

Product Carbon Footprint Measurement Methodology

Overview

Introduction and Background

The Carbon Trust, through its work on supply chain analysis, has developed a methodology to quantify the total emission of greenhouse gases (GHG) from a product across its lifecycle, from the raw material production, manufacturing and distribution to disposal, excluding emissions from use of the product.

The methodology will enable businesses to estimate the carbon footprint of an individual product. This will allow them to display a carbon label on products and give consumers the opportunity to factor carbon into their purchasing decisions. As an additional commitment, companies displaying the label will have not only measured the carbon footprint of their product, but also pledged to reduce that footprint over two years. If this does not happen, they will lose the label.

The draft methodology for consultation is based on a number of pilot studies completed by the Carbon Trust working with participating businesses. The methodology aims to strike a balance between being analytically rigorous but simple and practical for business to apply.

Methodology Overview

Scope

- Calculates the carbon footprint for one item that can be purchased by the consumer, including both the product and the packaging
- Includes all greenhouse gases, rather than just carbon dioxide
- Includes supply chain steps up to arrival at the retail store, plus disposal. Emissions during the product's use are not included, and currently, the emissions in the retail store are not included.
- Only includes input, output and unit processes which are directly associated with the product. Indirect emissions (e.g. from workers commuting to a factory) are not attributed to the product
- Does not allow emissions from any part of the supply chain to be offset when calculating the carbon footprint of the product. This is because the aim of the methodology is to provide information on the actual emissions associated with the product supply chain, to enable comparison between products, and to identify potential emissions reductions

- Focuses on inputs, outputs and processes in the supply chain that will have a significant impact on the overall carbon footprint

Key Process Steps

The methodology comprises five major steps, with each step covering several activities and building on the previous steps. The key steps are:

Step 1 – Analysis of the internal product data

This step develops a deep understanding of the product, including raw materials required, production processes, waste produced and storage and transport necessary – within manufacture as well as disposal of the final product. This step will often have to be undertaken with suppliers.

Step 2 – Build a supply chain process map

This step develops an understanding of the supply chain involved in getting the product to market. This would typically include raw materials, manufacture, distribution and disposal. At each stage there may be several steps involved, for instance with manufacture this might include conversion (i.e. a process that turns one or several materials into a different output), storage and transport. The supply chain process mapping needs to be completed for each input.

Step 3 – Define the boundary conditions and identify data requirements

In order to make the methodology both practical and robust, it is necessary to define the limits of data needed. Achieving 100 per cent data inputs for all products would make for an unwieldy and exceptionally expensive process, but missing out on key impacts would mean the methodology is not robust. The boundaries are currently set at 90 per cent of the mass of the product analysed, however this will be reviewed in future methodology development.

It is also essential to set a limit for when measurement will stop. It is suggested that this is either when the product becomes the raw material for something else, or when the product reaches a state where it stops emitting carbon.

Processes directly attributable to the product are included, such as producing packaging; whereas those indirectly associated are excluded, such as consumer transport to shops.

The data requirements will be different for each product, but must be sufficient to construct a mass balance and carbon footprint. This includes the major material inputs and outputs at each step, as well as the energy consumption and direct emissions.

Step 4 – Collect the primary and secondary data

This step collects the actual data required to develop the mass balance and calculate the greenhouse gas (GHG) emissions. Primary sources are always preferred, but secondary sources may have to be considered if primary sources are unavailable.

Step 5 – Calculate GHG emissions by supply chain process steps

This final step calculates the mass balance of the product at each stage in the process and uses this to calculate the GHG emissions. Emissions are calculated through energy and direct emissions data, using emissions coefficients to convert into carbon equivalents.

Next steps

This is the first step in a long journey. It is our intention to develop this methodology into an open standard through a consultation process which will be managed by a panel of experts in this field. This panel will form a Technical Advisory Group (TAG) which will help to develop this methodology through consultation with other stakeholders and by piloting it with a number of companies over the next 12 months.

Glossary

Greenhouse gases	Greenhouse gases are gases that contribute to the greenhouse effect, these include carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons and sulphur hexafluoride
In-use emissions	The emissions of greenhouse gases from a product during it's use by the end consumer, e.g. the energy used by a fridge
Carbon footprint	The total emissions of greenhouse gases in carbon equivalents from a product across its lifecycle
Mass balance	The quantity of materials into and out of a process
Emissions coefficients	The greenhouse gas emissions associated with a unit of energy e.g. kg CO ₂ equivalent per kWh of electricity used