



Glossary Climate Change

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INTERNATIONAL SOCIAL SECURITY ASSOCIATION

Section for Research on Prevention

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A

Abrupt climate change

Sudden (on the order of decades), large changes in some major component of the climate system, with rapid, widespread effects. (1)

Afforestation

Planting of new forests on lands that historically have not contained forests. (2)

Alternative drives

The term alternative drive systems covers concepts for powering vehicles that differ in terms of their energy type and energy efficiency from the drive technologies commonly used in the market and that have a positive effect on the carbon footprint.

Alternative drives must – in comparison to combustion engines – achieve environmental and sustainability effects, but they must also be economical and efficient so that their use can be worthwhile.

Alternative energy

Alternative energy is energy that does not come from fossil fuels, and thus produces little to no greenhouse gases like carbon dioxide. This means that energy produced from alternative sources does not contribute to the greenhouse effect that causes climate change. (3)

Antarctic sea ice

Antarctic sea ice is nearly a geographic opposite of its Arctic counterpart. Antarctica is a landmass covered in ice surrounded by an ocean, and the Arctic is an ocean of sea ice surrounded by land. (4)

Anthropogenic

Anthropogenic describes a process or result generated by human beings. (5)

Aquaculture

Aquaculture uses a body of saltwater or freshwater for the cultivation of plants and animals.

Atlantic meridional overturning circulation (AMOC)

The AMOC circulates water from north to south and back in a long cycle within the Atlantic Ocean. This circulation brings warmth to various parts of the globe and also carries nutrients necessary to sustain ocean life. (6)

Atmosphere

The gaseous envelope surrounding the Earth. The dry atmosphere consists almost entirely of nitrogen (78.1% volume mixing ratio) and oxygen (20.9% volume mixing ratio), together with a number of trace gases, such as argon (0.93% volume mixing ratio), helium, radiatively active greenhouse gases such as carbon dioxide (0.035% volume mixing ratio), and ozone. In addition, the atmosphere contains water vapor, the quantity of which is highly variable but typically 1% volume mixing ratio. The atmosphere also contains clouds and aerosols. (1)



B

Biodiversity loss

Biodiversity loss describes the decline in the number, genetic variability, and variety of species, and the biological communities in a given area. This loss in the variety of life can lead to a breakdown in the functioning of the ecosystem where decline has happened. (7)

Bioeconomy

Economy that uses biological resources. This includes agriculture, livestock farming and the production of chemical substances or biofuel from biomass. It can be considered as a part of circular economy where the environment is part of the loop.

Biofuels

Gas or liquid fuel made from plant material. Plant material include wood, wood waste, wood liquors, peat, railroad ties, wood sludge, spent sulphite liquors, agricultural waste, straw, fish oils, tall oil, sludge waste, waste alcohol, municipal solid waste, landfill gases, other waste. This distinguished them from fossil fuels, which are considered non-renewable. Example of biofuels are methane, ethanol, methanol, and biodiesel. (1)

Biomass

Materials that are biological in origin, including organic material from above and below ground, for example, trees, crops, grasses, tree litter, roots, and animals and animal waste. (1)

Biomass Feedstock

Feedstock is raw material, usually plant or agricultural waste, that can be processed into fuel or energy.

Biosphere

The part of the Earth system comprising all ecosystems and living organisms, in the atmosphere, on land or in the oceans, including derived dead organic matter, such as litter, soil organic matter and oceanic detritus. (1)

Black Carbon Aerosol

Black carbon is the most strongly light-absorbing component of particulate matter and is formed by the incomplete combustion of fossil fuels, biofuels, and biomass. It is emitted directly into the atmosphere in the form of fine particles. (1)

Blue Hydrogen

Blue hydrogen is produced mainly from natural gas, using a process called steam reforming, which brings together natural gas and heated water in the form of steam. The output is hydrogen, but carbon dioxide is also produced as a by-product. The definition of blue hydrogen includes the use of carbon capture and storage to trap and store this carbon. (8)

**C****Carbon capture and storage (CCS)**

Carbon capture and storage is a process in which a relatively pure stream of carbon dioxide from industrial sources is separated, treated, and transported to a long-term storage location. The aim is to reduce greenhouse gas emissions and thus mitigate climate change. (9)

Carbon capture and utilisation (CCU)

Carbon capture and utilisation technologies allow reusing captured carbon and potentially reducing carbon dioxide emissions to the atmosphere. (10)

Carbon cycle

Carbon cycle describes the process by which living things absorb carbon from the atmosphere, sediments and soil, or food. To complete the cycle, carbon returns to the atmosphere in the form of carbon dioxide or methane by respiration, combustion, or decay. (5)

Carbon Dioxide

Molecule often named after its chemical formula CO_2 . A naturally occurring gas, and also a by-product of burning fossil fuels and biomass, as well as land-use changes and other industrial processes. It is the principal human caused greenhouse gas that affects the Earth's radiative balance. It is the reference gas against which other greenhouse gases are measured and therefore has a Global Warming Potential of 1. (1)

Carbon Footprint

The total amount of greenhouse gases that are emitted into the atmosphere each year by a person, family, building, organization, or company. A person's carbon footprint includes greenhouse gas emissions from fuel that an individual burns directly, such as by heating a home or riding in a car. It also includes greenhouse gases that come from producing the goods or services that the individual uses, including emissions from power plants that make electricity, factories that make products, and landfills where trash gets sent. (1)

Carbon Handprint

Carbon handprint measures the positive impact of actions or processes to the environment, while carbon footprint measures the negative impact of actions or processes. When footprint and handprint are of equal size, the activity is carbon neutral. Carbon handprint can include climate benefits, or the emission avoided by using a product, process or service and it can be created by a state, company, association, or individual person. Handprint evaluates actions that help reduce the climate change beyond one's own value chain.

