



International Actuarial Association
Association Actuarielle Internationale

Glossary of Defined Terms Used in IAA Climate-Related Risk Publications

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This Glossary has been prepared and is maintained by the Climate Risk Task Force of the International Actuarial Association (IAA).

The IAA is the worldwide association of professional actuarial associations, with several special interest sections and working groups for individual actuaries. The IAA exists to encourage the development of a global profession, acknowledged as technically competent and professionally reliable, which will ensure that the public interest is served.

The role of the Climate Risk Task Force is to deliver on the [*Statement of Intent for IAA Activities on Climate-Related Risks*](#) as adopted by the IAA's Council on 7 May 2020.



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Glossary of Defined Terms Used in IAA Climate-Related Risk Publications

This glossary is the single repository of all defined terms used in IAA climate-related risk publications.

ACPR: French prudential supervisory authority.

Adaptation: when used in relation to climate, it is the process of adjustment to actual or expected climate and its effects.

Adaptive capacity: The IPCC defines adaptive capacity as the ability of systems, institutions, humans, and other organisms to adjust to potential damage, to take advantage of opportunities, or to response to consequences.

Anthropogenic global warming: global warming caused by human greenhouse gas emissions.

ARn: nth Assessment Report of the Intergovernmental Panel on Climate Change. The first assessment report is confusingly called FAR.

BAU: Business as Usual, a scenario where no actions to lower greenhouse gas emissions are being taken. It is equivalent to a pathway with radiative forcing of 8.5 W/m² by 2100 (Representative Concentration Pathway 8.5).

Biosphere: the sum of all ecosystems of the Earth, or the zone of life.

BP: British Petroleum.

CAPEX: capital expenditure.

Carbon footprint: the amount of greenhouse gases – primarily carbon dioxide – released into the atmosphere by a particular human activity.

Carbon footprint per capita: a measure of the carbon dioxide emission per person. Values range from 50 tons in Qatar to approximately 16 tons in Canada and the US, 8.6 tons in the European Union and close to zero in sub-Saharan Africa. (Data from Emissions Database for Global Atmospheric Research for 2018.)

Carbon footprint per GDP: A measure of carbon dioxide emission per GDP. It is measured by kg per GDP at Purchasing Power Parity and ranges from 0.5 for China to 0.3 for the US and Canada and 0.1 for Switzerland. (Data from the World Bank for 2016.)

Carbon neutrality: carbon neutrality means purchasing carbon reduction credits equivalent to emissions released. It does not feature an explicit requirement for emissions reduction to have taken place, nor does it always include greenhouse gases other than CO₂. See also “Net Zero”.

Carbon offset: reduction or removal of greenhouse gas emissions, to compensate for emissions that occur elsewhere.

CBAM: Carbon Border Adjustment Mechanism.

CBES: Climate Biennial Exploratory Scenario (Bank of England).

CCS: Carbon Capture and Storage are technologies for capturing carbon dioxide and storing it so that it will not enter the atmosphere.

CFRF: Climate Financial Risk Forum, a forum set up in 2019 and co-chaired by the UK prudential and conduct regulators, the PRA and FCA.

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Climate: the long-term average and variability of weather, typically averaged over a period of 30 years.

Climate Action 100+: investor initiative launched in 2017 to ensure the world's largest corporate greenhouse gas emitters take necessary action on climate change.

Climate change: the statistically defined change in the average and/or variability of the climate system, which includes the atmosphere, water cycle, land surface, cryosphere and biosphere and their interactions.

Climate refugees: people fleeing the effects of climate change. The United Nations Human Rights Committee ruled that "refugees fleeing the effects of the climate crisis cannot be forced to return home by their adoptive countries".

Climate-related risk: the potential negative impacts of climate change, and society's responses to it.

Climate system: consists of the interaction of the atmosphere, hydrosphere, cryosphere, lithosphere and biosphere.

Climate Value-at-Risk (Climate VaR): quantifies the size of loss attributable to climate-related financial risks by comparing the value of assets in a world with climate change relative to the same world without climate change.

CMSI: Climate Measurement Standards Initiative (Australia).

CO₂e: carbon dioxide equivalent is a unit that allows emissions of greenhouse gases of different warming potential to be added together to simplify analysis and comparisons. However, the conversion does not fully reflect the differences in persistency and in the timing of the resulting warming effect.

