

GLOSSARY OF CLIMATE TERMS

AIR POLLUTION - Defined by the [IPCC](#) as “the degradation of air quality with negative effects on human health or the natural or built environment due to the introduction into the atmosphere of substances (gases, aerosols) which have a direct (primary pollutants) or indirect (secondary pollutants) harmful effect.”

BIODIVERSITY - Biological diversity means the variability among living organisms from all sources, including, inter alia, terrestrial, marine and other aquatic *ecosystems* and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems (UN, 1992).

CARBON DIOXIDE (CO₂) - Carbon dioxide, (CO₂), a colourless gas, is one of the most important [greenhouse gases](#) linked to [global warming](#), but it is a minor component of Earth’s atmosphere (about 3 volumes in 10,000), formed in combustion of carbon-containing materials, in fermentation, and in respiration of animals and employed by plants in the photosynthesis of carbohydrates.

Carbon dioxide (CO₂) is the most common [greenhouse gas](#) (GHG) emitted by human activities, in terms of the quantity released and the total impact on global warming. As a result, the term “CO₂” is sometimes used as a shorthand expression for all greenhouse gases, however, this can cause confusion, and a more accurate way of referring to a number of GHGs collectively is to use the term “carbon dioxide equivalent” or “CO₂e” (explained below).¹

CARBON DIOXIDE EQUIVALENTS (CO₂e) - “Carbon dioxide equivalent” or “CO₂e” is a term for describing different greenhouse gases in a common unit. For any quantity and type of greenhouse gas, CO₂e signifies the amount of CO₂ which would have the equivalent global warming impact.

Greenhouse Gas Included Within the Term CO₂e

1. Carbon dioxide (CO₂)
2. Methane (CH₄)
3. Nitrous oxide(N₂O)
4. Hydrofluorocarbons (HFCs)
5. Perfluorocarbons (PFCs)

¹ <https://www.britannica.com/science/carbon-dioxide>

6. Sulfur hexafluoride (SF₆)

7. Nitrogen trifluoride (NF₃)

CO₂e allows “bundles” of greenhouse gases to be expressed as a single number; and it allows different bundles of GHGs to be easily compared (in terms of their total global warming impact). When comparing CO₂e totals it is important to verify that the same GHGs are included in the totals being compared, to be sure that like-for-like comparisons can be made.²

CARBON FOOTPRINT- A carbon footprint is the total set of greenhouse gas (GHG) emissions caused by an organisation, event, service or product over a set period, typically 1 year. For simplicity of reporting, it is often expressed in terms of the amount of carbon dioxide (CO₂), or its equivalent of other GHGs (CO₂e), emitted.³

CARBON REMOVAL - Carbon dioxide removal (CDR), also known as greenhouse gas removal, is a process in which CO₂ is removed from the atmosphere and sequestered for long periods of time.

CDR methods include afforestation, agricultural practices that sequester carbon in soils, bioenergy with carbon capture and storage, ocean fertilization, enhanced weathering, and direct air capture when combined with storage. To assess whether net negative emissions are achieved by a particular process, comprehensive life cycle analysis of the process must be performed and certified by certification bodies like the [Gold Standard](#).

CARBON OFFSET - A carbon offset broadly refers to a reduction in GHG emissions – or an increase in carbon storage (e.g., through land restoration or the planting of trees) – that is used to compensate for emissions that occur elsewhere. Carbon offsets avoid, reduce or remove carbon from the atmosphere.

CARBON NEUTRAL - A carbon neutral business, product or service can be achieved when the totality of greenhouse gas emissions (CO₂e) emitted are offset by verified carbon offset projects. Carbon offset projects make a decisive contribution to combating global warming by demonstrably saving greenhouse gases. These projects can take the form of forest conservation, reforestation or the development of renewable energy.

² <https://ecometrica.com/assets/GHGs-CO2-CO2e-and-Carbon-What-Do-These-Mean-v2.1.pdf>

³ <https://redshawadvisors.com/glossary/>

CLIMATE NEUTRAL - Can be used synonymously with the term “Carbon Neutral” as described above. In some cases, Carbon Neutral has been used to only refer to carbon dioxide whereas Climate Neutral makes the inclusion of all greenhouse gas emissions clear.