Carbon Sequestration

Terrestrial, or biologic, carbon sequestration is the process by which trees and plants absorb carbon dioxide, release the oxygen, and store the carbon. Geologic sequestration is one step in the process of carbon capture and sequestration (CCS) and involves injecting carbon dioxide deep underground where it stays permanently. (1)

Changing vegetation

The changing climate increases stressors that weaken plant resilience, disrupting forest structure and ecosystem services. Rising temperatures lead to more frequent droughts, wildfires, and invasive pest outbreaks, leading to the loss of plant species. That has numerous



detrimental effects including lowered productivity, spread of invasive plants, vulnerability to pests, saltwater intrusion, altered ecosystem structure.

Circular economy

A circular economy entails markets that give incentives to reusing products (rather than scrapping them and then extracting new resources) or to reusing parts of these products or materials. In such an economy, all forms of waste, such as clothes, scrap metal and obsolete electronics, are returned to the economy. (11)

Climate

Climate in a narrow sense is usually defined as the “average weather”, or more rigorously, as the statistical description in terms of the mean and variability of relevant quantities over a period ranging from months to thousands of years. The classical period is 3 decades, as defined by the World Meteorological Organization (WMO). These quantities are most often surface variables such as temperature, precipitation, and wind. Climate in a wider sense is the state, including a statistical description, of the climate system. (1)

Climate adaptation

Climate adaptation means taking action to prepare for and adjust to the current and projected impacts of climate change. With climate change bringing more frequent and intense extreme weather events such as heatwaves, droughts and floods, individuals and communities can reduce their vulnerability and increase their resilience by adapting now.(12)

Climate Change

Climate change refers to any significant change in the measures of climate lasting for an extended period of time. In other words, climate change includes major changes in temperature, precipitation, or wind patterns, among others, that occur over several decades or longer. (1)

Climate claims

Cases on climate change, global warming mitigation and adaptation brought before administrative, judicial and other investigative authorities. (13)

Climate fear

Climate fear or eco anxiety is fundamentally distress about climate change and its impacts on the landscape and human existence. That can manifest as intrusive thoughts or feelings of distress about future disasters or the long-term future human existence and the world, including one's own descendants. (14)

Climate protection

Precautionary actions, procedures or installations undertaken to prevent or reduce harm from pollution to natural weather conditions or patterns, including the prevailing temperature, atmospheric composition and precipitation. (15)

Climate tipping points

Tipping elements are critical natural systems that are important for our Earth's climate. If these tipping elements change, the climate on our entire planet changes. Tipping elements may pass a tipping point. Tipping points refer to critical thresholds in the climate system. If a tipping element crosses the threshold, a seemingly small change can lead to a sudden and irreversible change in the system.



Examples of tipping elements are the Amazon rainforest or the arctic ice. If the temperature on Earth rises, these systems will be severely affected when a certain temperature is reached (the tipping point). When affected these systems stop regulating the climate so that the initial perturbation is amplified.

Conference of the Parties

The supreme body of the United Nations Framework Convention on Climate Change (UNFCCC) comprises more than 180 nations that have ratified the Convention. The first Conference of the Parties (COP) was held in Berlin, Germany, in 1995 and meetings have been continued on a yearly basis. The COP's role is to promote and review existing commitments in the light of the Convention's objective, new scientific findings, and the effectiveness of national climate change programs. (1)

Cryosphere

One of the interrelated components of the Earth's system, the cryosphere is frozen water in the form of snow, permanently frozen ground (permafrost), floating ice, and glaciers. Fluctuations in the volume of the cryosphere cause changes in ocean sea level, which directly impact the atmosphere and biosphere. (1)

D**Decarbonisation**

The process by which states, or other entities achieve a low-carbon economy or by which individuals seek to reduce their carbon dioxide emissions.

Deforestation

Those practices or processes that result in the conversion of forested land for non-forest uses. Deforestation contributes to increasing carbon dioxide concentrations for two reasons: 1) the burning or decomposition of the wood releases carbon dioxide; and 2) trees that once removed carbon dioxide from the atmosphere in the process of photosynthesis are no longer present. (1)

Desertification

Land degradation in arid, semi-arid, and dry sub-humid areas resulting from various factors, including climatic variations and human activities. Further, the UNCCD (The United Nations Convention to Combat Desertification) defines land degradation as a reduction or loss of the biological or economic productivity and complexity of rain-fed cropland, irrigated cropland, or range, pasture, forest, and woodlands, in arid, semi-arid, and dry sub-humid areas. This degradation results from land uses or from a process or combination of processes, including those arising from human activities and habitation patterns, such as: (1) soil erosion caused by wind and/or water; (2) deterioration of the physical, chemical and biological or economic properties of soil; and (3) long-term loss of natural vegetation. Conversion of forest to non-forest is an example of this long term loss. (1)

District heating

District heating involves generating heat in a centralized location and then distributing it to residences, businesses, and industry in a local area. The heat is often obtained from a cogeneration plant burning fossil fuels or biomass, but heat-only boiler stations, geothermal heating, heat pumps and central solar heating are also used, as well as heat waste from factories and nuclear power electricity generation. According to some research, district heating



with combined heat and power is the cheapest method of cutting carbon emissions and has one of the lowest carbon footprints of all fossil generation plants. (16)

Drought

Drought is a prolonged dry period in the natural climate cycle that can occur anywhere in the world. It is a slow-onset disaster characterized by the lack of precipitation, resulting in a water shortage. Drought can have a serious impact on health, agriculture, economies, energy generation, and the environment. Drought threatens people's livelihoods, increases the risk of disease and death, and fuels mass migration. (17)

E**eCO₂**

eCO₂ means "equivalent carbon dioxide". It represents the effect on global warming of a given amount of greenhouse gas by comparing it with the amount of carbon dioxide expressed in tons with the same effect. It is obtained by multiplying the mass of greenhouse gas by its global warming potential (GWP).

