

VERTIS **2050**

**CARBON
FOOTPRINT
ACCOUNTING
GUIDE**



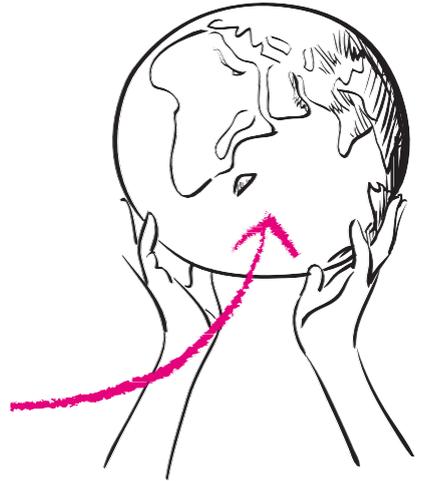
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WHY?

Striving to keep the global temperature increase below 2°C by 2050 compared to the 1990 levels, we are living through one of the most important periods of planet earth's history.

Decarbonisation has become one of the main priorities for governments all around the world and corporations, investors, events, cities and other subjects are joining the efforts to contribute their share to the transition towards a low carbon economy.

For corporations the transition is a difficult and complex task that is bound to many challenges including economical sustainability and technological feasibility. However the external pressure from its stakeholders has made the climate and energy action a necessity. At Vertis, we are committed to help our clients with the challenges they face by providing credible, financially viable solutions in sustainable energy and carbon offsetting areas.



KEY CONSIDERATIONS FOR BUSINESS LEADERS



Preparing for
Regulatory Change



Improving Regional
Perceptions



Re-aligning to
Industry Shifts



Driving Cost and
Energy Efficiency



Generating New Demand



Improving Talent
Attraction



Differentiating the
Corporate Brand



Engaging with Investors
and Business Partners

What is the Carbon Footprint?

A carbon footprint is the total amount of greenhouse gases emitted into the atmosphere by a particular human activity. A carbon footprint can be a result of an individual, a family, an event, an organization, or even an entire nation. It is usually measured as tons of CO₂ emitted per year, a number that can be supplemented by tons of CO₂-equivalent gases, including methane, nitrous oxide, and other greenhouse gases.

What are the GHG emissions and what are their sources?

According to Kyoto protocol's classification, greenhouse gases (GHG) are: Carbon dioxide - CO₂, Methane - CH₄, Nitrous oxide – N₂O, Hydrofluorocarbons – HFCs, Perfluorocarbons – PFCs, and Sulphur hexafluoride -SF₆. In the atmosphere, these gases absorb and emit radiant energy within the thermal infrared range, which leads to a fundamental cause of greenhouse effect.

Burning fossil fuels like coal, natural gas and gasoline to create energy releases carbon dioxide, the most common long-lived GHG. Livestock, rice cultivation and agricultural fertilizers primarily produce methane and nitrous oxide. Clearing forests also leads to GHG emissions when trees are burned and carbon-rich soils degrade. Manufacturing processes also produce GHG. Even waste that is discarded in landfills decomposes into methane and carbon dioxide.

How to calculate the Carbon Footprint?

Before starting the estimation of GHG emissions, it is critical to define the right methodology on carbon footprint accounting that will help you calculate properly your carbon footprint. There are dozens of internationally recognized methodologies that provide general or specific approaches for definition and calculation of GHG emissions. These methodologies have two main categories:

- Corporate-level
- Product -level

Corporate-level accounting:

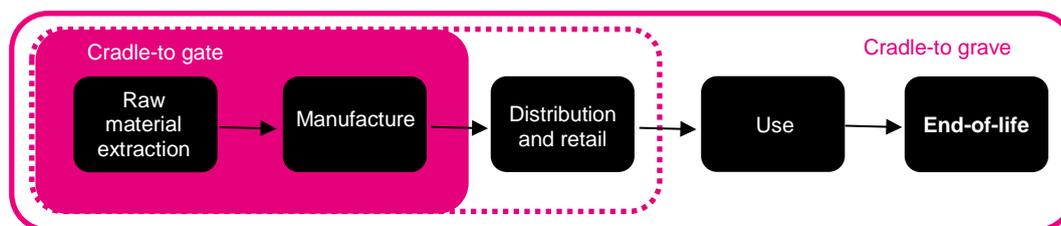
When business developing a GHG inventory, industrials (cement/lead producers, fossil fuel combustors, paper & pulp/glass developers), as well as organizations like NGOs, government agencies, universities, financial institutions, IT companies and etc. are able to apply corporate accounting methodology. There are three types of emissions, which may be taken into account while accounting:

- **Scope 1** or direct emissions, which are generated during combustion in the company's owned or controlled boilers, furnaces, vehicles, etc. For example, combustion of fossil fuels. These also are emissions from industrial/chemical production in owned or controlled process equipment.

- **Scope 2** or electricity indirect emissions account for GHG emissions from the generation of purchased electricity consumed by the entity/company. Under the electricity, we mean consumption of electricity itself, steam, heating and cooling.
- **Scope 3** are all other indirect emissions not included in scope 2. For example, these are emissions generated during employee's business travel; use and transportation of purchased goods/services; waste disposal etc. In general, Scope 3 emissions are divided into 2 subcategories: Upstream and Downstream. Upstream means all steps during the material's acquisition and pre-processing, while Downstream covers the steps addressing the product's storage and distribution, use and end-of-life. Calculation of Scope 3 is optional, but it provides an opportunity for the entity/company to be more innovative in GHG management. It does not need to involve a full-blown GHG life cycle analysis of all products and operations. Usually it is valuable to focus on one or two major GHG-generating activities.

