Glossary of Climate Change Terms and Definitions

This glossary provides an explanation of various terms relating to climate change appearing in publications and presentations published by American Academy of Actuaries committees, subcommittees, and task forces. The goal of the glossary is to familiarize actuaries with terms, clarify ambiguous interpretations, help explain the implications of climate change on the services performed by the actuary, and introduce the user to research prepared by Academy work groups. This glossary is expected to be updated on a regular basis as new developments relating to climate change emerge that impact the work performed by actuaries.

2° Investing Initiative (2DII):

The goal of the 2DII, "a non-profit think tank, is to align insurers' investment portfolios with international climate goals." 2DII developed models to analyze data reported in the 2019 Schedule D of the statutory statements from 250 New York domestic insurers. The conclusion reached by the study was that insurers are currently overinvested in coal- and oil-fired generation and underinvested in low-carbon technology, energy renewables and gas-fired generators.

ACI:

The Actuaries Climate Index® (ACI) is an educational tool created and maintained by four North American actuarial associations—the American Academy of Actuaries (Academy), the Canadian Institute of Actuaries (CIA), the Casualty Actuarial Society (CAS), and the Society of Actuaries (SOA)—to help inform actuaries, public policymakers, and the general public about climate trends and some of the potential impacts of a changing climate on the United States and Canada. The index covers the U.S. and Canada, and breaks results down for 12 regions, seven in the U.S. The index generally shows increasing likelihood of extreme weather events since the end of the reference period 1961–1990, using data related to observed changes in extreme weather and sea level. It is intended to provide a useful monitoring tool of climate trends and is updated quarterly as data for each meteorological season becomes available.

ACRI:

The Actuaries Climate Risk Index® (ACRI) is an index intended to measure the change in damages for property losses during the period 1991–2016 that could be attributed specifically to changing climate, controlling for changes in exposure in excess of those observed in the reference period, as measured by the ACI.

Actuaries' Research and Activity on Climate Change:

The Academy, the Casualty Actuarial Society and the Society of Actuaries, as well as the International Actuarial Association (IAA), are each performing research and reporting on recent developments in the climate arena in addition to the ACI and ACRI. The website for each organization has information about their current research and publications.

Actuarial Standards of Practice:

Currently, actuarial standards of practice (ASOPs) do not specifically highlight climate change or its impacts as a consideration, but they may implicitly suggest these as such under the considerations of uncertainty or provisions for risk. For example, ASOP No. 22, *Statements of Opinion Based on Asset Adequacy Analysis by Actuaries for Life or Health Insurers,* provides guidance to the appointed actuary in providing statements of actuarial opinion relating to asset adequacy services, which considers the assets, liabilities, and cash flows supporting reserves. Climate change may have a direct impact on asset and liability cash flows for particular insurers. Climate change risks to investment portfolios arise from both physical and transitional risks arising from climate change, as well as potential rebalancing into new asset classes. Climate change risk is among the considerations that actuaries may need to consider in their work and in their Statements of Actuarial Opinions (SAOs).

Attribution Science:

A field of research, largely used in climate studies, that seeks to test whether—and by how much—climate change may be responsible for certain extreme weather events, such as droughts, extreme flooding, hurricanes, excessive heat, or unusual storm trajectories. Numerous studies have already been conducted over the past several years on the impact of climate change on wildfires, droughts, and heat waves across the globe.

Carbon Footprint:

The total amount of greenhouse gases that are emitted into the atmosphere each year by a person, family, building, organization, or company.

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 long time horizons.

Climate-Related Risk:

Climate-related risk, also referred to as climate risk, refers to the potential impacts of climate change. It includes the potential for effects on lives; livelihoods; health status; economic, social, and cultural assets; services (including environmental); and infrastructure due to climate change.

Climate Risk Financial Disclosures:

Financial statements of insurers and non-insurers include descriptions of the risks that may impact the particular entity, including risks related to the impacts of climate and climate change on the operations, profitability, and solvency of the entity. Regulators are currently in the process of defining or requiring specific information for inclusion in these disclosures in order to promote further comparability among entities.

