



METHODOLOGY TO ESTABLISH A PRODUCT CARBON FOOTPRINT

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Amendments to Doc167/11

Section	Change
	Editorial to align style with IHC associations
6	Update to references with latest data

Note: Technical changes from the previous edition are underlined

1 Introduction

EIGA members are receiving more and more requests for the carbon footprint of their products.

Increasingly customers want to use this information to evaluate the carbon footprint of products they buy and, in some cases, to use this information to calculate their own product carbon footprint (for example, for carbon labelling of food products in UK).

In the future national regulations could require organisations to estimate the carbon footprint for the organisation or its products.

Currently, these requests have been answered using different calculations rules and scope. The production of industrial gases is a global business. Today, there is no clear method for calculating and reporting a product carbon footprint that is internationally harmonised.

This publication has been developed taking these issues into account and seeks to define a common set of guidelines for the industrial gases industry for calculating and reporting of product carbon footprint.

2 Scope and purpose

2.1 Scope

This publication presents the basis of a methodology for EIGA members to calculate a product carbon footprint that is applicable to industrial gases products, and guidelines on how to communicate this information to stakeholders.

A carbon footprint or carbon content for a product can be used to:

- answer the precise questions raised by customers assessing their own carbon footprint;
- evaluate carbon footprints for alternative methods of delivering industrial gases;
- promote gas products that reduce the carbon footprint of customers applications; or
- provide a process to evaluate the impact on climate change up and down the supply chain and take actions to minimise this impact where appropriate.

2.2 Purpose

This publication proposes the methodology, sources of emission factors and the scope and borders to be considered and applied by EIGA members when calculating a carbon footprint for products. These principles are based on and have been developed from currently established national and international standard methodologies (see [Section 5](#)).

3 Definitions

For the purpose of this publication, the following definitions apply.

3.1 Publication terminology

3.1.1 Shall

Indicates that the procedure is mandatory. It is used wherever the criterion for conformance to specific recommendations allows no deviation.

3.1.2 Should

Indicates that a procedure is recommended.

3.1.3 May

Indicate that the procedure is optional.

3.1.4 Will

Is used only to indicate the future, not a degree of requirement.

3.1.5 Can

Indicates a possibility or ability.

3.2 Technical definitions

3.2.1 Best Available Techniques (BAT)

The most effective and advanced stage in the development of activities and their methods of operation which indicates the practical suitability of particular techniques for providing the basis for emission limit values and other permit conditions designed to prevent and, where that is not practicable, to reduce emissions and the impact on the environment as a whole:

- a) 'techniques' includes both the technology used and the way in which the installation is designed, built, maintained, operated and decommissioned;
- b) 'available techniques' means those developed on a scale which allows implementation in the relevant industrial sector, under economically and technically viable conditions, taking into consideration the costs and advantages, whether or not the techniques are used or produced inside the Member State in question, as long as they are reasonably accessible to the operator;
- c) 'best' means most effective in achieving a high general level of protection of the environment as a whole.

3.2.2 Carbon dioxide equivalent (CO₂e)

Unit for comparing the radiative forcing of a greenhouse gas (GHG) to that of carbon dioxide, see ISO 14064-1 *Greenhouse gases — Part 1: Specification with guidance at the organization level for quantification and reporting of greenhouse gas emissions and removals* [1].¹ It is the amount of carbon dioxide by weight that is emitted into the atmosphere that would produce the same estimated radiative forcing as a given weight of another radiatively active gas.

Carbon dioxide equivalents are calculated by multiplying the weight of the gas being measured by its estimated global warming potential (for example for methane this is 21). Global warming potentials can be found in the Fifth Assessment Report of the Intergovernmental Panel on climate Change (IPCC) (though the values used in calculations should always be the latest available) [2].

3.2.3 Carbon equivalent units.

These are defined as carbon dioxide equivalents multiplied by the carbon content of carbon dioxide (i.e., 12/44).

¹ References are shown by bracketed numbers and are listed in order of appearance in the reference section.

3.2.4 Carbon footprint

The amount of greenhouse gas (GHG) emissions associated with an organisation, product or service when taking into consideration defined steps of its production, use and discharge, (steps selected from all possible steps from cradle to grave, see section 3.2.6). This is generally expressed as tonnes carbon dioxide equivalent per unit of product (for example per tonne of gas, per Nm³). The selection of an appropriate unit is important as it provides a unit of measurement to the consumer that reflects the quantity of product that is used by the end user.

3.2.5 Product carbon footprint

Total greenhouse gas emissions of a product across its life cycle, from raw materials through production (or service provision), distribution, consumer use and or disposal/recycling. It includes the emissions of greenhouse gases, including carbon dioxide (CO₂), methane (CH₄) and nitrous oxide (N₂O), together with families of gases including hydrofluorocarbons (HFCs) and perfluorocarbons (PFCs) from PAS 2050 [3, 4].

3.2.6 Radiative Forcing

A measure of the influence that a climatic factor has in altering the balance of incoming and outgoing energy in the Earth atmosphere system and is an index of the importance of the factor as a potential climate change mechanism. In the report from the IPCC, radiative forcing values are for changes relative to pre-industrial conditions as defined at 1750 and are expressed in watts per square metre (W/m²).

3.2.7 System boundaries

The term “Cradle to Grave” is often used when describing the scope and boundaries for a full inventory that includes all GHG emissions from the complete life cycle of a product from the beginning of the life cycle (for example raw material acquisition) though final disposal or end use by the end consumer. Figure 1 below illustrates cradle to grave system boundaries.

