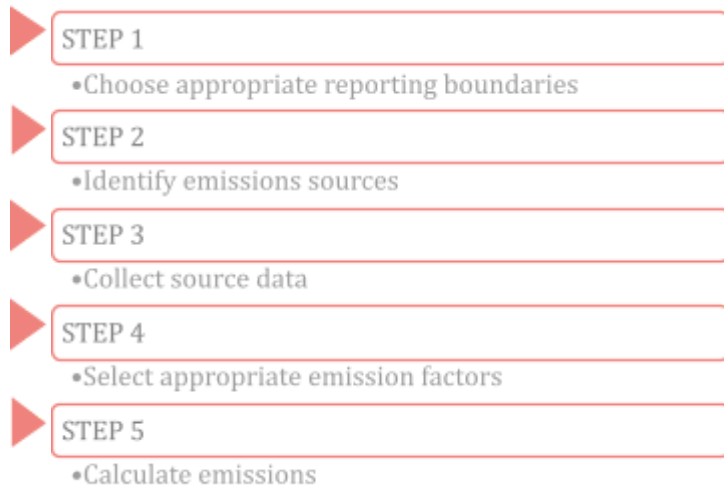


## GHG accounting and reporting guide

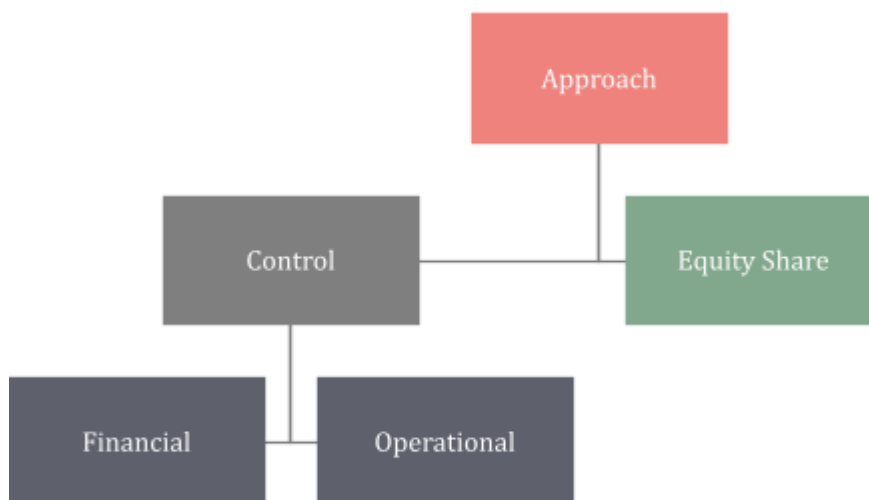
This guide explains the approach to GHG emissions data collection and accounting for Scope 1, 2 and 3 emissions at the company level. It applies to the day-to-day operations of any organisation, including private equity firms and their portfolio companies.

A simple five-step process can be followed:



### Step 1: Scoping - choosing boundaries

Set an organisational boundary for emissions calculation by reviewing legal and organisational structures to determine which operations, ventures and subsidiaries are in scope for a GHG emissions inventory. There are two main approaches to defining a company's organisational boundaries: control approach or equity share approach, as shown below.