ESG:

Environment, Social, Governance (ESG) is a multidimensional concept that weighs social, economic, and environmental considerations. This comprehensive approach is inherent in the United Nation's Sustainable Development Goals. Global institutional investors have indicated social issues were the most difficult to assess and integrate into their investment analysis. Challenges that need to be addressed are to properly incorporate the "S" into sustainable finance approaches.

Fossil Fuels:

A general term for 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.

Global Warming:

The overall increase in worldwide temperatures which, according to scientists, is exacerbated by rising greenhouse gas emissions.

Greenhouse Effect:

The trapping and buildup of heat in the atmosphere near the Earth's surface (troposphere). Some of the heat flowing back toward space from the Earth's surface is absorbed by water vapor, carbon dioxide, ozone, and several other gases in the atmosphere and then re-radiated back toward the Earth's surface.

Greenhouse Gas (GHG):

Any gas that absorbs infrared radiation in the atmosphere. Greenhouse gases include, carbon dioxide, methane, nitrous oxide, ozone, chlorofluorocarbons, hydrochlorofluorocarbons, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride.

Greenhouse Gas Emissions:

Greenhouse gas emissions are categorized into three groups or "Scopes" by the most widely used international accounting tool, the Greenhouse Gas Protocol. Scope 1 covers direct emissions from owned or controlled sources. Scope 2 covers indirect emissions from the generation of purchased electricity, steam, heating, and cooling consumed by the reporting company. Scope 3 includes all other indirect emissions that occur in a company's value chain.

Low-Carbon Transition:

The process by which a country changes from using its existing energy sources (which may include both high-carbon energy and low-carbon energy) to just using low-carbon energy.

NAIC Own Risk and Solvency Assessment (ORSA) Guidance Manual:

The National Association of Insurance Commissioners (NAIC) Own Risk and Solvency Assessment (ORSA) Guidance Manual specifies that insurers must categorize, manage, and monitor policies and procedures pertaining to their material and relevant risks at the group and entity level. When material climate risk is present, ORSA requires documentation that describes the assessment, measurement, and listing of key assumptions. The manual also requires risk assessment under both normal and stress scenarios, which would include material climate risk. Specific ORSA-related climate reporting requirements may differ by state. For example, for New York domestic insurers, a qualitative assessment is acceptable for carriers with no significant exposure to climate risks, but quantitative assessment is the long-term goal.

Net Zero:

Net zero means cutting greenhouse gas emissions to as close to zero as possible, with any remaining emissions removed from the atmosphere by being absorbed by oceans and forests, for instance.

Net-Zero Pledge:

A growing coalition of countries, cities, businesses, and other institutions is pledging to get to net-zero emissions. More than 70 countries, including the biggest contributors to GHG emissions—China, the United States, and the European Union—have set a net-zero target, covering approximately 76% of global emissions. More than 3,000 businesses and financial institutions are working with the Science-Based Targets Initiative to reduce their emissions in line with climate science, and more than 1,000 cities, over 1,000 educational institutions, and over 400 financial institutions have joined the Race to Zero Campaign, pledging to take rigorous, immediate action to halve global emissions by 2030.

NY DFS 4 Climate Risk Scenarios:

The New York State Department of Financial Services (DFS) has proposed a definition of four climate risk scenarios for domestic insurers to model and incorporate in public disclosures. The NY DFS climate risk scenarios evaluate assets and liabilities reflecting the phase-out of fossil-fuel-based energy. Scenario One reflects orderly transition with minimum financial market disruption and limited increase in natural disasters. Scenario Two reflects a disorderly transition with large financial market disruption accompanied by a limited increase in natural disasters. Scenario Three is a disorderly transition with a drastic increase in natural disasters, and Scenario Four assumes no transition (as the economy continues to use the same amount of fossil fuels) accompanied with a drastic increase in natural disasters. The DFS guidance indicates expectations that insurers utilize these scenarios to understand the impact climate risks will have on solvency, liquidity, and their financial ability to pay claims.

