



EFFICIENT USAGE OF NATURAL RESOURCES

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CARBON FOOTPRINT



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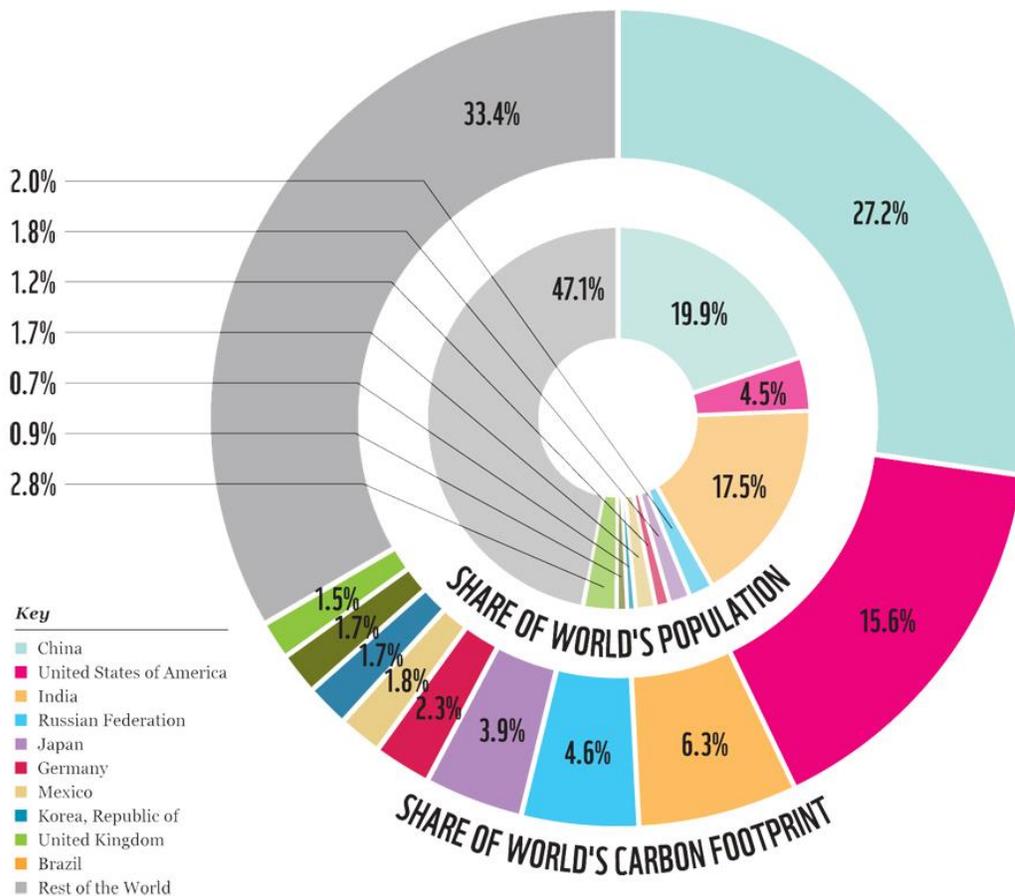
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Introduction

Climate change is increasingly recognised as a major challenge. It is widely accepted that the greenhouse gas emissions caused by humans have a negative impact on the environment.

The total set of greenhouse gas emissions caused directly and indirectly by an individual, organisation, event or product is commonly called their *carbon footprint*.

Establishing the carbon footprint of an organisation can be the first step in a programme to reduce the emissions it causes. The most important greenhouse gas, arising from human activity, is carbon dioxide (CO₂). Virtually all human activities cause the CO₂ emissions that lead to climate change. By using electricity generated from fossil fuel power stations, burning gas for heating or driving a petrol or diesel car, every person is responsible for CO₂ emissions.





The term *carbon footprint* is commonly used to describe the total amount of CO₂ and other greenhouse gas (GHG) emissions for which an individual or organisation is responsible. Footprints can also be calculated for events or products.

In order to produce a reliable footprint, it is important to follow a structured process and to classify all the possible sources of emissions thoroughly. A common classification is to group and report on emissions by the level of control which an organisation has over them. On this basis, greenhouse gas emissions can be classified into three main types:

1. Direct emissions that result from activities the organisation controls

Most commonly, direct emissions will result from combustion of fuels which produce CO₂ emissions, for example the gas used to provide hot water for the workspace.