COP: Conference of the Parties, the supreme decision-making forum of the United Nations Framework Convention on Climate Change, held annually. All states that are Parties to the Convention are represented at the COP, at which they review the implementation of the Convention and any other legal instruments that the COP adopts, and take decisions necessary to promote the effective implementation of the Convention, including institutional and administrative arrangements.

Cryosphere: parts of the Earth's surface where water is frozen, including sea, lake and river ice; glaciers; snow cover; ice sheets and caps; and permafrost.

CSR: corporate social responsibility.

CSSR: the Climate Science Special Report is to be published every four years by the United States Global Change Research Program (USGCRP). The USGCRP is moving towards an assessment process to integrate scientific knowledge into the mandated quadrennial National Climate Assessment. As part of this process, the USGCRP is developing the CSSR, a technical report that details the current state-of-science relating to climate change and its physical impacts. The CSSR is intended to focus on climate change in the US and to inform future USGCRP products.

Double materiality: double materiality refers to considering not just the impact of climate change on an organization, but also the impact of the organization's activities on the climate. The double materiality concept can be extended to other sustainability-related matters (e.g., biodiversity and ecosystem services).

ECB: European Central Bank.

EIOPA: European Insurance and Occupational Pensions Authority.

ERM: enterprise risk management.

ESG: environmental, social and governance – factors measuring the sustainability and social impact of investments and businesses.

ETS: Emissions Trading Scheme.

European Green Deal: a set of policy initiatives by the European Commission with the overarching aim of making the European Union climate neutral in 2050.

EU Taxonomy for Sustainable Activities: a classification system establishing a list of environmentally sustainable economic activities.

Exposure: The IPCC defines exposure to climate change as the presence of people, livelihoods, species or ecosystems, environmental functions, services and resources, infrastructure, or economic, social or cultural assets in places and settings that could be adversely affected. As typically used in actuarial practice the term refers to the measure or amount of an item that is subject to risk.

FAR: First Assessment Report of the Intergovernmental Panel on Climate Change (1990).

FCA: Financial Conduct Authority, a UK financial regulatory body.

FCR: financial condition report.

Forestry carbon capture: forests absorb carbon dioxide and help to reduce greenhouse gas from the atmosphere.

GDP: gross domestic product.

Geo-engineering: deliberate and large-scale intervention in the Earth's climate system, usually with the aim of mitigating the adverse effects of global warming. It includes techniques for solar radiation management and methods of greenhouse gas removal.

GFANZ: Glasgow Financial Alliance for Net Zero, a global coalition of financial institutions committed to accelerating the decarbonization of the economy and bringing together all net zero finance initiatives in one sector-wide coalition.

GFC: global financial crisis.

GHG: greenhouse gas – gas that absorbs and emits radiant energy within the thermal infrared range. Greenhouse gases in the Earth's atmosphere are primarily carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), perfluorocarbons (PFCs), hydrofluorocarbons (HFCs) and sulphur hexafluoride (SF₆). Ozone (O₃) is technically a greenhouse gas depending on where it is in atmosphere, and included in clean air legislation and the Montreal Protocol, not in climate agreements.

Green asset: generally refers to investment that raises capital for projects with environmental benefits.

Green Bond Principles: refer to voluntary process guidelines that recommend transparency and disclosure and promote integrity in the development of the green bond market by clarifying the approach for issuance of a green bond. They are established by the International Capital Market Association.

Greenhouse Gas Protocol: a non-governmental organization partnership between the World Resources Institute (WRI) and the World Business Council for Sustainable Development (WBCSD) established in 1997 to provide comprehensive global standardized frameworks to measure and manage greenhouse gas emissions from private and public sector operations, value chains and mitigation actions.

Green premium ("Greenium"): reflected in the higher prices and lower yield required on green bonds.

Greenwashing: making false or misleading claims about the environmental benefits of a product, service or technology. This may include material discrepancy between long-term environmental commitments and short-term action.

GRI: Global Reporting Initiative, an international independent organization that provides standards for businesses and other organizations to report their impacts on climate and sustainability issues.

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GWP: Global Warming Potential, the heat absorbed by any greenhouse gas in the atmosphere, as a multiple of the heat that would be absorbed by the same mass of carbon dioxide. Carbon dioxide has a GWP of 1, methane 12.4 and carbon tetrafluoride (CF₄) 50,000.

