Catastrophe and Climate

SOA Research Institute

Research Program Newsletter

Sponsored by the SOA Catastrophe and Climate
Strategic Research Program Steering Committee

December 2021

CONTENTS

2021 Wrap-up

By Priya Rohatgi, ASA

With this Bonus edition of the Climate Committee Newsletter, we conclude the year 2021. Though the numbers are still being tallied and it may take few months before we can get actuals but the preliminary estimates reported by Swiss Re and the infographics based on Aon's Catastrophe Insight Database, both indicate that 2021 was another year of record devastation. The global insured losses due to Natural Catastrophes surpassed once again the $100 billion dollar threshold with the ever-widening protection gap. Globally we experienced various natural calamities at their extremes. The critical physical attributes such as temperatures, level of evaporation and precipitation, soil moisture, wind speed and others reached levels that were once unthinkable.

The unprecedented December Tornadoes left a trail of destruction across eight states. The National Weather Service has confirmed 165 combined tornadoes from the outbreaks of Dec. 10-11 and Dec. 15, including a pair of long-track EF4 tornadoes, shattering the previous December record of 99 in 2002. Incredibly, the December tornado count from these two outbreaks nearly matched the preliminary totals from April (73) and June (110) combined, typically two of the three most active months behind May.[1]

The relationship between climate change and tornadoes is yet to be fully understood but as meteorologist Harold Brooks, at the US National Oceanic and Atmospheric Administration (NOAA), says – “The increasing amount of tornado clusters clearly implies that the patterns of the atmosphere have changed"[2].

The new year has already given us a preview of the challenges that lie ahead in 2022. The urban wildfires of Colorado and floods in Malaysia are a grim reminder of the urgent need to adapt and to mitigate such risks.

The challenges are immense and warrant a concerted global effort. COP26 (the 26th Council of the Parties (COP) meeting) commitments to working together towards a more sustainable, resilient and emission free future are a great start. But they need to be followed up with action and accountability.

The role of the insurance industry is multi-faceted and can play a significant role in changing consumer behavior and industry by appropriately underwriting risk and emphasizing sustainable investments.

Actuaries are increasingly adopting the multi-disciplinary paradigm - to collaborate and work with climate scientists to make our models more robust by leveraging the tools, techniques and data developed elsewhere. In conjunction, many are following the remediation impact of innovative technologies and sustainable solutions that will allow our urban environments to adapt and thrive, so we can properly reassess the changing risk profile of such exposures.

There is also the realization of a shared responsibility, at the individual level, as we are the demand creators and the drivers of what is produced, consumed and ends up as waste. The world is moving towards a circular economy, which requires shift in mindsets and in our current way of living.

In this edition, we share thoughts expressed by some of our committee members, links to articles/opinions presented by other actuaries and experts on the outcomes of COP26 with implications for the insurance industry

[1] https://www.noaa.gov/news/december-2021-tornado-outbreak-explained
[2] https://www.bbc.com/news/59641376

and actuarial profession as a whole. Also, we have curated a thought-provoking series of webinars and podcasts you may find interesting.

Last but not the least, we would like to direct you to the two winning submissions for our "From 9/11 to COVID-19: The Unthinkables", call for essays request that are now available on the SOA website (links below).

We hope that these resources will better equip you to identify the opportunities in the challenges that lie ahead. We thank you for your readership. As ever, we would love to hear your thoughts and suggestions. Please email us at Research@soa.org

Stay healthy and safe. Happy New Year!

Points of view: COP26 and its implications on the actuarial profession

COMMITMENTS - WHAT NEXT?

Sam Gutterman, FSA

In the run-up to the 26th Council of the Parties (COP) meeting held in Glasgow, there were numerous announcements of enhanced Nationally Determined Contributions (NDCs, commitments by the Parties, that is, national governments) to reduce their greenhouse gas emissions. At the Glasgow meeting, further enhanced NDCs to be made in 2022 were called for, even though, according to the Paris Agreement of 2015, such enhancements were not due for five years. In fact, several national governments, such as the United States and Australia, subsequently indicated that they will not update their NDCs in 2022.

Given the expected continued increase in greenhouse gas emissions and consequential changes in climate, it would be great if more aggressive NDCs were announced by all countries, for current NDCs are not expected to be sufficient to reach the long-standing global goal of 2 o C, let alone 1.5 o C, over pre-industrial levels, an aspirational goal set in the Paris Agreement.

