**Tynedale Transformed**

**Climate Change**

**Glossary of Key Words and Terms**

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**Tynedale Transformed hope the following glossary of key words and terms set out in alphabetical order, will help your learning and navigation around this debate and support necessary individual and community actions.**

One of the problems with understanding climate change is the language used, and it is not just the scientific concepts, though they can be testing. Terminology around climate change is not always clear, understood, and inclusive. **Climate change** is seen as the biggest challenge to the future of human life on Earth, and understanding the scientific **words** used to describe it can sometimes feel just as difficult. Language matters when our world and all of Earth’s resources, creatures fora and flora are at risk because of this climate crisis. Climate change is no longer considered to accurately reflect the seriousness of the situation; we increasingly hear the use of the term climate emergency, crisis or breakdown instead. All terms that aim to emphasise the urgency of the problem (“climate crisis,” “climate emergency”) or describe the alarming phenomenon driving up average temperatures (“[global warming](https://www.bloomberg.com/opinion/articles/2020-01-20/-global-warming-was-a-better-term-than-climate-change),” “global heating.”) Many of these calls come from a [good place](https://www.theguardian.com/environment/2019/may/17/why-the-guardian-is-changing-the-language-it-uses-about-the-environment). Humanity has failed to grasp the scale of the challenge facing us. The story of our changing climate can get technical. We hope this explanation of the many words used around Climate change and Climate Action will help improve our confidence to drive change for a better tomorrow.

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## **A**

**Adaptation:**  Action that helps cope with the effects of climate change - for example construction of barriers to protect against rising sea levels, or conversion to crops capable of surviving high temperatures and drought.

**Adaptation fund**: A fund for projects and programmes that help developing countries cope with the adverse effects of climate change. It is financed by a share of proceeds from emission-reduction programmes such as the Clean Development Mechanism.

**Air Pollution:**  The air we breathe is vital for our survival air pollution refers to the harmful particulates, chemicals and harmful gases that have affected the quality of the air we breathe. Although some pollutants come from natural sources as Volcanos, most is caused by humans, car aeroplanes, industry and landfills that release harmful gases and make the earth warmer.

A**lbedo effect:** Light surfaces reflect more heat than dark surfaces. This is called the albedo effect. When the Earth’s temperature dropped because its position in orbit around the Sun, the tilt of the axis, the ice sheets grew. This in turn caused more heat to be reflected and the ice sheets to expand further. (see also,Crolls Theory )

**Annex I countries:** The industrialised countries (and countries in transition to a market economy) which took on obligations to reduce their greenhouse gas emissions under the Kyoto Protocol. Their combined emissions, averaged out during the 2008-2012 period, should be 5.2% below 1990 levels.

**Annex II:**  Countries which have a special obligation under the Kyoto Protocol to provide financial resources and transfer technology to developing countries. This group is a sub-section of the Annex I countries, excluding those that, in 1992, were in transition from centrally planned to a free market economy.

**Anthropogenic Climate Change:**  Man-made climate change - climate change caused by human activity as opposed to natural processes.

**Aosis:**  The Alliance of Small Island States comprises 42 island and coastal states mostly in the Pacific and Caribbean. Members of Aosis are some of the countries likely to be hit hardest by global warming. The very existence of low-lying islands, such as the Maldives and some of the Bahamas, is threatened by rising waters.

**AR4**:The Fourth Assessment Report produced by the Intergovernmental Panel on Climate Change (IPCC) published in 2007. The report assessed and summarised the climate change situation worldwide. It concluded that it was at least 90% likely that the increase of the global average temperature since the mid-20th Century was mainly due to man's activity.

**AR5:**  The Fifth Assessment report from the Intergovernmental Panel on Climate Change (IPCC) was published over 2013 and 2014. It says scientists are 95% certain that humans are the "dominant cause" of global warming since the 1950s.

**Atmospheric aerosols:** Microscopic particles suspended in the lower atmosphere that reflect sunlight back to space. These generally have a cooling affect on the planet and can mask global warming. They play a key role in the formation of clouds, fog, precipitation and ozone depletion in the atmosphere.

## **B**

**Bali Action Plan**:A plan drawn up at the UN Climate Change Conference in Bali, in December 2007, forming part of the Bali roadmap. The action plan established a working group to define a long-term global goal for reduction of greenhouse gas emissions, and a "shared vision for long-term co-operative action" in the areas of mitigation, adaptation, finance and technology.

**Bali Roadmap**. A plan drawn up at the UN Climate Change Conference in Bali, in December 2007, to pave the way for an agreement at Copenhagen in 2009 on further efforts to reduce greenhouse gas emissions after the expiry of the Kyoto Protocol. The roadmap gave deadlines to two working groups, one working on the Bali action plan, and another discussing proposed emission reductions by Annex I countries after 2012.