CLIMATE POSITIVE / CARBON NEGATIVE - Climate positive means that an activity goes beyond achieving net zero carbon emissions to create an environmental benefit by removing additional carbon dioxide from the atmosphere although the company/product still causes carbon dioxide emissions. This term has yet to be clearly defined by any international body or standard. There is confusion around this term as although you may offset the entirety of your carbon emissions as a company, you have still been producing carbon emissions - no matter how much carbon offset projects you invest in. This could mislead consumers into believing that buying from a climate positive or carbon negative company/product has a beneficial impact on the planet which is untrue. Confusingly, carbon negative has been used interchangeably with Climate Positive.⁴

COMBINED HEAT AND POWER (CHP) PARTNERSHIP - CHP is an energy efficient technology that generates electricity and captures the heat that would otherwise be wasted to provide useful thermal energy—such as steam or hot water—that can be used for space heating, cooling, domestic hot water and industrial processes. CHP is typically located at facilities where there is a need for both electricity and thermal energy.⁵

CORPORATE CARBON FOOTPRINT - A Corporate Carbon Footprint (CCF) includes all emissions that are influenced by a company’s decision. This means that in addition to direct emissions, all relevant indirect emissions are also included. Depending on the system boundaries selected, for manufacturing company this would include value chain-related emissions. This can include all emissions from the supply chain, logistics, usage phase and disposal of all products. The Corporate Carbon Footprint is usually determined for a specific period, such as a calendar year, and changes between reporting periods.⁶

EMBODIED CARBON - Embodied carbon is the carbon emissions emitted in the creation of any product or service over its entire lifetime.⁷

⁴ <https://www.fastcompany.com/40583176/climate-positive-carbon-neutral-carbon-negative-what-do-they-mean>

⁵ www.epa.gov/chp

⁶ www.planetly.com.

⁷ <https://icarb.org/carbon-accounting-glossary/>

GLOBAL WARMING POTENTIAL - Global warming potential (GWP) describes how much impact a gas will have on atmospheric warming over a period of 100 years compared to carbon dioxide. Each greenhouse gas has a different atmospheric warming impact, and some gases stay in the atmosphere for longer than others.

GWP was developed to allow comparisons of the global warming impacts of different gases. Specifically, it is a measure of how much energy the emissions of 1 ton of a gas will absorb over a given period, compared to the emissions of 1 ton of carbon dioxide (CO₂). The larger the GWP, the more that a given gas warms the Earth compared to CO₂ over that period.

GWPs provide a common unit of measure, which allows analysts to add up emissions estimates of different gases (e.g., to compile a national GHG inventory), and allows policymakers to compare emissions reduction opportunities across sectors and gases.⁸

GREENHOUSE GAS EMISSIONS - A greenhouse gas (GHG) is any gas in the atmosphere which absorbs and re-emits heat, and thereby keeps the planet's atmosphere warmer than it otherwise would be. The main GHGs in the Earth's atmosphere are water vapour, carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O) and ozone.

GHGs occur naturally in the Earth's atmosphere, but human activities, such as the burning of fossil fuels, are increasing the levels of GHG's in the atmosphere to abnormal levels.

The Kyoto Protocol is an international treaty for controlling the release of GHGs from human activities.⁹

⁸ www.epa.gov/ghgemissions

⁹ www.ecometrica.com

GREENHOUSE GAS PROTOCOL- The GHG protocol is an internationally recognized standard for the accounting of corporate emissions. It was developed by the world resources institute (WRI) and the world business council for sustainable development (WBCSD). There are five basic principles to follow when preparing a corporate carbon footprint:

- **Relevance:** the principle of relevance dictates that all material sources of emissions must be considered when preparing a carbon footprint for a company and that the report should be useful for decision-making both inside and outside the company.
- **Completeness:** the principle of completeness states that all relevant emission sources within the system boundaries must be considered.
- **Consistency:** to enable comparability of results over time, the accounting methodologies and system boundaries should be recorded and maintained in subsequent years. Potential changes in methodology and system boundaries must be identified and justified.
- **Accuracy:** bias and uncertainty should be reduced as much as possible so that the results provide a sound basis for decision-making.
- **Transparency:** results should be presented in a transparent and understandable manner.