Ecosystem services

Ecosystem services are the benefits or "services" of an ecosystem to human life, such as cleaning water and the decomposition of organic matter. (5)

Electro Mobility (e-Mobility)

Electro mobility means using electric propulsion for transportation. Enabling the electric propulsion of vehicles and fleets requires the use of electric powertrain technologies, but also information and communication technologies and connected infrastructures. Powertrain technologies include full electric vehicles and plug-in hybrids, as well as hydrogen fuel cell vehicles that convert hydrogen into electricity. E-Mobility efforts are motivated by the need to address corporate fuel efficiency and emission requirements, as well as market demands for lower operational costs.

El Niño – Southern Oscillation

El Niño in its original sense, is a warm water current that periodically flows along the coast of Ecuador and Peru, disrupting the local fishery. This oceanic event is associated with fluctuation of the intertropical surface pressure pattern and circulation in the Indian and Pacific Oceans, called the Southern Oscillation. This coupled atmosphere-ocean phenomenon is collectively known as El Niño-Southern Oscillation. During an El Niño event, the prevailing trade winds weaken and the equatorial counter current strengthens, causing warm surface waters in the Indonesian area to flow eastward to overlie the cold waters of the Peru current. This event has great impact on the wind, sea surface temperature, and precipitation patterns in the tropical Pacific. It has climatic effects throughout the Pacific region and in many other parts of the world. (1)

Energy Efficiency

The ability to consume less energy to provide the same service.

Energy sectors

The industries involved in the energy production and distribution.



One part of this sector provides renewable, green energy. The source is less polluting than fossil fuels, for example: hydropower, solar power, wind power, geothermal energy, and biomass. While they are less polluting, maintaining large-area renewable energy plants can still harm the environment, changing the natural habitats of the locations.

Another part is based on the use of fossil fuels. It is more efficient but harms the environment: Fossil fuels are petroleum products, coal, natural gas. From the non-renewable fuels, natural gas is the most eco-friendly. Its price is lower, and it has fewer greenhouse gas emissions than the others.

In some countries a part of the energy is produced using nuclear energy extracted from uranium present on earth since the beginning. There is no consensus worldwide on this energy source. Some countries consider this is a way to produce large quantities of non-intermittent, low carbon energy while other ones highlight the fact that this energy produces long-lived radioactive waste and the effect of large-scale accidents.

Energy storage

Energy storage is the capture of energy produced at one time for use at later time to reduce imbalances between energy demand and energy production. Energy storage involves converting energy from forms that are difficult to store to more conveniently or economically storable forms, e.g., by means of Power-to-X or by means of batteries (i.e. electricity is transformed into chemical energy). However there are other ways of storing energy as gravitational (for instance pumping water upward), elevated temperature or latent heat (for instance molten salt storage), and kinetic (for instance with a flywheel). (18)

Energy use sector

Energy use is divided among economic sectors: residential, commercial, transportation, industrial, agriculture and waste management.

Enteric Fermentation

Livestock, especially cattle, produce methane as part of their digestion. This process is called enteric fermentation, and it represents one third of the emissions from the agriculture sector. (1)

Extreme weather

Extreme weather includes unexpected, unusual, severe, or unseasonal weather; weather at the extremes of the historical distribution – the range that has been seen in the past. Extreme events are based on a location recorded weather history. They are defined as lying in the most unusual ten percent. The main types of extreme weather included heat waves, cold waves and heavy precipitation or storm events, such as tropical cyclones. The effects of extreme weather events are economic costs, loss of human lives, droughts, floods, landslides. Severe weather poses risks to life and property. (19)

F

Fluorinated Gases

Powerful synthetic greenhouse gases such as hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride that are emitted from a variety of industrial processes. Fluorinated gases are sometimes used as substitutes for stratospheric ozone-depleting substances and are often used in coolants, foaming agents, fire extinguishers, solvents, pesticides, and aerosol propellants. These gases are emitted in small quantities compared to carbon dioxide, methane, or nitrous oxide, but because they are potent greenhouse gases (sometimes several thousand



times higher than carbon dioxide), they are sometimes referred to as High Global Warming Potential gases. (1)

Fossil Fuel

A general term of organic materials formed from decayed plants and animals that have been converted to crude oil, coal, natural gas, or heavy oils by exposure to heat and pressure in the earth's crust over hundreds of millions of years. (1)

Friday for Future

Fridays for Future (FFF) is the name of a movement of student and other young people around the world who are campaigning for climate protection. Every Friday, strikes are organised around the world to ensure that the climate targets agreed by the countries in the 2015 UN Global Climate Agreement (Paris Agreement) are met. (20)

G

Geothermal energy

Geothermal energy is a type of renewable energy taken from the Earth's core. It comes from heat generated during the original formation of the planet and the radioactive decay of materials. This thermal energy is stored in rocks and fluids in the centre of the earth. (21)