In addition, some organisations will directly emit other greenhouse gases. For example, the manufacture of some chemicals produces methane (CH₄) and the use of fertiliser leads to nitrous oxide (N₂O) emissions.

2. Emissions from the use of electricity

Workplaces generally use electricity for lighting and equipment. Electricity generation comes from a range of sources, including nuclear and renewables. However, in the UK around 75% is produced through the combustion of fossil fuels. Although the organisation is not directly in control of the emissions, by purchasing the electricity it is indirectly responsible for the release of CO₂.

3. Indirect emissions from products and services

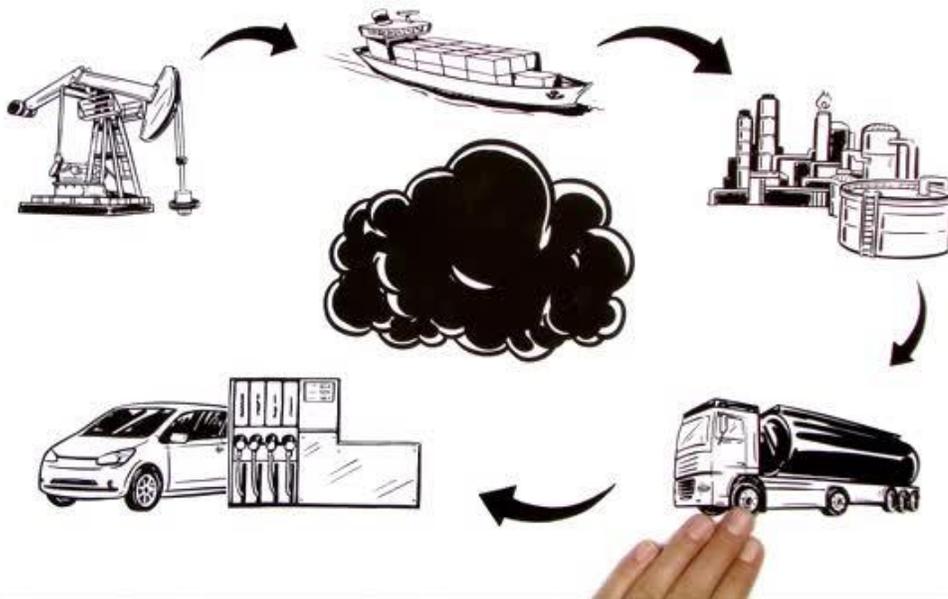
Each product or service that is purchased by an organisation is responsible for emissions. As a result, the way the organisation uses products and services affects its carbon footprint.

For example, a company that manufactures a product is indirectly responsible for the carbon that is emitted in the preparation and transport of the raw materials. Downstream emissions from the use and disposal of products can also be indirectly attributed to the organisation.

Why calculate a carbon footprint?

There are typically two main reasons for wanting to calculate a carbon footprint:

- To manage the footprint and reduce emissions over time
- To report the footprint accurately to a third party.



Footprinting for management of emissions

Calculating an organisation's carbon footprint can be an effective tool for ongoing energy and environmental management.

If this is the main reason that an organisation requires a carbon footprint, it is generally enough to understand and quantify the key emissions sources through a basic process, typically including gas, electricity and transport.

This approach is relatively quick and straightforward. Having quantified the emissions, opportunities for reduction can be identified and prioritised, focusing on the areas of greatest savings potential.

Footprinting for accurate reporting

Organisations increasingly want to calculate their carbon footprint in detail for public disclosure in a variety of contexts:

- For CSR or marketing purposes
- To fulfil requests from business or retail customers, or from investors
- To ascertain what level of emissions they need to offset in order to become 'carbon neutral'.

Calculating a carbon footprint

When calculating a basic carbon footprint it is common to exclude sources of indirect emissions which your organisation does not control, for example emissions from waste, from the supply chain or from employee travel on public transport or airlines.

Once the basic carbon footprint has been established, it is then possible to take steps to manage the emissions:

- Set and agree efficiency or emissions reduction targets
- Identify likely opportunities for efficiency or emissions reduction
- Prioritise the opportunities, based on environmental or financial criteria
- Take action to implement the opportunities

- Monitor the performance of the actions taken and improve as necessary

Producing a full carbon footprint

Accurate calculation of your carbon footprint requires a more detailed approach and may require specialist advice.

