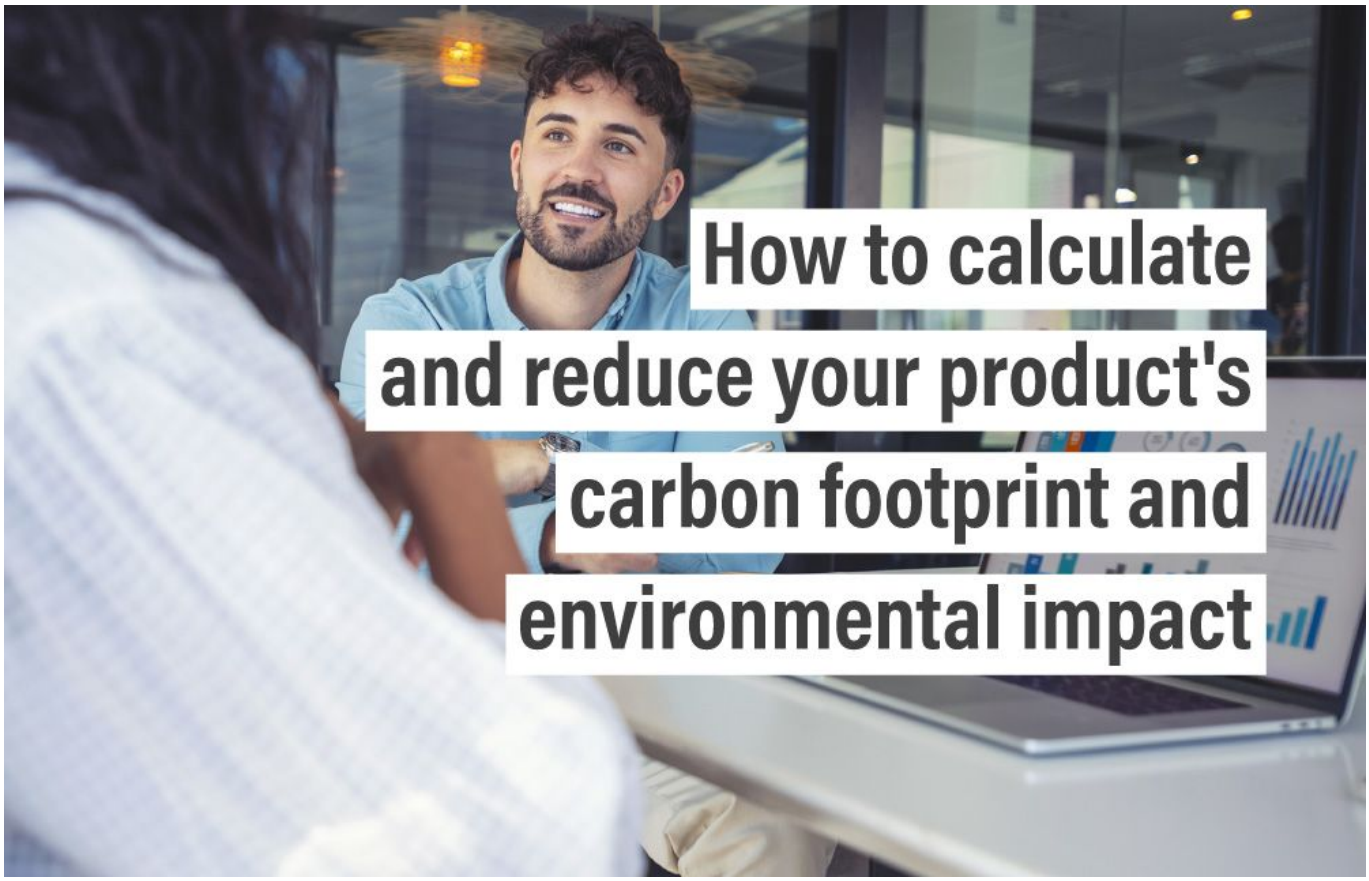
How to calculate and reduce your product’s carbon footprint and environmental impact



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How to calculate and reduce your product’s carbon footprint and environmental impact

Reading time 12 mins

Key Points

- Although there’s a lack of standardised methods for measuring product carbon (CO2) footprint, frameworks such as the Greenhouse Gas (GHG) Protocol and ISO 14046 make this easier
- Carbon accounting, also known as a greenhouse gas inventory, estimates carbon footprints for businesses, governments, and individuals. This helps entities to understand their climate impact, highlight high-emitting operations, and implement strategies to reduce them
- CO2 footprint measures the effect the GHS caused by a product has on the earth’s climate – and only focuses on the impact outcome on global warming
- A product environmental footprint, often also called a Life Cycle Assessment (LCA), assesses the environmental impacts of all chemical emissions and resource depletion caused by a product
- Choosing one over the other depends on what companies intend to use the product footprints for, e.g. comply with climate policy or develop environmentally sustainable products.