**Baseline for cuts.**  The year against which countries measure their target decrease of emissions. The Kyoto Protocol uses a baseline year of 1990. Some countries prefer to use later baselines. Climate change legislation in the United States, for example, uses a 2005 baseline.

**Biofuels:** Renewable fuels made from biomass that can be used to supplement or replace the fossil fuels, including petroleum and diesel, used in transport. The two main biofuels currently used are ethanol and biodiesel. Ethanol is produced from the fermentation of sugar or starch in crops such as corn and sugar cane. Biodiesel is made from vegetable oils in crops such as soybean, or from animal fats.

**Biodiversity:** The vast number of different kinds of species in an ecosystem is called biodiversity It is the natural balance of species and habitat that work together to keep a functioning ecology. It is repeatedly threatened by human activity as deforestation, over hunting, pollution, and climate change. Many plants and wildlife species are becoming extinct, with biodiversity and populations declining worldwide,

**Bio Mass**: The weight or total quantity of living organisms of one animal or plant species (species biomass) or of all the species in a community (community biomass), commonly referred to a unit area or volume of habitat. The weight or quantity of organisms in an area at a given moment is the standing crop. The total amount of organic material produced by living organisms in a particular area ...

**Black Carbon:**  The soot that results from the incomplete combustion of fossil fuels, biofuels, and biomass (wood, animal dung, etc.). It is the most potent climate-warming aerosol. Unlike greenhouse gases, which trap infrared radiation that is already in the Earth's atmosphere, these particles absorb all wavelengths of sunlight and then re-emit this energy as infrared radiation.

**Business as usual** : A scenario used for projections of future emissions assuming no action, or no new action, is taken to mitigate the problem. Some countries are pledging not to reduce their emissions but to make reductions compared to a business-as-usual scenario. Their emissions, therefore, would increase but less than they would have done.

## **C**

**Cap and Trade:** An emission trading scheme whereby businesses or countries can buy or sell allowances to emit greenhouse gases via an exchange. The volume of allowances issued adds up to the limit, or cap, imposed by the authorities.

**Carbon Budget:** A carbon budget is the**cumulative amount of carbon dioxide (CO 2) emissions permitted over a period to keep within a certain temperature threshold.**

**Carbon capture and storage**. The collection and transport of concentrated carbon dioxide gas from large emission sources, such as power plants. The gases are then injected into deep underground reservoirs. Carbon capture is sometimes referred to as geological sequestration.

**Carbon dioxide (CO2):** The most abundant of the greenhouse gases, CO2 currently contributes to around 75% of greenhouse gas emissions. Carbon dioxide is a gas in the Earth's atmosphere. It occurs naturally and is also a by-product of human activities such as burning fossil fuels. It is the principal greenhouse gas produced by human activity.

**Carbon footprint:**  The amount of carbon emitted by an individual or organisation in each period of time, or the amount of carbon emitted during the manufacture of a product.

**Carbon intensity**: A unit of measure. The amount of carbon emitted by a country per unit of Gross Domestic Product.

**Carbon leakage:**  A term used to refer to the problem whereby industry relocates to countries where emission regimes are weaker, or non-existent.

**Carbon neutral:**  A process where there is no net release of CO2. For example, growing biomass takes CO2 out of the atmosphere, while burning it releases the gas again. The process would be carbon neutral if the amount taken out and the amount released were identical. A company or country can also achieve carbon neutrality by means of carbon offsetting.

## **Carbon offsetting:** A carbon offset is a monetary investment in a project or activity elsewhere that abates *greenhouse gas (GHG)* A way of compensating for emissions of CO2 by participating in, or funding, efforts to take CO2 out of the atmosphere. Offsetting often involves paying another party, somewhere else, to save emissions equivalent to those produced by your activity. Offsets can be bought by a business or individual in the voluntary market (or within a trading scheme), a carbon offset usually represents one tonne of CO2.

## **Carbon price:** An economic value placed on the emission of greenhouse gases into the atmosphere from human activity. A carbon price usually takes the form of either a carbon tax or as the cost of permits in an *Emissions Trading Scheme.* The price is designed to create an incentive to reduce emissions.

**Carbon sequestration**: Carbon sequestration refers to the capture and long-term storage of carbon in forests and soils or in the oceans. For example, trees and other plants sequester carbon dioxide from the atmosphere as they grow, through the process of photosynthesis.

**Carbon sink:**  Any process, activity or mechanism that removes carbon from the atmosphere. The biggest carbon sinks are the world's oceans and forests, which absorb large amounts of carbon dioxide from the Earth's atmosphere.

## **Carbon tax**: A form of carbon price on *greenhouse gas emissions* where a fixed price is set by the government for carbon emissions for certain sectors. The price is often passed through from business to consumers.

**Certified Emission Reduction (CER):**  A greenhouse gas trading credit, under the UN Clean Development Mechanism programme. A CER may be earned by participating in emission reduction programmes - installing green technology or planting forests - in developing countries. Each CER is equivalent to one tonne of carbon dioxide.

