



# ACC discussion paper 2

## Applying insurance solvency skills to climate solvency: How actuaries can step up to the climate emergency

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*This discussion paper was issued in June 2021. It was reviewed by Louise Pryor and other members of the [Actuaries' Carbon Collaboration](#)*

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## Introduction

This article proposes how actuaries should use their unique skills to help tackle the climate emergency. Extending the actuarial remit to a field in serious need for professionals on whose conduct the public relies should boost the actuarial profession's relevance in the context of rapidly changing global risk priorities.

## Secondary climate change hazard

Putting aside the problem of the climate emergency itself, the rapid acceleration of the climate threat and lack of rigorous coordinated government decision-making and regulation has created the secondary hazard of understating emissions and overstating the benefits of the innumerable responses to the emergency.

A key culprit is the lack of regulation of greenhouse gas (GHG) accounting practices that underpin measures to mitigate GHG emissions<sup>1</sup>, for example in carbon pricing for global carbon market trading in credits and offsets. This reduces the efficacy of these measures and attracts accusations of greenwashing. The erosion in public confidence in such measures also makes it harder for governments to set a carbon price through mechanisms such as carbon quotas and tax.

GHG emissions accounting forms the bedrock of climate solvency – a concept which we define below. We then argue that accounting for and managing climate solvency is in many ways similar to managing insurance company solvency. Because actuaries play the key role in the latter, they are top candidates for a central function in the former. Actuaries should not hesitate to step up to this role.

## Solvency and insurers

Solvency requires a capital buffer to keep the probability of failure at an acceptable, predetermined, level.

An insurer fails when its assets fall below liabilities. Insurer insolvency can lead to a dangerous (from a policyholders' viewpoint) chain of events, starting with the company's owners walking away (as the value of their ownership becomes negative), policyholders moving their business elsewhere and a cessation of new business.

Solvency of the whole insurance sector is as important as that of individual companies. A systemic shock can lead to contagion: large-scale withdrawal of business by policyholders and, in the extreme, industry failure and possible socioeconomic damage. To support prevention of such an industry tipping point event, insurers are required to hold additional assets above their liabilities.

## Climate solvency

The IPCC's Special Report "Global Warming of 1.5°C"<sup>2</sup> assesses the potential impacts of an average global warming of 1.5°C and 2°C on climate, human and eco-systems. Higher global temperatures increase the probability of these systems crossing tipping points, defined in this context as "thresholds beyond which certain impacts can no longer be avoided even if temperatures are brought back down later on." The socioeconomic consequences from 1.5°C and 2°C warming considered in the IPCC report make for a sobering read.

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<sup>1</sup> The Guardian newspaper, 3 March 2021, "The climate crisis can't be solved by carbon accounting tricks"

<sup>2</sup> <https://www.ipcc.ch/sr15/>

Just as insurance sector solvency is defined in terms of the managing the likelihood of industry failure (a tipping point), so the need to manage climate-related tipping points forms the basis of defining climate solvency.

Climate solvency requires a global temperature buffer to keep the probability of failure —crossing one or more tipping points — at an acceptable, predetermined, level. Notably, governments could bail out insolvent insurers, but, since climate-related tipping points are deemed largely irreversible, government bailout at the point of climate insolvency is not possible.

Failure to maintain climate solvency is not an option.

Defining and measuring climate solvency is a leap up in complexity from insurance solvency. It requires global consensus on risk appetite expressed for example as the likelihood of a number of tipping points being reached. It requires global agreement on that representative basket of tipping points, and which takes priority. It requires global collective acceptance of a climate 'accounting standard': the stochastic models used to link GHG concentrations with temperature and the behaviour of the aforementioned systems.

Public acceptance and consensus require trust in those carrying out the calculations. Those carrying out climate solvency calculations must conduct them to the highest standards possible.

## Accounting and actuarial concepts: insurance vs. climate

Strong conceptual parallels can be drawn between existing accounting and actuarial concepts in managing risk in the insurance industry and those required to do the same for the global climate.

Some examples of these parallels:

- Just as future asset and liability flows are quantities to be valued to determine the balance sheet of an insurer, GHG emissions and absorption must be valued to determine the atmospheric GHG balance sheet. Evaluating climate solvency will most certainly operate up to the highest level of aggregation (i.e. global) and across the complete breadth of GHG emitting entities.
- Universally agreed upon methodologies and expert modelling are needed to predict and manage the timing and size of these financial flows, represented in applications such as ALM. Similar – or, arguably, greater, given the risk – rigour is needed to predict and manage timing and size of GHG emissions to and absorption from the atmosphere.
- Tools such as discounting and risk capital are used to account for and manage risk in insurers to acceptable levels. Carbon discount rates and climate risk capital should be similarly be used to plan actions and manage climate risk.
- Consensus on standards that are consistent, transparent and comparable, and their inclusion in regulation, underpins public trust for them to engage with insurers. To encourage public engagement with GHG management, similar rigour is needed in the standards underpinning future climate regulation.

## Key role for actuaries

Actuaries are heavily involved in determining the solvency position of insurers, and it is normally an actuary who is responsible for formal opinions on solvency.

There is currently no such position for climate solvency.

The close conceptual parallels between insurance and climate solvency point to a clear opportunity for actuaries — who already oversee and sign-off many aspects relating to the solvency management of insurance companies as a core competency — to be suitably up-skilled take on a central role in the solvency management of the global climate.

## Becoming pioneers

To date actuaries' involvement in climate change initiatives has primarily concentrated on modelling physical, transition and liability risks and their impact on insurance and other financial company balance sheets – the natural habitat of actuaries. This work remains important.

However, in this article we argue that it is time to use our deep and wide insurance expertise as a springboard to the field of GHG accounting and climate solvency. Actuaries could and should play a key role with other professionals including climatologists, economists, engineers and scientists.

Insurer solvency is underpinned by highly developed means of financially representing demographic, financial and consumer-behaviour; climate solvency will require actuaries to be more comfortable with a very wide range of much less clearly defined stochastic processes. There is a strong case for extending actuarial training – via optional syllabus modules or structured CPD – into climate change modelling, accounting and certification.

The IFoA is working towards expanding professional skills among actuaries to new domains of sustainability including climate change<sup>3</sup>, and is a founding signatory of the Green Finance Education Charter<sup>4</sup>. Graunt, Halley and Dodson pioneered work in the 17<sup>th</sup> and 18<sup>th</sup> centuries that led to innovations in premium and solvency accounting for insurers. We are again at a point where such pioneering work is required for GHG accounting and climate solvency. We have far less time than they did.

Let's not waste this opportunity.

## How can you get involved?

The Actuaries' Carbon Collaboration was set up in January 2021 as a platform for research and action on climate change. Working parties have been set up around themes for action, including:

- Minimum climate solvency
- The impact of time
- GHG discounting
- Carbon offsets and emissions trading
- Carbon tax
- Carbon accounting for large construction and infrastructure projects
- The removal of carbon from the atmosphere

Contact Louise Pryor or Roelof Coertze of the Actuaries' Carbon Collaboration (<https://carbon.ifoagroups.org.uk/>) and support the topic groups that have already started producing initial thought pieces and planning in-depth research with the aim of rapidly producing methodologies and applications for deployment in the real world.

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<sup>3</sup> <https://www.actuaries.org.uk/about-us/reinventing-profession/learning-change-programme>

<sup>4</sup> <https://www.greenfinanceinstitute.co.uk/green-finance-education-charter/>