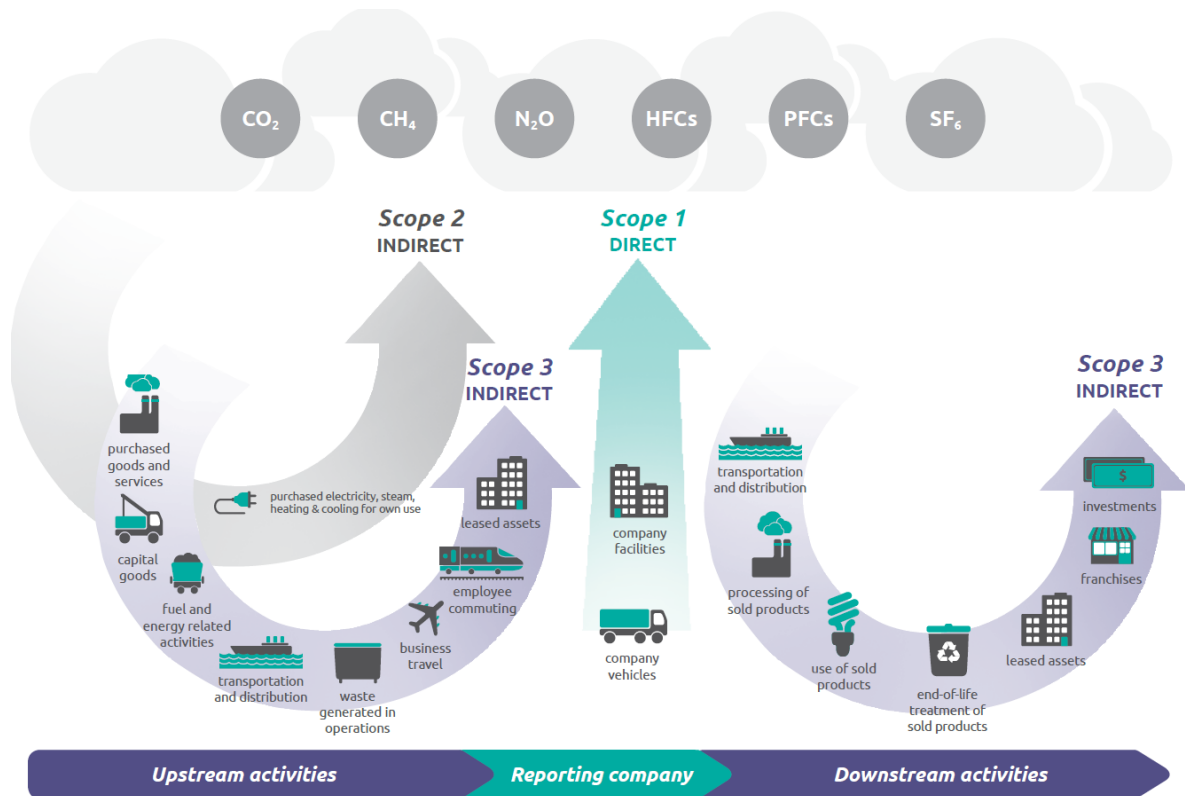
For most industries, the control approach is preferred as it means reporting for either 0 or 100 per cent of emissions from each entity or site. Under the control approach, where a company has operational control over an entity or site, it should account for 100 per cent of the emissions from that entity or site; otherwise, it should account for 0 per cent. The control approach is recommended for fund managers and portfolio companies calculating their Scope 1 and 2 emissions. This should not be confused with the attribution process for calculating Scope 3 financed emissions at the fund level, outlined in the body of the TCFD Toolkit.

The equity share approach is preferred for sectors with complex ownership or operational structures, such as the Oil & Gas industry.

For further detail on the approaches, refer to the [GHG Protocol Accounting Standard](#).

## **Step 2: Identify emission sources**

Once the **organisational boundaries** have been determined, and the company has established which entities and facilities to account for in its inventory, the **operational boundaries** must be confirmed. These determine which emissions sources to include, and how to categorise them into direct emissions (Scope 1) and indirect emissions (Scope 2 and 3) as outlined in Figure 8-1.



**Figure 8-1: GHG Protocol emission scopes [33]**

Scope 1 emissions sources include:

- **Stationary combustion:** Emissions from use of fuels for equipment such as generators, boilers, furnaces, incinerators, heaters.
- **Mobile combustion:** Emissions from use of fuels for transport such as cars, trucks, ships, forklifts, aviation.
- **Fugitive emissions:** Direct release of GHGs to the atmosphere, such as losses of refrigerants from air conditioning or refrigeration units, SF<sub>6</sub> insulation of transformers, and methane emissions from waste treatment.
- **Process emissions:** From chemical or physical processes such as smelting, catalytic cracking (usually only relevant to certain sectors such as Oil & Gas, manufacturing and heavy industry).

#### Agriculture and land use emissions

Where a portfolio company is involved in land sector activities (e.g., agriculture, forestry) the methodologies associated with land use are complex, and not consistently applied across industries. Although the GHG Protocol is developing guidance on carbon removals and land use, a [draft version](#) is already available, and a final version is due to be published in early 2024. The [IPCC Guidelines](#) and [FAO EX-ACT Guidelines](#) CITATION Foo22 \l 7177 [39] provide current guidance and emission factors for conducting land use GHG flows.

### Scope 2 emissions

- Emissions by a third party to provide the electricity, heating, steam or cooling, purchased and consumed by the reporting company.

### Scope 3 emissions

- There are 15 categories of Scope 3 emissions (as shown in Figure 8-1), covering a wide range of activities in the value chain, upstream and downstream of the reporting organisation.

Different business models will be suited to different footprinting approaches, and organisations should choose the method which ensures it can collect the best quality data.

Organisations looking to follow best practice should calculate their full Scope 1, 2 and 3 footprint. However, when this is not feasible, organisations should calculate Scope 1 and 2 as well as material Scope 3 categories. It is worth noting that for most organisational footprints, Scope 3 emissions represent 80 per cent-plus of total emissions. By accounting for Scope 3 emissions, organisations can assess their entire value chain and ultimately identify opportunities to reduce emissions.

