

Guildford Borough Council: Glossary of Climate Change terms

Adaptation: In human systems, the process of adjustment to actual or expected climate and its effects, in order to moderate harm or exploit beneficial opportunities. ([IPCC](#))

Baseline:

- Global emissions: Global warming is expressed as an increase against 'pre-industrial baseline'. Pre-industrial refers to an approximation of the combined air and sea surface temperatures averaged from 1850-1900. The 1.5°C temperature goal is related to this temperature. Currently the temperature is 1°C warmer than the baseline. ([Our World in Data](#), [IPCC](#))
- Council-owned emissions: The baseline for our emissions is 2009/10 as this is the first year the council's emissions were calculated. NB. Subject to changes in emissions boundaries a year-on-year comparison is not always accurate.

Carbon budgets: The total amount of carbon that can be released whilst maintaining our ability to prevent global warming exceeding 1.5°C (above pre-industrial levels (see 'Baseline')). This can be broken down geographically into 'fair contributions'. ([Carbon Tracker](#), [Tyndall Centre](#))

Carbon intensity (/ Emissions factor): The number of grams of carbon dioxide equivalent (CO₂e) that it takes to make one unit of electricity a kilowatt per hour (kW/hour). ([National Grid](#))

Carbon footprint: the amount of carbon dioxide released into the atmosphere as a result of the activities of a particular individual, organization, or community. ([Oxford Languages Dictionary](#))

Carbon literacy: being aware of the impact of everyday activities on the climate, and knowing what steps can be taken to reduce emissions as an individual, a community group, or an organisation, and why it's important that we all take these steps. ([Carbon Literacy Project](#))

Carbon pricing: An approach to reducing carbon emissions (also referred to as greenhouse gas, or GHG, emissions) that uses market mechanisms to pass the cost of emitting on to emitters. An Internal Carbon Price is a decision-making tool that organisations use to understand their exposure to carbon emissions-related risks and guide their business decisions and investments¹. ([Carbon Pricing Leadership Coalition](#))

Circular Economy: an alternative to a traditional linear economy (make, use, dispose) in which we keep resources in use for as long as possible, extract the maximum value from them whilst in use, then recover and regenerate products and materials at the end of each service life². ([WRAP](#))

Climate hazards: short-, medium-, or long-term climate events that have the potential to cause damage or harm to humans and natural systems. These include meteorological, climatological, hydrological, geophysical or biological events, and are expected to increase in frequency and intensity as a result of climate change. ([C40Cities](#))

(Climate action) Co-benefits: The positive effects that a policy or measure aimed at climate change might have on other objectives, thereby increasing the total benefits for society or the environment. Examples include health & wellbeing, economic, social equality, and resilience. ([IPCC](#))

Consumption-based emissions (vs. production-based emissions): those emissions occurring from the products and services that people consume. This includes a combination of different emissions sources ranging from energy use, transportation, and waste management, to the supply chain emissions of the goods and services that households in a city consume. This excludes goods and services exported and consumption by visitors ([C40Cities](#))

Decarbonisation: A net reduction in carbon emissions by increasing the share of low-carbon energy sources, particularly renewables, and correspondingly reducing the use of fossil fuels.

Deep decarbonisation: Long-term decarbonisation pathways that enable a societal transition to net-zero. Focus of this is the transformation of industry to deliver the end goal of net zero and to work back towards the present from that standpoint. ([DDP](#))

Demand/ consumption reduction: Reducing the volume of energy required to power an operation or service. For heat this relates to minimizing heat loss through energy efficiency, for electricity this is achieved through alternative equipment or processes.

Ecosystem services: outputs, conditions, or processes of natural systems that directly or indirectly benefit humans or enhance social welfare. Ecosystem services can benefit people in many ways, either directly or as inputs into the production of other goods and services³. ([Britannica Dictionary](#))

(Carbon) Emissions: Greenhouse gas emissions standardised as carbon dioxide equivalent (CO₂e) to allow for the different the greenhouse warming potential of different greenhouse gases.

Emissions boundaries: Organisational boundaries for the purposes of accounting and reporting Greenhouse gas emissions. ([WRI](#))

Emissions reduction: Reducing carbon emissions from a given scope, achieved by decreasing demand/ consumption and/ or decreasing the carbon intensity of the remaining consumption.

