposed factors are based on operational data from KLM and include the RF Index (RFI)* in order to include the contribution of gases other than CO₂ to the greenhouse effect. There is no distinction made between different flight classes, which are included as a separate factor in the calculation.

As in previous years, we use the new DEFRA factors. The emission factor on short flights has increased by 11.5%, on medium length flights by 0.6% and on long flights by 1.5%. The explanation from DEFRA for the large increases for short flights is that more smaller aircraft are being used for these short distances.

Because the above changes for short flights are significant, the emission factors for the zones need to be adjusted. Due to planning of communication with tour operators and the systems for doing so, the emissions per zone will be carefully recalculated according to the latest information and will be adjusted beginning on 1-1-2020. Tour operators will be informed of the upcoming changes in mid-August/September 2019.

Climate Neutral Group (CNG) and GreenSeat (powered by Climate Neutral Group, via corporate travel agencies TMCs), use a standard RFI of 1.9. Calculations by CNG of emissions from air travel also include the standard RFI factors and use tonnes of CO_{2e} (all greenhouse gases) as the unit, just like all other calculations, and can therefore be included in the total footprint. After offsetting the emissions, flying becomes **climate neutral. GreenSeat for consumers, via GreenSeat.nl and tour operators, uses an RFI of 0. This means that only greenhouse gas CO₂ is included and flying is CO₂ neutral.*

Paper, Accommodation and Water

There are no factors for these areas in the National List of Emission Factors. We continue to use the same factors as last year.

References

- National List of Emission Factors: www.co2emissiefactorenfactoren.nl
- DEFRA Factors: <https://www.gov.uk/government/collections/government-conversion-factors-for-company-reporting> (Conversion Factors 2018)

Appendix

- Table 1 - Emission Factors 2018 and 2019 for the CO₂ Calculator in the Netherlands



Table of Emission Factors 2018 and 2019

Emission Factors for the CO ₂ Calculator in the Netherlands					
		2018		2019	
	Unit	kg CO ₂ /unit			
		NL	Source	NL	Source
Gas	Nm ³	1.887	1)	1.89	1)
Biogas	Nm ³				
Landfill Gas	Nm ³	0.398	1)	0.398	1)
Co-fermentation Maize/Manure	Nm ³	1.260	1)	1.26	1)
Offset Gas ("Green Gas")	Nm ³	0		0	
Electricity - Grey	kWh	0.649	1)	0.649	1)
Electricity - Green 2					
Wind	kWh	0	1)	0	1)
Water	kWh	0	1)	0	1)
Sun	kWh	0	1)	0	1)
Landfill Gas	kWh	0	1)	0	1)
Biomass	kWh	0.075	1)	0.075	1)
Heating Oil	L	3.185	1)	3.185	1)
District Heating	GJ				
Waste Incineration Plant		26.49	1)	26.49	1)
Combined Cycle Gas Turbine Power Station		35.97	1)	35.97	1)
Geothermal Energy		25.05	1)	25.05	1)
Transport and Overland Transport					
		2018		2019	
Fuels	Unit	NL	Source	NL	Source
Petrol (gasoline)	L	2.74	1)	2.74	1)
Diesel	L	3.23	1)	3.23	1)
LPG	L	1.806	1)	1.806	1)
Biodiesel B-100	L	3.154	1)	3.154	1)
Bio Ethanol E-85	L	1.083	1)	1.083	1)
Natural Gas (CNG)	kg	2.728	1)	2.728	1)
Hydrogen - Grey	kg			12.00	1)
Hydrogen - Green	kg			0.840	1)
Kilometres (average consumption)	Unit	NL	Source	NL	Source
Petrol (gasoline) (automobile)	km	0.224	1)	0.224	1)
Diesel (automobile)	km	0.213	1)	0.213	1)
LPG (automobile)	km	0.196	1)	0.196	1)
Biodiesel (automobile)	E85	0.122	1)	0.122	1)
	B100	0.207	1)	0.207	1)
Natural Gas / Compressed Natural Gas (automobile)	km	0.189	1)	0.189	1)
Electric (grey)	km	0.107	1)	0.107	1)
Electric (green)	km	0	1)	0	1)

Unknown	km	0.22	1)	0.22	1)
Hydrogen - Grey	km			0.112	1)
Hydrogen - Green	km			0.0078	1)