"Net-zero" commitments have proliferated among both governments and private sector businesses (for example, corporate members of the Net-Zero Asset Managers Initiative have all committed to reaching this goal).

However, my immediate concern lies more with the challenges associated with reaching the current NDCs than with further enhancements to existing commitments. The rather vague current plans of some countries, along with recent backsliding, regarding how they will achieve their commitments have raised some skepticism about whether even these will be met. Will there be sufficient political will to overcome resistance and be willing to disperse the rather large financial resources needed? And there will be resistance!

Indeed, it is painless for current politicians to set forth aspirational goals for 30, 40 or 50 years in the future. Even when well-intentioned, few current politicians will be around in, say, 2050, 2060 or 2070. In my view, it is more important for the public and private sectors to develop and to immediately begin implementing transparent and monitorable mitigation and adaptation action plans to ensure that current NDC targets will be met and to overcome this skepticism. Talk and long-term 'commitments' are cheap and easy – action may not be.

Once realistic and detailed implementation plans have been established and are transformed into concrete actions, more aggressive and realistic short and long-term commitments can be enhanced. Those who commit to long-term objectives need to take responsibility to help ensure that financing and technologies will be in place to achieve them, through measurable intermediate goals. Only through such monitorable actions will key Paris Agreement goals be realized.

December 14, 2021, by Sam Gutterman – an elaboration of a Letter to the Editor of the Financial Times, published November 25, 2021

COP26 – TAKEAWAYS

Max J. Rudolph, FSA, CFA, CERA, MAAA

The window to modify the path of climate change is still open, but closing fast, so every meeting of the world's political leaders that doesn't seem to move us forward seems especially painful. The Glasgow event, held in November 2021, was frustrating as the primary outcome seemed to be an agreement to plant trees. A recent paper in the SOA Environmental Risk Series[3] shared a number of ways such a simple solution could go wrong.

At this point even leading practices are being manipulated. Here are a few random observations that make me think we will be lucky to avoid a Mad Max scenario for some regions.

- The Task Force on Climate-related Financial Discosures (TCFD) disclosure requirements are self-reported and not audited. There is little transparency. It reminds me of the early days of Enterprise Risk Management (ERM), when those professing their skills put out press releases that were later shown to be fraudulent. I recently saw an announcement that the head of sustainability for a company had recently been the head of investor relations. This is not a good sign. Sustainability can't get lost in a marketing umbrella or with spin doctors.

- The bare minimum should be a world-wide carbon tax to properly align incentives. Given that the world's developed countries recently set global minimum tax rates, this does not seem like too much to ask. Each time we extract fossil fuels from a stable home below the earth's surface we are taking out a loan against the use of the earth's resources that must be repaid. This debt is growing quickly and will make solutions much more challenging.

- Focus should move to researching engineering solutions for carbon capture and away from pure science. The pure science is important, but we already know what the problem is. Better batteries, perhaps those that don't use rare earths, are going to be necessary even if we move to electric vehicles. What I don't mean is cloud seeding and other solutions with unintended consequences.

- Company sustainability practices are not a Boolean variable. They fall on a continuum between good and bad practices. Examples of confusion include lithium miners (needed to make EV batteries but hard on the environment) and Berkshire Hathaway (gas pipelines and railroads that haul oil against renewable energy generation and a major electrical grid investment).

- We seem unaware that we are growing emissions at an exponential rate. Millennials seek out examples of yes/no environmental villains, where companies are bad and people like them are innocent pawns. Individuals need to be held accountable for their own emissions. Until that happens, we will see the internet of things explode while using electricity sourced from coal. I see electric cars all the time that generated huge emissions to build and use coal to recharge. I struggle to see how this is substance rather than style.

- Dr. Samantha Montano, in her book *Disasterology,*[4] notes that the US government struggles to manage one disaster at a time and is severely stressed during multiple events. Thanks in part to climate change, we are moving to a world where catastrophes are common and we are not going to be able to deal with

[3] https://www.soa.org/globalassets/assets/files/resources/research-report/2021/fire-hazard-risk.pdf

[4] Montano, Dr. Samantha. *Disasterology*. Park Row Books. 2021.