KYOTO PROTOCOL - The Kyoto Protocol to the United Nations Framework Convention on Climate Change (UNFCCC) is an international treaty adopted in December 1997 in Kyoto, Japan, at the Third Session of the Conference of the Parties (COP3) to the UNFCCC. It works by committing industrialized countries and economies in transition to limit and reduce greenhouse gases (GHG) emissions in accordance with agreed individual targets. The Convention itself only asks those countries to adopt policies and measures on mitigation and to report periodically.¹⁰

LIFE CYCLE ASSESSMENT - Is the compilation and evaluation of the inputs, outputs and the potential environmental impacts of a product or service throughout its life cycle. During a LCA, you evaluate the potential environmental impacts throughout the entire life cycle of a product (production, distribution, use and end-of-life phases) or service. This also includes the upstream (e.g., suppliers) and downstream (e.g., waste management) processes associated with the production (e.g., production of raw, auxiliary and operating materials), use phase, and disposal (e.g., waste incineration).

The International Organization for Standardization provides guidelines and requirements for conducting a Life Cycle Assessment according to ISO 14040 and 14044.¹¹

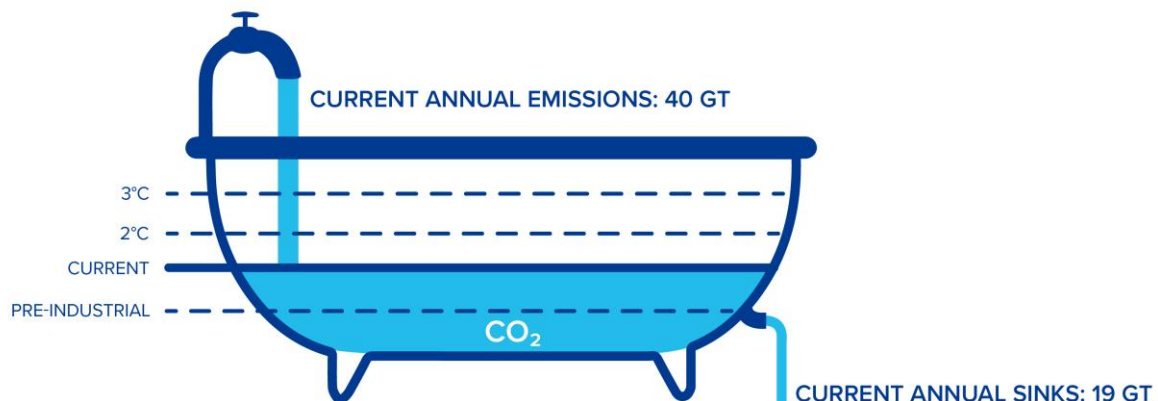
¹⁰ www.unfccc.int/kyoto_protocol

¹¹ www.sphera.com/glossary/what-is-a-life-cycle-assessment-lca/

For more detailed information on LCA terminology, click [here](#).

NET ZERO - Net zero refers to a state in which the greenhouse gases emitted into the atmosphere are balanced by the equivalent amount of greenhouse gas removals.¹² The aim is to have a long-term plan to reduce emissions as close to zero as possible and to remove the residual emissions.

Net Zero for companies should include a reduction pathway that is aligned with science. As defined by the Science Based Targets Initiative Net Zero means “Achieving a state in which the activities within the value chain of a company result in no net impact on the climate from greenhouse gas emissions. This is achieved by reducing value chain greenhouse gas emissions, in line with 1.5°C pathways, and by balancing the impact of any remaining greenhouse gas emissions with a proper amount of carbon removals.”¹³



Think about it like a bath – turn on the tap and you add more water (or CO₂e), pull out the plug and water sinks out through the drain. The amount of water in the bath depends on both the input from the taps and the output via the drain. To keep the amount of water in the bath at the same level, you need to make sure that the input and output are balanced.