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In our previous article on sustainable design challenges, we looked at how the tech industry offers both solutions to and negative contributors towards the numerous threats facing the planet, people, and natural environments. One such challenge is businesses' difficulty managing their carbon emissions due to a lack of standardised methods for measuring them. However, a lack of standardisation doesn't mean these standards don't exist. So if you're looking for ways to accurately calculate and reduce your product's carbon footprint and environmental impact, keep reading to find out how!

The terms carbon footprint, greenhouse gas (GHG) emissions, and environmental impact are increasingly associated with climate change to define and categorise our actions' consequences on the planet. Carbon footprint is the measure of the total GHG emissions released into the atmosphere that make the earth warmer, disrupting weather and climate patterns and impacting vegetation, wildlife, and human health.

The product carbon footprint (PCF) and product environmental footprint (PEF) are used to calculate a product's climate and environmental impacts. In this post, we'll review both.

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Carbon Accounting: Carbon Footprint for Corporates

Carbon accounting is a relatively new discipline resulting from a collective global awareness of the impact of carbon dioxide (CO_2) emissions on our climate. Also known as a greenhouse gas inventory, it estimates carbon footprints for businesses, governments, and individuals. By measuring, recording, and reporting GHG emissions, organisations better understand their climatic impact, can highlight and target high-emitting operations (e.g. business flights, employee commuting, waste generated), and identify strategies to reduce them.

Carbon accounting requires businesses to set goals within a framework based on three scopes defined by the GHG Protocol – the defacto global accounting standard for measuring an entity's direct, upstream, and downstream GHG emissions:

- **Scope 1:** direct emissions from sources that are owned or controlled by the company, including burning fuel on-site and company vehicles
- **Scope 2:** indirect emissions from the generation of purchased electricity, heating and cooling, and steam.
- **Scope 3:** all other indirect emissions (upstream and downstream) that occur in a company's supply chain. Upstream activities include business travel, employee commuting, waste generation, purchased goods, and transportation. Downstream activities include investments, product processing, franchising, use of sold products, and end-of-life retirement.

Why is carbon accounting challenging?

Looking at Scope 3 requirements hints at what makes carbon accounting so challenging: how does a company measure emissions from activities such as purchased goods or end-of-life retirement?

As the Harvard Business Review points out, the protocol is inherently flawed:

- It allows companies to guestimate Scope 3 emissions
- It requires companies to estimate the Scope 1 emissions for all their suppliers and customers
- It enables multiple accounting of the same emissions (e.g. one company's scope 3 emissions are another company's scope 1 emissions which – in theory, results in double accounting)
- It gives companies who cannot measure Scope 3 emissions (due to the sheer complexity and near impossibility) the option of using regional and industry averages rather than primary data
- Allowing companies to use average rather than specific and traceable data undermines the integrity of measurements
- Scope 3 reporting has now become voluntary, so most companies skip it – creating scepticism towards the companies that don't (i.e. they are often selective and opportunistic in what they report)

Additional challenges with carbon accounting include:

- Inconsistent data: gathering emission data is cumbersome, error-prone and lacks standardisation. If there's no uniformity in the data, it becomes difficult for companies to understand and curb their emissions accurately
- Complicated regulatory frameworks: reporting standards enable decision-making, but the frameworks used are complex and often contain confusing and conflicting guidelines. Varying metrics, priorities, and definitions compound the problem
- Inaccurate reporting and analysis: this is caused by the scope 3 reporting issues highlighted above

Carbon calculation frameworks and international

standards

The Greenhouse Gas Protocol is the leading global standard for public and private sector entities to measure their product carbon footprint and emissions. It was developed by the World Resources Institute (WRI) and the World Business Council for Sustainable Development (WBCSD) in the late 90s when global efforts to address climate change first emerged.