Hazard: Potential occurrence of a natural or human-induced physical event or trend that may cause loss of life, injury, or other health impacts, as well as damage and loss to property, infrastructure, livelihoods, service provision, ecosystems and environmental resources. A wide range of climate-related hazards exist, ranging from sudden onset storms, wildfires and floods to slow onset sea level rise, droughts and desertification.

Hydrosphere: the combined amount of water above, on and under the surface of the Earth. It includes water vapor (H₂O).

IAA: International Actuarial Association.

IEA: International Energy Agency.

IMF: International Monetary Fund.

Implied Temperature Rise: attempts in broad terms to estimate the global temperature rise associated with the greenhouse gas emissions of a portfolio if the global economy experienced the same emissions pathway as that portfolio.

IPCC: Intergovernmental Panel on Climate Change, the United Nations (UN) body for assessing the science related to climate change. Created by the UN in 1988, it is an organization of governments that are members of the UN or the World Meteorological Organization, and comprises 195 members. (Data from the IPCC for 2020.)

ISSB: International Sustainability Standards Board, an independent body that develops and approves International Financial Reporting Standards (IFRS) Sustainability Disclosure Standards under the oversight of the IFRS Foundation.

Keeling Curve: the graph of the daily values of the carbon dioxide concentration in the Earth's atmosphere in parts per million, taken at the Mauna Loa Observatory on the island of Hawaii and available continuously from the Scripps Institution of Oceanography from 1958 to the present day.

Kyoto Protocol: an international treaty that extends the 1992 United Nations Framework Convention on Climate Change that commits state Parties to reduce greenhouse gas emissions, based on the scientific consensus that global warming is occurring and is extremely likely to be anthropogenic. The Protocol was adopted in Kyoto in 1997 and entered into force in 2005. There are currently 192 Parties to the Protocol.

Liability-driven investment (LDI): investment approach based on the cash flows needed to fund future liabilities.

Lithosphere: the crust and uppermost mantle of the Earth.

Loss Recovery: the process of assessing and recovering from the damages occurred due to a climate change event or situation. Some financial losses can be recouped through private sector insurance benefits government assistance etc.

LRR: legal and reputation risks.

Maladaptation: changes in natural or human systems that inadvertently increase vulnerability to climatic stimuli; an adaptation that does not succeed in reducing vulnerability but increases it instead.

Methane clathrate: a form of water ice that contains a large amount of methane within its crystal structure, occurring in ocean sediments and under permafrost regions. Its release would add substantially to anthropogenic carbon emissions.

Minimum tillage: a farming practice which aims to minimize soil manipulation through minimum furrowing, use of organic fertilizer and minimum use of chemicals. One of the advantages is less soil erosion compared to conventional tillage.

Mitigation: when used in relation to climate, efforts to reduce the amount of greenhouse gas emissions released into the atmosphere and that reduce the current concentration of these gases by enhancing sinks (e.g., increasing the area of forests). In the context of climate, mitigation is different from adaptation. As typically used in actuarial practice the term refers to an action that reduces the frequency or severity of a risk.

NDC: Nationally Determined Commitments are at the heart of the Paris Agreement. The Paris Agreement requires each Party to prepare, communicate and maintain successive nationally determined contributions that it intends to achieve for its post-2020 climate actions. The Commitments embody efforts by each country to reduce national emissions and adapt to the impacts of climate change.

NDC scenario: a scenario where emissions are such that they lead to a radiative forcing of 2.6 W/m² by 2100 (Representative Concentration Pathway 2.6).

Negative emissions: these happen when more CO₂ is taken out than is being put into the atmosphere by using carbon-capture technologies, improving soil carbon capture through adjustments in farming methods, regenerating depleted forests and expanding coastal and underwater plant life.

Negative screening: an investment-selection approach of excluding companies that do business in sectors harmful to the environment or the society.

Net zero: the net zero concept goes further than carbon neutrality as it requires reducing emissions as much as possible before balancing any residual emissions through carbon removal or carbon offsetting. Net zero also considers greenhouse gas emissions overall and sets a target for all emissions in an organisation's value chain.

Net zero scenario: a scenario where net zero is reached by a certain date, such as 2050.

NFRD: the European Union (EU) Non-Financial Reporting Directive (Directive 2014/95/EU) lays down the rules on disclosure of non-financial and diversity information by large EU companies. The NFRD will be replaced by the CSRD (Corporate Sustainability Reporting Directive) with a broader application scope.