The IPCC defines Net Zero as follows: “Net zero emissions are achieved when anthropogenic emissions of greenhouse gases to the atmosphere are balanced by anthropogenic removals over a specified period.” This therefore means that you could technically achieve this by investing in appropriate amounts of removals to cover a business’ entire footprint for 2020 retrospectively as they wait for this year to finish in order to start measuring the carbon footprint of 2021.

The Science Based Targets Initiative defines Net Zero as having the two following principles ([SBTi](#), Jan 2021):

¹² <https://www.netzeroclimate.org/what-is-net-zero/>

¹³ <https://sciencebasedtargets.org/resources/legacy/2019/10/Towards-a-science-based-approach-to-climate-neutrality-in-the-corporate-sector-Draft-for-comments.pdf>

- Achieving a scale of value chain emissions reductions consistent with the depth of abatement in pathways that limit warming to 1.5°C with no or low overshoot
- Neutralising the impact of any source of residual emissions that is unfeasible to eliminate by permanently removing an equivalent volume of atmospheric CO₂.

LIFE CYCLE ASSESSMENT (LCA) VS CARBON FOOTPRINT - The difference between an LCA and a Carbon footprint are related to the impact categories which are studied. A Carbon Footprint is focused on one environmental impact category: greenhouse gas emissions (CO₂). Meanwhile an LCA can take more impact categories into account, such as land use, water use and ocean acidification.

A carbon footprint analysis, also known as a greenhouse gas (GHG) emissions assessment, evaluates the greenhouse gas emissions caused by the manufacture of a product or any given activity that contributes to global warming.

A life cycle assessment systematically evaluates multiple environmental impacts of a product, activity, or process over its entire life cycle. Carbon footprint analysis is a subset of a complete life cycle assessment of a product, activity, or process.¹⁴

PARIS AGREEMENT - The Paris Agreement under the United Nations Framework Convention on Climate Change (UNFCCC) was adopted on December 2015 in Paris, France, at the 21st session of the Conference of the Parties (COP) to the UNFCCC.

One of the goals of the Paris Agreement is “*holding the increase in the global average temperature to well below 2°C above pre-industrial levels and pursuing efforts to limit the temperature increase to 1.5°C above pre-industrial levels*”, recognising that this would significantly reduce the risks and impacts of climate change. Additionally, the Agreement aims to strengthen the ability of countries to deal with the impacts of climate change. The Paris Agreement is intended to become fully effective in 2020.

POWER PURCHASE AGREEMENT - A Power Purchase Agreement (PPA) is a long-term contract under which a business agrees to buy electricity directly from a renewable energy generator. Power Purchase Agreements supply financial certainty to you and the project developer, which removes a significant roadblock to building new renewable facilities.¹⁵

PRODUCT CARBON FOOTPRINT - A Product Carbon Footprint (PCF) is the most established method for determining the climate impact of a product. Throughout the entire life cycle of

¹⁴ www.thebalancesmb.com

¹⁵ www.group.rwe/en*

a product - from raw material extraction to recycling or disposal - climate-relevant impacts arise in the form of greenhouse gas emissions. The Product Carbon Footprint helps to identify, analyse and, with the right measures, reduce or (ideally) completely avoid these impacts.