In addition, is the ISO 14046 standard. It provides the tools that businesses can use to ensure GHG document reporting is reliable, valid, and verified, and also:

- Details the requirements for determining baselines; and monitoring, quantifying, and reporting emissions
- Quantifies emissions associated with the life cycle stages of a product, beginning with resource extraction and raw material sourcing and extending through the production, use and end-of-life stages of the product
- Specifies the competence requirements for validation and verification teams. These competence requirements are based on the tasks that validation or verification teams must be able to perform.

Divided into three tiers (ISO 14064-1, ISO 14064-2, and ISO 14064-3), this standard helps organisations to effectively:

- Design and develop GHG inventories
- Quantify, monitor, and report on emissions reduction
- Develop the CFP (carbon footprint of products) per functional unit or partially declared unit

The main difference between the GHG Protocol and the ISO 14064 is their scope and applicability – but both are compatible and complementary: businesses can use the former to identify and calculate emissions and removals, and the latter to report and verify them.

Product Carbon Footprint vs Product Environmental Footprint

As we saw in our post on climate responsibility, the carbon conversation tends to suck all the air out of the room – often neglecting environmental contributions to the climate crisis that are just as important. Taking your environmental footprint into consideration helps to cover all the bases.

The difference between carbon and environmental footprints is that a CO2 footprint measures the

effect the GHS caused by a product has on the earth's climate – and only focuses on the impact outcome on global warming. A product environmental footprint, often called a Life Cycle Assessment (LCA), assesses the environmental impacts of all chemical emissions and resource depletion caused by a product- not solely GHG emissions, as in a product carbon footprint.

Product environmental footprint is calculated by assessing 15 dominant impact categories such as human toxicity, land use, resource depletion, water scarcity, and carbon footprint.

Choosing one over the other depends on what companies intend to use the product footprints for.

Product CO2 footprints help businesses to:

- Report and communicate (especially to consumers) what a product's carbon impacts are
- Offset carbon: fund measures (e.g. tree planting) that fund or removes an equivalent amount of GHG elsewhere
- Comply with carbon policies such as carbon taxes and trading schemes

Product environmental footprints help businesses to:

- Report on their full environmental impacts, including carbon emissions. Two common reporting standards are (i) Environmental Products Declaration (EPD) report. For companies in the construction industry, an EPD of the planned project can help to win tenders (ii) Product Environmental Footprints (PEF), which provides LCA standards for many product categories and may be used as part of labelling in the future to help consumers compare the environmental impact of products in the same category
- Quantify environmental externalities. For example, the Environmental Cost Indicator and the Environmental Profit and Loss Account translate environmental damages into a single monetary score. This helps accurately compare products based on their impact
- Design more sustainable products based on environmental data, implement an Environment, Social, and Governance (ESG) strategy, or comply with international standards for environmental management, e.g. ISO 14044

How to calculate and reduce footprints and emissions effectively

Regardless of whether you choose to calculate your products' carbon or environmental footprint, the best place to start is to perform a Life Cycle Assessment (LCA). An online tool such as the LCA Calculator is a quick and intuitive way for designers and engineers to understand, analyse, and

compare the environmental impacts of their products or specific product design decisions.

Businesses interested in only addressing their carbon footprint can conduct a complete LCA and only report the climate impacts. Alternatively, they can use a carbon footprint calculator such as My Carbon, which looks only at GHG emissions or the Mackay Carbon Calculator, which provides a model of the UK energy system and pathways towards decarbonisation.

A robust LCA tool is the only method to calculate environmental footprints. This measurement is also required for businesses seeking certification for environmental management practices that comply with international standards (e.g. ISO 14044 and ISO 14040)

Once the relevant footprints have been measured, the onus is on the businesses to decide which practices to reduce. At Ignitec®, we're focused on reducing our carbon emissions and minimising our environmental impact wherever possible. We're committed to green energy and green tech, audit CO2 emissions annually, have a zero-waste office policy, and invest heavily in carbon offsetting programs.

A final word on footprints

What we leave behind in terms of our legacy is important.

While calculating footprints and navigating frameworks is cumbersome and time intensive, they leave a lasting impression and send a powerful message to future generations: we saw how badly things could go and rose to the challenge of stopping it.

If you're as passionate about sustainability and looking to improve your product's carbon footprint or Life Cycle Assessment, please get in touch. Designing for sustainability is one of the things we do best!

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