Glacier

A multi-year surplus accumulation of snowfall in excess of snowmelt on land and resulting in a mass of ice of at least 0.1 km² in area, that shows some evidence of movement in response to gravity. A glacier may terminate on land or in water. Glacier ice is the largest reservoir of fresh water on Earth, and second online to the oceans as the largest reservoir of total water. Glaciers are found on every continent except Australia. (1)

Global warming

In the early 1960s scientists recognized that carbon dioxide in the atmosphere was increasing. Later they discovered that the concentrations of methane, nitrous oxide and other gases were also rising. Because these gases trap heat and warm the Earth, as a greenhouse traps heat from the sun, scientists concluded that increasing levels of "greenhouse gases" would increase global warming. (5)

Global Warming Potential

Global Warming Potential (GWP) is the ability of a greenhouse gas to absorb infrared radiation reemitted by earth compared to carbon dioxide over a specified period of time, from 20 to 500 years. The timeframe is important because each gas has a different rate at which it is removed from the atmosphere. For each time period, carbon dioxide is always set at "1", and other greenhouse gases are compared to carbon dioxide for the same timeframe. (5)

Green Deal

The European Green Deal is a set of policy initiatives proposed by the European Commission. It has been adopted by the European parliament in 2020. The aim is to transform the EU into a modern, resource-efficient, and competitive economy, ensuring:

- no net emissions of greenhouse gases by 2050
- economic growth decoupled from resource use
- no person and no place left behind.



Green Hydrogen

Hydrogen that is produced using clean electricity from surplus renewable energy sources, such as solar and wind power.

Greenhouse Effect

Trapping and build-up of heat in the atmosphere (troposphere) near the Earth's surface. Some of the heat flowing back toward space as infrared radiation from the Earth's surface is absorbed by water vapor, carbon dioxide, ozone, and several other gases in the atmosphere and then reradiated back toward the Earth's surface. If the atmospheric concentrations of these greenhouse gases rise, the average temperature of the lower atmosphere will gradually increase. (1)

Greenhouse Gas

Any gas that absorbs infrared radiation in the atmosphere. Greenhouse gases include, but are not limited to, carbon dioxide, methane, nitrous oxide, ozone, chlorofluorocarbons, hydrochlorofluorocarbons, hydrofluorocarbons, perfluorocarbons, sulfur hexafluoride. (1)

Grey Hydrogen

Grey hydrogen is created from natural gas, or methane, using steam methane reformation but without capturing the greenhouse gases made in the process. Grey hydrogen is essentially the same as blue hydrogen, but without the use of carbon capture and storage. (8)

Gulf Stream

The Gulf Stream is a strong ocean current that brings warm water from the Gulf of Mexico into the Atlantic Ocean. It extends all the way up the eastern coast of the United States and Canada. This strong current of warm water influences the climate of the east coast of Florida, keeping temperatures there warmer in the winter and cooler in the summer than the other southeastern states. Since the Gulf Stream also extends toward Europe, it warms western European countries as well. (22)

H

Halocarbons

Compounds containing either chlorine, bromine or fluorine and carbon. Such compounds can act as powerful greenhouse gases in the atmosphere. The chlorine, fluorine and bromine containing halocarbons are also involved in the depletion of the ozone layer. (1)

Heat Island

An urban area characterised by temperatures higher than those of the surrounding non-urban area. As urban areas develop, buildings, roads, and other infrastructure replace open land and vegetation. These surfaces absorb more solar energy, which can lead to higher temperatures in urban areas. (1)

Heat Pump

A heat pump is a device that uses electrical energy to transfer heat from a cool space to a warm space. In cold weather a heat pump can move heat from the cool outdoors to warm a house; the pump may also be designed to move heat from the house to the warmer outdoors in warm weather. Mostly used are compression heat pumps, which utilise the physical effect of the enthalpy of vaporisation: a fluid is vaporised in the cold space, the gas is then transported



to the warm zone. It is liquefied by compression in the warm zone and this process together with the operation the electric compressor generates heat. The heat pump process is called the Carnot cycle, while the limiting case of a reversible heat engine is the left-hand Carnot process.

Heat Stress

Workers who are exposed to extreme heat or work in hot environments may be at risk of heat stress. Exposure to extreme heat can result in occupational illnesses and injuries. Heat stress can result in heat stroke, heat exhaustion, heat cramps, or heat rashes. Excessive humidity and physical strain are aggravating factors. (23)

Heat waves

A prolonged period of excessive heat, often combined with excessive humidity. (1)

Hydrocarbons

Substances containing only hydrogen and carbon. Fossil fuels are made up of hydrocarbons. (1)

Hydrogen Economy

A concept of an energy delivery infrastructure based on hydrogen as a carbon-free carrier. It aims to address the challenges of decarbonizing various economic sectors by using hydrogen as an alternative energy source.

