Concepts on Climate Change Mitigation











TITLE Concepts on Climate Change Mitigation

PROPERTY

NOVA University Lisbon Campolide Campus 1099-085 Lisboa – Portugal Tel.: +351 213 715 600 <u>sustainability@unl.pt</u> sustainability.unl.pt

July, 2024

COORDINATION

Júlia Seixas, Pro-rector for Sustainability, NOVA University Lisbon

AUTHORS

Madalena Ravara, NOVA University Lisbon Sandra Martinho, Lasting Values

Legal Notice

The contents of this publication do not necessarily reflect the official opinions of the NOVA University Lisbon or any of its schools. Neither the NOVA University Lisbon nor any person or company acting on its behalf is responsible for the use that may be made of the information contained in this report.

Copyright notice

© NOVA University Lisbon, 2024

This publication is published under a Creative Commons Attribution 4.0 International (CC BY-NC 4.0) licence (https://creativecommons.org/licenses/by/4.0). This means that it may be re-used without prior permission, free of charge, for commercial or non-commercial purposes, provided that the NOVA University Lisbon is acknowledged as the original source of the material and that the original meaning or message of the content is not distorted. It allows reusers to distribute, remix, adapt, and build upon the material in any medium or format, for noncommercial purposes only.

Co-funded by

FUNDO / MBHENTAL





Concepts on Climate Change Mitigation

Absolute Emissions

Expression of a quantity of greenhouse gas (GHG) emissions in terms of mass of GHG or tonnes of carbon dioxide equivalent (CO₂e). In contrast with emissions intensity (SBTi).

Activity data

Data on the magnitude of a human activity resulting in emissions or removals taking place during a given period of time. Data on energy use, metal production, land areas, management systems, lime and fertilizer use, and waste arisings are examples of activity data (IPCC).

Absolute Zero/Zero emissions

No GHG emissions are attributable to an organization's activities across all scopes. Under this definition, no offsets or balancing of residual emissions with removals are used (University of Oxford).

Asset

An item of property, such as land, buildings, equipment, owned by an organization and used to produce income for the organization (Cambridge Dictionary, 2021). The term assets also include financial assets such as ownership of businesses, real estate or infrastructure assets, or financial products, such as loans and bonds.

Base Year

A historic datum (a specific year or, in the case of a base period, an average over multiple years) against which an organization's emissions are tracked over time (SBTi).

Base Year emissions

GHG emissions in the base year (GHG Corporate Protocol Standard).

Base Year emissions recalculation

Recalculation of emissions in the base year to reflect a change in the structure of the organization, or to reflect a change in the accounting methodology used. This ensures data consistency over time, i.e., comparisons of like with like over time (GHG Corporate Protocol Standard).

Baseline

A hypothetical scenario for what GHG emissions, removals or storage would have been in the absence of the GHG project or project activity (GHG Corporate Protocol Standard).

ک--:



A reference point against which an organization's performance can be compared (SBTi).

Biogenic carbon

Carbon derived from biogenic (plant or animal) sources excluding fossil carbon (IPCC).

Boundaries

GHG accounting and reporting boundaries can have several dimensions, i.e. organizational, operational, geographic, business unit, and target boundaries. The inventory boundary determines which emissions are accounted and reported by the organization (GHG Corporate Protocol Standard).

Carbon dioxide (CO₂)

A naturally occurring gas fixed by photosynthesis into organic matter. A byproduct of fossil fuel combustion and biomass burning, it is also emitted from land use changes and other industrial processes. It is the principal anthropogenic greenhouse gas that affects the Earth's radiative balance. It is the reference gas against which other greenhouse gases are measured, thus having a Global Warming Potential of 1 (IPCC).

Carbon Neutral

An organization's net contribution to global CO₂ emissions is zero. Any CO₂ emissions attributable to an organization's activities are fully compensated by CO₂ reductions or removals exclusively claimed by the organization — irrespective of the time period or the relative magnitude of emissions and removals involved (University of Oxford).

Carbon Negative

An organization's carbon removals, internal and external, exceed its emissions and any removals are "like for like". Must be specified over a declared time period, and whether removals and emissions are cumulative or represent only the time period specified (University of Oxford).