**CFCs:**The short name for chlorofluorocarbons - a family of gases that have contributed to stratospheric ozone depletion, but which are also potent greenhouse gases. Emissions of CFCs around the developed world are being phased out due to an international control agreement, the 1989 Montreal Protocol.

**Circular** **Economy:** (also referred to as "circularity") is an **economic** system aimed at eliminating waste and the continual use of resources.

**Clean coal technology**: Technology that enables coal to be burned without emitting CO2. Some systems currently being developed remove the CO2 before combustion, others remove it afterwards. Clean coal technology is unlikely to be widely available for at least a decade.

**Clean Development Mechanism (CDM)**:A programme that enables developed countries or companies to earn credits by investing in greenhouse gas emission reduction or removal projects in developing countries. These credits can be used to offset emissions and bring the country or company below its mandatory target.

**Climate Change:**  Climate change is any long-term alteration in average weather patterns, either globally or regionally. As this broad definition suggests, climate change has occurred many times in Earth's history, and for many reasons. The changes in global temperature and weather patterns seen today, however, are caused by human activity. And they're happening much faster than the natural climate variations of the past. Scientists have many ways to track climate over time, all of which make it clear that today's climate change is linked to the emission of [greenhouse gases](https://www.livescience.com/37821-greenhouse-gases.html) such as carbon dioxide and methane. These gases are effective at trapping heat from the sun's rays near Earth's surface, much like the glass walls of a greenhouse keep heat inside. Small changes in the proportions of greenhouse gases in the air can add up to major change on a global scale. A pattern of change affecting global or regional climate, as measured by yardsticks such as average temperature and rainfall, or an alteration in frequency of extreme weather conditions. This variation may be caused by both natural processes and human activity. Global warming is one aspect of climate change.

**Climate Change Now:** There is clear evidence to show that climate change is happening. Measurements show that the average temperature at the Earth’s surface has risen by about 1°C since the pre-industrial period. 17 of the 18 warmest years on record have occurred in the 21st century and each of the last 3 decades have been hotter than the previous one. This change in temperature has not been the same everywhere; the increase has been greater over land than over the oceans and has been particularly fast in the Arctic. The UK is already affected by rising temperatures. The most recent decade (2008- 2017) has been on average 0.8 °C warmer than the 1961-1990 average. All ten of the warmest years in the UK have occurred since 1990 with the nine warmest occurring since 2023. Although the climate is warming in the long-term, note that temperatures are not expected to rise every single year. Natural fluctuations will still cause unusually cold years and seasons, but these events will become less likely. Along with warming at the Earth’s surface, many other changes in the climate are occurring:

• warming oceans

• melting polar ice and glaciers

• rising sea levels

• more extreme weather events

**Climate Crisis**: A term describing global warming and climate change, and their consequences. The term has been used to describe the threat of global warming to the planet, and to urge aggressive climate change mitigation. For example, a January 2020 Bioscience article endorsed by over 11,000 scientists worldwide, stated that "the climate crisis has arrived" and that an "immense increase in endeavours to conserve our biosphere is needed to avoid untold suffering.

**Climate Equity and Environmental Justice**: Refers to the equal ability of people of all races and national origins and incomes must be protected against all burdens and health concerns. It occurs when people have equal protection from environmental and health hazards and equal access tot eh decision making process for a heathy environment.

**CO2:**  See carbon dioxide.

**Croll's Theory:** **predicted multiple ice ages, asynchronous in northern and southern hemispheres,** and that the**last ice ages should have ended about 80,000 years ago.** Evidence was just then emerging of multiple ice ages, and geologists were interested in **a theory to explain** this.  (see Albedo Effect)

**Country in transition** Broadly speaking, any ex-Soviet bloc state. At the time the Kyoto Protocol was adopted in 1997, these countries were on the path from a Communist planned economy to a market economy. Many of them would now be categorised as market economies. Countries in transition to a market economy are grouped with industrialised countries in Annex I of the Kyoto Protocol, so they have emission reduction commitments to meet in the 2008-2012 period. In some cases, their industrial base collapsed to such a degree in the early 1990s that they will have no difficulty meeting these commitments.

## **D**

**Dangerous climate change** A term referring to severe climate change that will have a negative effect on societies, economies, and the environment. The phrase was introduced by the 1992 UN Framework Convention on Climate Change, which aims to prevent "dangerous" human interference with the climate system.

**Deforestation** The permanent removal of standing forests that can lead to significant levels of carbon dioxide emissions.