> simultaneous wildfires, hurricanes, earthquakes, tornados, civil unrest, flooding, not to mention the unraveling of democracy. Add to this a debt well over 100% of GDP and corporate leverage just as bad. Where will the money come from? Historically countries have created deficits during wartime and surpluses during peacetime, but voters today elect those who will promise (and deliver) benefits with no cost to them. I would be more worried about a war if other countries were more financially conservative.

This essay continues a series I have written over the last several years with a common theme of personal responsibility. This doesn't mean building your own bunker for the end days, but we need to better understand our own role in today's situation and how we can be part of the solution.

My greatest concern post-Glasgow is that people don't understand the magnitude of the problem. We need to convert our current sources of electricity away from fossil fuels to renewable energy PLUS convert all machines that run on fossil fuels to electricity which need renewable energy PLUS account for growth using renewable energy. My first question for a sustainability survey would be – what are you doing to increase renewable energy locally, nationally and internationally? If you don't have a good answer, then you don't have a sustainability program.

Additional thoughts…

Listed below are the links to articles and opinion pieces that we came across on the topic and wanted to share in case you missed.

COP26: Actual climate change success or a lot of hot air? *Nov 16, 2021*
David Thomson, Head of Policy and Research at the IFoA, rounds up some of the key takeaways from the COP26 UN Climate Change Conference and what it might mean for the work of the IFoA and the actuarial profession.
https://blog.actuaries.org.uk/blog/cop26-actual-climate-change-success-or-lot-hot-air

COP 26 Roundup *Nov 17, 2021*
https://www.theactuary.com/news/2021/11/17/cop26-roundup

Climate reflections – what do all the climate pledges actually mean? *Nov 20, 2021*
https://actuarialeye.com/category/climate-change/

Rising to the COP26 challenge *Dec 01, 2021*
https://www.theactuary.com/features/2021/11/29/rising-cop26-challenge

What is next for insurers on climate after COP26? *Dec 10, 2021*
So, what can insurers be doing in the shorter term to get prepared and to capitalise on climate-related opportunities. For this article, we've extracted six areas of priority action and investigation/investment that we believe will benefit insurers over the next year and beyond – as, really, the time for talking is over.
https://www.willistowerswatson.com/en-US/Insights/what-is-next-for-insurers-on-climate-after-COP26

How a passion for sustainability put me on the world stage *Dec 13, 2021*
https://actuaries.blog.gov.uk/2021/12/13/how-a-passion-for-sustainability-put-me-on-the-world-stage/

What Do the Outcomes of COP26 Mean for Insurers? *Dec 15, 2021*
"This article summarises climate-negotiation developments and ongoing challenges under seven key areas: politics and policy; finance; climate risk assessment and reporting standards; climate-related regulatory actions and capital

requirements; technology for transitioning; building community resilience including the role of nature-based systems; and carbon trading markets, offering important insights on the implications for insurers."
https://www.genevaassociation.org/news/articles-interest/COP26-insurers

Webinars/Podcasts

Impacts of Climate Change on Investors
SOA Research Institute

"The earth's ecosystem appears to be leaving the 10,000-year Holocene epoch that featured a stable environment. For homo sapiens, this stability encouraged a move from hunter/gatherer to farming and urban lifestyles. The new period showcases climate risk, resulting in higher temperatures and more extreme weather. These conditions lead to greater exposures to properties and economies when events like hurricanes and wildfires occur"[5].

https://SOA researchinsights.libsyn.com/impact-of-climate-change-on-investors

Future Urban Risk Landscapes and the Role of Insurance |Webinar recording
The Geneva Association

"The high concentration of people and economic value in cities amplifies the loss potential from urban risks, meaning cities have a bigger need and scope for insurance than rural areas. This includes both personal lines and commercial insurance. With the rise of city-level risk management, insurance is also set to become more relevant to urban risk mitigation strategies."[6]

https://www.genevaassociation.org/future-urban-risk-landscapes-and-role-insurance-webinar-recording

Disaster Protection
The Institute and Faculty of Actuaries, (IFOA)

This episode focuses on Disaster Protection with Daniel Clarke from the Centre for Disaster Protection. Shyam Gharial explores how Daniel's work is linked to many of the SDGs, including climate change, inequality, decent work, partnership for goals, and how an actuarial skillset can be utilised in this area of work.
https://audioboom.com/posts/7930201-6-disaster-protection