NGFS: Network of Central Banks and Supervisors for Greening the Financial System, established at the Paris One Planet Summit in December 2017. Central banks and supervisors established the NGFS to help strengthen the global response required to meet the goals of the Paris Agreement and enhance the role of the financial system to manage risks and to mobilize capital for green and low-carbon investments.

NZAM: Net Zero Asset Managers initiative, an international group of asset managers committed to supporting investing aligned with net zero emissions by 2050 or sooner.

NZAOA: Net-Zero Asset Owner Alliance, an international group of institutional investors committed to transitioning their investment portfolios to net zero greenhouse gas emissions by 2050 or sooner.

NZBA: Net-Zero Banking Alliance, an international coalition supporting the banking industry to align its investment and lending portfolios with net zero emissions by 2050 or sooner.

NZFSPA: Net Zero Financial Service Providers Alliance, a global group of financial service providers committed to supporting the goal of global net zero greenhouse gas emissions by 2050 or sooner.

NZIA: Net-Zero Insurance Alliance, a global group committed to transition its insurance and reinsurance underwriting portfolios to net zero greenhouse gas emissions by 2050 or sooner.

NZICI: Net Zero Investment Consultants Initiative, an international group of investment consultants committed to integrating net zero into investment advice.

Ocean acidification: the decrease in the pH of the Earth's oceans, caused by the uptake of carbon dioxide from the atmosphere.

OECD: Organisation for Economic Co-operation and Development.

OPEC: Organization of Petroleum Exporting Countries.

ORSA: Own Risk Solvency Assessment.

Overall portfolio alignment: at a basic level, overall portfolio alignment refers to the proportion of the portfolio committed to "net zero by 2050".

PAII: Paris Aligned Investment Initiative, a collaborative investor-led global forum enabling investors to align their portfolios and activities to the goals of the Paris Agreement.

Paris Agreement: an agreement within the United Nations Framework Convention on Climate Change dealing with greenhouse gas emissions mitigation, adaptation and finance, signed in 2016 by 189 governments. Its long-term temperature goal is to keep the increase in global average temperature to well below 2°C above pre-industrial levels, and to pursue efforts to limit the increase to 1.5°C.

Pathway: a representation of a scenario by a curve, called a pathway or trajectory, that traces the evolution of a metric over time, often complemented by a confidence interval.

PCAF: Partnership for Carbon Accounting Financials.

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

Physical risks: risks resulting from climate can be event-driven (acute) or longer-term (chronic) shifts in climate patterns. Physical risks may have financial implications for organizations, such as direct damage to assets and indirect impacts from supply chain disruption. Organizations' financial performance may also be affected by changes in water availability, sourcing and quality; food security; and extreme temperature changes affecting their premises, operations, supply chain, transport needs and employees' safety.

Portfolio emissions: overall greenhouse gas emissions generated by the companies in a portfolio (reduced according to the extent of the fund's shareholding in each company).

Positive screening: an investment-selection approach that include companies which demonstrate strong environmental, social and governance credentials in their area of business.

ppm: parts per million.

PRA: Prudential Regulation Authority, a UK financial regulatory body.

QNV2030: Qatar National Vision 2030.

Radiative forcing: the difference between energy absorbed by the Earth and energy radiated back to space. It is a measure of the influence a factor has in altering the balance of incoming and outgoing energy in the Earth's atmosphere, and is an index of the importance of the factor as a potential climate-change mechanism. Radiative forcing values are for changes relative to pre-industrial conditions – defined as before the year 1750 – and are expressed in W/m^2 .

RCP: Representative Concentration Pathway, a greenhouse gas concentration trajectory adopted by the Intergovernmental Panel on Climate Change. The pathways describe different climate futures, depending on the volume of greenhouse gases being emitted. They are labelled after the possible range of radiative forcing values in the year 2100 (2.6, 4.5, 6 and $8.5 W/m^2$).

RCPx: Representative Concentration Pathway leading to a radiative forcing value of $x W/m^2$.

Regenerative agriculture practices: agricultural practices which aim to increase the organic content of soil to improve their fertility.

Renewable energy: generated from resources which are naturally replenished on a human time scale; for example, from wind, sunlight, rain, tides, waves, or geothermal heat.