## **Direct emissions:** Emissions of greenhouse gases from sources within the boundary or control of an organisation or facility's processes or actions. Examples of direct emissions include burning of fossil fuels for energy and transportation and emissions from industrial processes**.**

## **Drought and Climate Change:** climate change creates more severe droughts﻿ It is a vicious cycle—greenhouse gas emissions trap heat, causing air temperatures to increase. The hot air absorbs more moisture, resulting in less rain. Hotter air also increases evaporation from lakes and rivers, reducing water sources. Reduced rainfall kills the plants that normally retain moisture in the soil, leading to even drier conditions. Unfortunately, droughts also increase the likelihood of more [extreme weather](https://www.thebalance.com/extreme-weather-definition-effects-on-the-economy-4589684). When it does rain, the hardened dirt and soil cause water to run off the dry land. This keeps the water from being absorbed into the water table. Since the drought kills plants, there are no roots to retain the soil during rainfall. This runoff creates larger and more frequent flash [floods](https://www.thebalance.com/mississippi-river-flooding-3305663), by creating new flow patterns. Dead vegetation, warmer air, and decreased rainfall also increase the frequency and severity of [wildfires](https://www.thebalance.com/deforestations-economic-impact-4163723).

## **E**

## **Ecological Footprint:** A resource accounting tool that can measure how much land and water area a person or a specific group, for example, an event, a business, a city or a country requires to produce the resources it consumes and to absorb its waste. The footprint is measured in global hectares (gha).

**Emission Trading Scheme (ETS):** A scheme set up to allow the trading of emissions permits between business and/or countries as part of a cap-and-trade approach to limiting greenhouse gas emissions. The best-developed example is the EU's trading scheme, launched in 2005. See Cap and trade.

## **Energy Efficiency**: Reducing the amount of energy used for a given service or level of activity to produce the same level of end-use service. Energy efficiency improvements are predominantly achieved through using technologically more advanced equipment. For example, using compact fluorescent light globes reduces the amount of electricity required for lighting.

## **Extreme Weather Events:** More damaging extreme weather events are being seen around the world. Heat waves have become more frequent and are lasting longer. The height of extreme sea levels caused by storms has increased. Warming is expected to cause more intense, heavy rainfall events. In North America and Europe, where long-term rainfall measurements exist, this change has already been observed.

**EU Burden-sharing agreement:**  A political agreement that was reached to help the EU reach its emission reduction targets under the Kyoto Protocol (a reduction of 8% during the period 2008-2012, on average, compared with 1990 levels). The 1998 agreement divided the burden unequally amongst member states, considering national conditions, including greenhouse gas emissions at the time, the opportunity for reducing them, and countries' levels of economic development.

**Extinction Rebellion:**  A global environmental movement with the stated aim of using nonviolent civil disobedience to compel government action to avoid tipping points in the climate system, biodiversity loss, and the risk of social and ecological collapse.

**Extinction Vortex**: First coined by Gilpin & [Soulé](http://en.wikipedia.org/wiki/Michael_Soule) in 1986, the [extinction vortex](http://en.wikipedia.org/wiki/Extinction_vortex) is the term used to describe the forces affecting small populations that cause them to spiral into a vortex of increasingly smaller populations and endanger their long-term survival. “when *a mutual reinforcement occurs among biotic and abiotic processes that drives population size downward to extinction*” ([Brook, Sodhi & Bradshaw 2008](https://conservationbytes.com/2008/08/24/synergies-among-extinction-drivers/)). Example [Asia Times | Death of the last male Sumatran rhino in Malaysia – Arcynewsy](https://www.archynewsy.com/asia-times-death-of-the-last-male-sumatran-rhino-in-malaysia/) (18:02:19) :[…] Small populations, few rhinos live in close contact and the isolation of viable habitats has combined fatal consequences for the Sumatran rhino. If females do not mate regularly, they have a tendency to develop cysts and uterine growths. That was what left Iman barren. This is what conservation biologists refer to an "Allee effect": the lower a population becomes; the less successful individuals reproduce. Ultimately, this leads to a vortex of extinction. […]

## **F**

**Feedback Loop:** In a feedback loop, rising temperatures on the Earth change the environment in ways that affect the rate of warming. Feedback loops can be positive (adding to the rate of warming), or negative (reducing it). The melting of Arctic ice provides an example of a positive feedback process. As the ice on the surface of the Arctic Ocean melts away, there is a smaller area of white ice to reflect the Sun's heat back into space and more open, dark water to absorb it. The less ice there is, the more the water heats up, and the faster the remaining ice melts.

**Flash Floods:** A flash flood is a **rapid flooding of low-lying areas: washes, rivers, dry lakes and depressions.** It may be caused by heavy rain associated with a severe thunderstorm, hurricane, tropical storm, or meltwater from ice or snow flowing over ice sheets or snowfields. ( see also Drought)

**Fires- (Wildfires):**  It is estimated 1.6 million square miles a year globally is burnt by wildfires an area 15 larger than the UK. And 5-8% of premature deaths are from air pollution every year thought to be attributable to wildfires. *(The Guardian special feature 20/02/2021,)* A wildfire is an uncontrolled fire that burnt in the wildland vegetation, often in rural areas. Wildfires can burn in forests, grasslands, savannas, and other ecosystems, and have been doing so for hundreds of millions of years. They are not limited to a particular continent or environment. Wildfires can burn in vegetation located both in and above the soil. Ground fires typically ignite in soil thick with organic matter that can feed the flames, like plant roots. Ground fires can smoulder for a long time—even an entire season—until conditions are right for them to grow to a surface or crown fire. Surface fires, on the other hand, burn in dead or dry vegetation that is lying or growing just above the ground. Parched grass or fallen leaves often fuel surface fires. Crown fires burn in the leaves and canopies of trees and shrubs.