The GHG Protocol Corporate Value Chain (Scope 3) Standard recommends organisations conduct a screening process to identify and assess which Scope 3 categories have the most expected impact on GHG emissions and offer the highest estimated reduction potential. Before attempting to calculate Scope 3 emissions, organisations should first assess the relevance and materiality of each Scope 3 category. Screening can be undertaken by using either estimates, proxy data or industry-average data, such as environmentally-extended input output (EEIO) emission factors. Sources such as CDP also provide data on which Scope 3 categories are generally considered material for which sectors.

### **Step 3: Collect data**

After boundaries are set, and emissions sources are identified, the data collection process can begin. The data collected should allow for the estimation of emissions from emissions-producing activities within the established boundary. The accuracy of the footprint relies on collating consumption, quantity or spend data for all of the emission sources within the established boundary.

Examples of activity data include: litres of fuel consumed, kilowatt-hours (kWh) of electricity consumed, or the value of money spent on utilities. There is a preference to use consumption data such as litres, kWh, and tonnes, as opposed to spend data. Consumption data for Scope 1 and 2 emissions sources can typically be collected from

direct meter readings, utility invoices from suppliers, maintenance records, vehicle fuel use, or mileage.

It is important to note the correct units such as litres, or kWh, so that the corresponding emission factor can be appropriately identified (see Step 4). For electricity bills, one unit is typically one kWh.

For Scope 3 categories, it is likely that a hybrid between organisational spend (for example, amounts spent on services) and activity data (such as distance travelled) will need to be collected, with the possibility of working with suppliers to obtain more accurate data.

It's important to clarify any gaps in the data and list any assumptions made in calculating the footprint. For example, extrapolation and estimates based on benchmarks may need to be used where data gaps exist.

Table 2 in the Annex of this document has a list of typical activities for Scope 1 and 2 emissions to support the data collection exercise. Appendix D of the GHG Protocol Corporate Standard includes a list of typical Scope 1, 2 and 3 emissions sources for certain sectors.

#### **Step 4: Select emission factors**

The carbon footprint is measured in tonnes of CO<sub>2</sub> equivalent (tCO<sub>2</sub>e) and is calculated by multiplying the activity data by standard emissions factors.

An emission factor represents the GHG emissions released per unit of the activity data. The most appropriate source for the emission factor must be selected from those available; a list of sources is in Table 5. The source should be relevant to the country, aligned with the unit of activity data, and up to date. Also, where available, emission factors which are for carbon dioxide equivalents (CO<sub>2</sub>e) should be used, as reporting should cover all GHGs as opposed to just carbon dioxide.

**Table 1: Emission factor sources**

<b>Resource</b>	<b>Description</b>
<a href="#"><u>DEFRA</u></a>	A set of emission factors for Scope 1 and scope 3 GHG calculations. Guidance provided on calculations.
<a href="#"><u>IFI</u></a>	A set of national grid emission factors for calculating scope 2 GHG emissions.
<a href="#"><u>IEA CO2 emissions from fuel combustion</u></a>	Provides electricity grid factors for 150 countries and regions. Note that there is a cost to buy these emission factors. Updated annually.
<a href="#"><u>IPCC Guidelines</u></a>	Guidelines for national GHG inventories, including energy, industrial, AFOLU and waste emission factors.

	Useful resource if emission factors are not found elsewhere. There are numerous emission factors available for different sectors.
<u>US EPA</u>	A set of default emission factors for Scope 1, 2 and some Scope 3 GHG calculations.
<u>Quantis Scope 3 Evaluator</u>	Free online tool by the GHG Protocol for estimating Scope 3 emissions.
<u>GEMIS</u>	Life cycle analysis programme and database for energy, material and transport systems.
<u>The ICE Database</u>	Embodied carbon database covering lifecycle.
<u>PCAF online emission factor database</u>	This includes emission factors relevant to the six PCAF asset classes. These are derived from Exiobase, national agencies and other publicly-available sources (only available for PCAF participants).

### Step 5: Calculate emissions

GHG emissions are calculated by multiplying activity data by an emission factor, and where relevant, by the Global Warming Potential (GWP).

$$\text{GHG Emissions} = \text{Activity Data} \times \text{Emission Factor} \times \text{Global Warming Potential (where relevant)}$$

GHG emissions are calculated in terms of tonnes carbon dioxide equivalent (tCO<sub>2</sub>e). Carbon dioxide equivalent is a unit of measure of the quantity of GHGs based on their GWP.

