Carbon Footprint Calculator

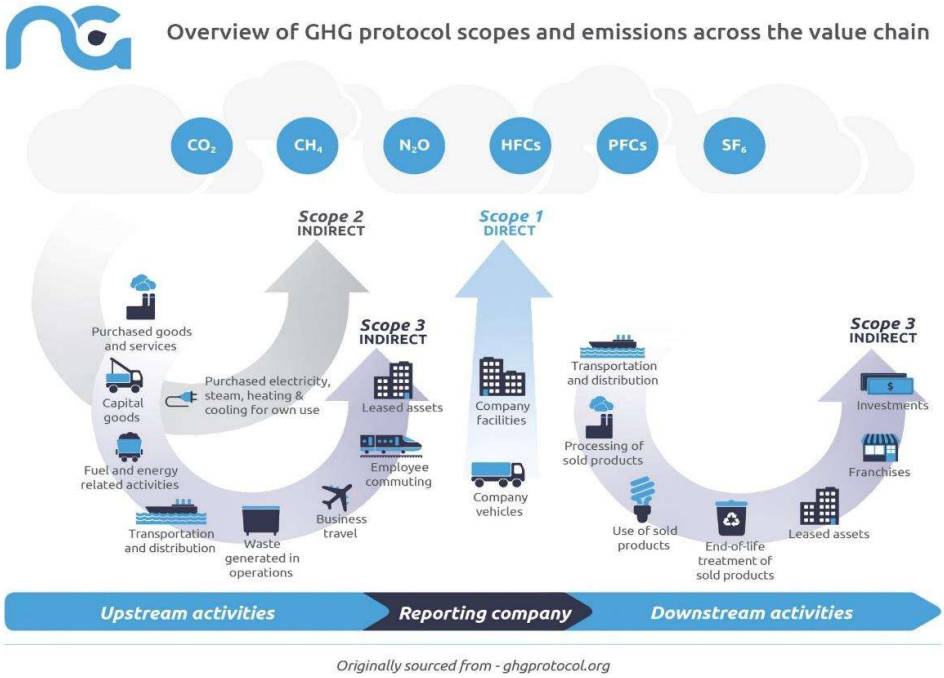
Introduction: The GHG Protocol Corporate Standard

The Greenhouse Gas (GHG) Protocol Corporate Standard is the most commonly used standard for calculating emissions and it has three Scopes, Scope 1, 2 and 3. Scope 1 encompasses emissions from fuels burned on site, Scope 2 encompasses emissions produced offsite due to imported electricity from the grid, Scope 3 attempts to cover all other potential sources of emissions.

Scope 1, Scope 2, Scope 3 (and the Importance of Scope 3)

Scope 1 emissions are direct emissions from owned or controlled sources, typically these are the emissions that come from fuel burned for heating building spaces and fuel burned in company vehicles. Scope 2 accounts for the indirect emissions that come from purchasing electricity. Scope 3 emissions are all other indirect emissions that occur in the supply chain of the reporting company, including both upstream and downstream emissions. Scope 3 has 15 categories, attempting to cover all other possible sources of emissions outside Scope 1 and Scope 2.

However, according to the GHG protocol only Scope 1 and 2 are mandatory to report on, and accurately measuring Scope 3 emissions can present significant challenges. As a result, Scope 3 emissions are often omitted from GHG inventories. This is problematic, as Scope 3 measures impacts that occur along the entire supply chain of an organisation, which needs to be decarbonised for an organisation to achieve net zero emissions. Also, when included in a GHG inventory, supply chain emissions usually make up the largest portion of emissions for an organisation.



University of Galway Carbon Footprint Calculator

The University of Galway are utilising a spend-based carbon footprint calculator in order to gain a high-level understanding of where the hotspots are within the University in terms of GHG emissions. This method selects a number of the most significant scope 3 categories and makes use of spend-based activity data to get a quick and rough estimate of scope 3 emissions. This means using expenditure reports as a way to sum up an organisation's activity & operations where more detailed data is not yet available. The spend-based method is generally not the most accurate way of calculating emissions, but it is very effective at giving an overview of emission hotspots while also making use of financial accounts, which are generally readily available. A research group from the University of Galway present a calculator based on this approach. The following section shows the different sources of data that the calculator requires.

Data collection & different types of activity data

The spreadsheet is populated with emission factors. These emission factors are either specific to Ireland or adopted from the UK Governments database where Irish factors were unavailable. The template has emission factors going back at least 10 years from 2022 for each category of emissions. Emissions are automatically calculated and totalled once activity data is input. There are tabs on the GHG Inventory Template for each category of emissions. The template contains the following scope 3 categories:

- Purchased Goods & Services/Capital Goods
- Commuting
- Business Travel
- Waste & Water

In order to calculate emissions, the first step is to choose a year and collect the organisations activity data for that year. The following is needed to complete a GHG inventory:

Table 1 - Data Required for the Carbon Footprint Calculator

Scope	Name	Description of Data Required	Units
1	Direct emissions	Natural gas, oil, petrol, diesel	Litres
2	Indirect emissions	Bill/report from electricity provider	kWhs
3.1	Purchased Goods & Services	Expenditure report split into categories of spend (e.g. Electronic Goods).	€
3.2	Commuting	Survey of employees: travel mode, distance, days per week etc.	Commute stats from survey
3.3	Business Travel	Company flights, hire cars, hotel stays etc.	Distance or €
3.4	Waste & Water	Report from utility service provider.	Weight or €

Explainer Videos

There are also some YouTube videos which explain the project in further detail and walk through how to use the Carbon Footprint Calculator:

What & Why of a Carbon Footprint: https://youtu.be/XH8ve9dft5c?si=jLeAN5mIja6q8r0t

Using the Carbon Footprint Calculator: https://youtu.be/uoQx-J8fYYo?si=5WPV2ats_p0Skc4N

University of Galway Carbon Footprint: https://youtu.be/I032QJ7k00k?si=Sw7et3JTge-ZFaml