Emissions scenarios: Storylines which illustrate how the world may change, these help us understand the key uncertainties and driving forces that will affect emissions in the future. ([Tyndall Centre](#))

Fuel poverty: a household is said to be fuel poor if it has above-average energy costs, and if paying those costs would push it below the poverty line as far as its remaining income was concerned. ([DECC](#))

Greenhouse Gas Conversion Factors: Used to change consumption units Greenhouse gas equivalent units.

Gross-zero emissions/ Absolute zero emissions: Reduction of emissions from all sources uniformly to zero. ([Grantham Institute, LSE](#))

Location-based emissions factors/ grid emissions intensity (vs. Market-based factors): the average emissions intensity of grids on which energy consumption occurs (therefore using grid-average emission factor data). ([GHG Protocol](#))

Low-carbon technologies: Technologies which generate power at a lower carbon intensity than traditional fossil fuel applications, this include renewables (which have a very low

carbon intensity) as well as fuels such as Combined heat and power (CHP), biomass and nuclear.

Market based emissions factors (vs. Location-based factors): reflects emissions from electricity that companies have purposefully chosen (i.e. derived from contractual arrangements). ([GHG Protocol](#))

Mitigation: A human intervention to reduce emissions or enhance the sinks of greenhouse gases. ([IPCC](#))

Natural capital: another term for the stock of renewable and non-renewable resources (e.g. plants, animals, air, water, soils, minerals) that combine to yield a flow of benefits to people. ([Natural Capital Coalition](#))

Negative emissions: Emissions below zero through carbon sinks, most straightforwardly, this can involve afforestation (planting new forests) and reforestation, may also include engineered sinks although negative emissions technologies are immature technologies⁴. ([Grantham Institute, LSE](#))

Net zero/ carbon neutral: an overall balance between emissions produced and emissions taken out of the atmosphere. In a *net-zero* scenario the residual emissions from these sectors are allowed as long as they are offset by removing emissions using natural or engineered sinks – gross negative emissions. In some instances ‘carbon neutral’ is used to imply greater amounts of offsetting (higher residual emissions) perhaps alongside a longer-term net zero goal (lower residual emissions and therefore less offsetting). ([Grantham Institute, LSE](#))

Offsets: a mechanism for cancelling out residual emissions by developing, funding, or financing projects that avoid or sequester GHG emissions outside the city boundary. ([C40Cities](#)).

Production-based emissions (vs. consumption-based emissions): Emissions measured on the basis of ‘production’, i.e. those where the emissions are physically emitted within the given location (i.e. produced). Normally measured through fossil fuel consumption.

Residual emissions/ Hard-to-decarbonise emissions: emissions remaining after all technically and economically feasible opportunities to reduce emissions in all covered scopes and sectors have been implemented. Scientifically these include aviation, shipping, agriculture, steel and cement, however in parlance these ‘hard-to-decarbonise emissions’ are sometimes framed as a sub-set of ‘residual emissions’ which is often used to refer to all remaining emissions (see ‘carbon neutral’) ([C40Cities](#))

Resilience: Preparations for and adapting to changing weather to protect infrastructure, networks and members of the community and so help mitigate the effects of climate hazards that are associated with climate change. This includes anticipating and responding to climate hazards. ([Tyndall Centre](#))

Scope 1 emissions/ Direct emissions: emissions from activities owned or controlled by the reporting organisation. Examples of Scope 1 emissions include emissions from combustion in owned or controlled boilers, furnaces and vehicles⁵. ([Gov.uk](#))

Scope 2 emissions/ Energy indirect emissions: emissions released into the atmosphere that are directly associated with the reporting organisation’s consumption of purchased electricity (also include purchases of heat, steam and cooling, in those forms (e.g. not as gas as this is purchased *for* heating, these are less common). These indirect emissions are a

consequence of the reporting organisation's energy use but occur at sources you do not own or control⁵. ([Gov.uk](#))

Scope 3/ Other indirect/ value chain emissions: emissions which are a consequence of the reporting organisation's actions that occur at sources they do not own or control and that are not classed as Scope 2 emissions. Examples of Scope 3 emissions are business travel by means not owned or controlled by the organisation, waste disposal, materials or products the organisation purchases (including the products value chain)⁵. ([Gov.uk](#))