**Flexible mechanism:**  Instruments that help countries and companies meet emission reduction targets by paying others to reduce emissions for them. The mechanism in widest use is emissions trading, where companies or countries buy and sell permits to pollute. The Kyoto Protocol establishes two flexible mechanisms enabling rich countries to fund emission reduction projects in developing countries - Joint Implementation (JI) and the Clean Development Mechanism (CDM).

## **Food Miles:** A calculation of the distance and mode of transport foodstuffs have travelled throughout the complete production process and until they reach the consumer. These calculations enable simple comparisons to be drawn between the use of energy and the level of *greenhouse gas emissions* associated with different food products.

## **Food Sustainability:** Much like clean water and clean air food is essential to our survival. . Inefficient global food systems compromise many peoples ability to access nutritious food; The food system is a major contribution to food degradation around the world and directly and indirectly contributes to climate change through deforestation pollution and food waste.

**Fossil fuels:**  Natural resources, such as coal, oil and natural gas, containing hydrocarbons. These fuels are formed in the Earth over millions of years and produce carbon dioxide when burnt.

## **G**

**G77**: The main negotiating bloc for developing countries, allied with China (G77+China). The G77 comprises 130 countries, including India and Brazil, most African countries, the grouping of small island states (Aosis), the Gulf states and many others, from Afghanistan to Zimbabwe.

## **Geosequestration:** Also known as carbon capture and storage (CCS), is the process of capture, transport, injection and storage of CO2 in underground geological formations for the primary purpose of mitigating greenhouse gas emissions.

**Global average temperature:**  The mean surface temperature of the Earth measured from three main sources: satellites, monthly readings from a network of over 3,000 surface temperature observation stations and sea surface temperature measurements taken mainly from the fleet of merchant ships, naval ships and data buoys.

**Global energy budget:**  The balance between the Earth's incoming and outgoing energy. The current global climate system must adjust to rising greenhouse gas levels and, in the very long term, the Earth must get rid of energy at the same rate at which it receives energy from the sun.

**Global dimming:**  An observed widespread reduction in sunlight at the surface of the Earth, which varies significantly between regions. The most likely cause of global dimming is an interaction between sunlight and microscopic aerosol particles from human activities. In some regions, such as Europe, global dimming no longer occurs, thanks to clean air regulations.

**Global warming:**  The steady rise in global average temperature in recent decades, which experts believe is largely caused by man-made greenhouse gas emissions. The long-term trend continues upwards, they suggest, even though the warmest year on record, according to the UK's Met Office, is 1998.

## **Global Warming Potential (GWP):** The GWP enables a comparison to be drawn between the six *greenhouse gases*. The GWP is a relative scale, where CO2 = 1. The other gases are given a number based on their effect on the atmosphere relative to CO2. The GWP changes relative to the time horizon, for example Methane has a GWP of 21 over 100 years, meaning it has 21 times the amount of heating capacity of CO2.

## **Greenhouse gases:** (GHG)Natural and industrial gases that trap heat from the Earth and warm the surface. GHGs in the earth’s atmosphere absorb and re-emit infrared radiation. The *Kyoto Protocol* lists six major greenhouse gases, which vary in their relative warming effect. The six gases are: carbon dioxide (CO2), methane (CH4), nitrous oxide (N2O), HFCs (hydrofluorocarbons), PFCs (perfluorocarbons) and sulphur hexafluoride (SF6).

## **Greenhouse effect**: The greenhouse effect is a term that describes how natural gases in the earth's atmosphere allow infrared radiation from the sun to warm the earth's surface, but they also prevent much of the heat escaping from the earth’s atmosphere. Human actions are increasing the concentrations of these gases, which is contributing to global climate change.

## **Greenhouse Gas** **Protocol:** The GHG protocol is an international accounting tool for government and business developed by the World Resources Institute (WRI) and the World Business Council on Sustainable Development (WBCSD). The protocol provides an international standard reporting system that can be used for every aspect of reporting, from national to small business**.**

**Greta Tintin Eleonora Ernman Thunberg**: A Swedish environmental activist who is internationally known for challenging world leaders to take immediate action against climate change. Thunberg initially gained notice for her youth and her straightforward speaking manner, both in public and to political leaders and assemblies, in which she criticises world leaders for their failure to take what she considers sufficient action to address the climate crisis.