Resilience: In the context of climate-related risks, the IPCC defines resilience as the capacity of social, economic and environmental systems to cope with a hazardous event or trend or disturbance, responding or reorganizing in ways that maintain their essential function, identity, and structure, while also maintaining the capacity for adaptation, learning, and transformation. Adaptation can strengthen climate resilience. However, resilience also encompasses the management of residual risks which will remain despite efforts to mitigate and adapt to climate change (e.g., due to economic, financial, capacity, social and cultural constraints).

SASB: Sustainability Accounting Standards Board, a non-profit organization which develops sustainability accounting standards.

SBTi: Science Based Targets initiative.

Scientific consensus on climate change: the agreement by most scientists and scientific organizations that the Earth is warming and that this warming is caused mainly by human activities. This consensus is supported by various studies of scientists' opinions and by position statements of scientific organizations, many of which explicitly agree with the Intergovernmental Panel on Climate Change's synthesis reports. Currently, among major scientific organizations, only the American Association of Petroleum Geologists has issued a non-committal statement.

Scope 1 emissions: direct emissions from company-owned and company-controlled resources. In other words, emissions released to the atmosphere as a direct result of a set of activities, at a firm level.

Scope 2 emissions: indirect emissions from the generation of purchased energy from a utility provider. In other words, all greenhouse gas emissions released in the atmosphere from the consumption of purchased electricity, steam, heat, and cooling.

Scope 3 emissions: a consequence of the activities of a company, but occurring from sources not owned or controlled by the company. Some examples of Scope 3 activities are extraction and production of purchased materials, transportation of purchased fuels and use of sold products and services, financing, investments, and insurance of emissions-intensive activity.

SDGs: Sustainable Development Goals.

Sensitivity: Climate sensitivity is the term used by the Intergovernmental Panel on Climate Change (IPCC) to describe the extent to which rising levels of greenhouse gases affect the Earth's temperature. As typically used in actuarial practice the term refers to the measurement of the change of a key variable in response to a small change of one or some of the drivers of that key variable.

SFDR: Sustainable Finance Disclosure Regulations.

Shift Project: a French non-profit thinktank created in 2010 that aims to limit climate change and the economy's dependency on fossil fuels.

SSPs: Shared Socioeconomic Pathways.

Stranded assets: assets that have suffered from unanticipated or premature write-downs, devaluations or conversion to liabilities.

TCFD: Task Force on Climate-related Financial Disclosure, established by the Financial Stability Board (FSB), with members chosen by the FSB to include both users and preparers of disclosures from across the G20's constituency, covering a broad range of economic sectors and financial markets.

TNFD: Taskforce on Nature-related Financial Disclosures, a global initiative to develop a risk management and disclosure framework for organisations to report and act on nature-related risks.

Transition bond: bond proceeds are used to fund projects that contribute to the bond issuer's long-term transition strategy to reduce greenhouse gas emissions.

Transition risks: risks emanating from transitioning to a lower-carbon economy that may entail extensive policy, legal, technology and market changes to address mitigation and adaptation requirements related to climate. Depending on the nature, speed and focus of these changes, transition risks may pose varying levels of financial and reputational risk to organizations.

UNDRR: United Nations Office for Disaster Risk Reduction (formerly UNISDR) brings governments, partners and communities together to reduce disaster risk and losses to ensure a safer, more sustainable future.

UNEP: United Nations Environment Programme, founded in 1972 and responsible for coordinating the UN's environmental activities and assisting developing countries in implementing environmentally sound policies and practices.

UNEP FI: United Nations Environment Programme Finance Initiative, created in 1992 following the Earth Summit in Rio de Janeiro as a global partnership established between the UNEP and the financial sector.

UNFCCC: United Nations Framework Convention on Climate Change, adopted on 9 May 1992 as an international environmental treaty. Its objective is to "stabilize greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system".

UN PRI: United Nations Principles for Responsible Investment. Six aspirational principles of an UN-supported international network of investors.

UN PSI: the United Nations Environment Programme Finance Initiative's Principles for Sustainable Insurance initiative provides global guidance on the integration of environmental, social and governance risks into all activities in the insurance value chain.

Vulnerability: The IPCC defines vulnerability to climate change as the extent 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.

WACI: Weighted Average Carbon Intensity, a measure of exposure to carbon-intensive companies, expressed in tons of carbon dioxide equivalent per unit of revenue.

WEC: World Energy Council, a forum promoting sustainable supply and use of energy.

W/m²: watts per square metre.

WMO: World Meteorological Organization, an intergovernmental organization with a membership of 193 Member States and Territories; a specialized agency of the United Nations.