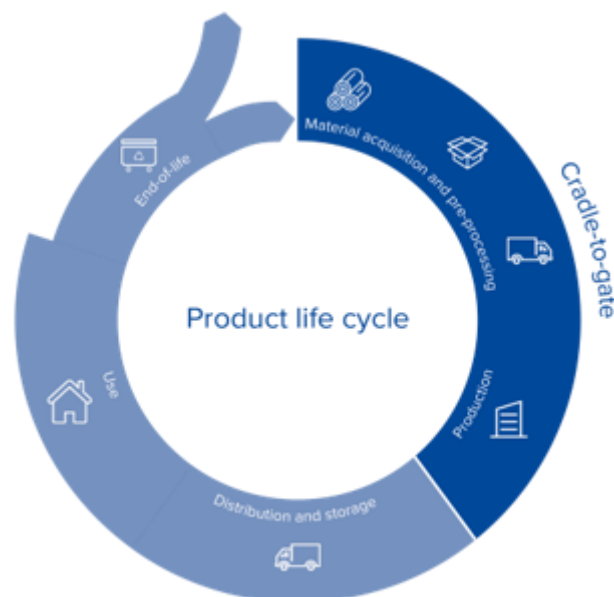
Within PCFs you can decide what system boundaries you set and therefore what you calculate. You can decide to consider the full life cycle analysis, do an analysis without the end of life of the product or without the usage phase.

CRADLE-TO-CRADLE ANALYSIS: The life cycle of a product that can be reused and recycled without loss of material integrity.

CRADLE-TO-GATE ANALYSIS: The life cycle of a product from generation to when the product leaves the reporting company, i.e. at the factory gate.

CRADLE TO CUSTOMER: The life cycle of a produce from cradle to delivery to the customer. This includes outbound logistics. The end of life of the product is included whilst the usage phase by the customer isn't.

CRADLE-TO-GRAVE ANALYSIS: The life cycle of a product from generation to disposal.¹⁶



RENEWABLE ENERGY GUARANTEES OF ORIGIN (REGO) - The REGO (Renewable Energy Guarantees of Origin) scheme supplies transparency to consumers about the proportion of

¹⁶ www.ifu.com

electricity that supplier's source from renewable generation. All EU (European Union) Member States must have such a scheme available to businesses.¹⁷

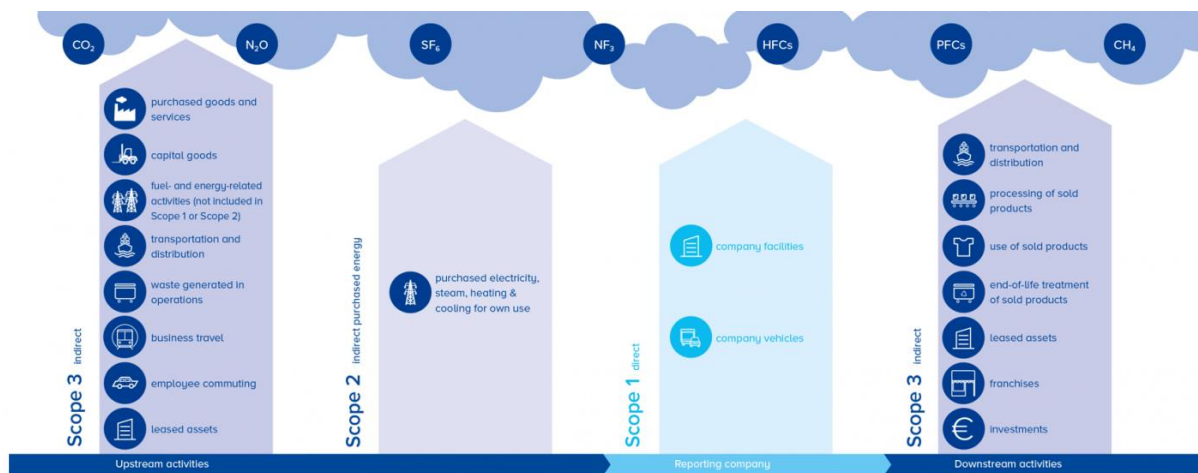
SCIENCE BASED TARGETS - Science-based targets are a set of goals developed by a business to provide it with a clear route to reduce greenhouse gas emissions. An emissions reduction target is defined as science-based if it is developed in line with the scale of reductions needed to keep global warming below 2C° from pre-industrial levels. More ambitious business' also have the option of setting targets that keep global warming levels to below 1.5C°.¹⁸

SCOPE EMISSIONS - Carbon emissions are broken down into three categories by the [Greenhouse Gas Protocol](#) to better understand the source.