## **H**

**Heat Energy:** Almost all the worlds energy use heat involves heat, from making steel, to refrigerating food, heating, and cooling buildings. Deep carbonisation without breakthroughs in thermal science and engineering seems inconceivable. To solve climate change we must deal with sources of renewable heat energy.

**Heat index:**- ‘The feels like’ temperature, also known as the apparent temperature, is what the temperature feels like to the human body when relative humidity is combined with air temperature. The index was developed in 1979 by Robert G. Steadman. Like the [wind chill](https://www.bing.com/search?q=Wind%20chill%20wikipedia&form=WIKIRE) index, the heat index contains assumptions about the human body mass and height, clothing, amount of physical activity, individual heat tolerance, sunlight and ultraviolet radiation exposure, and the wind speed. Significant deviations from these will result in heat index values which do not accurately reflect the perceived temperature. A recent study projects that the [annual number of days with a heat index above 100 degrees F will double](https://iopscience.iop.org/article/10.1088/2515-7620/ab27cf/pdf#page=14), and days with a heat index above 105 degrees F will triple, nationwide, when compared to the end of the 20th century.Extreme heat can increase the risk of other types of disasters. Heat can exacerbate [drought](http://c2es.org/content/drought-and-climate-change/), and hot dry conditions can in turn create wildfire conditions. In cities, buildings roads and infrastructure can be heated to [50 to 90 degrees hotter](https://www.epa.gov/heat-islands/learn-about-heat-islands) than the air while natural surfaces remain closer to air temperatures. The heat island effect is most intense during the day, but the slow release of heat from the infrastructure overnight (or an atmospheric heat island) can keep cities much hotter than surrounding areas.  Rising temperatures across the country poses a threat to people, ecosystems, and the economy.

**Hockey stick:**  The name given to a graph published in 1998 plotting the average temperature in the Northern hemisphere over the last 1,000 years. The line remains roughly flat until the last 100 years, when it bends sharply upwards. The graph has been cited as evidence to support the idea that global warming is a man-made phenomenon, but some scientists have challenged the data and methodology used to estimate historical temperatures. (It is also known as MBH98 after its creators, Michael E. Mann, Raymond S. Bradley and Malcolm K. Hughes.)

**Hothouse Earth**: A term used to describe **a scenario in which human activity causes a higher global temperature than** at any time during the past 1.2 million years, due to a breakdown in the feedback loops that regulate the planet’s temperature.

### **Humidity** Ameasurement of the amount of water vapour in the air. Atmospheric humidity is a measure of water held in the air as a gas. Water can be solid (ice), liquid (water) or a gas (vapour). The vapour component makes up about 99% of all water held in the atmosphere. The air that we breathe is a mixture of gases - mostly nitrogen (78%) and oxygen (21%) with small amounts of carbon dioxide, argon, and water vapour among other things. Warmer air can carry more water vapour than cooler air if there is plenty of water available. This is because it has more energy to evaporate water into vapour and keep it in this state. The tropics are very warm and very humid - the air in the tropics contains lots of water vapour. There is extraordinarily little water vapour over the very cold Arctic and Antarctic. Some very warm regions are also very dry (e.g., the deserts of the Sahara), because there is extraordinarily little available water to evaporate into vapour, and at about 30 degrees north or south of the equator the air descends from above and is already very dry**. Relative Humidity (RH)** is the most common measure of humidity. **Specific humidity** and the mixing ratio measure the amount of water vapour in the air. **Thermal humidity** 'Dew point temperature' and 'wet bulb temperature' are also measures of humidity. These are both measures of how close the air is to being saturated. If they are equal to the actual air temperature, then the air is saturated, and RH is 100 %. Any increases in surface water vapour will lead to greater warming due to latent heating effects upon condensation. Furthermore, any changes in surface absolute humidity have implications for upper-tropospheric water vapour content, where it plays a significant role in the global radiation budget as a greenhouse gas (Soden et al., 2005 https://crudata.uea.ac.uk/cru/pubs/thesis/2007-willett/1INTRO.pdf)

## **I**

**IPCC:**  The Intergovernmental Panel on Climate Change is a scientific body established by the United Nations Environment Programme and the World Meteorological Organization. It reviews and assesses the most recent scientific, technical, and socio-economic work relevant to climate change, but does not carry out its own research. The IPCC was honoured with the 2007 Nobel Peace Prize.

## **J**

**Joint implementation (JI):**  An agreement between two parties whereby one party struggling to meet its emission reductions under the Kyoto Protocol earns emission reduction units from another party's emission removal project. The JI is a flexible and cost-efficient way of fulfilling Kyoto agreements while also encouraging foreign investment and technology transfer.

## **K**

**Kyoto Protocol:**  An international agreement linked to the UN Framework Convention on Climate Change, (UNFCCC) and sharing its aim of stabilising atmospheric concentration of greenhouse gases, but requiring separate ratification by governments. This sets legally binding commitments on greenhouse gas emissions. Industrialised countries agreed to reduce their combined emissions to 5.2% below 1990 levels during the five-year period 2008-2012. It was agreed by governments at a 1997 UN conference in Kyoto, Japan, but did not legally come into force until 2005. A different set of countries agreed a second commitment period in 2013 that will run until 2020.