Carbon sequestration

The uptake of CO₂ and storage of carbon in biological sinks (GHG Corporate Protocol Standard).

Climate Change Mitigation

A human intervention to reduce emissions or enhance the sinks of GHGs (IPCC).

Climate Neutral

An organization's activities result in no net effect on the climate system. Any GHG emissions or other activities with warming effects are fully compensated by GHG reductions or removals, or other activities with cooling effects irrespective of the time period or the relative magnitude of emissions and removals involved. A near synonym for GHG neutral, but climate neutral also includes non-GHG radiative forcing



effects, such as land use changes with albedo effects (University of Oxford).

Climate Positive

An organization's GHG removals, internal and external, exceed its emissions and any removals are "like for like". Must be specified over a declared time period, and whether removals and emissions are cumulative or represent only the time period specified (University of Oxford).

Climate Targets

Goals set by an organization to reduce its impact on the climate. Targets may include a variety of GHG emissions across different corporate activities (i.e., operations, value chain, or products) and may focus on emissions abatement, neutralization, or beyond value chain mitigation (SBTi).

Carbon dioxide equivalent emissions (CO₂e)

The amount of carbon dioxide emission that would cause the same integrated radiative forcing or temperature change, over a given time horizon, as an emitted amount of a greenhouse gas (GHG) or a mixture of GHG. There are a number of ways to compute such equivalent emissions and choose appropriate time horizons. Most typically, the CO₂equivalent emission is obtained by multiplying the emission of a GHG by its global warming potential (GWP) for a 100-year time horizon (IPCC).

Decarbonization

The process by which countries, individuals or other entities aim to achieve zero fossil carbon existence. Typically refers to a reduction of the carbon emissions associated with electricity, industry and transport (IPCC).

Direct GHG emissions

Emissions from sources that are owned or controlled by the reporting organization (GHG Corporate Protocol Standard).

Emissions

The release of greenhouse gases and/or their precursors into the atmosphere over a specified area and period of time (UNFCCC Article 1.4).

Emission Factor

A coefficient that quantifies the emissions or removals of a gas per unit activity. Emission factors are often based on a sample of measurement data, averaged to develop a representative rate of emission for a given activity level under a given set of operating conditions (IPCC). They may also be referred to as conversion factors, emission intensity or carbon intensity.

Emissions Intensity

Emissions per a specific unit, for example: tCO₂e/\$million invested, tCO₂e/MWh, tCO₂e/ton produced, tCO₂e/\$million organization revenue (SBTi).

رے ۔ ج

Fugitive Emissions

Emissions that are not physically controlled but result from the intentional or unintentional releases of GHGs. They commonly arise from the production, processing transmission storage and use of fuels and other chemicals, often through joints, seals, packing, gaskets, etc (GHG Corporate Protocol Standard).

Greenhouse gases (GHG)

Greenhouse gases are those gaseous constituents of the atmosphere, both natural and anthropogenic, which absorb and emit radiation at specific wavelengths within the spectrum of thermal infrared radiation emitted by the Earth's surface, by the atmosphere itself, and by clouds. This property causes the greenhouse effect. Water vapor (H₂O), carbon dioxide (CO_2) , nitrous oxide (N_2O) , methane (CH_4) , and ozone (O_3) are the primary greenhouse gases in the Earth's atmosphere. Moreover, there are a number of entirely human-made greenhouse gases in the atmosphere, such as the halocarbons and other chlorine- and bromine- containing substances, dealt with under the Montreal Protocol. Besides CO₂, N₂O, and CH₄, the Kyoto Protocol deals with the greenhouse gases sulfur hexafluoride (SF₆), hydrofluorocarbons (HFCs), and perfluorocarbons (PFCs) (IPCC).

GHG source

Any physical unit or process which releases GHG into the atmosphere (GHG Corporate Protocol Standard). GHG emission reduction targets Goals set by an organization to reduce direct or indirect emissions by a specified amount (SBTi).

Global Warming Potential (GWP)

Global Warming Potentials (GWP) are calculated as the ratio of the radiative forcing of one kilogramme greenhouse gas emitted to the atmosphere to that from one kilogramme CO₂ over a period of time (e.g., 100 years) (IPCC).