Hydrologic Cycle

The process of evaporation, vertical and horizontal transport of vapor, condensation, precipitation, and the flow of water from continents to oceans. It is a major factor in determining climate through its influence on surface vegetation, the clouds, snow and ice, and soil moisture. The hydrologic cycle is responsible for 25 to 30 percent of the mid-latitudes' heat transport from the equatorial to polar regions. (1)

Hydropower

Hydropower, or hydroelectric power, is one of the oldest and largest sources of renewable energy, which uses the natural flow of moving water to generate electricity. (24)

I

Ice Core

A cylindrical section of ice removed from a glacier or an ice sheet in order to study climate patterns of the past. By performing chemical analyses on the air trapped in the ice, scientist can estimate the percentage of carbon dioxide and other trace gases in the atmosphere at a given time. Isotopic analysis of the ice itself can give some indication of historic temperatures. (1)

Ice Loss

Ice loss refers to the retreat of sea ice and land ice mass from its historic extents. This retreat of sea ice and land ice is one of two major causes of the current sea level rise, the other one being the thermal expansion of water due to the rise of temperature. (5)



Ice Sheet

An ice sheet forms on land and extends over tens of thousands of miles. Greenland and Antarctica have vast ice sheets that together contain more than 99 percent of the freshwater ice on Earth. In Greenland, today's record summer melts bring rapid and widespread ice sheet loss. In Antarctica, the melt is slower and more localised for now. (5)

Ice Shelf

An ice shelf forms from the outflow of land ice and floats on the sea at the land's edge. It creates a barrier that slows the flow of land ice into the ocean. In the last thirty years, both rapid disintegration of ice shelves and ice shelf collapses have been observed along Canada and the Antarctic Peninsula. (5)

Indirect Emissions

Indirect emissions from a building, home or business are those emissions of greenhouse gases that occur as a result of the generation of electricity used in that building. These emissions are called "indirect" because the actual emissions occur at the power plant which generates the electricity, not at the building using the electricity. (1)

Infrared Radiation

Infrared radiation is light with a wavelength longer than that of the colour red at the visible end of the spectrum, but shorter than microwave radiation. Infrared radiation can be perceived as heat. Close to ambient temperature, matter such as that which makes the Earth's surface, the atmosphere, and clouds all emit infrared radiation, which is also known as terrestrial or long-wave radiation. In contrast, solar radiation is mainly shortwave radiation because of the temperature of the Sun. (1)

Intergovernmental Panel on climate Change (IPCC)

The IPCC was established jointly by the United Nations Environment Programme and the World Meteorological Organisation in 1988. The purpose of the IPCC is to assess information in the scientific and technical literature related to all significant components of the issue of climate change. The IPCC draws upon hundreds of the world's expert scientists as authors and thousand as expert reviewers. Leading expert in climate change and environmental, social, and economic sciences from some 60 nations have helped the IPCC to prepare periodic assessments of the scientific underpinnings for understanding global climate change, its consequences, and the viability of adaptation and mitigation measures. The IPCC is also recognized as the official advisory body to the world's governments on the state of the science about methods for conducting national greenhouse gas emission inventories. (1)

J

K

L

Landfill

Land waste disposal site in which waste is generally spread in thin layers, compacted, and covered with a fresh layer of soil each day. (1)

**Longwave Radiation**

Radiation emitted in the spectral wavelength greater than about 4 micrometers, corresponding to the radiation emitted from the Earth and atmosphere. It is sometimes referred to as “terrestrial radiation” or “infrared radiation”, although somewhat imprecisely. (1)

Low Ozone Events

Low Ozone Events are small-scale, “Pass through” ozone-depleted air masses that result in sudden, unexpectedly high levels of UV irradiance, leading to an increased risk of UV-related diseases, especially UV-related cancers of the eye and skin. (25)

M**Marine heatwave (MHW)**

A marine heatwave is a period of abnormally high ocean temperatures relative to the average seasonal temperature in a particular marine region. Marine heatwaves are caused by a variety of factors, including shorter term weather phenomena such as fronts, intraseasonal, annual, or decadal modes like El Nino events, and longer-term changes like climate change. Marine heatwaves can have biological impacts on ecosystems at individual, population, and community levels. MHW have led to severe biodiversity changes such as coral bleaching, sea star wasting disease, harmful algal blooms, and mass mortality of benthic communities. Unlike heatwaves on land, marine heatwaves can extend for millions of square kilometres, persist for weeks to months or even years, and occur on surface levels. (26)

Methane

A hydrocarbon that is a greenhouse gas with a global warming potential most recently estimated at 25 times that of carbon dioxide. Methane is produced through anaerobic (without oxygen) decomposition of waste in landfills, animal digestion, decomposition of animal wastes, production and distribution of natural gas and petroleum, coal production, and incomplete fossil fuel combustion. (1)

Metric Ton

Common international measurement for the quantity of greenhouse gas emissions. (1)

Micro mobility

Micro mobility refers to a range of small, lightweight vehicles operating at speeds typically below 25 km/h (15 mph) and driven by users personally. Micro mobility devices include bicycles, e-bikes, electric scooters, electric skateboards, shared bicycle fleets, and electric pedal assisted (pedelec) bicycles. (27)

Mitigation

A human intervention to reduce the human impact on the climate system; it includes strategies to reduce greenhouse gas sources and emissions and enhancing greenhouse gas sinks. (1)

N**Natural Gas**

Underground deposits of gases consisting of 50 to 90 percent methane and small amounts of heavier gaseous hydrocarbon compounds such as propane and butane. (1)

**Nitrogen Cycle**

The natural circulation of nitrogen among the atmosphere, plants, animals, and microorganisms that live in soil and water. Nitrogen takes on a variety of chemical forms throughout the nitrogen cycle, including nitrous oxide and nitrogen oxides. (1)

Nitrogen Oxides

Gases of which the molecules consist of one nitrogen atom and a varying number of oxygen atoms. Nitrogen oxides are produced in the emissions of vehicle exhausts and from power stations. In the atmosphere, nitrogen oxides can contribute to formation of photochemical ozone (smog), can impair visibility, and have health consequences; they are thus considered as pollutants. (1)