## **Kyoto Protocol Mechanisms:** The three market-based mechanisms introduced by the Kyoto Protocol are Clean Development Mechanism (CDM), Joint Implementation (JI) and Emissions Trading. CDM enables developed countries to generate tradeable credits by setting up projects that reduce greenhouse gases in developing countries. The JI mechanism allows developed countries to earn emission reduction units when they finance projects in another developed country that reduce net greenhouse gas emissions. Under the Kyoto Protocol Emissions Trading enables developed countries to trade emissions credits in order to reach their emissions targets.

## **L**

**Land Use, Land-Use Change, and Forestry LULUCF:**  This refers to. Activities in LULUCF provide a method of offsetting emissions, either by increasing the removal of greenhouse gases from the atmosphere (i.e., by planting trees or managing forests), or by reducing emissions (i.e. by curbing deforestation and the associated burning of wood).

**Least Developed Countries** **LDCs:** represent the poorest and weakest countries in the world. The current list of LDCs includes 49 countries - 33 in Africa, 15 in Asia and the Pacific, and one in Latin America.

## **Life Cycle Assessment (LCA: )** LCA is the investigation and valuation of the environmental, economic and social impacts of a product or service. A product’s life cycle starts when the raw materials are extracted from the earth through to processing, transport, use, reuse, recycling or disposal. For each of these stages, the impact is measured in terms of the resources used and environmental impacts caused.

## **M**

## **Major Economies Forum on Energy and Climate:** A forum established in 2009 by US President Barack Obama to discuss elements of the agreement that will be negotiated at Copenhagen. Its members - Australia, Brazil, Canada, China, the European Union, France, Germany, India, Indonesia, Italy, Japan, Mexico, Russia, South Africa, South Korea, the UK and the US - account for 80% of greenhouse gas emissions. The forum is a modification of the Major Economies Meeting started by the former President George Bush, which was seen by some countries as an attempt to undermine UN negotiations.

**Melting polar ice and glaciers:**  As the Arctic warms, sea ice is decreasing rapidly. In the Antarctic, sea ice has slowly increased, driven by local changes in wind patterns and freshening sea water. However, in recent years Antarctic sea ice has stopped growing. Over the past few decades the ice sheets (the great masses of land ice at the poles) in Greenland and the Antarctic have shrunk, as have most glaciers around the world.

**Methane:** The second most important man-made greenhouse gas. Sources include both the natural world (wetlands, termites, wildfires) and human activity (agriculture, waste dumps, leaks from coal mining).

**Mitigation:**  Action that will reduce man-made climate change. This includes action to reduce greenhouse gas emissions or absorb greenhouse gases in the atmosphere.

## **N**

**Natural Greenhouse Effect:** The natural level of greenhouse gases in our atmosphere, which keeps the planet about 30C warmer than it would otherwise be - essential for life as we know it. Water vapour is the most important component of the natural greenhouse effect.

**Negative Carbon Measures**: Both 'climate positive' and 'carbon negative' mean the same thing: removing CO2 from the atmosphere to make a positive impact on climate change. Achieving climate targets is set out in the Paris Agreement. To keep the global temperature rise to no more than 1.5 degrees higher than pre-industrial levels, the [IPCC](https://www.ipcc.ch/sr15/chapter/chapter-4/) has said we must proactively remove CO2 from the atmosphere.

**Net Zero Targets:** (see Zero Targets)

**Non-annex I countries:**  The group of developing countries that have signed and ratified the Kyoto Protocol. They do not have binding emission reduction targets.

## **O**

**Ocean acidification:**  The ocean absorbs approximately one-fourth of man-made CO2 from the atmosphere, which helps to reduce adverse climate change effects. However, when the CO2 dissolves in seawater, carbonic acid is formed. Carbon emissions in the industrial era have already lowered the pH of seawater by 0.1. Ocean acidification can decrease the ability of marine organisms to build their shells and skeletal structures and kill off coral reefs, with serious effects for people who rely on them as fishing grounds.

## **P**

**Paris Agreement:** The Paris Agreement (French: l'accord de Paris) is an agreement within the United Nations Framework Convention on Climate Change (UNFCCC), dealing with greenhouse-gas-emissions mitigation, adaptation, and finance, signed in 2016.

**Parts Per Million, ppm (350/450):** An abbreviation for parts per million, usually used as short for pomp (parts per million by volume). The Intergovernmental Panel on Climate Change (IPCC) suggested in 2007 that the world should aim to stabilise greenhouse gas levels at 450 ppm CO2 equivalent to avert dangerous climate change. Some scientists, and many of the country’s most vulnerable to climate change, argue that the safe upper limit is 350ppm. Current levels of CO2 only are about 380ppm.