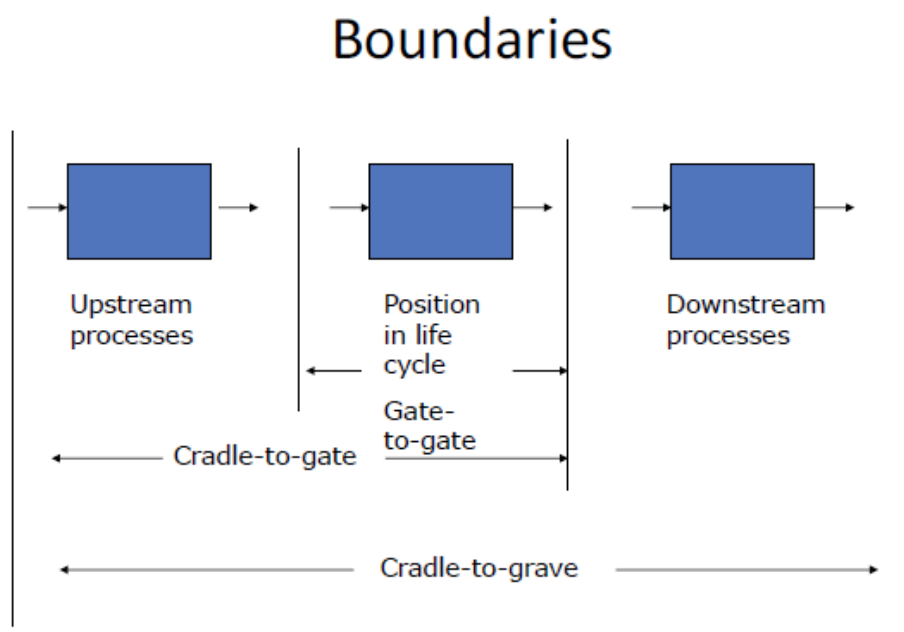


Figure 1 Cradle to grave system boundaries

4 Carbon footprint

4.1 Scope and boundary of carbon footprint

A carbon footprint is a term used to describe a method used to measure the amount of impact human activities have on the environment in terms of the amount of greenhouse gas (GHG) produced by a particular activity or entity. It can be used by organisations to communicate with stakeholders about their contribution to climate change.

A product carbon footprint is measured in units of carbon dioxide for example kg CO₂ equivalent (CO₂e) per unit of product or tonnes CO₂e. The selection of an appropriate unit is important as it provides a unit of measurement to the consumer that reflects the quantity of product that is used by the end user.

Figure 2 below shows different possible scopes and system boundaries for calculation of carbon footprints.

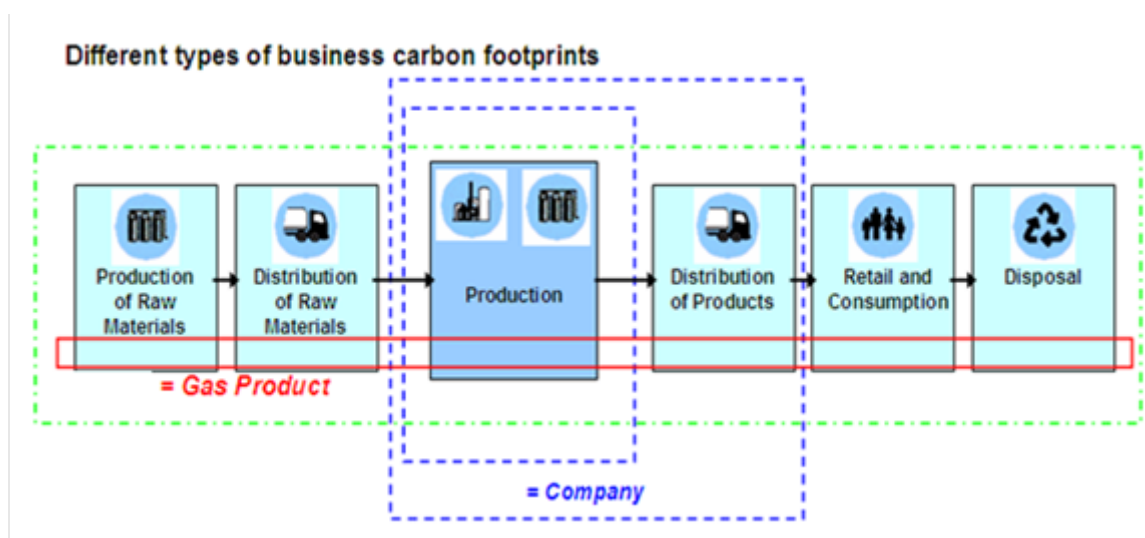


Figure 2 System boundaries for carbon footprint

Scope A (Blue line – Figure 2) is the organisation's carbon footprint, covering all activities under the operational control of the organisation, typically used for corporate reporting. More details on calculating the organisation's greenhouse gas emissions can be found in ISO 14064 and the World Resources Institute (WRI) GHG protocol [1, 5].

Scope B (Red line – Figure 2) is the product carbon footprint and the boundary covering carbon emissions related only to the activities undertaken for a specific product; this includes an evaluation / review of upstream emissions (raw material related) and downstream emissions (products use and disposal) which may not be within the operational control of the organisation. Appendix A provides a summary of scopes and assumptions for some typical gases supplied by industrial gas companies.

NOTE This publication is primarily concerned with the methodology for calculating the product footprint of Scope B, with a business to business (B2B) scope for a single gas, covering production and distribution and following the methodologies suggested in the references in Section 6.

Scope C (Green line – Figure 2) covers the carbon footprint of the whole organisation's activities, upstream and downstream, and includes all raw material and product impacts. This is more comprehensive but requires extensive data across all products and activities.

4.1.1 Data collection

Having determined the scope and boundaries for the carbon footprint, the next step is to collect the data to match the scope and boundary.