Indirect GHG emissions

Emissions that are a consequence of the operations of the reporting organization but occur at sources owned or controlled by another organization (GHG Corporate Protocol Standard).

Infrastructure

Facilities built primarily to provide a public service or good rather than a commercial purpose, and from which the organization does not seek to gain direct economic benefit (GRI Standards).

Intensity ratio

Ratios that express GHG impact per unit of physical activity or unit of economic value (e.g. tonnes of CO₂ emissions per unit of electricity generated). Intensity ratios are the inverse of productivity/efficiency ratios (GHG Corporate Protocol Standard).

Inventory

A quantified list of an organization's GHG emissions and sources (GHG Corporate Protocol Standard).



رے ۔ ج







The activities and their associated direct and indirect emissions that are included in the GHG inventory. It results from the chosen organizational and operational boundaries (SBTi).

Net Zero emissions

Net zero emissions are achieved when anthropogenic emissions of GHGs to the atmosphere are balanced by anthropogenic removals over a specified period (IPCC).

Net Zero Goal

The internationally agreed upon goal for mitigating global warming in the second half of the century. The IPCC concluded the need for net zero CO₂ by 2050 to remain consistent with 1.5C (University of Oxford).

Mitigation (of climate change)

A human intervention to reduce the sources or enhance the sinks of greenhouse gases. Mitigation includes reducing the GHGs emitted from energy production and use (e.g., that reduces use of fossil fuels), and land use, and methods to mitigate warming, for example, by carbon sinks which remove emissions from the atmosphere through land-use or other (including artificial) mechanisms. The ultimate goal is to preserve a biosphere which can sustain human civilisation and the complex of ecosystem services which surround and support it. This means reducing anthropogenic GHG emissions towards net zero to limit the warming, with global goals agreed in the Paris Agreement (IPCC).

Offsetting

Reducing GHG emissions (including through avoided emissions), or increasing GHG removals through activities external to an organization, in order to compensate for GHG emissions, such that an organization's net contribution to global emissions is reduced. Offsetting is typically arranged through a marketplace for carbon credits or other exchange mechanism (University of Oxford).

Projection

A projection is a potential future evolution of a quantity or set of quantities, often computed with the aid of a model. Unlike predictions, projections are conditional on assumptions concerning, for example, future socio-economic and technological developments that may or may not be realized (IPCC).

Removals

Removal of greenhouse gases and/or their precursors from the atmosphere by a sink (IPCC).

Reporting

Presenting data to internal management and external users such as regulators, shareholders, the general public or specific stakeholder groups (GHG Corporate Protocol Standard).

رے ۔ ۔



Residual emissions represent the emissions that cannot be completely eliminated despite implementing all available mitigation measures contemplated in pathways that limit warming to 1.5°C with no or limited overshoot. In the context of sciencebased targets, residual emissions refer to the organization's scope 1, scope 2 and scope 3 emissions that remain once its long-term emissions reduction target has been achieved (SBTi).

Scenario

A plausible description of how the future may develop based on a coherent and internally consistent set of assumptions about key driving forces (e.g., rate of technological change, prices) and relationships (SBTi).

Scope

Defines the operational boundaries in relation to indirect and direct GHG emissions (GHG Corporate Protocol Standard).

Scope 1 inventory

A reporting organization's direct GHG emissions (GHG Corporate Protocol Standard).

Scope 2 inventory

A reporting organization's emissions associated with the generation of electricity, heating/cooling, or steam purchased for own consumption (GHG Corporate Protocol Standard).

Scope 3 inventory

A reporting organization's indirect emissions other than those covered in scope 2 (GHG Corporate Protocol Standard).

Source

Any process or activity which releases a greenhouse gas, an aerosol or a precursor of a greenhouse gas into the atmosphere (UNFCCC Article 1.9).

Stationary Combustion

Burning of fuels to generate electricity, steam, heat, or power in stationary equipment such as boilers, furnaces etc (GHG Corporate Protocol Standard).

Survey

A survey is an investigation about the characteristics of a given population by means of collecting data from a sample of that population and estimating their characteristics through the systematic use of statistical methodology (IPCC).

Value chain emissions

Emissions from the upstream and downstream activities associated with the operations of the reporting organization (GHG Corporate Protocol Standard).