**Per-capita emissions**: The total amount of greenhouse gas emitted by a country per unit of population.

## **Permit:** A permit is a legal permission authorising the holder to emit a defined quantity of greenhouse gases. In an emissions trading scheme, a permit is usually equivalent to one tonne of CO2e. If a company emits less greenhouse gases than authorised, they can sell their permits within the trading scheme.

**Perma Frost:** A thick subsurface layer of soil that remains below freezing point throughout the year, occurring chiefly in polar regions. **Permafrost contains massive amounts of carbon which are likely to be released as climate change heats up the world**. When this carbon enters the atmosphere as CO2 and methane gas, it will itself contribute to warming the globe.

**Plastics Pollution:** Effects all countries regardless of economic status but disproportionally effects countries that do not have well developed waste management systems. Wealthy countries like UK and USA exasperate the problem by creating more waste than can manage and export it overseas. Many of these importing countries have plastic management schemes where plastic is burnt or left on landfills. This contributes to greenhouse gas emissions and respiratory health issues within those communities breathing in the fumes and tends to impact most on low income and marginalised communities. It is estimated that 8 million ton of plastic pollutants end up in our seas and oceans yearly. Plastic pollution has a major impact on marine life as they absorb toxic chemicals produces by plastics that accumulate throughout the food web. harming habitat, reproduction systems and lead to population decline in many species. Scientists have discovered micro plastics in clouds falling to earth in raindrops.

**Pre-industrial levels of carbon dioxide** The levels of carbon dioxide in the atmosphere prior to the start of the Industrial Revolution. These levels are estimated to be about 280 parts per million (by volume). The current level is around 380ppm.

## **R**

**Renewable energy:** Renewable energy is energy created from sources that can be replenished in a short period of time. The five renewable sources used most often are: biomass (such as wood and biogas), the movement of water, geothermal (heat from within the earth), wind, and solar.

**REDD:** Reducing Emissions from Deforestation and forest Degradation, a concept that would provide developing countries with a financial incentive to preserve forests.

**Rising sea levels:** As land ice melts and the warming oceans expand, sea levels have risen. Global sea level has risen by around 20cm over the past century, likely faster than at any point in the last 2,000 years. The rate of sea level rise has increased substantially over the 20th Century and further rise this century is inevitable – how much depends on the amount of human greenhouse gas emissions.

## **S**

**Stern review:** A report on the economics of climate change led by Lord Nicholas Stern, a former World Bank economist. It was published on 30 October 2006 and argued that the cost of dealing with the consequences of climate change in the future would be higher than taking action to mitigate the problem now.

## **T**

**Technology transfer:** The process whereby technological advances are shared between different countries. Developed countries could, for example, share up-to-date renewable energy technologies with developing countries, in an effort to lower global greenhouse gas emissions.

**The world at 1.1C:** Each year sees record breaking temperatures for the Earth’s surface. The 2019 average temperature was 1.1C warmer than the average between 1850 and 1900, before the ramp-up of fossil fuel use. Scientists also criticised governments for not responding adequately to climate change, which is likely to intensify extreme weather and expected to increase poverty and global unrest. The UN climate change meetings have seen delegates making polished speech but presented little concrete plans for limiting CO2 emissions.

**Tipping point:** A tipping point is a threshold for change, which, when reached, results in a process that is difficult to reverse. Scientists say it is urgent that policy makers halve global carbon dioxide emissions over the next 50 years or risk triggering changes that could be irreversible.

**Twenty-twenty-twenty (20-20-20):** This refers to a pledge by the European Union to reach three targets by 2020: (a) a 20% reduction in greenhouse gas emissions from 1990 levels; (b) an increase in the use of renewable energy to 20% of all energy consumed; and (c) a 20% increase in energy efficiency. The EU says it will reduce emissions by 30%, by 2020, if other developed countries also pledge tough action.

## U

## **United Nations Framework Convention on Climate Change (UNFCCC)** : Established in 1992 at the Rio Earth Summit and currently has 189 signatory parties. An international framework was agreed that aimed at stabilising atmospheric concentrations of greenhouse gases. The UNFCCC agreed to the Kyoto Protocol in 1997 to implement emission reductions in industrialised countries.

**W**

**Warming Oceans:** While the temperature rise at the Earth’s surface may get the most headlines, the temperature of the oceans has been increasing too. This warming has been measured all the way down to 2 km deep. The chemistry of the oceans is also changing as they absorb approximately a third of the excess carbon dioxide being emitted into the atmosphere. This is causing the oceans to become acidic more rapidly than perhaps any point in the last 300 million years.

**Weather:** The state of the atmosphere with regard to temperature, cloudiness, rainfall, wind and other meteorological conditions. It is not the same as climate which is the average weather over a much longer period

**Zero Targets:** The government's advisory Committee onClimate Change recommended "net zero" target by 205 Britain is the first major nation to propose this target - and it has been widely praised by green groups.

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