The five steps below show a systematic approach, suitable for producing an accurate carbon footprint:

1. Define the methodology
2. Specify the boundary and scope of coverage
3. Collect emissions data and calculate the footprint
4. Verify results (optional)
5. Disclose the footprint (optional).

HOW TO CALCULATE



Carbon footprint calculations for energy



Energy carbon calculations use the selected base unit of measure.

The following calculations are used for scope 1 (direct) energy emissions:

$$\begin{aligned} \text{CO}_2 &= (\text{Total Amount} * (\text{CO}_2 \text{ Emission Factor} * \text{Heating Value}) * \text{Density}) \\ \text{CH}_4 &= ((\text{Total Amount} * (\text{CH}_4 \text{ Emission Factor} * \text{Heating Value}) * \text{Density}) * \\ &\text{GWP CH}_4 \text{ Conversion}) \\ \text{N}_2\text{O} &= ((\text{Total Amount} * (\text{N}_2\text{O} \text{ Emission Factor} * \text{Heating Value}) * \text{Density}) * \\ &\text{GWP N}_2\text{O} \text{ Conversion}) \end{aligned}$$

The following calculations are used for scope 2 (indirect) energy emissions:

$CO_2 = ((\text{Total Amount Used Based on Occupancy} * \text{Emission Factor}))$

$CH_4 = ((\text{Total Amount Used Based on Occupancy} * \text{CH}_4 \text{ Emission Factor}) * \text{GWP CH}_4 \text{ Conversion})$

$N_2O = ((\text{Total Amount Used Based on Occupancy} * \text{N}_2O \text{ Emission Factor}) * \text{GWP N}_2O \text{ Conversion})$

Carbon footprint calculations for travel

If the company owns the vehicle, emissions are calculated by the distance that is travelled. If the company does not own the vehicle, emissions are calculated by usage.

The following calculations are used for scope 1 (direct) travel emissions for vehicles that are owned by the company:



$CO_2 = ((\text{Distance Travelled} + \text{Fuel Usage}) * \text{Emission Factor})$

$CH_4 = (((\text{Distance Travelled} + \text{Fuel Usage}) * \text{CH}_4 \text{ Emission Factor}) * \text{GWP CH}_4 \text{ Conversion})$

$N_2O = (((\text{Distance Travelled} + \text{Fuel Usage}) * \text{N}_2O \text{ Emission Factor}) * \text{GWP N}_2O \text{ Conversion})$

The following calculations are used for scope 1 (direct) travel emissions for vehicles that are not owned by the company:

$CO_2 = ((\text{Distance Travelled} + \text{Fuel Usage}) * (\text{Emission Factor} * \text{Heating Value}) * \text{Density})$

$CH_4 = (((\text{Distance Travelled} + \text{Fuel Usage}) * (\text{CH}_4 \text{ Emission Factor} * \text{Heating Value}) * \text{Density}) * \text{GWP CH}_4 \text{ Conversion})$

$N_2O = (((\text{Distance Travelled} + \text{Fuel Usage}) * (\text{N}_2O \text{ Emission Factor} * \text{Heating Value}) * \text{Density}) * \text{GWP N}_2O \text{ Conversion})$

The following calculations are used for scope 3 (indirect) travel emissions for vehicles that are owned by the company:

Travel Carbon Footprint = (Emission Factor * Distance Travelled)

The following calculations are used for scope 3 (indirect) travel emissions for vehicles that are not owned by the company:

Travel Carbon Footprint = ((Distance Travelled + Fuel Usage) * Emission Factor * Heating Value * Density)

Carbon footprint calculations for other emissions

The following calculations are used for other emissions:

Other Emissions = Total Quantity * 0.001102 * GWP Emission Factor

REDUCING CARBON FOOTPRINT

10 TIPS FOR REDUCING YOUR CARBON FOOTPRINT



ILLUSTRATION BY JULIE SALVATIERRA / CONTRIBUTOR

Simple show explains the Carbon Footprint

https://www.youtube.com/watch?v=8q7_aV8eLUE