Future-Proofing Technological Innovations for a Resilient Net-Zero Economy – What can the insurance industry offer?|Recording
The Geneva Association

This was a high-level conference co-hosted by The Geneva Association and Organisation for Economic Cooperation and Development (OECD). The discussion focused on the technological innovations necessary to accelerate decarbonisation and achieve climate targets and the key role of the insurance industry in supporting those innovations.
https://www.genevaassociation.org/future-proofing-technological-innovations-resilient-net-zero-economy

[5] https://www.soa.org/globalassets/assets/files/resources/research-report/2021/2021-impact-of-climate-change-on-investors.pdf
[6] https://www.genevaassociation.org/sites/default/files/research-topics-document-type/pdf_public/futureurbanrisk_summary_web_2021.pdf

Fix the economy to fix climate change: the role of the circular economy
We cannot fix climate change unless we transform the whole economy. The circular economy is a key part of the solution to tackle climate change and to fulfil the objectives set out in the Paris Agreement.
https://www.youtube.com/watch?v=OeyXzRvL6Jo

Allied for Climate Transformation By 2025, ACT2025 Podcast
World Resources Institute

The ACT2025 Podcast is a new WRI miniseries looking at what's needed to secure ambitious, just and equitable outcomes at COP26 and beyond, especially for climate-vulnerable countries. Listen to episodes below — or learn more about ACT2025.

https://www.wri.org/initiatives/allied-climate-transformation-act2025/act2025-podcast

From 9/11 to COVID-19: The Unthinkable – Winning Essays

MORTALITY: WELL-BEHAVED, CHAOTIC OR UNPREDICTABLE?

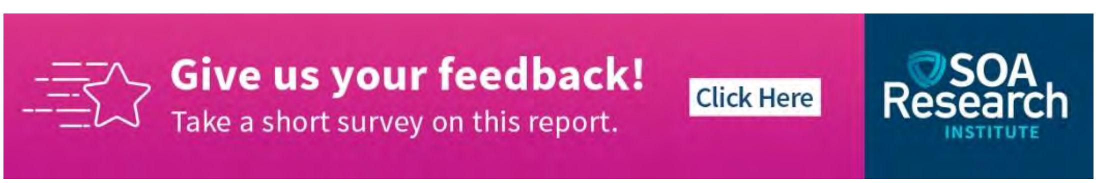
By Sam Gutterman, FSA, FCAS, CERA, MAAA, FCA, HonFIA

https://www.soa.org/globalassets/research-report/2021/unthinkables-essay-gutterman.pdf

FROM 9/11 TO COVID-19: THE UNTHINKABLES ESSAY

By Max J. Rudolph, FSA, CFA, CERA, MAAA

https://www.soa.org/globalassets/research-report/2021/unthinkables-essay-rudolph.pdf



About the Society of Actuaries Research Institute

Serving as the research arm of the Society of Actuaries (SOA), the SOA Research Institute provides objective, data-driven research bringing together tried and true practices and future-focused approaches to address societal challenges and your business needs. The Institute provides trusted knowledge, extensive experience and new technologies to help effectively identify, predict and manage risks.

Representing the thousands of actuaries who help conduct critical research, the SOA Research Institute provides clarity and solutions on risks and societal challenges. The Institute actuaries, academics, employers, the insurance industry, regulators, research partners, foundations and research institutions, sponsors and non-governmental organizations, building an effective network which provides support, knowledge and expertise regarding the management of risk to benefit the industry and the public.

Managed by experienced actuaries and research experts from a broad range of industries, the SOA Research Institute creates, funds, develops and distributes research to elevate actuaries as leaders in measuring and managing risk. These efforts include studies, essay collections, webcasts, research papers, survey reports, and original research on topics impacting society.

Harnessing its peer-reviewed research, leading-edge technologies, new data tools and innovative practices, the Institute seeks to understand the underlying causes of risk and the possible outcomes. The Institute develops objective research spanning a variety of topics with its strategic research programs: aging and retirement; actuarial innovation and technology; mortality and longevity; diversity, equity and inclusion; health care cost trends; and catastrophe and climate risk. The Institute has a large volume of topical research available, including an expanding collection of international and market-specific research, experience studies, models and timely research.

Society of Actuaries Research Institute
475 N. Martingale Road, Suite 600
Schaumburg, Illinois 60173
www.SOA.org