Scope 1 – All Direct Emissions from the activities of an organisation or under their control. Including fuel combustion on site such as gas boilers, fleet vehicles and air-conditioning leaks.

Scope 2 – Indirect Emissions from electricity bought and used by the organisation. Emissions are created during the production of the energy and eventually used by the organisation.

Scope 3 – All Other Indirect Emissions from activities of the organisation, occurring from sources that they do not own or control. These are usually the greatest share of the carbon footprint, covering emissions associated with business travel, procurement, waste and water.¹⁹



¹⁷ www.ofgem.gov.uk/environmental-programmes/rego

¹⁸ www.edie.net/definition/Science-based-targets.

¹⁹ www.compareyourfootprint.com

SUSTAINABLE DEVELOPMENT GOALS - The SDGs (Sustainable Development Goals) are the 17 global goals for development for all countries set up by the United Nations through a participatory process. These goals include ending poverty and hunger; ensuring health and well-being, education, gender equality, clean water and energy; building and ensuring resilient and sustainable infrastructure, cities and consumption; reducing inequalities; protecting land and water ecosystems; promoting peace, justice and partnerships; and taking urgent action on climate change.²⁰



Figure 4 Sourced from the [United Nations](https://www.un.org/sustainabledevelopment/)

RADIATIVE FORCING- Due to the high-altitude airplanes reach during cruising phase, emissions occur in very different parts of the earth’s atmosphere compared to all other human made carbon emissions. In this context, radiative forcing describes the additional indirect effect that the combustion of kerosene at high altitudes has on global warming due to the disbalance between the energy absorbed by the Earth and energy radiated back to space that it causes. The so-called radiative forcing index (RFI) attempts to account for the additional impact on global warming. The IPCC (Intergovernmental Panel on Climate Change) recommends a factor between 1.9 and 4.7. ClimatePartner uses a radiative forcing index of 3.

RENEWABLE ENERGY CERTIFICATES (RECS) - Renewable Energy Certificates (RECs) are a market-based instrument that certifies the purchaser of electricity owns one megawatt-hour (MWh) of electricity generated from a renewable energy resource. Once the power provider has fed the energy into the grid, the REC received can then be sold on the open

²⁰ www.sdg.un.org/goals

market as an energy commodity. RECs earned may be sold, for example, to other entities that are polluting as a carbon credit to offset their emissions.²¹

RESIDUAL EMISSIONS - Reducing emissions can be achieved in a variety of ways. Business' can see reductions of emissions by up to 70% yet will find it difficult to decrease carbon emissions down to zero.

This leaves a carbon gap with difficult to remove residual emissions across a business' activities. Residual emissions are any emissions which stay after 'all technically and economically possible opportunities to reduce emissions in all covered scopes and sectors have been implemented'. These are difficult to mitigate with short term solutions and hinder any further progress towards achieving carbon neutrality.²²

This means that to achieve a 1.5°C aligned Science Based Target and journey towards Net Zero, business' must reduce their emissions till it's no longer possible and the emissions removed through carbon removal projects are truly residual.

UNITED NATIONS FRAMEWORK CONVENTION ON CLIMATE CHANGE (UNFCCC) - The UNFCCC was adopted in May 1992 and opened for signature at the 1992 Earth Summit in Rio de Janeiro. It entered into force in March 1994 and as of May 2018 had 197 Parties (196 States and the European Union). The Convention's ultimate objective is the 'stabilisation of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system.' The provisions of the Convention are pursued and implemented by two treaties: the Kyoto Protocol and the Paris Agreement.

UPSTREAM FUEL AND ENERGY EMISSIONS- Emissions associated with extraction, production, and transportation of fuels consumed in the generation of electricity and heating or directly by the company (e.g. in company vehicles).

VOLUNTARY CARBON MARKET - The segment of the carbon credit market for carbon offset transactions outside of government-related regulatory schemes i.e. offsets purchased by organisations wishing to offset their carbon on a voluntary basis.

²¹ www.investopedia.com/terms

²² www.negativeemissionscentre.co.uk.