Nitrous Oxide

Gas of which the molecule consists of two nitrogen atoms and one oxygen atom. A powerful greenhouse gas with a global warming potential of 298 times that of carbon dioxide. Major sources of nitrous oxide include soil cultivation practices, especially the use of commercial and organic fertilizers, fossil fuel combustion, nitric acid production, and biomass burning. Natural emissions of nitrous oxide are mainly from bacteria breaking down nitrogen in soils and the oceans. Nitrous oxide is mainly removed from the atmosphere through destruction in the stratosphere by ultraviolet radiation and associated chemical reactions, but it can also be consumed by certain types of bacteria in soils. (1)

Nuclear energy

This energy source comes from the fission of nuclei of heavy atoms present on earth since its formation or formed during the process (uranium 233, uranium 235, plutonium 239). There exist various technologies allowing harnessing nuclear energy including the development of small modular reactors which is nowadays pursued in some countries. The resources depend on the fuel cycle, some technologies allowing energy production in the long term.

Nuclear energy allows the continuous production of low carbon electricity. However, there is no consensus about its use to decrease the carbon emission. Some countries consider this is a way to produce large quantities of non-intermittent, low carbon electricity. Other ones highlight the fact that this energy produces long-lived radioactive waste which are an unsolved problem. Also the effect of severe accidents in a nuclear plant like in Fukushima is used as an argument to stop nuclear energy. In addition, this technology can foster the proliferation of nuclear weapons.

O**Ocean Acidification**

Increased concentrations of carbon dioxide in sea water causing a measurable increase in acidity. This may lead to reduced calcification rates of calcifying organisms such as corals, mollusks, algae, and crustaceans. (1)

Ozone

Ozone, the triatomic form of oxygen, is a gaseous atmospheric constituent. In the troposphere, it is created by photochemical reactions involving gases resulting both from natural sources and from human activities. In high concentrations, tropospheric ozone acts as a greenhouse gas. In the stratosphere (above 15 km), ozone is created by the interaction between solar ultraviolet radiation and molecular oxygen while chemical reactions with ozone depleting



substances destroy ozone molecules. Stratospheric ozone plays a decisive role in the stratospheric radiative balance. It absorbs ultraviolet B radiation protecting life at the surface of the earth. The depletion may also be triggered by climate change, resulting in an increased ground-level flux of ultraviolet B radiation. (1)

Ozone Depleting Substance (ODS)

A family of man-made compounds that includes, but are not limited to, chlorofluorocarbons, bromofluorocarbons, methane trichloride (chloroform), carbon tetrachloride, methyl bromide, and hydrochlorofluorocarbons. These compounds have been shown to deplete stratospheric ozone, and therefore are typically referred to as ODSs. (1)

Ozone Layer

The layer of ozone that begins approximately 15 km above Earth and thins to an almost negligible amount at about 50 km, shields the Earth from harmful ultraviolet radiation from the sun. The highest natural concentration of ozone occurs at approximately 25 km above Earth. The stratospheric concentration changes with the seasons. Natural events such as volcanoes and solar flares can produce changes in ozone concentration, but man-made changes are of the greatest concern. (1)

P**Permafrost**

Ground (soil or rock and included ice and organic material) that remains at or below 0°C for at least two consecutive years. (28)

Phenology

The timing of natural events, such as flower blooms and animal migration is influenced by changes in climate. Phenology is the study of such important seasonal events. Phenological events are influenced by a combination of climate factors, including light, temperature, rainfall, and humidity. (1)

Photochemical smog

Photochemical smog is a brownish-grey haze caused by the action of solar ultraviolet radiation on atmosphere polluted with hydrocarbons and oxides of nitrogen. It contains anthropogenic air pollutants, mainly ozone, nitric acid, and organic compounds, which are trapped near the ground by temperature inversion. These pollutants and some others can affect human health and damage plants. Photochemical smog often has an unpleasant odour due to some of its gaseous components. The term smog is commonly used to represent a near-ground haze made of a combination of smoke and fog rather than ozone, nitric acid, and organic compounds. (29)

Photosynthesis

The process by which plants take carbon dioxide from the air to build carbohydrates, releasing oxygen in the process. There are several pathways of photosynthesis with different responses to atmospheric carbon dioxide concentrations. (1)

**Power-to-X**

Power-to-X refers to various technologies for storing or otherwise utilising surplus electricity in times of (future) oversupply of variable renewable energies such as solar energy, wind energy and hydropower. (30)

Power-to-Heat (PtH)

Power-to-Heat means generating heat using electrical energy. As a technology, it is one of the most promising options in the fight against climate change and makes a massive contribution to reducing carbon dioxide emissions - especially when Power-to-Heat systems utilise surplus electricity generated from renewable energy sources such as photovoltaics and wind power.

Power-to-Gas (PtG)

With Power-to-Gas technology, green electricity is converted into hydrogen by electrolysis and stored in existing gas infrastructures, transported, and made available again as required.