Separation approach: Separation of negative emissions targets and accounting for energy demand reduction, rather than combining them in a single "net-zero" goal, this supports the management of the twin goals (negative emissions and emissions reductions). ([Carbon Brief](#))

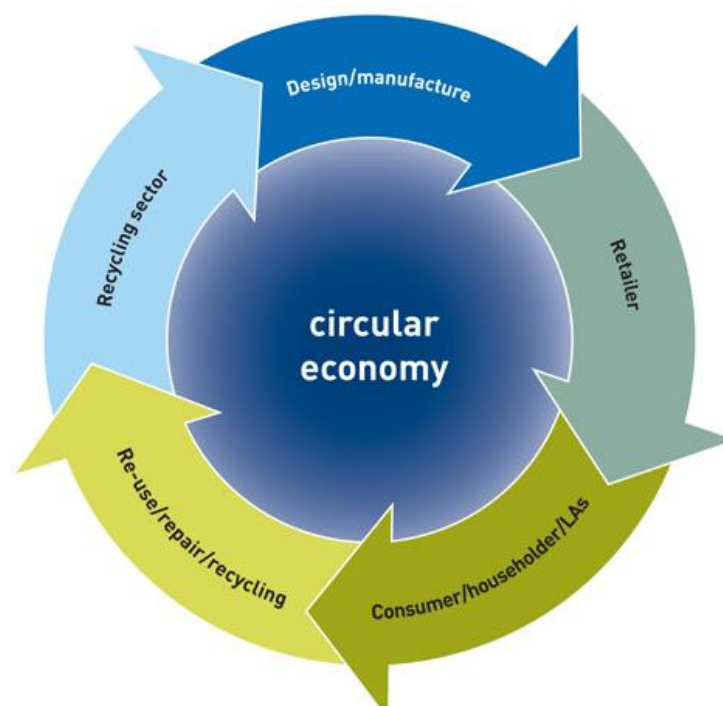
Sustainability: A dynamic process that guarantees the persistence of natural and human systems in an equitable manner. This differs from climate change through its inclusion of additional issues related to inter-generational equity such as plastic pollution and land designations. ([IPCC](#))

Waste-to-energy/ Energy-to-waste: There are several different ways of generating energy from waste which do not require fossil fuel consumption but all of which require combustion to generate electricity. Whilst considered an efficient use of waste, energy from waste is not considered renewable due to the carbon emissions resulting from combustion and also due to their linear, rather than, circular use of materials (see circular economy). ([Energy Saving Trust](#))

¹ An Internal Carbon Price could be based on any of, or a combination of:

- The social cost of carbon;
- The market price of carbon, such as that in the EU Emissions Trading Scheme;
- The cost of abatement;
- The cost of purchasing offsets.

² Diagram of the circular economy ([WRAP](#), also [Ellen MacArthur Foundation](#))



³ Ecosystem services may or may not have a monetary value to individuals or society at large. They are frequently classified as (1) supporting services such as productivity or biodiversity maintenance, (2) provisioning services such as food or fibre, (3) regulating services such as climate regulation or carbon sequestration, and (4) cultural services such as tourism or spiritual and aesthetic appreciation. (IPCC)

⁴ Negative emission technologies (also known as *Anthropogenic removals*): some of the most commonly used involve carbon capture and storage (CCS). This works by capturing CO₂ before it is released into the atmosphere, by removing carbon from the gases produced by burning fossil fuels, or using hydrogen or oxygen in the process. Once the CO₂ has been captured, it is compressed into liquid state and transported so that it can then be pumped underground, usually at depths of 1km or more, to be stored into depleted oil and gas reservoirs, coalbeds or deep saline aquifers. The technology can capture up to 90% of CO₂ released by burning fossil fuels in electricity generation and industrial processes such as cement production.

Combining these approaches, bioenergy with carbon capture and storage (BECCS) is the process of growing plants, crops or trees, harvesting them for energy generation and then capturing the carbon given off so it can be stored underground.

In addition, Direct Air Capture (DAC) removes carbon dioxide directly from the air to convert it into oxygen and store the carbon. This has historically been used in closed environments where oxygen is not available, such as submarines and space craft, to remove CO₂ from the air before concentrations become too high for humans. However, there are still real questions about how economically viable this technology currently is at scale, meaning it is not a silver bullet. (Grantham Institute, LSE)

5: Illustration of emissions scopes (GHG Protocol)