GWP is relevant for GHG emissions other than carbon dioxide. It is the radiative forcing impact (degree of harm to the atmosphere) of one unit of a given GHG relative to one unit of CO<sub>2</sub>. GWP values are included in IPCC assessment reports, and updated based on the latest science.

The GHG Protocol covers the accounting of seven GHGs covered by the Kyoto Protocol, with their current GWP potential over 100 years being:

- Carbon dioxide (CO<sub>2</sub>): 1
- Methane (CH<sub>4</sub>): 28
- Nitrous oxide (N<sub>2</sub>O): 265
- Hydrofluorocarbons (HFCs): 4 to 12,400
- Perfluorocarbons (PFCs): 6,630 to 11,100
- Sulphur hexafluoride (SF<sub>6</sub>): 23,500

- Nitrogen trifluoride (NF<sub>3</sub>): 16,100

An example of a GHG calculation is outlined on the next page.

The complexity of calculating a carbon footprint depends on the nature of the organisation, specifically the size of company, its activities and, importantly, its sector. Calculating the GHG emissions of a small warehouse or office, for example, tends to be a much simpler exercise than calculating the GHG emissions of a large farm, which takes into account land use GHG flows, or an oil and gas facility that includes process and fugitive emissions.

Once a company has calculated its emissions, the process should be repeated annually. To support measuring progress over time, and relative to a target, it is important to select a single year as a base year to track change against. Ideally, this should be the earliest reporting year where data and calculations are reliable and representative of normal operations.



## Example of a Scope 1 and 2 GHG emissions calculation for a cold chain logistics company

**Step 1: Identify and collect the company's GHG sources and associated activity data over an annual period**

**Step 2: Identify the relevant emission factors from a reputable source**

**Step 3: Calculate the GHG emissions using the formula:**

**GHG emissions = activity data x emission factor <sup>2</sup>**

To note: the units of the consumption data and emission factors should be paid attention to.

<sup>1</sup> The company's operations are assumed to be all in South Africa.

<sup>2</sup> Global Warming Potentials (GWP) were not used in the calculation, given the GWP are included in the emission factors, with the exception of the refrigerants emission factor

<sup>3</sup> Refrigerant gas is contained in a closed loop system and therefore emissions associated with refrigerants are due to losses within the year.



**Table 2: Typical activities for Scope 1 and 2 emissions**

Scope	Activity	Common fuels / sources	Units	Where to find the data	Likely relevance for office-type businesses
1	Fuel combustion for heating, hot water, steam or electricity generation	Natural gas (supplied directly from gas mains)	m <sup>3</sup> ; kWh or tonnes	Gas utility supplier invoices	High
		Diesel	Litres; kWh or tonnes	Purchase invoice/delivery note	Possible
		Propane	Litres; kWh or tonnes	Purchase invoice/delivery note	Possible
		Liquefied petroleum gas (LPG)	Litres; kWh or tonnes	Purchase invoice/delivery note	Possible
		Fuel oil	Litres; kWh or tonnes	Purchase invoice/delivery note	Possible
		Biomass (wood pallets, chips, or logs)	kWh or tonnes	Purchase invoice/delivery note	Possible
		Biogas	kWh or tonnes	Purchase invoice/delivery note	Possible, in newer buildings
1	Fuel consumed for owned or leased vehicle fleets used for business purposes (transport of goods, company cars, etc.); when the company has direct control over fuel use	Petrol / gasoil	Litre or US gallon consumed OR km or miles travelled	Fuel card invoices, fuel/mileage reimbursement requests	Possible
		Diesel / gasoil	km or miles travelled OR km or miles travelled	Fuel card invoices, fuel/mileage reimbursement requests	Possible

		Compressed natural gas (CNG)	Litre; kWh or tonnes km OR miles travelled	Purchase invoice/delivery note	Possible
		Liquefied natural gas (LNG)	Litre; kWh or tonnes km OR miles travelled	Purchase invoice/delivery note	Possible
1	Refrigerant gas leaks from refrigeration and/or air-conditioning units	R134a, R290, R404A, R410A, Ammonia (R717), etc.	Litre; kWh or tonnes OR with kg	Refill invoices/service note	Limited
2	Electricity purchase and consumption	Electricity	kWh	Power utility supplier invoices	High
		Renewable electricity	kWh	Power utility supplier invoices; REGOs, RECs, etc.	Possible
2	Purchase of district heating or cooling	District heating or cooling	kWh	District heating supplier	Possible, dependent on location
2	Purchase of heating from landlord; when no direct gas supply contract	Natural gas combustion	kWh	Landlord pro-rata invoice/service charge	Possible

Adapted from Greenhouse Gas Accounting and Reporting for the Private Equity Sector.