Ozone Layer:

The layer of ozone that begins approximately 10 miles above the earth, which thins to an almost negligible amount at about 30 miles and shields the earth from harmful ultraviolet radiation from the sun. The highest natural concentration of ozone (approximately 10 parts per million by volume) occurs in the stratosphere at approximately 15 miles above the earth. The stratospheric ozone concentration changes throughout the year as stratospheric circulation changes with the seasons. Natural events such as volcanoes and solar flares can produce changes in ozone concentration, but manmade changes are also a concern, according to the U.S. Environmental Protection Agency (EPA).

Paris Agreement:

The Paris Agreement is an international treaty on climate change. It was adopted by 196 Parties at the Conference of the Parties (COP) 21 in Paris in December 2015 and entered into force in November 2016. Its goal is to limit global warming rise to well below 2 degrees Celsius, preferably to 1.5 degrees, compared to pre-industrial levels. To achieve this long-term temperature goal, countries aim to reach global peaking of greenhouse gas emissions as soon as possible to achieve a climate neutral world by midcentury.

Paris Agreement Capital Transition Assessment (PACTA) Climate Temperature Scenarios:

The PACTA analysis uses three climate scenarios from the International Energy Agency's World Energy Outlook (WEO) 2020 report. The Current Policy Scenario (CPS) is a business-as-usual scenario based on policies currently existing. It equates to a ≥3.2° global average temperature rise by 2100. The Stated Policy Scenario (STEPS) assumes announced policies in the future. It equates roughly to a 2.7°C global average temperature rise by 2100. The Sustainable Development Scenario (SDS) looks to achieve goals set out by the United Nations Sustainable Development Goals, Paris Aligned. It equates roughly to a 1.75°-2.0°C global average temperature rise per year by 2100. This example of a particular proprietary set of scenarios is intended to illustrate that a range of approaches to building scenarios is available.

Paris Agreement Capital Alignment Assessment:

The Paris Agreement Capital Transition Assessment (PACTA) model prepared by the 2° Investing Initiative (2DII) has been used by more than 3,000 financial institutions, governments, supervisory authorities, and industry associations. The model assesses the alignment of investors' and banks' portfolios with different climate scenarios ranging from business as usual to alignment with Paris Agreement. Results will help with the understanding of the extent to which financial portfolios may be exposed to transition risks. Other vendors and models exist. PACTA is representative of a broader category of models.

Physical Risks:

Physical risks arise from the increasing frequency, severity, and volatility of acute events, such as hurricanes, floods, and wildfires, as well as chronic shifts in weather patterns, such as droughts disrupting agriculture production. These physical risks may impact property/casualty and health insurers differently depending upon their specific products and geography.

Portfolio Alignment:

Portfolio realignment alters the investment strategy of the insurance company to work to reduce global warming by increasing investment allocation in low-carbon bond and equity investments. Alignment of an investment portfolio to match the Paris benchmark may require rebalancing a portfolio over time, which may be more difficult or costly for a portfolio with longer-term investments.

Strategic Approach to Managing Climate Risk:

Every entity develops its own strategic approach to managing climate risk. The New York State Department of Financial Services (NY DFS) expects domestic insurers licensed by it to manage climate risks and be monitored through the financial examination process. The NY DFS indicates that climate risks need to be integrated into corporate governance, business decisions, and financial risk management programs. Climate risk analysis should include climate risk scenarios reflecting short-, medium-, and long-term time horizons.

Transition Risks:

The risks to investment portfolios that may occur as investments in carbon intensive industries, such as energy, power generation, and coal mining, move to investments in energy efficient producers. Transition risks arise from society's transition towards a low-carbon economy, driven by policy and regulations, low-carbon technology advancements, and shifting sentiment and societal preferences. Transition risks can lead to "stranded assets," investments in carbon intensive industries held on the company's balance sheet that are expected to be worth less in the future. The International Energy Agency, an international intergovernmental organization, is projecting that demand for coal, oil, and gas will drop significantly between 2020 and2050, resulting in a dramatic reduction in the fair value of companies with carbon intensive asset values over the long term.

Resources

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