Product-level accounting:

This type of accounting is the product's value chain or life cycle based approach. It can be used to identify the main sources of emissions for all types of goods and services, from orange juice to hospitality. While product-level accounting, a map of the product life cycle stages should be drawn. Usually, this map includes cradle-to-gate (or business-to-business) and/or cradle-to-grave (or business-to-consumer) assessments. Cradle-to-gate takes into account all stages, from raw material extraction up to the point at where the product leaves the manufacture. Cradle-to-grave takes into account all stages from raw material extraction up to disposal at end of life.



Calculation step-by-step: what do you need?

Step1 - Define the product/service to account for carbon footprint: whether it is applied for corporate-level or product-level accounting.

Step2 - Prioritize your organizational and operational boundaries: which scopes or stages are required to consider, and what base year is to select

Step3 - Collect the activity data in a transparent way. Bills or references from fuel, energy and other product consumptions can be used. Find out the emission factor, which is specific for each scope in case of corporate-level accounting, or for each stage in case of product-level accounting.

Step4 – Apply the following calculation formula:

$Activity\ data \times emission\ factor = Emissions$

Activity data is the magnitude of human activity resulting in emissions or removals taking place during a given period. The units of the activity data can be given for example in Litres for fuel combustion or in kWh for energy consumption.

Emission factor is the measurement of the average amount of specific GHG emissions released into the atmosphere by a specific process, fuel, equipment, or source. It is expressed as number of kilograms of CO₂-e per unit.

Example:

There is a UK company operating in the financial sector, which intends to calculate its' corporate-level GHG emissions. To get its carbon footprint, the company prioritized the organisational and operational boundaries within selecting the base year as 2017. Emissions generating during the combustion of fuel by the company's owned/controlled vehicles, were considered as Scope 1, while consumption of energy in the company's facilities was set up as Scope 2 emissions. To calculate Scope 1, the company multiplied the amount of used fuel (7000 Litres of diesel and 2000 Litres of gasoline) by the specific fuel-type emission factor.

$$7000 \text{ L} \times 2.60016 \text{ kgCO}_2\text{-e/L} = 18,2 \text{ tCO}_2\text{-e}$$

$$2000 \text{ L} \times 2.19835 \text{ kg CO}_2\text{-e/L} = 4,4 \text{ tCO}_2\text{-e}$$

$$\text{Scope 1} = 22,6 \text{ tCO}_2\text{-e}$$

The same formula applies for Scope 2 calculation, with the consideration of the amount of energy in kWh as an activity data, and the national energy-specific conversion factor as an emission factor. The total electricity amount used for the facilities during 2017 was 51 000 kWh, while heating and cooling as 67 000 kWh and 62 000 kWh respectively. The company's energy source is connected with the local electricity grid, so the emission factor in this case will be the specific one for the UK's electricity generated grid connection.

$$51 \text{ 000 kWh} \times 0.35156 \text{ kgCO}_2\text{-e/kWh} = 17,9 \text{ t CO}_2\text{-e}$$

$$67 \text{ 000 kWh} \times 0.20431 \text{ kgCO}_2\text{-e/kWh} = 13,6 \text{ t CO}_2\text{-e}$$

$$62 \text{ 000 kWh} \times 0.30045 \text{ kgCO}_2\text{-e/kWh} = 18,6 \text{ t CO}_2\text{-e}$$

$$\text{Scope 2} = 50,1 \text{ t CO}_2\text{-e}$$

Base year - 2017	Activity data	Emission factor	Results
Scope 1	Diesel – 7000 L	2.60016 kgCO ₂ -e/L	18,2 tCO ₂ -e
	Gasoline – 2000 L	2.19835 kgCO ₂ -e/L	4,4 tCO ₂ -e
Scope 2	Electricity 51 000 kWh	0.35156 kgCO ₂ -e/kWh	17,9 t CO ₂ -e
	Heating 67 000 kWh	0.20431 kgCO ₂ -e/kWh	13,6 t CO ₂ -e
	Cooling 62 000 kWh	0.30045 kgCO ₂ -e/kWh	18,6 t CO ₂ -e
Total GHG emissions	72,7 t CO₂-e		

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CARBON FOOTPRINT CALCULATION

You get an advice on the scope of emissions considered based on your corporate goals.

We choose the appropriate methodology for calculating your company/product footprint.

You get guidelines on what data should be collected and monitored.

ARRANGEMENT OF THIRD PARTY VERIFICATION OF THE FOOTPRINT

Your footprint will be verified by certified verifier to make sure the calculation reflects the reality and you can comfortably disclose the data to the public.

Third party verification is done via one of our partners to make sure you don't spend time and money and can focus fully on your business.

ABOUT VERTIS - 20 YEARS IN THE CARBON MARKET



Established in 1998, Vertis Environmental Finance was one of the first companies in the world to be involved in the carbon markets as pioneer of the Kyoto Protocol's Joint Implementation projects, helping companies to finance emission reduction investments. Vertis' mission is to inspire and empower businesses to make the transition to a low carbon economy.