Power-to-Liquids (PtL)

The power-to-liquid concept is based on the conversion of renewable energy into liquid fuels and chemicals such as methanol, oxymethylene ether, ammonia and hydrocarbons. These liquids provide the high energy density required for aeroplanes, ships, and other applications with high energy requirements, including for travelling long distances. (31)

Q**R****Radiation**

Energy transfer in the form of electromagnetic waves or particles that release energy when absorbed by an object. (1)

Radiative Forcing

A measure of the influence of a particular factor (e.g. greenhouse gas, aerosol, or land use change) on the net change in the Earth's energy balance. (1)

Recycling

Collecting and reprocessing a used product or material so it can be used again. An example is collecting aluminium cans, melting them down, and using the aluminium to make new cans or other aluminium products. (1)

Reforestation

Planting of forests on lands that have previously contained forests but that have been converted to some other use. (1)

Relative Sea Level Rise

The increase in ocean water levels at a specific location, considering both global sea level rise and local factors, such as local subsidence and uplift. Relative sea level rise is measured with respect to a specified vertical datum relative to the land, which may also be changing elevation over time. (1)

**Relocalisation**

The transfer of production units closer to the consumers. The opposite of globalisation. A reduction in transport, together with a profound change in economic and social perceptions, in which the factors of proximity and the resettlement of industry in particular must be prioritised.

Renewable Energy

Energy resources that are naturally replenishing such as biomass, hydro, geothermal, solar, wind, ocean thermal, wave action, and tidal action.

Residence Time

The average time spent in a reservoir by an individual atom or molecule. With respect to greenhouse gases, residence time refers to how long on average a particular molecule remains in the atmosphere. For methane, for example, the residence time in the atmosphere is about 10 years, while carbone dioxide remains between 50 and 200 years in the atmosphere. Inert gases as “permanent gases” reside far longer in the atmosphere than any other gases. (1)

Resilience

A capability to anticipate, prepare for, respond to, and recover from significant multi-hazard threats with minimum damage to social well-being, the economy, and the environment. (1)

Respiration

The process whereby living organisms convert organic matter to CO₂, releasing energy and consuming O₂. (1)

S**Salt Water Intrusion**

Displacement of fresh or ground water by the advance of salt water due to its greater density, usually in coastal and estuarine areas. (1)

Sea ice

Sea ice, both Antarctica and Arctic seas, forms from salty ocean water. Overall, the Earth has lost a surface of sea ice the size of Maryland each year since 1979. (5)

Sea Surface Temperature

The temperature in the top several feet of the ocean, measured by ships, buoys and drifters. (1)

Sensitivity

The degree to which a system is affected, either adversely or beneficially, by climate variability or change. The effect may be direct or indirect. (1)

Sink

Any process, activity or mechanism which removes a greenhouse gas, an aerosol or a precursor of a greenhouse gas or aerosol from the atmosphere. (1)

**Snowpack**

A seasonal accumulation of slow-melting snow. (1)

Soil Carbon

A major component of the terrestrial biosphere pool in the carbon cycle. The amount of carbon in the soil is a function of the historical vegetative cover and productivity, which in turn is dependent in part upon climatic variables. (1)

Solar energy

Solar radiation is the electromagnetic radiation that is produced on the surface of the sun as blackbody radiation due to its temperature of approximately 5500 °C, which is ultimately due to nuclear fusion processes in the interior of the sun. Solar energy is the energy of solar radiation that reaches the earth and can be transformed into electricity, heat, or chemical energy.

Solar energy is an inexhaustible renewable source by human standards and can be used both directly and indirectly.

Solar Radiation Management (SRM)

Solar radiation modification (SRM), or solar geoengineering, is a type of climate engineering (or geoengineering) in which sunlight (solar radiation) would be reflected back to outer space to offset human-caused climate change. There are multiple potential approaches, with stratospheric aerosol injection being the most-studied, followed by marine cloud brightening. SRM could be a temporary measure to limit climate-change impacts while greenhouse gas emissions are reduced and carbon dioxide is removed but would not be a substitute for reducing emissions. (32)

Storm Surge

An abnormal rise in sea level accompanying a hurricane or other intense storm, whose height is the difference between the observed level of the sea surface and the level that would have occurred in the absence of the cyclone. (1)

Streamflow

The volume of water that moves over a designated point over a fixed period of time. It is often expressed as cubic feet per second (ft³/sec). (1)

Sulphate Aerosols

Particulate matter that consists of compounds of sulphur formed by the interaction of sulphur dioxide and sulphur trioxide with other compounds in the atmosphere. Sulphate aerosols are injected into the atmosphere from the combustion of fossil fuels and the eruption of volcanoes. Sulphate aerosols can lower the Earth's temperature by reflecting away solar radiation. General Circulation Models which incorporate the effects of sulphate aerosols more accurately predict global temperature variations. (1)

Sulphur Hexafluoride

A colourless gas soluble in alcohol and ether, slightly soluble in water. A very powerful greenhouse gas used primarily in electrical transmissions and distribution systems and as a dielectric in electronics. According to the IPCC's Fourth Assessment Report (AR4) the global warming potential of SF₆ is 22,800. (1)



Sustainability

Sustainability is the balance between the environment, equity and economy. Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs. (33)

Sustainable Mobility

Sustainable mobility is a concept for transforming transport from an ecological point of view. The aim is to reduce fuel consumption and emissions in such a way that the ecosystem can regenerate. (34)

T

Thermal Expansion

The increase in volume that results from warming water. A warming of the ocean leads to an expansion of the ocean volume, which leads to an increase in sea level. (1)

Thermochemical technologies

Thermochemical technologies are methods of capturing the energy potential of biomass. (5)

Thermohaline Circulation

Large-scale density-driven circulation in the ocean, caused by differences in temperature and salinity. In the North Atlantic the thermohaline circulation consists of warm surface water flowing northward and cold deep water flowing southward, resulting in a net poleward transport of heat. The surface water sinks in highly restricted sinking regions located in high latitudes. (1)

Thermonuclear energy

This energy source comes from the fusion of light nuclei (in most technologies deuterium and tritium, the latest being produced from lithium). There is presently a significant research and development activity in this field, including governmental laboratories, large international undertaking such as ITER and also start-up companies developing prototypes utilising various type of technologies. Nevertheless there is no thermonuclear plant with a net production of electricity.