Continued Table 1 >>

Transport and Overland Transport		2018		2019	
Public Transport	Unit	NL	Source	NL	Source
Train - Unknown	person km	0.006	1)	0.006	1)
Bus	person km	0.140	1)	0.140	1)
Tram	person km	0.084	1)	0.066	1)
Tour Bus	person km	0.033	1)	0.033	1)
Regional Bus	person km	0.135	1)	0.135	1)
City Bus	person km	0.146	1)	0.146	1)
Metro	person km	0.095	1)	0.074	1)
Regional Rail	person km	0.024	1)	0.024	1)
National Rail	person km	0.000	1)	0.000	1)
High Speed Line / International Train	person km	0.026	1)	0.026	1)
Other Public Transport	person km	0.036	1)	0.036	1)
Various Freight and Shipping	Unit	NL	Source	NL	Source
Truck <20 t	ton km	0.259	1)	0.259	1)
Truck >20 t	ton km	0.110	1)	0.110	1)
Truck with Trailer	ton km	0.082	1)	0.082	1)
Train	ton km	0.012	1)	0.012	1)
Inland Shipping (96TEU)	ton km	0.030	1)	0.030	1)
Sea Freight (<1800 t ship)	ton km	0.027	1)	0.027	1)
Sea Freight (<8000 t ship)	ton km	0.021	1)	0.021	1)
Sea freight (30,000 t ship)	ton km	0.015	1)	0.015	1)
Air Freight and Transport	Unit	NL	Source	NL	Source
Short Flight	person km	0.297	3) (incl. RFI)	0.331	3) (incl. RFI)
Medium Length Flight	person km	0.179	3) (incl. RFI)	0.180	3) (incl. RFI)
Long Flight	person km	0.200	3) (incl. RFI)	0.203	3) (incl. RFI)
Class Factor Economy (short/medium)		0.95	3)	0.95	3)
Business		1.4	3)	1.4	3)
First		1.4	3)	1.4	3)
Undefined		1	3)	1	3)
Class Factor Economy (long)		0.7	3)	0.7	3)
Business		2.1	3)	2.1	3)
First		2.9	3)	2.9	3)
Undefined		1	3)	1	3)
RFI		1.9	3)	1.9	3)
Zone 1 (economy return)	kg CO ₂	500	CNG (excl. RFI)	500	CNG (excl. RFI)
Zone 2 (economy return)	kg CO ₂	1000	CNG (excl. RFI)	1000	CNG (excl. RFI)
Zone 3 (economy return)	kg CO ₂	1250	CNG (excl. RFI)	1250	CNG (excl. RFI)
Zone 4 (economy return)	kg CO ₂	2000	CNG (excl. RFI)	2000	CNG (excl. RFI)

Continued Table 1 >>

Various:		2018		2019	
Loose Paper	Unit	NL	Source	NL	Source
Not Recycled	kg	1.1	CNG	1.1	CNG
Recycled	kg	1.1	CNG	1.1	CNG
FSC Paper	kg	1.1	CNG	1.1	CNG
Inserts / Flyers	kg	1.1	CNG	1.1	CNG
Books	kg	2.4	CNG	2.4	CNG
Books - Recycled	kg	2.4	CNG	2.4	CNG
Newspapers	kg	1.1	CNG	1.1	CNG
Newspapers - Recycled	kg	1.1	CNG	1.1	CNG
Magazines	kg	1.3	CNG	1.3	CNG
Magazines - Recycled	kg	1.3	CNG	1.3	CNG
Printed matter (glossy)	kg	1.6	CNG	1.6	CNG
Printed matter (glossy) - Recycled	kg	1.6	CNG	1.6	CNG
Accommodation	Unit	NL	Source	NL	Source
Hotel (per person)	overnight	20.6	CNG	20.6	CNG
Catering	Euro	0.713	CNG	0.713	CNG
Water	Unit	NL	Source	NL	Source
Drinking Water	m ³	0.3	CNG	0.3	CNG
Waste Water	Resident eq.	40	CNG	40	CNG

1) National List of Emission Factors; <http://co2emissiefactoren.nl/>

2) Green electricity that does not conform to the SKAO factors is grey. See CO₂ Performance Ladder Manual 2.2

3) <http://www.ukconversionfactorscarbonsmart.co.uk/>

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