The advantages highlighted for this energy source are that it could allow low carbon massive energy production in the long term, the intrinsic safety of the process, a significantly reduced problem waste. Other stakeholders point out the fact that technology will not be mature on time if ever.

Tipping point

A tipping point is a threshold in the evolution of a natural system (for instance water acidity or temperature, ice surface, loss of biodiversity) beyond which the system changes drastically.

Trace Gas

Nitrogen, oxygen, and argon make up more than 99 percent of the Earth's atmosphere. Other gases, such as carbon dioxide, water vapor, methane, oxides of nitrogen, ozone, and ammonia, are considered trace gases. Although relatively unimportant in terms of their absolute volume, they have significant effects on the Earth's weather and climate. (1)



Troposphere

The lowest part of the atmosphere from the surface to about 10 km in altitude in midlatitudes (ranging from 9 km in high latitudes to 16 km in the tropics on average) where clouds and “weather” phenomena occur. In the troposphere temperatures generally decrease with height. (1)

Tundra

A treeless, level, or gently undulating plain characteristic of the Arctic and sub-Arctic regions characterized by low temperatures and short growing seasons. (1)

U

Ultraviolet Radiation (UV)

The short wavelength range of light just beyond the violet end of the visible spectrum. This type of light carries more energy than visible light and can trigger various chemical reaction and damage to cells.

Although ultraviolet radiation constitutes only about 5 percent of the total energy emitted from the sun, it is the major energy source for the stratosphere and mesosphere, playing a dominant role in both energy balance and chemical composition.

Most ultraviolet radiation is blocked by Earth’s atmosphere, but some solar ultraviolet penetrates and aids in plant photosynthesis and helps produce vitamin D in humans. Too much ultraviolet radiation can burn the skin, cause skin cancer and cataracts, and damage vegetation. (1)

V

Vector propagation

A vector is a living organism that transmits pathogens from an infected animal to a human or another animal. Vectors are often arthropods, for example mosquitoes, ticks, flies, fleas and lice.

Vectors can transmit infectious diseases actively or passively:

Biological vectors, such as mosquitoes and ticks, can be carriers of pathogens that multiply in their bodies and are transmitted - usually through bites - to new hosts.

Mechanical vectors, such as flies, can carry infectious agents and pass them on through physical contact. (35)

Vulnerability to climate change (climate change vulnerability)

The degree to which a system is susceptible to, or unable to cope with, adverse effects of climate change, including climate variability and extremes. Vulnerability is a function of the character, magnitude, and rate of climate variation to which a system is exposed; its sensitivity; and its adaptive capacity. (1)

**W****Wastewater**

Water that has been used and contains dissolved or suspended waste materials. (1)

Water Vapor

The most abundant greenhouse gas, it is the water present in the atmosphere in gaseous form. Water vapor is an important part of the natural greenhouse effect. While humans are not significantly increasing its concentration through direct emissions, it contributes to the enhanced greenhouse effect because the warming influence of greenhouse gases leads to a positive water vapor feedback. In addition to its role as a natural greenhouse gas, water vapor also affects the temperature of the planet because clouds form when excess water vapor in the atmosphere condenses to form ice and water droplets and precipitation. (1)

Weather

Atmospheric condition at any given time or place. It is measured in terms of such things as wind, temperature, humidity, atmospheric pressure, cloudiness, and precipitation. In most places, weather can change from hour-to-hour, day-to-day, and season-to-season. Climate in a narrow sense is usually defined as the “average weather”, or more rigorously, as the statistical description in terms of the means and variability of relevant quantities over a period ranging from months or millions of years. (1)

Wet Bulb Globe Temperature

Wet Bulb Globe Temperature is a measure of the heat stress in direct sunlight, which takes into account: temperature, humidity, wind speed, sun angle and cloud cover. This differs from the heat index, which takes into consideration temperature and humidity and is calculated for shady areas. (36)

Wildfire

Wildfires are unplanned burns in any natural environment, like a forest or a grassland. Wildfire can spread quickly, burning through most anything in their path, causing injury and death to people and animals. (5)

Wind power

Wind power is the use of wind energy to generate useful work. Historically, wind power was used by sails, windmills, and windpumps, but today it is mostly used to generate electricity. Today, wind power is generated almost completely with wind turbines, generally grouped into wind farms, and connected to the electrical grid. (37)

World Weather Attribution

World Weather Attribution is an academic collaboration studying to climate change. Events such as heat waves, droughts, and storms are considered. When an extreme event occurs, the project computes the likelihood that the occurrence, intensity, and duration of the event was due to climate change. The project specializes in producing reports rapidly, while news of the event is still fresh. (<https://www.worldweatherattribution.org>) (38)



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Section for Research on Prevention

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100-Year Flood Levels

Severe flood levels with a one-in-100 likelihood of occurring in any given year. (1)

3-Rs of waste management

Reduce, Reuse, Recycle

Reduce means to cut back in the amount of trash we generate.

Reuse means to find new ways to use things that otherwise would have been thrown out.

Recycle means to turn something old and useless into something new and useful. (39)

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